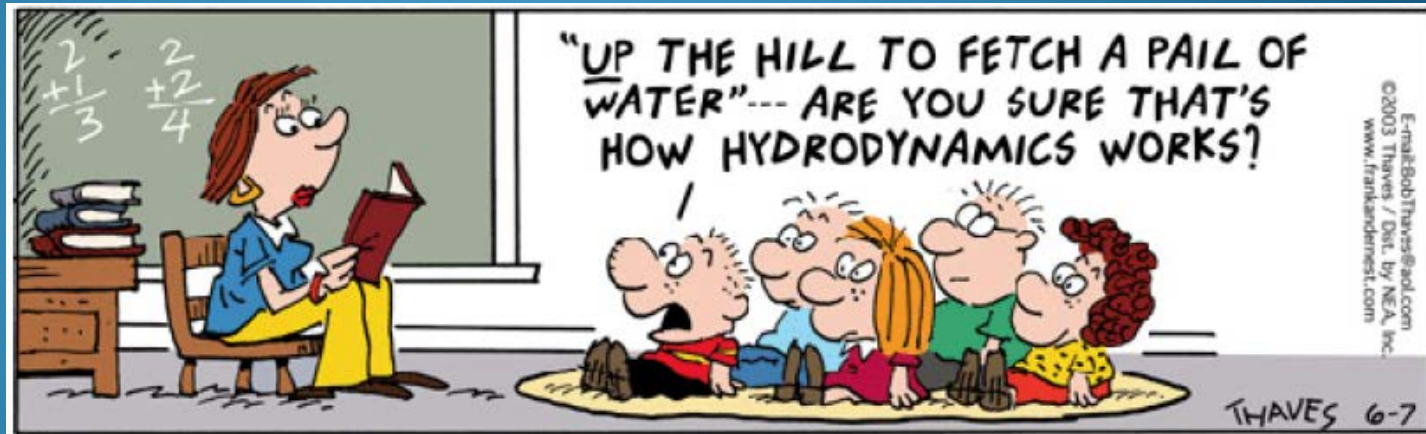


USGS Streamgaging

Gary P. Johnson
Civil Engineer / Hydrologist
USGS – IL Water Science Center
Urbana, IL



What is the USGS?

- U.S. Geological Survey
 - Nation's largest Earth Science agency
 - Department of Interior
 - No regulatory responsibility
- Mission
 - Provide Geologic, Geographic, Hydrologic and Biologic information for the “Public Good”
 - Data collection and Interpretive projects

**"I was raised on this river,
and I've never seen it this high.
No one alive has seen it this high."**





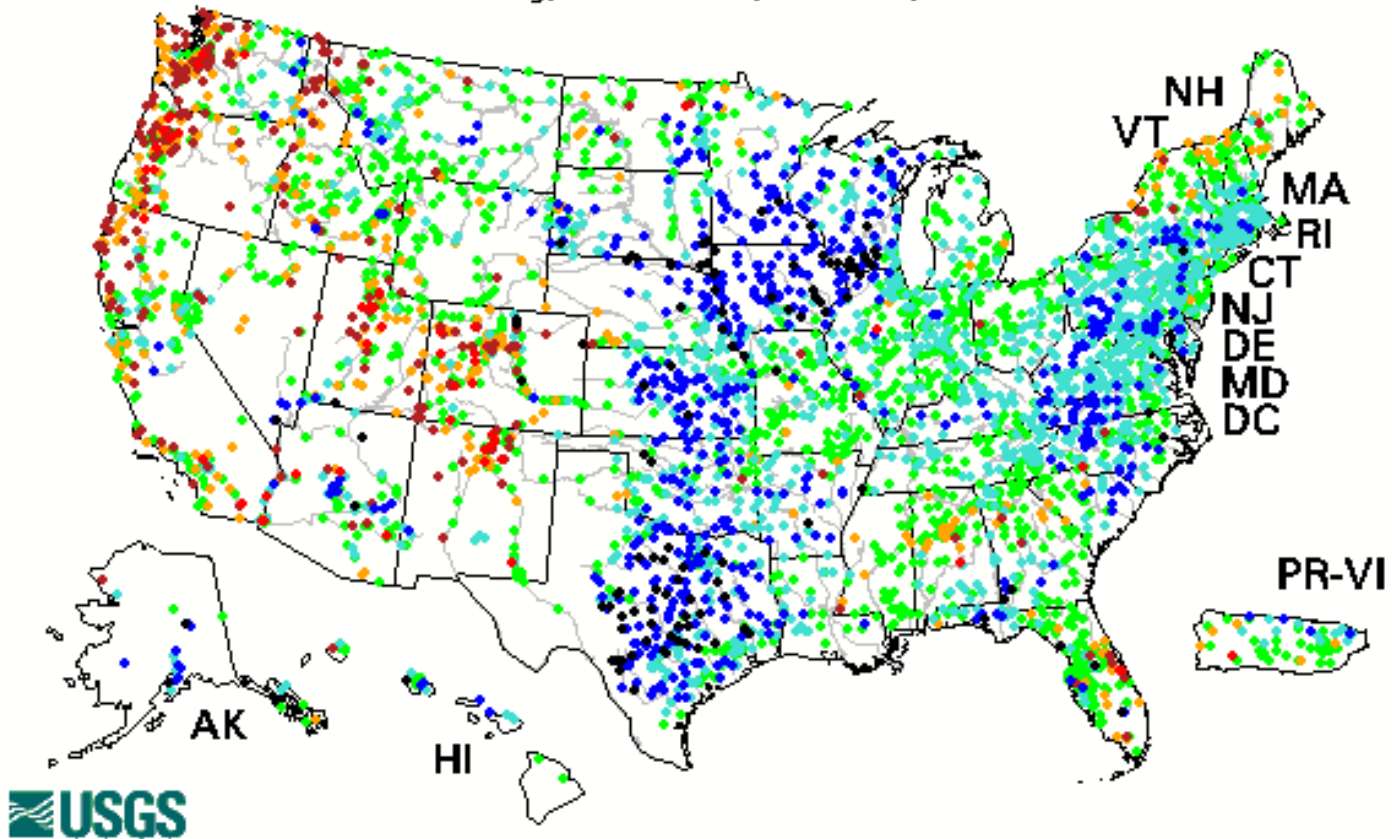
Crowds panic as flooding threatens Ireland...

1st USGS Streamgage

- Rio Grande River near Embudo, NM 1889



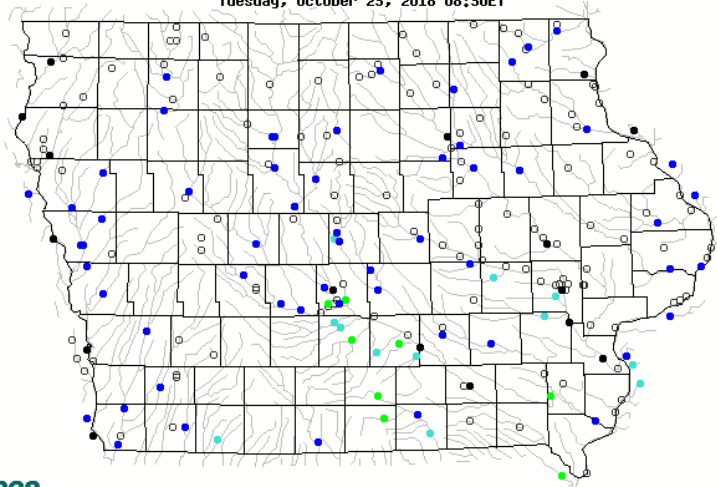
Tuesday, October 23, 2018 08:30ET



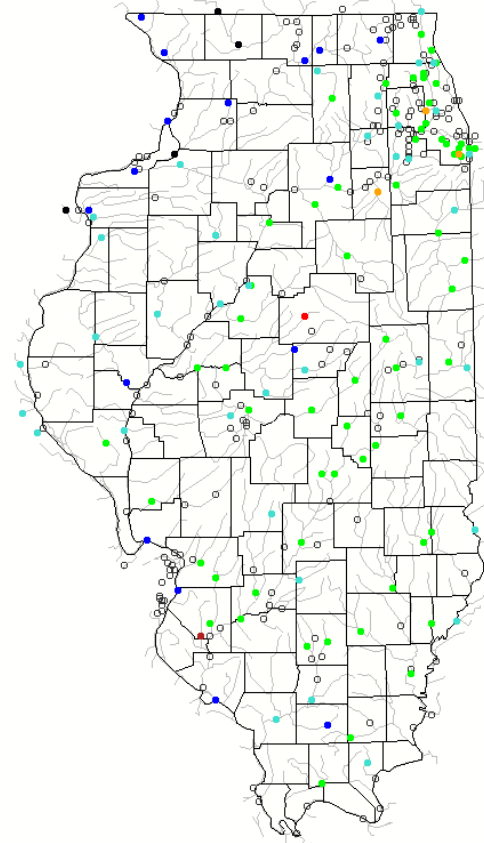
Explanation - Percentile classes

Low	<10	10-24	25-75	76-90	>90	High
	Much below normal	Below normal	Normal	Above normal	Much above normal	

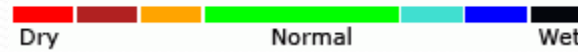
Tuesday, October 23, 2018 08:30ET



Tuesday, October 23, 2018 08:30ET



Current streamflow conditions

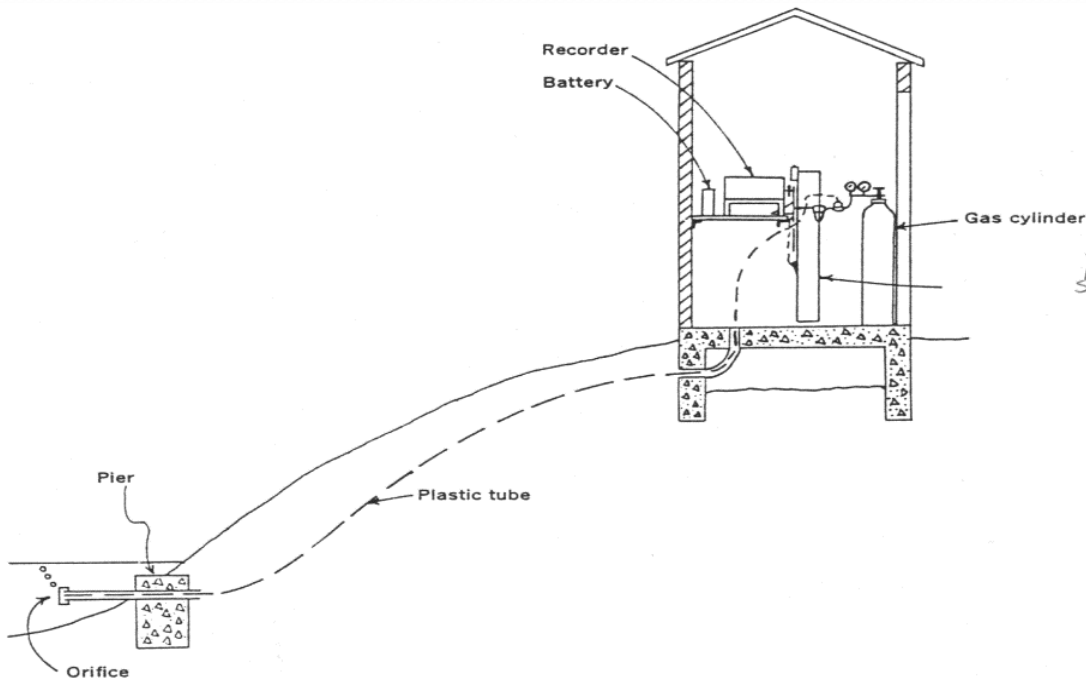




USGS
STREAMFLOW MONITORING STATION
U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY
WATER RESOURCES DIVISION
SPRINGFIELD, MISSOURI
CONTACT: 618-338-6222
http://water.usgs.gov

06/08/2012

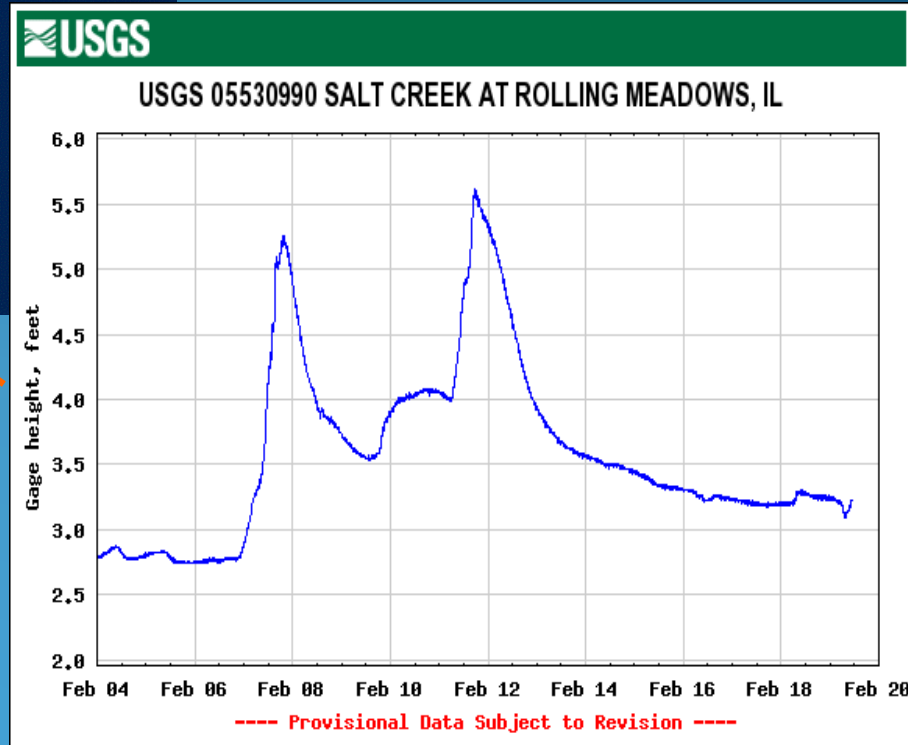
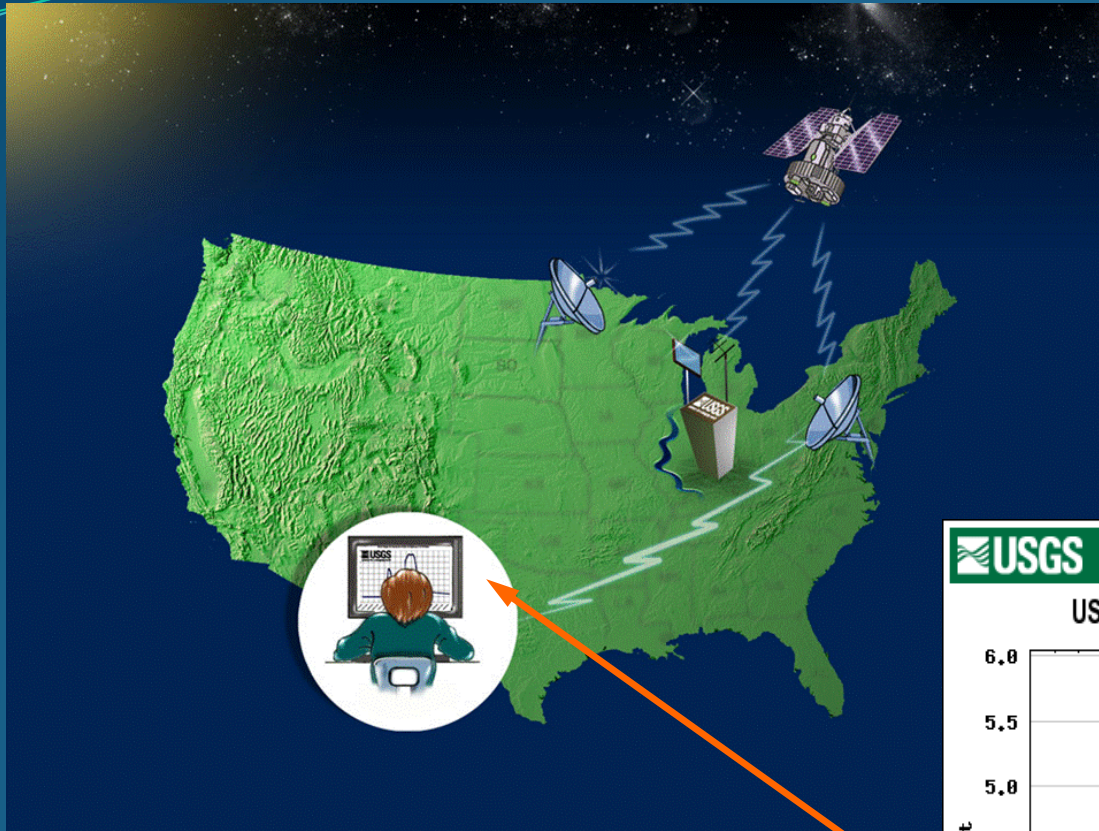
6. 26. 2007



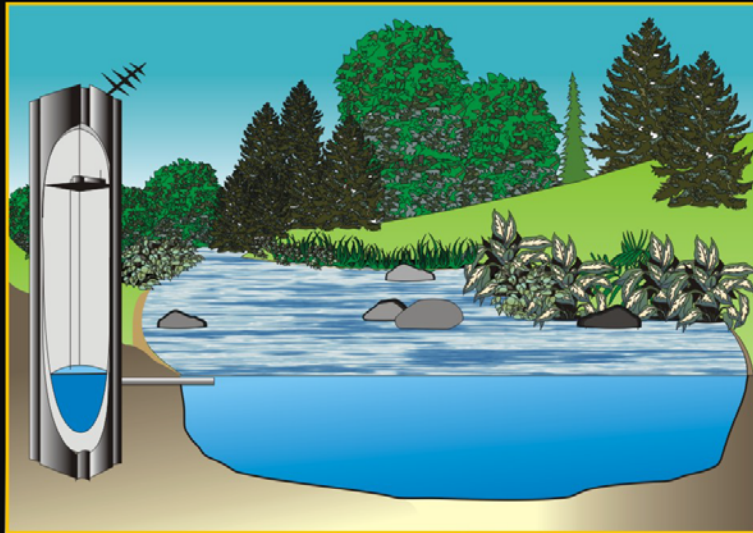




Example of Flow of Satellite Data



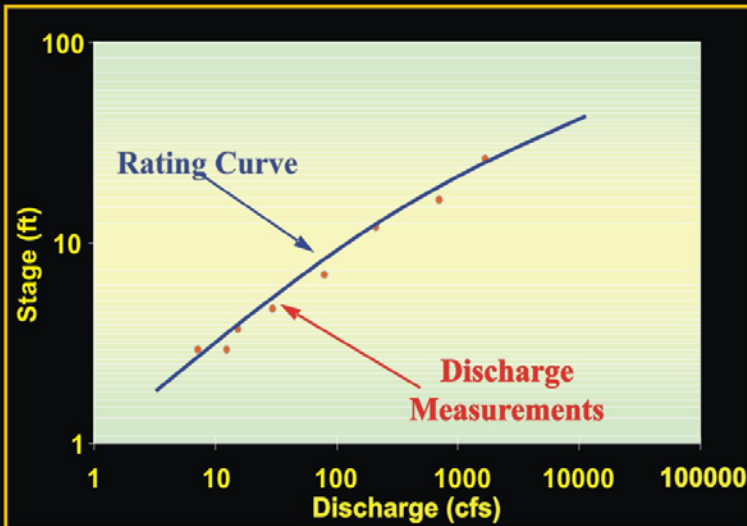
Streamgaging Process



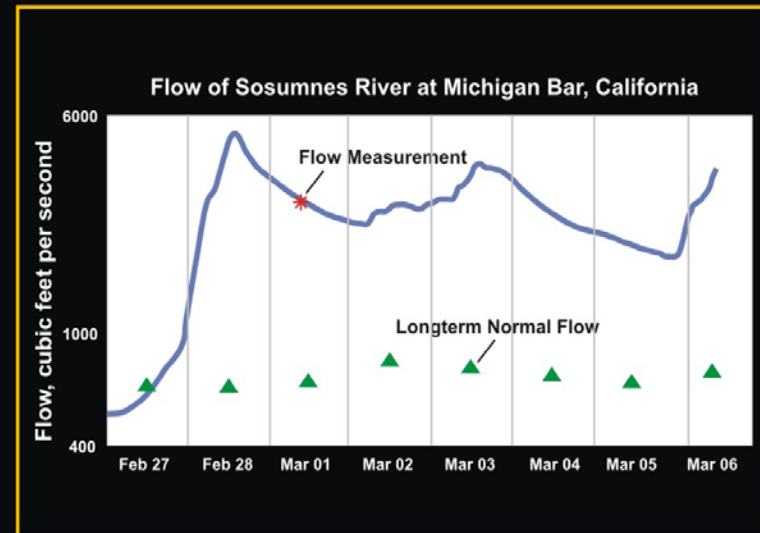
Monitor River Level



Measure Flow



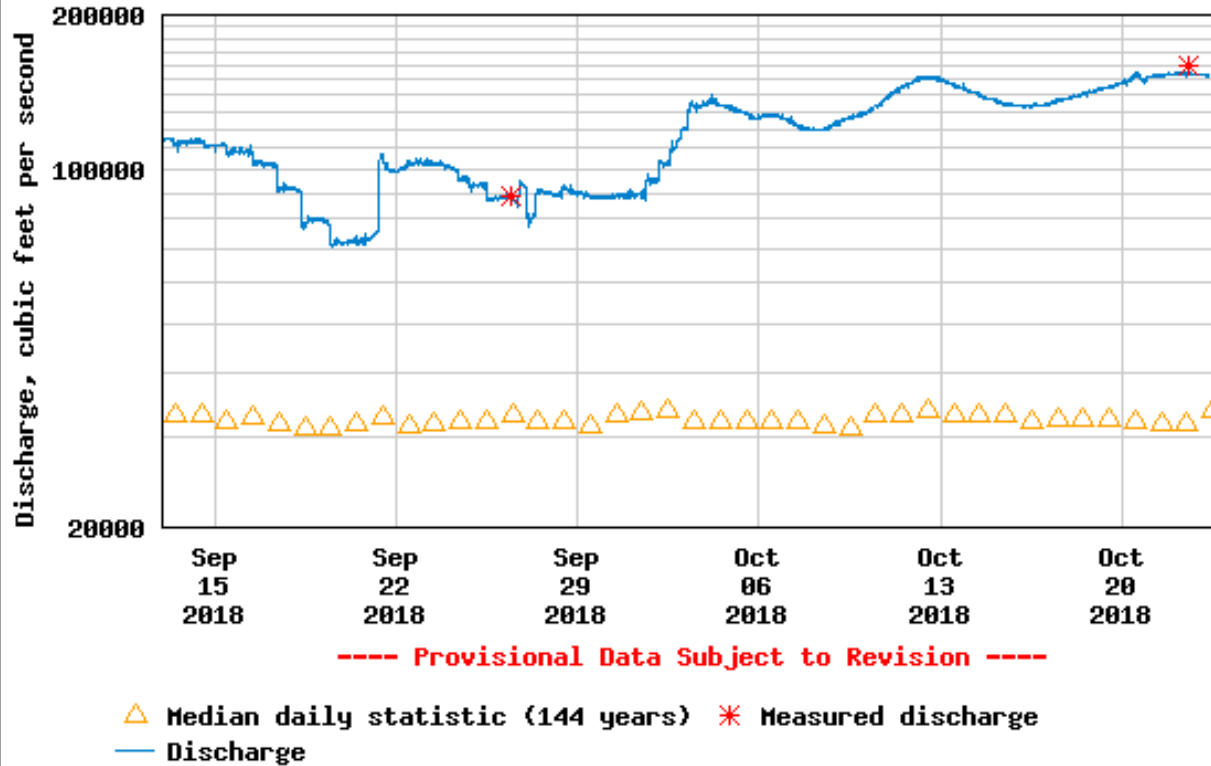
Relate Water Level to Flow



Disseminate Information



USGS 05420500 Mississippi River at Clinton, IA



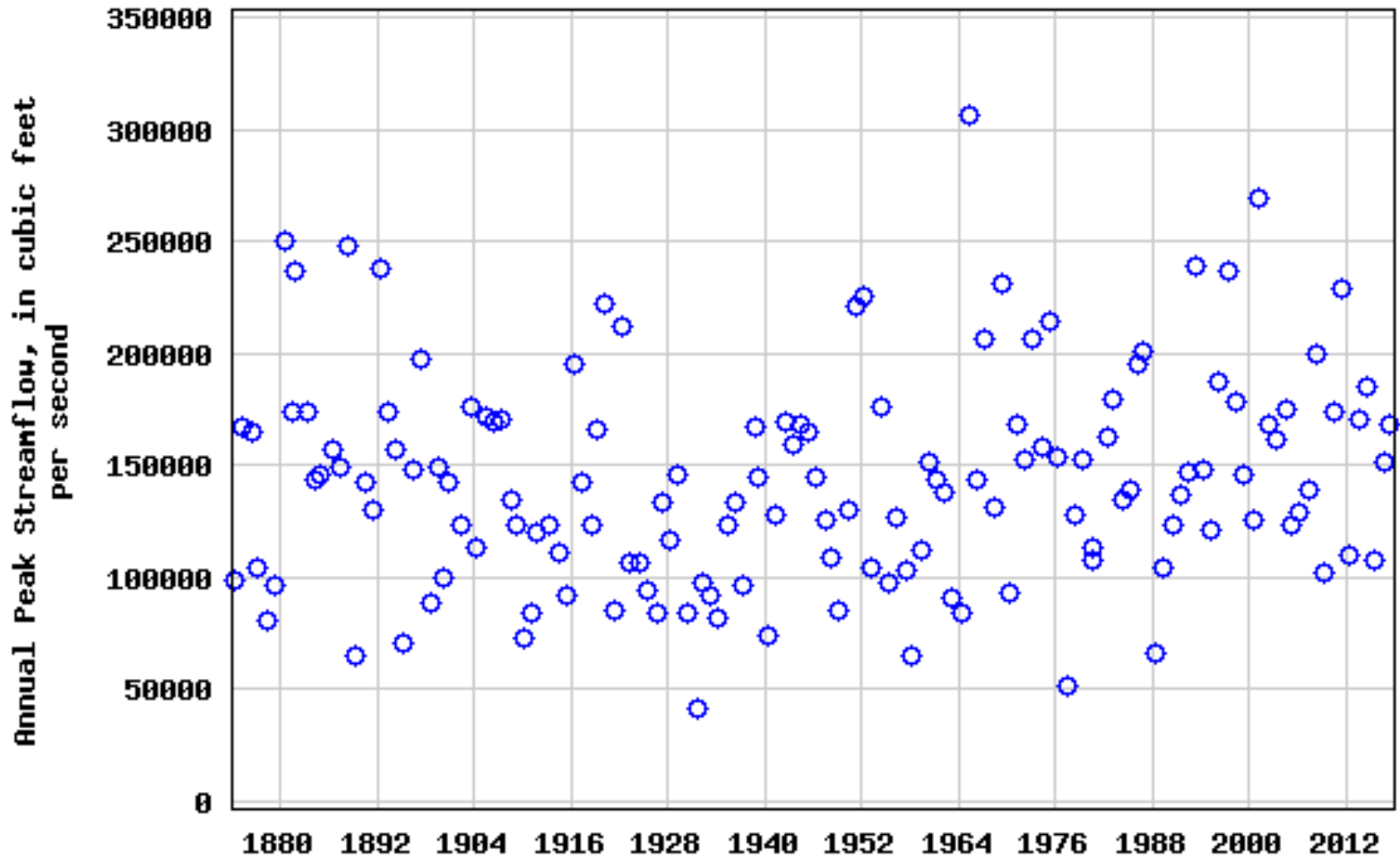
05420500 Mississippi River at Clinton, IA

LOCATION - Lat 41°46'50", long 90°15'07" referenced to North American Datum of 1927, in SW 1/4 SE 1/4 NW 1/4 sec.34, T.81 N., R.6 E., Clinton County, IA, Hydrologic Unit 07080101, on right bank near end of 8th Avenue in Camanche, 5.0 mi upstream from Wapsipinicon River, 6.4 mi downstream from Clinton, 10.6 mi downstream from Lock and Dam 13, and 511.8 mi upstream from Ohio River. The Real-Time Water Quality Gage, Lat 41°52'44.688", long 90°10'20.3514" is located 1 mile upstream of the Highway 136 bridge, where the NASQAN water quality sampling occurs.

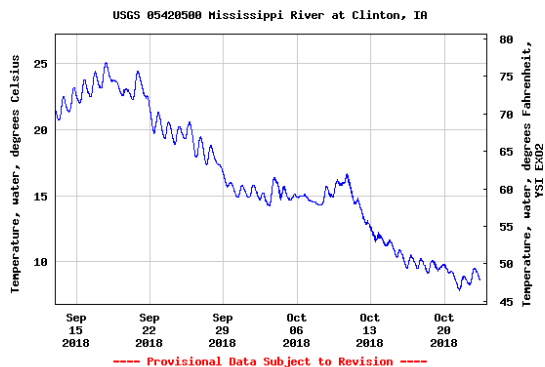
DRAINAGE AREA - 85,600 mi².

EXTREMES OUTSIDE PERIOD OF RECORD - Since at least 1828, no flood outside the period of record exceeded the April 28, 1965, stage of 24.65 ft.

USGS 05420500 Mississippi River at Clinton, IA



Temperature, water, degrees Celsius, YSI EX02
 Most recent instantaneous value: 8.7 10-23-2018 09:15 CDT



Create [presentation-quality](#) / [stand-alone](#) graph. Subscribe to [WaterAlert](#) P00010.

[Share this graph](#) | [f](#) [t](#) [g+](#) [v](#)

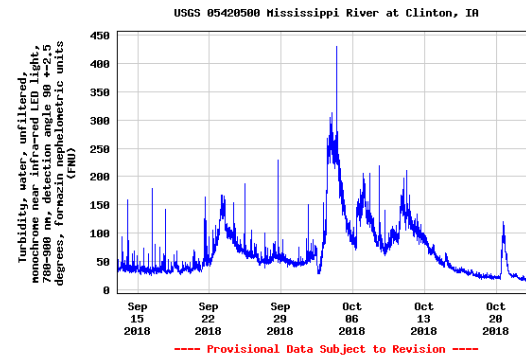
Dissolved oxygen, water, unfiltered, milligrams per liter, YSI EX02
 Most recent instantaneous value: 9.9 10-23-2018 09:15 CDT



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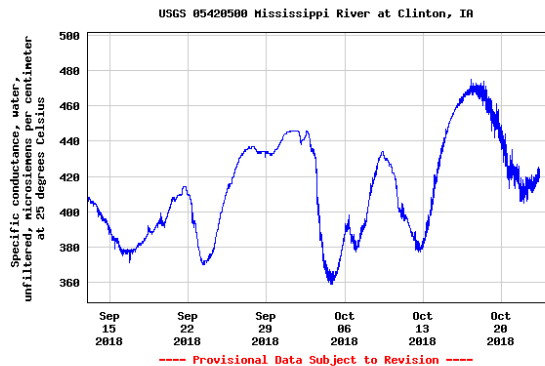
[Share this graph](#) | [f](#) [t](#) [g+](#) [v](#)

Turbidity, water, unfiltered, monochrome near infra-red LED light, 78 EX02
 Most recent instantaneous value: 17.5 10-23-2018 09:15 CDT



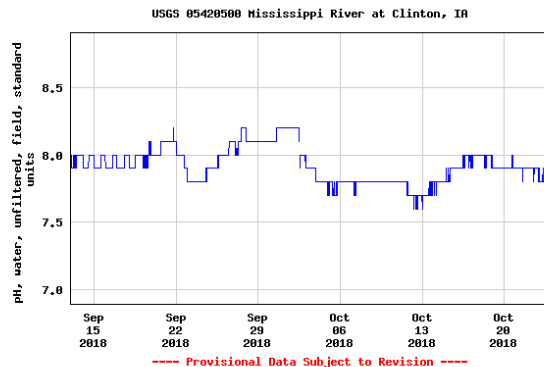
Create [presentation-quality](#) / [stand-alone](#) graph. Subscribe to [WaterAlert](#) P63680.

Specific conductance, water, unfiltered, microsiemens per centimeter
 Most recent instantaneous value: 424 10-23-2018 09:15 CDT



Create [presentation-quality](#) / [stand-alone](#) graph. Subscribe to [WaterAlert](#) P00095.

pH, water, unfiltered, field, standard units, YSI EX02
 Most recent instantaneous value: 7.8 10-23-2018 09:15 CDT



Create [presentation-quality](#) / [stand-alone](#) graph. Subscribe to [WaterAlert](#) P00400.

Nitrate plus nitrite, water, in situ, milligrams per liter as nitrogen, I
 Most recent instantaneous value: 3.26 10-23-2018 09:15 CDT



Create [presentation-quality](#) / [stand-alone](#) graph. Subscribe to [WaterAlert](#) P99.



**West Fork
Cedar River
near
Finchford, IA**

2008 Flood

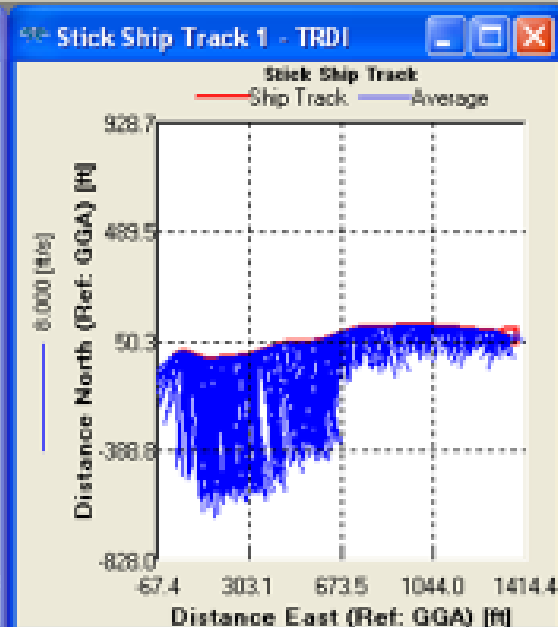
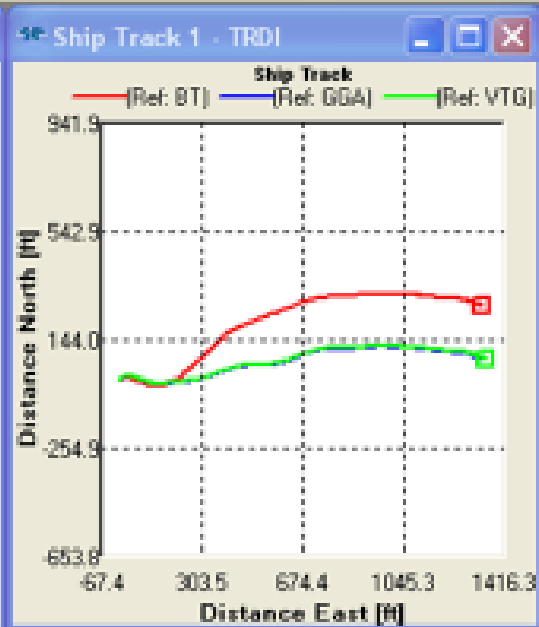
File Configure View Acquire Playback Window Help



Measure... [X]

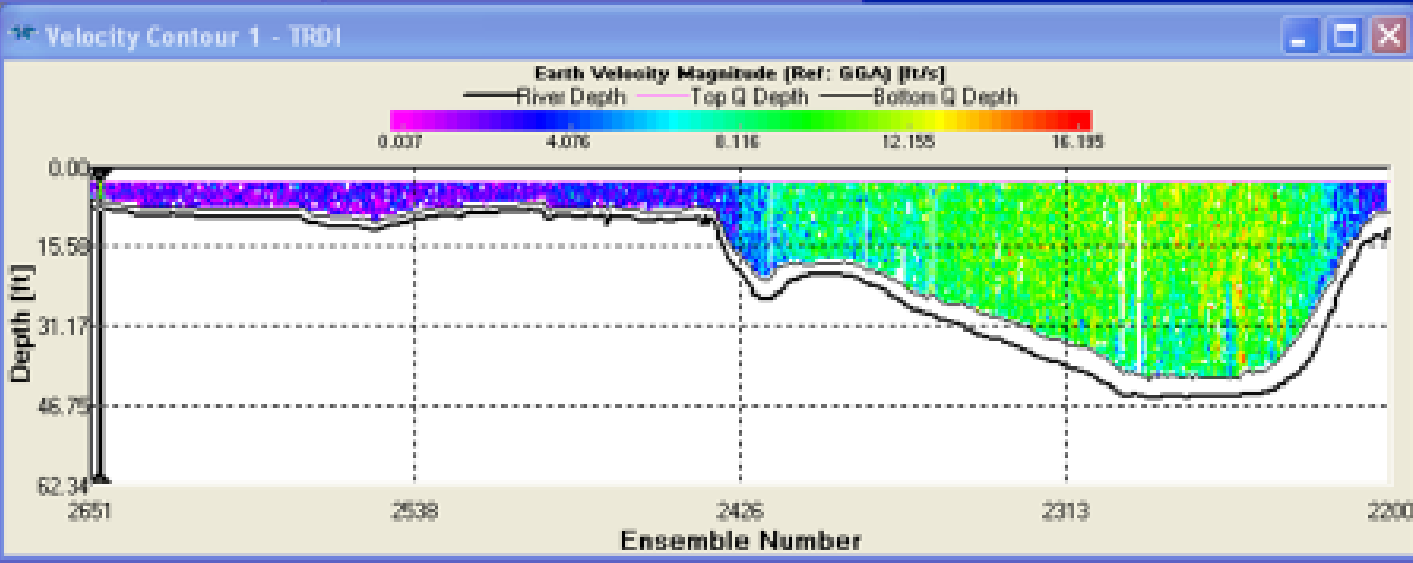
06610000_5049.mwk

- Site Information
- Site Discharge
- Transect 000
- Transect 001
- Transect 002
- Transect 003**
- Discharge Summary
- QA/QC
- ADCP Test
- Compass Calibration
- Compass Evaluation
- Moving Bed Test
 - Loop 000
 - MBT Summary
- Collect Data



Composite Tabular 1 - ...

Ens. Nmb.	Nmb. of Ens.	Lost
2648	449	
Bad Ens.	%Bad Bins	Del:
2	5%	
July 25, 2011 09:24:13.99		
Pitch	Roll	
-0.86°	0.59°	
Temp.	Press. Sensor	
27.54°C	NA	
Discharge (Ref: GGA) Right to Left		
Good Bins		2
Top Q		21468.373
Measured Q		153375.596
Bottom Q		20404.674
Left Q		0.000
Right Q		988.884
Total Q		196237.526



MBT Corrected Q

Navigation (Ref: GGA)	
Boat Speed	2.690
Boat Course	111.03
Water Speed	0.356
Water Dir.	223.29
Calc. Depth	7.921
Length	1378.71
Distance MG	1348.96
Course MG	86.98
Duration	304.39
Latitude	41° 15.7

Cedar River at Charles City, IA 2008 Flood USGS Crew Surveying



Cedar River near Cedar Rapids Highway 30 Road Overflow 2008 Flood





**Turkey River at Garber, IA
Winter Streamflow Measurement - 2011**

Users of Streamgaging Network

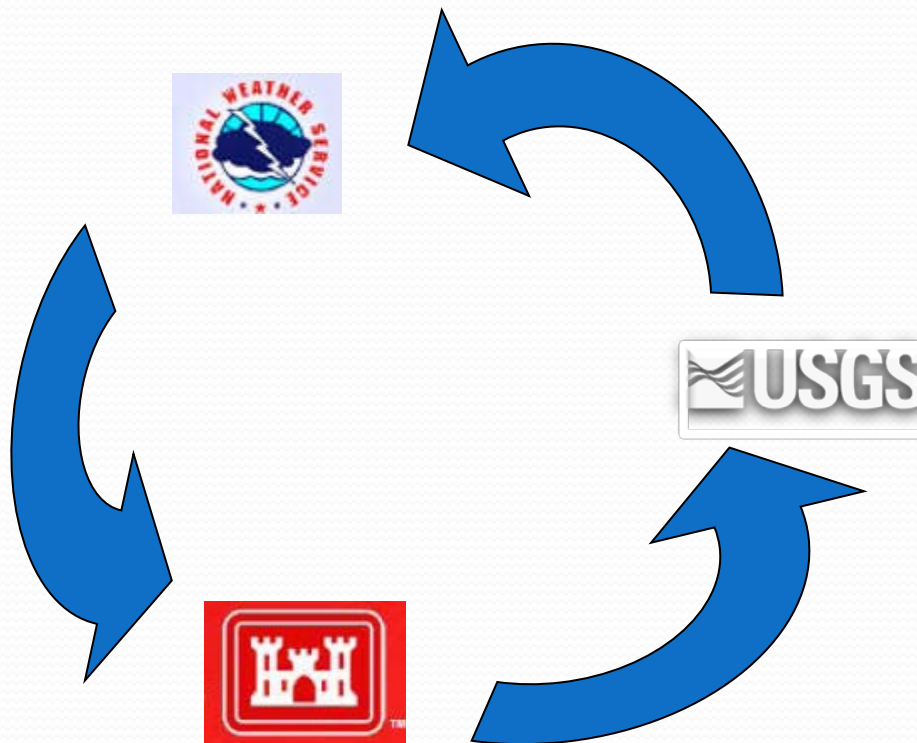
- NWS and others for flood forecasting
- Corps of Engineers for navigation and other projects
- DOT and others for bridge design
- NFIP for 100-yr flood elevation
- Informed citizenry
 - Recreationists, farmers, homeowners

The Process

USGS collects and provides streamgauge data

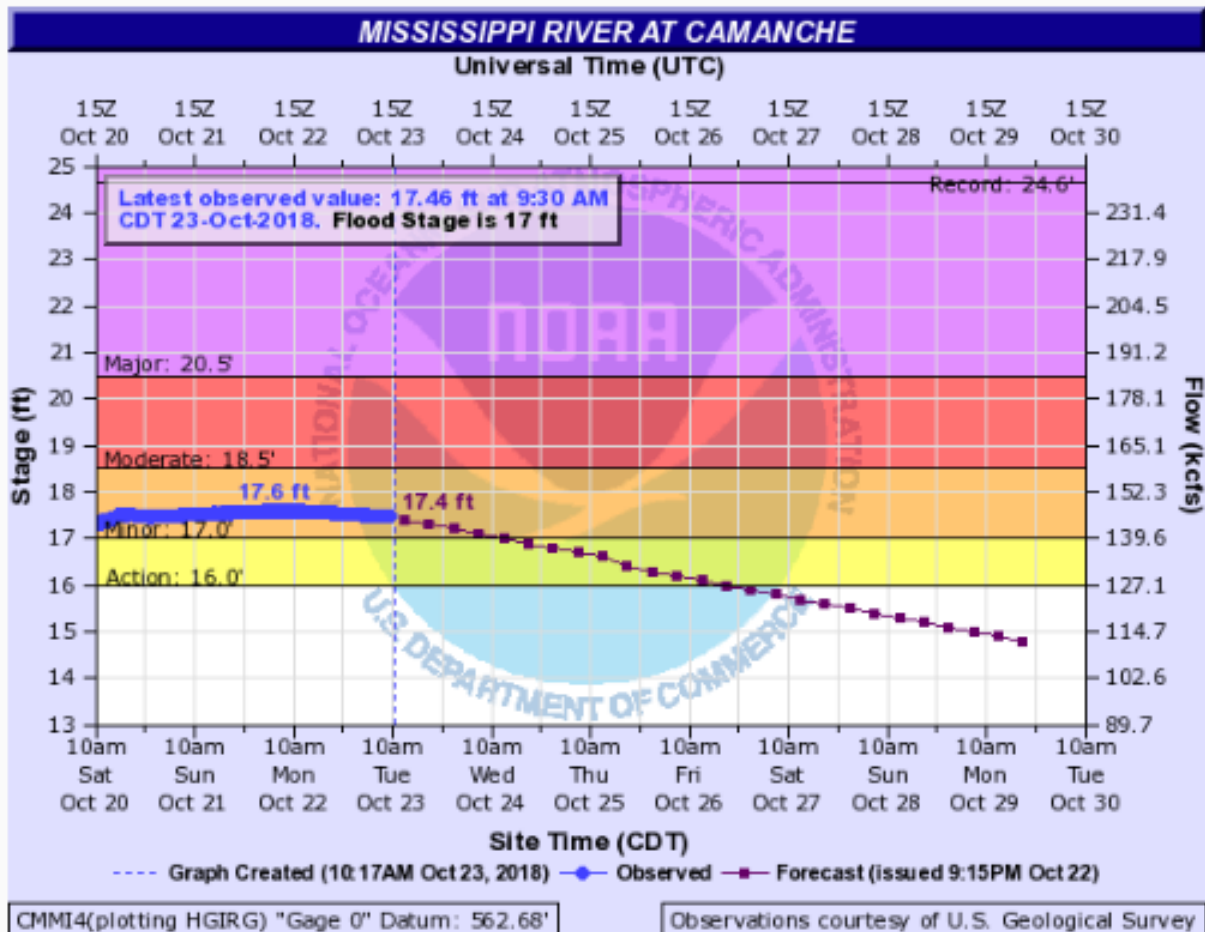
NWS uses the USGS streamgauge data,
coupled with their rainfall predictions,
to issue forecasts

Corps and many other entities use the NWS
forecasts to make operational decisions

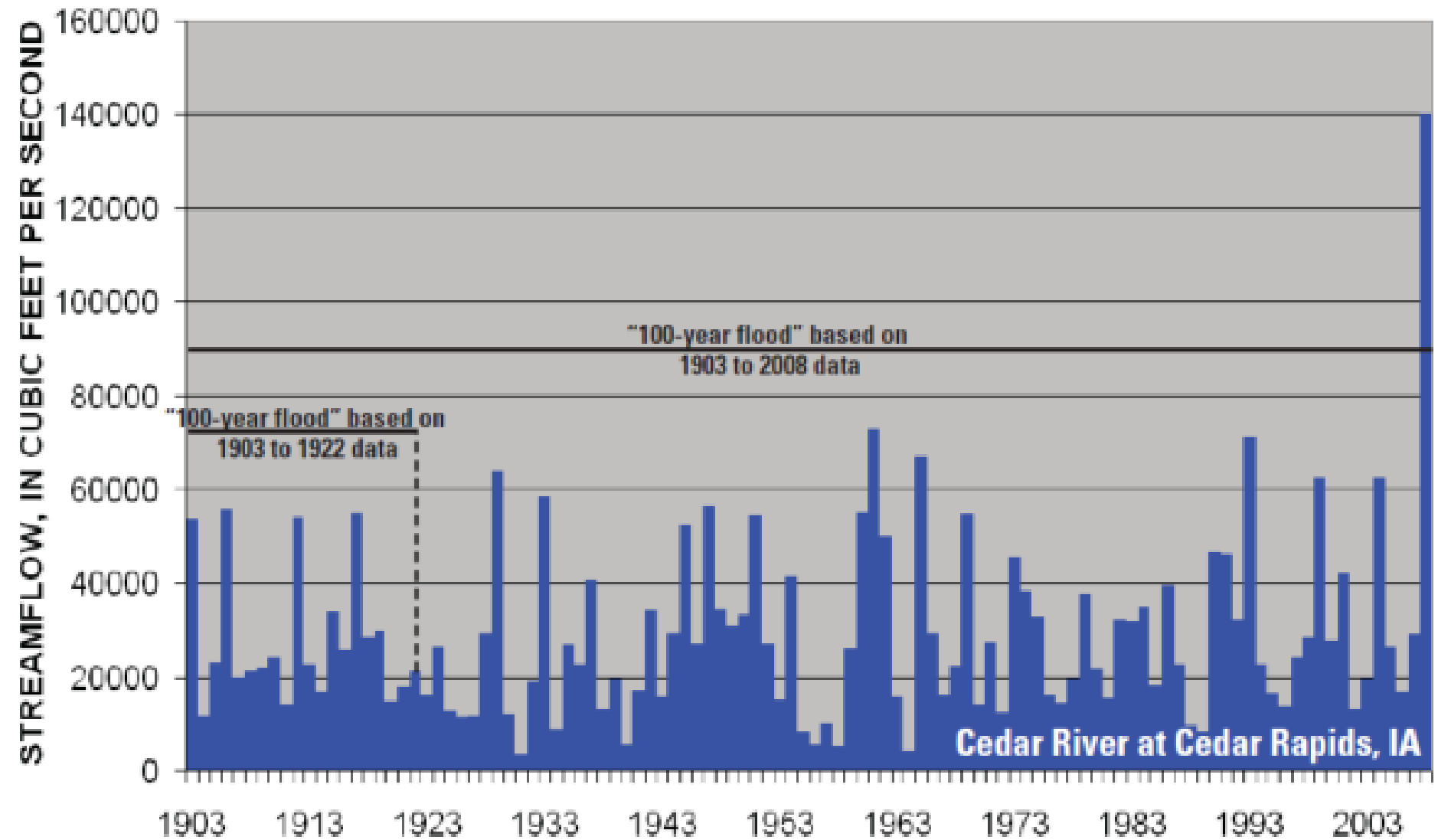




Advanced Hydrologic Prediction Service

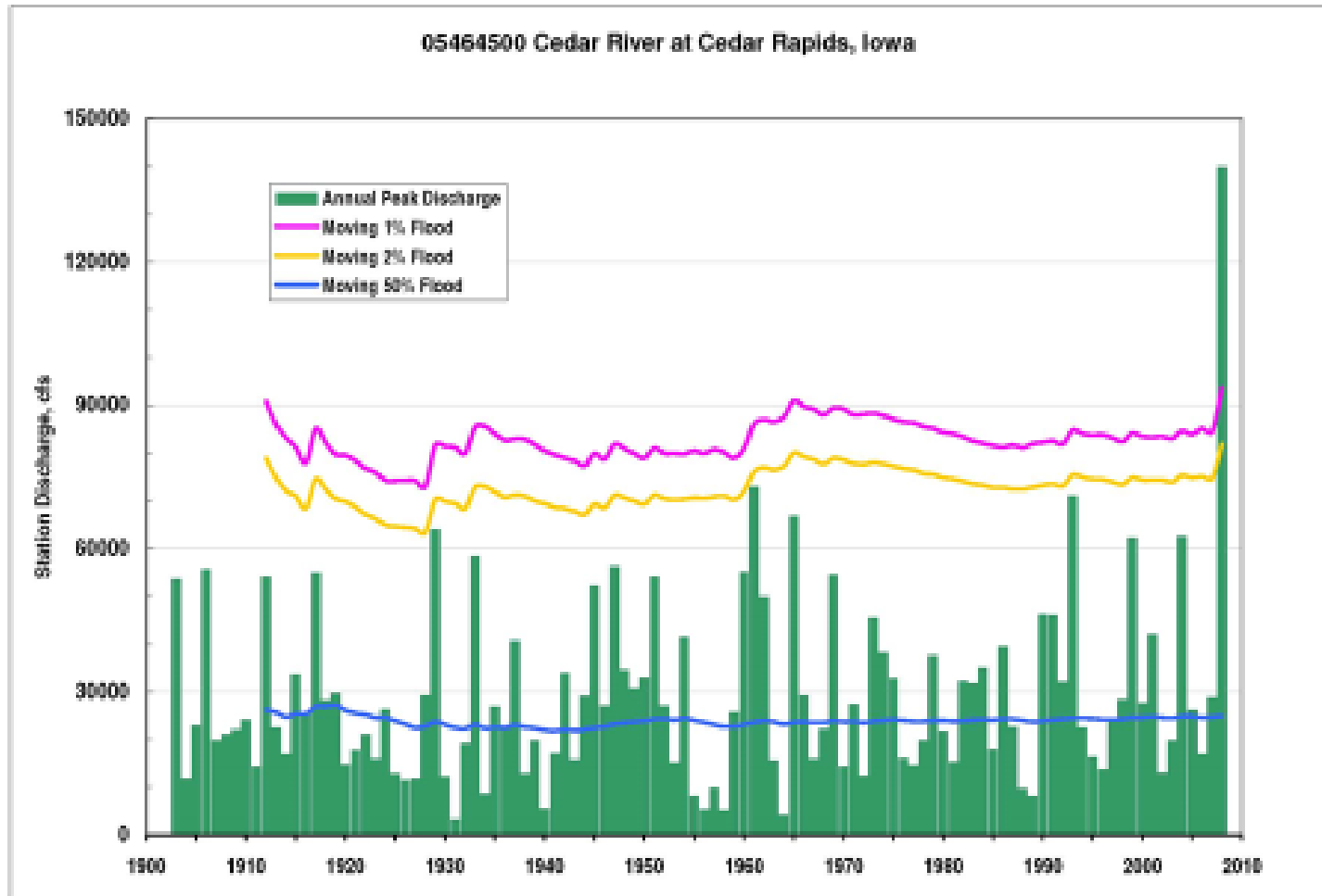


NOTE!!



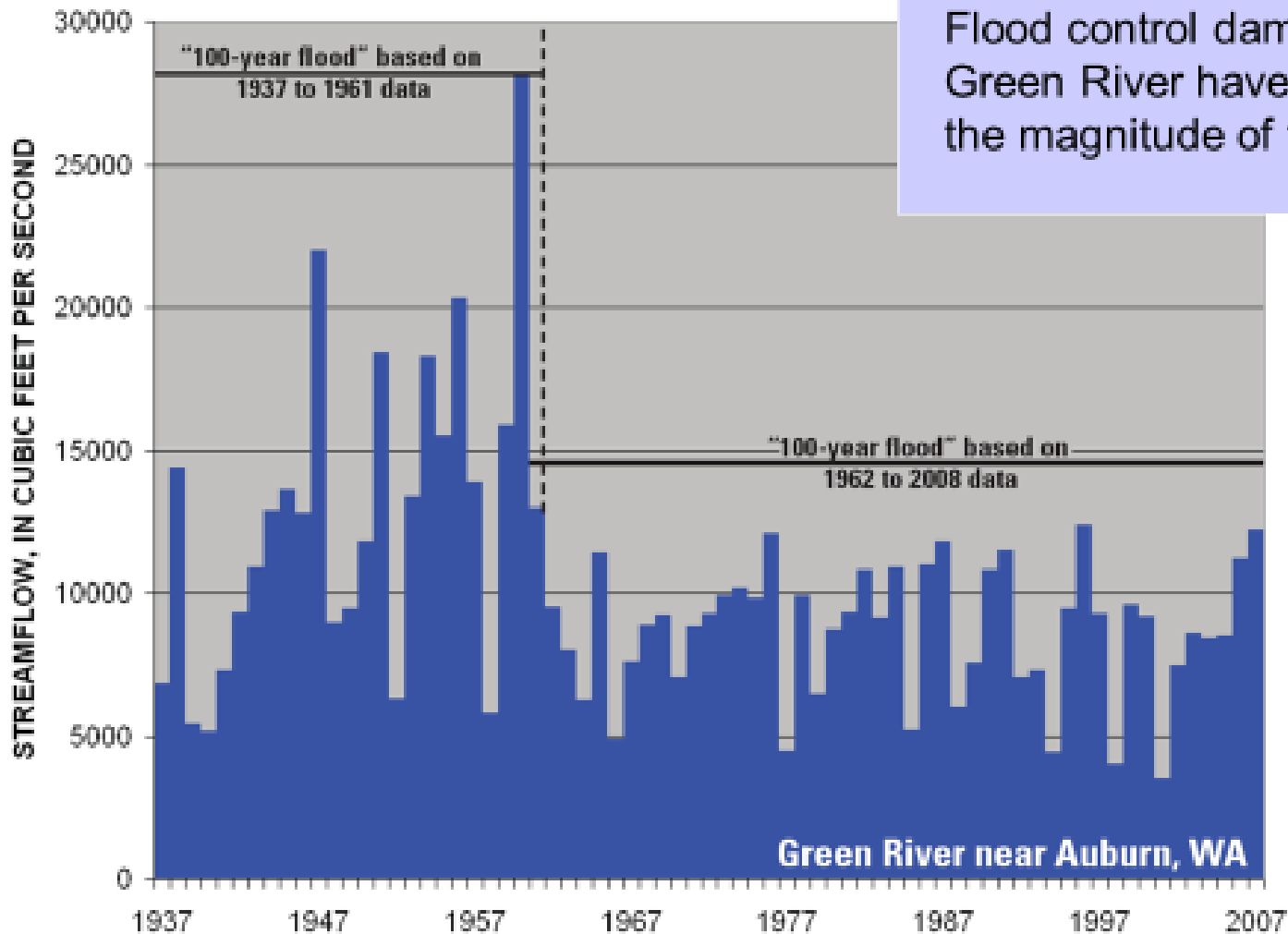
Cedar River at Cedar Rapids, Iowa

Changes to 100-Yr Estimate with Increased Data



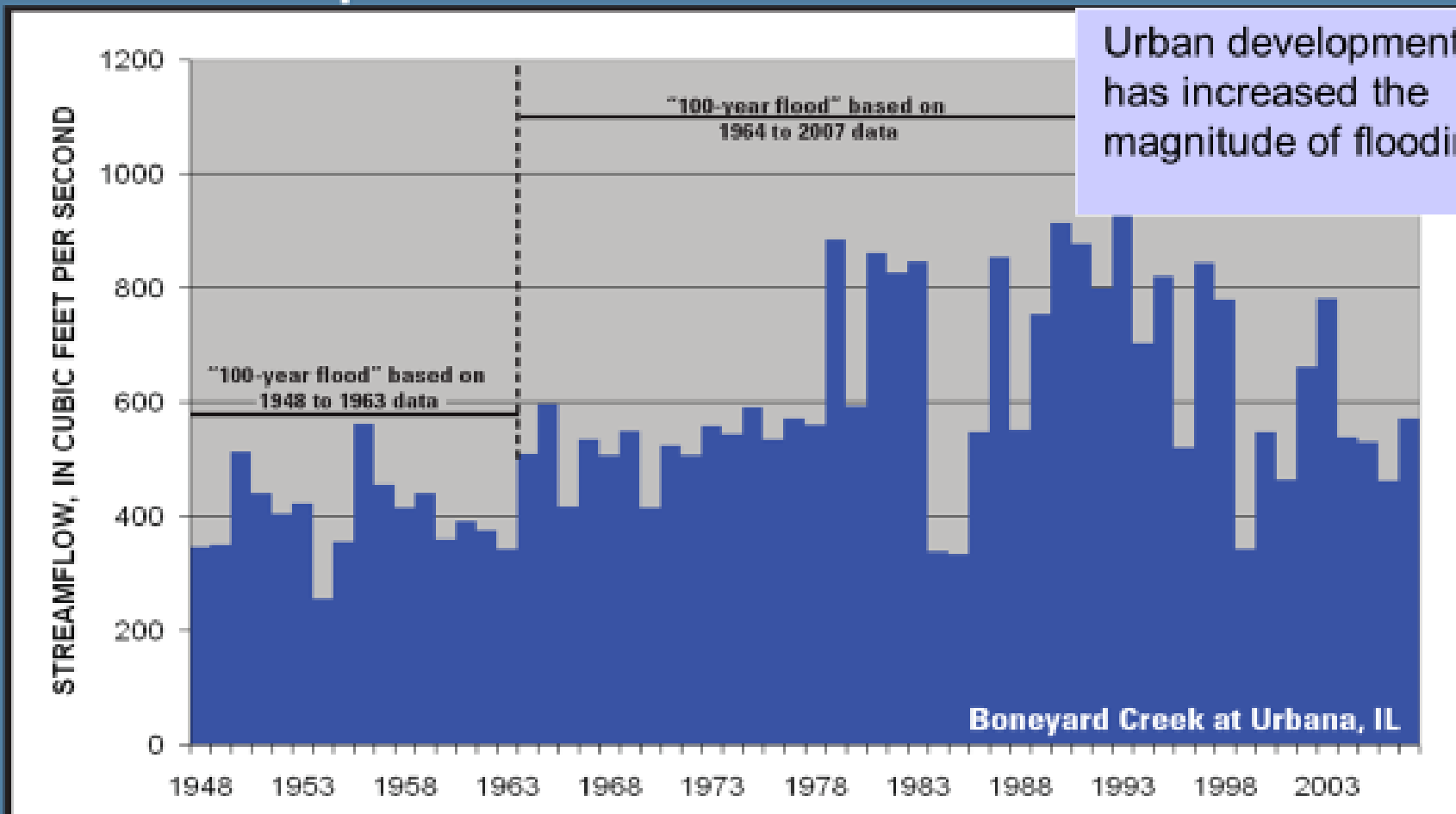
Installation of Flood Controls

Flood control dams on the Green River have reduced the magnitude of floods.



Urban Development

Urban development has increased the magnitude of flooding.



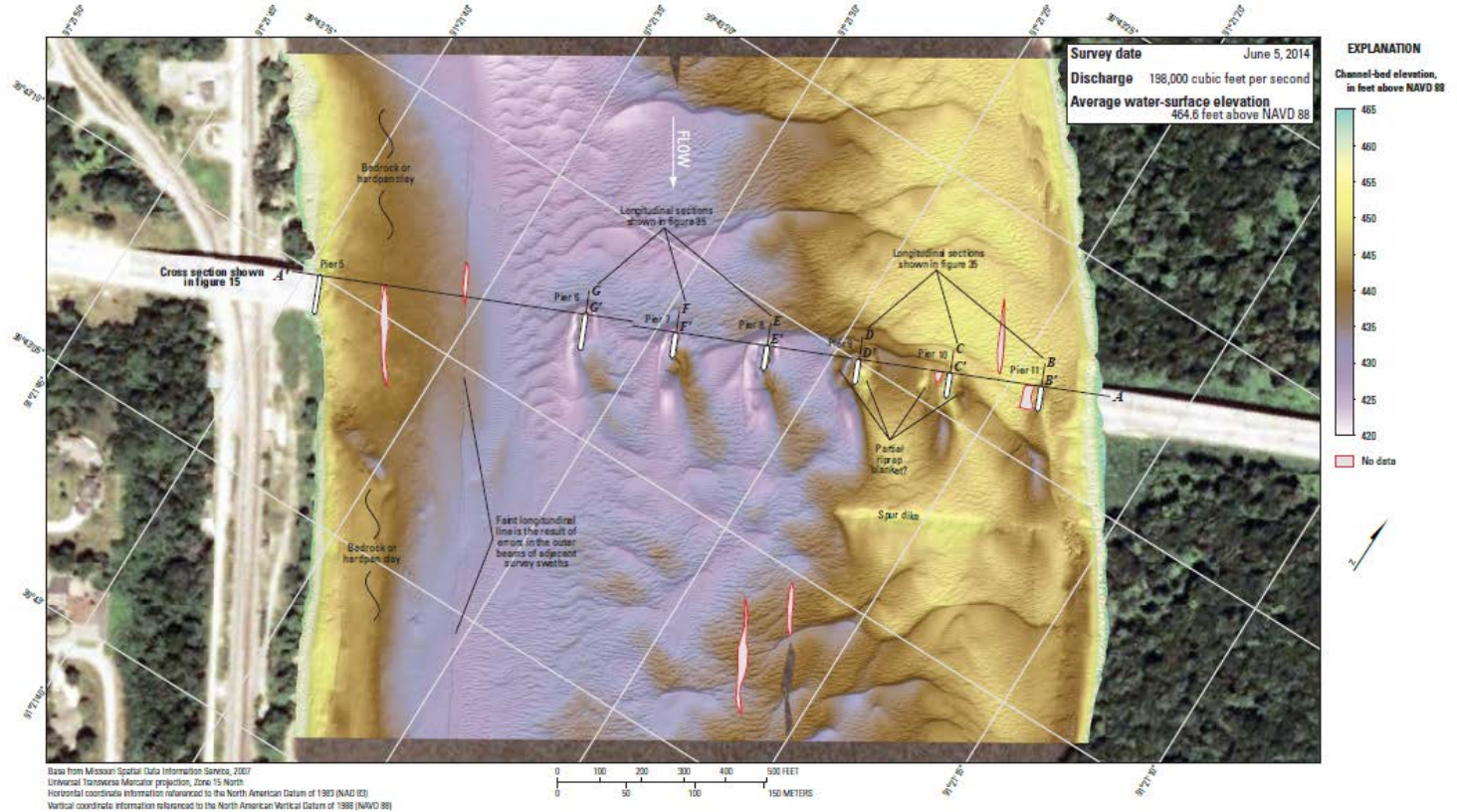


Figure 14. Bathymetric survey of the Mississippi River channel in the vicinity of structure A5054 on Interstate 72 at Hannibal, Missouri.





Questions?