

# Pigeon Lake Water Monitoring Buoy

Information and frequently asked questions about the Pigeon Lake water monitoring buoy

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## What is a lake monitoring buoy?

A floating platform with attached instruments that are capable of taking key water quality measurements and related factors such as weather. It collects data every 15 minutes, 24 hours a day, over the open water season and removed before ice up.

A water monitoring buoy station typically consists of a buoy platform, data logger, solar power, telemetry equipment, mooring hardware, sondes, and sensors for various depths.

The buoy is customized to suit the needs and budget of the lake monitoring program.

It will be optimized to better understand several key factors that affect algal blooms in Pigeon Lake

## What will it measure?

### Weather Station

- Air temperature, humidity, barometric pressure, wind speed and wind direction.

### Sonde and Sensors

- Water temperature, conductivity, pH, dissolved oxygen, turbidity (clarity), total algae (both chlorophyll a and blue green algae sensors).

### Thermister string

- Temperature and/or dissolved oxygen from the lake surface to 1m off the lake bottom.
  - Temperature for the first 5m
  - Dissolved oxygen and temperature for bottom 3 m

## What will it look like?



Example of a lake monitoring buoy installed on Nakamun Lake in 2019.

## What kind of information does it provide?

- Allows monitoring of parameters that change on short (e.g., daily) and long (e.g., decadal) timescales. Therefore, information is useful for understanding lake ecosystem dynamics and detecting changes over time
- Able to detect a bloom situation and the dates and times that blooms form
- Better understanding temperature and oxygen conditions throughout the water column to

understand internal loading (internal recycling) of phosphorus

- Better understanding on algae growing conditions and the factors that affect their distribution across the lake (like wind)
- It will help us to understand fish habitat and factors that lead to fish kills in the summer

#### Benefits:

- Relatively easy to install and maintain
- Can be used over many years
- Continuous data over the summer months (current programs are only providing four measurements a summer)
- Real time data that can be shared with the public, creating greater awareness of water quality conditions, temperature, and water quality issues
- Complementary with current water monitoring program (does not duplicate data)
- High frequency monitoring data necessary for any in-lake treatment application

#### Limitations:

- Data will still need to be analysed by professionals in order to understand the chemical, physical and biological interactions in the lake and the ultimate reasons for algal blooms. This may accrue additional time and costs
- Does not replace the need for current monitoring program because water samples will still need to be collected and sent for laboratory analysis for different parameters (such as phosphorus, nitrogen, toxins, dissolved solids and algal species)
- Enhanced monitoring does not guarantee that any in-lake treatment will occur

## Frequently Asked Questions

Q: Can the buoy handle the waves?

A: The buoy system selected was based on wave height on Pigeon Lake. It will be deployed at a central location (9-m depth) and exposed to a fetch no greater than 10 km. For this location, wave height will be no greater than 1.05 m.

Q: How long will it last?

A: Buoys are made of durable materials and can be expected to last 4-10 years. Sensors and probes may require more frequent replacement (2-3 years) than the buoy platform.

Q: Who owns the buoy?

A: Funding for the buoy was obtained by the Summer Village of Crystal Springs through a Community Partnership Grant from Alberta Municipal Affairs. The Summer Village of Crystal Springs retains ownership, however a MOU with Alberta Environment outlines the roles and responsibilities in the management of this monitoring project.

Q: Who will be responsible for installation?

A: The Province will be responsible for annual deployment (only on Pigeon Lake), maintenance, and data management. A MOU outlines the roles and responsibilities in the management of this monitoring project.

Q: Who will be responsible for maintenance?

A: The Province will be responsible with the help and assistance of the municipalities, boaters, and residents around the lake (e.g. contact AEP if there is apparent damage or other problems spotted)

Q: Is this recommended in the Pigeon Lake Watershed Management Plan?

A: The plan noted that algal blooms can be affected by many factors, so information gaps about the cause of blooms and the behavior of blue-green algae need to be filled. More science and research were recommended.

Q: Why only Pigeon Lake?

A: Buoys are being deployed on several Alberta lakes as part of the long-term water quality monitoring program for lakes. Buoys are a new component of this monitoring program. The purchase of the buoy is a partnership opportunity to enhance the monitoring at Pigeon Lake and fill a data need for lake management.