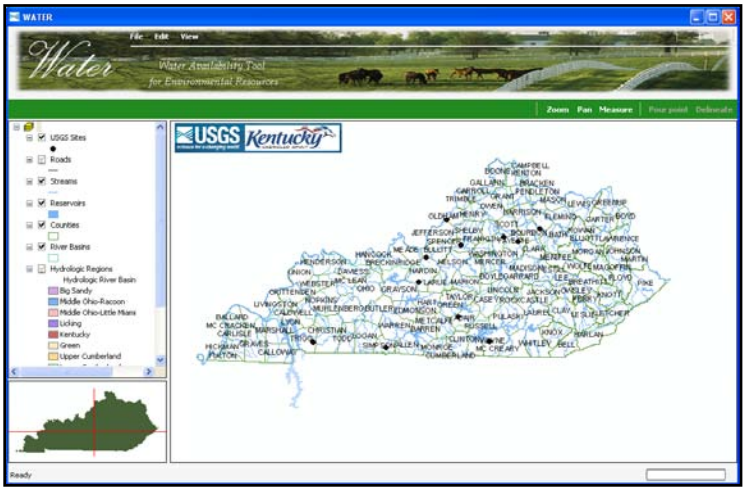
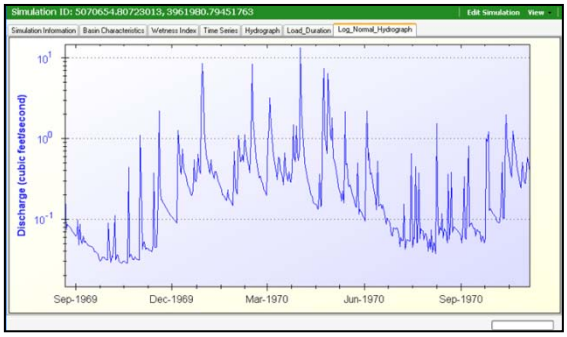
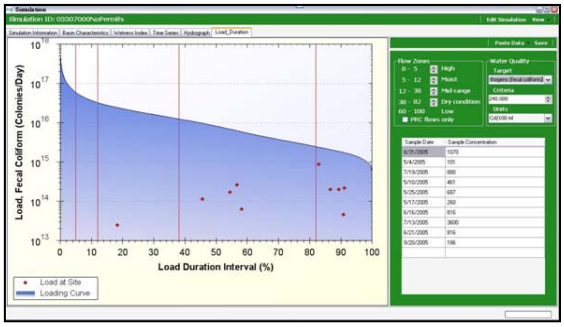
WATER

Water Availability Tool for Environmental Resources

The concept of the Kentucky WATER application was born from the need in Kentucky to quantify water availability in areas of the Commonwealth with limited long-term monitoring data. The program was later expanded to include the creation of load-duration curves for TMDL development. Kentucky's wealth of geospatial data was critical to the Kentucky WATER application and enabled USGS scientists to take well-known streamflow generation and modeling concepts (Beven and Kirkby, 1979), develop innovative data-processing methods, and apply the concept across all regions of Kentucky with much greater accuracy and precision than had been previously possible.







Potential applications

- Estimating water availability for permitting and land-use planning
- Estimating flow statistics
- Drought mitigation
- Flood forecasting and analysis
- Extension of water-quality analyses
- Quantifying anthropogenic effects on water availability
- Source-water assessments
- Definition of ecoflows for protection of aquatic habitats

What makes WATER different?

- Innovative soils methodology
- Advanced climate data
- Comprehensive data and flexible program structure

USGS science for a changing world

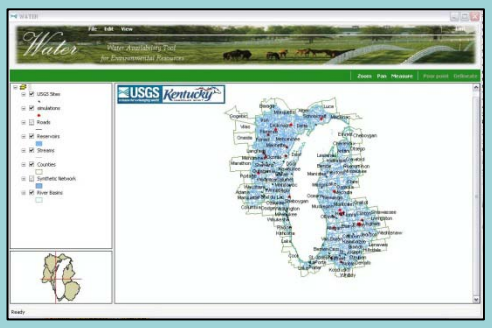
Leading the way in water-resource management

Kentucky UNBRIDLED SPIRIT

Applications in Local and National science

Example applications of WATER and TOPMODEL-based applications in Kentucky and other regions of the United States include:

National USGS efforts: Developing estimates of runoff-contributing areas used in National-scale models (SPARROW) and assessing of the effects of global climate change; including the Great Lakes Restoration Initiative (Screen Capture of WATER application for Lake Michigan region below).



Kentucky: Kentucky Division of Water; assessing local and regional water availability. Kentucky State Nature Preserves Commission; assessing ecosystems. Sanitation District No. 1 of Northern Kentucky; use for flow component of new "Stream Condition Index" tool.

Alabama: Estimating water availability in Alabama with focus on daily mean flows at the spatial scale of 12-digit HUCs.

Florida: Assessing ecosystem flows. Coarse and fine resolution hydrologic models are being coupled with biological models to estimate the effects of changing water availability on fish populations at a stream reach level.

Georgia: Estimating ecologically-relevant flow metrics for input to a model of fish-species occurrence and distribution. Hydrologic, geologic, geomorphic, water-quality, and landscape characteristics are being used in the model to assign species-presence probabilities to fish communities.

Kansas: Developing estimates of potential runoff-contributing areas in Kansas to assess water-quality and other issues.

New Jersey: Quantifying water-availability, effects of digital elevation models (DEM) resolution on landscape characteristics, relations between terrain characteristics and stream chemistry, and the effects of climate change on water resources.

New York: Developing models for mercury in streams and rivers in an on-going joint effort with USGS National Water Quality Assessment (NAWQA) program and EPA.

South Carolina: Assessing the hydrologic controls on the transport of mercury species between uplands/hill slopes, riparian wetlands, and stream channels.

Additional Information and Contacts

Pete Cinotto
USGS
9818 Bluegrass Parkway
Louisville, KY 40299
502-493-1930
Email: pcinotto@usgs.gov

Bill Caldwell
Kentucky Division of Water
200 Fair Oaks Lane , Fourth Floor
Frankfort, KY 40601
502-564-3410
E-mail: water@ky.gov

USGS science for a changing world

http://ky.water.usgs.gov/projects/waterbudget/index.html

Kentucky UNBRIDLED SPIRIT