

**Lake Champlain Basin Program
Technical Advisory Committee meeting
Held remotely due to COVID-19
Wednesday, February 3, 2021, 8:45 AM – 2:00 PM**

Approved TAC Meeting Summary

TAC Members: Bill Ardren, Jennifer Callahan, Ryan Cunningham, Bryan Dore, Curt Gervich, Neil Kamman, Steve Kramer, Margaret Murphy, Mario Paula, Ryan Patch, Andrew Schroth, Jamie Shanley, Lauren Townley

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

Guests: Rebecca Diehl, Nisha Nadkarni, Oliver Pierson, Andres Torizzo, Beverley Wemple, Thomas Adler, Meghan Arpino, Amy Macrellis, Kristen Underwood, Matt Schley, Rob Evans, Don Ross, Basil Waugh, Dave Braun

1. Executive session for RFP review: Unifying stormwater technical assistance programs for private properties in the Lake Champlain Basin (*Lauren Jenness and Colleen Hickey, LCBP*)

Motion to enter executive session: Jen Callahan

Second: Andrew Schroth

Exit executive session

2. Updates, announcements, public comments, review and approve summary from previous TAC meeting

Updates and Announcements

- Oliver: 2020 data for Lake Champlain tributary monitoring efforts have been migrated to Vermont Department of Environmental Conservation's (VT DEC) website; all of the lay monitoring data are up as well. DEC has issued a draft permit for the reefing of the ferry Adirondack in Lake Champlain, which is out for public comment. A permit should be issued soon for herbicide use to reduce Eurasian watermilfoil in Lake Iroquois. There has been lots of interest from the public in VT DEC's response on this issue. A meeting will be held on Friday 2/22 to discuss Rock River monitoring progress on best management practices (BMPs). We are developing new lakes landcover maps, which are currently available for 23 lakes.
- Neil: I forwarded a DEC press release about the new [Clean Water Performance Report](#) release. Given State investments made over the past 5 years, we are approaching 13% of the total phosphorus reduction necessary to meet the total maximum daily load (TMDL). These initial reductions are largely attributable to the agricultural sector. We will

continue to carry these nutrient reductions over time if the practices are kept up. We are also seeing an increase in the amount of reduction from developed land due to increases in implementation efforts and our ability to track nutrient reductions. On 2/8, there will be a lecture in the clean water series. We've received revised revenue projections coming in from rooms and meals tax and have identified additional dollars in the clean water fund that we had not expected. The clean water board met to consider how to add \$1.4 million into the clean water budget. They chose to restore the budget back to fiscal year 20 levels; dollars are being invested in the agricultural area, as well as multi-agency partnerships, and in stormwater. There will be additional dollars plugged into 2022 as well following the Board's process.

- Matt: Technical full proposals due in a week, TAC will review and score full proposals at the March TAC meeting.
- Mae Kate: The International Joint Commission (IJC) Lake Champlain – Richelieu River flood study's report on structural solutions will be released before the end of the month. LBP has begun planning the next Lake Champlain Research Conference. It will be held at the UVM Davis Center on January 10th and 11th, 2022.
 - Eric: We are working with Sea Grant and the Lake Champlain Research Consortium to be planning this conference. Let Mae Kate and Lauren know if you want to be on the planning committee.
- Jamie: USGS is starting a 2-year study on glyphosate, the chemical used in Roundup. Its use is on the rise, but there are no data on how much is going into the lake. We will be sampling this summer and targeting high flows from agricultural areas.

Review and approve summary of previous TAC meeting

- **Motion to approve by:** Jenn
- **Second:** Margaret
- **Discussion:** Neil: I've noted in the past that the minutes are very complete. I am wondering whether they are becoming so complete that they are taking too much staff time. Matt: I agree, Mae Kate and Lauren work hard to capture this conversation. It's been useful for me to go back to the summaries with this amount of detail, but we can work to summarize the notes more if TAC requests. Oliver: I appreciate the detail and often learn things from the minutes for meetings I haven't been able to attend that I receive. I haven't found the detail to be onerous.
- **Vote:** All in favor.
- **Abstentions:** None.

3. Final report review and approval: Evaluating floodplain potential for sediment and phosphorus deposition: Development of a framework to assist in Lake Champlain Basin planning (*Rebecca Diehl and Beverley Wemple, UVM*)

- Rebecca Diehl presented. She provided an overview of efforts over the past 2 years to improve our understanding of functioning of floodplains. The study created the first comprehensive base map of floodplain surfaces, developed the first large-scale dataset

of floodplain sediment and phosphorus deposition rates in the region. They found that floodplains in the region can be highly effective (average = 35%) at capturing phosphorus. They developed a management framework from statistical models to help outline the benefits of specific interventions and make decisions about where to prioritize future work.

Discussion

- Several TAC members offered congratulations and praise to the project team.
- Matt: Thanks for the awesome presentation. I'm excited to comb through results. I wonder about estimating phosphorus load to rivers and the percent of phosphorus deposited on the floodplain. Are you using the Clean water roadmap?
 - Rebecca: We used the hydrologic unit code (HUC) 12 values, divided by stream length. Matt: So, you take the average efficiencies of 35% of the total load from HUC12. Rebecca: Each floodplain had its own efficiency, the average of each of those was 35%. Matt: Does the variability in annual load factor into our understanding? Rebecca: We use those numbers, it's important to understand in terms of efficiencies. I wish we had a more robust understanding of what loads are. If we have the opportunity to think about how these dynamics look over long term scales, incorporating loads would be a piece of the puzzle.
- Bill: Thank you for this presentation. We are doing salmon restoration work, and we consider river geomorphology since it influences where they spawn. Have you thought about using the maps you developed to talk about other positive effects of wetlands, and opportunities to restore/conservate them through time?
 - Rebecca: The work that we are doing is getting tied into other projects. We have been looking at in-channel processes and stream power signatures, how those are mapped throughout basin, connections with incision ratios, etc. We are in the process of linking up these concepts. That ideally will be part of the Functioning Floodplains Initiative (FFI). Those maps will be available. There are absolutely opportunities, this research was not conducted in isolation.
 - Beverly: There is a habitat component under development for the FFI.
- Andrew: You have an inventory of samples that could be used to characterize total phosphorus and reactive phosphorus. A cool way to link this work with Eric Roy's work would be to prioritize investigating which floodplains capture the most reactive phosphorus, since the drivers of that might be different than the drivers of total phosphorus capture. That could help identify wetlands where phosphorus could be re-released. It would be a cool follow up to explore.
 - Rebecca: Can you do that on archived samples? Andrew: If you freeze dried them. Rebecca: We are working with Eric to merge our research and to look at particulate vs soluble reactive phosphorus dynamics, this suggestion could be a neat future step.
- Jamie: I'm curious about the fate of phosphorus in the floodplain, I'm glad to hear it's something you are thinking about. I wonder if the variables distance from channel and frequency of inundation are cross coordinated?

- Rebecca: We see an opposite relationship between inundation of two settings because of medium and low energy differences, and elevated surfaces close to the channel. It depends on which setting you are in. Jamie: With higher depth closer to the channel, is that from small frequent events or large ones? Rebecca: The data were collected after individual flood events; we don't have the capacity at this time to integrate. Literature on the mechanics of sediment indicate that you get levies because sediment drops out close to the channel, we see that effect often, it stands out in the data. The limitations of short duration investigations into long-term processes are that we have to target areas closer to the channel and that were more likely to be inundated to get our data.
- Neil: This is really important work, and really important messaging to get right. The punchlines include the 35% deposition figure. We don't want to misuse that in the TMDL sense, but we do have the opportunity to show the value of floodplains in holding sediment back. I hope to discuss with partners how we optimize the short time results of this study for our messaging. It could be referenced in the clean water report. In terms of the method used to quantify total phosphorus, that can vary a lot between studies. What's your sense of the applicability of your methods used in terms of translating phosphorus retained to the TMDL accounting framework?
 - Rebecca: The ICP and total phosphorus methods used are conservative. Also, the rates we capture are going to be on the higher end, as they are snapshot of flood events. These events are not integrating what's going on over time, generally the numbers we are seeing are on the higher end. Beverly: That's something to think about in terms of the loads used to normalize, there's wiggle room.
 - Neil: There is an ongoing phosphorus/sediment study that could be leveraged to answer what the optimal methods are to use for these processes.
- Matt: I'm thinking about the relationship between impervious cover and deposition. It looked like you showed that at low levels, deposition is better with increasing impervious percentages?
 - Rebecca: That's because our dataset only had low impervious sites, less than 2.5%, and we didn't really look at urban streams. Within that range, we found that greater upstream impervious surface was correlated with greater deposition. Matt: Could that be problematic for programs treating and removing impervious surfaces? Neil: Flashier watersheds will push sediment down. Matt: In terms of the interpretation of that - looking at the deposition rate, but not the load compared to other watersheds, there might be higher loads to begin with. Rebecca: The rates did come out in efficiencies as important. The rate itself is higher downstream of impervious surfaces, but we don't know how that translates to urban watersheds. This is a gap in our knowledge and something we should keep eye on.
- Amy: For follow up later - I am still in QAPP development on the LCBP funded "Uniform accounting for Soil and Sediment phosphorus reductions in evaluating water quality project benefits" project. We have an opportunity to choose phosphorus extractions and

specific sites/clean water project types. I look forward to discussion with Rebecca and others as to how the work I am beginning can add the best value for all!

Motion: To approve the final report as presented.

Motion by: Jenn Callahan

Second: Andrew Schroth

Discussion: Margaret noted an inconsistency in the number of points shown in figure 1 vs. the number of data points collected.

Vote: All in favor.

4. Review and discussion: Project concepts for FY21 Lake Champlain phosphorus TMDL implementation (*Sarah Coleman, VTDEC*)

- Sarah Coleman presented. Vermont proposes 3 initiatives for FY21 funding, which are all continuations of past initiatives: 1) priority wetland acquisition, restoration, and conservation, 2) enhanced agricultural practice implementation, and 3) Green schools initiative and public private partnerships to support stormwater compliance.
- Neil: The priorities demonstrate a strong focus on implementation this year. Remember that we have a neat project running in Missisquoi currently.

5. Interim report review and approval: Tile drain base-flow phosphorus removal using St. George Black (*Andres Torizzo and Nisha Nadkarni, Watershed Consulting Associates*)

- Andres and Nisha presented the results of this project, which analyzed the effectiveness of using the St. George Black (locally sourced shale material) to capture phosphorus from tile-drain effluent coming from an agricultural field in the Jewett Brook watershed. Their measurements from the first year of monitoring showed that total phosphorus concentrations were reduced by an average of 36%, total dissolved phosphorus concentrations were reduced by an average of 41%, and soluble reactive phosphorus concentrations were reduced by an average of 45%. The team will continue monitoring the project over a second year.

Discussion

- Ryan P.: How much of the baseflow are you able to collect and treat through the system? How large is the field that is being drained by the tile drain outlet? Does the sump move water from the collection point at end at tile where you are filtering? Is the sump running continuously? How much flow is going through the system over the course of the year? Do you turn the sumps on and off?
 - Andres: I can check on the drainage area. Even after significant rainfall events, the sump was not running substantially, which could be because it was a dry year. The pump has to be manually turned on after an event, let run to get water filling through the media, then programed to activate and collect samples.
- Ryan P: The duration of the effectiveness of the media, with waters flowing through, is something to think about. If does become saturated, is there a disposal plan? How can it be utilized?

- Andres: When we originally acquired the material and got approval from the farmer, the plan was wasting it somewhere on the land, in an upland area. Right now, we don't have a specific disposal plan. We will have to address this year.
- Andrew: Is the plan to only expose the media to low flow? Or if not, would you want to get a feel for particulate loads in stormwater and the media's capacity to absorb phosphorus in those conditions?
 - Andres: We are envisioning that this would be paired with a system treating higher flows, that would have higher flows diverted into a basin with outlet control that would meter our particulates, and allow you to dose the filter system with water in controlled fashion. The basin would also filter out sediment.
- Margaret: In a real-world example, you'd have it set so pumping moves from the tile drain into the media and then is discharged back. Is that how you'd envision it if it was successful on land, and how do you get farmers to maintain the systems?
 - Andres: You could set it up as a gravity feed. You'd have a stormflow basin with outlet control, water would go into a second bay with the media, then there'd be a concrete bunker, set up by elevation. Water filters through media, it doesn't necessarily need to be a pump system.
- Neil: I'm curious as you go through year 2 if it would be feasible to compare the results of the St. George black with other materials. Dave has nearby studies and there are capital equipment assistance program (CEAP) studies in Addison county. With three different projects running that looking at this, it'd be good to compare.
 - Andres: It is an interesting thought to look at using the media outside of agricultural settings, like applying it to urban stormwater. Good resources to have.
- Neil: Do you think the media could be use in the design of passive stormwater systems like raingardens, used as an amendment to the soil to allow additional retention?
 - Andres: Absolutely. It could be amended into a gravel layer, or you could have a layer that is 100% this material. The structural may not be sufficient, but there are ways to amend it in. Or, you could have a check dam or spread it on the surface. There would need to be investigation that water would be in contact with the media for an appropriate amount of time.
- Ryan P: In the chemical analysis section in terms of recommendations to farmers for total phosphorus, dissolved phosphorus, and soluble reactive phosphorus, do you have commentary on those results or will you be looking at that in year 2?
 - Andres: We don't have input to provide right now, but we'll look to that at the end of year 2. It wasn't a primary focus of the study currently.
- Matt: I don't see any big roadblocks to incorporating TAC questions into the 2nd year of this study.

Motion: To approve the interim report

Motion by: Ryan Patch

Second: Jenn Callahan

Discussion: Ryan P.: I noticed a minor typographical error in the report. I'll send a note to Matt.

Vote: all in favor

6. Vessel Incidental Discharge Act (VIDA): Great Lakes and Lake Champlain Invasive Species Program Update (*Meg Modley Gilbertson, LCBP*)

- Meg presented. The Great Lakes and Lake Champlain Invasive Species Program report was delivered to Congress. Recommendations in the report include establishing a more robust aquatic invasive species (AIS) early detection and monitoring program in Lake Champlain, enhancing ballast water research, and increasing funding to states and tribes. The Lake Champlain Steering Committee will consider a line item to support a graduate student in populating a Great Lakes Aquatic Nonindigenous Species Information System (GLANSIS)-style database for Lake Champlain.
- Mario: This project has been an excellent collaboration, hopefully the VIDA program will receive an appropriation.

7. Review and discuss content for the 2021 State of the Lake and Ecosystem Indicators Report (*LCBP Staff*)

Matt: Staff are trying to wrap up as many figures as possible and have text drafted by early March. Beyond this conversation, we may be reaching out to TAC members individually with any remaining questions.

Wastewater treatment facility loading

- Mae Kate: Our plan is to keep this graphic in the same format as in the 2018 report, and add updated data. We have updated data through 2019 and are waiting on 2020 data, which we expect to receive by the end of this month. Matt drafted new graphic. Do TAC members have comments on way these data are communicated?
- Matt: One question I have is if we should stick with VT having two different TMDL limits shown in the graphic? As the initial TMDL was redacted.
- Neil: TMDL limits and effluent limits are in the VT statute. Starting the line in 2016 is a bit awkward and having the 2002 limit is also awkward. I'd mark the line clearly as the VT 2016 TMDL limit, and draw it back.
- Lauren T.: I agree to having one limit per jurisdiction brought back across the graph.
- Neil: For the timeline captioning: you could show milligrams, equivalent NY adoption of VT effluent standards. In the new phosphorus TMDL established in VT, you could reference that wastewater effluent limit of 0.8 or 0.2.
- Lauren T.: I don't think NY has something equivalent, the limit varies based on facility. Maybe you can include major upgrades to highlight instead of a general NY one.
- Neil: That 2002-2004 reduction on the NY side correlates to work done under the NYS Bond Act.
- Lauren: You could highlight if we've infused a lot of money over a given period, or if a specific facility had a major upgrade which reduced loading.
- Neil: The clean water performance report relates and may contain numbers and info.
- Matt: The dataset that we collected includes other things like concentrations and discharge. We can include what average concentrations/loads are if TAC has interest.

Cyanobacteria reports graphic

- Mae Kate: We are waiting on 2020 data for this one as well, Oliver is conducting quality control and assurance with partners. Our plan is to present these data in a similar way as they were presented in the 2018 report.
- Oliver: Quality assurance is ongoing. We have 2500+ individual entries that need to be looked at. 2020 was a year with more incidents of category 1-2 reports. If the differences are marked 2018, 2019 and 2020, we could indicate that it was a dry summer, there was perhaps less loading, warmer temperatures did X, which led to increase in blooms. We could show that graphically and explain it in the text. I saw media at end of 2020 suggesting that it was a “bad year” for cyanobacteria.
- Matt: To generate the map, we use only routine reports and filter out supplemental reports so as to not skew the data. We only include sites that have 8+ reports during each monitored each year. We then calculate the percentage of high alert conditions to determine if the status is good, fair, or poor.
- Andrew: For the status legend, if we didn't want to frame as good/fair/poor, we could frame it in terms of the frequency of blooms: infrequent, moderate, etc.
 - Matt: We've used good/fair/poor to be consistent with other SOL graphics, but we are open to adjusting it.
- Matt: Should we show alert conditions as a gradient of colors instead of categories?
 - Neil: That might make it more busy
- Meg: I think the good/fair/poor structure should stay for SOL, but having some better definitions would be useful. Cyanobacteria status are one of our indicators.
 - Matt: The indicator can stay good/fair/poor, but we can think about it differently for the map.
 - Neil: Consistency is good. Good means 'swimming is virtually unlimited by cyanobacteria' poor is 'swimming is limited beyond a reasonable amount'
 - Matt: We could have none/infrequent, occasional blooms, frequent blooms. The colors mean different things in the map versus the bar.
 - Neil: Good means less than 2% of time is a beach at any alert condition.
 - Matt: Correct, 98% of time it's at no alert condition.
 - Oliver: I like how the bar graph uses the existing system. With the map, describing the site based on relative categories per site, like idea good means 98% of time this way, poor means X, etc. I wouldn't advocate for making changes to the map.
 - Matt: I'd think about flipping the percentages and wording.
 - Sarah: Switching good/fair/poor to be more of measure of frequency might make sense. If people see /good/fair/poor they may question if a beach is rates as fair if it's not a suitable site for swimming even if no bloom are present.
 - Matt: It might be worth giving the map a try with a gradient of colors?
 - Sarah: That may make sense, but I also agree the colors could be framed around bloom frequency.

Beach closures updated graphic

- Matt: We've had difficulties gathering the data we need to show beach closures on a map like we did in the 2018 report. Last time, we showed TAC "bar code" graphs for data due to cyanobacteria or coliform bacteria at different places. TAC was concerned about only showing a select number of beaches – so we've created a line plot showing % of beaches open vs. closed over time, and also showed these data in an area plot format.
- Neil: For a long time, we've been drawing a distinction between cyanobacteria and *E. Coli* closures. I'm not sure the general public gets the difference. We could be communicating that - adjacent to the area figure could be a number of proportions attributed to one type of closure or the other, and then you could have the closures aggregated on graph.
- Matt: In the text we do discuss difference between the 2 quite a bit. The combined sewer overflow (CSO) discussion has brought up need to draw a distinction.
- Oliver: I like the graph over years and closures (upside down mountains) it is powerful. I wouldn't want to use it exclusively, but it's nice to show the differences between years. I agree that for the CSO text section we want to distinguish causes of CSOs from cyanobacteria, but that isn't necessarily germane to this discussion on beach closures.
- Neil: How would you feel about inverting the line plot?
 - Oliver: I'm not opposed to using that approach.
- Matt: So, we could bump the scale up from 0-100, shade the bottom blue, and shade above the line red. Don't differentiate between types of closures
 - Neil: Take the area plot, expressed proportionally, squished down, and it shows the same richness of info as line plots. Make 2020 area plot, squish it down.
 - Matt: Take the 3 area plots, stack them so they look like the line plots? Neil: Correct.
- Margaret: I think the map is helpful for the public to pinpoint beaches to go to or avoid. I think the map and line plot together would be really powerful. I'm not sure we need to separate out types of closures, I like the simplicity of the line plot.
- Jamie: I like the idea Neil brought up. I like the added info, but I do see how it might confuse people. Would it help instead of making it green and purple to make it dark green and light green so people can differentiate or not? I like the number of beaches rather than percentage, it's more intuitive.
- Andrew: I don't have a strong opinion on % or #, I like the idea of scaling to 100, I like Matt's idea about use of color. What's up with sustained bacterial closure on the 2020 area plot?
 - Matt: It could be because of testing capabilities. The beach may have been closed for high count, then didn't re-test and re-open for a while.
 - Lauren: Ausable point state park for half a month.
- Lauren T: some state parks have pre-emptive closures due to rainfall.
 - Lauren J: We didn't ask for that data, it might be interesting.
 - Matt: to that point we need to be careful how we're describing this, closures are due to a measurement or concern for possibility of hazard.

- Matt: We have a couple options, seems like boiling the area plot down to the line style with just 2 colors, or area style but laid out more like line style. Margaret said the map is helpful, we may be able to have it in some form. Those are options we have support from the TAC for. And we are abandoning the bar codes.
 - Neil: Those are cool, but could be busy.
 - Meg: Bar codes would be cool online.
 - Matt: Map magic, hover over map and see bar codes.

CSO graphic update

- Mae Kate: This would be a new graphic to the report, designed to help to battle public misconceptions.
- Neil: I would provide the number to contextualize the 65% of CSO outfalls. It's valuable to have that statement. The point of reductions is the ick factor of CSOs.
 - Mae Kate: It's harder to find data on CSOs related to public health.
- Neil: Lauren, does NY have a 303d list that shows waterways which are impaired due to CSOs?
 - Lauren T.: I believe it would, it might be an overestimation though because it would indicate a whole segment as impaired.
- Neil: frame what impacts are, CSOs can be cause for impairment.
- Neil: The financial part about progress continues but retrofits are expensive is true, but I'm not sure that figures make the case. The figure assumes a ton of background knowledge. I wonder whether something simple, like the total cost of CSO projects lined up, would communicate that better. You could show the total cost and the total number of projects. Or show impaired segments.
- Oliver: I'm pleased for the attention to using the infographic to correct misconceptions and align with DEC messaging. There's interest in this graphic within VTDEC and Agency of Natural Resources (ANR) leadership. When we have a near final version, we need to share it within the department. I will follow up with Amy and John on the remaining VT data.
- Lauren T.: I did a quick search of 303d, it doesn't list any in basin impaired for CSOs in the Lake Champlain basin.
 - Neil - then forget that idea! It would only work if it was consistent across states.
- Neil: on pie chart, make the CSO slice colored in and the rest white or not filled in.

Conserved lands and beach access map

- Lauren J.: The new conserved lands graphic will be in the Thriving Communities section. We worked with lots of partners in all 3 jurisdictions to get these data. Updated 2020 data will be released soon, but it's not expected to change the graphic much. Summary statistics: 36% of the basin is conserved (1.9 million acres).
- Neil: Does this have public lands? Lauren: Yes, VT and NY databases do a good job of including state lands, federal lands, etc.
- Neil: It looks like part of the Adirondack Park is not included? Lauren: We checked the data and thought it did a good job of covering known conserved areas, but it's not 100% perfect. These are the best data that each jurisdiction could provide.