

Lake LeAnn Water Quality Summary

Comprehensive Monthly Analysis & Resident Report — July 2026

Executive Summary

The July 15, 2026 water quality sampling report for Lake LeAnn, prepared by Aquatic Control, provides a comprehensive look at the health of both the North and South Basins during the peak of summer. Overall, the lake is displaying typical mid-summer characteristics, including strong thermal stratification, deep-water oxygen depletion, and moderate nutrient and algae levels. While both basins maintain a pleasant green hue, no surface algal blooms were visually apparent during sampling, and water clarity remained relatively stable—with the North Basin showing a slight improvement and the South Basin showing a minor decrease compared to June.

A central highlight of the report is the behavior of oxygen and nutrients in the deeper waters. As surface waters warm up significantly (reaching up to nearly 30°C), the lake separates into distinct warm upper layers and cold bottom layers. In the deeper zones, dissolved oxygen drops drastically, creating hypoxic (low-oxygen) conditions near the sediment. This lack of bottom oxygen is critical because it triggers the release of phosphorus stored in the bottom sediments back into the water column—a process known as internal loading. Soluble reactive phosphorus was detected in bottom waters, confirming that this internal recycling is actively occurring.

From a biological and recreational standpoint, the lake's conditions are manageable but require watchful stewardship. Total phosphorus and nitrogen concentrations place the system in a eutrophic state, which naturally supports abundant aquatic plant and algae growth. Although immediate nuisance bloom risks are controlled, the combination of warm water temperatures, abundant nutrients, and deep-water nutrient release means that lake managers, board members, and residents must remain vigilant regarding stormwater runoff and lawn fertilizer use to prevent excessive late-summer algae proliferation.

Key Findings

- The North Basin demonstrated slightly improved water clarity compared to June, whereas the South Basin experienced a slight decrease in water clarity.
- Secchi disk depths ranged from roughly 5 feet 11 inches to 6 feet 11 inches across all monitoring sites.
- Both basins exhibited a distinct green hue in the water column, though no surface algal scums or harmful blooms were visible at the time of collection.
- Strong thermal stratification was present, with surface temperatures reaching roughly 29°C to nearly 30°C while bottom temperatures dropped down toward 13°C to 18°C.
- Severe oxygen depletion (hypoxia, with dissolved oxygen falling below 2 mg/L) occurred in the deeper water layers of both basins, dropping as low as 0.07 to 0.14 mg/L near the bottom.
- Bottom water samples detected soluble reactive phosphorus (up to 15 ug/L), indicating that low-oxygen conditions are actively causing internal nutrient release from lake sediments.
- Surface total phosphorus concentrations across all sites were estimated below the 50 ug/L reporting limit (ranging tightly between 14 and 30 ug/L).
- Total nitrogen values remained consistent across the lake, ranging from 1.02 to 1.26 mg/L, placing them in the moderate-to-eutrophic risk category.
- There were no noticeable differences in water quality metrics that could be attributed to wildfire smoke.

Water Quality Scorecard

The following table outlines the parameters measured during the July 2026 sampling event, their results, typical ranges, and operational status:

Parameter	Result	Target/Typical Range	Status	What It Means
Total Phosphorus (Surface)	Estimated 14–30 µg/L	Eutrophic: 25–96 ppb Oligotrophic: <12 ppb	Fair	Primary fertilizer driving algae and plant growth in the lake.
Soluble Reactive Phosphorus (Bottom)	<10 to 15 µg/L	No universal standard; ideally near zero	Concern	Dissolved phosphorus immediately available for algae; indicates sediment release.
Chlorophyll-a (Surface)	Estimated 0.0–1.3 µg/L	Clear water: 0–3 µg/L	Good	Pigment measuring free-floating microscopic algae; indicates low current planktonic algae biomass.
Secchi Depth	5 ft 11 in to 6 ft 11 in	Varies by lake; higher is clearer	Fair	Standard measure of water clarity and transparency.
Dissolved Oxygen (Surface)	8.41 to 9.00 mg/L	Generally healthy: >5 mg/L	Good	Oxygen mixed into surface waters vital for fish and aquatic life respiration.
Dissolved Oxygen (Bottom)	0.07 to 0.40 mg/L	Hypoxic: <2 mg/L	Concern	Critically low bottom oxygen caused by decay, squeezing fish habitat and releasing sediment nutrients.
Temperature (Surface)	28.9°C to 29.9°C	Varies seasonally	Fair	Warm summer surface water limiting oxygen-holding capacity and driving recreation.
Total Nitrogen	1.02 to 1.26 mg/L	Eutrophic risk: 1–2 mg/L	Fair	Combined inorganic and organic nitrogen supporting biological productivity.
Total Kjeldahl Nitrogen (TKN)	0.96 to 1.19 mg/L	Varies by waterbody	Fair	Measures organic nitrogen tied up in living or decaying matter and ammonia.
pH	7.07 to 8.53	Freshwaters: 6–9 S.U.	Good	Measures how acidic or basic water is; optimal for protecting aquatic organisms.
Conductivity	447 to 547 µS/cm	Normal freshwaters: 100–1,000 µS/cm	Good	Measures dissolved ions and salts within safe freshwater ranges.
Phycocyanin	0.0 to 2.18 RFUs	Screening baseline	Good	Pigment specific to cyanobacteria; shows minor sub-surface presence but no surface scum.

Phosphorus Assessment

- **Current Phosphorus Conditions:** Surface total phosphorus levels range from 14 to 30 parts per billion (ppb), placing Lake LeAnn solidly in the eutrophic (nutrient-enriched) category. Bottom water samples revealed soluble reactive phosphorus levels up to 15 ppb, confirming that a pool of bioavailable nutrient is present right near the lake bed.
- **Potential for Algae Growth:** Because phosphorus acts as the primary 'fuel' or limiting nutrient for aquatic plant and algae growth, these concentrations provide enough baseline nutrition to maintain moderate productivity and the observed green water tint.
- **Internal Loading:** Internal loading is actively occurring. When summer thermal stratification sets in, the bottom waters lose all their oxygen. Under these anoxic conditions, chemical changes in the sediment cause bound phosphorus to dissolve and release directly into the bottom water.
- **Trend Status:** Phosphorus levels remain relatively stable compared to typical seasonal expectations for mid-summer, reflecting a persistent eutrophic baseline that fluctuates based on runoff and internal recycling.
- **What Residents Should Understand:** Residents must realize that phosphorus doesn't just come from surface runoff (like lawn fertilizers and pet waste); a significant portion is being recycled internally from the lake's own bottom sediments every summer. Managing watershed inputs alone is vital, but understanding internal recycling helps explain why nutrient levels persist even during dry spells.

Algae Bloom Risk

Classification: Moderate Risk

Reasoning in Plain Language: While the lake water currently displays a healthy green tint and no floating surface scums or mats were observed during the July sampling, the underlying ingredients for algae growth are present. Water temperatures are very warm (near 30°C), surface nutrients are squarely in the eutrophic range, and sub-surface sensors detected minor bumps in blue-green algae pigments (phycocyanin) at mid-depths. This means the

lake is primed; if a stretch of hot, calm, sunny weather occurs, these populations could multiply quickly. It is not an immediate crisis (hence 'Moderate Risk'), but conditions require close monitoring.

Oxygen Conditions

- **Fish Habitat Health:** Surface and upper-layer waters have ample oxygen (above 8 mg/L), providing a healthy environment for fish to breathe and swim. However, as fish attempt to escape warm surface temperatures, they face a squeeze because the deeper, cooler waters are completely devoid of oxygen.
- **Low Oxygen Extent:** Severe oxygen depletion (hypoxia, defined as less than 2 mg/L) begins around 3 to 4 meters deep and drops down to near-zero levels at the bottom of both basins. This is a normal seasonal response to summer thermal layering (stratification) combined with the bacterial decay of organic matter in the sediments.
- **Nutrient Release Connection:** The absence of oxygen at the lake bottom directly drives internal phosphorus loading. When oxygen vanishes at the sediment-water interface, chemical bonds holding phosphorus in the mud break down, releasing the nutrient into the water where it can eventually feed summer algae.

Trend Analysis

- **Improving Indicators:** Water clarity in the North Basin showed a slight, positive improvement compared to the June observations. Surface pH and conductivity remain well within healthy, normal ranges for freshwater systems.
- **Stable Indicators:** Total nitrogen and surface phosphorus concentrations remain consistent with typical mid-summer eutrophic baselines. Thermal stratification patterns and deep-water oxygen loss follow predictable seasonal cycles for a lake of this depth and morphometry.
- **Worsening Indicators:** Bottom water oxygen depletion has intensified as summer heating progresses, expanding the volume of hypoxic water. Soluble reactive phosphorus concentrations in bottom waters confirm ongoing internal nutrient recycling from sediments.
- **Areas Requiring Additional Monitoring:** Tracking the depth-specific distribution of blue-green algae pigments (phycocyanin) and chlorophyll-a to catch any subsurface accumulation before it reaches the surface. Continuing tributary and watershed nutrient tracking to support Barr Engineering's ongoing nutrient budget modeling.