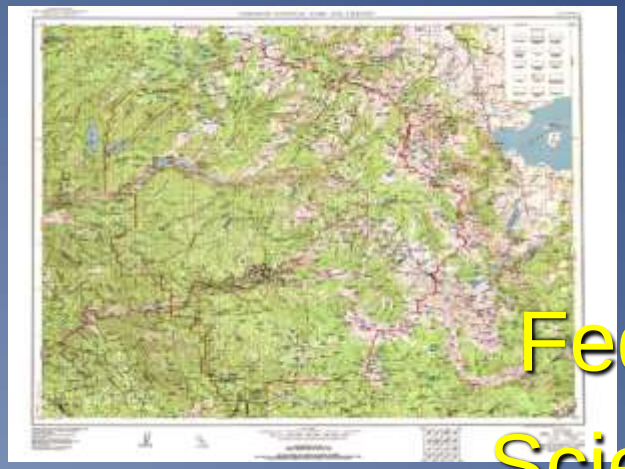
USGS
OVERVIEW
to
CAHMDA/DAFOH

12 September 2014

Bob Joseph
Director USGS Texas Water Science Center – Austin, TX

U.S. Department of the Interior
U.S. Geological Survey

Who is the USGS?



Federal Agency

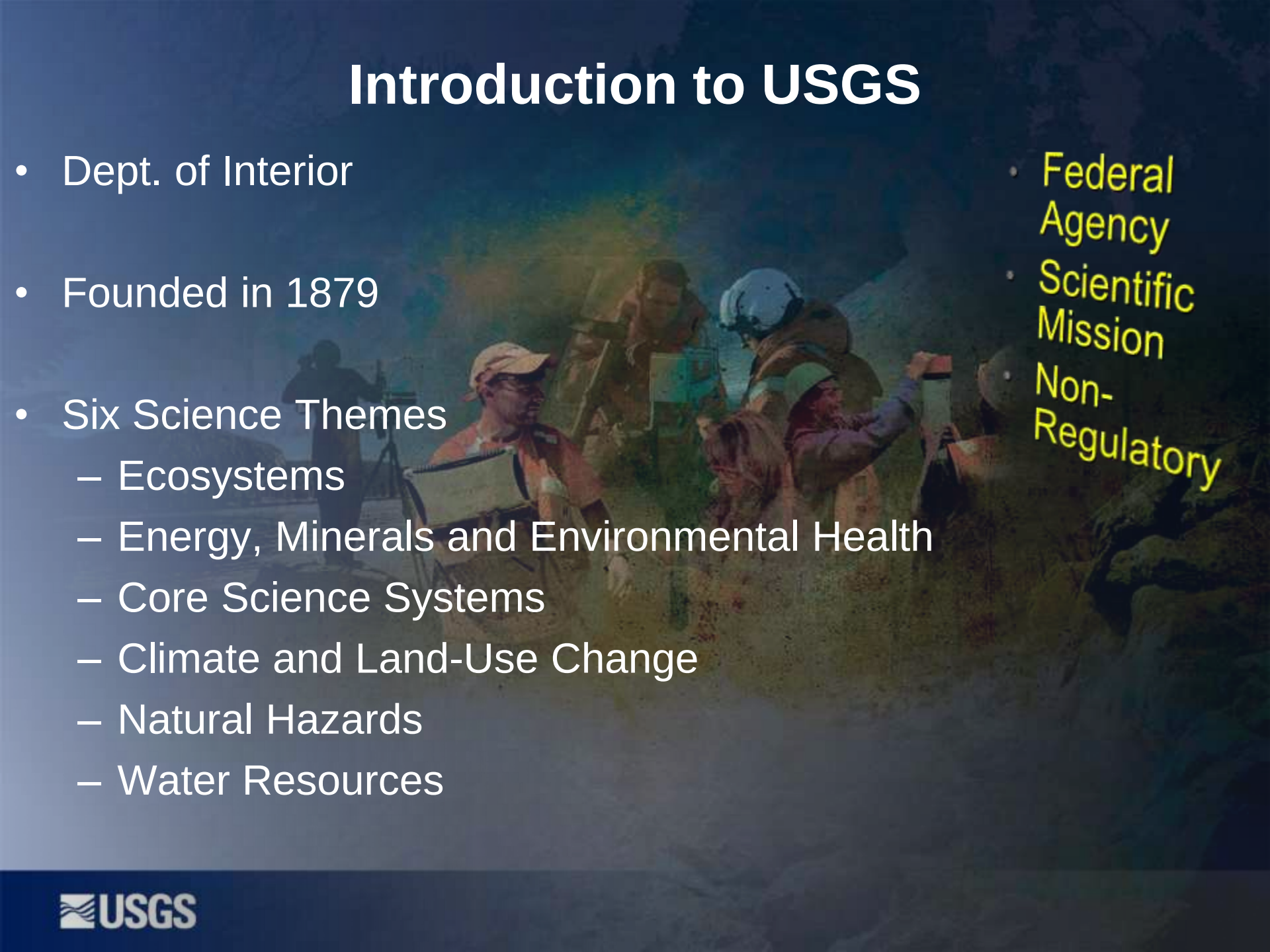
Scientific Mission

Non-Regulatory

USGS

Introduction to USGS

- Dept. of Interior
- Founded in 1879
- Six Science Themes
  - Ecosystems
  - Energy, Minerals and Environmental Health
  - Core Science Systems
  - Climate and Land-Use Change
  - Natural Hazards
  - Water Resources



USGS GEOGRAPHIC REGIONS

USGS:Overview

- Has 9,000 employees located in offices in every state.
- Conducts interdisciplinary scientific monitoring, assessment, and research.
- Primary scientific disciplines are biology, geography, geology, and hydrology

WATER RESOURCES MISSION –

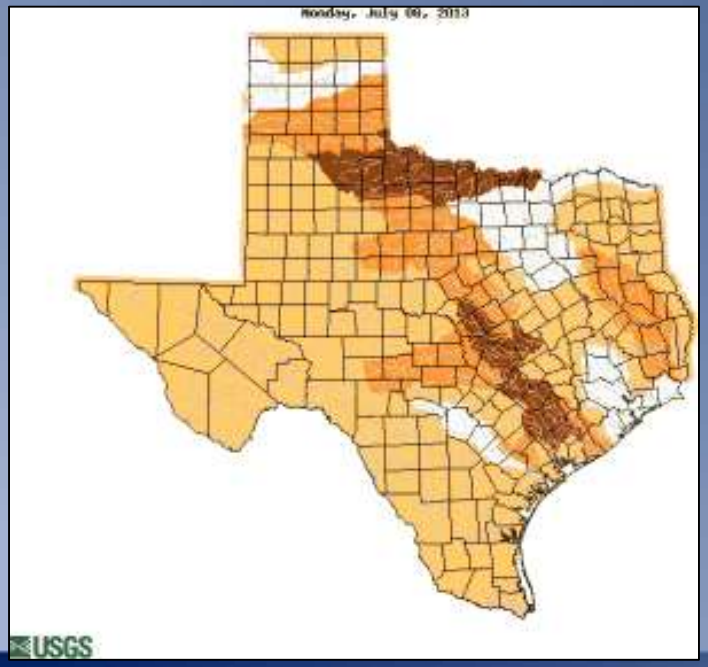
…to provide hydrologic information and understanding needed by others to achieve the best use and management of the Nation's water resources. USGS accomplishes this mission in cooperation with State, local, and other Federal agencies.

USGS Mission – Water Resources

USGS accomplishes this mission in cooperation with State, local, and other Federal agencies.

Water Science Information

- Informs water managers
- Informs civil engineers
- Monitor and model our environment
- Ensure compliance between water users



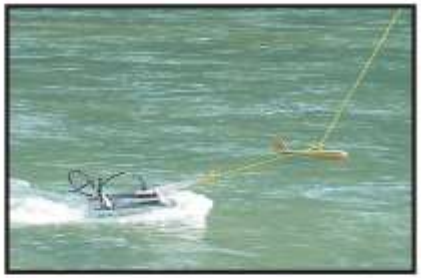
National Support

- National Laboratory
- Hydrologic Instrumentation Facility
- National Research Program
- Publishing Network
- Nationwide Database
- Discipline Office Reviews
  - Groundwater
  - Surface Water
  - Water Quality
  - Publication
  - Safety

USGS
science for a changing world

In cooperation with the U.S. Army Corps of Engineers, Detroit District

Quality-Assurance Plan for Discharge Measurements Using Acoustic Doppler Current Profilers



Scientific Investigations Report 2005-5183

U.S. Department of the Interior
U.S. Geological Survey

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NATIONAL WATER INFORMATION SYSTEM WEB (NWISWeb)

Water Data For Your County

Frio River, Texas

Characterizing Water Quality

A Ground-Water Well in Arizona

http://water.usgs.gov/nwis/

USGS

USGS NWISWeb Database

Total monitoring sites	1.58 million
Real-time sites	13,384
Real-time GW sites	1,874
Daily values	354 million
Groundwater levels	8.94 million
Water-quality samples	5.24 million
Water-quality analyses	98 million
Peak discharges (floods)	736.692

April 22, 2013

USGS

USGS NWISWeb Daily Values

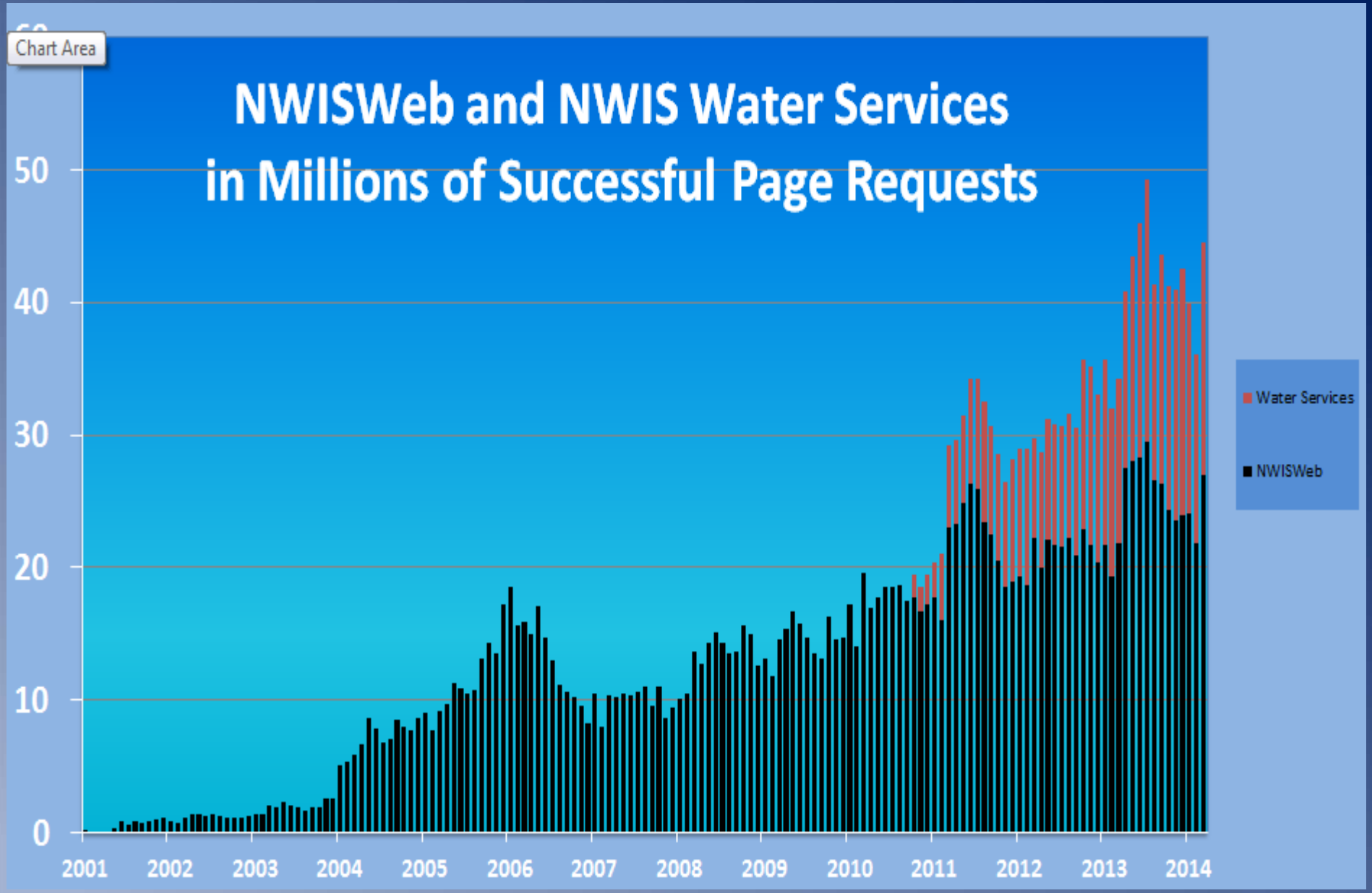
Discharge	216.6 million
Stage	34.9 million
Water Levels in Wells	22.4 million
pH	3.3 million
Temperatures	20.2 million
Specific Conductance	9.3 million
Other	40.8 million

April 22, 2013

USGS

USGS Real-time Water Monitoring

Sites	Name	Sites	Name
9737	Gage height	102	Relative humidity
8125	Discharge	99	Barometric pressure
2787	Precipitation	50	Solar radiation
2118	Water temperature	42	Soil moisture
1801	Groundwater levels	33	Nitrate/nitrogen
1100	Stream/lake/res elevation	28	Dissolved gases
957	Specific conductance	27	Chlorophyll
518	Dissolved oxygen	23	Sediment
444	pH	21	Tide Stage
382	Turbidity	17	Soil temperature
349	Stream velocity	12	Water depth
327	Air temperature	10	Sodium adsorption ratio
169	Wind speed/direction	9	Blue green algae
149	Salinity	4	Surface area
130	Reservoir storage	3	Atmospheric vapor



Through March 2014

USGS

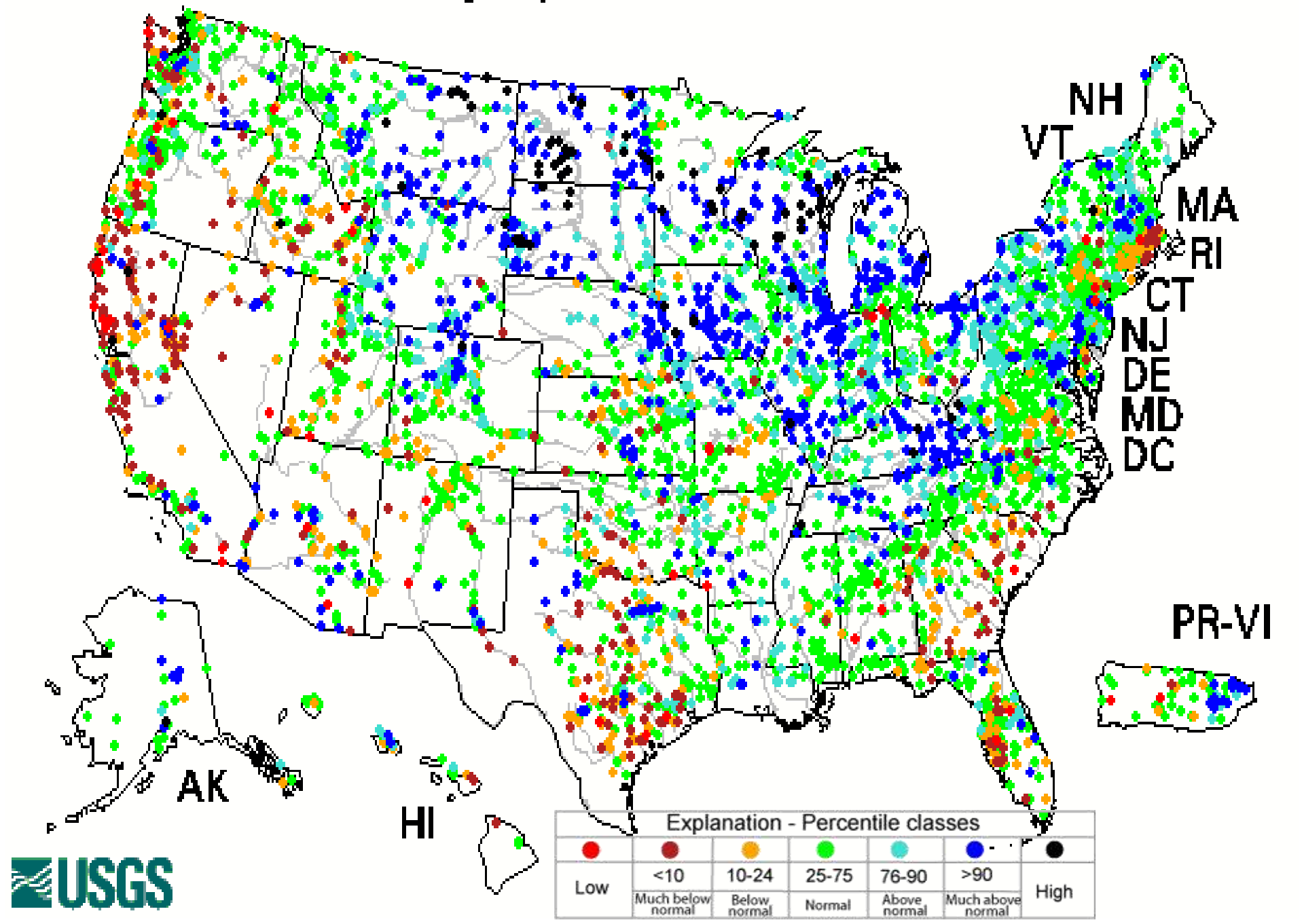
WaterWatch

- http://waterwatch.usgs.gov/

- Current Streamflow
- Flood
- Drought
- Past Flow/Runoff

USGS

Sunday, September 07, 2014 14:30ET



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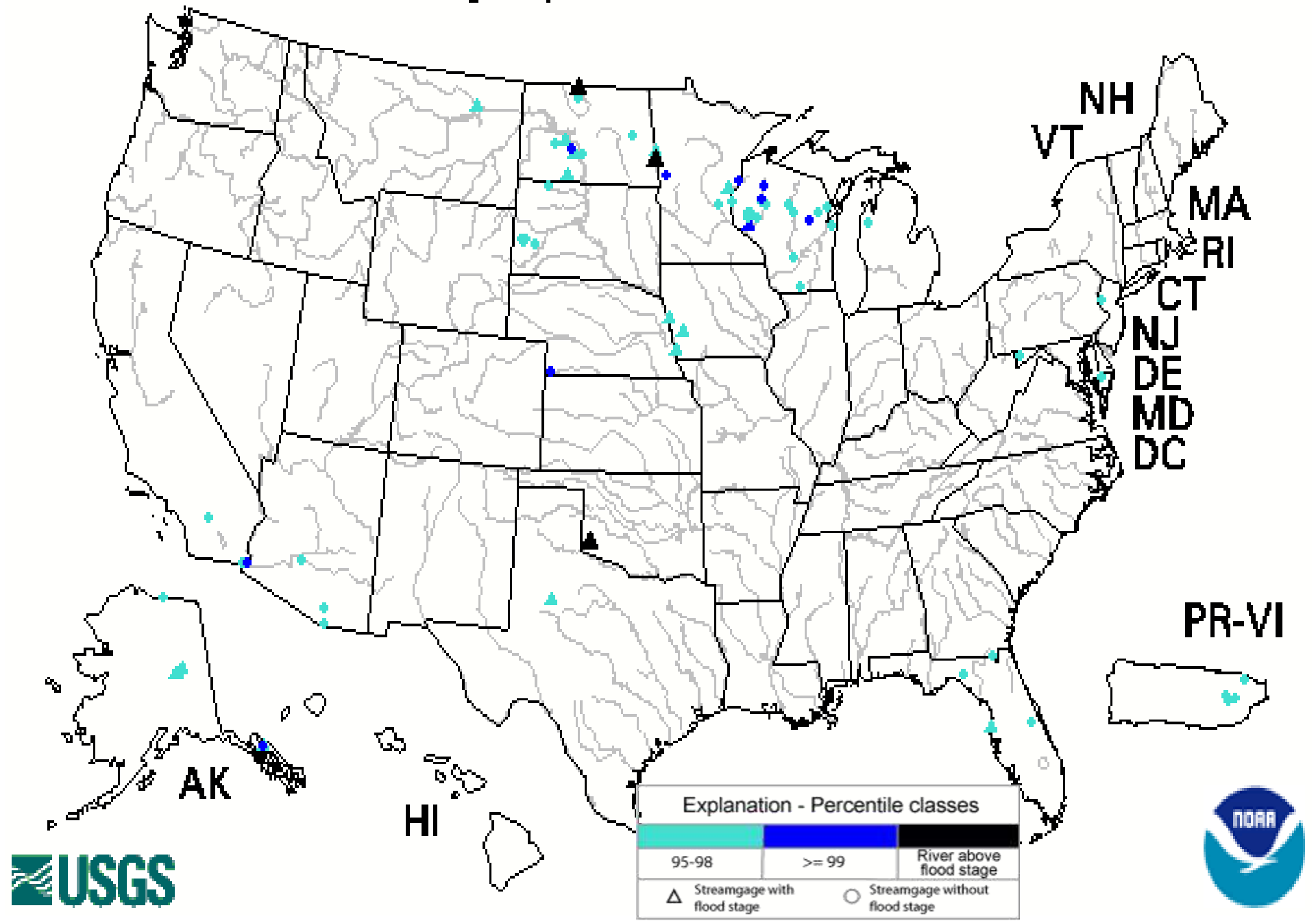
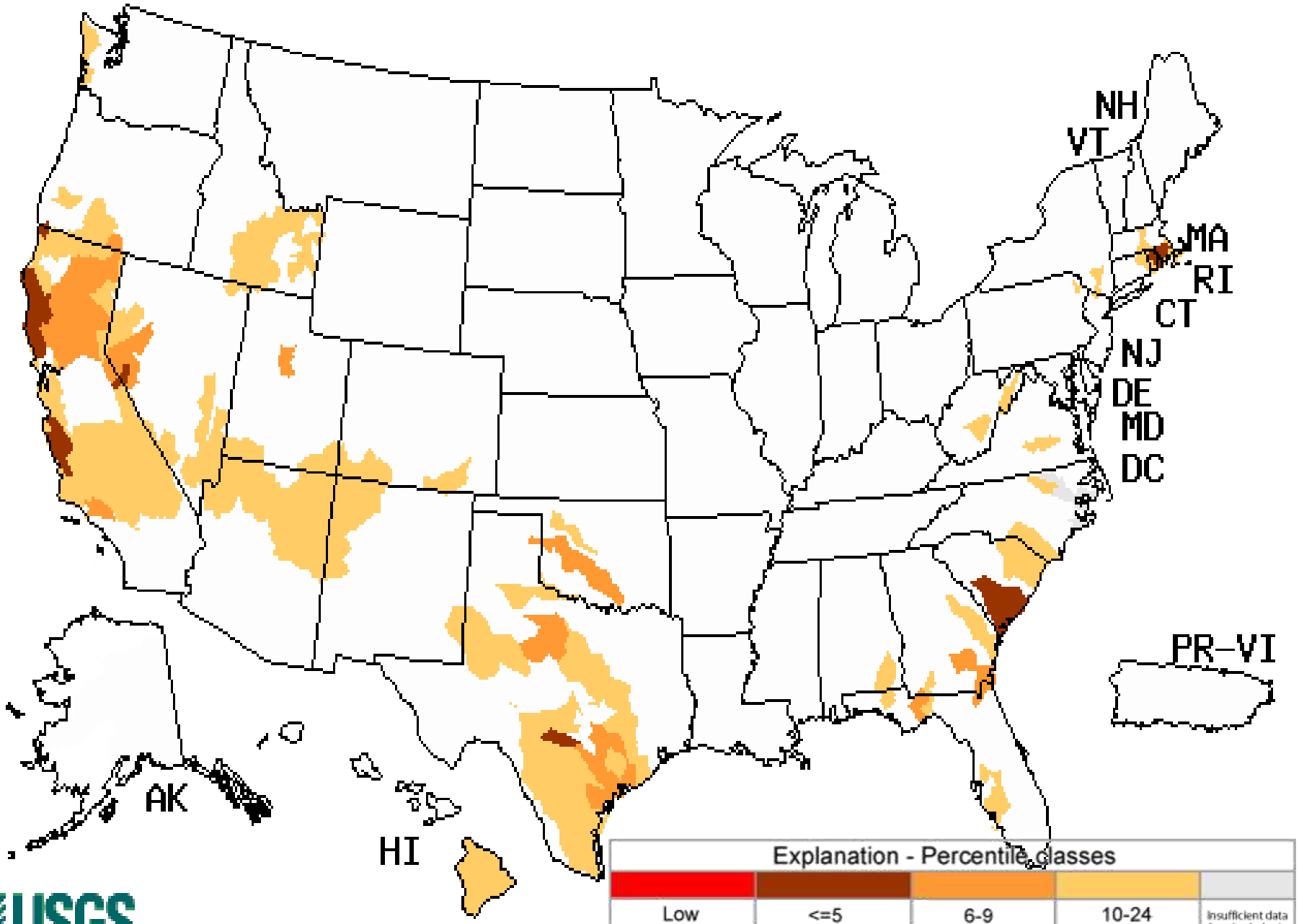


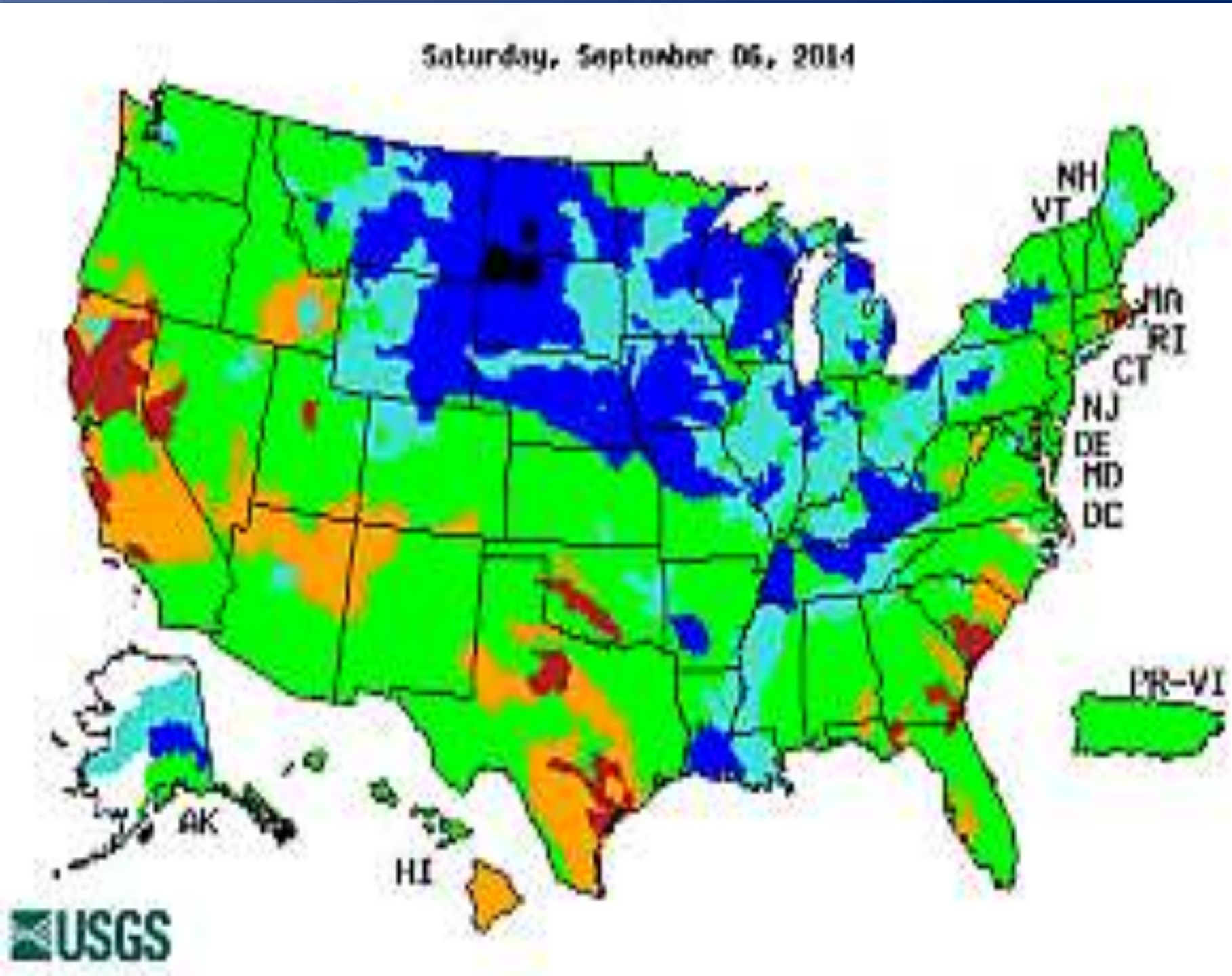
USGS

NOAA

Saturday, September 06, 2014

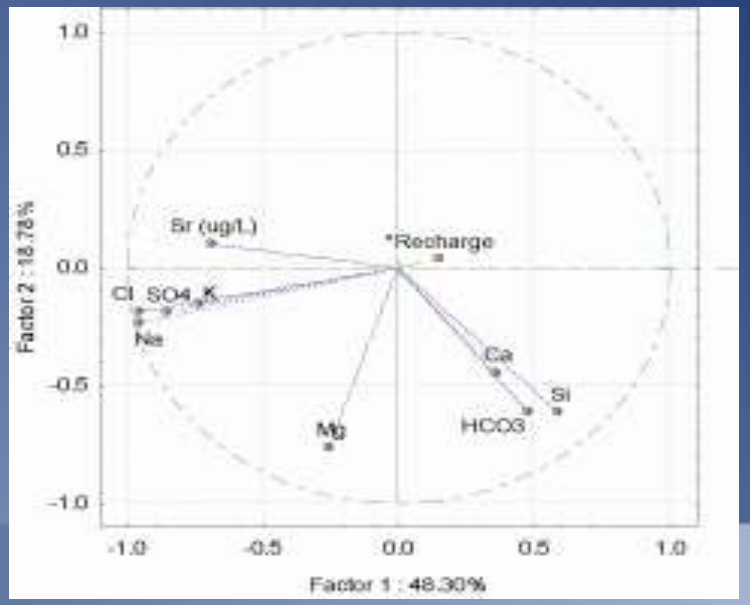


USGS


Saturday, September 06, 2014
NH
VT
MA
RI
CT
NJ
DE
MD
DC
PR-VI
AK
HI
USGS

Water Science Center Staff Expertise

- Civil Engineers
- Surveyors
- Certified Flood Plain Managers
- Hydrologists
- Geologists
- Geographers
- Hydrologic Technicians
- Biologists
- Hydraulic Engineers
- Chemical Engineers
- Chemist


1.0
0.5
0.0
-0.5
-1.0
Factor 2 : 18.78%
Sr (ug/L)
*Recharge
Cl
SO4
K
Na
Ca
Si
HCO3
Mg
-1.0
-0.5
0.0
0.5
1.0
Factor 1 : 48.30%

USGS

Water Science Center Staff Expertise

- Geomorphologists
- Hydrogeologists
- Computer Programmers
- Mathematicians
- Statisticians
- Civil Engineers
- Computer Scientists
- Web designers
- Geophysicists

Hydrologic Activities

- Water Availability – GW Modeling
- Salt Water Intrusion
- Aquifer Storage and Recovery
- Flood Frequency Analyses
- Land Use Effects – Watershed Modeling
- Contaminant Distribution and Transport
- Eutrophication – Lakes and Estuaries
- Drinking Water Quality

USGS

Surface-Water Activities

- Real-time flood Inundation
- Levee Analysis
- Dam Analysis
- Streamgaging
- Flood Warning
- Watershed Modeling
- H&H Modeling
- Time and Travel Investigations
- Gain/Loss Investigations
- Flood Frequency Analysis
- Historical Database/Archival

USGS

Water-Quality Activities

- Stream and Reservoir Data Collection
- Real-Time Water-Quality Monitoring
- Chemical/Microbial Source Tracking
- Total Maximum Daily Load (TMDL) Development
- Biological Indicator Analysis
- Sediment Coring/Age Dating
- Trend Analysis
- Historical Database/Archival

USGS

USGS Texas Activities

- Invasive Species Monitoring
- Ground Water Assessments (Quantity & Quality)
- Surface Water Modeling
- Evapotranspiration Monitoring (Water Budget)
- Drinking Water Supply Monitoring (Decision Support)
- Biological Habitat Monitoring and Mapping
- Web Application Development

Zebra Mussel Monitoring

- Invasive Species
- Impacts on systems for water managers
- Spreading across US and now in Texas
- Local concern about transfer from Red River Basin to Trinity River Basin

USGS

Pecos Water Availability Assessment

- Edwards-Trinity is the principal aquifer and a vital groundwater source
- Resource managers are concerned with future groundwater availability and the potential effects of withdrawal increases and/or redistribution
- Scale of the existing regional Groundwater Availability Model (GAM) is too coarse to adequately simulate the Edwards-Trinity aquifer in the study area

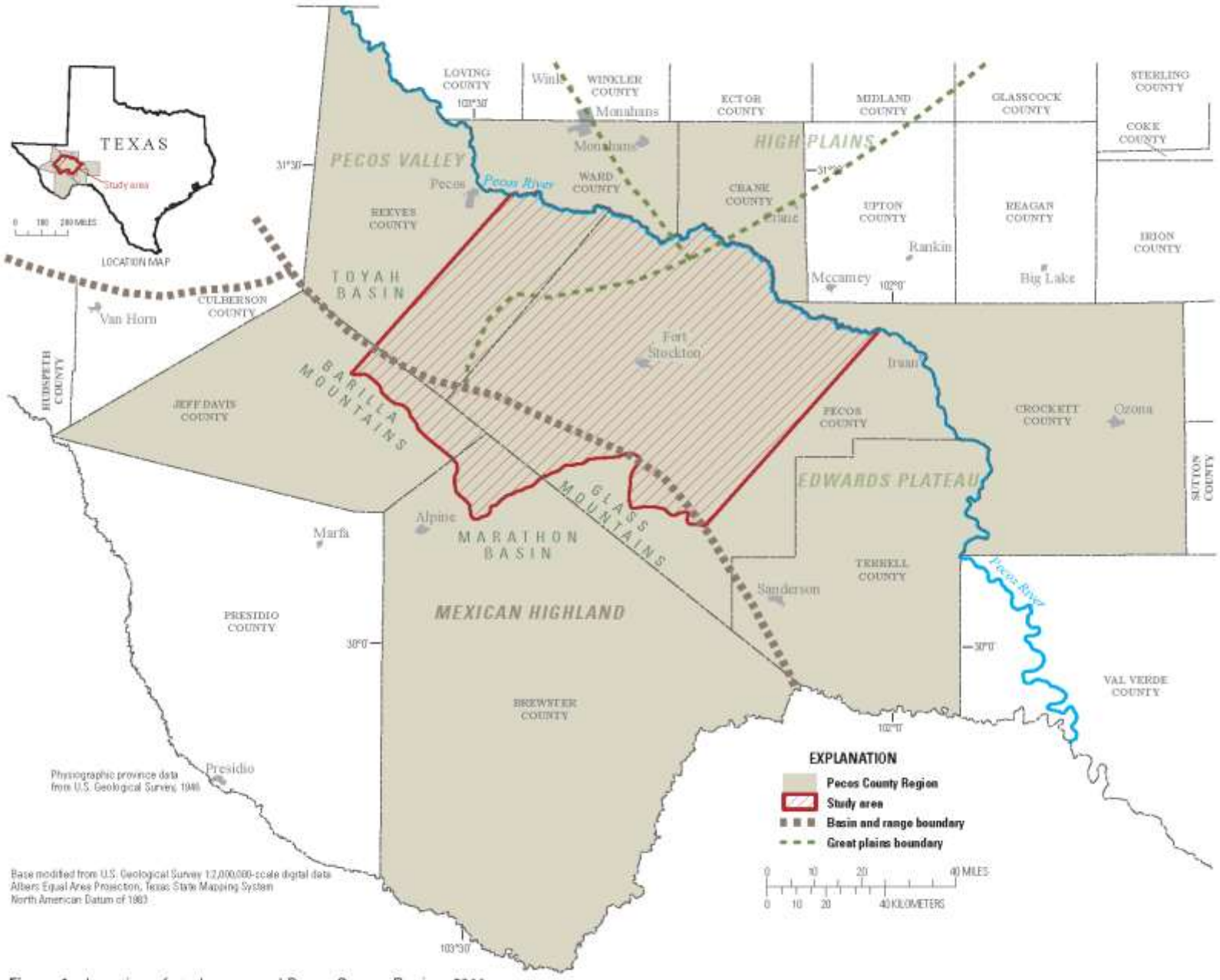


Figure 1. Location of study area and Pecos County Region, 2011.

Pecos Project Overview

- **Evaluate the potential effects of changes in groundwater withdrawals and/or distribution**

- **Three phase study:**
  - **Phase 1: Groundwater, water-quality, geophysical, and geologic data collection, compilation, and management**
  - **Phase 2: Develop a conceptual model of the hydrogeologic framework, geochemistry, and groundwater-flow system**
  - **Phase 3: Develop geochemical and groundwater-flow models to simulate future conditions**

USGS

Lake Alan Henry SWAT Model

- Run-of-river reservoir on the Double Mountain Fork Brazos River in Garza County, Texas
- 63.9 percent full or 14.70 feet below conservation pool as of 03/10/2014
- After calibration, effects of brush management will be simulated to evaluate water yields to Lake Alan Henry

USGS

Honey Creek Paired Watershed Brush Management Study

USGS

Honey Creek Hydrology

- Evaluated differences in hydrology between watersheds
  - Statistical difference in evapotranspiration between pre- and post-treatment periods
  - Conclusion published in USGS SIR 2011-5226
- Prescribed burn occurred in the treatment watershed
  - Approximately 8 years after initial brush management

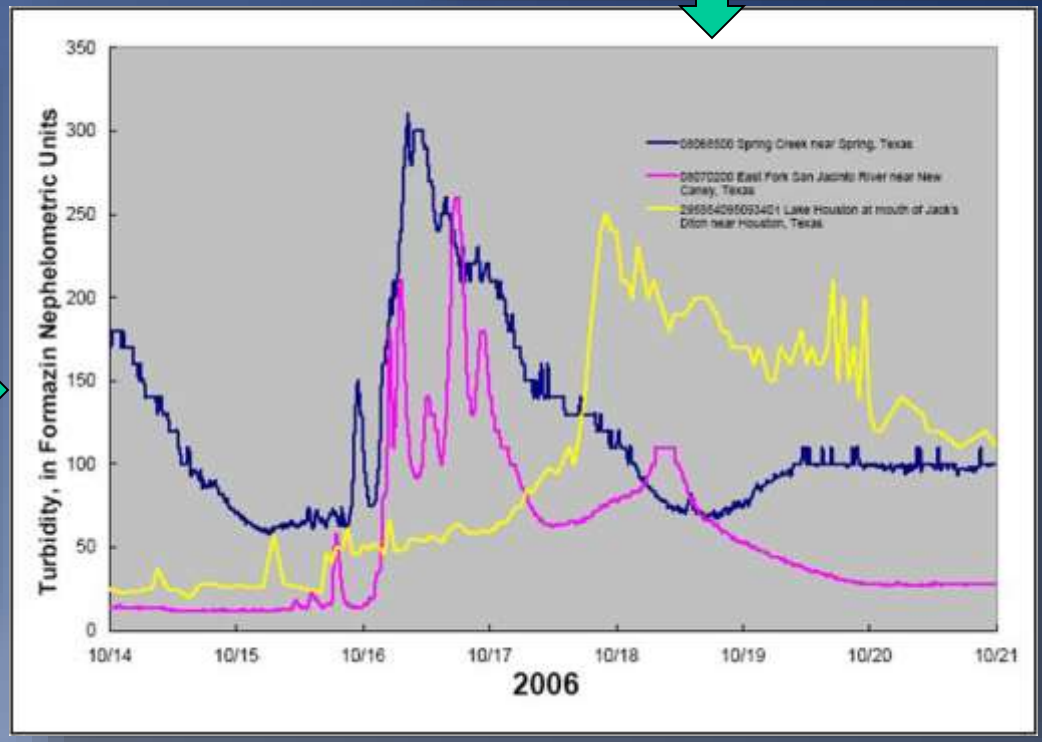
Before

After

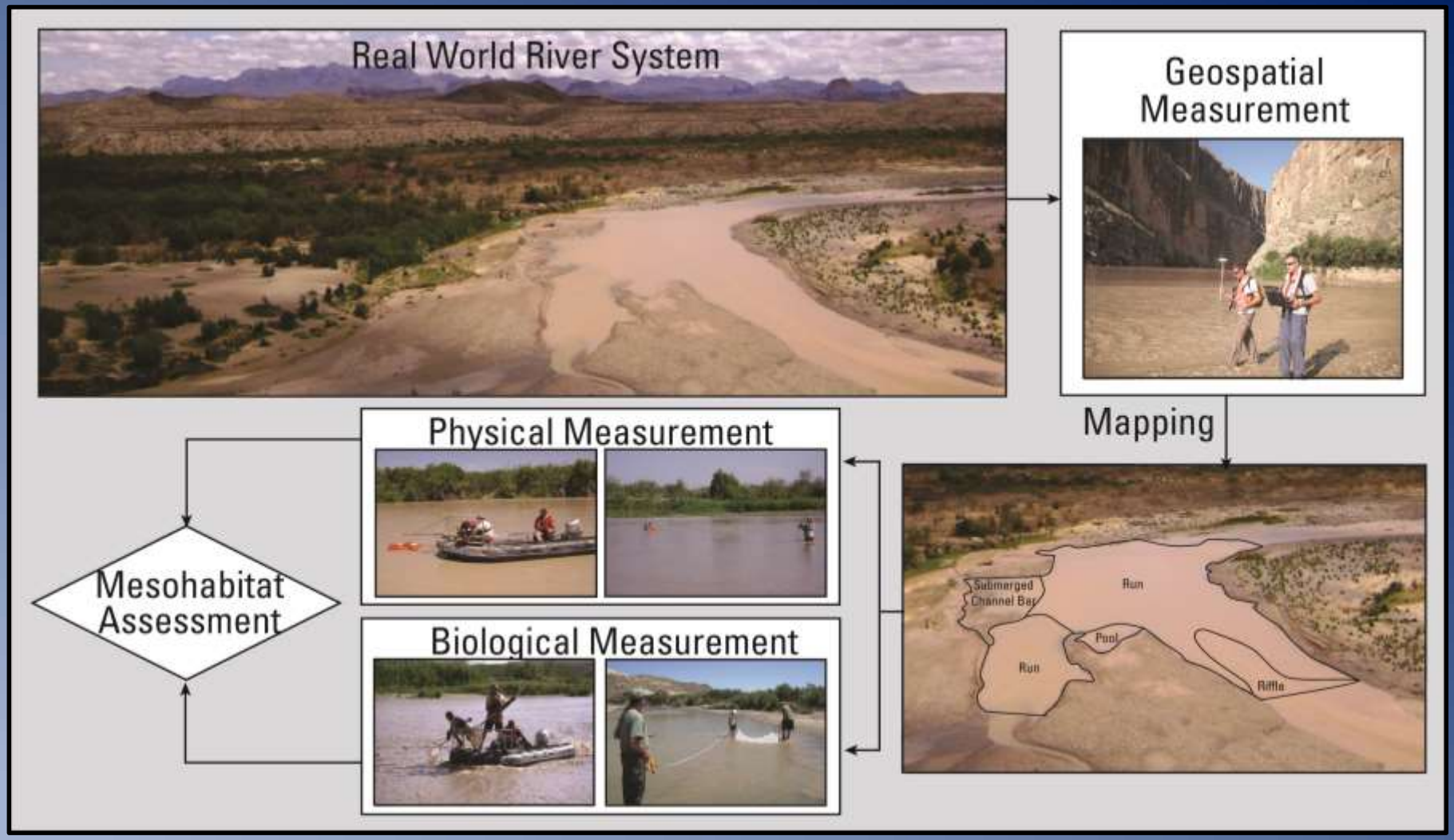
USGS

Lake Houston Study

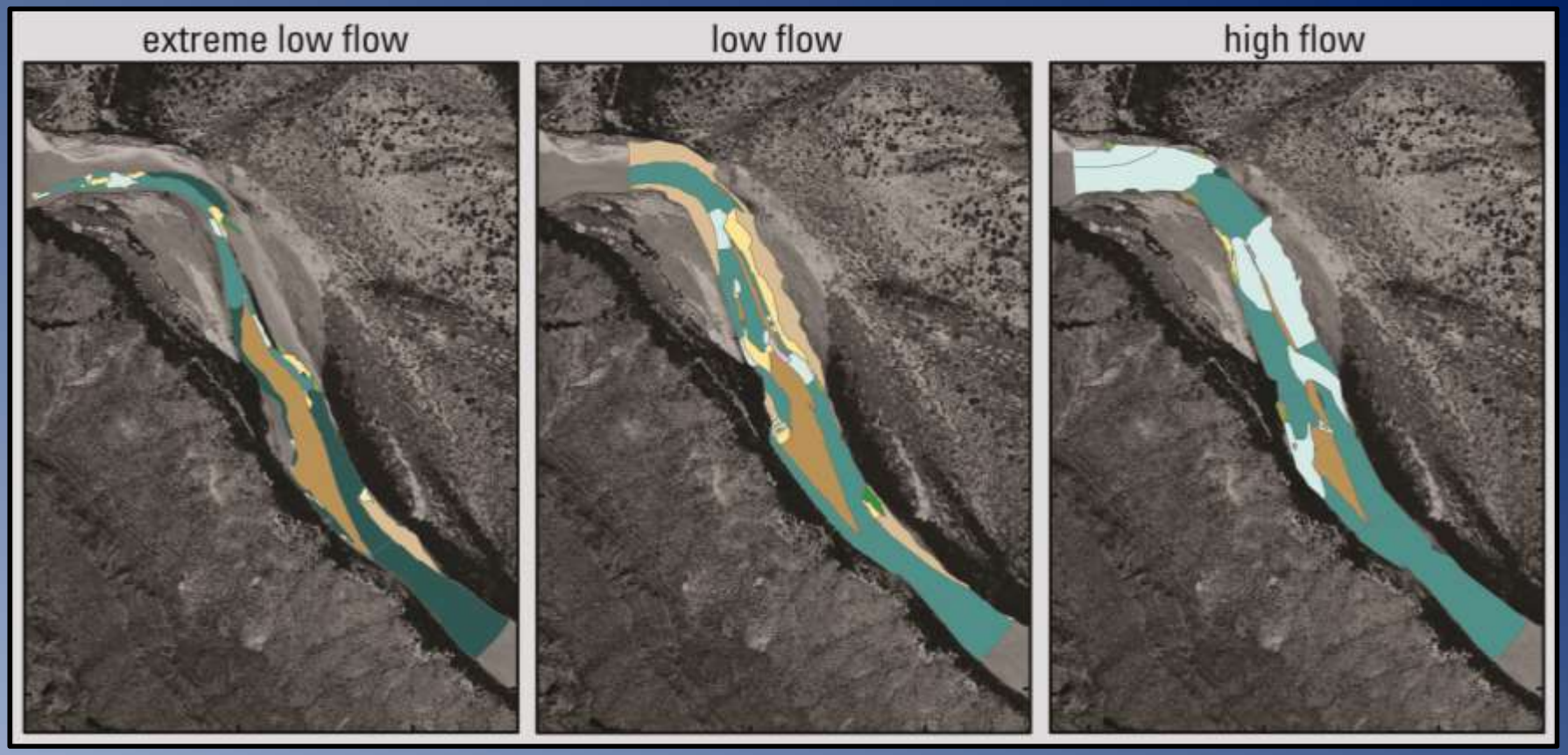
A synergistic approach to gain a better understanding of the watershed as well as provide continuous data to aid in drinking water treatment operations and long term resource planning



Mesohabitat Assessment for the Silvery Minnow in the Rio Grande



Terlingua Creek Site Over a Range of Flows



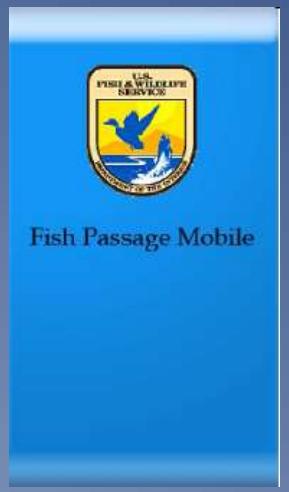
Mobile Application Development

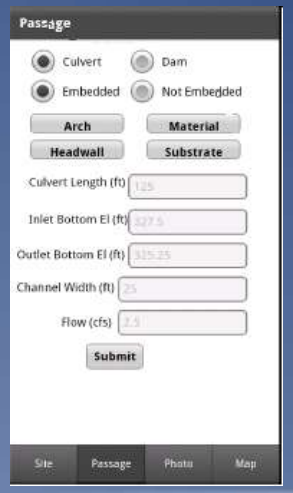
Scope:

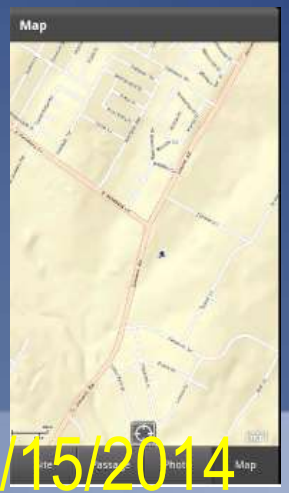
- Build mobile application to collect location and attributes of fish passage barriers throughout Texas

Technology:

- Google Android App and HTML5 solution along with online mapping system
- SQL database to capture data and provide web services to online solution







Streamer


Streamer
Base Map
Zoom
Scale = 1:36978595
About Streamer
Contact Us
FAQ


Streamer
Base Map
Zoom
TENNESSEE
LOWER
MISSISSIPPI
Scale = 1:9244649
About Streamer
Contact Us
FAQ


Streamer
Trace Downstream
Trace Upstream
(1 of 3)
Gage Info
Site Number: 14164900
Station Name: McKENZIE RIVER ABV HAYDEN BR, AT SPRINGFIELD,OR
Station Data: More info
Zoom to
Scale = 1:288895
About Streamer
Contact Us
FAQ

USGS
National Water Information System: Web Interface
USGS 14164900 McKENZIE RIVER ABV HAYDEN BR, AT SPRINGFIELD,OR
Stream Site
DESCRIPTION:
AVAILABLE DATA:
Data Type
Current / Historical Observations
Daily Data

Walker Basin Hydro Mapper

Scope:

- Working with the Nevada Water Science Center in cooperation with the U.S. Bureau of Reclamation and National Fish and Wildlife Foundation
- Interactive map and web site as common operating picture for stakeholders in and affected by the Walker Basin Restoration Program
- Visual and quantitative summary of daily streamflow conditions and waterbody storage in the Walker River Basin in Nevada and California

USGS

Walker Basin Hydro Mapper

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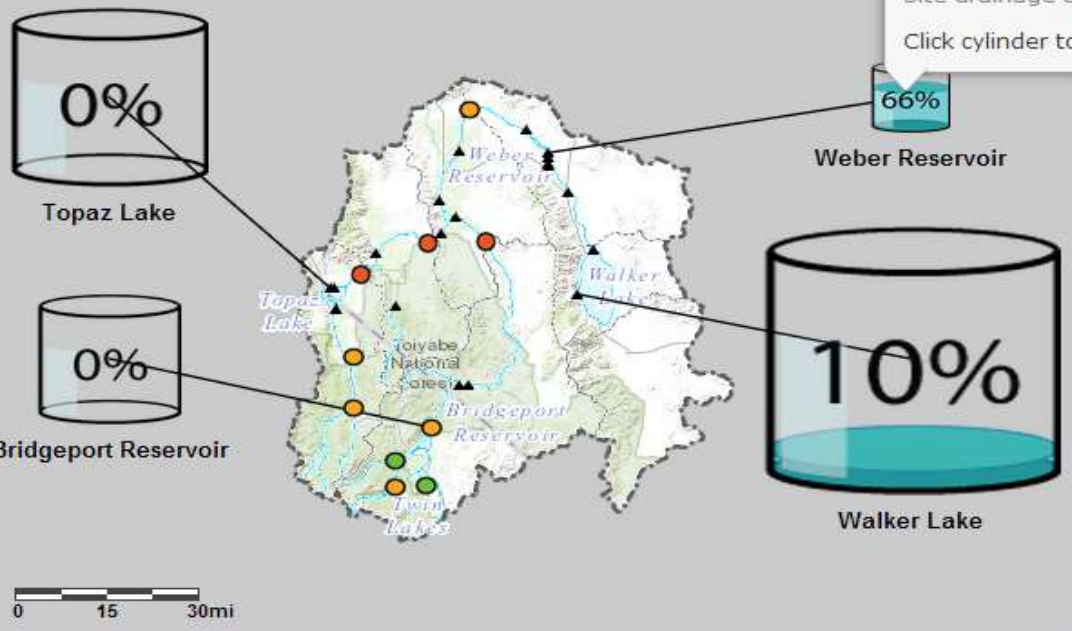
Walker Basin Hydro Mapper

Home | Full-Size Map



10301700 Weber Res Nr Schurz, NV

Stage: 4,204.31 ft
Current volume: 7,788 acre-ft
Maximum volume: 11,876 acre-ft
Percentage full: 65.57%
Measurement date-time: 2014-03-27 10:00 PDT

Site elevation: 4,218 ft
Site drainage area: 2,770 sq.mi

Click cylinder to view NWISWeb realtime page

Hydro Mapper. This mapping application provides a basin-wide perspective of real-time streamflow and lake and reservoir storage capacity and stage for the Walker River Basin in Nevada and California. It also provides access to historic streamflow, lake, and reservoir data. This tool was developed to create a common operating picture for the stakeholders involved in and affected by the Walker Basin Restoration Program.

Walker Basin Restoration Program

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

NATIONAL FISH AND WILDLIFE FOUNDATION

Background

The Walker Basin Restoration Program was enacted by Congress in 2009 through Public Law 111-85 and is administered by the National Fish and Wildlife Foundation (NFWF) through the Bureau of Reclamation's (BOR) Desert Terminal Lakes Program. The program's core purpose is to restore and maintain Walker Lake, a natural, terminal lake in west-central Nevada at the endpoint of the Walker River system of Nevada and California. Walker Lake is an internationally protected stopover point for migratory birds on the Pacific Flyway and an important fishery for threatened Lahontan cutthroat trout. Depleted freshwater inflows and changes to the hydrologic cycle have resulted in declines in lake levels and increases in salinity which threaten the ecological health of the lake.

Real-Time Data

http://tx.usgs.gov

USGS
science for a changing world

125 years of science for America ★ ★ ★ ★ ★ 1879–2004

USGS Activities in Texas

Texas Home | Real-time Water Data | Historical Data | District Info | Contact Us

Water Resources

NEW NRC Review of USGS Streamflow Program

Real Time Water Data

TX Stations Currently Above Flood Stage | Map of TX Sites / Basins | Stream Lake / Reservoir | Ground Water | Water Quality Coast Storm Surge and Salt Water Intrusion

Recent Daily Water Data

Daily Data for Texas: Stage and Streamflow

Historical / Summaries

Retrieve NWIS Historical Water Data
Daily Streamflow Data for TX or US
Water Data Reports: 2003 - 1998
Lake Conservation Pools / Elevations
Barton Springs | Non-USGS Data

National Water Quality Assessment - NAWQA

Texas NAWQA Projects: Reconstructed Trends
High Plains Ground Water | South Central Texas
Trinity River Basin

Flood and Drought

NWS Flood Guidance | NWS Recent Precip
Current Flood Warnings NWS/NOAA | TWDB Drought Conditions Summary | Texas Weather Information
County Hurricane/Hazard Risk Maps

Recent USGS Flood Reports

Preliminary July 2002 Flood Report | Preliminary Ground-Water Levels during July 2002 Flood

USGS Study in Austin Determines PAH Concentration in Parking Lot Runoff

Edwards Aquifer & Barton Springs

Current data, studies, and publications including water, biology, & geological maps.
Barton Springs Groundwater Characterization Project

Biology & Environment

CERC Biological Research Projects in Texas
TX Gulf Coast | Big Bend | Big Thicket Prsv
Houston | US/Mexico Border

Galveston Bay Wetland Inventory

General Info

- Frequently Asked Questions in Texas
- Data Request Form
- Office Locations
- Ask USGS Info/Search
- Cooperating Agencies
- Recreation
- Employment
- Ask a Geologist

Search USGS Pubs

- Reports Warehouse
- Pubs Search Engine
- USGS Products & Pubs
- Water Resources Pubs
- USGS Library

Maps & Spatial Data

- Texas Mapping
- Online Map Catalog
- Geospatial Data
- EROS Earth Explorer
- Topographic Maps

Education

- Learning Web
- The Water Cycle
- Earth Science Week
- Water Science
- La Ciencia del Agua

USGS

Thank You

Bob Joseph
(512) 297-4371
(512) 927-3502
rljoseph@usgs.gov
http://tx.usgs.gov