

**LITTLE ST. GERMAIN LAKE PROTECTION
AND REHABILITATION DISTRICT
SAINT GERMAIN, WI**

Elected Commissioners

Ted Ritter, Chairman
Erv Stiemke, Treasurer
Lou Mirek, Secretary

Appointed Commissioners

Todd Wiese, Town of Saint Germain
Mary Platner, County of Vilas

<http://littlesaint.org>

WATER CLARITY / ALUM TREATMENT UPDATE:
Prepared by Ted Ritter, Board of Commissioners
January, 2009

Background: Reduction of water clarity and the annual occurrences of green water in Little Saint are the result of excess phosphorous in the lake. While phosphorous is abundant year round, the phosphorous itself is not visible and does not turn the water green. It is the combination of phosphorous and warm water that triggers algal blooms. Simply stated, algae are tiny green plant organisms having no roots, leaves or stems. They thrive on phosphorous and suspend in the water. When in high enough concentrations, they accumulate on the lake surface and look like scum. As the water temperature drops in the fall, the algae die and the water clarity improves.

Phosphorous can come from many sources. Studies over the years have confirmed that the two primary sources in Little Saint are:

1. **Muskellunge Creek:** The volume of water entering Little Saint via the creek is sometimes half or less the volume that leaves Muskellunge Lake. The balance is ground water which flows into the creek between the two lakes. The watershed through which the creek flows is rich in natural phosphorous resulting in large amounts of phosphorous entering the stream and ending up in Little Saint.
2. **Lake sediments:** The annual cycle of aquatic plants growing, dying and settling to the lake bottom results in a gradual build up of phosphorous in the sediment. Sedimentary phosphorous is not typically "available" to support algae growth in the water, but studies have proven that under certain summer conditions, some of the phosphorous releases from the sediment. It is believe that such releases contribute to the sudden severe "spikes" in algae production.

Possible solutions: Barr Engineering, a Minneapolis firm specializing in phosphorous management in lakes, was hired by the Little Saint Lake District Board of Commissioners to determine the feasibility of removing phosphorous from Muskellunge Creek just prior to the creek flowing into Little Saint. Barr has successfully installed stream diversions and treatment ponds elsewhere to capture and remove phosphorous before streams flow into lakes. An aluminum compound known as "alum" is introduced in the treatment ponds. The alum binds around the phosphorous particles and settles to the pond bottom in the form of a flocculent which is periodically removed and used as upland fertilizer.

After assessment of the Little Saint situation, Barr determined that a Muskellunge Creek in-stream alum treatment system would theoretically work, but would be

extremely impractical due the size of the system that would be necessary and the remoteness of the treatment site. Not only would initial costs to build the system be tremendously high, the annual operating expenses would be cost prohibitive.

However, Barr scientists suggested that a more practical option might be an in-lake alum treatment system to bind sedimentary phosphorous to prevent it from releasing into the water column and becoming available to support algae growth. While such a system would do nothing to reduce algal blooms supported by phosphorous entering the lake via Muskellunge Creek, reducing sediment releases might prevent the sudden and severe algal bloom "spikes". Barr suggested that perhaps the early season water clarity, which is far better than what typically develops later in the season, could be maintained throughout the summer by managing phosphorous in the sediment. While this alternative would also be expensive and would have a treatment benefit of perhaps only five to eight years, it would be significantly more cost effective and affordable than the in-stream treatment option.

Discussions with WI DNR scientists and fisheries managers raised concerns about whether in-lake alum treatments would work and if the potential for devastating impacts on fish populations (resulting from radical shifts in pH levels following alum introductions) would be justified. It was agreed by all parties through a teleconference discussion in the fall of 2008 that a carefully planned alum treatment proposal be prepared by the lake district before any further consideration be given by the DNR to issuing an alum treatment permit. The Board of Commissioners authorized Barr Engineering to prepare the requested proposal and to address all concerns raised by the DNR during previous discussions. Completion of an initial draft and the final version of the proposal are anticipated before spring, 2009.

Current status: Uncertainty persists regarding whether a DNR permit will ever be issued for an alum treatment. Barr Engineering has estimated a treatment cost for the east end of the lake at \$400,000. Whether grant funding would be available to offset some of the cost is even more uncertain than the likelihood of a permit being issued. However, it is conceivable that the DNR will authorize an "experimental" alum treatment under strict conditions (and without financial assistance) to determine if the treatment works. If that happens and if the treatment is successful, some degree of State cost sharing might be considered. The initial alum treatment could occur as early as fall, 2009.

All of the above was discussed in detail at the August 31, 2008 lake district annual meeting. Attendees authorized the Board of Commissioners to include \$66,000 in the 2008 tax levy. That is the anticipated annual payment on a \$400,000 loan amortized over eight years.

- In the event a permit is issued, the Board will secure a loan to pay for the \$400,000 treatment. The \$66,000 included in the 2008 tax levy would cover the first annual payment on the loan.
- If a permit is not issued, no loan will be committed to and the \$66,000 will be held by the Board of Commissioners. Attendees at the 2009 annual meeting will then decide how to use the unspent tax dollars.

Further updates on this topic will be provided over time.