



Water and Sediment Monitoring in the Illinois River Basin

Timothy D. Straub and Gary P. Johnson

Hydrologists/Engineers

USGS Illinois Water Science Center



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



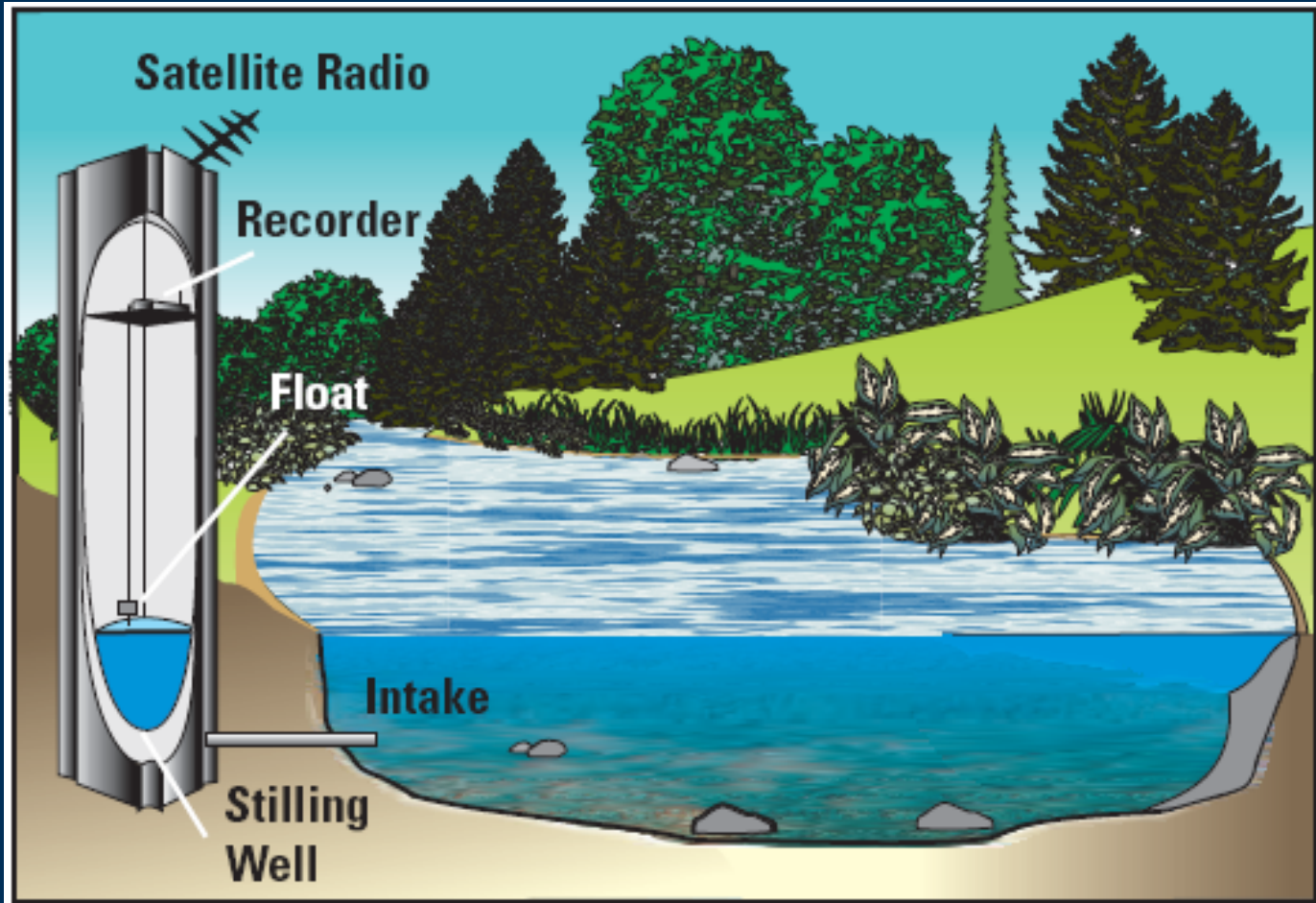
Where is this?

- 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?!?!

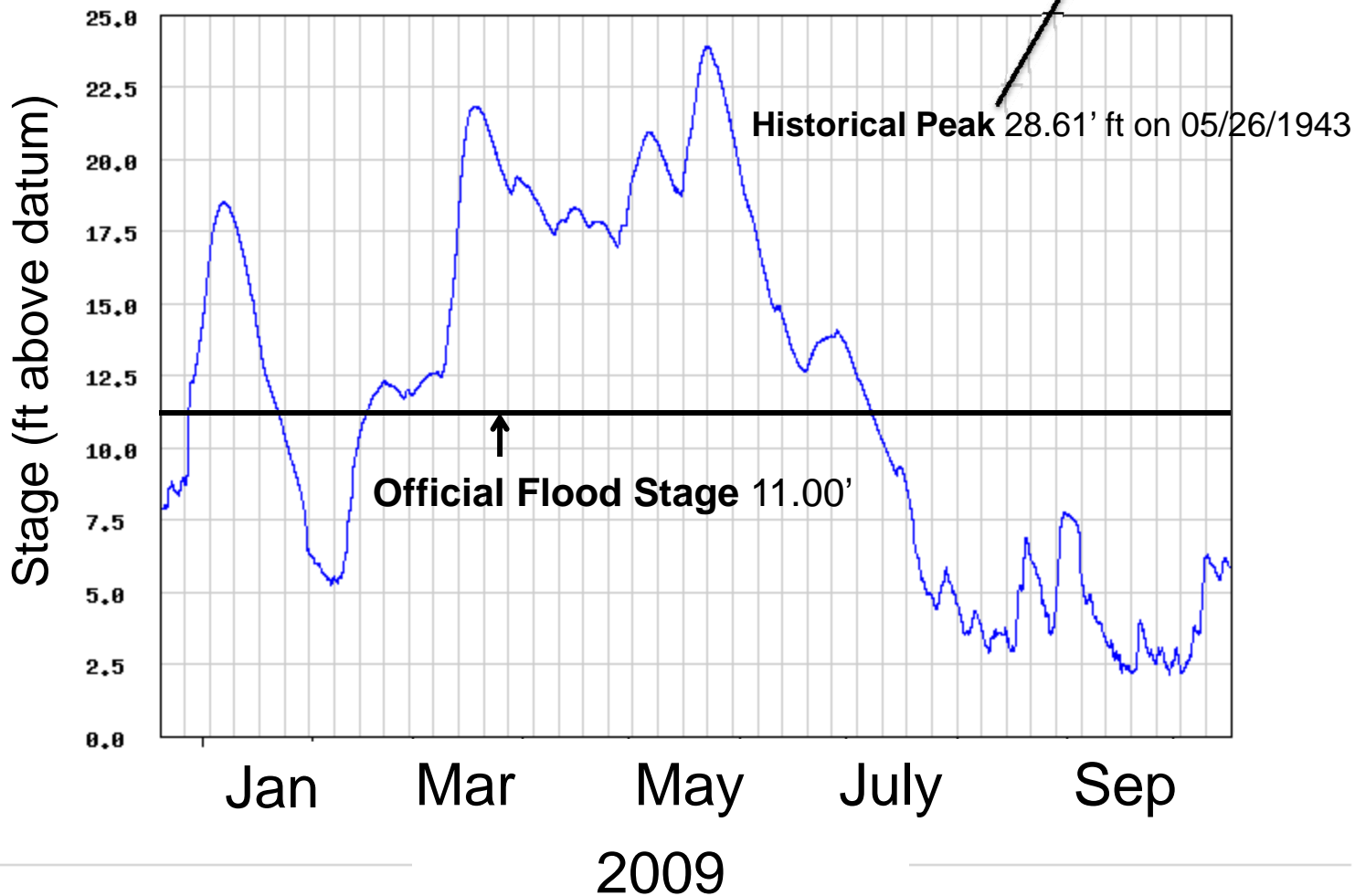
Water and Sediment Monitoring in the Illinois River Basin

- 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

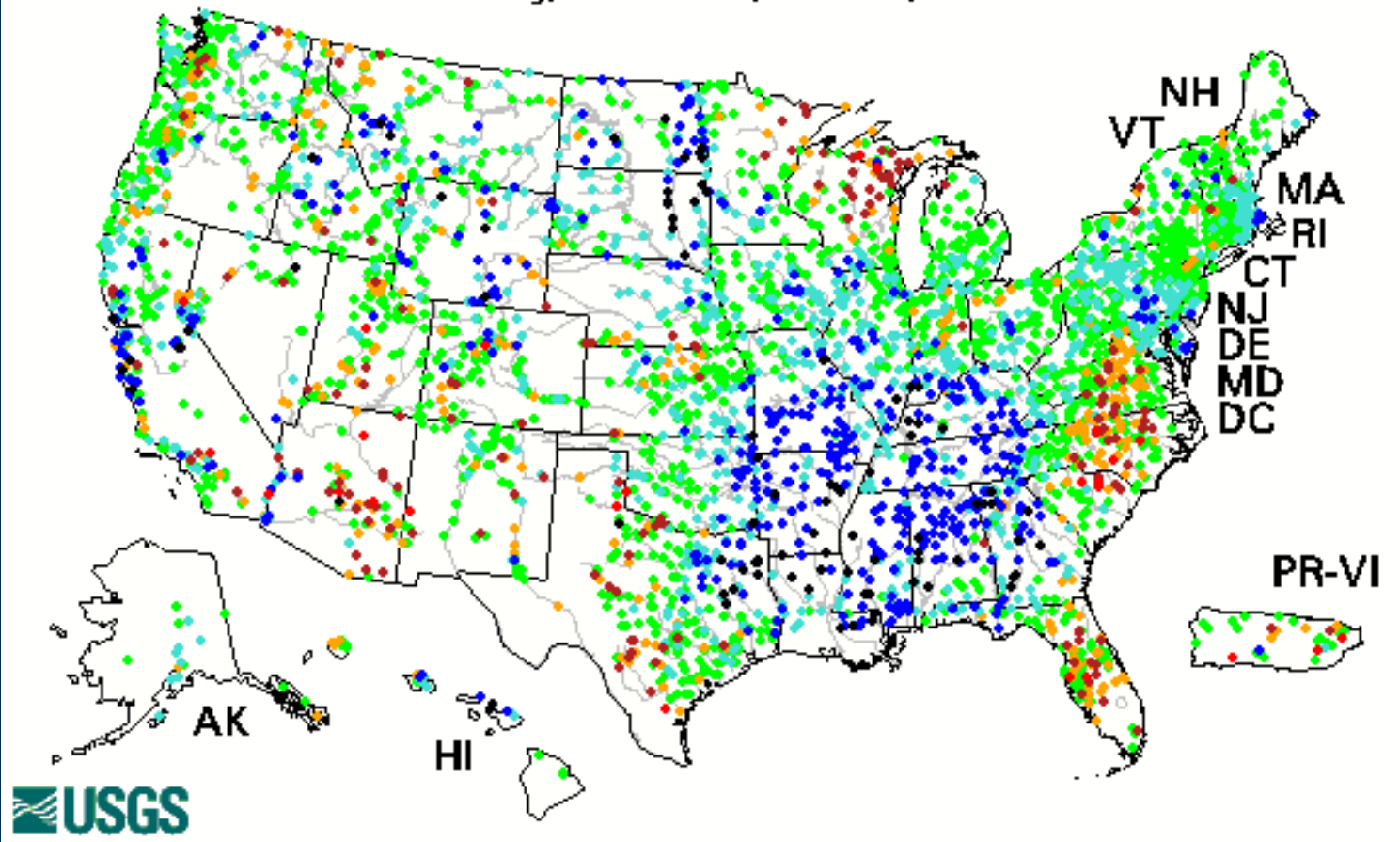


Real-Time Streamgages

Tuesday, October 20, 2009 16:31ET

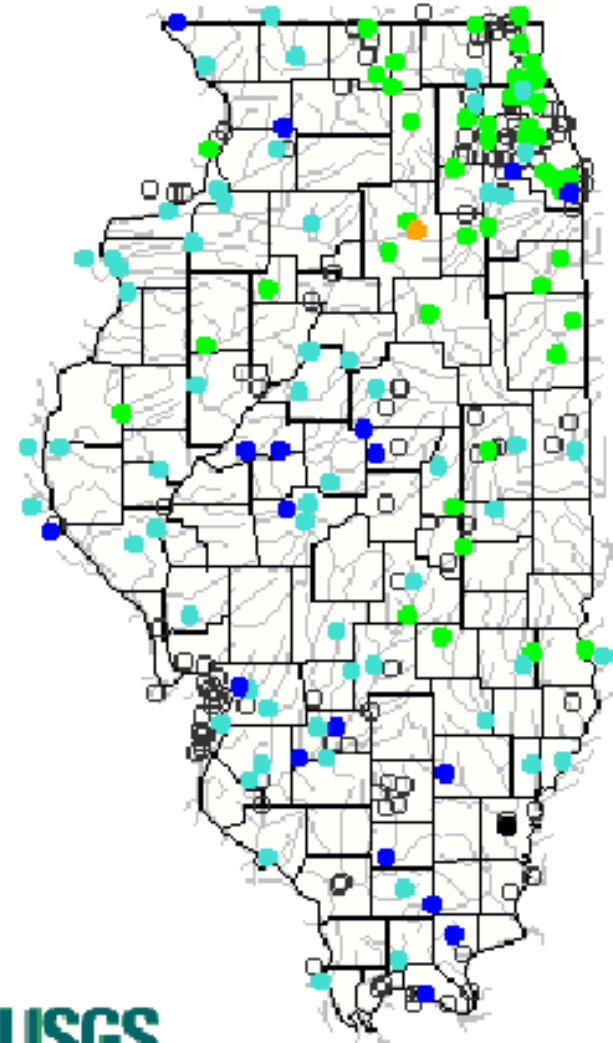
Explanation

- Wet
- ≥ 90 th percentile
- 75th - 89th percentile
- 25th - 74th percentile
- 10th - 24th percentile
- < 10 th percentile
- Dry
- Not ranked



- 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

Tuesday, October 20, 2009 15:31ET



 USGS

 USGS

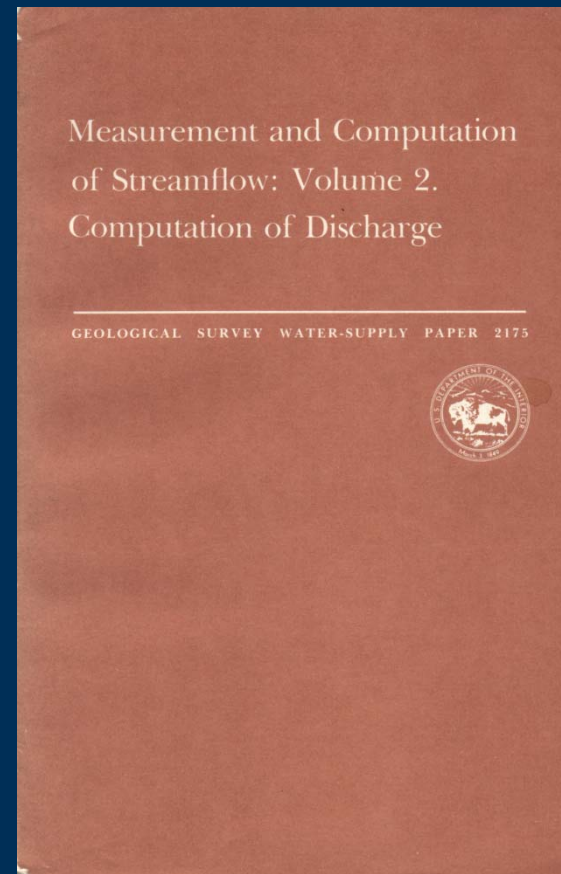
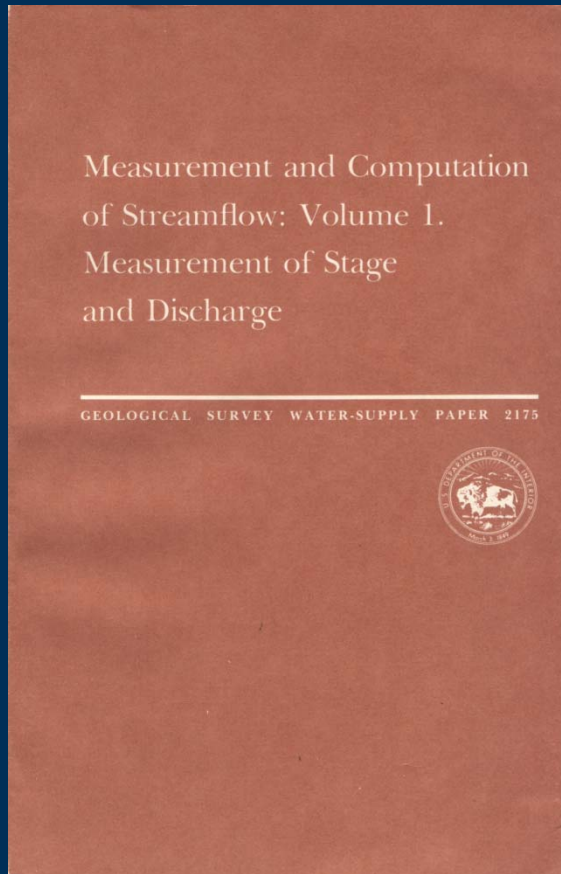
Dry

Normal

Wet



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

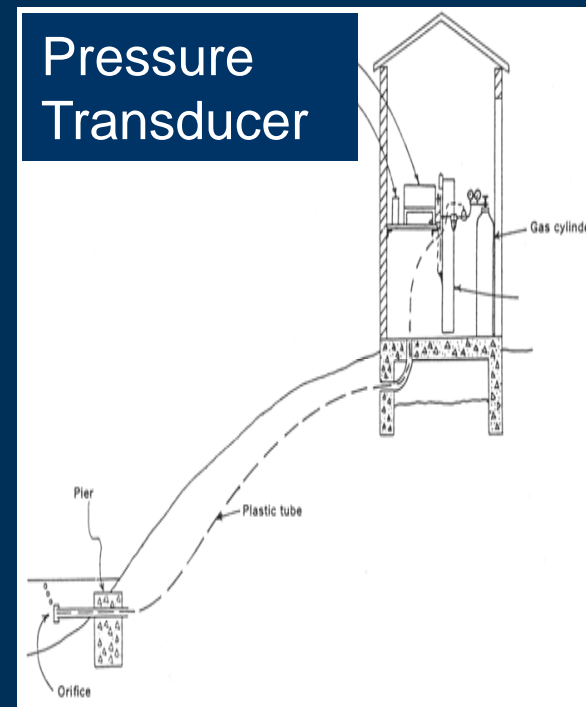
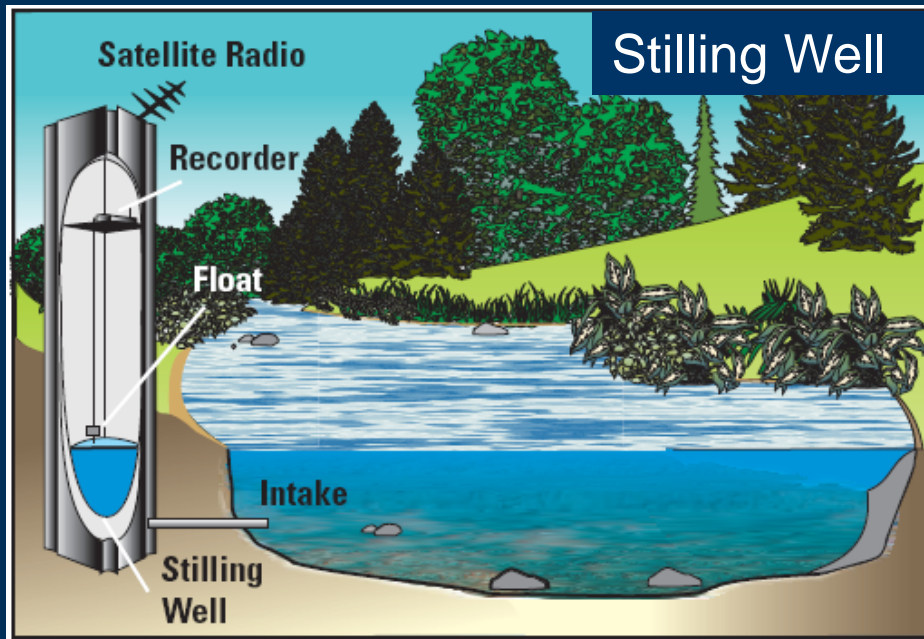


Early IL River Streamgage

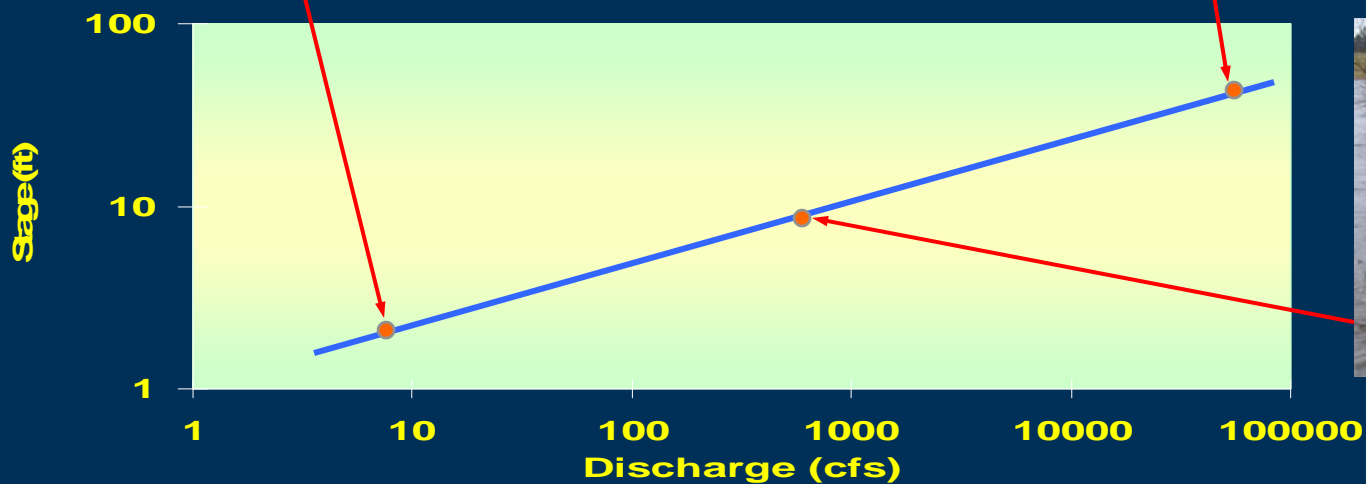
- Illinois River at Marseilles
 - Peaks: 1892; 1894-1898; 1900; 1905-Present
 - Continuous Streamflow: 1920-Present



Progression of stage sensing:



Discharge must be measured over a range of stages



Uses of Streamgaging Network

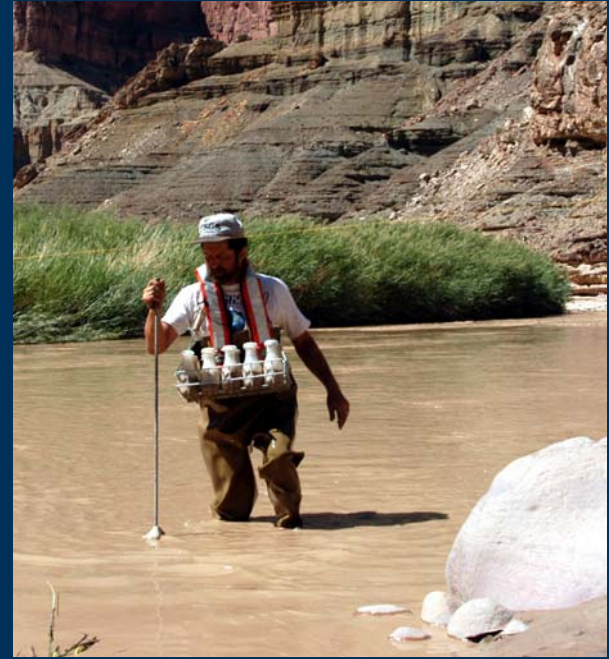
- Flood forecasting
- Navigation
- WWTP's
- Industry
- Bridge design
- Flood elevations
- Recreation
- Irrigation

Additional Streamgage Options

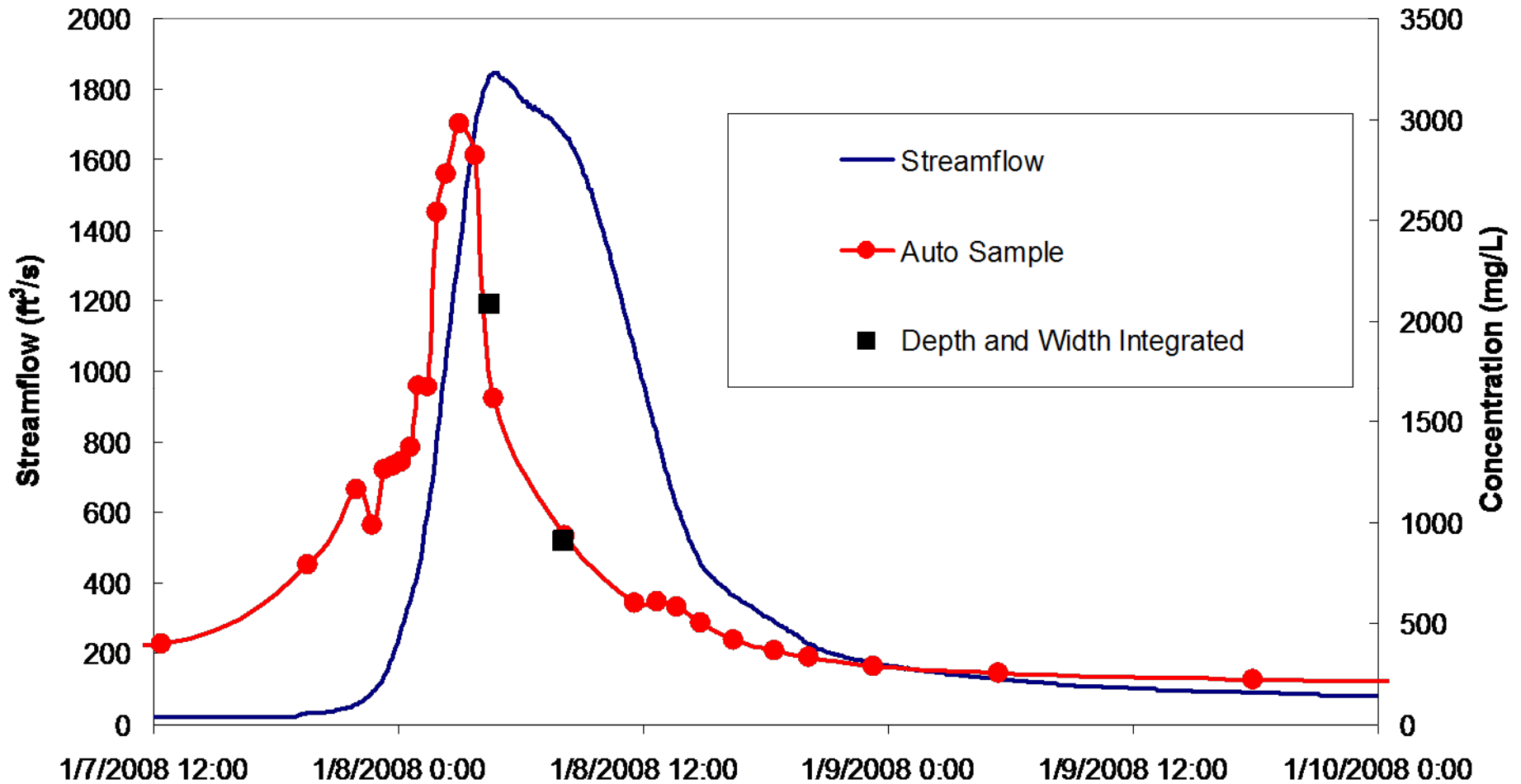
- Raingages
- Water-quality measurements and sampling devices **INCLUDING SEDIMENT**
- Velocity-sensing devices



Sediment must be measured over a range of stages

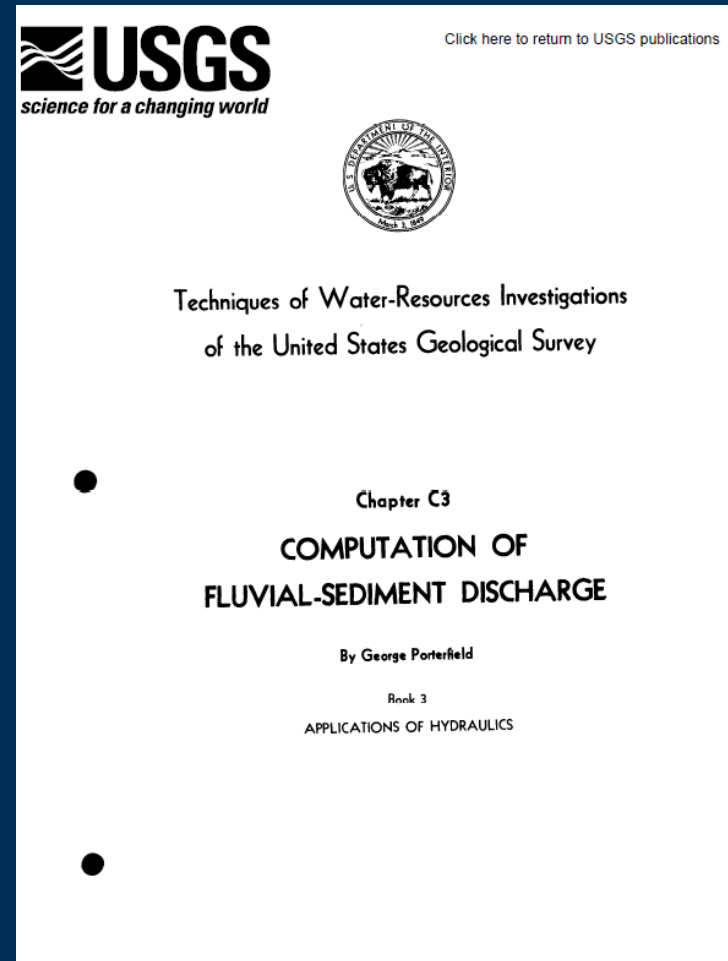
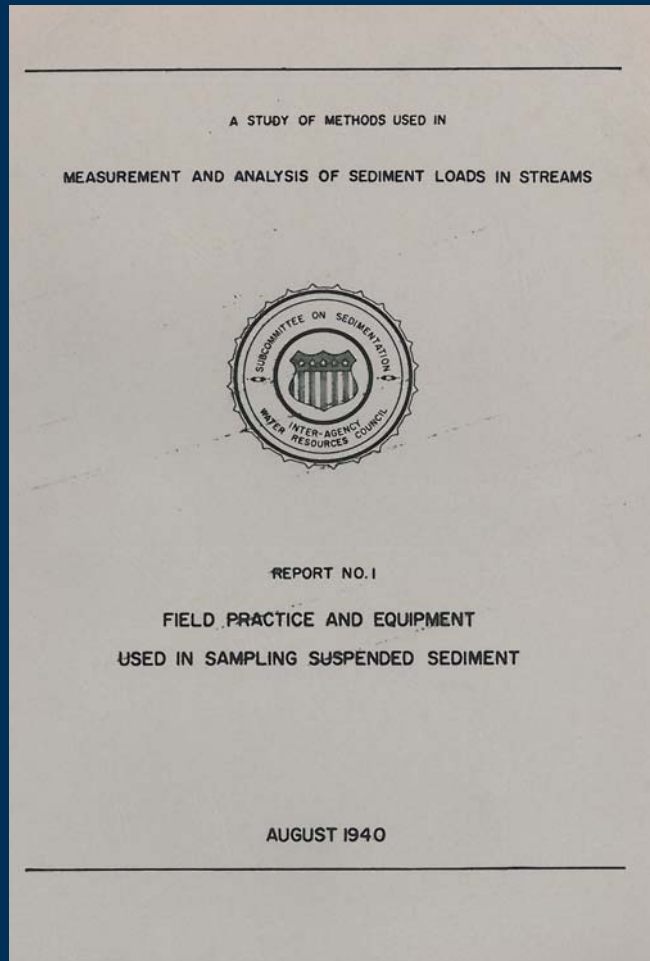


Streamflow and Sediment Concentration January 2008 - Kickapoo Creek at Bloomington



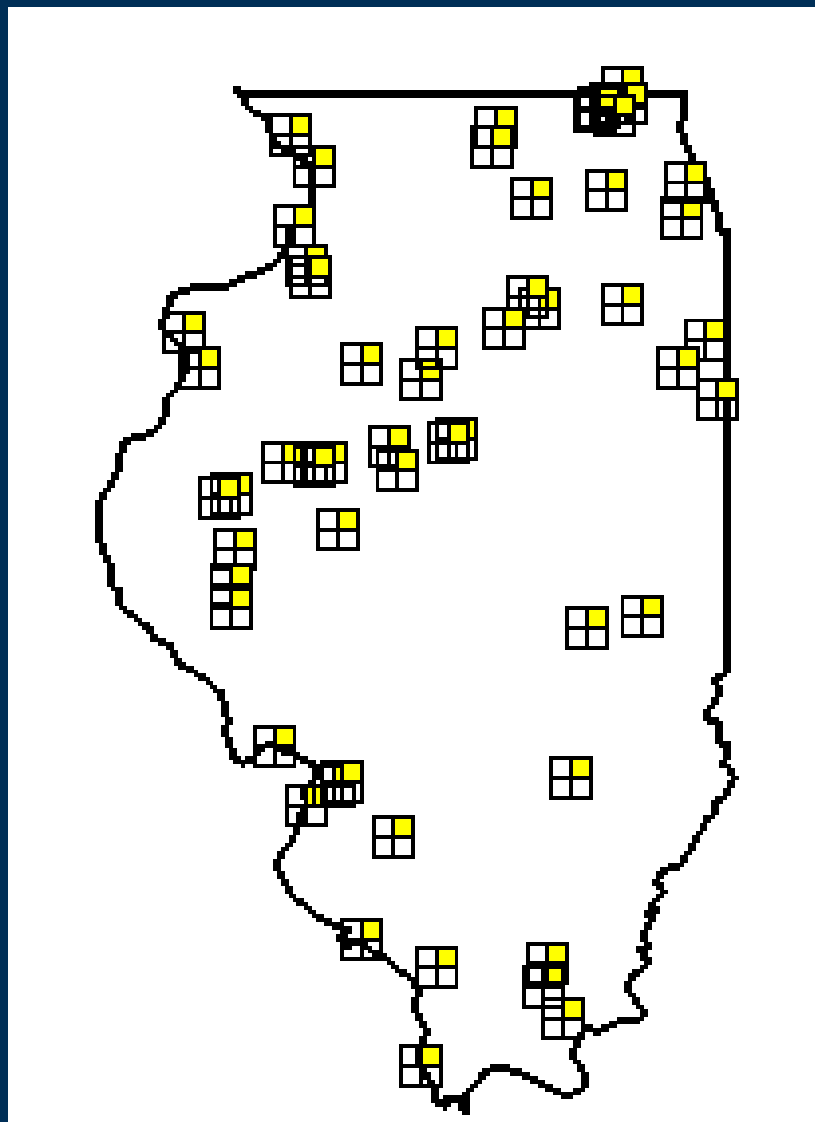


Everything you need to know about sediment measurement and calculation



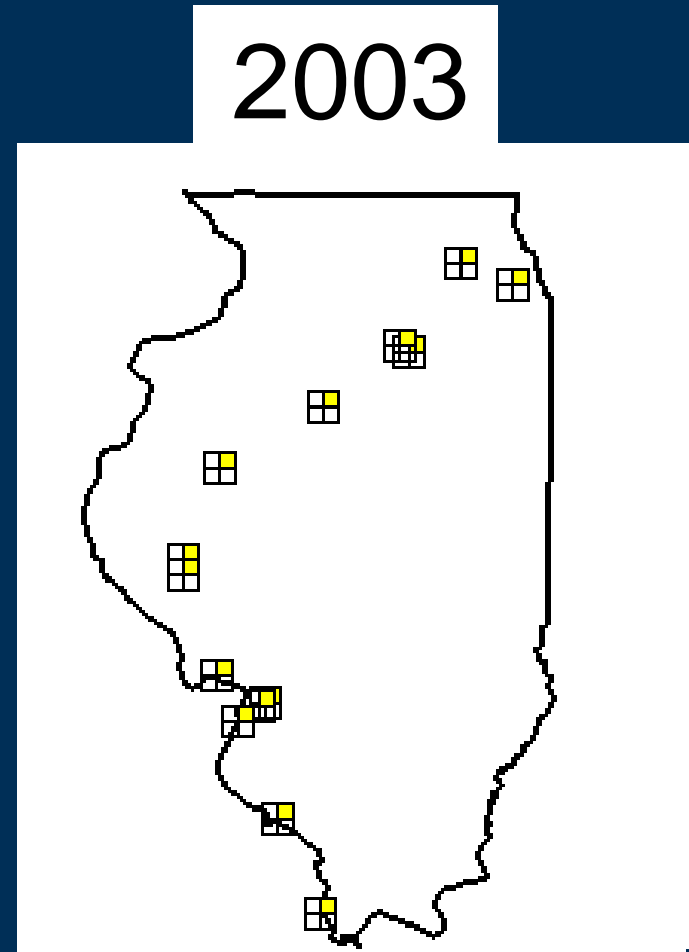
Intermittent USGS Sediment Gages: 1972-Present

**IL River at
Valley City:
longest
continuous
record
(1980-present)**



Flux of USGS Sediment Gages 1972-2003

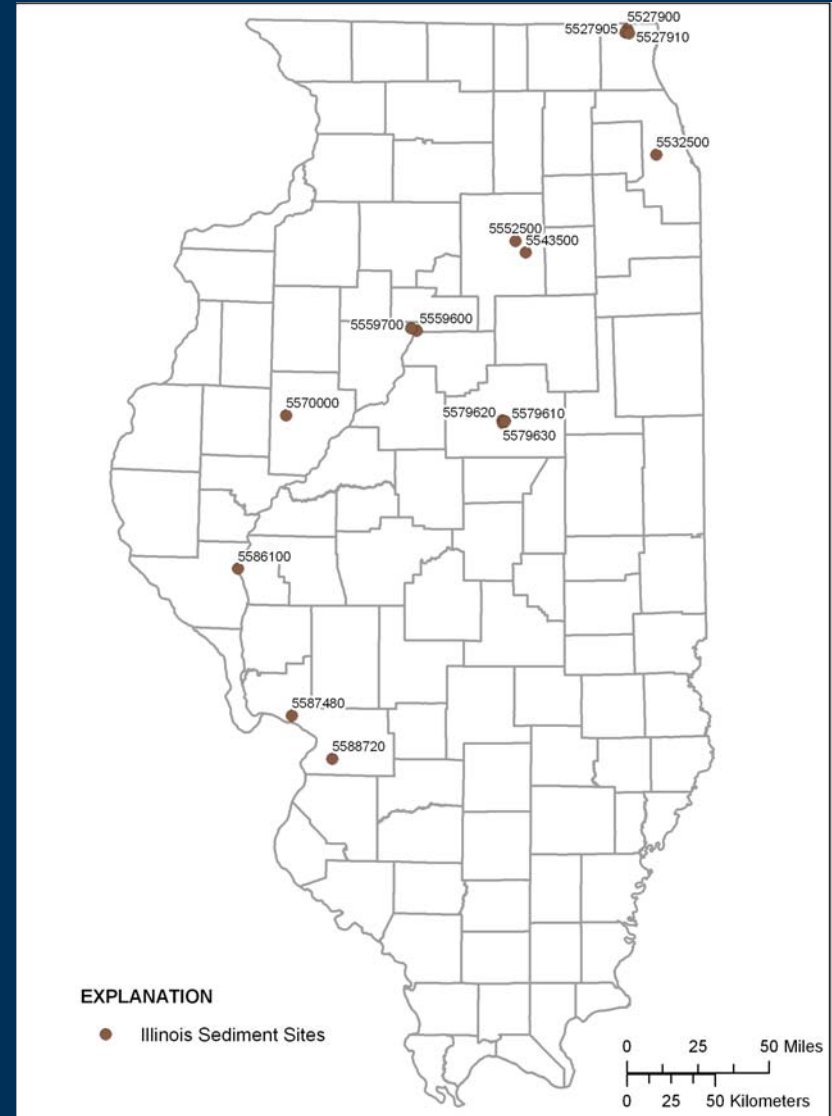
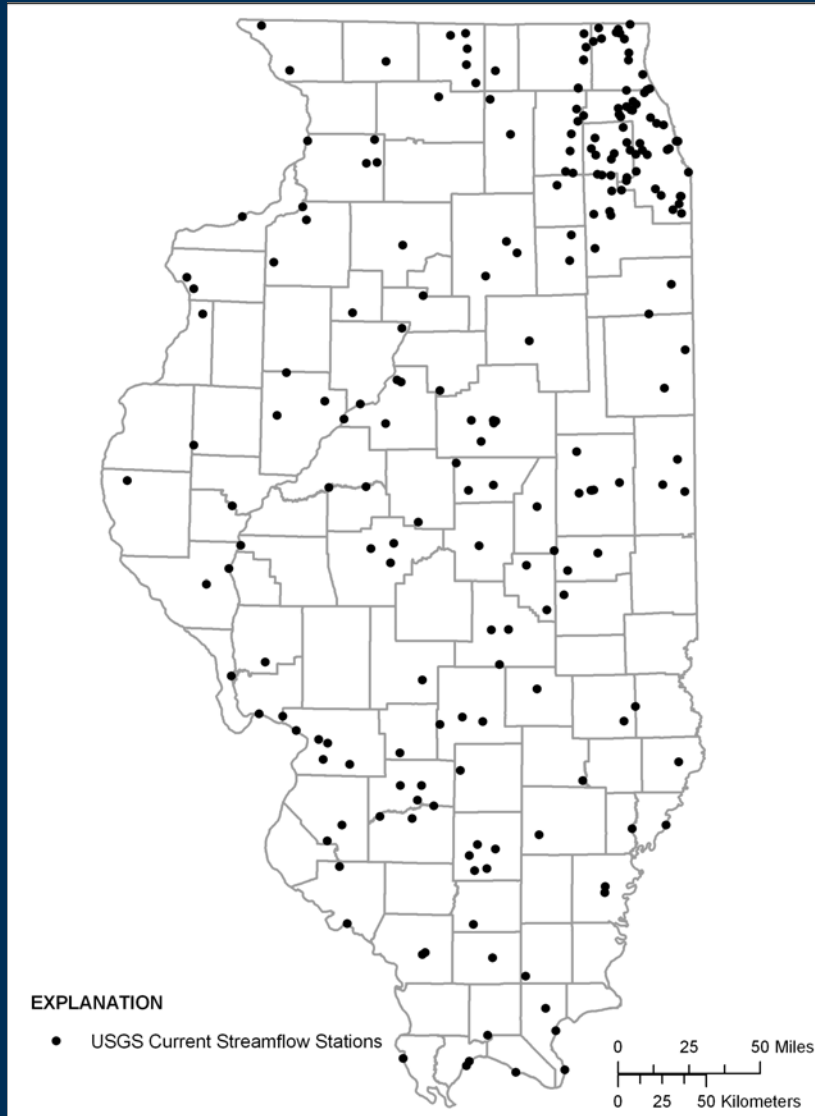
- Network unstable until 2003
- IMP awareness helped in stabilizing
- 2010 budget cuts to Corps 519 program may force cutbacks



CURRENT USGS NETWORK

Streamflow (>180)

Sediment (15)

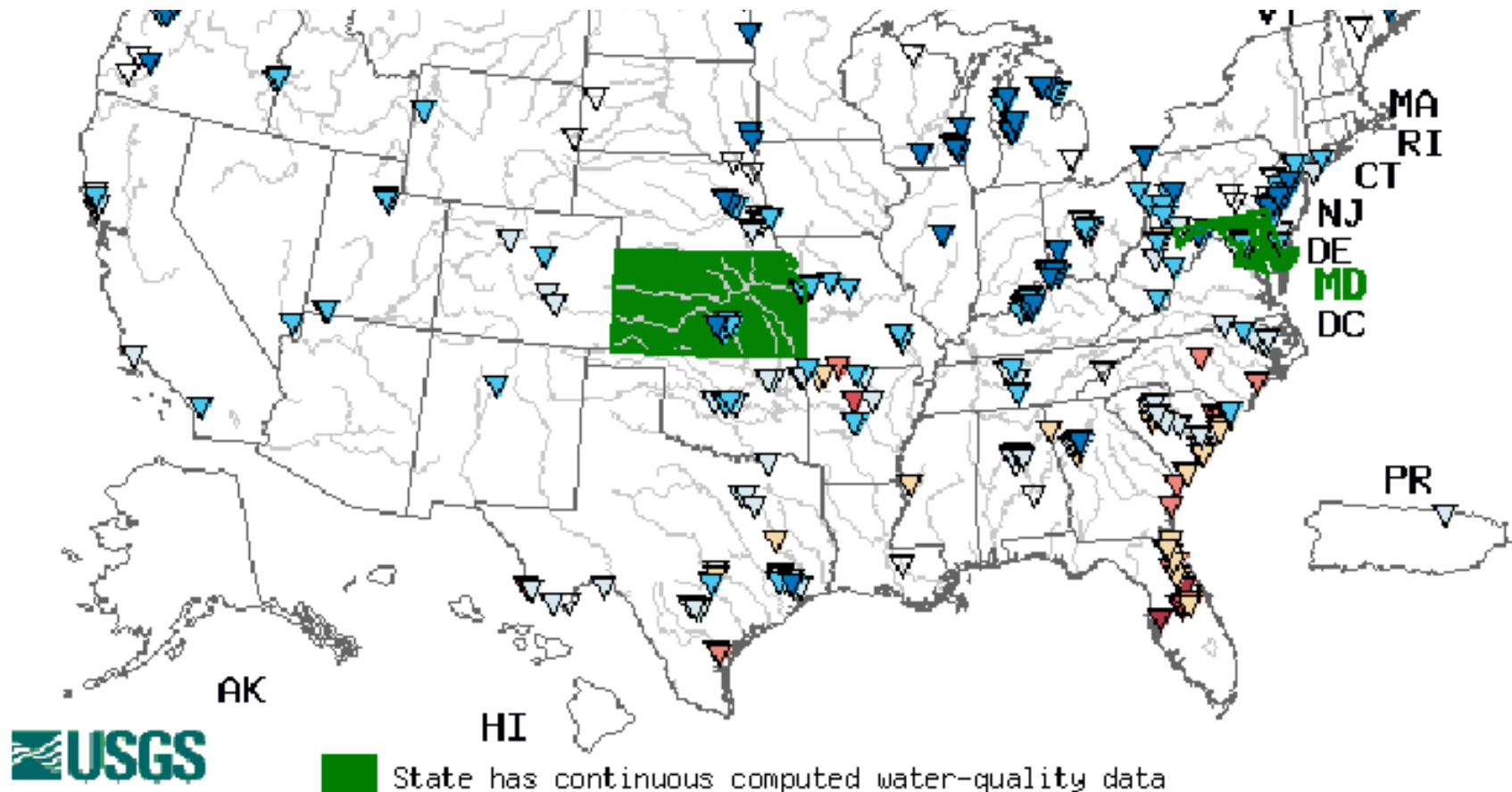


Current Sediment Gaging Funding Agencies

- 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/>



Explanation							
<1	1-2.9	3-4.9	5-6.9	7-8.9	9-11	>11	No Data

Temp

Cond

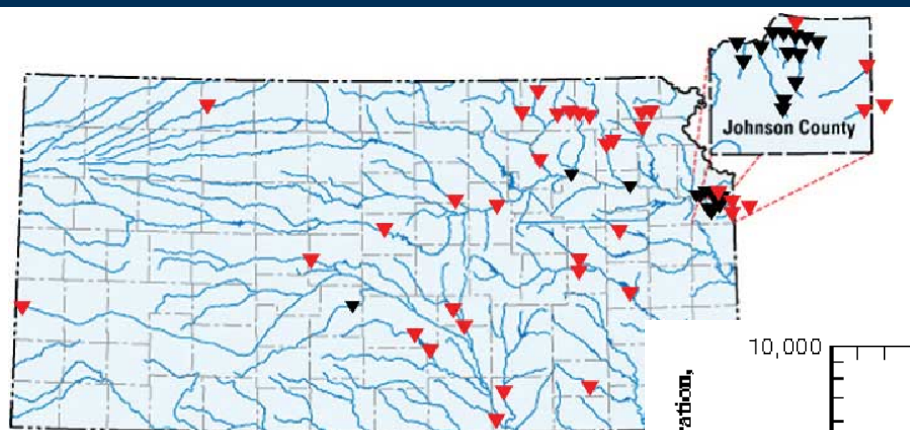
pH

D.O.

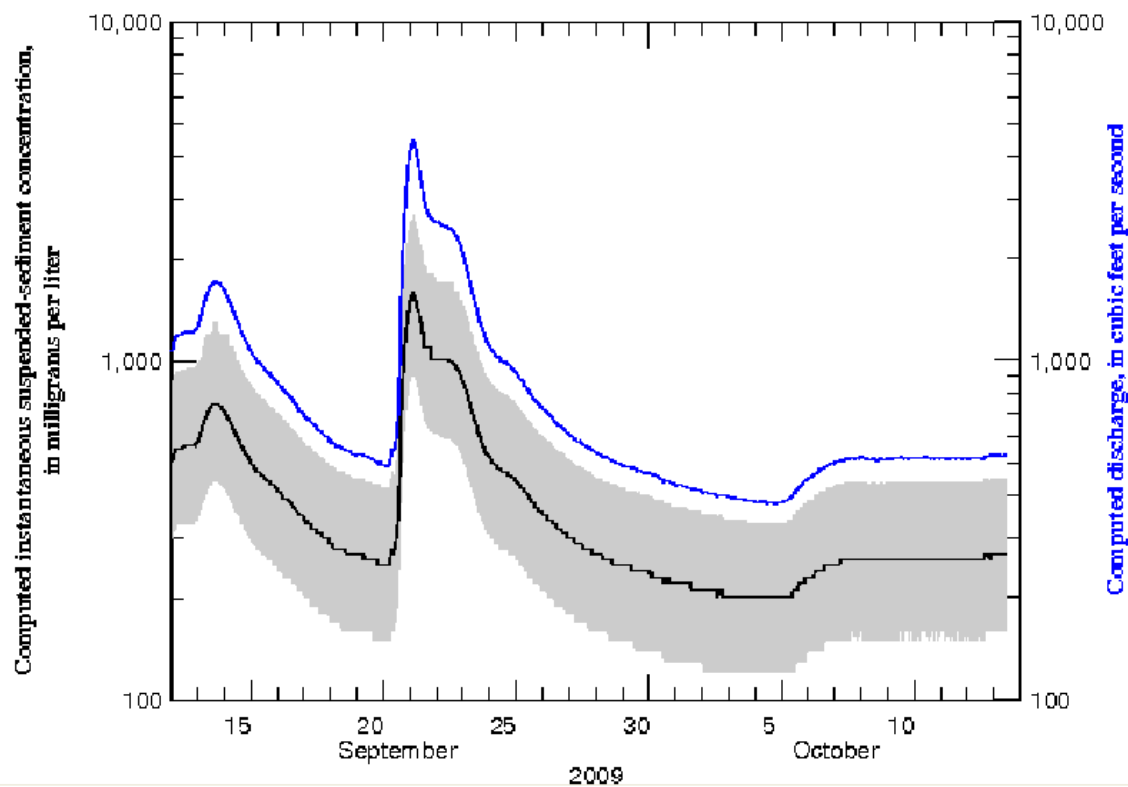
Turb

Disch

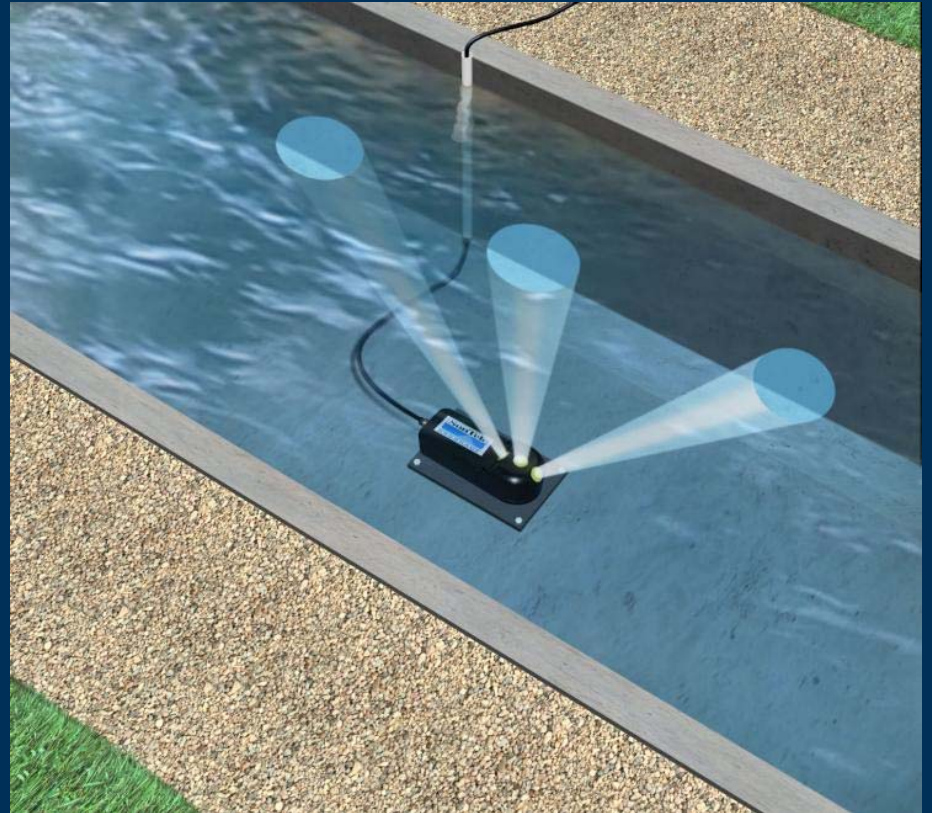
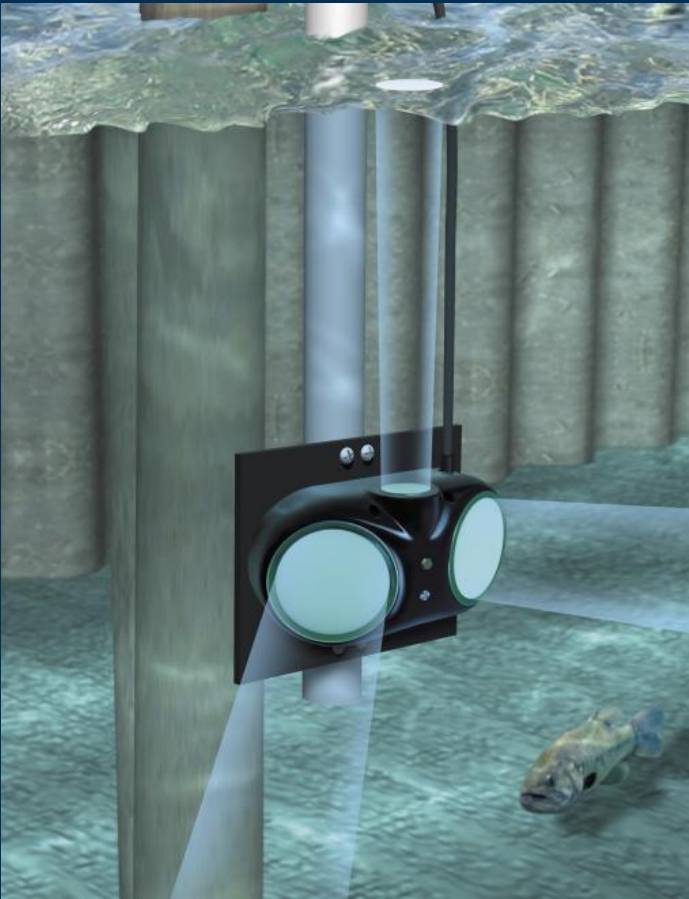
Real-Time Streamflow and Sediment Concentration in Kansas



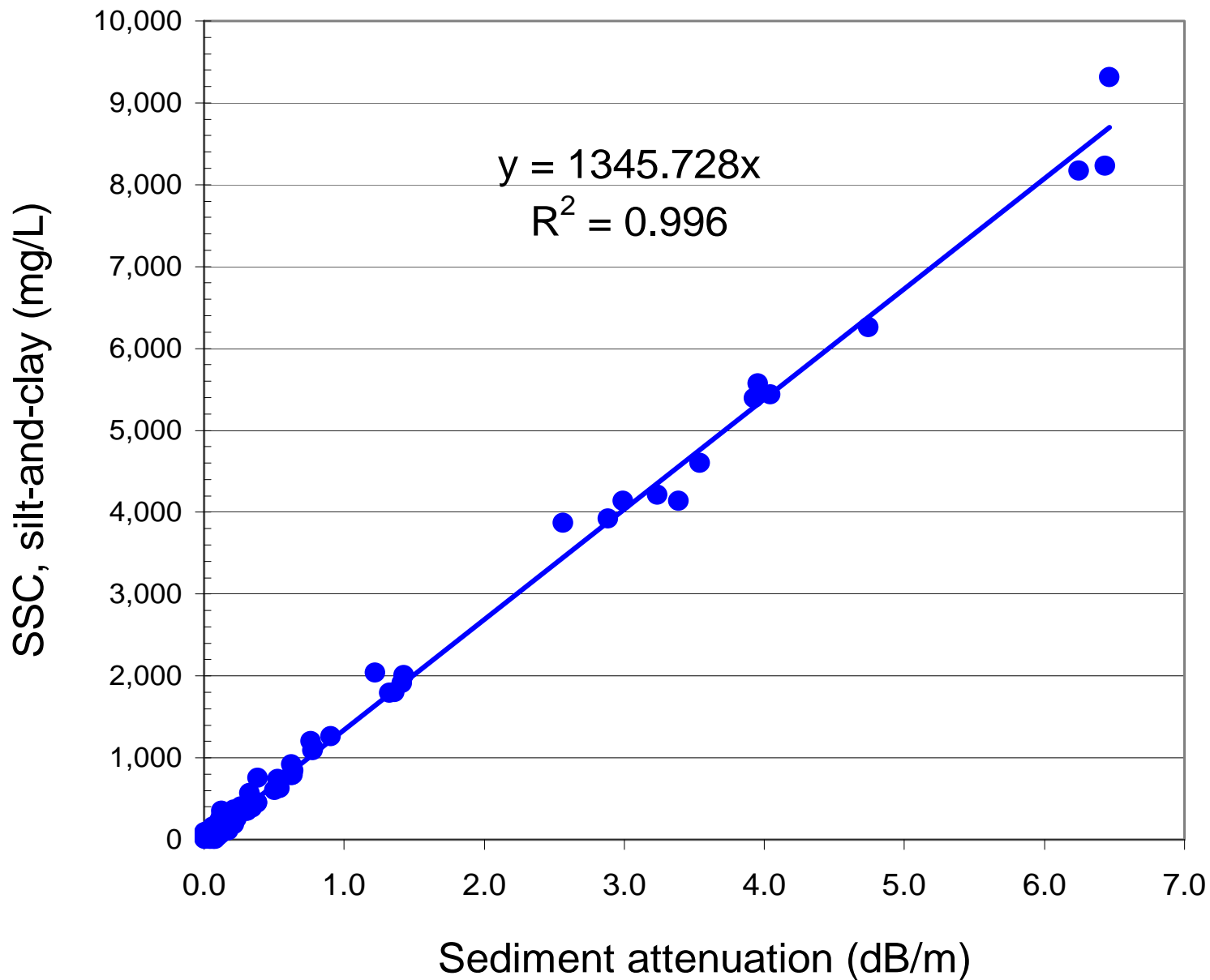
▼ Continuous water-quality gage
▼ Discontinued continuous water-quality gage



Velocity sensors (Index-Velocity ratings)



Silt-and-clay vs Backscatter Attenuation - Colorado River



Moving Forward Potential

