

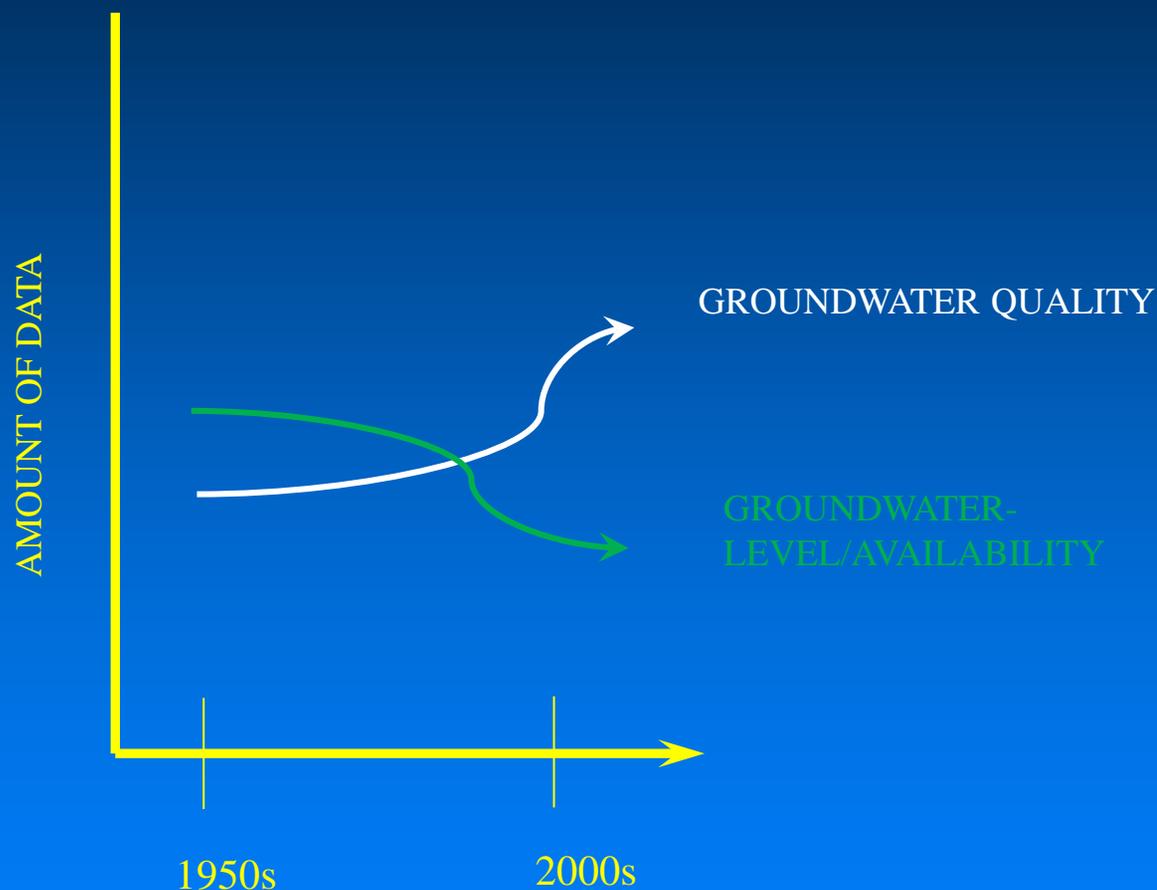
# Groundwater Observation Well Network Update

Chuck Taylor, Water Resources Section, Kentucky Geological Survey

KASMC Meeting, March 11, 2015  
Frankfort, Ky



# Historical Trends in the Collection of Kentucky's Groundwater Monitoring Data



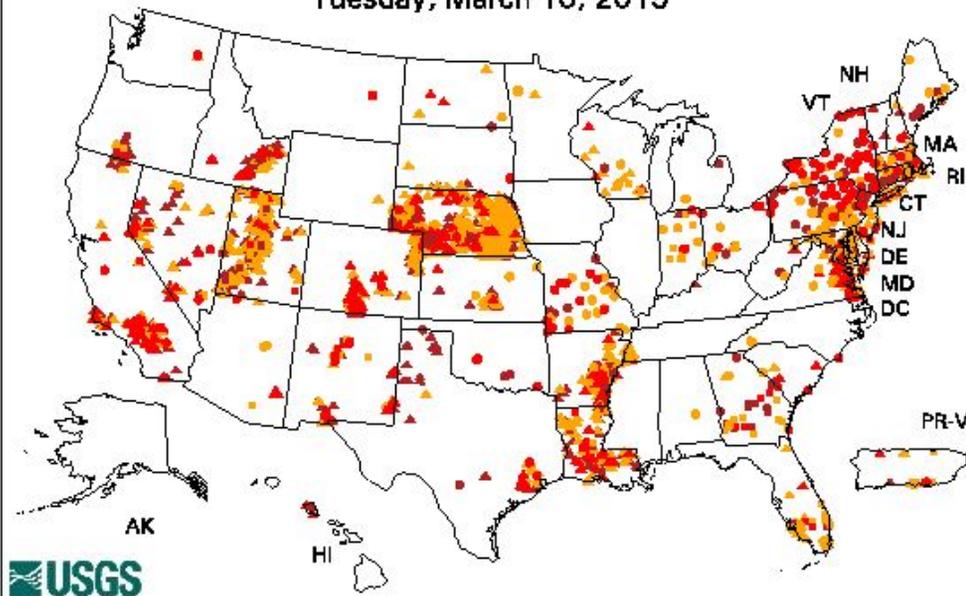
GWQ data: Driven to a large extent by needs of state and federal regulatory programs.

GWL data: Impacted by continual federal and state budget cuts and misperceptions about importance and usefulness of data.

# Cause For Concern?

## Below Normal Groundwater Levels

Tuesday, March 10, 2015

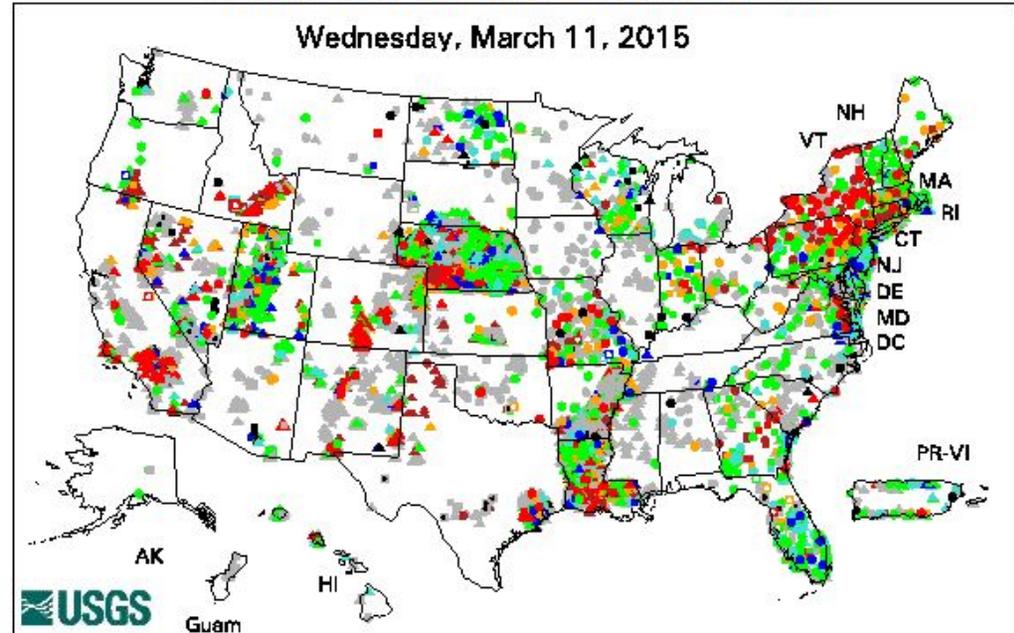


Explanation - Percentile classes (symbol color based on most recent measurement)

Low	<10	10-24	25-75	76-90	>90		High	Not Ranked	○ Real Time	□ Continuous
	Much Below Normal	Below Normal	Normal	Above Normal	Much Above Normal				△ Periodic Measurements	

## Active Groundwater Level Network

Wednesday, March 11, 2015



Explanation - Percentile classes (symbol color based on most recent measurement)

Low	<10	10-24	25-75	76-90	>90		High	Not Ranked	○ Real-Time	□ Continuous	△ Periodic Measurements	■	▲
	Much Below Normal	Below Normal	Normal	Above Normal	Much Above Normal								

# Presently Active Kentucky Groundwater Monitoring Sites



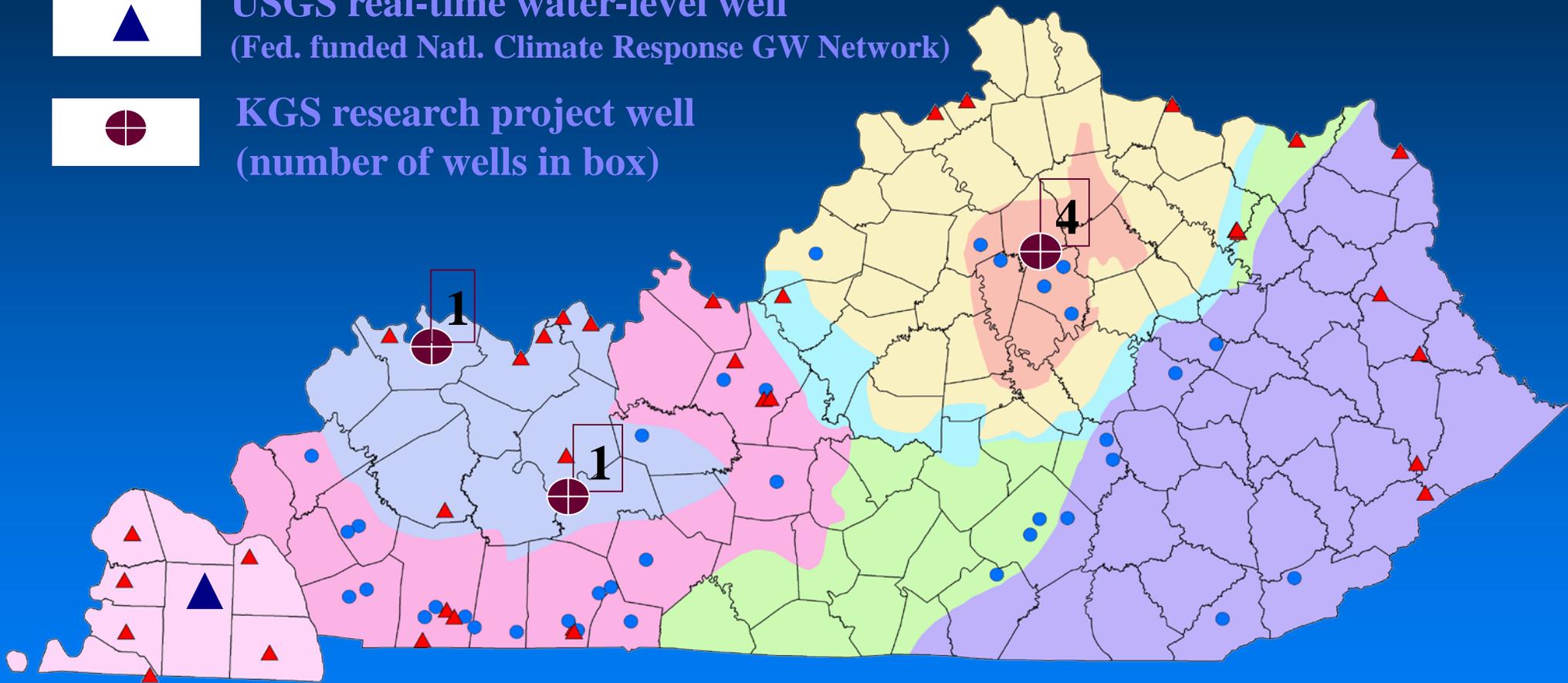
**KDOw Sites (ITAC Groundwater-Quality Network)**



**USGS real-time water-level well  
(Fed. funded Natl. Climate Response GW Network)**



**KGS research project well  
(number of wells in box)**



Map Courtesy of Rob Blair, KDOw, 2014

# KGS Initiation of A New Kentucky Groundwater Observation Network (KGON)

- Helps meet critical need for continuously updated groundwater-level data and re-establishment of a statewide long-term groundwater monitoring network.
- Helps fulfill KGS legislative mandate (KRS 151.625) to establish a network “...for the purpose of characterizing the quality, quantity, and distribution of Kentucky’s groundwater resources.”
- “...in areas of demonstrated need.”
- Wells serve as fixed monitoring sites representative of specific aquifers or aquifer types (e.g. karst, fractured sedimentary rock, etc.).
- “...support research efforts that develop models for groundwater systems...”, and “...to determine and monitor trends...”.

## Capitalization:

- KGS: Approx. \$145K one-time funding to establish initial network of 14 observation wells (from surplus carbon sequestration research funds) and cover 12 mo. operations costs (implementation during 2015-16).
- “Livestream” NEA-LexArts project: Additional \$75K in private donations to establish continuous WQ+flow monitoring at four karst spring sites.
- Annual O&M costs (app. \$30K) are presently anticipated to be covered by KGS for first 3 years; unanticipated cost increases, funding cuts, or resource re-allocation decisions could potentially affect this.
- Long-term maintenance, expansion or enhancement of network and data-collection activities, will require additional outside funding/partnerships.

# Network Design:

- Proposed 14 observation wells located in areas of state where groundwater withdrawals are great and/or are expected to increase.
  - Geographic distribution is a consideration, as are monitoring needs in areas having significant agricultural or energy resource-extraction activities.
  - Shallow, mostly unconfined (water table) aquifers are a priority for monitoring.
- Utilize existing (unused) wells if possible to minimize installation costs; also locate on public-owned lands where possible.
  - Approx. 7 newly-constructed wells to be drilled in areas of special interest or need.
- Continuous water-level loggers installed in all network wells.
  - Approx. 6 wells equipped with telemetry for near-real-time monitoring.
- Quarterly groundwater quality sampling (major/minor inorganics) planned in first year.

# Proposed New KY Groundwater Observation Network



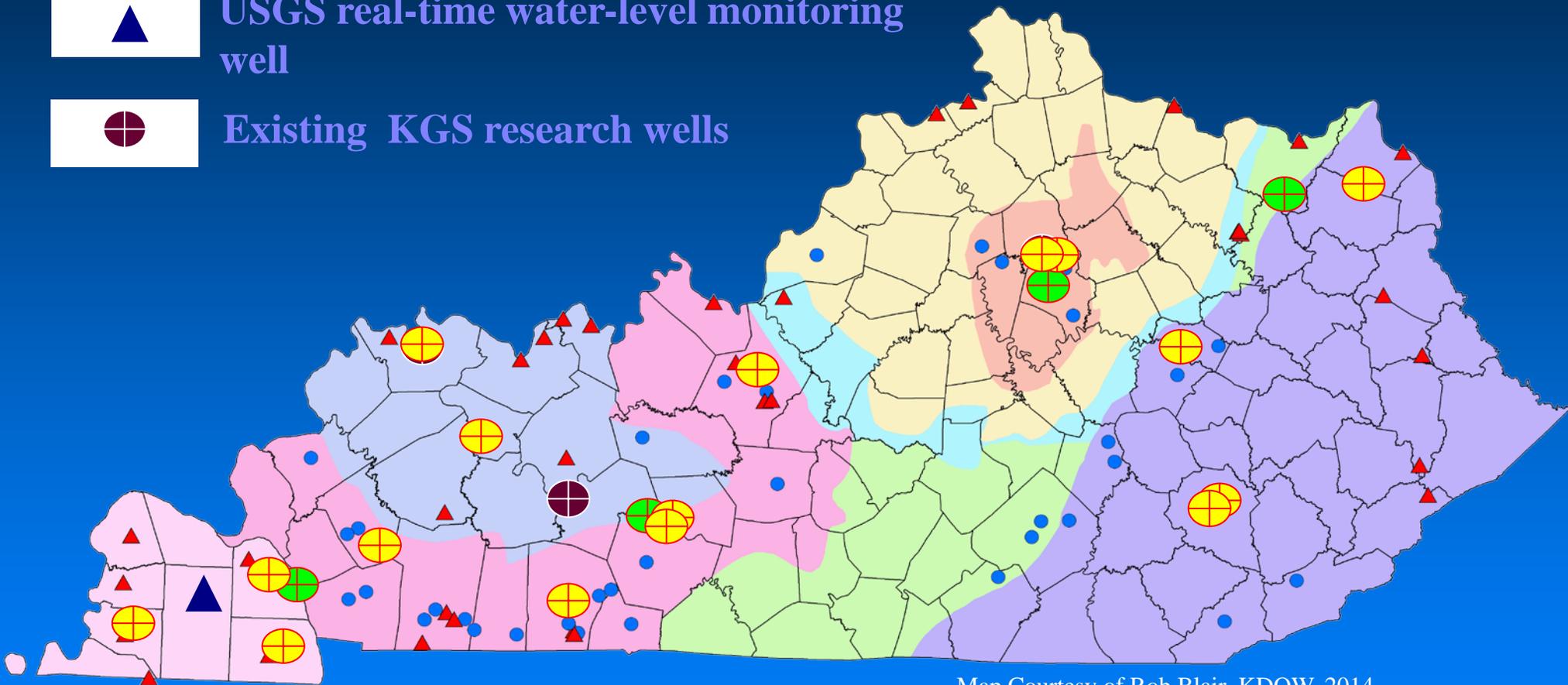
KDOW (ITAC GWQ network) sites



USGS real-time water-level monitoring well



Existing KGS research wells



Map Courtesy of Rob Blair, KDOW, 2014



Proposed general location for new KGS-KGON observation well site



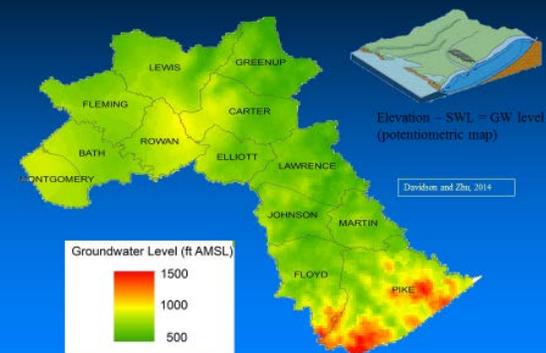
Proposed KGS "Livestream" spring monitoring site

# Additional Data Collection Activities Being Conducted by KGS to Support the Network:

## Well/borehole logging



Groundwater levels in the Berea play area (feet above mean sea level)



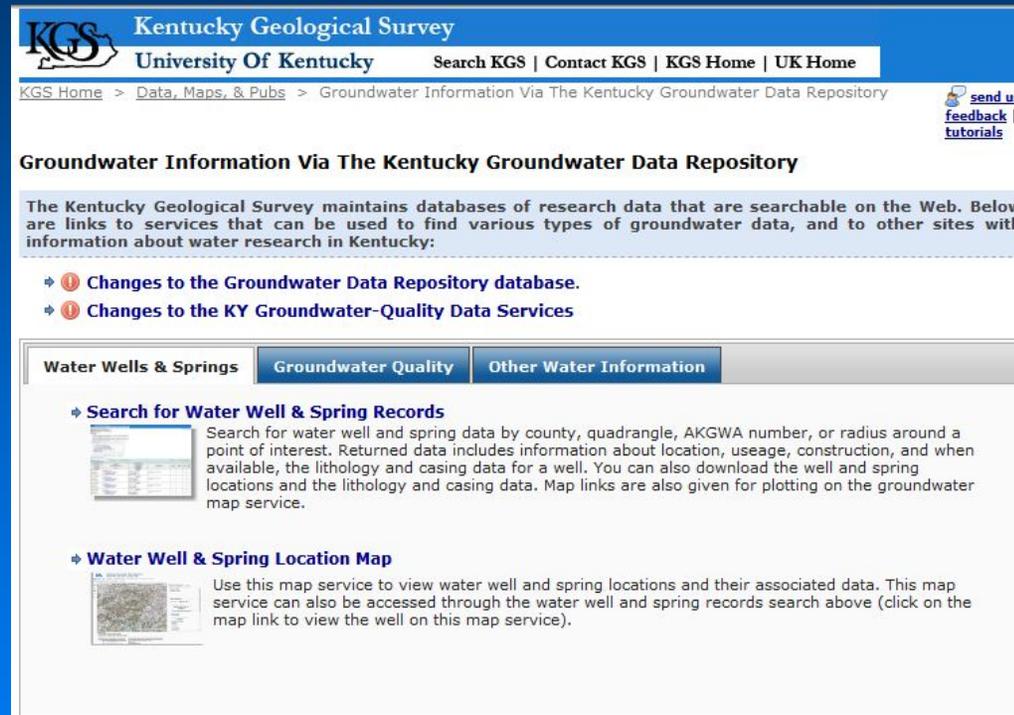
Additional synoptic water-level measurements and water-level mapping

## Aquifer tests



# All KGON Data will be Publicly Accessible Through A Webpage and the Kentucky Groundwater Data Repository

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



The screenshot displays the Kentucky Geological Survey (KGS) website interface. At the top, the KGS logo and name are visible, along with navigation links for 'Search KGS', 'Contact KGS', 'KGS Home', and 'UK Home'. Below this, a breadcrumb trail reads 'KGS Home > Data, Maps, & Pubs > Groundwater Information Via The Kentucky Groundwater Data Repository'. A 'send us feedback | tutorials' link is also present. The main heading is 'Groundwater Information Via The Kentucky Groundwater Data Repository'. 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:'. Two bullet points with red circular icons indicate updates: 'Changes to the Groundwater Data Repository database.' and 'Changes to the KY Groundwater-Quality Data Services'. Below this is a navigation bar with three tabs: 'Water Wells & Springs', 'Groundwater Quality', and 'Other Water Information'. Under the 'Water Wells & Springs' tab, there are two sections: 'Search for Water Well & Spring Records' and 'Water Well & Spring Location Map'. Each section includes a small thumbnail image and a brief description of the service.

Well and spring hydrographs, tabulated data, and special publications on groundwater conditions including digital maps and periodic summary reports are all anticipated products that will be available.