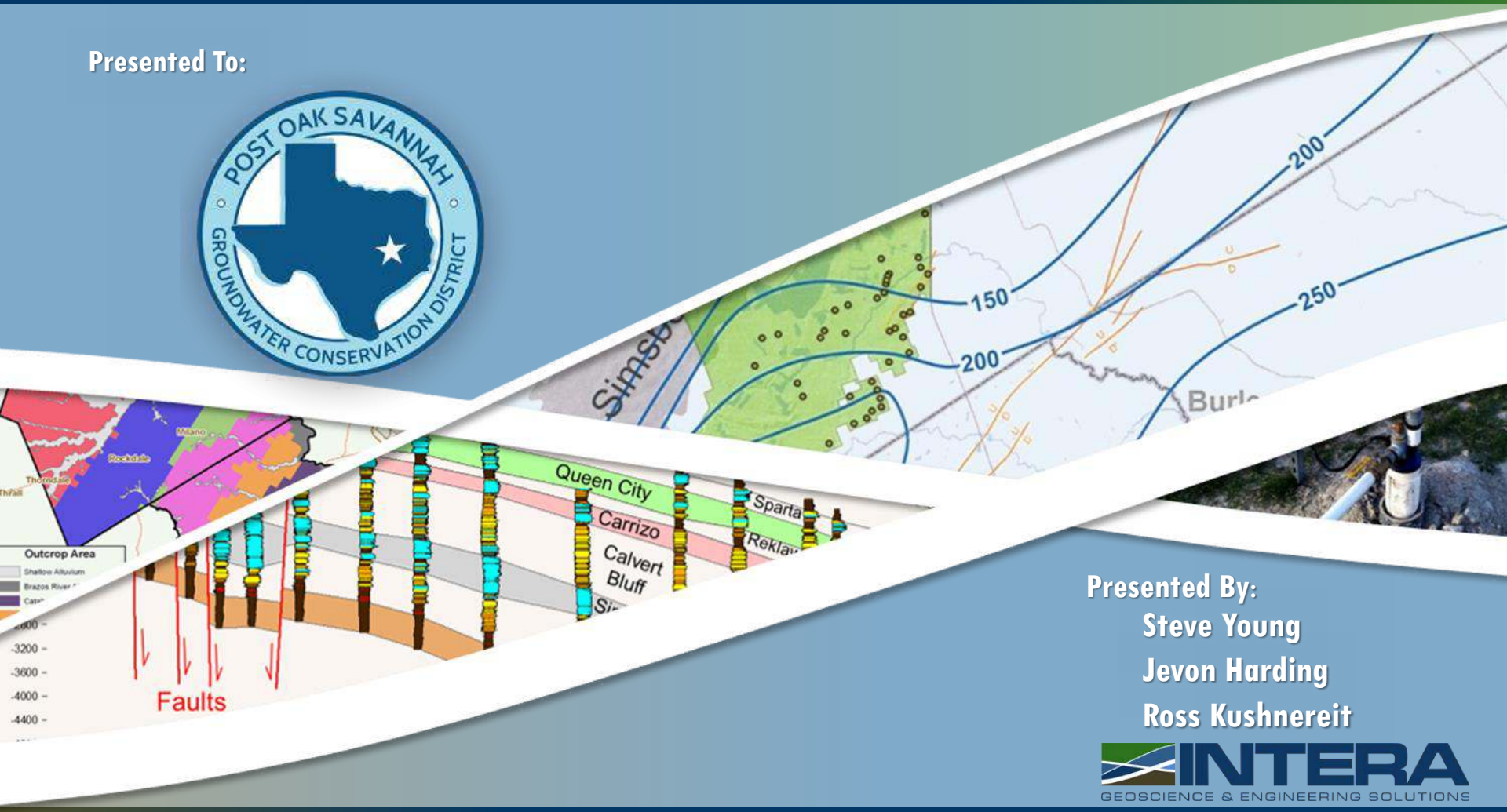
Workshop to DFC Committee: Collection, Management, Evaluation, and Reporting of Monitoring Data

Presented To:

POST OAK SAVANNAH GROUNDWATER CONSERVATION DISTRICT



Presented By:

Steve Young

Jevon Harding

Ross Kushnereit

INTERA
GEOSCIENCE & ENGINEERING SOLUTIONS

June 9, 2020

Agenda

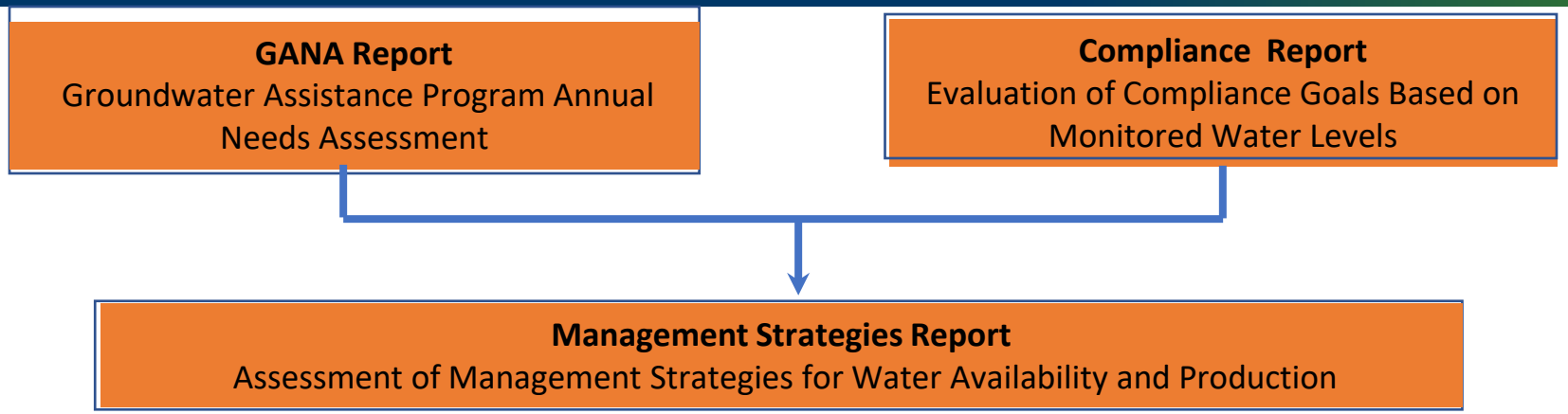
- Review May 2020 Workshop Topic
  - Approach to GANA, CP, MS reports
  - GMA 12 DFCs and POSGCD PDLs
  - GWAP Reassessment
- Monitoring Dashboards
  - Water Levels
  - Historical Pumping
- Compliance Report
  - Assumptions & Caveats
  - Preliminary Results

Agenda (con't)

- Monitoring of Vista Ridge Operations
  - Reported Pumping Rates
  - Measured Water Levels
- Revised GAM and Modified PS-7
  - Vista Ridge Pumping Tests
  - Approach to GAM Revision
  - Current Revised GAM and Simulated Impacts
- GWAP Goals and Policies
  - Potential Benefits and Pitfalls of GANA
  - Subject Areas for Additional Review
  - Guidance for Providing Committee with Possible Modifications

May 2020 Workshop Topic

Required POSGCD Reports



- Provides information & support for policies and rules
- Establish groundwork for possible enforcement to reduce permit & pumping
- Requires high-level of monitoring data collection
- Requires best-science for GW modeling and analysis of monitoring data
- Requires transparency

POSGCD DFCs

Aquifer	Current DFC (feet)	PS-7 Drawdown from 2010 to 2070 (feet)	Options for Achieving POSGCD DFC with PS-7 and without modifying Pumping in other GCDs
Sparta	28	17	• Increase pumping to permit amount ~ 3,000 AFY • Increase pumping to include exempt pumping
Queen City	30	19	• Increase pumping to include exempt pumping
Carrizo	67	177	• 10% Uncertainty with GAM Prediction • Reduce Pumping in POSGCD
Calvert Bluff	149	183	• Improve GAM Representation of Simsboro Transmissivity • 10% Uncertainty with GAM Prediction (18 ft)
Simsboro	318	355	• Improve GAM Representation of Simsboro Transmissivity
Hooper	205	222	• Improve GAM Representation of Simsboro Transmissivity • 10% Uncertainty with GAM Prediction (22 ft)

GWAP Questions Regarding Corrective Action

- Based strictly on modeling results?
- POSGD to assume “no-fault” policy and pay for all costs?
- What does “as soon as possible” mean?
- Should requirement be “pump being set at a depth that will exceed the 50-year water level decline” ?
- Who is responsible party to conduct investigation?
- What components comprise the investigation and evaluation?
- What is meaning of “aquifer-wide” pumping
- Is owner responsible for providing accurate well construction specifications?

Monitoring Dashboards

Reason for Dashboards

- Why create Monitoring & Pumping dashboards?

Monitoring Water Level Dashboard

Version	*1*			
Date Created	*5/29/2020*			
Number	**Description**	**Tasks**	**Checks**	
Task A	Complete Inventory of Monitoring Wells	1. update POSGCD monitoring well list (include "retired" wells)	POSGCD monitoring wells	243
		2. update non-POSGCD monitoring well list	non-POSGCD monitoring wells	0
Task B	Complete Trimble survey of remaining monitoring wells	1. Survey remaining monitoring wells	monitoring wells to survey	35
		2. Survey Permitted wells with bad locations	wells with bad locations (outside District)	16
Task C	Complete well depth or screen information	1. Fill data gap for wells with no depth (drillers log, well tape, run camera, etc.)	wells w/ no depth	6
		2. Fill data gap for wells with no screen (drillers log, run camera, etc.)	wells w/ no screens	53
		3. Fill data gap for wells with no pump elevation		
		4. Identify/Validate source of well info for all monitoring wells	wells not validated	??
Task D	Compile Water Levels	1. Compile water levels (used for DFC Compliance)		
		2. Compile shallow water levels (used for PDL Compliance)		
Task E	Assign Wells to Aquifers	1. Identify monitoring wells in single Aquifer	wells completed in one aquifer	210
		2. Identify wells in multiple aquifers	wells completed over multiple aquifers	33
		3. Identify Wells with suspect WLs	wells w/ suspect WLs	???
		4. Reclassify wells using information other than GAM structure (ex. Gause)		
		5. Identify wells in Shallow Management Zone		
Task F	TWDB Aquifer Assignments and SWNs	1. Submit new well locations to TWDB for SWN assignment	wells with no SWN	119
		2. Complete documentation for Aq Assignment for TWDB meeting	wells with different AQ than TWDB	57
Task G	Transducer & WellIntel Data	1. Download & Compile Transducer WLs	In-Situ transducers	21
		2. Validate Transducer WLs with manual measurements		
		3. Download & Compile WellIntel WLs	WellIntel recorders	15
		4. Validate WellIntel WLs with manual measurements		
Task H	Vista Ridge Hourly Data	1. Add Vista Ridge Well Info	Vista Ridge wells	??
		2. Download & compile WLs		
Task I	Maintain Master spreadsheet	1. Download and store latest spreadsheet (every 2 weeks)		
		2. Update spreadsheet version and reshare file		

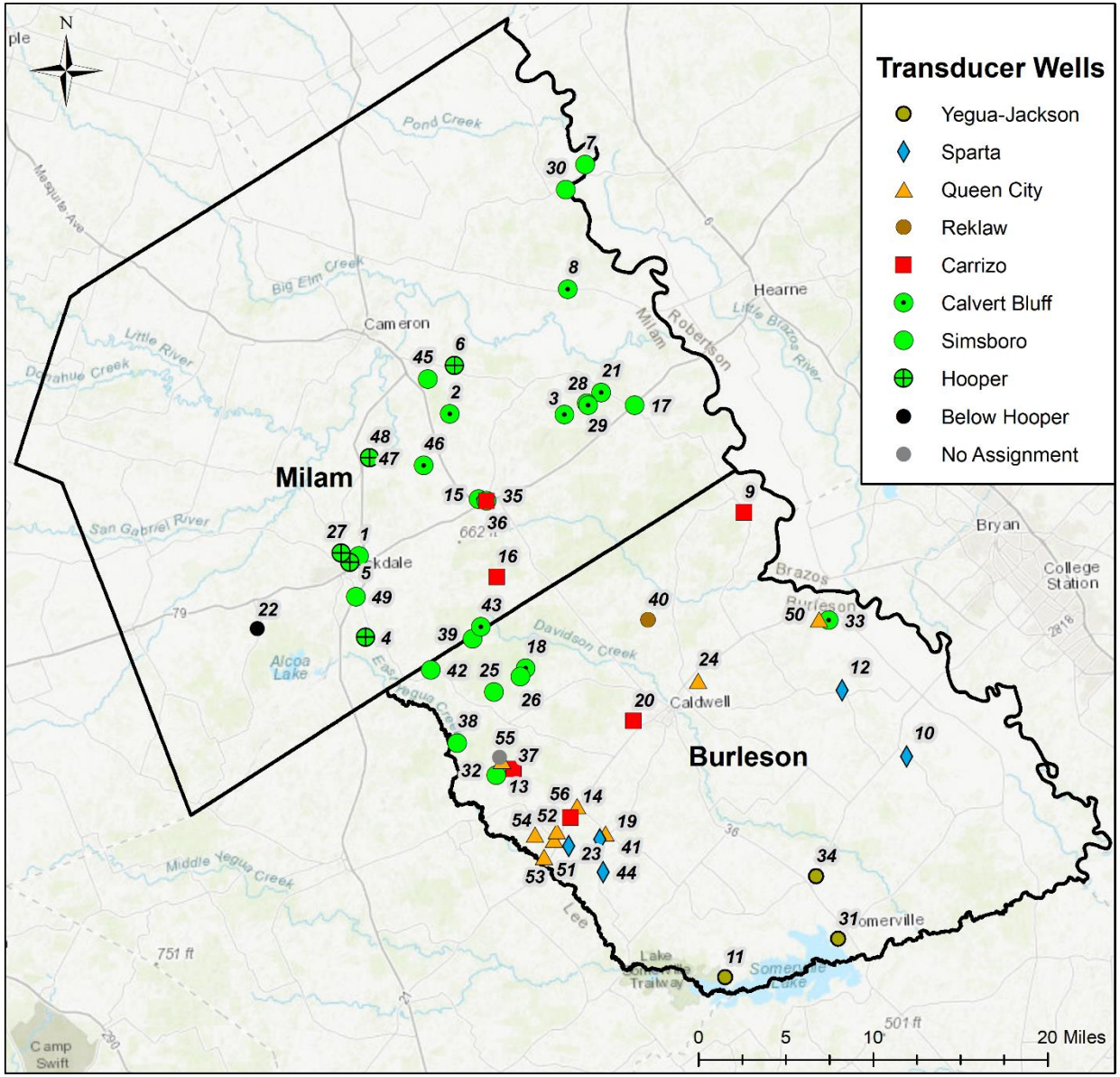
Monitoring Pumping Dashboard

Version	***1***	
Date Created	***5/29/2020***	
Number	**Description**	**Tasks**
Task A	Inventory of Operational Permits	1. Complete Information Related to Amounts, Aquifers, and Wells
		2. Compile total permits by Owner
Task B	Inventory of Permitted Wells	1. Associate wells with permits
Task C	Location and Construction of Permitted Wells	1. Survey Permitted wells with bad locations
		2. Validate well depth and screen location
Task D	Assign Permitted Wells to Aquifers	1. Identify permitted wells in single Aquifer
		2. Identify permitted wells in multiple aquifers
		3. Identify Wells with suspect WLs
		4. Reclassify wells using information other than GAM structure
Task E	POSGCD Historical Pumping	1. Reported Pumping by Operating Permit
		2. Reported Pumping by Permitted Well
		3. Report Pumping by Aquifer
Task F	TWDB Historical Pumping	1. Compile TWDB pumping by Aquifer
		2. Compare TWDB pumping to POSGCD values by User
Task G	Measured Flow Rates	1. Schedule for site visits
		2. Measured Flow Rates
Task H	Exempt Pumping	1. Methodology for estimating exempt pumping
		2. Calculated exempt pumping
Task I	Maintain Master spreadsheet	1. Download and store latest spreadsheet (every 2 weeks)
		2. Update spreadsheet version and reshare file

Continuous Monitoring Locations for Water Level Data

WellIntel - Existing	
#	DistrictId
3	PO-000073
5	PO-000121
14	PO-001061
15	PO-001063
17	PO-001082
19	PO-001573
20	PO-001575
28	PO-007998
29	PO-008153
33	PO-009064
36	PO-009167
49	PO-009706
50	PO-009707

WellIntel - Pending	
#	DistrictId
8	PO-000256
13	PO-000943
18	PO-001390
21	PO-001789
22	PO-001983
24	PO-006090
30	PO-008274
31	PO-008420
37	PO-009189
40	PO-009387
56	PO-011279



Transducers	
#	DistrictId
1	PO-000025
2	PO-000053
4	PO-000107
6	PO-000221
7	PO-000234
9	PO-000433
10	PO-000638
11	PO-000698
12	PO-000877
16	PO-001066
23	PO-005899
25	PO-006621
26	PO-006910
27	PO-007506
32	PO-008767
34	PO-009157
35	PO-009166
38	PO-009215
39	PO-009230
41	PO-009445
42	PO-009446
43	PO-009475
44	PO-009477
45	PO-009545
46	PO-009551
47	PO-009553
48	PO-009555
51	PO-009708
52	PO-009709
53	PO-009710
54	PO-009774
55	PO-011118

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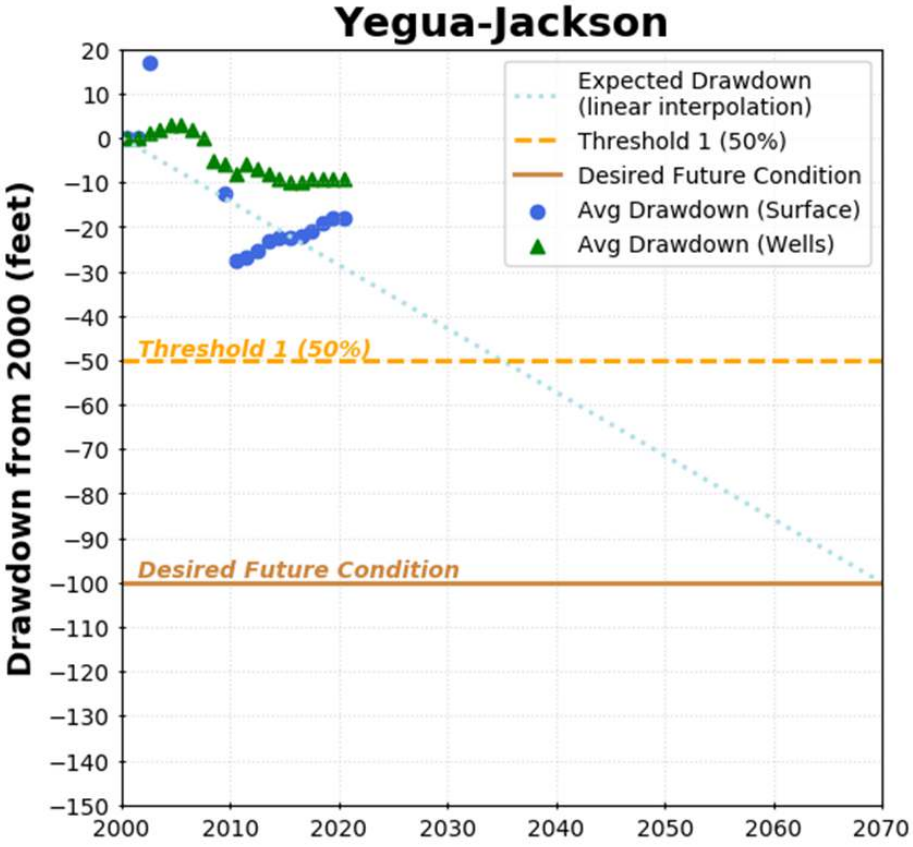
Compliance Report – Preliminary Results for Calculated DFCs and PDLs

Compliance Report – Preliminary Results

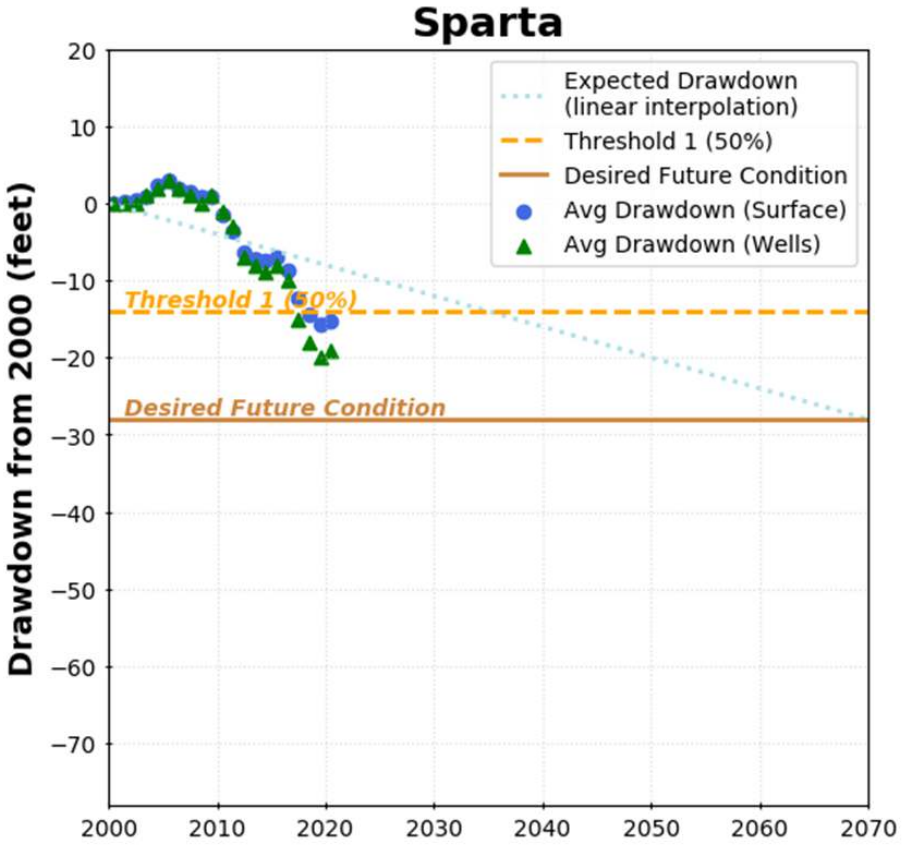
- Preliminary Analysis of Drawdowns
  - based on 2000 baseline year
  - Aquifer assignments currently being validated

- On-going Evaluations
  - Investigate sensitivity of drawdown to number of wells by using another initial year besides 2020
  - Investigate potential improvements to the interpolation methods

Preliminary Evaluation for DFC Compliance

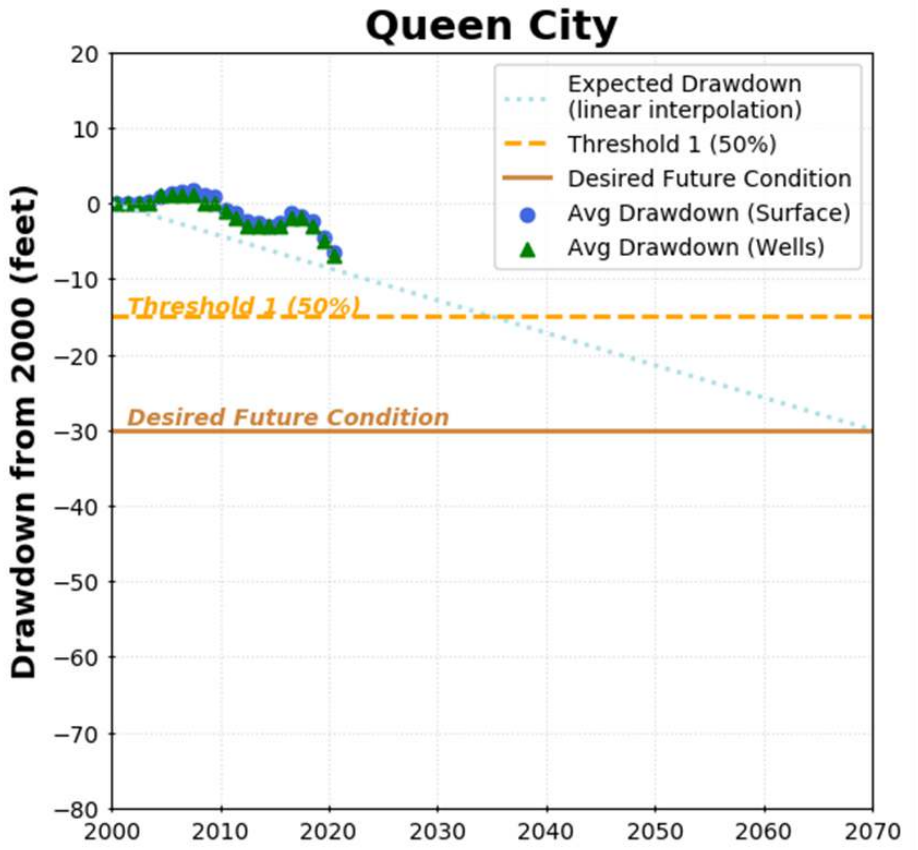


(1 well)

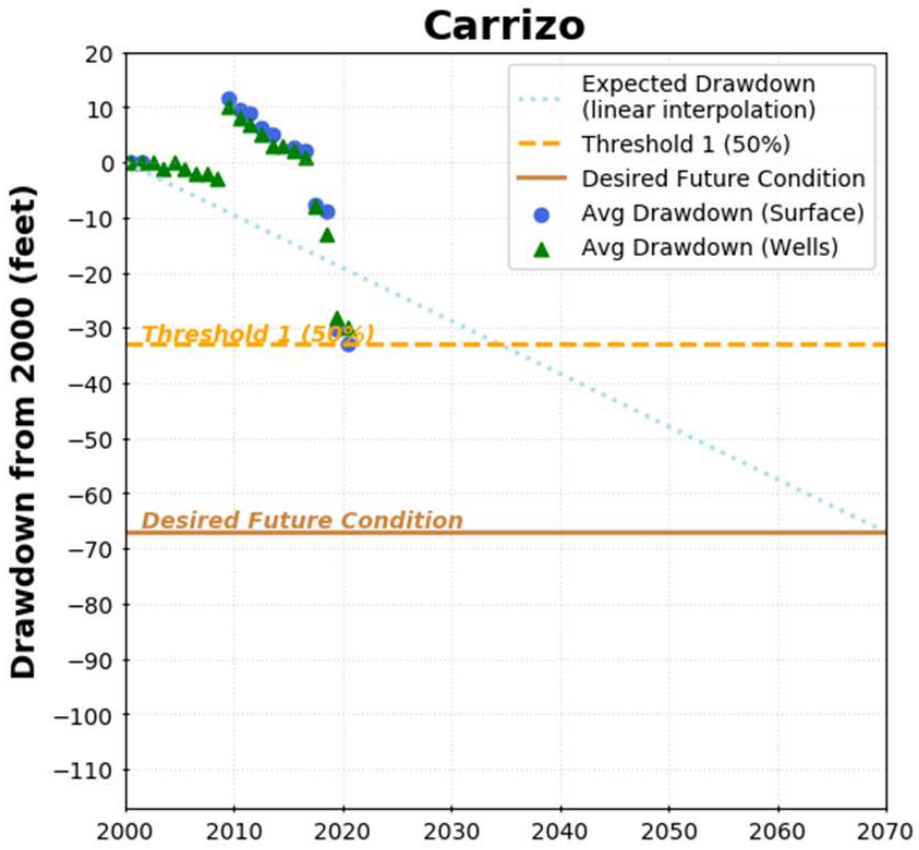


(3 wells)

Preliminary Evaluation for DFC Compliance



(4 wells)



(5 wells)

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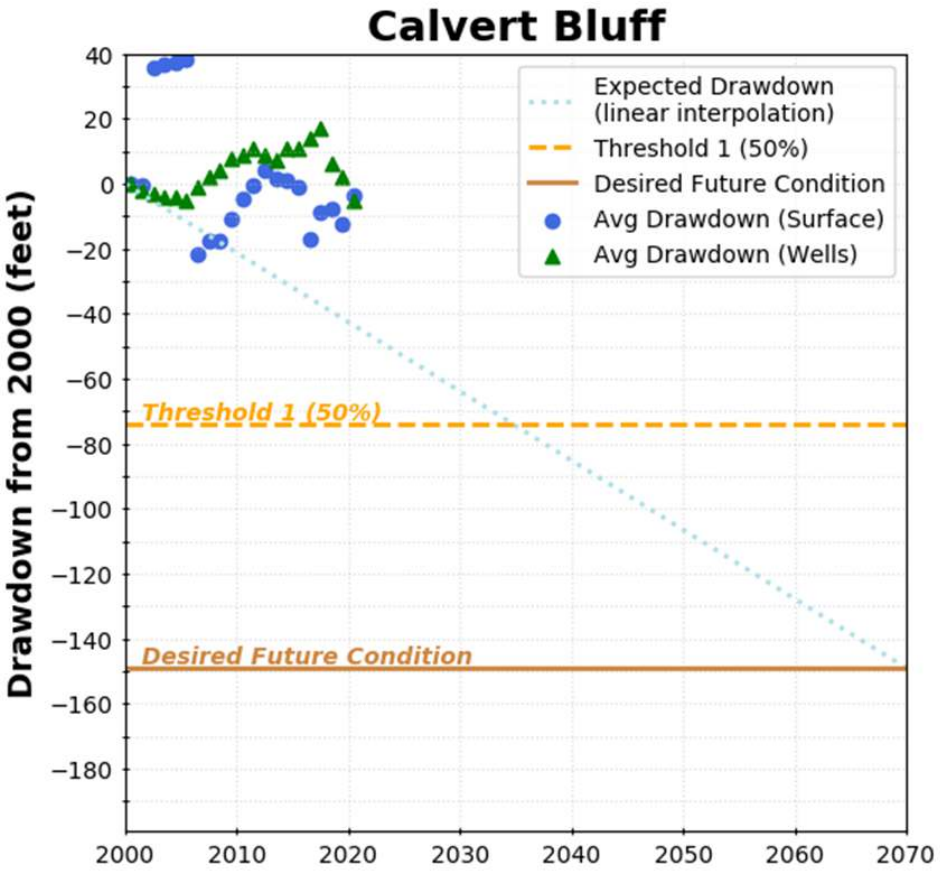
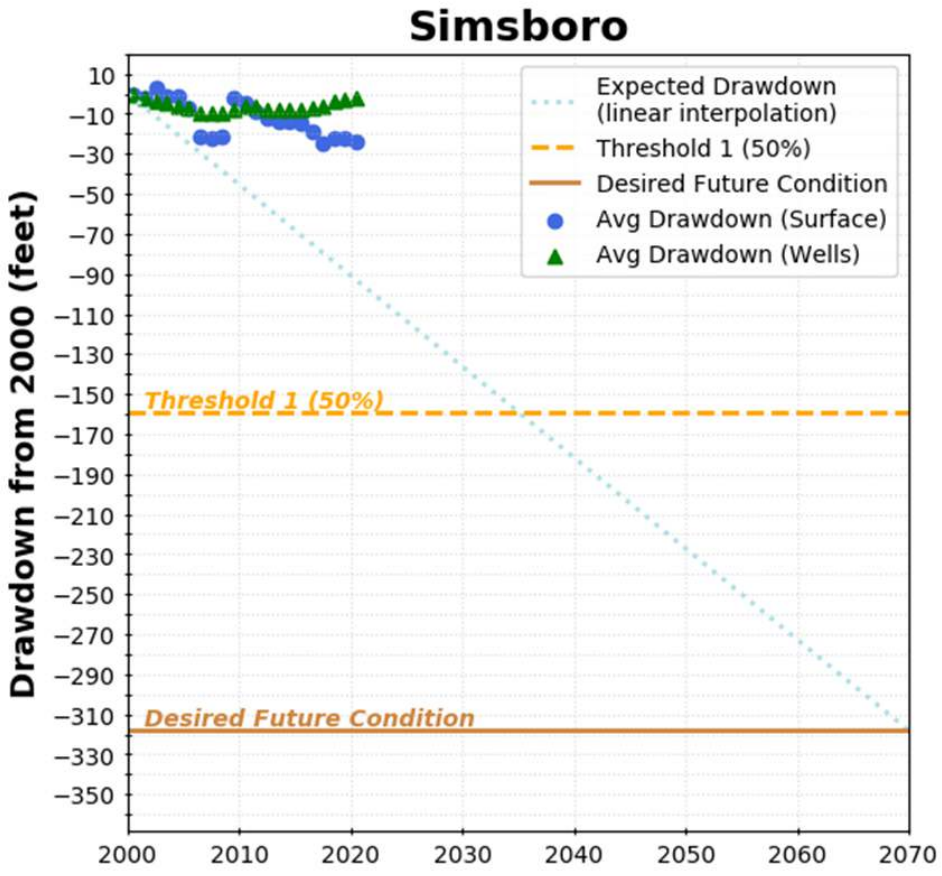
Preliminary Evaluation for DFC Compliance



(12 wells)



(15 wells)

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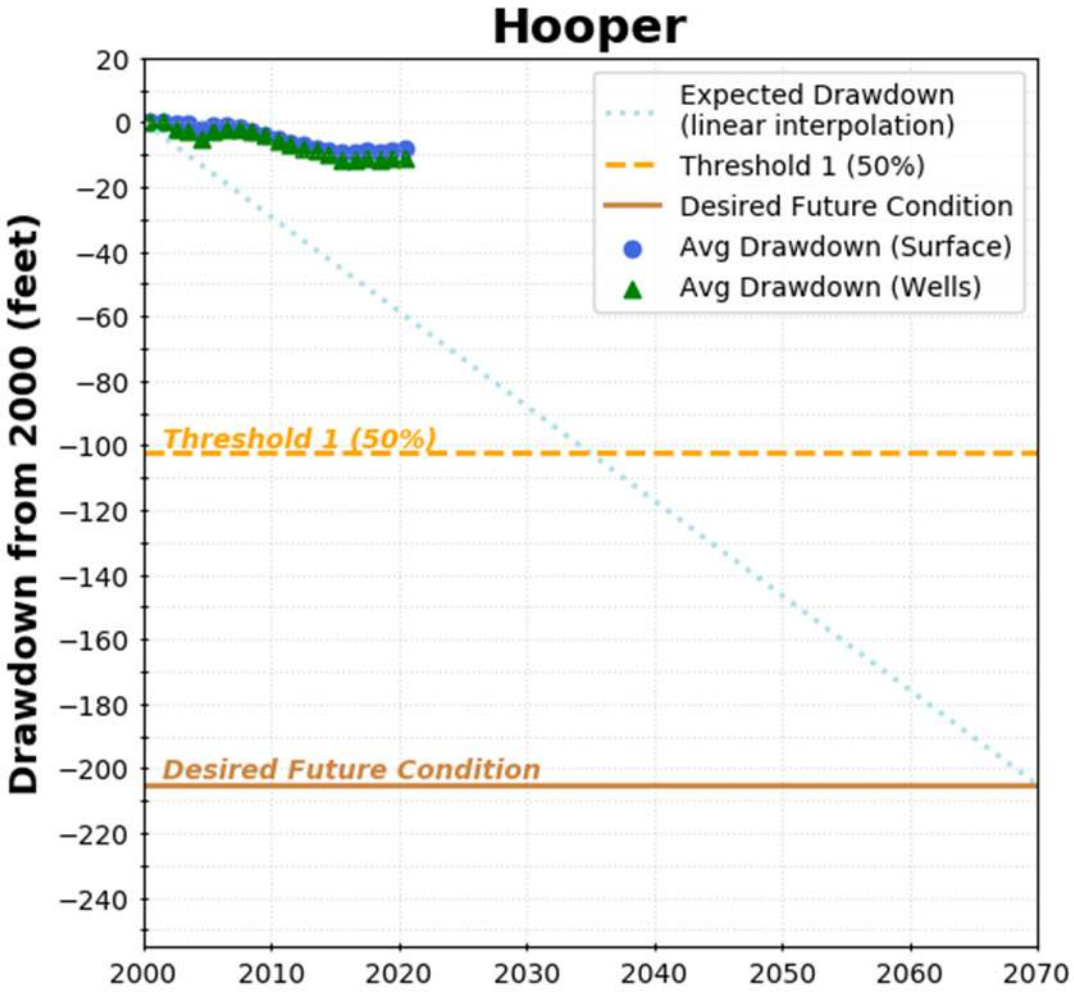
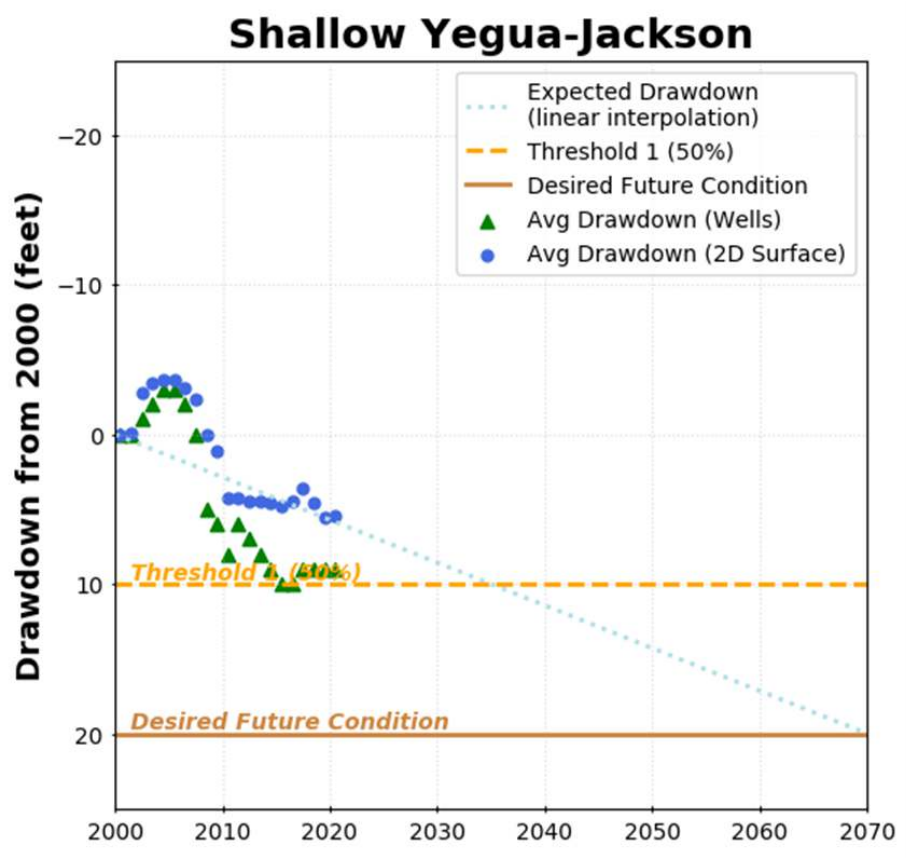
Preliminary Evaluation for DFC Compliance

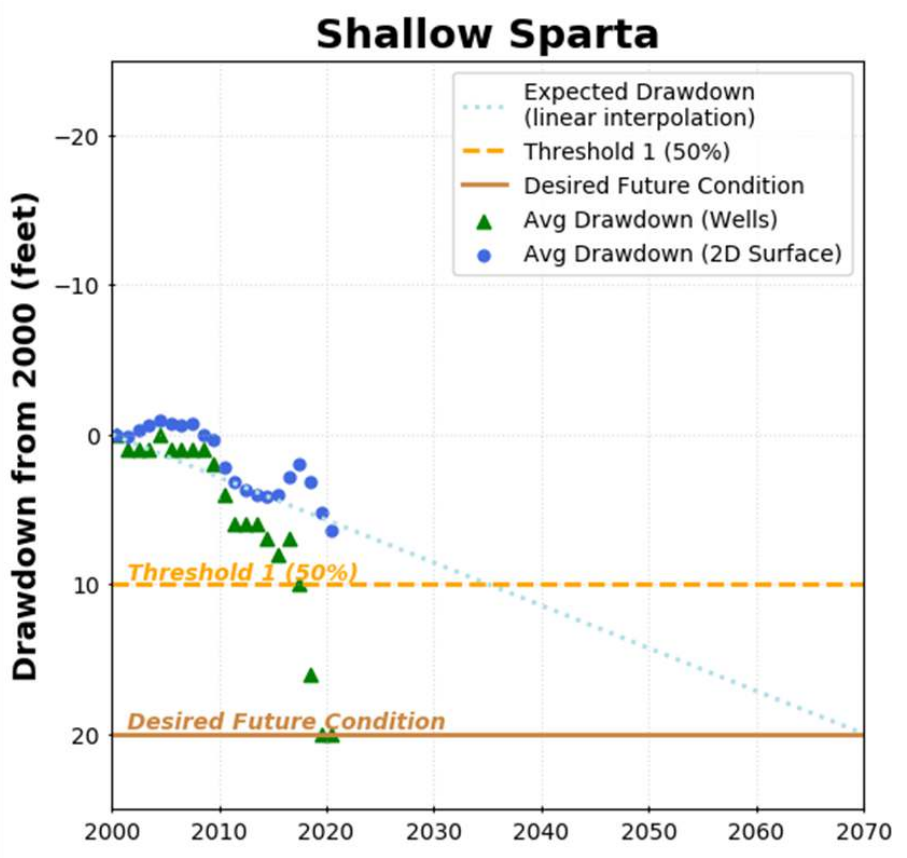


(5 wells)

Preliminary Evaluation for PDL Compliance

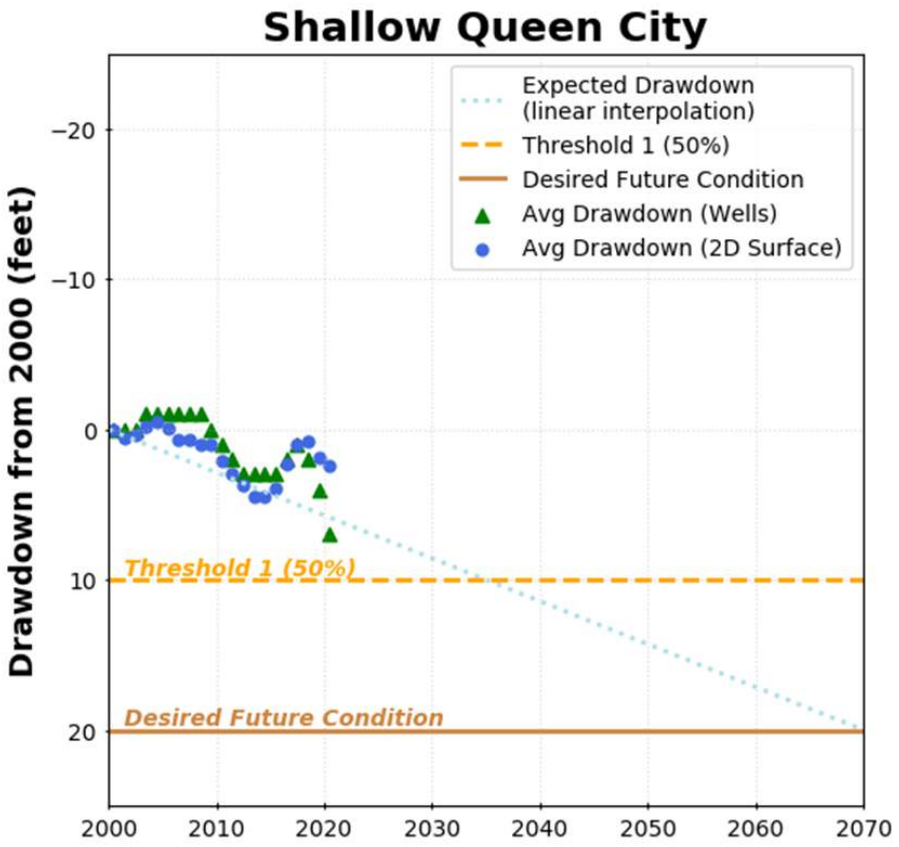


(1 wells)

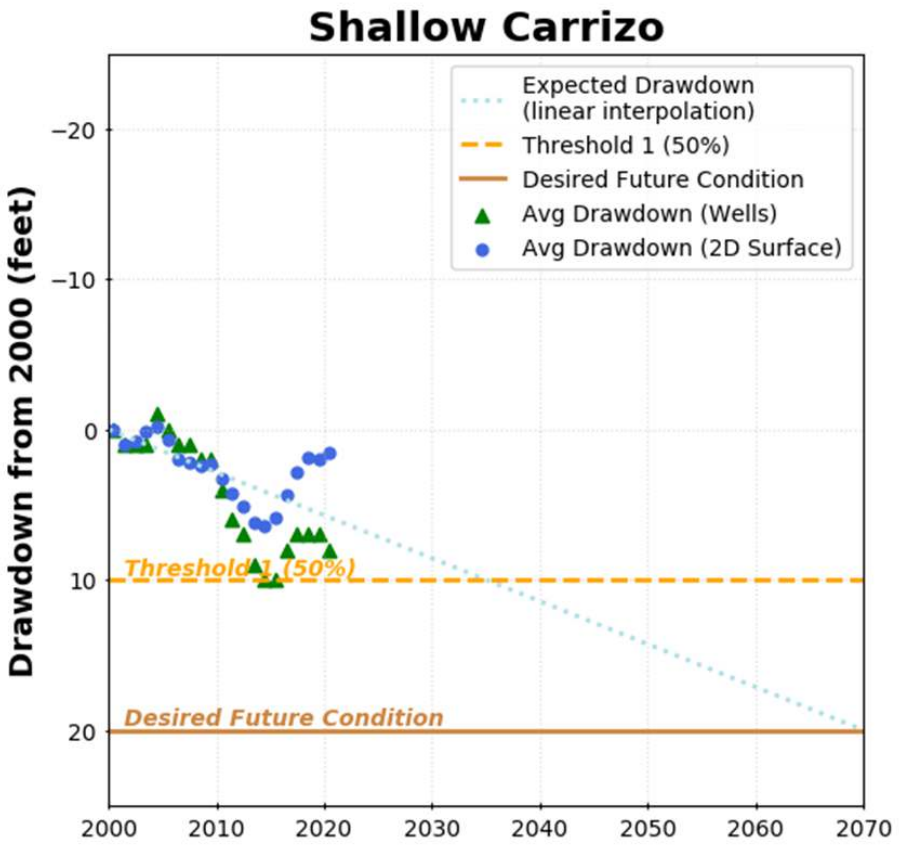


(1 wells)

Preliminary Evaluation for PDL Compliance

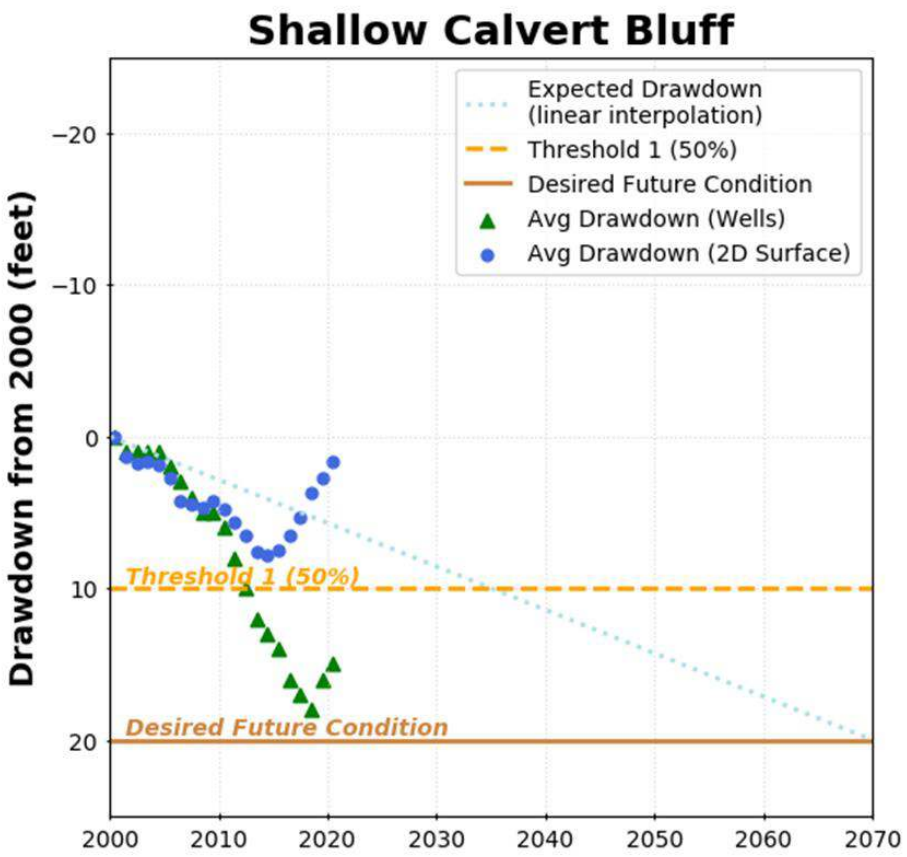


(3 wells)

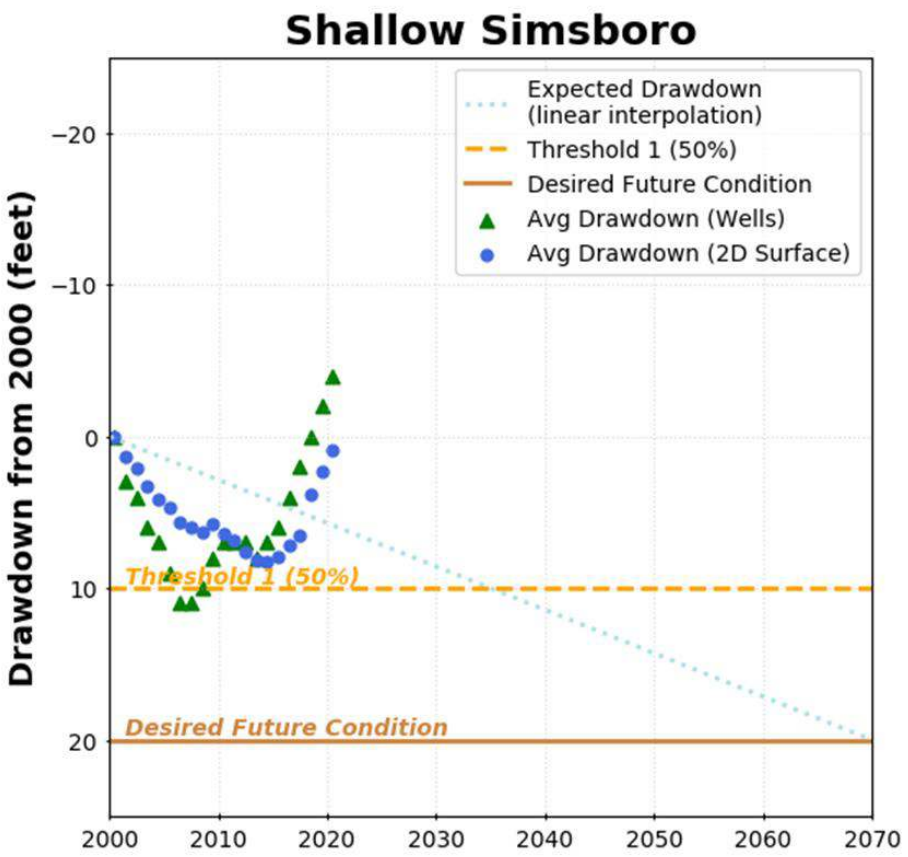


(1 wells)

Preliminary Evaluation for PDL Compliance



(2 wells)



(10 wells)

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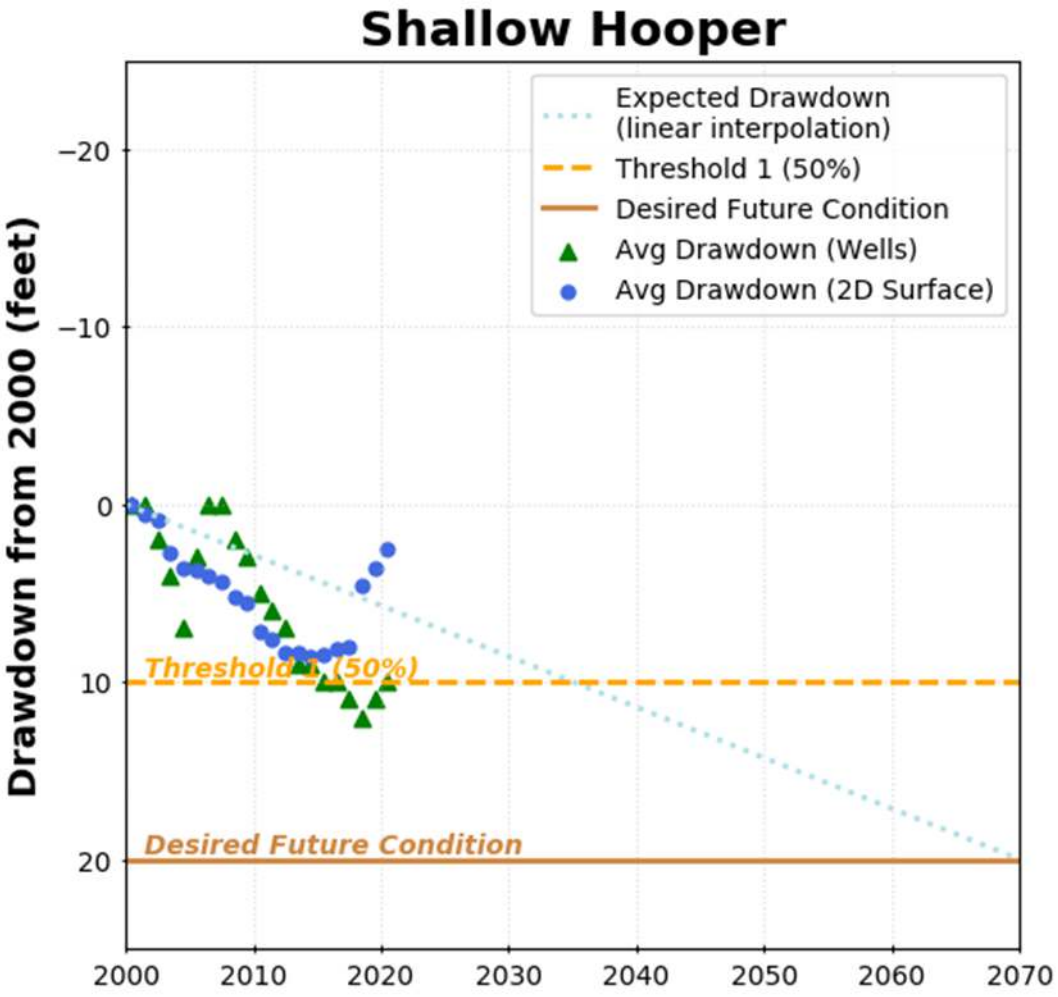
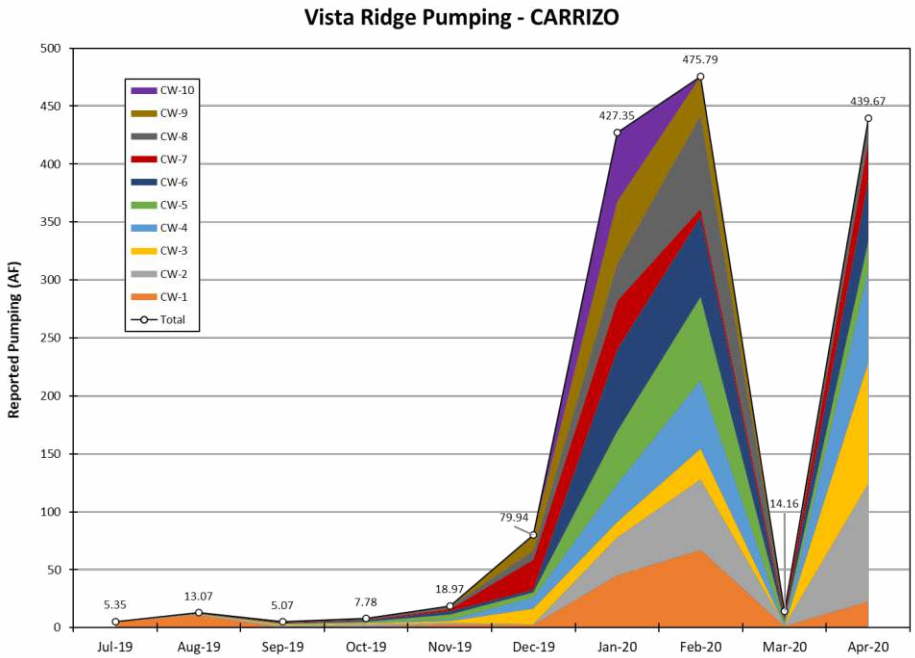
Preliminary Evaluation for PDL Compliance

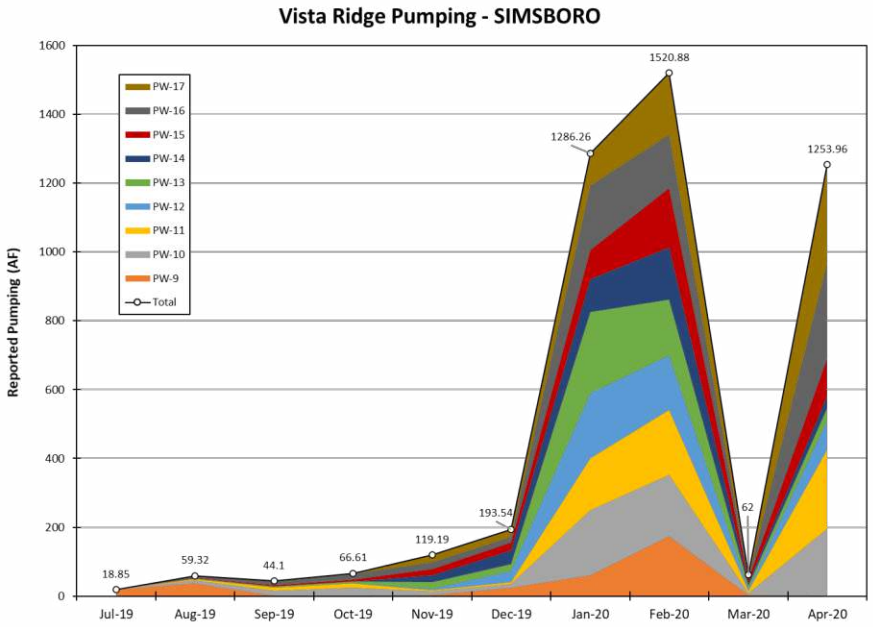


(3 wells)

Monitored Results from Vista Ridge Pumping

Pumping Rates





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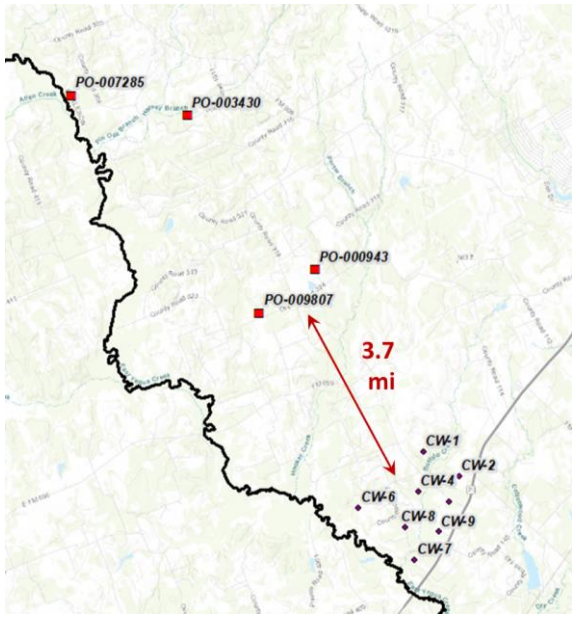
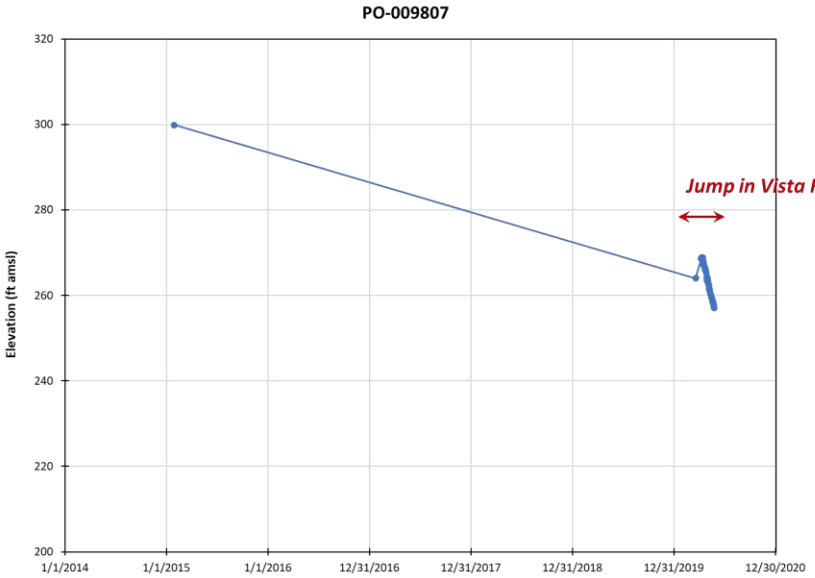
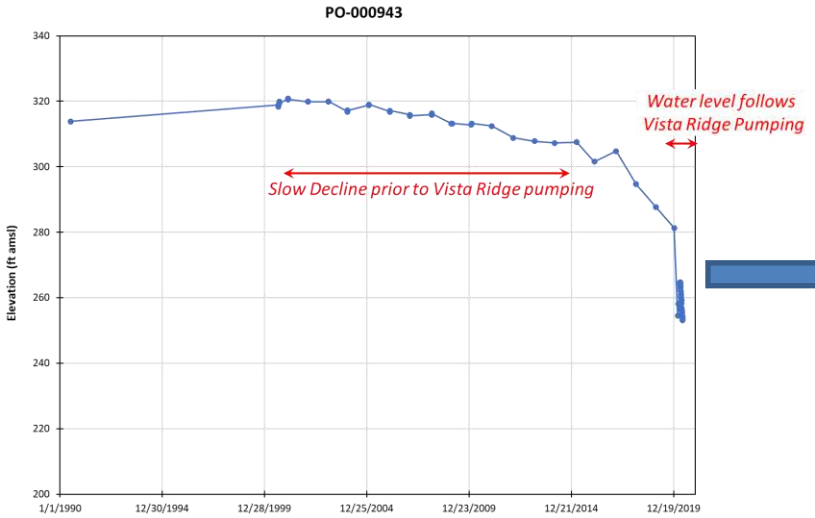
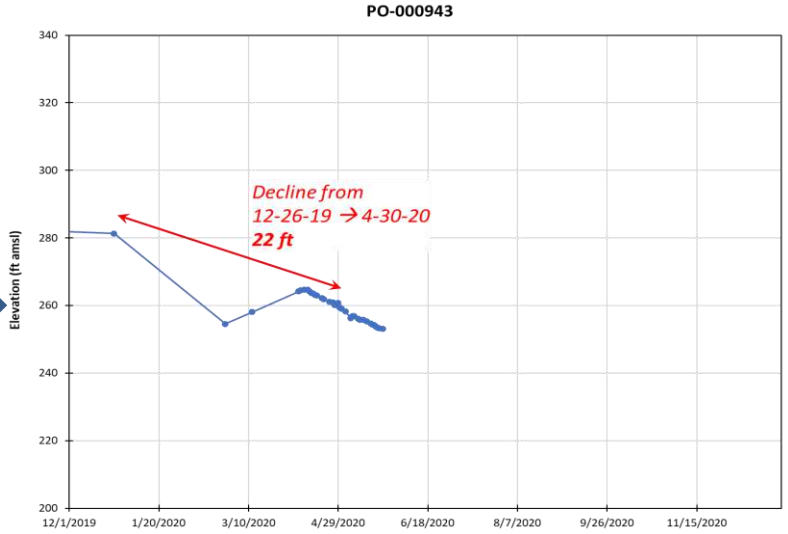
Observed Drawdown in Carrizo: PO-009807 & PO-000943



Carrizo







Draft - Preliminary Results

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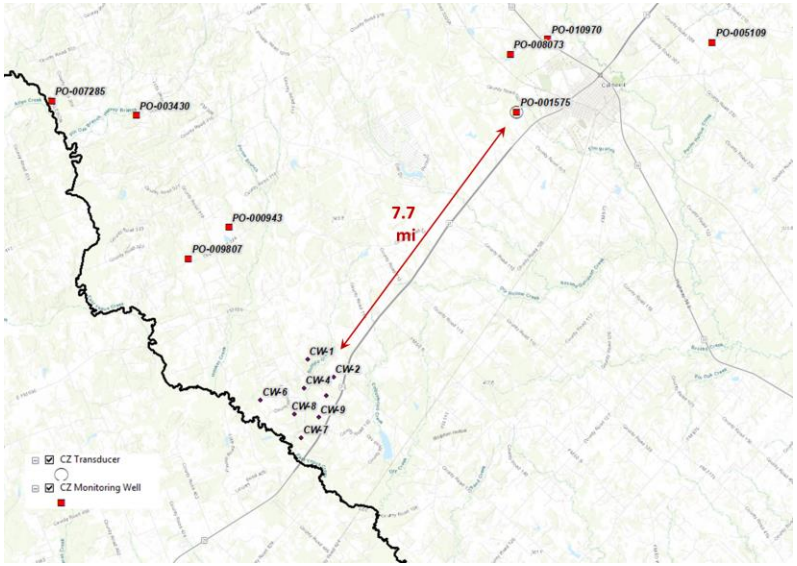
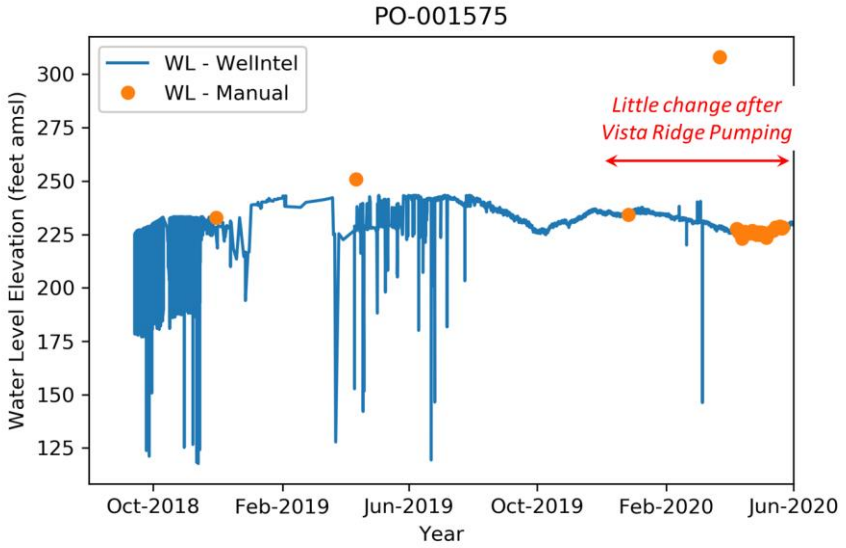
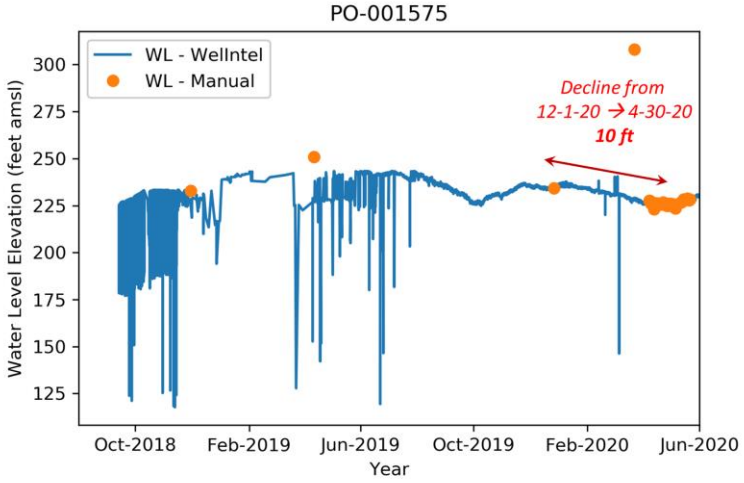
Observed Drawdown in Carrizo: PO-001575







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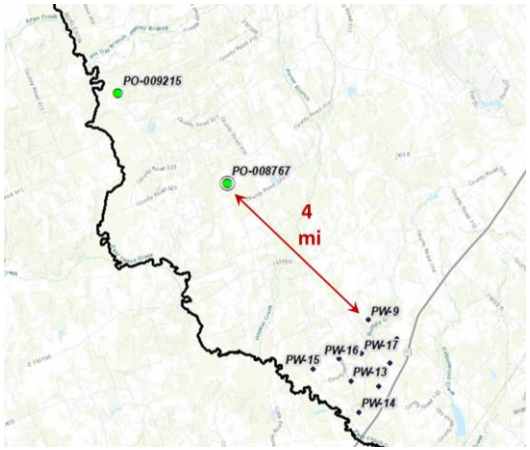
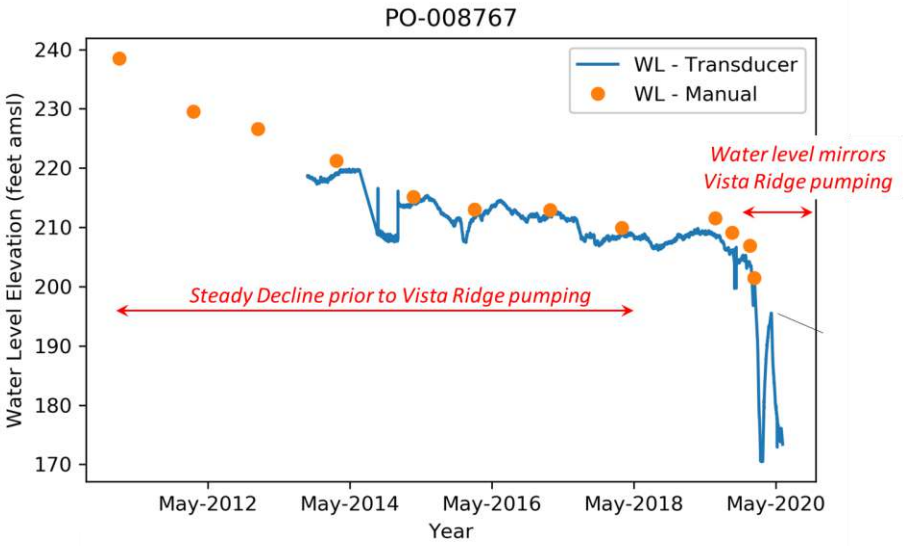
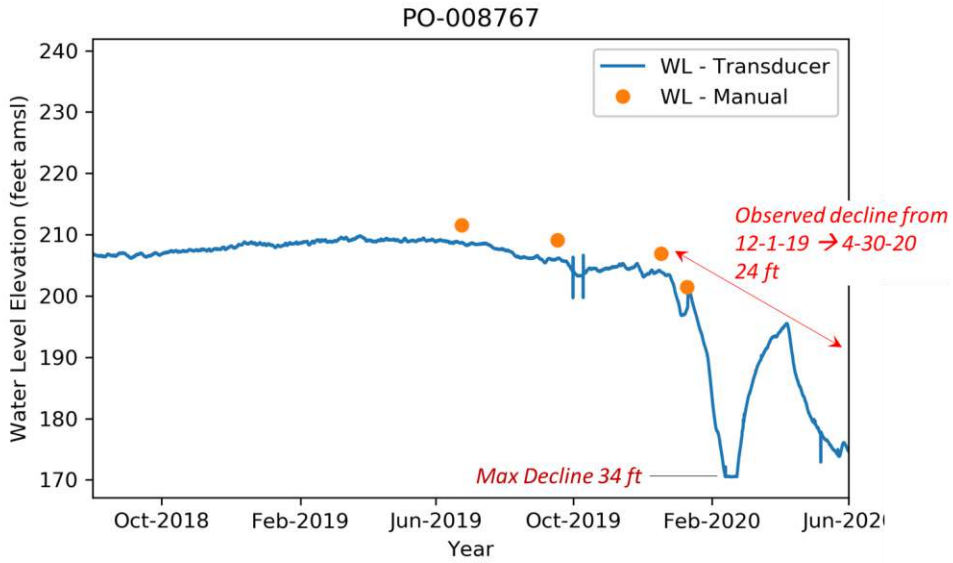
Observed Drawdown in Simsboro: PO-008767







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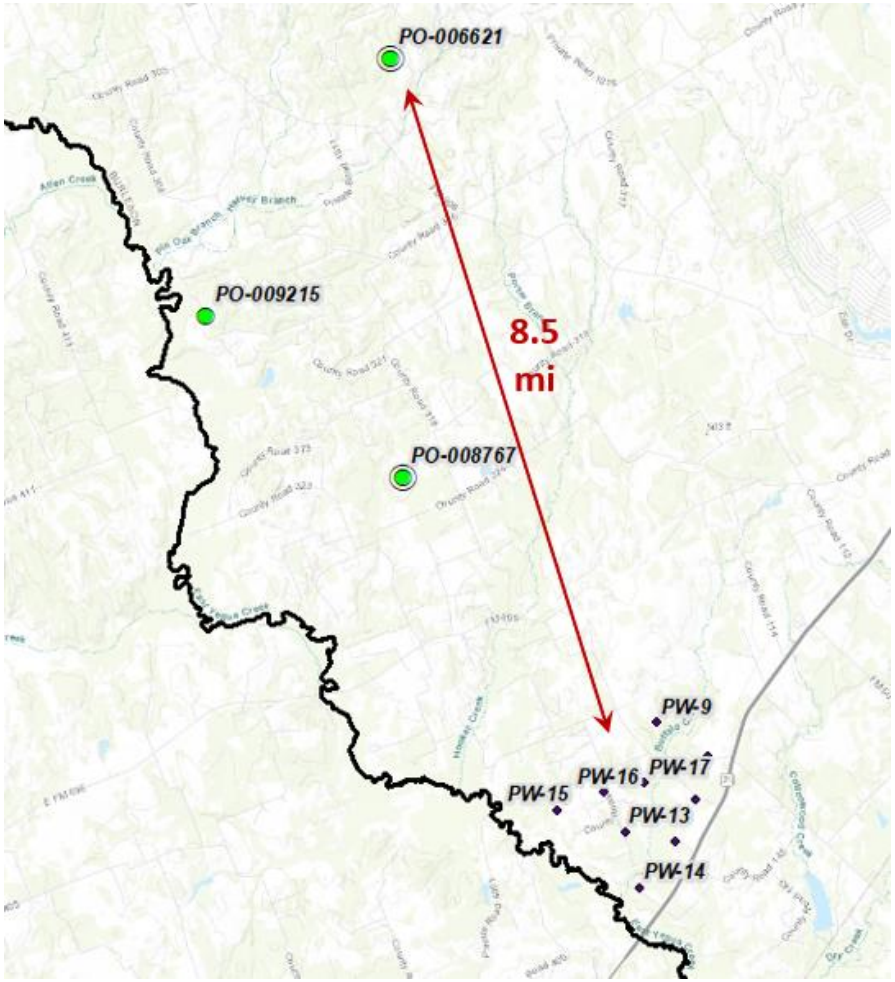
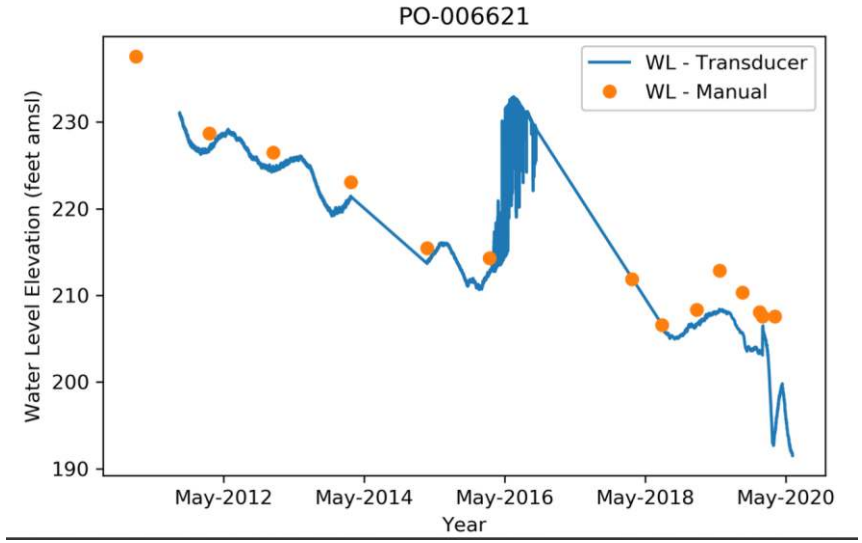
Observed Drawdown in Simsboro: PO-006621





Draft - Preliminary Results

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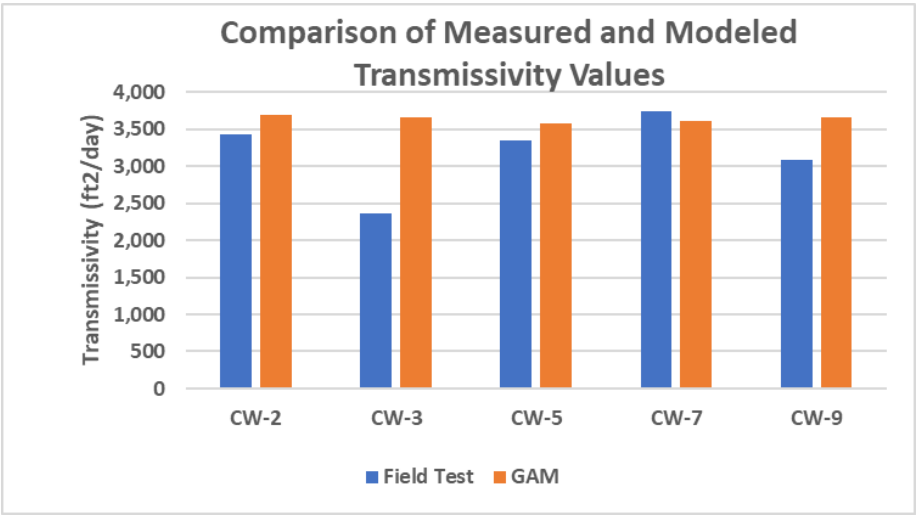
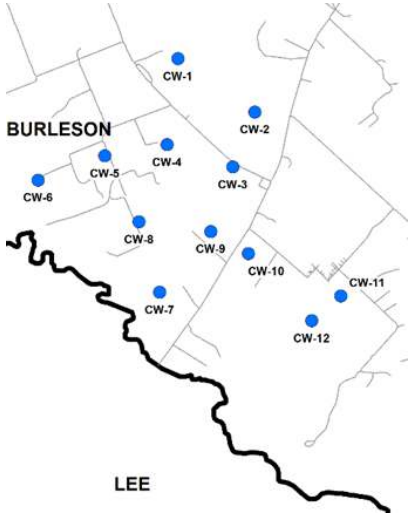
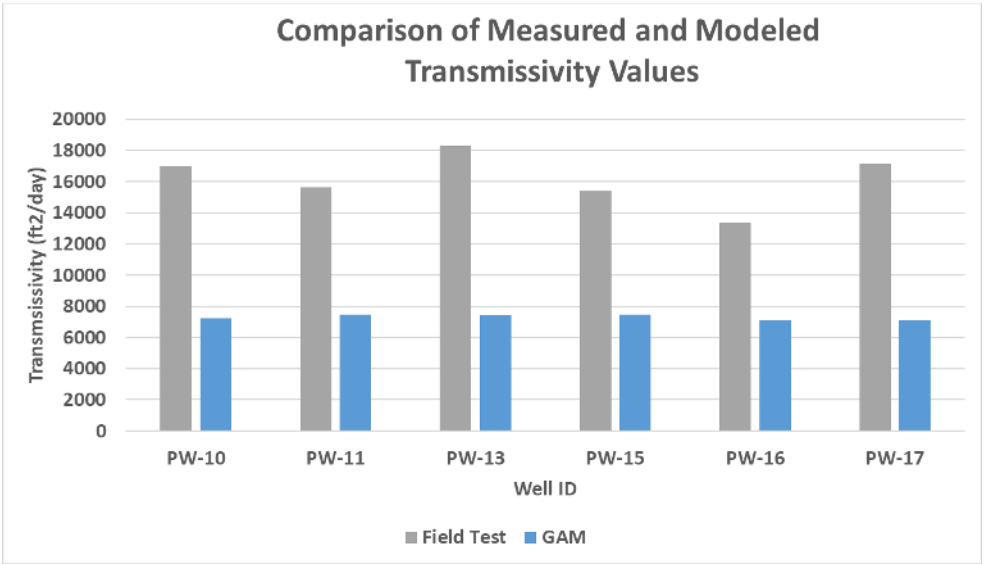
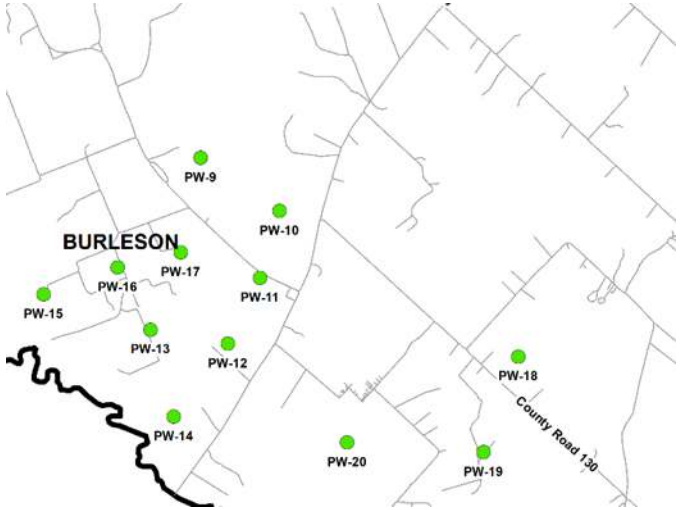
Modified GAM to Account for New Simsboro Transmissivity Data Near Vista Ridge Wells

Vista Ridge Pumping Tests









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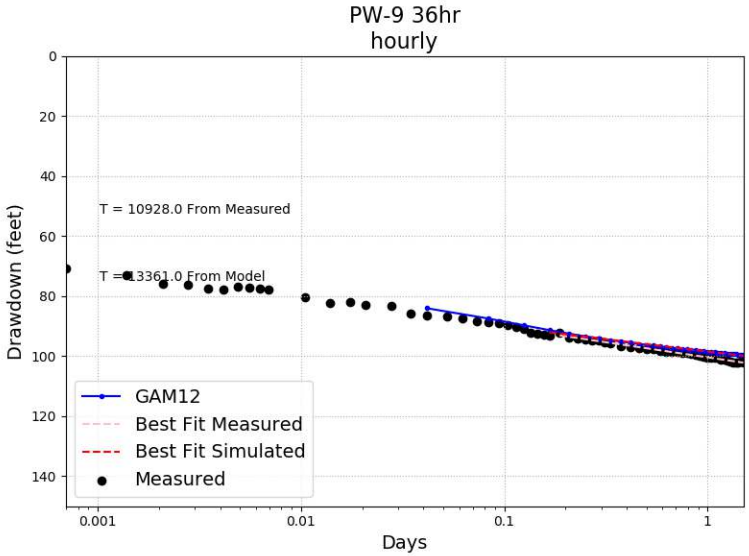
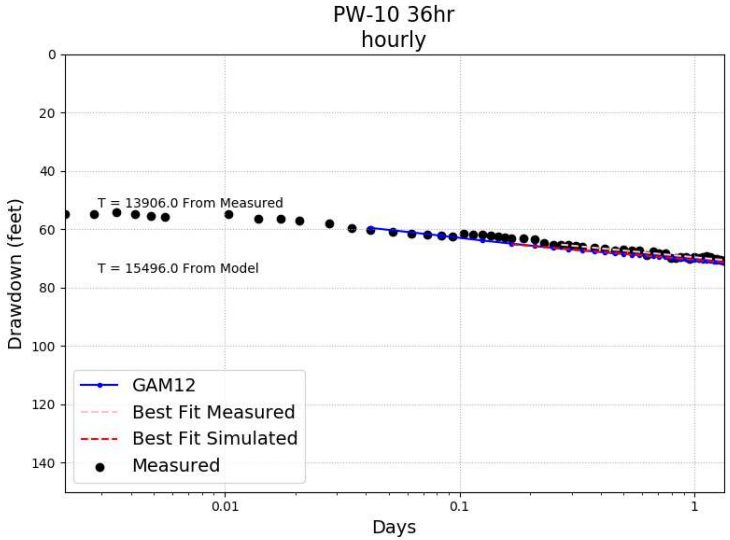
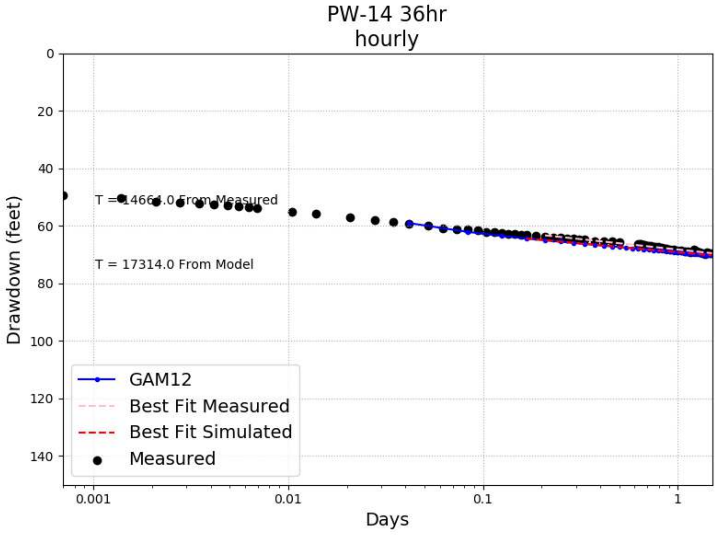
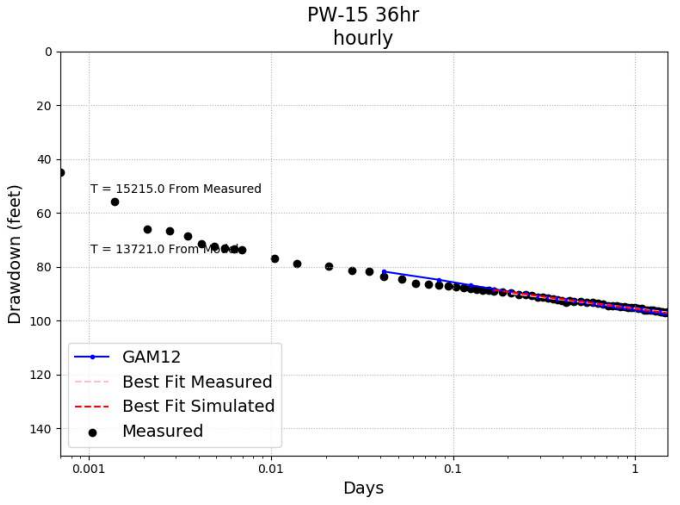
Preliminary GAM Modification: PW-13 23-day Aquifer Pumping Test





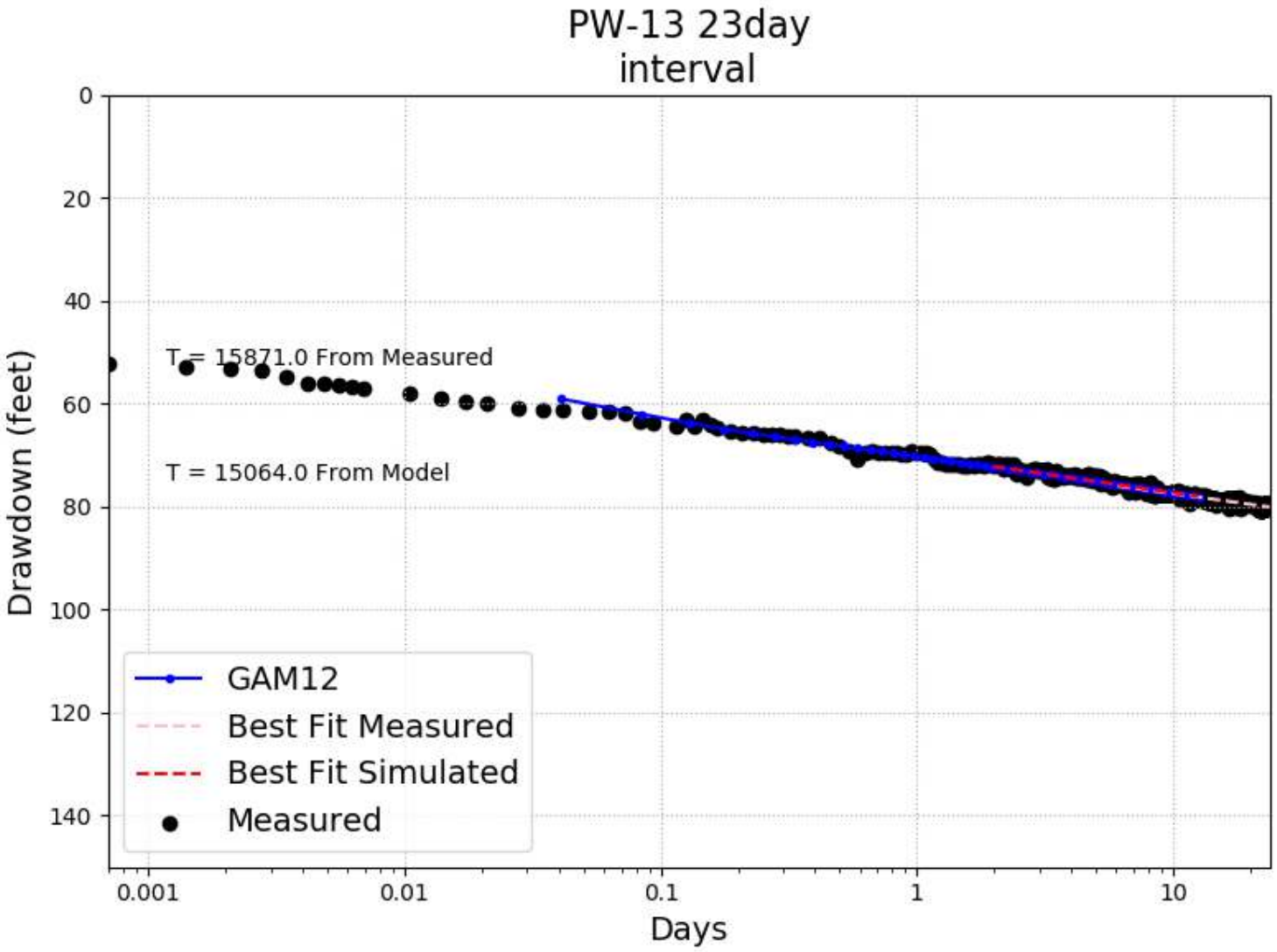




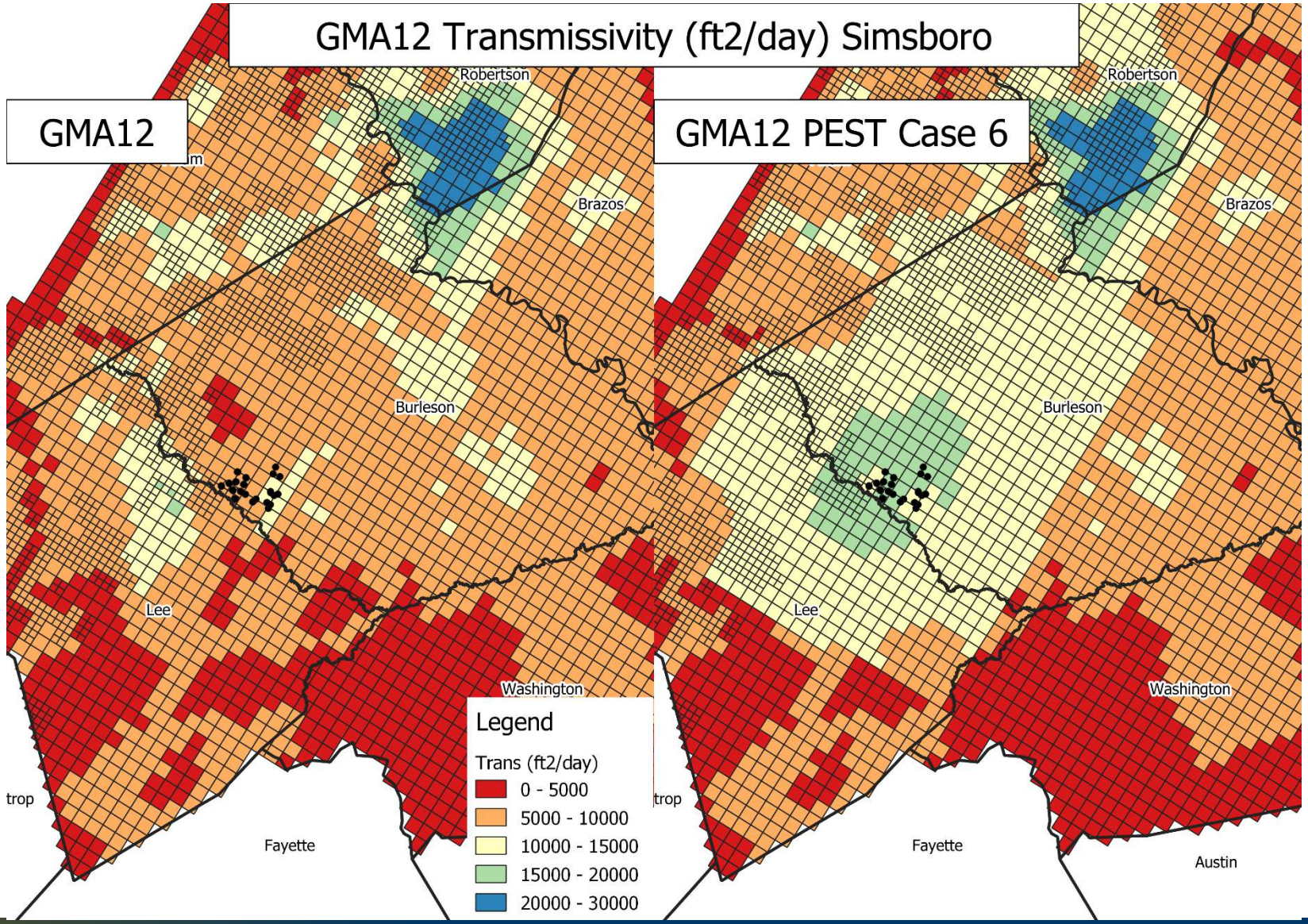
Draft - Preliminary Results

INTERA GEOSCIENCE & ENGINEERING SOLUTIONS

Preliminary GAM Modification: PW-13 23-day Aquifer Pumping Test



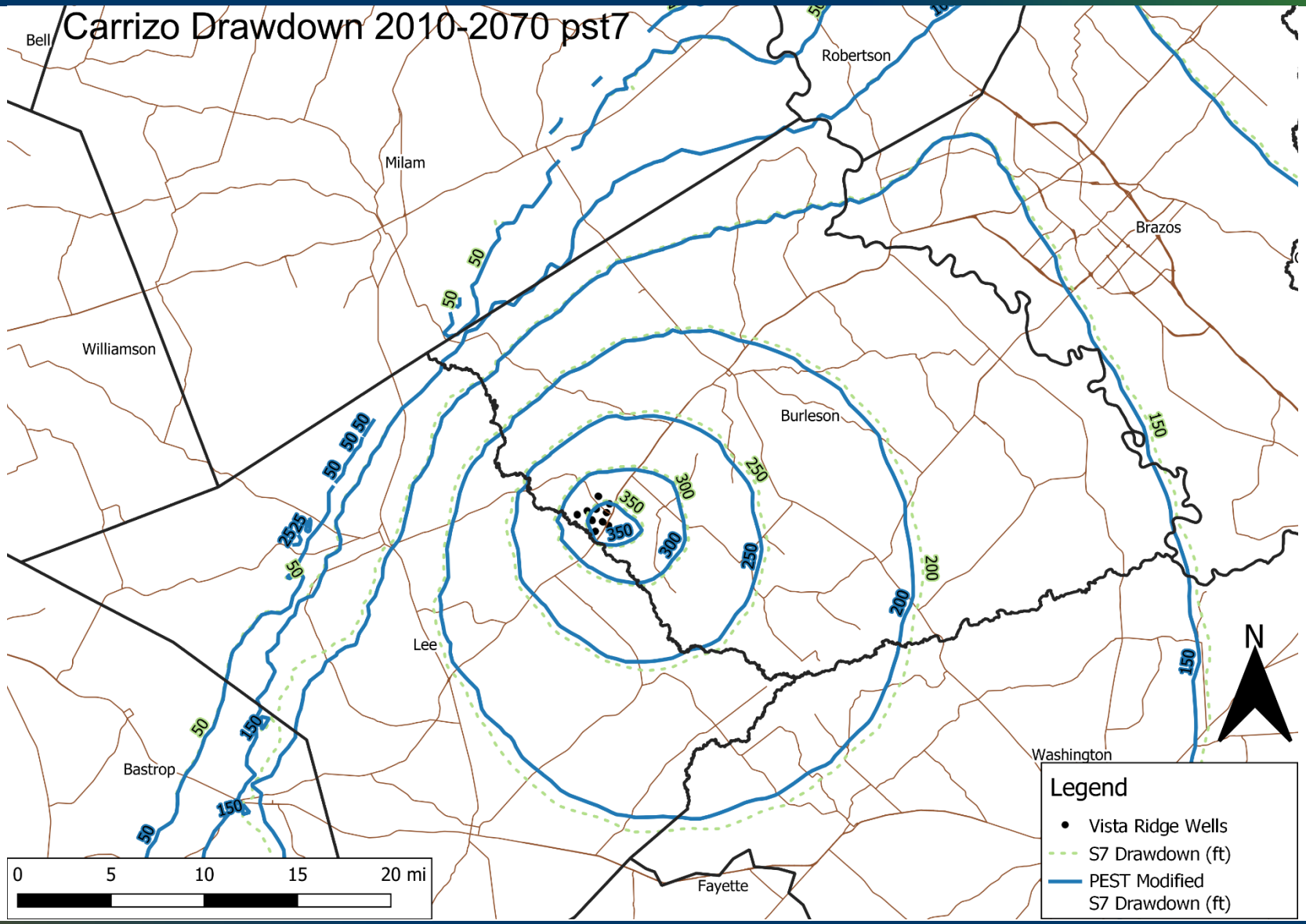
Preliminary GAM Modification



Draft - Preliminary Results

INTERA GEOSCIENCE & ENGINEERING SOLUTIONS

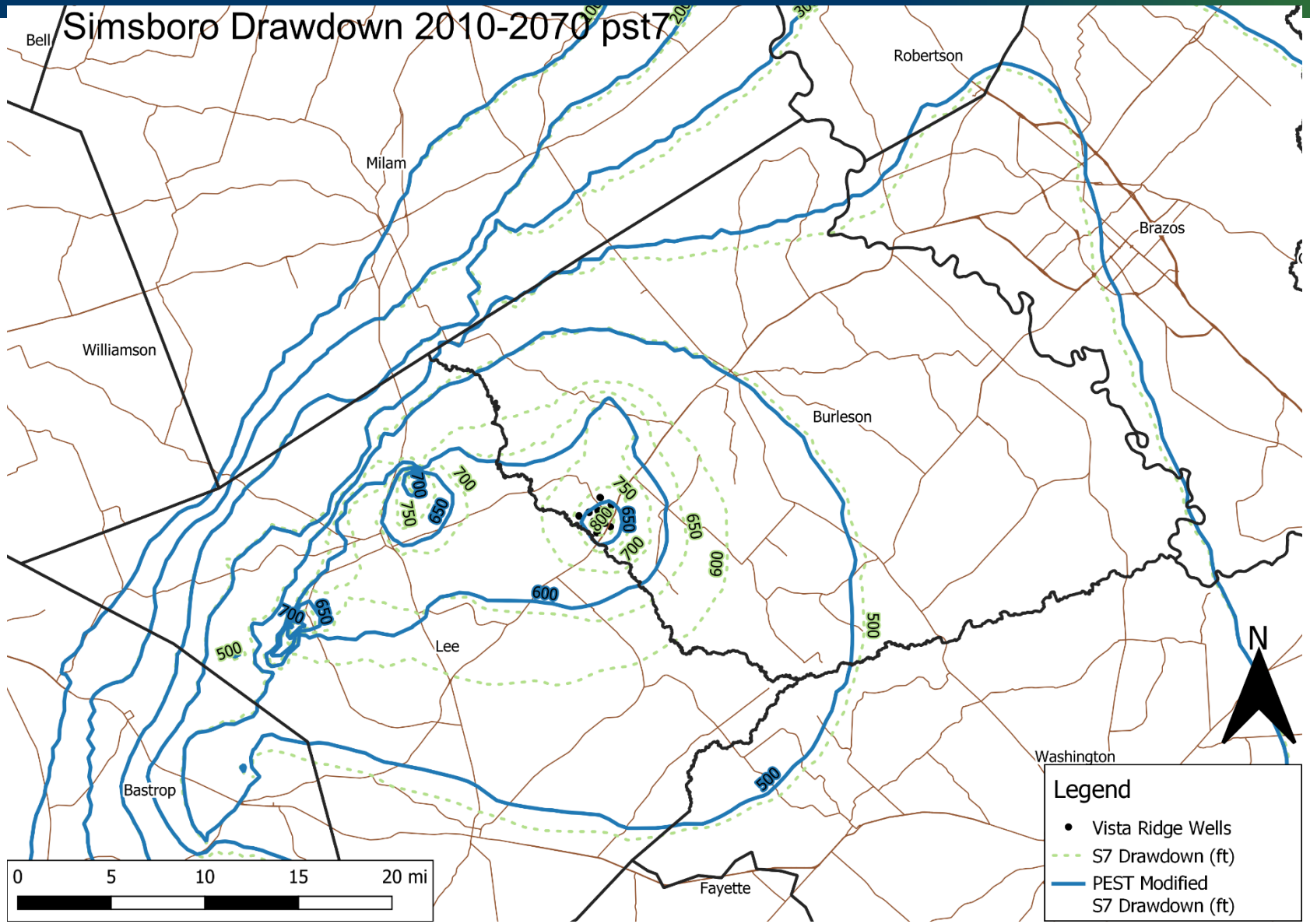
Carrizo Drawdown 2010 to 2070



Draft - Preliminary Results

INTERA GEOSCIENCE & ENGINEERING SOLUTIONS

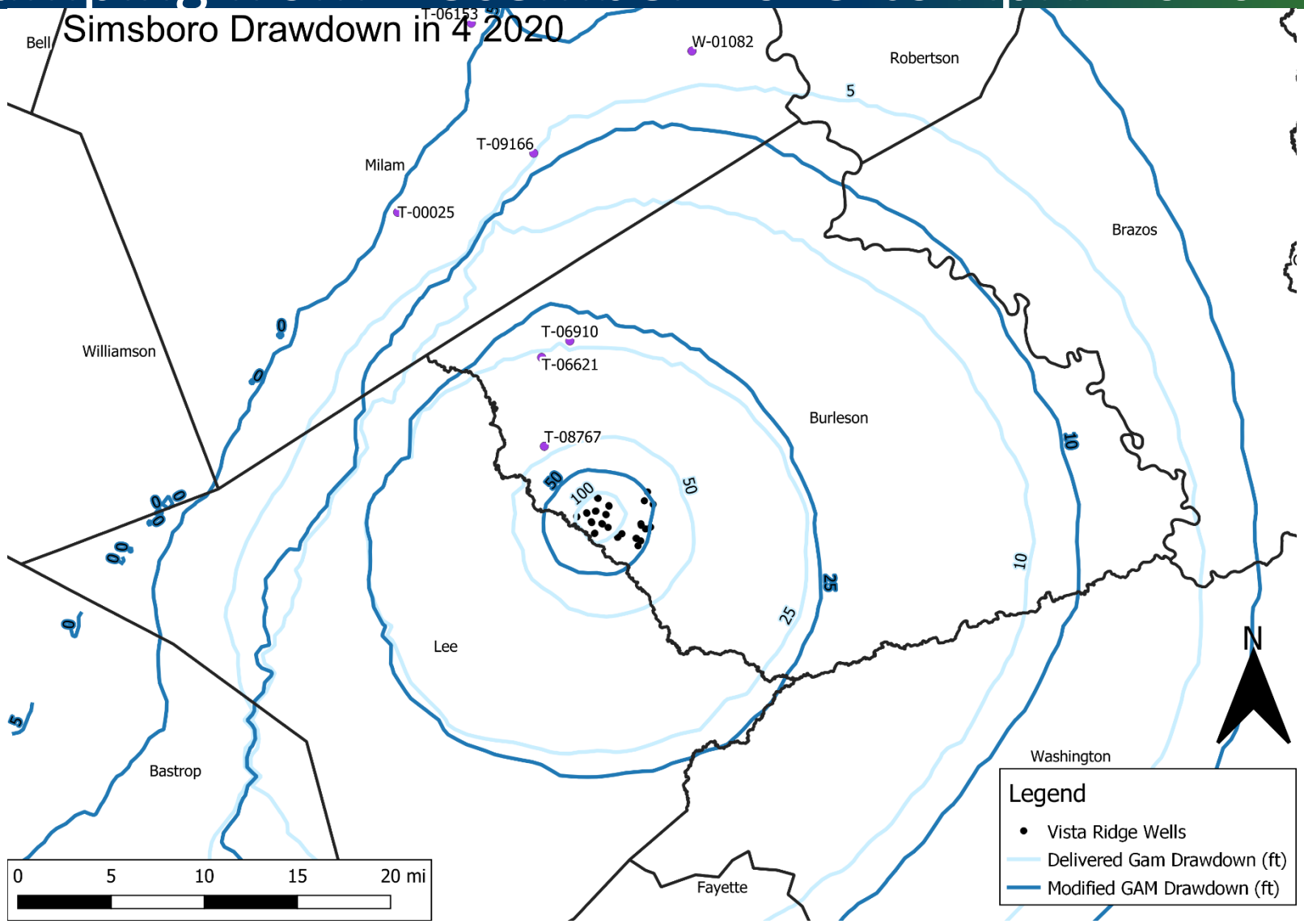
Simsboro Drawdown 2010 to 2070



Draft - Preliminary Results

INTERA GEOSCIENCE & ENGINEERING SOLUTIONS

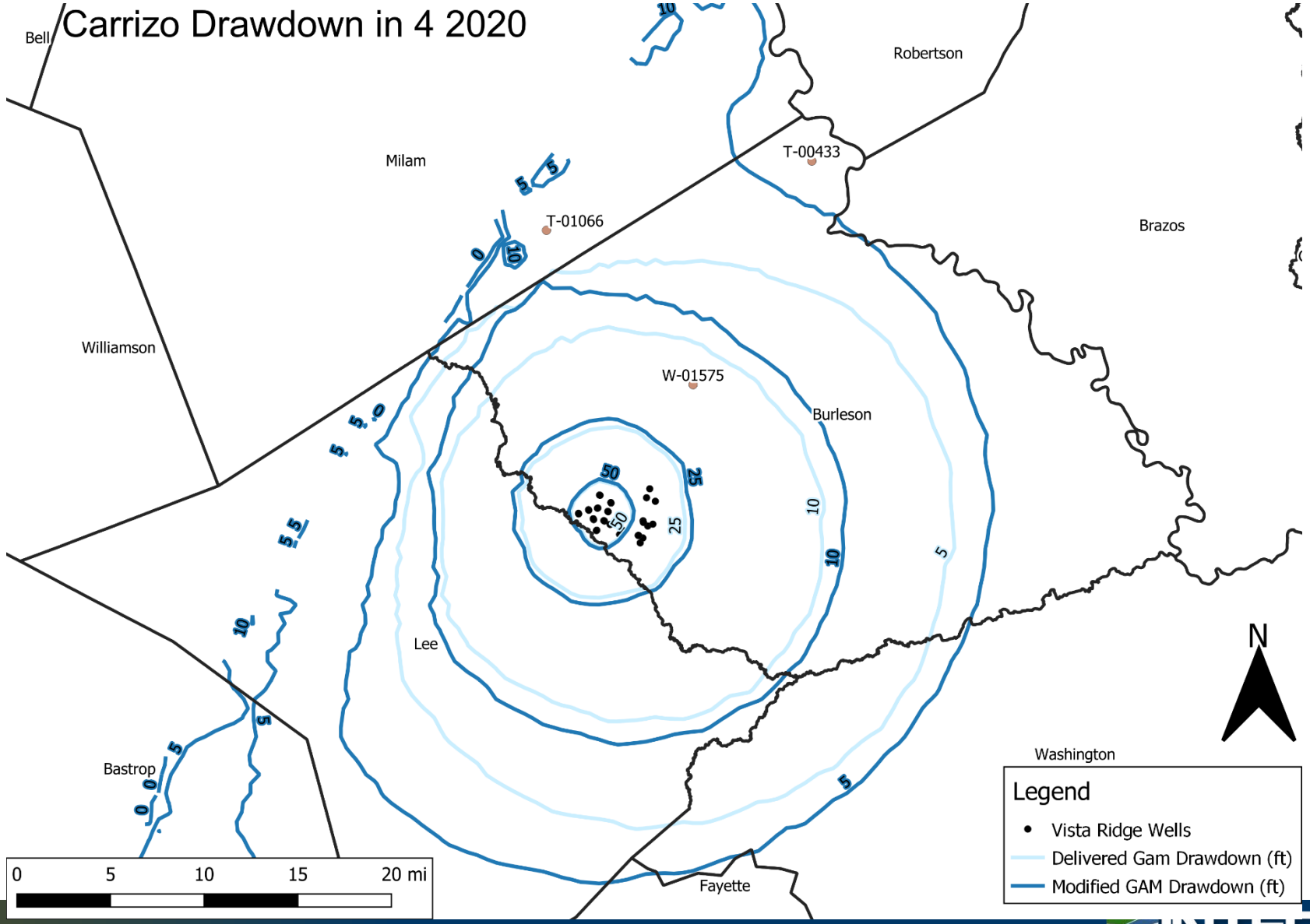
Simulation Drawdown Caused by Vista Ridge Pumping from December 2019 to April 2020



Draft - Preliminary Results

INTERA GEOSCIENCE & ENGINEERING SOLUTIONS

Simulation of Drawdown Caused by Vista Ridge Pumping from December 2019 to April 2020

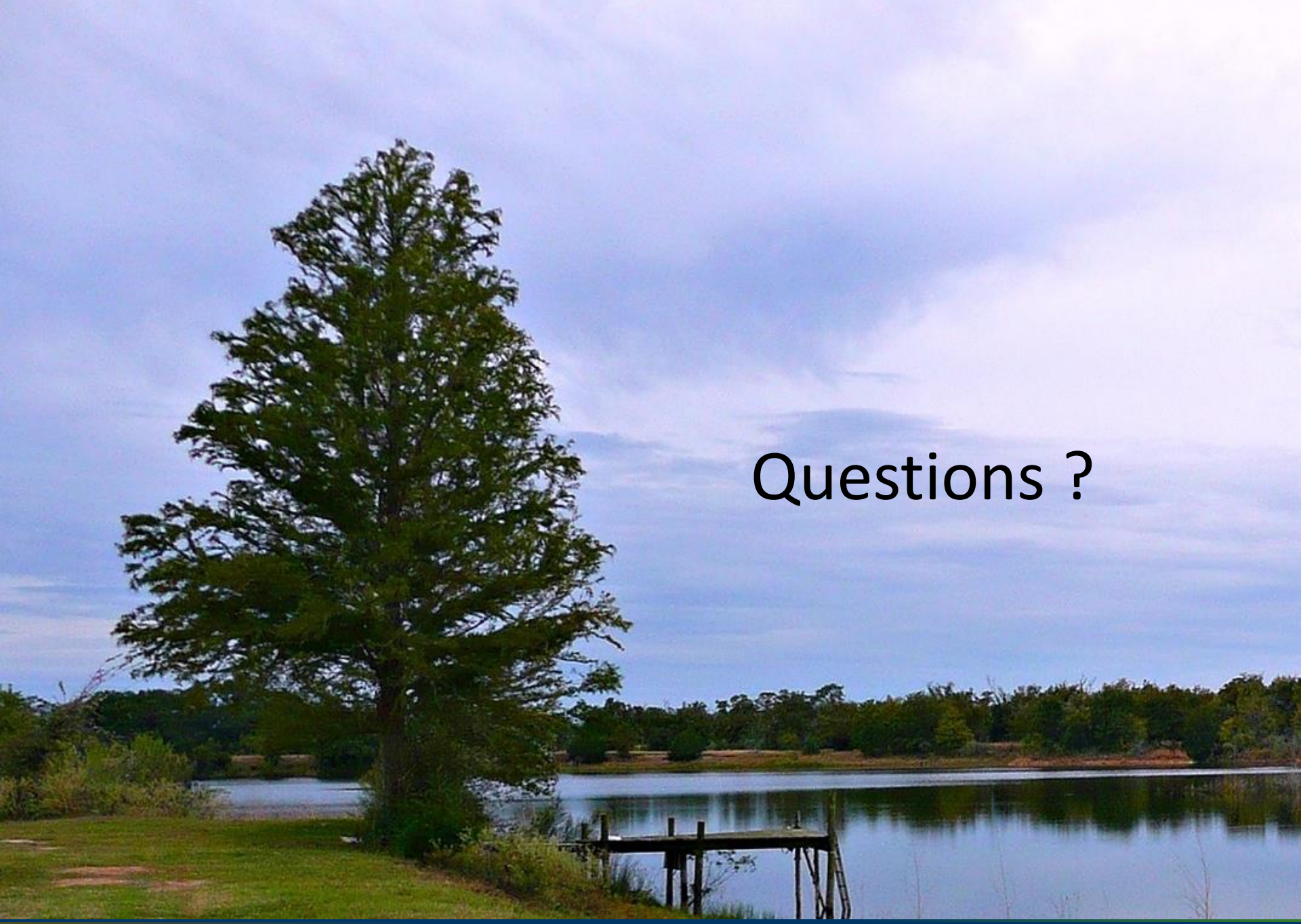


INTERA GEOSCIENCE & ENGINEERING SOLUTIONS

GWAP Goals and Policies

GWAP Questions Regarding Corrective Action

- Based strictly on modeling results?
- POSGD to assume “no-fault” policy and pay for all costs?
- What does “as soon as possible” mean?
- Should requirement be “pump being set at a depth that will exceed the 50-year water level decline” ?
- Who is responsible party to conduct investigation?
- What components comprise the investigation and evaluation?
- What is meaning of “aquifer-wide” pumping
- Is owner responsible for providing accurate well construction specifications?


Questions ?