



## Water Quality Monitoring on the Mississippi River

### Hydrolab DS5X and Hach Nitratax™

Using the DS5X and Nitratax sensor for real-time water quality monitoring in pool 16 of the Mississippi River



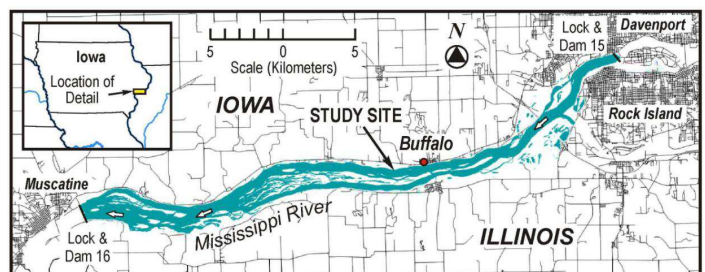
Sensor clusters on Pool 16

#### Background

- Agricultural runoff from the Mississippi River Basin significantly disturbs the river's natural aquatic nitrogen cycle, eventually leading to hypoxic dead zones in the Gulf of Mexico
- The University of Iowa IIHR – Hydrosience & Engineering has undertaken the task of studying how the nitrogen cycle is affected by human and climate-induced influences
- Researchers at IIHR decided to use freshwater mussels as a sentinel species to study in relation to the disruption of the nitrogen cycle and in addition to their water quality monitoring
- A study site was selected within Pool 16 of the Mississippi River, a section spanning from Rock Island, IL, to Muscatine, IA
- Monitoring water over extended periods of time in this section of the Mississippi can be difficult due to build-up of aquatic sediments and zebra mussels on instruments

#### Task

- To offer a resilient method for monitoring water quality and nitrate levels in the harsh aquatic environment of the Mississippi River
- To publish real-time water quality data from sensor clusters in Pool 16 that is viewable remotely
- To provide continually accurate water quality data for analysis in conjunction with the diurnal mussel study



## Monitoring Solution

- Six sensor clusters were deployed in Pool 16 with the Hydrolab DS5X multiparameter sonde and Hach Nitratex nitrate sensor
- The Hydrolab DS5X is a multiparameter sonde designed for long term deployment in aquatic environments
- The Hach Nitratex sensor accurately measures nitrate levels by continuously measuring UV light absorbed by nitrates
- Water quality and nitrate data was transmitted to dataloggers from the sensor clusters every 15 minutes
- Data was regularly analyzed in conjunction with information gathered from the freshwater mussel beds

### The Advantages

- The self-cleaning Nitratex sensor was able to continue recording and transmitting data despite the presence of sediment and zebra mussels
- The DS5X multiparameter sonde's central cleaning system kept sensors in operation while minimizing power consumption
- Long term deployment in the harsh aquatic environment was possible with high grade plastic, stainless steel, and titanium materials on both Instruments
- Remote data transfer with error warnings and web publishing was available for troubleshooting and easy access to data for users in the lab and field



## Summary

- The Hydrolab DS5X and Hach Nitratex sensor were able to successfully collect water quality data over time despite harsh aquatic conditions
- Water quality data collected by the two instruments played a key role in the larger study involving freshwater mussels and the nitrogen cycle
- Discovery of the diurnal nitrate dynamics from the study helped validate the use of sensors to measure highly time sensitive data in large scale systems such as the Mississippi River

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### Technology

**Hydrolab DS5X** multiparameter sonde  
Active data transmission (via GSM/SMS)

**Hach Nitratex™** plus sc 5mm Nitrate sensor  
Active data transmission with sc100 universal controller



**Above:** Jeremy Brill and Craig Just of IIHR with their sensors  
**Below:** The DS5X covered in mussels and sediment after extended deployment

