# Pecos Basin Assessment and Watershed Protection Planning

# Funding

Provided by the Texas State Soil and Water Conservation Board (TSSWCB) through the Environmental Protection Agency (EPA) Clean Water Act Section 319(h) grant.


# Multi-Agency Effort

- Texas Cooperative Extension
- Texas Agricultural Experiment Station
- Texas Water Resources Institute
- International Boundary and Water Commission – Clean Rivers Program

# Significance of the Pecos

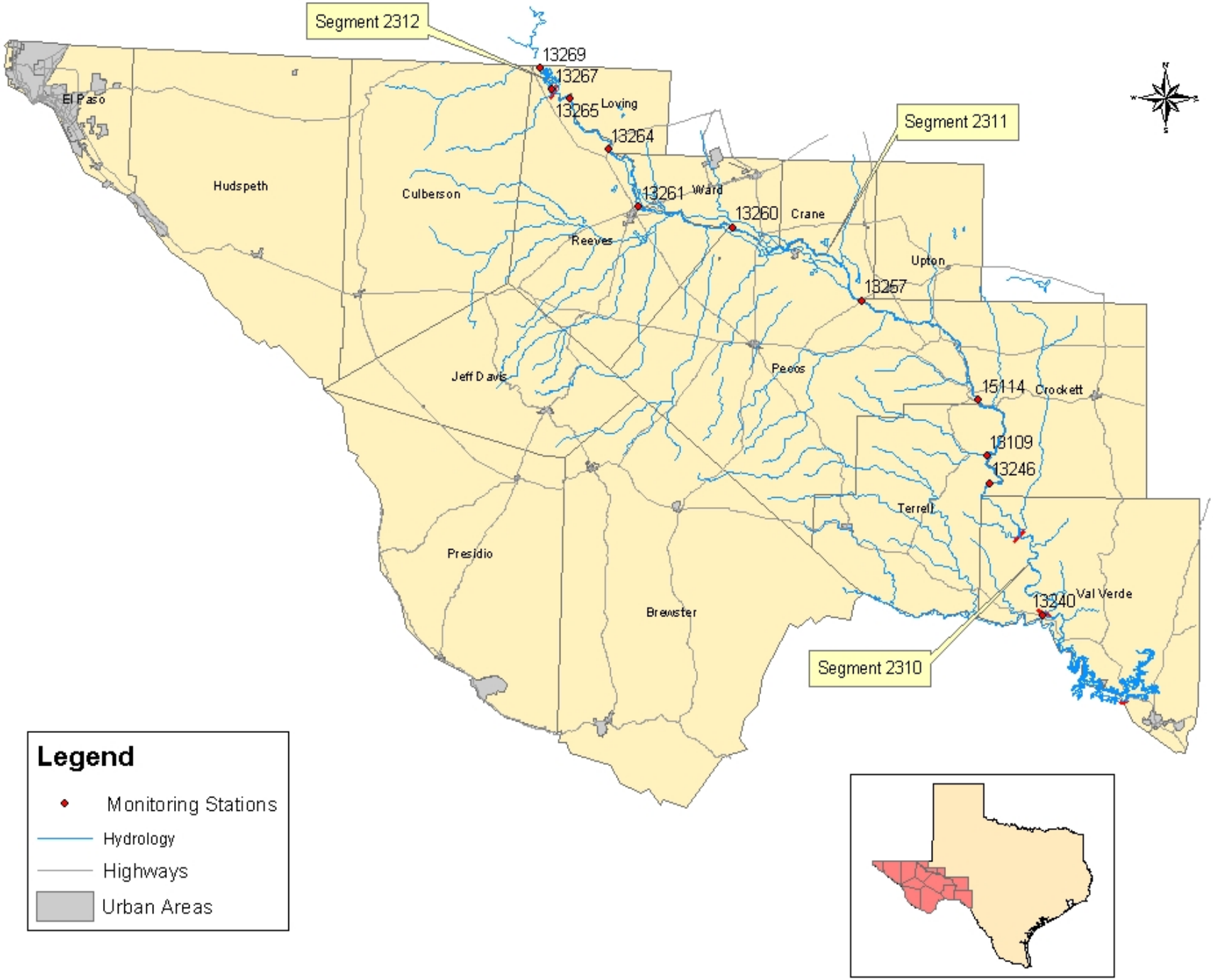
- Largest U.S. river sub-basin flowing into the Rio Grande
  - Only perennial surface water source between the Colorado & Rio Grande rivers
  - Economic driver for the region
- Accounts for 11% of stream inflow into Amistad Reservoir
- Contributes 29.5% of total salt loading into Amistad

# Need for the Project

- Decreased water quantity
- Declining water quality
- Dwindling biological diversity


# Project Objectives

- Assess physical features of the Pecos River basin (Task 1)
- Facilitate communications with stakeholders (Task 2)
- Monitoring Program (Task 3)
- Develop Watershed Protection Plan for Pecos River in Texas (Task 4)


Segment 2312
13269
13267
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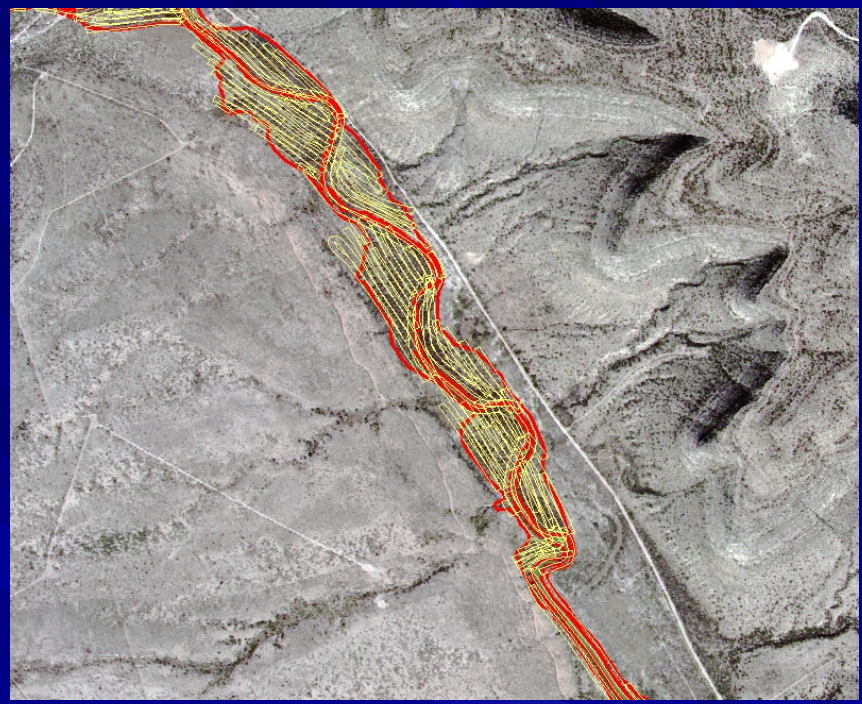
15114
13109
13246
13240
Segment 2311
Segment 2310
El Paso
Hudspeth
Culberson
Loving
Ward
Crane
Upton
Reeves
Jeff Davis
Pecos
Crockett
Terrell
Presidio
Brewster
Val Verde
Legend
Monitoring Stations
Hydrology
Highways
Urban Areas

# Task 1: Basin Assessment

- Identify, characterize, and evaluate physical features of the Pecos River
- Develop interactive maps of the basin
- Use modeling to evaluate salinity and flow



Generated saltcedar delineation map with “spray files” overlaid showing areas where herbicide will or have been applied aerially

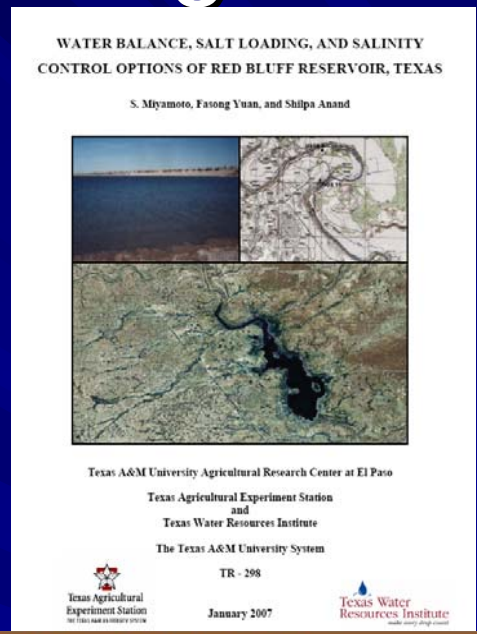
# Task 1: Basin Assessment

Pecos pupfish photo courtesy of the Texas Wild


- Environmental, Social, & Economic Inventories of:
  - Historical information
  - Land & water use
  - Economic modeling
  - Salinity
  - Riparian and Aquatic habitat
  - Aquatic species

# Task 2: Educational Programming

- Publications
  - Technical
  - Historical
  - Informational
- Meetings
  - Stakeholder involvement
- Website
  - pecosbasin.tamu.edu



WATER BALANCE, SALT LOADING, AND SALINITY CONTROL OPTIONS OF RED BLUFF RESERVOIR, TEXAS

S. Miyamoto, Fasong Yuan, and Shilpa Anand

Texas A&M University Agricultural Research Center at El Paso

Texas Agricultural Experiment Station and Texas Water Resources Institute

The Texas A&M University System

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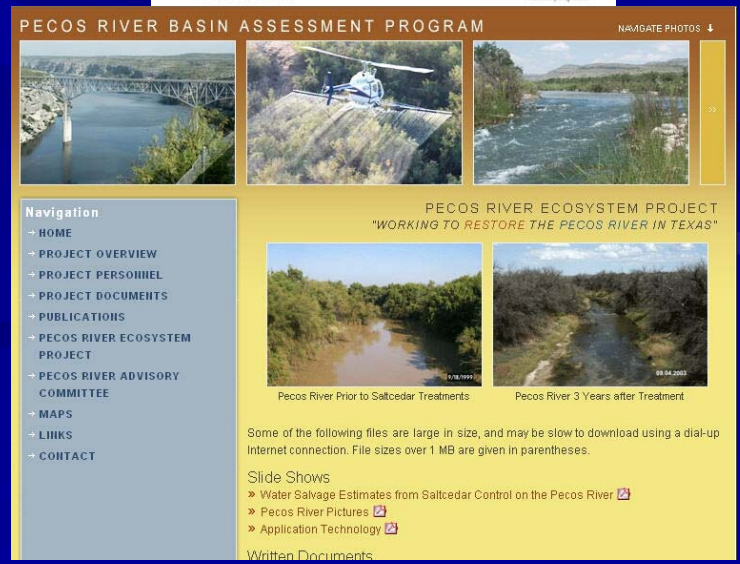
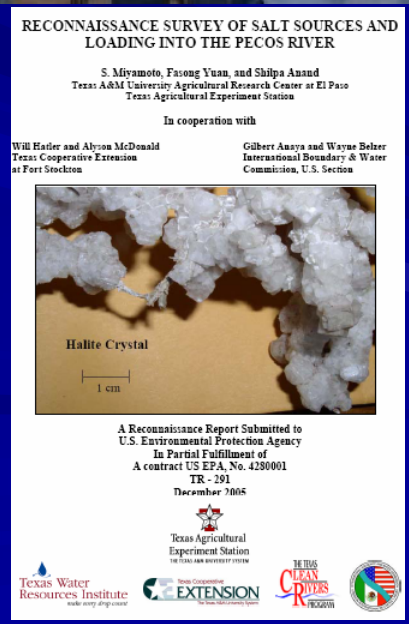


# Task 3: Monitoring Program

- Monitoring
  - Standard water quality monitoring
  - Paired plot study
    - Treated and untreated saltcedar plots
    - Evaluate potential water salvage from saltcedar control

# Task 4: Watershed Protection Plan

- Conduct stakeholder meetings to get their input
- Develop a draft plan for public comments that includes original stakeholder input and scientific study findings
- Release for public comment
- Incorporate comments into draft and create a final, stakeholder approved document
- Submit final Watershed Protection Plan



RECONNAISSANCE SURVEY OF SALT SOURCES AND LOADING INTO THE PECOS RIVER

S. Miyamoto, Fasong Yuan, and Shilpa Anand
Texas A&M University Agricultural Research Center at El Paso
Texas Agricultural Experiment Station

In cooperation with

Will Hatler and Alyson McDonald
Texas Cooperative Extension
at Fort Stockton

Gilbert Anaya and Wayne Belzer
International Boundary & Water
Commission, U.S. Section

Halite Crystal

1 cm

A Reconnaissance Report Submitted to
U.S. Environmental Protection Agency
In Partial Fulfillment of
A contract US EPA, No. 4280001
TR - 291
December 2005

Texas Agricultural
Experiment Station

Texas Water
Resources Institute

EXTENSION

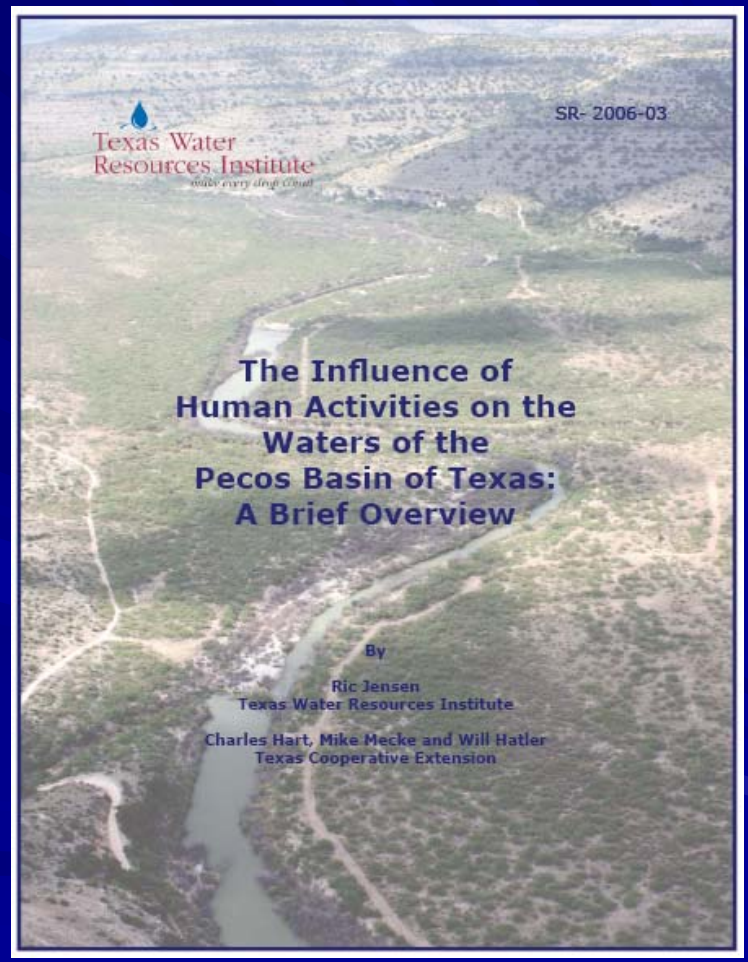
THE TEXAS
CLEAN
RIVERS
PROGRAM

# Project Status

- Assessment and monitoring are completed
  - Task reports in progress
- Educational programming continues
  - Stakeholder meetings still to come
- Watershed Protection Plan is in the works
  - 1st draft done by early summer

# Pecos History

- A project deliverable
- An account of human activities in the watershed
- Highlights water resource challenges in the basin



# Early Humans

- Human artifacts have been aged at about 9600 years old
- Early European Explorers first documented Native American presence in the 1500s
- Native American Tribes
  - Jumano
  - Pecos
  - Comanche
  - Apache
  - Pawnee
  - Kickapoo
  - Kiowa
  - Shawnee

# The European Entrance

- Alvar Nunez Cabeza de Vaca (1530)
- Francisco Vazquez de Coronado (1540)
- Fray Augustin Rodriguez (1580)
- Antonio de Espejo (1583)

- de Vaca refered to the Pecos as the “great river”
- Coronado recorded that Native Americans were using irrigation to grow crops

# Anglo Settlement

Capt. John Pope and Party at Artesian Well Drilling Site Near Texas – New Mexico State Line (1857) Photo Courtesy of the State Preservation Board

- Began in the mid 1800s
  - 1st water well drilled in 1849 near Van Horn
  - Spring flow diverted to irrigate crops
  - 1st major effort to dam the Pecos for irrigation was in 1887 near Imperial

# Early Irrigation Projects

| *Irrigation Project* | *County* | *Year Started* | *Potential maximum acreage* |
|---|---|---|---|
| Imperial | Pecos | 1887 | 25,000 |
| Barstow & West Valley | Ward, Reeves | 1889 | 27,000 |
| Grand Falls | Ward | 1890 | 32,000 |
| Big Valley | Ward | 1906 | 16,000 |
| Arno | Reeves | 1908 | 15,000 |
| Porterville | Loving | 1908 | 6,000 |
| Farmers' Independent | Reeves | 1908 | 10,000 |
| Biggs | Ward | 1908 | 12,000 |
| Zimmerman | Pecos | 1909 | 26,000 |
| Victor | Crane | 1914 | 4,000 |
| ***Total Acreage*** | | | 173,000 |

*Source: Hill,1965.*

# Water Management: The Early Days

## Surface Water

- Take what you can get
- Irrigation projects
  - Poor coordination
- Red Bluff
  - Cooperative effort to manage irrigation waters from the Pecos

## Groundwater

- Difficult in the early days
- Took off in the 40's and 50's
- Take what you can get
  - The rule of capture at work

# Red Bluff Reservoir


- 1st proposed in 1905
- Completed in 1936 by Red Bluff Water Improvement Dist. and the Public Works Admin.
- Pecos Interstate Compact signed in 1948 ensures joint river management
- 1987 lawsuit awarded $14 Million and 340,100 AF to Texas

# Irrigation Milestones Since 1959

- 69,499 acres was the least amount of land irrigated (1989)
  - Used a total of 193,163 AF of irrigation water


- Irrigated acreage peaked at 259,570 acres in 1964
  - Used a total of 835,412 AF of irrigation water

# Recent Irrigation

Water well in the Pecos basin used for irrigation

- About 73,000 ac irrigated in 2000
  - 176,541 ac/ft groundwater (87.5%)
  - 25,119 ac/ft surface water (12.5%)

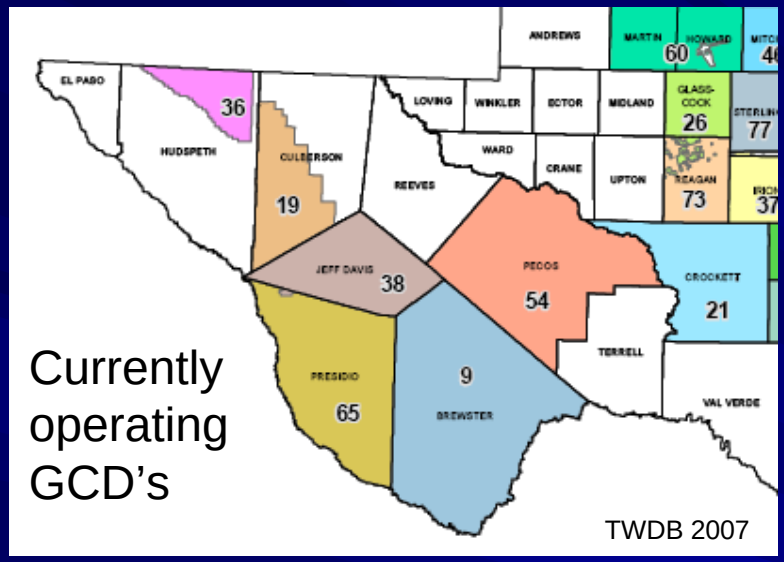
# Surface Water Management: Today

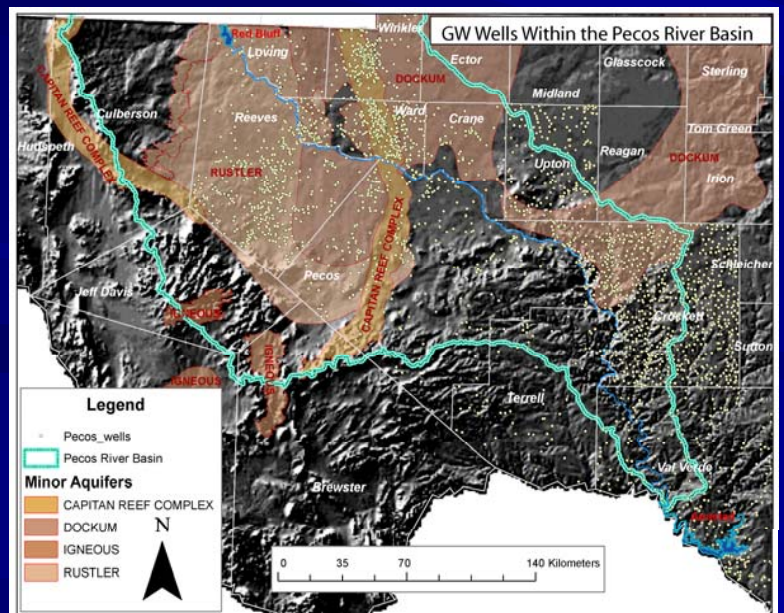
- Rely on water from New Mexico
- Red Bluff Water Control District controls releases
  - Irrigation districts request releases
- 7 irrigation districts remain


Red Bluff Reservoir

Barstow Dam, Ward Co. Irrigation Dist. No. 1

# Groundwater Management: Today




- Groundwater conservation districts
- Costs to pump water
- Declining aquifer levels and quality
- The rule of capture still rules

# Progression of the River


Prior to 1918


November 1936


October 1961


March 2005

# Current Management Efforts

- Saltcedar control
- Aerially applied selective herbicide
- GPS guided system
- Over 12,000 acres treated to date


# Needed River Management

- Salinity control
- Quantity of flow
- Environmental flows
- Habitat management

# http://pecosbasin.tamu.edu

Lucas Gregory

Project Manager

Texas Water Resources Institute

979-845-7869

lfgregory@ag.tamu.edu