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**Keywords:** *Provide several relevant words that describe the content of your work.*

muskegon lake, time-series data, hypoxia, episodic weather, seasonal trends, algal bloom, cyanobacteria

**Public Abstract/Description:** *Provide a short description of your work. You may use the abstract from your work, modify it, or create a new description.*

Over the last 10 years, the Robert B. Annis Water Resources Institute (AWRI) at Grand Valley State University has collected buoy sensor data from Muskegon Lake. This sensor data, captured every 15 minutes, records a variety of physical and biological characteristics important to the regional biome. Ranging from wind speed to dissolved oxygen to chlorophyll, the 21 distinct metrics reveal details about the intertwined processes and seasonal variations in the ecosystem. Previous research from AWRI has shown that "episodic weather events" play a role in water column mixing and algal blooms. For example, a strong storm system will mix up nutrient-rich bottom water and distribute it throughout the lake, potentially leading to a future algal bloom. Research is ongoing to formally prove this link. The goal for this project was to aid with the analysis and visualization of this time-series data set and to provide quantitative insight into how episodic weather events are linked to other processes in the lake. Long term, the vision is to create comprehensive models that can predict information valuable to the public, e.g. the likelihood of a dangerous cyanobacteria bloom in the lake during the summer months. The data analysis focus for this project consisted of a small subset of metrics from 2011-2019, including: water temperature at various depths to measure stratification, dissolved oxygen concentration to measure hypoxia, wind speed and direction to quantify episodic storm events, and chlorophyll and phycocyanin to track different types of algal blooms. These specific metrics just scrape the surface of what is available but helped further our understanding of the cycles at play in Muskegon Lake.

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Title: Exploring Seasonal Trends and Episodic Weather in the Muskegon Lake Ecosystem

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