**Tug Lake District**

**Board Of Commissioners Meeting**

**Merrill Incredible Bank**

**August 13, 2022**

**Present:** Bill Wulf, Gene Simon, Mike Specht, Todd Nicklaus, Reid Badeau, Don Olson, John Greenwood, Jean Greenwood, and Buzz Sorge via speaker iPhone.

**Motion to Accept April 30, 2022, BoC Meeting Minutes**

* Todd Nicklaus moved, Mike Specht seconded, motion passed.

**Water Research Team - Water Sampling Report**

* Tug Lake resident Reid Badeau is working with Scott Van Egeren, DNR Water Resources Specialist, and UWSP student Cutler Nowak who was hired by Dr. Todd Miller to assist the DNR.
	+ Since March of 2022 Reid has been measuring water level variations upstream and downstream at the Hay Meadow creek inlet culvert, the Pier Street culvert, the Nicklaus dam, and a spot south of the Pier Street Culvert. The sampling is at minimum once per week or rain event or noticeable water level change. This information is sent to Scott Van Egeren who enters it into a DNR database.
	+ Scott Van Egeren and others have been taking water samples since April 15, 2022. The sampling schedule is every other week. Since April they are also training Cutler Nowak, and Reid as an assistant, in the processes, methods and documentation procedures. As of July 24, 2022 Cutler and his assistant Reid, have been approved by Scott Van Egeren to sample solo.
	+ April 28, 2022 Scott brought a DNR boat to take lake samples and demonstrate the procedures at the deepest part of the lake (the ‘deep hole’ just north of the middle island). Reid launched his pontoon boat early May. Water testing is now done from the pontoon.
	+ Water testing has two parts. Testing on the lake and testing on land.
		- Water testing on the lake has multiple parts. Multiple water samples are taken for nutrients in the water and biological elements in the water. These water samples are taken at intervals with decreasing levels to near lake bottom. In addition water clarity is sampled. And finally using an electronic device called a Sonde the temperature, percent and milligrams per liter of dissolved oxygen are taken from the surface to near lake bottom (6.5 to 7 meters based upon lake level). Scott Van Egeren, DNR Water Resources Specialist from Rhinelander provided the Sonde and other equipment.
		- Water testing on land also has multiple parts. When the stream flow and water level were low enough to safely install Staff Gauges, one was installed at the inlet culvert and the outlet downstream of the dam. The staff gauge consists of two parts. One is a board with water level markings on it. The second is a plastic pipe. Inside the pipe is a sensor that is synchronized to the board markings. The sensor updates water temperature and water level every thirty minutes. The sensor is bluetooth capable. With special software the data can be uploaded. Scott, Cutler and Reid have been gathering staff gauge readings and uploading the sensor data which is then entered into the DNR database. The visual reading and sensor readings are compared for consistency and accuracy.
		- Water samples are taken at the inlet and outlet staff gauge.
		- Water flow is also taken at the inlet and outlet with a special monitoring device. Jon Kleist, DNR North District Water Biologist from Park Falls, has provided us with the Flow Meter.
		- The lake level is now so low that water is no longer flowing downstream of the dam. The area is still being monitored at the staff gauge, but water samples and flow data will not be taken until flow is re-established.
		- A large thank you. The DNR is providing and entrusting the specialized testing equipment used by Cutler and Reid at no charge. They are also providing consumable supplies. This is secured at Reid’s residence.

* + It is critical that the freshwater samples get to ,the UWSP Water Quality lab as soon as possible. Tug Lake resident volunteers are taking the water samples down to the UWSP Water Quality lab on Monday mornings after the Sunday PM sampling. The samples need to be at the lab within 24 hours for the lab to start processing.
	+ Reid’s information is sent to Scott who posts it on a data acquisition site where it is available to everybody, Dr. Todd Miller, etc. UWSP posts to the same central collection point.
	+ Scott is the contact person for the written report.
	+ The Board of Commissioners thanks Reid for his assiduous attention to data collection and the use of his pontoon boat for water sample procedures.
* Dr. Miller’s buoy deployment was originally scheduled for late May, 2022. He was testing the electronics for all of his buoys at his home i Milwaukee prior to deployment. A lightning strike next to his home destroyed all of the sensors and control boards for all of the buoys he uses throughout the state. He also had to recover from Covid. He is still hopeful to get a buoy in Tug Lake to capture the fall turnover.
	+ Because of this set back Reid has added additional Sonde readings to his testing. This information would have been automatically uploaded to Dr. Miller if his buoy was in the lake.
* Reid commented that the last flow measured at the inlet was negative or no flow. Mike Specht commented that if water is coming from the lake and going above (north) of the culvert (could be wind) might explain BG algae bloom seen north of the culvert.
* Bill Wulf asked if it is true that the DNR is advocating an additional year of testing which would delay our application process regarding an intervention for blue green algae. Reid said no, that the delay is because we need more spring data. Scott believed we should have enough data by the end of this year that will help us start to formulate a Lake Management Plan. The spring data will improve the plan by filling in the 2022 spring data gap. Dr. Miller’s buoy in 2023 will add more real time information that was being gathered bi-weekly by the water sampling team.
* A central question is: After we have a plan and we implement a remediation strategy, aeration, alum etc. why do we need to keep testing?
	+ How do you know if your implemented system is working? We must have enough data from the lake to see if there is improvement. That requires accurate data gathering. This is where Scott is coming from. It is the same case with Dr. Todd Miller’s study. Don indicated that Dr. Miller said he wished he had his buoy installed because he could tell more about the blue green algae we have encountered this summer.
* Buzz Sorge, DNR Lake Management Consultant, had a conversation with Scott on Thursday, August 11, 2022, about water sampling progress. Pat Oldenburg is the lake modeler and indicated we missed the spring runoff for development of a proper “rating curve.” If the minimal gathered spring floe data (Reid) lines up to more recent actual instrument flow data, then the earlier data will let us predict how much water might be coming in and going our at the earlier spring water elevations. Some phosphorous samples were also collected during the spring. This can reflect phosphorous loading during spring runoff.
* A multi sensor probe (Dr. Miller’s buoy) could not be installed this year, so far, so the water quality model will be supported with Reid’s weekly data collections.

* Bill James, a Senior Researcher at UW-Stout for Limnological Rehabilitation, can look at core samples of the lake sediment to determine Phosphorus accumulations and review land usage characteristics of the watershed. “Sometimes estimated is more accurate than reported”. Preliminary modeling will wrap most of this data in early January of 2023. “Lotta shoes gotta drop between now and the first of the year”.

**Lake Management Plan Scheduling Timeline**

* John Greenwood asked what the implications were for grants and the intervention plan for the summer of 2023.
* Buzz indicated continued data analysis will reveal whether most of the phosphorus is coming from the watershed or bottom sediments. Then we put the data into a model to see the probability of how an effective remediation plan would work. We need to develop a Rating Curve which is a flow graph of how much water is entering and leaving the lake. Our goal is to compile enough data to do the Lake Management Plan/Water Quality Model.
* Bill James will help us determine the amount of phosphorus coming out of lake floor sediments so we can compare that with the amount of sediment coming from the watershed. Every year, this comparison will be different. He will also determine the amount of available iron in the lake. Scott has indicated the modeling data should be ready by January 1, 2023.
* John asked if Bill James’ iron report will be part of the modeling report to begin in January of 2023 as well. Buzz indicated yes and that Scott will coordinate everyone’s calendar as they work together often. Input from our experts will allow us to create an effective plan and whether it is achievable through the resources we have and who will support us.
* After January 1, 2023, the Lake Management Plan Committee and Water Research Team will meet with Buzz Sorge every two to four weeks to develop a Water Quality Model that will establish a water quality goal for Tug Lake based on whether our problem is coming from watershed nutrient loading, internal nutrient loading, or both. This process will occur through April of 2023 and then the Lake Management Plan will be completed.
* Once the Lake Management Plan is submitted to the DNR, a review will be performed within 45 days. A permit can then be approved. Upon approval, the Tug Lake District will be able to apply for various DNR grants such as a Surface Water Grant or Historical Agricultural Run-Off Grant etc. which have submission dates of September 1st and November 15th for each year.
* It is projected that if we receive a DNR grant after November 15, 2023, we would be able to implement an intervention plan regarding the blue green algae by March of 2024. The 2024 implementation budget would need to be presented and approved at the 2023 Annual Meeting.
* Habitat and invasive species goals will be included in the Lake Management Plan for DNR needs.
* A Water Research Team zoom meeting is scheduled for Monday, August 22, 2022, to discuss a water sampling update report and recap the Lake Management Planning timeline. These Water Research Team meeting occur on a weekly basis.

**Blue Green Algae Questions**

* Bill Wulf opined that at the annual meeting there may be questions about why the bloom has been so extensive this summer. Reid indicated every year is a different year.

We won’t know why until we get all the data collected. Once we get the modeling figured out it will give us some answers and directions to go.

* Buzz said the science isn’t a plan, it tells us what’s going on. We are doing the science now and he will work with us to develop best management practices according to what the science tells us. The science is the What, and the Plan turns What into How. Doing the Plan turns it into the How.
* Todd Nicklaus asked if there was a possibility of nutrient loading as a result of runoff from adjoining farmland. Several years ago, Todd walked the farm property up to Irma head waters with biologist Chad Cason of Cason and Associates, Land and Water Managers, to see if there was evidence of agriculture runoff. Based on his opinion there were more than adequate and buffers between the farmland and the creek bed and any nutrient loading coming from this area was negligible.
* The Nicklaus farm fertilizing plan was squared with the DNR and was determined to have minimal impact to the lake. Todd looked at how much water is pulled out daily to cover one acre of land with 326 gallons. Tug Lake is roughly 155 acres and pumping in excess of one million gallons in a 24-hour period. Evaporation alone pulls more water out of the lake. Also, the Nicklaus farm needed a permit when it began that process.
* Reid indicated the dam outflow impact is negligible because of no flow. Tug is essentially a holding pond and gave current data to support this claim.
* Reid said Bill James will do core sampling on Monday, August 15, 2022. Bill Wulf said the water in front of his cottage has rock and sand. Below that is clay. It was hard to put in his old dock pilings because the clay went so deep. Will that level of clay be a problem in taking a core sample?
* Buzz said our sediment is 15,000 years old. He guesses that the clay level is several meters thick. Near shore core samples will be very different. Bill James’s team takes shorter cores than long cores. Probably only the top ten centimeters drive our water quality conditions.

**Treasurer’s Report and Annual Audit Approval**

* Don Olson indicated we have $6,000 and change in our budget right now but are waiting for our $14,000 distribution which should come this August. We are paid up for insurance up to April of next year. By the August 27, 2022 Annual Meeting we should have a total of about $20,000 with all the sampling yet to pay for.
* Dr. Todd Miller will not charge us for his buoy and algae testing this year. Also, there are savings due to fewer water samples because there is no lake outflow right now. We would be taking samples of a puddle. The DNR decided water samples would be a waste. Reid said we are also saving money on shipping of samples to UWSP ($80 every other week) by our volunteer transporters.
* Don stated that the biggest expenditure in 2023 will be water sampling and monitoring. The resident rate will be 1.777 mil on $100,000 which will be announced at the August 27, 2022, Annual Meeting. Todd said this is a reasonable mil rate for what we are attempting to do. Don said we do NOT have a special charge this year. Last year was for system installation, but this was reallocated for sampling and this year’s expenses.
* John observed that we don’t know what the special charge will be going forward because, like the lake analysis, we don’t know yet what the model, lake management plan, grants, and other funding sources might be. Thus, we can only speculate at this point. Bill Wulf stated that we are then talking about 2024 before mitigation of the blue green algae starts.
* Don said we had a whole different direction last year regarding mitigation strategies, but we need to collaborate with the DNR and take into account their expertise regarding lake management.
* Jean asked if it is possible that things at the DNR have changed due to the rise of public awareness of lake issues with blue green algae, etc. Institutional direction there has changed as the problem has risen.
* Todd observed we are on a giant learning curve. We are doing the best we can and focusing on the positive. We have the most collegial situation he has ever been in with the DNR. Don added that the DNR is helping us more than anyone anticipated.
* Regarding the budget, Bill brought up the cost of the website. Todd indicated Incredible Bank has been covering it. Jean expressed thanks to Incredible Bank for setting it up.
* John indicated the website contact person is Dan Lewison, chair of the Lake Management Committee. The website is especially important now as questions will arise with our lake community.
* Mike Specht made a motion to approve the Treasurer proposed budget. Todd Nicklaus seconded. Motion passed.
* Gene Simon commented that there is a need to have a Special Category if we are not using money in ways that we had approved for last year. Don indicated we did that when we reallocated the budget funds. Don talked with audit chairman Judy Hill and the audit will be available at the August 27, 2022, Annual Meeting to approve before the Treasurer’s Report.

**Tug Lake District Organizational Decisions**

* New Board Commissioner Gene Simon was welcomed to the meeting. We are appreciative of Gene’s interest in Tug Lake and his expertise regarding lake management issues.

**Next Steps**

* Next BOC Meeting Date – it was decided to wait until the Annual Meeting to set this date**.**
* The Tug Lake District Annual Meeting Date will be August 27, 2022, at the Merrill Incredible Bank from 10 am to noon.

**Public Comment**

* Bill inquired about the timing of the core sampling and aquatic species sampling. Reid indicated it will be done the week of August 15, 2022 based upon his information.
* Gene sat in on a Pickerel Lake meeting and said it was fascinating to see lake districts and how they solve problems. This year, Lake Pesobic has very high water levels which is odd because we at Tug have low lake levels. Could these factors be related? Pesobic has no inlet or outlets and is a glacial seepage lake. Jean asked if Pesobic did a core sample but Gene said it was not recommended for a seepage lake. People did not like the mushy bottom when walking out and the lake is only 11 feet deep. Did a study years ago funded by DNR for $11,000 on invasive species, due to purple loosestrife; now a small concern is yellow water lily which no one has worried about before.
* Bill brought up the frog issue on Tug Lake. No frogs for many years, but this year they are coming back. Todd said blue herons were brutal on the frogs.

Note: Public Comments will be heard, but no action will be taken on them. Items brought to the Commissioner’s attention during the public comment section will be added to future Commissioner Quarterly or Electors Meeting Agendas for future discussion and decision.

**Motion to Adjourn**

Todd Nicklaus moved to adjourn the Board of Commissioners Meeting. Don Olson seconded. Motion approved.

Respectfully submitted,

John Greenwood

Tug Lake District Secretary