City of Bandera ASR Study Follow-up

Discussion with Bandera County River Authority and Groundwater District (BCRAGD) and City of Bandera on study objective and timeline

January 15, 2021

Outline

- Background
  - State Water Plan- City of Bandera ASR project
  - 2009 feasibility study
  - Stakeholder interest

- Aquifer models
  - 2008 Lower Trinity ASR Model
  - 2011 Groundwater Availability Model (GAM)
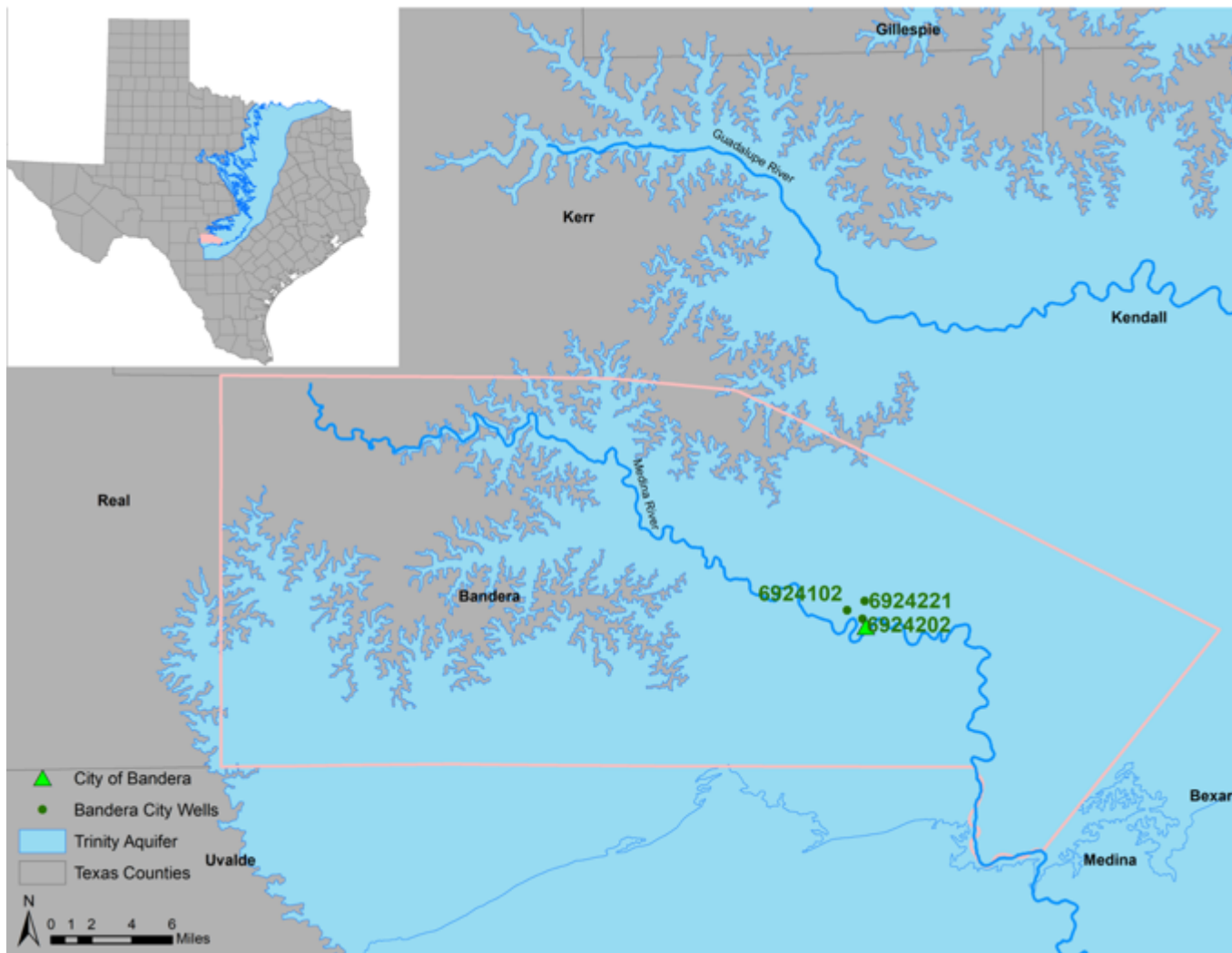
- Study road map and timeline

- Next step

Texas Water Development Board

State Water Plan

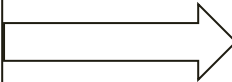|	
Project Sponsor	City of Bandera
GCD	BCRAGD
Region	J
GMA	9
Water Source	Medina River
Target aquifer	Lower Trinity

State Water Plan

Treatment Facility

6.7 MGD projected capacity

500 acre-feet/year supply in 2040 and 1,500 acre-feet/year by 2060
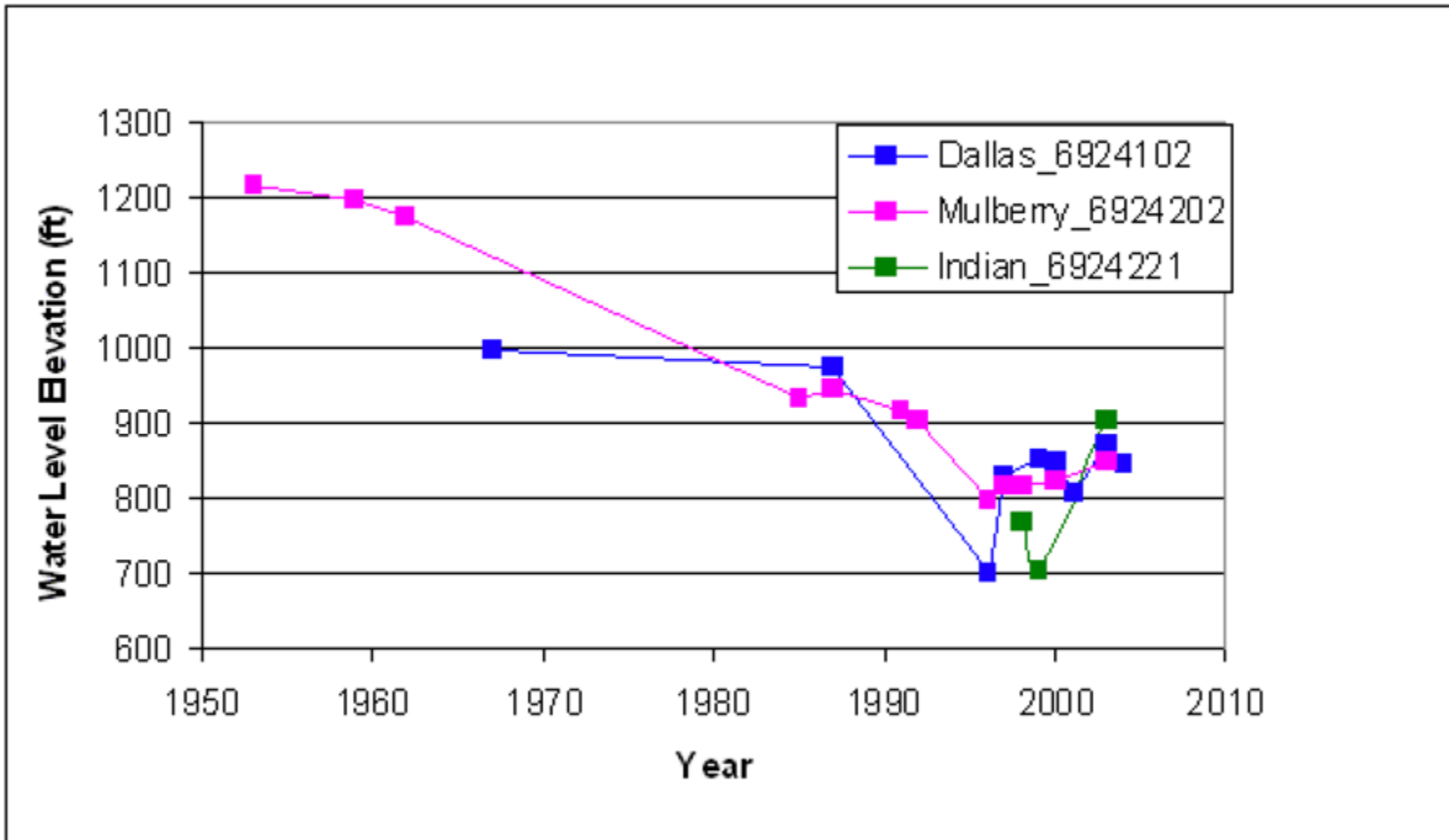
→

ASR
store excess water

use existing public supply wells initially

add 2 new wells- future plan

Feasibility Study

- Project in the conceptual stage

- Conducted in 2009 by LBG-Guyton Associates

- Funded by region J (TWDB)

- Main objective - build a Lower Trinity Aquifer model

- Also includes:
  - ASR water supply availability
  - Infrastructure Cost

Feasibility Study

Stakeholder Interest

BCRAGD

1 - Evaluate stormwater suitability

- o Flood Science and Community Assistance Department
- o Storm water storage
- o City of Bandera SFY 2020 Flood project

  Drainage Improvements

### 2 - Evaluate longevity of existing wells

- o Lower Trinity ASR Model vs. GAM

Table 5-1. Potentially Feasible Water Management Strategies

| County	WUGs and WWP Entities Potentially Served by WMSs	WMS Number	Water Management Strategy Title
Bandera	City of Bandera	1	Surface water acquisition, treatment and ASR.
		2	Drill additional wells outside of current cone-of-depression and lay pipeline back to city.
		3	Drill additional wells completed in Middle Trinity Aquifer inside of city limits.
		4	Promote, design and install rainwater harvesting systems on public buildings.
		5	Provide public with conservation information.
	Bandera County Other	6	Water loss audit and replace necessary distribution lines.
		7	Water loss audit and replace necessary distribution lines.
		8	Water loss audit and replace necessary distribution lines.
		9	Drill additional wells, renovate existing wells, and build treatment facility (possibly to include dasal).
		10	Drill two wells to PWS standards at VFD or other suitable locations to provide emergency supply in rural areas and firefighting supply. Wells would also be used as county drought monitoring sites.
		11	Drill wells to PWS standards and create distribution lines to help mitigate supply shortage around Medina Lake.
		12	Build wastewater collection and treatment system to help mitigate problems in Medina Lake area.
		13	Brush management and invasive species (*i.e. Arundo donax*) control.

Lower Trinity ASR Model

- Local model (Bandera, Kendall and Kerr counties)

- Single-layer

- Processed with data from 1950 to 2005

- 66 wells

- Grid cell size 0.25 X 0.25 (mile)
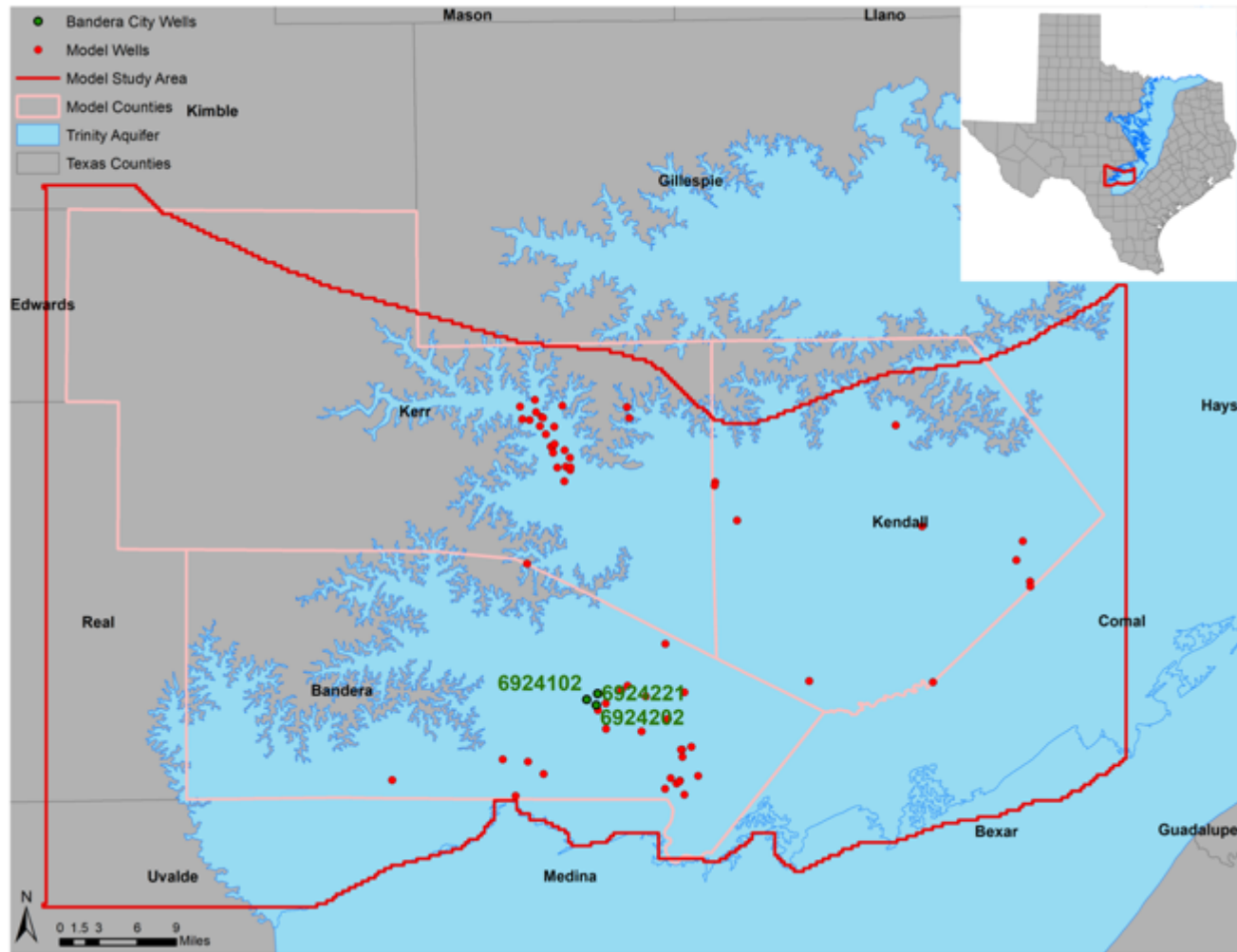
Lower Trinity ASR Model

Simulations (2006 – 2060)

- **S1**: 2006 demand rate - water levels continue to decline

- **S2**: increased demand - accelerated decline

- ASR options
  - **S3**: Injection using city wells (appropriate rate = 0.5 MGD)
  - Injection using city wells and southeast Bandera County well (appropriate rate = 1 MGD)
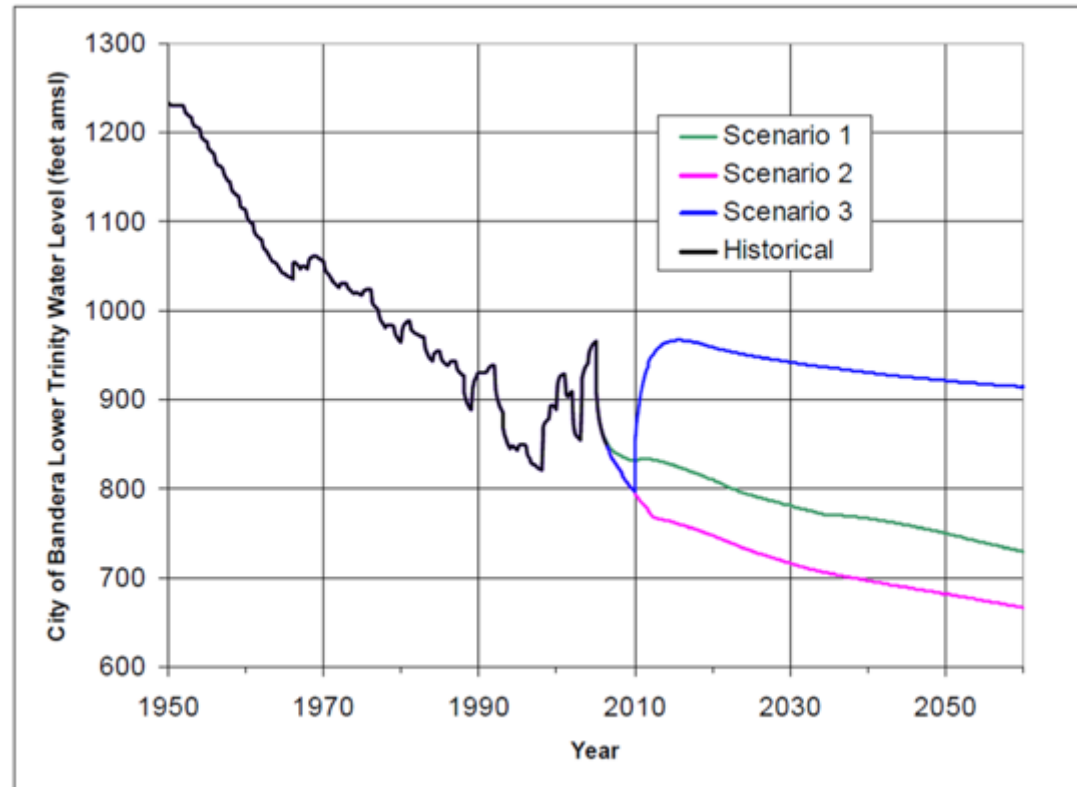
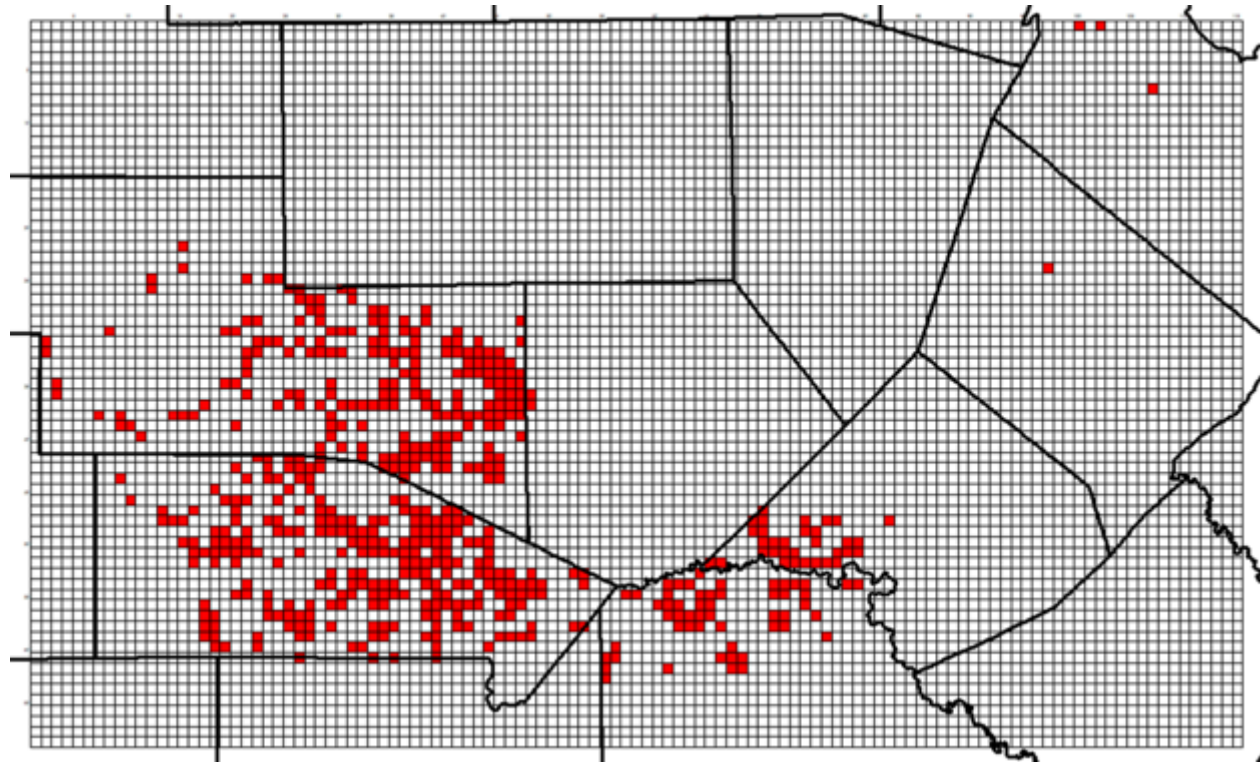# Lower Trinity ASR Model

Downside: recharge from Middle Trinity assumption (green)
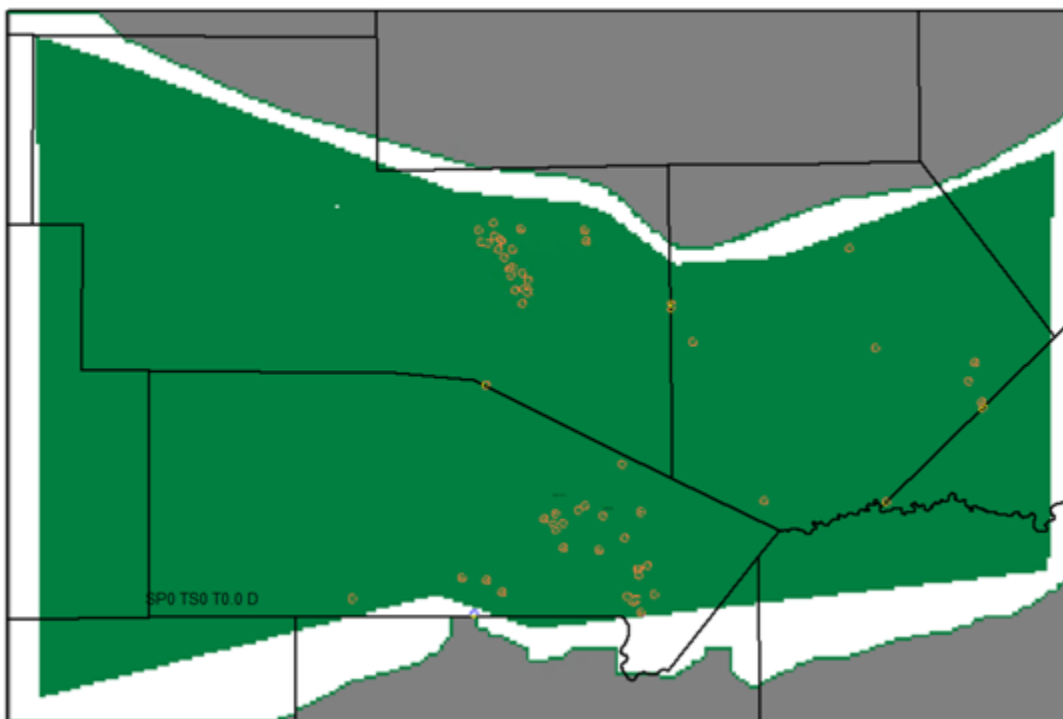
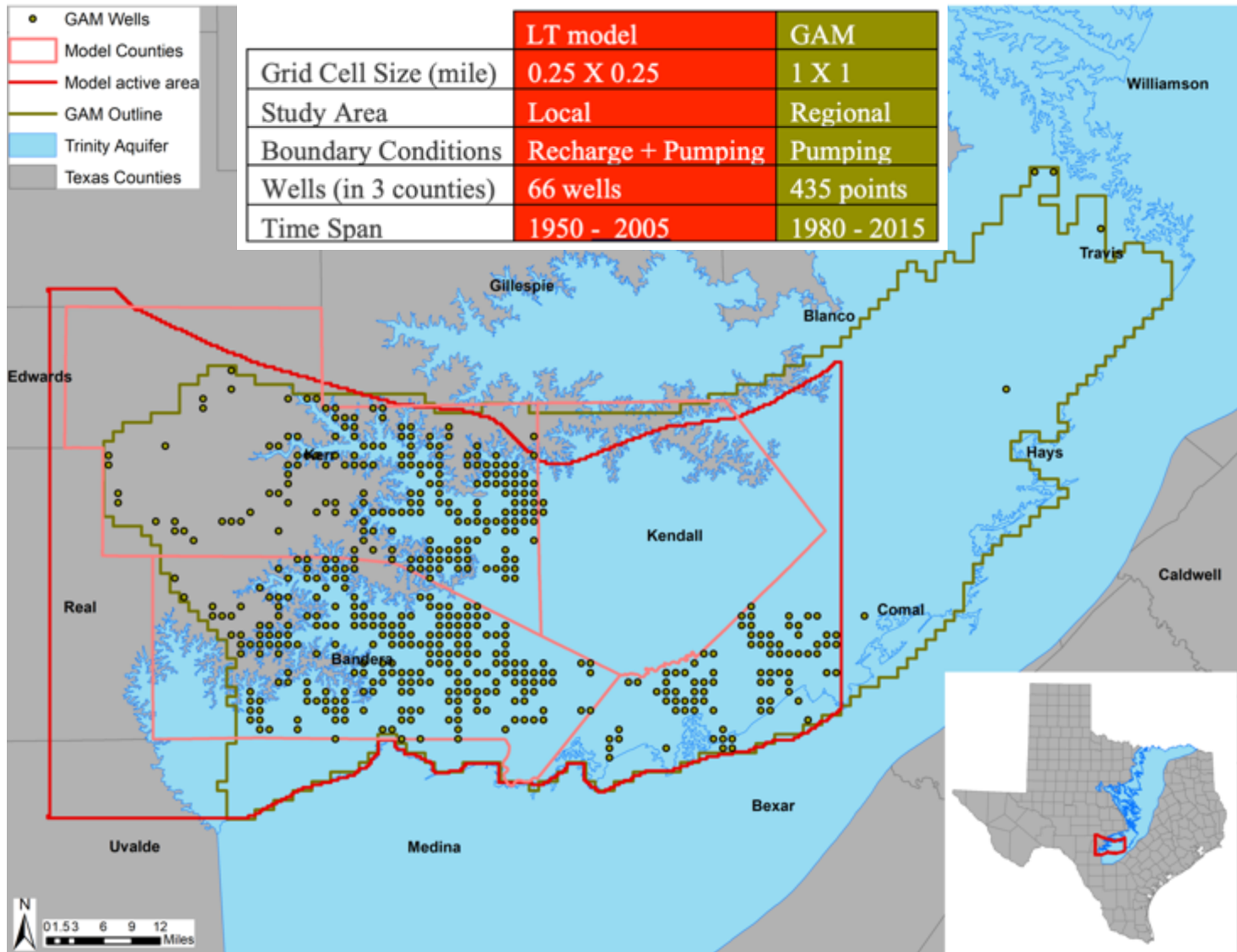Model area in Groundwater Vistas

GAM

- Regional model

- 4 layers (Edwards, Upper Trinity, Middle Trinity, and Lower Trinity)

- More appropriate representation for Lower Trinity - only pumping (red)

- Pumping estimates from 1980 to 2011

- Grid cell size 1 X 1 (mile)

Model area in Groundwater Vistas

Lower Trinity ASR Model vs GAM

	LT model	GAM
Grid Cell Size (mile)	0.25 X 0.25	1 X 1
Study Area	Local	Regional
Boundary Conditions	Recharge + Pumping	Pumping
Wells (in 3 counties)	66 wells	435 points
Time Span	1950 - 2005	1980 - 2015

Legend:
- GAM Wells
- Model Counties
- Model active area
- GAM Outline
- Trinity Aquifer
- Texas Counties

Study Road Map

- In GAM
  - o define the same study area as Lower Trinity ASR Model
    - o Bander, Kerr, and Kendall counties
  - o refine mesh to 0.25 mile as Lower Trinity ASR model
- Collect data
  - o TWDB Groundwater Database
  - o TWDB historic use information
  - o TCEQ
  - o GCD
- Process modified GAM
- Predict levels until 2060 as Lower Trinity ASR Model
- Prepare report and present results

Texas Water Development Board
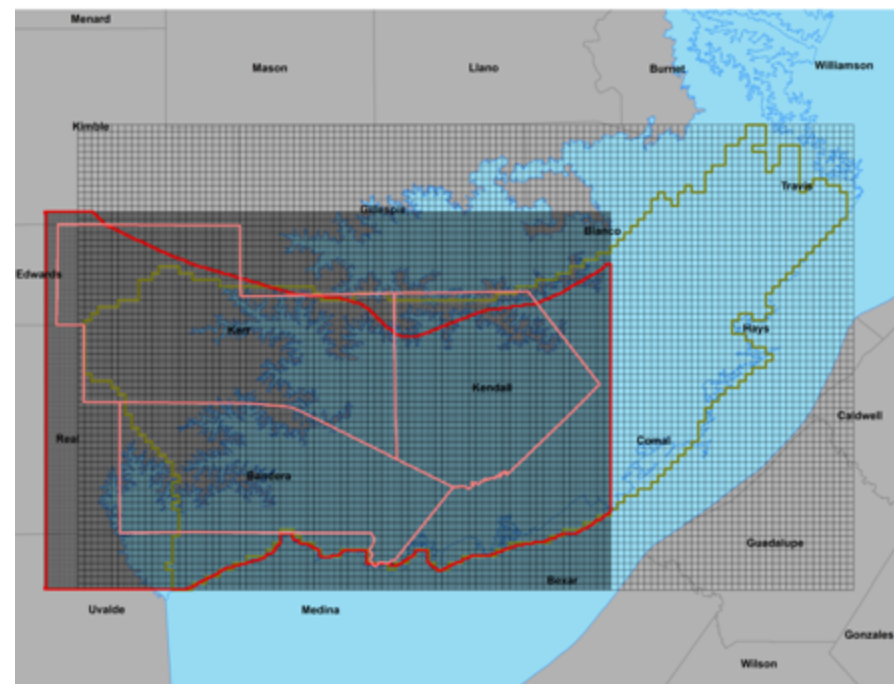
Study Timeline

	September -December	January				February				March				April				May				June				July			
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Information Gathering	███	██																											
Refine Study Area Grid				██	██	██																							
Collect Data							██	██	██	██																			
Process Model										██	██	██	██	██	██	██	██	██											
Simulate Future Levels																			██	██	██								
Prepare Report																						██	██	██	██				

Scenarios

BCRAGD and City of Bandera:
Good Plan

⬇

IWT team:
Continue as proposed

BCRAGD and City of Bandera:
Project is not a priority at this point

⬇

IWT team:
Prepare a report with gathered information

BCRAGD and City of Bandera need:
- more time to decide
Or
- more information

⬇

IWT team:
happy to answer questions