

LONG-TERM SURFACE WATER MONITORING

Long-term datasets of sufficient length at spatial scales are invaluable toward addressing water resource planning issues, such as watershed nutrient or sediment loadings, the effectiveness of land management practices, to estimate loading from unmonitored areas, and long-term trends. Synoptic data collection informs about a location for current land use or climate conditions at one point in time; long-term collection informs about a place accounting for varying land use or climate conditions over an extended period ... even decades.

Since 1981, the Illinois State Water Survey has conducted numerous stream monitoring, assessments, sampling and lake sedimentation survey projects in Illinois. Some projects are data intensive lasting more than 15 years. Watershed geomorphic assessments are carried out periodically to determine changes in stream channel adjustment and erosion processes.

The Illinois Benchmark Sediment Monitoring Program, established in 1981, currently has 15 suspended sediment stations co-located with U.S. Geological Survey stream-gauging stations to compute annual sediment loads. Sampling is a partnership of ISWS field technicians and citizen observers who collect weekly samples. A 35-year trends analysis is currently being conducted and preliminary analyses indicate either “no” or “decreasing” trends. This is encouraging information for Illinois land management programs.

The Stream & Watershed Monitoring, Assessment, and Restoration Program conducts analytical and field-based multi-scale, applied research. This work is supported by long-term and project-specific stream and watershed monitoring and assessments to evaluate land management and stream restoration impacts. Changes in land management practices and climate conditions, which have profound impacts on the type and magnitude of natural water, sediment, and nutrient movement as well as channel adjustment mechanisms. Our watershed monitoring studies collect detailed runoff event data to understand the timing and character of concentrations and loading to understand sources and transportation modes.

Some of these studies draw on observations spanning more than 15 years. Our active monitoring regime in the Illinois River Basin are now in its 18th year. Assessment, analyses and Illinois Watersheds Hydrologic Models development of this data can have significant contributions to the Illinois Nutrient Loss Reduction Strategy discussion.

Large-scale monitoring generates unique historical and spatial scientific datasets, to investigate and understand past watershed processes. It represents a finger on the pulse to evaluate long-term trends in water, nutrients, and sediment in watersheds.

This data, not available anywhere else, underpins research in hydrology, water resource management downstream impacts, trends, and transport processes.

Modeling provides information to policymakers, planners, and resource managers so they can develop and implement sustainable watershed programs based on the best scientific analyses possible today.

FOCUS AREAS

Foundational Research

Emerging Issues

HEAL Laboratory

Community/Citizen Outreach

State Agency Engagement

FOUNDATIONAL RESEARCH

ISWS MONITORING/DATA COLLECTION MILESTONES

- Illinois Benchmark Sediment Monitoring Program 35-year trends analysis – no or decreasing trends.
- Cache River Wetlands Restoration and Management Alternatives – hydrologic & hydraulic modeling of restoration scenarios based on 25 years of monitoring.
- Lake Decatur Watershed Nutrient Monitoring, City of Decatur drinking water standards – 15 years of monitoring, developed prediction tool, National Science Foundation grant (Critical Zone Observatory).
- Illinois Conservation Reserve Enhancement Program. Hydrologic, nutrient and sediment monitoring and evaluation of BMP effectiveness – monitoring 18 years, trends analyses, watershed models calibration, test future scenarios of BMP effect on loading.
- Watershed-scale hydrologic and nutrient/sediment modeling framework for major watersheds of Illinois to determine critical source areas of runoff, and sediment and nutrient loadings.
- Watershed/river monitoring studies: Upper Sangamon (Decatur), Cache, Kaskaskia tributaries, Embarras tributaries, Vermilion (Wabash), Vermilion (Illinois), Lake Springfield tributaries, Spoon River tributaries, Lower Sangamon tributaries.
- Stream restoration projects: Sangamon River, Kaskaskia River, Embarras River, Cache River, Spoon River, Hall Creek, Waukegan River, Panther Creek, Cox Creek, Blue Creek, North Creek, Court Creek, and Hickory Creek.

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