
Sutton County
Underground Water
Conservation District

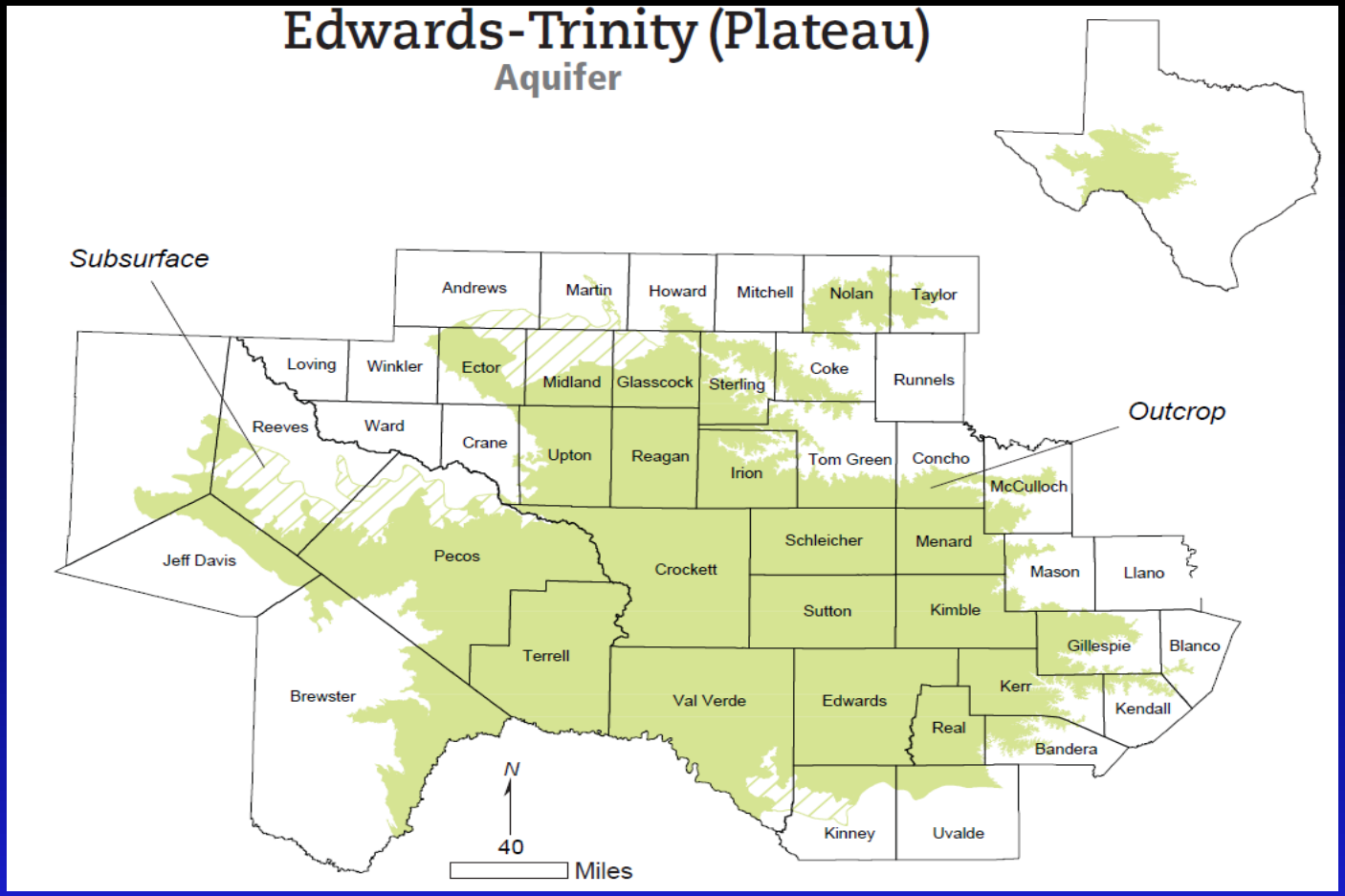
Sutton County UWCD
301 S. Crockett Ave.
Sonora, TX 76950

Edwards Plateau Soil & Water Conservation District - Ranch Gathering

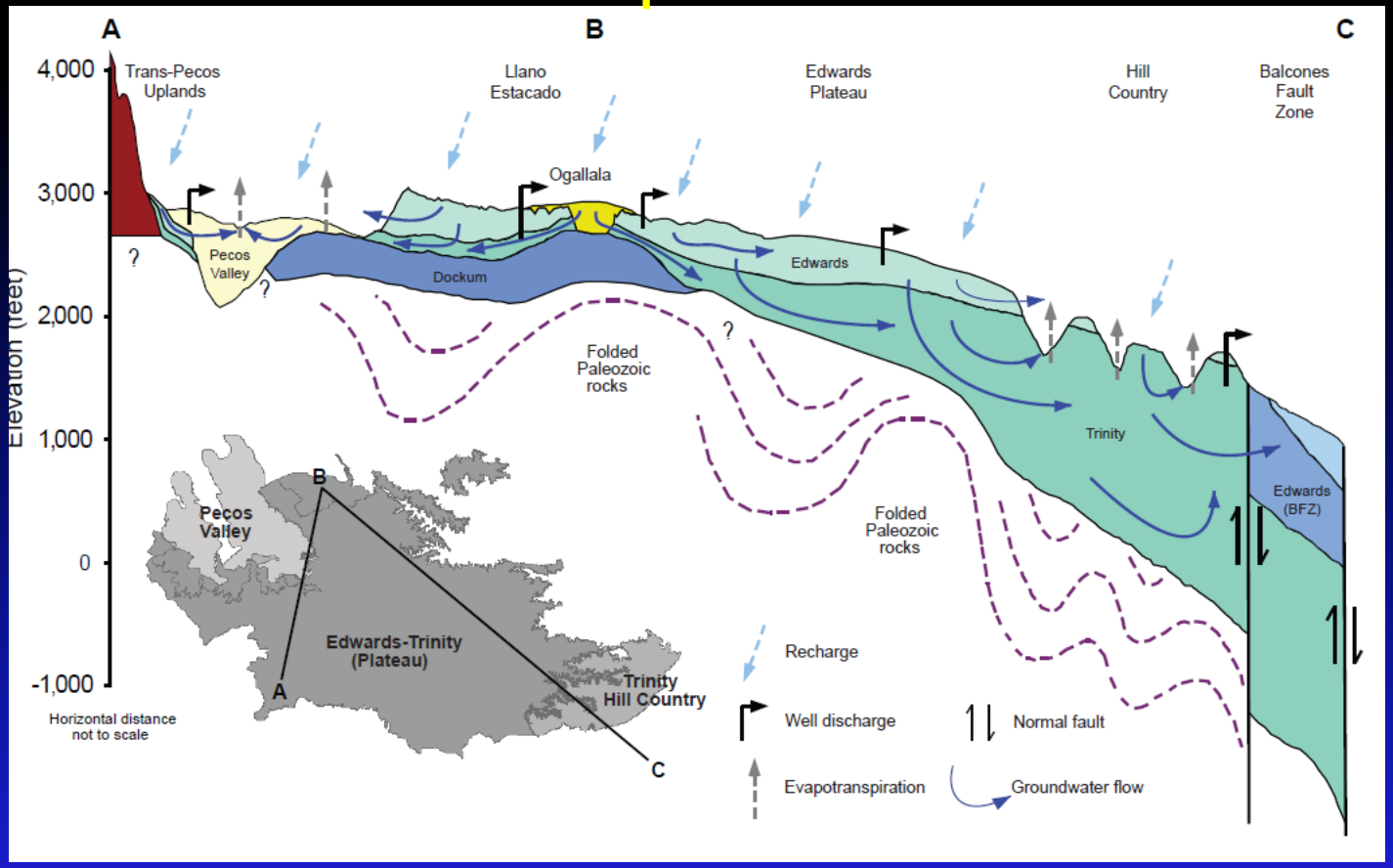
Water Facts

- Basic hydrogeology of Sutton County and surrounding area
- Where data is collected by the Sutton County UWCD
- How data is collected and utilized
- A word about rainfall
- Rain Harvesting

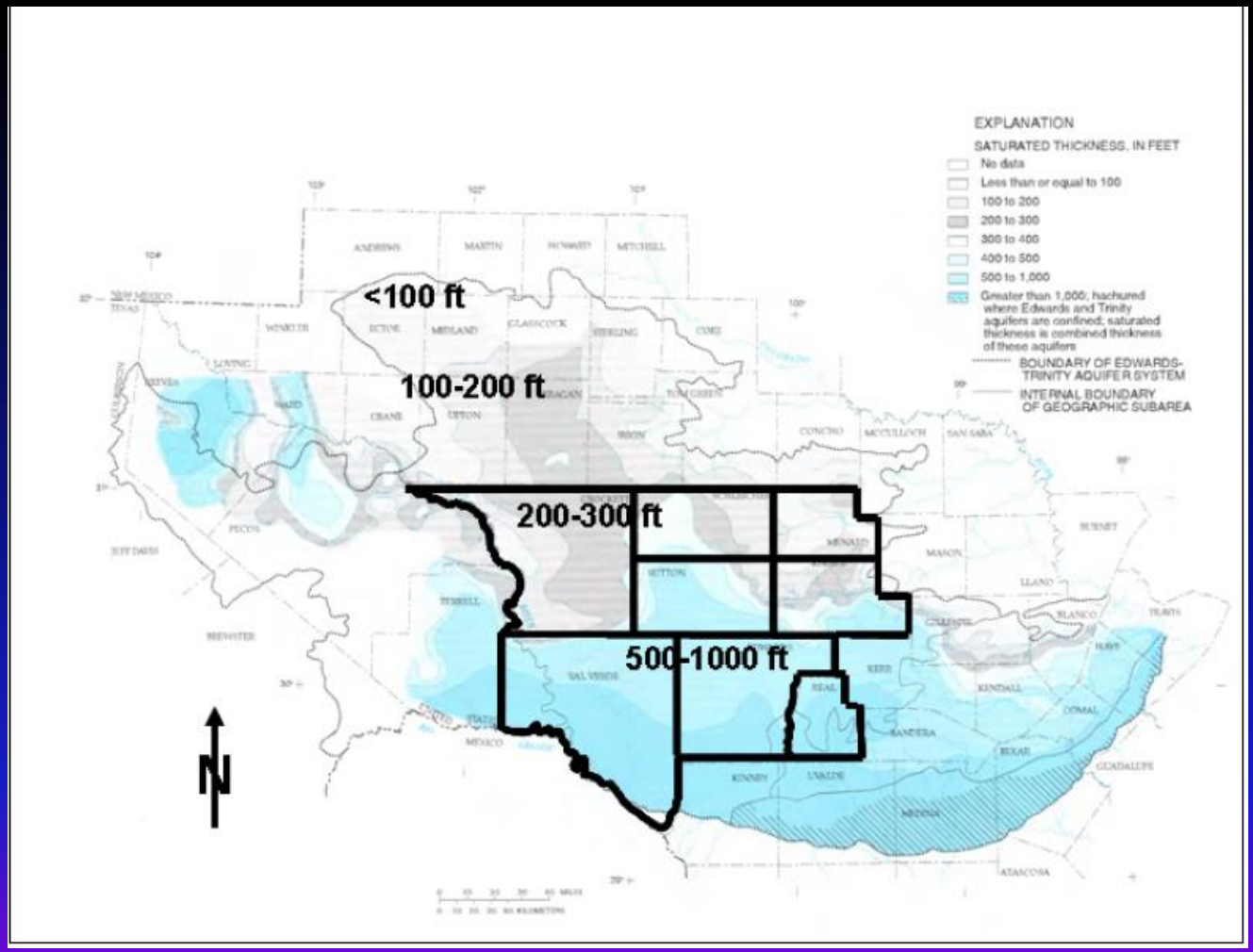
Basic Hydrogeology of Sutton County


Edwards-Trinity (Plateau)
Aquifer
Subsurface
Outcrop
Andrews
Martin
Howard
Mitchell
Nolan
Taylor
Loving
Winkler
Ector
Midland
Glasscock
Sterling
Coke
Runnels
Reeves
Ward
Crane
Upton
Reagan
Irion
Tom Green
Concho
McCulloch
Jeff Davis
Pecos
Crockett
Schleicher
Menard
Mason
Llano
Sutton
Kimble
Gillespie
Blanco
Terrell
Brewster
Val Verde
Edwards
Kerr
Kendall
Real
Bandera
Kinney
Uvalde
N
40
Miles

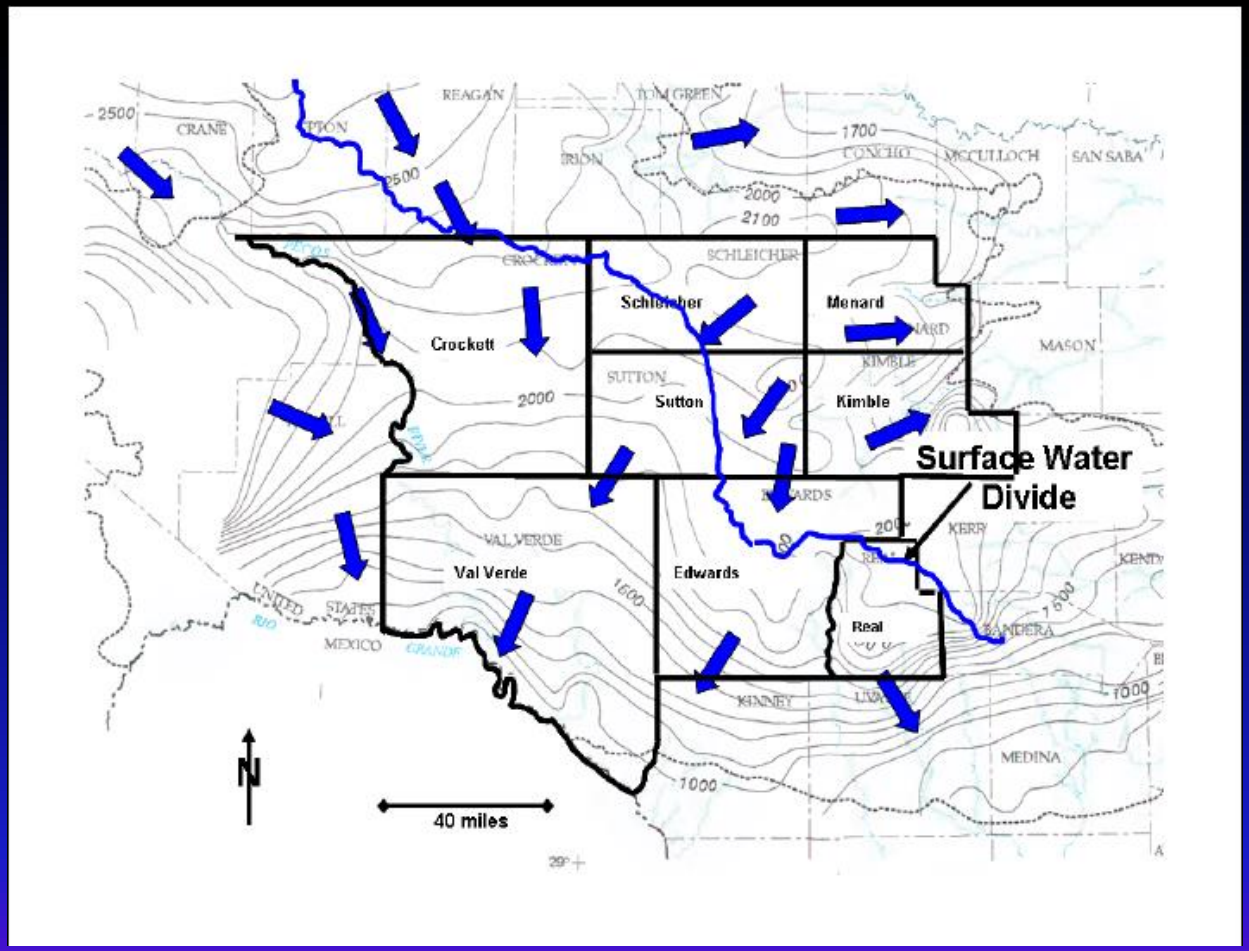
Vertical Cross-Section Edwards-Trinity Aquifer



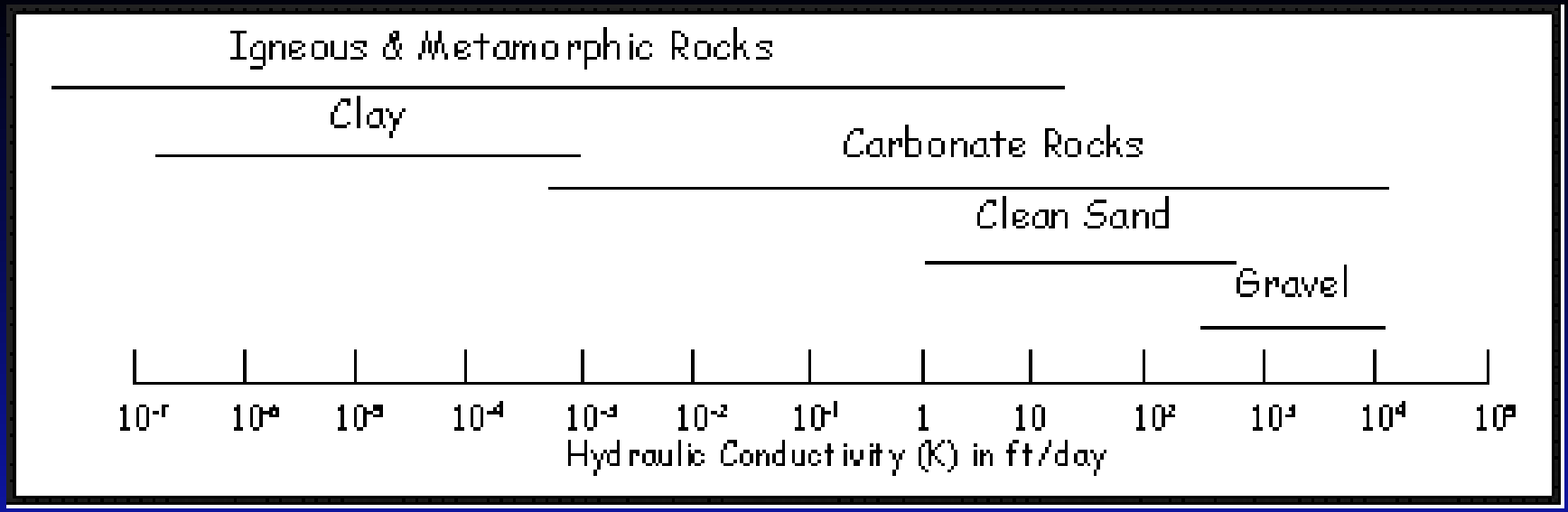
Saturated thickness of the Edwards-Trinity Aquifer



Flow paths through the Edwards-Trinity Aquifer



Hydraulic Conductivity (speed water travels through an aquifer)



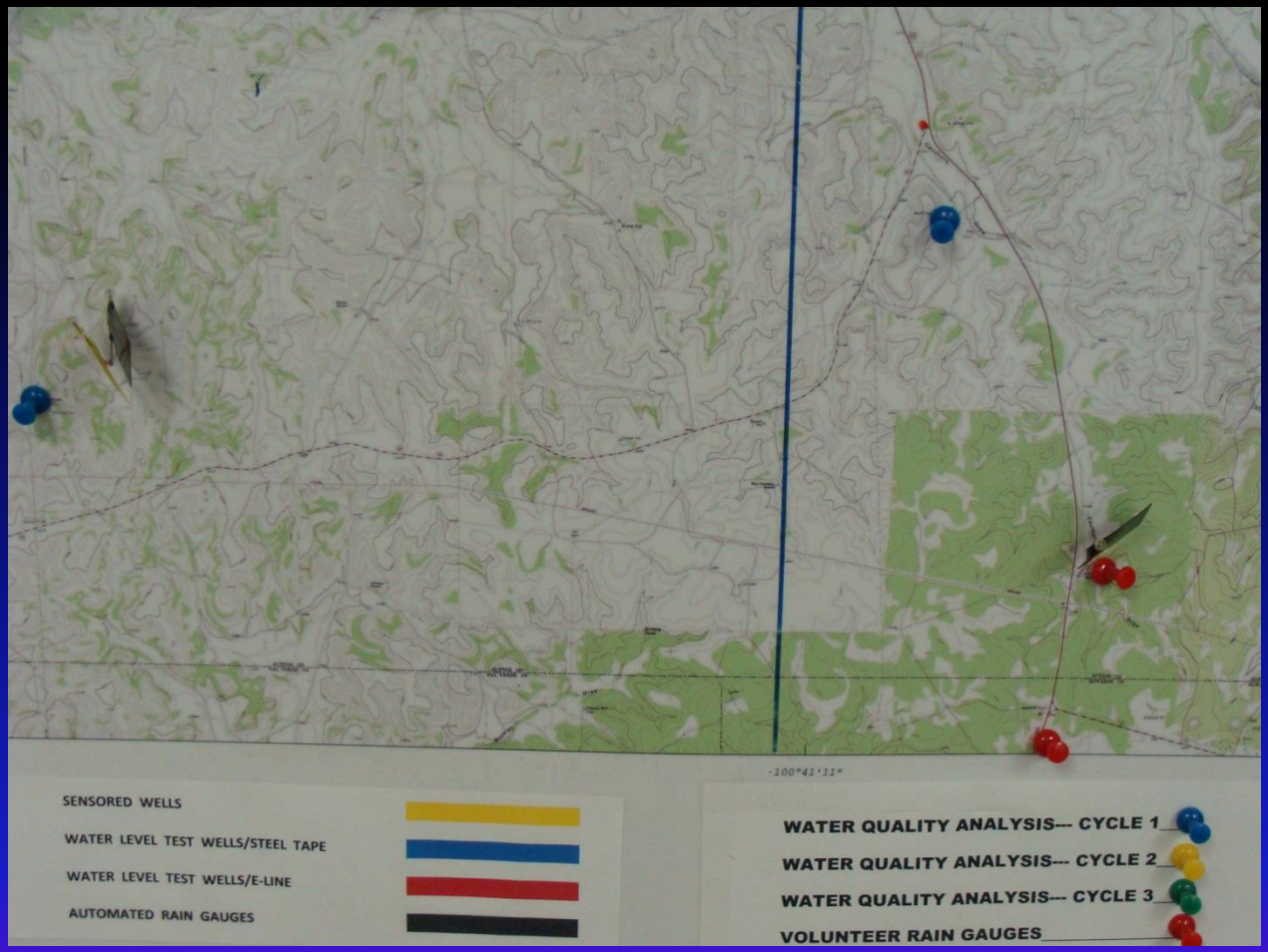
Sutton County UWCD Data Collection

Instrumentation and data collected by the District

- Water Levels - 31 Wells strategically located throughout the District
  - 15 wells with automated sensors
  - 14 wells measured with a steel tape
  - 2 wells measured with an electric (E) line
- Rain Gauges – 41 throughout the District
  - 31 automated rain gauges throughout the county
  - 10 graduated gauges located throughout Sonora
- Water Quality Wells – 60 wells divided into three groups of 20 each
  - Extensive water quality analyses performed on each well sampled

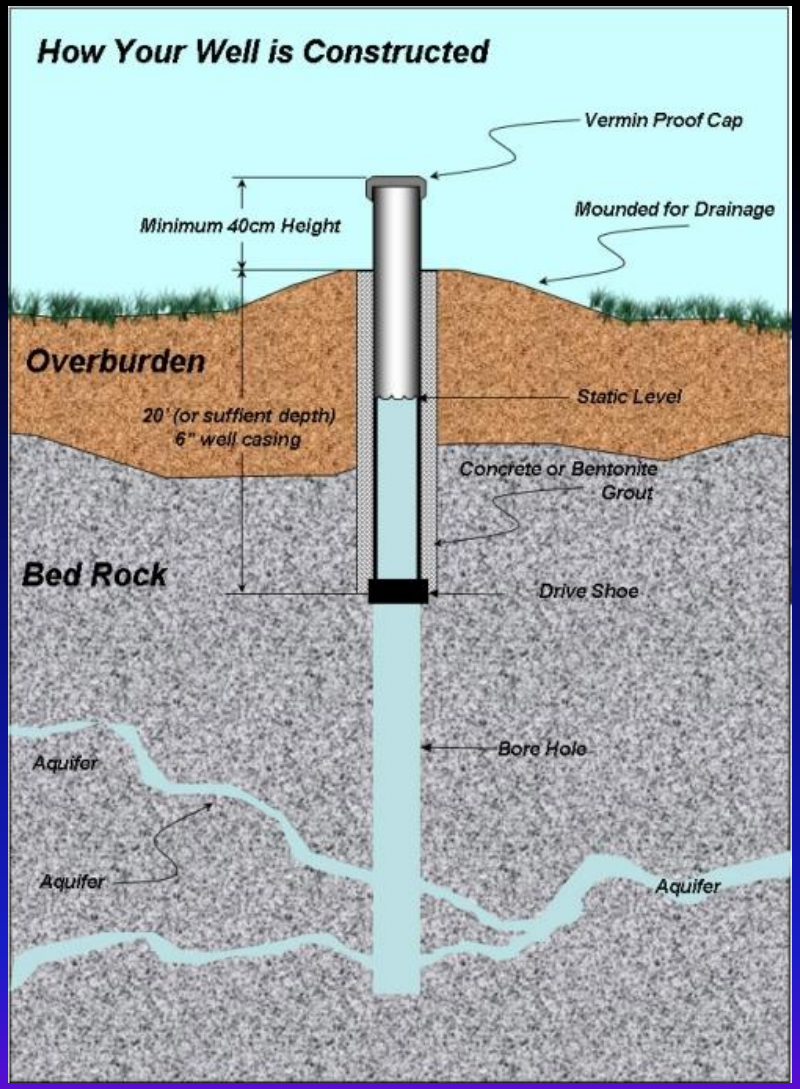
Sutton County UWCD instrumentation sites

Close-up of data collection sites and legend



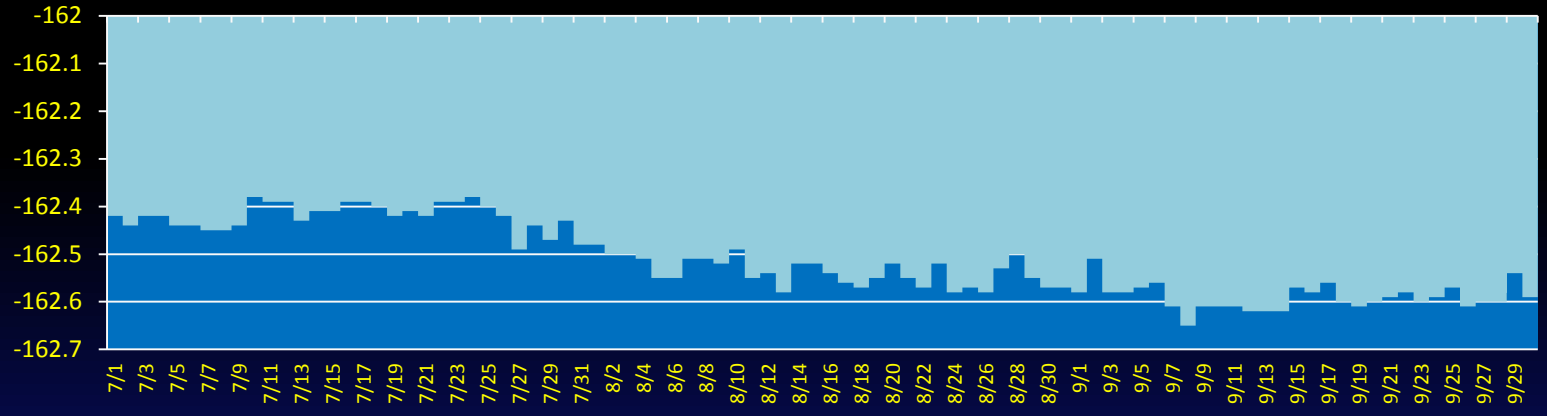
Cross Section Drought Index Well

Cross Section of monitor well

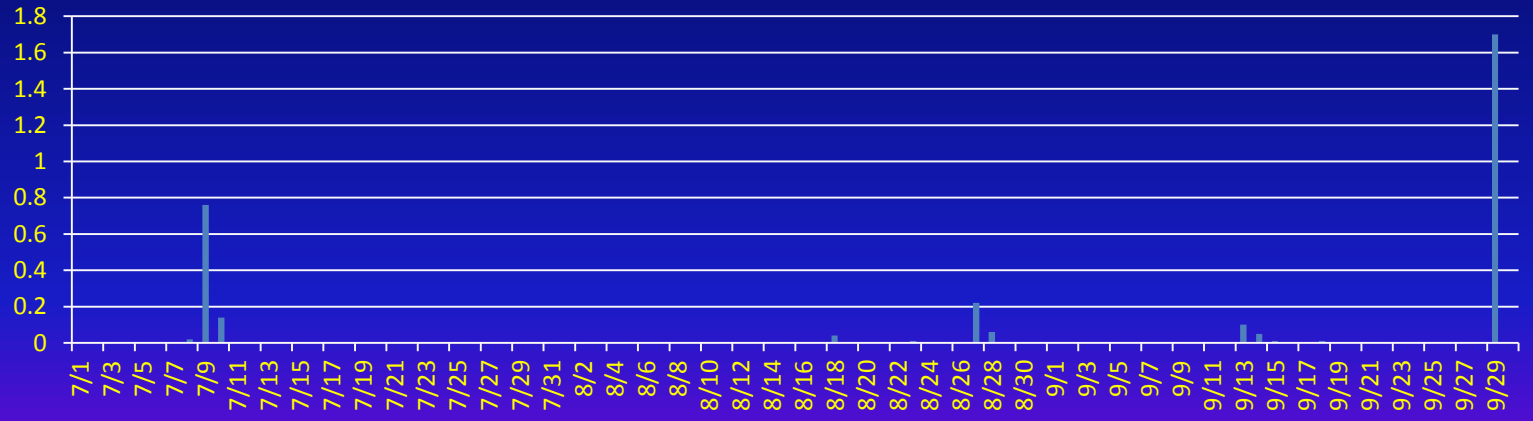


Examples of Water Level Data

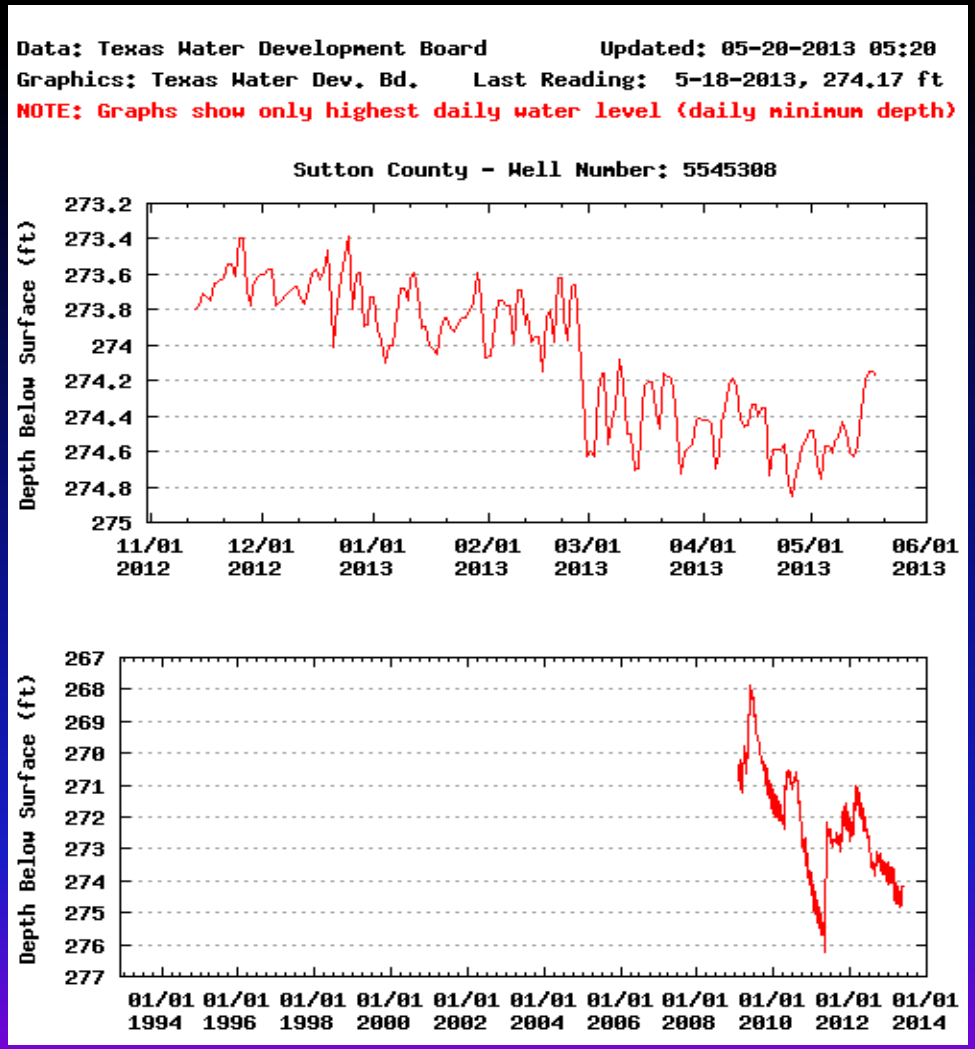
SUTUWCD DCW 3rd Qtr. 2012 55-27-322 SN#: 305080
Level Surface Elevation (ft)



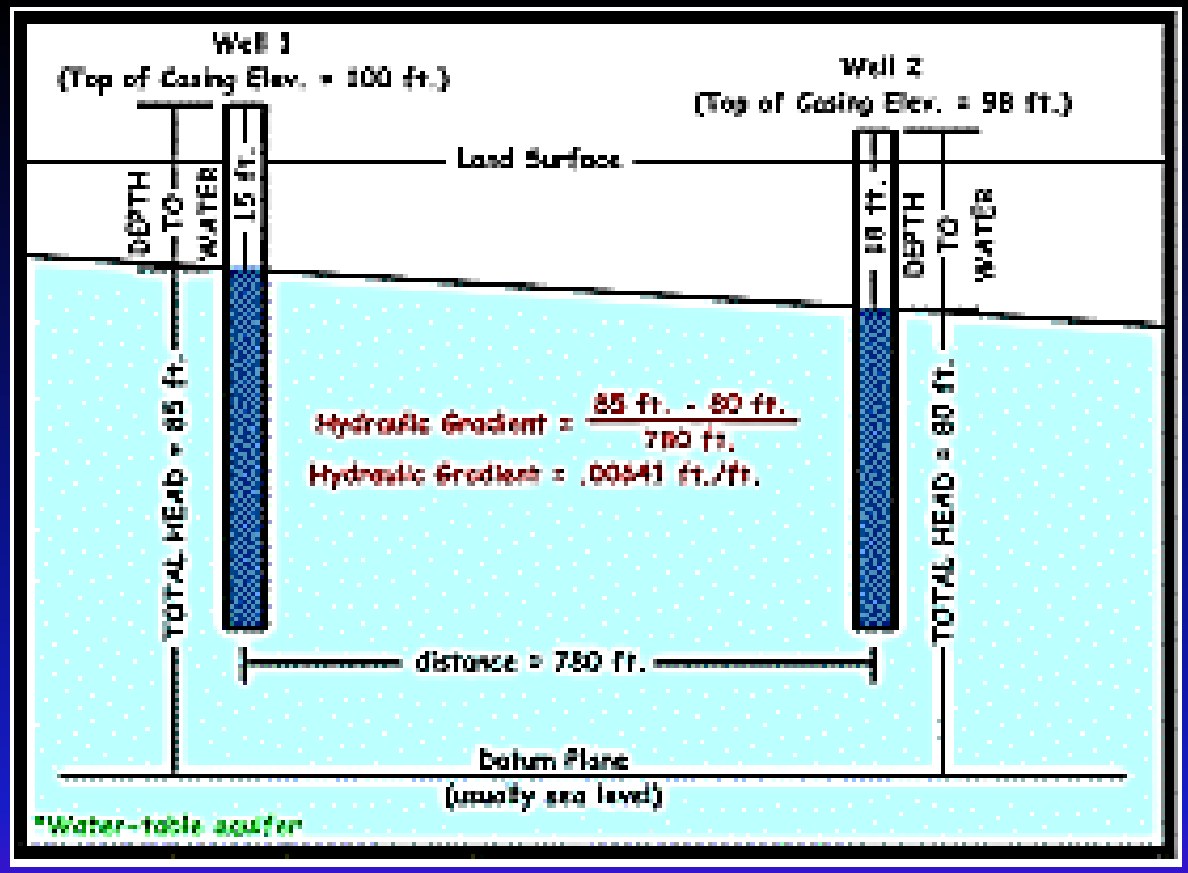
Sum: Event (Rainfall) SUTUWCD DCW RMS #30 3rd Qtr. 2012
3.12" total



TWDB satellite linked monitor well – Sutton County

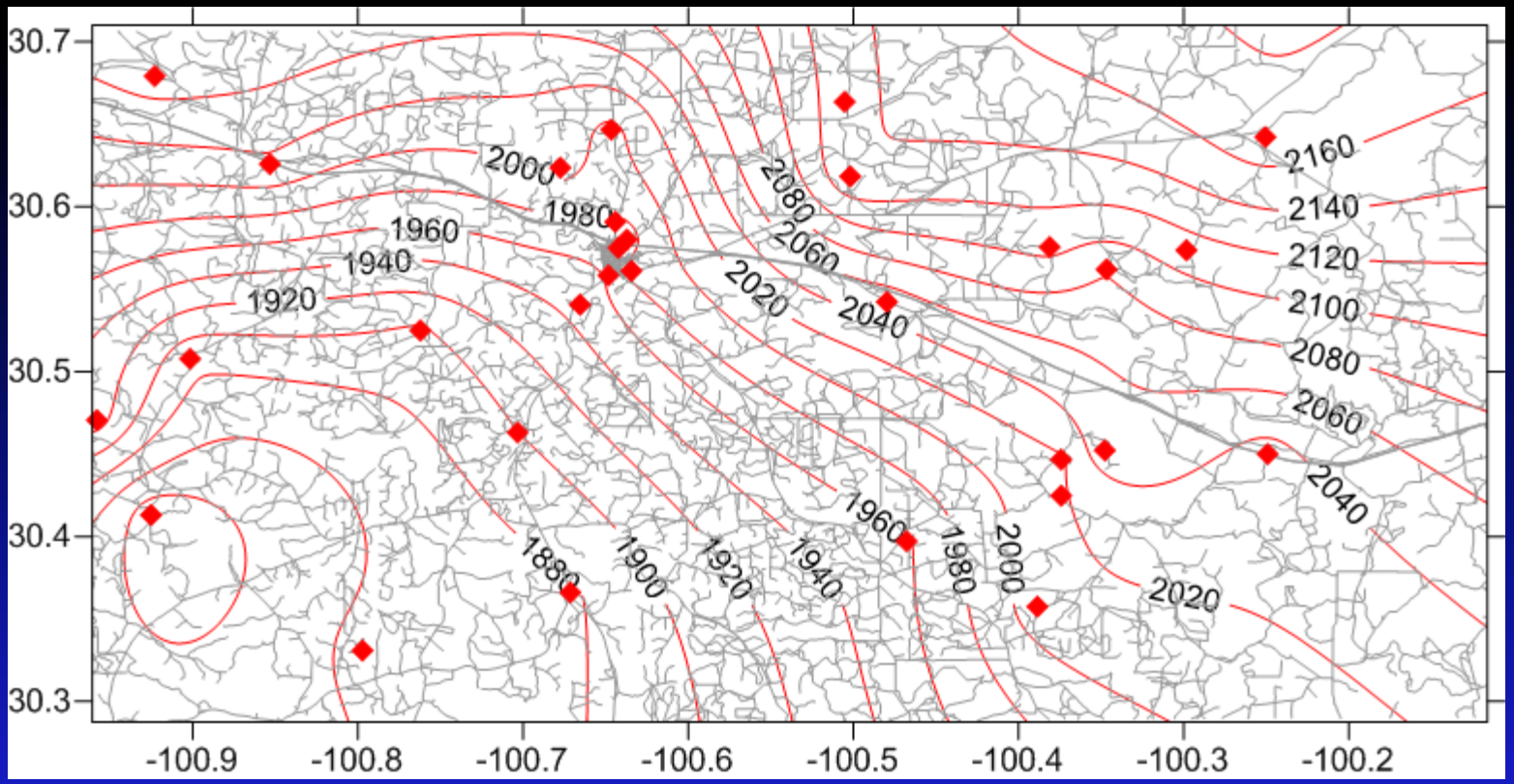


Water level monitoring wells

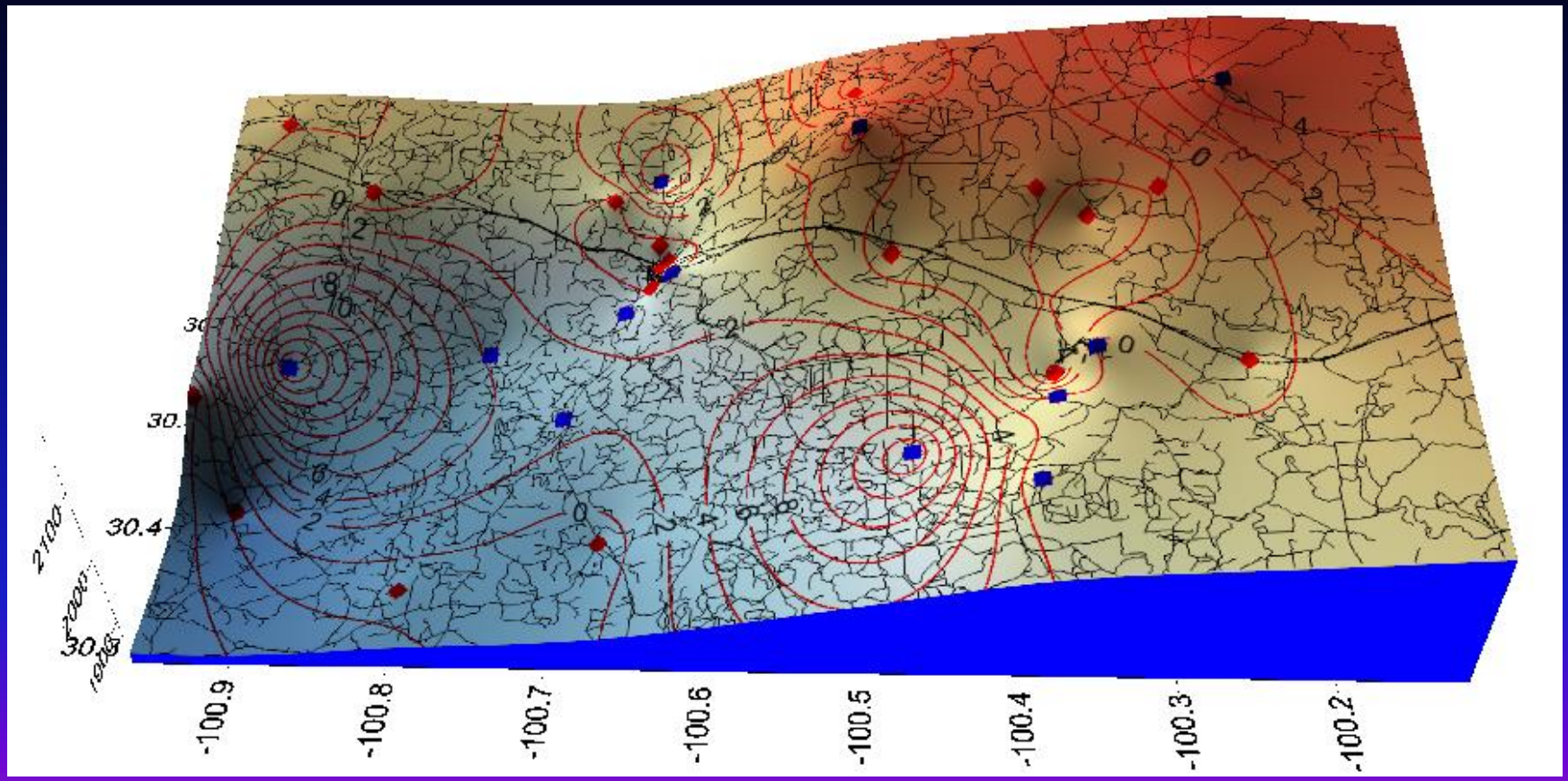


Potentiometric surface map (aquifer contour)

map of Sutton County

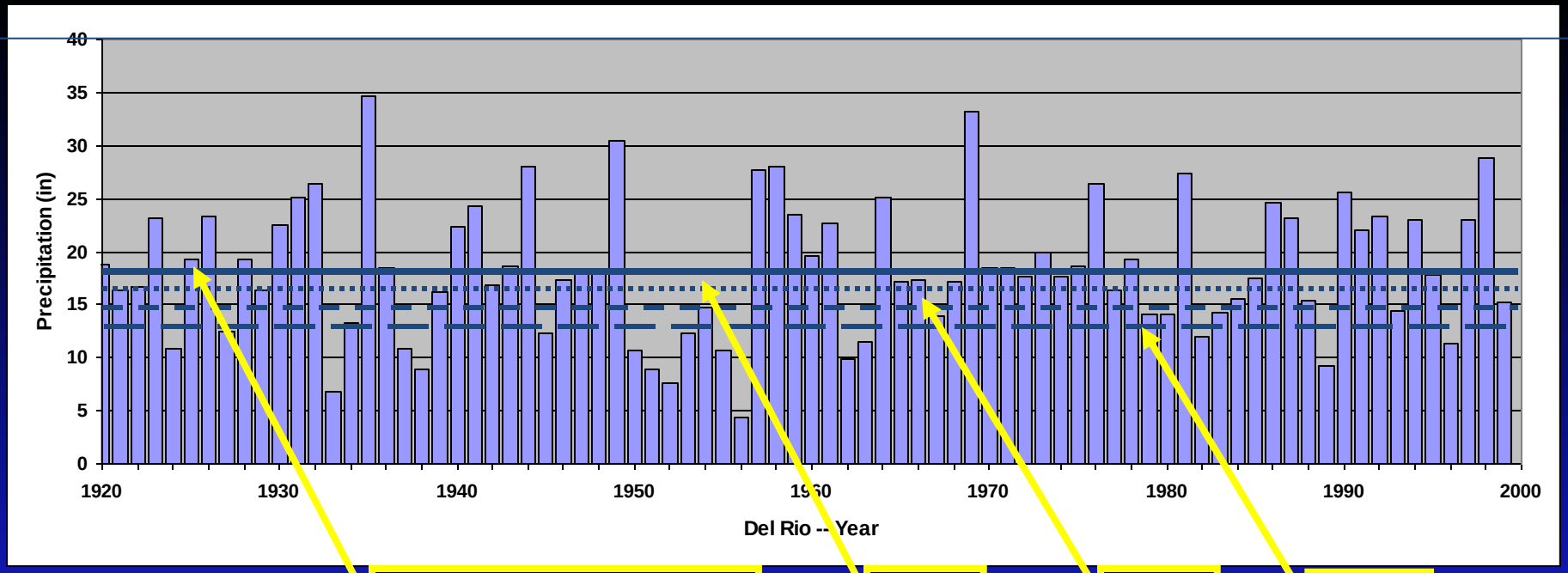


Example of three dimensional potentiometric map

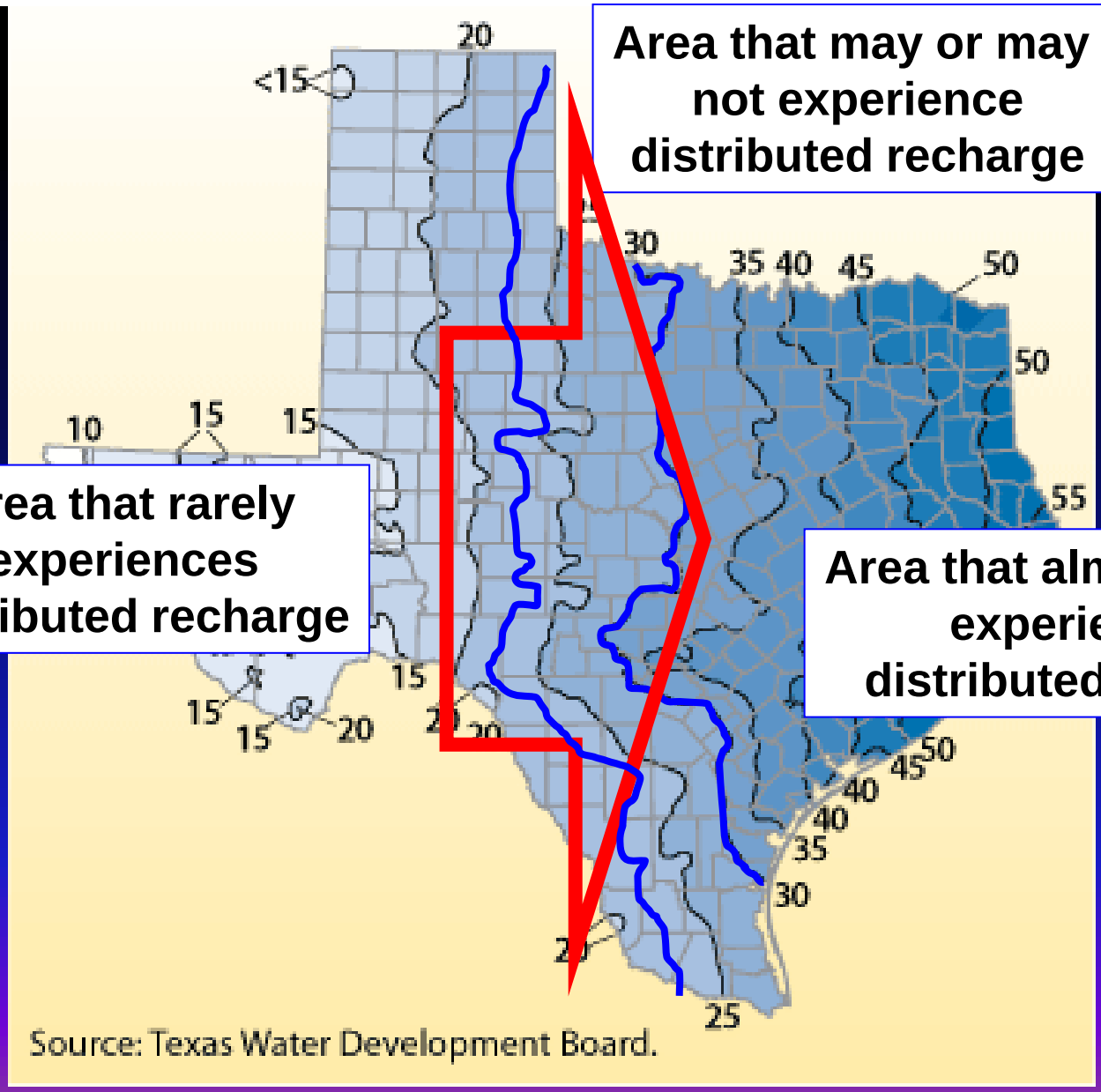


Rainfall/Drought Conditions

High variability in average annual precipitation
Del Rio, Texas (inch/year) (1920 to 2000)



Climate Change that Causes Less Precipitation in Texas Will Shift these Zones to the East



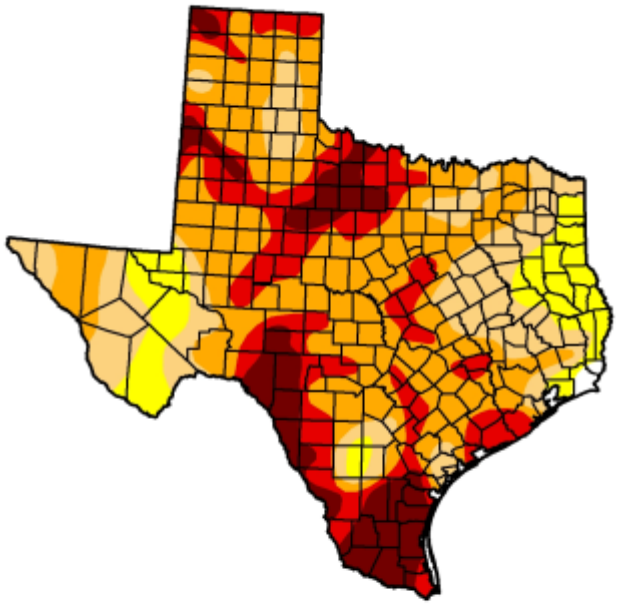
U.S. Drought Monitor

April 9, 2013
Valid 7 a.m. EST

Texas

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.44	99.56	89.44	69.35	29.91	11.56
Last Week (04/02/2013 map)	1.40	98.60	88.21	65.44	32.95	11.81
3 Months Ago (01/08/2013 map)	4.29	95.71	83.78	65.85	34.79	11.41
Start of Calendar Year (01/01/2013 map)	3.04	96.96	87.00	65.39	35.03	11.96
Start of Water Year (09/25/2012 map)	9.13	90.87	78.73	57.41	24.91	5.18
One Year Ago (04/03/2012 map)	16.55	83.45	65.39	53.08	34.81	14.05



Intensity:

- D0 Abnormally Dry
- D1 Drought - Moderate
- D2 Drought - Severe
- D3 Drought - Extreme
- D4 Drought - Exceptional

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

http://droughtmonitor.unl.edu

Released Thursday, April 11, 2013
David Miskus, NOAA/NWS/NCEP/Climate Prediction Center

Rain Harvesting

Plan for rain harvest project

- Use 1/2 of the Civic Center roof area –7350 ft^2 square feet
- Utilize East side of building and four gutters
- Direct rain water to four 3,000 gallon poly-tanks
- Rain water to be used for irrigation of the park area; could also be used to water livestock during the annual rodeo

Sutton County Civic Center

East wall of Civic Center

- Collection system has to convey 4410 gallons of water from a 1” rain
- System has to be strong enough to convey collected water yet light enough to not overstress wall, a total distance 140’
- Four inch PVC pipe fit this requirement
- A 4” , 20’ length of PVC pipe will hold 13 gallons of water and weigh 104lbs when full.
- A series of double metal straps cradle the pipe distributing the weight so each pair of straps supports 6 lbs.

Pipe system along wall

Transfer System

- Water collected in the 4” pipe is directed to a 6” pipe that conveys the water from the Civic center to the four 3,000 gallon tanks
- Schedule 40 PVC pipe is used throughout the system
- The 6” pipe traverses to the poly tanks beneath the parking lot a distance of 120’

6” Pipe Transfer System

Tank Distribution System

- The transfer system is divided into four branches, each branch connected to one 3,000 gallon tank
- Three inch and two inch pipe is used in this part of the system

Branch lines to tanks

3,000 gallon poly tanks

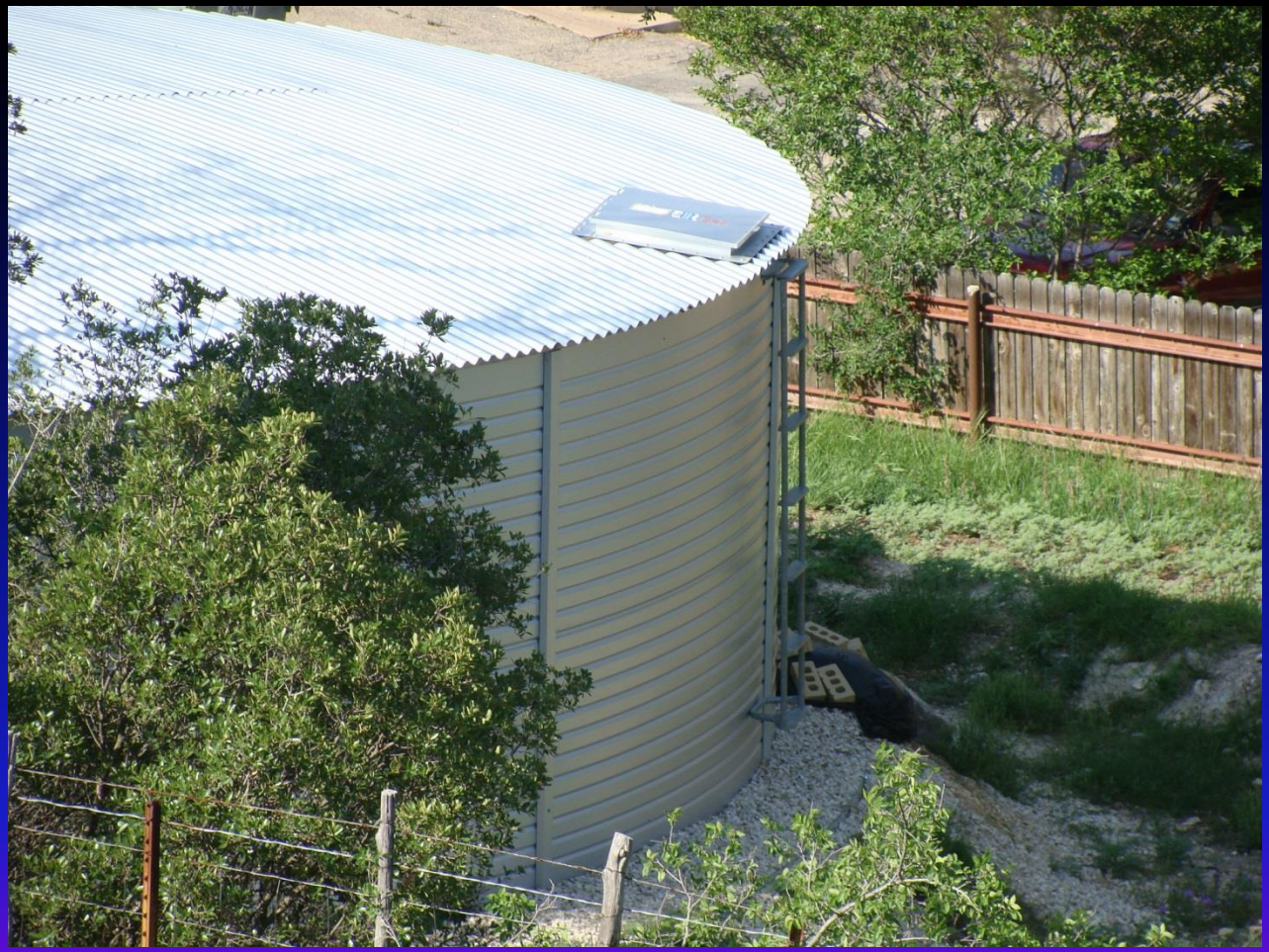
- Each tank has three ports, two at the bottom for in-flow and out flow, and one at the top for overflow
- Note: it takes less energy to fill a tank from the bottom than to fill from the top. When filling a tank at the top it is like filling a full tank

Outflow and overflow pipe system

Presbyterian Church – Sonora, TX

Roof collection area – 6,464 ft^2
3,878 gallons from a 1” rain

30,000 gallon storage tank



Gutter Collection System

1st Stage collection tank/pump

Input port and water level gauge – 16,000 gal.

Examples of rain harvest systems


Down Spouts

Sand Pad and Cement for Pump House
Poly Tanks Painted With Latex Paint

Be Creative…???!!!!!


The End