

Lake Kanasatka Aluminum Treatment Project Overview and FAQ

Permit Applicant: Lake Kanasatka Watershed Association (LKWA)

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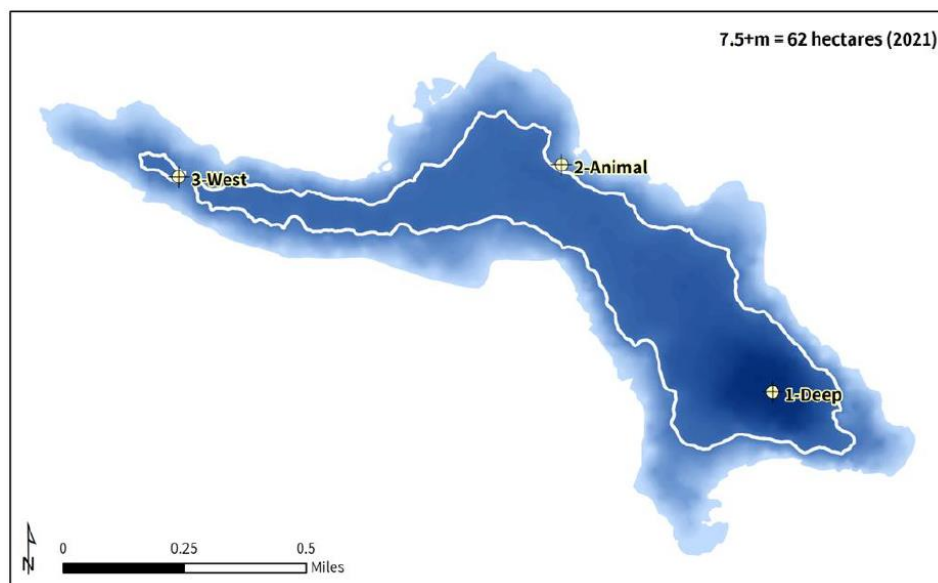
An aluminum treatment plan was submitted to NHDES in January 2024. The plan served as an application for a temporary surface water quality discharge permit under Env-Wq 301 as authorized by RSA 485-A:13. The project is considered to be a demonstration project focused on the mitigation of cyanobacteria blooms using in-lake treatment techniques. Below is a basic summary of what the proposed project entails and answers to questions that may be of interest.

NHDES has deemed the application complete and intends on making a final determination of permit issuance based on the content of the application in conjunction with public comments submitted prior to or after a public hearing. Public comments may be submitted to david.e.neils@des.nh.gov or to 29 Hazen Dr., C/O David Neils, Concord, NH 03833 through April 3, 2024.

Project Goal: To reduce the frequency and severity of cyanobacteria blooms in Lake Kanasatka and return it to those conditions consistent with an oligotrophic lake.

How will the goal be achieved? Aluminum compounds will be added to the lake and those compounds settle to the bottom and bind phosphorus in the lake sediments. A reduction in the internal load of phosphorus released from bottom sediment will reduce cyanobacteria and algal growth.

What is the area of Lake Kanasatka to be treated: 153 acres in all areas of the lake >24' deep.



When will the treatment be completed? Treatment will occur over 7 days total. Tentatively scheduled dates include April 30 for the pilot treatment, May 15 through May 17 for phase one of the full treatment, and May 20 through May 22 for phase two of the full treatment. Confirmation of scheduled treatment days by the contractor will be included in the public notification letters, posted signage, LKWA emails, LKWA website, and LKWA's social media page as soon as available. Each day of treatment is expected to begin around 7am and be completed by 6pm. However, the schedule is subject to change

based on weather conditions or other unexpected circumstances. Changes in scheduling will be communicated through the [LKWA website](#) and social media page.

Will the lake be open for use during the treatment? Public access to and use of the lake will be restricted while treatment is actively occurring. A staging area for equipment will be established at the public access point off Route 25. There will be no access to this area during treatments. The lake will be available for use once a day's treatment is complete and the individuals completing the work have left for the day. Those who draw water directly from the lake for domestic use should avoid using the water for showering, dishes, toilet flushing, irrigation, etc. as a precaution.

What chemicals will be used? Aluminum Sulfate [$\text{Al}_2(\text{SO}_4)_3$] and Sodium Aluminate [NaAlO_2].

Are the chemicals safe? Yes. The concentrations that will result in Lake Kanasatka don't pose harm to humans or pets. However, to be safe, use of water from the lake is not recommended during active treatment and for 24 hours after the treatment has been completed. Aluminum sulfate (alum) is often used in the water purification industry (municipal drinking water supplies) to coagulate particulates. Sodium aluminate (aluminate) is used as a buffering agent to help balance pH.

What amount of chemicals will be added? A dosage of 50 grams per square meter of area will be added in the prescribed area or 446 pounds of aluminum per acre. The chemicals come in liquid form. Approximately 60,720 gallons of aluminum sulfate (~4.4% aluminum) and 30,360 gallons of sodium aluminate (10.4% aluminum) will be used.

How do the chemicals work? The aluminum binds to the phosphorus in bottom sediments restricting its release into the overlying water. By reducing the internal load of phosphorus, cyanobacteria and other algae have less nutrients for growth.

How effective will the treatment be? The treatment planned for Lake Kanasatka is expected to reduce the internal phosphorus load by 97 pounds per year or 92% of the load reduction necessary to achieve the in-lake phosphorus concentration target of 7.2 $\mu\text{g}/\text{L}$ set in the 2022 Watershed-Based Management Plan (WMP).

How long will the treatment last? The expected period of time that the treatment will be effective is 15 to 20 years. However, a variety of factors can influence this time period, including external nutrient loads, sedimentation to the lake, and runoff to the lake. To ensure the treatment remains effective, it is critical that lakefront property owners (and others in the watershed) work collectively to control stormwater inputs to the lake from their properties, so that runoff from roads and impervious surfaces to lake are managed properly. Projects outlined in the WMP should be implemented to the extent possible, and opportunities to protect land from development within the watershed should be pursued when feasible.

Will there be any noticeable changes to the lake during or after the treatment? For the first few days following the treatment, the water will appear a unique aquamarine color because the chemicals produce a white flocculent and strip particulate matter from the water and quickly settle on the bottom of the lake. The floc binds phosphorus in the water column and in bottom sediments. Over summer 2024, the lake will likely experience a period of extreme water clarity. In the following years, the lake should "reset" itself to a more natural state consistent with conditions normally observed in years prior to when cyanobacteria blooms became prevalent.

Are there risks to aquatic life? Overall, the risks are minimal and temporary. During the treatment, several measures will be in place to protect aquatic life. The greatest risk relates to aluminum toxicity which occurs when the pH of the lake water is low (<6.0) or high (>8.0). The chemicals are added in such a way as to minimize this risk by balancing the pH. Continuous pH monitoring will be in place during the treatment to ensure the ideal range is maintained. Additionally, visual surveys for stressed aquatic life will be completed throughout the treatment process. The treatment will be stopped if there any signs of unexpected impacts to aquatic life. Aluminum concentrations in the water usually return to background levels within days after the treatment once the floc has settled to the bottom. We do advise not letting pets or livestock drink directly from the lake during the treatment timeframe.

Will the lake be monitored during/after the treatment? Yes. An extensive monitoring program will be implemented to track water quality conditions during and after the treatment. Intensive monitoring will occur on each treatment day before, during, and after the treatment is complete. Then monitoring will be reduced to weekly events for the first month following treatment. Monthly monitoring will then occur through October 2024. Results of this monitoring will be included in a summary report prior to the end of 2024.

Does the contractor who will execute the project have experience? Yes. A similar project was completed on another NH lake in 2021. Contractors with significant experience in aluminum compound treatments around New England will be responsible for all aspects of the project. NHDES will be onsite during each day of the treatment.

How will the chemicals be applied? A large barge will be used to apply the chemicals. The barge has two holding tanks, one for each chemical. The chemicals are injected several feet down into the lake using a manifold mounted on the back of the barge. The barge uses a GPS to track its position and stay within the target area. Flow meters monitor the rate of chemical release and can be modified if needed. Observers from land will see the barge making systematic passes through an area, and will not see chemical spray in the air or above the water.

Are there safety measures in place in case of an accident or spill? Yes. The contractor is developing an operations and maintenance plan that provides the specific details of the safety measures that will be put in place. These include, but are not limited to, a list of the individuals in charge, nearest emergency response contacts, an activities hazards and response review, and a health and safety plan. Spill containment aprons will be placed around holding tanks and transfer hoses to contain any spilled products. All equipment will be secured during non-work hours and the area will be clearly marked as off limits. If you believe a spill has occurred, please contact 911 first, then NHDES spill response at [\(603\) 271-3899](tel:6032713899) (M-F 8am to 4pm), weekends and evenings [\(603\) 223-4381](tel:6032234381) (State Police Dispatch).