Lake Carmi Coordination Meeting

March 10, 2025

Meeting Recording: Recap: Lake Carmi Coordination Meeting Monday, March 10

9:00 – Introductions

- Jenny Austin – DEC Lakes and Ponds Program manager
- Neil Kamman – DEC Deputy Commissioner, former Water Investment Division (WID) director, funding team
- Katherine King – DEC WID funding team
- Karen Bates – DEC WID Watershed Basin Planner
- Staci Pomeroy – DEC Rivers Program Physical Science Section Lead
- Alison Marchione – DEC Lakes and Ponds, Shoreland Restoration Ecologist
- Mark Mitchell – DEC Lay Monitoring Program Coordinator, Lake Assessment/Management in Partnership with Lake Champlain/Seagrant
- Peter Isles – DEC Cyanobacteria and Lake Champlain monitoring lead, in partnership with Lake Champlain Basin program
- Kelsey Colbert – DEC Lake Champlain long term and Lake Carmi monitoring, in partnership with Lake Champlain basin program
- Jon Kim – DEC Vermont Geological Survey, groundwater/surface water interactions at Lake Carmi since 2020, particularly with phosphorus and nitrogen species
- Ben Dejong – DEC Vermont Geological Survey, State Geologist, labels sample bottles for Jon
- Andrew Schroth – UVM Geochemist in Geography and Geosciences department, studying Lake Carmi since 2018
- Pete Benevento – President of Lake Carmi Campers Association, Vice President of Franklin Watershed Committee, happy these meetings starting again, been going to Lake Carmi since 1971
- Rob Evans – President of the Franklin Watershed Committee and Vice President of Lake Carmi Campers Association
- Dean Pierce – Senior Planner at the Northwest Regional Planning Commission, focusing on water resource issues, Clean Water Service Provider for the basin that includes Lake Carmi, Franklin native who first started splashing around in Lake Carmi around 1963
- Heather Darby – UVM Professor of Agronomy and Soil Science, Faculty of Agriculture, Landscape and Environment Department, for 23 years

- Jeff Sanders – UVM Outreach specialist, works with Heather on Lake Carmi over the years
- Keith Fritschie – Watershed planner and PM for Lake Morey treatment; support for Katherine and others
- Others in attendance, but not introduced (or missed in recording):
    - Ryan Walquist (DEC Lakes and Ponds Monitoring lead), Julia Crocker (Watershed Coordinator, Franklin Watershed Committee), Ethan Swift (DEC WID Watershed Planning Program Manager), Keith Pilgrim (Barr Engineering Alum Treatment Project Manager), (Lauren Weston, Franklin County Natural Resources Conservation District), Ben Gabos (Conservation Reserve Enhancement Program (CREP) Coordinator, VT Agency of Agriculture), Kris Stepenuck (UVM Associate Director and Extension Program Leader, Lake Champlain Sea Grant), James Brady (Fish Program Manager, VT Fish & Wildlife)
    - Peter Lafley, John Costa, Ernie Englehardt, Diane Larose, Joanne Peduzzi, Jerry Delollis, Sue Prasch, Lee Simard, Maria Abernethy, Bryan Dore, Ryan Archibald, Michael Garala, Matthew Vaughan, Krystal Sewell, Bridget O'Brien

9:10 – Watershed Efforts

- Agriculture (UVM, Heather Darby, Jeff Sanders)
    - Heather Darby, Professor of Agronomy, Soil Science
        - Working with farmers for 20+ years around Lake Carmi, on nutrient management practices and plans, soil testing, manure analysis, recommendations, in season nutrient testing to minimize inputs
        - At least one farm in watershed has exceptionally high organic matter and carbon levels in their fields – which is a positive thing especially with all our climate work
        - Working to improve hay fields (predominant cropland in watershed); trying to produce higher quality feed. One practice recommended is raising height of mowing. Creates a better soil environment, protects soil from rainfall, improves infiltration, reduces compaction, helps both water quality and productivity. Low cutting has been the norm.
        - Precision nutrient management: varying rates of both manure and fertilizer applications. New project that started last year. Standard nutrient management – one test and one recommendation. Reality is a field can have highly variable and benefit from multiple soil tests. New technology used, sensors, types of fertilizer spreaders that can change rates
    - Jeff Sanders, Outreach specialist with Heather

        - Strong relationships with farmers. Many farmers interested in compaction issues caused by spreaders tires (UVM injection machine has lots of tires). Inhibits water infiltration, causes runoff.
        - Variable rate work Heather mentioned, with prescription mapping etc. Have funding and expanding efforts this years.
        - Seeing more drag lining in watershed, where people not moving manure with trucks and trailers; they're moving with hoses to move manure from pits to fields without using wheels. The manure applicators that do injections have flow meters on them, so not a risk for over-applying, just another method for applying. No more UVM funds to keep going, and some farmers continuing on their own, but main concern for maintenance of broken machines. Dairy farming likely to be unprofitable in 2025.
        - Pete Benevento: we'll get together to explore other sources funding
        - Rob Evans: For time being, is it your understanding that we probably aren't expecting any additional grant funding from the extension to do this type of work in the watershed?
        - Jeff Sanders: We currently do not have any grants directly related to running the injectors
        - Rob Evans: Question about running injectors versus broadcast spreading? Compaction issue? The spreader with the 6 tires on it is the real issue, especially when in wet conditions. Issue in recent years with all the wet weather events. Worst piece of equipment is a hay merger, because it has only 2 tires with really heavy weight.
        - Overall, benefits of manure injection, better than laying it on top. Risks/issues with equipment maintenance. Funding is needed.
- River floodplain enhancement work (Staci Pomeroy, Lauren Weston)
    - Lauren Weston, Franklin County Natural Resources Conservation District
        - BMP Assessment scoping projects through Fitzgerald Environmental. Currently working on 8 projects, various stages of 30% design/final design implementation, through CWSP and enhancement grants.
        - Projects involve creating two tier channels to increase floodplain connection, floodplain restoration and berm removals, wood addition projects, shoreline bioengineering, floodplain/wetland restoration.
        - Previously held well-attended watershed workshops, planning to do some Lake Wise and shoreline implementation projects this coming Fall and future years to help some of the camp owners with BMPs.
- Roads (private, local and state) (Karen Bates)

    - Public roads - Municipal general road permit – Town of Franklin is required to comply with by performing road erosion inventories and address high priority roads with more erosion
    - Private roads – erosion inventory done by NW Regional Planning commission.
    - Patton road, Westcott, Mullen Shore Rd projects done a little over a year ago, funded through clean water funds
- Other BMP assessment and scoping projects (Alison)
    - Take stock of existing BMPs, identify new ones. Shoreline, tributaries, and non-RAP Agricultural BMPs
    - Four 30% designs: 2 ag designs, 1 shoreline, 1 natural resource
    - 100 potential new projects identified, 20 high priority projects
    - Of 20 high priority, cumulative potential Phosphorus reduction of 200 lbs per year.
    - BMP Report on Lake Carmi website: https://dec.vermont.gov/sites/dec/files/wsm/lakes/docs/2024-11-01_Lake_Carmi_Scoping_Final_Report.pdf
    - Rob Evans: Has funding already available? Or is it design/engineering next?
    - 4 of projects at 30%, trying to bring to 100% designs. One is funded right now, others need to progress further
    - Rob Evans: in the scale of things, how much reduction is 200 lbs per year?
    - Alison: Yes, it's a big number.
    - Rob: is there a geographic area that projects are focused on? Are they focused on Marsh Brook (hot spot)?
    - Lauren: The way the prioritization worked was landowner willingness and Phosphorus reduction potential

9:30 – Alum Treatment

- Funding (Katherine King)
    - Shooting for fall application (October)
    - Estimated $2.8M total cost; through Clean Water Fund, partially through Clean Water State revolving Loan Fund (emerging contaminant subsidy)
    - Clean Water Fund grant agreement just about completed. Will allow for the town to start drawing on.
    - Rob Evans: Thank you for team effort to get this funding lined up; concerns if alum treatment doesn't happen this fall, the prices could go up
- Permitting (Jenny Austin on behalf of Heather Collins/Michelle Kolb)

    - Application for NPDES permit received Jan 28th and technical review in process. They've reached out to colleagues for input. They need to work with the water quality standards specialist Anna Gallagher to complete the review.
    - Bottom line is they think they will be able to get things done for a fall application.
    - There are some unknowns however, about how long it may take to respond to public comments if we get a lot during the required 30 day notice period.
    - Really important to do proactive community outreach so the community understands what an alum treatment is, etc, and we aren't thrown off our timeline by public questions.
    - Rob Evans: the watershed committee and LCCA can be really instrumental to help with this outreach. Keith and Barr Engineering offered to come out and do outreach too.
    - Lauren Weston: We need good messaging about impacts to fish. That is a high concern around the lake.
    - Interaction with F&W important
    - Benefit of fall treatment – avoids Walleye spawning
- Project Management (Katherine King)
    - Barr Engineering hoping to start bidding process for applicators in June, to line up with application in October.
    - Keith Pilgrim- working on contract documents. Should have a draft ready for review in the next 3-4 weeks. We'd like to put it on bid in April if we could, to give us a bit extra time.
    - Rob Evans: Keith is meeting with F&W and other stakeholder groups

9:50 – Aeration Removal (Rob Evans, on behalf of John Tucci/Everblue)

April 1 – May 15	Remove all equipment at Compressor Sites
May 15 – June 30	Remove all airline and diffusers from lake. Work will begin after water temps are above15 deg. C
June 1 – July 31	Complete all site restoration and Contract completion/sign-off.

- Compressors already off site, building locations and 2 manifolds along shoreline still need to be removed
- 80 airlines to remove; concern for amount of activity on lake. Rob spoke with John and says they're planning to use flat-bottom boats to wrap up the lines from the water and not dragging the lines across the bottom. Airline removal delayed to reduce impacts to any walleye spawning (water temps above 15 degrees C)
- Planning to store tubing on State Park property (temporarily)

10:00 - Monitoring updates

- Lay Monitoring (Mark Mitchell)
    - https://dec.vermont.gov/watershed/lakes-ponds/monitor/lay-monitoring-program
    - Pete helping with lay monitoring for years
    - Interesting to see changes after aeration turned off
    - Protocols changed within past year. Surface sample, and a sample a meter off the bottom, biweekly, (8 samples) June to August… as opposed to traditional hose sampling which combined the whole water column. The new discreet sampling allows for a comparison of bottom sediments versus surface
    - Added caffeine sampling last couple years – for indicator of wastewater (septic) impacts. 60 to 70 positive hits for caffeine from 30 lakes and Carmi had multiple. Currently used as outreach tool until we get a little more data.
    - Road salt impacts show in chloride data
    - Phosphorus - Huge difference in surface (Epilimnetic) and bottom (Hypolimnetic). Bottom has really high concentrations which is indicative of internal loadings, with surface at just a little above the TMDL water quality standard of 22 micrograms/L.
    - Secchi disk transparency (clarity). June was more clear, then declined after July flooding and late summer cyanobacteria blooms
    - See same trend in Chlorophyll-a (indicative of algae). Surface algae in blooms increased after July floods
    - Comparison of previous sampling year to this year. Without aeration, seeing increased bloom activity
    - Additional Monitoring summary to be added
- Tributary monitoring (Mark on behalf of Julia Crocker)
    - Mark helps coordinate this monitoring
    - Some reductions in Sandy Bay Brook
    - Some high concentrations of Phosphorus (Marsh Brook), but overall, we haven't seen that much change
- Groundwater (Jon Kim)
    - 2020, installed 9 monitoring wells around lake in the shallow soil aquifer, sampling each year – focus on Phosphorus, total dissolved, Nox, nitrite and ammonia
    - Coordinate further with Mark
    - Question from Ben Gabos in chat: is caffeine removed by a well-functioning septic?

    - Mark: Yes, it should be highly removed. Lots of literature research
    - Question Lauren: multiple sites on Marsh brook… why do some of the other tribs only have one downstream monitoring site?
    - Mark and Karen: we've had more sites in past, and over time focused more in areas with higher concentrations. Marsh brook is a larger river too
    - Ben Dejoung: easy to think of water as two separate systems, but it's all connected. Jon's groundwater monitoring is very important, especially given all the talk of famers and pros/cons of injection versus surface spreading. Important to keep up this monitoring to understand all the variables that can impact flux of phosphorus to the system, especially right before and after the alum treatment.
    - Ben Gabos: LC-20 upper Marsh Brook site, why not sampled?
    - Julia Crocker: stopped sampling there because the owner passed away. Lauren can help get in contact with the family to begin sampling again
- UVM lake monitoring buoy results (Andrew Schroth)
    - Results in the high frequency buoy
    - Change in temperature profile of the lake – huge difference during and post aeration
    - Lake returned to what it was before in 2018 before we put the aerators in: More consistent cold-water bottom, with fall mixing
    - Particularly warm surface temperatures in August this year, partly because the cooler bottom water isn't mixing with the surface continuously with aeration anymore
    - In fall, when temperatures cool, lake mixes, but then warm spells in September cause cyanobacteria blooms because rich bottom waters have mixed benthic nutrients into water column
    - Dissolved oxygen, systems with sustained anoxic conditions was causing fouling with rust on sensors as the sensors were pulled up
    - Phycocyanin – pigment primarily associated with cyanobateria species of concern. 2024 had earlier strong bloom. 2023 worst conditions later (in September).
    - Colleague Mindy Morales Williams looking at the different species compositions of the blooms. She did see a change in the populations of cyanobacteria during versus pre-aeration. So it will be interesting to see if it returns to pre-aeration now.
    - Rob Evans: will this monitoring continue?
    - Peter: We hope to keep this monitoring going
    - Jon Kim: Do certain cyanobacteria species respond more favorably or grow with different water chemistries?

- Peter: Yes, some are able to fix atmospheric nitrogen and some are not. When you get a lot of internal phosphorus loading, you also get a lot of transformations of nitrogen in the system and mineralization of the organic end which comes up as ammonium, which is superfood for certain cyanobacteria. You also get a lot of de-nitrification under low oxygen conditions. The nitrogen cycle is a very dynamic system in lakes, especially when you have these wildly oscillating oxygen concentrations and differences in turbulence (aerators versus none). Different species monopolize light resources in different ways.

10:20 – Questions/ Wrap-up

- John Costa: What can we do as a group to make sure this thing gets done in October
- Jenny: Continue to have these coordination meetings, and as mentioned before, public outreach to make sure the permitting goes smoothly.
- Peter B: Largest state park on our Lake – we should seek to have them attend future meetings. Great to have these meetings going again.
- Jenny: Yes, I will try to add them. (Post meeting comment: Joe Tyson, Regional Park Manager was invited to this meeting but he couldn't make it). Please let me know if there's anyone else to add to the group, and any suggestions for next meeting agenda items.