

Lake Mohawk Master Plan Development

Lake Mohawk Country Club

Sparta, NJ

Lake Mohawk, a 770-acre lake located in northwestern New Jersey, had a history of serious blue green algae blooms. The frequency and durations of these blooms steadily increased despite increases in the intensity of algaecide treatments. To combat this problem and address the root causes of the algae bloom, Princeton Hydro prepared a comprehensive lake management master plan. The key element of this plan was the use of alum to reduce the lake's sizable internal total phosphorus load, and to inactivate phosphorus loadings from stormwater and other external nutrient sources. This innovative nutrient control program was the first of its kind in New Jersey.

To decrease the lake's internal phosphorus load, Princeton Hydro applied 90,000 gallons of alum thereby effectively binding the sediment-based load. The company then installed a destratification aeration system to prevent thermal stratification and the resulting anoxia, thus further combating the internal regeneration of sedimentary phosphorus. Princeton Hydro then designed and constructed a metered alum dosing system consisting of 21 diffusers, each equipped with a small mixing-type aerator. These units were strategically placed throughout the lake to address the external phosphorus load. To ensure the correct dose of alum, Princeton Hydro's limnologists calculated a daily alum dose based on the normalized, computed monthly influx of phosphorus from storm sewer inputs, septic contributions, lawn runoff and atmospheric deposition.

The innovative use of the alum in a low dose, metered strategy, reduced the lake's phosphorus load by 60%, decreased the frequency and magnitude of blue-green algae blooms, and alleviated the need for the whole lake applications of copper sulfate. As a result, the transparency of the lake increased more than five-fold, the lake's zooplankton community rebounded, and a more diverse and balanced phytoplankton community was re-established.

The success of this program was recognized by USEPA with an Environmental Excellence Award, by the NJDEP with an Environmental Initiative Award and by the North American Lake Management Society with a Technical Merit Award.

