Lake Champlain Basin Program
Technical Advisory Committee meeting
Held remotely over Microsoft Teams due to COVID-19
Wednesday, November 4, 2020, 8:45 AM – 2:30 PM

Approved TAC Meeting Summary

Attendance: Bill Ardren, Kevin Behm, Jennifer Callahan, Jean-François Cloutier, Ryan Cunningham, Ryan Davies, Bryan Dore, Lauren Townley, Curt Gervich, Neil Kamman, Steve Kramer, Mark Malchoff, Margaret Murphy, Bridget O'Brien, Andrew Schroth, Leigh Walrath, Ryan Patch, Ryan Waldron

LCBP Staff: Mae Kate Campbell, Lauren Jenness, Laura Hollowell, Eric Howe, Meg Modley, Matthew Vaughan, Sarah Coleman, Elizabeth Lee, Pete Stangel, Colleen Hickey, Ryan Mitchell

Guests: Eric Perkins, Oliver Pierson, Tom Berry, Ethan Swift, Carol Adair, Lori Fisher**,** Ben Block, Pete Stangel, Brenda Gail Bergman, Carol Adair

Updates, announcements, public comments

Updates/Announcements

- Ben Block introduced himself as a representative of TetraTech, working on stream bio-restorations.
- Oliver: The 3-acre permit goes into effect on December 1st, 2020. The stormwater program at the Vermont Department of Environmental Conservation (DEC) is making progress to issue it. The natural shoreline erosion control certification training will be held virtually on Friday and there is still time to sign up, see details on our website. Newport, Vermont experienced a small sewage leak, in response DEC is coming up with an updated international communications protocol to address communication issues. It will be discussed at the Lake Memphremagog steering committee meeting on Nov. 10th The Town of Ripton, VT submitted a petition to reclassify streams (Goshen, Alder, Blue Bank) to A1 status to protect aquatic biota uses. DEC is working through those requests and hopes to have progress in near future.
- Margaret Murphy: Lampricide treatments were completed last week. All 4 treatments (Missisquoi, Lamoille, LaPlatte, Winooski) went well. All water quality advisories have expired. We collected samples from Québec for a few weeks following the treatments and all were negative. The Lamoille had a small protest in defense of mudpuppies. There was a mudpuppy relocation effort, ~50 mudpuppies were found and ~35 were relocated upstream.
- Neil Kamman: The Clean water board had its public hearing for FY22; they will be issuing final recommendations to the legislature shortly. Basin 5 is in the final stage of approval by the secretary. The clean water service provider rule will be going into the public process beginning in December.
    - Jean-François: The Québec Ministry of the Environment and VT DEC have a great working relationship. DEC's response to the low-volume sewage leak was totally appropriate. In that kind of minor situation, Québec would not have advised Vermont. There is total confidence between my office and the VT DEC.
- Eric: Sea Grant has restarted their Zoom a Scientist program.

- Neil: Conversations around marking the 50th anniversary of the Clean Water Act are ongoing. We are working to knit together activities of the TAC, CVNHP, and E&O to create joint programming. Have in mind the opportunity that our technical work presents in this process and the communications and outreach opportunities that exist.
    - Eric: I'll add that this came up through the CVNHP, the 50th anniversary is acknowledged in their RFPP that closed this week. We have a number of interesting projects in the works to mark this anniversary, one of which is to put together a 'retro' State of the Lake report, to be published in 2022, that examines the state of the Lake before the Clean Water Act was passed in 1972. We are working with a class at UVM to do background work for this publication. I will likely ask the Steering Committee to support a line item to push this celebration forward.
- Tom: Senator Leahy will be on VT edition at about 12:30pm, tune in if you want to hear his thoughts about the election situation.

LCBP Updates

- Last week, the Executive Committee approved the record of decision for the Enhanced BMP grants. Award letters will be going out soon, we can provide an update at the next TAC meeting. The Pollution Prevention and AIS Spread Prevention RFPs are closed, grant reviews are being organized. The Executive Committee will make a decision on those awards on November 18th. The Technical RFPP closes at the end of this week, TAC members will review them between this meeting and the December meeting. The Education and Outreach RFP will be posted in the near future.
- The new New York Lake Champlain Basin Coordinator will be coming on at the end of the month, there will be a formal announcement soon.
- Technical projects reviewed by TAC at the last meeting are moving to contract.
- On the DEI front, LCBP anticipates that we will be working with Adirondack Diversity Solutions to conduct an organizational assessment, and we are also pursuing DEI training opportunities for our staff through TC Consulting.
- The CAC coordinator position has closed and applications are under review.
- The IJC is holding a series of webinars focused on some of the more technical aspects of the flood study. The series kicks off tomorrow with a webinar about watershed storage options; webinars will continue on a weekly basis through mid-January. Sign up at https://www.ijc.org/en/lcrr/virtual-technical-webinars-lake-champlain-richelieu-river-study
- TAC will hold a January meeting to review SOL.
- The New York dam task force is making steady progress. They've formed a subcommittee focusing on the Indian Rapids dam removal, which has strong partnerships to make those links towards Lower Saranac restoration and potentially create opportunities for fish passage. The first step will be a feasibility Study.

<u>Public Comment</u>

- None

<u>Review and approve summary of previous TAC meeting</u>

Motion by: Jenn Callahan
Second: Margaret Murphy
Discussion: Neil noted that the summary is very complete.
Vote: All in favor.

Revised LCBP budget development process review (*Eric Howe, LCBP*)

Eric Howe reviewed the new LCBP budget development process as it relates to TAC. The key differences of this new budget process include (1) a new Lake Champlain Steering Committee Summit meeting in June that will set the budget priorities for the upcoming fiscal year, (2) the Executive Committee will have one full meeting in March devoted to reviewing the technical full proposals before sending to the Steering Committee for their approval in April and because of this, (3) the Steering Committee will not be reviewing each technical pre-proposal in detail at their December meeting.

- Tom: You indicated that the new June summit meeting will be important for identifying budget priorities and that the participants who attend this meeting will be invited. Is there a public input track that will be incorporated into the summit?
    - Eric: I view voicing the public's opinion on our budget priorities as a role of the three Citizen Advisory Committees. This would create an opportunity for the CACs to better engage the public and stakeholders to make recommendations for the summit meeting. The new LCBP CAC Coordinator position opening has closed and it is expected that the new staff person will start in January. Because the June 2021 Summit will be our first one, I worry about opening up the meeting to the general public, however we can explore that option for a future summit meeting.
- Neil: I propose to TAC that we process our recommended priorities in advance of the Summit meeting to create a cogent set of recommendations that I can represent during the meeting. I also want to note that I represent the TAC on the Executive Committee which makes operational choices on an almost monthly basis for the LCBP.
- Matt: I also want to note that during this annual budget process TAC and LCBP staff are at the same time getting projects started that were approved in the previous fiscal year and closing projects that were funded before that. It's never ending!

Workplan review for approval: Water quality conditions and trends for Lake Champlain and its tributaries (*Matthew Vaughan, LCBP*)

Matt presented the workplan on water quality conditions and trends for Lake Champlain and its tributaries.

- Andrew: We've done a little more work with the dataset. Wilton Burns compared St. Albans and Missisquoi Bay and came up with interesting findings in changes in phosphorus over time. It would be exciting to collaborate with you on this work.
    - Matt: I think this work will complement the work your lab is doing really well.
- Neil: I know you've thought about it, but with as many variables as you're talking about, do some of the univariate analyses you're discussing consider how multiplying all those errors together will affect the results?
    - Matt: There will be greater variance, it will need a higher bar to show a difference in the medians in this case. Either way, the more scattered they are, the more difficult it is to show a significant difference. Neil: I guess I'm referring to the global analysis variance.

Matt: The approach that I'll take is that for each of these hypothesis tests and trend analyses I'll generate statistics on these test that show whether or not we can reject the null hypothesis.

- Bill: You should also consider using generalized additive models (GAMs) as an alternative to segmented regression. GAMs work better for non-linear data. A new Middlebury professor has been helping us use these, I can put you in touch.
    - Matt: I'm trying to keep things simple here, but agree that this could be a good tool to have in my toolbox. This will also be important for writing the QAPP that will be reviewed by the EPA, including any potential methods is important.
- Neil: Each symbol represents where one stream sits in this analytical space?
    - Matt: Exactly, each of these is a trend over time in a river. Where it lies in this plotting space tells us how much of that trend is attributable to watershed management or stream flow.
- Margaret: This is intriguing. I'm curious what that management component contains?
    - Matt: Essentially the model is designed to statistically remove the influence of streamflow so the assumption is that any other change that's left can be attributed to management, because there's nothing else left to attribute it to. It's definitely an assumption, but that's the interpretation. Part of the discussion is that watershed management can influence streamflow, so they can be confounded.
- Sarah: It could be management or lack thereof, so it's trying to pick up the signal of people's impact on water quality.
    - Matt: Right.
- Neil: Where this could be valuable is if you took that management trend score value and relate that to things we know have or haven't been done in that watershed. That could be really interesting.
    - Matt: I'll add the caveat that my assumption is that many of our results will plot along the horizontal axis because I don't think there will be large changes in the streamflow.
- Ben: I'm curious about whether you'd be applying this to annual values or seasonally as well? Perhaps these plots would differ based on season.
    - Matt: Good question. The goal of this model is to look more long-term. The way season plays in to it is more to develop how the concentrations change. It takes seasonality into account but doesn't necessarily isolate it.
- Neil: My only concern is bandwidth; beyond that this is the perfect thing to be looking into.
    - Matt: That's why I'm not making any promises, but I think it'll be straightforward since it's an update to a package I'm already using.
- Eric: I definitely support adding in that last component allowing you to separate out the effects of management.
- Kevin: I think you said that the program that the USGS updated was for the tributary analysis, but you're writing the in lake one yourself?
    - Matt: Correct. Kevin: That definitely will be a big pull.
- Neil: We've been talking about tackling this kind of analysis for a long time. We're looking at being able to celebrate the 50th anniversary of the Clean Water Act, having an analysis like this would be so cool.

    - Matt: I've had my eye on this since I started with the Basin Program. I think it's achievable.
- Pete: Last year the 2019 data didn't get uploaded until March. 2020 data will likely be a similar timeframe.
    - Matt: I think I was able to expedite that last time, maybe I'll be successful again. Pete: I can get it to you earlier, just might not be quality assured.
- Margaret: For lake parameters, it looks like you're just searching for a trend instead of thinking about the questions that can be answered.
    - Matt: Fair point. There are a lot of data available that haven't been tapped. No one's really addressed hypolimnetic conditions. We don't know what's out there but don't think we will know until someone looks. The computer program makes it easy to do a lot of parameters. I like to crank out everything and then look at results to build a story. The technical report would be more on the side of everything, the manuscript would be more focused on research questions and stories; for example, hypolimnetic dissolved oxygen depletion, chloride, nutrient concentrations not covered for all strata or all areas of the Lake. Margaret: I caution looking for something that might not be relevant or might not affect management, but I agree that people ignore the hypolimnetic data too often.
- Mark: Great job, go forth. Stay in touch with Tim Mihuc.
- Bridget: I wanted to echo Neil's first point, complemented by what Margaret just said. We need to consider how to correct for looking at everything.
- Neil: I'd suggest in terms of outcomes, this should influence the design of the process. Producing the data necessary to have that conversation.
    - Matt: If there are things that I should not be looking at we should look to not collect samples on them. If we're not interested in the analyses, we shouldn't be spending resources collecting those data. I did include everything under the sun as part of the quality assurance plan so EPA can approve me working on that, so that was part of the strategy as well.

Motion to approve the workplan: Bridget
Second: Andrew
Discussion: Andrew: Do you have plan to have a group interacting with you on this regularly? Matt: I'd be happy to entertain volunteers as a subcommittee of the TAC. Andrew: I'd volunteer. Matt: I can also provide updates at TAC meetings and ask for feedback along the way. Neil: To a degree you can have a subcommittee but you'll be working with this on the TAC anyways. You can always call a meeting and see who can join.
Vote: all in favor.

Discussion: 2021 State of the Lake report-- In-lake phosphorus concentration, Tributary phosphorus loading, Chloride, Lake water temperature, Combined sewer overflows, Wastewater phosphorus loading

<u>CSOs</u>

Colleen Hickey and Laura Hollowell began this conversation sharing their perspectives on this graphic from their experiences working at the Resource Room (which sees up to 30,000 visitors annually), public

events, and with schools. They expressed that there seems to be some misperceptions and confusion on the lack of progress on CSOs from the public and recommend that the 2021 SOL clearly describe the progress that has been made to reduce CSOs in the Basin.

- VTDEC had a report in fall 2018 that provided a summary of the progress that has been made. It would behoove us to add the information in print or online for SOL 2021 to address that a bit more upfront.
- When we staff farm shows, CSOs are a hot topic. The public seems to think that a lot of phosphorus comes from CSOs and there is also confusion between the relationship between bacteria and phosphorus. A sentiment that is often brought up is that we are fining farmers and why are we not fining municipalities.
- Staff know a lot of work has been done and there are positive examples like the work taking place in St. Albans, etc. However, we mainly hear complaints about Rutland, Burlington, and St. Albans. We don't hear as much in NY but staff are not in NY as much for outreach.
- CSOs are in the news a lot and we hear that the public is concerned but not always well informed. Burlington locals have a lot of questions about the wastewater treatment facilities, especially when beaches are closed. They typically don't know the details of the bond issued to upgrade the plant. We also hear a lot from the public that people think CSOs are accounting for a lot of nutrient pollution.
- Infographics are important. The main message is that CSOs are an important issue, but it is being addressed by communities and there are fewer in fewer CSOs happening. This may also be an opportunity to talk about the interconnections between aging infrastructure, growing communities, and climate change.
- Our staff does use SOL to explain these areas of concern for the public. One area in SOL where we can maybe prioritize addressing this is the ‘what you can do’ sections, which flip the stormwater responsibility to them.

- Neil: CSOs are a valuable topic to get our messaging right on. Oliver may engage Watershed Management Division staff to create standard messaging around this topic and the work required by the state. There is an ‘ick’ factor and water, even when you don't have a high flow event, is being treated. It's a topic that is hard to unpack and then communicate effectively. I’m surprised that Vergennes isn’t mentioned by the public related to CSOs.
    - Colleen: When our Education Intern Hannah did more South-lake outreach events, Vergennes was brought up in relation to CSOs.
- Oliver: I agree DEC should engage on this topic. We have a long-term control plan for CSOs within an October 2019 document which describes our planning, regulations and modeling work to give the public an idea on what is happening. We may have a bit more information that we can provide as well. One thing lacking in the 2018 SOL is what is being done to address aging infrastructure. If Burlington and other municipalities are actively seeking funding, that might be worth mentioning. I’m also curious about why pathogens and cyanobacteria are grouped in the 2018 SOL and if there is any interest in separating them for 2021. I feel like they can be treated separately to help with the public’s confusion.
    - Matt: I believe we were trying get across the message that the bacterial load from untreated sewage water is the concern and that is why they both fit into the same section. Pathogens and bacteria go hand in hand with CSOs and cyanobacteria blooms. Then the

text gets into the driving factors of those. Oliver: It does make sense, however the problems that are occurring in lakes due to CSOs and cyanobacteria are not necessarily linked. Matt: We will take that feedback, thanks.

- Eric P: It makes sense to include a summary of the CSO issue along with a graph of trends in terms of the elimination of CSOs overtime. SOL is results oriented. The information could be kept contained to a status report on CSOs and not speculation or a discussion of funding or additional work, just reporting on what has been done in the past. Questions on the contribution of CSOs to phosphorus were raised and responded to in many public comments on the 2016 TMDL. One thing that was cited was an analysis of CSOs and wastewater loads in Massachusetts. That analysis showed that phosphorus contribution is modest from a typical CSO event.
- Neil: I suggest that we don't shy away from investments in the past. There has been a substantial amount of investment on both sides of the Lake. Investments are a response variable.
- Tom: Exploring CSO's might also be part of the Clean Water Act anniversary discussion. Addressing direct discharges from municipal wastewater was one of the main intents and outcomes of the Clean Water Act, and CSO's remain one source that is still firmly within the National Pollutant Discharge Elimination System (NPDES) jurisdiction.

<u>In lake P</u>

Matt explained that staff hope to keep Figure 4, Annual Mean Phosphorus Concentration by Lake Segment, and are looking for feedback from TAC.

- Neil: How the figure depicts volume is somewhat confusing.
    - Matt: Yes, I believe we are leaning toward either changing how volume is shown or removing it. Eric: For historical context, volume numbers were added in the 2015 SOL as a way to provide context on the amount of Lake each segment contributes to as Missisquoi Bay was getting a lot of bad press. The intent was to show readers that what happens in Missisquoi Bay, while an important part of the Lake, does not reflect the rest of the Lake. We do realize now that it can confuse the message of graphic.
- Leigh: You could have a separate graph of Lake volume versus watershed area. It wouldn't be as neat, but it may be good for understanding.
    - Eric: Interesting idea. We might be able to build that into other related graphics. It probably wouldn't be side by side with this one. Matt: Now that we have the numbers, we can even think about showing the contributing land area to Lake volume.
- Sarah: Perhaps volume can be portrayed in the map of the Lake where different segments are colored differently?
- Andrew: It wouldn't be hard to add bathymetric data to the map.
    - Matt: That could be visually attractive too. Neil: It could be a different piece of messaging. Eric: We haven't had bathymetry in SOL before.
- Tom: I think that if we are going to present any information we should maybe move away from volume as the public experiences the area and shoreline of the lake. This becomes more misleading than it can be with volume. It's good to portray but are we trying to say how much phosphorus is in the volume of water or the extent it is experienced when using the Lake.

- Mark: I was going to argue for volume but Tom made some good points. If we took the existing graphic and pulled out purple bubbles that would be misleading as the point of showing the volume bubbles is that Missisquoi Bay is but a small portion of the lake via volume or area. Whether its bathymetry, area. etc. we don't want to send the wrong message.

Tributary Phosphorus Loading

- Matt presented the graph from the 2018 report. Feedback from partners and staff indicate that this graph is confusing, so staff decided to rethink the graphic. Matt shared an idea for a new graphic to put phosphorus loading in the context of the TMDL.
- Neil: Shouldn't the average of the 2000-2010 tendency in this line essentially equal the difference between the total loading allocation for the segment and the base loading? And if I'm right there, does it?
    - Matt: The TMDL used Long-Term Monitoring Program (LTMP) data, used the Soil and Water Assessment Tool (SWAT) model, and modeled the rest of the watershed area based on land use/land cover. This analysis doesn't know anything about the unmonitored areas. They should track the baseline for the TMDL, but won't be identical. Eric P.: I agree, right on point Matt, that makes good sense to me.
- Mark: Good work, but I'm going to play the devil's advocate here. You took time to explain the y-axis ratio, that's going to be over the top of a lot of the public's heads.
    - Matt: I agree, that's part of the feedback we're asking for. Is there a simpler way to explain it if it's worth explaining? Leaving the methods details out and just saying if the trends are on track or not. Mark: maybe a paragraph to walk people through that might work. Beyond that, the inter-annual variability blows me away. That's going to confuse the public as well, we need to have a good explanation of that. Is it tied to flow, temperature? Matt: It's largely due to flow. Mark: We need to have a lengthy explanation of that also. Matt: that's been included in the previous report. We tried to convey that loading is largely driven by hydrologic variability.
- Matt: My question is, is this valuable, and would it be fair or reasonable to use this metric in SOL?
- Neil: There's an official publication from the VT side that makes a statement about how we're doing with respect to reductions, I don't want that and the SOL to say drastically different things. I wonder if we can put a line of central tendency or trend through your new graph.
    - Matt: The reporting you're talking about approaches it from an entirely different perspective. Neil: True, but my concern is if they say really different things, astute people will ask why.
- Andrew: I think that is a key take home message that the public doesn't get, and that these kinds of plots can convey that to the public. The watershed has a lot of memory, and interannual variability makes assessing changes difficult. Conveying that well to the public would be really valuable.
- Oliver: Isn't another way to show inter-annual variability to show discharge? With text, the report could make some of the points we've been making here. Explaining this graphic to the public will

be challenging. Conveying progress on a basin-by-basin scheme would be really valuable, but I'm not sure if people will put the time into understanding this graphic.
    - Matt: We have another plot in SOL that shows how discharge drives loading, and we've gotten feedback from the public that that plot is very confusing. It's slated for removal at this point. I should have prepared what I'm thinking here, but imagine this plot instead of these words here on the y-axis with "100%, 200%, etc. of TMDL allocation". If anyone wants to dig into more details the methods are available, that might be all we need to explain.
- Neil: I'd feel better if the base load was also shown in there. Like the in-lake figure has a blue zone and red zone, the distance between baseload and the TMDL could be the blue zone.
    - Matt: this is lake-wide, which is combining 2 different TMDLs. Base loads are different for the 2 TMDLs. I'm worried about too many lines making the graphic confusing.
- Leigh: To make the graph easier to understand, you could use a bar graph for every decade. Go off of the base and do a color ramp by percent above. That would get rid of noise of these points, then you could have an arrow showing trend analysis.
- Matt: It seems like main concerns is communication not interpretation. Correct?
- Oliver: The assumption that monitored areas contribute similar loading to unmonitored levels. Did that affect our monitoring decisions? If that's true, would that challenge that assumption? Did you test the assumption or do we not have the numbers?
    - Matt: Monitored areas are major tributaries chosen in 1992. Unmonitored portions include minor tributaries, and areas downstream between the sampling points and the mouth of the monitored tributary. Neil: Oliver makes an important point, that assumption should be examined. In the Vermont TMDL formulation, analyses suggested that the contribution of unmonitored areas is substantially higher than monitored areas. Otter Creek would create a challenge. Matt: That assumption doesn't make these numbers incorrect, it makes the interpretation about TMDL progress difficult. The other pieces we don't have the bandwidth to assess.
- Eric: One of big changes in baseloads was based on unmonitored area methods. The SWAT analysis changed that significantly, but doesn't sound like it's feasible to repeat that analysis every time you do this analysis.
- Matt: We'll explore communicating this to the public and will touch base in January.
- Neil: Thanks Matt, really thought provoking.

Presentation and RFP review for feedback: Forest phosphorus load allocation project (*Ethan Swift, VTDEC*)

Ethan presented.

- Ryan C.: Can you comment on the chop and drop Best Management Practice (BMP) design? Is it something unique to Vermont or a new design feature? It seems counterintuitive to what you would do in a stream.
    - Ethan: There are different metrics associated with the BMP. We want to ensure a certain amount of large woody debris within the stream and also want to recognize the value of a healthy riparian corridor. We also recognize that headwater streams have historically been modified. The purpose behind this work is aquatic habitat restoration improvement.

What we've found by completing additional geomorphic assessments after the BMPs were placed is that it changed the geometry to a reference stream condition (for example with pool-riffles versus cascading a stream that was the result of past channelization). We have seen good results in installing those projects. However, there is also the need to be cautious in selecting which species and how many you are recruiting in the system. So far, we have had good success doing these kinds of projects in Vermont.

- Eric P: Thanks for the presentation. It seems like there is good work that is already being done and more planned. I'm happy to see how thoroughly VTDEC has approached this category of phosphorus loading under the TMDL. In an earlier slide, you indicated that there is a 60% reduction target for Missisquoi and South Lake B for forest loading and that was the number in the draft TMDL. In the final TMDL the numbers were 40% for South Lake B and 50% for Missisquoi.
    - Ethan: Good point. In providing the overview I should have called out that the numbers were related to the 2016 TMDL implementation plan and weren't the final reduction amounts.
- Eric P: Great thanks. It's good to see that it will be modified before the final release. It was also mentioned in the presentation that the new RFP will only address private forest lands. Why? Is there a separate analysis on public forest lands that will achieve different results?
    - Ethan: The landscape analysis will include all forest lands. The Clean Water Service Provider work is directed to private land restoration work. That's not to say there isn't already work that the Vermont Department of Forests, Parks, and Recreation is taking on. They are working on a modified Municipal Roads General Permit survey to identify high priority projects for implementation. This consultant work will also identify high erosion spots on state lands as well.
- Margaret: The chop and drop BMP is something that the Fisheries Division is using now, especially in the Northeast Kingdom, and we are looking to expand its use as it strategically adds wood back into streams and creates an enormous amount of aquatic habitat. It has been shown to triple the biomass of brook trout, slow runoff during high flow events, and capture sediment.
- Neil: There are co-funding opportunities that Clean Water Service Providers can add to this funding. The RFP will address issues in private forest land that may not be addressed otherwise. TAC will have eyes and ears in this process; one person will be involved in the RFP selection process. Ethan will have the draft RFP for TAC to review in the upcoming months.

Workplan review for approval: Consequences of winter perturbations on nutrient export to Lake Champlain (*Carol Adair and Andrew Schroth, UVM*)

- Carol Adair and Andrew Schroth presented.
- Jamie (from email): I'm not clear what winterizing sensors means. Should it maybe be winterizing the installation? I.e. by ensuring deep enough water, altering measuring interval to reduce power as they mention? But I am guessing the sensors would not be modified.
    - Carol: We are in the process of this method development. We know people who have done it successfully in other places. I know Jamie has expertise about this as well so we'd love to talk about it with him. We've already done some site visits and thinking, but are still forming a plan. We are confident we can get something working.

- Jamie (from email): I'm curious about the soil strip deployment, do the strips make contact with the soil or are they in some kind of protective sleeve? If they make contact with the soil, is the thinking that the soil can be washed off without removing adsorbed ions? Are there no plans for other solutes other than nitrogen species? It would be interesting to see how the stoichiometry compares to soil and water samples.
    - Carol: Strips do come in contact with the soil. The resins are stuck to a surface and then you put that down into the soil. Yes, the soil can be brushed off without removing the ions. This will be my first time with the strips, many colleagues have used them very successfully. The method is established. We have plans for nitrogen and phosphorus on those strips, those are the ones we've been considering so far.
- Kevin: What's the anticipated depth of frozen soil and how does that impact nutrient measurement?
    - Carol: Interesting question. I can get information on that from the sensors that measure soil temperature. I imagine that it would impact availability-- having frozen water is a problem for microbes and roots. You need water to transport nutrients. So yes, I do think it would impact availability.
- Jamie (from email): I don't believe they mention an analytical lab but imply internal UVM. Is that also true for phosphorus? Are there any concerns about comparability with the State lab since they'll be sampling at the LTMP sites?
    - Carol: The plan is to use same methods that we use for EPSCoR. Andrew: We haven't done that comparison yet; we could specify in the QAPP that we team up with Pete to sample a few events jointly. I'm confident they'd be comparable. Neil: that would be a good idea.
- Neil: I'm curious about snowfall/snowpack sampling. It seems like it's a big factor in what the sensors are going to make note of, can you elaborate?
    - Andrew: I would be happy to talk with folks who have done more snow sampling. We want to capture a range of elevations and events. Carol: We looked at some of Jamie's work, the preliminary plan is to follow what he'd done. This will become more refined during the QAPP stage. We want to make sure we get enough information to be successful.
- Eric P.: I'm curious if you'd be keeping track of when manure spreading events would occur in these watersheds. The phosphorus contribution from spreading manure on frozen ground is a big issue.
    - Carol: That's a really challenging question. We do see a signal (we think) of spring management every year in terms of pulses of nitrogen and phosphorus coming down. In my experience it's tricky to nail down when farmers are doing what they're doing. I'd love to know that as well, but I'm not sure what the best method would be. Getting that information from farmers is pretty challenging. Andrew: I think one thing that's a big deal in Hungerford is late fall manure spreading. That's why you see big pulses from the first winter event. We see a pulse after the ban is lifted that occurs throughout spring. Farmers shouldn't be spreading manure in the winter. Eric: It's been an issue because of changing weather patterns, spreading that would normally be banned is allowed during warmer weather. You could coordinate with the Agriculture agency to see if they have information on spreading. Neil: Ryan Patch would be the person to connect with. Ryan P:

I'm happy to collaborate on that point. Carol: I have a student who did some work with drones to detect when manure spreading happens. It was fairly successful, but people probably don't want drones and it's beyond our scope.

- Margaret: I'm excited to see some winter work being done. It's a challenging season. Hopefully you're lucky and will get two very different winters. You talk about looking at reduced soil accumulation, I'm curious if increased winter events are not allowing nutrients to accumulate in the soil, what the long-term impact would be on soil health. Would your study be able to get at what the baseline you're comparing this reduction to is?
    - Carol: That's an interesting question, how much winter transport do you need before it starts impacting productivity and the health of riparian areas. I don't have a good idea of how much is being lost. A first step would be to try to figure that out. The answer could be very different depending on the surrounding land use.
- Neil: are you capturing any road runoff in Wade Brook, in Hunger Brook are you able to discriminate that?
    - Andrew: I don't know that it would be sensitive to that. Maybe if you were doing particle tracing. That would be more characteristic of road runoff. Neil: Road networks act like transport networks, particularly during snowmelt. Andrew: Maybe we've gotten some of this in the chloride measurements.

Motion to approve the workplan: Jen
Second: Leigh
Discussion: None
Vote: All in favor. Andrew abstained.

Workplan review for approval: Volunteer coordination and training for the Lake Champlain cyanobacteria monitoring program, 2021 season (*Lori Fisher, Lake Champlain Committee*)

Lori Fisher presented.

- Oliver: It was mentioned in the presentation that there is a well-defined schedule for volunteer observations and that some data points are eliminated from the database. Then it was mentioned that the season is getting longer. Are you planning on changing the dates of the season? We are seeing blooms later into the Fall, and I hope we can continue to collaborate.
    - Lori: The key to the program is to expand the season. What I was emphasizing is our recruitment efforts as we still have to grow the program. We have had monitors that began with us 18 years ago and have to leave mid-September. Similarly, with State agencies they have to get off the water and close at a certain point as well. We have to make sure we are recruiting enough people who can stay longer into the season, especially at the high-priority sites. We want to know what the high-priority sites are early so we can do advance-planning. We also want to do advance-planning for any training that needs to take place if a new monitor takes over for another late in the season. LCC volunteers do monitor inland lakes and LCC is happy to do or help with the training of the monitors. We, in fact, do more training sessions than the state does and our weekly emails go to the monitors at inland lakes and state staff as well. For example, the state

parks in the southern Lake Champlain region had us do the training this past year while the northern parks did their own training. We'd like input from state agencies on their priorities. LCC also vets all of the reports. We want to make sure we don't lose momentum with the program.

- Leigh: Can you expand upon what the criteria is to expand the season?
    - Lori: We have expanded the season due to the extended bloom season, though many of our core monitors (including state and municipal personnel) may not be able to monitor as long as this new season is. Most have to stop monitoring after Labor Day. We want to identify if high priority locations will have a monitor that can stay until the end of season. There is a natural fall off in reporting every year and we want to increase the reporting at the end of the season. We usually start the season mid-June, though this year due to COVID it was pushed until the end of June. The season used to end Labor Day, but due to the frequency of late-season blooms we are trying to push the season until the end of October.
- Neil: This is not related to the technical elements of the workplan so TAC has no role, but I'll note that within the budget justification that the fringe and indirect rates are reasonable and personnel is around $50/hr. Is that the average salary of your staff members?
    - Lori: The staff are all at different rates but that is the average. We put in a lot more time than is in the budget so I feel comfortable with that average listed to try to cap the fringe at 10%. The actual fringe is higher but that's what we are trying to contribute to the program.

Motion to approve the workplan: Mark Malchoff
Second: Jenn Callahan
Discussion: None.
Vote: all in favor.