

**Lake Champlain Basin Program  
Technical Advisory Committee meeting  
Wednesday, June 7, 2023, 10 AM – 3 PM  
Held In-person at LCBP office with remote sign-in option**

**Approved TAC meeting summary**

**TAC Members:** Jennifer Callahan, Ryan Cunningham, Laura DiPietro, Bryan Dore, Laurie Earley, Michele Fafette, Peter Isles, Neil Kamman, Steve Kramer, Margaret Murphy, Bridget O'Brien, Oliver Pierson, Andrew Schroth, Jamie Shanley, Lauren Townley, Daniel Tremblay

**LCBP Staff:** Mae Kate Campbell, Katie Darr, Colleen Hickey, Eric Howe, Elizabeth Lee, Meg Modley, Matthew Vaughan, Sarah Coleman, Erin Vennie-Vollrath

**Guests:** Heather Darby, Brendan Wiltse

**1. Updates, announcements, public comments**

- Andrew (UVM): The Lake Carmi monitoring buoy has been deployed, and those data are now available online.
  - Peter (VT DEC): The Missisquoi Bay one is up and running now as well.
- Laurie (US FWS): We were planning on doing a lampricide treatment in the Ausable this week, but we had to reschedule it due to low flows.
  - Margaret (VT FWD): Are you still planning to do the treatment before summer hits?
  - Laurie: Yes, if we can make it work.
- Neil (VT DEC): Based on the science that has been developed and the monitoring that teams at the University of Vermont (UVM) have done, the Vermont Department of Environmental Conservation (VT DEC) will be funding a feasibility analysis looking at the potential for alum treatment. We have developed a Request for Proposals (RFP) and are waiting for the State budget to be adopted. Until there is an adopted budget, the State cannot move its FY2024 activities forward. I expect a budget will emerge after the veto session which is scheduled for the 20<sup>th</sup> of this month.
  - Peter: We have a meeting tomorrow to review responses to that RFP.
- Neil: Flows are incredibly low for this time of year. It feels strange to be seeing smoke and red sunsets.
- Matt (LCBP): The Lake Champlain Basin Program Steering Committee will meet on June 13<sup>th</sup>, following that meeting there will be a public meeting on Missisquoi Bay where VT and QC officials will review action plans and recent monitoring data. The Missisquoi Bay and Lamoille River water quality monitoring buoys have been launched. The St. Albans Bay buoy will be up and running in the next few weeks, and the Malletts Bay buoy will be launched soon. We will be adding the new buoys to the real-time data website shortly. The Boat Launch Stewards are out at launches, they are a great team working on aquatic invasive species (AIS) spread prevention.
- Mae Kate (LCBP): LCBP is holding its second public comment period on our 'disadvantaged community' definition, which will be used to help prioritize funding

decisions. We will be holding in-person public meetings this evening and tomorrow. Please see our website for more information and for a comment submission form.

- Oliver (VT DEC): We received two really strong responses to the alum feasibility RFP. The Lake Carmi aeration system is being reconfigured. On Monday, we have the beginning of the rulemaking process on the wake boat regulation. We provided a final review of the bill to examine AIS regulations. VT DEC does not support that bill as it is duplicative of existing efforts. The bill will likely pass; some good can come out of it. We'll get to work on it assuming it passes. We will have a draft decision on the Bomoseen permit shortly, and we will be holding a public meeting.

*Review and approve summary of previous TAC meeting*

**Motion:** To approve the summary from the May TAC meeting

**By:** Laurie

**Second:** Margaret

**Vote:** All in favor

**2. Final report review: Implementation of whole farm nutrient management to reduce phosphorus loading and improve farm viability in the Lake Champlain Basin (Dr. Heather Darby, University of Vermont)**

- Heather introduced the project and shared how the initial funding from LCBP enabled a process that has expanded and grown. She noted that the project began during the pandemic, which created difficulties.
- Heather shared a [presentation](#). The goal of the project was to demonstrate how applying a whole-farm approach to nutrient management can improve both farm viability and water quality by reducing phosphorus loading. 5 farms in critical watersheds were selected to participate in this project. Changes to the nutrient management approach were implemented at each farm based on individualized assessments. Strategies included changes to the forage species selection, forage harvest timing and approach, improving feed storage, and optimizing crop rotation. Farms increased the amount of farm grown forage being fed from 79.8% to 91.6% of the total ration during the project period. In addition, grain as a percentage of the ration was reduced from 20.2 to 7.4%. These changes reduced the amount of surplus P on the farm from an average 2.14 tons per year to 0.70 tons P per year.

Discussion

- Oliver: Has a whole-farm approach like this been taken before in VT?
  - Heather: No, not like this. Pieces of it have been undertaken, but not all together.
- Neil: Can nutrient management plans be written to maximize forage feeding potential?
  - Heather: That's not traditionally how they've been written.
- Matt: What are your policy recommendations coming from this work?
  - Heather: The biggest focus we had was on the feed storage piece, since we know there is no funding for that. Feed storage was a problem for four out of five farms we have in this project and we've seen it in a lot of new farms as well. I think farmers are seeing the importance of improved feed storage, but it's quite

costly. Cost-sharing or financial assistance options would be really important for achieving these goals.

- Peter: You said farms went back to the status quo after the project – what caused that if whole farm nutrient management was a financial benefit?
  - Heather: Farmers are not nutritionists, it's quite complicated. Most of the grain company nutritionists will advocate for feeding corn. Feeding grass is more variable, putting more work on the farmers. One farm, once they saw what was happening on their farm with the traditional nutritionists, contracted with a private nutritionist. Traditional nutritionists and grain salespeople provide a lot of perks to farmers (taking people to events, etc.).
- Oliver: Thinking through the water quality benefits from this whole farm approach, is it fair to say reducing phosphorus inputs to farms reduces phosphorus runoff?
  - Heather: Absolutely. As we have more nutrients coming on, we have a constant buildup of phosphorus, which at some point has consequences.
  - Oliver: Are you able to quantify that benefit through this project?
  - Heather: Yes, through the whole-farm nutrient balance. There's been a lot of emphasis on reducing phosphorus from fertilizers, but less focus on phosphorus from imported feed.
- Steve: This was a phenomenal presentation. One of the things I find myself thinking about is the concept of testing, be it the potential to send samples off to a lab or to use on-farm probes. Did you do any measurements in-field?
  - Heather: All samples we collected were sent to labs.
  - Steve: Do you have any thoughts on that technology? I've heard from farmers they are really interested in an on-the spot answer, but there are concerns about data quality.
  - Heather: I agree, there are concerns about quality. I am sure people would be interested, but I don't think the technology is there yet.
- Matt: You talked about the diversity of grasses and mixing legumes in to forages grown. Is that benefit due to nitrogen fixing, nutrition, or both?
  - Heather: I've always encouraged farmers to incorporate legumes for feed quality and nitrogen fixation. The energy output of food that we've been looking for to replace corn in nutrition comes from grass, not legumes. Alfalfa can replace soybean one-to-one, but due to storage concerns it gets mixed in and that can impact feed quality because too many legumes are not optimal.
- Laura: This was great work, and you raise some good points. I put a few comments in the online report. Your highlighting of feed management concerns is something we've heard as well. It was informative to me to hear this angle on the benefits from a water quality perspective.
  - Heather: The cutting length findings are interesting. If the forage cut length is too long, it takes cows longer to eat and they sleep less. It's important for them to have enough rest to optimize milk quality. Long cut length is also more difficult to store. This has been one of the most rewarding things I've done with farmers and professionally, and I heard the same from the nutritionists we work with. I've

learned more in this project than I have in any other project or in college. This has helped improve my work with farmers.

Motion: To approve the final report

By: Peter

Second: Margaret

Discussion: Oliver encouraged TAC participants to read the report carefully and to identify the farms and support them. 3 of the farms were in the Carmi watershed, we should think about how to spotlight that in the Carmi workgroup.

Vote: All in favor.

### **3. Final report presentation: Quantifying the road salt pollution load to Mirror Lake and the Chubb River** (Dr. Brendan Wiltse, Paul Smith's College)

- Brendan shared [a presentation](#). He noted that the study took place during COVID, which presented its own challenges. Brendan shared background around the increasing chloride concentrations in Mirror Lake, which has the most developed watershed of all lakes in the Adirondacks. High chloride concentrations are causing impacts to lake turnover and aquatic habitat.
- The objectives of this project were to establish a continuous water quality monitoring program capable of quantifying the de-icing salt pollutant load to Mirror Lake and the Chubb River, estimate the de-icing salt pollutant load to Mirror Lake from direct stormwater runoff, estimate the total amount of de-icing salt applied within the Chubb River watershed, and to educate the public about the effects of de-icing salt on the environment and BMPs for de-icing salt reduction.
- Data loggers were installed at all stormwater outlets to Mirror Lake. Monitoring was also conducted bi-weekly throughout the entire year (apart from times when the ice is unsafe to navigate). Stormwater impacts were characterized, and the project team worked with municipal officials to implement stormwater treatment improvements, such as constructing infiltration basins. Salt application rates from municipal equipment was tracked, but there were difficulties in determining the total amount of deicing salt applied over the project period.

### Discussion

- Margaret: Sand is heavily used as a de-icing alternative. Is that better than salt?
  - Brendan: It can be difficult for pumps to manage sand. It's hard to determine which material has a higher impact. In some cases, a salt/sand mixture can actually lead to higher rates of salt application. The North Elba Highway department changed leadership during the range of the grant, which led to questions as to how well the salt application process continued throughout the life of the project.
- Erin: Will monitoring continue under different funding?
  - Brendan: Monitoring will continue at the Mirror Lake inlet/outlet. The other monitoring sites are in limbo currently. We are leaving the loggers in,

downloading the data twice per year, and will pull them out when they reach the end of their life. If another project comes around that can support them, we'll have data.

- Peter: In terms of the timing of application with discharge to the lake, how much of the mass is happening during which times of the year/different flow conditions?
  - Brendan: Field staff found that during very stormy days, the sample rates were lower. We learned early on that only when material was being applied that the salt concentrations were being picked up at high levels. Stormwater is definitely coming out in the winter (i.e., sunny days), but the slug of material comes out in late winter/early fall.
- Neil: I'm intrigued by the change in hypolimnetic chloride concentration and clear clip-off in spikes as a result of the installation of storm techs in the stream. Storm tech is next to the lake, so that would be expressing into the groundwater?
  - Brendan: Part of the other grant is to continue some of this work. We don't have groundwater monitoring set up, but the question of how long it will take for the groundwater to become saturated with chloride and then end up in the lake. We've been clear with the village that if they did this, it would restore the mixing regime the next year. If we cut off chloride inputs, it should go back to normal. We saw the implementation of best management practices leading to that reduction in hypolimnetic chloride concentrations. We had conversations with the village about those questions and that they are going to hear good news about the lake, but it doesn't mean they should let up on salt reduction efforts. We haven't fully figured out the implications of discharging water underground. There are remaining questions about how that will flow from the groundwater into the lake.
- Margaret: I liked the plots of the survey results showing expectations for different surfaces. It actually allowed for more snow/ice than I would have thought. How do you work on changing expectations on roads, knowing that they may need to be a little snowy to have environmental benefits?
  - Brendan: There is a NY working group looking at campaigns to change driver expectations for roads. Data showed that people were accepting of hardpack surfaces in this project. When people understand the connection between salt impacts and the lake, we've seen increased willingness to have more snow/ice on roads.
- Peter: Has there been an improvement in oxygen saturation in the lake?
  - Brendan: Dissolved oxygen has been higher in the hypolimnetic layer post implementation. We still get anoxia, but the duration has been reduced.

#### **4. Discussion: FY23 research program review**

- Matt reviewed the process for moving the awarded FY23 research grants through the TAC review process to the contract stage. Last year, TAC weighed in on which projects should receive full review and the TAC point-people system. TAC reviewed each awarded FY23 project to determine the point people for each project, which projects

were designated for full review, and which projects should convene a project advisory committee. Matt recorded the information in a project management spreadsheet.

## **5. Discussion: 2024 State of the Lake and Ecosystem Indicators Report**

- Matt: The next State of the Lake (SOL) report will be released 1 year from now. Because of the long list of projects TAC will be reviewing in the fall, we won't have much committee time to talk about this. We wanted to start the conversation now with TAC to allow us to have as much time as we can to brainstorm and work on any changes to the report. We are joined by Laura Hollowell from the LCBP Resource Room and members of the LCBP Education and Outreach team to share their perspectives on common questions received by members of the public. This discussion will focus on stories and main messages, we'll cover more technical details later. We also need to balance adding new content with the need to keep the report a certain length.
- Laura: We find that SOL is incredibly helpful in our work in the Resource Room. It is great at addressing the main questions people ask us. People want to know "how is the lake doing?". We do get some good broad questions. For example, a lot of people want to know "what's being done" about cyanobacteria, zebra mussels, etc. Where SOL becomes tricky is talking about success stories. We give out a lot of copies of the summaries of the LCBP report of activities. People love seeing what's happening, where the funding for Lake Champlain restoration is going. People are particularly interested in knowing how we are reducing phosphorus from farms and hearing about innovative solutions –tech-y things like green infrastructure, knowing what stormwater infrastructure they are walking by in Burlington is. Swimming is a big issue here in Burlington. SOL graphics are good for answering those questions. Cyanobacteria, that term can confuse people, they think people are talking about wastewater. We talk about climate change a lot. People ask us how much the water has warmed up, there was information on that topic in a previous SOL but not in this most recent one. We have the lake freeze over time and air data, but people want to know how much the lake itself has warmed. One other thing people love is ecosystem restoration, talking about dam removals, connectivity, the addition of the salmon connectivity was a really good idea in the last SOL. People enjoy hearing about things that are working and have multiple benefits, like culvert replacements having clean water and healthy ecosystems benefits.
- Margaret: Do people distinguish between the lake proper and the watershed?
  - Laura: We point that out, we have the basin map and explain why we are called the Basin program. Lots of people don't know what a watershed is, it's helpful to clarify that we can't talk about lake pollution without talking about how it's running off the entire region and the tributaries. One really broad question we get is "where is the pollution from?". Getting people to realize it's not just farms is important. Lots of people think it's all the farms. We have good graphics to show them in the current SOL. When farmers do come here, they are happy to see that graphic because they often feel they are being targeted.
- Neil: It's great to hear your translation of what you are hearing from people in ECHO. Sounds like there's interest in knowing what efforts are currently going on. I am

wondering if we can crosswalk this report with the state reporting to help answer that question. There's info that could help us tell the story.

- Laura: I saw the goby story map had been done. For a lot of visitors, telling a story about what's been done will be helpful. Some people want a list format, but most people want to hear a couple positive, encouraging things. Having examples of how a farm is using innovative methods to reduce runoff, if we could incorporate a little more positivity that could be good.
- Matt: It's interesting to hear your thoughts, Laura. Thinking about the pressure state response model we work on, previously we've tried to focus SOL on how the lake is doing and less focus on the response. But I know there is that interest out there, and maybe we aren't answering those questions well enough. Should it be in SOL, or something complementary?
  - Laura: We primarily use the report of activities to talk about what's being done currently. Even a few photos in SOL showing a couple examples of innovative practices or restoration projects could be great.
  - Neil: I could see a way to do that, to bring in info from the states and province to paint that picture that there's a lot happening, but that doesn't take too much space and points people to other resources to learn more.
- Oliver: How often does the term "TMDL" come up, are people aware there's a phosphorus reduction plan? Or is that too detailed and too wonky? I think people like to know there's a plan we're working towards, but that's maybe presumptuous on my part.
  - Laura: Even UVM Natural Resource students don't remember what a TMDL is. If you explain things to people, they can understand very complex topics. Using acronyms is a turnoff for many folks. Lots of people do know the state of Vermont has to reduce phosphorus coming into the lake. Lots of people don't know what phosphorus is.
- Colleen: One target group we always work with is teachers, this document is used a lot by middle and high school science classes. They like to use the data. They particularly like the lake freeze over graph, it's simple, did it freeze or not? We have a grant working with teachers using this report, and another grant looking at water quality parameters in streams and doing outreach with teachers. Teachers like the hard science and how it's done well in layman's terms. We just had a public survey completed which asked if people knew what a watershed was. We found in that survey that many people don't understand that fertilizers may contain phosphorus and can be used under certain circumstances. Because of that finding, we will be re-invigorating our "Don't P on Your Lawn" campaign. People want to know more about agriculture, I agree with Laura there. Agricultural practices are really visible in many parts of the watershed, so showing that progress that has been made in the agriculture sector is important. People also love fish and wildlife news, lamprey wound reductions, etc. I think sticking to the state of the lake is important.
- Ryan: One thing I'd reiterate is if anything new goes in, something else needs to come out, given constraints on the limited length of the report.
- Laura: I think the fact that the report is science based and not super emotional or a commentary is really important. People respect that.

- Neil: Julie Silverman has just completely upended how the Conservation Law Foundation has been working. Do you all work together, could we get input there?
  - Colleen: I think it'd be great to ask Julie and Ashley. Julie draws a lot of what she does from SOL.
  
- Matt reviewed the current SOL content. We have heard that people like the scorecard. I personally have mixed feelings about that, it's arbitrary where you draw the line on a trend.
- Oliver: On scorecards, obviously VTDEC is a big believer in scorecards. I know it is arbitrary, but being able to succinctly describe trends and conditions is extremely helpful.
  - Matt: If you have any ideas for improvement, let me know.
- Margaret: One of the other factors I think we should start looking at is lake water level. The news is always reporting on that. If we can start looking at those trends, I think that'd be great. Studies that have happened have focused on flooding, but we're seeing low lake and tributary levels.
  - Peter: That point ties in to snowmelt timing and warming winters.
  - Matt: We don't do a lot of hydrology, but it is a question we get a lot and see in the news often.
- Oliver: Suggestion to add temperature data as a climate indicator.
- Matt reviewed bolded statements and graphs in the Clean Water Section. One idea that's been raised is to include callout boxes for ongoing research, for example with the mercury in fish tissue graphic, there's been an increase and we're trying to find out why. The beach closure graphic presented in this way was new for 2021.
- Oliver: I wonder what Laura thought about that combined sewer overflow (CSO) graphic?
  - Laura: This is really helpful. There have been quite a few CSOs in Burlington. Sometimes people go to the beach and it's closed for cyanobacteria but they think it's closed due to sewage treatment. Though CSOs are a concern, this helps us draw the line that CSOs and cyanobacteria are not really related.
- Neil: We are able to determine why beaches are closed. Our investments in science and monitoring let us know what risk the public is facing. That may be a story worth communicating more. That's a unique LCBP function.
- Neil: I've always wondered why we call the main lake fair for cyanobacteria. 95% of the time you aren't observing blooms. I'm not suggesting we go elsewhere, yet when people ask me, I say most of the lake is a really great place and I would totally swim there, and you should too. If we did change the color, we'd have to do some explaining.
  - Eric: Looking at criteria for the indicator, I believe this was right on the cusp.
  - Matt: You think it should be good, not fair?
  - Neil: If you are only seeing blooms 5% of the time, even as monitoring is increasing, that should be enough.
  - Matt: Cutoffs are completely arbitrary and value-based. The standards we have settled on are strict.
  - Margaret: But looking at reports, I think the main lake and south lake should be classified as good.



- Peter: But that plot is just routine reports, not supplemental.
- Oliver: Do the cutoffs have to be arbitrary? For the VT lake scorecard, the threshold for oligotrophic vs. mesotrophic are science-based from the literature.
  - Matt: For some indicators, like phosphorus concentrations in the lake, that's based on EPA criteria. But then the question is: how frequently is it below that level? Even if you have a defensible concentration, where do you draw the line? Even when you have a solid number, you have to make subjective and value-based decisions. I think it's defensible to say if the main lake is in good condition for cyanobacteria blooms, we can make that change.
  - Peter: It's a question of what baseline you want to hold it to. Would Missisquoi Bay be held to the same level?
- Andrew: I would push back a bit on the main lake piece. Isn't North Beach in the main lake? That is closed often during the summer recreation and tourism season. Given that, maybe it's not good optics to say that the main lake is "good".
  - Neil: I guess it gets to what we as a science community communicate to community members. We've always known there's been some level of naturally occurring cyanobacteria, we do know it's increasing, but it is naturally a part of the system. Point well taken Andrew that that's where eyes are on the water.
  - Laura: A certain amount of people will not believe you if you say the main lake is good. A lot of locals remember when the beaches were rarely closed. People also go down to the water on the hottest, calmest days of the year, and that's when the beach is closed. You will lose people if you tell them that everything's great in the main lake. We want people to look at this science and know that there are a lot of people working really hard to make sure it's safe for you to swim in the lake, because a lot of people are not going in anymore.
  - Matt: Option instead of making it blue, yellow, red, can look at other scale or option.
- Neil: Idea for the phosphorus graph and for making space for new stuff. Something like page 12, that information will not change. We could take bolded statement #1 and #2, add them to #3, make that bolded statement and figure, then you've gained the whole page. Point back to previous SOL or online for info.
  - Matt: One challenge we had was including nitrogen as part of story. But to do that, need to introduce nitrogen and phosphorus. This used to be so much text and background.
  - Ryan: One idea we floated last time was including 1 or 2 of these charts in the publication and then including link to full graphic online (Fig 6).
- Neil: Figure 7 is the culmination of an over \$500K investment every year, this and the lake figures. Seems like we should keep the figure in there, it's ever-updated.
  - Erin: I like to use this one, especially when we explain the total maximum daily load (TMDL).
  - Colleen: The *No Other Lake* video that shows data from Missisquoi Bay, this dataset helps explain why.

- Neil: For microplastics and contaminants, I wonder if this is a section where we can say what we are doing. Plastic monitoring is happening, that's a much more visible source of info on plastics than microplastics.
- Laurie: We have a couple projects looking at chemicals and PFAS (Per- and polyfluoroalkyl substances), highlighting that could be great since that's such a big topic.
- Oliver: I am thinking about the possibility of adding air temperature and recreation use to the scorecard.
  - Peter: Dissolved oxygen can also combine with oxygen. Might be worth highlighting.
  - Matt: Something like "bottom-layer lack of dissolved oxygen".
  - Peter: Or, the area of the lake bottom without oxygen at maximum.

## **6. Discussion: Developing FY24 Clean Water and Healthy Ecosystems research priorities**

- Matt: Many of you will remember that our call for research proposals has included a list of priorities for each year. When TAC members score proposals, proposals that meet a priority get extra points. We brought this topic to the Steering Committee because TAC had concerns about the effectiveness of the priorities, and frustration at the process of developing the priorities. The path forward that was chosen was to have Steering Committee members go to their teams/agencies to ask what the research questions are that we need to explore to better manage the lake/watershed, TAC will provide feedback and tweak them, then they will go back to the Steering Committee to be discussed and finalized. We'll be doing separate tracks for research next year, so we are comparing similar types of projects against each other rather than comparing projects that don't meet priorities with ones that do. We got feedback from a few TAC members who were concerned about if TAC would have a say in developing the priorities. What I heard from the discussion is that the intention isn't to cut TAC members out of the process. If TAC has specific ideas, the Steering Committee has been really supportive in the past.
- Neil: This process will make it easier to defend our recommendation of what should or shouldn't be funded.
- Matt: Yesterday we had a call with the state designee TAC representatives since they will be involved in the coordination process. We discussed making it clear what management implications the research needs to have, which I think would be really useful. If anyone has an idea on a priority and wants to chat with me about it or get a group together, let me know.
- Neil: Ethan Swift last meeting discussed the forest land model, wonder if that's something that would be useful to the state of New York. If it is, that could be a very concise priority to convey.
- Oliver: Peter and I will work with Vermont state folks to develop priorities. We'll talk with Matt about the best way to communicate those priority ideas with the TAC and other state agencies. VTFWD is welcome to join us.