

**Lake Champlain Basin Program
Technical Advisory Committee meeting
54 West Shore Rd, Grand Isle, VT
Wednesday, October 2, 2019, 9:30 AM – 2:30 PM**

TAC meeting summary

Attendees: Curt Gervich, Fred Dunlap, Stéfanos Bitzakidis, Andrew Schroth, Bernie Pientka, Angela Shambaugh, Jennifer Callahan, Eric Perkins, Bill Arden, Bridget O'Brian, Tom Berry, Mindy Morales-Williams, Kevin Behm, Ryan Cunningham, Ryan Davies, James Jutrus, Jamie Shanley, Neil Kamman (second half of meeting)

Guests: Becky Tharp, Dave Braun, Chris Jage, Michelle Brown, Leslie Matthews, Blaine Hastings, Angie Allen, Ellen Marsden, Jason Stockwell

Phone and Webinar: Ryan Patch, Ethan Swift, Bethany Sargent, Jordan Geller

Staff: Eric Howe, Meg Modley, Lauren Jenness

9:30 AM Updates, announcements, and public comments

- Bill Arden served as chair of the group until Neil Kamman arrived after lunch.
- Tom Berry provided an update on federal funding with a focus on the following: The Continuing Resolution passed through Nov 21st; FY20 funding picture: EPA \$13M up from \$11M; GLFC \$9M up from \$7M. Most work in the Lake Champlain basin is slightly better than level funding with the additional dollars going toward a new research vessel for UVM. However, if CR continues, looking at level funding for FY20. Lake Champlain Sea Grant has a budget for their sea lamprey control program that would aid in the establishment of the program's long term sustainability. There is also funding for the USGS Research Unit's moose research. USACE funding is in good shape for their 542 program and invasive species work. The USACE Gordon's Landing project will probably be funded in the future. The Vessel Incidental Discharge Act funding should be in good shape, there is some confusing language within the bill but Great Lakes members are pushing for funding through EPA Region 5. A press conference will be held at 2:30pm on October 8th at the Leahy Center with USDA-NRCS Officials, Congressman Welch, and Senator Leahy. They will be making an announcement of the NRCS CEAP Program. LCBP will circulate the announcement to this group once it is released.
- Bill Arden announced the Salmon Festival that is taking place in Richmond, VT this weekend. The announcement and flyer for this festival with details on the activities that are happening can be found on the LCBP website.

- Jamie Shanley announced that USGS has funded the 3 gauges in the LCB he talked about at the last TAC meeting: East Branch of Dead Creek, West Branch of Dead Creek, and the headwaters of the Little Otter Creek. He also announced Keith Robinson's retirement and let the group know that Keith will be working part-time out of the USGS regional office in NH.
- Eric Perkins announced that EPA provided funding a couple of years ago to test the effectiveness of drinking water residuals in bioretention areas. Most of the funds went to UVM. The EPA applied for additional funding, received funding, and will test residuals from areas all around New England and create a database. The project will also look at PFAS and PFOAs. Eric Roy and Stephanie Hurley are the leads on the project and could provide information to the group if requested in the future.
 - Jim Jutras asked if they are looking at the residuals regionally because of the cost of trucking. Eric Perkins said they are doing it to get a sense of the distribution for local use. Jim added that it would be helpful to have some mapping of their density.
- Bernie Pientka stated that while American Eels are still washing up, their mortality rate is decreasing. Experts still don't know why and live eels that were caught didn't have any distinguishing characteristics that would suggest a cause. The eels collected will be aged and looked at for stocking marks to see if the fish are dying from a batch stocked at the Richelieu River. The same method to mark walleye was used to mark eels and staff will be able to identify any stocked eel. There are still a lot of unknowns.

Review and approve summary of previous TAC meeting

- **Motion:** Jim Jutras moved to approve the September TAC 2019 meeting minutes with revisions, seconded by Jenn Callaghan, all in favor, Bridget, Angela, Mindy, Kevin and Fred abstained.

LCBP updates, *LCBP staff*

- Eric Howe noted that Matt Vaughn had his baby named Ethan on September 10th. He will be off on paternity leave until the beginning of December. Ellen Kujawa has landed in London and is starting her Oxford Master program. The Technical Associate position has been posted. LCBP/NEIWPCC agreements with EPA, GLFC, and NPS are all in place for FY19 funding.
- Meg Modley added that the LCBP Steering Committee approved the technical pre-proposal funding priorities, minus the microplastic priority, that were recommended by the TAC for the LCBP Technical RFPP, released yesterday. A cheat sheet of all LCBP grant and project RFPs is available on the LCBP website. LCBP staff may be tapping into the TAC membership for grant reviewer expertise.

- Eric described the new LCBP Artist in Residency Program RFP that was recently released.
- Meg added that the Steering Committee also looked at line items in LCBP's budget for FY20 and described them to the group. The SC will be making FY20 funding final decisions at the April 2020 SC meeting.
 - Eric clarified that the NRCC along with the Vermont Association of Conservation Districts will host the Agricultural Water Quality Partnership's full-time position (LCBP FY20 Line-item funding - \$45,000/3 years).
- The 39th annual NALMS conference will be held in Burlington the week of November 11th.
- Eric Howe and Meg Modley are assisting with the writing of a VIDA report to congress to identify existing AIS programs in the Lake Champlain basin and opportunities to collaborate with the Great Lakes basin with EPA regions 1, 2, and 5.
- Meg described the LCBP Steering Committee's discussion on LCBP long-term budget line items: The LCC Cyanobacteria Program and the LCBP Boat Launch Steward Program. The Cyanobacteria program funding has a lot of support at the SC even with its increased budget. There was discussion about if the monitoring could start and then end later in the season, but others commented that collecting 'no-detects' of cyanobacteria was just as important as detects for the public. The other component of the updated workplan is the media blitz that would provide facts about cyanobacteria to local media outlets so they can better frame their stories. The Boat Launch Steward Program funding had equal support and discussion. It was said that the BLS program was great for having boots on the ground for public outreach. Meg explained that the BLS program currently runs from Memorial Day to Labor Day, with some stewards this year staying to the end of September. There was a hydrilla interception (currently sent out for DNA analysis) at the South Hero Boat Launch 2 weeks after Labor Day. There is a worry that with the effects of Climate Change, boaters will be launching and moving well after Labor Day. This may be a reason to push for a later BLS season. Meg also announced that a hydrilla survey is being conducted on the Connecticut River and that an AIS Rapid Response Task Force meeting is taking place to address the findings of adult zebra mussels in Lake Dunmore.

9:45 Workplan review: Fish Community Monitoring, Ellen Marsden, University of Vermont

- Ellen Marsden and Jason Stockwell presented the workplan and described the project's importance, background data, and the workplan scope changes that have transpired since the pre-proposal was submitted based on feedback from local and Great Lake region partners.
 - Bill Arden asked if there has been any attempt to do a meta-analysis on the data collected in the previous forage fish study that ended in 2015 to see how they can

correlate cold fish species data. Ellen referred to Bernie Pientka. Bernie's answer was yes and no, there has been some evaluation looking into that information, but it had been limited to the direct measurement of defined parameters.

- Bill then asked if the scale of the previous study could be replicated or enhanced with this study. Ellen answered that answering that question will be a big part of the study. They want to see what can be made more efficient and streamlined, what is necessary, what data people are still using. Bill suggested a motion that the TAC ensure that the project's metadata and previous analysis be incorporated in this new project.
- Ellen added that UVM has collected juvenile fish data over the past five years that can be used to see what has changed and align the two study's efforts. She stated that in the Great Lakes region these two different studies are one in the same. Bernie reiterated that the Great Lakes region are doing both for a little while to see what has worked. This new study would lend itself into that work and show how they all work together.
- Andrew Schroth asked if there would be an analysis to see what data collection methods are most useful. Ellen answered that this analysis is in the data and explained that a prey study rather than a predator study is preferred as predator data have a lag time. Jason Stockwell added that the study's management applications have been discussed over the last two months and have resulted in a number of new inputs into this project. He believes that this study will create something useful, but they also will be learning the best methods to use as they go.
- Bill commented that this work is much needed and the collaboration with partners within the workplan aids to its overall goal, gathers additional benefits, and is a powerful approach.
- Meg added that it's been great to develop the workplan with a team of partners that provided their revisions and input. It's critical that this workplan has Great Lake partners involved in the discussion and once it is approved the QAPP process can start.
- Ellen finished the discussion by adding that having Great Lakes partners involved is mutually beneficial as we have different but similar lake systems.
- **Motion to approve:** Angela Shambaugh motioned to approved the workplan with consideration of comparison between previous forage fish survey and new proposed survey metadata explanation, seconded by Jim Jutras, all in favor with Mindy and Andrew abstaining.

10:30 Workplan review: Evaluating Performance of Media Filters to Remove Phosphorus in Stormwater Pond Outflow, Dave Braun, Stone Environmental

- Dave Braun presented his workplan and asked for comments and questions.

- Kevin Behm asked about the ages of the stormwater ponds to be studied. Dave answered that he hopes to look at the older ones.
- Jim Jutrus asked if Stone Env has talked about ease of sample access when picking the stormwater pond to study rather than just focusing on the one with the highest phosphorus numbers. He suggested that Stone base their decisions on the outflow rather than the Phosphorus. Dave answered that Stone Env is set up to do this. They will look at total reactive phosphorus in their screening process.
- Becky Tharp suggested that the results from an in-depth Minnesota study published that looked at the amounts of phosphorus laden sediment moving through the system vs phosphorus being released from the sediment that found that stormwater ponds were internally releasing P be considered. The project's objectives are focused on filter design that removes P though additional measures to the screening process may be added. In depth analysis of P flux is not included in the scope of this project.
- Angela questioned the methodology and asked if they are studying 3 stormwater ponds with 4 filters. Dave clarified that they are only studying one pond with 4 different filter media placed in their filter design. For each filter there will be one outlet pipe.
- Jim asked and Dave confirmed that each filter media box has its own valve, in a real practice the pipes would be located underground.
- Jamie Shanley asked if all of the pipes are connected to a common pipe that you turn on and off for sampling and asked how these designs fit with the original sw pond design plans. Dave explained their preliminary design concepts and pointed out features in a diagram in his presentation. They expect to choose a sw pond that would be amenable to excavation work to install the 4 types of filters and associated pipe networks.
- Kevin asked if the valve work would be on-site or off site. Dave explained that it was on-site and they expect to sample weekly with a focus on storm events.
- Eric Perkins asked for clarification around why the design would include a valve adjustment option if Stone Env is trying to collect systematic data. Dave explained that different medias may have different phosphorus reduction potentials. They want to learn how to optimize what each filter media can do independently from each other. Dave will do the load in and load out calculations so a comparison can be made even if the valve levels are different.
- Angela asked if Stone Env would look at the individual filters to see if any other changes besides water quality are noticed that would impact the filters' performance. Dave responded that clogging wouldn't be addressed by the valve system. The valve system is more about water flow rate.
- Fred Dunlap asked about the angled-design of the filters. He questioned if the design as-is, with the collection system being at the bottom, would have a high

enough water level to not constrict flow. He worries that each media would become impacted. Dave answered that they wouldn't be able to change the filter design once they are installed. Dave's hope is that the flows are lateral and a raking of the media would prevent any clogging from taking place. The idea of having sections of perforated pipe installed up and down the hill of the sw pond may prevent clogging.

- Jim stated that he believes the design as is isn't conducive to angled flow. He suggests that the media be horizontal, not angular, with two collection pipes. Dave said he was hoping to avoid a horizontal filter as he sees the angular filters as somewhat self-cleaning. Dave suggested holding a sketching meeting for anyone who wants to provide input. Jim asked for a TAC subcommittee meeting during the design phase to approve the design.
- Meg stated that the TAC can assign a subcommittee to review the workplan details further.
- Jenn Callahan asked if Stone Env has thought about the filter design's maintenance, cost, and lifespan. If they are too expensive, others will be less likely to adopt the practice. Dave responded that South Burlington Utility will not install a practice that is either too expensive to install or maintain.
- Angela asked if there was a minimum number of samples that Stone Env is planning to collect to ensure data accuracy. The workplan reads that Stone Env aims to collect weekly samples, but what if there is a really dry year? Dave answered that they will collect at least 20 samples. The practice will run continuously, but it is recognized that midsummer water levels might be too low to sample. He said that workplan and QAPP will address these concerns. Becky recommended doing a power calculation to figure out the sample size needed as the margins will be small.
- Wrapping up the conversation, Bill stated that the TAC and Dave have heard a lot of discussion, with design components and feedback. He asked how the group would like to proceed. He heard that Dave would like to work with TAC members to review certain aspects of the project: Jim with the filter design, others with sampling and maintenance activities.
- Bernie added that the existing infrastructure around the ponds and Act 250 permits is something to take into consideration when choosing a sw pond.

Motion: Jamie Shanley moved to designate Evaluating Performance of Media Filters to Remove Phosphorus in Stormwater Pond Outflow workplan approval pending revisions to a subcommittee of the TAC, seconded by Angela Shambaugh, all in favor, no abstentions. Revisions requested include enhanced screening methods for selecting a stormwater pond for study and a deliverable of the selected filter maintenance, cost, and lifespan. The advisory committee (Jim Jutras, Jenn Callahan, Eric Perkins, and Fred Dunlap) will review and provide

input to the filter design and media selections and provide review of the QAPP once the workplan is approved.

11:15: Workplan review: TNC Boquet River Habitat, Michelle Brown and Chris Jage, TNC

- Michelle and Chris presented their workplan and asked for questions and comments.
 - Michelle thanked Bill Arden for sharing his data which was used during workplan development.
 - Ryan Cunningham asked about the landuse on the outer edges of the watershed. Chris answered that there are more forest landowners than agricultural land owners. TNC has worked with many landowners in the area and are currently looking for active ag landowners that they can work with as there has been a lot of turnover recently.
 - Ryan also asked if TNC is working with local organizations such as the Essex Soil and Water Conservation District. Chris stated that TNC is working with them as well as the extension programs. Ryan said that the Essex SWCD has been involved in private culvert assessments and that he, as staff in the NY Agency of Ag and Markets, is willing to collaborate with TNC in this project. Chris said that the Adirondack Land Trust has received a grant for their farm and conservation program. Cornell is spearheading the restoration plan.
 - Bill Arden commented that TNC is a great organization to bring all the tools together as TNC is a leader in this front. He then suggested that the workplan expand its language on easements to reflect the different types and that some may be extended to long-term easements. He also suggested language change that would emphasize that TNC is building off local and regional efforts and using a tool that was developed to prioritize aquatic organism passage in relation to their culvert replacement efforts. Bill stated that both of these are important for the document as a whole.
 - Bill offered to share the data he has on where USFWS has found the natural reproduction of salmon if TNC would add the data layer to their spatial tool. Michelle stated that Bill's work has really got TNC to think about sedimentation in rivers and how they can see that change over time. Bill described the linkages between good salmon habitat and decreased phosphorus loading and hopes that this project would be able to emphasize this.
 - Kevin Behm asked for clarification that TNC is only prioritizing culvert replacements as a part of this grant. Michelle confirmed this. This grant will be setting the stage for the future funding of culvert replacements working with local partners.
 - Kevin asked how many municipalities will be involved in this scope of work. Michelle answered that it will be primarily Willsboro and the county will be involved in the culvert work.

- Chris added that the political support for this project has been ‘absolutely tremendous’. TNC is trying to keep pace with the public’s enthusiasm.
- Neil Kamman asked if TNC knew about CWICNY’s road erosion inventory and is wondering if that would be another data layer to add to their spatial tool.
- Stefanos Bitzakidis asked if TNC has an objective for it’s land restoration efforts. Chris answered that all of it is with the caveat that the process takes time, but it looks promising as the public is talking with TNC even before the project started. Chris hopes that the project will be successful and instead of a bureaucratic difficult process landowners will have an easy time joining in because the project’s focus is on such a small area, where 30 projects can make a big difference.
- Bill provided a bit more background on the project for the group. In TNC’s original proposal implementation projects were embedded in the tasks. TNC was asked to remove project implementation from the tasks and come back for support for these tasks in future years.
- Tom Berry stated that if this project produces the groundwork data and a list of implementation projects that can be bundled together it may be worth looking at the USACE 542 program. He reminded the group that the NRCS Head Chief will be looking at wetland restoration projects next Monday and Tuesday. If there is interest, he can encourage NRCS staff Vicky Drew and an NRCS NY staff member to stay involved in this project.
- Neil asked if TNC has any stream geomorphic assessment data for the tributary. Michelle answered that Vermont is so far ahead of New York in this type of assessment that they don’t. Neil said that having this data in the future would be a good resource for landowners as they would then know that project’s on their land need to happen. This work could be completed by TNC field crews and Vermont could provide staff support if requested. Eric Perkins added that collecting this data would also inform the culvert sizing information. Chris described a story of a landowner misinterpreting the project - he thought that TNC was a rapid response team that would be able to fix erosion issues. The evidence of the need for the types of projects covered by this project are evident in the landscape.
- Bill Arden asked TNC to reach out to USFWS as they have people walking the river every fall looking for salmon reds.
- **Motion to Approve:** A motion to approve the workplan with minor modifications (adding language about easements and emphasizing the collaborative approach) was moved by Neil Kamman. Kevin Behm seconded. All in favor with Bill Arden abstaining.

12:00 PM Lunch!

1:00 Presentation: P trends in Vermont’s Oligotrophic Lakes, Leslie Matthews, VTDEC

- Leslie Matthews presented on the increasing phosphorus trends in Vermont's Oligotrophic lakes and hypotheses on why this is happening. The group had a discussion on potential hypotheses.
 - Neil Kamman asked if all of the lakes in the VT Lay Monitoring Program are also in the spring phosphorus graphs. Leslie answered yes.
 - Kevin Behm said that a dataset exists from a study done in the 1990s on the lakeshore buffers (100-200ft) in Vermont. It was done at a 30 meter resolution either from orthophotos or aerial photos. Leslie said that she would like to see the dataset as seeing even a snapshot of it now would help, especially to compare Vermont and Maine. Kevin then questioned if the increasing p trend may be indicative of greater rainfall amounts.
 - Eric Perkins said that it may be helpful to see when the buildings around the lakes were constructed in order to compare. Kevin stated that the E911 layer could provide a count and type of building within the lake watersheds. Leslie added to this by saying that lawns and managed areas are often associated with buildings. She would like to do a lawn vs tree analysis. Neil said that the VTDEC stormwater program would be a good partner to do this.
 - Bernie Pientka stated his observation on the construction taking place around VT lakes outside of the tier of the Shoreland Protection Act. He pointed out the work that Eric Howe was a part of that looked at the effects of shoreland development on littoral zones which was used to aid in the implementation of the Shoreland Protection Act of 2014. As part of this study a lot of landuse types were digitized in the 100' and 600' zones around lakes. This data might be outdated, especially with the impacts of climate change, but the tiered view of the landscape would be important to look at. We are seeing an increasing phosphorus change in both lakes and rivers. Neil added that construction outside of the 100' protections adds to the entire watershed drainage pattern. Jamie Shanley re-iterated that this may be why Maine's trends are different.
 - Eric Perkins asked if there is data on the changes in macrophytes for the lakes studied. Leslie said that staff are in the process of digitizing paper data from the 1980s and are also collecting new data. They are doing this work in conjunction with developing biocriteria for Vermont lakes. The sampling methods for plants that staff use are different than previous studies. The new methods are more expansive and in-depth.
 - Neil went back to Jamie's question and asked if 'undisturbed' lakes within the dataset are also showing increasing phosphorus trends. Leslie said that each lake has varying levels of disturbance. What she thinks about is the distribution of the disturbance within each lake's watershed, concentrated disturbance often has a bigger impact. The studies so far have not got at this point.

- Neil added his hypothesis. The landscape in Maine is way less buffered with calcium and alkalinity than Vermont. He wonders if the signal isn't compounded with the fact that we've lost the aluminum in soil layers that would bind to phosphorus. This may be a compounding factor that is specific to Vermont. Leslie said that that could be a possibility. Jamie said that that was a good point, but asked if the aluminum would have already disappeared by the 1980s as that was the peak of acid rain. The soils have not recovered from this fully as there was such a big pulse of acid, the aluminum is still bleeding out. Leslie stated that with the depleted soil going into the lakes in the 1980s, internal loading may have been affected.
- Kevin Behm asked about lakes in New York as NY has also limited development around their lakes. Leslie responded that she has presented this work at other meetings and conferences and no one has come forward with a long-term dataset. If a long-term dataset is provided she would be able to run the analysis. Leslie said that she also tried to get data from New Hampshire but their dataset doesn't go back as far. Fred Dunlap said that NY should be able to provide some data. Neil added that at least the Huntington Research Forest in NY would likely have some data. He imagines it will take a bit of digging to bring partners together.
- Andrew Schroth asked what Leslie makes of the phosphorus trend slopes in the summer (Lay monitoring program data) versus spring (spring P data). Leslie said she hasn't compared the magnitudes of the slopes. Andrew added that they see a difference in slopes in Lake Champlain in St Albans Bay and Missisquoi Bay, which has been attributed to internal loading. TAC members weren't sure if the slopes were significant based on their detail in the presentation.
- Jamie asked about atmospheric deposition. He said that phosphorus dust was a hypothesis in a research study. Leslie answered that she looked at studies from Lake Ontario and Sweden that didn't find an increased phosphorus trend using a similar analysis method.
- Neil noted that phosphorus sampling methods haven't changed, but equipment has. Leslie said that she has looked into that hypothesis with no results leaning either way. This does haunt her. Jamie pointed out that Maine would go through the same advancements of technology. Mindy Morales said that a study she was involved in looked at gloeotrichia from a carbon perspective that may be of use. Leslie added that if it was lab equipment that caused an increasing trend, you would think the graphs would show a turning-point where the new equipment was put in place, instead of the gradual trend that you see.
- Eric Perkins noted that Maine's protection laws, while in place since the 1970s, have evolved over time. He was involved in their update in the 1990s. Leslie restated that looking at the 1-meter resolution imagery that has been newly

released would be a good comparison. Neil said it would be interesting to look at this imagery at Mallets Bay or in the main lake.

- Leslie added that as part of their littoral habitat survey, Kelley Merrill went to Maine to look at the impacts of shoreland development on habitat. While Maine had many properties on lakes that meet the Shoreland Protection Act criteria, there were almost none on Vermont lakes. This makes it hard to compare.
- Jamie asked to go back into the presentation to the map of Shadow Lake. There was a discussion on the possible causes of this lake's increased P trends. Leslie stated that the increased trends are probably caused by more than one thing and those things may be different for each lake. In figuring this out, we may need to go lake-by-lake. Hopefully overarching themes would emerge.
- Bill Arden asked about the geology of Vermont lakes as related to Maine lakes. Andrew said that the Adirondacks would be the best place to study the effects of surficial geology on increasing phosphorus trends. Leslie has thought about the hypothesis that Bill proposed and has already starting talking to geology staff at VTANR.
- Jamie echoed Andrew's comment and said that this analysis should be done in New York. Neil reminded the group of Jonathan Kim's groundwater study that is going to take place in the Lake Carmi watershed. Leslie talked about her conversations with Jonathan Kim. Of the 23 Oligotrophic lakes studied, 8 came out as not having an increasing P trend. Sunset Lake in Benson and Miller Pond in the Connecticut River Basin were two of them. Sunset Lake has a lake assessment completed last year. One hypothesis was that these lakes are fed primarily by little tributaries and groundwater.
- Neil concluded the conversation by bringing the group back to the map of Shadow Lake. He pointed out the new area of development outside of the Shoreland Protection Act boundaries and re-iterated land use as a hypothesis for the increasing phosphorus trends.

1:45 Final report review: McKenzie Brook Flow and Water Quality, Blaine Hastings and Angie Allen, VTDEC

- Angie Allen and Blaine Hastings presented their final report and asked for feedback.
 - Kevin Behm asked if they are able to differentiate between grazing land and cropland in their study as it would be nice to compare these land uses in watersheds of similar sizes. Angie responded that they are working with UVM on this and hope to be able to look at finer spatial scale maps to collect this data.
 - Andrew Schroth pointed to the high flow TP sample (25 micrograms/liter) at Wards Creek in 2018 as the water quality flow is marked as 0. A discussion took place on the different TP samples versus flow. Angie said that she took upstream downstream photos each time she sampled. If she had more time she wished she

- could put together a ‘walk-through’ time series for each sample date and location and mentioned that she once saw cows in the stream she was sampling.
- Eric Perkins asked if there were any other trends Angie noticed - like cows in the river - that would explain the trends within the graphs. Angie reiterated that she only saw cows one time, but that doesn’t mean they weren’t there at other times.
 - Ryan Cunningham asked to go back to the second to last slide to ask if Angie and Blaine compared the data they collected to the SWAT model for the Otter Creek portion of the Lake Champlain Phosphorus TMDL in relation to the corn/hay/pasture land use types. He commented that the loading rates seen in the study fall below the estimated corn loading rates but are above the hay loading rates. Angie replied that that was not in the scope of the study, but they could look at it in the future.
 - Neil made a comment based on Ryan’s question. He emphasized the comparison of streams in the study to Vermont’s warmwater medium gradient criteria of 27 micrograms/liter. He said that the study shouldn’t be using that criteria as a model, but that is the closest criteria that matches the stream types sampled in the study (which are warmwater low gradient). This is new territory because these stream-types are not in Vermont regulations. Angie stated that the State is working on new biocriteria criteria for this type of stream. Neil added that the number will be high.
 - Eric Perkins said that the study’s overall goal was to determine phosphorus trends overtime to determine if the work of the NRCS on agricultural land is bearing fruit. He asked if he was correct to assume that people will still collect this water quality data after this study is completed. This would be important to compare future conditions. Angie said that if she was able, she would do this sampling until the end of the TMDL, but has no answer on the funding outlook. At the monitoring summit she advocates for the sites within the study to be sampled more than they have in the past, having no criteria for warmwater low gradient criteria is a talking point. One of the goals of this study was to get a baseline of load estimates at the start of all agricultural BMPs so in 5, 10 years we can revisit the streams to assess the impact of the BMPs.
 - Blaine chimed in saying that the USGS and NRCS have funded 3 gauges that have the possibility of auto sampling, at 3 sites in the watersheds they studied. He said it would be good to compare the stream gauge data with the data they are collecting. The study design of this project would be good for others to adopt if they don’t have a lot of data. A true goal of this study was to show the need of investing in water quality sampling. Bernie Pientka illustrated that this is a chicken or the egg dilemma as the goal is often continuous monitoring, but it takes a multi-year sampling efforts to demonstrate the need.

- Kevin added that Angie and Blaine may look to the Addison County River Watch Collaborative to look at certain portions of these watersheds to see if they have the capacity to do more volunteer water quality sampling.
- Angie added to this by saying that the partnerships are growing in these watersheds. The NRCS CEAP project as well as tile drainage studies are located in the area. Knowing what type of agriculture is done in each watershed will lead to further understanding.
- Neil told the TAC that this final report goes way beyond the original workplan. The original LCBP Steering Committee objective of the project was to see if a long-term gauging program could happen in this watershed. He urged TAC members to bear this in mind when talking about what the data means as much of it was not even in the original workplan.
- Andrew pointed to a recently published long term monitoring study completed by Kristen Underwood. The watershed is very unique to the rest of the Lake Champlain Watershed in terms of its morphology and geology. It is hard to study as relationships are hard to distinguish. Neil asked Angie to go back into the slides to show a map of the study location and described the area to the group. He advocates that the sampling continue and then 5 years down the road the study is replicated, hopefully with automatic sampling. Angie agreed that that would bolster the program.
- Eric Perkins questioned Table 12b, wondering whether it could be reformatted to remove the top left corner wording to make it less confusing.
- **Motion to approve:** A motion to approve the final report with minor revisions including removing wording in the top left box of table 12, removing the last paragraph on the last page because it does not reflect the stream type, and adding context for the important of the data collection in small adjacent watershed to Lake Champlain and the lack of P data was made by Bernie Pientka and seconded by Jenn Callaghan, Neil and Angela abstained. All agreed that this project lays the groundwork for understanding direct drainage contributions of P – warm water low gradient streams.

Adjourn