

Nanobubbles Question and Answer:

The first 4 questions were submitted immediately following the Sept 19th Nanobubbles info session or during the Sept PLA General meeting:

- 1) **Q:** Need to have responses / reviews from Lake Associations who have used this system.
A: The Water Quality Committee has been in touch via emails with the Middle Fork Crow River Watershed District (Tadd Lake, Upper Tadd Lake, Diamond Lake) in Atwater, MN. We have also reviewed the 30 day report showing measurable results of the Tadd Lake pilot project.

The Water Quality Committee has reviewed online information and written reports from Moleaer for the pilot project conducted in Summer 2023 for the Tri Lakes Management District (Lakes Arrowhead, Camelot, Sherwood) in Rome, WI.

The committee will also be in touch with the other projects in Minnesota and Wisconsin prior to installation of a pilot project on Pokegama Lake.

- 2) **Q:** The team: support. What is your definition of support?
A: Initially, the PLA Water Quality Committee needs to gauge lakeshore owner support for proceeding with a nanobubbles pilot project and a potential future full lake project. We are asking all lakeshore owners who did not attend the September 19th meeting to view the video of our Nanobubbles Information meeting to become informed about this technology.

Once you have learned about this clean water technology, we need your feedback at the PLA Membership meetings, via our Facebook page, and through our email address at pokegamalakeassociation@gmail.com. The PLA is also in the process of establishing “neighborhood champions” to ensure we are reaching ALL lakeshore owners with our communication. In order to actually proceed with a pilot project (and later full lake project) we know we will need to establish a nanobubbles fund-raising committee.

Currently, we are looking for volunteers for two efforts:

a) identifying “neighborhood champions” who will help us communicate with lakeshore owners about nanobubbles and ensure we are communicating with all lakeshore owners as we proceed

b) individuals to join a nanobubbles fund-raising committee. The PLA BOD has committed \$50,000 as a dollar-for-dollar match of other tax deductible contributions.

Of course we would also love to hear from anyone who would like offer their time and knowledge in other ways to help with this nanobubbles effort. You can reach out to us at the e-mail address noted above.

- 3) **Q:** Saturation rate? Cycle Time?
Per gallon of water returned to the lake what is the effective volume treated?
How many gallons / cubic meter are currently in our lake at “normal” level?
Once the treated water is returned to the lake, how quickly is the oxygen consumed by the digestive process?
A: This question was sent to Chris/Moleaer for a complete answer. His answer is provided below.

Water volume is only one of the characteristics we use to size our products. Sediment oxygen demand, conditions, number of locations, gas type that can be used and other factors are all also used.

What is the volume per gallon treated? Dependent on conditions. Volume is not our primary way of sizing large water bodies. Sediment Oxygen Demand is more critical to size based on in large water bodies.

Current volume of the lake? According to MN DNR, Approx. 15,000 Acre Ft

How quickly is the oxygen consumed once in the lake? This changes over time. (treat one area, reduce oxygen demand and then spreads. Also, depends on wind, flow, mixing, etc. Also, need to separate O2 and NB. Different things.

- 4) **Q:** Chris mentioned Moleaer sells units sized for individual / residential purchase. How much are these units? What is gpm & lbs O2/hour stats for these units? What is the electricity demand? If installed in the super shallow north bay of Pokegama what would be the effective reach of one of these units over a 6 month summer? Does Moleaer have case examples of units of this size being used in a water body where the water is not “trapped” (river flows past)?

A: This question has been sent to Chris/Moleaer for a complete answer. His answer is provided below.

Low Flow units sizing, pricing, etc.

- A number of choices. \$20-40k/ea
- Sizing: 110-250 gpm
- O2: 1.5#/hr and up to 30g/hr O3
- Effectiveness: 1-3 acres in short period, 5-10 acres over time/ .
- We do not have case studies on installs in larger water bodies. Can connect you with local distributor and get you connected with one of the 30+ customers that they have in the region.
- www.lakerestore.com is the local distributor of low flow units.

The following questions have been submitted during the month of October:

- 1) **Q:** Why did the PLA decide to fund 50% of the Nanobubbles pilot project and seek contributions to support the other 50% of the project? (The total cost of the nanobubbles pilot project is estimated at \$100,000. The PLA Board has approved \$50,000 for this project and is asking the PLA Water Quality committee to solicit tax-deductible contributions via a fund-raising campaign to cover the other \$50,000.)

A: The PLA is taking the approach of funding half of the pilot project as a dollar-for dollar match for two important reasons.

1. This is an expensive and important undertaking. We need to know that there is broad support for the pilot project, and if successful, there will be support for pursuit a full lake project. The best way to judge if people are serious about helping to clean the lake is to ask them to participate - financially. If we can't get financial support for a \$100,000 project, we believe it's unlikely we would have support for a larger full lake project.

2. If the pilot project is successful, we will need significant funds to cover the cost of moving forward either with form a LID (Lake Improvement District), or to provide a matching contribution for an agency grant. The PLA does not have the funds to cover both 100% of the pilot project costs and the costs of moving forward with a full lake project. The PLA must ensure that funds are available not only for the pilot project, but also a future full lake project.

2) Q:
A: