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EnvironmentalMONITOR

A quarterly newsletter with emphasis on environmental products and applications. **Summer 2009**

OHIO Researcher Explores Dam Removal

Located in Southwest Ohio, Buck Creek and its tributary, Beaver Creek, run through a series of low-head dams in Springfield, Ohio.

Historically, the four dams diverted water and protected the surrounding utilities along a continuous seven mile stretch. Now, the Springfield Conservancy District is exploring stream restoration efforts that include modification or removal of the four dams. This will help restore the natural flow of sediments and fish along the entire river and provide a healthier ecosystem for Buck Creek.

What's Inside

Many precautions have been taken to observe and address concerns such as flood hazards, wetland soils, endangered species, historic properties and sites, combined sewer overflows, and stream integrity. Dr. John Ritter, Professor of Geology from nearby Wittenberg University, has been studying the project's effects on Buck Creek's ecosystem.

Fondriest Environmental recently worked with Professor Ritter to setup research tools such as a rooftop weather station, stream gauge station, and two water quality monitoring stations to help automate sampling efforts.

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This special assembly houses a SDL500 Data Logger and protects against vandalism.

OHIO RESEARCHER EXPLORES DAM REMOVAL

Partnering with Fondriest Environmental to to create a healthier ecosystem for the Buck Creek area.

Continued from Cover

The research tools implemented at Buck Creek will allow the Springfield Conservancy District and researchers at Wittenberg to monitor weather and water quality data as it occurs, helping to facilitate a safe dam removal and successful stream restoration.

The two water quality stations are located upstream and downstream of the reach with the low-head dams in order to assess the impact of changes to them on water quality. Each station is outfitted with a YSI 6920 V2-2 multi-parameter sonde that measures temperature, conductivity, pH, dissolved oxygen, and turbidity. The downstream site, connected to a bridge, uses spread spectrum radio telemetry to send data back to the University. Upstream, the remote water quality station was outside of radio telemetry range; therefore, this system was outfitted with a built-in cellular modem to transmit data over the Verizon cellular network.

The stream gauge station is housed at a gage house formerly managed by the U.S. Geological Survey. The gauge station employs a NexSens AccuStage vented water level sensor. The sensor is fixed in a stilling well below the minimum expected water level, and a cable containing the sensor signals and vent tube runs from the sensor to a 4100-iSIC radio telemetry data logger.

Located on the roof of the Wittenberg lab building is a multi-parameter weather station. The weather station is multi-functional; it collects weather data locally from a multi-parameter weather sensor, and it also serves as radio signal repeater from the remote sites into the Wittenberg lab. The Vaisala model WXT520 is a unique multi-parameter weather sensor that simultaneously measures wind speed and direction, liquid precipitation, barometric pressure, temperature, and relative humidity.

The remote monitoring sites integrate with one another to form a reliable network for streaming environmental data into Wittenberg's Barbara Deer Kuss Science Center. In the Geology lab, NexSens iChart Software serves as the centralized database and control center for the remote network. iChart Software is also set to automatically relay incoming data to a NexSens WQData website. WQData is a secure web datacenter hosted by NexSens Technology that provides an online interface for viewing environmental data. It offers 24/7 instant access to project data. This web-based interface allows researchers at Wittenberg and other interested parties to view current and past conditions of Buck Creek from any internet browser.

Complete story: www.nexsens.com

For more information on Remote Environmental Monitoring Systems, call 888-426-2151 or visit www.nexsens.com.

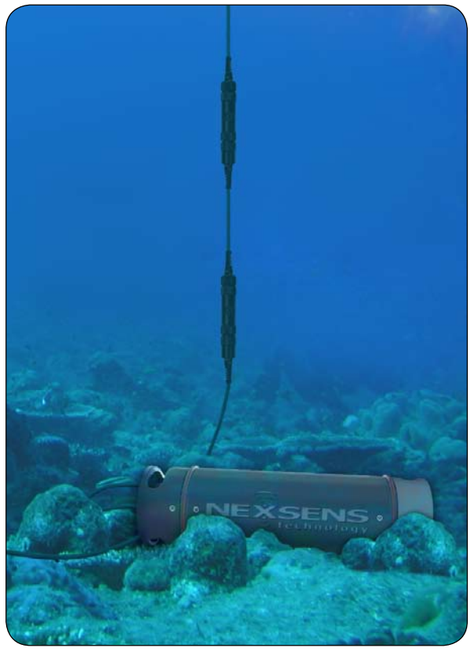
Technician wiring a bridge-mounted sonde junction box.

"Fondriest Environmental has been extremely responsive to our needs. From the initial design of the monitoring to actual setup, they offered advice, creative solutions, and timely support to the project. The upstream site, with both banks in bedrock, is unique in their experience. The design they developed for anchoring the water quality sonde is stable and secure and does not detract from the natural setting."

Dr. John Ritter

EnvironmentalMONITOR Summer 2009

SDL500: Submersible Data Logger



Bottom-deploy temperature strings, water quality sensors, underwater PAR sensors, and more!

The SDL500 Submersible Data Logger is a rugged, self-powered remote data logging system for deploying environmental sensors in streams, rivers, wetlands, coastal waters, sewers, and culverts without fear of accidental flooding. The system is configured with five sensor ports for connection to industry-standard digital and analog interfaces including RS-485, SDI-12, 1-wire temp string, 0-2.5 VDC, pulse count, and more. Each sensor port offers a UW receptacle with double O-ring seal for a reliable waterproof connection. Unlike many data loggers, the SDL500 is truly submersible. The housing and battery compartment are completely sealed and waterproof.

When it comes to field ruggedness, the NexSens SDL500 is in a class of its own. The housing is constructed of impact-resistant PVC and includes two elastomer bumpers for long-term deployment in close-fitting pipes and buoy ports. Internal circuit boards and communication modules are shock mounted and all access ports incorporate redundant sealing. The SDL500 withstands extreme wave action, drops, floods, periodic & long-term deployment underwater, and more. The optional radio and cellular antennas are also waterproof.

The SDL500 can be powered autonomously by eight D-cell alkaline batteries. Optional solar power kits provide long-term continuous operation and solar charging. The data logger incorporates the same analog and digital interfaces as the popular NexSens iSIC data loggers. There are a wide variety of common sensor connections, and user-supplied sensor cable assemblies can also be connectorized and tested at the factory for SDL500 integration. With this sensor interface versatility, the measurement possibilities are endless.

YSI PROFESSIONAL PLUS METER
with Quatro Cable Assembly

Quatro Cable
The YSI Professional Plus water quality meter with Quatro 4-Port Cable Assembly allows users to conveniently sample a full suite of parameters in the field. Users can simultaneously measure temperature, conductivity, specific conductance, salinity, resistivity, total dissolved solids (TDS), dissolved oxygen, and any 2 Ion Selective Electrode (ISE) sensor parameters: pH, ORP, ammonium, nitrate, or chloride.

Professional Plus
The YSI Professional Plus display features an internal barometer for dissolved oxygen calibrations, internal data logging for up to 2000 data-sets, password protection, backlit display & keypad, and direct USB interface with software for uploading data, configuring the instrument, and conducting real-time studies.

Connect any Pro Series cable and probe option to the instrument and use the convenient cable management kit to keep everything simple and organized. Cable options range from 1m, 4m, 10m, 20m, and 30m choices (up to 100m on DO only cables).

The Pro Plus instrument meets the demands of true field work. The instrument is rated to IP-67 standards even without the battery cover on. Other tough features include a 3 year display warranty, Mil-spec connectors, rubber over-molded case, and a 2 year cable warranty. In-house testing procedures also include 1m drop tests from all angles to ensure expected field-durability.

Trimble's Yuma Rugged Tablet Honored With

2009 Best Of FOSE Award

Trimble recently received a Government Computer News (GCN) Best of FOSE (Federal Office Systems Exposition) award for the new Yuma rugged tablet computer. The Yuma brings full office capabilities to the field in a mobile package with its Microsoft Windows operating system and wireless connectivity.

The Yuma tablet can function in the harshest outdoor conditions as a hand-carried computer, mounted on a tripod or pole for data collection, or secured in a vehicle-mount for use as a computer on the road. It is equally adept in a climate-controlled office. With this true all-in-one computing tool, a mobile worker can get the job done anywhere.

More than 65 companies submitted a total of 115 new products for consideration. GCN's editors and technology analysts reviewed the new products during the FOSE show March 10-12 in Washington D.C. and chose the winners based on four criteria: innovation; usability/applicability to government; relative performance based on specifications; and value.

"Government workers find it critically important to have accurate up-to-date information at their fingertips," said Ken Wineberg, federal sales manager for Trimble's Mobile Computing Solutions. "From utilities to homeland security applications, reliable and easy-to-use integrated solutions are required to increase efficiency and avoid the need to transcribe information. That's all possible with the Yuma tablet. Its dynamic mix of ergonomic design, ruggedness and computing speed can provide significant value to the user. Now, workers can carry their office wherever they work."

ABOUT THE YUMA

The Yuma is a field-rugged tablet Computer with Windows Vista Business Software. Yuma can be used with popular instrument software applications including NexSens iChart, micro-T, weatherVIC & WQSensor; YSI EcoWatch & Data Manager; In-Situ Win-Situ 5.0; Solinst Levelogger Gold; and more! Multiple sensors can be simultaneously connected via (1) 9-pin serial port and (2) USB 2.0 ports. Other features include built-in WiFi, Bluetooth & GPS, SDIO memory slot, ExpressCard 34mm slot, dual (front & rear) cameras, and 7" sunlight-readable WSVGA color touch screen. Yuma is IP67 rating for accidental immersion in 1m of water for up to 30 minutes and meets MIL-STD-810F military standard for drops, vibration, humidity, altitude & extreme temperatures.

For more information, visit www.fondriest.com.

Trimble

MICHIGAN BRIDGE SCOUR MONITORING

Proper bridge design depends on many factors. One factor is a proper estimate of expected scour around the bridge piers and abutments. Local accelerations of the river as it passes through a constricted bridge opening causes scour, and the design of the bridge must account for it. Due to the complexity of the physical processes at work in the vicinity of bridge piers, scour-prediction models contain a large amount of uncertainty. Uncertainty is generally accounted for by over-predicting expected scour depth to ensure the safety of the bridge. While over estimating scour depth is necessary for safety, it increases the cost of bridge construction.

In an effort to reduce uncertainty associated with scour prediction models, the Michigan Department of Transportation awarded a research grant to Wayne State University and Lawrence Technological University to collect field-scale data related to pier scour. Reducing uncertainty will help reduce the cost of bridge construction without sacrificing safety.

NexSens 3100-iSIC data logger with cellular telemetry.

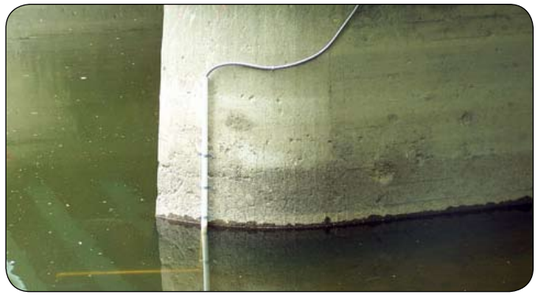
System Description
The research team chose their initial site along the Flint River in mid-Michigan. Soil and bridge characteristics as well as presence of USGS real-time flow gauge influenced site selection. A Tritech Micron Echo Sounder was mounted at the site to measure the depth to the riverbed, and a NexSens AccuStage vented pressure transducer was selected to measure the changes in water level.

Both instruments were placed inside a 1.5 PVC tube with a 90-degree bend, and the PVC housing was installed on the bridge pier with the elbow resting on top of the spread footing to prevent vertical movement. The AccuStage pressure transducer was installed to the depth of the footing, while the Micro Sounder was cantilevered over the footing to measure the depth to the riverbed. Cabling for both instruments runs through the top of the PVC housing and into a NexSens 3100-iSIC data logger with cellular telemetry.

Bridge-mounted data logger.

The Micron Echo Sounder requires more power than the standard 8.5 A-Hr iSIC battery can supply. To compensate, an external 55 A-Hr marine battery is mounted on top of the pier between the steel beams to power the system. A unistrut frame anchors the 3100-iSIC data logger to the top of the bridge pier. A NexSens A23 30-watt solar panel provides a continuous charge to the marine battery to keep the system powered without the need to continuously swap batteries.

Bridge scour data is collected once per hour and transmitted via cellular telemetry back to the project computer running iChart Software. The results are stored on a network storage device shared between the universities and project sponsor.



Cable housed in PVC.

NEXSENS technology

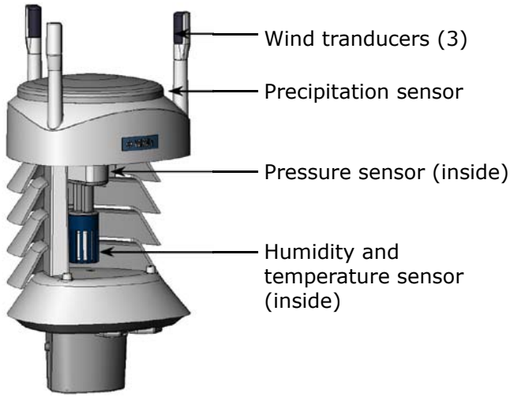
Vaisala WXT520 Multi-Parameter Weather Sensor

Revolutionary weather sensing technology with no moving parts

The WXT520 measures the six most essential weather parameters: wind speed and direction, liquid precipitation (rainfall, intensity, and duration), barometric pressure, air temperature, and relative humidity, all in one compact, lightweight instrument. The WXT520 offers a plug-and-play interface with NexSens environmental data logging and telemetry systems, providing users with automatic data collection and the option of real-time data posting through the Internet.

Wind speed and direction are measured ultrasonically with Vaisala's advanced WINDCAP sensor. In order to ensure accurate wind measurement in all directions without blind angles or corrupted readings, the sensor design utilizes an array of three equally spaced ultrasonic transducers in a horizontal plane. The WINDCAP sensor eliminates nearly all problems common to mechanical sensors, such as damage and wear of moving parts, slow response times, and the inability to detect wind speed below threshold levels.

Rainfall, intensity, and duration are measured with the Vaisala RAINCAP sensor, which is one of very few maintenance-free liquid precipitation sensors on the market. This sensor is designed to detect the impact of raindrops. The impacts exert signals that are proportional to the volume of the drops. The RAINCAP sensor then converts the signal from each drop into rainfall, intensity, and duration. This measurement method eliminates problems common to traditional precipitation gauges such as flooding, clogging, and evaporation losses.



Barometric pressure, temperature, and relative humidity sensors are housed in a ventilated chamber. These sensors rely on Vaisala's proven technology and experience and provide highly accurate and stable readings for two years without maintenance. The module is easy to remove for calibration, or replacement if needed.

For more information on the Vaisala WXT520, call 888-426-2151 or visit www.fondriest.com.

VAISALA

ORION DUAL STAR:
Multi-Parameter Lab Meter

The new Thermo Scientific Orion DUAL STAR Meter is now available. It is ideal for measuring from two different samples at the same time or reading two different measurement parameters simultaneously from one sample. The DUAL STAR makes it quicker and easier for wastewater laboratories to measure pH and ammonia levels quickly and for food processing facilities to measure pH and sodium levels concurrently.

The DUAL STAR has the capability to save up to 10 methods per channel, making repeated routine testing more convenient. Individual points of the calibration slope can be edited, minimizing errors, and the calibration graph with slope can be viewed on-screen. The meter interface works well for beginners and experienced users alike.

Features of the Orion DUAL STAR meter include:

- ***Two individual BNC inputs with two separate ATC inputs***
- ***Dual channel with simultaneous displayed measurements***
- ***Low concentration range reading stability***
- ***Known addition and subtraction incremental methods***
- ***EZ Startup for quick and easy meter setup***
- ***Meter prompts and shortcut keys for quick access to programs***
- ***Save up to 10 methods with calibration sets per channel***
- ***1000 point data logging with time and date stamping***

Please call Fondriest Environmental at 888-426-2151 for NEW product pricing on the Orion DUAL STAR.

Thermo SCIENTIFIC

Nationwide Events

August 26-27
2009 Ohio Statewide Floodplain Management Conference: Doubletree Hotel in Columbus, OH

September 24-26
Humanities & Technology Annual Conference: University of Virginia in Charlottesville, VA

September 29
American Water Works Association (AWWA) 2009 Annual Conference: Renaissance Hotel in Cleveland, OH

October 6-8
2009 Virginia Environmental Management System Conference: Hotel Roanoke & Conference Center in Roanoke, VA

October 12-14
WEFTEC 2009: Orange County Convention Center in Orange County, FL

October 16
North American Lake Management Society: Kettenun Center in Tustin, MI

October 19-20
2009 ORBCRE Scientific Symposium: River Institute at Hanover College in Hanover, IN

October 20-22
2009 Southeastern Water Pollution Biologists Association: Capital Plaza Hotel in Frankfort, KY

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