

**Lake Champlain Basin Program
Technical Advisory Committee meeting
Held remotely due to COVID-19
Wednesday, October 6, 2021, 8:45 AM – 3:00 PM**

Approved TAC meeting summary

TAC Members: Jennifer Callahan, Ryan Davies, Laura DiPietro, Bryan Dore, Curt Gervich, James Jutras, Neil Kamman, Steve Kramer, Margaret Murphy, Bridget O'Brien, Mario Paula, Oliver Pierson, Andrew Schroth, Jamie Shanley, Lauren Townley, Ryan Waldron, David Minkoff for Bill Ardren

LCBP Staff: Mae Kate Campbell, Eric Howe, Lauren Jenness, Elizabeth Lee, Meg Modley, Matthew Vaughan, Sarah Coleman, Erin Vennie-Vollrath, Peter Isles

Guests: Roy Schiff, Liz Doran, Mike Kline, Karina Dailey, Dave Braun, Daniel Shearer, Mike Winchell, Jody Stryker, Aubert Michaud, Eric Roy, Amy Macrellis, Brenda Gail Bergman, MaryJo Feuerbach

1. Updates, announcements, public comments, review and approve summary of previous TAC meeting

Updates

- Jamie: We are now in a new water year; I am happy to announce that there are no changes to Lake Champlain gauges this year. There has been no flow at Jewett Brook since June 7th. The MJW3 groundwater gauge had record low September level. The glyphosate project started up; our goal was to sample urban and agricultural streams around Vermont after spring application. Post-storm sampling has been a bust, but we did collect samples during base flow, and during high flows on Engelsbee and Potash brooks. We wanted to sample during high flow out of a wastewater treatment plant, but that hasn't happened yet. We will go out in October if we get some high flows. We will be getting results back soon and then will work to them write up.
 - Matt: Is there another field season?
 - Jamie: No, so hope for a big storm in October. But we might not see a glyphosate signal at this time since application was a few months ago.
- Matt: As shown by the data.lcbp.org website, the combined flow from tributaries to the lake currently is just over 3400 cubic feet/second. That is incredibly low. That's low flow for the Winooski River alone, but that number is for the whole basin.
- Oliver: We've had microcystin detections at the Alburgh Village drinking raw water intake for a week straight. We are trying to figure out the strategy for drinking water protection. This is the first time we've had consistent, above the limit detections at a drinking water facility. We may do a phytoplankton drag. We are seeing late season blooms, so this issue may be related to benthic cyanobacteria. For inland lakes, we did get a petition from the town of Greensboro to reclassify Caspian to A1 status (excellent water quality).

The State is reviewing that. We also received a few petitions from outside of the basin. We are working to finalize the Lake Carmi response plan update, which lists projects taking place in Carmi.

- Bryan: Eric Perkins has announced his retirement at the end of this month. For his official programs in Vermont, I will be stepping in. For the total maximum daily load (TMDL) work, EPA is still figuring out a replacement.
 - Neil: Eric has made significant, substantial, long-term contributions to LCBP.
- Neil: Vermont has a substantial set of American Rescue Plan Act (ARPA) programs. Julie Moore will be doing sessions at 4 o'clock on Thursdays to review these plans. \$100 million of water and sewer plans are being considered.
- Matt: The Clean Water and Healthy Ecosystems request for proposals (RFP) is currently open. This RFP used to be called local implementation grants, but we've reorganized the grants. Clean Water applications are due Monday, Healthy Ecosystems responses are due 10/27. We may be tapping TAC members to serve on review committees. The Technical Request for Pre-Proposals (RFPP) was released after the most recent Steering Committee meeting, and is due on 11/8. RFPP review will be the focus of the December TAC meeting. Full proposals will be reviewed at March TAC. We will be convening a subcommittee to discuss the future of buoy monitoring on the lake. We have an opportunity to take over UVM buoys, as well as several other possibilities for expansion. We want the subcommittee to envision the end goal of this program, what a monitoring network would look like.
- Mae Kate: Abstract submission for the Lake Champlain Research Conference is now closed. We received 55 abstracts. We sent a note to abstract authors to weigh in on if we should move forward with the conference in person, pivot to virtual, or postpone. A decision will be made by the end of this week.
- Meg: The Executive Committee received an update on the detection of the round Gobi in the Hudson. Monitoring efforts, including eDNA and trawling, are ongoing. An informational meeting is being held on 10/15, TAC members are welcome to join. The Army Corps will provide an update on the Champlain Canal barrier study, and an update on the Reimagine the Canals initiative will be provided. The Executive Committee was supportive of an expansion to the rapid response program; there's a possibility of doing eDNA in the South Lake. The North American Lake Management Society (NALMS) meeting is going virtual this year. Decontamination stations on the Vermont side are shutting down for the season, the boat launch steward year is coming to a conclusion. I will provide a summary of this year's monitoring season at the next TAC meeting.

Public Comment

- No public comments were made

Review and approve summary of previous TAC meeting

Motion: To approve the summary of the September TAC meeting

By: Jenn

Second: David

Discussion: Neil provided a clarification over email, which was incorporated into the summary.

Vote: All in favor.

Abstentions: Bridget O'Brien

2. Workplan review: Expanding Vermont's Functioning Floodplain Initiative (FFI) to Advance the Science and Conservation of Healthy Stream, Riparian, Wetland, and Floodplain Ecosystems (Dr. Roy Schiff, SLR)

Roy Schiff, Jody Stryker, Elizabeth Doran, and Mike Kline provided an overview of the larger FFI project, and the workplan for this grant.

- Neil: This is an incredible tool, foundational for Vermont. The workplan makes note of limited prospective habitats in the Mad River valley, but could you comment on the tool's ability to predict the existence of habitats that don't occur there for other areas in Vermont?
 - Liz: The plan is to use the mapped natural communities dataset from across the State. There is more coverage of communities that exist outside of the Mad River valley in the dataset, but we are using the dataset to develop statistical relationships to predict in the Mad River to make sure it exists on some scale and validate the model. Provided that that makes sense, we would want to go forward and make those predictions at larger watershed scales, but we want to make sure in that case, we'd be extending the project to get the validation. We are hopeful that we will learn a lot in this timeline that will inform next steps.
- Margaret: Most of this project is applied to the Mad River, then based on validation, you'd expand to other watersheds. Got it. For the data that is being collected in the field, (stream size, etc.) uniqueness to that system isn't same in every system within the basin. How would you apply that for hopefully expanding to the basin overall? Last comment - make sure there is fisheries involvement on the advisory committee, not just DEC.
 - Roy: We'd love to work with the fisheries data. On the expansion for instream habitat, the focus is on wade-able streams that the stream geomorphic assessment protocol is commonly conducted on. With that, analogous to what Liz was saying, we will have a dataset across the State. We are focusing initially on the Mad River because there is a rich dataset there, it's a good pilot watershed. We will expand those relationships pretty quickly. There are two tiers of data collection - verifying old data and reconnaissance/windshield surveys with representative sites.
 - Mike: The Fish and Wildlife Department is fundamental in completing the reach habitat assessments, further ongoing participation is critical. Will Eldridge is a part of that planning committee; we'll be reaching out to him to bring him into additional subcommittees.
- Amy: One potential resource – VTrans in its phosphorus control work has developed a hydro-enforced DEM for the State highway network. They'd be willing to share the dataset, but it may need further extension.

- Mike: I will relay that to Kristen right away.
- Margaret: For work on the Middlebury River, you'd have to move the town to get that floodplain back. What do you do when you find those situations where you can't get to a functioning floodplain, how is that incorporated into your assessment?
 - Roy: in our departure analysis, we have variables that talk about lateral constraints on the river system, buffers, riparian channel and environmental inventories, and vertical connections. In Middlebury, for their mapped corridors, about half is occupied by the village. We can do our best to play defense and maximize the habitat potential around the village. There is high quality instream habitat there. I think the habitat component will show the departure from connectivity.
 - Mike: For feasibility factors we are trying to bring into the analysis and prioritization, constraints and other socioeconomic factors will be included. This initiative and app are a collection of relationships. We are taking our combined knowledge to bring into the algorithm to build this tool. It's an adaptive management practice. An effort to tweak connectivity may be worth it.
 - Liz: This is a tool for public education as much as project prioritization.
- Sarah: If we are looking at the departure from habitat from natural communities, how do we take early successional phases into account that may not be as significant as a departure overtime?
 - Liz: In the communities database, quality indicators are used. There is successional information that will also need to be incorporated.
- Matt: Mae Kate is leading this for LCBP.
- Mae Kate: will provide team with comments from TAC.

Motion: To approve the workplan

By: James Jutras

Second: Margaret Murphy

Discussion: none

Vote: all in favor

Abstentions:

3. Project update: Reconnecting VT rivers through dam removal in the Lake Champlain Basin (Karina Dailey, VNRC)

- Matt: This is phase 3 of the work the Basin Program has supported with the Vermont Natural Resources Council (VNRC) to remove dams. This is an implementation project; this update is to show how the projects are moving forward.
- Karina provided an overview of ongoing work associated with the project. The project is part of the Vermont Dam removal initiative, which aims to raise awareness of the impacts of dams, identify dams that no longer serve a useful purpose, prioritize dams that no longer serve a useful purpose for removal, and collaborate with dam owners and communities to remove dams. 4 dams are being addressed as part of this project. A feasibility study on the Connolly Pond Dam in Shrewsbury is nearly completed, that dam is planned for removal in 2022. An RFP for the feasibility analysis and design of the

Breadloaf dam in Ripton has been released. Design work for the removal of Pelletier Dam in Castleton has been completed, fundraising is underway, permits are in place. Browns Pond Dam in Bakersfield is also being assessed. 8-12 additional dams are being scoped.

- Matt: What was purpose of the Breadloaf dam?
 - Karina: According to the dam safety record, it was for snowmaking for Ripton Nordic Center. It is no longer used for this purpose.
- Curt: This is a great project. I'm curious – the International Joint Commission (IJC) Flood Study has looked at watershed storage options for reducing flood damages. Do you think dams provide significant water storage in floods like 2011 that we'll need to account for in removal?
 - Karina: Dams that fall under dam safety impound 500 cubic feet of water, or more. Storage behind dams takes away from the natural storage capacity of streams that are reconnected when dams are removed. Removing dams would result in a net gain of watershed storage. Many other habitat factors are improved as well.
- Curt: Is there significant restoration that needs to happen once dams are removed?
 - Karina: In some cases, yes. Both for floodplains and wetlands.
- David: Thanks for the update. For the Shrewsbury Dam, since it was unmapped and dam safety got involved, what was the process there?
 - Karina: The landowner had concerns about the dam; they went to the fire department since it was an old water supply, and were told to contact dam safety. Dam safety originally didn't think it was under their jurisdiction, but then realized it was. Landowners are supportive and looking forward to reconnecting the stream. Through this assessment, we also found another small dam upstream that we'd like to remove eventually.
- Margaret: Talk about recreational opportunities – how do you handle the loss of swimming places and ponds?
 - Karina: This is a genuine concern. We address this by educating people on the bigger ecological issues, and the larger-picture co-benefits that dam removal provides. Often dams were built where swimming holes were already, as well.
- Brenda: Thanks Karina, impressive body of work. I'm interested in the scoping piece. A critical step to raising awareness about dam removal is articulating the need and implications. In your big vision, what do you think we should be doing to scope out dam removal needs and potential?
 - Karina: Scoping, capacity building is critical.
- Neil: Please ensure that these newly found targets show up on the tactical basin plans.

4. Workplan review: Achieving verifiable phosphorus removal from tile drains discharging to Lake Carmi tributaries (Dave Braun, Stone Environmental)

- Dave Braun provided an overview of previous research on tile drains, with a focus on the use of media to sorb phosphorus. He described how this research feeds into the current project.

- Jim Jutras: I believe aluminum has been introduced into the water quality standards? Are you planning to do discharge testing? That may be a liability down the road. A big asset for phosphorus control is this aluminum-based product that we will now be regulated on. This was not known at the time during the initial grant review.
 - Dave: I didn't know aluminum was introduced in the water quality standards. We could certainly build in sampling at the discharge point. No problem there. It does raise the question of whether land application would be suitable. Our clays are chock full of aluminum oxides; the mineralogy is largely aluminum.
 - James: It might be okay towards the end of study as things get anoxic or the media is sorbed. We are doing a little bit of research on this now as part of the biosolids study. I am suggesting that a couple samples are worthwhile to do.
 - Neil: Rick Levey or Bethany Sergeant would be the contact about the new water quality standards. The draft standards are online.
- Laura: Great presentation. We should have further discussions before you include the Vermont Agency of Agriculture, Food, and Markets (VTAAF) on best management practice (BMP) maintenance. You said you will estimate load within the proposal, and not put a liner in at this time, but how do you mathematically figure that out? You may have down drainage.
 - Dave: Fair question, one thing is that the top will be mounded, so there would not be much infiltration down. In terms of shallow groundwater moving through, it would be a good thing but would complicate measurements. It's a good thing if we divert tile drain water through the filter. Some deeper infiltration is a good thing. Lateral water treatment is good thing. It does complicate monitoring because we would need to monitor flow quite accurately at the intake and the outtake; it's an enormous science exercise to do well. We are kind of imaging for this one that we'd measure inflow accurately, and do some productive scribbling to simplify the design. We propose that we monitor inflows and sample inflows to 4 filters, measure bypass separately, and then sample outflows (but we wouldn't monitor flow at that point), then just take paired measurements repeatedly. What we saw in previous work is if there are inflows then there is outflow; there is a lag, but we were getting the same rates. The right thing to do is to have a permeable liner. If we agree that we don't need continuous flow monitoring and some sort of coincidence flow measurements is adequate, that would be great, otherwise we would have to scale up the technical measurements and equipment.
 - Laura: Connect with the Lake Carmi Groundwater study led by Jon Kim.
- Oliver: We have been out monitoring 12 tributaries in watershed since March; with the dry summer most tributaries, including our study area, have had no flow since July. Many will be dry next year. We have gotten 85 samples; dissolved phosphorus is 75%-85% of total phosphorus values. My question is, for the project objectives (specifically the 1st one), is that just from filters or are there other ways to work with farmers, what they are doing on the surface level for manure application or was that just addressed by the folder? It'd be interesting to hear if farmers with tile drained fields have also used

manure injection technology, and determine what outputs, loading, and concentrations they have been seeing.

- Dave: There are a range of things that one might do to reduce phosphorus loading, we are just focused on filters here. Removing standpipes is first order, applying, when possible, when tile lines aren't flowing, but that's not possible on a lot of corn ground. In no till, about the best you can do, other than reducing phosphorus inputs to high phosphorus soils is obvious and important one, then allowing long-term decrease in soil phosphorus test levels. Agronomists can speak to better. Surface tillage can be good to break up macropores, and now you can't stack manure in tile drained areas. UVM extension and others are working to convert corn ground to hayfields and are getting the most of balance of corn injected. If we are reducing surface runoff loads of phosphorus through tile drainages and further by injection, we are probably increasing the mass of phosphorus available to leach into tile drainages to be exported.
- Oliver: If you are able to do work on fields that are tilled and grasslands that are manure injected, trying to document conditions to show the relationship would be interesting.
 - Matt: LCBP has funded [a study to model BMP efficiencies](#).
- MaryJo: How do soil conditions affect the filters; are you finding they work best in one type of soil versus others?
 - Dave: The benefits are greatest where the soils have high loading and higher phosphorus concentrations, which you typically find more often in clay soils with a long history of use. For the operation of the filter, it doesn't matter a lot. Digging a trench in clay is a lot of work, but you get shallow water flow in sandy soils. Sandy soils have lower phosphorus values.
- Neil: An additional thought for Dave to consider in running the project: Will you be gathering management data (e.g., how much manure is spread, rainfall data) during the monitoring year or only at the start? It would be good to know when application/rainfall occurs, and sampling is implemented at some appropriate lag after.

Motion: To approve the workplan

By: Oliver Pierson

Second: James Jutras

Discussion:

Vote: all in favor.

Abstentions: Andrew Schroth

5. Presentation and discussion: Plattsburgh City Beach restoration and enhancement project (Daniel Shearer, Saratoga Associates)

- Matt: Introduced Dan Scherer, who is asking TAC for feedback on the redesign of Plattsburgh City beach.
- Dan provided an overview of the plan for development of the City Beach property in Plattsburgh.
- Neil: Other committees could benefit from hearing about this project.

- Erin: This is an amazing project, I'm excited to see it roll out. I'm curious – with the State Park right next to that property, have you been thinking about the connection there?
 - Dan: We want to find as many synergies as possible, but we don't want to have redundancies in programming.
- Curt: Great presentation. I wanted to give a shout out to Saratoga Associates. We've had students doing a survey of the old dump on the property. It's been a fantastic collaboration.
 - Dan: We do a lot of work with higher education. Sometimes, we have the challenge of students coming in from out of town and not being accepted as part of the community. We want to help them feel like they have a stake in the community.
- Oliver: Great project, neat opportunity for state-of-the-art lakefront development. I'm excited about the mention of shoreline stabilization through shoreline best management practices. I will be excited to see what we can learn from each other.
 - Dan: The most important asset to the beach is water quality, that's why we want to restore the dune network and ensure we are stewarding the property.

6. Workplan review: Development of a comprehensive binational phosphorus mass balance analysis toolkit for the Missisquoi Bay Watershed (Mike Winchell and Dr. Jody Stryker, Stone Environmental; Dr. Aubert Michaud, IRDA; Dr. Andrew Schroth and Dr. Eric Roy, UVM)

- The project team provided an overview of the project tasks, outcomes, and outputs. Key objectives of the project include quantifying terrestrial phosphorus inventories, quantifying inventories of phosphorus in Missisquoi Bay, developing a Soil and Water Assessment Tool (SWAT)-based terrestrial phosphorus export metamodel, applying the metamodel to simulate mass balance input changes in the bay under alternative conditions, simulating and quantifying the fate of and transport within of phosphorus in Missisquoi Bay, and developing the Missisquoi Bay Phosphorus Mass Balance Assessment toolkit.
- Neil: In the discussion on the toolkit, do we know how long it will be hosted for and when it will or will not be available for public use?
 - Mike: We built our budget assuming to host it for the 2-year development period. After that, LCBP could decide how much longer the tool would be available.
- Matt: Clarification on the quality assurance project plan (QAPP) – this will be a secondary data and modeling QAPP. It's going to be tricky, but we have opportunities for flexibility with a project advisory committee (PAC). I am interested in hearing from TAC about feedback on the modeling and metamodel approach. Especially for public feedback and trust.
 - Andrew: Given that the AEM3D model is already calibrated...do we lay out that calibration in the QAPP?
 - Matt: Whatever your planned approach is. You are not going to be re-running the calibration, but you will be having different secondary data input into the models.
- Neil: For the modeling, I'm not sure what other manner or means exist to undertake to do the work. This is a complex analysis with many datasets. It's not a first principles

analysis, it's more elevated, but that captures the right pieces of analysis. All models are wrong, some are useful, this one will be useful because it's addressing the specific IJC charge.

- Eric Roy: The strength of this approach, aside from quantifying what is going into the bay, is that it's providing tools that will allow people to strategize for remediation. It's useful, and we need to communicate that upfront.
- Neil: In one of the task slides, you mention aggregating the SWAT data to parcel level. One of the missed opportunities when the Lake Champlain SWAT was developed was that we lost the disaggregated hydrologic response unit (HRU) data, everything was recompiled at the hydrologic unit code (HUC) 12 level. Are you planning to do an average on the parcel scale?
 - Aubert: We did work at the HRU level, there is a fine resolution from outputs done by Stone Environmental. This runs smoothly and starting from that we can aggregate. There are numerous issues that Matthew brought forward – issues of confidence, confidentiality, etc. Want it to be regularly used, we don't want to pinpoint too much to have discomfort, but we are feeling that we have the data to do a fine-scale study, we have to do at the finest scale we can and then we would aggregate. We have elevation models, farm plans, and the ability and capacity to develop things at a fine scale, but there is an interest in confidentiality, especially in Québec where we have data by production units, which should remain confidential. We have something very precious here, tributary loadings from 1991, we have data to back us up. We can make sure the aggregation is representative of the actual loading. The big issue is when we get into predicting the efficiencies of alternative scenarios, we need to have as much documentation as possible. We have been documenting some results, water quality at the micro-watershed level, especially at riparian buffers, to validate the metamodel or projections for actual period as we have those monitoring data. For scenarios, we don't have validation data, so we have to be cautious on that.
 - Mike: We are going to build the model spatially at a high resolution and also report out practically. For confidence, a lot of SWAT modeling has already been done already in the basin; there's already developed well-calibrated models to start our work from.
- Matt: Call for PAC members?
 - Neil: Marli Rupe may have the capacity to participate.
 - Oliver: Peter Isles is a possible advisory committee member.
 - Laura: VTAAF would like to include Laura DiPietro and Judson Peck.

Motion: To approve the workplan

By: Jenn Callahan

Second: Jim Jutras

Discussion: None.

Vote: All in favor

Abstentions: Andrew Schroth

7. Discussion: 2022 Opportunities for Action (OFA)

Eric provided an overview of OFA, the comprehensive plan for managing the Lake Champlain watershed. LCBP's budget cycle is driven by OFA. The plan provides information about LCBP, the Lake Champlain watershed, the Lake Champlain Steering Committee, and many of the groups working in the Basin. OFA is divided into 4 goals: Clean Water, Healthy Ecosystems, Informed and Involved Public, and Thriving Communities. Each goal has a suite of priorities associated with it. Eric also summarized the outcomes of the Steering Committee June Summit, which began identifying priorities for the upcoming OFA update. Eric noted that for the new OFA, EPA has requested that LCBP incorporate metrics for tracking progress towards meeting these goals. Specific, measurable metrics for each task area need to be developed. Eric requested that TAC and the other advisory committees assist with scheduling out the timeframe of the tasks over the 5-year window for OFA. Eric also asked TAC to consider the potential for infrastructure funding that would be appropriated to the Basin Program.

Matt reviewed the high-level objectives and strategies covered in the Clean Water and Healthy Ecosystems sections.

- Eric: I'd like to keep the current OFA structure and add in the priorities identified during the summit.
- Neil: For strategy I C 1, the language could be modernized to include river equilibrium. This speaks to something I'm interested in, which is bringing Vermont and New York towards similar spaces in stream restoration.
- Dave: There might be a place for connectivity in either of these big headings.
 - Matt: That could fall in a strategy area.
 - Neil: The one I just suggested could incorporate that. Part of restoring equilibrium. Calling it out specifically in healthy ecosystems makes sense.
- Andrew: Where does climate change fit within all this?
 - Eric: Also coming out of the summit we have 2 overarching themes: climate change and diversity, equity, and inclusion/environmental justice. They will apply across all 4 goals. We can discuss how best to integrate those overarching themes.
- Matt: A few thoughts that I've had - would it be helpful to break out the contaminants strategy in more detail? Types of contaminants, activity that leads to contamination? For monitoring, this would be tying in the discussion we're about to have about the end goal of a monitoring program.
 - Eric: That could be connected into the scheduling piece too.
- Neil: It would be good to discuss if we think we can have a long-scale budget prioritization plan.
- Matt: This was a good intro, we will discuss OFA further in November.
- Neil: The funding landscape has changed so much in the last 5 years; it would be good to think about types of projects that different funding sources can support.