

The Texas Water Digital Library

David R. Maidment

Director, Center for Research in Water Resources
University of Texas at Austin

Texas Conference on Digital Libraries, May 17, 2010

Texas Water Issues

Flooding



Water Quality



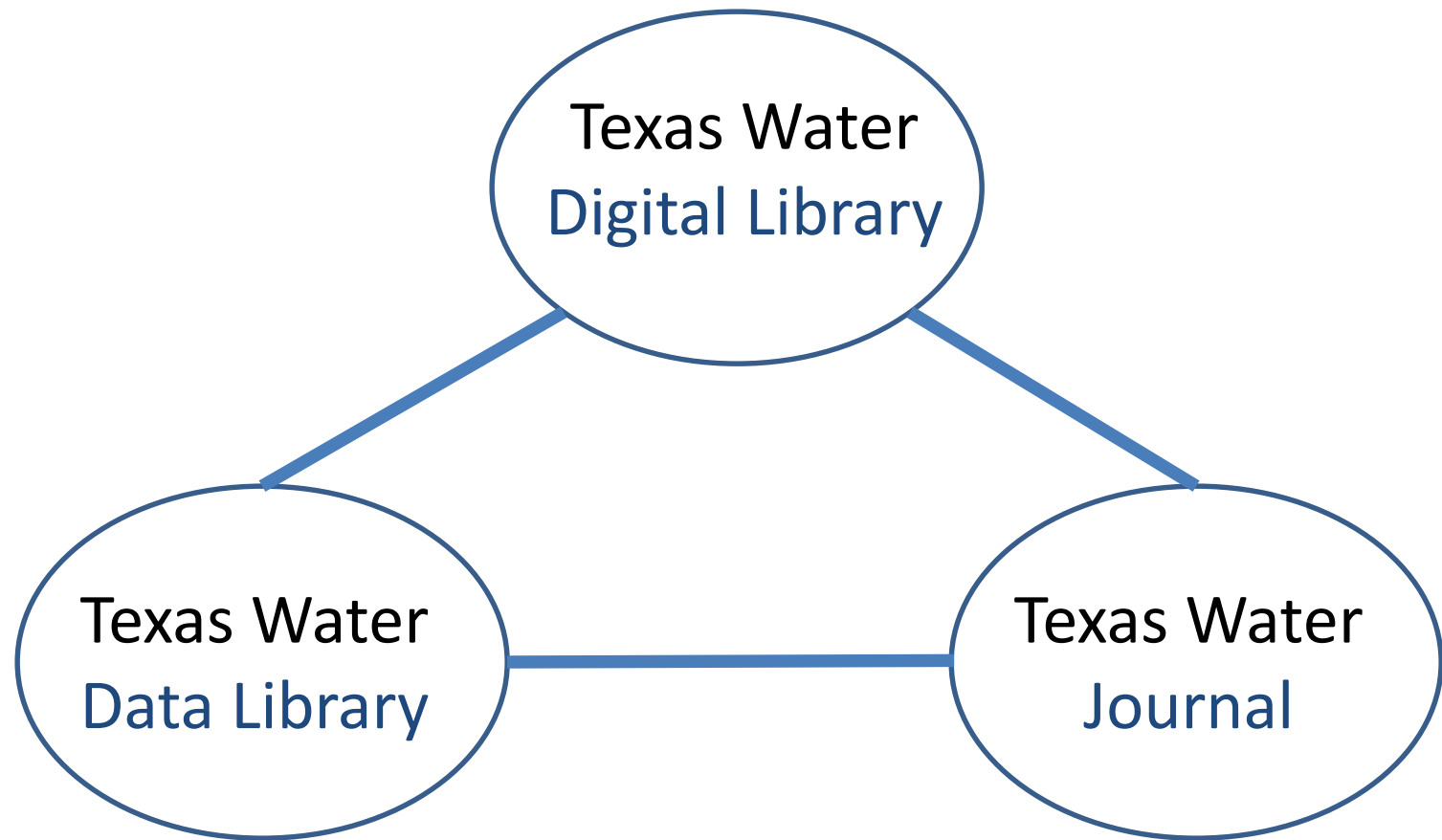
Drought



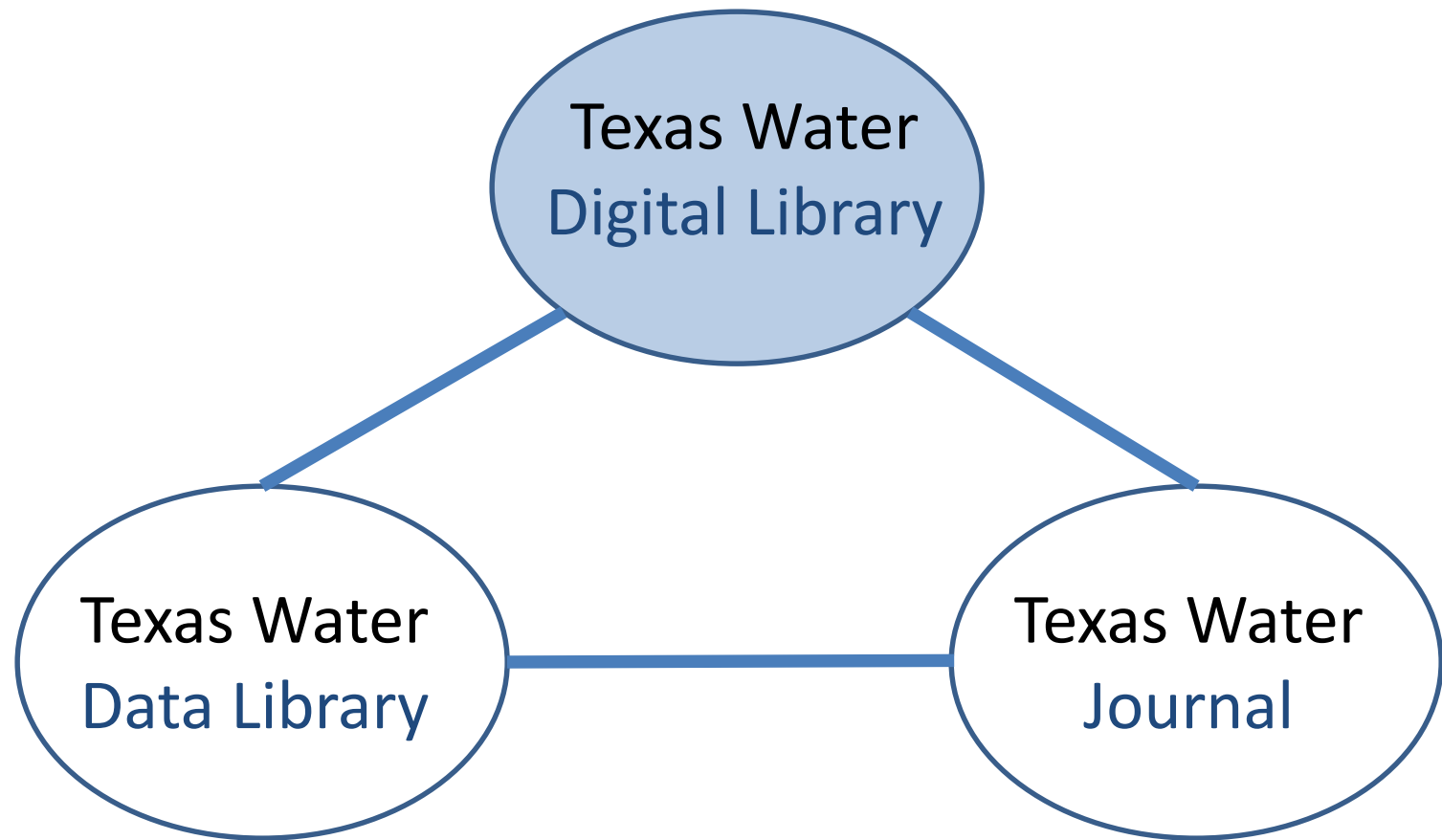
Environmental health



Texas Water Digital Infrastructure



Texas Water Digital Infrastructure



The Texas Water Digital Library: People

- **TDL:** John Leggett, Mark McFarland, Ryan Steans
- **TAMU TWRI:** BL Harris, Ralph Wurbs, Kathy Wythe, Leslie Jordan
- **TAMU Libraries:** Holly Mercer, Scott Phillips, Sandy Tucker
- **TTU WRC:** Ken Rainwater
- **TTU Libraries:** Matthew Mckinney
- **UT CRWR:** David Maidment, Eric Hersh
- **UT Libraries:** Amy Rushing, Robyn Rosenberg

Texas Digital Library Members

Many of these universities also have a [Water Research Center](#)



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Online Publications

CRWR Online Reports are available in pdf format. This format is suitable for viewing on a title page, a table of contents, a wide web browser, a chapter or section, created using Adobe Acrobat which can be read on a computer or a portable reader.

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Listing of CRWR Online Reports

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2008

- [CRWR Online Report 08-1: Water Management Scenarios for the Rio Grande/Bravo Basin](#), Samuel Sandoval-Solis, M. S., Daene C. McKinney, PhD., PE, and Rebecca L. Teasley, M. S., April 2008
- [CRWR Online Report 08-2: Space-Time Analysis of the WRAP Model with a Focus on Data Visualization](#), Clark D. Siler, M.S.E., David R. Maidment, Ph.D., May 2008

Incorporated into UT Digital Repository, 2010



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Or enter first few letters:

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Now showing works 1-20 of 144

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Abstract floodplain visualization on TINs

Azagra, Esteban; Olivera, Francisco; Maidment, David R. (*Center for Research in Water Resources, University of Texas at Austin, 1999-12*)

An algorithm to delineate coastal watersheds for TMDL development

Samuels, Victoria Ann; Maidment, David R. (*Center for Research in Water Resources, University of Texas at Austin, 2001-05*)

An analysis of a methodology for generating watershed parameters using GIS

Mason, David; Maidment, David R. (*Center for Research in Water Resources, University of Texas at Austin, 2000-05*)

Analysis of Pedernales River and water quality: report to the Lower Colorado River Authority

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The Texas Water Resources Institute, a unit of the Texas Agricultural Experiment Station and Texas Cooperative Extension, and member of the National Institutes for Water Resources, provides leadership to stimulate priority research and Extension educational programs in water resources within the Texas A&M University System and throughout Texas.


Contents of this community

Federated with water reports from Texas A&M College Station



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Recent Submissions

- Management strategies for dryland cotton production in West Texas
Pumphrey, Ronald Gary (Texas Tech University, 2006-09-05)
- Economic and hydrologic
as Southern High Pla
-)
- as Southern High Pla





*and with reports from
Texas Tech University*

Texas water research centers are individually embracing digital libraries



BL Harris



Ken Rainwater



David Maidment

currently hosting technical reports, project data,
outreach publications, theses and dissertations

Collaborating to form the Texas Water Digital Library

“A digital water library will link and make available the vast amount of information, research and data that has been and is continuing to be developed by water resource researchers in Texas. Providing information digitally is imperative for the future, and this library is definitely going to bring critical and needed information together for everyone's use.”

- B.L. Harris, acting director of TWRI

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Texas Water Digital Library

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- [Sanderson, Texas Flood Study](#)
- [Texas Water Resource Institute](#)
- [TTU Water Resources Collection](#)

Recent Submissions

Hydraulic Modeling of the Floodplain in Sanderson, Texas

Chisolm, Rachel (May 12, 2010)

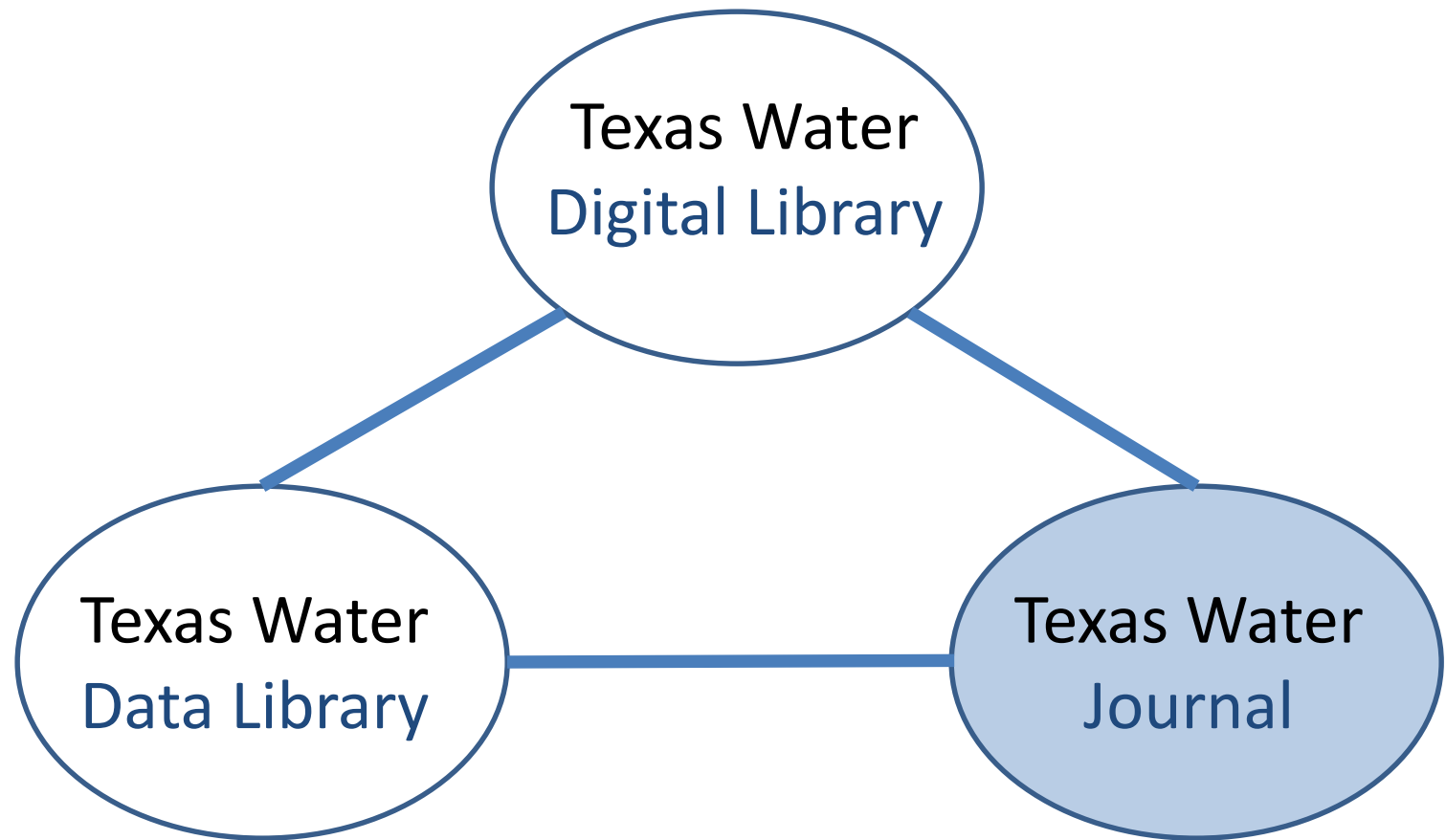
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The Texas Water Digital Library

- **Mission:** to be a **centralized, online location** for the research and works of university and other water resource entities in Texas, **effectively federating water research** currently housed at many universities across Texas

Texas Water Digital Infrastructure



THE TEXAS WATER JOURNAL

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Home > Vol 1, No 1 (2010)

The Texas Water Journal

Coming Soon: A Water Journal for Texas!

THE TEXAS WATER JOURNAL is an online journal devoted to the timely consideration of Texas water resources management and policy issues from a multi-disciplinary perspective that integrates science, engineering, law, planning, and other disciplines. It also provides updates on key state legislation and policy changes by Texas administrative agencies.

*"Thousands have lived without
love, not one without water."* -

W.H. Auden

<http://journals.tdl.org/twj>

Announcements

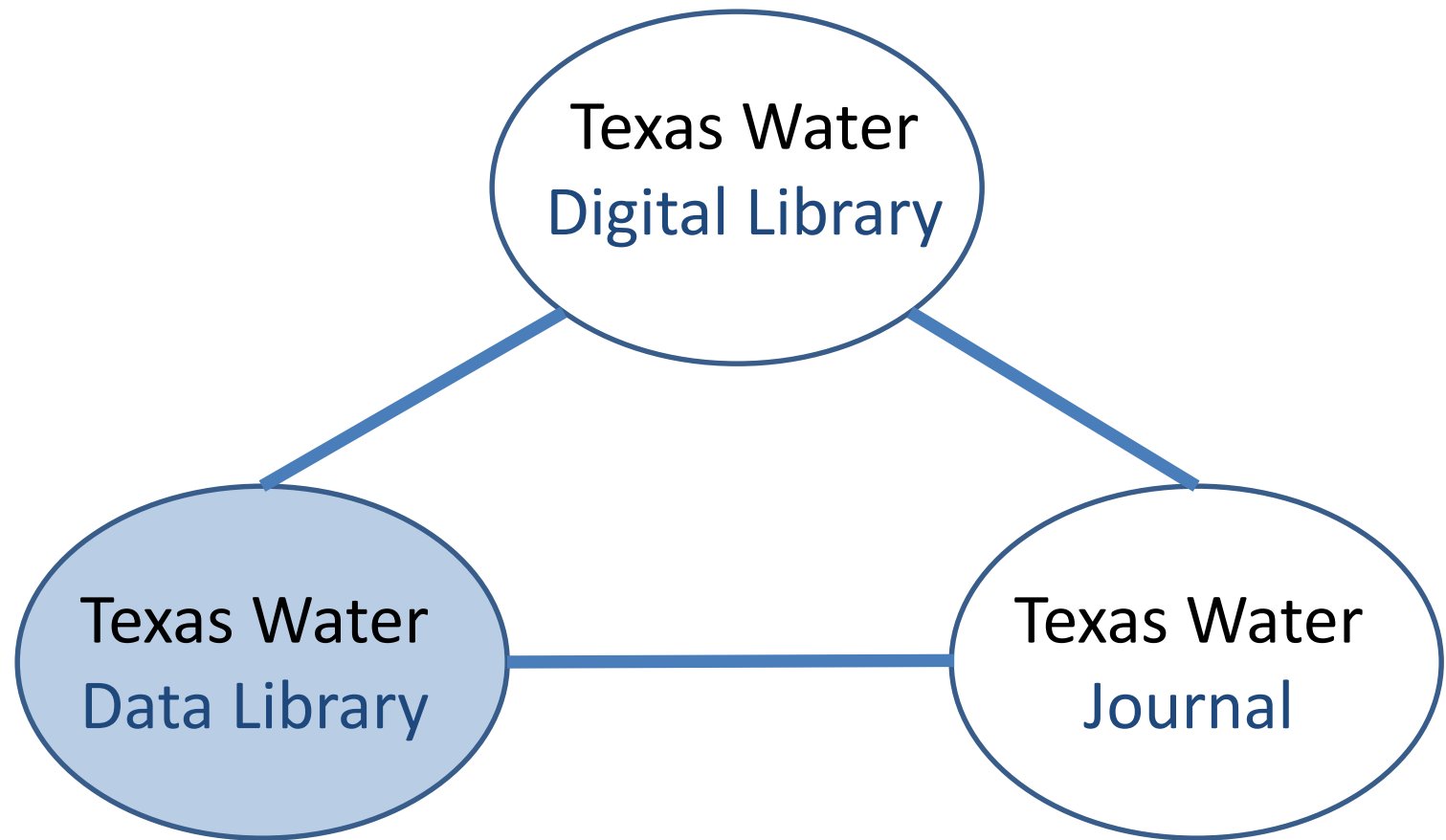
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Texas Water Digital Infrastructure



Integrating Water Resources Information

Using GIS and the Web

Vision and Technology



*Creating a Better Framework
for Water Management . . .*

*. . . Enhancing Environmental
Management*

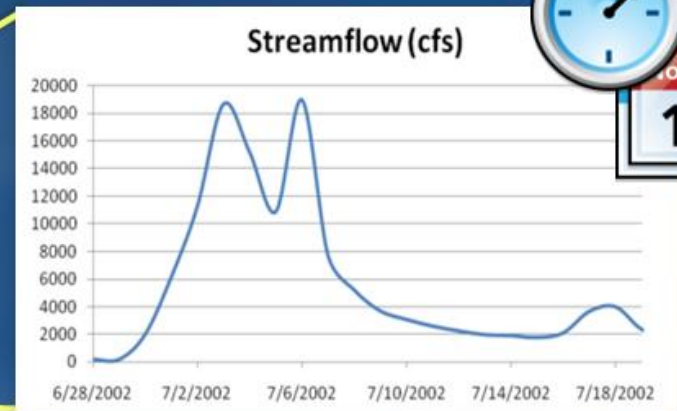
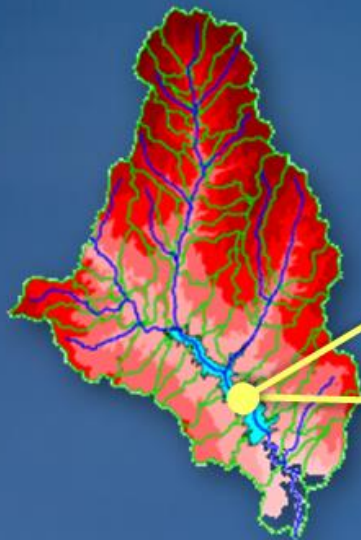
*AWRA GIS in Water Resources Conference
Orlando, FL, March 29, 2010*

Jack Dangermond and David Maidment

A Key Challenge

Integrating GIS and Water Resources Observations Data

Geography and GIS provide the Framework



Time Series Data

GIS

Water Environment
(Watersheds, streams,
gages, sampling points)

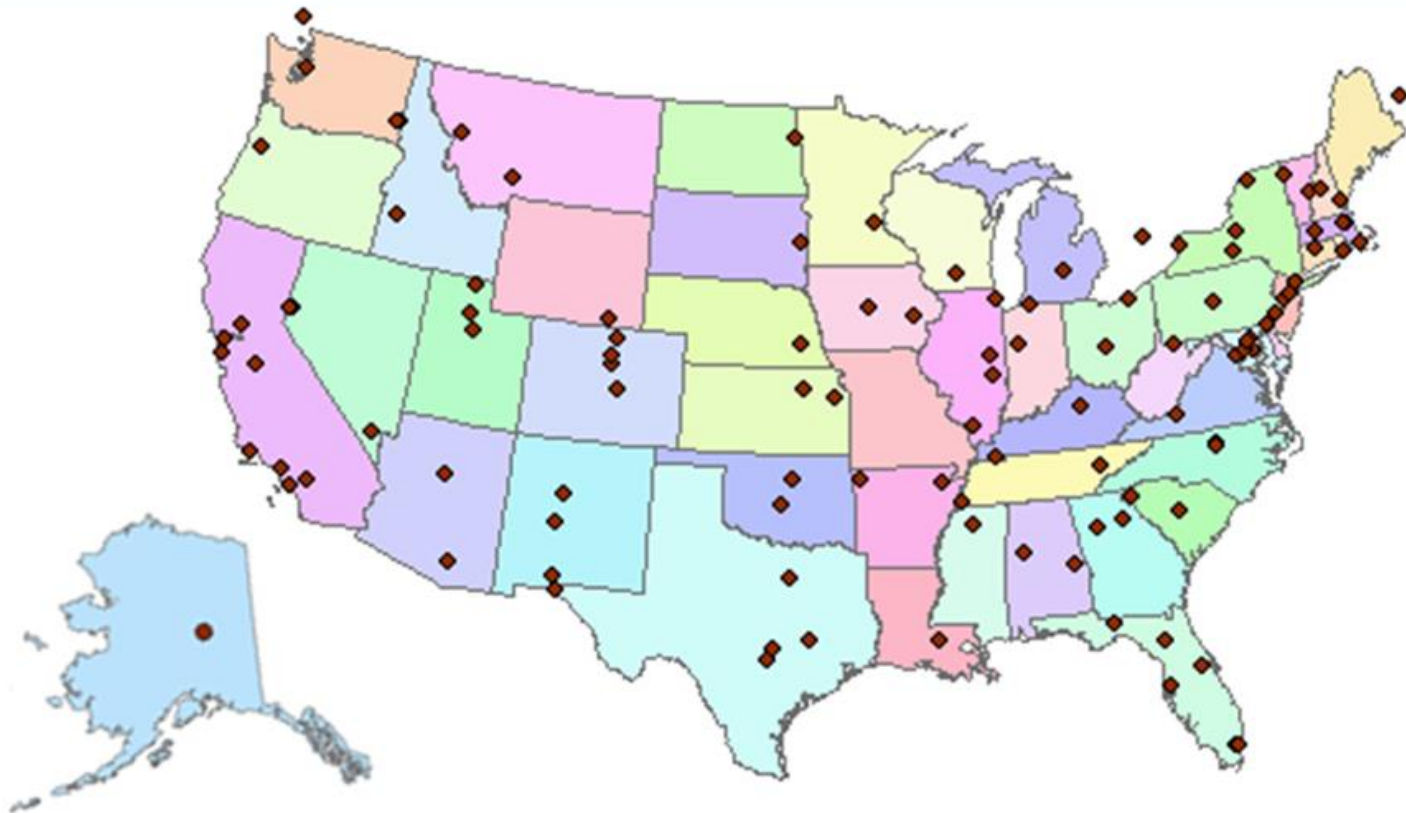


The Water Itself
(Flow, water level
concentration)

... Relevant at all Scales

CUAHSI Has been Working on All These Challenges

Building a Hydrologic Information system



CUAHSI is a Consortium of more than 120 Universities . . .

. . . Supported by NSF

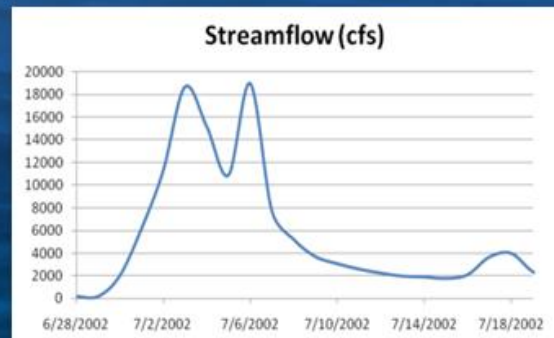
A Large Scale Prototype Has Been Constructed

Transforming Water Information Access

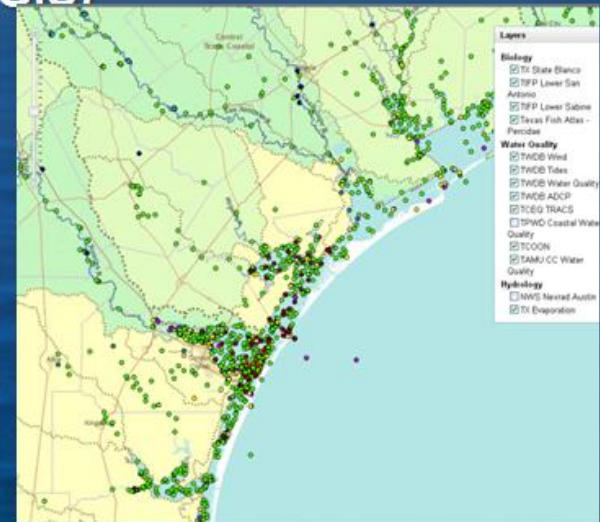
- Providing a Web Enabled Observation Data Model
- Establishing Data & Interoperability Standards
- Maintaining a Central Data Catalog for Water Agencies
- Collaborating with ESRI to host an Online Community Water Map
 - (Key for Integrating Water Observations w/ GIS)



A point in space



Time Series



Integrated Map View

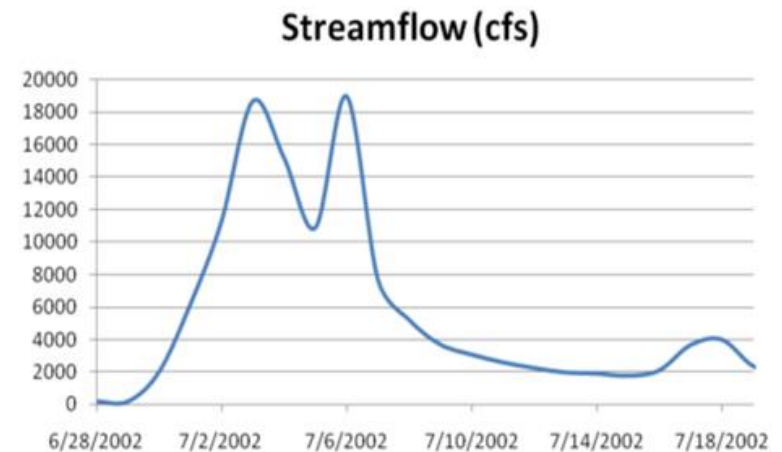
... CUAHSI Provides Ongoing Innovation and Community Leadership

This is Enabled by WaterML

a Web Language for Water Observations Data

GetValues Response in WaterML

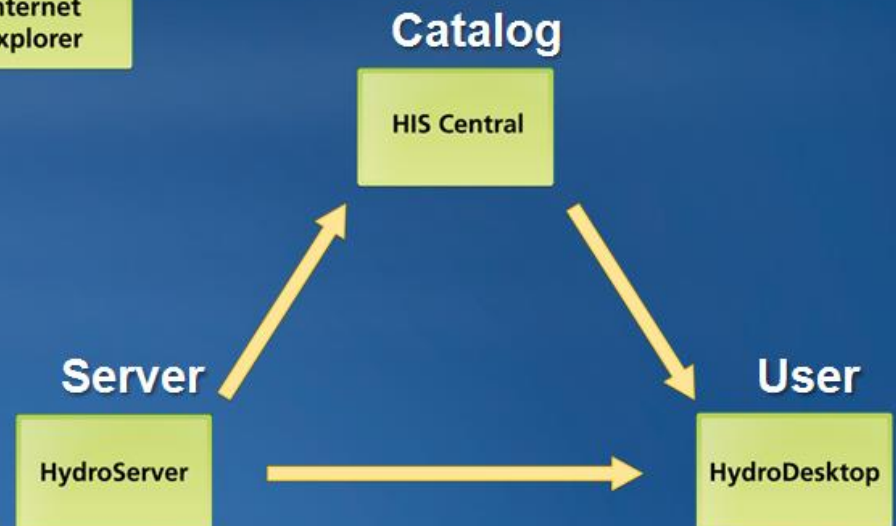
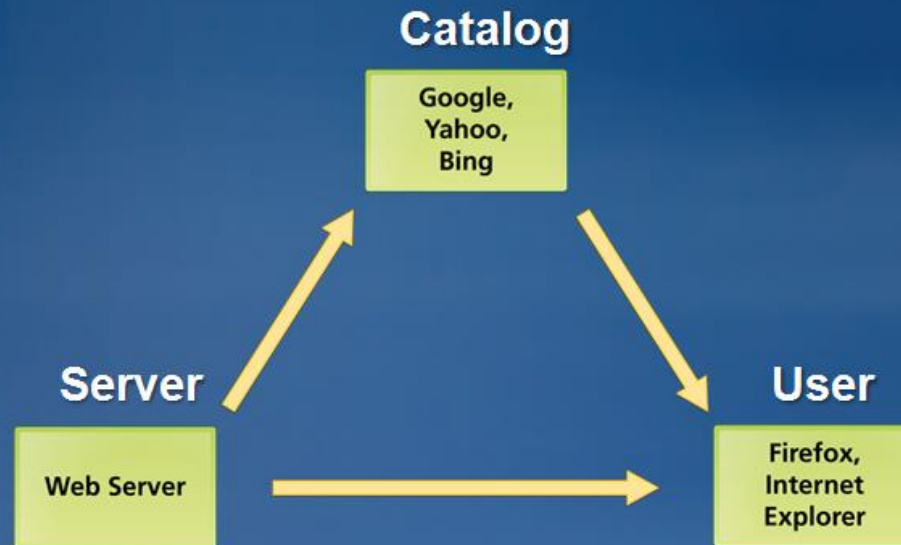
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...Adopted by USGS, and other agencies for Publishing Some of their Data

CUAHSI's Portal Follows Internet Patterns

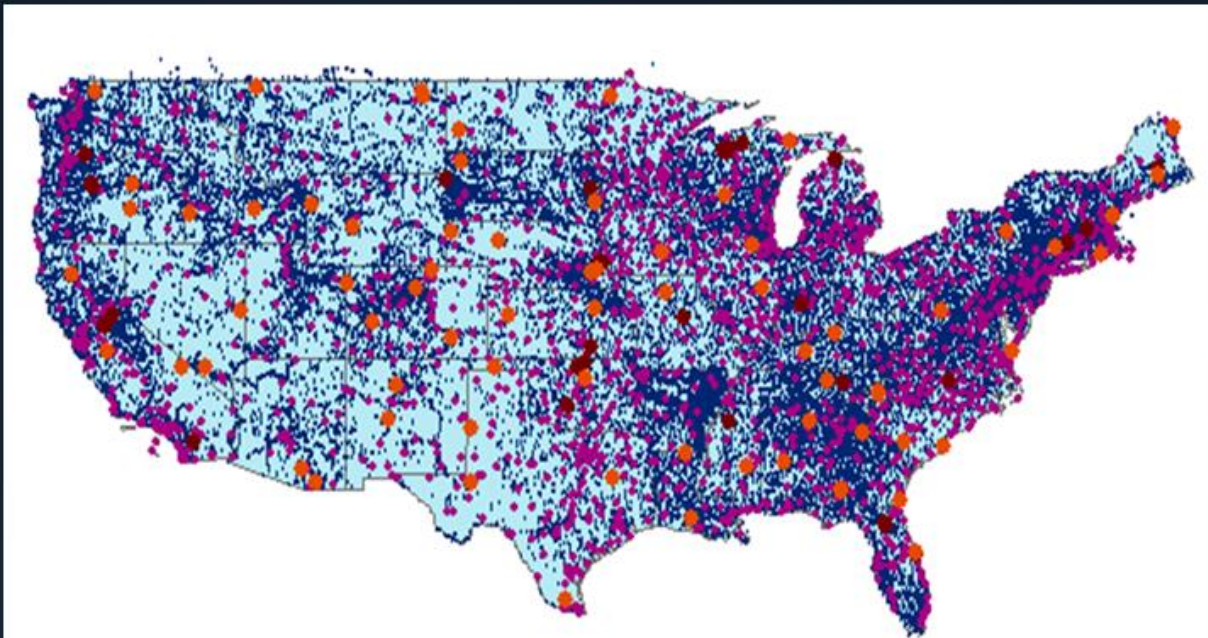
Three Basic Components



The CUAHSI Data Catalog Integrates

Multi Source Water Data Services

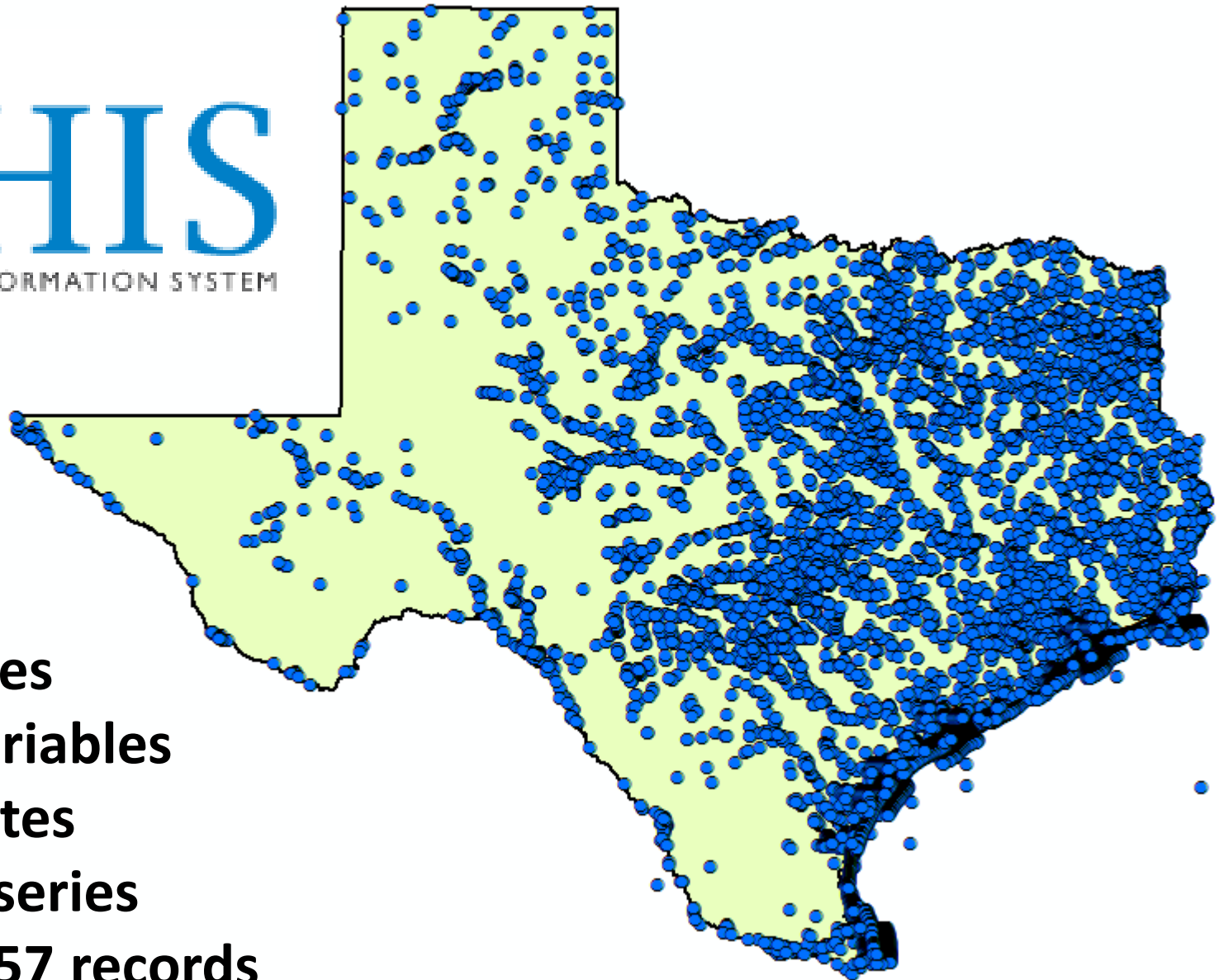
Map Integrating NWIS, STORET, & Climatic Sites



- 47 services
- 15,000 variables
- 1.8 million sites
- 9 million series
- 4.3 billion data Values

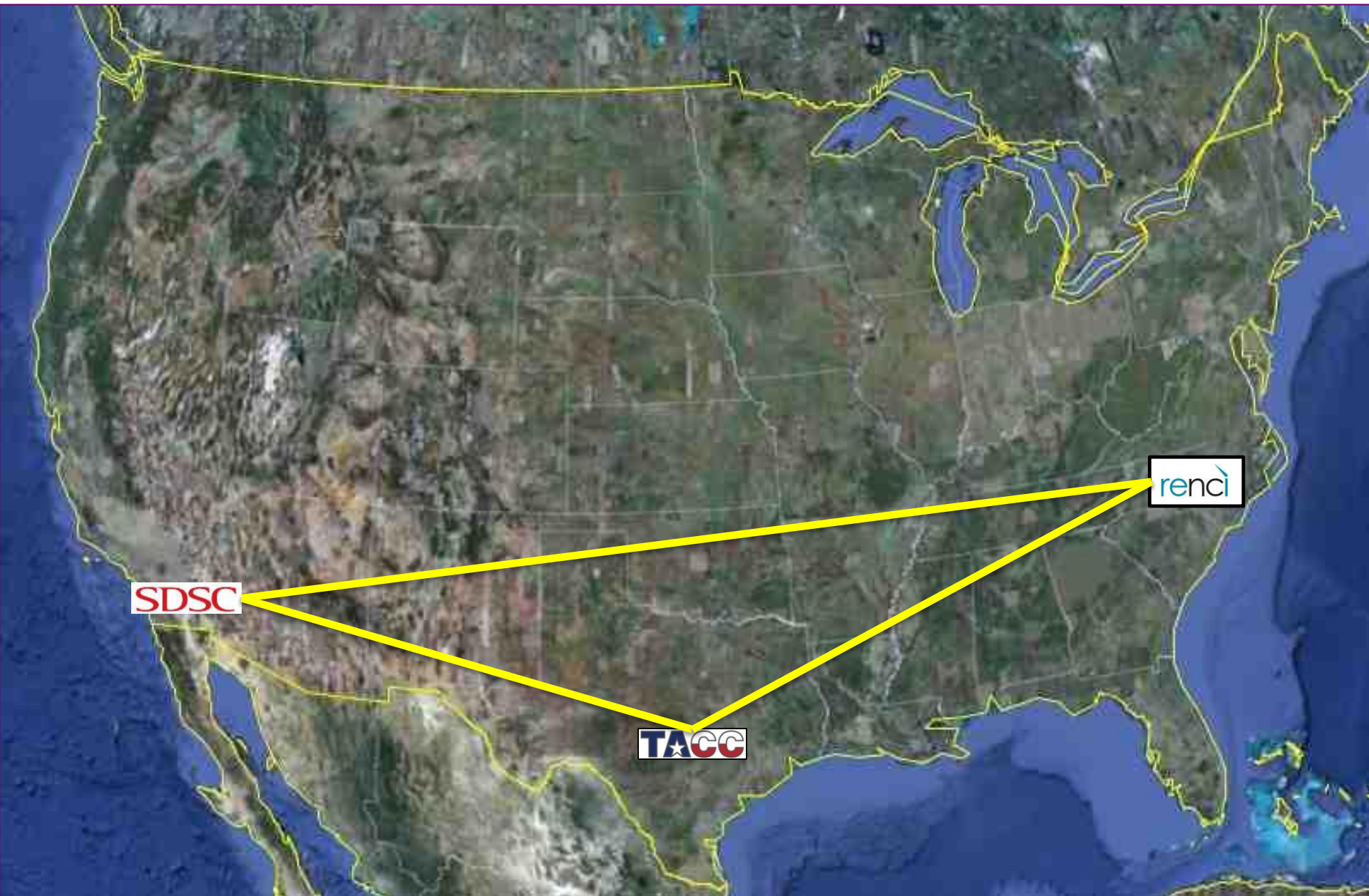
*Stored at the San Diego
Supercomputer Center,
SDSC*

... The Worlds Largest Water Data Catalog



11 services
4,816 variables
15,645 sites
645,565 series
23,272,357 records

CUAHSI Online Data Grid



Corral

1.2 Petabytes of Disk
Storage with Tape
Backup

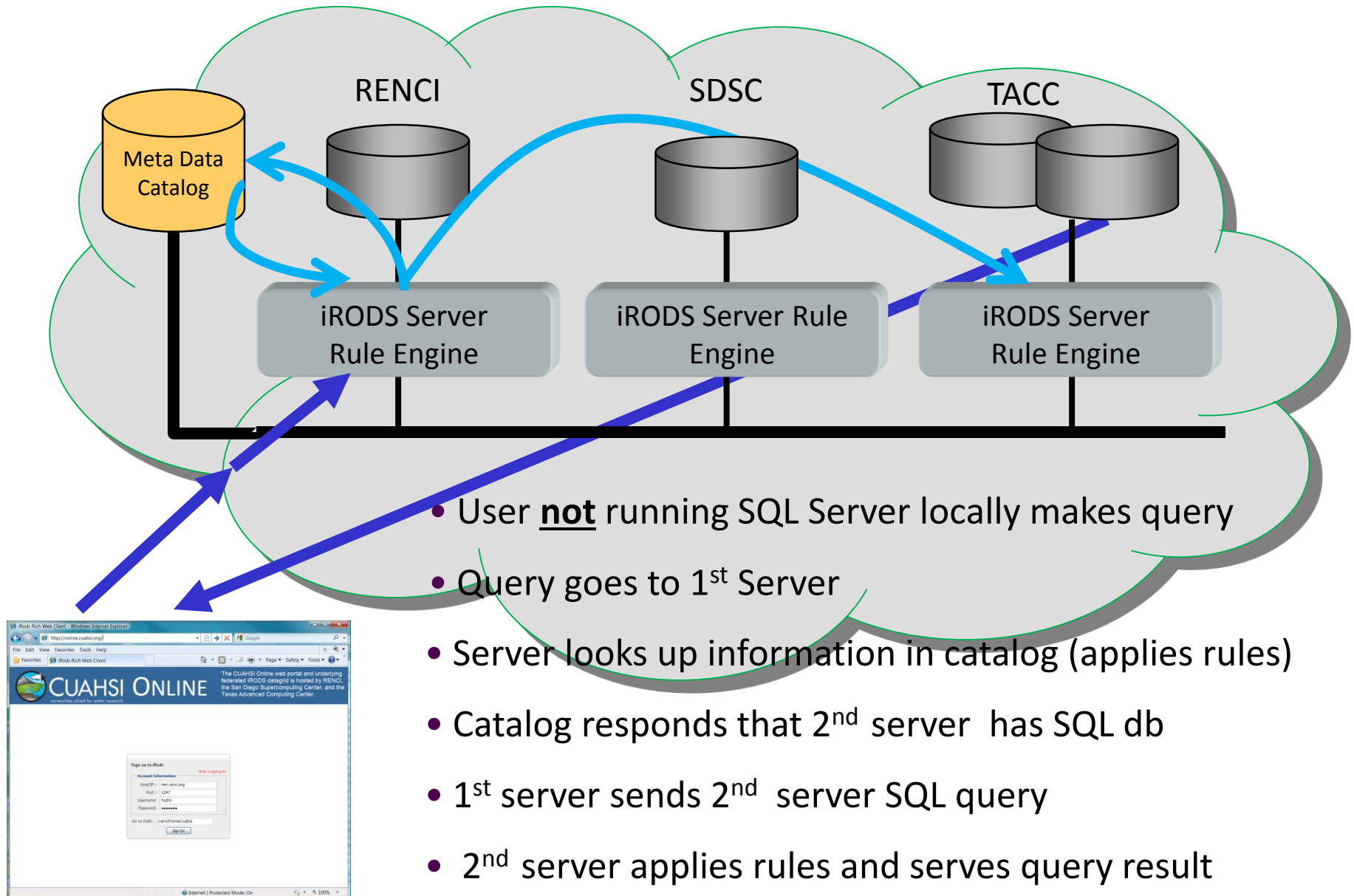
= 1200 Terrabytes

= 1,200,000 Gigabytes

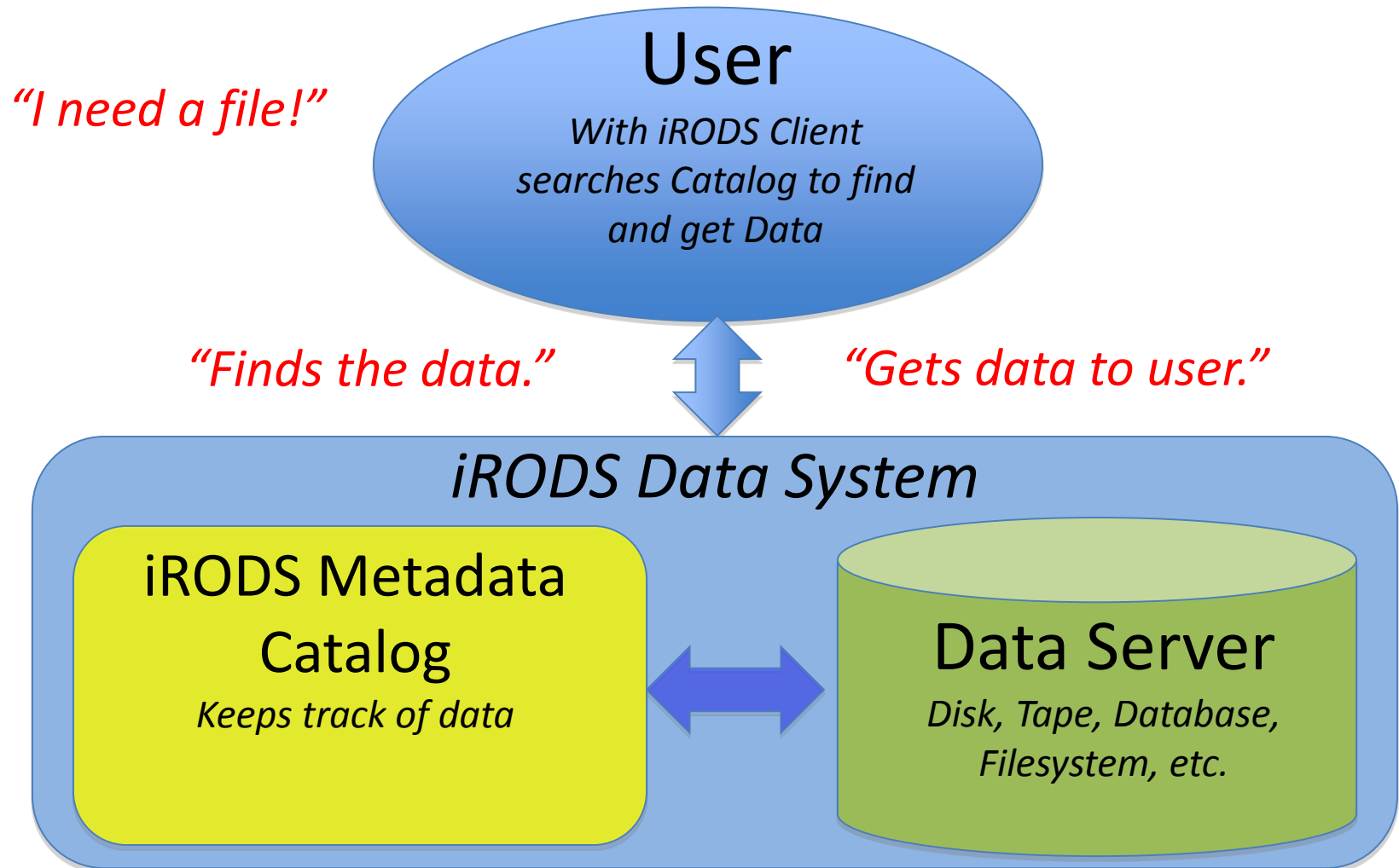


An enormous data storage system

Using a Data Grid – *NEAR FUTURE (SQL)*



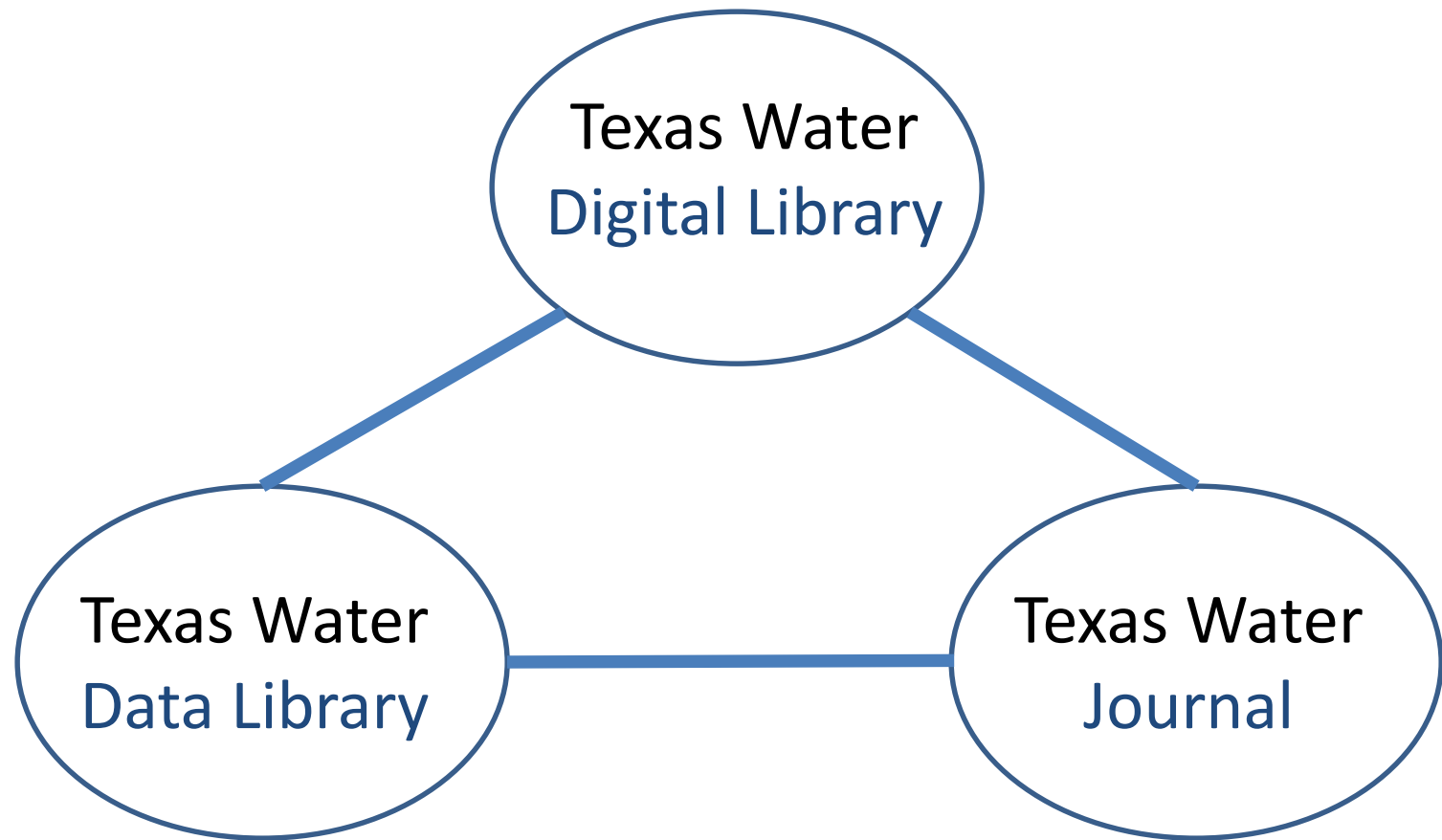
Accessing Data in iRODS System

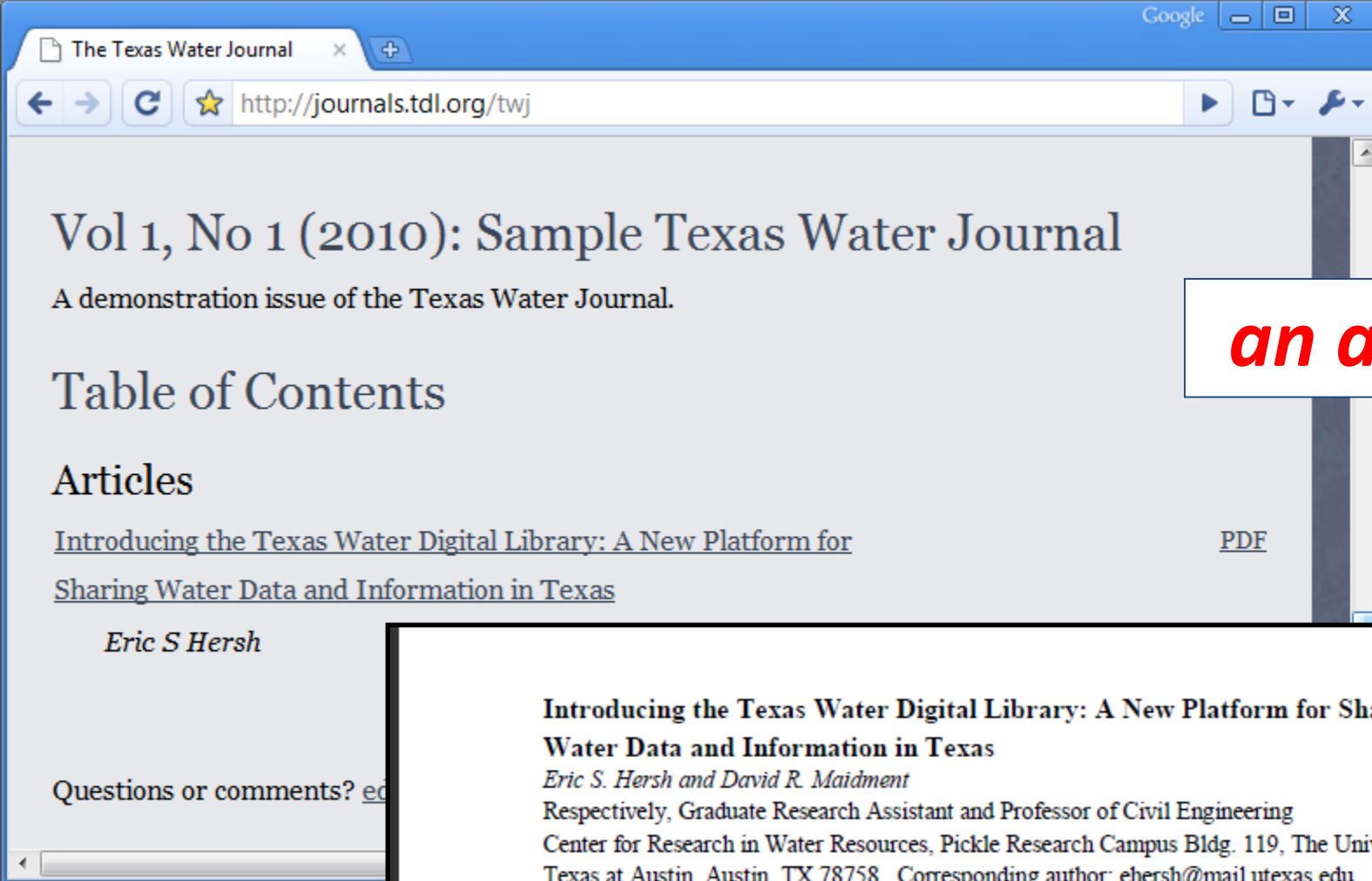


Users can search for, access, add, move, annotate, analyze, share data, and automate administrative tasks.

Texas Water Digital Infrastructure

How do these components connect?





an article...

Introducing the Texas Water Digital Library: A New Platform for Sharing Water Data and Information in Texas

Eric S. Hersh and David R. Maidment

Respectively, Graduate Research Assistant and Professor of Civil Engineering

Center for Research in Water Resources, Pickle Research Campus Bldg. 119, The University of Texas at Austin, Austin, TX 78758. Corresponding author: ehersh@mail.utexas.edu.

Background and Motivation

The digital era has brought about a deluge of water information. Today's satellites, flux towers, aircraft, instruments, and ships are capable of monitoring the water environment with

<http://journals.tdl.org/twj>

*...referencing an
academic study...*



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An integrated stream classification system for Texas

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Title: An integrated stream classification system for Texas

Author: Hersh, Eric S.; Maidment, David R.

Description: Research in Water Resources, Center for

URI: <http://hdl.handle.net/2152/7029>

Date: 2010-04-15

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Sanderson, Texas Flood Study

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An updated flood study for the City of Sanderson, Terrell County, Texas performed by students in the CE394K.2-Surface Water Hydrology Spring 2010 class under the direction of Professor David R. Maidment of The University of Texas at Austin. The study was undertaken in conjunction with Glenn Wright of AECOM, Melinda Luna of the Texas Water Development Board, Trent Street of the Natural Resources Conservation Service, and the City of Sanderson.

a professional study...

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Elevation-Storage

$$\frac{dE(S)}{dt} = I(t) - Q(t)$$

- E(S)=Elevation function of storage

STORAGE-CAPACITY TABLE

ELEVATION	SURFACE ACRES	CAPACITY	
		ACRE FEET	INCHES
3628	6.0	12	0.01
3632	22.0	63	0.07
3636	41.0	198	0.19
3639	54.0	334	0.34
3640	59.0	394	0.38
3642	81.0	674	0.65
3644	83.0	720	0.69
3648	105.0	1046	1.00
3652	132.0	1520	1.46
3654	162.5	2109	2.02
3659	192.0	2757	2.64
3660	194.5	2827	2.71
3664	237.5	3695	3.54
3668	271.0	4712	4.51
3672	305.5	5805	5.62
3672.9	315.0	6109	5.85
Drainage Area, Acres		12,535	
Top of Dam (effective) El.		3672.9	
Emergency Spillway Crest El.		3659.6	
Principal Spillway Crest El.		3644.3	
Lowest Ungated Outlet El.		3636.0	
Sediment Capacity, Acre Feet		793	
Floodwater Capacity, Acre Feet		1,924	

...linked to reports and presentations...

year flood without dams



Disclaimer: Map is based on 10 m digital terrain model that is too coarse to define an accurate floodplain

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2. Field Trip to Sanderson
3. Objectives
4. Methods
 - 4.1. HEC-GeoHMS preprocessing
 - 4.2. Routing methods
 - 4.3. Design Storm
 - 4.4. Calibration of the HEC-HMS model
 - 4.5. Effect of the dams in the hydrologic model
5. Conclusions

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Corral iRODS DataGrid - S... x

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You are logged in as <cuahsi>

Corral iRODS DataGrid

You are browsing:

tacc > Collections > TWDL > Sanderson

 Upload File  Create Directory

File/Directory Name


Last Modified

Size


Select

Select all


... Parent Directory

 Sanderson_DEM.zip

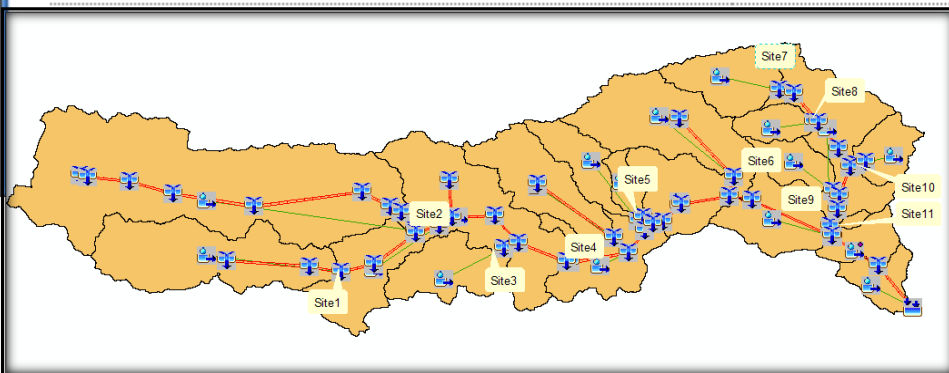
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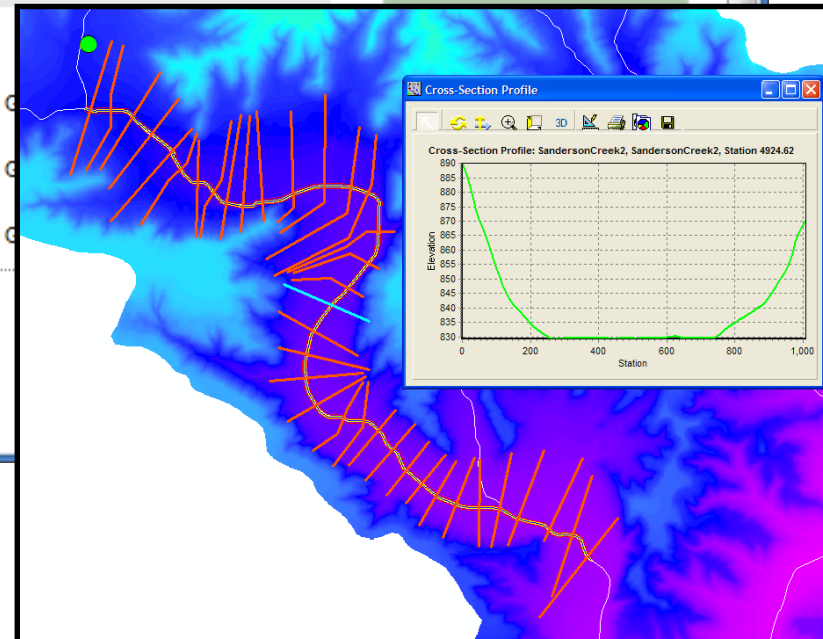
Wed, 12 May 2010 19:49:02 C

 Sanderson_HECRAS_SteadyState.zip

Wed, 12 May 2010 19:48:56 C



*...along with
models & data*



TCDL & TWDL goals and challenges moving forward

- The **digital library process** is more ‘formed’ than the **data process**
 - Workflow for submitting and registering data and documents
 - ‘Versioning’ of information: temporary/living versus permanent/archived
- External users and providers (e.g. consultants)
 - access and intellectual property issues
- What is the role of **informal student projects** compared to **formal documents**?

Some Questions

- How do we understand the relation between a **Digital Library** and a **Data Library**?
 - Are they the same thing?
- How do we **connect digital libraries** of different organizations
 - CUAHSI and TWDL?
- What is the meaning of a repository of **data services** as compared to **data files**?

