

Draft Minutes of the Cyanobacteria Mitigation Steering Committee
Alton's Gilman Museum
Thursday May 16, 2019 at 6:30PM

Present: David "Swens" Swenson, William Mannion, Jason Smith, David Neils, Mark Sullivan, Fred Quimby, Bob Craycraft, Ray Howard and Gene Young.

Absent: Cydney Johnson and Bill Meyer

Guest: Art Hoover, Mike Gelinas, Doug Gilman

The meeting was called to order by Fred Quimby at 6:30PM.

Fred gave a brief review of the topics to be discussed at this meeting and began with an interpretation of the Lake Loading Response Model Report (LLRM). The purpose of the LLRM is to validate an approach for determining phosphorus and water loads for lakes, ponds and tributaries in the Merrymeeting River Watershed (MMRWS). The Watershed Management Consultants, Forrest Bell Environmental Associates (FBE), created a series of models using inputs of land cover, point sources, septic systems, waterfowl, rainfall, lake water volume, lake water surface area, internal loading estimates and water quality data in order to predict annual water and phosphorus loads in each of 5 subwatersheds. Predictions made from these models were then compared to data collected by in field testing numerous sites throughout the watershed over the years. Agreement between the model predictions and observed data was quite good. Now validated, the models will be used in the future to identify current and future pollution sources, estimate pollution limits and water quality goals, and guide watershed improvement projects. Fred first discussed how the models were created and calibrated and then he presented the findings based on the figures and tables found in the report. Finally, Fred presented the conclusions of the watershed planners which included degradation of water quality in the waterbodies downstream from Merrymeeting Lake in part due to the presence of a point source in the Powder Mill Fish Hatchery. In addition, FBE noted that current and future development including septic systems and internal loading were important to address. They recommend conservation of intact forest land and town zoning ordinance amendments which encourage low impact development. More specific conclusions will be present in the final Watershed Management Plan (WMP). A copy of Fred's complete interpretation of the LLRM is attached and available on request. There were no questions after this presentation and Fred asked David Neils if he would briefly explain the discussion which took place Friday May 10, 2019 with the New Hampshire Department of Environmental Services (NH DES), FBE and the United States Environmental Protection Agency (USEPA) regarding this LLRM.

David Neils passed out a handout summarizing the conference call with the USEPA. He noted how the model for this watershed actually incorporated 5 different models which spanned the watershed. The model describing the watershed in Alton was complex both in area and the routing of stormwater through the sub-basins and as a result they needed to adjust attenuation factors especially in model 5 (Alton). He noted that while 79% of the land cover in the watershed was forest this land only contributed 33% of the phosphorus into the system, however, the developed land which represented only 8% of the land cover contributed 55% of the phosphorus. There was discussion about the flow from Merrymeeting Lake into the system and how that changes over 12 months of the typical year noting that for 4 months there was no contribution from the lake which did not pass through the hatchery. Teasing out the respective water flows and phosphorus loads in this area was essential and required

that flow weighted annual phosphorus concentration be calculated. David presented an example on how this flow weighted calculation took place. This led to a discussion on the difference between the annual average phosphorus concentration seen in Marsh Pond compared to the data observed in the field. The problem was that there were no water quality data taken during the months December through March when water volumes into Marsh Pond were high and thus leading to diluted P concentrations which affected the annual average. The annual averages were fine for watershed planning purposes. And there were ways to deal with this low average phosphorus when setting a limit for phosphorus discharge from the hatchery. One such technique was to use mass balance calculations to better evaluate the summer months when phosphorus concentration is highest and cyanobacteria blooms are likely to occur. The NH DES and USEPA now have the models along with the built-in mass balance calculations. David went on to state that the NH DES felt that a phosphorus concentration of 12 ug/L and a chlorophyll-a value of 5 ug/L were reasonable targets for the downstream waterbodies (downstream from the hatchery). These are consistent with water quality values for mesotrophic lakes. The USEPA indicated that the end of September 2019 was the target date for delivering a draft discharge permit. While they did not indicate how the permit would be structured, it was clear that the model outputs would be helpful. And finally, David noted that watershed planning and permitting were two separate efforts entirely. The WMP was the critical step forward to managing and restoring conditions at the local level. There will be ample opportunities to comment on the new draft permit after it is released. While the NH DES will stay involved in permit development it is the USEPA who is ultimately responsible, since NH is not a delegated state.

David Swenson asked Neils why the USEPA cannot simply ask that the hatchery return to the river, through its discharge, the same level of phosphorus it receives in its intake water? Neils responded that other conditions must also be considered including loading from other streams into Marsh and Jones Ponds which will likely not have the same phosphorus concentrations seen in Merrymeeting Lake. The goal here is to return Marsh Pond, and those areas downstream, to a mesotrophic state.

Mark Sullivan reminded the group that there have been decades of loading downstream by the hatchery and the sediments are heavily laden with phosphorus which must also be addressed. Fred said he planned to address this issue tonight.

Fred Quimby then explained the purpose of the Build-Out Analysis which was recently received from FBE. This document, when completed, will predict the increase in phosphorus loads into the system as a result of full build-out of all available property according to current town zoning standards. The reason we received this build-out analysis first in draft form was to allow us to review the land in conservation and the zoning restrictions used in the analysis to be sure they truly reflect the current situation. In fact, Fred, Bob Craycraft, and Gene Young have all examined the report and made comments on it which were shared with FBE. If anyone else spots any inconsistencies in the report please let Fred know before the end of the weekend. This report should be finalized within a week and following that, the water quality goals sub-committee will meet with FBE.

Following up on Mark Sullivan's comments earlier, Fred continued to discuss the plans of the Water Quality Working Group (WQWG) to survey the watershed this year and specifically addressing phosphorus turnover internally and the role of sediments in this process. An article explaining the entire process was handed out to all members. Fred reminded everyone that FBE, in the LLRM, noted that internal loading from sediments in Marsh and Jones Ponds must be addressed in the future. Fred

explained that since our water quality data definitely shows anoxic conditions above the sediments of both ponds by June of each year all the components were in place for substantial internal loading to evolve after remediation of the hatchery discharge. The levels of phosphorus gained to the water column from sediments will depend on what elements phosphorus is bound to in the sediments. Naturally, phosphorus binds to either aluminum or iron, and knowing how much is bound to each of these elements is essential to solving the problem. For instance, if all the phosphorus is bound to aluminum there is no problem since aluminum binds the phosphorus tightly regardless of the anoxic state of the water. However, when phosphorus is bound to iron and the water above the sediment is anoxic the iron releases the phosphorus back into the water column where it may feed a cyanobacteria bloom. In the latter case you can seed the waterbody with alum to bind the phosphorus but this is not cheap and may require additional seeding after several years in use. Aeration will eliminate the anoxia and prevent the iron from releasing the phosphorus but this is very expensive. The New Durham Water Quality Committee already has quotes to do this in the three ponds downstream from the hatchery and the costs are in the millions of dollars. Finally, dredging the sediment is the most expensive but it is permanent and there is the problem of where the sediment will be disposed. To decide which is the most suitable technique, sediment analysis must be done. Fred sought a quote from an expert, Don Kretchmer, on how this is done and what it costs. Marsh Pond would need 8 samples based on its bathymetry and after collecting the samples (which is inexpensive) they are sent to the Midwest for laboratory analyses (which is expensive). The estimate for Marsh Pond alone is \$7000. So, this will not be in the current budget. We also have a huge problem with phosphorus in Mill Pond for a variety of reasons. Mill Pond will be the site of much of our summer activity assessing the water column and finding out if a state of anoxia exist there also. If so, sediment analyses will be required there. As part of our testing of Mill Pond we will take continuous specific conductivity tests from a boat around the parameter of the pond, this will help identify any underwater plume arising from the old town dump which sits beside Mill Pond. Sampling of the Rt.11 culverts during a storm will also aid in determining whether or not remediation of these culverts is required. The LLRM model already predicts lots of phosphorus arising from Rt.11 during stormwater runoff into Mill Pond. Ray Howard asked if fish are being tested from Mill Pond and Fred replied that fish are being sampled from Mill, Downing, Jones and Marsh Ponds this year for cyanobacterial toxins. This is being done by the NH DES at their expense. And since this issue has come up Fred stated that the NH DES has agreed to set up continuous recording water quality sondes in Marsh and Jones Ponds this year to better characterize the anoxic conditions in these ponds. NH DES is working with the NH Fish and Game Department to evaluate the efficacy of a new Septic system being constructed in-site to handle all vacuumed waste rather than placing these vacuumed waste in settling ponds which communicate with the river. And they have already completed bathymetry in Marsh and Mill Ponds and sent the results back to the FBE for inclusion in the WMP.

Fred then went on to explain that the WQWG also will maintain the same analysis of water quality testing at 6 key sites along the river from Marsh Pond to Alton Bay. These tests along with water flow and phosphorus load (P-load) analyses will continue to serve as a monitoring system to evaluate the success of remediations implemented. River analysis began on May 6, 2019 and will continue all year to provide winter water quality data for the model. In the future river flow and P-load will be collected using stream gauges critically placed through the system. Placement is critical so as not to receive false and misleading data due to backpressure effects of dams and artificial lake water height. The current high level of Lake Winnepesaukee is affecting river flow most of the way up to the Alton Dam. The Alton Dam is affecting the flow in the river all the way back to Johnson's Restaurant on Rt. 11 in New Durham.

Once sites are chosen, 5 gauges will be placed and then calibrated. This calibration must be perfect and Fred asked Don Kretchmer, who specializes in this and set up the system for the town of Wolfeboro, what it would cost. Calibration involves measuring water flow under three different water heights at each of 5 gauge sites and creating a graph of stream gauge water height vs flow from which all future water flow rates will be extrapolated. The cost to have Don do this work for the CMSC will be \$3000. Fred moved and Mark seconded a motion to have Don Kretchmer perform three flow analyses under different flow conditions at each of 5 gauge sites for \$3000. The vote for approval was unanimous.

Fred has developed a budget for all the next year of water quality testing (see attachment) and shared this with Gene Young for budgeting purposes by each town. Since all the sampling is being done by volunteers the only costs are for laboratory analyses. And many of the lab tests are being performed by Bob Craycraft for nothing. The total lab costs for 2019/2020 for New Durham is \$1152 and for Alton it is \$1680.

Quimby made one final comment about the possibility that cold and dense water coming from the hatchery may actually sink to the bottom of the river and under-ride the current until it settles out at the Marsh Pond deep site. This would bring the highest concentration of phosphorus to this site where we think internal loading is occurring. David Neils had an excellent idea which would prove or disprove this as a theory. He believes we can hire a company to perform a dye test directly into the outfall 002 of the hatchery and then testing the water column at the deep site and see if the dye collects on the bottom or is distributed throughout the water column. Fred is seeking a quote to perform this test.

Ray Howard said he was told by a resident that Mill Pond was tested this year and had good water quality. Fred responded that this was not true. It has been tested this year and the water quality is not good. Specific conductance was very high and decaying cyanobacteria were seen on the bottom; we are still waiting for the results on phosphorus levels. However, the cyanobacteria bloom has not occurred yet and maybe that is what the resident had heard.

Fred asked Jason Smith to give a brief description of the interim measures being taken by the hatchery this year to reduce phosphorus discharge into the river. Jason began by stating that the 50,000 Atlantic salmon were transferred to Nashua and will not be raised at Powder Mill Hatchery this year. The new contract for feed has been modified so that beginning July 1, 2019 a reduced phosphorus diet will be fed to the fish. And a new on-site septic system is being built which will incorporate three circular ponds, which will be taken off-line, and used to empty vacuumed waste into. Water flowing from the ponds will enter construction bags filled with shavings. As the water percolates through the bags, the shavings will adsorb phosphorus and nitrogen and the remaining water will trickle from the bags into a gravel entrapment area where it will seep into the ground. Mike Gelinas asked if there would be any direct flow from this system into the river. Jason replied nothing direct, if it made its way into the river it would be only after filtering through the gravel into the water table.

Fred stated that he inquired of Jeff Marcoux about the timing of the Section 319 grant proposals for correction of roadside erosion sites. Jeff stated that the deadline for the preproposals was the middle of September. So Alton and New Durham have plenty of time to get these applications submitted.

Pat Tarpey, Director of the Lake Winnepesaukee Association, has offered interns who will provide free assessments of stormwater routing across land into fresh waterbodies and provide advice on how to correct any problems. Send the names and addresses of interested individuals to Fred and he will

contact Pat. Pat will work with the homeowner to set the final date. All requests should be made within the next three weeks, feel free to advertise this. Fred has already put a notice in the Baysider.

And finally, Pat Tarpey has contracted a lecturer who is an expert on septic systems to provide a public education lecture in Alton for Alton and New Durham residents to attend and find out everything they need to know about maintaining their septic systems. This was a potential problem identified by FBE and will definitely be in the final WMP. Ray Howard asked who the Alton BOS representatives were and Fred said Cydney was the representative and Reuben Wentworth was the alternate. Both had last minute conflicts which prevented their attendance tonight. Ray mentioned that this lecture should be sponsored by the Town BOS and Swens agreed. Swens will make contact with Cydney and Reuben and set a date and place for this lecture to be given. The time frame is June 17-22, 2019.

The meeting was adjourned at 7:45PM