

discover the GLOBE

# watershed dynamics project

Powerful instructional materials for Grades 7-12 that help your students investigate watershed behavior using scientific datasets

Your students can use educational materials from the Watershed Dynamics Project at Northwestern University to conduct inquiry-based investigations using real-time data from a large-scale observatory.

## Program Curriculum

The curriculum is structured in two units, each of which contains several activities. Students study NARR (North American Regional Reanalysis) data, USGS stream gauge data, and the National Land Cover Data to analyze relationships and draw conclusions from the data.

### First Module: Water Availability

**What Students Study:**

The water cycle by comparing rates of precipitation, evaporation, and surface runoff to see how they compare nationally.

**Emphasis:** Emphasis is placed on water availability in different regions of the country and how these variables change throughout the year using data analysis and visualization tools.

**Students investigate their own watershed to understand:** The flow of water through the watershed. Seasonal precipitation patterns: inter-relationships between precipitation, evaporation and surface runoff.

### Second Module: Human Impact on the Watershed

**What Students Study:**

Land cover data and stream gage data to see if they can find a relationship between surface type and stream flow.

**Emphasis:** Students examine land cover change over time and analyze the effect it has on streamflow.

**Students investigate their own watershed to understand:** How human activities within the watershed have been shaped by its hydrology and how human land use is impacting the hydrology of the watershed.

### Sample Student Questions

Where does your water come from?

Do you always have enough or is the supply limited?

What factors affect the quantity and seasonal availability of the water where you live?

How does change in landcover affect streamflow?

## benefits

- Offers students the opportunity to conduct investigations on watershed behavior for local, regional, and national scales
- Uses authentic scientific datasets from the observatory being constructed by the Consortium of Universities for Advancement of Hydrologic Science (CUAHSI – [www.cuahsi.org](http://www.cuahsi.org)).
- Offers analyses using the full-featured My World GIS™ ([www.myworldgis.org](http://www.myworldgis.org)), one of the top earth science software applications—a geographic information system specifically designed for educational use with support for the novice
- Improves education through inquiry-based pedagogy

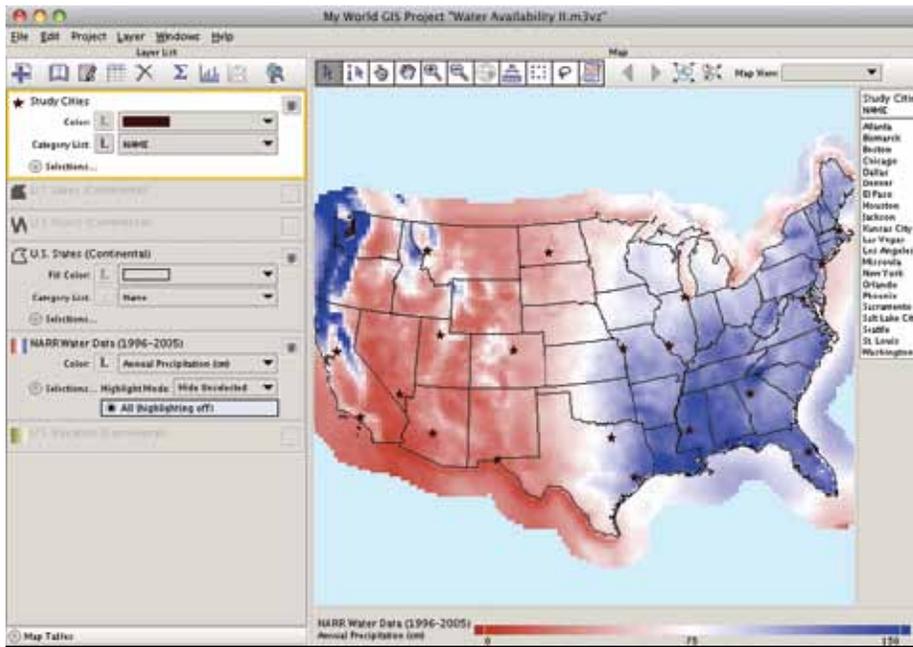
## learn more

Colleen Buzby, Curriculum Developer  
[c-buzby@northwestern.edu](mailto:c-buzby@northwestern.edu)  
School of Education and Social Policy,  
Northwestern University

GLOBE Watershed Dynamics Project:  
[www.globe.gov/projects/watersheds](http://www.globe.gov/projects/watersheds)  
My World GIS™:  
[www.myworldgis.org](http://www.myworldgis.org)

E-mail for more information about the GLOBE Watershed Dynamics Project:  
[watershedinfo@globe.gov](mailto:watershedinfo@globe.gov)

# Sample Data



## About the Project

The Watershed Dynamics Project is a partnership between Northwestern University, the Global Learning and Observations to Benefit the Environment (GLOBE) program, and the Consortium of Universities for the Advancement of Hydrologic Science (CUAHSI). The project goal is to develop educational materials that use authentic scientific data and analysis techniques. By partnering curriculum developers at Northwestern and GLOBE with scientists at CUAHSI, two units of educational materials have been developed and tested in classrooms around the U.S.

## Technology

My World GIS™ is a Geographic Information System (GIS) designed specifically for use in educational settings. My World allows learners to explore and analyze geographic data about our world. It combines the power of a full-featured GIS environment with the support and structure required by novice users in an educational environment.

## PARTNERS

### Northwestern University

*Kemi Jona, Co-Principal Investigator and Colleen Buzby, Curriculum Developer*  
School of Education and Social Policy,  
Northwestern University: [www.northwestern.edu](http://www.northwestern.edu)

### National Geographic Society

*Danny Edelson, Co-Principal Investigator and Eric Russell, Software Developer*

### GLOBE

*Gary Randolph, Educational Designer*

A worldwide hands-on, primary and secondary school-based science and education program, GLOBE's vision promotes and supports students, teachers and scientists to collaborate on inquiry-based investigations of the environment and the Earth system working in close partnership with NASA and NSF Earth System Science Projects (ESSPs) in study and research about the dynamics of Earth's environment: [www.globe.gov](http://www.globe.gov)

### CUAHSI

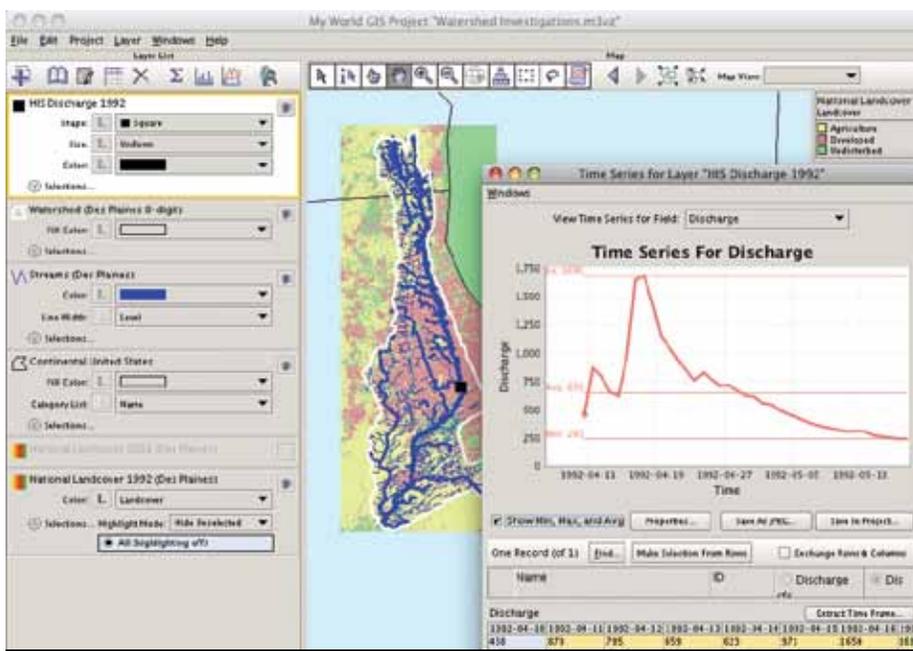
*David Maidment, Co-Principal Investigator*  
An organization representing more than 100 U.S. universities, CUAHSI receives support from the National Science Foundation to develop infrastructure and services for the advancement of hydrologic science and education in the U.S.: [www.cuahsi.org](http://www.cuahsi.org)



This work is supported in part by NASA and the National Science Foundation under NSF grant GEO-0627923.

However, any opinions, findings, conclusions, and/or recommendations are those of the investigators and do not necessarily reflect the views of NASA or the Foundation.

In the first module, students analyze North American Regional Reanalysis (NARR) data to understand when and where the U.S. gets its water. Students investigate the water budget as new data is introduced to the equation and find that it doesn't all add up.



Students investigate how the change in landcover over time can impact stream discharge in a watershed near Chicago, IL. They access live discharge data to create a hydrograph. Using skills they learn in this investigation, students can recreate the study in their own region and compare results.



**NORTHWESTERN UNIVERSITY**

Office of STEM Education Partnerships (OSEP)  
School of Education and Social Policy  
<http://osep.northwestern.edu>

[www.northwestern.edu](http://www.northwestern.edu)

