

**Lake Champlain Basin Program
Technical Advisory Committee meeting
Wednesday, September 4, 2024, 9:00 AM – 2:00 PM**

Held remotely via Microsoft Teams

Approved TAC meeting summary

TAC Members: Jennifer Callahan, Ryan Cunningham, Laura DiPietro, Bryan Dore, Michele Fafette, Curt Gervich, Peter Isles, Neil Kamman, Steve Kramer, Margaret Murphy, Helen Polanco, Andrew Schroth, Jamie Shanley, Daniel Tremblay

LCBP + Lake Champlain Staff: Mae Kate Campbell, Katie Darr, Corrie Miller, Meg Modley, Matthew Vaughan, Sonya Vogel, Sarah Coleman, Erin Vennie-Vollrath, Colette Ward

Guests: Melanie Giangreco, Eric Roy, Mark Ferguson

1. Updates, announcements, public comments

- Neil welcomed the TAC back to regular session.
- Jamie (USGS): We experienced significant flooding in Vermont again this summer. Montpelier was spared this time, but St. Johnsbury and Barre were not. The US Geological Survey still does not have an office since being impacted from the 2023 floods. It looks like we will relocate to Waterbury in 2025. We will be under a 3-year lease with the intention of moving back to the Federal Building in the long term. We are currently using some space at the Community College of Vermont for lab operations.
- Margaret (VTFWD): In light of the flooding, we are doing our best to remind people about the importance of aquatic organism passage and that leaving wood in streams provides habitat and flood resilience benefits. We've been observing lower-weight lake trout than we've seen in the past, and we are considering eliminating stocking for the species. The balance between predator and prey ratio is the new challenge. The first wild fish that we saw in 2015 may be reproducing.
- Andrew (UVM): The erosion that I observed from the July flooding event is unlike anything I've seen previously. A local elementary school flooded for the second time in six months and is seeking resources for solutions. In research news, the Cooperative Institute for Research to Operations in Hydrology (CIROH) initiative is developing a nutrient forecasting model for tributaries to Lake Champlain using the national model to build off of the work that Peter did using machine learning to predict impact. This could be something to feature on the LCBP data portal.
- Sarah (VTDEC): Yesterday our request for proposals (RFP) for private road erosion inventory closed, and we are working on application review. This scope of work involves technical assistance and analysis for improving spatial data on roads and hydrologic connectivity and evaluating the standards by which we are evaluating BMPs.
- Daniel (MELCCFP): During the last flooding event we did not hear of emergency situations from the intense storms.

- Matt and Meg (LCBP) provided LCBP updates:
 - The 2024 *State of the Lake* report was released in June. We are conducting education and outreach initiatives, including responding to multiple requests for interview and media events. The report included a new section on the 2023 flood, which was the first time since Tropical Storm Irene that flooding information was featured.
 - Matt is working on analyzing data to compare the impacts of the 2023 and 2024 floods.
 - LCBP has multiple open RFPs, including Clean Water and Healthy Ecosystems Planning and Implementation projects, which includes categories for aquatic invasive species (AIS) and aquatic organism passage projects. Other open RFPs include the Artist in Residence program and the NY Agronomy program.
 - We have a new team member! Sonya Vogel has joined the LCBP staff as an Assistant Scientist. She has worked with Andrew on studying winter nutrient loading. The US Army Corps of Engineers (USACE) Champlain Canal Barrier phase 2 contract is nearing execution. This is the 2nd phase to look at aquatic invasive species solutions, utilizing Section 542 funding which requires a 35% local match that will be split between the New York State Department of Environmental Conservation (NYSDEC) and LCBP/NEIWPC. We are hoping that this fall we can begin traffic studies, operations, and the National Environmental Policy Act (NEPA) process. Phase 2 will take 18 months and will lead to a preferred alternative that can lead to full federal funding.
 - The Champlain-Hudson Power Express (CHPE) remediation funding is forthcoming. Projects installing an electric barrier at lock C8 on the Champlain Canal and an economic study on the impact of AIS and movement through Chambly canal.
 - The Chambly canal is currently closed; there is an issue that caused it to be shut down. The canal sustained some damage, excessive runoff may have compromised one of the walls, so it's been shut for repair.
 - We have detected round goby eDNA above lock C2 twice now, but have not caught fish in hand. NYSDEC and Canals have changed operations to double flush and do scheduled locking. We are working to expand monitoring between locks C2 and C4. On the Richelieu River side, there has been a positive eDNA detection. The Quebec Ministry of the Environment is doing rapid response detection.
 - The Boat Launch Steward (BLS) field season is winding down; we still have staff at decontamination stations and other spots. The Québec program is shut for the season. We have had a lot of interceptions, including one big save from a lake in Massachusetts (Fanwort).

TAC season overview, fall workplan review scheduling

- Matt reviewed the 2024-2025 TAC season schedule document and provided an overview of expected meeting topics for September - June.

- TAC meeting format was discussed. TAC members agreed to hold longer, more discussion-focused meetings primarily in-person with a remote sign-in option. The October meeting will be held in person.

Review and approve summary of previous TAC meeting

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

By: Margaret

Second: Jenn

Discussion: Neil made some minor comments on the document.

Vote: All in favor.

2. Discussion: FY25 Clean Water and Healthy Ecosystems research priorities

- Matt: We received a lot of ideas through this process this year. These priorities will feed in to our request for pre-proposals (RFPP) for projects that will begin in 2026. The idea is that we have separate topical areas, referred to as research tracks. One track is general Opportunities for Action (OFA), then we have specific call-outs for areas of interest to the TAC with specific priorities within those tracks. This allows similar projects to compete against similar projects, which makes it easier to rank and compare. We received good feedback from reviewers and applicants on this process. We asked Steering Committee members to discuss with their teams management-focused research needs and provide their suggestions to the TAC. We will walk through and discuss these ideas, form a recommendation to the Steering Committee, then with their approval build these priorities into the RFPP.
- Matt reviewed the FY25 submitted research priorities draft document and tracks that were developed for last year's RFPP.
- TAC members reviewed and discussed submitted priorities in categories including: wastewater and developed lands, erosion and stream function, and water quality and project performance. Edits were made on a shared document, [available here](#).

3. Workplan review: Monitoring distribution patterns of invasive crustacean and mollusk communities to prevent further spread (Melanie Giangreco, Upstream Consulting & Evaluation, LLC)

- Melanie introduced the project and shared a presentation. The purpose of the project is to analyze available data and sample 90 sites in VT + NY for invasive mollusks and crustaceans to better understand baseline distribution and characteristics of sites that are more prone to invasion. Project tasks include:
 - Project Preparation and Planning: QAPP, E&O plan, permitting, analyzing publicly available data to inform site selection, outreach to landowners for permission to sample, finalizing sampling sites, and ordering supplies.
 - Data collection & Analysis: Analyze publicly available datasets (USGS Nonindigenous AS Database, NY iMapInvasives, VT DEC AIS Map, EDDMaps, NatureServe, iNaturalist), onsite data collection

- Dissemination & Reporting: Educational materials, microsite with map, data shared on a rolling basis to relevant state/fed agencies (focus on reporting mollusks and crustaceans, but will also make it a point to monitor and report other AIS identified), full data sets posted on VT Center for Ecostudies website, 3 classroom visits, 3 community events, conference presentation, peer reviewed paper, final technical reports.
- Melanie provided additional detail on project methodology in response to TAC questions. The project team will use a modified version of the Great Lakes Aquatic Nonindigenous Species Risk Assessment (GLANSRA) framework, to inform site selection. Potential sites will be ranked based on priority criteria (proximity to LC, boat ramps, fishing access, and recreational sites, where there are established invasive mollusk/crustacean presence, and where there is limited research). Prioritization based on feedback from state and federal agencies will be factored into the ranking process. 90 sites will be selected for sampling (30 sites per year over three years). Sampling methods will include crayfish traps, timed searches, and water samples for eDNA detection of dreissenid mussels.

Discussion:

- Erin: How are you going to weigh doing river or stream sites vs lake sites, and do you think the species you're going to look at will change the methods or use the same methods?
 - Melanie: The methodology will be fairly similar, we are looking mostly at river sites along the main tributaries and the lake. Sampling methods are going to change depending on which species will be in a river vs. a lake, a lot will potentially be present in both
- Neil: Are you intending to sample Lake Champlain itself?
 - Melanie: Yes.
- Meg: Will you be sampling rivers and lakes just at the mouth/shoreline?
 - Melanie: Our intention was to sample close to the shoreline. Samples will not be collected at significant depth.
- Neil: I appreciate the confidence with this workplan. My own sense is that the higher value information is going to be in the slow-moving river reaches around the lake, or a little upstream. I see areas of really dense crayfish activity in certain waterbodies I visit. I wonder if there's an opportunity to pull that expert opinion from state agency folks, watershed groups.
 - Melanie: The plan is to get feedback on the sampling sites. I agree that river sites are of interest – the Lamoille River specifically might have a spot right where the invasion zone was, far upstream. Similar areas in other water bodies are of particular interest.
- Margaret: On site selection, we are interested in preventing further spread of AIS. For doing eDNA analysis for zebra mussels, we already know they're there. Why not just jump to quagga?

- Melanie: The way that PCR test is set up is a two-step method. The first phase is detecting genus only, we wouldn't know before the second phase if there are quagga mussels, the second phase is species level.
- Neil: We haven't identified a need for a project advisory committee for this project, but keeping this on the radar of Kim Jensen's team and others at NYSDEC and in Québec would be valuable.
 - Meg: We will continue linking Melanie to key contacts.
- Neil: This is a very cool opportunity to get data at a lot of sites, some bias may be okay in the circumstance.
 - Meg: As the project develops, our team wants to weave in a piece with disadvantaged communities as effectively as possible. If crayfish is being used as bait or in other ways, can share our knowledge more effectively.
- Margaret: For the educational piece, you state 3 classroom visits for K-12 audiences, which is a wide span. Is there a specific age group that should be targeted? We want to make sure those classroom outreach events are getting the most impact among those students.
 - Meg: Some high/middle schools have very active fishing clubs that do tournaments on rivers/lake. We will be messaging those groups in particular to see if they can target this project.
 - Neil: Bass fishing specifically at some schools, could be a great audience to target for this work.

Motion: To approve the workplan

By: Margaret

Second: Jenn

Vote: All in favor

4. Workplan review: Net phosphorus retention by non-floodplain wetlands in the Lake Champlain Basin (Dr. Eric Roy, University of Vermont)

- Eric Roy shared a presentation. He noted that non-floodplain wetlands remain understudied, and in particular, their potential effectiveness in phosphorus (P) cycling and benefits to water quality are not well understood. The overall objective of this study is to clarify the P reduction benefits provided by non-floodplain wetlands in the Lake Champlain Basin. Tasks include:
 - QAPP
 - 2 years of field monitoring - up to 18 sites total, monitoring each for 1 year.
 - An outreach program with Winooski middle school (2 years)
 - Expanding an existing wetland P retention model to non-floodplain wetlands
 - Developing a web-based wetland P retention calculator
- The project includes a project advisory committee (PAC). Field monitoring will focus on water level/hydraulic residence time, influent water quality, soil P stocks and P storage capacity, and vegetation P stocks. Sites will be selected in consultation with the PAC and will span a continuum of anticipated conditions.
- Eric reviewed field methods, including in-situ hydrology measurements, water quality probes and grab samples, soil cores, and collection of vegetation biomass samples.

Using these data, the existing wetlandP model will be adapted to non-floodplain wetlands. The model and field data will be used to generate a set of scenarios that will serve as the foundation for a web-based wetland P retention calculator that will allow users to generate site-level net P retention estimates that will be suitable for non-floodplain and riparian/floodplain wetlands.

Discussion

- Neil: In terms of the sources of P to non-floodplain wetlands - what is your understanding of the atmospheric deposition component? We know it's there, but likely not a predominant source.
 - Eric: Atmospheric deposition can certainly be important - transport of fine particles in the air. When we've examined that before and looked at estimated rates in the literature, atmospheric inputs have been a relatively minor contribution. We can look again and see if that would be important. Right now, only looking at P input from water. We could do some calculations to make sure we aren't missing something important.
 - Neil: Back in the original total maximum daily load (TMDL), atmospheric deposition got looked at as a P source.
 - Eric: Depending on the size of a watershed, a lot of P from atmospheric deposition is captured in influent P measurements since that deposition is happening into the watershed, not on the wetland itself.
- Matt: I'm really excited about and appreciate the outreach component of this project. How computationally intensive is the wetland P R code? I've had experience where that doesn't work well with a Shiny app.
 - Eric: It's not super computationally intensive. The idea is to generate a large number of potential scenarios in advance, then allow users to make parameter selections to identify the most appropriate scenario.
 - Matt: I appreciated the mock-up of the calculator, that helped me visualize the product.
 - Eric: People have gone to great lengths to try to have code running in the background, which can be a pitfall. We are trying to avoid that problem and balance rigor and utility.
- Jamie: Nice presentation. On atmospheric deposition, you mentioned particle P and ruled out gaseous, but what about dissolved? Dissolved in rain?
 - Eric: Great question, have you seen any estimates?
 - Jamie: We measure it at Sleepers River, often below detection. We worry about particles from vegetation and pollen.
 - Eric: One scenario where this could be important is in a depressional wetland surrounded by agriculture. Agriculture generates a lot of dust. Outside of that with more isolated systems, we would expect this input to be negligible. I'd be happy to consider other sources and do some calculations.
- Sarah: My questions can be brought up at the project advisory committee level. I have a question about how the tool will work in terms of balancing prioritization and cost reduction for restored sites. It could be useful for both purposes, so I'm excited to dig into that on the PAC.

Motion: To approve the workplan

By: Jenn

Second: Steve

Vote: All in favor

Abstention: Andrew

5. Final report review: Conservation of the Lamoille River Mudpuppy (*Necturus maculosus*) Population Using Translocation and Monitoring (Mark Ferguson, Vermont Department of Fish & Wildlife)

- Mark shared a presentation. The goals of this project were to enhance the resiliency and long-term viability of mudpuppy in the Lamoille River by establishing a novel population upstream of the Peterson Dam, and to increase our understanding of mudpuppy migration. To accomplish this goal, mudpuppies were trapped between March-April. Mudpuppies were processed (measurements of length and weight, markers for identification, small amounts of tissue taken for future work), then taken to the relocation site and released. Over the course of the study, 18 animals were radio tagged to study movement patterns.
- Project takeaways include:
 - Most movement occurs in spring. There is little movement in the summer, with a small increase as the fall comes in October and November.
 - Relocation is likely increasing the distance the animals moved in the early spring. Are mudpuppies potentially moving back to familiar habitat or habitat where they like to breed? The less exaggerated movements in the fall were the result of settling into comfortable territory.
 - Of the 18 animals that were tagged: 7 animals survived, 6 went missing/whereabouts unknown, 5 were presumed dead. Predation risk could have been increased since the mudpuppies were relocated, moving more than normal.
 - Flooding in 2023 didn't appear to have a major effect on the tracked animals. However, 2 of the animals ceased to move later and were presumed dead.
- Next steps:
 - Attempt to track mudpuppies in the relocation area
 - Sample to assess reproduction- were the animals able to establish themselves in a new location?

Discussion/Questions:

- Neil: A lot of basic natural history is inferable from your data- to what degree will this work contribute to the natural history of this species?
 - Mark: Trying to have information before conducting a project is important. For introduction or re-introduction projects, this work could be helpful for the future. No one had previously done tracking work for mudpuppies other than through trapping methods. There was one other person who started a grad project and was helpful to me in this project - not relocation, but tracking. This study is the first time radio tracking has been provided for this species. It's a species of

concern in other regions as well. The one caveat here is this is looking at relocation and seasonal movement; it's hard to separate out those variables.

- Neil: It seems like there are themes in there where the animals have a lot of movement or very little, a level of natural history study on top of the relocation study.
 - Mark: Our findings agree with previous work. We assumed that if trapping success increases, it's due to increased movement. I was trapping at stationary locations and would have more animals move in. My best trap was approaching 1 mudpuppy every time I checked it. Higher trap rates I do think indicate higher movement rates. Also, when the water temperature increases too much, movement shuts down and you don't catch them anymore. My results were in line with that.
- Meg: Laurie, Margaret, and Erin were TAC point people on this project. There were a few comments from Laurie- recovery time and how long tagged mudpuppies were held, were any tags retained to conduct battery life tests?
 - Mark: Recovery time, refer to the appendices it is reported in the 2023 implantation to cover those questions. Expected battery life is reported by the company they were purchased from. I chose the longest battery life to attempt to track them for the following year. I was only able to detect one following the 2023 season. The maximum of their range was 441 days.
- Meg: One question about animals that were not detected, is it possible that it was delayed mortality from tagging?
 - Mark: It is always possible that a death could be due to delayed mortality, we didn't have a way of recovering the animal soon after it died. If the animal died, we would expect the signal to still be picked up.
- Neil: The one the pike ate could be anywhere.
 - Mark: Probably my leading theory - predation by large fish which swallowed these animals, or avian predator (heron) that picks these things and flies elsewhere, outside of our range.
- Meg: If we wanted to establish a breeding population in this new reach of the Lamoille River, are there any data or numbers that suggest what population density we would need to establish a new breeding population?
 - Mark: You can establish a population with 30 individuals, but for no shared genomes you need over 1,000. I went somewhere in the middle. Hopefully we get at least 30 in the end that survive.
 - Meg: I would love to see this effort carry forward.
 - Mark: I think the first step is to assess whether or not we have surviving animals. It's difficult working with species you can't capture in a net. Either eDNA or trapping in March or April will allow us to assess.

Motion: To approve the final report pending incorporation of written comments submitted by TAC reviewers.

By: Jenn

Second: Margaret

Vote: All in favor.

6. Continue FY24 Clean Water and Healthy Ecosystems research priorities if needed

- TAC members continued the discussion on submitted priorities in categories including cyanobacteria, invasive species management, and habitat and native species. Edits were made on a shared document, [available here](#).