

# World Water Online

*Linking People Everywhere with Water Data, Maps and Models*

**Presentation by David Maidment**

Center for Research in Water Resources  
University of Texas at Austin

Microsoft eScience Workshop

Chicago, October 8, 2012



THE UNIVERSITY OF  
**TEXAS**  
AT AUSTIN

# Four water problems to be solved

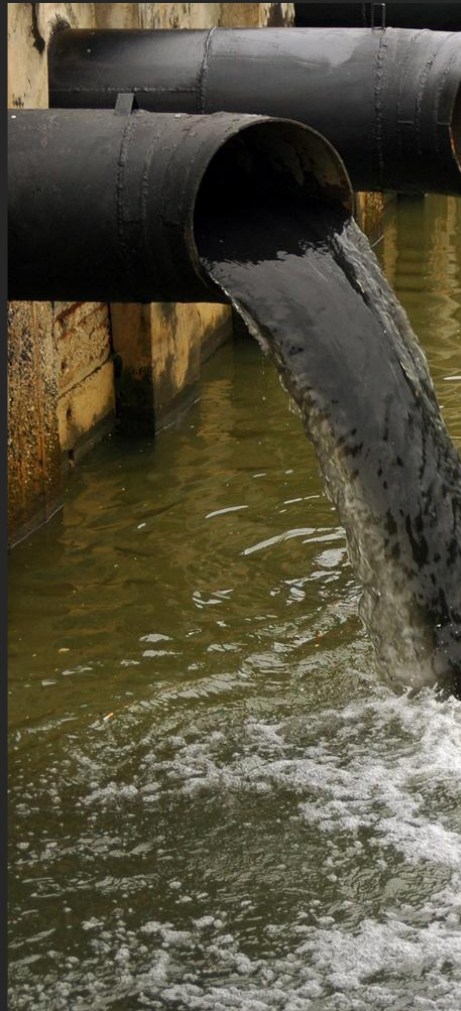
Too much water



Not enough water



Dirty water

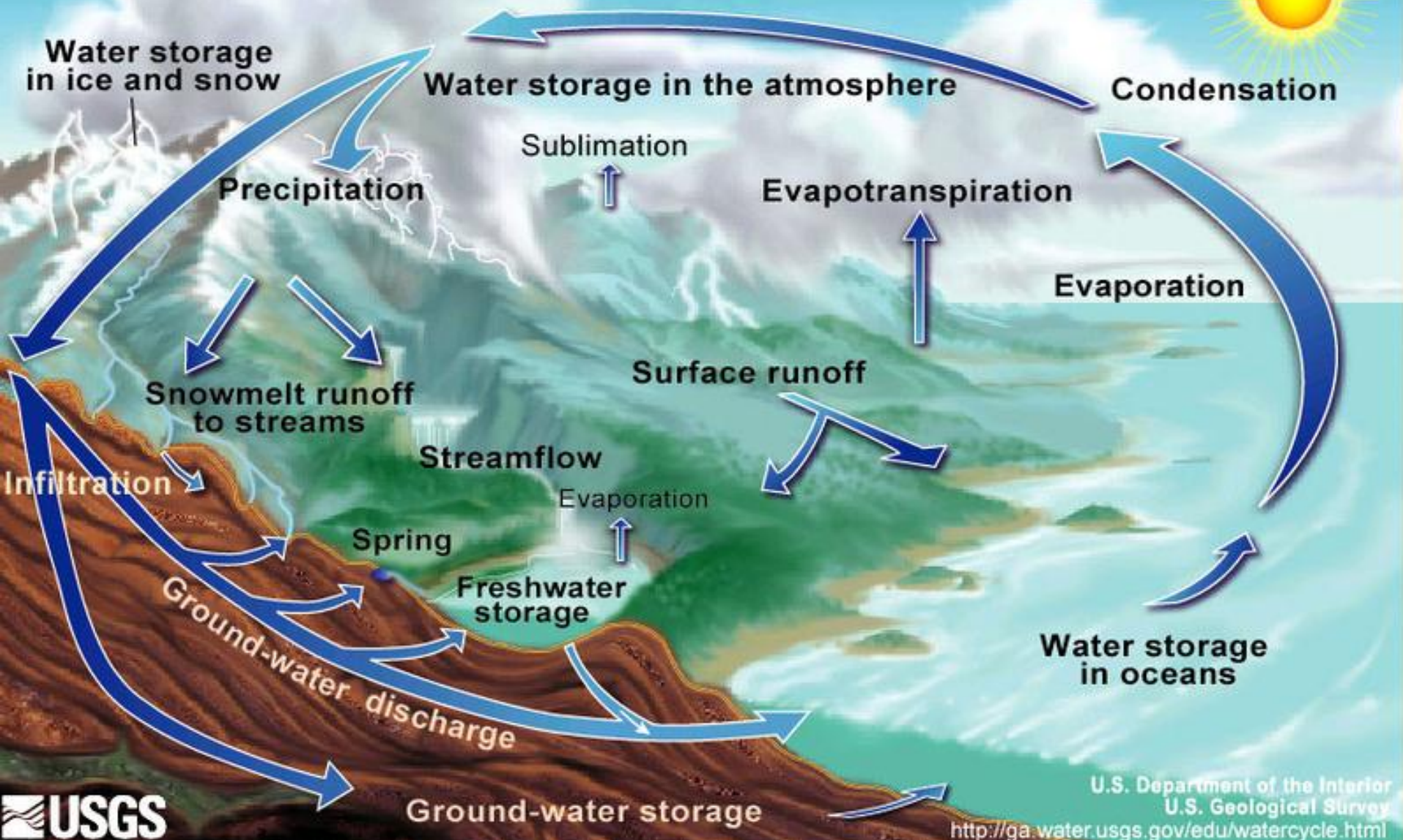


Environmental Issues





# The Water Cycle



# Is Global *Hydrologic* Consciousness Possible?

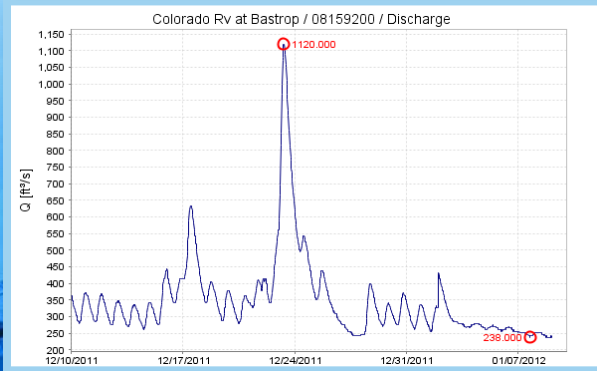
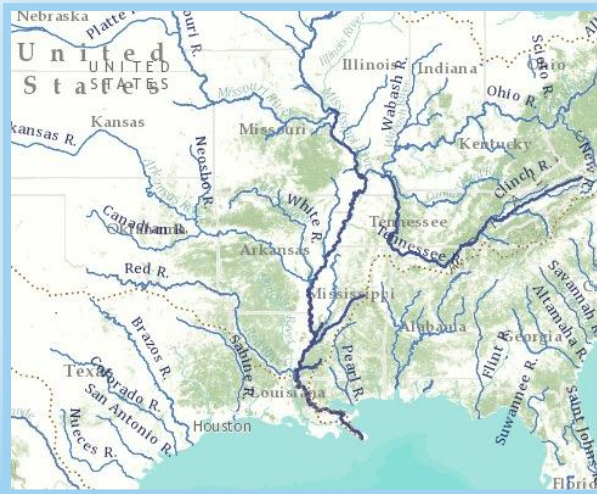
World Water Online

*Linking People Everywhere  
with Water Data, Maps and Models*





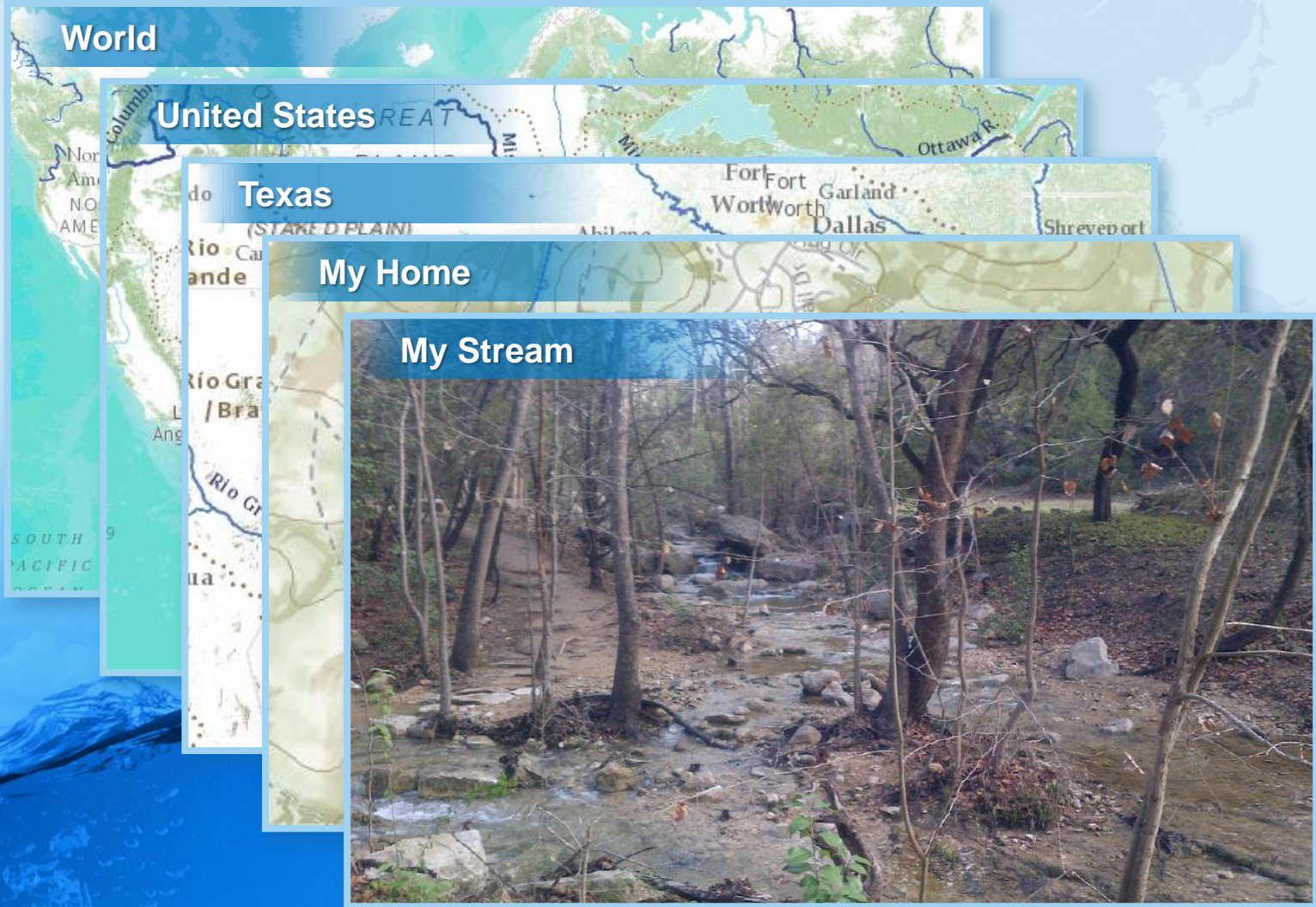
# World Water Online



- Bring together **water information** for the whole earth
- All **spatial scales**: global, regional, local
- Both **geospatial and temporal** information
- Linking **data and modeling**
- Everything on the **web**

... a transformation  
of our world!

# World Hydro Overlay Map

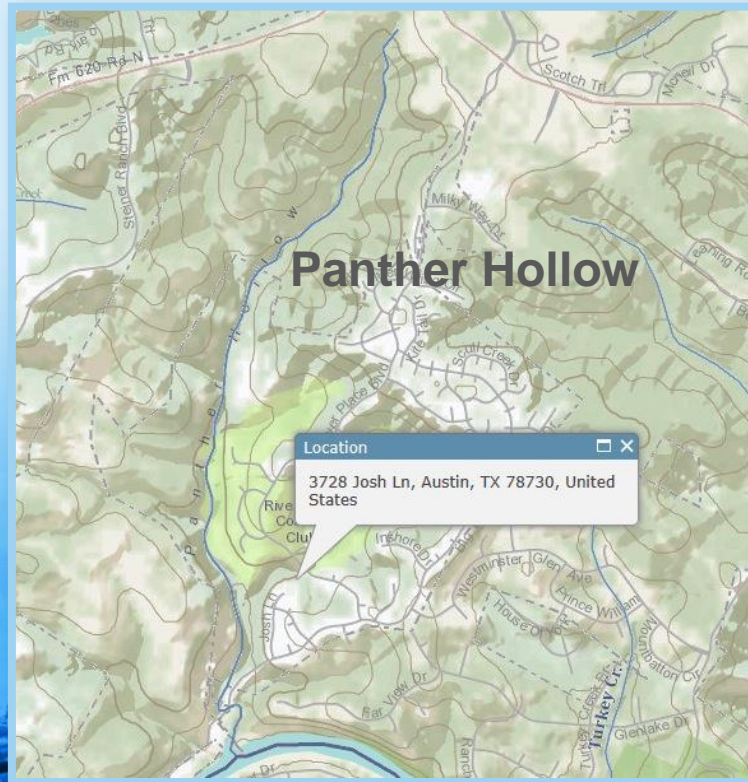




# Watershed of My Stream

ESRI Base Map and Delineation Services

My stream



My watershed



Delineate the watershed of any stream or river anywhere on earth on the web

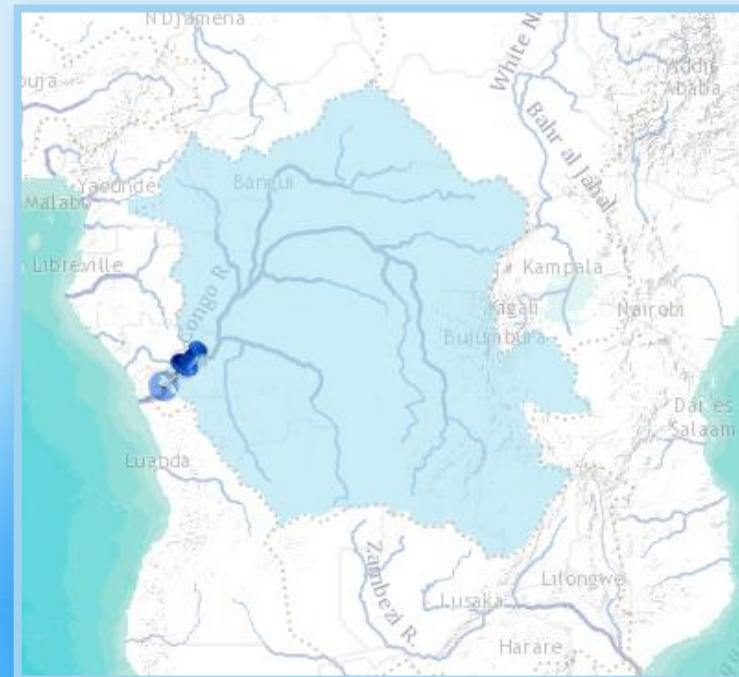
# Congo River Basin

Global river mapping and watershed delineation

**World Hydro Overlay Map**



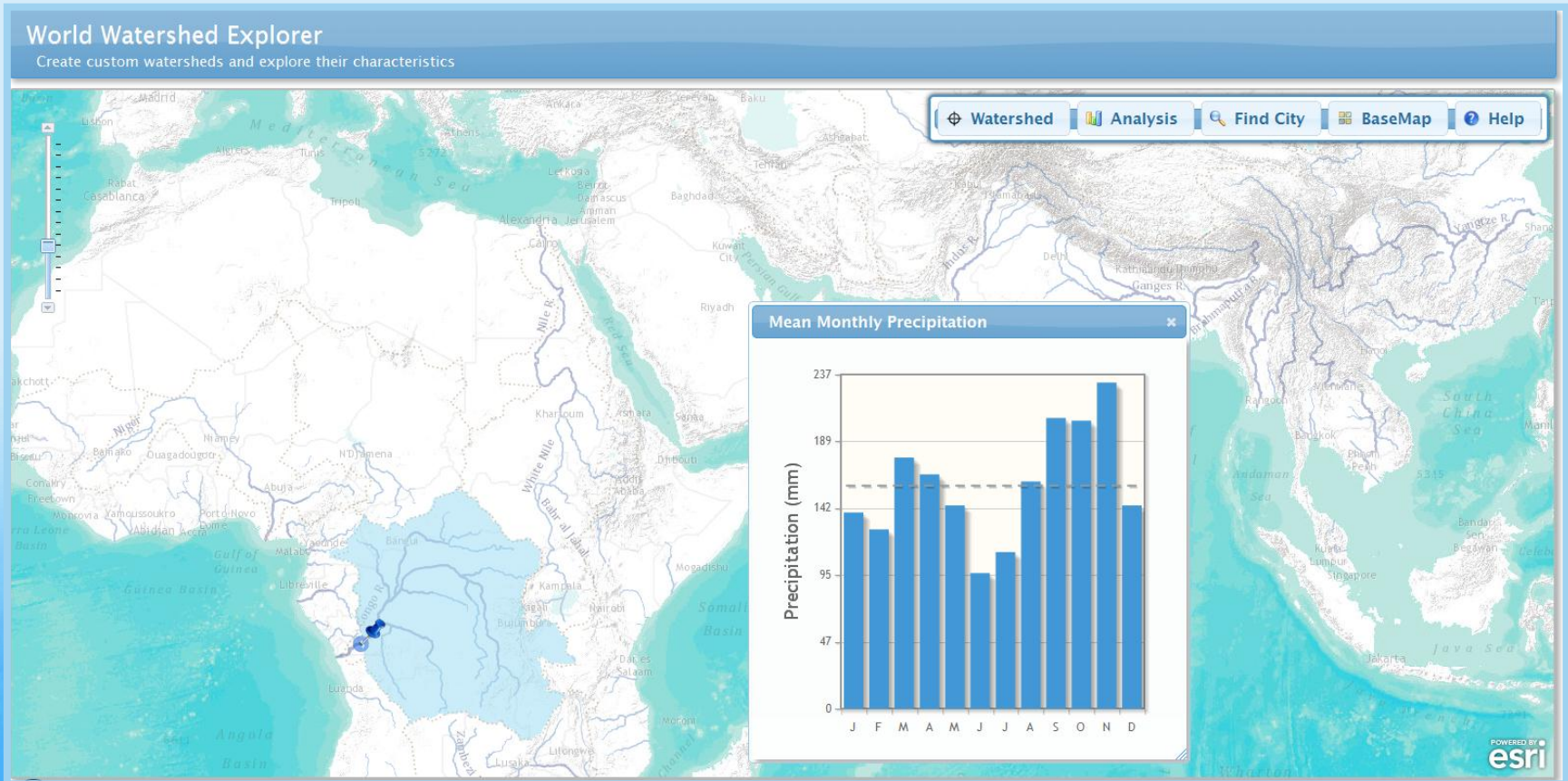
**River Basin Delineation**



**Delineate a watershed from any point on a river**



# World Watershed Explorer – Congo Basin



Watershed characteristics . . .

. . . precipitation, soils, land cover, population...

# Collecting Water Data Locally

Water Quantity



Rainfall



Soil Water



Water Quality



Meteorology

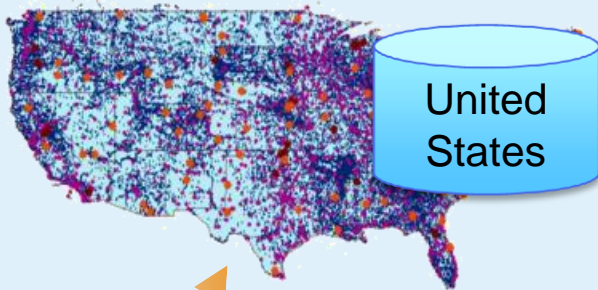


Groundwater

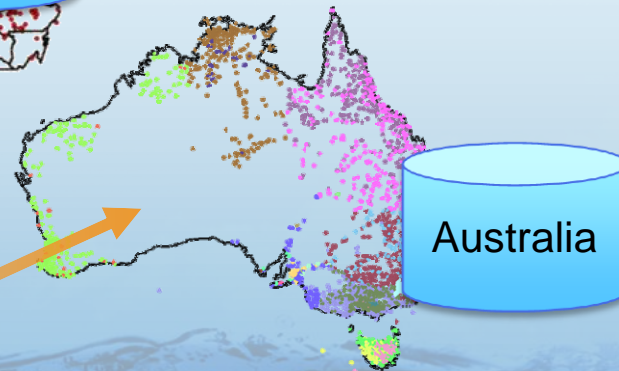
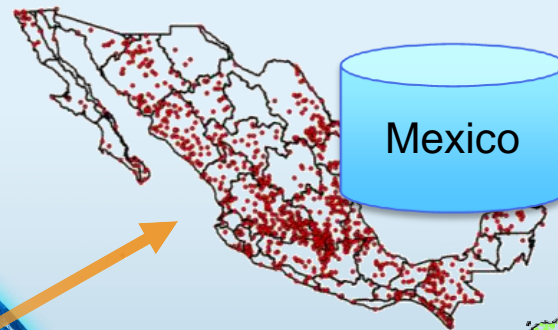




# Every Country Collects These Data

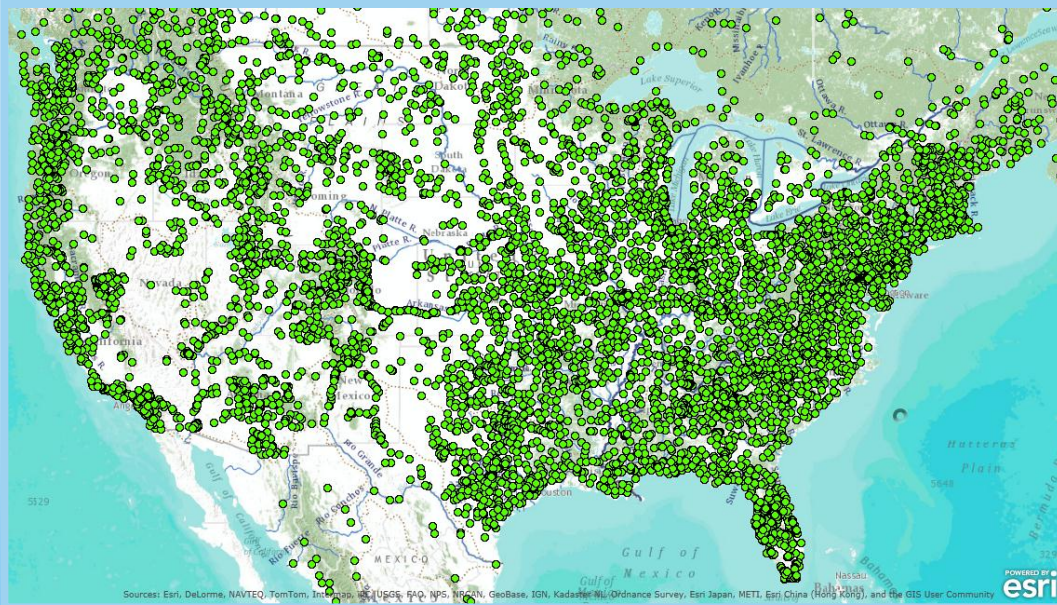


**We Lack a Global Water Information System!**



# WaterML as a Web Service

## USGS Gauges



### USGS Water Services

This site serves [USGS water data](#) via automated means using [web services](#) and [extensible markup language \(XML\)](#) as well as other popular media types. Services can be invoked with the [REST](#) protocol. These services designed for high fault tolerance and very high availability. You will find this site very useful if you to periodically acquire and process USGS water data.

### Service Highlights

#### USGS Instantaneous Values Web Service

Need current data? Try this service! Retrieve current streamflow and other real-time data for one or multiple sites, using sets of flexible, predefined filters, since October 1, 2007. Data are available in [WaterML](#), [JSON](#) and in a tab-delimited format with more formats, like Microsoft Excel, to come. [Learn more about the web service](#) or [test the web service](#).

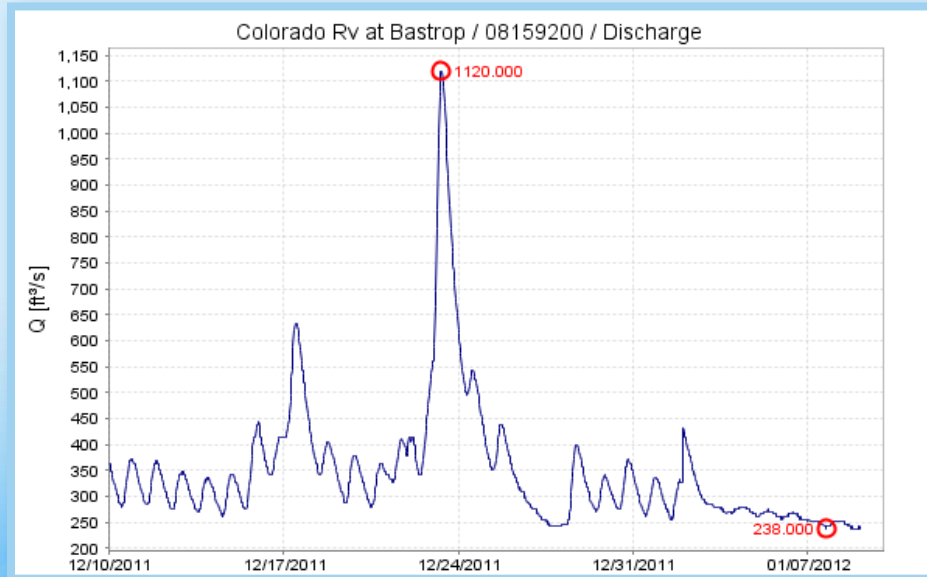
<http://waterservices.usgs.gov/nwis/iv?sites=08158000&period=P1D&parameterCd=00060>

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# WaterML2

International standard for water resources time series



**WaterML2**— now an Open Geospatial Consortium (OGC) standard. Being considered for adoption by WMO.


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# Central Texas HUB

Current Water Information in Central Texas

## Synthesis of Water Observations Networks into Thematic Maps

### Central Texas HUB



Map Table Favorites

Select service to display  
Choose service

Select data to display  
Flow

Site List

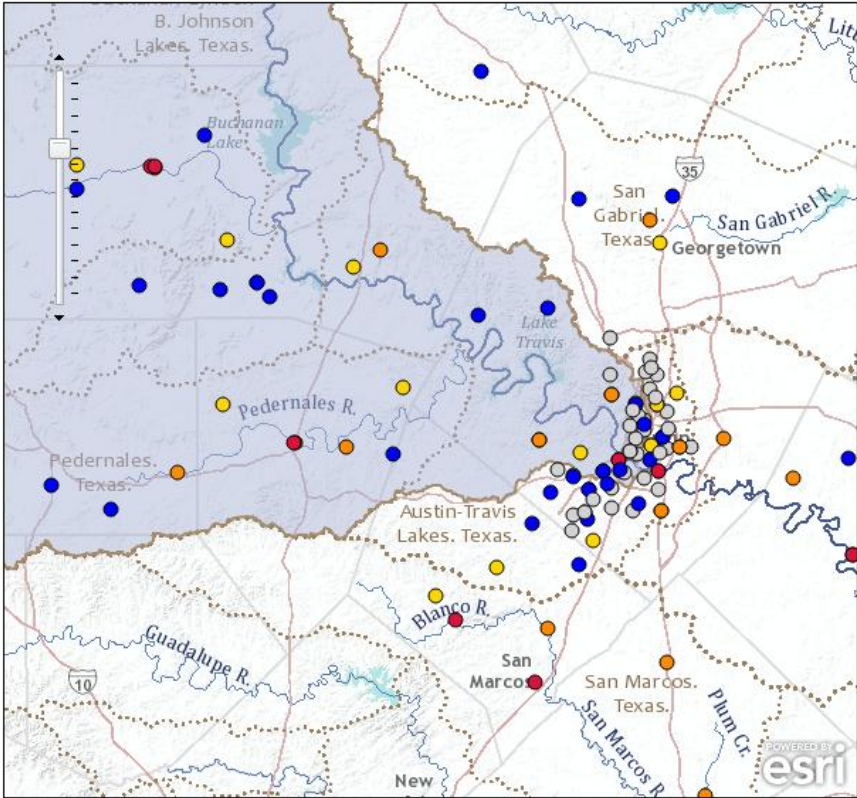
**Flow (ft<sup>3</sup>/s)**

- no class (0)
- no value (40)
- <1 (37)
- < 1 to 5 (19)
- < 5 to 50 (23)
- >50 (30)

Interpolated 24h Rainfall

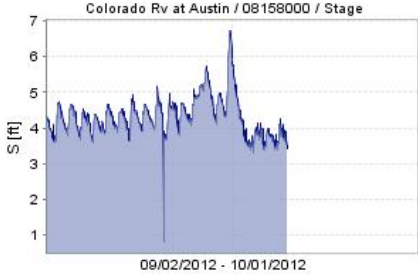
Most Current

Previous

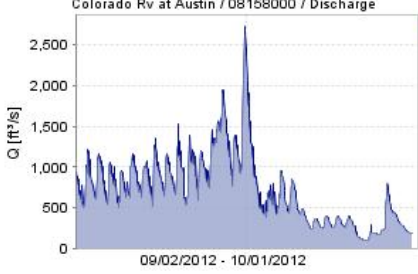


Colorado Rv at Austin / 08158000 / Stage

Stage	3.49 ft	(Sep 21, 12:45)
Stage 1 hr Delta	0.06 ft	(Sep 21, 12:45)
Stage 3 hr Delta	-0.20 ft	(Sep 21, 12:45)



Colorado Rv at Austin / 08158000 / Discharge



Favorites

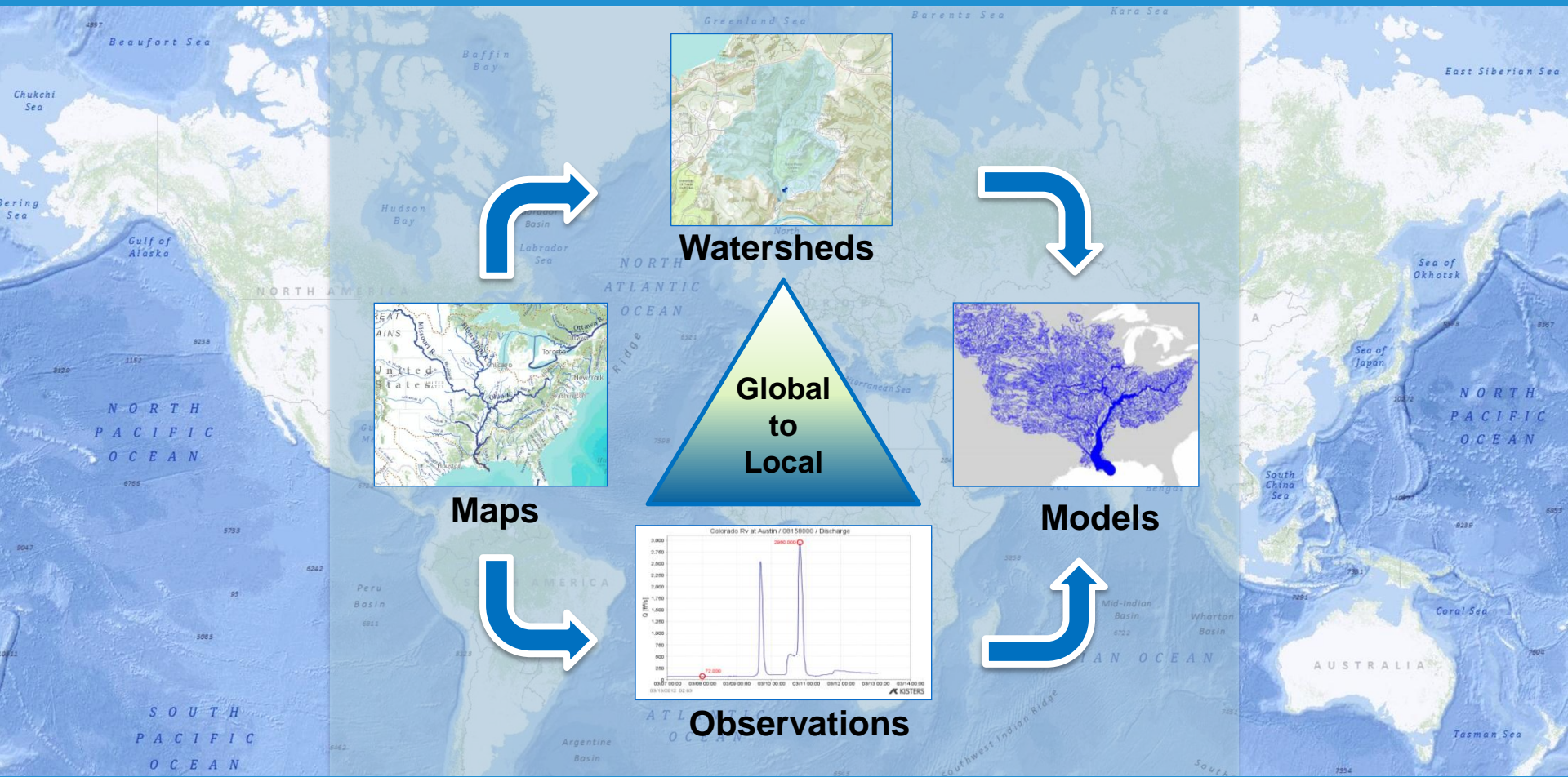
Real-time information from a “network of networks”

<http://www.centraltexashub.org/wiskiweb.htm>



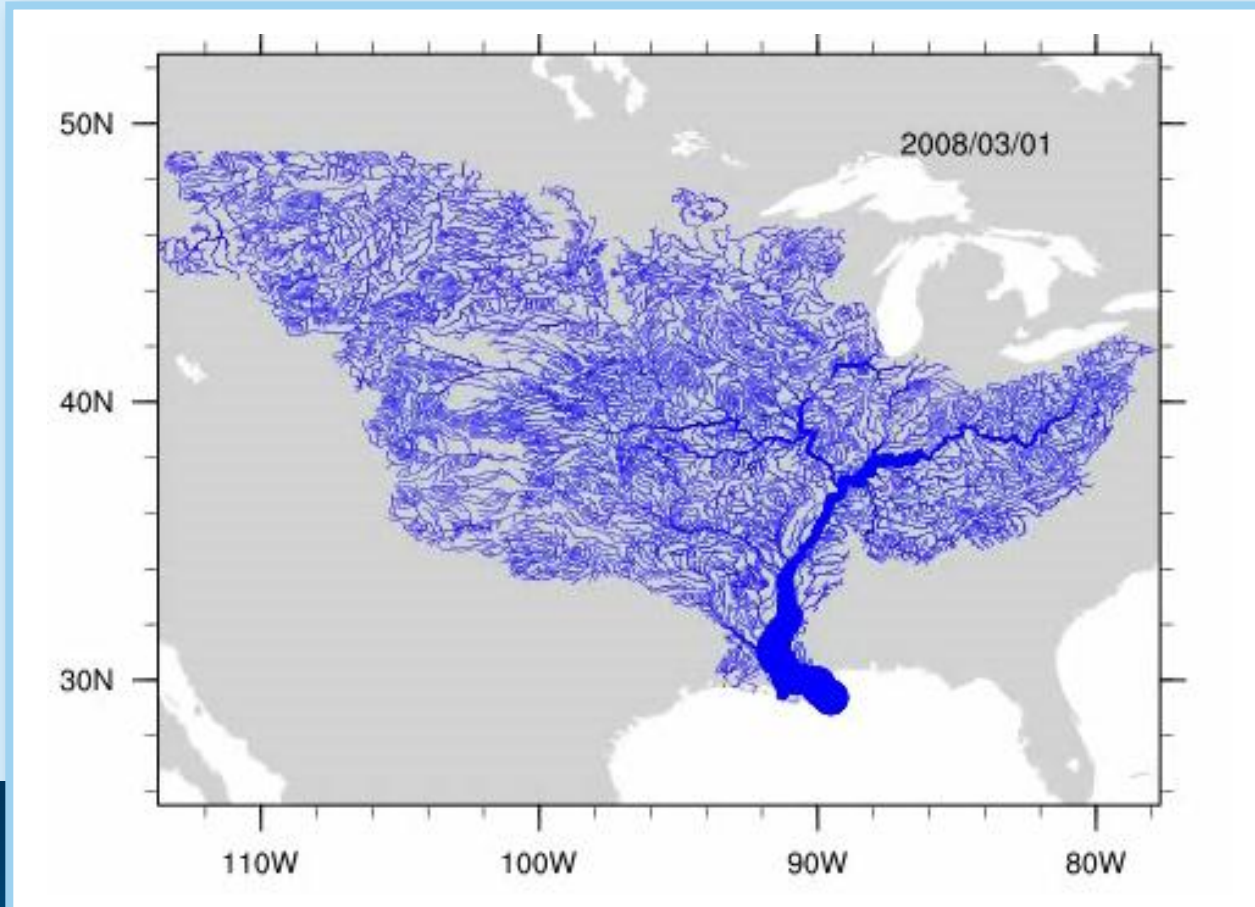
# World Water Online

Hydrology on the web



# Flow in the Mississippi River Basin

March to May 2008

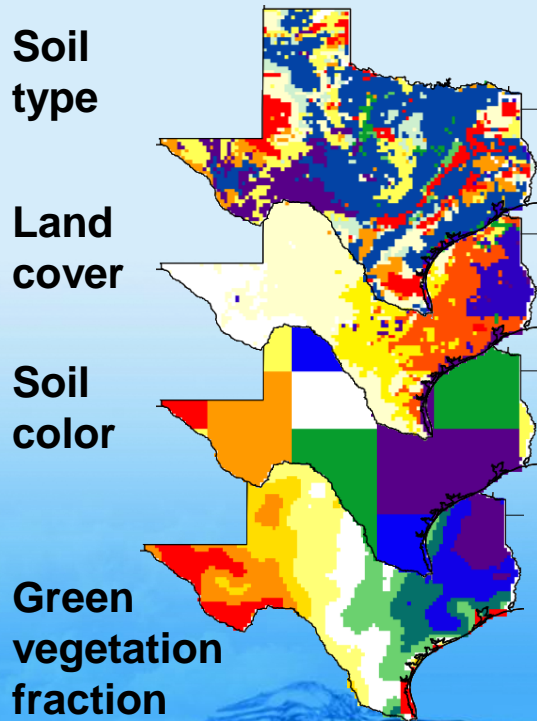


River maps . . .  
. . . River models



# Land-Atmosphere Modeling for Texas

## Land surface features



## NLDAS atmospheric forcing

- Temperature
- Precipitation
- Wind speed
- Specific humidity
- Surface pressure
- Downward SW radiation
- Downward LW radiation

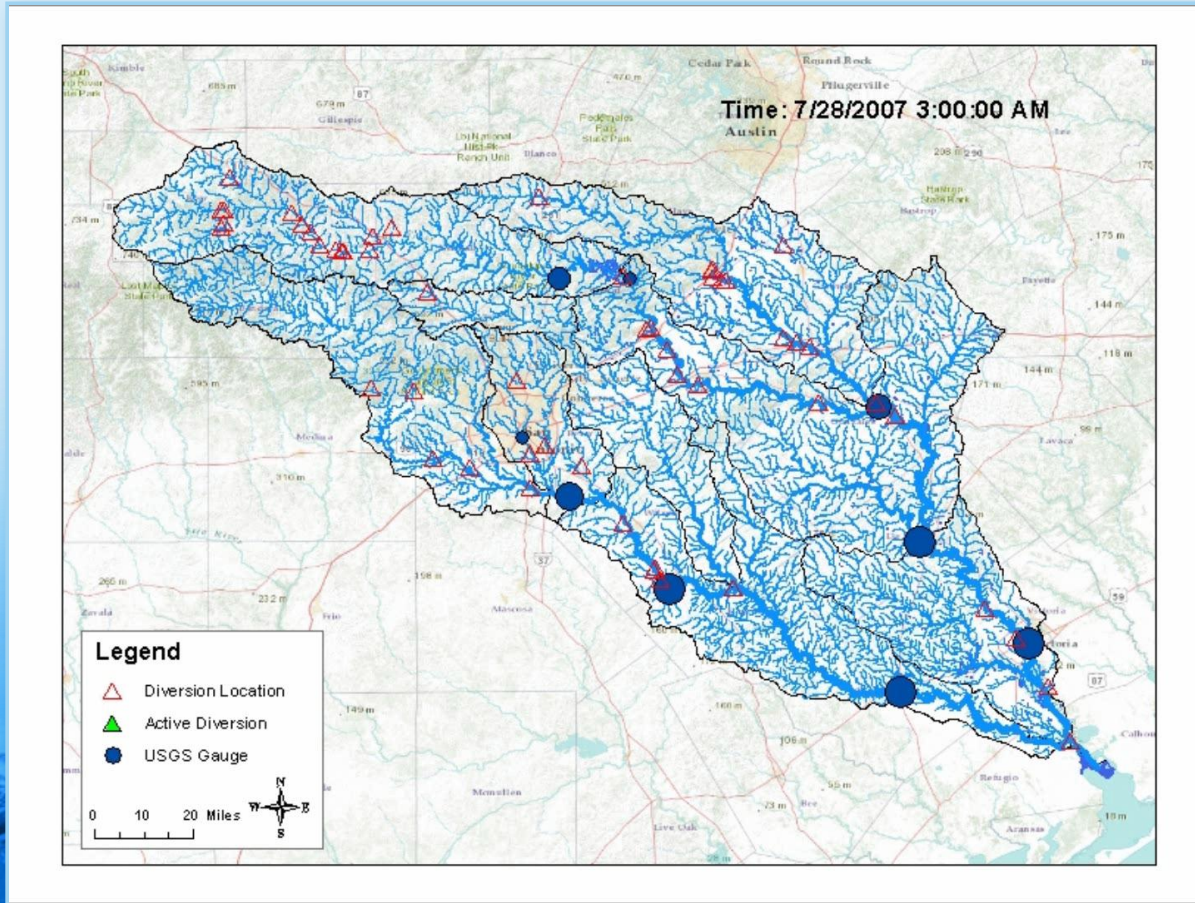


## Model output

- Surface runoff
- Sub-surface runoff
- Soil moisture
- Evapotranspiration
- Water table ...

# Flow and Water Diversions in the Guadalupe and San Antonio basins

Managed by the Texas Commission for Environmental Quality



Water Information . . .  
. . . Water Operations



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Linking people everywhere with water data, maps and models

