Water and Sediment Monitoring in the Illinois River Basin

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U.S. Department of the Interior
U.S. Geological Survey
Where is this?
a) Illinois River near Valley City
b) Illinois River near Chillicothe
c) Illinois River near Marseilles
Where is this?

a) Illinois River near Valley City
b) Illinois River near Chillicothe
c) Illinois River near Marseilles
Where is this?

a) Senachwine Creek near Chillicothe

b) Spoon River near Seville

c) Fox River at Dayton
Where is this?

a) Senachwine Creek near Chillicothe

b) Spoon River near Seville

c) Fox River at Dayton, and Ryan and Greg wonder why they work for the USGS?!?!
Water and Sediment Monitoring in the Illinois River Basin

- Needed to evaluate historical and current conditions, and plan and evaluate management alternatives
- Many agencies participate in funding or collecting data
- Presentation will focus on overall monitoring principles, the IMP, and USGS network
  - Streamflow/water monitoring/gaging
  - Sediment monitoring/gaging
So... what is a streamgage?
Illinois River At Valley City

Historical Peak: 28.61’ ft on 05/26/1943

Official Flood Stage: 11.00’
- Real-time data at il.water.usgs.gov

- The USGS operates over 180 streamgages in the State of Illinois

- Cooperation with over 30 local, State, and Federal Agencies
Everything you need to know about streamflow measurement and calculation: USGS WSP 2175 Vol. 1 & 2
1st Streamgage

- Rio Grande River near Embudo, NM
  - 1889

Early IL River Streamgage

- Illinois River at Marseilles
  - Peaks: 1892; 1894-1898; 1900; 1905-Present
  - Continuous Streamflow: 1920-Present
Progression of stage sensing:

- Satellite Radio
- Stilling Well
- Pressure Transducer
- Recorder
- Float
- Intake
- Stilling Well
- Radar
Discharge must be measured over a range of stages.
Uses of Streamgaging Network

- Flood forecasting
- Navigation
- WWTP’s
- Industry
- Bridge design
- Flood elevations
- Recreation
- Irrigation
Additional Streamgage Options

- Raingages
- Water-quality measurements and sampling devices INCLUDING SEDIMENT
- Velocity-sensing devices
Sediment must be measured over a range of stages
Streamflow and Sediment Concentration
January 2008 - Kickapoo Creek at Bloomington
Everything you need to know about sediment measurement and calculation
Intermittent USGS Sediment Gages: 1972-Present

IL River at Valley City: longest continuous record (1980-present)
Flux of USGS Sediment Gages 1972-2003

- Network unstable until 2003
- IMP awareness helped in stabilizing
- 2010 budget cuts to Corps 519 program may force cutbacks
Current Sediment Gaging Funding Agencies

- Rock Island Corps of Engineers
- St. Louis Corp of Engineers
- Illinois Environmental Protection Agency
- U.S. Environmental Protection Agency
- Illinois State Water Survey
- Illinois Department of Natural Resources
- Lake County Forest Preserves
- Lewis and Clark Community College
- Bloomington Parks and Recreation
Real-Time Water Quality Gages
http://nrtwq.usgs.gov/
Real-Time Streamflow and Sediment Concentration in Kansas
Velocity sensors
(Index-Velocity ratings)
Silt-and-clay vs Backscatter Attenuation - Colorado River

\[ y = 1345.728x \]

\[ R^2 = 0.996 \]
Moving Forward Potential