
Sutton County
Underground Water
Conservation District

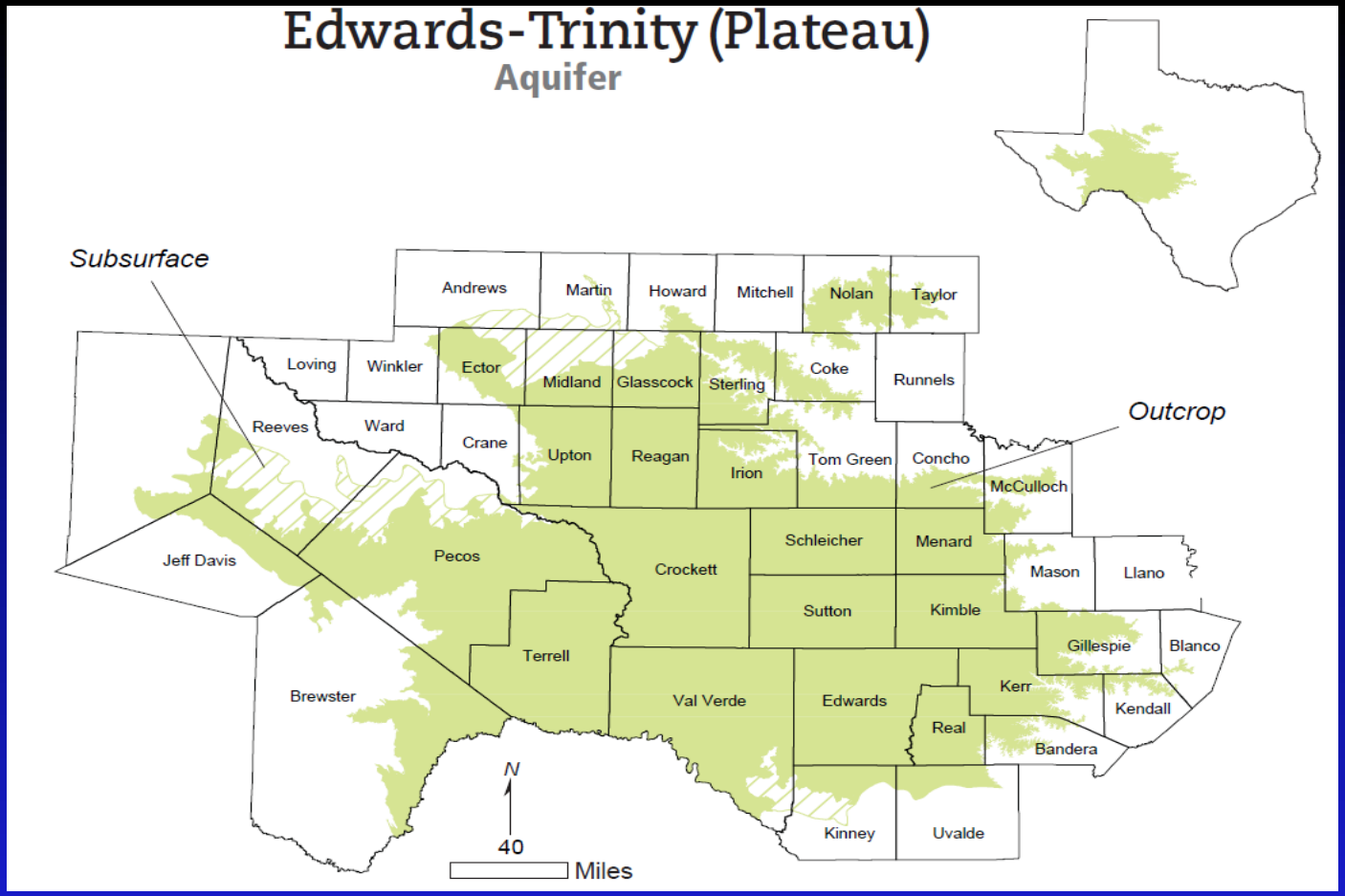
Sutton County Basic Hydrogeology

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

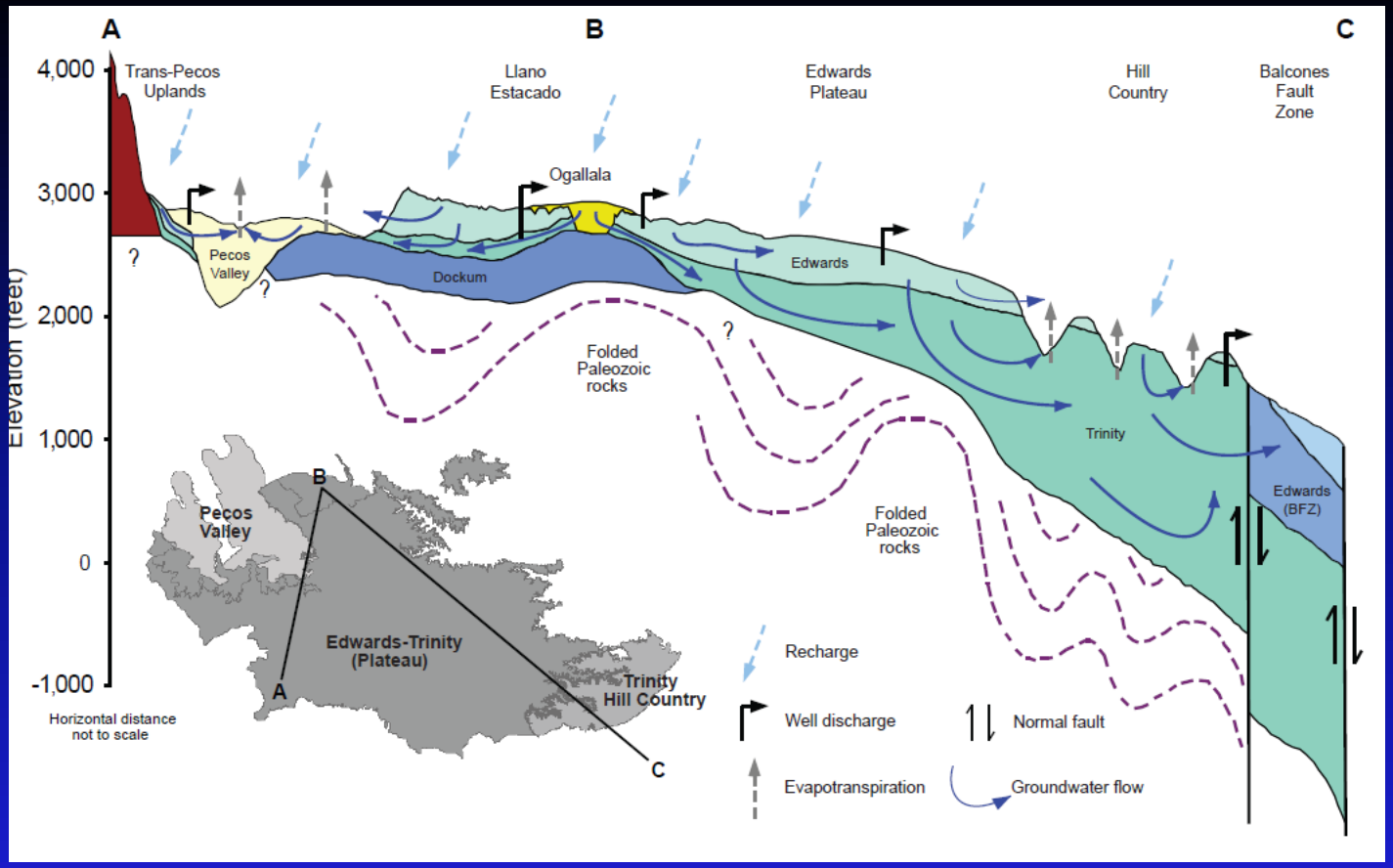
Aquifer Characteristics

Edwards-Trinity (Plateau)

Aquifer


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
Terrell
Gillespie
Blanco
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

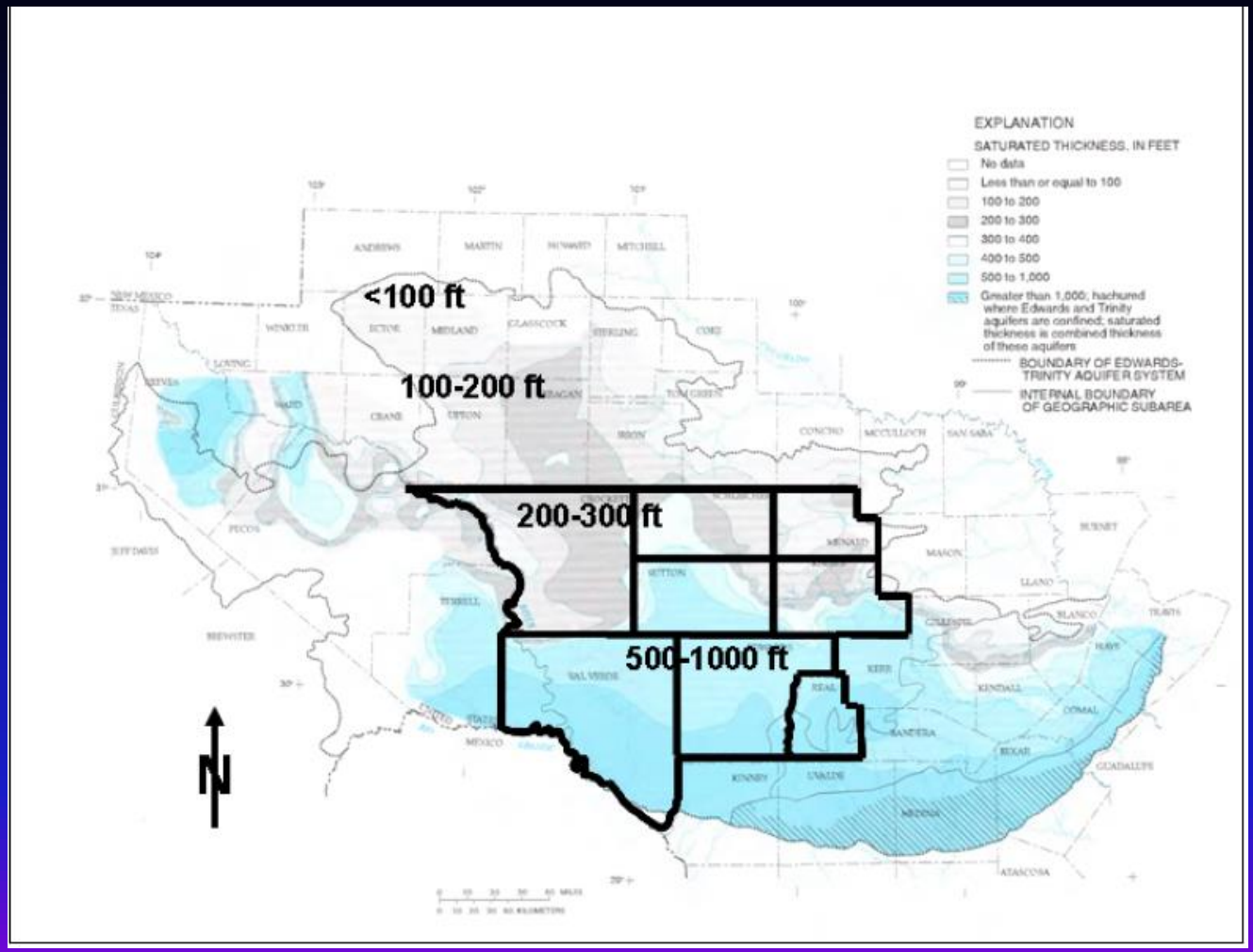
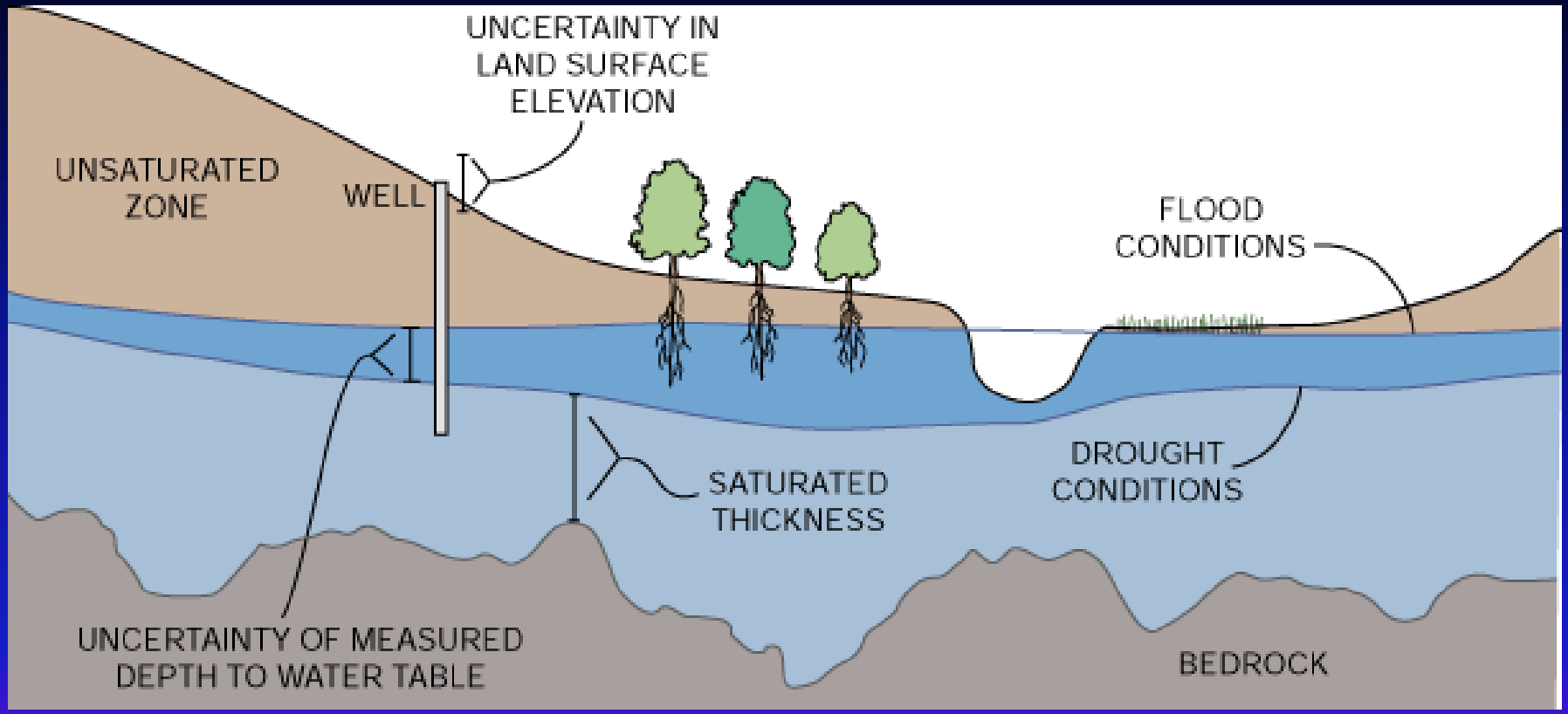
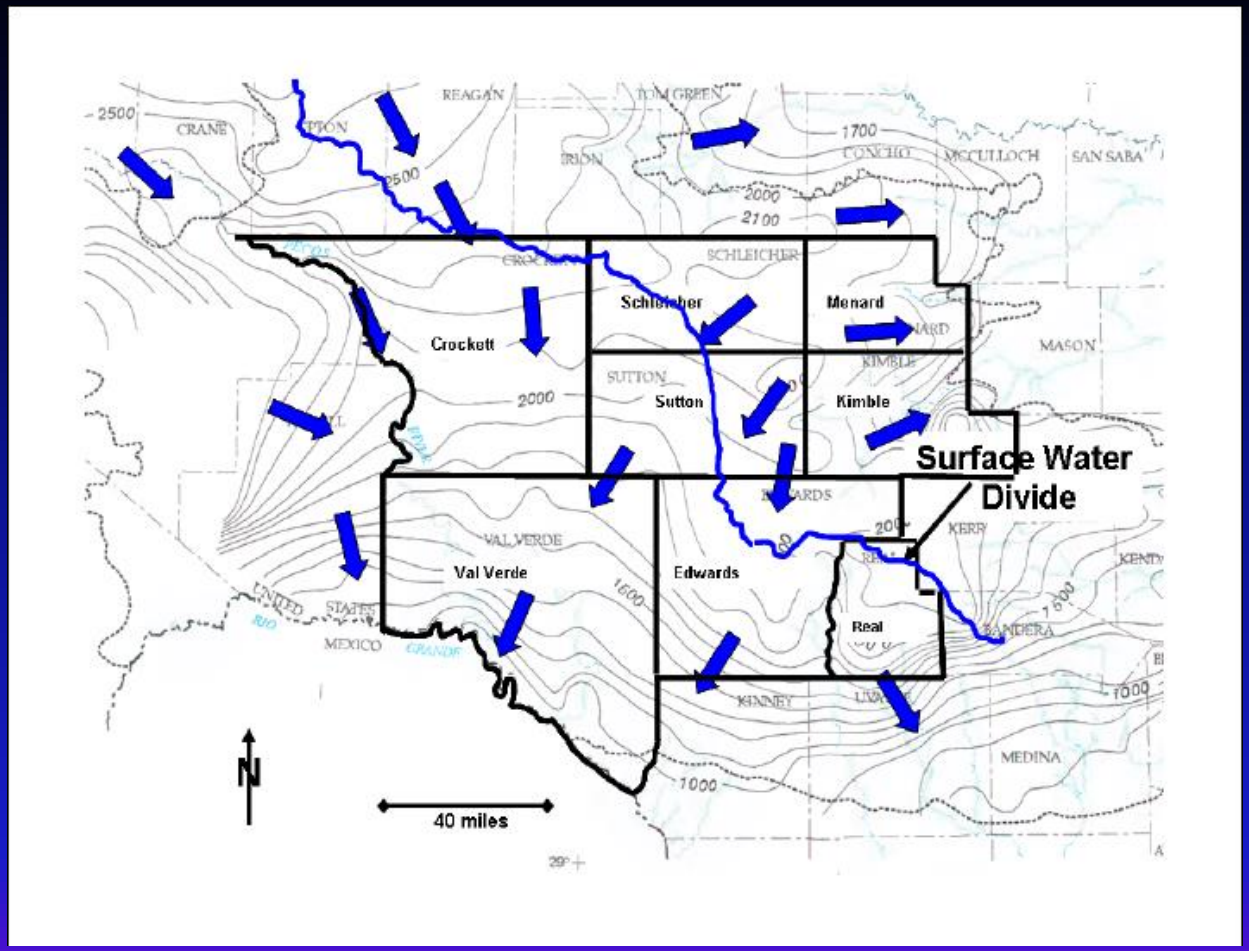


Illustration of saturated thickness



Flow Paths Through the Edwards-Trinity Aquifer



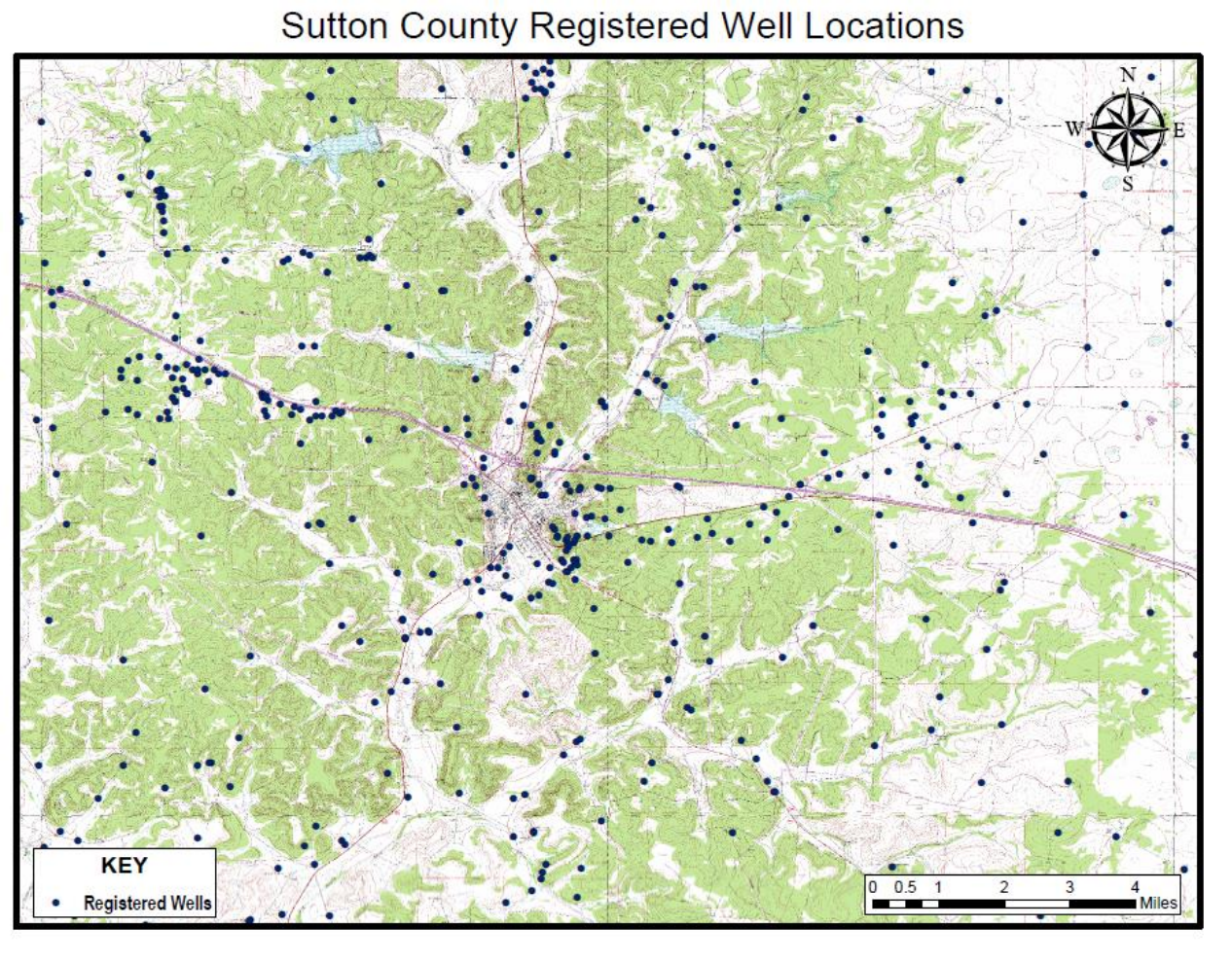
Sutton County UWCD

Job #1

Manage the water resources of the District.

How we do it.

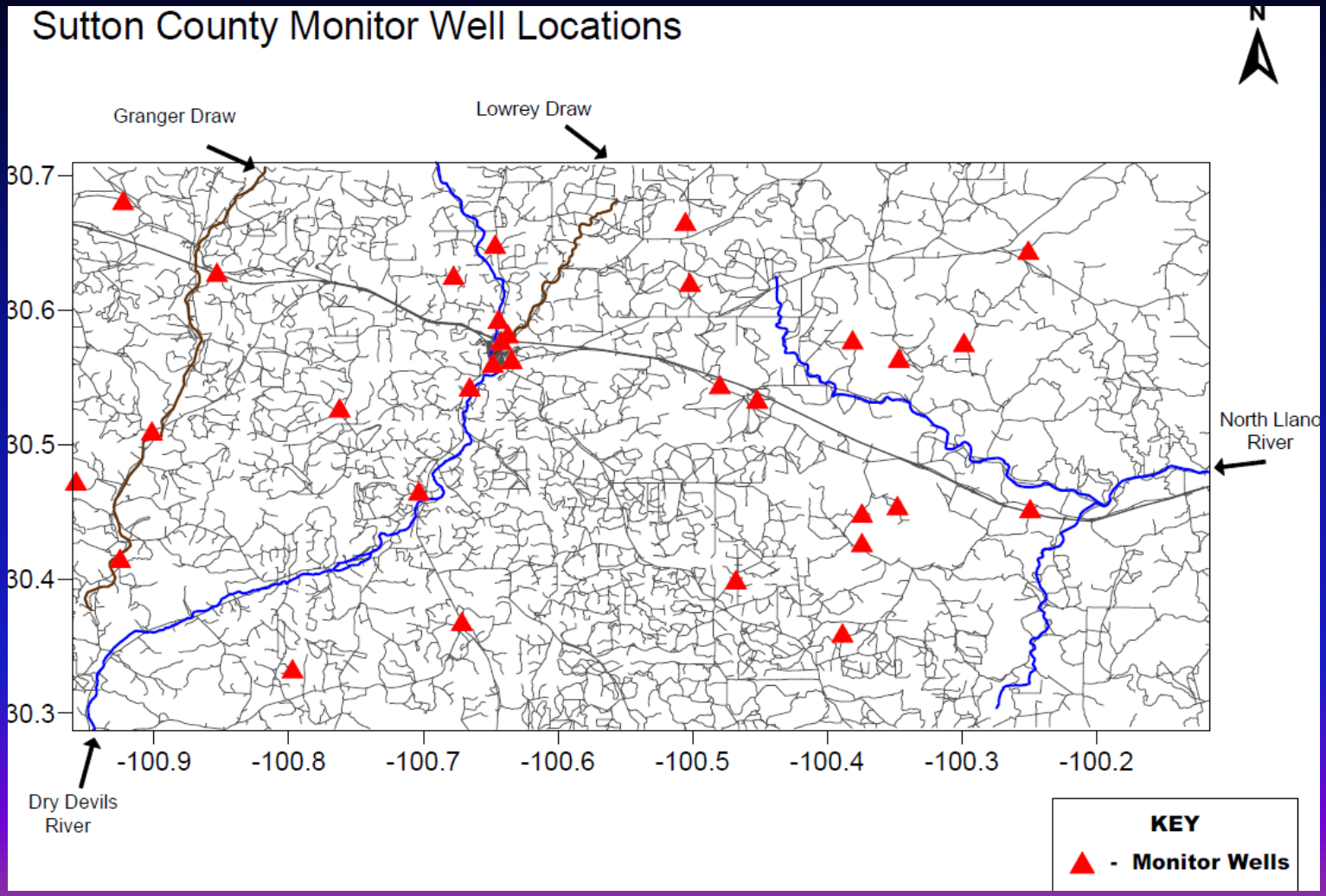
Sutton County UWCD Registered Wells



Instrumentation and Data collected by the District

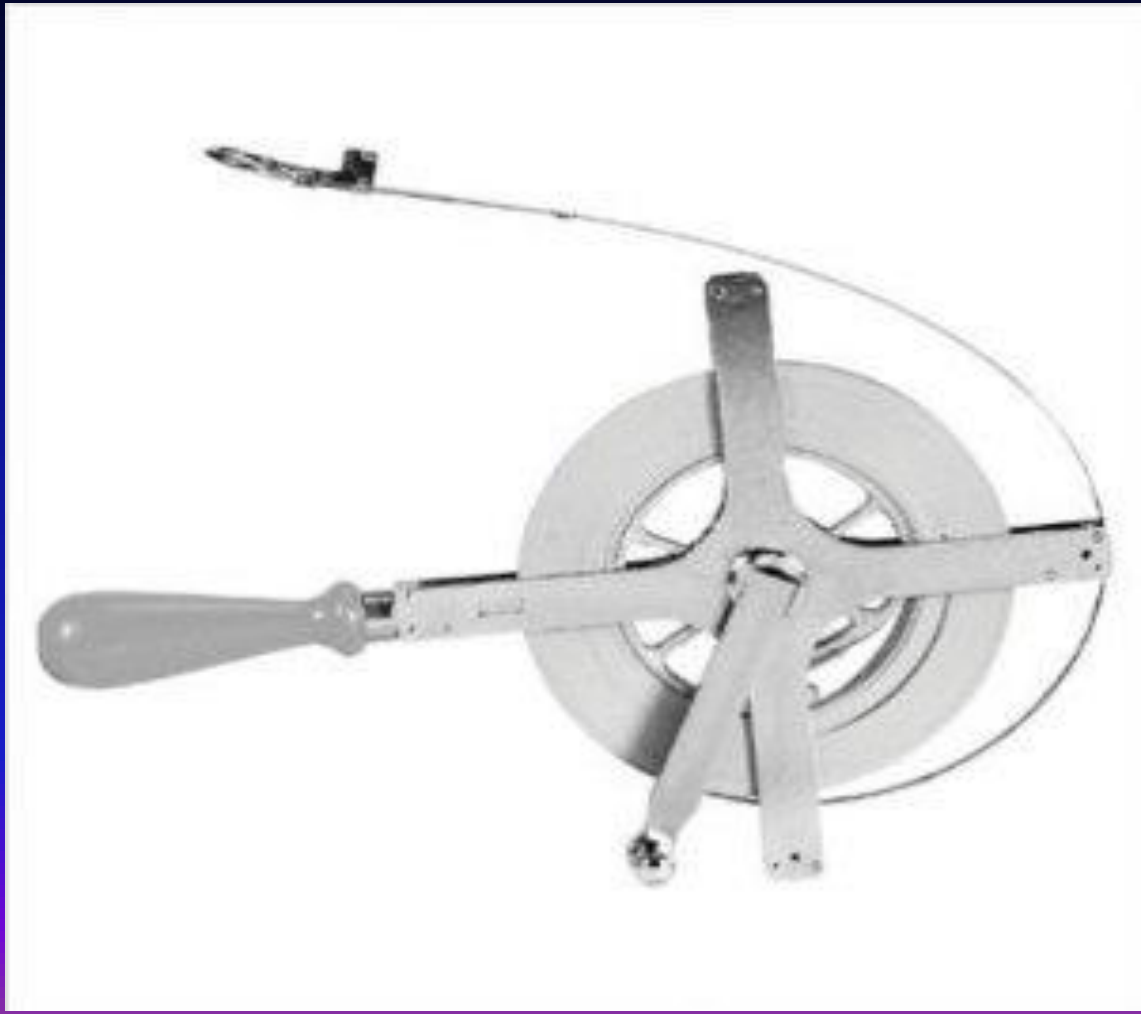
- Water Levels - 31 Wells strategically located throughout the District
  - 16 wells with automated sensors
  - 14 wells measured with a steel tape
  - 1 well measured with an electric (E) line
- Rain Gauges – 41 throughout the District
  - 31 automated rain gauges throughout the county
  - 10 graduated 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

Location of Water Level Monitor Wells



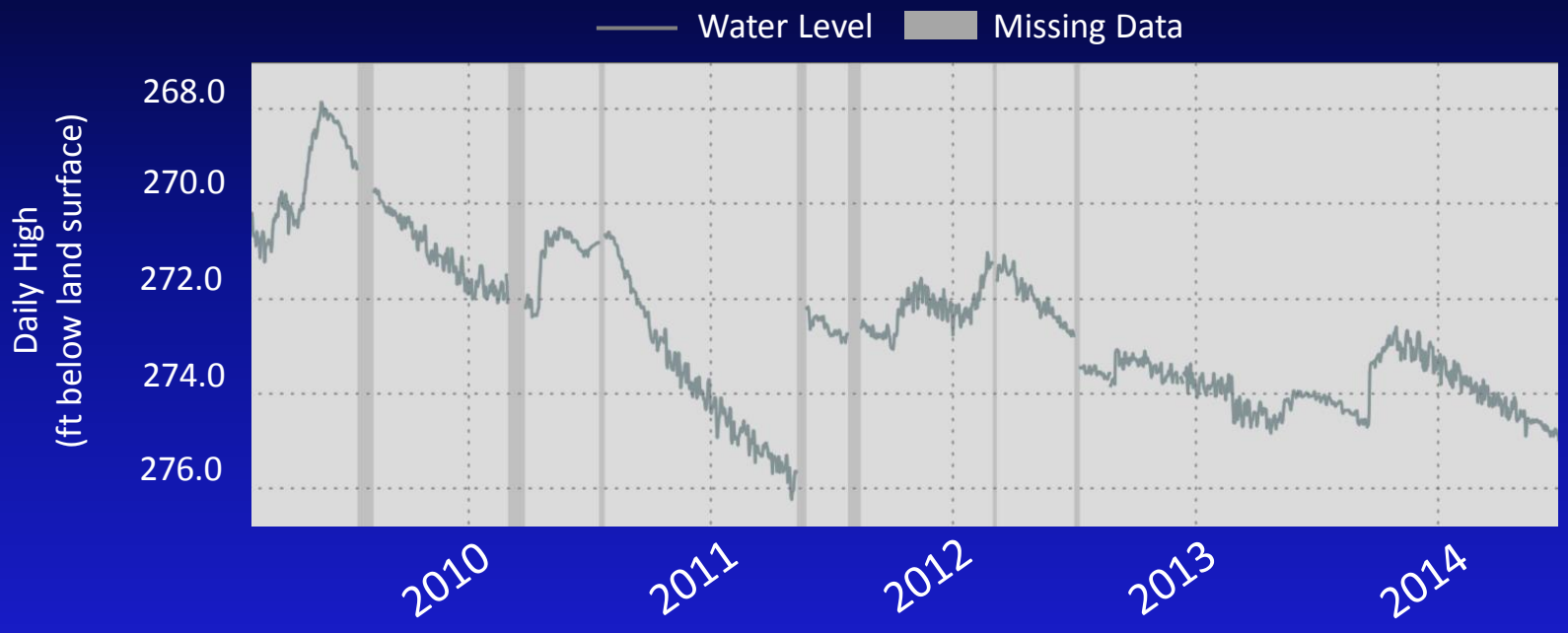
Water Level Sensor

Steel Water Level Tape

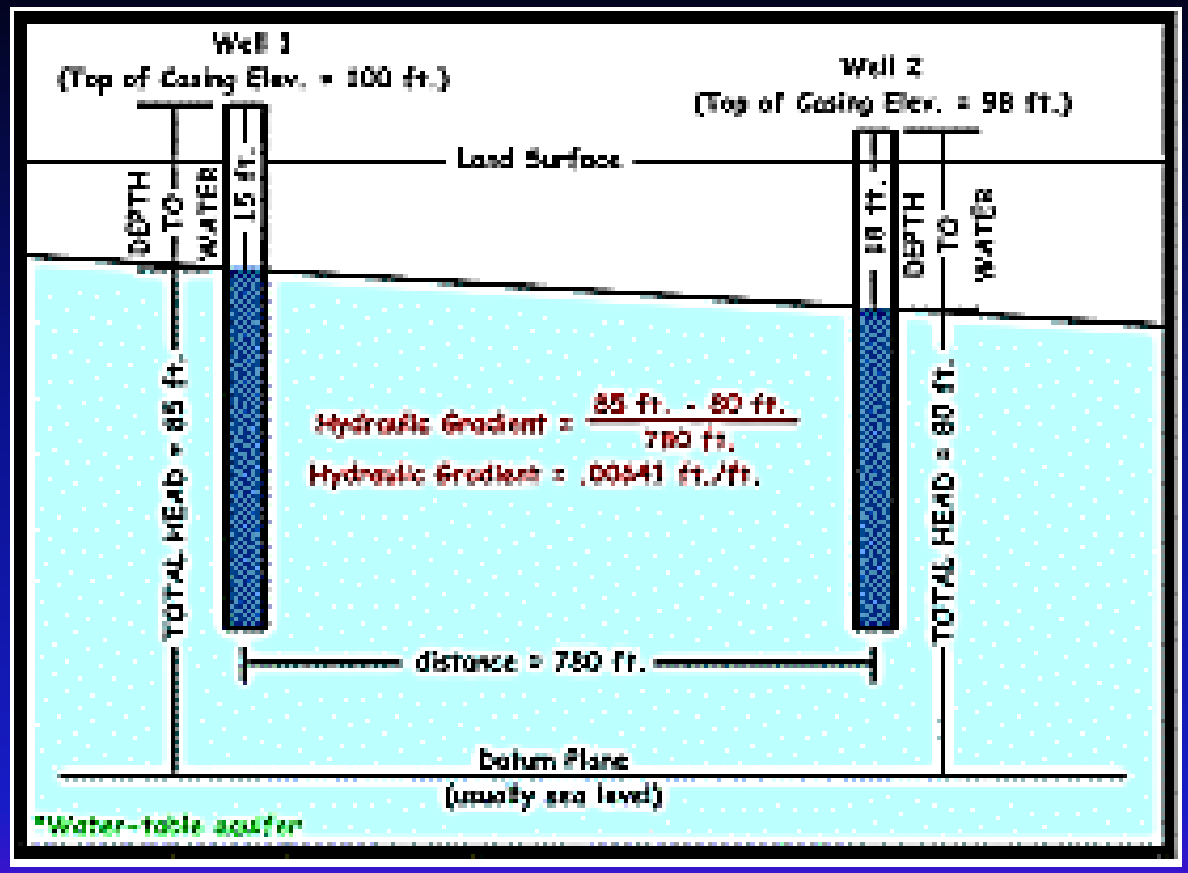


TWDB Satellite Linked Monitor Well – Sutton County

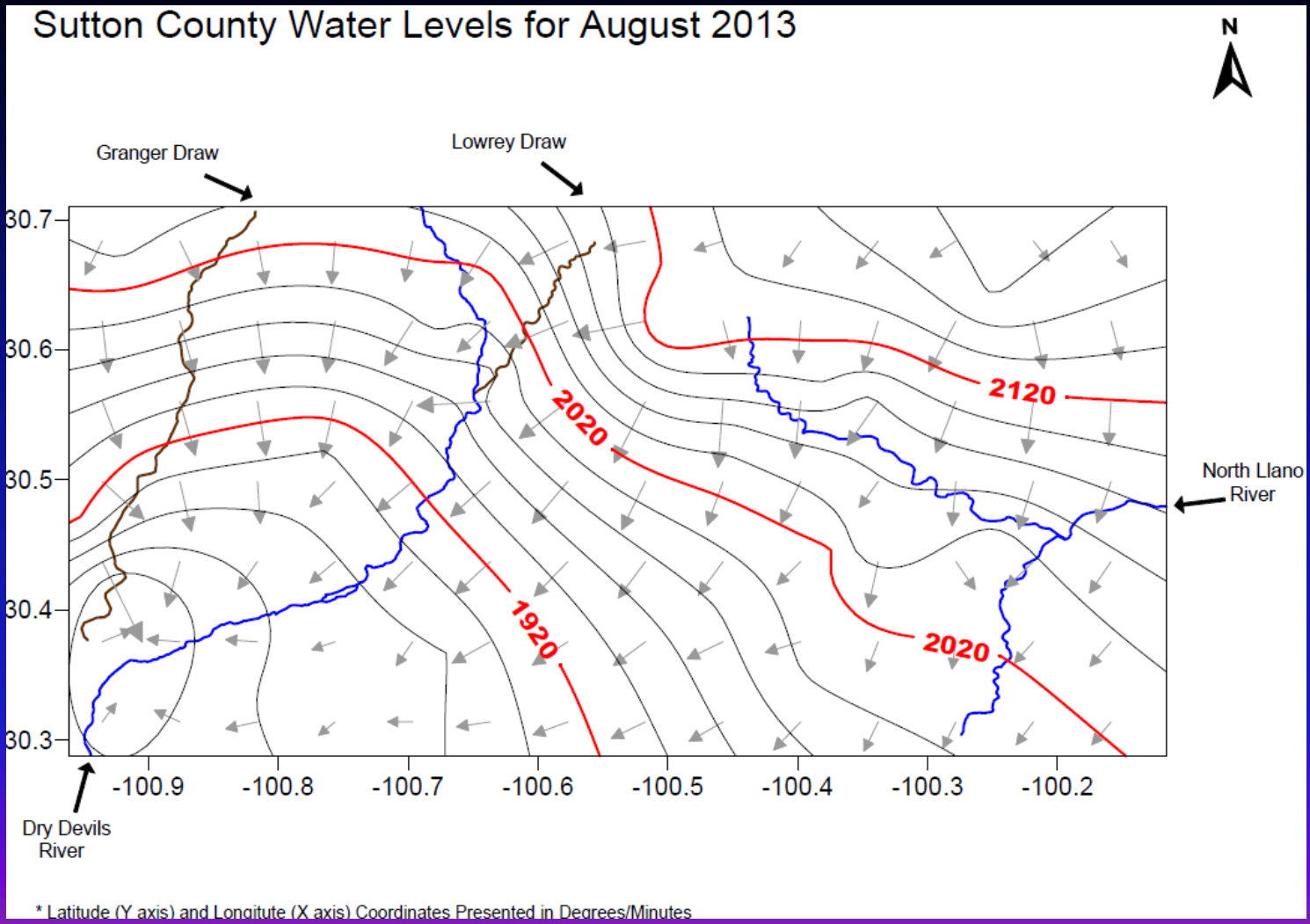
TWDB Satellite Linked Monitor Well Data
Sutton County



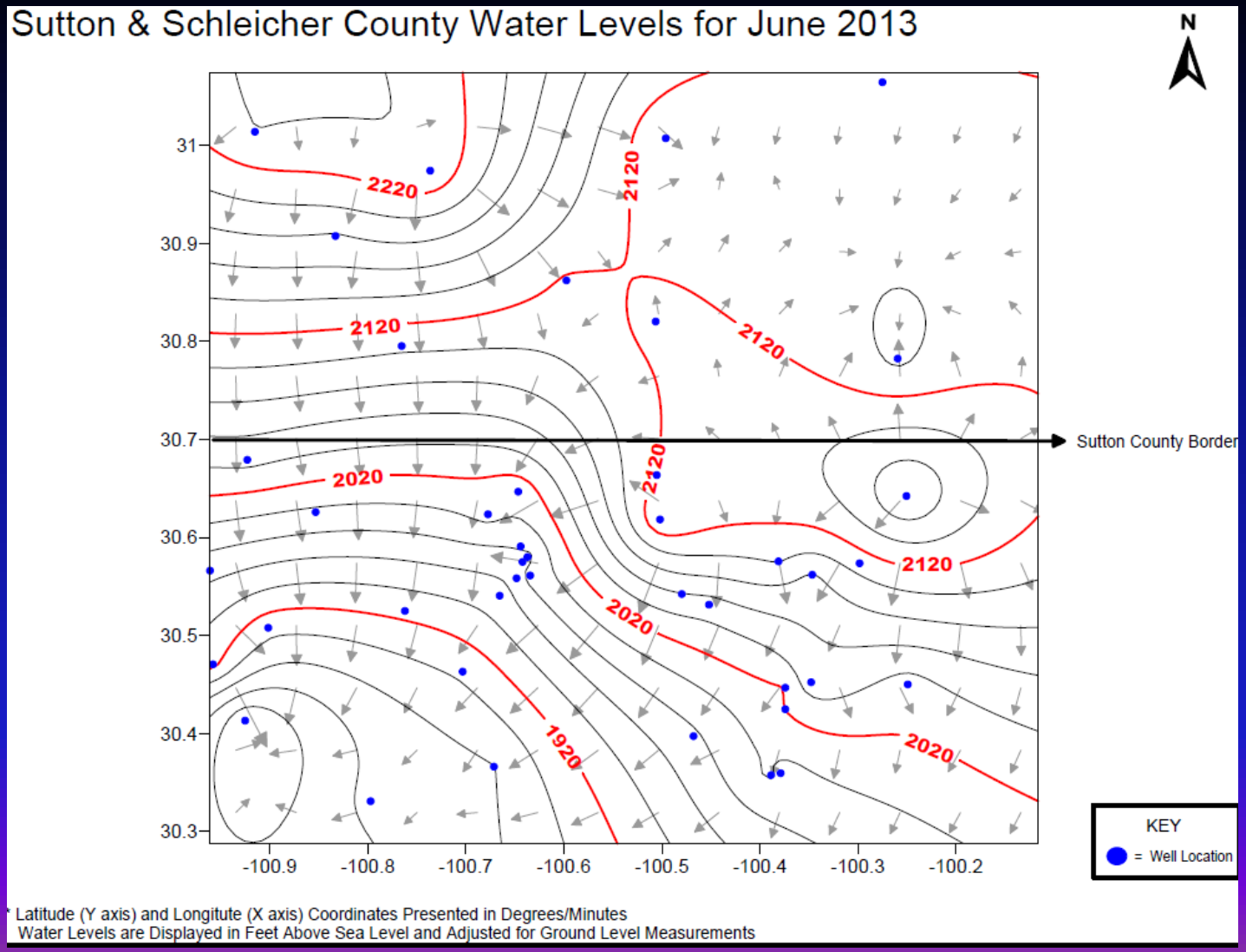
Water level monitoring wells



Water Level Data – Flow Vectors



Sutton/Schleicher Counties - Flow Vectors

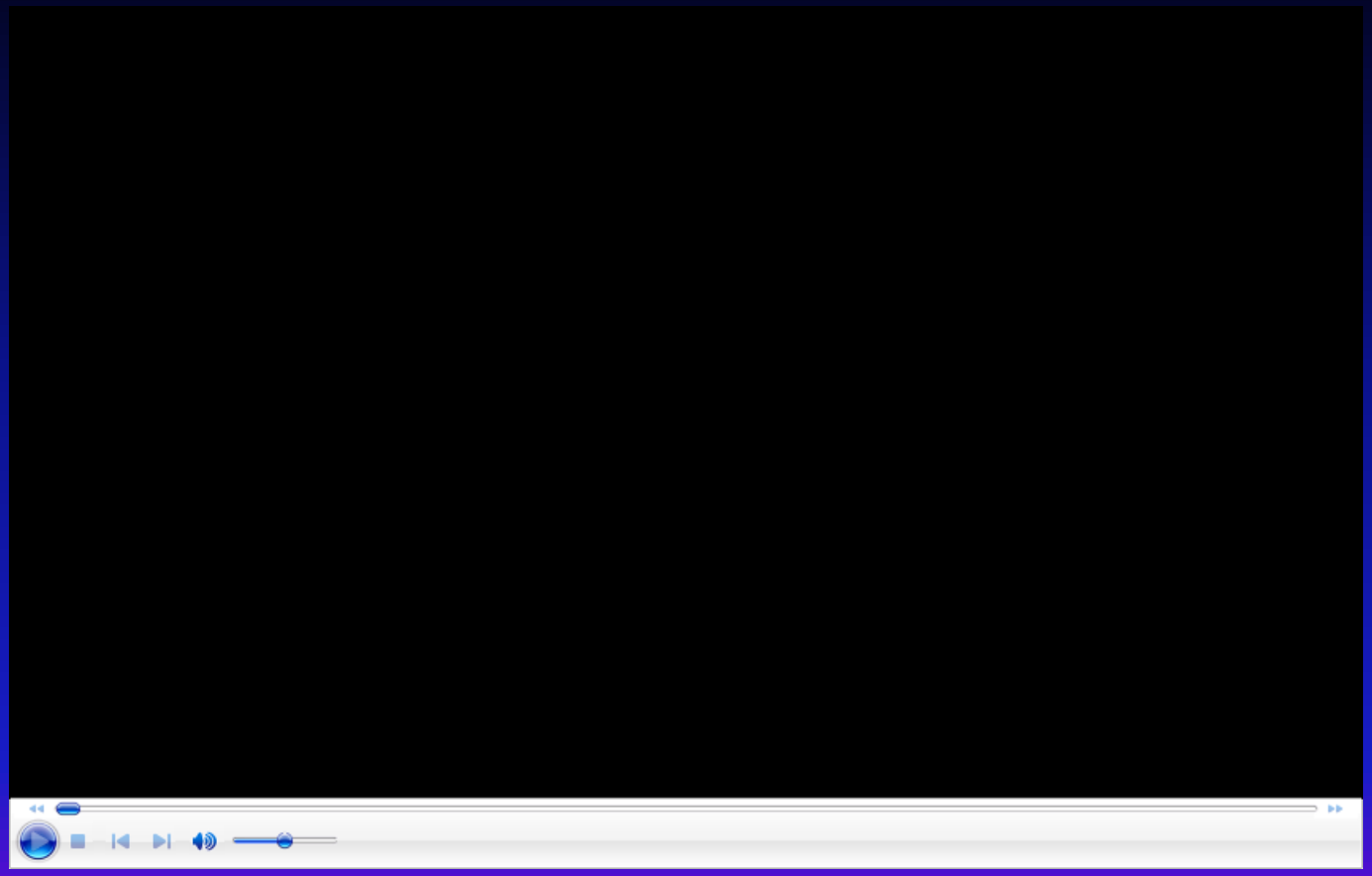


Stratigraphy

- Borehole camera system

Video Camera System

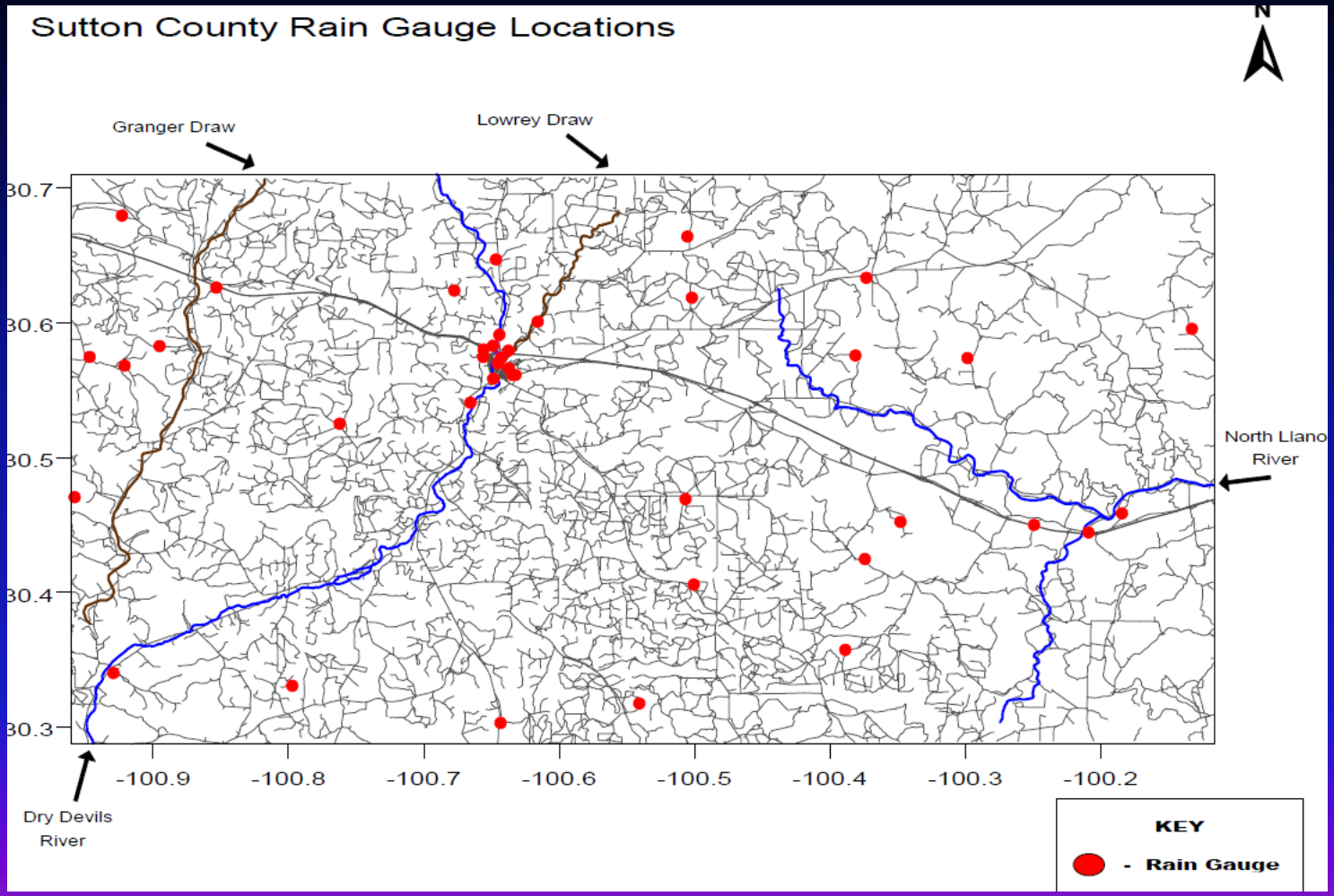
View from borehole camera of a newly drilled well



Rain Measurement

Automatic Rain Gauge

Location of Rain Gauges



In-Town Rain Gauge

Water Quality Analyses

Water Sample Analysis Lab

Dye Test Analysis Lab

Water analysis of well for landowner

- Lab equipped for limited water analysis
- Selected elements commonly found in local water samples
  - Chlorides
  - Iron
  - Nitrates
  - Sulfates
  - Fluorides [Limited to families w/ small children]

Water analysis of well for landowner (continued)

- Water Characteristics
  - Alkalinity
  - Hardness
  - pH
  - Specific Conductivity/Total Dissolved Solids (TDS)
- Test for e-Coli bacteria/Total Coliforms

Cycle Wells Water Analyses

- 60 wells are sampled over a three-year period
- A set of twenty wells are tested each year
- Trace Elements
- Anions
- Volatile organic compounds

Cycle Wells –Water Analyses

Trace Elements	Anions
Boron	Chloride
Calcium	Fluoride
Strontium	Sulfate
Iron	Bromide
Magnesium	Phosphorus
Potassium	
Sodium	Alkalinity
Aluminum	
Antimony	Nitrate/Nitrite
Arsenic	
Barium	Silica
Beryllium	
Cadmium	Mercury
Cobalt	
Copper	
Lithium	
Lead	
Manganese	
Molybdenum	
Selenium	
Silver	
Thallium	
Uranium	
Vanadium	
Zinc	

Volatile Organic Compounds

Volatile Organic Compounds		
Dichlorofluoromethane	Dibromomethane	4-Isopropyltoluene
Chloromethane	Bromodichloromethane	1,4-Dichlorobenzene
Vinyl Chloride	cis-1,3-Dichloropropene	n-Butylbenzene
Bromomethane	4-Methyl-2-pentanone	1,2-Dichlorobenzene
Chloromethane	Toluene	1,2,4-trichlorobenzene
4-Chlorotoluene	trans-1,3-Dichloropropene	Hexachlorobutadine
Trichlorofluoromethane	Ethyl methacrylate	Napththalene
1,1-Dichloroethene	1,1,2-Trichloroethane	1,2,3-Trichloropropane
Acetone	Tetrachloroethene	Xylene (Total)
Methyl iodide	1,3-Dichloropropane	Total Trihalomethanes
Carbon disulfide	1,3-Dichloroethane	1,2-Dichlorobenzene-d4 (S)
Methylene Chloride	2-Hexanone	4-Bromofluorobenzene
trans-1,2-Dichloroethene	Dibromochloromethane	
Acrylonitrile	Chlorobenzene	
tert-Butyl methyl ether (MTBE)	1,1,1,2-Tetrachloroethane	
1,1-Dichloroethane	Ethyl Benzene	
Vinyl acetate	m,p-Xylene	
2,2-Dichloropropane	o-Xylene	
2-Butanone	Styrene	
cis-1,2-Dichloroethene	Bromoform	
Bromochloromethane	Isopropylbenzene (Cumene)	
Tetrahydrofuran	1,1,2,2-Tetrachloroethane	
Chloroform	Bromobenzene	
1,1,1-Trichloroethene	1,2,3-Trichlorobenzene	
1,1-Dichloropropene	n-Propylbenzene	
Carbon Tetrachloride	2-Chlorotoluene	
1,2-Dichloroethane	1,3,5-Trimethylbenzene	
Benzene	tert-Butylbenzene	
Trichloropropane	1,2,4-Trimethylbenzene	
1,2-Dichloropropane	sec-Butylbenzene	
Methyl metharylate	1,3-Dichlorobenzene	

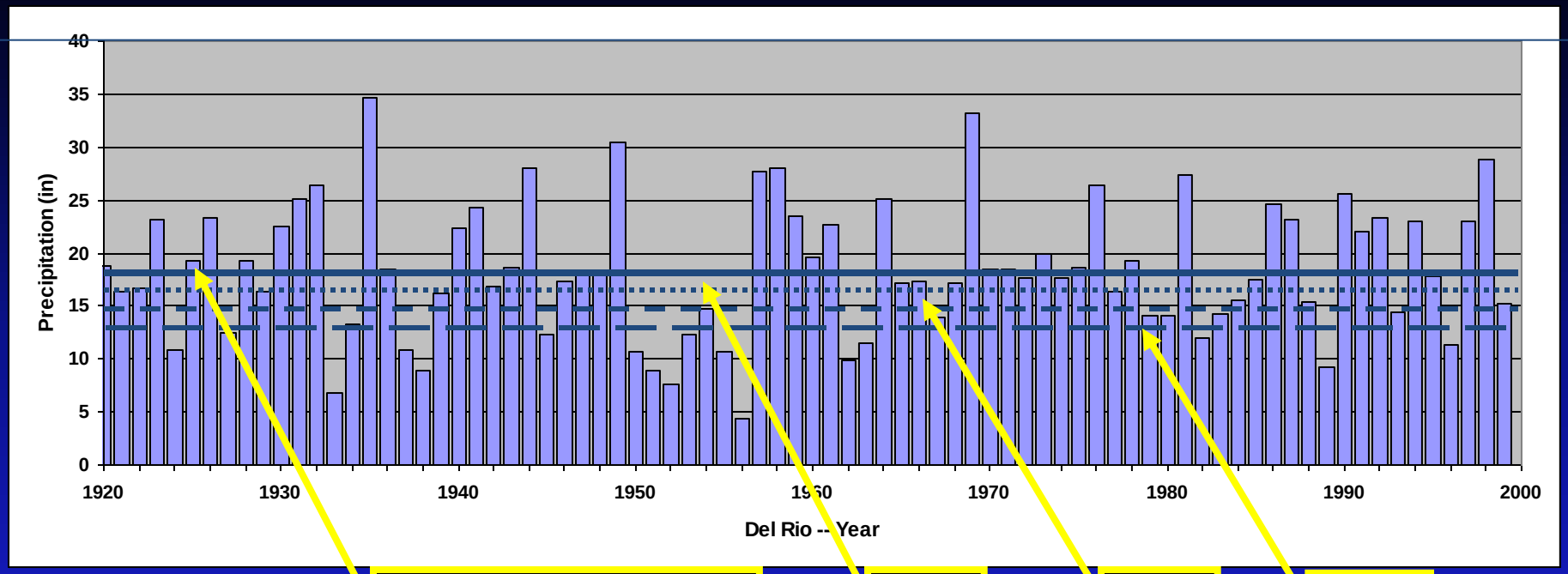
Comments about rainfall

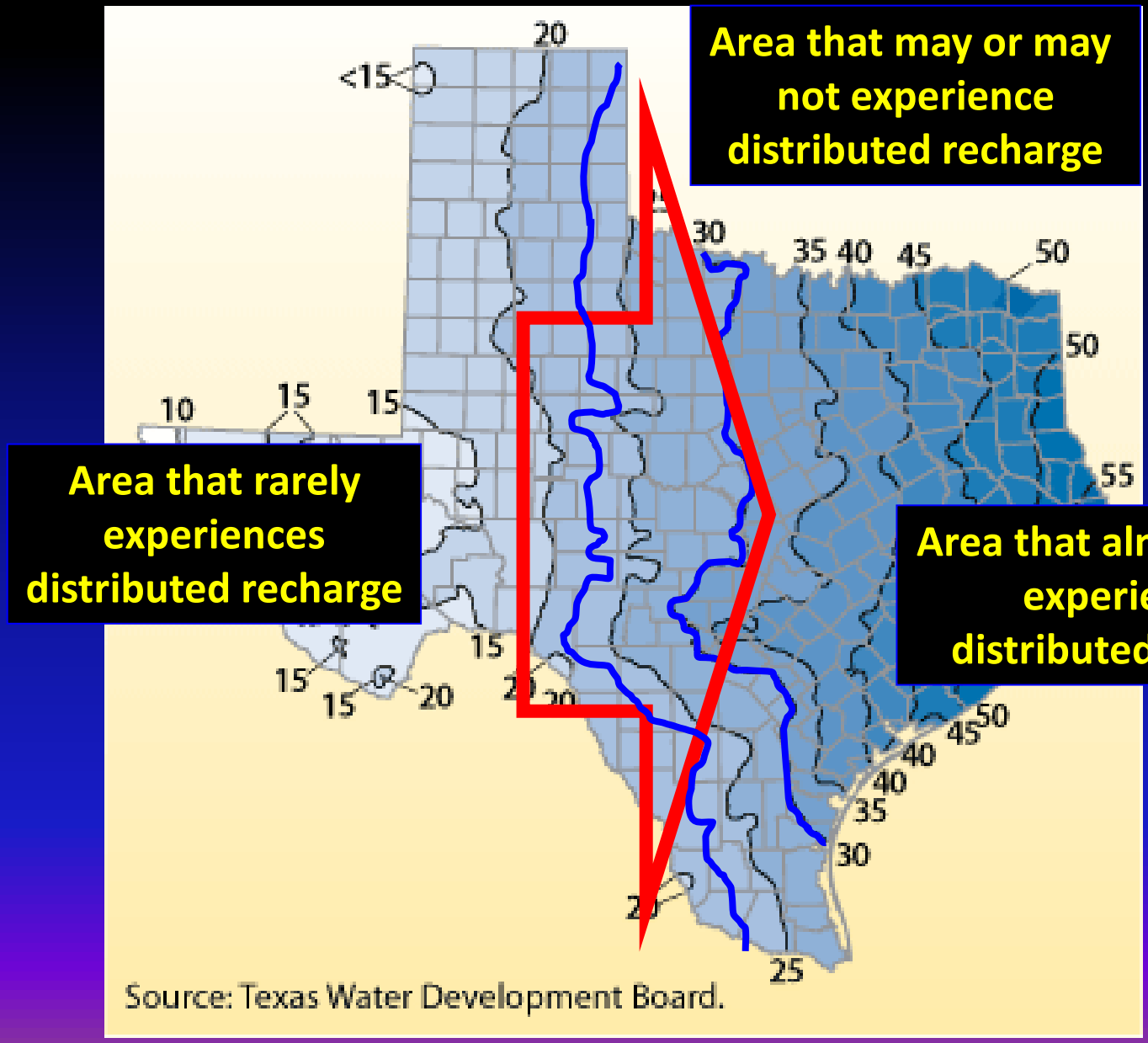
Historical record

Trends

Method of rain enhancement

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

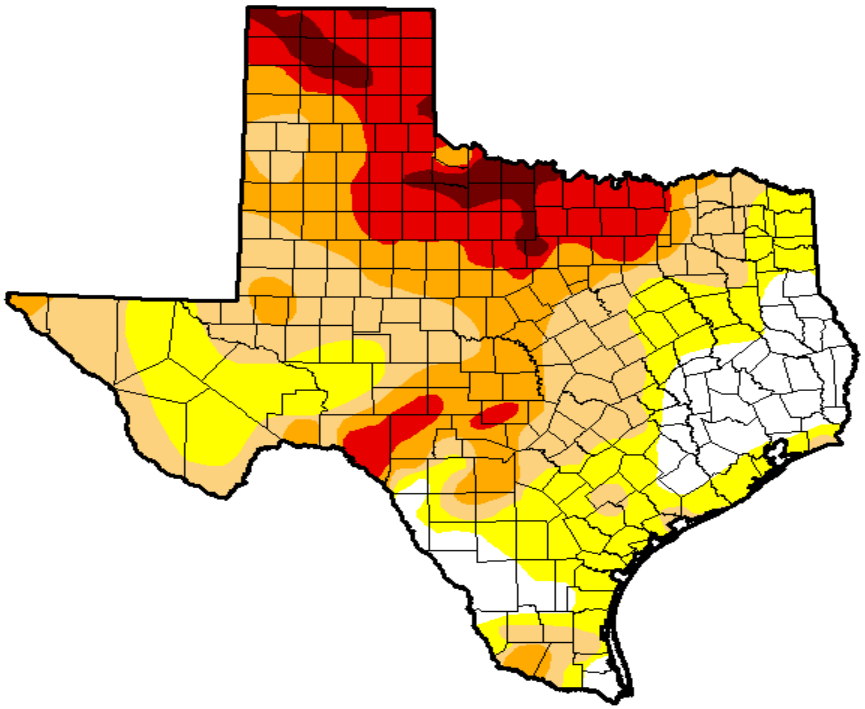



Area that may or may not experience distributed recharge
Area that rarely experiences distributed recharge
Area that almost always experiences distributed recharge
Source: Texas Water Development Board.

Texas Drought – July 15, 2014

U.S. Drought Monitor

Texas



July 15, 2014

(Released Thursday, Jul. 17, 2014)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	12.72	87.28	63.36	36.80	18.36	3.77
Last Week 7/8/2014	12.46	87.54	60.99	36.48	18.36	4.51
3 Months Ago 4/15/2014	17.64	82.36	65.67	44.14	28.98	10.31
Start of Calendar Year 12/31/2013	28.48	71.52	43.84	21.15	5.82	0.79
Start of Water Year 10/1/2013	6.62	93.38	70.95	25.08	4.01	0.12
One Year Ago 7/16/2013	0.30	99.70	94.38	70.99	33.43	12.07

Intensity:

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

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

Author:

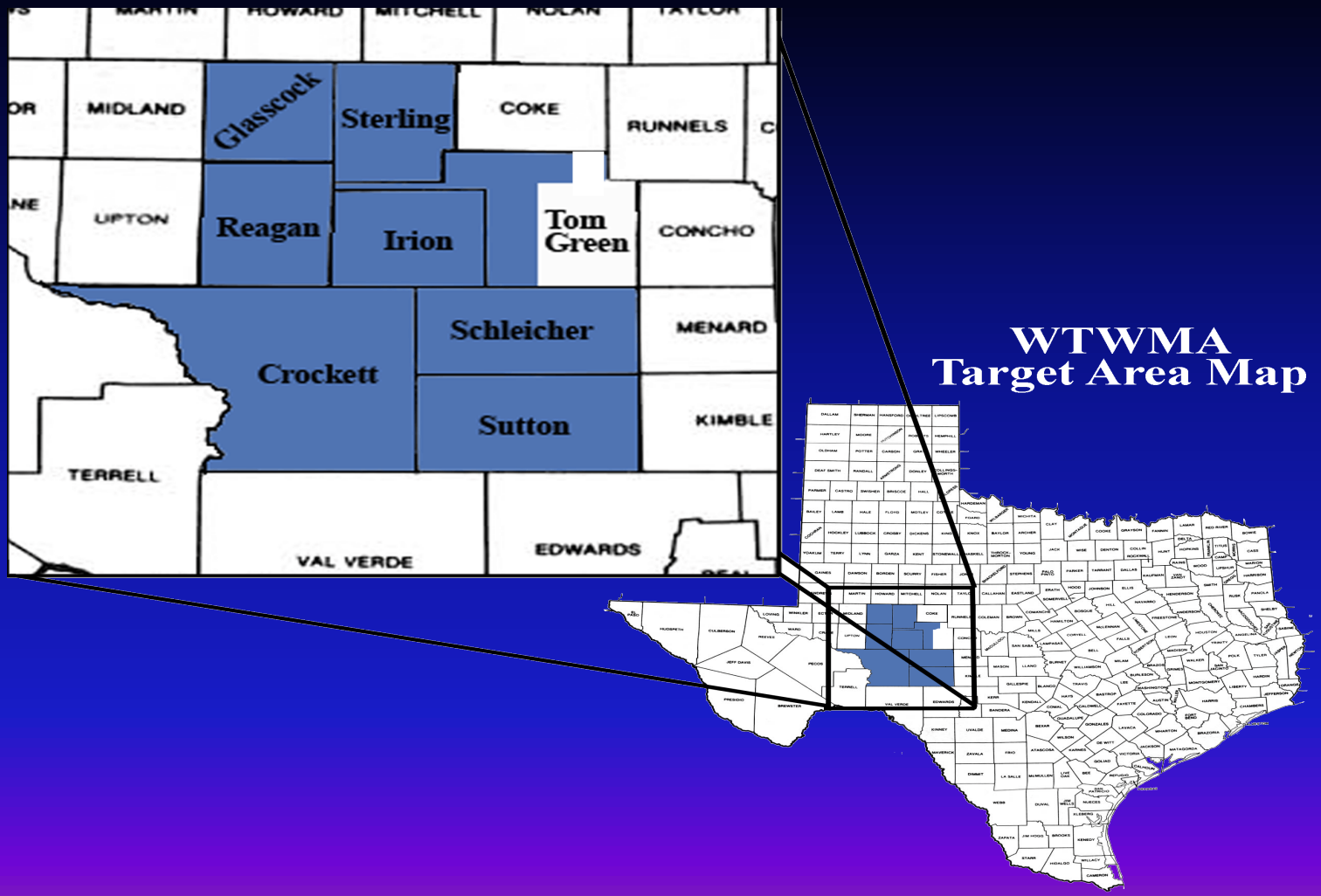
David Miskus

NOAA/NWS/NCEP/CPC

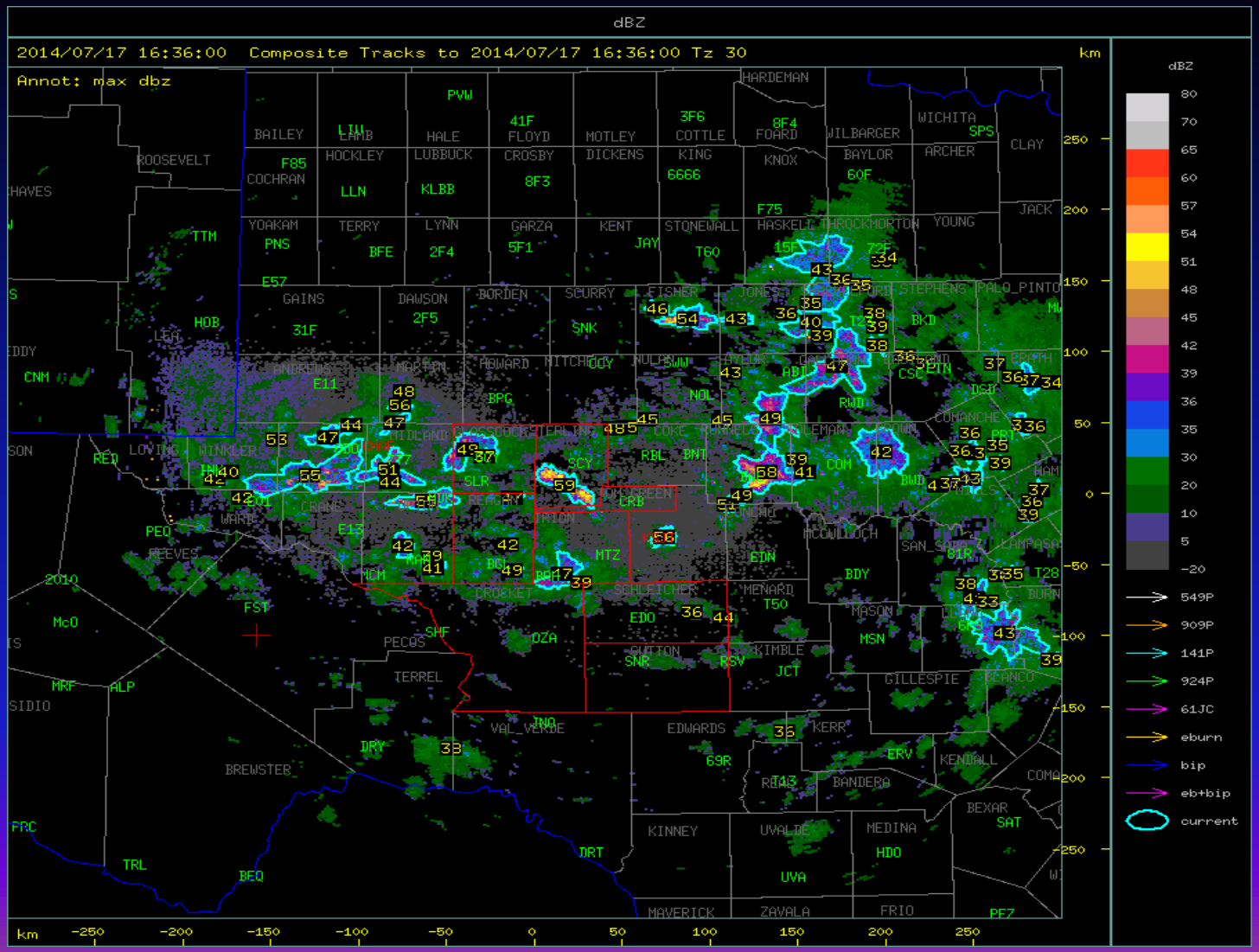
http://droughtmonitor.unl.edu/

West Texas Weather Modification Association (WTWMA)
wtwma.com

West Texas Weather Modification Association (WTWMA)



WTWMA Screen Shot of Radar Image of storms in target area




The End

Sutton County UWCD

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