White Paper - Phosphorus in Soils Surrounding Marion County Lake

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Marion County Lake has historically had a blue-green algae problem that has not been addressed due to lack of data about soil, water, and land use in the area. Blue-green algae is caused by an excess in phosphorus, and is an issue because it is toxic to humans and animals. This research sought to provide data about the soils surrounding the lake for use in identifying causes of the lake's water quality issues. Additionally, this research tried to identify relationships between different soil characteristics and phosphorus concentration.

Methodology involved taking 16 soil samples from 4 different places around the lake (see map to left) and testing them in a lab for a variety of different properties. Analyzing the results from the laboratory tests led to the following conclusions:

- Approximately 1300 kg of phosphorus are present in the soils immediately surrounding the lake.
- Measured soil properties did not match properties expected based upon soil maps of the area. More specifically, samples were coarser in texture than what was expected, and had higher organic matter and CEC than predicted by soil maps.
- Samples with high organic matter had less phosphorus than those with low organic matter. This relationship is opposite to what was expected based upon literature.
- Sample location B, which is right next to the tributary and downhill of residences, had significantly high phosphorus concentrations (see graph below).
- Distance from the lake's edge did not have a correlation with phosphorus content.
- A positive correlation was observed between CEC and phosphorus.

To pinpoint the cause of blue-green algae, more research on erosion, land use, and water table levels around the lake is necessary. The data from this research, coupled with further testing and research, will give park managers at Marion County Lake a better understanding of the risks that soils may pose to water quality.