

Hawaiian Village Water Quality History & Recommendation

Algae forms when water temperatures exceed a certain point (dependent on weather patterns and water depth) and when adequate nutrients (phosphorus) are in the water to allow it to reproduce. Most lakes have some amount of algae present during warm weather months; they form what we call “algae blooms” when the quantity of algae cells reaches a level that imbalances the water. Whether algae cells are the type or in the amounts that make them toxic (ie: beach closures, no contact orders, etc.) cannot be determined by sight, and testing is only accurate for the moment and location where the water sample is taken. HV has not maintained a regular schedule of water testing, so we do not have historic data to compare our current water quality to at this time. Water sampling was done in 2019 following Platte River flooding, but it was focused largely on concerns about e-coli, from the compromised Waste Water Treatment Plant, not algae or phosphorous.

HV has experienced algae blooms throughout most of its history (since the early 1970’s), usually in late-July and August, when water temperatures are highest. However, blooms appear to be occurring earlier in the year (May in 2023), more frequently than in the past, and in lake areas that didn’t previously have blooms, according to remarks from residents over the past 3 years. It is possible the increase in blooms is due to higher phosphorus levels from biomatter and run-off that entered the lake during the 2019 flood. In 2021 several residents began exploring options for water quality management at HV; contacts were established with NE Lakes Management personnel and on their recommendation, with Carly Dana, volunteer water manager at Ginger Cove, NE.

May 2023, Water IQ Technologies (the company that serves Ginger Cove) tested HV lake water from 3 locations and identified that we have 2 different types of algae present that can become toxic under specific conditions. The exact conditions that lead to algae becoming toxic have not been quantified by even scientists, but warmer water temperatures, increased phosphorus levels and increased algae quantities (measured in parts per million or billion) are believed to be primary factors.

This Water Quality Committee’s (WQC) members have heard from numerous HV residents with a rising concern about the color and murkiness of our water, with questions about its safety due to the increasing algae blooms and fish kills experienced in recent years. Our community has essentially been operating blindly, trusting that the blooms we are witnessing are not dangerous to pets and people. Given the knowledge that our lake has two types of algae that can become toxic under certain conditions, and, given anecdotal reports of people and pets experiencing illness after being in the lake, this Committee believes our Association should take preventative and corrective action. Not doing so seems ill-advised for safety, quality of recreation, as well as liability reasons. Supporting reasons for treatment include:

- A. Safety for all residents of the lake (people, pets, waterfowl, fish, and other aquatic animals)

- B. Improved health of the water, including a rebalancing of the ratio of algae to beneficial bacteria (good for sport fisheries)
- C. Increased clarity (reduced turbidity) and aesthetic appeal
- D. Support for home values (numerous area lakes are treating for algae; at some point unrestrained algae growth WILL affect HV homes' competitiveness in the Omaha lake home market)
- E. Protection for HOA from possible litigation following the death of a pet (hundreds are documented each year in the US) or serious illness of a resident or guest.

The Water Quality Committee (WQC) has recommended installation of a Water IQ system to address the lake's increasing blooms and potentially harmful algae.

Water IQ Ultrasonic Technology: Water IQ technology is a system of ultrasonic devices (HV=7) mounted under select docks around the lake (electricity required). They work by emitting sound waves that disrupt the internal structures (gas vesicles) within algae cells that cause the algae to lose buoyancy, drop out of the light and sink to the bottom of the lake. The dead algae then become food for fish and other aquatic animals. Each ultrasonic unit works within line-of-sight of the unit (no land or other blockages to sound waves) within a specific area (determined by the strength of the unit). Average life of units: warranted for 3 yrs.; average life expectancy 7-9 yrs. Cost: full install \$45,680-\$47,080 (installation adds \$2100-\$3500 to the 6/9/23 bid).

Pros:

- a. Ultrasonic affects algae directly through both treatment of existing algae and prevention of future algae. Regardless of phosphorus levels, the algae cannot reproduce. Average reduction in algae counts is 65-75%.
- b. Treated water is always safe for humans and animals. Treatment is on-going 24/7 during warm weather months, April/May-Sept/Oct (when algae growth takes place).
- c. The sound waves are at strengths lower than those in the depth finders found on many boats; they have no negative effect on people, pets, fish, waterfowl, or other desirable aquatic animals.
- d. The external cell membrane of the algae is not disrupted, so any toxins that may be present remain contained and will not re-enter the water column.
- e. Kills algae without killing beneficial bacteria in a lake.
- f. Multiple Northeast Nebraska residential lakes are reporting immediate results (within weeks) and high resident satisfaction. Lakes include: Ginger Cove, Valley Shores, Blue Water, Timber Lodge, Timber Shores, Eagle Woods, and Riverside. The Committee has not been in touch with all the above lakes, but all lake representatives who have been contacted report positive outcomes.
- g. Monitoring software ("dashboard") is available to allow remote management of all units by Water Quality Committee volunteers to assure proper operation.

Cons:

- a. Ultrasonic treatment's effectiveness has been documented in municipally managed bodies of water around the world and U.S. since 2003 but use in residential lakes has only been occurring since 2020.
- b. Units require monthly cleaning of ultrasonic heads and placement each spring and removal each fall (volunteer time).
- c. HV is considering a phased-in implementation which is not the standard or recommended for this technology (water continually moves in a lake which reduces the predictability of the technology's impact). Water quality and clarity outcomes for the full lake cannot be predicted when treating only half the lake.
- d. HOA would need to budget for future replacement costs over 7-9 years to maintain operating system (estim. \$4600 annually), and cost of dashboard each year (\$3500).