

# Current Status of Joint Groundwater Planning with GMA 12

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# Outline

- What is joint groundwater planning and GMA 12? How does it relate to regional water planning?
- Review of DFCs, MAGs, and GAMs
- Discussion of updated GAM
- Discussion of status and results of GMA 12 modeling for current round of joint groundwater planning
- Discussion of potential use of “DFC Zones” for establishing and monitoring DFCs

# Joint Groundwater Planning

- Groundwater Management Area (GMA )  
12
  - Lost Pines GCD
  - Fayette County GCD
  - Brazos Valley GCD
  - Post Oak Savannah GCD
  - Med-East Texas GCD
- Currently in the third round of planning
  - First round completed in 2011
  - Second round completed in 2016
- Proposed DFCs due by May 1, 2021 (that's less time than it seems)

# Regional Water Planning

- Joint groundwater planning process (GMAs) defines the water availability from aquifers (MAGs)
- Regional water planning process must use the availabilities defined through the GMA process
- Lost Pines GCD is in two RWPGs- Region G/Brazos G (Lee County) and Region K/Lower Colorado (Bastrop County)

# Current DFCs

- DFC = Desired Future Conditions
- Currently stated as average drawdowns across the entire district from 2000 to 2070

	<b>DFC</b>
	(feet)
Sparta	5
Queen City	15
Carrizo	62
Calvert Bluff	100
Simsboro	240
Hooper	165

# Current MAGs

- MAGs = Modeled Available Groundwater
- Calculated by TWDB based on the DFCs adopted by the GMAs
- Current MAGs are based on previous GAM
- MAGs are the availability used by RWPGs

	<b>2020</b>	<b>2030</b>	<b>2040</b>	<b>2050</b>	<b>2060</b>	<b>2070</b>
	(afy)	(afy)	(afy)	(afy)	(afy)	(afy)
Sparta	2,390	2,391	2,392	2,390	2,391	2,393
Queen City	1,315	1,315	1,315	1,315	1,315	1,315
Carrizo	7,618	8,358	9,263	11,800	12,052	12,052
Calvert Bluff	2,224	2,631	3,181	3,909	3,983	3,984
Simsboro	32,246	32,894	33,342	34,513	30,843	30,303
Hooper	713	857	1,048	1,295	1,296	1,255
<i>Carrizo-Wilcox</i>	<i>42,801</i>	<i>44,740</i>	<i>46,834</i>	<i>51,517</i>	<i>48,174</i>	<i>47,594</i>

# GAM(s)

- GAM = Groundwater Availability Model
- Used by TWDB to determine Modeled Available Groundwater (MAG)
- Previous GAM originally developed in 2000, updated in 2004
- Many changes were needed
- Updated GAM completed in 2018 and is being used for the current round of planning

# Impact of Updated GAM

- Tested updated GAM by using current MAGs as the pumpage input
- Drawdown calculations are much more complicated:
  - Variable cell size
  - Addition of Layer 2 representing the shallow flow systems in all aquifers
  - New starting year for predictive model run (2011 vs. 2000)
- Updated GAM produces significantly different results than previous GAM

# Current GMA 12 Modeling

- Working with the newly updated GAM
- Current working “baseline” simulation is called S-7
- Pumpage was created in a similar manner as the second round of planning five years ago
- Pumpage included was based on anticipated growth and existing permits

# S-7 Pumpage vs. Existing MAGs

		<b>2020</b>	<b>2030</b>	<b>2040</b>	<b>2050</b>	<b>2060</b>	<b>2070</b>
Sparta	Existing MAG	2,390	2,391	2,392	2,390	2,391	2,393
	S-7 Pumpage	1,046	1,260	1,523	1,849	2,256	2,766
Queen City	Existing MAG	1,315	1,315	1,315	1,315	1,315	1,315
	S-7 Pumpage	1,108	1,219	1,339	1,471	1,615	1,774
Carrizo	Existing MAG	7,618	8,358	9,263	11,800	12,052	12,052
	S-7 Pumpage	4,715	5,902	7,237	8,788	10,655	12,981
Calvert Bluff	Existing MAG	2,224	2,631	3,181	3,909	3,983	3,984
	S-7 Pumpage	2,155	2,815	3,485	4,166	4,858	5,563
Simsboro	Existing MAG	32,246	32,894	33,342	34,513	30,843	30,303
	S-7 Pumpage	24,240	106,393	111,265	116,149	121,046	125,958
Hooper	Existing MAG	713	857	1,048	1,295	1,296	1,255
	S-7 Pumpage	1,690	1,985	2,289	2,605	2,933	3,273

# S-7 Drawdowns [1999 to 2070]

GCD	Sparta	Queen City	Carrizo	Calvert Bluff	Simsboro	Hooper
LPGCD	24.5	29.1	147.3	169.8	346.2	192.9
POSGCD	20.6	20.6	184.4	196.2	384.5	238.7
BVGCD	49.6	42.9	83.6	112.0	256.9	175.7
METGCD	31.2	24.5	53.2	64.3	89.3	79.0
FCGCD	52.4	74.9	136.2	NA	NA	NA

# S-7 Drawdowns [2010 to 2070]

GCD	Sparta	Queen City	Carrizo	Calvert Bluff	Simsboro	Hooper
LPGCD	20.2	25.9	140.4	161.8	333.9	183.0
POSGCD	17.4	18.6	176.7	183.0	354.8	222.2
BVGCD	47.1	40.6	76.9	96.7	214.1	152.6
METGCD	25.4	21.2	49.4	59.9	81.7	73.9
FCGCD	40.2	65.8	125.0	NA	NA	NA

# Summary of Current DFCs and S-7 Drawdowns

	DFC	S-7 Drawdown (1999-2070)	S-7 Drawdown (2010-2070)
	(feet)	(feet)	(feet)
Sparta	5	24	20
Queen City	15	29	26
Carrizo	62	147	140
Calvert Bluff	100	170	162
Simsboro	240	346	334
Hooper	165	193	183

# S-7 Conclusions

- GMA 12 did a similar exercise five years ago in the second round of planning
  - Established a “baseline” pumpage well file
  - Model runs resulted in significantly more drawdown than the DFCs
  - Pumpage was reduced to meet the desired DFCs
- S-7 includes significantly more pumpage than the current MAGs and previous baseline well file
  - Current MAGs included reductions in pumpage
  - New permits

# Run S-8

- Can we adjust S-7 pumpage and meet existing DFCs?
- Adjusted pumpage in the well file S-7 GCD-by-GCD for each aquifer
- All stress periods for 2019 to 2070 adjusted equally
- Started with Simsboro, moved to Carrizo, then Calvert Bluff, then Hooper, then Queen City, and finally the Sparta
- Final results were labeled “S-8” and are presented here

# Final S-8 Factors

	Sparta	Queen City	Carrizo	Calvert Bluff	Simsboro	Hooper
BVGCD	0.25	0	0.6	10	1.27	8
FCGCD	1	1	2	NA	NA	NA
LPGCD	0	0	0	0	0.67	15
METGCD	0	0	3.5	0	7	5
POSGCD	2	15	0	6	0.52	1

- Despite these drastic changes, DFCs were unable to be met in several areas

# Lost Pines

	Current DFC (feet)	Current MAG in 2070	S-8 Drawdown from 1999 to 2069 (feet)	S-8 Pumpage in 2070 (acre-feet)
Sparta	5	2,393	18	0
Queen City	15	1,315	20	0
Carrizo	62	12,052	71	0
Calvert Bluff	100	3,984	107	0
Simsboro	240	30,303	241	84,391
Hooper	165	1,255	164	49,100

# S-8 Conclusions

- Updated GAM cannot match the existing DFCs, especially in the upper aquifers
- Existing DFCs will have to be changed

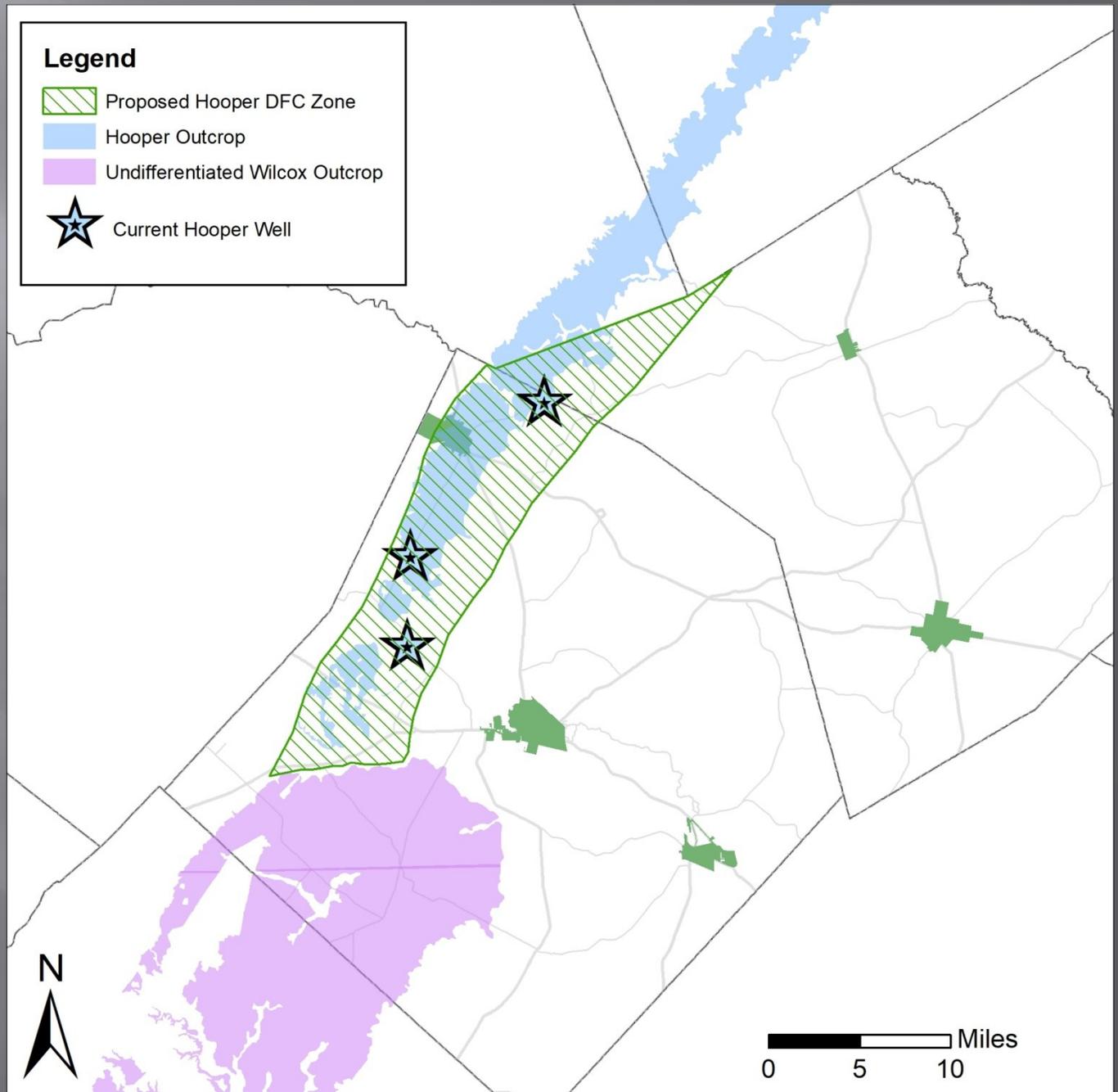
# Summary of Current Modeling

- S-7 pumpage cannot be reduced to meet the current DFCs for the upper aquifers, even if pumpage is reduced to zero
- Simsboro pumpage can be reduced to match the current DFC of 240 feet if pumpage is reduced to ~85,000 ac-ft/yr
- Reducing the Simsboro pumpage to meet the current DFC significantly impacts the Hooper and Calvert Bluff drawdowns
- What other GCDs do has a significant impact on LPGCD

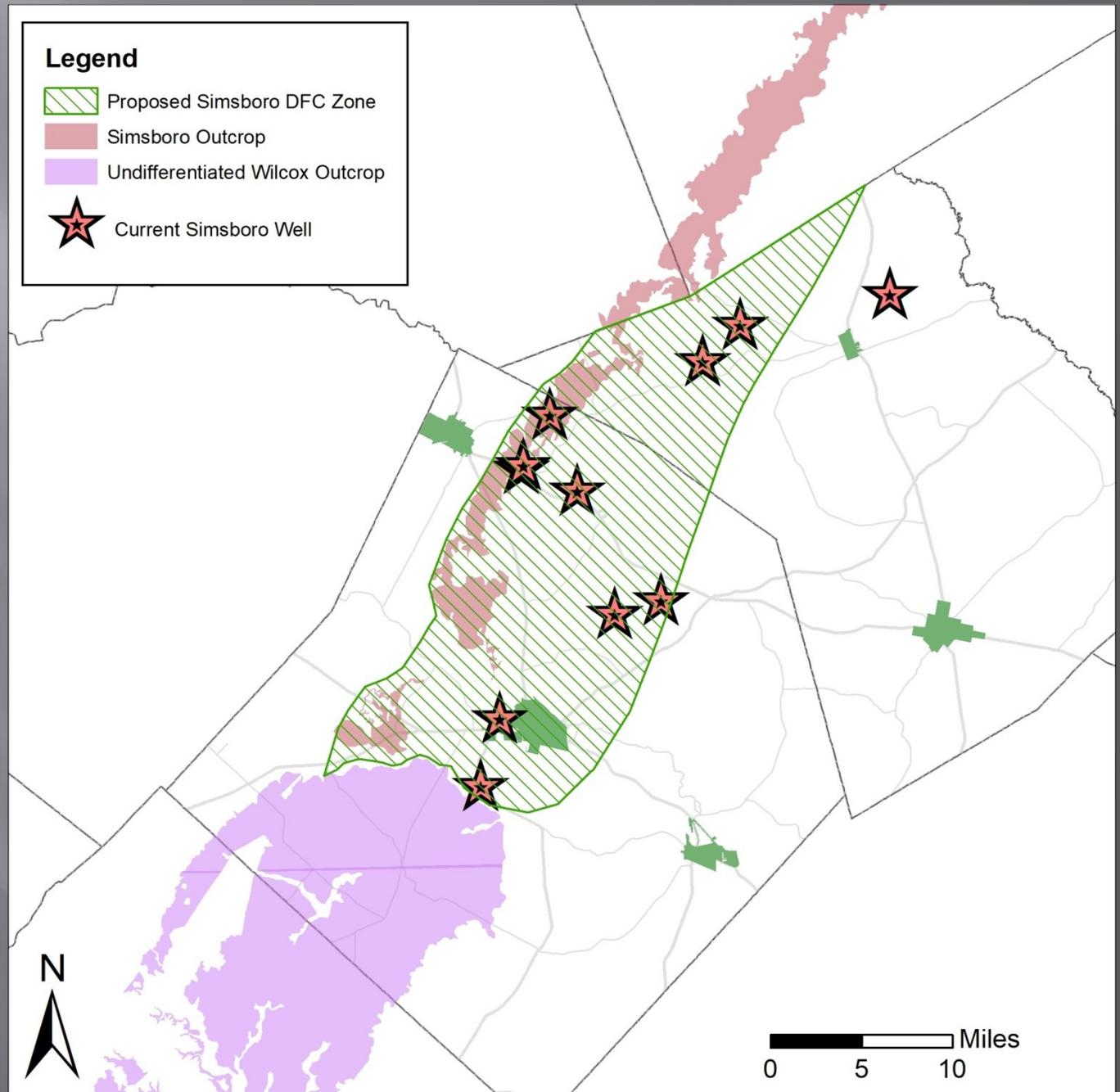
# Proposed “DFC Zones”

- Initially presented to the Board in September, 2018
- Monitoring drawdowns across the entire district is impossible due to the availability of wells
- Revised approach would shrink the DFC monitoring zones to the aquifer outcrop and shallow(er) downdip, where most of the wells are present

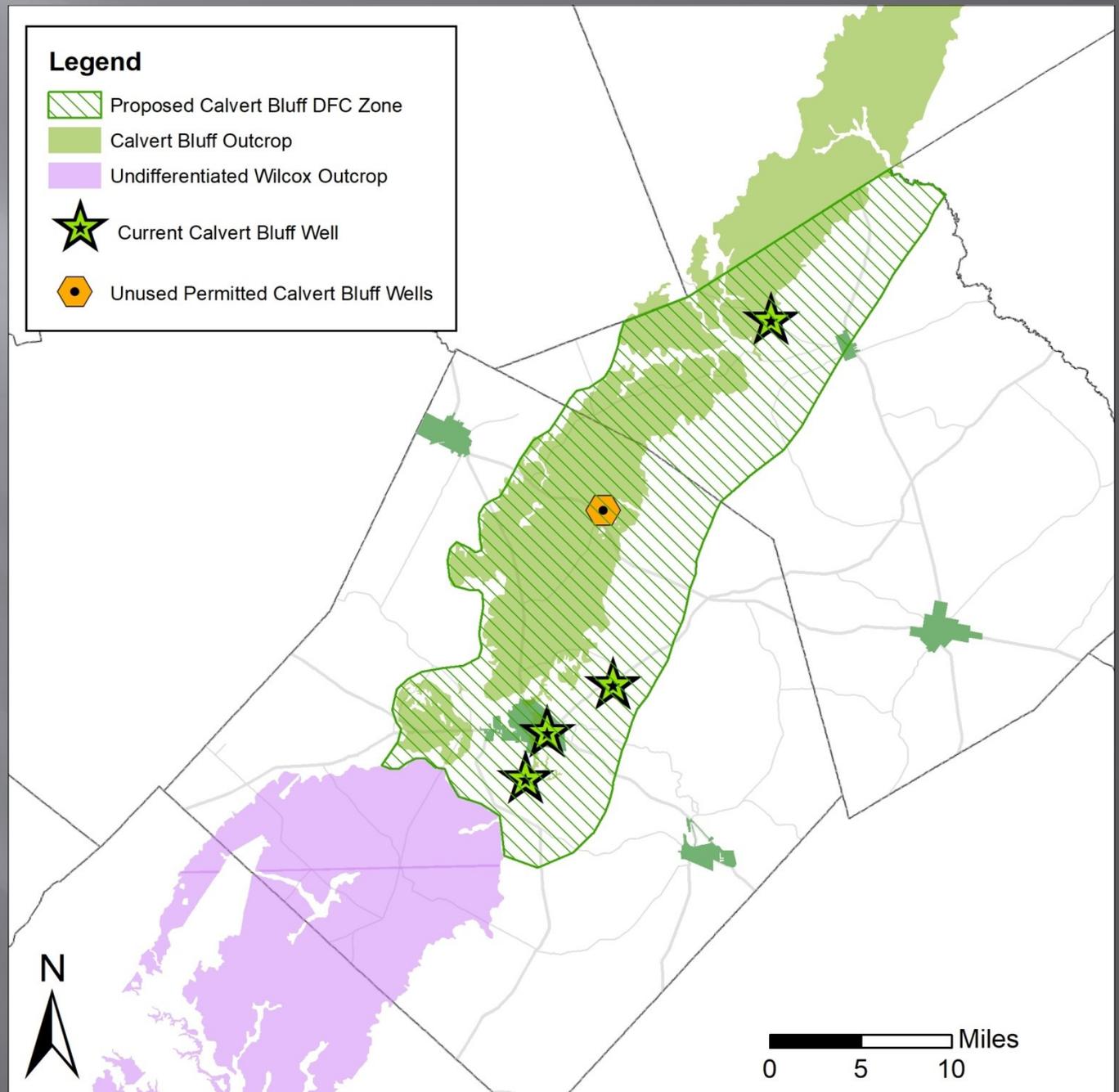
# Hooper



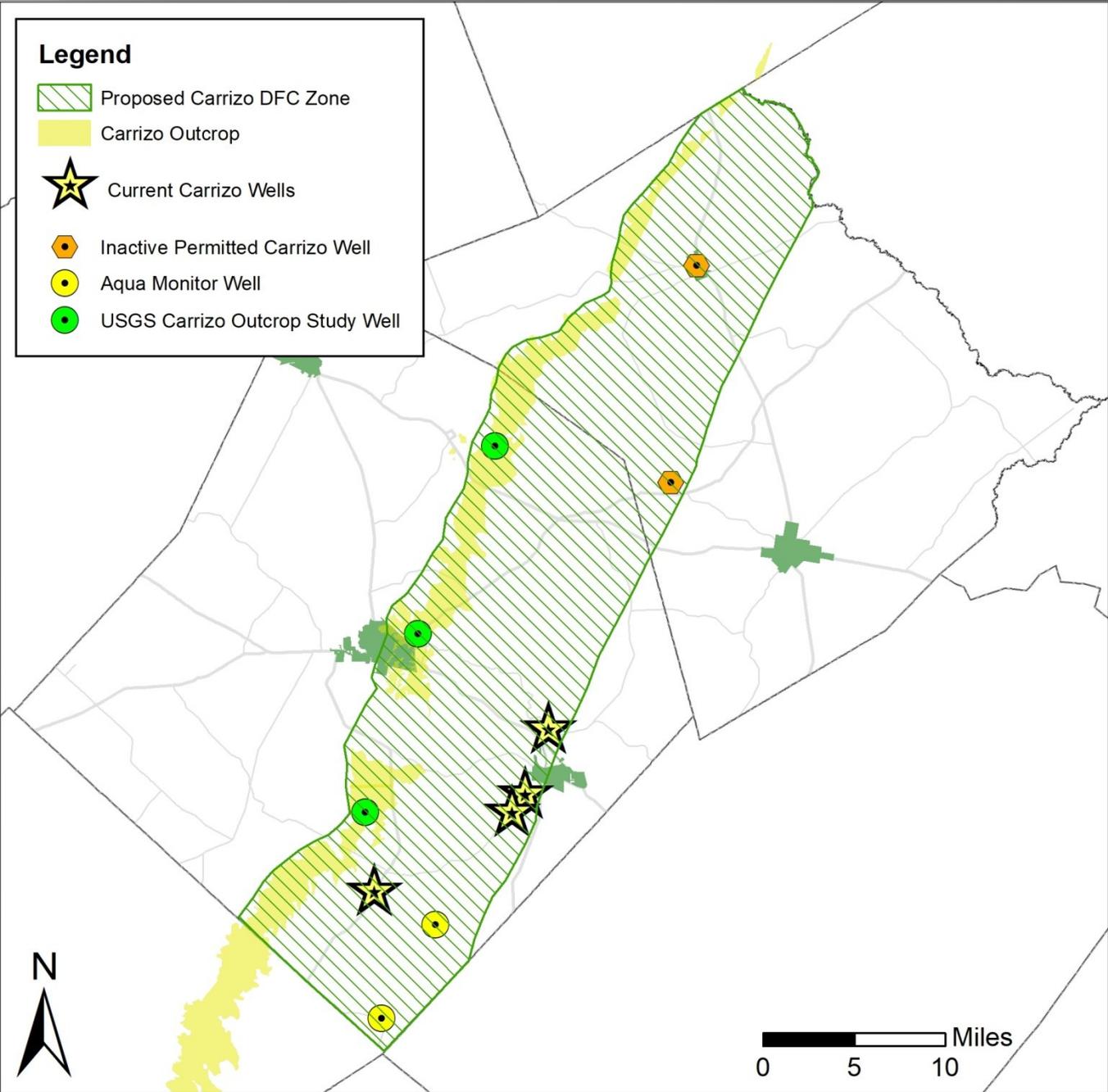
# Simsboro



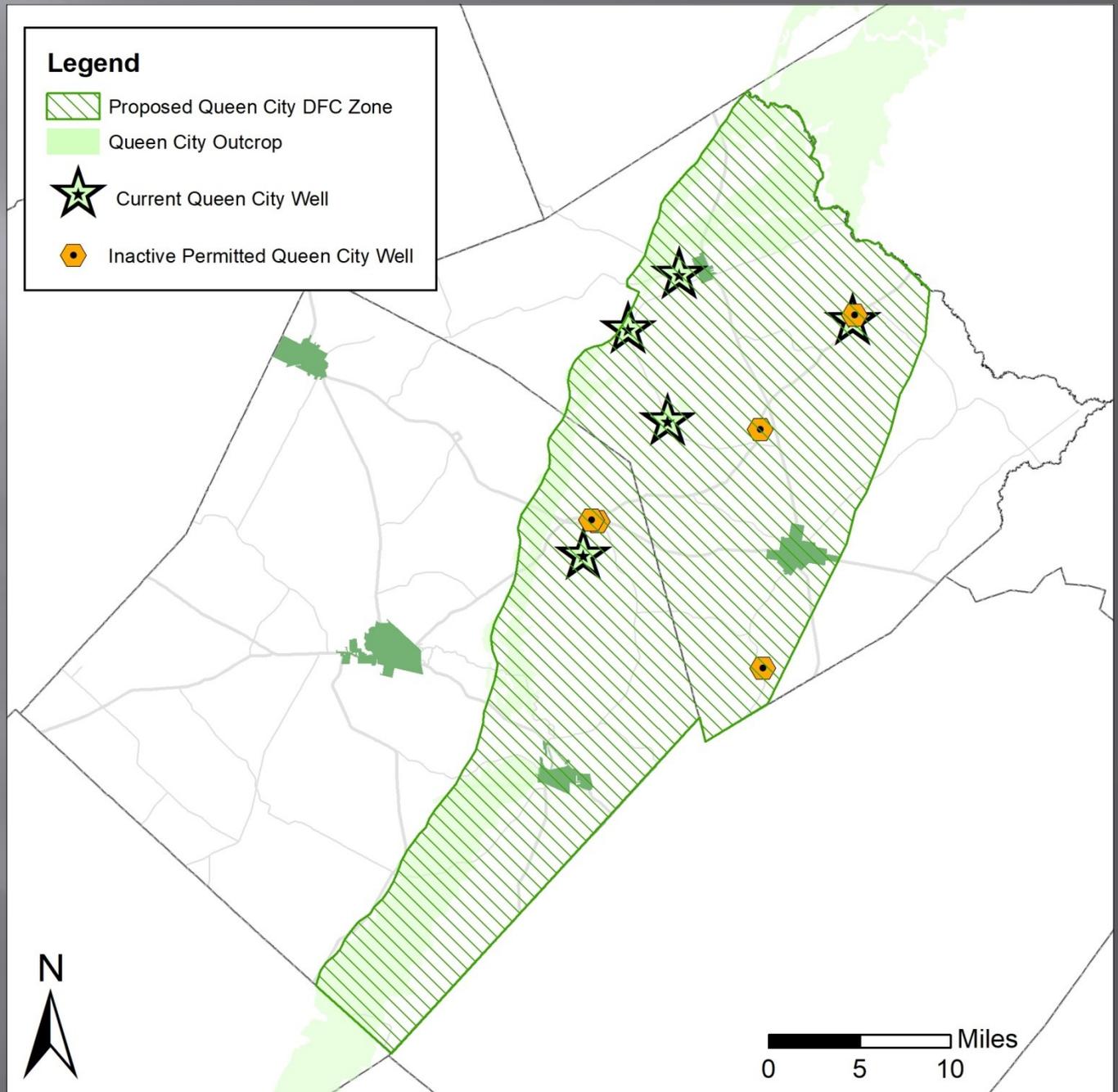
# Calvert Bluff



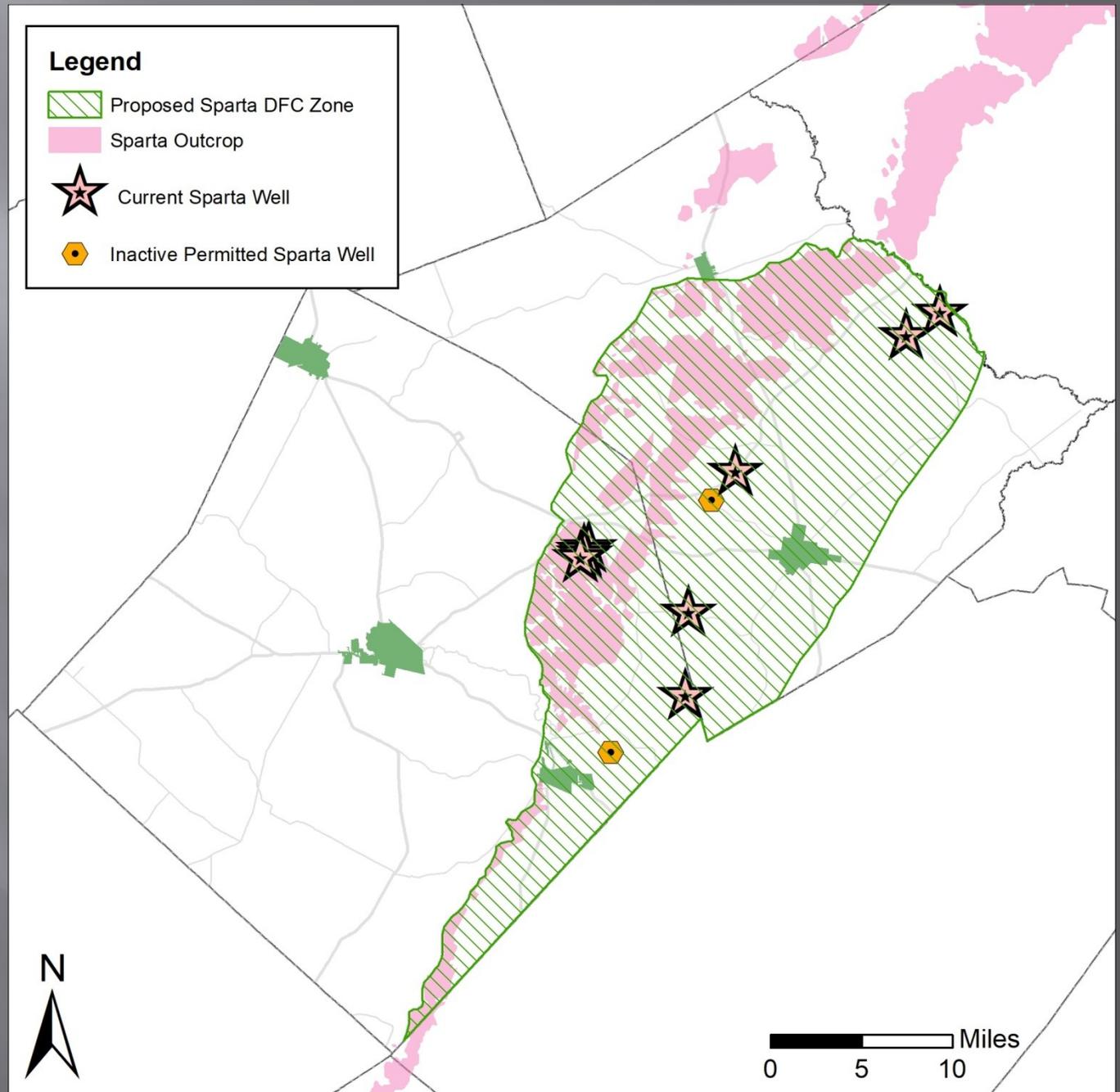
# Carrizo



# Queen City



# Sparta



# Impact of “DFC Zones”

- Evaluation of S-7 using the new GAM
- Drawdowns for 2010 - 2070

	County Average Drawdowns	DFC Zone Drawdowns
	(feet)	(feet)
Sparta	20	18
Queen City	26	26
Carrizo	140	95
Calvert Bluff	162	85
Simsboro	334	207
Hooper	183	44

# Timeline

- March Board meeting- feedback on material presented tonight
- March to July- GMA 12 will discuss required elements and evaluated additional model runs
- Fall, 2020- GMA 12 finalizes proposed DFCs
- Winter, 2020/21- LPGCD Board meets to discuss and formally approve proposed DFCs
- Spring, 2021- GMA 12 adopts proposed DFCs

**Questions??**