

4-16-24 Lake Carmi Coordination Team Meeting

Pete Benevento/Rob Evans introduction 4:30 pm

- Thank you to Oliver Pierson for his work at Lake Carmi and all other DEC staff
- Aeration will be discontinued

Bethany Sargent Watershed Management presentation 4:34 pm

- Agenda overview and introducing speakers
- Aeration decision
 - Was not helping the lake and may have been exacerbating problems

Mark Mitchell Aeration Update 4:40 pm

- Low oxygen causes phosphorus to be released into lake due to internal loading
- Aeration purpose was to break up thermal stratification to allow oxygen to mix into lake
- Pre-aeration: bottom layer of lake (8 m) had low oxygen levels, especially in August
 - Normally a dimictic season but can have partial mixing in summer
- Aeration system did as expected and created less stratification
- Phosphorus levels in surface waters increased in years following aeration
- Conclusions:
 - Aeration partially successful at reducing stratification
 - However, system had unintended consequences of mixing bottom-water total phosphorus into surface waters earlier in season
 - Resulted in much higher surface water total phosphorus and stronger, more protracted cyanobacteria blooms
 - Aeration has been effective in other lakes but does not seem to be good solution for Lake Carmi
- System to be removed in the fall
- Questions:
 - Where does equipment go once removed?
 - Still working on removal plan. Will be working with town and EverBlue to figure out details.

Barr Engineering Feasibility Study presentation – Keith Pilgrim 4:55 pm

- Study Goals and Components:
 - Will alum treatment work?
 - If alum, will additional watershed controls be needed to stop algal blooms?
 - How much will it cost?
 - Will it be one or more treatments and when?
 - How long will it last?
 - Will it harm fish?
 - How will this affect aquatic plants?
- Objective of alum is to keep phosphorus in the sediment locked in the sediment

- Developed set of recommendations of dose and treatment area
 - Treatments will be targeted where highest concentrations of phosphorus are and where phosphorus is coming from
 - 775 acres of treatment area
 - Recommended dose: 67 g/m²
 - 412,183 gallons of liquid alum
 - 206,092 liquid sodium aluminate
 - 29 days treatment time if done all at once
- Used existing watershed data to calculate benefits of alum
- Phosphorus concentrations in lake would significantly decrease (50%) if alum treatment is done
 - Lake clarity would also improve; 1.5 m to 2.6 m
 - 70% reduction in algae concentration
- Internal loading made up 87% of P concentration in lake in 2018
 - Only 12% came from watershed input
 - 1% dry deposit
- Effects on fish and plants (based on other treated lakes)
 - Compared largemouth bass and walleye weight of three large, treated lakes and found no significant difference in weight before and after treatment
 - Two lakes did have slight decreases in fish weight, but difference was not significant
 - Very unlikely that pH will increase due to treatment
- Conclusions:
 - Aluminum treatment of lake bottom will be very effective in terms of clarity and cyanobacteria blooms
 - Treatment can be one treatment or split into two
 - No expected adverse effects on fish
 - Aquatic plants will grow at deeper depths
- Questions:
 - Will treatment increase milfoil abundance?
 - Will have more plants overall due to increased clarity of lake
 - Were other lakes studied similar in depth to Lake Carmi?
 - 30 ft depth is commonly treated for alum treatments
 - What is expected longevity of treatments effects?
 - 10-30 years
 - Based on experience; Lake Carmi has features working in our favor such as low organic P levels and size of lake
 - Invertebrate activity in sediment will decrease longevity
 - What happens after the 10-30 years?
 - Educated guess: may be better off than before due to watershed improvement activities but at some point, the lake won't be as clear. Hard to predict.
 - Will have to continue to do the work in the watershed

- Like Morey had very successful treatment in 1986 and are just now facing second treatment. Still in better shape than in the 80s – Mark Mitchell
 - Will the external loading affect treatment?
 - No
 - Has there been considerations about smaller localized blooms post-treatment? Can they be taken care of?
 - Very unlikely that there will be localized blooms post-treatment due to high mixing tendencies of water
 - How do sample lakes compare in size to Lake Carmi?
 - They are smaller but had similar sized treatments
 - Recommendation is to treat at 20-ft contour. Is it not needed in other areas?
 - Yes
 - There is enough oxygen and low phosphorus concentration at depths above 20 ft
 - How is treatment applied at depth and how do you ensure it mixes at appropriate depth?
 - Barge goes across water and releases floc material that settles on bottom
 - Will mix into sediment layer due to invertebrates living in sediment
 - How quickly do you see results?
 - Almost instantaneously; if treated in spring or fall, it will take phosphorus out of water column right away
 - Prevents internal loading immediately
- Draft report is on DEC Restoring Lake Carmi website

Evaluating Proposed Use of Alum – Bethany Sargent 5:36 pm

- Want to make sure external loading reductions support alum treatment
- Make sure any adjacent wetlands and endangered species are protected
- Proposed dosing concentration must meet treatment objectives
- NPDES Permitting requirements:
 - Alternatives analysis
 - Proposed dosing regime and ultimate alum target concentration
 - Ambient water quality data necessary to conduct reasonable potential analysis to determine compliance with Vermont Water Quality Standards
 - Documentation of any Rare, Threatened, or Endangered species in treatment area
- Prospective permitting process timeline:
 - Submit application - Summer/fall 2024
 - Wastewater program reviews app and drafts decision - Fall 2024
 - Wastewater program reviews comments and drafts final decision - Winter 2024/2025
 - Final decision - winter 2024/2025

Options for Funding - Neil Kamman 5:44 pm

- Cost estimate is \$2.6 million for recommended approach
- Clean Water Fund
 - \$750,000 reserved in SFY25 Board-opted spending plan, pending study results
 - Money will not be redirected for other uses at this time
 - Available 7/1/2024 or upon Gov. signature
- Clean Water State Revolving Loan Fund
 - Federal dollars
 - Bipartisan Infrastructure Law provides new funding to address emerging contaminants
 - 100% subsidy but municipality must be applicant
 - Fund allocated based on prioritized applications
 - Application period early Dec 2024
 - Funds available late spring 2024
 - Source may have sufficient funding by August 2025 to cover full cost after CWF is accounted
 - Plenty of time for Town of Franklin to work with FWC/LCCA to prepare and submit application
 - If no other applicants to Emerging Contaminants Fund, then we will have enough money for treatment by August 2025
- Congressionally Directed Spending
 - Direct request to Congressional Delegation
 - Dependent on congressional budget passing – takes time
 - Application period will open mid-winter 2025
 - If awarded, funds flow a “few months” after Federal Budget is signed
 - Likelihood of success depends on other applicants and whether federal budget is accepted
- Capital Appropriations (done for aeration system)
 - Request to Institutions Committee
 - Would require engagement with DEC and Clean Water Board to orchestrate request
 - Feasibility study would need to confirm adequate longevity of treatment

Other questions/Business 5:55 pm

- Who orchestrates these processes?
 - DEC and Neil’s department will work towards permits and financing requirements
 - Folks at Northwest Regional Planning Commission can help Town with State Revolving Fund application