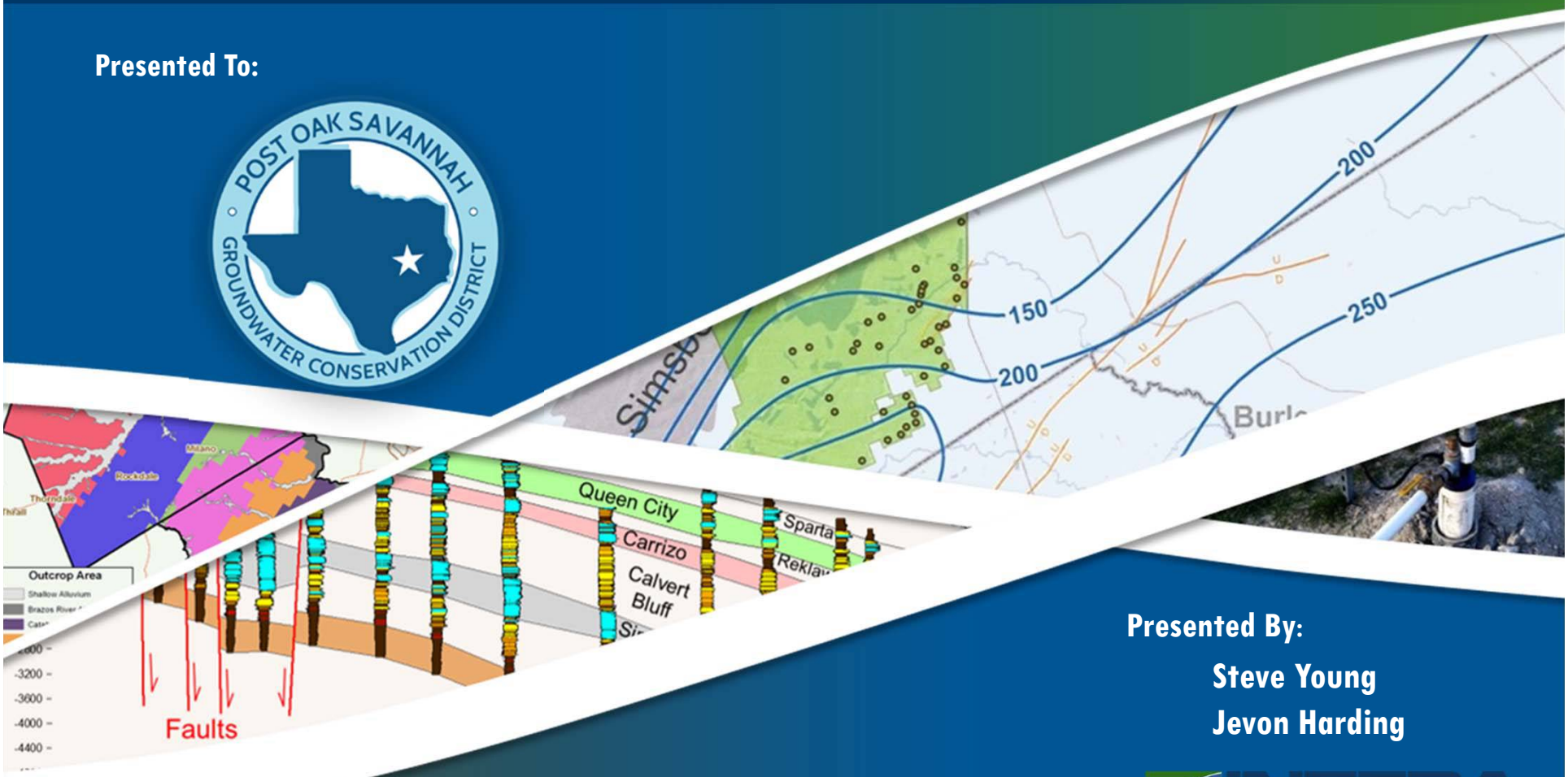
Options for Management of Pumping and Prevention of Excessive Drawdowns with Regard to DFCs and PDLs

Presented To:

POST OAK SAVANNAH GROUNDWATER CONSERVATION DISTRICT



Presented By:

Steve Young

Jevon Harding

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

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Outline

- Rules to Prevent Excessive Drawdowns Caused by Pumping

- Discuss Previous Analyses for Implementing Changes to Prevent Excessive Drawdowns Caused by Pumping

Rule 16.4- Actions Based on Monitoring Results

- Threshold 1
  - Criteria (60% of MAG, 50% of DFC or PDL, DFC projected using GAM to be exceeded in 15 years)
  - Initial Required Action (additional study to identify the source of impacts and/or improve site data or analysis tools)
- Threshold 2
  - Criteria (70% of MAG, 60% of DFC or PDL)
  - Initial Required Action (review of MP and rules, initiation of public process to discern preventive and/or protective actions including but limited to Rules 16.5 and 16.6, initiate development of response and action workplan)

Rule 16.4- Actions Based on Monitoring Results (con't)

- Threshold 3
  - Criteria (75% of DFC or PDL)
  - Initial Required Action (consider and adopt amendments to MP and rules, conduct public hearings, develop and implement a Response and Action Workplan)
    - Reduce permitted production and/or maximum allowable production

Rule 16.5 Reductions Required by Regulatory Action

- "Board may proportionately reduce the maximum amount of water that may be permitted per acre and the volume of water authorized to be produced under any permit issued by the District"

- "Board will adjust the thresholds established in Rule 16.4…"

Rule 16.6 Adjusting Maximum Production Permitted

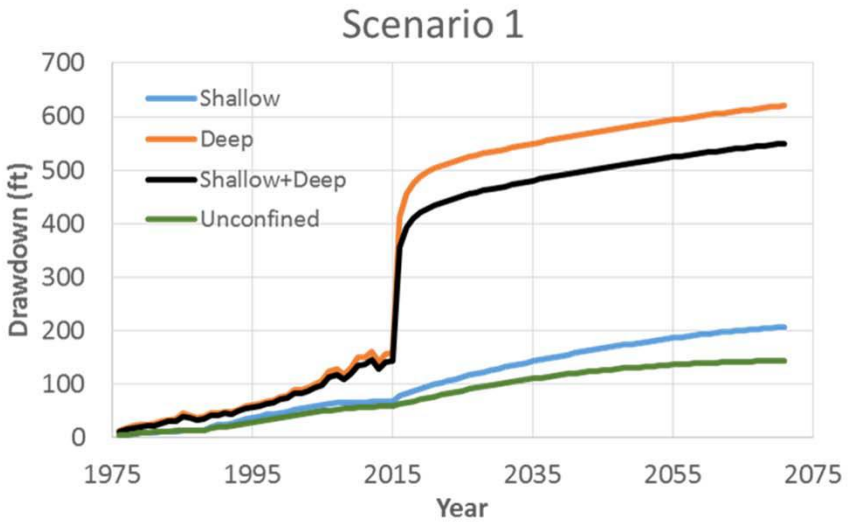
- "District shall adjust the maximum groundwater production permitted per acre and/or the permitted production under any permit issued by the District as follows:"
  - "the maximum water production permitted per acre for the Management Zone and the water authorized to be produced under any permit issued by the District for that zone will be reduced"
  - "production in a Management Zone may be reduced to the extent that production in that Management Zone is impacting water drawdown levels in any Management Zone in the District"
  - "The maximum allowable production of 2 acre feet of groundwater per acre of land, provided in Rule 5.1.2, may be reduced, and the maximum allowable production may be established or reduced for any one, or more than one, Management Zone"

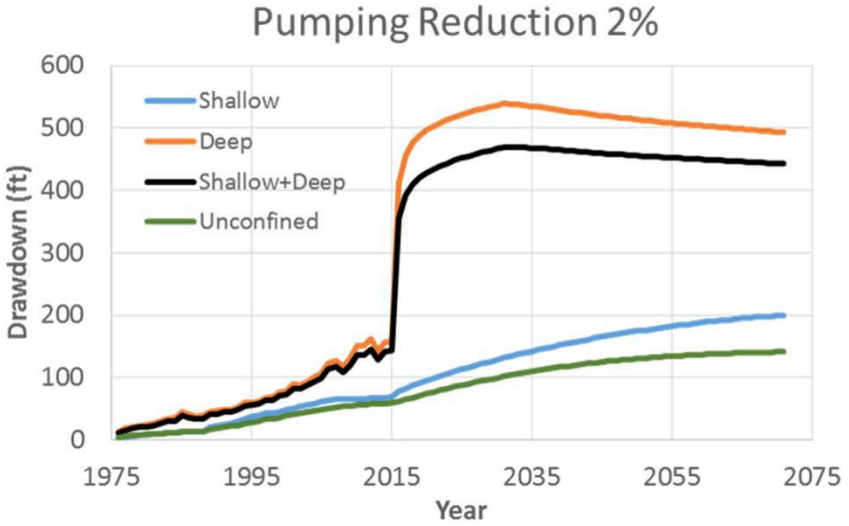
Rule 16.7 Permit Limitation and Reduction

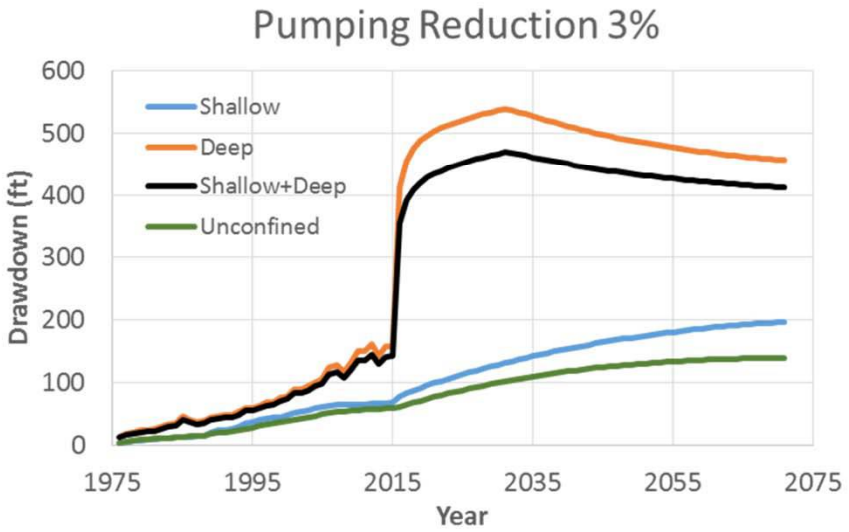
- “If the maximum allowable production of 2 acre feet of groundwater per acre of contiguous land is reduced for a Management Zone, or if any such reduced maximum of allowable production is thereafter reduced again, ”

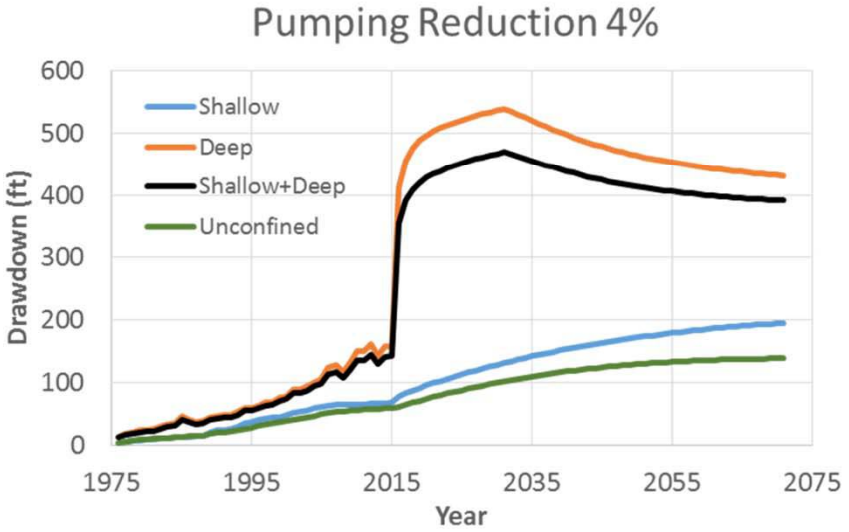
- “If the Board finds it is necessary to reduce the maximum allowable production per acre, or the permitted production for any Management Zone, by a greater percentage or more quickly than is provided in Rule 16.7(3),…. shall establish a schedule for a phased reduction in the maximum allowable production or permitted production for the zone. ”

Investigation of Reduced Pumping Rates: POSGCD Simsboro Deep Pumping

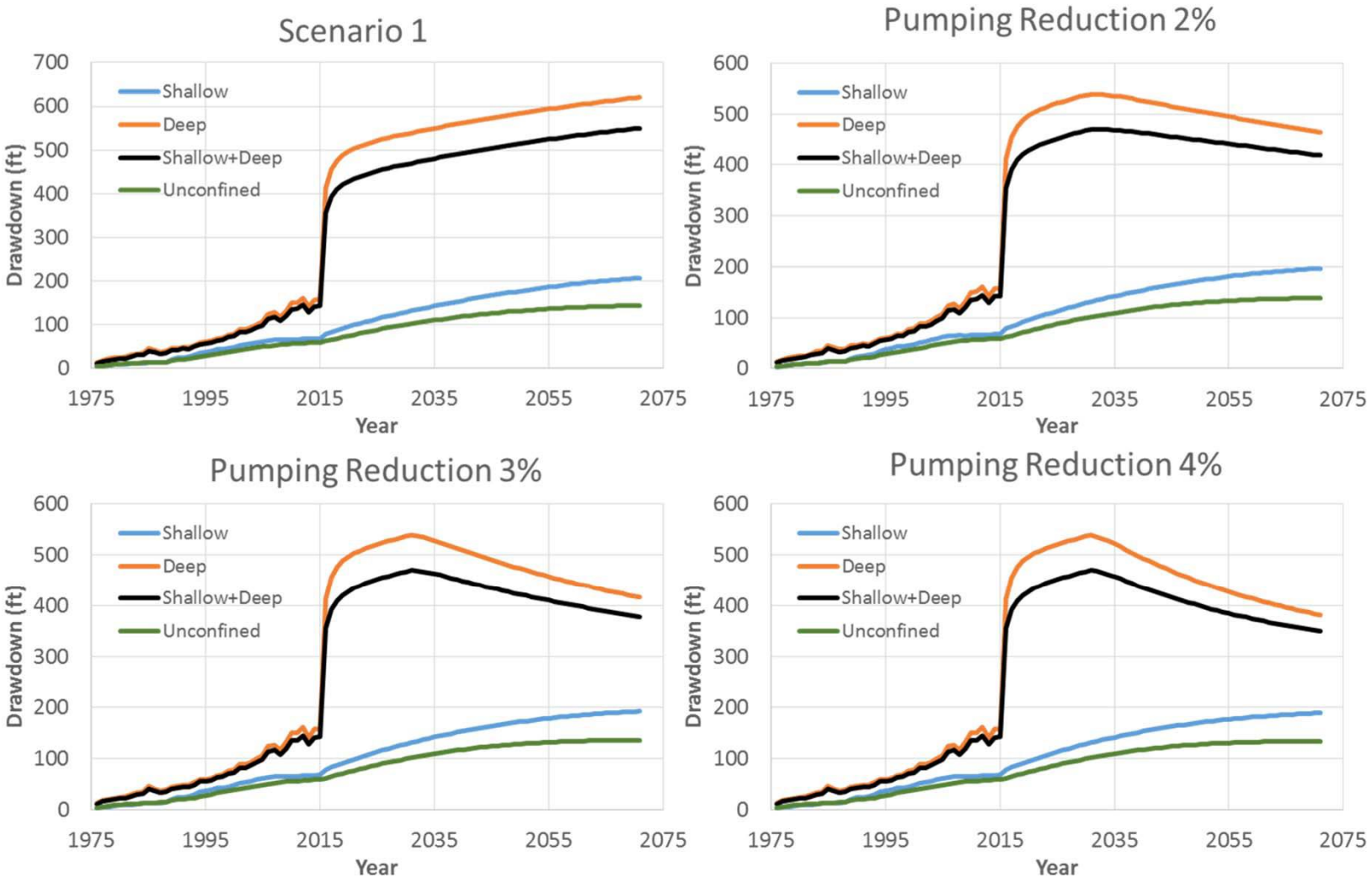








Investigation of Reduced Pumping Rates: Non- POSGCD Simsboro Pumping



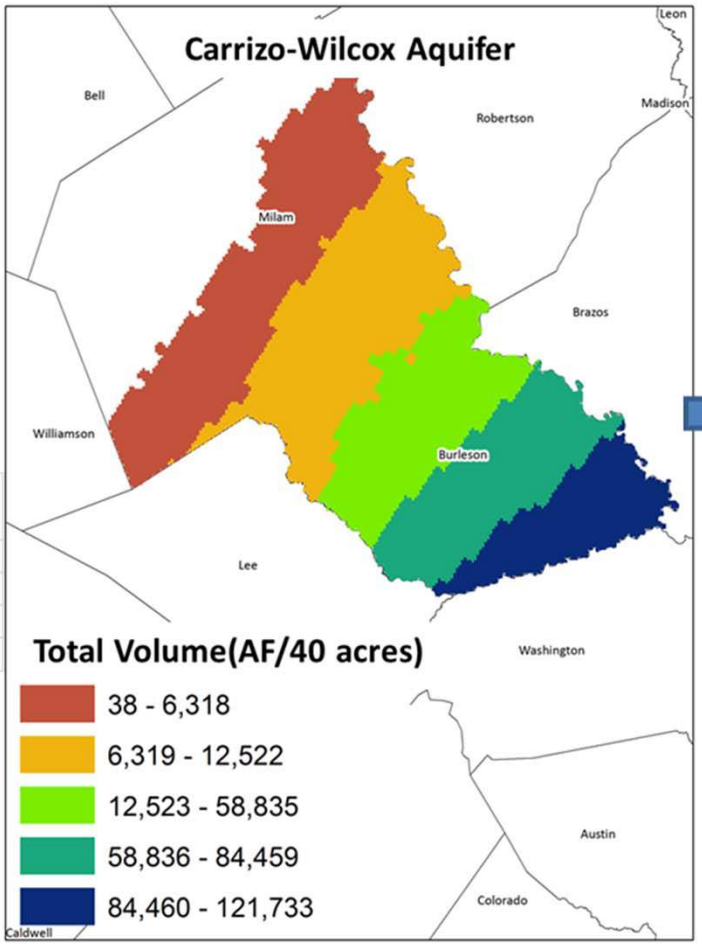
Adjustments to the 2 AFY/acre Maximum Production Rate

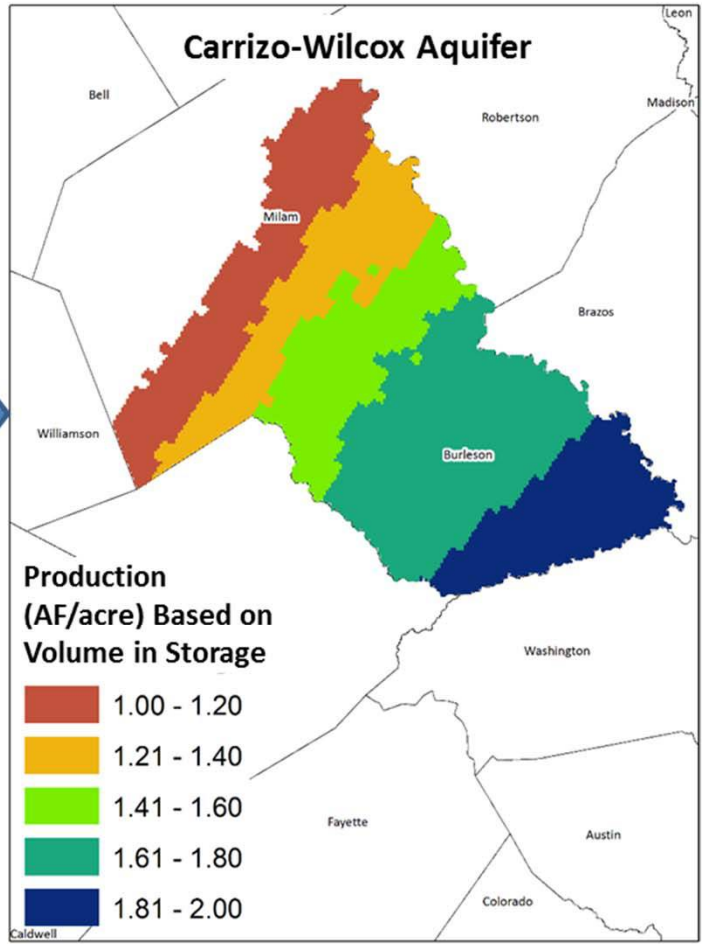
- Factors that Could be used for Basis of Fair Share
  - Surface acreage
  - Groundwater in storage underlying acreage
  - Aquifer production capacity underlying acreage
  - A combination of the three factors above
- Review Several Mathematical Options for Transforming (or Scaling) Factors to Production Rate (AF/acre)
- Example Maps of Production Rates
  - Single aquifers
  - All aquifers

Example for Carrizo-Wilcox Aquifer: Max Production Rate (AF/acre) based on Groundwater in Storage

- Map Storage Values to a Production based on linear interpolation
- Production Rates

Production (acre/ft)			Aquifer(s)
Min.	Med.	Max.	
1	1.5	2	Carrizo
			Calvert Bluff
			Simsboro
			Hooper





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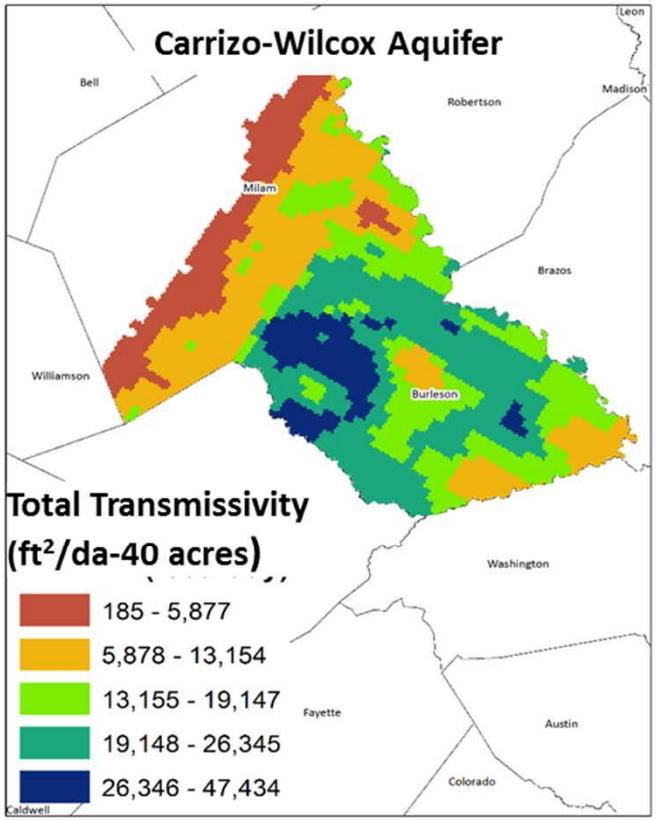
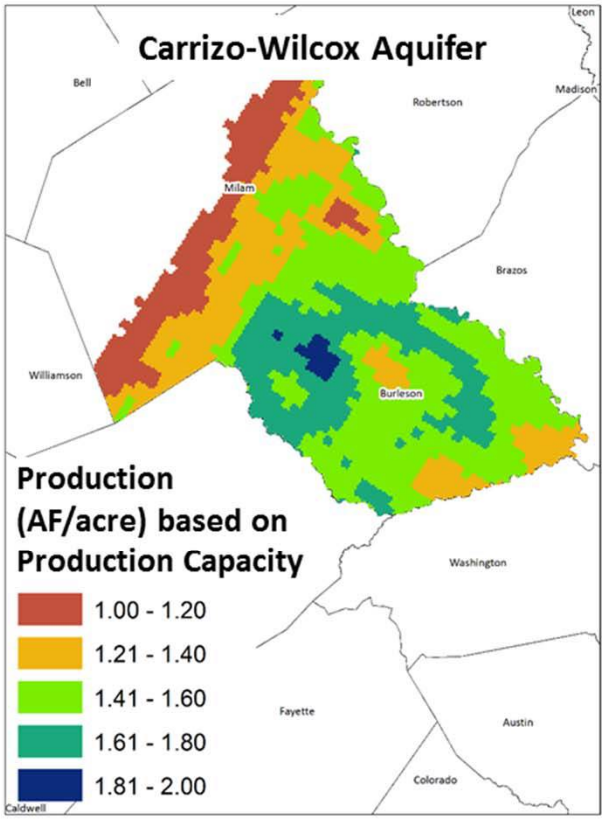


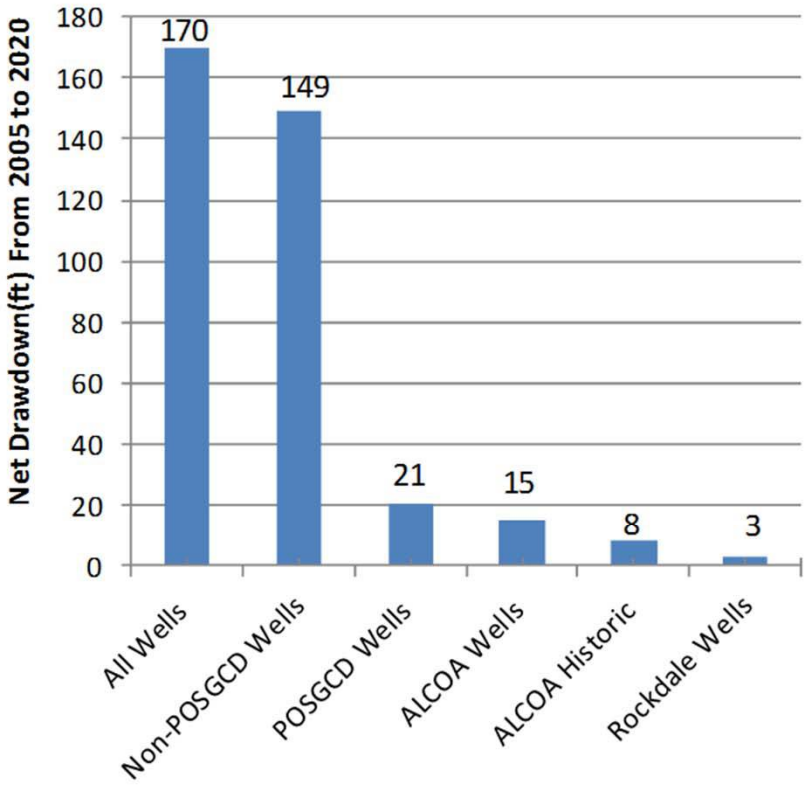


Identify the Impact of Pumping in a Management Zone to Drawdown in another Management Zone

- Cross-flow is groundwater that flows across aquifer boundaries
- Pumping in an aquifer reduces the water level in the adjacent aquifers and causes an increase in cross-flow to the aquifer
- POSGCD has investigated methods of how to determine:
  - How pumping in well A affects drawdown in another well B
  - How pumping in management zone A affects drawdown in management zone B

Well Contributing to Net Drawdown in Simsboro Aquifer

2020



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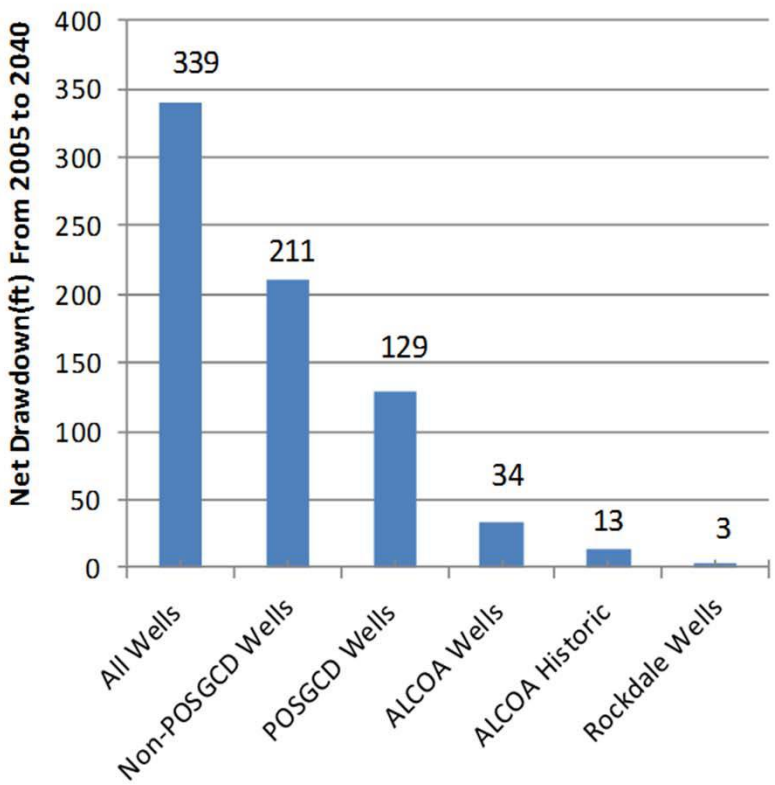
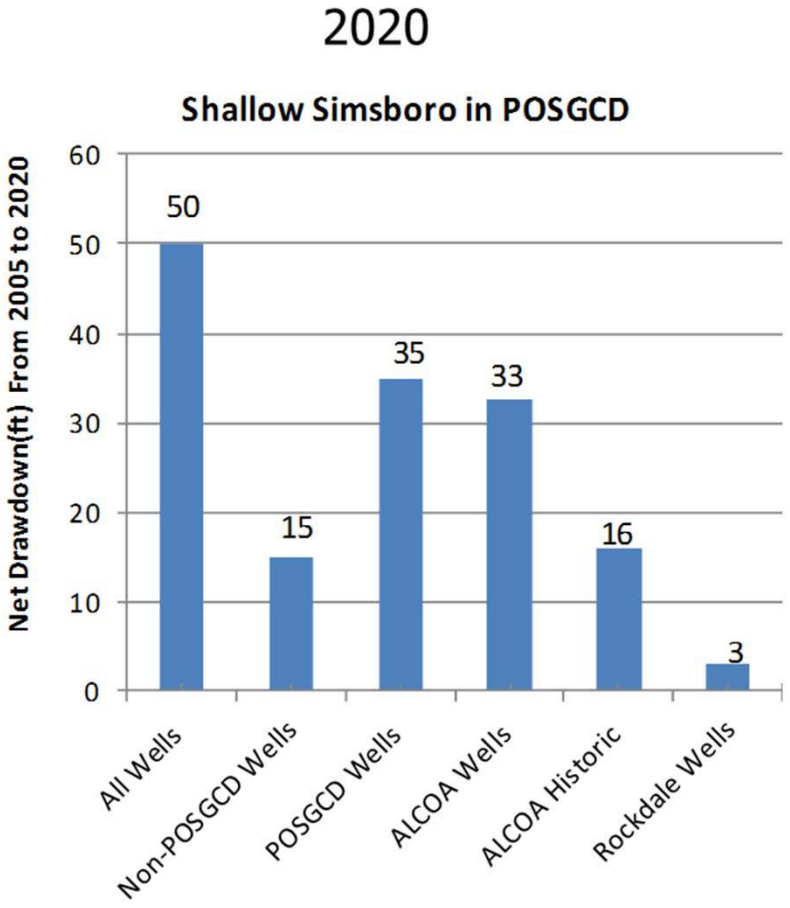
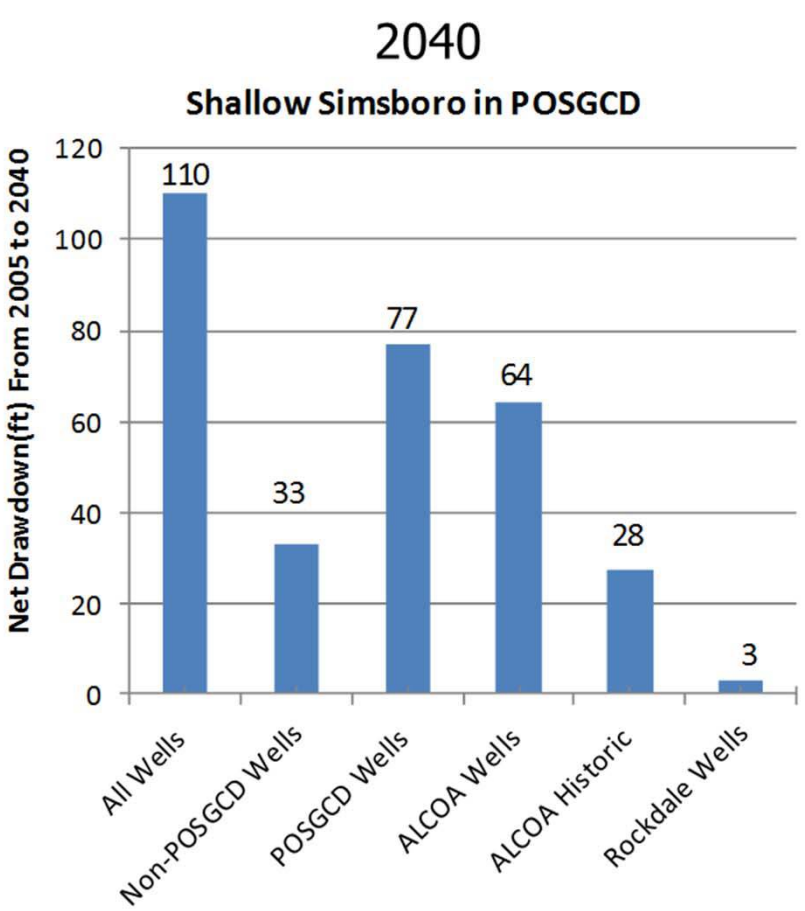


Results are generated by performing series of model runs with different groupings of wells

Well Contributing to Net Drawdown in Shallow Simsboro Aquifer

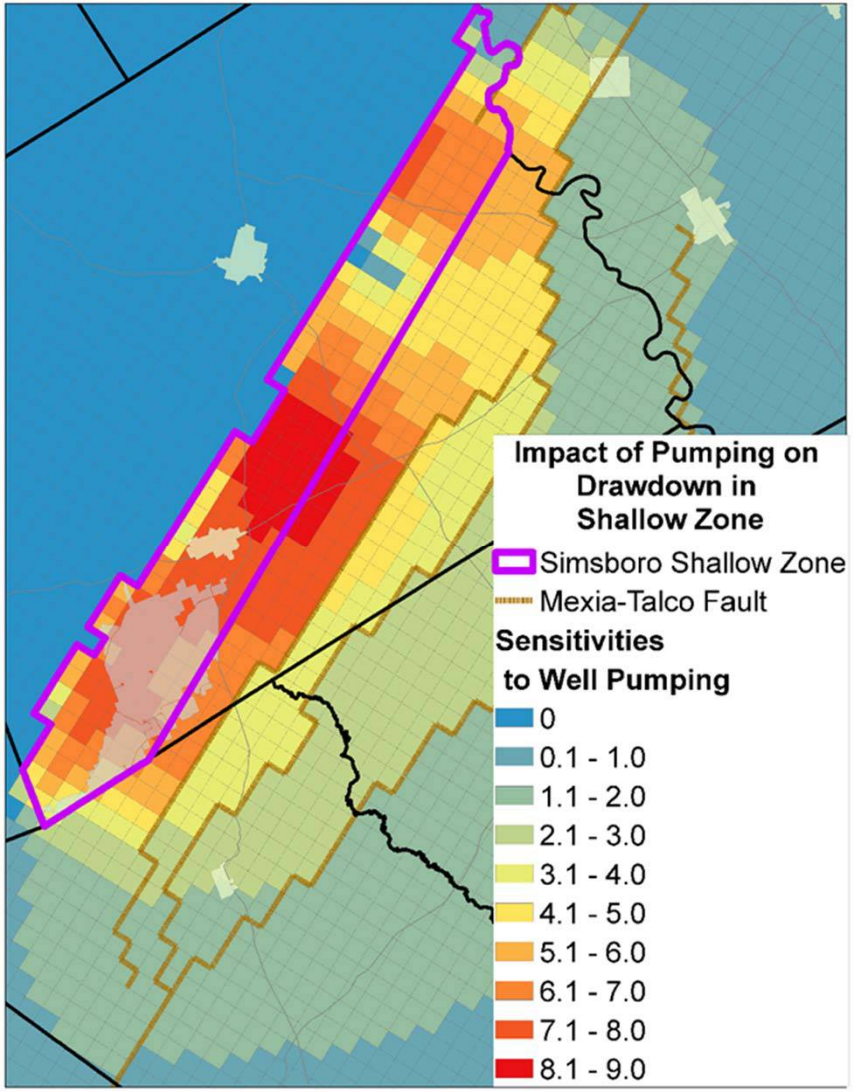




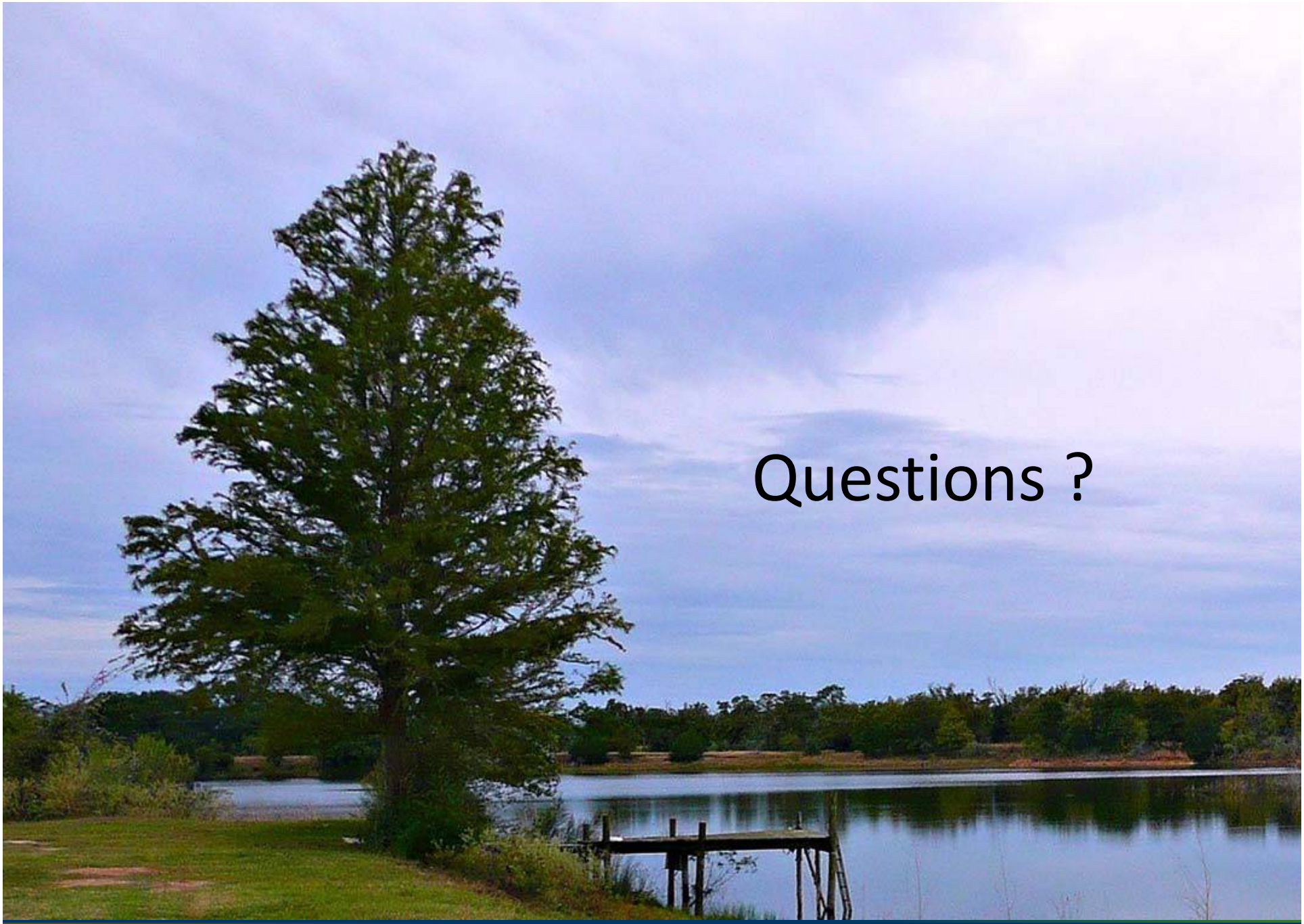
Results are generated by performing series of model runs with different groupings of wells

Sensitivity of Average Drawdown in the Shallow Simsboro to Pumping in Each Grid Cell

- The shallow Simsboro zone is outlined by purple line
- The color of the grid cell reflects how pumping will affect average drawdown in shallow Simsboro Zone
- Faults are the brown lines



Results are generated by a single model run that is very complex to be performed


Questions ?