Ravenna Country Club: An Effluent Fed Irrigation Pond Held Near Zero Ammonia and Phosphate for a Full Season

Littleton, Colorado | Private country club, golf course irrigation pond (Hole 6)| 2026 season

A main inoculation in June took ammonia from 1.0 ppm to near zero and phosphate from 0.5 ppm to barely detectable, and the pond held there through September, through a late-July supply outage, while taking roughly 380,000 gallons of treated effluent each irrigation cycle. Two independent analyses confirmed the field results.

1. Site overview

Water body	Golf course irrigation pond, Hole 6. The working irrigation source for the course.
Size	Roughly 4 million gallons, about 12 acre-feet, estimated from the July 2026 drawdown (about 2.5 million gallons lost with about 1.5 million remaining). About 1.1 surface acres, measured from the pond outline on satellite-based mapping (OpenStreetMap).
Water source	Refilled after every irrigation cycle with treated wastewater effluent from the Town of Castle Rock reuse water, piped to the course. The pond irrigates and refills roughly 380,000 gallons every irrigation which could be nightly or with a few nights in between. The amount irrigated is nearly a tenth of the pond's volume.
Use	Turf irrigation for an 18-hole private club.
The problem	A constant supply of nutrient-rich effluent carried toxic ammonia and phosphate into the pond. The pond had grown surface filamentous algae every season for at least six years. The club had previously paid an outside pond maintenance company before the director of agronomy took responsibility for the pond himself.
Site lead	Steve Datwyler, Director of Agronomy and Superintendent

2. Why this pond qualified

On May 13, 2026, Hydralife tested all four ponds on the property. The ponds at Holes 12, 13 and 14 (non-irrigation) read near zero ammonia and 0 to 0.25 ppm phosphate. Their nutrient loads were too little for a phytoplankton program to work with, so they were left untreated. The Hole 6 irrigation pond read 0.5 to 1.0 ppm ammonia and 0.25 to 0.5 ppm phosphate which makes it a viable candidate to utilize competitive exclusion. The untreated ponds later served as an informal comparison, although they differed significantly from the primary irrigation pond.

3. Approach

- May 13, 2026: site survey and baseline.
- Late May: two weeks of cloud cover and cool water slowed early growth, so the main inoculation was timed to the return of warm, sunny weather.
- June 10, 2026: main inoculation of 100 gallons of Hydralife Compete, concentrated phytoplankton, applied from shore as water temperatures rose and sunshine was in the forecast.

- July 29, 2026: after a municipal pump failure cut the course's water supply from July 16 to July 24, and the pond was partly refilled with chlorinated hydrant water that stirred up silt, the pond still tested excellent. A further 180 gallons of concentrate was added as a precaution and because Hydralife had harvested it and brought it on site in case it was needed. It was not needed, but it was added so the product would not go to waste.
- June through September: biweekly and then monthly nutrient testing was conducted alongside the Director of Agronomy. The Director of Agronomy did not add algaecides, dyes or other chemical treatments although he had lines of biochar in the pond prior to Hydralife's work.

4. Results

Date	NH4	NO2	NO3	PO4	Notes
June 10 (baseline)	1.0	0	0	0.5	Main inoculation day.
June 19	under 0.25	0	0	0.25	No surface algae observed.
July 8	0.25	0	0 to 5	0 to 0.25	Pond stable, beautiful and in excellent condition.
July 14 (lab)	confirmed	confirmed	confirmed	confirmed	Brookside Laboratories, Inc. results matched Hydralife's field testing.
July 29	almost 0	0	5	almost 0	Tested excellent after the July 16 to 24 supply outage and looked pristine with no surface algae and minimal aquatic vegetation.
Late summer	low		low	low	Metropolitan State University of Denver analysis confirmed low nutrients.
September 30	0	0	0	almost 0	Season's final reading.

Ravenna Country Club, Hole 6 irrigation pond, 2026

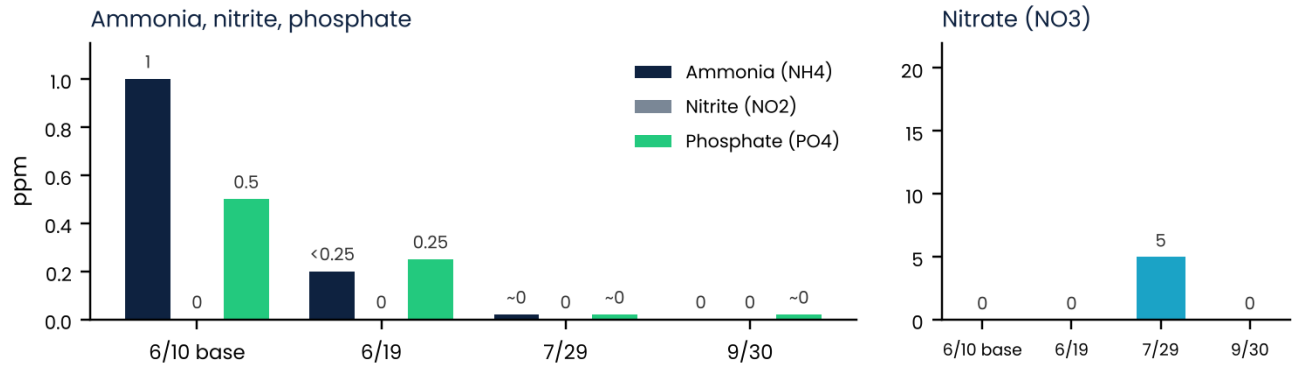


Figure 1. Nutrient readings in ppm, Ravenna Hole 6 irrigation pond, 2026. Source: Hydralife field testing; values match the 2026 U.S. Symposium on Harmful Algae poster.

Field readings are taken on site with a color-comparison freshwater test kit and reported in parts per million (ppm). Text readings such as "under 0.25" or "almost 0" are shown as recorded; in the charts they are drawn at an approximate height and labeled with the recorded wording. Weather, water temperature and irrigation schedules influence individual readings. The trend across the season is the measure of the work.

Within nine days of the main inoculation, ammonia fell from 1.0 ppm to under 0.25 ppm and phosphate was cut in half. By late July both read almost zero, and the pond held that condition into the fall, even though nearly a tenth of its volume was replaced with nutrient-rich effluent every irrigation cycle. The phytoplankton consumed the incoming nitrogen and phosphorus as fast as it arrived.

The superintendent observed no surface filamentous algae on the pond for the first time in his six years managing it, while the untreated ponds on the property continued to produce surface algae. A large bloom of daphnia that covered the entire shoreline of the irrigation pond occurred in late May and June. Grass carp were also active and spent more time at the shoreline. The club reported that the pond had looked better than it ever previously had. It reported an 80 percent reduction in its pond maintenance spending and a significant reduction in labor and stress. After the July water supply outage, the director of agronomy and his assistant superintendent reported that the turf recovered over a weekend which was faster than they had ever seen that take place. The superintendent credited the full set of practices he uses on the course, including irrigating with phytoplankton rich water as a biostimulant.

> *"The pond that you treated looks great. No algae pressure with the heat, and in years past we would have seen some pressure by now."*
>
> Steve Datwyler, Director of Agronomy and Superintendent, Ravenna Country Club, June 2026

5. Late-season observation

In late September, after an unusually warm month and with dissolved nutrients reading near zero, a surface bloom of Microcystis, a cyanobacterium, appeared along the shoreline. Hydralife documented it with photographs and microscopy. The bloom was short-lived. It was observable along the shoreline for about a week. During the second week, winds picked up and turbidity in the pond increased, and the Director of Agronomy was unable to confirm whether the bloom was still present. After that period, Microcystis was not observed again.

6. Takeaways for similar sites

- Effluent-fed and reclaimed-water irrigation ponds are strong fits for Hydralife Compete, live beneficial phytoplankton. The same nutrient load that drives algae growth becomes food for the phytoplankton, and the culture keeps pace with constant inflow.
- Test first. Three of the four ponds at Ravenna did not have enough nutrients to justify treatment. Targeting the one that did produced the result.
- Time the main inoculation to warm, sunny water. Growth accelerates once the water warms and photoperiods are long.
- Irrigation returns the phytoplankton to the turf as organic matter, so the water program also supports soil biology and makes for an advantageous biostimulant.
- Results are stronger when verified. Field testing was confirmed by an independent laboratory and a university analysis.

7. About Hydralife Solutions

Hydralife Solutions Inc. is a Denver, Colorado company that grows and ships live, multi-species beneficial phytoplankton for lakes, ponds, reservoirs and irrigation water. Hydralife Compete, live concentrated phytoplankton, works by competitive exclusion. Excess nitrogen and phosphorus that feed nuisance algae and cyanobacteria become the food source for a beneficial microalgae culture that constantly consumes nutrients and competes with bloom-forming organisms for the nutrients they need. Hydralife Compete thrives in high-nutrient water, where most alternative solutions struggle, and it feeds the zooplankton, fish fry and fish that depend on a healthy food web.

Hydralife was founded by Ryan Philipsborn, who brings nearly 30 years of professional work in aquatics, in reef keeping, coral propagation and phycology to commercial aquaculture.

To discuss a water body of your own please contact service@hydralifesolutions.com, 303.219.0623 or visit hydralife.org.