GMA 12

Summary of the Impacts of the Revised GAM and the Path Forward

by

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Differences in GAMs

- Addition of two new model layers:
  - River alluvium
  - Shallow groundwater flow system
- Updating of location and characteristics of faults
- Calibration time period 1930-2010
- Grid refinement around rivers and streams
- Improving surface water-groundwater interactions *(grid refinement, two new layers)*
- Some localized changes in aquifer properties and structure

Comparison to Updated GAM

- Task was to run the previous amount and distribution of pumpage in the updated GAM and compare the results
- Direct comparison of results not possible for numerous reasons:
  - Calibration time period through 2010
  - Refinement of the grid around rivers and streams
  - Additional of two new model layers
- Methods developed to convert and assess the well file from the previous GAM are different than the methods that should be used moving forward

2017 Planning Cycle Approved DFCs

GCD or County	Average Aquifer Drawdown (ft) measured from January 2000 through December 2069					
	Sparta	Queen City	Carrizo	Calvert Bluff	Simsboro	Hooper
BVGCD	12	12	61	125	295	207
FCGCD	47	64	110	Declared as non-relevant		
LPGCD	5	15	62	100	240	165
METGCD	5	2	80	90	138	125
POSGCD	28	30	67	149	318	205
Falls	--	--	--	--	-2	27
Limestone	--	--	--	11	50	50
Navarro	--	--	--	-1	3	3
Williamson	--	--	--	-11	47	69
GMA-12	***16***	***16***	***75***	***114***	***228***	***168***

Calibration Time Period

- Previous GAM calibrated through 1999
- Predictive run was 2000 to 2070
- All DFC statements were therefore stated as "Drawdowns from January 2000 to [future date]"
- Updated GAM calibrated through 2010
- Predictive run is now 2011 to 2070
- 2000-2010 will not be included in DFCs for updated GAM

Drawdown from 2000-2010 using Updated GAM

GCD or County	Average Aquifer Drawdown (ft) modeled from January 2000 through December 2010					
	Sparta	Queen City	Carrizo	Calvert Bluff	Simsboro	Hooper
BVGCD	3	3	6	11	25	14
FCGCD	13	11	10	Declared as non-relevant		
LPGCD	4	4	6	7	9	9
METGCD	4	3	3	3	5	4
POSGCD	3	2	6	10	18	11
Falls	--	--	--	--	2	1
Limestone	--	--	--	0.2	-0.3	-0.2
Navarro	--	--	--	0	-0.1	-0.1
Williamson	--	--	--	9	5	4
GMA-12	***6***	***4***	***6***	***7***	***12***	***8***

Drawdown from 2000-2010 using Previous GAM

GCD or County	Average Aquifer Drawdown (ft) modeled from January 2000 through December 2010					
	Sparta	Queen City	Carrizo	Calvert Bluff	Simsboro	Hooper
BVGCD	2	1	1	23	88	49
FCGCD	0	0	1	Declared as non-relevant		
LPGCD	-2	-1	0	9	31	21
METGCD	-1	-1	16	24	36	32
POSGCD	1	0	-2	22	66	45
Falls	--	--	--	--	-1	3
Limestone	--	--	--	1	16	10
Navarro	--	--	--	-1	2	1
Williamson	--	--	--	-3	15	7
GMA-12	***0***	***0***	***6***	***19***	***49***	***33***

Drawdown Calculation Options

- Use only the water levels / drawdowns in shallow flow system (Layer 2)
- Use only the water levels / drawdowns in the cell representing the deeper flow system
- Use an average of the water levels / drawdowns in both the shallow and deep flow systems (straight or weighted average)
- Use the maximum of drawdowns in the shallow and deep flow systems

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Preliminary Results- All Runs

GCD or County	Average Aquifer Drawdown (ft) modeled from January 2011 through December 2070					
	Sparta	Queen City	Carrizo	Calvert Bluff	Simsboro	Hooper
BVGCD	~40	~35-40	~65-75	~80-85	~145-150	~115-125
FCGCD	~35	~65	~135	Declared as non-relevant		
LPGCD	~25	~30	~100	~85-90	~140-145	~105
METGCD	~25	~20	~40	~40	~50	~50
POSGCD	~60-65	~30-35	~105-110	~110-115	~190-200	~150
Falls	--	--	--	--	~10-15	~5
Limestone	--	--	--	~10	~10	~5
Navarro	--	--	--	~0	~0	~0
Williamson	--	--	--	~30	~25-30	~15
GMA 12	***~35***	***~35***	***~80-85***	***~80-85***	***~125-130***	***~105***

Summary

- Several significant differences between the previous and updated GAMs- faults, calibration time period, grid, layering
- Updated GAM significantly impacts calculated drawdowns from previous GAM run
- It was not possible to do an exact comparison of the previous amount and distribution of pumpage (MAGs) in the updated GAM
  - Multiple ways that PS-12 can be converted for use in the updated GAM
  - Multiple ways to evaluate results and calculate drawdowns

Summary

- It is apparent that all users *(GMA 12, GCDs, TWDB, etc.)* must come to a consensus as to how the model will be set up and used for joint groundwater planning
- Recommend pumping be included in all layers including Layers 1 and 2
- Recommend using the maximum of drawdowns in the shallow and deep flow systems to estimate DFCs

Moving Forward with Modeling

- Determine how results from GAM will be analyzed
- Predictive well (WEL) file will be based on the 2010 data from the historic calibration well file
- GCDs will estimate pumpage for their districts for 2011-2017
- Similar to the last round, we will create well files based on an anticipated demand increase and for all permits fully produced for all of predictive time period (2018-2070) and assess the results

Possible Schedule- 2019

- Winter 2019- Current Meeting
- Spring 2019- Finish “interim” pumpage (2011-2017), other discussions
- Summer 2019- Finish two predictive GAM runs (anticipated pumpage, full production of permits), discuss non-relevant aquifers
- Fall 2019- Additional GAM runs, discussion of nine factors, declaration of non-relevant aquifers

Possible Schedule- 2020

- Winter 2020- Additional GAM runs, discussion of nine factors
- Spring 2020- Final decisions on GAM runs, final discussions on nine factors
- Summer 2020- Discuss and finalize proposed DFCs
- Fall 2020-Adopt proposed DFCs (deadline May 1, 2021)

Possible Schedule- 2021

- Winter 2021- GCDs public comments and public hearing
- Spring 2021- Discuss public comment received
- Summer 2021- Adopt final DFCs (deadline Jan. 5, 2022, discuss draft Explanatory Report
- Fall 2021- Adopt final Explanatory Report