Capital Improvement Project
Apple Valley and Burnsville: Alimagnet Lake Alum Treatment



Figure 1. A barge applies alum to Alimagnet Lake in October 2024. Courtesy of the City of Apple Valley.

Alimagnet Lake, split between the Cities of Apple Valley and Burnsville and surrounded by city park land, is impaired for total phosphorus (TP). This has resulted in algae blooms and poor water quality conditions affecting recreation. The Vermillion River Watershed Joint Powers Organization (VRWJPO) and Cities completed projects in 2017 and 2019 (*Figure 2*) that addressed phosphorus entering the lake externally. Now the focus has turned to internal load TP from lake bottom sediment.

The VRWJPO and Cities conducted a feasibility study in 2023 on the effectiveness of aluminum sulfate (alum) treatments to improve Alimagnet Lake's water quality. Alum chemically binds to phosphorus in the water column, forming a heavier particulate material (floc) that sinks to the bottom. This prevents phosphorus from being resuspended in the water column. The feasibility study identified priority areas of the lake for treatment, dosing recommendations, buffering estimates, locations for storing chemicals, barge entry points, costs, and potential pollutant reductions. With this information, the VRWJPO applied for and received FY23 and FY25 Clean Water Fund competitive grants from the Minnesota Board of Water and Soil Resources (BWSR) for alum treatments in Alimagnet Lake.

The treatments are being applied in two doses. The first was completed in fall 2024 and the second is planned for spring 2026. Following treatments, the partners' consultant will monitor lake sediment conditions to inform dosing and quantify treatment efficacy. Since the first treatment, physical and chemical monitoring of the lake has shown significant increases in water clarity and decreases in TP levels, enough for City of Burnsville staff to report that 2025 Alimagnet monitoring results were among the best ever recorded. The projected TP reduction over 10-14 years would allow the Minnesota Pollution Control Agency to remove Alimagnet Lake from the Minnesota Impaired Waters List.

3/2026

Partners:

- VRWJPO
- City of Apple Valley
- City of Burnsville
- BWSR

Timeline:

- First split-dose treatment in 2024, second in 2026
- Lake sediment monitoring in 2025 and 2026

Location: Apple Valley/Burnsville, MN

Subwatershed: North Creek

Costs and Contributions:

- VRWJPO: $8,360 for in-kind grant administration/coordination, $37,000 cash match for engineering/technical assistance
- City of Apple Valley: Technical assistance
- City of Burnsville: Technical assistance
- BWSR: $25,000 from competitive CWF grant for engineering/technical assistance; $332,000 from competitive CWF for alum treatments

Benefits:

- Estimated to reduce TP in Alimagnet Lake by 115 lbs/ year for 10-14 years, which would bring in-lake concentrations into compliance with Minnesota water quality standards. This could allow the lake to be removed from the Impaired Waters List.
- Decreasing phosphorus in the water column can reduce excess algae, making this recreational lake more enjoyable for residents and park visitors.
- Cleaner lake water has allowed University of Minnesota graduate students to begin an experiment in the lake to gauge effectiveness of planting native aquatic plants in reducing aquatic invasive species.



Figure 2. An iron-enhanced sand filter at a stormwater pond, a past project addressing external phosphorus load to Alimagnet Lake.



Figure 3. Native aquatic plants planted in Alimagnet Lake as part of University of Minnesota research on using native vegetation to reduce aquatic invasive species.

Grants from the Clean Water Fund, one of four funds established by the Clean Water, Land & Legacy Amendment, support this project. Clean Water Stories can be found on the BWSR website.

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