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Application Note
YSI Systems • A578-01

Using Real-Time Telemetry

FOR ECOLOGICAL MONITORING OF COASTAL WETLANDS

Long-Term Monitoring of Estuary

The Grand Bay National Estuarine Research Reserve (NERR) in Mississippi is one of 27 protected estuarine reserves across the United States. The reserves serve as platforms for long-term research and monitoring, as well as reference sites for comparative studies. At the Grand Bay NERR, an *in situ* water quality monitoring system coupled with a near real-time telemetry system allows managers and technicians to monitor changes in water quality at various temporal scales, providing a greater understanding of the ecosystem dynamics and better management of the monitoring program.

The near real-time access to the data enables improved management decisions of the environment and monitoring equipment.

Water Quality Monitoring System

The monitoring system consists of four water quality monitoring stations (Figure 1). These stations have YSI multiparameter water quality sondes that collect data every 15 minutes. Three of the water quality stations have data nodes that transmit data to a master node located on a weather station. One remotely located water quality station has a stand-alone master node. The two master nodes transmit data to a central server on an hourly basis.

The near real-time access to the data enables improved management decisions of the environment and monitoring equipment.

The monitoring program rotates two sondes per site, meaning that at the time of maintenance, previously deployed sondes are removed and freshly calibrated sondes are installed. After this, previously deployed sondes are put through the QA/QC process and then cleaned for the next rotation.

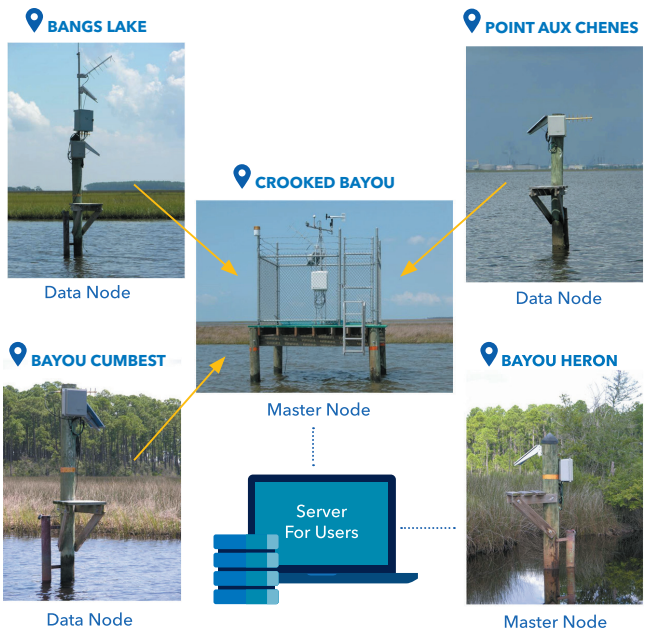

Figure 1. Continuous Monitoring Scheme

CONFERENCE: 2009 National Conference on Ecosystem Restortion

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Data During a Hurricane

The sondes collect data for temperature, specific conductivity, salinity, pH, dissolved oxygen (% saturation and mg/L), turbidity, water level and battery voltage. These sensors provide the data necessary to monitor the health of the ecosystem and to track the impacts of natural or man-made events (Figure 2).

The sonde is ideal for long deployments and incorporates wipers to remove biofouling from optical sensors and a brush to remove fouling on dissolved oxygen, conductivity/temperature, and pH sensors. To further extend deployments, copper-alloy anti-fouling kits have been developed for the sensors; all of this reduces the operating cost by extending maintenance intervals and maintains data quality.

Data from Hurricane Katrina are highlighted in Figure 3. The dark blue line represents water level data. The red line indicates the elevation of the telemetry box. Data indicates the unit was submerged by 2.6 ft (0.8 m) of water for about 3.5 hours during the storm surge, which reached 14.19 ft (4.3 m) at this site.

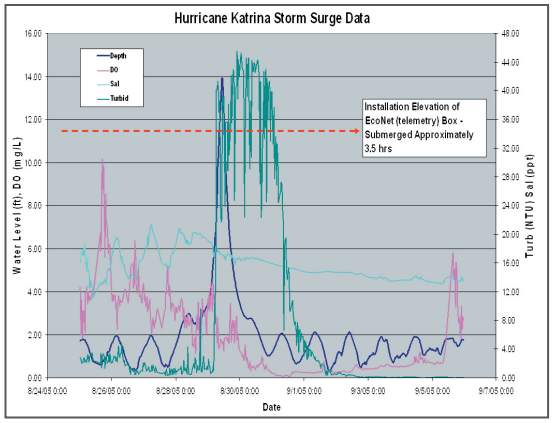

Figure 3. Storm surge data from Hurricane Katrina

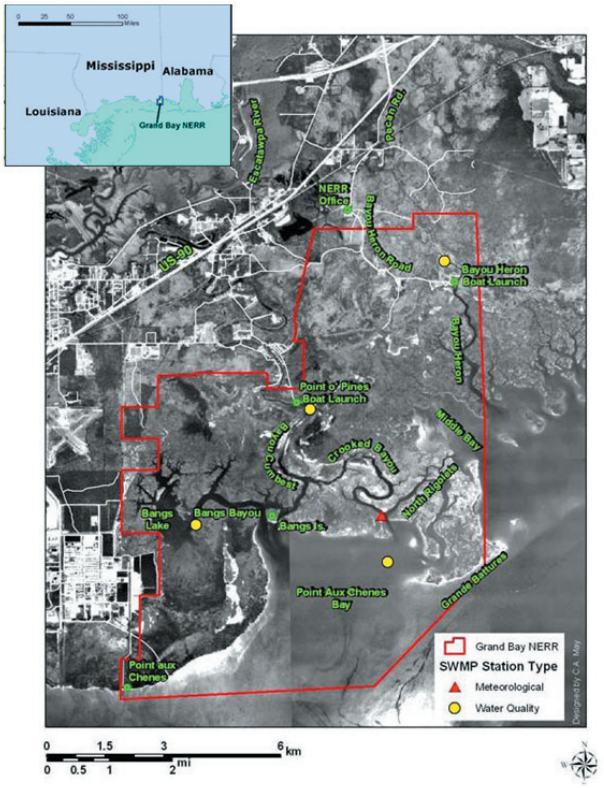

Figure 2. Continuous monitoring locations in the Grand Bay Estuary

These sensors provide the data necessary to monitor the health of the ecosystem and to track the impacts of natural or man-made events

Benefits of Real-time Telemetry

"In-touch" with data every hour
- Identifies problems when they happen
- Maintains data quality

Save resources
- Prevents unnecessary trips to stations
- Fewer trips mean less money spent and increased efficiency

Interactive – two-way communications
- Set up alerts for near real-time warnings
- Troubleshoot equipment remotely

Robust and durable
- Able to withstand hurricane-force winds
- Transmits data after complete submersion

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