

Kentucky Groundwater Data: What Do We Have? What Do We Need?

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Questions About Kentucky's Groundwater Resources:

- Where can we obtain groundwater for present and future needs?
- How much groundwater do we have? Are we running out?
- Where does groundwater quality limit use? Which aquifers are degraded or highly sensitive to degradation?
- Where are groundwater resources being stressed by changing climate conditions or human activities?

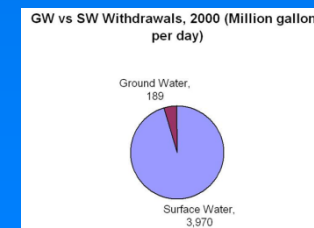
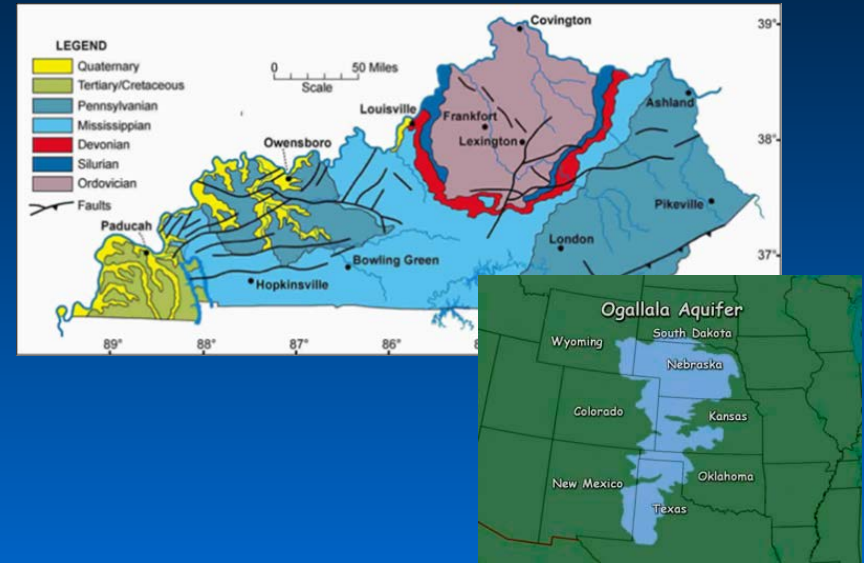
These questions are relatively simple and straightforward—

Getting the answers often is not.



Available Groundwater Data Are Sometimes Limited: Why Is That?

- Kentucky's geology is complex and varied
 - Aquifers are heterogenous and not easy to characterize.
 - Don't conform to simple stratigraphic boundaries.
 - Compared to many other states, Kentucky has few geographically extensive, highly-utilized aquifer systems.
- Kentucky relies mostly on abundant surface water resources
 - Comparatively relatively little socio-economic need to investigate and monitor groundwater.
 - Consequently, funding and resources devoted to systematic or statewide groundwater studies have been limited.



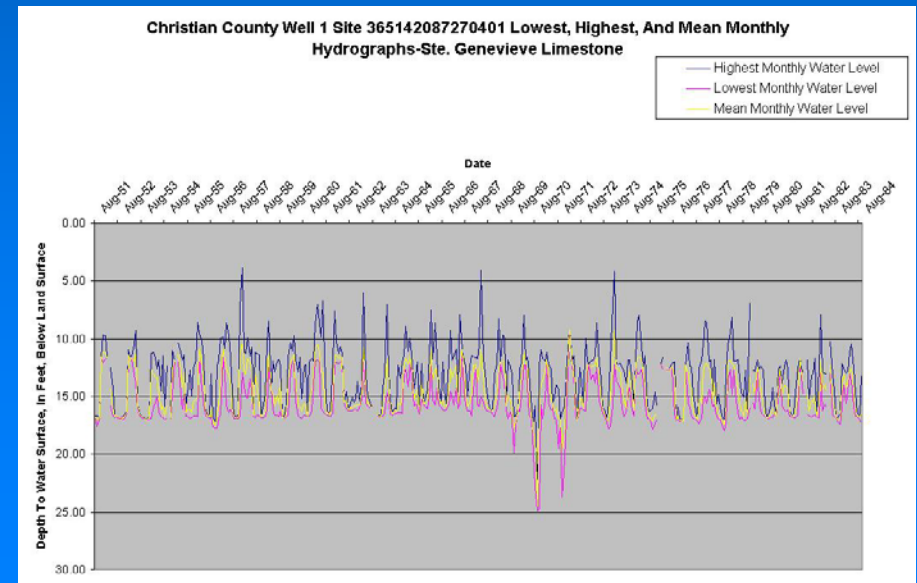
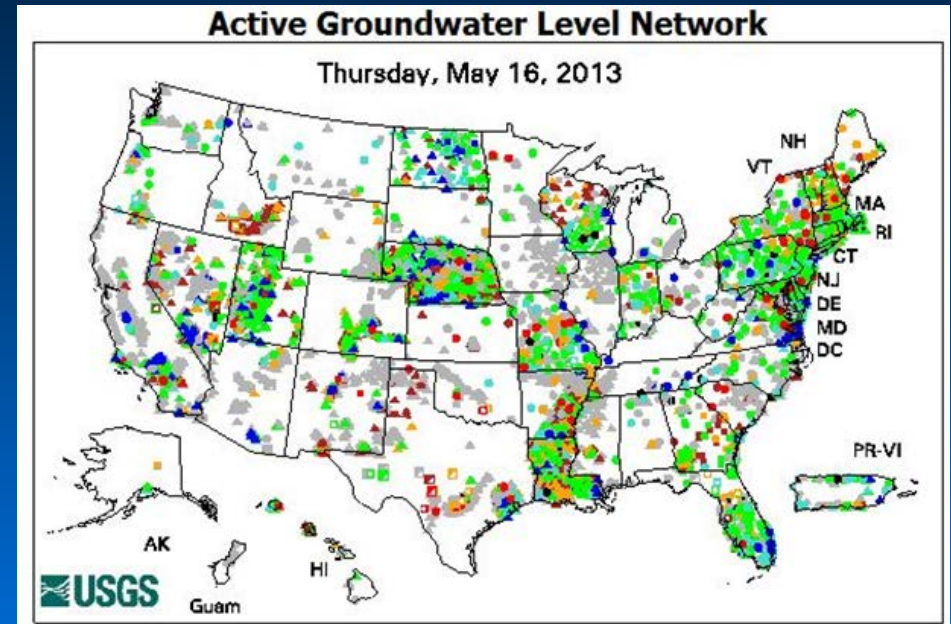
Source: USGS 2000
Water Use Data

Assessments of Groundwater Availability and Sustainability Are Greatly Hindered By:

- Almost total lack of long-term groundwater-level observation wells.
- Available groundwater-level data are often decades old:



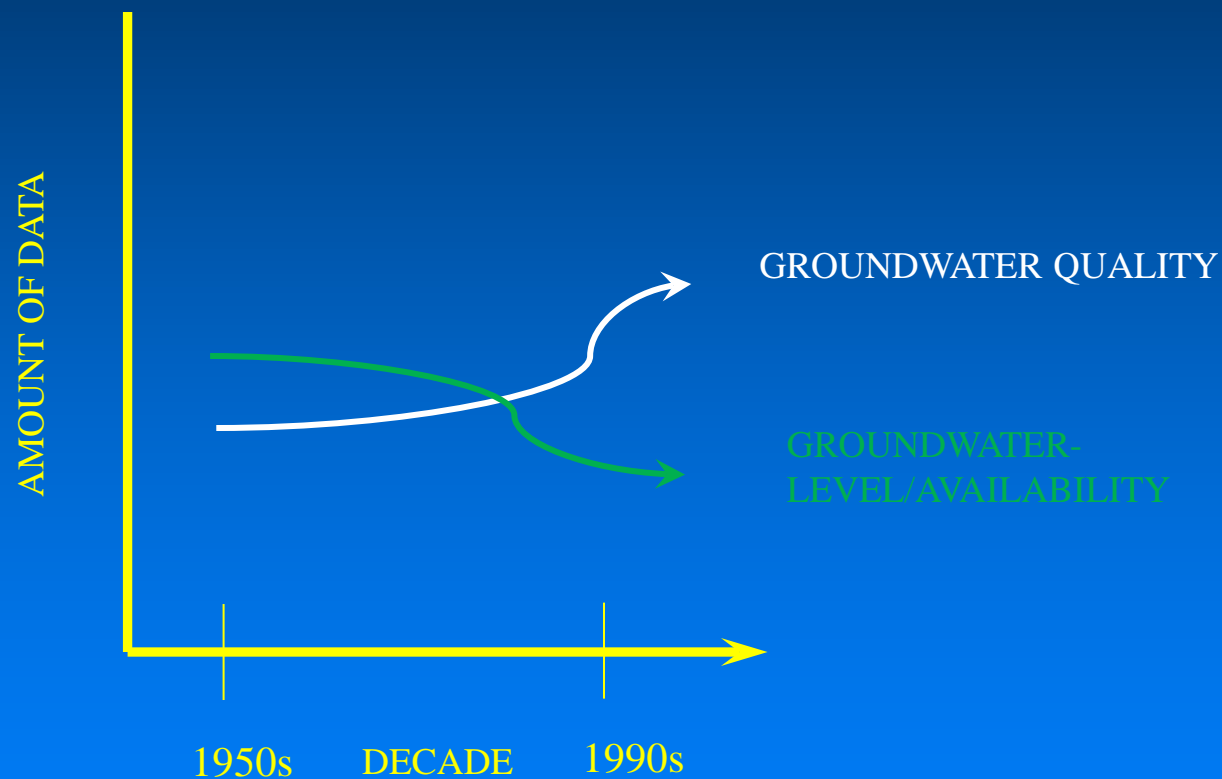
It's not uncommon for the only available data to be 30 years or more out-of-date.



Historical Perspective on Level of Funding and Priority Between Groundwater-Level and Groundwater-Quality Data Collection

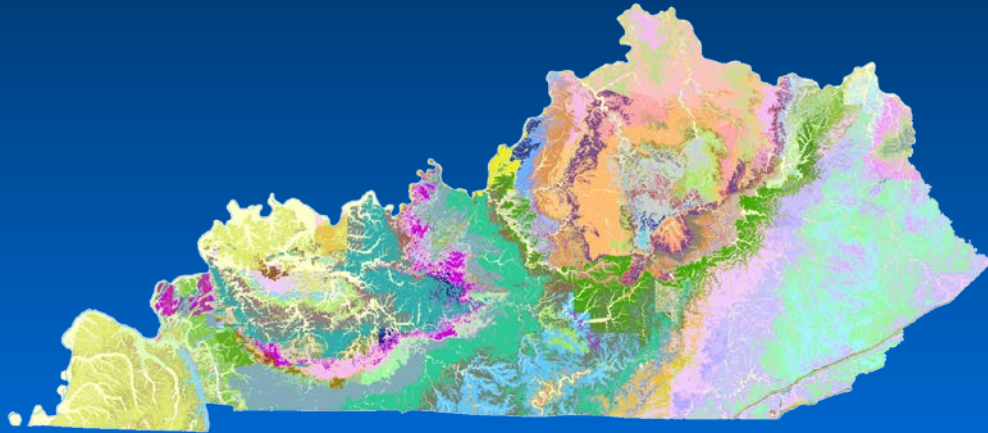
In recent decades, emphasis has been on collecting groundwater quality data.

In contrast, groundwater availability data has declined steadily, with limited local exceptions.



What We Do Know About Kentucky's Groundwater Comes From:

- Statewide geologic mapping at high-resolution scale (1:24,000).

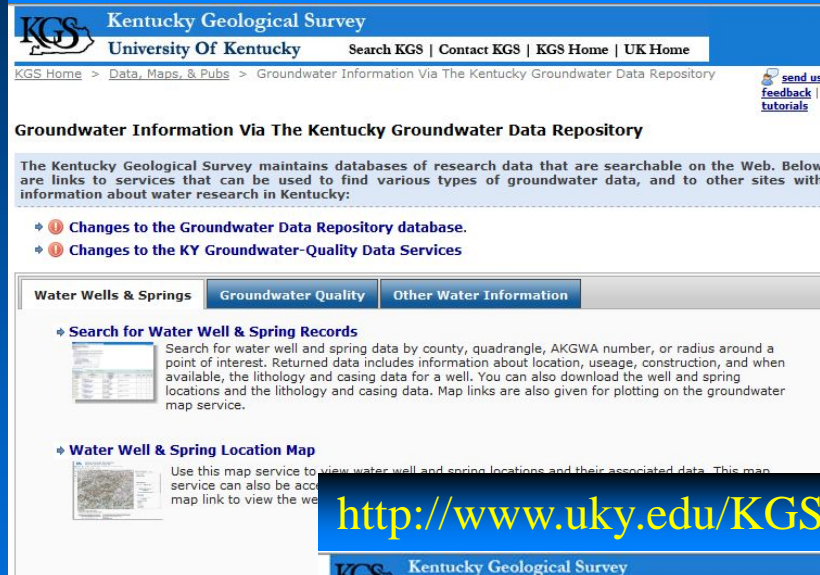


- A number of hydrogeological investigations conducted to address specific local groundwater issues (KGS, USGS, KDOW).
- Hydrologic Atlas mapping project (1950-1960s).
- Recent (1990-present) groundwater sampling conducted largely by KDOW and others to support regulatory program needs.

All Groundwater Data Collected In Kentucky is Stored and Accessed By the Groundwater Data Repository (GWDR).

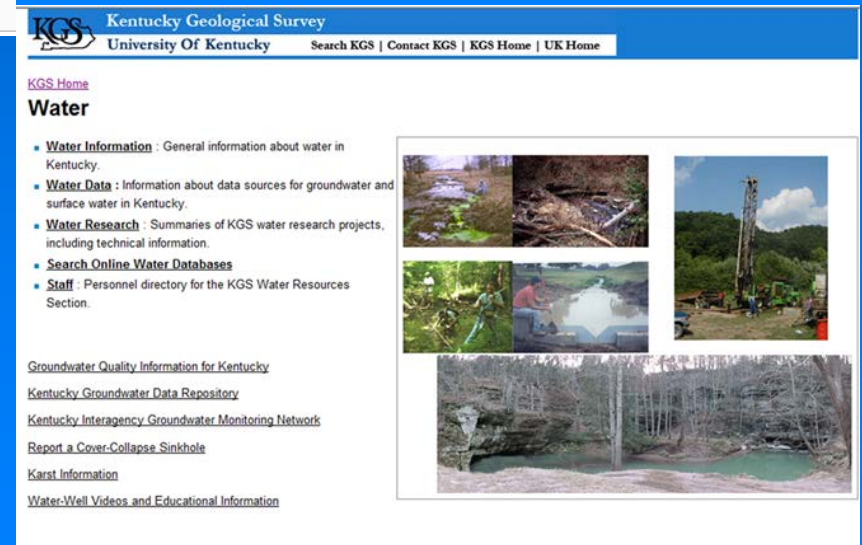
- Initiated in 1990 by legislative mandate (KRS 151:035) and maintained by KGS.
- Currently:
 - Over 92,000 water well records.
 - Approximately 5,100 spring records.
 - About 60,000 groundwater-quality analyses.
- Over 15 contributing agencies, including KDOW, USGS, and EPA Storet.
- **Largest single source of data: Kentucky certified water-well driller records.**

<http://kgs.uky.edu/kgsweb/DataSearching/watersearch.asp>

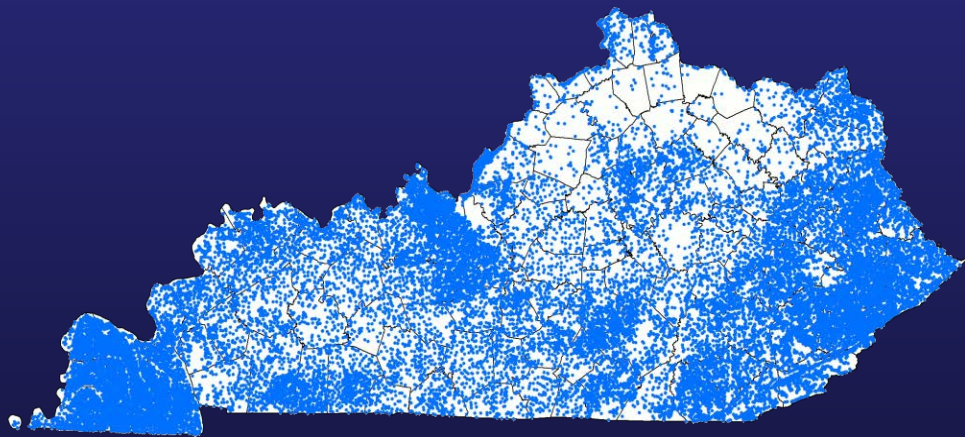


The screenshot shows the KGS website header with navigation links: Search KGS, Contact KGS, KGS Home, and UK Home. Below the header, the page title is "Groundwater Information Via The Kentucky Groundwater Data Repository". The main content area includes a paragraph about the KGS databases and links to services. There are two red circular icons with exclamation marks, indicating changes to the database and data services. Below this, there are three tabs: "Water Wells & Springs", "Groundwater Quality", and "Other Water Information". The "Water Wells & Springs" tab is selected, showing a search form for water well and spring records, and a link to a water well and spring location map.

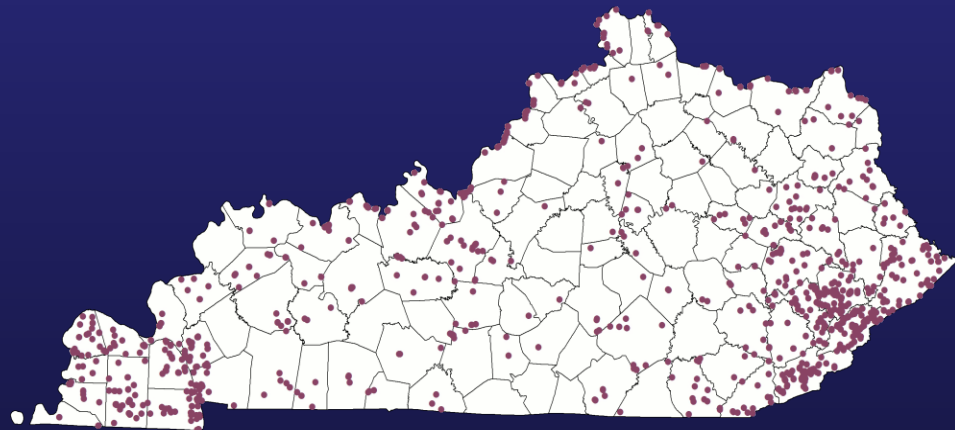
<http://www.uky.edu/KGS/water/index.htm>



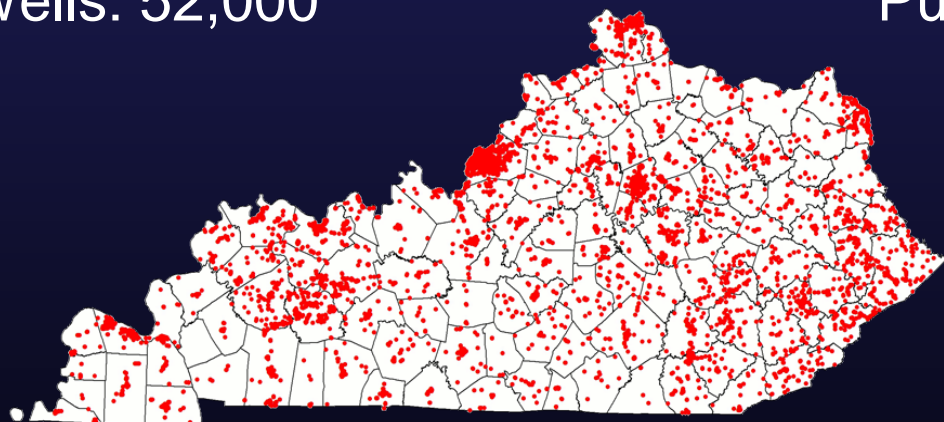
The screenshot shows the KGS website header with navigation links: Search KGS, Contact KGS, KGS Home, and UK Home. Below the header, the page title is "Water". The main content area includes a list of links: "Water Information", "Water Data", "Water Research", "Search Online Water Databases", and "Staff". To the right of the text, there are several small images showing water-related activities, including a person drilling a well, a person working in a field, and a person working in a laboratory.



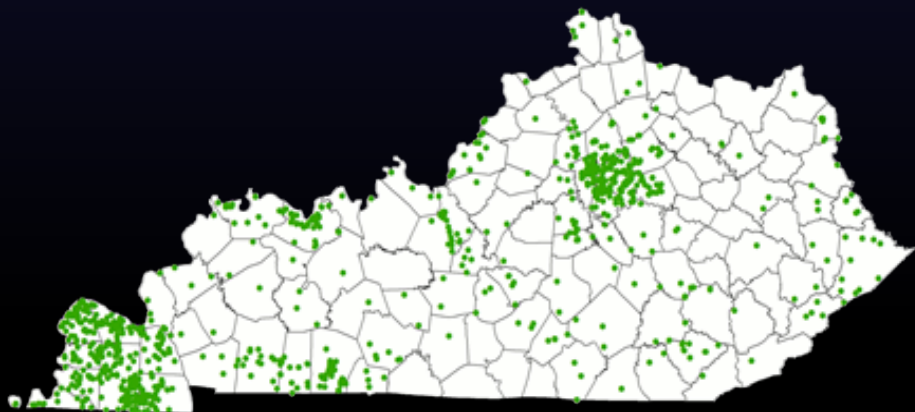
Water Wells: 52,000



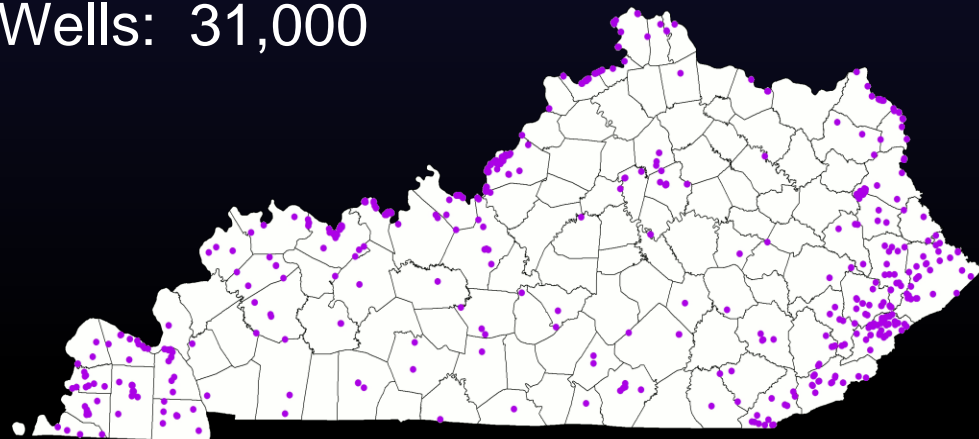
Public Wells: 1,300



Monitoring Wells: 31,000

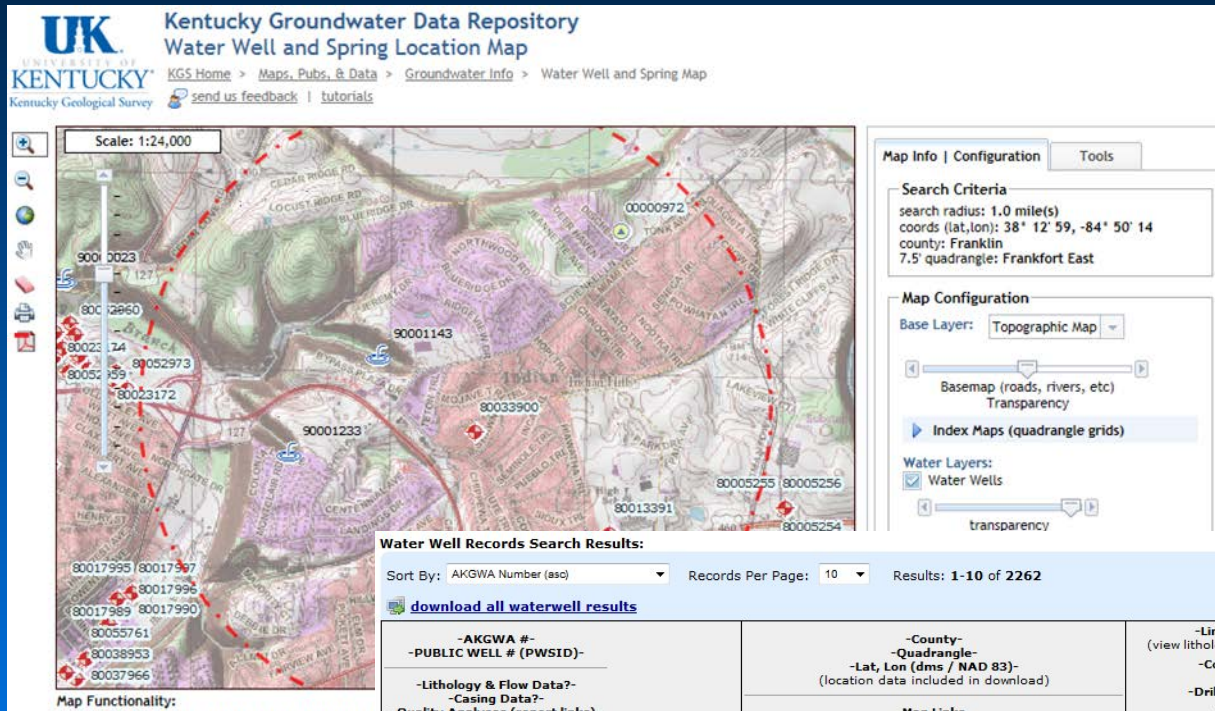


Irrigation Wells: 1,100



Industrial Wells: 700

Groundwater Data Is Available Through User-Interactive On-Line Searching:



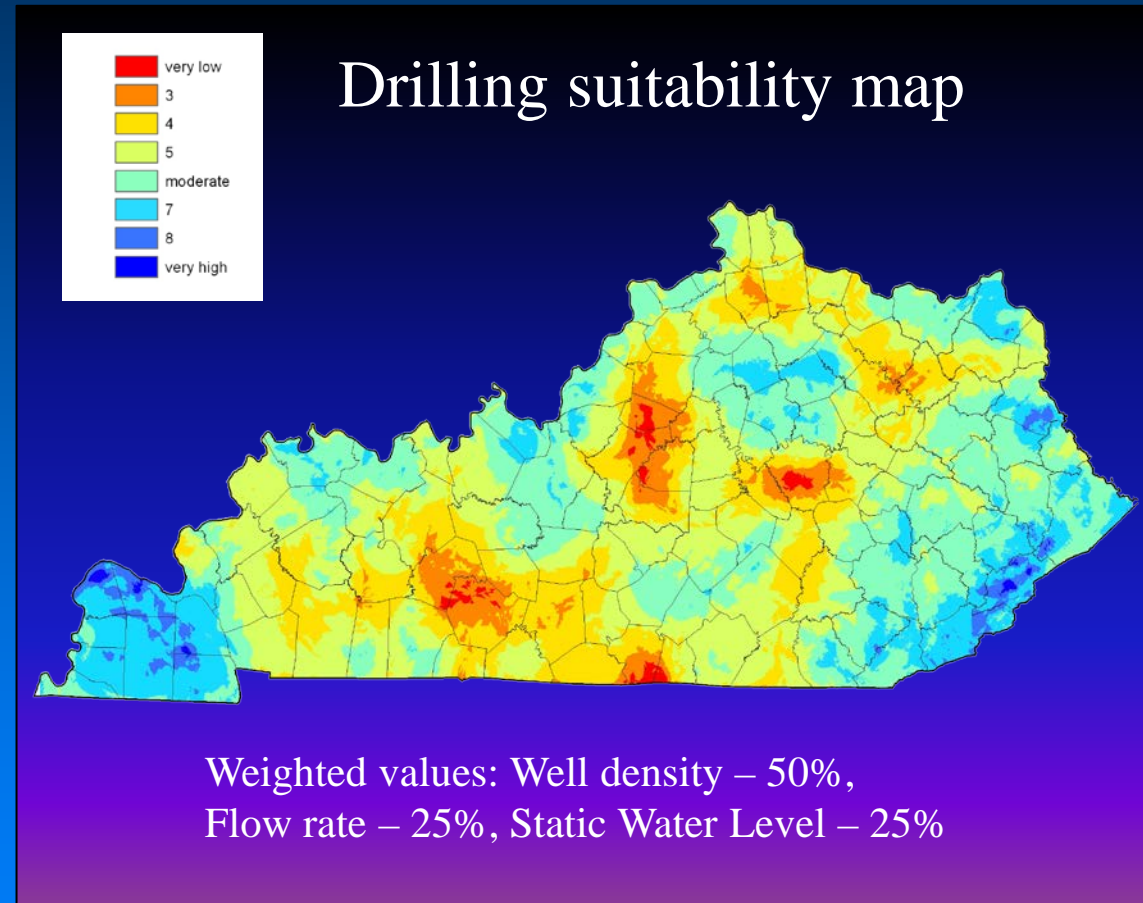
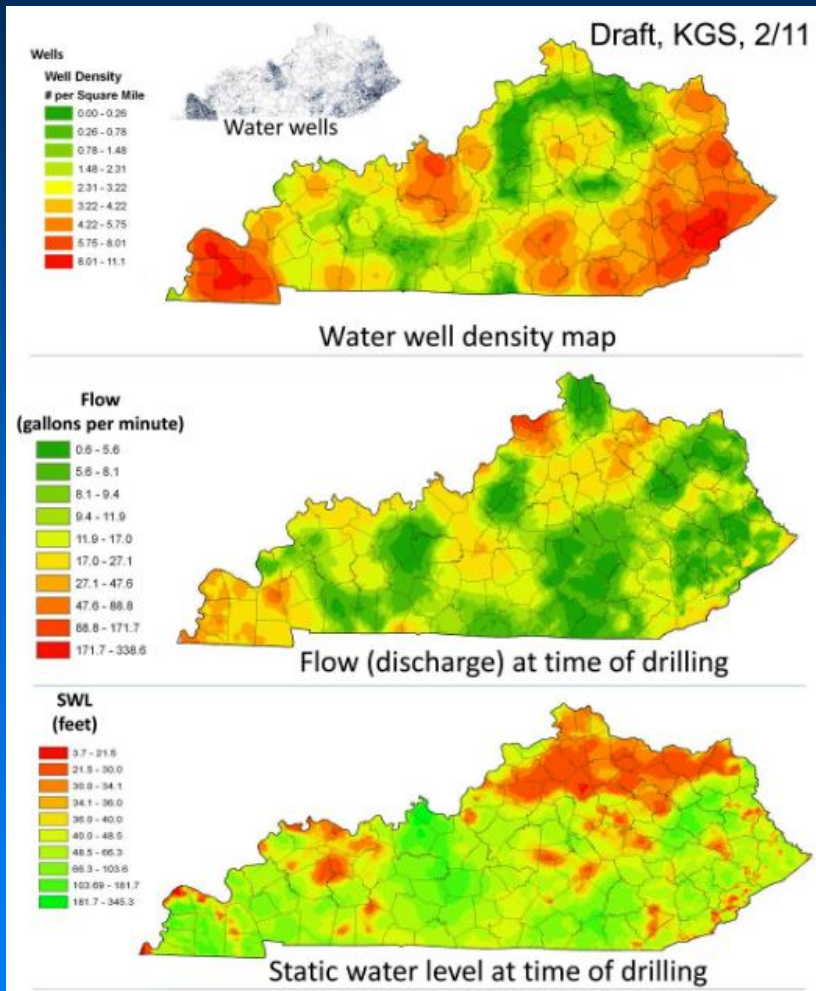
Water Well Records Search Results:

Sort By: AKGWA Number (asc) Records Per Page: 10 Results: 1-10 of 2262 Jump To Page: 1 << First < Prev 1 2 3 Next > Last >>

[download all waterwell results](#)

-AKGWA #- -PUBLIC WELL # (PWSID)-	-County- -Quadrangle- -Lat, Lon (dms / NAD 83)- (location data included in download)	-Link to Well Report- (view lithologic, casing, quality data) -Construction Date- -Driller Name- -Driller Certification #- -Owner Name- -Owner Business-	-Status- -Primary Use- -Regulatory Program-	Surface Elevation	Depth to Bedrock	Total Depth	Static Water Level
-Lithology & Flow Data?- -Casing Data?- -Quality Analyses (report links)-	Map Links						
AKGWA #: 00000682 Public Well #: n/a ---- Lithology & Flow Data*: n/a Casing Data*: <input checked="" type="checkbox"/> Quality Analyses: n/a *view well report for more info *flow data may not be available for all wells	County: Calloway Quadrangle: Hico Lat, Lon (dms): 36° 44' 17.000", -88° -7' -40.000" google map view (quick map) groundwater map service geologic map service	WELL REPORT Construction Date: 6/8/1987 ---- Driller Name: Leon Stafford Driller Cert. #: 0174 Owner Name: Dowdy, Donald Owner Business: n/a	Status: Active Use: Domestic - Single Household Program: n/a	475 ft	150 ft	200 ft	120 ft
AKGWA #: 00000683 Public Well #: n/a ---- Lithology & Flow Data*: n/a Casing Data*: <input checked="" type="checkbox"/> Quality Analyses: n/a *view well report for more info *flow data may not be available for all wells	County: Calloway Quadrangle: Hico Lat, Lon (dms): 36° 44' 2.000", -88° -8' -20.000" google map view (quick map) groundwater map service geologic map service	WELL REPORT Construction Date: 5/30/1987 ---- Driller Name: Leon Stafford Driller Cert. #: 0174 Owner Name: Smith, Jim Owner Business: n/a	Status: Active Use: Domestic - Single Household Program: n/a	480 ft	140 ft	200 ft	120 ft
AKGWA #: 00000763 Public Well #: n/a ---- Lithology & Flow Data*: n/a Casing Data*: <input checked="" type="checkbox"/> Quality Analyses: n/a *view well report for more info *flow data may not be available for all wells	County: Calloway Quadrangle: Hico Lat, Lon (dms): 36° 44' 17.000", -88° -8' -25.000" google map view (quick map) groundwater map service geologic map service	WELL REPORT Construction Date: 5/25/1987 ---- Driller Name: Leon Stafford Driller Cert. #: 0174 Owner Name: Hunton, Tom Owner Business: n/a	Status: Active Use: Domestic - Single Household Program: n/a	450 ft	100 ft	145 ft	80 ft
AKGWA #: 00001196 Public Well #: n/a ---- Lithology & Flow Data*: n/a Casing Data*: <input checked="" type="checkbox"/> Quality Analyses: n/a *view well report for more info *flow data may not be available for all wells	County: Calloway Quadrangle: Dexter Lat, Lon (dms): 36° 38' 15.000", -88° -21' -39.000" google map view (quick map) groundwater map service geologic map service	WELL REPORT Construction Date: 6/24/1986 ---- Driller Name: Keith Campbell Driller Cert. #: 0038 Owner Name: Waytt, Jack Owner Business: n/a	Status: Active Use: Domestic - Single Household Program: n/a	565 ft	0 ft	48 ft	27 ft

Examples of groundwater-availability data that can be obtained through GWDR On-Line Searching




On-Line County Groundwater Summary Reports

KGS Kentucky Geological Survey
University Of Kentucky Search KGS | Contact KGS | KGS Home | UK Home

KGS Home > Water > Water Data

Ground-Water Resources in Kentucky

Click on a county or use the dropdown list below

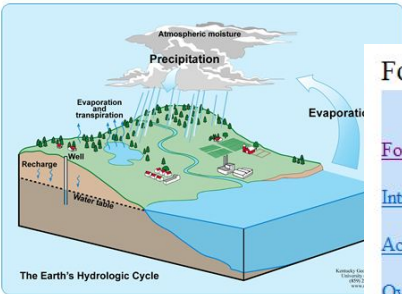


Select a County

Each groundwater resource report is a compilation of information on hydrology, geology, topography, water supply, and water quality taken from maps, reports, and data collected from 1940 to 2000. The primary way of accessing the information is via the Internet—for example, by linking to the KGS Water Research Library on the Kentucky Geological Survey's Web site. The digital form of this report, and its ability to link to data anywhere on the Internet, makes it a dynamic tool for gathering information.

Kentucky Geological Survey
James C. Cobb, State Geologist and Director
University of Kentucky

Groundwater Resources of Calloway County, Kentucky



The Earth's Hydrologic Cycle

Daniel I. Carey
John F. Stickney

County Report 18, Series XII ISSN 0075-4

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Foreword

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[Groundwater Availability](#)

[Exploration for Groundwater](#)

[Karst](#)

[Water Quality](#)

[Maps and Data](#)

[Additional Reading](#)

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[Definitions of](#)

This report on the groundwater resources of Calloway County was prepared for the Water Resource Development Commission by the Kentucky Geological Survey. Reports were prepared for each of Kentucky's 120 counties. These reports complement other county planning reports of the commission, including strategic water development plans and strategic wastewater treatment plans, and the Kentucky Division of Water's county water-supply plans.



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The current compilation is by no means exhaustive; no doubt valuable data have been overlooked. As new or more-detailed information becomes available, it can be easily linked to this report.

Although this report may be of value to planners and geologists for strategic planning and feasibility studies, it cannot replace field investigation for the development or assessment of site-specific groundwater resources.

Disclaimer Statement: The Kentucky Geological Survey (KGS) is constantly gathering data from multiple sources, interpreting the data it gathers, and reflecting its interpretations on maps such as those in this report. Reasonable efforts have been made by KGS to verify that these maps and the digital data provided thereon accurately interpret the source data used in their preparation.

Available Groundwater Quality Data Can Be Obtained Through On-Line Searching As Well

Water Wells & Springs

Groundwater Quality

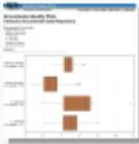
Other Water Information

Search for Groundwater-Quality Data



Search for groundwater-quality data by county, quadrangle, AKGWA number, or radius around a point of interest. You can view and download data for **545 different analytes from 15 analyte groups**: bulk water properties, caffeine & derivatives, herbicides, inorganics, metals, microbes, nutrients, PCB's, pesticides, petroleum hydrocarbons, radionuclides, residues, SVOC's, VOC's, and other analytes. Data can be downloaded and a link to the groundwater quality map is provided for each location.

Graphical Groundwater-Quality Comparison



Plot groundwater-quality data by Physiographic Province or HUC 6 Watershed basin for 38 possible analytes. You can choose to display the data in a cumulative, analytical value vs. well depth, or box-and-whisker plot.

Groundwater-Quality Data Map Service

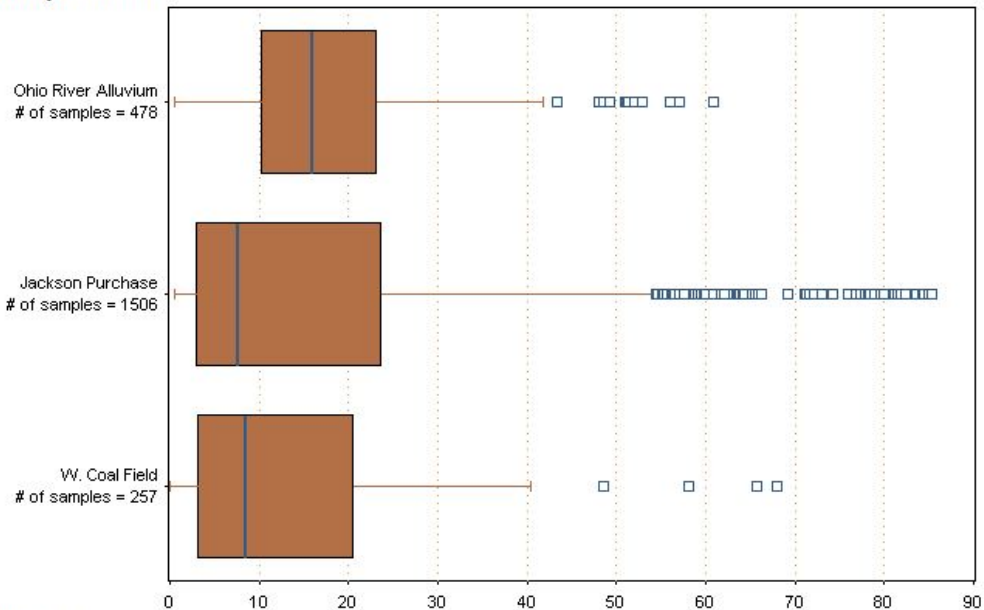


Use this map service to create a thematic map **analytes from 15 analyte groups**) that is four Select one analyte from a category and view th an area of interest. Analysis data for each site search is provided for data download capability

Physiographic Province(s):

Western Pennyroyal
W. Coal Field
Jackson Purchase
Ohio River Alluvium

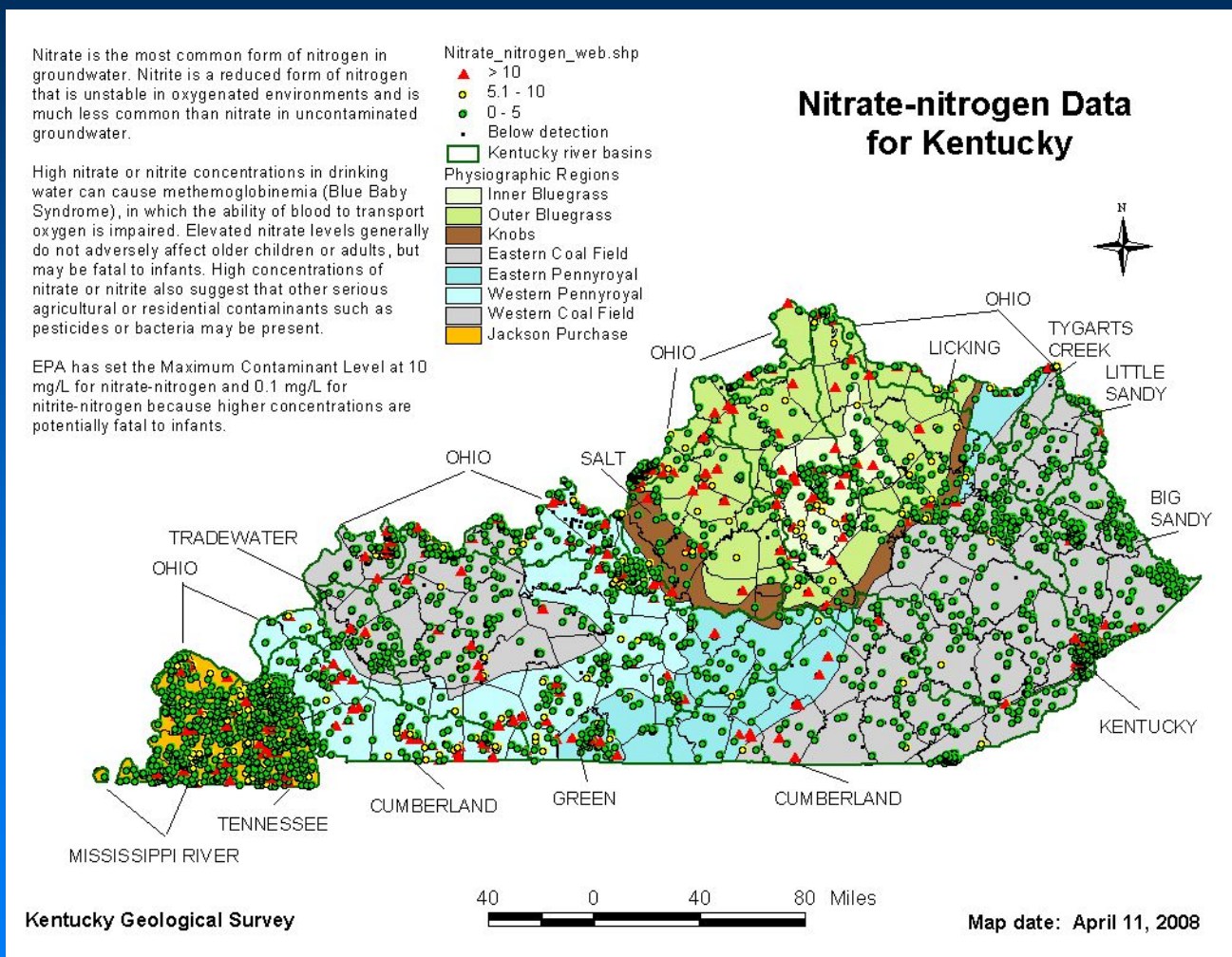
Analyte: chloride



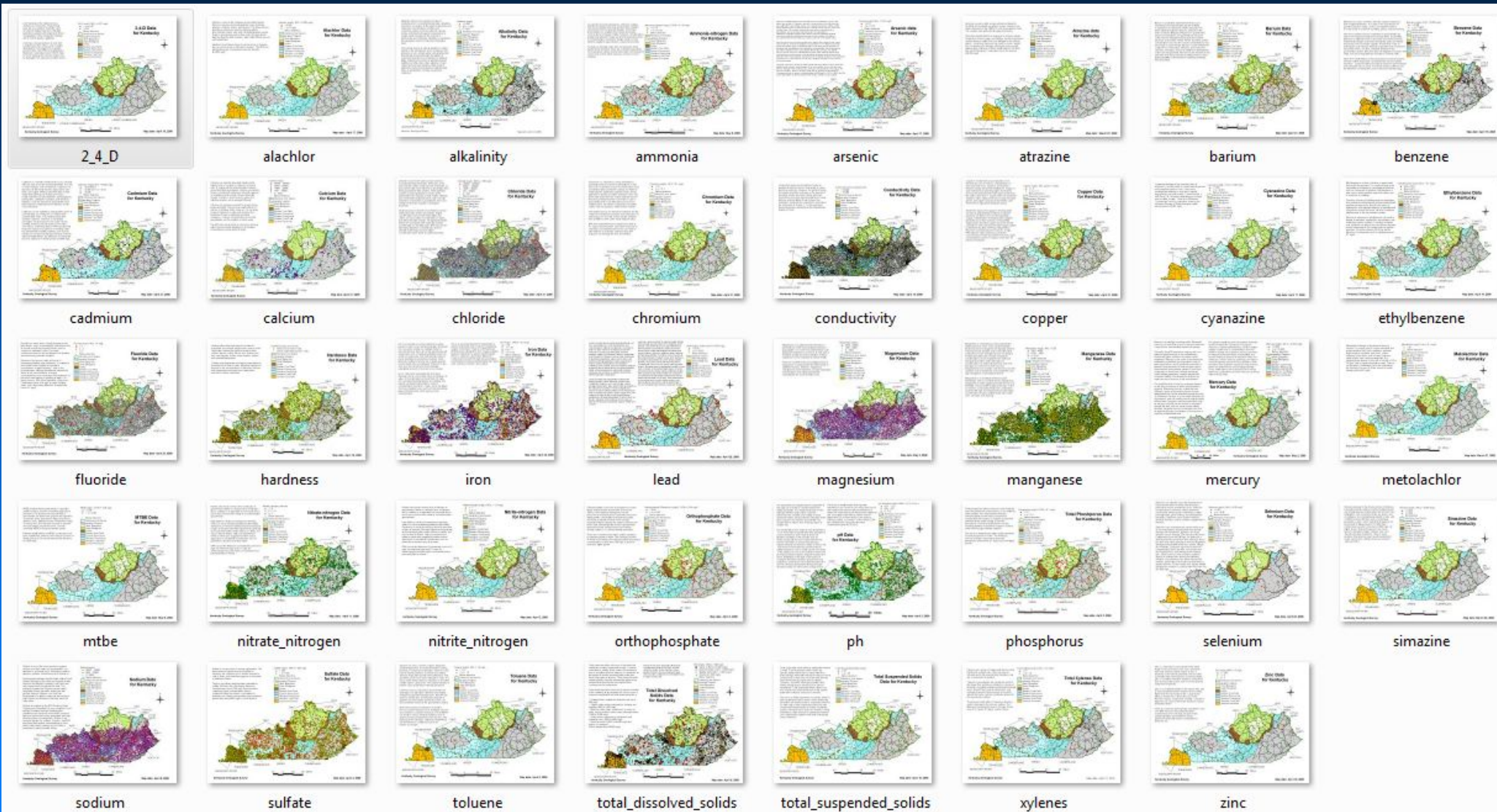
Plot Data:

(note: extreme outlier values are not plotted)

Periodically updated “preprocessed” map reports of groundwater-quality data are also available for certain chemical constituents:



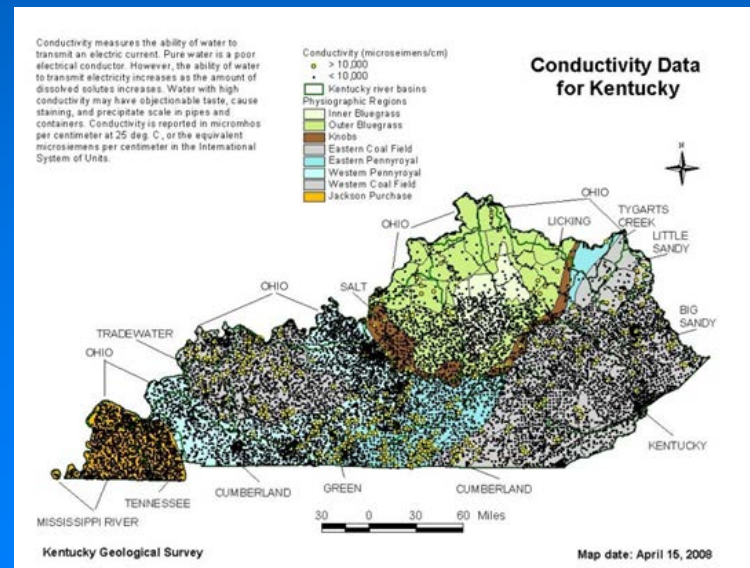
Pre-processed Groundwater-Quality Maps Derived from KY GWDR:



In Summary: What Do We Have:

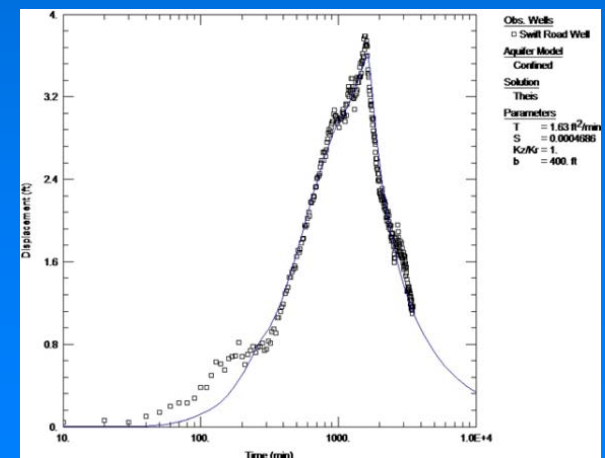
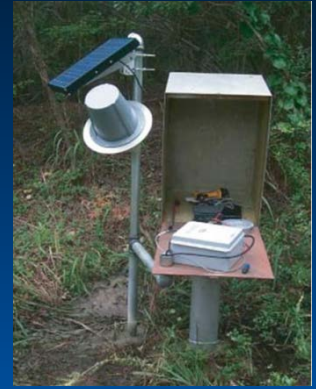
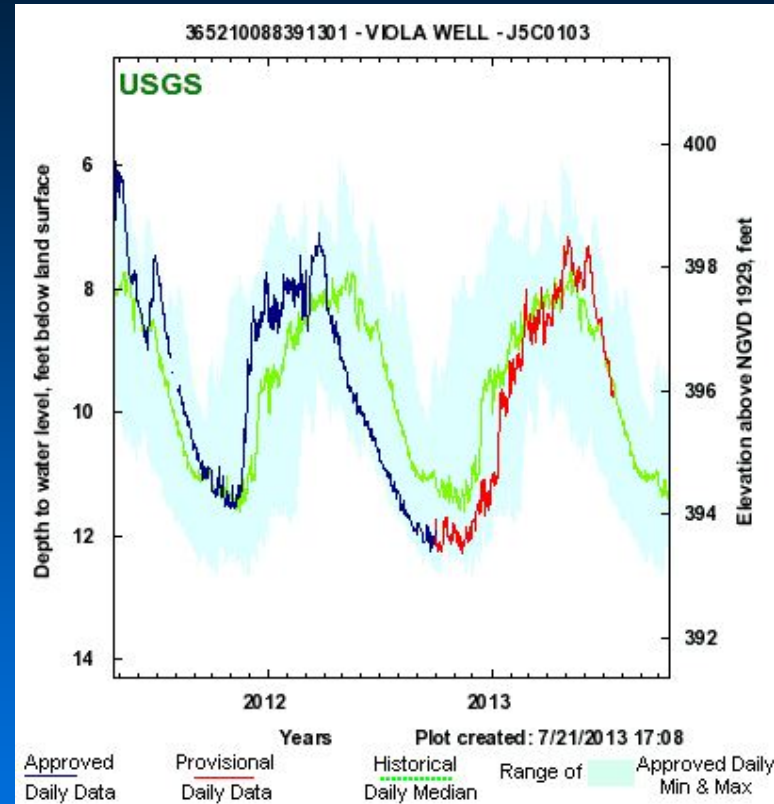
- The GWDR, a user-interactive Web-based platform for storing and retrieving GW data that greatly facilitates public access to available data.
- A fairly large groundwater database containing thousands of water-well records and groundwater-quality analyses.
- GWDR also contains karst flowpath and spring inventory data.
- County-specific groundwater summary reports.
- State-wide high-resolution, digital geologic data.
- Generally good info about where the best potential areas for groundwater withdrawals are located.

The screenshot shows the Kentucky Geological Survey (KGS) website. The header includes the KGS logo, "University Of Kentucky", and navigation links: "Search KGS | Contact KGS | KGS Home | UK Home". Below the header, there's a breadcrumb trail: "KGS Home > Data, Maps, & Pubs > Groundwater Information Via The Kentucky Groundwater Data Repository". The main heading is "Groundwater Information Via The Kentucky Groundwater Data Repository". Below this, a paragraph states: "The Kentucky Geological Survey maintains databases of research data that are searchable on the Web. Below are links to services that can be used to find various types of groundwater data, and to other sites with information about water research in Kentucky:". There are two bullet points: "Changes to the Groundwater Data Repository database." and "Changes to the KY Groundwater-Quality Data Services". Below these are three tabs: "Water Wells & Springs", "Groundwater Quality", and "Other Water Information". Under "Water Wells & Springs", there are two sections: "Search for Water Well & Spring Records" and "Water Well & Spring Location Map".



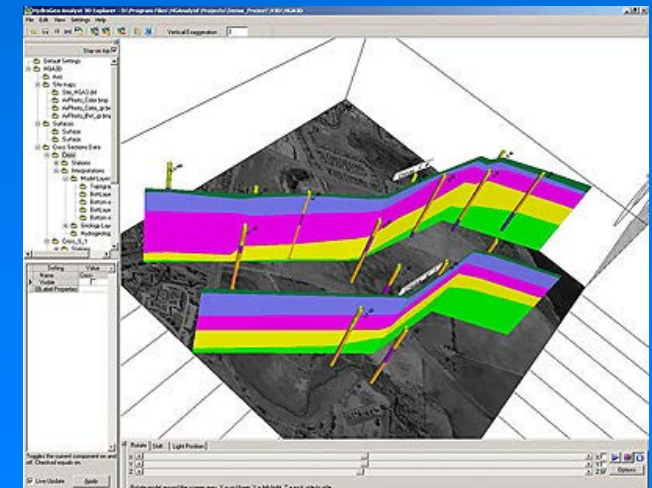
What Do We Need:

- Updated, long-term groundwater-level data:
 - Either a strategically-designed statewide network, or
 - Multiple local-to-subregional networks in high withdrawal or potential use areas.
- More quantitative hydrogeologic data—good aquifer test data is still lacking in most parts of the state.



What Do We Need:

- Groundwater-quality data:
 - Occurrence/concentrations of emerging contaminants (pharmaceuticals, hormones).
 - Shift toward longer-term collection of GWQ data at fixed monitoring sites to identify/track trends.
- Better understanding and quantitative information about groundwater and surface water interaction, especially in karst areas.
- Digital hydrogeologic framework data models for the major aquifers in the Commonwealth—as improved groundwater-resource management tools.



For More Information:

<http://www.uky.edu/KGS/>



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