

Lake Champlain Basin Program
Technical Advisory Committee meeting
Wednesday, October 1, 2025, 9:00 AM – 12:30 PM
Meeting held remotely via Microsoft Teams

Approved TAC meeting summary

TAC Members: Jennifer Callahan, Sarah Coleman, Laura DiPietro, Bryan Dore, Brian Duffy, Michele Fafette, Karyn Hanson, Peter Isles, Neil Kamman, Steve Kramer, Margaret Murphy, Bridget O'Brien, Andrew Schroth

LCBP + Lake Champlain Staff: Mae Kate Campbell, Emma Janson, Corrie Miller, Meg Modley, Matthew Vaughan, Sonya Vogel, Erin Vennie-Vollrath, Colette Ward, Sarita Croce

Guests: Savannah Bailey, Meghan Arpino, Anne Jefferson, Andrea Stumpf, Karina Dailey, Kris Stepenuck, Mindy Morales, Kate Warner, Wade Ashton, William Bastian, Ben Luskins, Tim Koch, Dave Braun, Asim Zia

1. Updates, announcements, public comments

- Margaret (VTFWD): A portion of Hatchery Cove has been closed to fishing - it's been designated so salmon aren't caught as they are trying to head up the cove to reproduce. The press release is coming out today and there are barriers in place.
- Neil (VTDEC): Matt and I are heading to Lake Carmi after this meeting for a press event as the alum treatment is in full swing.
 - Brian: How long will the treatment take?
 - Peter: Close to 3 weeks, weather dependent.
 - Brian: Is that a single dose?
 - Neil: It is, at a slow rate.
- Matt (LCBP): Jamie sent me updates on the stream gage network. Recent/proposed changes to the VT stream gage network include:
 - Gage number 04282795 (LaPlatte R at Shelburne, VT) now has water temperature at request of Champlain Water District.
 - Gage number 04292201 (Lamoille River at Jeffersonville, VT) has been upgraded to publish stage and discharge (it previously was stage only).
 - Green Mountain Power has requested the addition of a stream gage in the headwaters of the Winooski River in the reach between Lower Cabot and Marshfield. This new gage will hopefully be installed this fall.
 - We will be discontinuing the publication of water temperature at gage number 04296000 (Black R at Coventry, VT) on October 1.
- Matt: The Research Request for Pre-Proposals (RFPP) has been released. Thanks to TAC for a productive meeting and follow-up to identify priorities for that RFPP. The RFPP was reviewed by the Steering Committee and the committee approved TAC's recommended priorities. Prep-proposals are due November 7th, and we will distribute

them to TAC to review in advance of the December TAC meeting. We will hold the December meeting in person at the Grand Isle office with a remote sign-in option.

- Lake Champlain Research Conference abstracts are due October 15th.

Buoy subcommittee to discuss Lamoille buoy placement

- Matt: Peter and I have talked about relocating the Lamoille tributary buoy. I'd like to ask for volunteers to see who's interested in discussing this further.
 - Peter, Andrew, Jamie, and Neil (optional) volunteered.
 - Matt: I will look at list from last time too.

Review and approve summary of previous TAC meeting

Motion: To approve the meeting summary from the September 2025 TAC meeting

By: Jenn

Second: Margaret

Discussion: Neil - Mercury conversation sounded really interesting

Vote: All in favor

Abstentions: Neil, Margaret

2. Workplan review: Wetlands Post-Dam Removal: Condition and Function (Savannah Bailey, Stone Environmental)

- Savannah shared a presentation. The project focuses on the relationship between wetland condition (hydrology, size, type, vegetation, and soils) and wetland function (nutrient removal, flood attenuation, habitat, water quality, plant communities), and the impact of dam installation and removal on these factors.
- Overall project goals/deliverables are to select post-dam removal sites with associated wetlands, identify nearby paired reference wetland sites, conduct a literature review to inform wetland function, collect data on wetland condition, conduct data analysis, and synthesize data and reporting.
- Outcomes: Improved understanding of the effect of dam removal on long-term wetland condition and function, more informed decisions in future dam removal and wetland restoration design.

Discussion

- Neil: Cool project. I see several questions and comments in the workplan document online.
- Steve: Are there any considerations for extended dry periods in terms of the scope of the project?
 - Savannah: That isn't something we'd considered when we put together this proposal. Part of the wetland delineation process is noting the climatic conditions and noting how that can influence wetlands. We'll consider these variables in the QAPP as well.
- Margaret: You are going to focus on dam removals in set year intervals, are you trying to get at least one per category?

- Savannah: At least one per category would be ideal. It will depend on the sites and reference sites that we identify and what's available.
- Margaret: Your fieldwork seems underbudgeted to me. You have 12 wetlands to look at, some are hikes. Will there be one or 2 people in the field?
 - Savannah: We budgeted for one.
 - Margaret: I recommend having two, it can be helpful to have another person in there to talk through issues with. Marcy Dam would be a cool site to consider - the dam failed, then it was removed, but because it's in the park, no other restoration was completed.
- Neil: Is there a size vs. removal limit?
 - Savannah: We haven't considered size as a factor yet. That's another variable to consider as we go into site selection. I imagine we'd want to have similar dams.
- Tim: It wasn't made as clear in the workplan that you're looking for sites that had a wetland pre-dam construction. Is the intent of this to see if removal restores the wetland to the pre-dam condition, or is it more that you build a dam, it creates artificial wetlands, and then what is the fate of those wetlands post-removal?
 - Savannah: Intention was to go back to sites where wetlands will persist after removal. If a dam creates wetlands and then they are gone after the dam is removed, we have nothing to compare.
 - Tim: Makes sense, but also wondering how accessible floodplains fit in? For instance, in the historic image you showed, it didn't look like there were wetlands, it looked more like a floodplain.
 - Savannah: We want to have accurate descriptions of land use over time and use that as a basis.
- Erin: For the PAC, there's interest in having a NYSDEC rep on the committee.
- Neil: To Margaret's point about an independent view on delineations. If you're working on projects in Vermont, the Wetlands program may be able to offer support.

Motion: To approve the workplan

By: Margaret Murphy

Second: Jenn Callahan

Vote: All in favor

3. **Workplan review: Dam Removal Impacts on Fine Sediment Erosion and Transport** (Dr. Anne Jefferson and Andrea Stumpf, University of Vermont, and Karina Dailey, Vermont Natural Resources Council)
- Anne, Andrea, and Karina presented their plan of work. The project seeks to characterize what happens when phosphorus and fine sediment is released into streams after dam removal, to better inform management decisions in dam removal work.
 - Project objectives:
 - Quantifying the volume of sediment and phosphorus (P) removed during and following dam removal
 - Characterize relationships between discharge, turbidity, suspended sediment concentration, total P, and soluble reactive P
 - Calculation of fluxes

- Monitoring sediment stabilization structures
- GIS analysis of potential sediment release impacts

Discussion

- Neil: There's several good comments and questions in the online version of the workplan. I'm curious about the monitoring of the in-stream structures (i.e. beaver dam analogs). Is that extendible, can you use what you learn there to actually model the impact of stream structures on other removals?
 - Anne: We may be able to provide more qualitative information. For example, if we see a lot of sediment building up on the upstream side of a structure, this has the potential to help us understand the impact of these structures. Are they good? Bad? Stable? I expect lessons learned, but I do not intend to have anything more than generalized hydraulic monitoring.
- Margaret: You are going to quantify the P and sediment, then calculate the load?
 - Anne: There has been a limited amount of probing of sediment depth to create the design plans for these dam removals and a very limited amount of P data collected to inform the design too. We won't necessarily have better information from this project about the amount of sediment and P stored in rivers due to dams. But just because we are not probing storage ahead of time, we will lean on the consultants and designers who have done some of that work. We won't necessarily be able to say how much is left behind, since we don't know how extensive the reservoirs are.
 - Margaret: Then I am confused at how you will look at erosion regarding where content is coming from like streambanks or in streams.
 - Anne: Our goal is to have the upstream and downstream sites as close to the impoundment as possible, to limit the expected inputs from streambank erosion.
- Margaret: What are you defining as a storm?
 - Anne: Always an interesting question. Storm events will be operationally defined as we are doing the work, since we can't predict the weather. It may be small rainfall events, but we do hope for at least a few large ones. We will likely end up sampling more than we have described here in the workplan, as additional events happen that we will want to capture. ISCOs are notoriously finicky, so we are also accounting for loss of samples. We are committing to sampling at least 6 events.
- Andrew: We have had a lot of problems in the past using ISCOs for soluble reactive phosphorus (SRP), because you aren't filtering fast enough. I may recommend that grab samples are used for SRP.
 - Anne: Thanks for that. We do plan to have samples filtered within 24 hours of collection, and may switch to field filtering where needed.
 - Andrew: For the Missisquoi we had the mass balance project this year, there is a paper from Eric's master's student that may be helpful.
- Karyn: When you are looking at P related to fine sediment in particular, how are your models able to separate fine sediments from coarser sediments?

- Anne: We are using the model only for fine sediment. The rest will be regressions developed based on field monitoring.
- Matt: For loading estimates, we can provide those for you.
 - Anne: I don't want to replicate, I want to make sure that our math matches yours at different sites.
 - Matt: I don't think that will be possible. The estimates I calculate from the Long-Term Monitoring Program data rely on a much longer dataset. We can talk about it ahead of the QAPP. I was wondering how you will get discrete data for flow velocity if the tool is connected to the ISCO?
 - Anne: We leave the tool for flow velocity in the stream during the discrete event to get multiple points on the rating curve.
 - Matt: It would be good to add a few sentences clarifying the process to the workplan. I knew it applied to the ISCO, so I was confused about discrete measurements. I thought 5 was light, but maybe the combined approach is enough.
 - Anne: The safety aspect of getting in the stream was a consideration. I'd also prefer 10-15 events on the rating curve, but this workaround has worked well.
- Matt: The idea of teasing out the effect of removal with the equation in the workplan, I had a hard time following that equation. I think a sketch or an illustration of the result would be helpful. It wasn't clear if it would be fluxes or concentrations.
- Erin: I wanted to introduce you to Tim and Foster, they are working on the guidance for NYSDEC for dam removals and sediment. We hope you consider adding one or both of them to your PAC. I think it would be helpful for them and you, they bring a lot of valuable expertise.
- Tim: With objective one, the LiDAR quantification of sediment pre-removal and 1-year later. There are two phases of P removal that really define the release. I worry that the 6 storms for developing relationships between concentration and discharge will make you miss this important removal era.
 - Anne: There's limited literature on this, but the literature that does exist suggests a longer response period. I've been thinking about this too. With flows we have during the winter, we could do a LiDAR flyover in the spring to measure that response. It will depend on final sites, cost, when dams actually come out, etc. I welcome TAC to comment on interest in post removal monitoring. Both dam removals have sediment removal from the reservoir required as part of the design. We expect that sediment and P will be reduced since the designs will need to limit this anyway.
 - Neil: Seems like there may be an opportunity for PAC input on this front.

Motion: To approve the workplan

By: Margaret Murphy

Second: Jenn Callahan

Vote: All in favor

Abstentions: Andrew Schroth

4. **Workplan review: The ecological, biogeochemical and economic impacts of phosphorus inactivation in Lake Carmi** (Dr. Andrew Schroth, Dr. Kris Stepenuck, Dr. Mindy Morales, Dr. Asim Zia, University of Vermont)

- Andrew, Kris, Mindy, and Asim presented. Project goals include:
 - Quantifying how geochemical and ecological systems respond to alum treatment
 - Comparing dynamics between post-treatment, untreated, and aeration years
 - Assessing the cost effectiveness of alum treatment
 - Informing and involving the public through an outreach plan that builds awareness of the causes and risks of cyanobacteria blooms and increases understanding of phosphorus inactivation

Discussion

- Neil: I'd like to chat with you, Asim, as you are designing the economic analysis. I have a lot of background about this project cost and what it took to get us to this point. I think there's a lot of nuance to how you would complete the analysis.
 - Asim: Absolutely, it would be great to connect. Your information will be critical to designing an effective model.
- Sarah: I appreciate the communication messaging. It seems like there's a real opportunity in the outreach efforts to educate the public about how phosphorus inactivation and watershed management dynamics are uniquely linked.
 - Asim: I understand why watershed-level factors are really important to calculating cost effectiveness for an intervention like this. Models can be evaluated to factor this in.
- Matt: Could you share more detail on the National Hydro Fabric model?
 - Andrew: The National Oceanic and Atmospheric Administration (NOAA) is developing hydro fabric models of the United States that include flow forecasts at different timescales and retrospective analyses that have greater data assimilation. The model will have flow forecast and discharge estimates for the two sites.
 - Matt: Will these forecasts inform sampling?
 - Andrew: No, the data will be used to inform data analysis. This is a developing model, so we don't want to rely too heavily on it at this point. We'd like to leverage the Pike River gage data as well if the National Hydro Fabric model data does not seem like it's working well for the project.
 - Matt: Will the project include any ground truthing?
 - Andrew: Yes, we will ground truth where there are gages. The model data so far haven't looked great in mountainous regions. It is one tool we will be leveraging in this project. We are not trying to get a perfect mass balance, but an estimate of what loading looks like in Lake Carmi.
 - Matt: That's helpful and gets at the comments I made in the workplan document. Some balance in the work could be helpful – maybe budgeting for ground truthing measurements where those model sites are, but having backups. Mae Kate can work with you to ensure all possible options are included in the QAPP to allow for flexibility.

Motion: To approve the workplan

By: Jenn

Second: Margaret:

Vote: All in favor

Abstentions: Peter Isles, Andrew Schroth

5. **Workplan review: Cyanotoxins and cyanobacteria biomass: investigating incongruities in Lake Champlain** (Dr. Mindy Morales and Dr. Kate Warner, University of Vermont)

- Dr. Kate Warner presented the project plan of work.
- Project research questions include:
 - Are the dominant bloom formers capable of producing cyanotoxins?
 - If they do, why do Lake Champlain's blooms have such low cyanotoxin concentrations?
- Project research objectives:
 - Which cyanobacteria are responsible for microcystin and anatoxin production in Lake Champlain?
 - Four study sites: Alburgh, Missisquoi Bay, St. Albans Bay, Burlington Bay
 - Bi-weekly sampling for nutrients, metagenomics DNA + RNA, buoy data, phytoplankton microscopy
 - Using an experimental approach, what limits cyanotoxin production under changing weather patterns, specifically with increases in nutrient availability and temperature?
 - Toxin synthesis is constrained by resource stoichiometry
 - Hypothesis: Microcystin production occurs primarily under N-replete conditions.
 - Experimental set up will test cyanotoxin production under different temperatures and controlled nutrient availability.
 - When during blooms are cyanotoxins at their highest?
 - High-frequency data monitoring will fill gaps in data collection- buoys in Missisquoi Bay and St. Albans Bay. If available, ISCO samplers will be deployed at the buoys to collect daily samples. Field site visit grab samples. Will add beach samples if funding and time allows.

Discussion

- Leanna: Great presentation. I was wondering if you could describe how this project would help inform management strategies?
 - Kate: Helping understand the frequency of toxin formations and when they produce cyanotoxins. Could inform beach closures, etc. If risks of toxic blooms are low, we can prioritize where management is required.
 - Leanna: It seems presumptive to inform management strategies based on this. I wouldn't be able to recommend recreating in a HAB regardless of toxins.

- Kate: My goal is to understand which blooms are becoming more toxic and if there is always a threat of toxicity to blooms. I think this would impact how we monitor for toxins, and how we inform the public. I would help to inform how we study blooms.
- Brian: I think the messaging over changing beach closures is something we would be concerned about because in NY, when there is a bloom we close the beach. Suggesting that we may not do that could be a concern, in terms of our messaging.
- Mindy: I can follow up, I completely agree that we need to be careful about messaging over beach closures. This work will inform management for drinking water, bloom threats, and better prediction of blooms generally. We are not in the position to provide public health advice.
- Brian: I think that the project overall is great, just think that the packaging of the work in an outreach perspective could be altered.
- Kate: I agree. I wouldn't recommend swimming in a high alert bloom, regardless of toxin concentrations. My point is that there are many people who don't want to recreate in Lake Champlain at all, given perceptions of cyanobacteria blooms. This work has the potential to help inform the public about cyanotoxins.
- Peter: The nitrogen management piece is a very interesting part of the study. You are looking at two specific toxins, but there are other chemicals produced that you are studying that can irritate the skin, etc., which is why messaging may be important.
- Brian: Exactly, we just want to make sure that messaging is informed.
- Neil: I really appreciate, Kate, your statement about how Lake Champlain has become maligned. The research you are doing is extremely informative.
- Andrew: Great presentation! One question, why St. Albans Bay Town Park? It is representative of what you are sampling on the platform. Maybe Oakledge Park or something like that would be more unique.
 - Kate: I agree, but the goal is to compare in-lake versus shorelines and it's difficult to get ISCOs out within Burlington Bay. I would love thoughts or ideas about how to do that.
- Peter: How will your experimental design capture the question of acclimation of species? Similarly, with microcystin there are a lot of interesting hypotheses, but there are a lot of missing factors in the lab analysis. Some thoughts to consider when you are analyzing those results.
 - Kate: I'd love to have the genetic piece included, targeting genes, etc. It comes down to funding for that and how we can answer those questions. I'd like to get additional funding.
- Bridget: I echo others' concerns about messaging and beach closures. I'm interested in the spatial dynamics on a smaller scale than across the lake. If you can incorporate smaller spatial scales, I think that is important. How generalized could the results of the species and population data be over the years? Is it a snapshot in time for what we know now, or can it be applied for other years?

- Kate: There is so much utility in that space in high frequency work in Burlington Bay. Do we want high frequency data collection in Burlington Bay? Do we want high frequency and modelling with ISCOs on buoys, which could help predict when blooms may become toxic? We can plug in factors to a model and determine if a bloom is likely to become toxic. Even though this is a snapshot in time, I think the spatial component will help with management.

Motion: To approve the workplan

By: Peter Isles

Second: Brian Duffy

Vote: All in favor

Abstentions: Andrew Schroth