

# Report:

## Water quality data from monthly sampling at Bass Lake



Photo credit: Bass Lake Property Owners Association

Prepared for:  
Bass Lake Conservancy District  
Knox, IN

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## 1. Summary

Aquatic Control completed data and sample collection at Bass Lake on May 19, 2026. Three open-water sites were sampled for water quality and sediment phosphorus analysis (see map and coordinates on page 2). At each of these three sites, a YSI ProDSS Multi-parameter water quality meter and ProDSS 4-port sensor cable were used to measure vertical profiles of pH, dissolved oxygen (DO), temperature, conductivity, phycocyanin, and chlorophyll-*a* at 1-meter intervals through the water column at each site. Secchi depth was also measured in each basin. Water samples were collected at the surface and bottom of each site and overnight shipped to Aquatic Control's laboratory. Surface water samples were analyzed for total phosphorus, total nitrogen, total Kjeldahl nitrogen, and chlorophyll-*a* (via extraction and fluorescence). Bottom water samples were analyzed for total phosphorus and soluble reactive phosphorus. In addition, at these 3 open water sites, sediment samples were collected using a sediment gravity core for analysis of total phosphorus and phosphorus fractionation in the laboratory. A sample was also collected from the groundwater pumphouse outflow for analysis of pH, DO, temperature, conductivity, phycocyanin, and chlorophyll-*a* using the multi-parameter sonde, while water samples were analyzed in the laboratory for total phosphorus, total nitrogen, total Kjeldahl nitrogen, and chlorophyll-*a* (via extraction and fluorescence). Five near-shoreline sites were visited within the lake to collect water samples for analysis of algal identification and enumeration in the laboratory.

At the time of sampling on May 19, 2026, Bass Lake had not yet stratified based on dissolved oxygen and temperature data. pH, conductivity, dissolved oxygen, alkalinity, and hardness data were all within normal ranges for a freshwater lake. Algal pigments indicative of planktonic algae or cyanobacteria were also relatively low in the open waters. Phosphorus and nitrogen concentrations were moderate to high, in line with a eutrophic (biologically productive) lake. Secchi depths at all three sampling sites were less than 1 foot, indicating relatively low water clarity also consistent with a eutrophic lake. Samples collected from shoreline sites for algae identification and enumeration showed high densities of cyanobacteria, indicating that there is likely more phosphorus available in those areas for cycling by plants and algae. Toxin testing was not performed on these samples but can be added in the future if desired by Bass Lake. Sediment sampling for phosphorus fractionation analysis showed that 2 out of the 3 sites sampled had high concentrations of stored phosphorus that could be contributing to internal phosphorus loading during the summer. While these results provide an initial snapshot of water and sediment quality at Bass Lake, it will be more useful to interpret data as trends over time. Sampling will continue monthly through September in 2026.

## 2. Sampling Site Information



### Sample Site Coordinates

Sample Site	Latitude	Longitude
Site 1- Water Quality and Sediment	41.2136	-86.5942
Site 2- Water Quality and Sediment	41.2251	-86.5836
Site 3- Water Quality and Sediment	41.2357	-86.5765
Pumphouse Outflow	41.2298	-86.5759
Site 1- Algae ID&E	41.2120	-86.6113
Site 2- Algae ID&E	41.2242	-86.6015
Site 3- Algae ID&E	41.2216	-86.5791
Site 4- Algae ID&E	41.2312	-86.5867
Site 5- Algae ID&E	41.2409	-86.5742

### **3. Results**

#### **3.1 pH**

pH is the measure of how acidic or basic water is, reported in standard units (S.U.). A pH of 7 is neutral, and a range of 6-9 is typical for freshwater. A pH range of 6.5-9 is required for health and protection of aquatic organisms (i.e., survival, growth, and reproduction).

#### Results:

pH levels measured in the open water sites at Bass Lake ranged from about 8.79 at the water surface down to about 8.60 at the bottom of the water column. pH in the pumphouse water was 7.47 (see Table 1 and Figure 1 for results). Therefore, pH levels in Bass Lake were on the higher end of normal range and the groundwater flowing into the lake was closer to neutral. Common factors that contribute to higher pH in lakes can include high photosynthetic activity by plants and algae (including algae blooms), and relatively higher alkalinity or carbonate geology in the lake or watershed. Higher pH levels are not inherently a problem or unusual but can be an indicator of eutrophication if levels are higher in the afternoon and lower in the early morning.

#### **3.2 Dissolved Oxygen**

Dissolved oxygen (DO) is the amount of oxygen gas that is mixed into water and available for aquatic organisms to breathe. DO is considered an important metric for water quality since it is essential for survival of aquatic life. Changes in DO can occur for several reasons including changes in water temperature, wind action, and biomass of plants and algae in a lake. When plants and algae respire overnight, this process consumes oxygen. When these organisms are conducting photosynthesis during the daytime, this process produces oxygen. Thus, heavier growth of plants or algae will have a proportionally higher influence on DO swings each day. Warmer water can hold less oxygen, so summer months tend to see lower DO levels, while colder months will see higher DO levels. Bacterial decay of detritus and other organic matter in sediments consumes oxygen, so DO levels are often lowest at the bottom of the water column, especially when a lake stratifies. The most beneficial method for evaluating DO in lakes is to measure vertical profiles in the water column from surface to bottom, along with water temperature (as an explanatory parameter) to discern the amount of oxygen being consumed towards the bottom of the water column due to degradation of organic matter in sediments. By doing this, we can determine the amount of oxygen available to fish and the fraction of the water column that is habitable by fish during warmer summer months. DO of less than 2 mg/L is considered hypoxic (i.e., low or depleted oxygen), while DO between 3 and 5 mg/L can be stressful for sensitive organisms including larger fish, and DO greater than 5 mg/L is considered generally healthy. DO greater than 8 mg/L is considered optimum for aquatic organism health. However, super-saturated DO levels can be attributed to cyanobacteria blooms and are not necessarily representative of stable conditions.

### Results:

At the time of sample and data collection, DO levels ranged from 9.23 mg/L at the surface to 8.84 mg/L at the bottom (Table 3 and Figure 3). These measurements were collected between 10:15 AM at Site 1 through about 11:55 AM at Site 3, so we would anticipate these ranges of DO at this time of day in a healthy lake and given the current water temperature. Temperature profiles ranged from about 20.6 degrees Celsius at the surface, down to about 20.2 degrees Celsius at the bottom of the water column, indicating lack of stratification at these open water sites at the time sampled (Table 2 and Figure 2). DO in the groundwater outflow was 2.68 mg/L at 14 degrees Celsius. Thus, the groundwater is more oxygen-depleted when it enters the lake, but it does not appear to be negatively influencing lake-wide DO since it is a relatively small volume being added daily compared to the volume of the lake. Overall, these data indicate that at the time of collection, DO levels were optimal for health of aquatic organisms without any indication of spikes due to cyanobacteria or vegetation growth.

### **3.3 Conductivity**

Conductivity is a measure of water's ability to pass an electrical charge. This is directly related to the concentration of dissolved ions in the water (e.g., calcium, magnesium, sodium, potassium, sulfate, and chloride). Conductivity is measured in  $\mu\text{S}/\text{cm}$ . In freshwater bodies, a conductivity less than 100  $\mu\text{S}/\text{cm}$  is considered low, between 100 and 1,000  $\mu\text{S}/\text{cm}$  is considered normal for freshwaters, and greater than 1,000  $\mu\text{S}/\text{cm}$  may not be tolerable for fish and aquatic invertebrates.

### Results:

Conductivity ranged from about 220.2  $\mu\text{S}/\text{cm}$  at the water surface to about 219.2  $\mu\text{S}/\text{cm}$  at the bottom of the water column (Table 4 and Figure 4). Conductivity in the groundwater outflow was 444.0  $\mu\text{S}/\text{cm}$ . All measurements were within normal range for freshwater.

### **3.4 Phycocyanin**

Phycocyanin is a blue-colored pigment produced in cyanobacteria for photosynthesis. This pigment is mostly unique to cyanobacteria, so it can often be used as a screening-level measurement for detection of these organisms in water. While chlorophyll-*a* (pigment discussed below) is a more standardized metric for algal productivity in water, phycocyanin measurements are useful to discern the relative proportion of cyanobacteria within an algal assemblage. These data can be used to prompt further investigation with manual water sampling, algal identification and enumeration, and toxin testing where appropriate.

### Results:

Phycocyanin fluorescence values ranged from 1.57 RFUs (relative fluorescence value) at the water surface to 1.38 RFUs at the bottom of the water column among the three open water sites (Table 5 and Figure 5). Phycocyanin was 0.07 RFUs in the groundwater outflow. Overall,

all levels were relatively low which would indicate low levels of cyanobacteria in the open water sites at Bass Lake.

### ***3.5 Chlorophyll-a***

Chlorophyll-*a* is a pigment produced by plants and algae that is used to conduct photosynthesis. Measurements in water provide an estimate of the amount of planktonic (i.e., free-floating) algae and cyanobacteria present and can serve as a metric of productivity in water at that point in time. Chlorophyll-*a* measurements are used as a core metric in determining trophic state of lakes, along with nutrient levels. For example, oligotrophic (low productivity systems) lakes generally have chlorophyll-*a* levels of less than 3 µg/L, while hypereutrophic systems may routinely experience chlorophyll-*a* levels of greater than 40 µg/L. It is important to note that these designations should not be derived from one-time measurements, but rather trends over time. For example, a lake may experience a temporary algal bloom and experience high chlorophyll-*a* levels, but does not technically fall under the definition of a hypereutrophic lake. Thus, it is important to use this measurement as a line of evidence in tandem with other water quality parameters.

#### **Results:**

Chlorophyll-*a* levels measured using the sonde in the open water sites increased slightly from surface to bottom. Chlorophyll-*a* levels ranged from about 1.21 RFUs at the water surface to 1.63 RFUs at the bottom of the water column (Table 6 and Figure 6). The measurement in the pumphouse water was non-detect (i.e., 0 RFUs), indicating a lack of algal pigments in that water. Please note that RFUs are a generic unit of measurement for fluorescence, but do not correlate directly with concentration of chlorophyll-*a*. The actual concentration of chlorophyll-*a* ranged from 23.2 to 40.3 µg/L (Table 7) when measured in the laboratory in the surface water samples from the open water sites. These are concentrations consistent with eutrophic lakes, but again, the more important method of interpretation is to evaluate trends over time rather than single measurements.

### ***3.6 Total Phosphorus***

Phosphorus is an essential nutrient often correlating with algae growth. Total phosphorus (TP) is the measure of all phosphorus in a sample, reported in µg/L, and includes phosphorus that is readily available for algae and plant growth, as well as phosphorus that has potential to become available. The total phosphorus concentration in an aquatic system is often correlated with the trophic state of water. For example, < 12 µg/L is considered oligotrophic and is often characterized by clear water with little plant or algae growth; 12-24 µg/L is considered mesotrophic and is characterized by moderately clear water with some algae; 25-96 µg/L is considered eutrophic and is characterized by productive waters with algae and plants; > 96 µg/L is considered hypereutrophic (highly productive) and is characterized by frequent algal blooms. Again, these ranges are generalized, and site-specific data should be interpreted in context with

other water quality data and lake assessments of productivity. It is helpful to measure phosphorus in both the surface water and bottom of the water column to discern if there is evidence of phosphorus loading into the water column from sediments. Evidence of this would include significantly higher phosphorus concentrations at the bottom of the water column, especially when a lake is stratified.

#### Results:

Total phosphorus concentrations ranged from 20 to 34  $\mu\text{g/L}$  in the surface water (Table 7) among Sites 1-3. In the bottom water, all sites had a concentration of 11  $\mu\text{g/L}$  (Table 9). The pumphouse water had a total phosphorus concentration of  $< 10 \mu\text{g/L}$  (Table 7). Based on these data, surficial phosphorus levels were in the mesotrophic to eutrophic range and the groundwater is not contributing appreciable phosphorus to the lake. When looking at dissolved oxygen and temperature profiles in addition to bottom water phosphorus levels, these various lines of evidence indicate that the water column is still well oxygenated, destratified, and that there is minimal phosphorus loading from sediments at this time.

### ***3.7 Soluble Reactive Phosphorus***

Soluble reactive phosphorus (SRP) is the form of phosphorus in water that is dissolved in water and immediately available for uptake by plants and algae to use for growth. Most of SRP consists of orthophosphate, which is an inorganic form of phosphorus and is the simplest, most biologically available. Since SRP is readily usable, measurement of this parameter can help inform whether there is potential risk for rapid growth of cyanobacteria and algae, as well as reduced water clarity. While there are no universally adopted ranges of SRP that are considered normal/healthy since this form fluctuates often, it is helpful when interpreted in context with total phosphorus concentrations and other water quality parameters. Measurement of SRP is most beneficial in bottom water samples as another line of evidence to discern if lake sediments are a major source of phosphorus release, transformation, and recycling. Surface water dynamics can mask SRP since there is a higher chance for algae in the water to immediately take up the phosphorus, thus this measurement is not as useful in surface water.

#### Results:

SRP concentrations in bottom waters ranged from 11-17  $\mu\text{g/L}$  among the three sites sampled (Table 9). One of these samples (Site 2) had a higher SRP concentration than total P concentration (i.e., 17  $\mu\text{g/L}$  vs. 11  $\mu\text{g/L}$ , respectively). Since it is not possible for SRP to be greater than total phosphorus, there is a possibility that there was some confounding in the data due to the filtration process used to preserve samples in the field. Our team is modifying the filtration equipment and supplies for the next sampling visit to minimize potential for errors moving forward. However, levels were low overall and indicate minimal loading of phosphorus from sediments into the water column presently. This is logical based on the abundance of dissolved oxygen throughout the water column down to the sediment-water interface. Release of

phosphorus from sediments into the water typically occurs most notably when oxygen declines to below 2 mg/L near the sediment surface.

### ***3.8 Total Nitrogen***

Nitrogen is an essential nutrient that can enhance growth of algae and plants, measured as total nitrogen (TN) in mg/L. Total nitrogen is the combined amount of all forms of inorganic nitrogen (ammonia, nitrite, nitrate) and organic nitrogen (forms found in animal and plant matter). Nitrogen is usually not a limiting nutrient in aquatic systems but is often compared to total phosphorus levels which can inform whether a lake is more nitrogen-limited or phosphorus-limited. In general, nitrogen levels less than 0.3 mg/L are consistent with nutrient-poor waters, levels between 0.3 and 1 mg/L are considered moderate, levels between 1-2 mg/L are considered a potential eutrophication risk (when interpreted along with phosphorus), and levels greater than 2 mg/L often correlate with highly nutrient enriched systems.

#### Results:

Total nitrogen concentrations in surface water samples ranged from 1.15 to 1.32 mg/L among the open water sites, while the groundwater had a concentration of 0.591 mg/L (Table 7). When interpreted alongside total phosphorus data, these nitrogen levels are moderate and common for lakes in the Midwest.

### ***3.9 Total Kjeldahl Nitrogen***

Total Kjeldahl Nitrogen (TKN) is a measurement of the sum of organic-N and ammonia-N in water. TKN represents much of the nitrogen tied up in organic matter, which can include nitrogen in algae, plants, and organic debris, as well as in the ammonia form. High TKN levels may provide evidence of runoff containing manure or fertilizers, wastewater influence, decaying organic matter, or dense algae/aquatic vegetation. Organic-N and ammonia-N can both be transformed by bacteria over time into other forms of nitrogen, providing insight into the nitrogen cycle in the lake sampled.

#### Results:

TKN concentrations ranged from 1.09 to 1.25 mg/L (Table 7) in surface water among the open water sites. The TKN in the groundwater was 0.498 mg/L (Table 7). TKN values were > 94% of the total nitrogen in the samples, indicating that there was very little nitrate and nitrite in the water and most of the nitrogen was either in organic form or as ammonia. This means that the nitrogen pool in the lake is currently dominated by algal biomass, dissolved organic nitrogen, particulate organic matter, and reduced nitrogen forms which is common for biologically active lakes.

### ***3.10 Alkalinity***

Alkalinity is a measure of the buffering capacity of water, reported in “mg/L as calcium carbonate”. Buffering capacity of water describes the capacity of water to resist changes in pH. In other words, water with lower alkalinity is more susceptible to pH shifts that can occur due to plant and algae growth. An alkalinity of 50-150 mg/L is desirable for fish health and growth.

#### Results:

Alkalinity will only be measured in water samples collected in May to understand general water chemistry but does not need to be routinely measured since this value does not change substantially in a lake from month to month. Among surface water samples, alkalinity ranged from 88 to 106 mg/L as CaCO<sub>3</sub> (Table 8). In the groundwater sample, alkalinity was 228 mg/L as CaCO<sub>3</sub>. It's common for alkalinity to be higher in groundwater because this water spends longer periods of time in contact with soils, sediments, and rock minerals underground, allowing it to dissolve carbonate and bicarbonate-forming materials.

### ***3.11 Hardness***

Hardness is a measure of dissolved calcium and magnesium in water, reported in “mg/L as calcium carbonate”. Elevated calcium helps to improve survival of juvenile fish and is necessary for scale and bone formation as well as other metabolic functions. Hardness can also impact herbicide/algacide efficacy. For fish health, a range of 50-150 mg/L hardness is desired.

#### Results:

Hardness will only be measured in water samples collected in May to understand general water chemistry but does not need to be routinely measured since this value does not change substantially in a lake from month to month. Among surface water samples, hardness ranged from 114 to 120 mg/L as CaCO<sub>3</sub> (Table 8). In the groundwater sample, hardness was 272 mg/L as CaCO<sub>3</sub>. It's also common for hardness to be higher in groundwater, because this water spends longer periods of time in contact with soils, sediments, and rock minerals underground, allowing it to dissolve higher levels of calcium and magnesium into the water.

### ***3.12 Secchi Depth***

Secchi depth is a simple measurement for water clarity in a lake. It is determined by using a piece of equipment called a Secchi disc which is a circular disc painted in alternating black and white quadrants, attached to a rope that is lowered down into the water. Secchi depth is defined as the depth of water at which the disc disappears from view as it is lowered. Therefore, a lower Secchi depth indicates highly turbid or algae-dense water, while a higher Secchi depth indicates clearer water. In general, Secchi depths of less than 1 meter (3.3 feet) indicate eutrophic or hypereutrophic conditions, while depths of greater than 6 meters (19.7 feet) would be indicative of clear water and low productivity systems. However, these ranges vary by region.

## Results:

Secchi depth was approximately 0.8 feet (9.6 inches) at all three open water sites on the day of sampling (Table 10). Analysts who have routinely been to Bass Lake for other work prior to this visit also noted the water was relatively green compared to other visits to the lake. These Secchi depths were relatively low, indicating a higher abundance of planktonic algae in the water which is common in highly productive lakes.

### ***3.13 Sediment Phosphorus Fractionation Analysis***

The purpose of this analysis was to measure the total and potentially releasable amounts of phosphorus in sediments within Bass Lake. When interpreted in tandem with DO profiles, phosphorus levels in the water, and other nutrients, we can discern the relative probability of sediments being a high contributor of phosphorus to the lake. Phosphorus pools in sediments can consist of phosphorus in various forms. These operationally defined forms range from labile (readily available for use by aquatic organisms) to mineral-bound permanently stable forms that will likely never be released or usable by aquatic organisms. Sediment phosphorus fractionation allows us to determine the total phosphorus load in sediments in addition to the relative abundance of that total phosphorus among the various forms in sediments. The fractions that are analyzed include the following:

- Labile and porewater: refers to the most weakly associated and readily exchangeable fraction of phosphorus. It consists of phosphorus that is held on sediment particle surfaces through weak electrostatic forces or minimal chemical binding and can be easily released into the water column. This fraction is highly sensitive to changes in redox conditions, pH, and ionic strength, making it the most biologically available form of sediment phosphorus.
- Redox-sensitive: the fraction in sediments that consists of phosphorus bound in iron or manganese compounds when oxygen is present. When oxygen levels decline (e.g., in stagnant or deep waters), those compounds get dissolved back into the water which also releases the phosphorus. Because of this, the phosphorus can easily move between the sediment and water depending on oxygen conditions. This makes it an important source of nutrients that can fuel algae growth during low-oxygen events, common during summer in most ponds and lakes.
- Organic-bound: phosphorus that is attached to or stored within organic material in sediment which can include decaying plants, algae, and microorganisms. This form is not immediately available because it is bound up in these materials. As organic matter is decayed over time, this phosphorus can be released from sediments into water and available for plant and algae growth. However, the rate at which this can occur varies widely.

- Metal-oxide: phosphorus attached to aluminum and other metal oxides in sediments. This form is stable and held fairly tightly in sediment and is unlikely to release into water under environmentally relevant conditions. Occasionally, drastic increases in pH can cause some of this phosphorus to be released.
- Mineral-bound: phosphorus locked in minerals often containing calcium in sediments. This form of phosphorus is very stable and cannot be released from sediments under normal conditions. This fraction is considered a more permanent form of phosphorus storage in sediments. Following treatments with lanthanum-based products, phosphorus bound up with those products would convert to this fraction.
- Refractory: phosphorus in sediments that is very tightly locked within highly stable minerals or complex organic materials that do not easily release phosphorus into the water. This fraction is considered permanent and therefore, the least reactive form of phosphorus stored in sediments.

### Results:

Total phosphorus concentrations in sediment samples ranged from 95 to 1,481 mg P/kg dry sediment among the three sampling sites (Table 11). Samples collected from Sites 1 and 3 were more organic-rich, porous, and contained more water, whereas the sample collected from Site 2 was very sandy and lacked muck (Table 12). These observations were consistent with phosphorus concentrations and fractionation results for each sample. For example, sediments that contain more muck are more likely to have higher phosphorus concentrations overall, while sediments that are mostly sand cannot store as much phosphorus. At Site 1, the total phosphorus concentration was 1,081 mg P/kg. Concentrations of labile, redox-sensitive, and organic-bound phosphorus were < 6.2 (detection limit for specific sample), 67.1, and 537 mg/kg, respectively (Table 11 and Figure 7). These three fractions are considered the most mobile and therefore most important for predicting potential sediment phosphorus loading. At Site 2 (sandy sample), total phosphorus was 95 mg P/kg. From labile, redox sensitive, and organic-bound fractions, concentrations were < 0.3 (detection limit for specific sample), 2.3, and 5.5 mg P/kg, respectively. At Site 3, the total phosphorus concentration was 1,481 mg P/kg. From labile, redox sensitive, and organic-bound fractions, concentrations were 8.4, 187.5, and 508.15 mg P/kg, respectively. Please see Table 11 and Figure 7 for full fractionation results. From these data, we can discern that there were relatively high phosphorus concentrations in samples from Sites 1 and 3, especially for fractions of potentially mobile phosphorus. If and when Bass Lake stratifies and dissolved oxygen levels decline below the thermocline, these conditions will create a higher probability for release of phosphorus from sediments into the water in deeper areas, which can fuel vegetation and algae growth. This initial sampling event served to create a line of evidence for whether sediment phosphorus loading could be occurring. In the future, if more comprehensive watershed modeling and nutrient budget calculations are undertaken, additional sampling will be necessary to refine those studies.

### 3.14 Algal Analysis

The purpose for algal analysis at Bass Lake was to discern the types and relative densities of planktonic cyanobacteria and/or algae. Surficial water samples were collected from five sites within the lake closer to the shoreline. Planktonic algae (especially cyanobacteria) are more likely to be found in shallow, stagnant, and wind-blown shoreline areas in lakes, especially in larger lakes. Therefore, it was important to analyze sites closer to shoreline for algal densities to ensure that if growth was present, it was detected. Sampling only in open water sites could result in false negatives. Samples were analyzed in the laboratory using a light microscope and standardized enumeration methods.

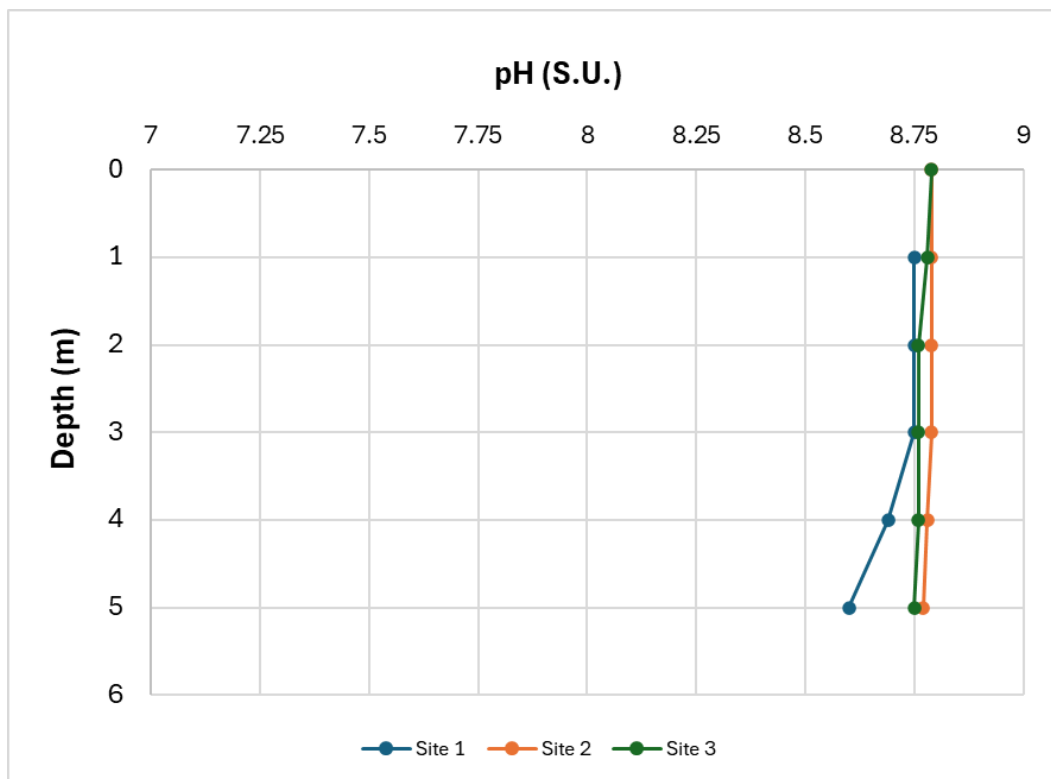
#### Results:

Several genera of planktonic cyanobacteria (i.e., blue-green algae) were detected in samples collected among the five sampling sites at high densities ranging from 590,000 to 8,870,000 cells/mL (Table 13). The dominant genus detected at all sites was *Aphanocapsa sp.*, which is a colony-forming type of cyanobacteria, not well established as a cyanotoxin producer. *Limnothrix sp.* and *Microcystis sp.* were also detected at moderate levels at Sites 1 and 3 (Table 13). Both genera are potential microcystin producers. Microcystins are a group of cyanobacterial toxins that can adversely affect the liver and kidney in people and animals. While toxin testing was not performed on these samples, our laboratory can offer that testing if Bass Lake is interested in future sampling events. We recommend keeping dogs out of water that appears dense green/blue-green along lake shorelines. Similarly, if these signs of dense cyanobacteria are present, we also recommend that people not swim or otherwise come in contact with the water. For more information on harmful algal bloom guidance in Indiana, please refer to IDEM's webpage: <https://www.in.gov/idem/algae/indiana-reservoir-and-lake-sampling-update/>.

Since algal assemblages were dominated by cyanobacteria, this would indicate potentially higher levels of phosphorus around the lake shoreline. Higher phosphorus concentrations around shoreline areas can result from runoff of nutrients due to rain events (especially in springtime), potential groundwater runoff from leaky septic tanks, or from the release of phosphorus that can occur following invasive vegetation treatments as the plant material gets degraded by bacteria. At the time of sampling, invasive vegetation management had not yet been completed for the year at Bass Lake.

**Table 1. pH measurements (reported in standard units) collected with depth on May 19, 2026. Note: surficial measurement not taken at Site 1. Pumphouse outflow water was collected in a bucket for measurement with sonde.**

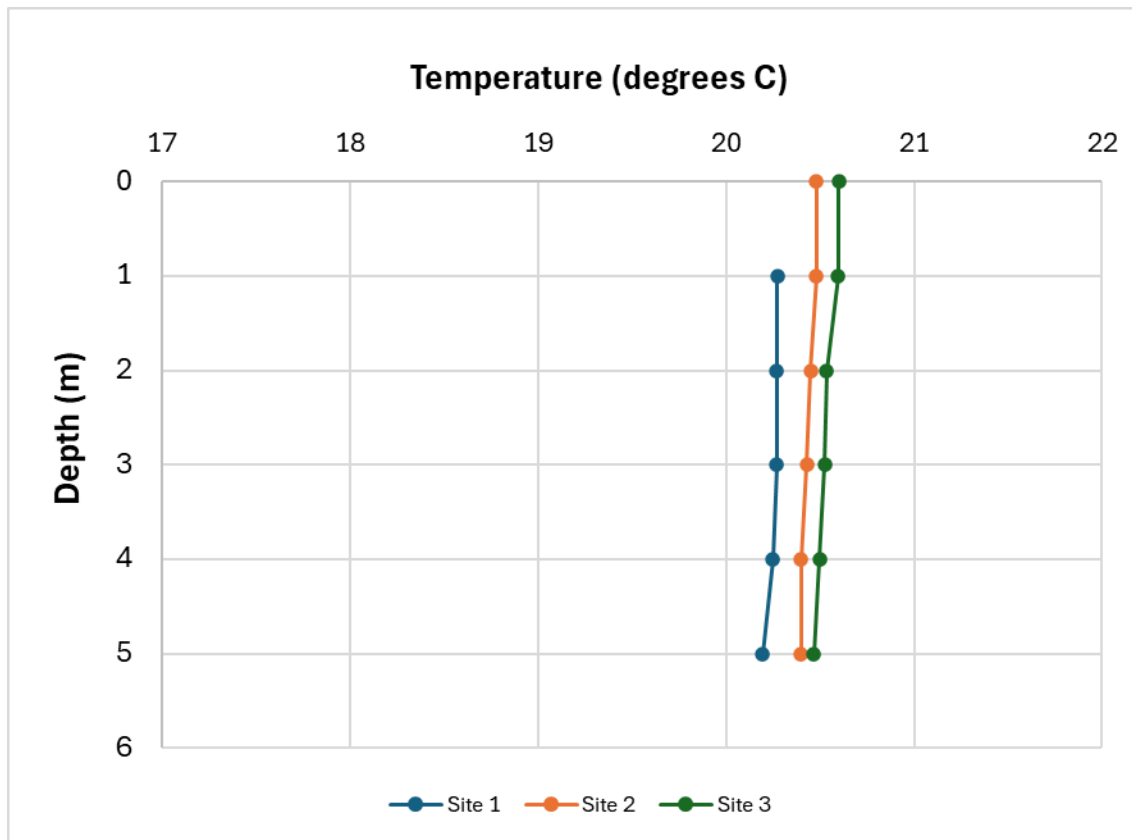
Depth (m)	Site 1	Site 2	Site 3	Pumphouse
0	-	8.79	8.79	7.47
1	8.75	8.79	8.78	
2	8.75	8.79	8.76	
3	8.75	8.79	8.76	
4	8.69	8.78	8.76	
5	8.60	8.77	8.75	



**Figure 1. Graph of pH measurements (reported in standard units) collected with depth on May 19, 2026. Note: surficial measurement not taken at Site 1. Pumphouse measurement only reported in Table 1.**

**Table 2. Temperature measurements (reported in degrees Celsius) collected with depth on May 19, 2026. Note: surficial measurement not taken at Site 1. Pumphouse outflow water was collected in a bucket for measurement with sonde.**

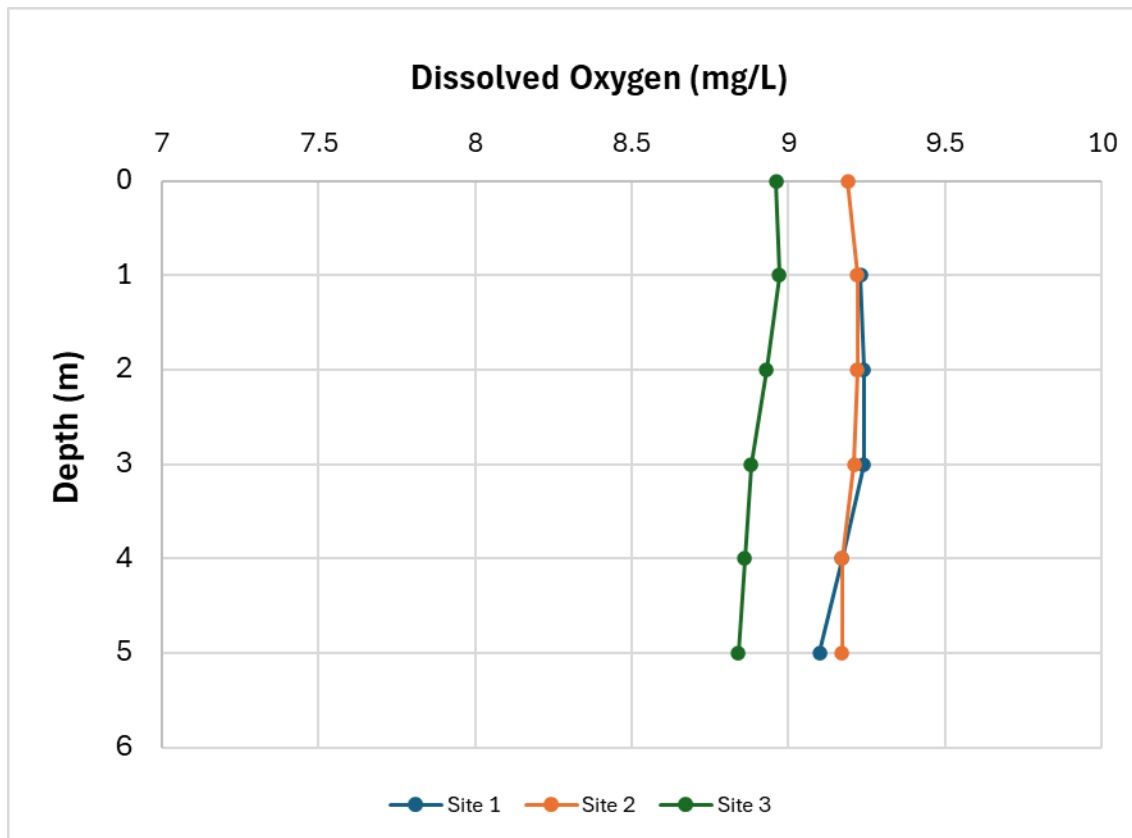
Depth (m)	Site 1	Site 2	Site 3	Pumphouse
0	-	20.5	20.6	14.0
1	20.3	20.5	20.6	
2	20.3	20.5	20.5	
3	20.3	20.4	20.5	
4	20.3	20.4	20.5	
5	20.2	20.4	20.5	



**Figure 2. Graph of temperature measurements (reported in degrees Celsius) collected with depth on May 19, 2026. Note: surficial measurement not taken at Site 1. Pumphouse measurement reported in Table 2.**

**Table 3. Dissolved oxygen measurements (reported in mg/L) collected with depth on May 19, 2026. Note: surficial measurement not taken at Site 1. Pumphouse outflow water was collected in a bucket for measurement with sonde.**

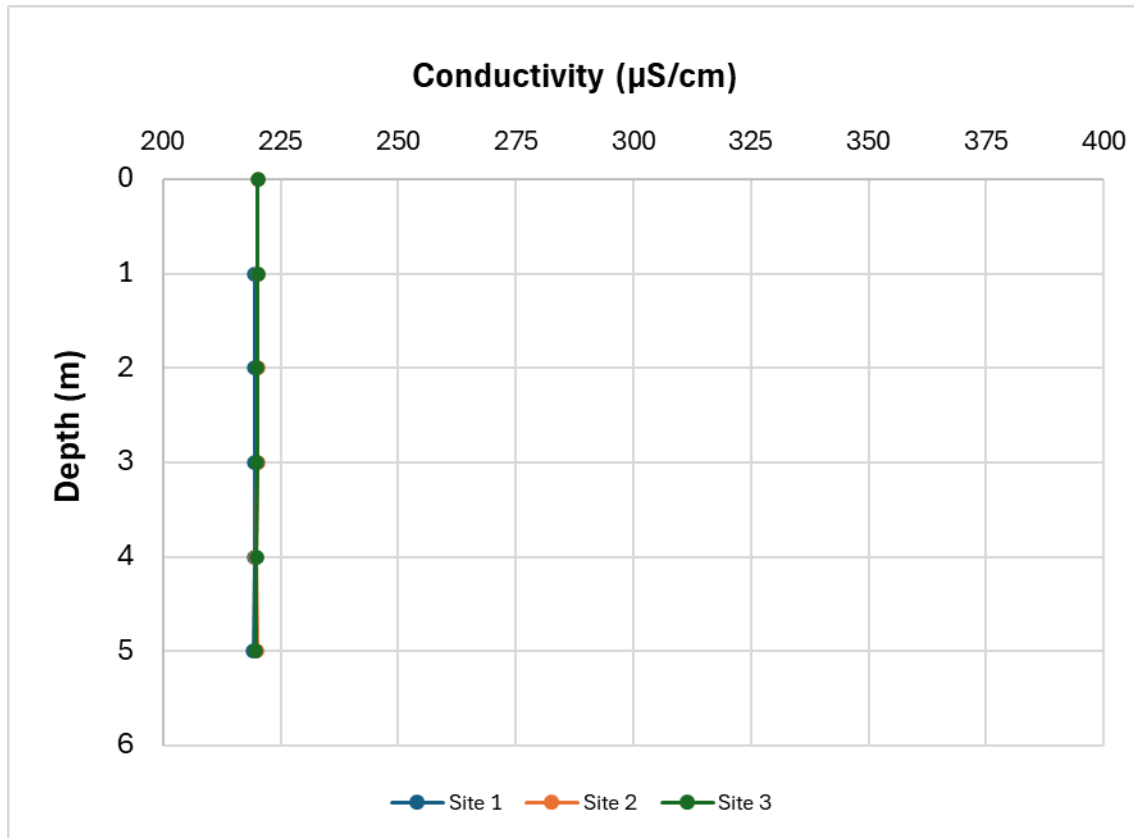
Depth (m)	Site 1	Site 2	Site 3	Pumphouse
0	-	9.19	8.96	2.68
1	9.23	9.22	8.97	
2	9.24	9.22	8.93	
3	9.24	9.21	8.88	
4	9.17	9.17	8.86	
5	9.10	9.17	8.84	



**Figure 3. Graph of dissolved oxygen measurements (reported in mg/L) collected with depth on May 19, 2026. Note: surficial measurement not taken at Site 1. Pumphouse measurement reported in Table 3.**

**Table 4. Conductivity measurements (reported in  $\mu\text{S}/\text{cm}$ ) collected with depth on May 19, 2026. Note: surficial measurement not taken at Site 1. Pumphouse outflow water was collected in a bucket for measurement with sonde.**

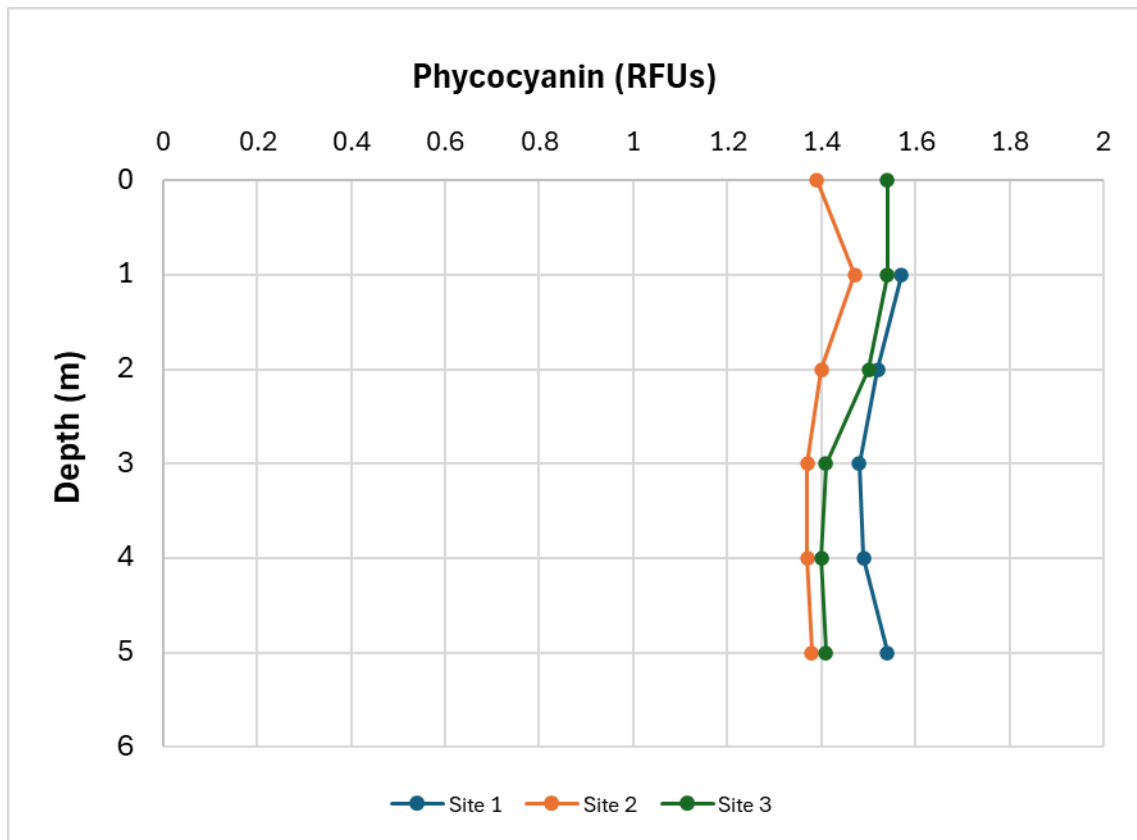
Depth (m)	Site 1	Site 2	Site 3	Pumphouse
0	-	220.2	220.2	444.0
1	219.3	220.2	220.2	
2	219.3	220.1	220.0	
3	219.3	220.1	220.0	
4	219.3	219.8	219.9	
5	219.2	220.0	219.8	



**Figure 4. Graph of conductivity measurements (reported in  $\mu\text{S}/\text{cm}$ ) collected with depth on May 19, 2026. Note: surficial measurement not taken at Site 1. Pumphouse measurement reported in Table 4.**

**Table 5. Phycocyanin measurements (reported in relative fluorescence units; RFUs) collected with depth on May 19, 2026. Note: surficial measurement not taken at Site 1. Pumphouse outflow water was collected in a bucket for measurement with sonde.**

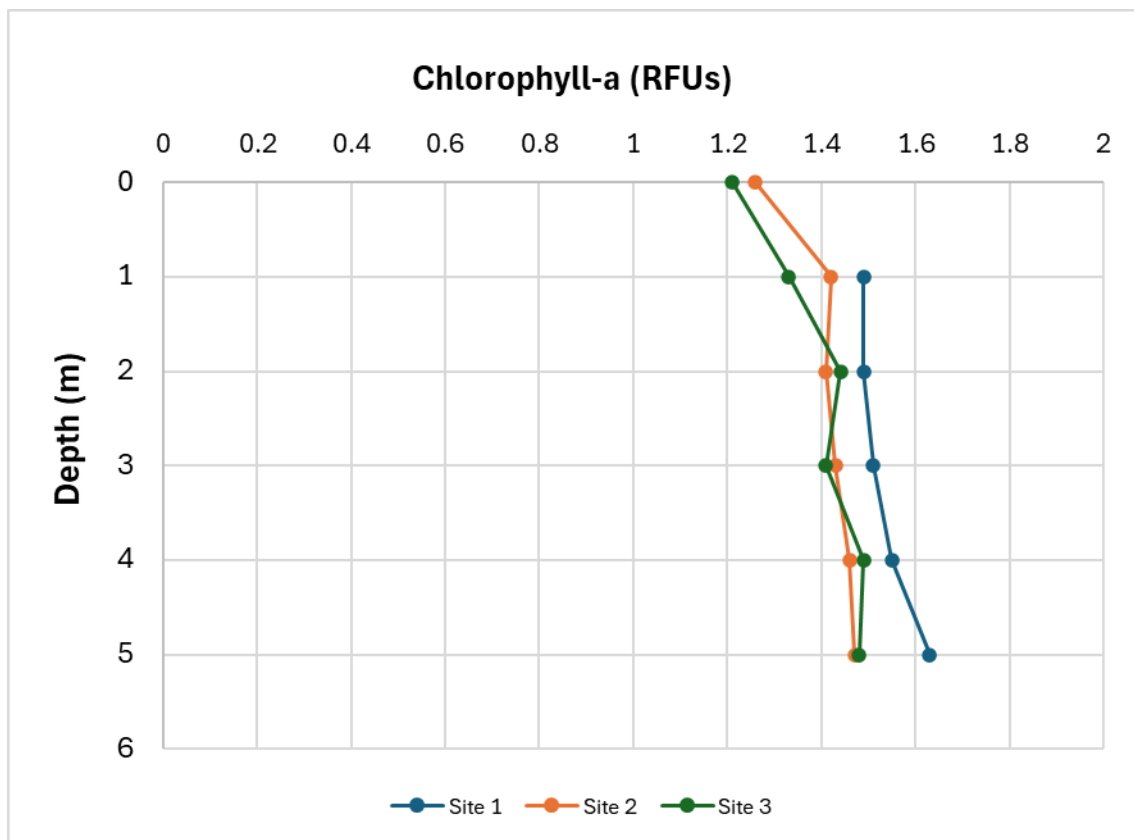
Depth (m)	Site 1	Site 2	Site 3	Pumphouse
0	-	1.39	1.54	0.07
1	1.57	1.47	1.54	
2	1.52	1.40	1.50	
3	1.48	1.37	1.41	
4	1.49	1.37	1.40	
5	1.54	1.38	1.41	



**Figure 5. Graph of phycocyanin measurements (reported in relative fluorescence units; RFUs) collected with depth on May 19, 2026. Note: surficial measurement not taken at Site 1. Pumphouse measurement reported in Table 5.**

**Table 6. Chlorophyll-*a* measurements (reported in relative fluorescence units; RFUs) collected with depth on May 19, 2026. Note: surficial measurement not taken at Site 1. Pumphouse outflow water was collected in a bucket for measurement with sonde.**

Depth (m)	Site 1	Site 2	Site 3	Pumphouse
0	-	1.26	1.21	0
1	1.49	1.42	1.33	
2	1.49	1.41	1.44	
3	1.51	1.43	1.41	
4	1.55	1.46	1.49	
5	1.63	1.47	1.48	



**Figure 6. Graph of chlorophyll-*a* measurements (reported in relative fluorescence units; RFUs) collected with depth on May 19, 2026. Note: surficial measurement not taken at Site 1. Pumphouse measurement reported in Table 6.**

**Table 7. Nutrient and pigment data from surface samples collected at Bass Lake on May 19, 2026**

Sample ID	Total Phosphorus (µg/L)	Total Nitrogen (mg/L)	Total Kjeldahl Nitrogen (mg/L)	Chlorophyll- <i>a</i> (µg/L)
Site 1	26	1.32	1.25	40.3
Site 2	34	1.24	1.16	23.2
Site 3	20	1.15	1.09	33.4
Pumphouse	< 10 (9)*	0.591	0.498	n/a**

\* Result was below reporting limit. Estimated concentration in parentheses.

\*\*Not measured since field measurement was reported as zero

**Table 8. Water chemistry data from surface samples collected at Bass Lake on May 19, 2026**

Sample ID	Alkalinity (mg/L as CaCO <sub>3</sub> )	Hardness (mg/L as CaCO <sub>3</sub> )
Site 1	88	120
Site 2	100	120
Site 3	106	114
Pumphouse	228	272

**Table 9. Water quality data from bottom samples collected at Bass Lake on May 19, 2026**

Sample ID	Total Phosphorus (µg/L)	Soluble Reactive Phosphorus (µg/L)
Site 1	11	< 10 (0)*
Site 2	11	17**
Site 3	11	11

\* Result was below reporting limit. Estimated concentration in parentheses.

\*\* SRP value higher than TP value. Note and explanation in text.

**Table 10. Secchi depth measurements collected at Bass Lake on May 19, 2026**

Sample Site	Secchi Depth (feet)
Site 1	0.8
Site 2	0.8
Site 3	0.8

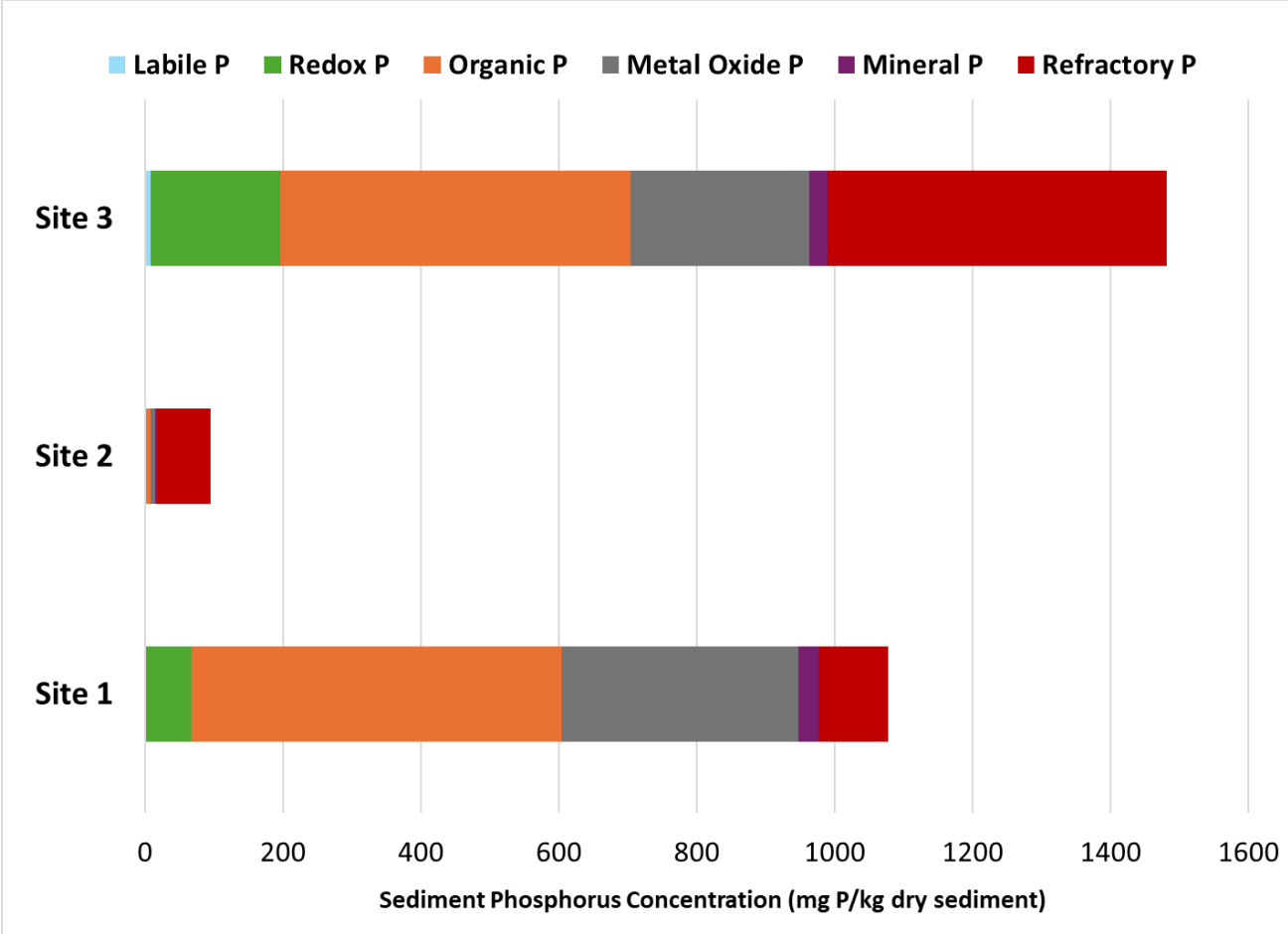
**Table 11. Sediment Phosphorus Fractionation Data (all values reported in terms of mg phosphorus per kg dry sediment)**

Sediment Phosphorus Fraction (mg P/kg dry sediment)	Site 1	Site 2	Site 3
Total Phosphorus	1,081	95	1,481
Labile and porewater phosphorus	*	*	8.4
Redox-sensitive phosphorus	67.1	2.3	187.5
Organic-bound phosphorus	537	5.5	508.2
Aluminum-bound phosphorus	343.4	6.6	259.3
Mineral-bound phosphorus	28.8	3.5	25.5
Refractory phosphorus	100.7	76.7	492.6

\*Indicates result was less than detection limit

**Table 12. Sediment sample characteristics**

Sediment Parameter	Site 1	Site 2	Site 3
Dry bulk density (g/cm <sup>3</sup> )	0.04	1.49	0.04
Moisture Content (%)	96	21	96
Organic Matter (%)	48.3	0.5	38.6



**Figure 7. Sediment phosphorus fractionation data indicating relative proportion of each fraction within each sample**

**Table 13. Algal identification and enumeration results**

Site ID	Genus (Taxonomic Class)	Cell Density by Genus (cells/mL)	Total Cell Density (cells/mL)
Site 1	<i>Aphanocapsa sp.</i> (Cyanophyceae)	6,355,000	6,412,500
	<i>Limnothrix sp.</i> (Cyanophyceae)	15,000	
	<i>Microcystis sp.</i> (Cyanophyceae)	42,500	
Site 2	<i>Aphanocapsa sp.</i> (Cyanophyceae)	5,490,000	5,490,000
Site 3	<i>Aphanocapsa sp.</i> (Cyanophyceae)	495,000	590,000
	<i>Limnothrix sp.</i> (Cyanophyceae)	95,000	
Site 4	<i>Aphanocapsa sp.</i> (Cyanophyceae)	3,870,000	3,870,000
Site 5	<i>Aphanocapsa sp.</i> (Cyanophyceae)	8,870,000	8,870,000

**Note: Cyanophyceae is the taxonomic class that includes cyanobacteria (i.e., “blue-green algae”)**

*All data presented in this report met QA/QC criteria unless otherwise specified here.*

**Field Notes and Data Sheet**  
**Bass Lake; Knox IN**

Sample Date: 5/19/26  
 Analyst: Leif Willey / Malora Ryan  
 Notes on weather: Windy, ~~20-25 mph~~ sunny, turned cloudy  
30-45 mph with gusting 60.

Approximate time of sample/data collection:

Open Water Site 1: 9:25 AM  
 Open Water Site 2: 11:00-11:15 AM  
 Open Water Site 3: 12:02-12:15 PM  
 Pumphouse: 11:40 AM  
 Algae Site 1: 8:30 AM  
 Algae Site 2: 1:26 PM  
 Algae Site 3: 10:50 AM  
 Algae Site 4: 12:57 PM  
 Algae Site 5: 12:35 PM

**Secchi Depth Measurements:**

Site ID	Secchi Depth (ft)
Open Water Site 1	<del>0.8</del> 0.8'
Open Water Site 2	0.8'
Open Water Site 3	0.8'

Observations: lake is very green today  
~~site~~ Open water 2 is very sandy