

**Lake Champlain Basin Program
Technical Advisory Committee meeting
Wednesday, May 1, 2024, 9:00 AM – 11:30 AM**

Held remotely via Microsoft Teams

Approved TAC meeting summary

TAC Members: Jennifer Callahan, Ryan Cunningham, Laura DiPietro, Bryan Dore, Laurie Earley, Michele Fafette, Neil Kamman, Steve Kramer, Margaret Murphy, Bridget O'Brien, Helen Polanco, Andrew Schroth, Daniel Tremblay

LCBP + Lake Champlain Staff: Mae Kate Campbell, Corrie Miller, Meg Modley, Matthew Vaughan, Sarah Coleman, Sarita Croce, Theresa Vander Woode

Guests: Colette Ward, Kim Jensen, Marli Rupe, Dave Minkoff, Jacob Fetterman

1. Updates, announcements, public comments

- Daniel (MELCCFP): I'd like to introduce my colleague, Colette Ward. Colette will be helping on Lake Champlain and Memphremagog work.
 - Colette (MELCCFP): I will be joining the TAC meetings. I am newly with the Ministère de l'Environnement, de la Lutte contre les changements climatiques, de la Faune et des Parcs (MELCCFP) and I will be working on Lake Champlain and Lake Memphremagog issues. I was previously with Fisheries and Oceans Canada, my background is in community ecology and how foodwebs respond to changing environmental conditions.
- Margaret (VT FWD): Sampling is ongoing in Otter Creek. We have been stocking walleye there - not historic habitat, but we've observed spawning happening there.
- Bryan (EPA): The Environmental Protection Agency (EPA) released our report card for Lake Champlain Total Maximum Daily Load (TMDL) implementation progress. We were glad to sit down with the Vermont Department of Environmental Conservation (DEC) and go through the implementation report - there is a high rate of projects being implemented.
- Sarah (VTDEC): The Clean Water Conversation Series webinars have been announced for the spring and summer.
- Neil (VTDEC): The VT general assembly is wrapping up their work for this session. There is a healthy budget coming along that will support the Agency's work.
- Laura (VAAFAM): I was just selected to be on the National Animal and Agriculture committee for EPA to look at concentrated animal feeding operations (CAFO) farms. Looking forward to it.
- Matt (LCBP): We hosted the Lake Champlain Steering Committee meeting in April - the main focus was to approve the full fiscal year 2024 budget. The budget was approved, totaling nearly \$35 million dollars. The recommendation you made for the research projects was accepted by the Steering Committee. There will be significant investment in

Clean Water and Healthy Ecosystems implementation and planning projects as well. The Steering Committee approved funding to develop a pre- and post- flooding water quality sampling project. We may reach out to TAC members to help us develop that program. Senator and Mrs. Patrick Leahy joined us for a bit. The *State of the Lake* report will be released on June 5th; we will not have a TAC meeting that week. The release will feature guest speakers and our staff will highlight the four sections of the report. Our team is also talking about putting together the next Lake Champlain Research Conference. If you have input on the timing, let us know.

- Meg: We are working hard with the Lowell office to hire 20 boat launch stewards and get equipment mobilized. Field season will kick off in 2 weeks with a 2-week training program. Our region is hosting the national aquatic nuisance species task force in Saratoga, NY, highlighting the work on the Champlain Canal. Quebec waterways and Parcs Canada will be hosting us for a tour of the St. Ours Dam on the Richelieu River on June 18th.

Review and approve summary of previous TAC meeting

Motion: To approve the summary from the April 2024 TAC meeting

By: Jenn

Second: Margaret

Discussion: Neil noted one minor correction.

Vote: All in favor

2. Interim report and workplan: Water chestnut Management Program (Kim Jensen, VTDEC)

- Meg provided an overview of the water chestnut management program, an LCBP core project. Kim will provide an update on the previous year's harvest and the workplan for the upcoming year. Kim does an enormous amount of work to coordinate this program. It's a huge success story and will continue to be successful as long as consistent efforts to manage water chestnut are continued. It requires robust inter-jurisdictional collaboration.
- Kim shared a presentation. 2023 was a tough season due to the July flooding, early-season seeding, high plant volume, and challenges with staff and crew turnover. Some sites, like the La Chute River, saw huge increases in population this year. Total rosette hand-harvesting numbers were similar to 2022. New satellite populations were identified in Dead Creek and Gander Bay. In the 2024 field season, a new contractor will be brought on to focus on hand pulling operations in the northern lake.

Questions and Discussion

- Ryan C: There's a lot of water chestnut in Oswego and the canal area in the western area I cover. They have New York State Department of Environmental Conservation (NYSDEC) permission to use herbicide and have used drones to apply them - it's been a great success. Has that been considered for this program?
 - Kim: Vermont is not keen on using herbicides. We've been challenged in legal proceedings and almost had a moratorium on use of any herbicides.

- Michele: In your experience, which mechanism has been more successful - hand-pulling or mechanical?
 - Kim: Mechanical harvesting is used in areas with high water chestnut coverage. Hand pulling operations are used in smaller population sized areas and places where access with the mechanical harvester is more difficult.
 - Michele: What about that bay you said was totally covered?
 - Kim: We would love to get a mechanical harvester in that area, but we would have difficulty launching the equipment there.
- Michele: You mentioned that people were having reactions to the water, do you know why?
 - Kim: I'm sure it was due to pollutants being washed into the water after the flooding. We stopped operations for 2 weeks following the flood events, and then encouraged the use of gloves.
 - Michele: Was any testing done to identify potential sources of this reaction?
 - Kim: No, it was not feasible.
- Meg: The US Army Corps of Engineers (USACE) has funded the mechanical harvesting for many years. They asked an environmental consulting firm to do an assessment of the program and that report is forthcoming. It's great to see that investment of resources in this long-term program.
- Neil: Amazing work, thank you. I noted you flagging the turnover issue, I know other offices that contribute to this program experienced that issue as well.

3. Informational presentation: Regional Conservation Partnership Program (RCPP) Work (Marli Rupe, VTDEC)

- Neil: Marli is our agricultural programs lead in the Water Investment Division. She will be reviewing implementation in the agriculture and forestry space that Marli helps coordinate.
- Marli: This program is managed by DEC but it is an enormous partnership.
- Marli shared a presentation. Marli reviewed the history of the RCPP in Vermont, the types of projects that are eligible through that program, and recent initiatives.

Questions and Discussion

- Theresa: Can you say more about the social assessment component of this 3rd RCPP program?
 - Marli: It will be part of this next RCPP, but we have not signed that agreement yet so it's a project in progress. We anticipate starting that planning process more robustly in 2025.
- Ryan C: There was some RCPP money in the Champlain watershed on the NY side years ago. We do have state programs working on easements and I noted the challenges you spoke to. Where are there successes with that? We have farms who are eligible but it's hard to get an agency to hold the easement.
 - Marli: The state developed a wetland incentive program which is a major part of our work on RCPP. There's a calculator for wetland and river corridor easements that factors in location, level of hydrologic restoration, target watershed area, and it provides an incentive payment on top of the RCPP payment, which has made a

big difference. Investing technical assistance in developing projects and building relationships with landowners has made a big difference also.

- Margaret: How do we link fish and wildlife needs to these conservation projects?
 - Marli: One of the Natural Resources Conservation Service (NRCS) processes we've been doing under RCPP is strategic woody additions. Buffers and riparian restoration projects are also a focus.
- Neil: Are there discussions happening to ensure that RCPP can do its work in a way that won't compete with other funding programs like the Clean Water Service Providers (CWSPs), LCBP, the Clean Water fund, etc.?
 - Marli: We think about this constantly. LCBP has brought lots of value to the RCPP process with matching funds for some projects. The main way to handle this issue is to stay in touch with partners – the Vermont Agricultural Water Quality Partnership (VAWQP) has been a great pathway for coordination. One suggestion is to put together a flow chart of different funding programs. Technical assistance is so important, having folks familiar with the different funding streams to point interested landowners in the right direction is critical. We are fortunate to have lots of funding available right now, but coordination is so important.
 - Matt: I agree that VAWQP has been great in this space, and has matured as these increased funding streams have come online.
 - Marli: In the next RCPP, working with folks who haven't traditionally been as big a players in the land conservation space will be helpful.
 - Matt: We don't restrict applicants from going after multiple sources of funding for the same project and can adjust depending on when/where it gets funded.

4. Informational presentation: Aquatic organism passage restoration on the lower Saranac River (Dave Minkoff, USFWS; Jacob Fetterman, Trout Unlimited)

- Corrie Miller introduced David and Jacob. Corrie is working on managing EPA Bipartisan Infrastructure Law (BIL) funded aquatic organism passage (AOP) projects and coordinating aquatic organism passage and dam removal working groups. The Nature Conservancy (TNC) was the first recipient of the EPA BIL funded resources.
- David reviewed completed and planned dam removals on the Lower Saranac River, NY. He provided context on the history of Atlantic salmon, the rationale for constructing dams in the late 1800s and early 1900s, and the potential to restore aquatic organism passage in the Saranac through a combination of dam removals and fish ladder additions.
- Jacob reviewed the dam removal design and construction process. Geomorphic surveys were completed, and instream structures were documented to quantify the amount of debris that needed to be removed. SLR produced design plans, created existing conditions maps, and coordinated the sequential removal process plans. The excavators removed steel A-frames. Drone imagery was collected pre and post removal. Additional surveys were needed to document ancillary structures at Indian Rapids. SLR created similar plans and maps to document plan view for construction. Stream bank restoration is underway.

- David wrapped up to note that work is still in progress, but in a few years the goal of fish being able to pass upstream for the first time since the Revolutionary War should be achieved. Biological water quality and fish habitat monitoring are planned.

Questions and Discussion

- Neil: How much do you all love your jobs? This is very cool work. You showed two elevation plans - is that a function of the river incisions because you are changing river morphology?
 - Jacob: No, it was more a measure of finer sediment that was retained upstream. The bed of the river is more bedrock and boulders.
 - David: There was a minimal amount of sediment that was removed to help build up the bank at the former powerhouse site. Some days of doing this work are great, and others are not so great. There are a lot of factors that have to fall into place to achieve these goals.
- Matt: In the 2021 *State of the Lake* report, we developed a map to show the historic and accessible habitat for landlocked Atlantic salmon. We will be highlighting this dam removal work in the 2024 report.
- Andrew: As we see warming water temperatures, does the US Fish and Wildlife Service (USFWS) use climate change models to help prioritize restoration efforts?
 - David: Projects that increase fish passage are important to climate change mitigation efforts. Getting rid of barriers allows fish to access thermal refugia in colder water headwaters. USFWS works a lot with brook trout and similar partners using climate change prediction models. Even with BIL funding, we are not scratching the surface of the number of dam removals that are needed to meet both habitat and climate resilience work.
 - Laurie: There are climate models that are incorporated into our assessments that support AOP work and in prioritizing which projects should be undertaken first. With a focus on the Saranac, Bouquet, and Winooski Rivers, we are hoping to move forward with climate resilient projects first. Remote sensing projects will also help us target cold water refugia.
 - David: Victory lap presentations like these are fun, but they don't show the 4+ years of work that happened before the project went to implementation, including an enormous amount of assessment work undertaken by numerous collaborative partners. Using climate models is a critical part of that.
- Neil: To what degree did the NY State Historic Preservation Office engage with this work and establish requirements?
 - David: Neither of those sites were considered historically significant, interestingly. We worked with those contacts, shared plans, and they confirmed our path of action. Since the structures were already so degraded, they were not considered to have historical value. In my experience, there is less oversight generally in NY than VT when it comes to historical preservation requirements.
- Neil: Is the design for the fish ladder complete?
 - Dave: There have been designs shared back and forth from USFWS and NYSDEC, and NYSDEC is leading that.

5. Discussion: Review of draft 2024 State of the Lake Report graphics (LCBP staff)

- Matt recapped the idea for an infographic to explain the concept of legacy phosphorus. Ryan reviewed the graphic concept.
- Andrew: The wording on the top might be a little awkward. How do you lay out the concept of legacy phosphorus (P) in the text? What's not coming out of here is that the sediments are more naturally enriched in P than they would be because of the legacy of watershed loading.
 - Matt: We decided to focus on the topic of P from watershed loading.
 - Andrew: You could tweak the text to say something about sediment becoming enriched in P.
 - Matt: Or something like that the sediments have more P due to human activities.
 - Neil: Agree, the natural state is that P will accumulate in sediments over time. The issue is that we are accelerating that.
- Neil: Is this in context of the Northeast Arm or Missisquoi Bay?
 - Matt: In my mind, this illustration is more linked to a place like Missisquoi Bay. We don't specify the location though, as this graphic is supposed to communicate a general concept.
- Sarita: I was going to make the comment, I don't think this gets to the heart of the issues with legacy P. I don't think a layperson would look at this and understand it. Can we add information about turbid water? Sediments from the bottom are coming into the lake and creating this issue. I think more needs to be done here.
 - Neil: Interesting point, that note speaks to a slightly different dynamic in my view.
- Margaret: Given the details that we all know about this concept as technical experts – it's hard to make it simple. I think the P in the sediment, if you add more Ps to the graphic, shows legacy load. In the 2nd panel, more info on how P gets incorporated into the overall water column would be helpful.
- Neil: There are water bodies out there where you will always see low dissolved oxygen (DO) towards the sediment water interface, but that does not imply that they have a P concern. We don't want to conflate the idea that low DO deep water = internal loading.
 - Matt: Good points. This is talking about our shallow area, which comes in in the last panel. We have vertical migration of cyanobacteria, physical mixing. Even where there is mixing, we also need redox chemistry to release P. We are not trying to provide the most accurate diagram of how this works, we are trying to communicate a technical concept simply in a way that's not very wrong. It is going to be a little simplified and will not include all dynamics and all processes. Do you disagree with this being a main point? Legacy P is there, and the most important dynamic for its release is redox at the sediment water interface.
- Sarah: Margaret's idea about increasing P symbols might help to bring home the point. In terms of messaging, there's a part of me that wants to be able to compare what's happening in deeper areas to then understand why there's an important impact in the shallower areas. Could the last panel be split to compare the dynamic in shallow vs. deep areas? Or, at least changing the text in the bottom to say this dynamic is more impactful for cyanobacteria blooms in shallow areas would be helpful. With the blue text

at the top, I was associating it with the first illustration, but I realized the gray text beneath is associated with each part of the figure.

- Theresa: Great illustration! I like the simplicity achieved by showing chemical processes separately from other dynamics like mixing.
- Michele: I have a laundry list of how I would improve this diagram. It is not as good as it could be.
- Bridget: I think discussing legacy P is worthwhile. I wind up speaking to it a lot with folks who call. +1 for adding more P dots in the illustration.
- Andrew: Two thoughts. I wonder if you put something in the middle panel that illustrates mixing more than just arrows, like a circle? Then in the last panel you can articulate that subtle changes in wind can mix the entire system in shallow places. When I explain this to lay audiences, I use the spigot analogy or idea of a leaky boat to illustrate the problem of internal loading. Those analogies work well for general audiences and can be articulated in 2-3 sentences. Something that doesn't come out as clearly as it could in the current iteration is transient mixing. That dynamic is important in these shallow systems in the most important time of the year when it comes to blooms.
- Bridget: The middle panel begs the question of why when dissolved oxygen goes down does P get released?
 - Matt: We need to add the idea of respiration. If you have suggestions on ways to convey that, that would help. "When living things take up oxygen?"
 - Neil: You could say that oxygen levels vary naturally. When excess P is available, it can drive oxygen levels down, which can cause re-suspension.
- Neil: Beyond what Bridget said, this goes back to Sarita's comment of sediment re-suspension. You have anoxia, increased lability of P, then wind that disrupts more floccular sediment and creates more turbid water. It's part of this dynamic, maybe you could include it in the text?
 - Andrew: But that's getting into different mechanism of P release. In Missisquoi Bay there's not a lot of sediment re-suspension. I am unclear on if Sarita's comment referred to re-suspension or a plume of sediment coming into the bay.
 - Sarita: Turbulence is a huge aspect of everything. Articulating that in this figure makes it more clear.
- Neil: Publish it and see how it lands! If this causes a lot of confusion at the Resource Room, then we'll learn something.
 - Matt: Last *State of the Lake* we had a different more in-depth science topic we were focusing on (TN:TP ratio); we dropped that this year for flooding and legacy P info.
- Neil: It seems like adding more Ps and changing the Os in the figure would be helpful.
- Michele: I can submit all the changes I recommend after the report is done and ready for EPA review. First of all, I have no idea why the font up top is in blue and the rest is in brown. I don't think a layperson is going to understand that this is a cross section - that needs to be explained. A layperson isn't going to understand the stratification of the sediment layers. I don't understand why the green is that shade to represent vegetation. Why is the oxygen red or reddish orange instead of green? Green is generally positive, red is bad. Why is there only oxygen on the bottom? I would add a first panel showing

what a healthy lake would look like with oxygen everywhere, then would change the color used for P from purple to red. To convey the effect that P is leaving the sediment and going to the water, I would use a wavy line instead of a straight line and show P at the bottom going up. I don't think it's intuitive that green blob is a cyanobacteria bloom, that needs a label. Why are there tiny green dots in the middle of the water, I'm not clear? Why does the sun have part rays coming down? I would use wavy lines to convey energy coming from the sun. These are things I would change to make it simpler. We are technical people and can understand what the diagram conveys, but we need to look at it from the point of view of average person. They are not going to see things in the way we see them.

- Neil: interesting points. I didn't think about the point of stratification of sediment, good thought.
- Matt: The goal is certainly to convey this to a lay person. This is a bit of a reach topic, more complex. The *State of the Lake* report does have a range of topics of complexity, some things take a little longer to read/interpret and we shoot for a middle-school reading level.
- Sarah: Our team is developing information for the Clean Water Performance Report and are developing plain-language resources, including a 1-pager on legacy P.
 - Ryan: I would love to see that if it's available, thank you.
- Bridget: For the oxygen/respiration comment, maybe saying something like: "as plants and animals use up oxygen, there is less oxygen at the bottom of the lake near the sediment. This causes a reaction that can release phosphorus in the sediment into the water. Cyanobacteria can then access this phosphorus, and during sunny, warm and calm water conditions this can lead to blooms."