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Profiling Buoy

ARTHUR (Aquatic Resource for High-Frequency Underwater Research) is a profiling buoy that has been deployed on Lake Lacawac during the ice-free season since 2011. The profiling buoy collects data on a number of different water quality parameters using sensors that measure water temperature, dissolved oxygen, pH, water color, sediment run-off and algae in the lake, as well as many others. The sensors are lowered automatically by 1-m increments, where readings are taken down to a depth of 10 m (~30 ft). The buoy completes a full profile to the bottom of the lake every 6 hours. In addition, there is a weather station on top of the buoy collecting air temperature, wind speed, and rainfall data. The data are sent by way of a radio antenna to a computer on shore that then allows it to be displayed online.

Lake Lacawac is an ideal place to deploy a profiling buoy because of the long history of water quality data and the undisturbed nature of the lake. As one of a few lakes with a completely protected watershed, it allows scientists to examine climate change effects on water quality without the confounding factors of human influence. We are currently using data from the profiling buoy to monitor how climate change affects water temperature, clarity, and dissolved oxygen levels in Lake Lacawac. The increase of major storm events like hurricanes is having a dramatic impact on lake color with increasing amounts of sediment run-off entering the lake during heavy rain periods. Decreases in water clarity decrease the amount of light available, and significantly alter the suitable habitat for aquatic organisms, which can change the dynamics of the entire aquatic food web. These changes to the lake ecosystem will be important to document over time. As a recent member of the Global Lakes Ecological Observatory Network (GLEON), Lake Lacawac will become an important hub for cutting edge research and education.