

Monitoring of Blue-Green Algae in Lake Winnebago

Fond Du Lac, Wisconsin

Case Study



Expertise in Sampling

Benefits of the 6712 Portable Sampler

- Light weight, compact, and robust
- Environmentally sealed controller (IP67) with data logging
- Powerful peristaltic pump (8.3 m lift)
- Non-contact liquid detector ensures accurate sample volume
- Plug-in modules for flow, pH and other parameters (analog input)
- SDI-12 and rain gauge connection and logging
- Versatile programming for unique applications
- Remote access via GSM



6712 Portable Sampler

The Teledyne Isco 6712 portable sampler was used to monitor not only the production of the blue-green algal in Lake Winnebago, but also any algae toxins that could contaminate the surrounding community's drinking water.



Teledyne Isco 6712 portable sampler attached to a buoy in Lake Winnebago

Lake Winnebago and Cyanotoxins

Lake Winnebago, the largest lake in Wisconsin, supplies drinking water to the major cities surrounding the lake. There is a concern in the community that toxins from the growth of blue-green algae in the lake could be contaminating the local drinking water. If ingested, at certain levels, these cyanotoxins can be fatal. To determine this high-resolution sampling was required. Professor Todd Miller and his team from the University of Wisconsin in Milwaukee used a Teledyne Isco 6712 portable sampler to assist them in finding if these toxins are indeed infiltrating the drinking water. The 6712 portable sampler was ideal for this study because of its compact design, its extensive range of programming modes, and its built-in SDI-12 interface which provides great flexibility when connecting multi-parameter sondes and other SDI-12 devices.

Sampling at Sea

The objectives of this study were to link lake characteristics (water quality parameters and algal toxin concentrations in the lake) with removal efficiency of toxins by the drinking water treatment processes employed. Since water samples needed to be taken from the lake at various times, the team found a unique way to sample the water without having to remain on the lake for days at a time. Their solution: attach the 6712 portable sampler to a homemade buoy. This buoy was equipped with sensors that measured physical parameters like water and air temperature, and blue-green algae pigment levels in the lake. A modem on the buoy would send data collected by the sensors to Miller's lab.

There were a few obstacles that Miller and his team needed to overcome. First, to offset their tight budget constraints the team sampled the drinking water from the water treatment plant manually instead of purchasing a second sampler.





6712 Controller

System Options:

- Stationary or portable
- Pacing by:
 - Time
 - Non uniform time
 - Flow
 - Event
- Large selection of bottle configurations in glass and PE (from 1 x 20 liters to 24 x 1 liter)
- Communication:
 - GSM
 - Analog output (4-20 mA)
 - ASCII data output
 - 3 x I/O ports
 - Dialout alarms
- Flowlink 5.1 software:
 - Data analysis
 - Diagnostics
 - Graphs/ tables
 - Editing

Then, the team had to find a way to firmly attaching the sampler to the buoy while being able to obtain samples easily. Their solution was to deploy the buoy with a small platform for the sampler to sit on. Two bars held the sampler in place and provided holes for padlocking the sampler to the buoy to prevent it from being stolen since vandalism was a concern.

With the sampler being afloat in the lake with no nearby power source, one needed to be created. Power was delivered by a separate marine battery in the hull of the buoy and recharged by solar panels. Since the sampler works efficiently when collecting samples, a single, rechargeable battery could be used. The team used the eyelets on the sampler to securing solar panels on each side of the buoy so one panel was facing the equator at all times.

Aquatic Achievements

According to Miller, the sampler and buoy were a perfect pairing for this study. Even though the buoy wobbled back and forth in strong waves, samples remained in their bottles. The sequenced program took enough samples so the team could get an adequate amount of samples per day for their project, but only visit the buoy once per week to retrieve samples. This time frame was necessary because there are not that many days in each week where wind and wave conditions are conducive for boating out to the buoy.

“We are not aware of other products that would have worked as well as the 6712 portable sampler. As mentioned, power, sample volume, and sample integrity were all perfect,” Miller said.



Sampler on buoy with solar panels