# An Integrated Big Data Framework for Water Quality Issues in the Upper Mississippi River Basin

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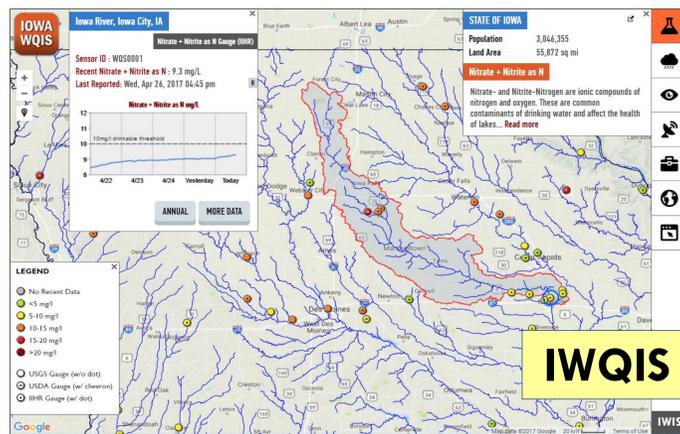
The purpose of the project is to develop an integrated and open cyberinfrastructure, **Upper Mississippi Information System (UMIS)**, to support large-scale water-quality data integration, analyses, and visualization in the Upper Mississippi River Basin (UMRB) in real time using data-enabled information technologies. Seamless integration of existing real-time and ad-hoc water quality data streams with continuous modeling is a major challenge in big data domain.

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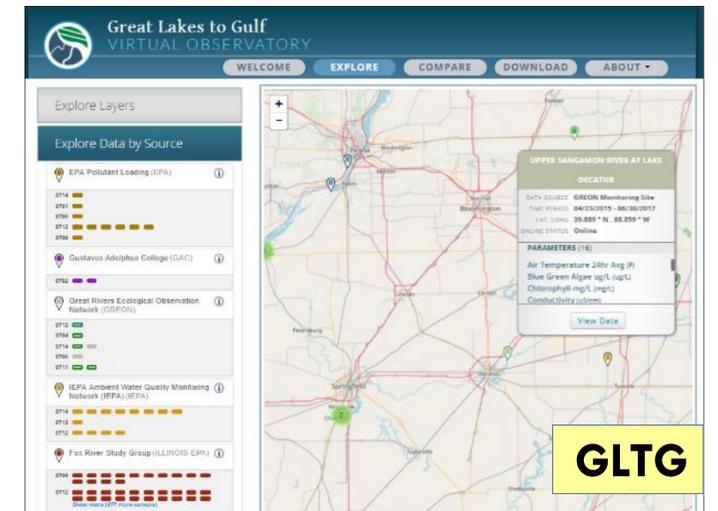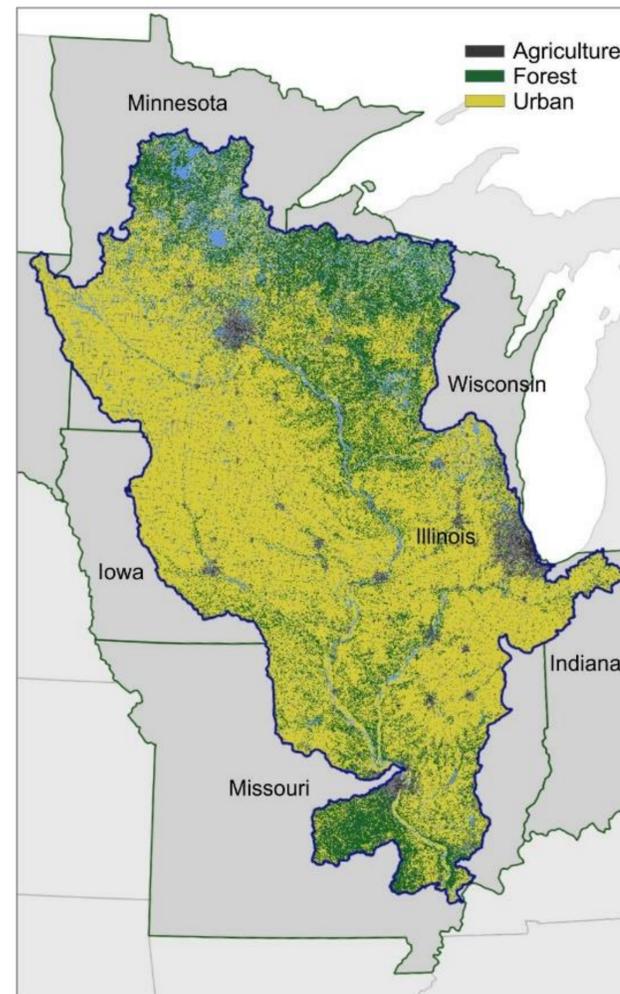
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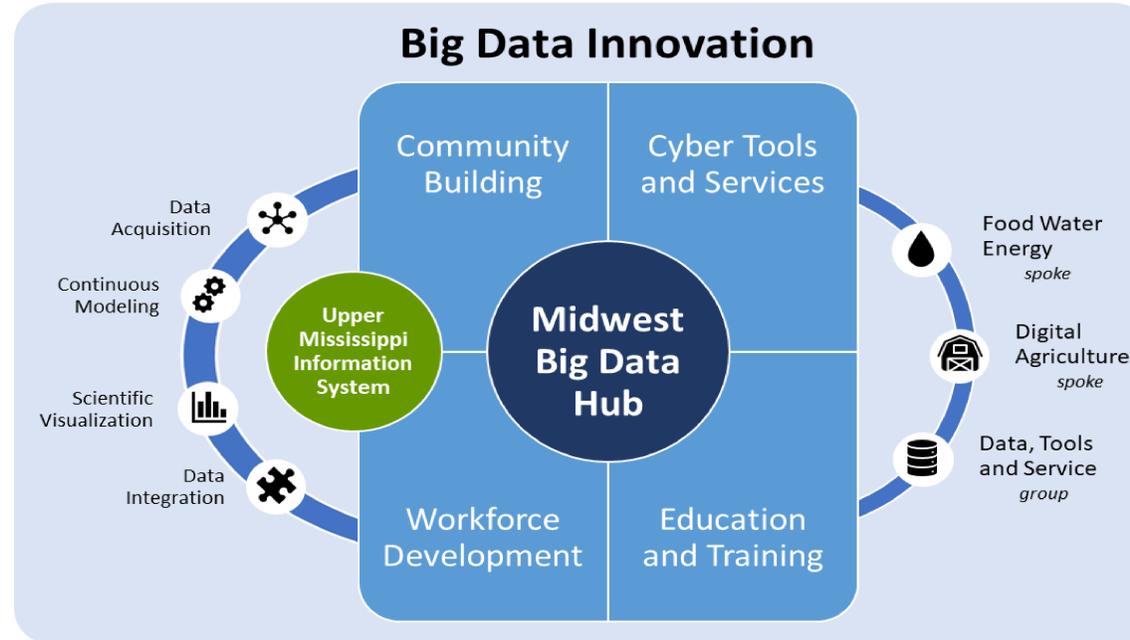
Partners

Partners include researchers at the University of Iowa (IIHR—Hydroscience & Engineering), the University of Illinois Urbana-Champaign (Great Lakes to Gulf Virtual Observatory - GLTG, National Center for Supercomputing Applications – NCSA), Iowa State University, and Lewis and Clark Community College (National Great Rivers Research and Education Center), and many data providers and user groups.

Midwest Big Data Hub

The project at the UMRB scale is only possible within the framework of a Midwest Big Data Hub ecosystem because it requires significant: 1) expertise in collection of water quality data from a wide range of academic, agency, and NGO sources across several states; 2) integration of data (of varying quality, format, and duration) into a user-friendly system (UMIS); 3) input from partners and stakeholders to understand the great variety of ways in which the data may be best accessed and used; and 4) computing resources.

Grand Challenges

UMIS directly addresses three of the Grand Challenges for Engineering identified by the National Academy of Engineering: i) provide access to clean drinking water; ii) manage the nitrogen cycle; and iii) engineer the tools of scientific discovery. The immediate impacts include facilitation of a centralized platform for data access, integration, and scientific discovery for water-quality challenges in the UMRB. The long-term implications for this project are adoption of data-enabled CI tools and services through the Midwest Big Data Hub to expand its reach to the UMRB, and ultimately to the entire Mississippi River and the nation.

GLTG

Collaboration

We are looking for partners for data access and sharing, and user groups for the development and testing the system.

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