

# EnvironmentalMONITOR

A quarterly newsletter with emphasis on environmental products and applications.

Summer 2010



## AQUATIC CLASSROOM

Students Learn the Future of Their Field on Acton Lake

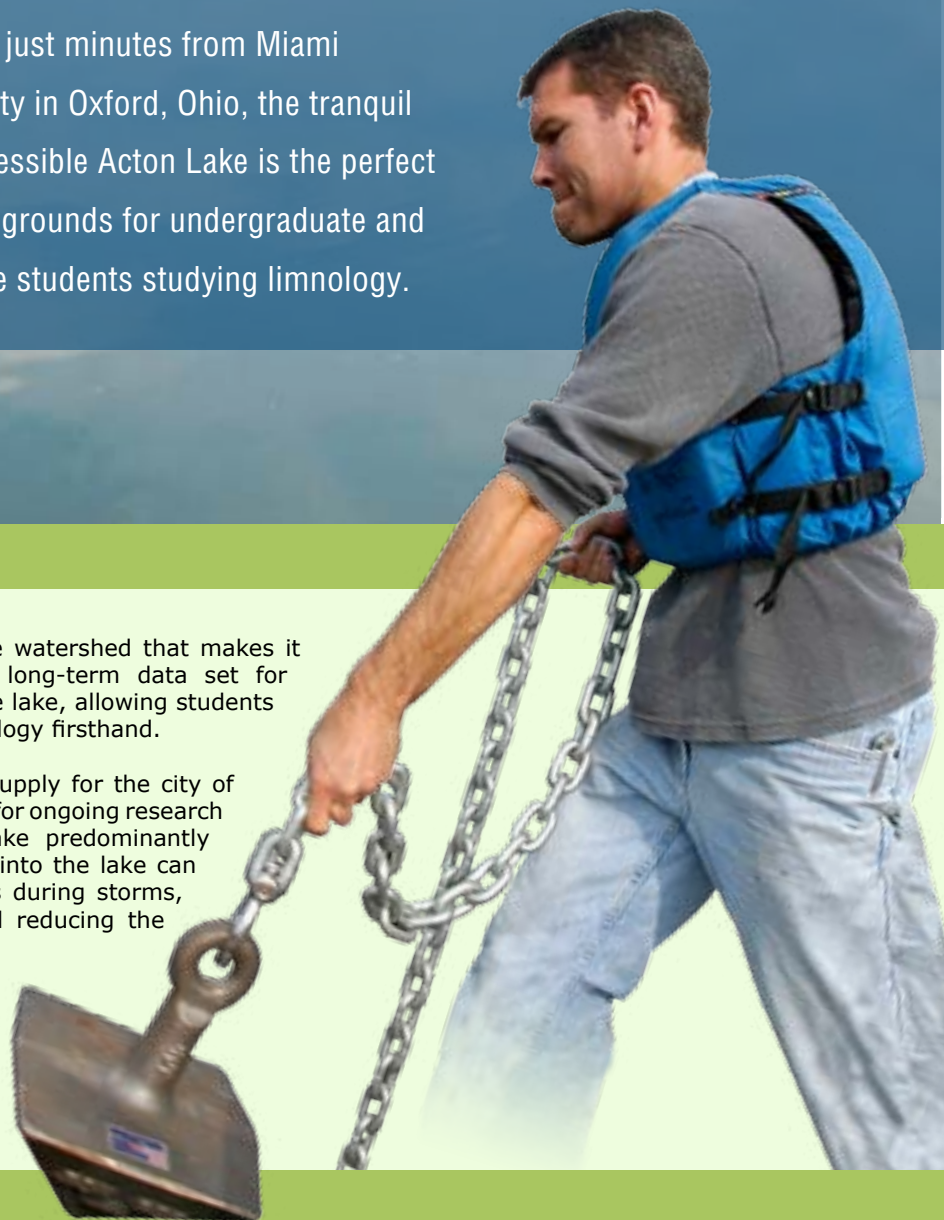
Located just minutes from Miami University in Oxford, Ohio, the tranquil and accessible Acton Lake is the perfect training grounds for undergraduate and graduate students studying limnology.

Not only is the site close to campus, it also has a large watershed that makes it responsive to environmental disturbances and has a long-term data set for reference. The university even has access to a boat in the lake, allowing students to take classes out on the water and learn about lake ecology firsthand.

The reservoir serves as the emergency drinking water supply for the city of Oxford, is a productive fisheries site, and has been the site for ongoing research for decades. Because the watershed around Acton Lake predominantly consists of agriculture, the streams and rivers that flow into the lake can bring in large concentrations of sediments and nutrients during storms, stimulating harmful algal blooms, hurting fisheries, and reducing the lake's water quality.

"With runoff, you get a lot of different effects," said Kevin Rose, a PhD candidate in Miami University's Department of Zoology.

• Continued on Page 2



## AQUATIC CLASSROOM: Continued



*Kevin Rose and Jeremy Mack, PhD candidates from Miami University, prepare to deploy a YSI multi-parameter sonde.*

"Agricultural runoff includes suspended solids from the tilling of the fields as well as a lot of fertilizer," he said. "In addition to the algal blooms that can be caused by the fertilizer, the increase in suspended solids will change the colors of the lake. Over time, it will also fill in the reservoir, making it necessary to dredge."

This spring, a research and monitoring buoy was purchased with a grant to Miami University and Kent State University to help students in the field, including Rose, study lake ecology as well as understand how landscape level processes and land use affect water quality. The system will also contribute to a long-term monitoring program. The grant was funded by the National Science Foundation, using stimulus money from the American Recovery and Reinvestment Act.

The platform delivers streaming real-time data, providing researchers and students with insight into the lake's physics, chemistry, and biology and how they interact.

A NexSens MB-300 buoy was selected for the application. Fondriest technicians accompanied Rose and two other graduate students this spring to deploy the buoy, which was placed at the deepest point in the lake (25 feet) near the dam and anchored with a two-point mooring system.

The buoy's center housing contains a NexSens SDL500 data logger with cellular telemetry. Sensors include a T-Node temperature string and a YSI 6600 V2-4 multi-parameter sonde with pH/ORP, conductivity, dissolved oxygen, optical chlorophyll, phycocyanin, and turbidity sensors.

The students also installed a meteorology station on shore near the buoy. The weather station allows researchers to respond to rain events that cause plumes of turbidity in the lake.

"When there's a plume, you can physically see the brown water moving through the lake," Rose said. "The rain sensor gives us a heads up, and we can then measure turbidity and nutrient levels in and around the plume."

The weather data, particularly wind speed, also helps researchers understand gas fluxes and carbon cycling in the water. Boaters can use the information, too, to see current conditions on the lake.

The buoy and weather station data loggers transmit information back to the university, allowing scientists and students to observe changes in water quality and weather parameters in real time.

This real-time data access means researchers can now conduct adaptive sampling. For example, when a recent toxic algal bloom occurred, the phycocyanin sensor detected it. Then, based on pre-determined settings, NexSens iChart software automatically text messaged researchers as the bloom grew. Thanks to this real-time notification, scientists were able to visit the lake to conduct more intensive research on what was occurring underwater.

Prior to installing the real-time system, the students collected data every two weeks from a sonde in the lake that logged sensor readings internally. The old setup made it almost impossible to get samples from such an algal bloom event, Rose said.

"The algal bloom toxin levels spike and drop rapidly. It's difficult to hit that peak," he said. "Unless you see that bloom in real time, you might not know it's even there."

The streaming data has even been made publicly available via the Internet, allowing people interested in visiting the lake and anyone else to see information about water temperature, weather, and water quality. Rose said this public access has fostered a greater public understanding about the lake.

"It facilitates a better form of outreach to the community about what happens around the lake and what that does to it," Rose said. "The data generated by the buoy provides people with a unique insight into what is happening underwater, and this better connects the science with the community."

The ongoing research and monitoring has stimulated new avenues of research for scientists and provided students with an invaluable learning tool.

Rose said working with the real-time monitoring system will also give him and the other graduate students the big picture on the future of their profession. The experience, he said, will teach them to utilize cyber infrastructure, effectively manage large data sets, and work with the sensors and technology that have become vital for field research.

"The whole field of ecology is moving to more sensor driven, more high frequency, more large scale network based science," Rose said. "This sort of training and research provides the opportunity to learn in an atmosphere that represents the future for ecology."

# Hach Releases 2100Q Portable Turbidimeter

The new Hach 2100Q Portable Turbidimeter is easy to use, accurate, and conforms to the Environmental Protection Agency's Method 180.1 for turbidity measurements. It also offers a number of features that streamline the measurement process, such as assisted calibration and simplified data transfer.

**Easy Calibration and Verification** — On-screen assisted calibration and verification helps ensure measurements are right every time. The easy-to-follow interface helps save time in the field by eliminating the need to reference complicated manuals in order to perform routine calibrations. Hach's single-standard "RapidCal" calibration offers a simplified solution for low-level measurements.

**Simple Data Transfer** — Data transfer with the 2100Q is simple, flexible, and doesn't involve additional software. This feature requires the USB + Power module. All data can be transferred to the module and easily downloaded to a computer with a USB connection, providing superior data integrity and availability. With two different module options, it's possible to customize connectivity and power to meet a project's specific needs.

**Accuracy for Rapidly Settling Samples** — The Hach 2100Q incorporates an innovative Rapidly Settling Turbidity (RST) mode to provide accurate, repeatable measurements for difficult-to-measure, rapidly settling samples. An exclusive algorithm that calculates turbidity based on a series of automatic readings eliminates redundant measurements and estimating.

**Convenient Data Logging** — As many as 500 measurements are automatically stored in the instrument for easy access and backup. Stored information includes: date and time, operator ID, reading mode, sample ID, sample number, units, calibration time, calibration status, error messages, and the result.



## FEATURES

- Meets EPA Method 180.1
- Range: 0-1,000 NTU
- Resolution: 0.01 on lowest range
- Two-detector optical system
- On-screen, assisted operation
- Verify calibration function
- "RapidCal" single standard calibration
- Rapidly Setting Turbidity mode

# Ohio Division of Wildlife Studies Lake Erie Walleye Hatch

Lake Erie is described by many as the “walleye capital of the world,” but populations of the fish might be dwindling in the area.

That’s a big deal for Great Lakes fishermen, who are a part of the region’s multibillion-dollar commercial and recreational fishing industry that relies heavily on the walleye.

The last major walleye hatch in Lake Erie occurred in 2003. Hatch sizes since then have been, at best, below average. It’s unprecedented for a six-year period of substandard spawning; worse yet, many worry that walleye population in the lake has been on the decline since long before 2003.

There’s little doubt the issue stems from this inconsistent recruitment, which is the number of walleye added to the population from natural reproduction. But deciphering the intricate web of physical and chemical interactions that facilitate or hinder a good hatch is where it gets complicated.

Lake Erie’s nutrient cycles are certainly an important factor in walleye growth, and their timing is critical to producing the right type and amount of edible algae and zooplankton at the time the young walleye larvae need to feed on their own. Shifts in these cycles might be interfering with walleye reproductive success. Phosphorus and nitrogen feed excessive

algal blooms, and an increasing amount of it is inedible toxic blue-green algae.

The ODNR’s Division of Wildlife Sandusky Fish Research Unit is exploring another angle — how walleye spawns are affected by lake currents. Aiding in the study is a newly deployed current-tracking data buoy, positioned proximate to the lake’s reefs where walleye breed.

The investigation, part of a multiagency project, will further examine findings from research by Michael Jones at Michigan State University’s Department of Fisheries and Wildlife.

Jones’ research, which uses wind velocities over the lake to approximate lake currents, indicates that the success of a hatch seems to correspond with whether current is pushing toward or away from shore. This is largely because distance to shore dictates how warm the waters are, and temperature affects incubation and larvae growth, explains Fisheries Biologist Travis Hartman from the Sandusky Fish Research Unit.

“If you have an inshore current flow, the larvae end up in near-shore areas,” Hartman said. “These nursery areas are warmer and more hospitable to the young larvae, which potentially results in a larger hatch.”



*A research buoy marks a water monitoring site in Lake Erie.*



*Fisheries Biologist Travis Hartman works with a NexSens field engineer to mount an acoustic Doppler current meter.*

If current has an offshore flow, on the other hand, the larvae tend to settle in cooler, less productive areas closer to the center of the western basin. These locations are less accommodating to emerging fry and support smaller hatches.

NexSens Technology was selected to assist in the design and configuration of the monitoring system for the study.

The system utilizes an acoustic Doppler current meter that tracks water velocity in 3D. The current meter is mounted to an instrument sled at the lake's bottom. Also attached to the sled is a multi-parameter water quality sonde with sensors for measuring temperature, conductivity, and dissolved oxygen, which Hartman said are all factors that can affect a hatch.

"We need to know more about warming rates, oxygen levels, and prevailing currents during the hatch," Hartman said.

Cables connect the sonde and current meter to a NexSens submersible data logger that is mounted to the surface buoy. ODNR biologists periodically visit the site to offload data from the data logger. Future plans include implementing real-time cellular telemetry that will allow for review of the latest data without making a trip to the buoy.

The data buoy and attached lake-bottom sled are located west of Put-in-Bay and between the Niagara and Crib reefs. Walleye breed on the reefs, which are shallow areas composed of rock and substrate where the eggs can be safely nestled, Hartman said.

Although there are more than 10 named reefs in Lake Erie, Hartman noted that they are mostly all connected to each other. Keeping these sensors at the lake bottom within this field of reefs is important for representative data.

"We wanted to measure the water quality closer to the bottom of the lake," he said. "Those are the conditions most similar to what the eggs are experiencing."

The main lake reefs aren't the only site of walleye spawns that contribute to the population, Hartman said, but they are probably the largest — the other sites being the Maumee River, Sandusky River, and Sandusky Bay stocks.

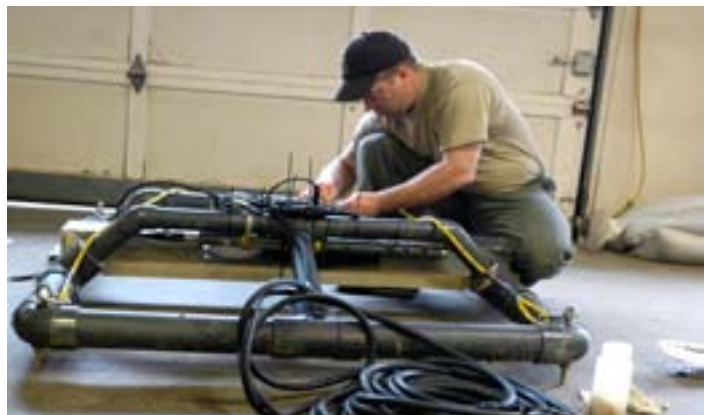
The size of these spawns is primarily estimated by trawling the lake. August trawling generates initial estimates of the yearly hatch strength of walleye and other Lake Erie fish species, Hartman said, adding that there are about 80 trawl sites in Erie's western basin.

The process involves pulling a large net across a measured distance of water. The total area netted is then calculated from the distance, and this is used in conjunction with how many walleye were caught in that area to estimate the year class strength.

Understanding what affects these year classes is particularly difficult in Lake Erie considering how rapidly the lake has been changing over the last several decades. In addition to nutrients entering the lake, a multitude of new invasive species such as zebra mussel and round goby are rapidly shifting the lake's ecology and making it even more difficult to understand walleye hatches.

Though daunting, the research Hartman and others at the ODNR are conducting could pave the way to a more sophisticated model of walleye reproduction in the lake and solve the mystery as to why there hasn't been a great hatch in nearly a decade.

"Obviously we can't control the hatch size," Hartman said. "But we're at least trying to figure out how to better predict what is happening."



*Hartman readies the lake-bottom instrument sled for deployment.*

# Exploring Lakes at the Extremes

Lakes can be big or small, pristine or foul, and, in rare cases, even deadly. Here are some interesting facts about lakes at the extremes, courtesy of the staff at LakeScientist.com.

## EXPLODING LAKES

A tragic phenomenon occurred in Cameroon in the mid 1980s, where lakes seemed to be mysteriously killing people. The first event happened in 1984, when 37 people near Lake Monoun died suddenly.

The second event, however, was much more deadly. In August 1986, Lake Nyos released a cloud of carbon dioxide (CO<sub>2</sub>) that hugged the ground and flowed down surrounding valleys to suffocate thousands of local villagers and animals.

Overall, more than 1,700 people were killed as far as 26 km away from the lake. A third lake, Lake Kivu, on the Congo-Rwanda border in Central Africa, is also known to act as a reservoir of carbon dioxide and methane. These three lakes contain extremely high concentrations of CO<sub>2</sub> in their depths and can be lethal to the thousands of people who live around them. If Lake Kivu were to explode, more than two million people who live around it would be in danger.

The science behind the buildup of CO<sub>2</sub> is relatively simple. These deep lakes occur near a dormant volcano. The real danger is generated by subsurface magma about 50 miles below the lakes. The magma releases the CO<sub>2</sub> and other gases, which travel upward through the Earth.

The CO<sub>2</sub>, instead of being released harmlessly into the atmosphere, collects in the cold water at the bottom of the lake. The amount of gas that can be dissolved in the water is dependent on water temperature and pressure. The greater the pressure and colder the water, the more gas can be trapped.

None of this would be particularly hazardous if the water at the bottom of the lake were to rise regularly to the surface, where the gas could be released safely. The problem is that the waters of these lakes, like many tropical lakes, are usually quite still with little annual mixing of the water layers.

Over time, the lowest levels of the lakes become supersaturated with CO<sub>2</sub>. This gas can quickly escape if the lake is disturbed by a landslide, earthquake, violent storm, or other disturbance. The sudden release of CO<sub>2</sub> can be fatal. CO<sub>2</sub> is heavier than air, and when it was released in previous explosions it poured over the rim of the crater and down into the surrounding low-lying valleys.

Although CO<sub>2</sub> normally makes up 0.03% of the atmosphere, concentrations of more than 10% can be fatal. The unfortunate villagers around Lake Nyos literally suffocated under the heavy poisonous cloud of CO<sub>2</sub> gas.

Unfortunately, this problem does not yet have a solution. Scientists have installed pipes to degas the high CO<sub>2</sub> concentrations soon after the disaster, but according to recent reports, the lake now contains twice as much carbon dioxide as was released during the explosion. Earlier attempts to siphon off the gas had to be abandoned for financial reasons.

## MOST POLLUTED LAKE

Lake Karachay, a small lake in the southern Ural Mountains in western Russia, is thought to be the most polluted spot on Earth. Starting in 1951, the Soviet Union used Karachay as a dumping site for radioactive waste from Mayak, a nearby nuclear waste storage and reprocessing facility located near the town of Ozyorsk. By some estimates, the lake has accumulated roughly 4.44 exabecquerels (EBq) of radioactivity. By comparison, the Chernobyl disaster released 5 to 12 EBq of radioactivity, although this was spread over a much larger area.

# LAKE SCIENTIST

Your online source for lake science and technology



## DISAPPEARING LAKES

Many lakes around the world are disappearing as water usage increases and input rivers and streams are diverted for agriculture and municipal water supply. Further, climate change is also reducing water levels in many lakes due to changes in precipitation patterns. Lake Chad, located in North Africa, is a sad but noteworthy example of this because its inflow rivers have been increasingly diverted for human use over the last several decades and less precipitation has fallen. Ironically, the name Chad is a local word meaning "large expanse of water."

According to the United Nations, Lake Chad shrank by as much as 95 percent since 1963. Lake Chad is economically important, providing water to more than 20 million people living in Chad, Cameroon, Niger, and Nigeria.

## OTHER UNIQUE LAKES

Laguna Colorada, a shallow saltwater lake in Bolivia, is renowned for its red color and white islands. What makes this lake so striking is the contrast between the red microorganisms growing in the lake and the white borax and salt deposits in and around it.

The Plitvice Lakes are a series of 16 lakes connected by waterfalls. The lakes are located inside Plitvice National Park, Croatia near the border of Bosnia and Herzegovina. These lakes span a distance of more than five miles (8 km) and come in various shades of azure, green, and blue. The lakes also cross a large elevation gradient, with the highest lake at about 4,000 feet (1,280m) and the lowest at about 1,200 feet (380m). The lakes were formed by natural precipitation of carbonate minerals from ground and surface waters, called travertine and are extremely rare.



*The Plitvice Lakes are a series of 16 lakes connected by waterfalls.*

Lake Victoria, bordered by Kenya, Uganda, and Tanzania, is the largest tropical lake in the world. As recently as the mid-1950s, Lake Victoria had more than 500 species of cichlids in its waters. The number of cichlids and other measures of biodiversity has rapidly dropped in recent decades due to the introduction of invasive species such as the Nile Perch and increasing human disturbance that alters water quality and transparency of the lake.

This information is excerpted from "Extreme Lakes" at LakeScientist.com. Visit the site to learn more in the "Learn about Lakes" section. Lake Scientist provides an interactive community resource focused on lakes and other freshwaters for the benefit of the scientific community, the education community, and all others interested in the subject.



**LAKE SCIENTIST** is a partnership between Fondriest Environmental, Miami University, and Kent State University. Our mission is to provide an interactive community resource focused on lakes and other freshwaters for all who are interested in the subject.



To access our rich repository of in-depth information about lake science, as well as the latest news on freshwater resources, visit us at:

 [lakescientist.com](http://lakescientist.com)

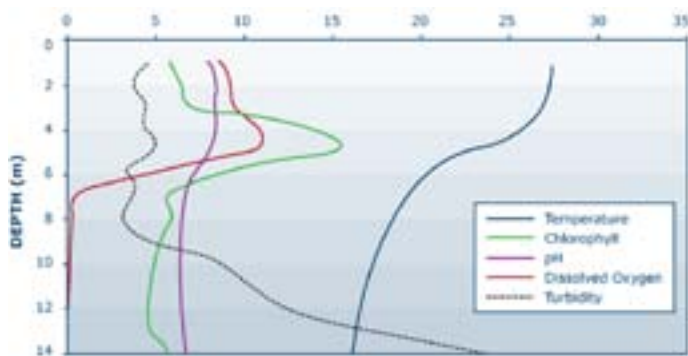
# Buoy-Based Water Quality Profiling Takes a Look Below the Surface

Buoy-based water profiling systems with real-time telemetry can provide streaming data on important water quality parameters all day, every day.

This information helps managers, agencies, and universities care for and understand the world's precious freshwater resources. Most buoys, however, have sensors located primarily in the surface waters — the epilimnion — of lakes, usually with only a temperature string taking measurements deeper in the water.

Often the data from such setups can only provide insight that's surface deep. A number of water parameters fluctuate along the water column, and the only way to gather an accurate picture of a water body's quality is to measure at various depths.

What happens deeper in the water column and why, and what does this mean for lake science?



Measurements made from a YSI profiling buoy on a Midwestern reservoir show that many parameters change significantly throughout the water column. Let's take a closer look at how those parameters vary.

**Temperature:** Surface water temperatures are usually close to uniform over the first several meters due to wind-driven mixing. In the case of this reservoir, the temperature is near-constant over the uppermost three meters and decreases quickly deeper in the reservoir. The temperature near the bottom of the lake remains cold and changes much more slowly than surface temperatures. Because temperature is one of the most important measurements made on a lake, a temperature string that measures at various depths along the water column is one of the most common and important tools used in water profiling. (Units: °C)

**Chlorophyll:** Chlorophyll is an indicator of algae. Often there is a below-surface peak in chlorophyll levels (termed a deep chlorophyll maximum) that depends on a lake's transparency and nutrient levels. A rule of thumb is that the chlorophyll peak occurs at about the 1% light level. Because of this, the chlorophyll peak helps to estimate transparency. In the case of this reservoir, the chlorophyll peak occurs at about five meters. Chlorophyll can also regulate the pH and dissolved oxygen (DO) of a lake, and algal productivity increases pH and DO. (Units: ug/L)

**pH:** pH can change throughout the water column depending on the physical, chemical, and biological processes in a lake. For example, algal photosynthesis increases the pH; thus, pH can vary from day to night and from summer to winter. Since algal photosynthesis occurs more in surface waters, pH can also fluctuate near the surface. Note how, in the reservoir depicted in the graph, pH is higher near the surface, where chlorophyll is higher. pH can also become lower deeper in the water column especially when lower oxygen conditions, called anoxia, develop.

**Dissolved Oxygen:** Water's DO concentration depends on water temperature and the balance between algal photosynthesis and respiration. Oxygen is less soluble at higher temperatures. Moreover, photosynthesis produces oxygen, meaning dissolved oxygen can be extremely high when algae are abundant. Note how in the example reservoir, the peak in dissolved oxygen occurs at about the same depth as the chlorophyll peak. Lower in the water column, there isn't enough light to support photosynthesis. Here, respiration consumes oxygen, and anoxic conditions can develop. Anoxia is harmful to aquatic organisms, such as fish that will struggle to breathe in such conditions. (Units: mg/L)

**Turbidity:** Turbidity is a measure of the light-scattering properties of particles in the water — in other words, the water's cloudiness. Particles can range from dust and dirt from nearby roads to algae and materials from vegetation in the land around a lake. Because variation in particulate size, shape, and distribution affect turbidity readings, its measurement is site- and depth-specific depending on local geology, soil conditions, land use, and river inputs. Therefore, it is difficult to make predictions about turbidity throughout the water column based on surface sensor measurements. (Units: NTU).

Glacial lakes are a classic and beautiful example of how turbidity affects lakes. Glacial lakes usually have extremely high turbidity because glaciers grind against rocks to release fine sediments, called glacial flour, into downstream lakes. The underlying geology and soils determine the size, shape, and distribution of particles, and this creates the many beautiful colors seen in glacial lakes.

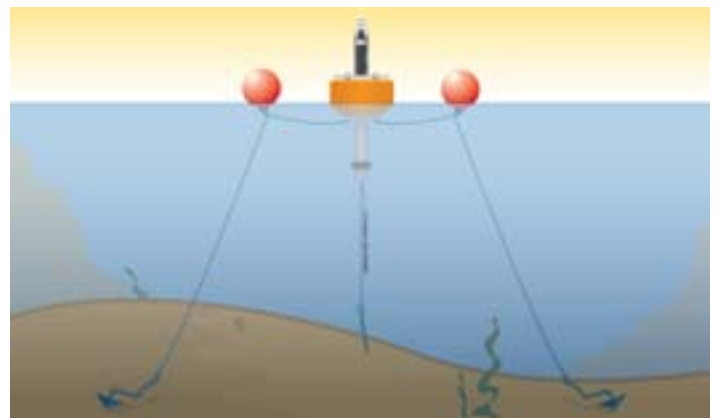


Illustration of a NexSens MB-300 with a two-point mooring configuration.



# REAL-TIME DATA: From the Field to Your Desktop

Environmental monitoring technology from NexSens can transmit real-time data from almost anywhere on Earth. Remote communication with sensors allows users to gather data as if they were on-site, but from the comfort of their office.

NexSens data loggers with real-time telemetry can connect to virtually any sensor via analog and digital interfaces. Specifically designed for remote environmental monitoring applications, they offer superior data acquisition performance in even extreme conditions.

Moreover, with telemetry options including radio, cellular, Ethernet, WiFi, and satellite, there's a solution for nearly every application and every price range. See below for a breakdown of telemetry options.

This versatility makes NexSens data loggers suitable for a wide range of remote monitoring application needs, from a nearby stream gauge station to a remote lake water quality monitoring buoy.

To discuss real-time telemetry solutions, call a Fondriest Environmental application engineer at [888.426.2151](tel:888.426.2151) or email [customercare@fondriest.com](mailto:customercare@fondriest.com).

## Telemetry Options

### RADIO

When the project computer can be located within a few miles (line-of-sight) or few hundred feet (non-line-of-sight), license-free, spread-spectrum radio telemetry is often the best choice. A radio telemetry data logger wirelessly communicates with a radio base station, which usually plugs directly into a project computer and serves as a central hub for one or more remote data loggers.

### CELLULAR

Cellular telemetry requires the additional cost of a cellular data plan, but it offers greater geographic flexibility. With this method, data transmissions from almost anywhere in the U.S. are possible. A cellular data logger does not need to be in proximity to a base station; instead, its data is accessible, with appropriate credentials, over the Internet. NexSens data loggers can use cellular data plans from many U.S. providers, such as AT&T, Verizon, or Sprint Nextel.

### ETHERNET/WIFI

If sites have access to Ethernet ports or are in a WiFi network's range, Ethernet and WiFi telemetry are ideal choices. With these options, the data logger is available directly on the local network. A landline connection is also available, but it does not provide real-time results as a computer must dial the data logger periodically for updates.

### SATELLITE

Lastly, for the remotest applications — where cellular telemetry is unfeasible — satellite telemetry may be required. Data loggers with this option communicate with Iridium satellites, allowing them to transmit data from anywhere on Earth.



*HydroMet station with  
cellular telemetry*

# Monitoring the Nation's Rivers



*Whitewater on  
The Potomac River*

## POTOMAC RIVER BASIN

Terrorism events of the last decade have forced security officials to reconsider how to protect the nation's infrastructure from sabotage, one of the key areas of concern being drinking water supplies. Of course, drinking water is not only vulnerable to terrorist attacks, but natural and unintentional contamination as well.

Homeland Security, the National Infrastructure Protection Plan, and the Bioterrorism Preparedness and Response Act of 2002 all identify water as a critical infrastructure that requires protection.

The urgency to defend this basic resource is perhaps greatest for the water that serves the nation's capitol.

The Potomac River basin provides drinking water for millions in the Washington, DC area, including the water for the White House, Pentagon, Capitol Building, and the memorials and Smithsonian museums that surround the National Mall.

In order to protect this population from hazards in the water, the Metro Washington Council of Governments has implemented an extraordinarily sophisticated early warning system. The detection network includes real-time monitoring stations at several water intakes, treatment plants, high population areas, and critical buildings in the capital region.

NexSens Technology was consulted to provide a data logging and real-time telemetry solution for the network. Each of the 16 monitoring stations include a NexSens Ethernet data logger that continuously streams water quality data.

The system utilizes both chemical and aquatic bio-monitoring technology that can detect a wide spectrum of toxins and chemicals in the water.

The bio-monitoring systems involve assessing the level of stress in fish exposed to the source water. They measure electrical signals emitted from the fish to see if their ventilation or behavior indicates they're reacting to a contaminant.

Thanks to these advanced monitoring systems and NexSens data logging technology, DC officials will be able to respond quickly to a drinking water crisis.

## DETROIT AND ST CLAIR RIVERS

On Super Bowl Sunday in 2004, about 42,000 gallons of two toxic solvents — methyl ethyl ketone and methyl isobutyl ketone — gushed into the St. Clair River, forcing the closure of intakes for water plants serving tens of thousands of people in the Detroit area.

Although this may have been the worst, it hasn't been the only major spill to hit the St. Clair. Both the Detroit and St. Clair Rivers have been under increased scrutiny in recent years because of these spills, which has prompted the implementation of an early warning system intended to immediately recognize river contaminants and identify the origin.

NexSens Technology was chosen to provide data logging equipment, software, and web datacenter service at 13 water treatment intakes along the two rivers.

The real-time data allows water utility, local, county, and state personnel to monitor the river water quality and receive notifications of spills or contaminants that may enter the rivers.

At the 13 water treatment facilities, NexSens data loggers collect measurements from several water quality sensing instruments, including YSI 6600 V2 multi-parameter sondes, Turner Fluorometers, Inficon Hapsite GC/MS, and Hach TOC analyzers.

NexSens iChart software serves as the centralized project database for data received from these instruments, and each parameter will have an alarm notification to alert officials of a possible contamination.

The project also uses NexSens' WQData Web datacenter service to provide a real-time interface for viewing river water data at each treatment facility and other project offices.

The Internet-based, password-protected datacenter allows officials to view data in tables, statistical summaries, and graphs. Moreover, a built-in website forum facilitates communication and information.

## SUSQUEHANNA RIVER BASIN

Drilling for natural gas in the Marcellus shale formation poses a significant threat to the Susquehanna River basin. The shale's sedimentary rock holds sizable natural gas reserves, and a recent boom in drilling has endangered local water quality.

A monitoring system for the Susquehanna River itself is already in place, but a more comprehensive network was called for after much scrutiny of the water affected by the drilling.

The Susquehanna River Basin Commission (SRBC) is installing 30 remote water quality monitoring stations in the northwestern part of the Susquehanna basin, including the border between Pennsylvania and New York. These stations form a network that will broadcast real-time water quality data from local rivers and streams.

NexSens Technology is providing the data logging and remote telemetry systems. Each water quality station includes a NexSens data logger with built-in cellular modem.

The water quality data collected includes water temperature, level, pH, conductivity, dissolved oxygen, and turbidity measurements. It may be viewed by officials, scientists, and the public to keep tabs on their local rivers and streams for threat of natural gas pollution as well as any other irregularities in the water.

## OHIO RIVER

The Ohio River Valley Water Sanitation Commission (ORSANCO) is upgrading its Organics Detection System (ODS) with a new communication network and data management system.

The commission is working with NexSens to replace existing ODS sites using 56K telephone modems with high-speed Ethernet and cellular telemetry data loggers at 13 locations along the Ohio River in addition to a site at the ORSANCO headquarters.

The new system will provide automated detection notifications, a water quality data website, and automated data screening using NexSens iChart software.

iChart provides alarm notifications and can automatically post data to the WQData Web-based datacenter. WQData features multilevel password protection, a public portal, near real-time data presentation, narrative postings, active data sourcing, and a project information sharing forum.

The Organics Detection System was established in 1978 to detect the presence of volatile organic compounds in the Ohio River valley basin. Since then, the system has detected volatile contaminants from numerous unreported spills and releases. These detections are reported by station operators to downstream utilities, state, and federal agencies.

## NATIONWIDE EVENTS

### July 18-20

2010 Tennessee Water Professionals Conference: Nashville Convention Center in Nashville, TN

### July 18-21

2010 SWCS Annual Conference: Hilton at the Ballpark in St. Louis, MO

### August 10-11

MI-AWWA and MWE Joint Conference: Soaring Eagle Resort & Conference Center in Mt. Pleasant, MI

### August 10-12

Ohio Statewide Floodplain Management Conference: Doubletree Hotel Columbus

### September 12-15

Distribution Systems Symposium & Exposition 2010: Gaylord Opryland Hotel & Convention Center in Nashville, TN

### September 12-15

25th Annual WasteRefuse Symposium: Omni Shoreham Hotel in Washington, DC

### October 2-6

WEFTEC 2010 (83rd Annual): New Orleans Memorial Convention Center in New Orleans, LA

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**Mixed Sources**

Product group from well-managed  
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# EnvironmentalMONITOR

A quarterly newsletter with emphasis on environmental products and applications.

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