AWRI Lake Restoration and Project Clarity Photography

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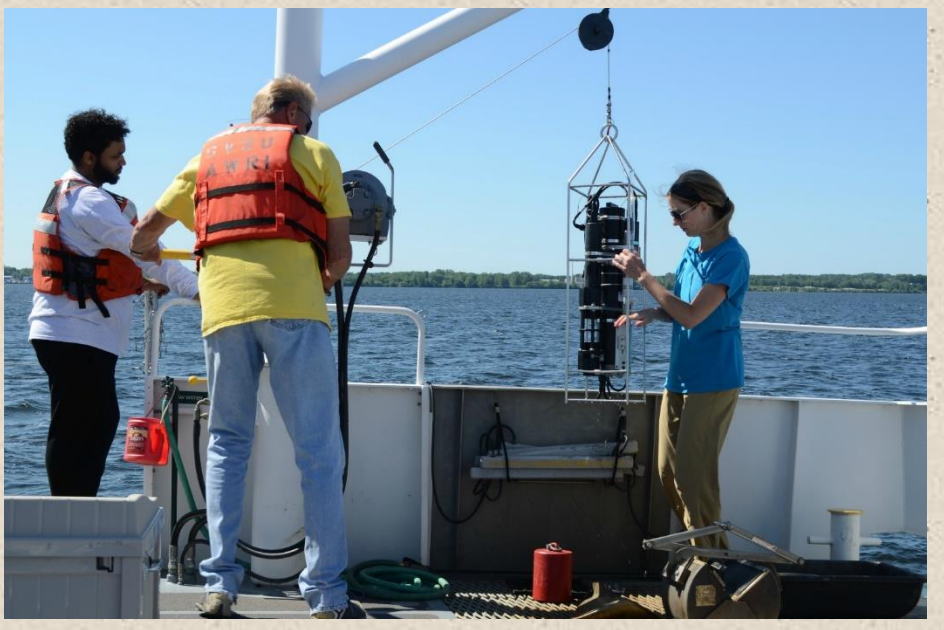

Figure 1: Vertical profiles of water quality, including measurements of dissolved oxygen, temperature, conductivity, and turbidity, are one of the ways that the Muskegon Lake long-term monitoring program tracks the lake's health.

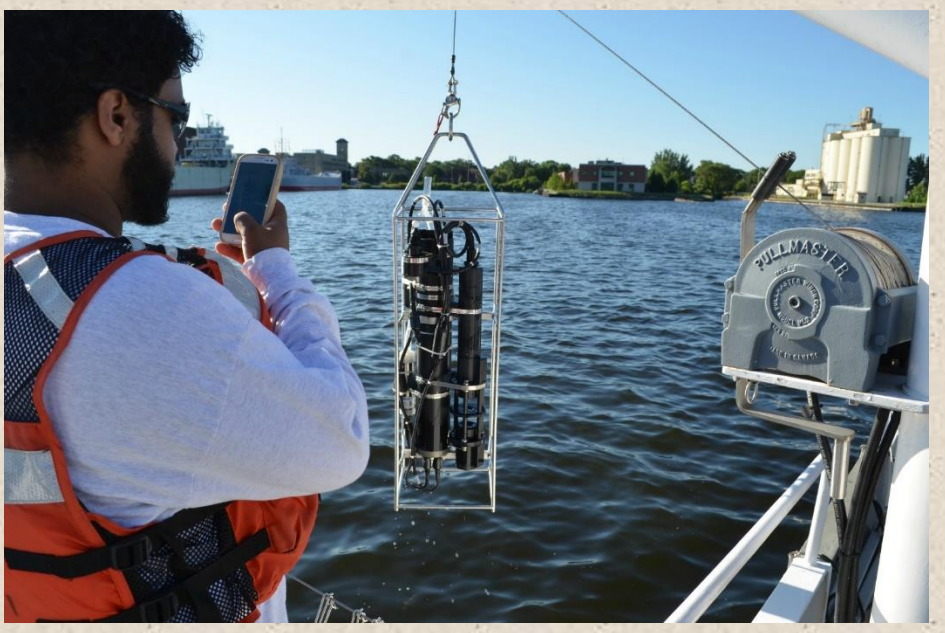

Figure 2: Sophisticated sensors are lowered through Muskegon Lake's water column to record water quality information that is used to characterize the lake's status.

Figure 3: Water samples are collected from the surface and bottom of Muskegon Lake to measure nutrients and algae.

Figure 4: A specialized water collection bottle, called a Van Dorn sampler, is used to collect water from specific depths in Muskegon Lake.

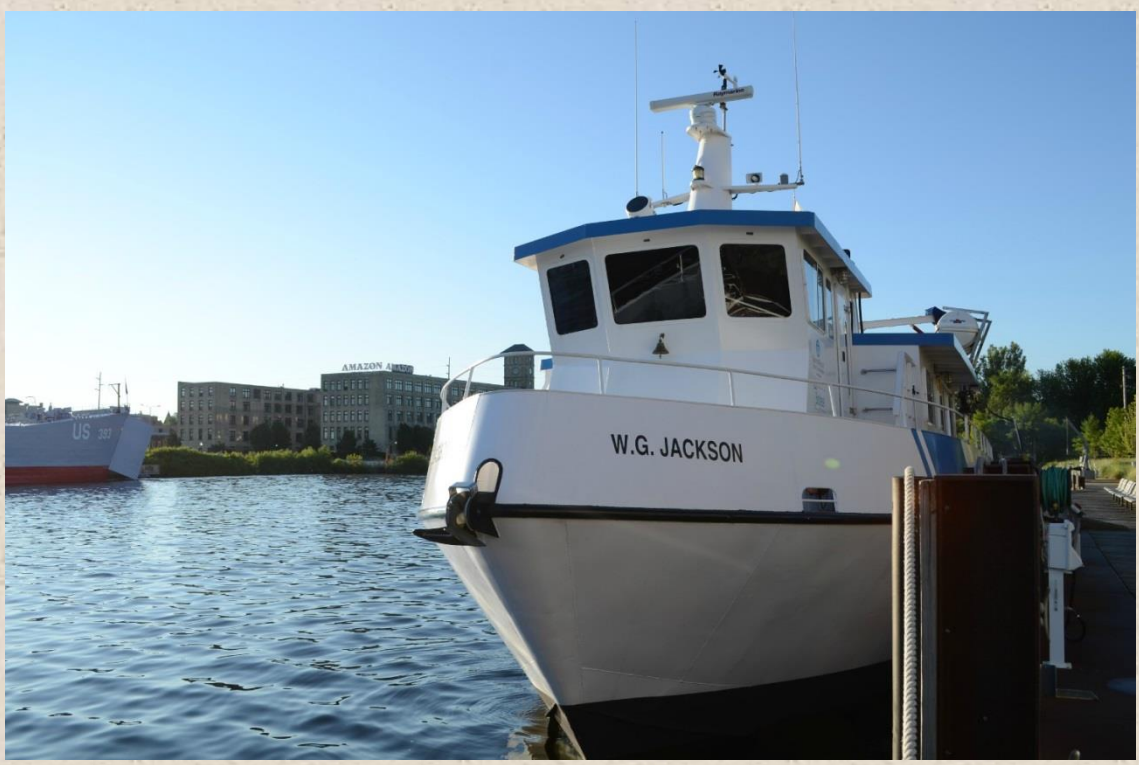

Figure 5: AWRI operates two research vessels in support of its Education and Outreach program and research efforts. Sample collection for the Muskegon Lake long-term monitoring program takes place from the *W.G. Jackson*, pictured here.

Figure 6: Grand Valley State University's Annis Water Resources Institute (AWRI) is located on the shore of Muskegon Lake, near Lake Michigan's eastern edge. AWRI's campus consists of three buildings that feature state-of-the-art research laboratories and equipment, office spaces, meeting rooms and classrooms, and a fleet of small boats.

Figure 7: Part of AWRI's Project Clarity monitoring involves documenting the actual *clarity* of the water in the Macatawa River, which is the main source of water to Lake Macatawa. Turbidity sensors placed in the stream continuously measure turbidity levels.

Figure 8: Regular maintenance of the turbidity sensors ensures they will collect high quality data that can be related to restoration activities, helping to document their effectiveness.

Figure 9: Data gathered during year-round, monthly visits to key restoration areas within the Macatawa watershed are being used to track the effectiveness of efforts to clean up the water that flows into Lake Macatawa.

Figure 10: Agricultural best management practices (BMPs), such as this two stage ditch, are being monitored to assess their effectiveness in reducing sediment and nutrient inputs to Lake Macatawa. Here, a sediment core is being collected for analysis of phosphorus content.

Figure 11: Wetland restoration areas are being created within the Macatawa watershed to help reduce the flow of water to Lake Macatawa during rain events, thus keeping excessive sediment and nutrients on the land and out of the lake.

Figure 12: Nutrients and other key water quality parameters are measured upstream and downstream of the restoration areas during both dry and wet weather.