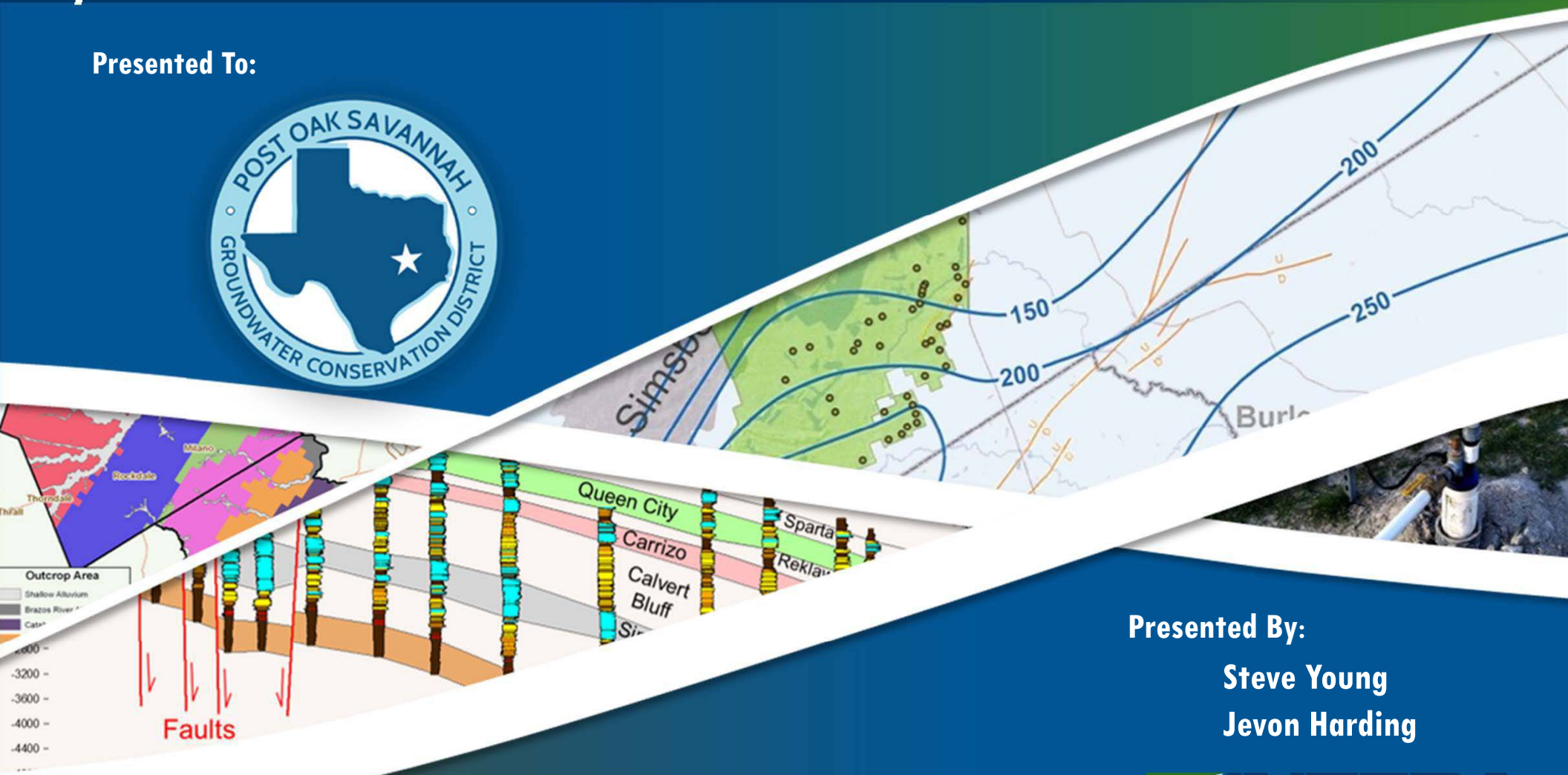
Review of Update of Groundwater Availability Model for Central Portion of the Sparta, Queen City, and Carrizo-Wilcox Aquifers

Presented To:

POST OAK SAVANNAH GROUNDWATER CONSERVATION DISTRICT



Presented By:

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August 7, 2018

Participating Entities

- Texas Water Development Board
- Post Oak Savannah GCD
- Brazos Valley GCD
- Mid East Texas GCD
- Lost Pines GCD
- Lower Colorado River Authority
- Brazos River Authority
- Colorado & Lavaca Rivers and Matagorda & Lavaca Bays Basin and Bay Area Stakeholder Committee
- Environmental Stewardship

Outline

- Major Changes in GAM Structure, Aquifer Properties, and Predictive Capabilities

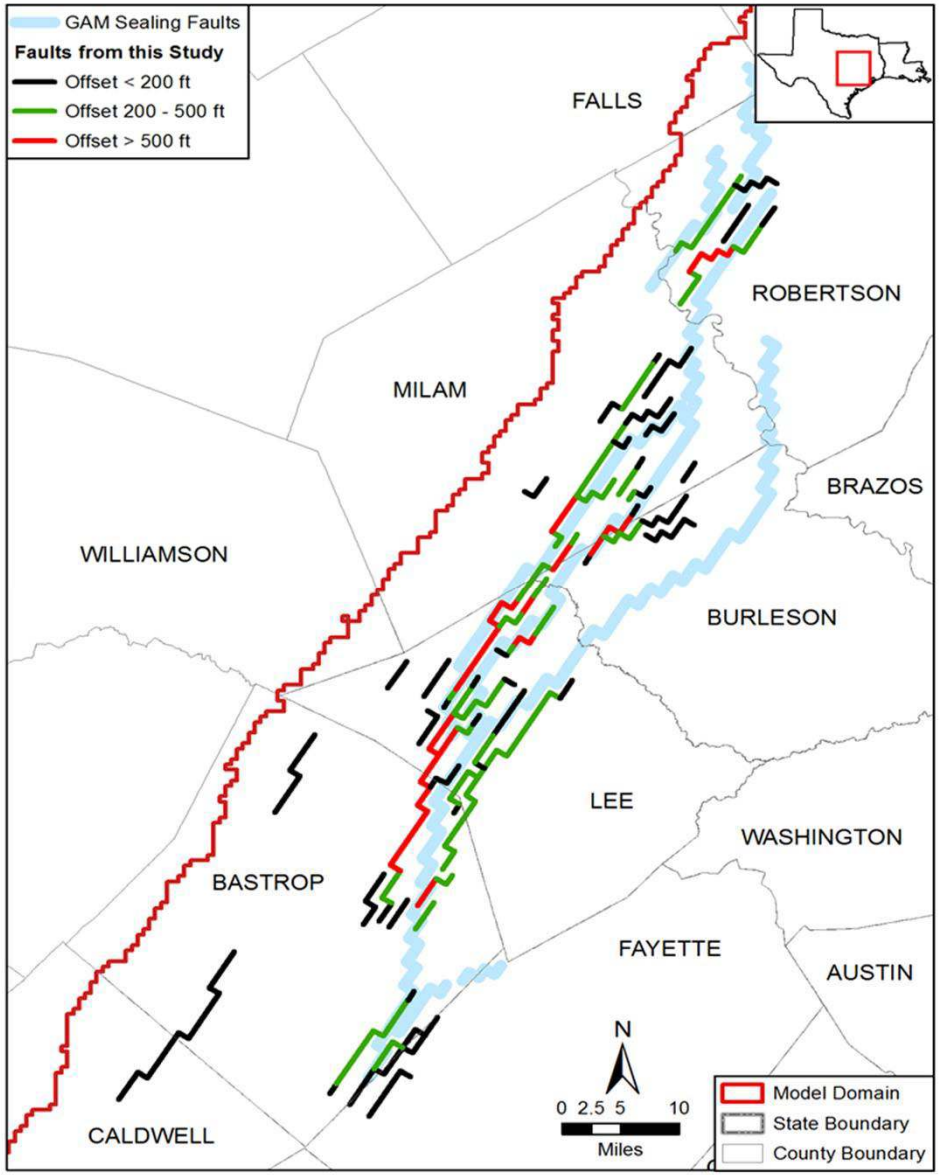
- Application of GAM for Evaluating DFCs and PDLs

Revised Transmissivity Values

- Modified Representation of Geological Faults
  - Based on geological analysis
  - Less obstruction to groundwater flow
- Revised Hydraulic Properties for Aquifers
  - Aquifer tests from Fault Study
  - Aquifer tests from Vista Ridge Field Testing
- Developed New Recharge Function
  - More recharge to aquifers
  - Greater temporal and spatial variability across model
- Improved Simulation of SW-GW Interaction
  - Stream flow and shallow GW systems are more accurately represented in model
  - More GW contributions to stream baseflow
- Vetted Historical Simulation from Predevelopment
  - Current model calibration from 1980 to 2000 (20 years)
  - Updated model calibration from 1930 to 2010 (80 years)

Representation of Faults

- Faults mapped using geophysical logs
- Properties of faults determined by analysis of pumping tests
- Less obstruction to groundwater flow

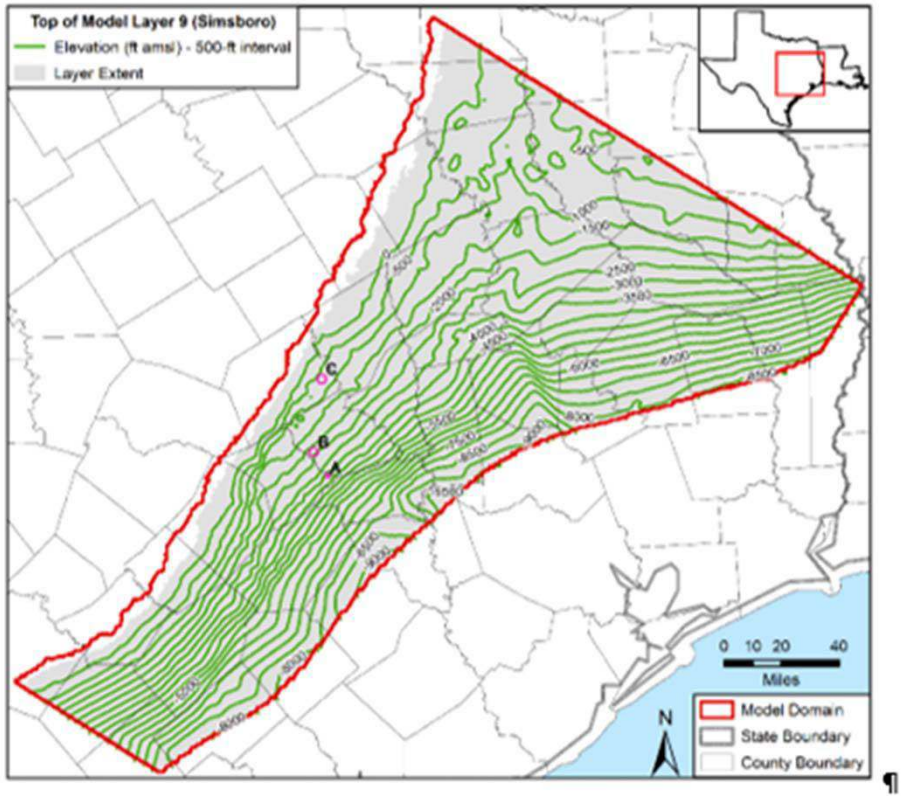


Revised Hydraulic Properties for Aquifers

- Aquifer pumping tests from Fault Study
- Aquifer pumping tests from Vista Ridge Field Testing

Well	Aquifer	Decimal Latitude	Decimal Longitude	Test Pumping Rate	Test Length	Estimated Transmissivity (ft^2/day)
CW-2	Carrizo	30.43564	96.80366	1,650	48 days	3,422
CW-3	Carrizo	30.42803	96.80739	2,000	36 hours	2,366
CW-5	Carrizo	30.43037	96.82592	1,816	36 hours	3,342
CW-7	Carrizo	30.41233	96.81705	2,075	28 days	3,743
CW-9	Carrizo	30.42052	96.81123	2,000	36 hours	3,075
PW-10	Simsboro	30.41916	96.80507	3,000	36 hours r	16,979
PW-11	Simsboro	30.41392	96.7928	3,100	36 hours	15,642
PW-13	Simsboro	30.44583	96.76865	3,100	23.75 days	18,316
PW-15	Simsboro	30.41001	96.78026	3,503	36.5 hours	15,374
PW-16	Simsboro	30.40794	96.77606	3,110	36 hours r	13,369
PW-17	Simsboro	30.41709	96.77139	3,110	36 hours r	17,112

[1] depth to top of uppermost screen
[2] depth to bottom of lowermost screen
Note: ft^2/d = square feet per day



Revised Recharge Function

Precipitation-Recharge Relationship for GMA 12

Average Precipitation (in/yr)	Recharge (in/yr)	Recharge divided by Precipitation
26.3	0.80	0.03
29.2	1.16	0.04
32.2	1.59	0.05
34.3	1.77	0.05
36.9	2.03	0.05
38.9	2.11	0.05
42.3	2.37	0.06
44.9	2.33	0.05
48.2	2.30	0.05

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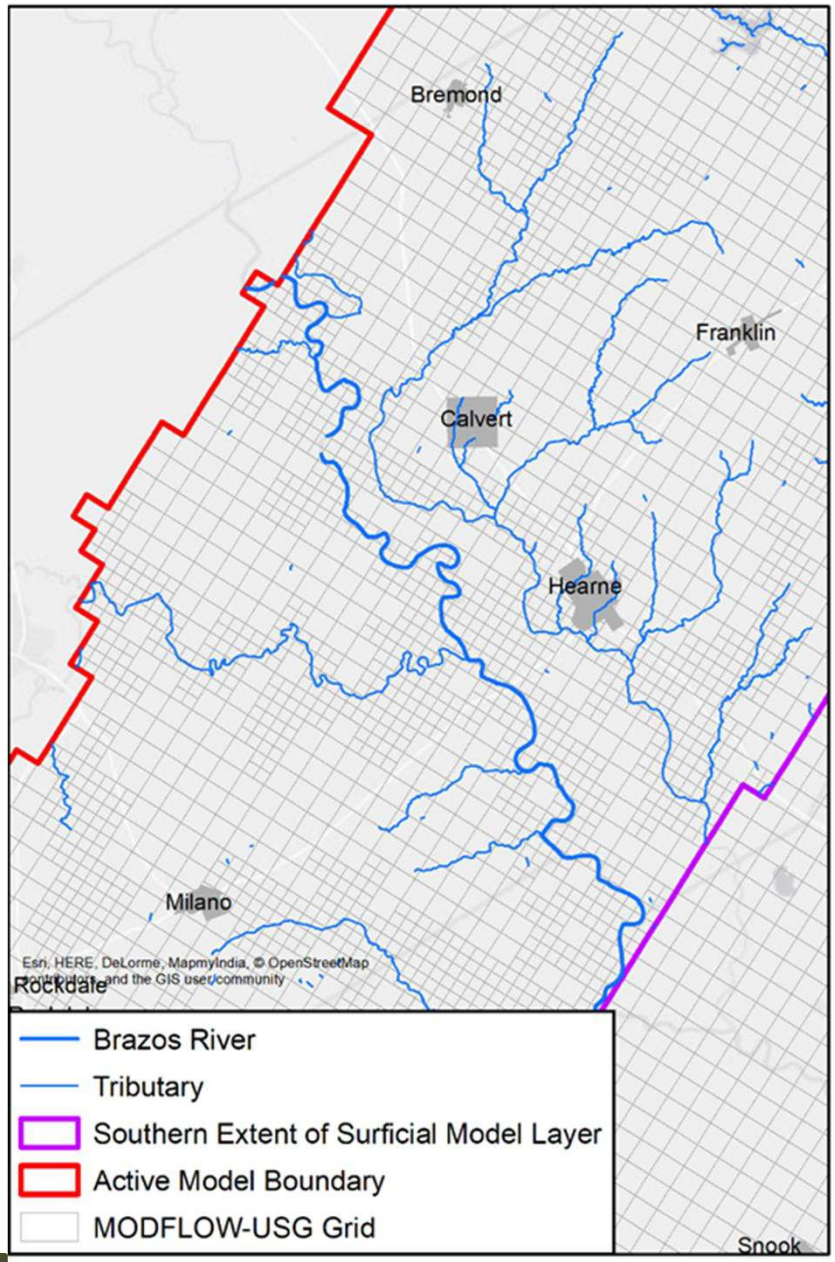
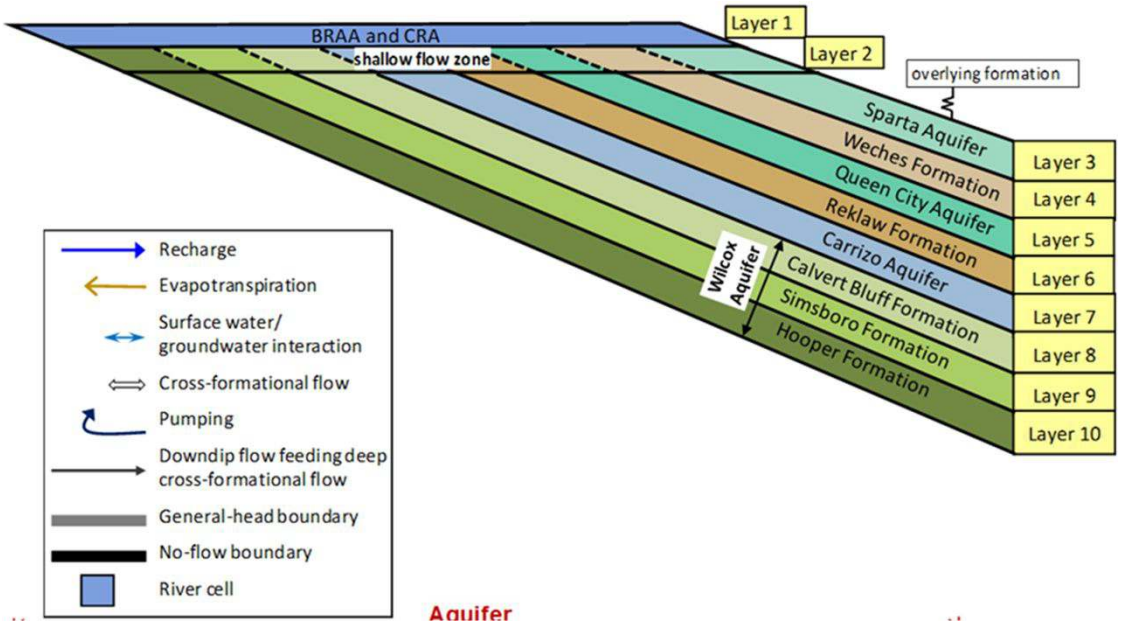
Improved Simulation of SW-GW Interaction





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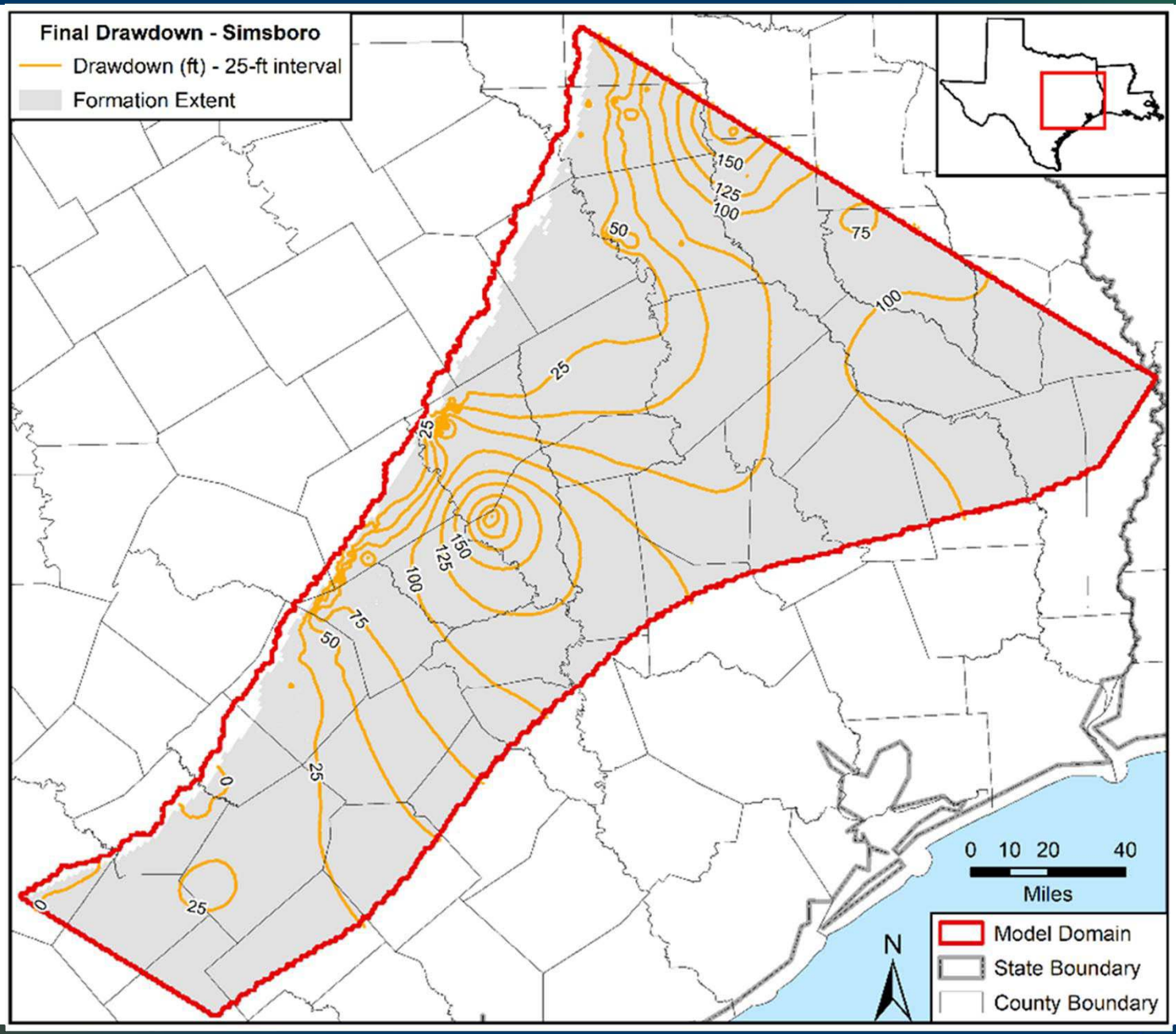
1930 to 2010 Historical Simulation: Simsboro



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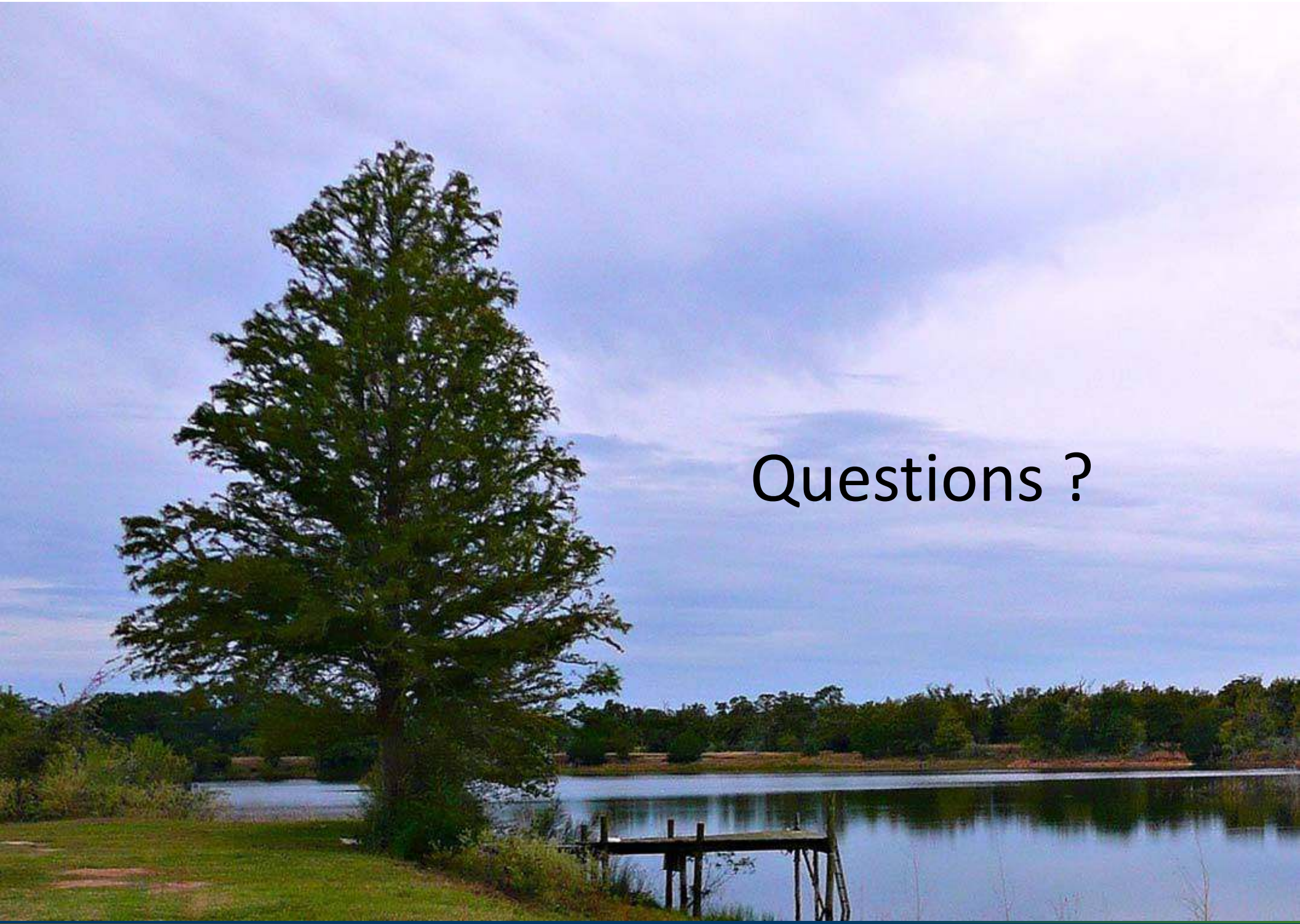
Application of GAM for Evaluating DFCs and PDLs

- Possible Sensitivities of Importance
  - Area versus Volume-based DFCs
  - Assignment of pumping for aquifers with multiple layers
  - Average of water levels for aquifers with multiple layers
  - Recharge rates for future scenarios
  - Hydraulic boundary conditions for future scenarios
  - Defining and quantifying and SW-GW interaction

- Proposed Tasks
  - Continue with developing analytical tools to process DFC simulations
  - Co-investigate sensitivities with GMA 12 consultants
  - Report findings to Board in November 2018 for guidance on application to GMA 12 and POSGCD


Questions ?