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Monitoring Networks in Kentucky

Kentucky Farm Bureau

March 25, 2015

U.S. Department of the Interior
U.S. Geological Survey

Monitoring large rivers (to determine: "What is coming into Kentucky and what is going out"?) requires both discrete sampling and continuous monitoring as the systems are not, typically, well mixed.

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How do we collect defensible discrete data to validate continuous monitors?

Video
"USGS Sampling on the Mississippi"

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USGS monitoring stations or "super gages"

Continuous monitors

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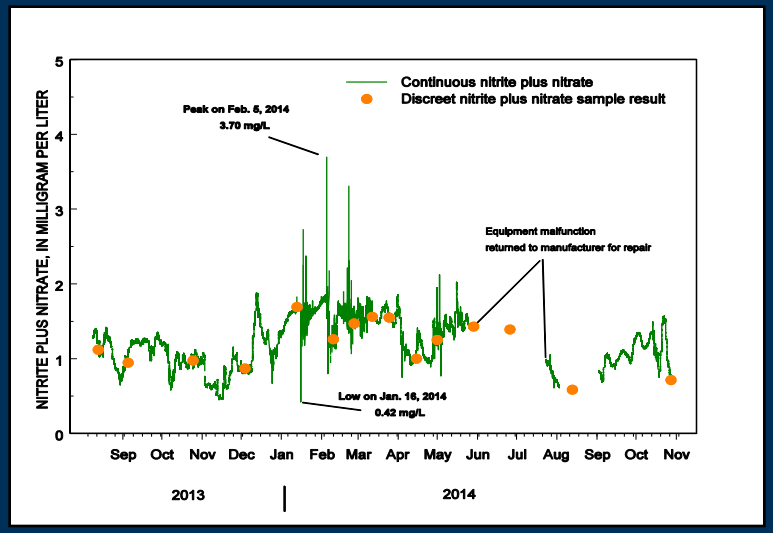
Super gages/Sentry gages (real-time continuous data)

- Advantages
  - Captures water-quality changes at night and during storms
  - Cost effective
  - Data confirmed via sampling (defensible)



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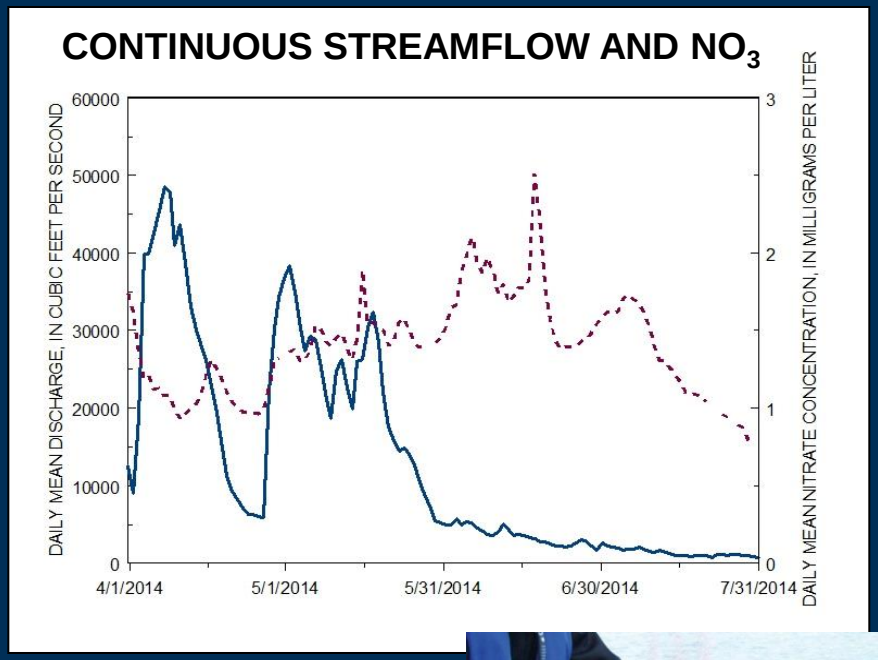
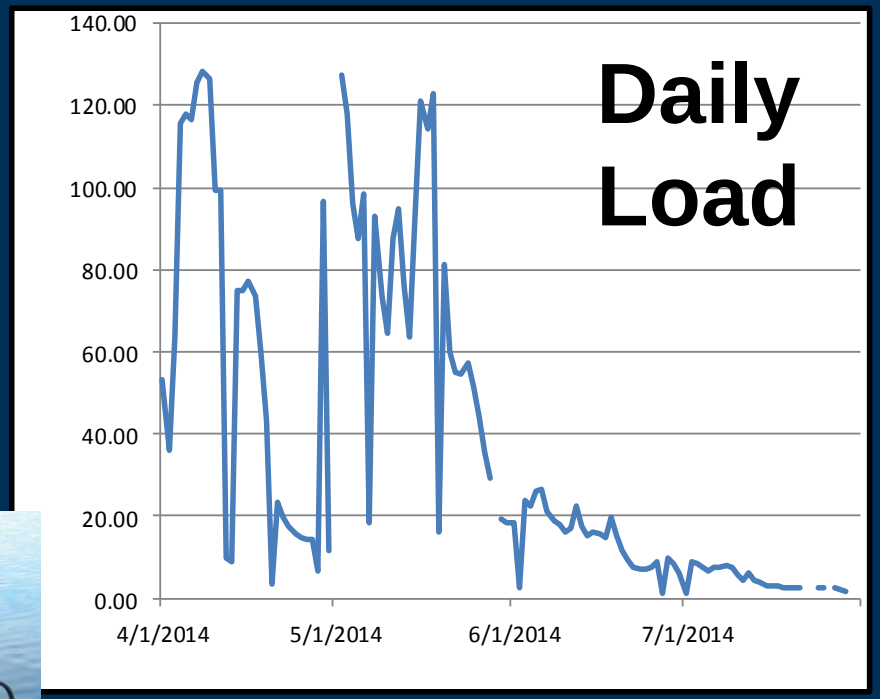
Real-time Nitrate Data

Green River at Spottsville, KY





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http://ky.water.usgs.gov/

Hydrologic monitoring networks

What is needed to answer the question: “What is coming into Kentucky and what is going out”?

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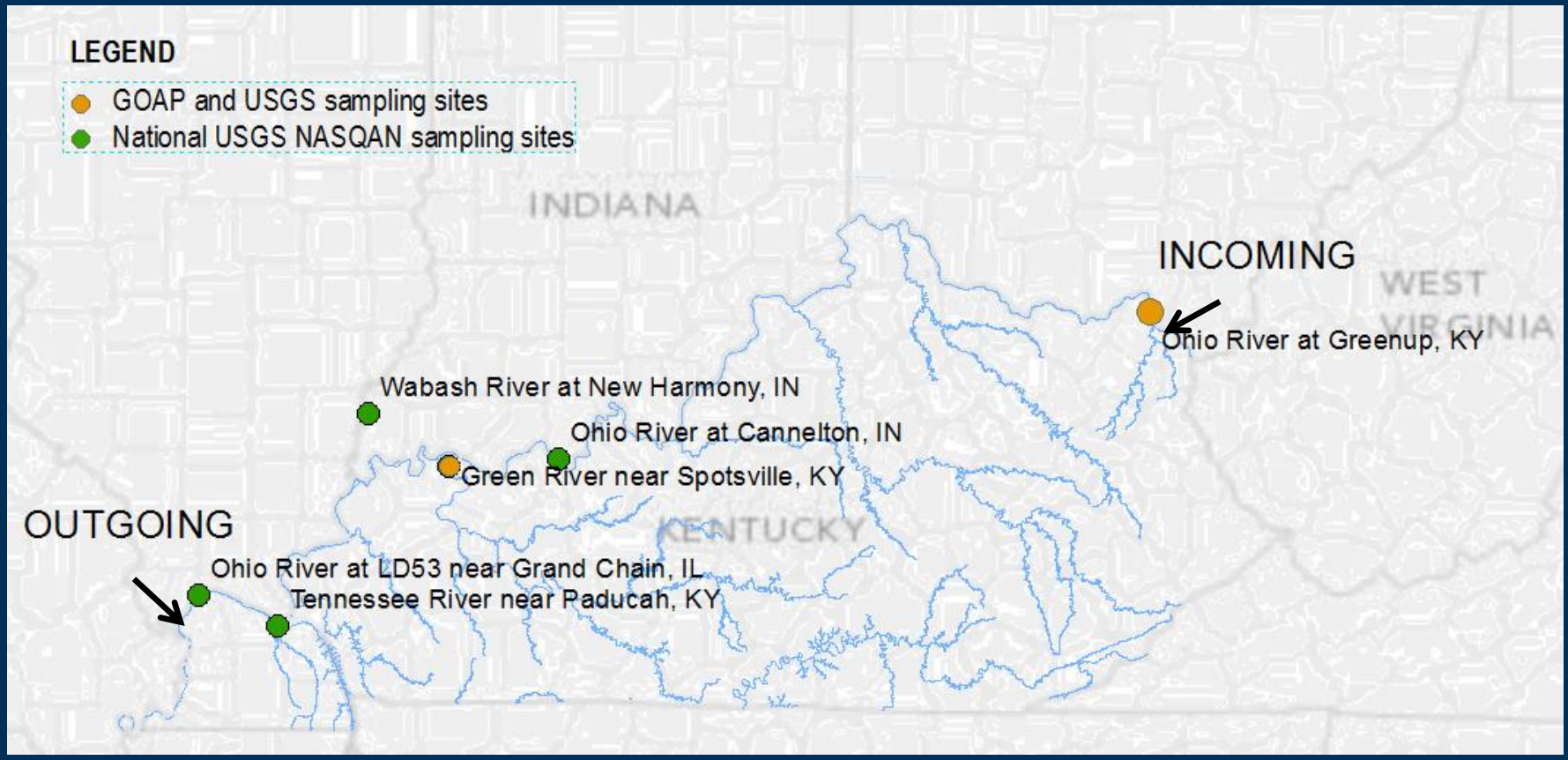
Site Locations where loads can currently be defensibly derived



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Hydrologic monitoring networks

What does this mean in terms of a network?

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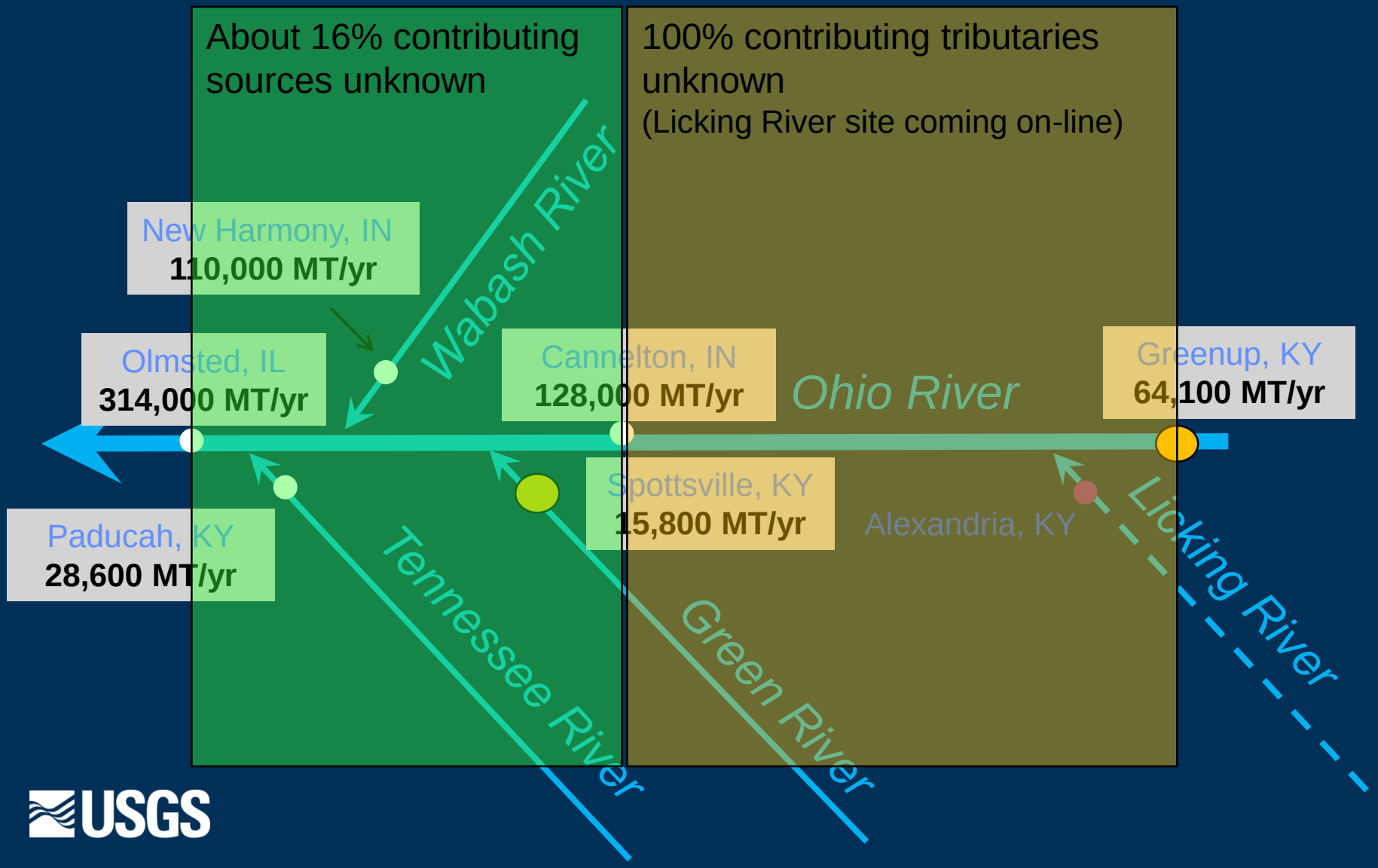
Nitrite plus nitrate loads



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Hydrologic monitoring networks

What is needed?

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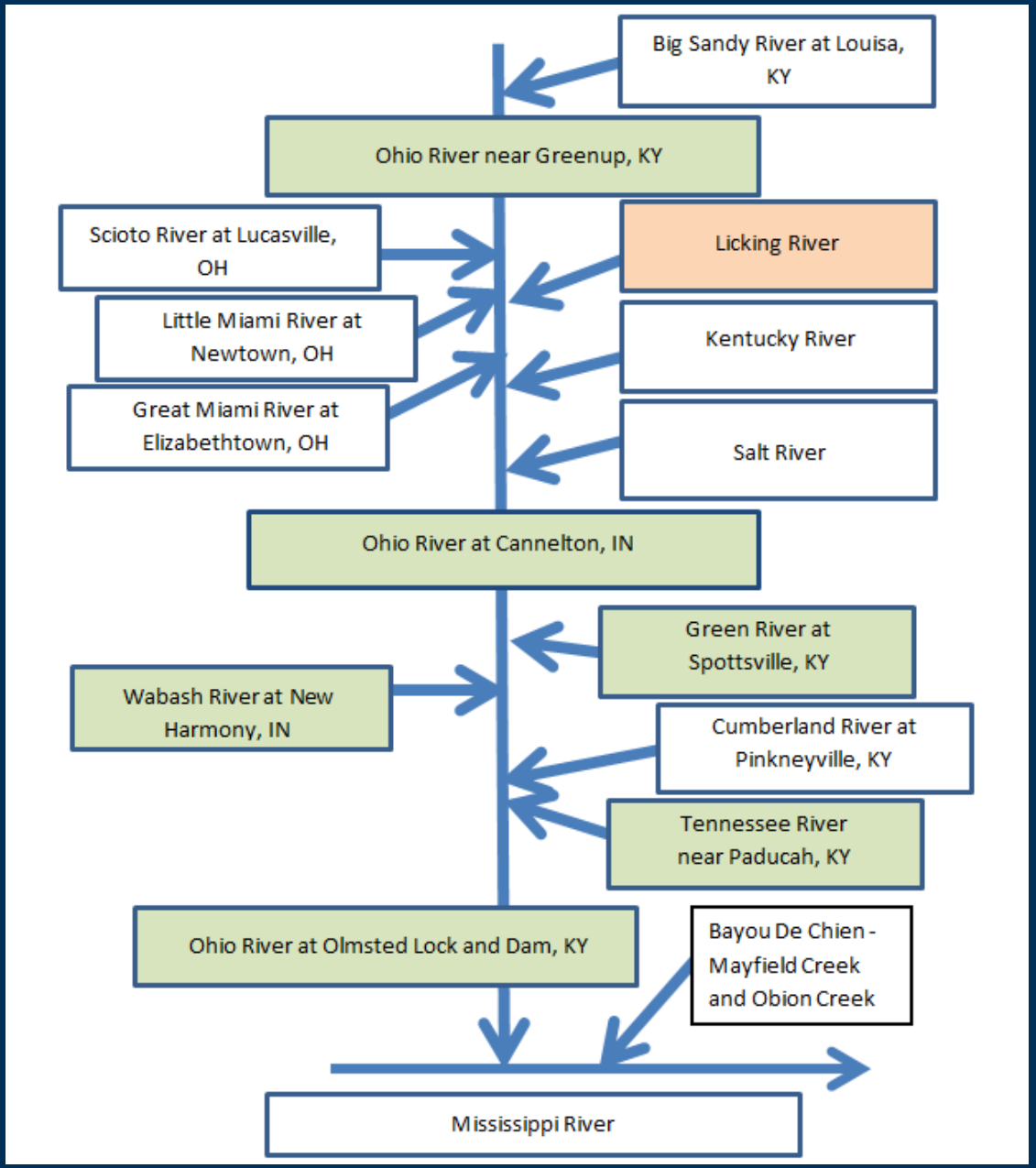
Big Sandy River at Louisa, KY
Ohio River near Greenup, KY
Scioto River at Lucasville, OH
Licking River
Little Miami River at Newtown, OH
Kentucky River
Great Miami River at Elizabethtown, OH
Salt River
Ohio River at Cannelton, IN
Green River at Spottsville, KY
Wabash River at New Harmony, IN
Cumberland River at Pinkneyville, KY
Tennessee River near Paducah, KY
Ohio River at Olmsted Lock and Dam, KY
Bayou De Chien - Mayfield Creek and Obion Creek
Mississippi River

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Hydrologic monitoring networks

What are the costs?

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Component	Approximate cost (site specific)
ONE-TIME **Construction of new station and first year operation for standard streamflow**	$26,000
***Acoustic**	$30,000
***Acoustic year 2 operation and maintenance**	$24,000
ONE-TIME **Cost of 5-parameter water-quality sonde**	$9,000
ONE-TIME **Cost of Nitrate sonde**	$24,000
ANNUAL **Operation and Maintenance of surface-water gage (all sites after first year or after 2nd year for acoustic)**	$14,000
ANNUAL **Operation and Maintenance of 5-parameter water-quality sonde**	$27,000
ANNUAL **Operation and Maintenance of nitrate sonde**	$12,000
ANNUAL **Collection of other water-quality samples**	Approx. $50,000
ANNUAL **Laboratory fees for water-quality analyses**	Approx. $8,000

Boiled down:

If there is a gage already there, it's obviously cheaper as this eliminated construction and equipment costs.

USGS will provide funding as available through the USGS Cooperative Water Program (up to 40%) as this is within our federal mission.

These costs are site specific and vary with analytical costs (what are you looking for?), distance, etc.

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Hydrologic monitoring networks

Where do I find this data?

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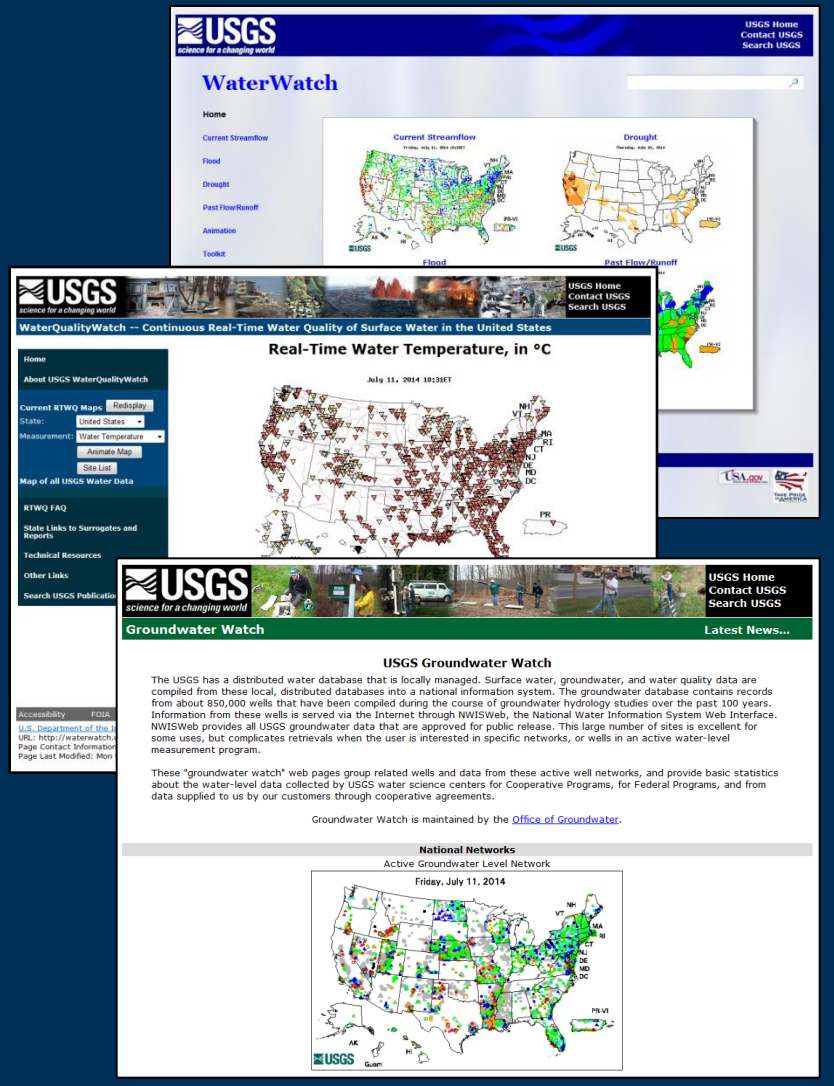
USGS Water Watch

Surface water:
http://waterwatch.usgs.gov/

Water quality:
http://waterwatch.usgs.gov/wqwatch/

Groundwater:
http://groundwaterwatch.usgs.gov/



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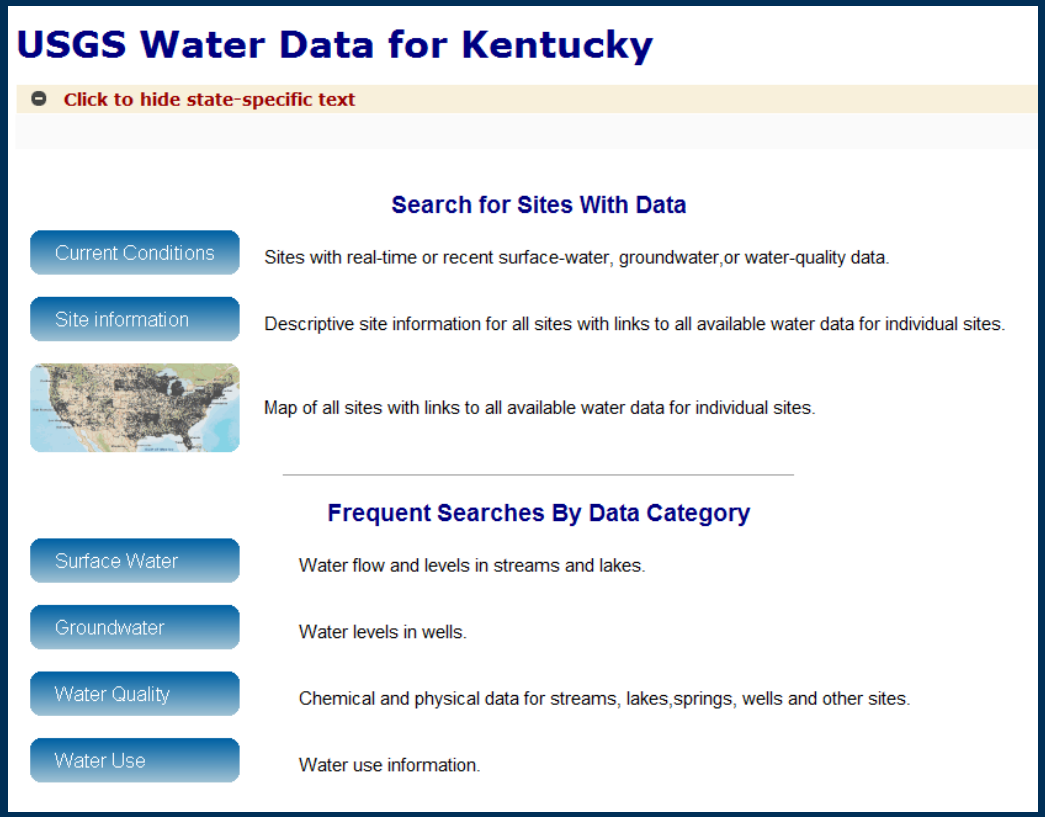
NWISWeb – http://waterdata.usgs.gov/ky/nwis

- These pages provide access to water-resources data collected at approximately 1.6 million sites in all 50 States. This number is constantly growing.
- KENTUCKY:
- Approx. 14,750 total sites
- Approx. 210 real-time sites
- Approx. 100 rain gages
- Approx. 315 daily SW data sites
- Approx. 350 sites for Peak Flow Data
- Approx. 900 sites for field measurements
- Approx. 8,200 sites of GW field meas.
- 1 real-time GW well
- Approx. 50 real-time QW sites
- Approx. 5,200 field/lab samples
- Water Use data from 1985-2010



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Summary

- Sampling and data collection is not easy if it's going to stand up.

- The water-quality network needs some upstream sites between Greenup and Cannelton to better drill down to sources.
  - The Kentucky River
  - The Salt River
  - The Great Miami River

- The smaller streams draining the Jackson Purchase are also a data gap but perhaps less important than the major river basins.

- We can get a continuous monitoring site built from scratch and running for about $160K (USGS will cover approximately 40% of the cost pending availability of funds, so that leaves it at about $96K Partner / $64K USGS). This amount is less if the site already exist.

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Questions?

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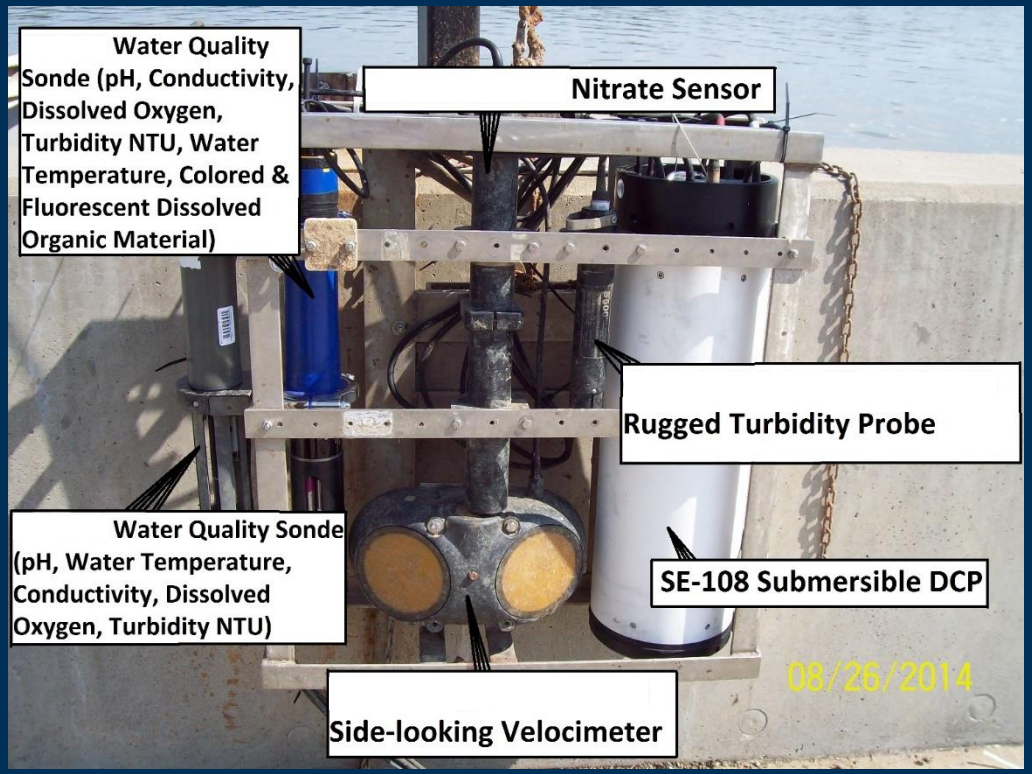
Super gages/Sentry gages (real-time continuous data)

Ohio River at Olmsted



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