



Monitoring Networks in Kentucky

KASMC

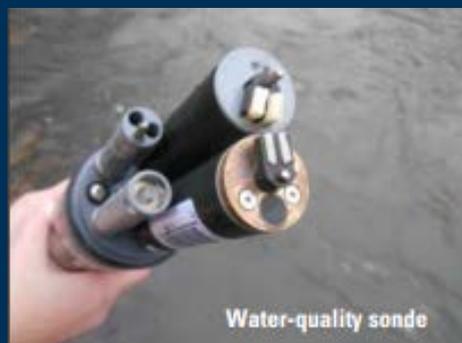
March 11, 2015

Video
“USGS Sampling on
the Mississippi”



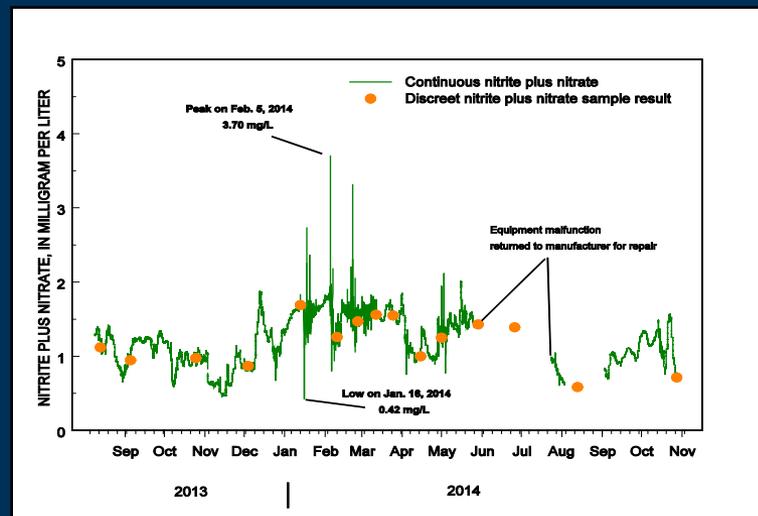
USGS monitoring stations or “super gages”

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



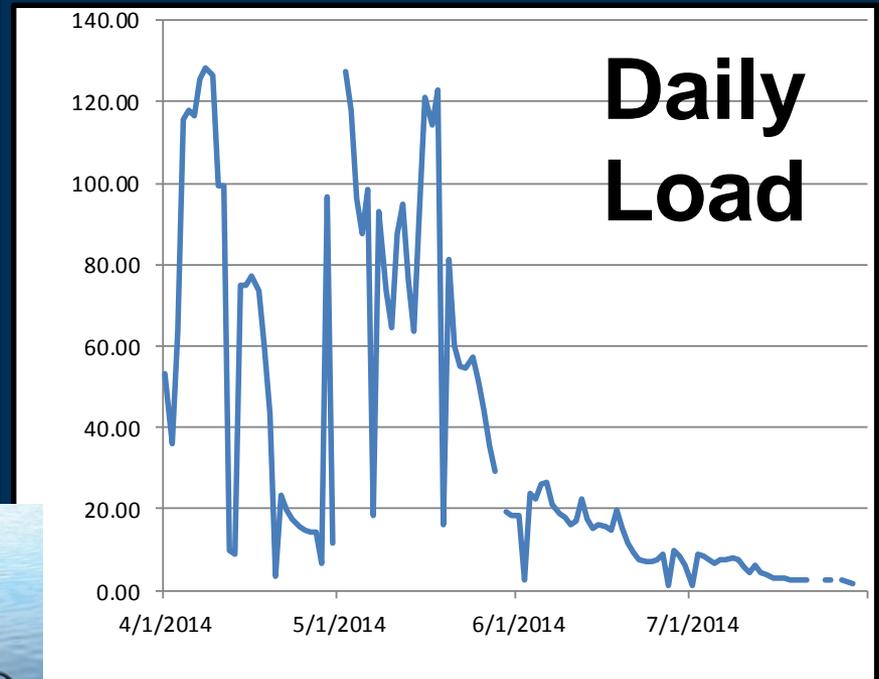
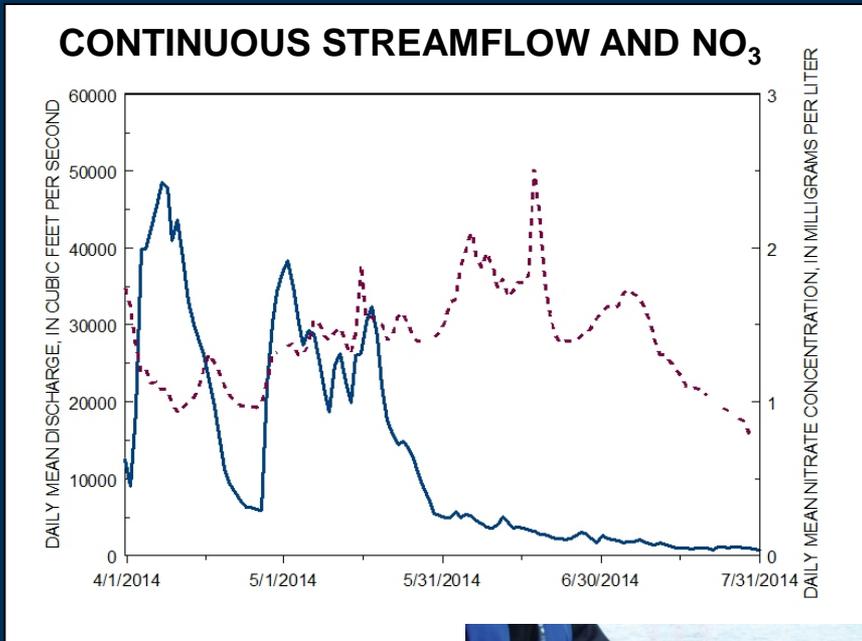
Advantages

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



Real-time Nitrate Data

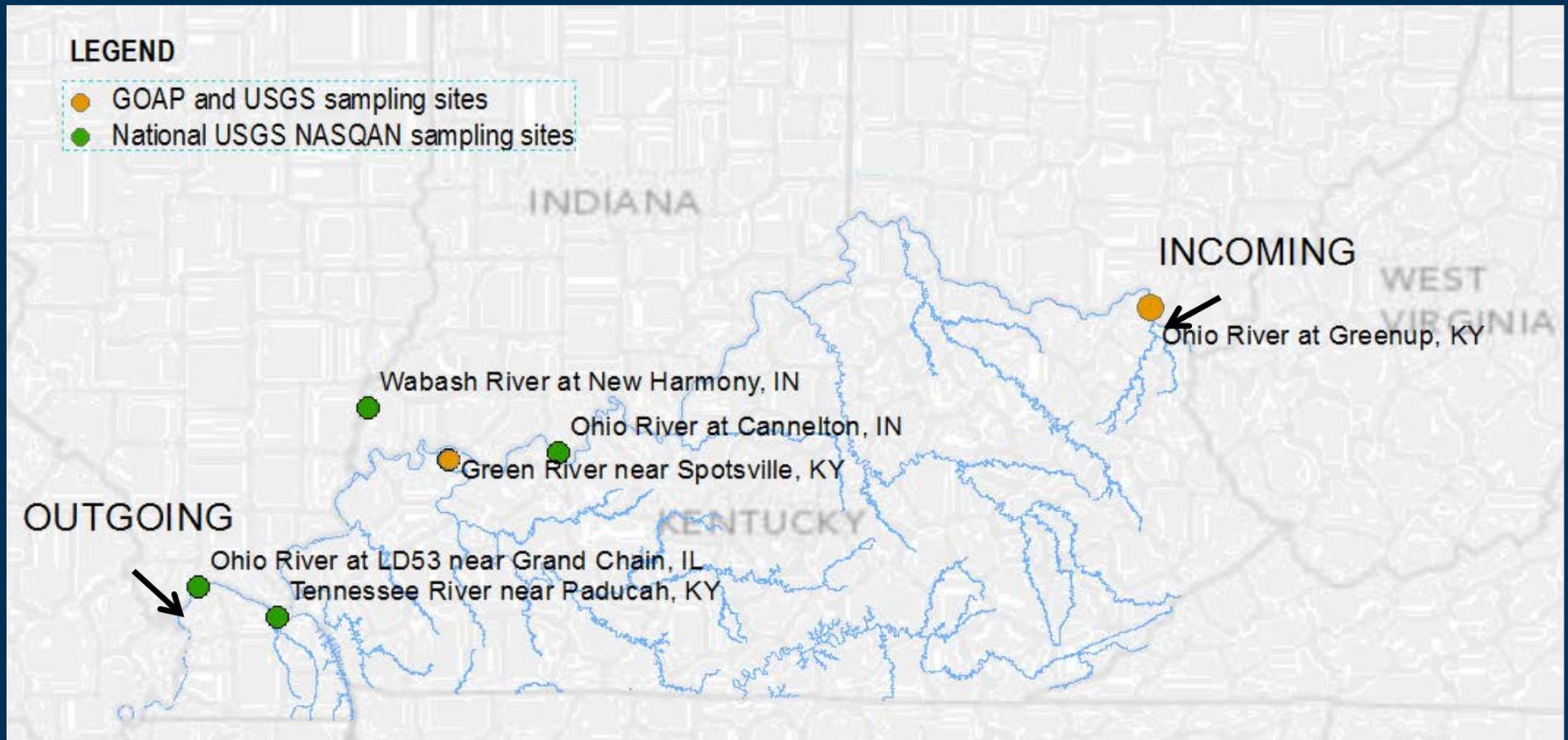
Green River at Spottsville, KY



Hydrologic monitoring networks

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

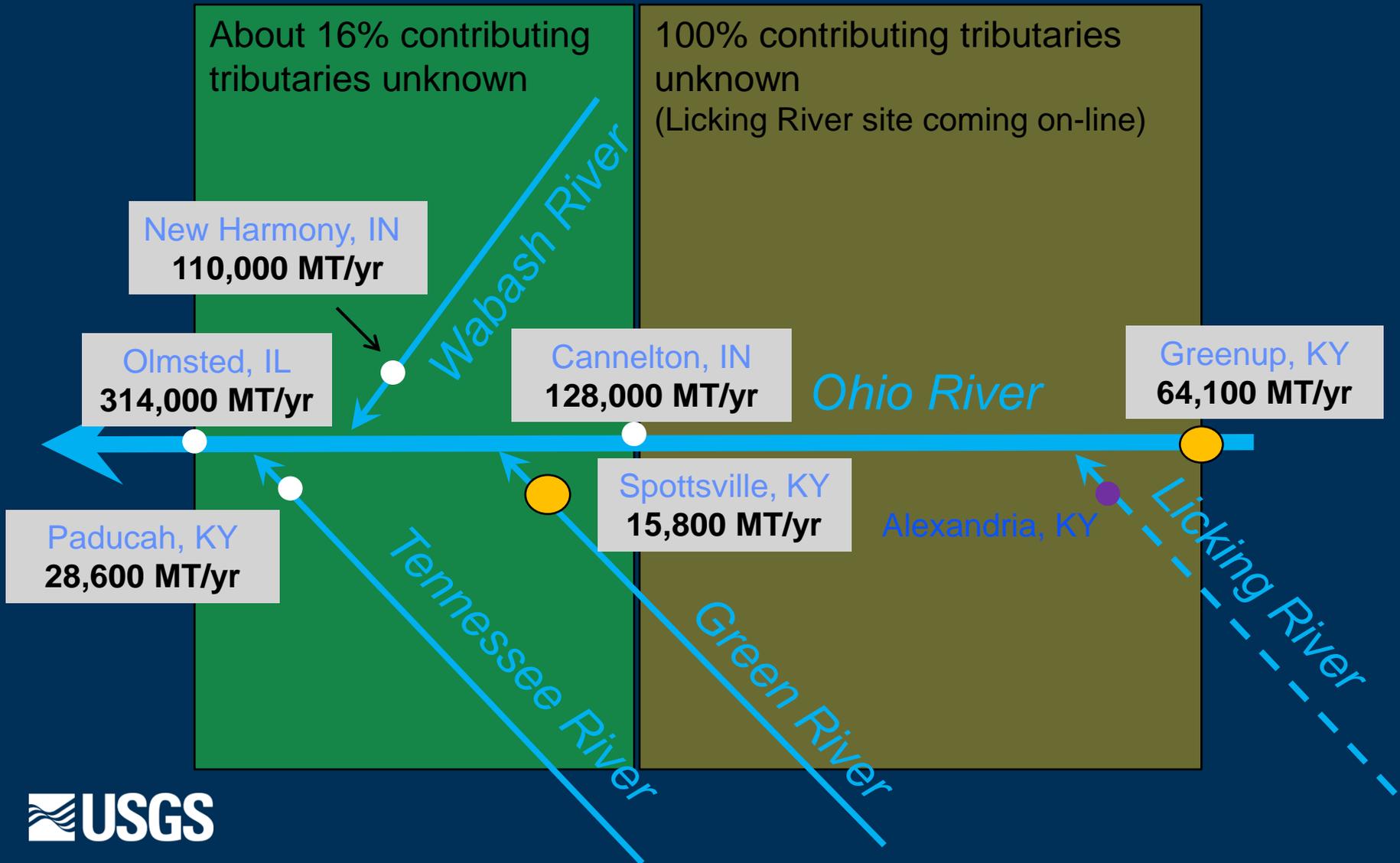
Site Locations where loads can currently be defensibly derived



Hydrologic monitoring networks

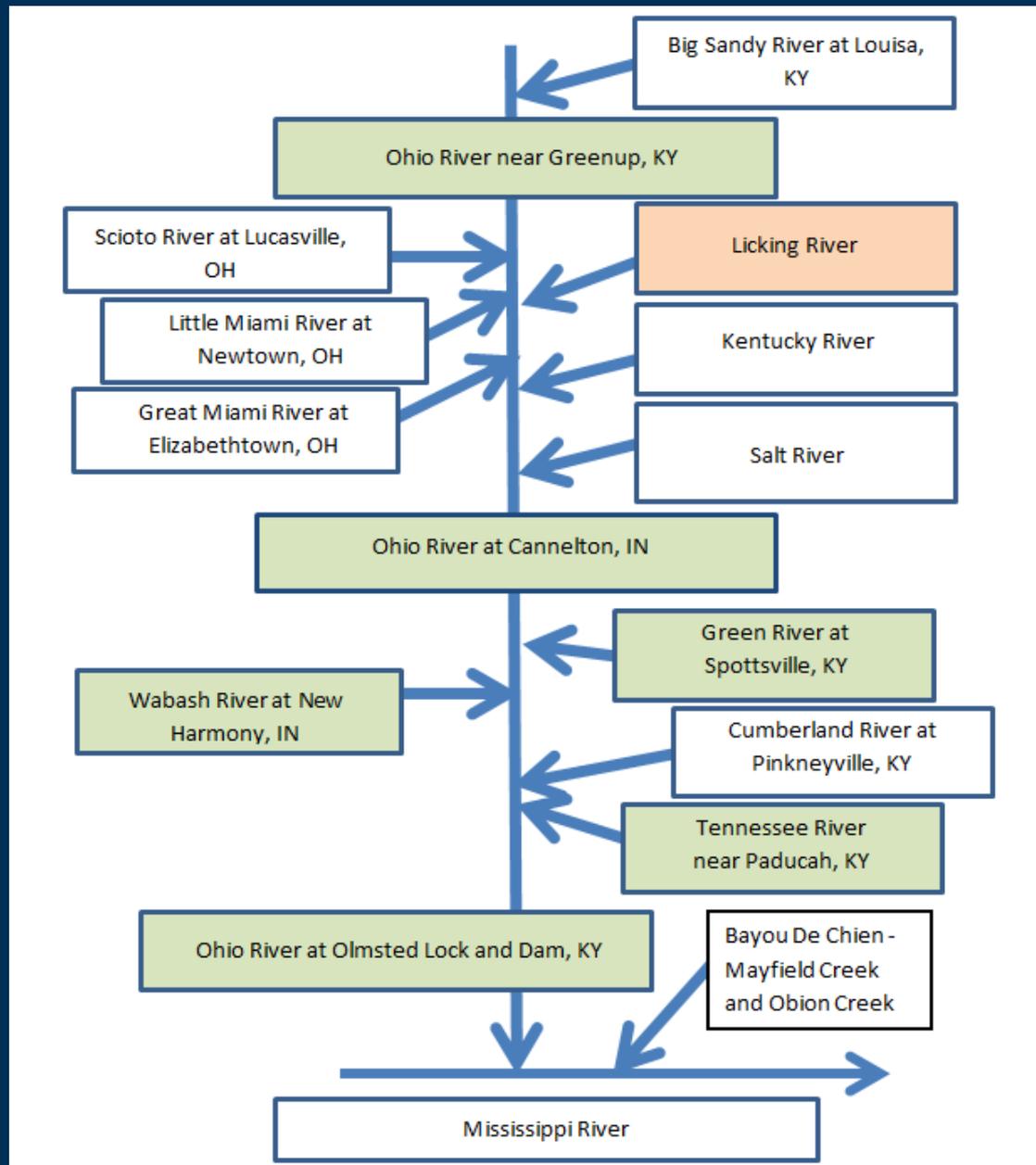
What does this mean
in terms of a
network?

Nitrite plus nitrate loads



Hydrologic monitoring networks

What is needed?



Hydrologic monitoring networks

What are the costs?

Component	Approximate cost (site specific)
ONE-TIME Construction of <u>new station</u> 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 2 nd 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.

USGS will provide funding as available through the USGS Cooperative Water Program (up to 40%).

These cost are somewhat site specific; however, the approximate cost for a Super gage (built from scratch and similar to Green River @ Spottsville) is:

Year 1 = about \$160,000
Year 2 = about \$121,000
Year 3+ = about \$ 111,000



Hydrologic monitoring networks

Where do I find this
data?

USGS Water Watch

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

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

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



A screenshot of the USGS WaterWatch homepage. At the top is the USGS logo with the tagline "science for a changing world". Below the logo is the "WaterWatch" title and a search bar. A navigation menu on the left includes links for Home, Current Streamflow, Flood, Drought, Past Flow/Runoff, Animation, and Toolkit. The main content area features two maps of the United States: "Current Streamflow" and "Drought". The USGS logo and tagline are repeated at the bottom of the page.

A screenshot of the USGS WaterQualityWatch homepage. The title is "WaterQualityWatch -- Continuous Real-Time Water Quality of Surface Water in the United States". Below the title is a navigation menu with links for Home, About USGS WaterQualityWatch, Current RTWQ Maps, and a "Relist" button. There are dropdown menus for "State:" and "Measurement:" (set to "Water Temperature"). A "Map of all USGS Water Data" is shown with a "Site List" button. The main content area displays a map titled "Real-Time Water Temperature, in °C" for July 11, 2014 10:34ET, showing numerous data points across the United States. The USGS logo and tagline are at the top, and a "USA.gov" logo is at the bottom right.

A screenshot of the USGS Groundwater Watch homepage. The title is "Groundwater Watch" with a "Latest News..." link. Below the title is the "USGS Groundwater Watch" section, which includes a paragraph of text: "The USGS has a distributed water database that is locally managed. Surface water, groundwater, and water quality data are compiled from these local, distributed databases into a national information system. The groundwater database contains records from about 850,000 wells that have been compiled during the course of groundwater hydrology studies over the past 100 years. Information from these wells is served via the Internet through NWISWeb, the National Water Information System Web Interface. NWISWeb provides all USGS groundwater data that are approved for public release. This large number of sites is excellent for some uses, but complicates retrievals when the user is interested in specific networks, or wells in an active water-level measurement program." Below this text is another paragraph: "These 'groundwater watch' web pages group related wells and data from these active well networks, and provide basic statistics about the water-level data collected by USGS water science centers for Cooperative Programs, for Federal Programs, and from data supplied to us by our customers through cooperative agreements." A link for "Groundwater Watch is maintained by the Office of Groundwater." is provided. The "National Networks" section is titled "Active Groundwater Level Network" and shows a map of the United States for "Friday, July 11, 2014" with various data points. The USGS logo and tagline are at the top, and a "USA.gov" logo is at the bottom right.

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

The screenshot shows the 'USGS Water Data for Kentucky' page. At the top, there is a header with the title and a toggle button labeled 'Click to hide state-specific text'. Below this is a section titled 'Search for Sites With Data' which contains three options: 'Current Conditions' (described as sites with real-time or recent surface-water, groundwater, or water-quality data), 'Site information' (described as descriptive site information with links to all available water data for individual sites), and a map of the United States (described as a map of all sites with links to all available water data for individual sites). Below this is a section titled 'Frequent Searches By Data Category' with four categories: 'Surface Water' (Water flow and levels in streams and lakes), 'Groundwater' (Water levels in wells), 'Water Quality' (Chemical and physical data for streams, lakes, springs, wells and other sites), and 'Water Use' (Water use information).

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 site built from scratch and running for about \$160K (USGS will cover approximately 40% of the cost pending availability of federal funds so that leaves it at about \$96K for partners / \$64K USGS).

Questions?

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