Lake Champlain Basin Program
Technical Advisory Committee meeting
June 4, 2025, 9:00 AM – 12:30 PM

Held remotely via Microsoft Teams

Approved TAC meeting summary

TAC Members: Jennifer Callahan, Bryan Dore, Michele Fafette, Peter Isles, Neil Kamman, Steve Kramer, Andrew Schroth, Jamie Shanley, Daniel Tremblay, Jennifer Callahan, Colette Ward, Karyn Hanson

LCBP + Lake Champlain Staff: Matthew Vaughan, Meg Modley, Sonya Vogel, Erin Vennie-Vollrath, Theresa Vander Woode

Guests: Mike Winchell, Tim Mihuc, Brittany Mosher, Matthew Marcelino, Aubert Michaud, Brian Duffy, Marli Rupe, Patrick Clemins, Marli Rupe

1. Updates, announcements, public comments

- Jamie (USGS): The Stone Environmental project doing emerging contaminant sampling is scheduled to start this week or next. U.S. Geological Survey (USGS) is contributing match to a project to look at harmful algal blooms (HABs) that will be jointly funded and carried out by our New England and New York offices. We also have a low flow regression equation project that the USGS is collaborating with the TAC on. This work will be focused on regressions for making watershed predictions at low flows. Another upcoming project is working to draw more watershed boundaries down to the HUC 14 level.
    - Neil (VTDEC): Are you going to update the National Hydrography Dataset (NHD) with the results?
    - Jamie (in the chat, later in the meeting): When I announced the USGS effort to improve watershed boundaries based on newer LiDAR data, a question came up as to whether the new boundaries would be incorporated into the National Hydrography Dataset (NHD Plus). The short answer is no. Here is an elaboration from Luke Sturtevant of our USGS office in Maine: “The updated LiDAR-derived watershed boundaries would not be incorporated into NHD as that product is no longer being supported. The updated watersheds would be a USGS data release, integrated into StreamStats, and used to inform future 3DHP efforts in the state. To date, there is no clear avenue forward to integrate products like these directly into an official national level product for Watershed Boundary Dataset (WBD), but this is something we are working towards with the National Geospatial Program and the official 3DHP products.”
- Neil: Jamie mentioned the HAB project. USGS approached us about having some match for that, and VTDEC was actually able to do it. It would be cool to see Peter Isles (VTDEC) and Jamie talk more about this sometime. Any news about the gage project Jaime?
    - Jamie: Not yet. Hopefully in September.
- Bryan (EPA): Every year EPA issues a report card for Lake Champlain TMDLs. We expect that we’ll be able to send final report cards for Missisquoi Bay and Otter Creek, and interim report cards for Lamoille and Missisquoi rivers. All at this point approved.

- Neil: General assembly has wrapped up their work- the budget is approved and prepared for next year. Shortfalls and interruptions. New work on the authority over agricultural water pollution. Will assign additional responsibilities to VT ANR to set limits to non-point pollution.
- Matt (LCBP): Reminder, this will be the last TAC meeting of the TAC season. We will plan to reconvene in September. We still have projects that will be wrapping up over that hiatus, so thanks for being available during our break for some review over email. Welcome, Karyn Hanson (NYSDEC) to the TAC! We are also excited to have Brian Duffy (NYSDOH) on TAC, it's not official yet but I don't see why this wouldn't happen. We are hiring for three positions at LCBP, one is to help with our Clean Water team, another is a similar position on the E&O team, and the E&O coordinator to replace Colleen Hickey, who is very sadly retiring this summer after being here since the beginning of the program.
- Neil: Colleen's role is integral to the work of the LCBP so this is a huge loss and a massive opportunity for someone to join the LCBP.
- Matt: Steering Committee (SC) meeting on June 17th. I'll be asking members to come to us with their requests for research focus. The TAC will make a list of priorities for FY26 this fall. This will begin at the SC level, today or over the summer if you have research needs that you see, please send them to Matt and we will compile them.
- Meg (LCBP): We have 24 boat launch stewards (BLS) this year, busy intercepting things to and from the lake. 3 out of 4 of the decontamination stations are operational. SC approved a Point au Roche decontamination station, maybe will install this season? Award letters just went out NY/VT organizational support, Tree Nursery, etc. We are expecting to get things moving soon on that front! The Champlain Canal had a delayed opening because the water level was too high. We are already sampling the Champlain Canal for round goby. So far, it's negative. Working with Vermont Fish and Wildlife (VTFWD). Also, Matt has done a massive amount of work getting the long-term monitoring program (LTMP) off the ground.
    - Matt: Peter Isles has also put a ton of work into the LTMP this year! Also, I was preparing for an interview, and I found that last year we had the highest measured lake water temperature at the Burlington station on Aug. 3rd. - 80 degrees F! This year (so far) temperatures are more normal.
- Meg: It's free fishing day in Vermont on June 14th. Huge day! Citizen's advisory committee outreach on this front.

Review and approve summary of previous TAC meeting

Motion: To approve the summary from the April 2025 TAC meeting
By: Jenn
Second: Peter
Vote: All in favor, Karyn abstains

2. Final report review: Developing a Comprehensive Binational Phosphorus Mass Balance Model for the Missisquoi Bay (Mike Winchell, Stone Environmental)

- Aubert (OBVBM), Mike (Stone), and Andrew (UVM) introduced themselves and their work on the mass balance model in Missisquoi Bay. Eric Roy (UVM, not present) was also a primary investigator in this work.
- Project goals;
    - Quantify the distribution of phosphorus (P) in different compartments of the Missisquoi Basin

    - Link existing watershed and lake models to quantify the fate and transport of P within and out of the Missisquoi Bay
    - Create a stakeholder focused toolkit to use this model, SWAT-based Terrestrial P-export Metamodel
- Results
    - Targeted BMP implementation should be most effective, most P loading coming from cropland. Targeting 50% of critical areas achieves nearly the same benefit of applying BMPs to 100% of the area. Land conversion from cropland to grassland increases the effect of P reduction.
    - Internal loading represents a low annual fraction of P, high P imbalance driven by extreme events but relatively close to P equilibrium in low flow years under reductions. Internal loading is the dominant prevenance during summer bloom season while shoulder seasons are overwhelmingly dominated by tributaries. The bay exports substantial P in the form of cyanobacteria. Summer blooms are relatively resilient to watershed P reductions.
- Conclusions
    - P inputs exceed P outputs, particularly during years with many high-flow events
    - Metamodel simulations improve water quality, but do not meet P targets nor suppress blooms
    - Summer bloom severity is hard to manipulate with external P load reductions
    - Seasonal fluctuations in P balance illustrate that comprehensive management of P loading is essential
    - Watershed reductions are critical, but internal loading of legacy P needs to be addressed as well to suppress summer blooms

Discussion

- Neil: Is the HUC 12 the only presentation scale?
    - Mike: Yes.
    - Neil: One thing we ran into for the main SWAT model for the Lake Champlain Basin (LCB) was that we had to remodel from HUC 12 to get down to the catchment scale. I'm curious if you have retained the data, and what it would take to get this at the HRU scale.
    - Mike: There would be some considerations with time, but it's certainly possible.
    - Neil: The critical source area model was a different tool, but it also presented very fine targeting.
- Steve (Miner Institute): When you have cover cropping, that is a wide-open thing. Is that a source or a sink? Are you harvesting the cover crop?
    - Aubert: The idea behind cover cropping is erosional. The way we model, it's based on solubility, we are basically abating/reducing the soil loss emissions. Regarding the crop in VT, there is a lot of bare soil after harvesting. We are considering an important abatement in sediment bound/particulate phosphorus. There is some increase in soluble P with the richness of the sediment.
    - Mike: Implicitly, the cover crop is not harvested. We are using it to represent the reduction of erosion.
    - Steve: You are taking some P and putting it in a different pool. A lot of people look at cover crops as a great way to reduce erosion. I'm just curious if the use of cover crops introduces a new pool.

- Peter (VTDEC): When I look at the results of this model in terms of internal vs. external loading, I think it is underestimating the effects of those external loads over time. Something to keep in mind.
    - Andrew: We acknowledge that in the text. I would push back in that your model assumes the same thing.
    - Peter: Another thing with the Missisquoi Bay Basin (MBB) is the component of a burial flux.
- Karyn (NYSDEC): What a fascinating project. I wonder if you considered climate change in your evaluation? How did you pair up your land side model within lake models to get chlorophyll estimates?
    - Mike: We did not explicitly include climate change. However, given the water year (WY) data we included, we are sort of considering climate change in that.
    - Andrew: Climate change favors stratification, internal loading, and extreme events. What we had were models of % reductions, then WRTDS, then the process-based model has chlorophyll-a as an output.
- Neil: Amazing project! It would be great to find more time to chat about it and explore. If the contract were to allow it, some sort of training session or workshop to involve our partners would be an opportunity to get this out there.
- Matt: Sounds great to me, we are going to be wrapping this up. I haven't seen any comments from the PAC yet. Neil, we could think about how you'd like to approve it. In terms of the knowledge sharing aspect, I think that sounds great depending on the project team's availability.
- Neil: Members of TAC should say how long they need to review this. I don't want it to be indefinite so that Stone can wrap this up with NEIWPCC. Or we can get a motion to approve.
- Matt: I am comfortable having TAC approve it and requiring a second approval by PAC?
    - Neil: PAC will have an additional week to read the report.
- Andrew: Just to be clear, do you want that box plot in the report?
    - Matt: Yes, please. I also found the take-home points that you included in this presentation very helpful and succinct. I would add those as well.
    - Neil: I think that an executive summary of this report for Secretary Moore would be important as well.

Motion: To approve the final report subject to incorporating recommended edits from TAC/PAC when they come in
By: Peter
Second: Steve
Vote: All in favor, Andrew abstained

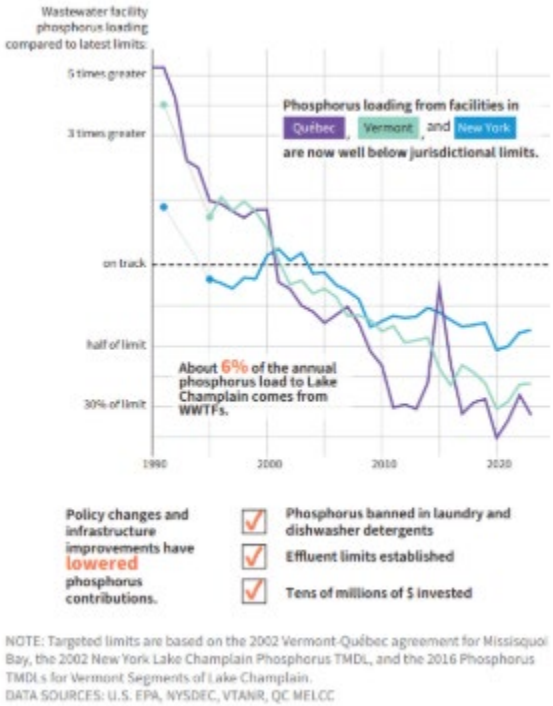
3. Interim report and workplan: Lake Champlain Long-term Monitoring Program (Dr. Peter Isles, VTDEC, Dr. Tim Mihuc, SUNY Plattsburgh)

- Peter Isles and Tim Mihuc presented on the 2024 LTMP results in VT and NY

Discussion

- Brian: When you talk about the flow-weighted regression or loading from WWTPs, can you walk me through how you got those concentrations from wastewater?
    - Peter: Wastewater departments/organizations give us numbers, and we rate them with flow to get our numbers.
    - Brian: So that is how it is done for NY/VT?

- Matt: Just to be clear, that is just an add-on. LTMP doesn't measure WWTP metrics. It is just an additional point pulled from regulatory documents and should match what is out here already.
- Neil: It is done consistently across the basin.
- Matt: I'll paste the figure from SOL 2024 for context.



- Andrew: Pete, curious about your Missisquoi data. To what extent do you think that was driven by water temp, high-flow events, or the dry fall?
  - Pete: It was a weird warm winter, think back to the Biogeochemistry paper from my dissertation. A lot of the nitrogen (N) comes out in the spring while P comes out from external loading. I can speculate that a warm, early summer and a warm preceding winter would be to blame.
- Karyn: Are all of these data available on the LCBP database?
  - Peter: Housed on the VTDEC LTMP site.
  - Matt: FYI, the LCBP site is primarily for real-time monitoring data. I think this is the best set up. One day I'd like to have a button for downloading all of the data at once.
  - Karyn: Is there a separate location for just NY data? Or is it all hosted together?
  - Peter: All on VTDEC website.
  - Matt: To the user, it's all one program. It's under the same QAPP, goes to the lab, same repository, etc.
  - Neil: Using the filters, you can isolate just NY data if you are interested.

4. Interim report and workplan: Lake Champlain Cyanobacteria Monitoring Program (Dr. Peter Isles, VTDEC)

- Peter presented on the 2024 field season for the Lake Champlain Cyanobacteria Monitoring Program. Greatest number of reports from volunteers and staff this year in the history of the program. There are categories of alerts from 1; no cyanobacteria, 2; some cyanobacteria, 3; cyanobacteria bloom present

- Results from 2024:
    - Blooms reported between early June through mid-November. There was a combination of routine and supplemental reports. 2024 saw more reports in all regions of the lake which reflects more engagement in the program. However, 2024 was not a remarkable bloom year compared to previous years.
    - Blooms are most common in the Missisquoi and St. Albans Bays, including northern Main Lake.
    - The program also tracks blooms in inland lakes. There was a surge of volunteers from inland lakes during COVID. Hard to retain volunteers on lakes where there are not blooms.
    - Lake Carmi did not have the aeration system in 2024 but it was also not a significant bloom year.
    - Only a few sites had exceedances of toxin levels. Toxins were detected in drinking water near Alburgh.
    - Benthic cyanobacteria testing will occur in 2025. Also, working to collect more detailed plankton community data in inland VT lakes where there have been low level blooms. Working to develop satellite monitoring products to help guide sampling or predict where blooms will occur. We suspect that Missisquoi Bay flow does not go into the NE Arm, but rather through the Alburgh passage into northern Main Lake.

Discussion

- Matt: All detections were at Alburgh in raw water, correct?
- Peter: Yes, that is correct. The detections are low in the raw water.
- Neil: The intake at Alburgh is very low and goes through sand. It is always encouraging to see all cyanotoxin detections below limits.
- Peter: There were a few detections above the WHO limits (3 total in 2024).

Motion: To approve VT DEC/NYSDEC LTMP 2024 Program Report
By: Jenn
Second: Andrew
Vote: All in favor: Peter abstained.

- Neil: Tim and Peter, wondering if you have articulated meeting target numbers on tributary sampling with staffing challenges?
    - Peter: Two teams operate independently typically, but we have broken down the season into 4-week blocks to meet the targets.
    - Neil: Tail-end of season sampling missing data in the last year so hope to get those in 2025.

Motion: To approve the final report for the 2024 cyanobacteria monitoring program
By: Jenn
Second: Andrew
Vote: all in favor

5. Informational presentation: The Impact of Aquatic Invasive Species Mechanical Harvesting on Eastern Musk Turtle (*Sternotherus odoratus*) Populations in the Lake Champlain Basin – Final report (Drs. Brittany Mosher and Matthew Marcelino, University of Vermont)

- Drs. Matt Marcelino and Brittany Mosher (UVM) presented the project *Impact of AIS Mechanical Harvesting on Eastern Musk Turtle Populations in the LCB*.
- Project motivation: The effects of aquatic invasive species (AIS) in the LCB are widespread and significant. Approximately $166 billion is spent on management of AIS in the U.S. each year- typically using chemical, biological, or physical control methods. Mechanical harvesters are used to clear areas primarily for human recreation, cutting the plant beneath the surface of the water, and collecting the cuttings. These may have negative impacts on fish and other wildlife populations which are removed from their habitats by the harvesters. There is a lack of data that investigates how mechanical harvesting impacts both short and long-lived species.
    - Eastern Musk (rare, non-swimmers) and Painted Turtles (common, can swim) are small, long-lived species that could potentially be affected by bycatch from mechanical harvesting.
- Project objectives:
    - Understand current data gaps
    - Determine if turtles are being captured by mechanical harvesters
    - Determine the amount of bycatch captured by mechanical harvesters
- Results:
    - Very few studies discussed the impacts of AIS mechanical harvesting, and even fewer mentioned impacts on long-lived species
    - 43 turtles were captured and released, EMT turtles being the most captured species, but not a statistically significant difference in number per species.
    - Self-reported surveys captured 54 animals, 47 alive and 7 mortalities (1 snake and 6 fish)
        - Bycatch rates were low, but 43 turtles were caught.
    - Hand-sorted bycatch results sorted through 1400 liters of plant material. Mostly captured invertebrates, ~1,128 animals, 98% invertebrates, primarily zebra mussels.
    - Turtle surveys caught 220 turtles in 2023 and 2024. Included snapping turtles, map turtles, and spiny softshell turtles in addition to painted Eastern Musk turtles. Tagged 29 turtles with transmitters, but these largely failed due to difficulty downloading data and captured data didn't track whether turtles were able to avoid harvesters.
- Conclusions
    - Potentially low impacts to turtle populations, more work is needed in this space. Harvester operators were very willing to participate in monitoring.

Discussion

- Matt M. spoke about using art to communicate science with the public and acknowledging the work done by the communities for this type of work.
- Meg: Great to have this information, a long time coming!
- Matt M.: A lot of these harvesters have been doing this work for a long time, turtle/fish exclusion devices may be something that they can fashion. A lot of these people are brilliant in their own right so I'm glad to acknowledge their work!

6. End of Meeting Check-In
    - Matt: I just wanted to flag that both Meg and myself (Matt) have projects that are wrapping up during the hiatus.

    - Matt: Stone Environmental project studying how much P would be reduced by the sediment/erosion reduction practices. If you would like to be involved in the approval of this work, let me know.
    - Meg: We have the UVM fish monitoring project that is coming to a close. Since this was pre-PAC assignment, I'm going to assign Laurie Earley and Margaret Murphy to the PAC. So, we'll need a PAC to convene and approve this work during the TAC hiatus. Like Matt's project we will have an informational report out in September.
    - Neil: Who's interested?
    - Matt: If we were building a PAC for this one it would be good to get Sarah, Erin, and Laurie to get state and fed reviewers.
    - Neil: What about your project Matt?
    - Matt: We have a PAC for that project, so we are all set with reviewers, but wanted to open it up in case anyone is interested.
    - Brian: You want me involved, Meg?
    - Meg: You or someone else from DEC
    - Brian: I'll investigate experts from DEC for this
- Neil: You will be receiving information regarding the TAC budget for FY26. EC/SC approval came through and federal funding came through officially too. How would you like to communicate this?
- Matt: We'll do it the same way as last year. Anything you want to be included in just note it. For each project we have 1-2 TAC members that are looking at projects closely providing more thorough reviews throughout the life of a project.
- Neil: Great way to get plugged into individual projects.
- Matt: Seems like a good approach for this group.

7. Discussion: TAC point people for FY25 Clean Water and Healthy Ecosystems research projects

- Removed from the meeting agenda. The conversation will be held over email. Matt will reach out.