REGION H
Water Planning Group

GROUNDWATER SUPPLY COMMITTEE MEETING MATERIALS

March 26, 2018

Lone Star GCD
Conroe Office

Region H Water Planning Group
Groundwater Supply Committee
9:30 AM Monday
March 26, 2018
Lone Star Groundwater Conservation District Office
655 Conroe Park N. Drive, Conroe, TX 77303

AGENDA

1. Introductions.
2. **Receive public comments on specific issues related to agenda items 3 through 7**. (Public comments limited to 3 minutes per speaker)
3. Discuss Committee activities and schedule.
4. Receive update on Groundwater Management Area process and activities.
5. Receive update from Consultant Team regarding Modeled Available Groundwater in Region H Water Planning Area.
6. Receive update from Consultant Team regarding evaluation of existing groundwater supplies in portions of aquifers deemed non-relevant by the Joint Planning process, and consider making recommendations to the Region H Water Planning Group to approve supply estimates.
7. Receive update from Consultant Team regarding the addition of MAG Peaking Factors to the RWP process, and consider development of Peaking Factors for groundwater supplies in the Region H Water Planning Area.
8. **Receive public comments**. (Public comments limited to 3 minutes per speaker)
9. Adjourn.

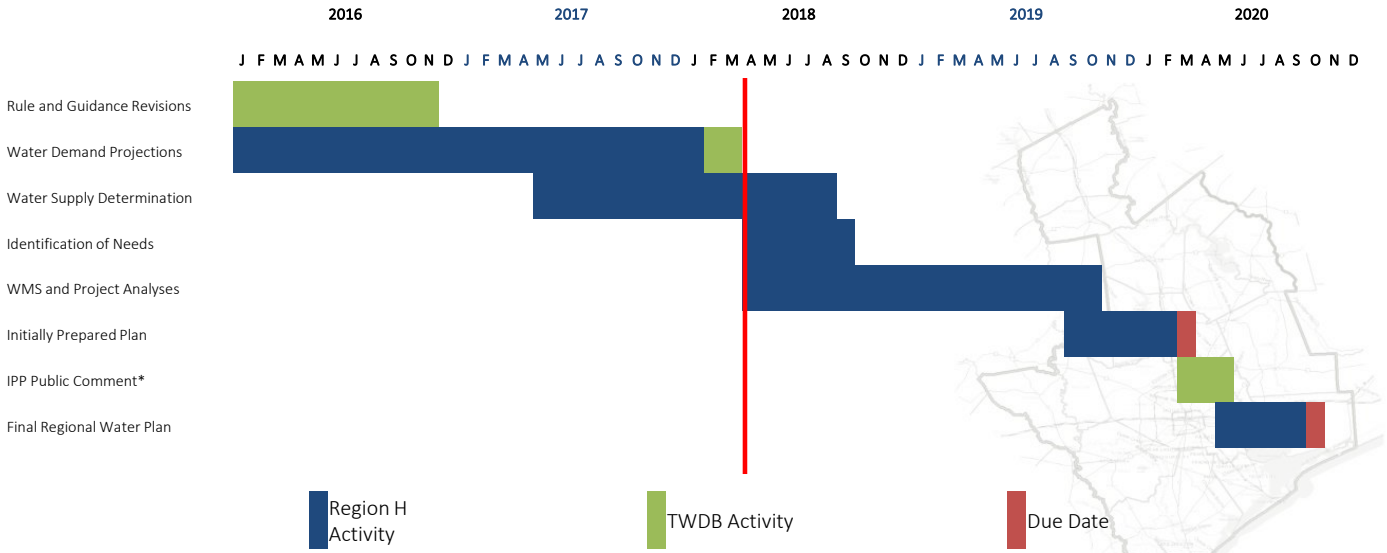
Persons with disabilities who plan to attend this meeting and would like to request auxiliary aids or services are requested to contact the Lone Star Groundwater Conservation District at (936) 494-3436 at least 24 hours prior to the meeting so that appropriate arrangements can be made.

Agenda Item 3

Discuss Committee activities and schedule.

REGION H
Water Planning Group

Agenda Item 3
Committee Activities and Schedule



*Region H accepts public comment throughout the planning cycle and at each RWPG and committee meeting.

Agenda Item 3
Committee Activities and Schedule

Date	Scheduled Events/Tasks
03/2018	**Groundwater Committee Meeting**
04/2018	RWPG Meeting
09/2018	DUE DATE: Technical Memorandum
03/2020	DUE DATE: Initially Prepared Plan
10/2020	DUE DATE: FINAL RWP

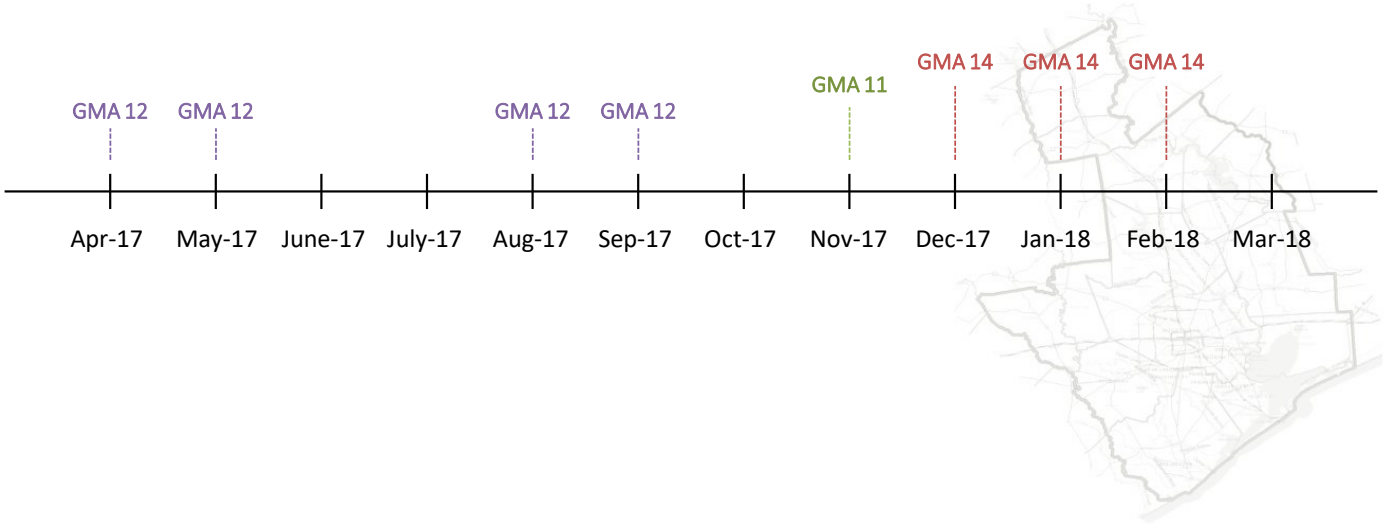
Agenda Item 4

Receive update on Groundwater Management Area process and activities.

REGION H
Water Planning Group

Agenda Item 4
GMA Activity

Joint Planning Meetings



Agenda Item 5

Receive update from Consultant Team regarding Modeled Available Groundwater in Region H Water Planning Area.

REGION H
Water Planning Group

Agenda Item 5
Modeled Available Groundwater

GMA 11

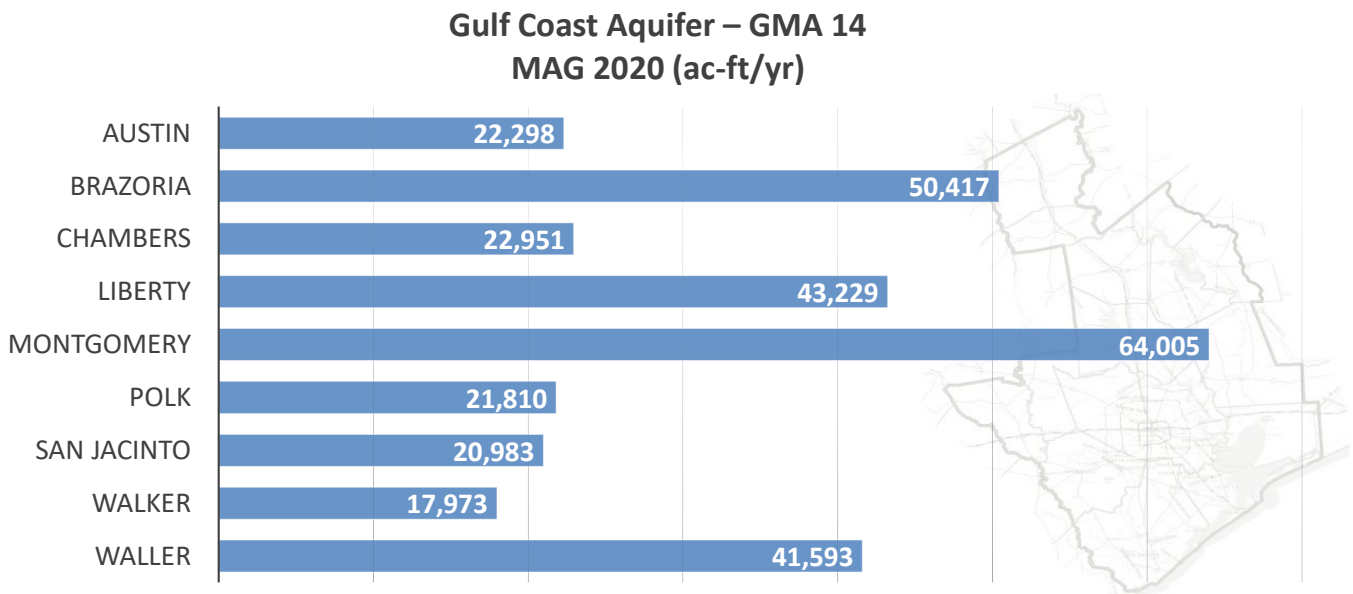
County	Aquifer	Modeled Available Groundwater (ac-ft/yr) 2020	2030	2040	2050	2060	2070	*% Change from 2016 RWP (2020 MAG)*
Trinity	Carrizo-Wilcox	99	99	99	99	99	99	***-91%***
Trinity	Sparta	29	29	29	29	29	29	***-90%***

GMA 12

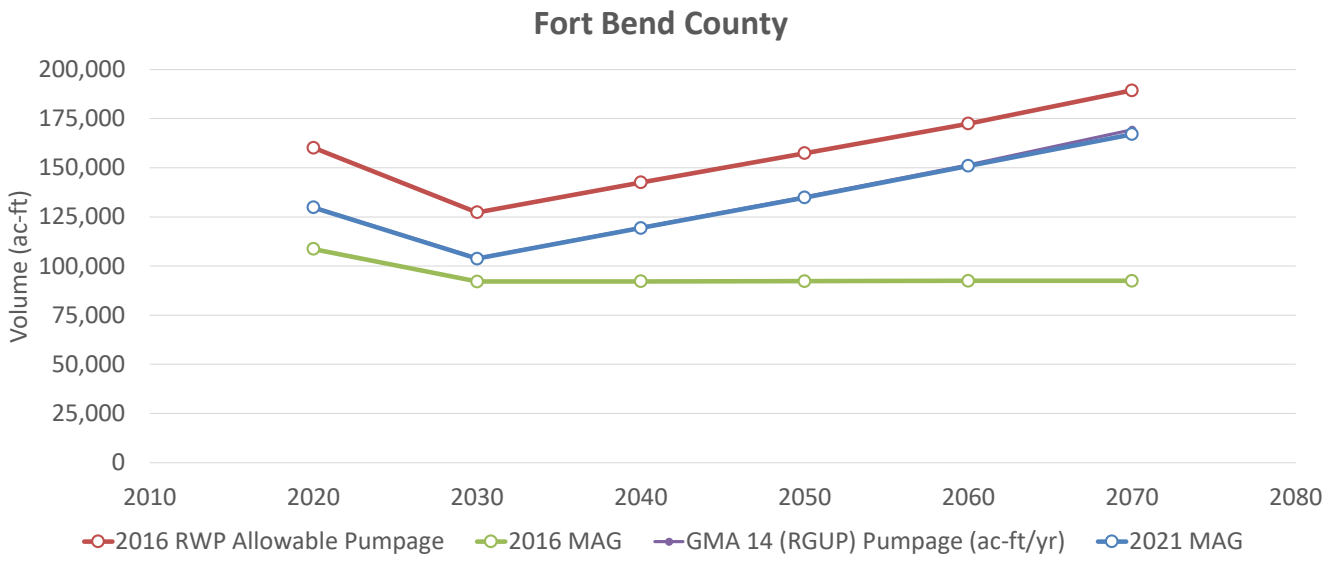
County	Aquifer	Modeled Available Groundwater (ac-ft/yr) 2020	2030	2040	2050	2060	2070*	% Change from 2016 RWP (2020 MAG)
Leon	Carrizo-Wilcox	14,288	14,461	14,714	15,001	15,024	15,024	***-1%***
Leon	Queen City	594	594	594	594	594	594	***0***
Leon	Sparta	21	21	21	21	21	21	***0***
Leon	Yegua-Jackson	0	0	0	0	0	0	***(reduced from 4 ac-ft/yr)***
Madison	Carrizo-Wilcox	2,862	2,770	2,656	2,554	2,544	2,544	***0***
Madison	Queen City	380	380	380	380	380	380	***0***
Madison	Sparta	3,320	3,322	3,322	3,322	3,322	3,322	***0***
Madison	Yegua-Jackson	810	810	810	810	810	810	***-28%***

**GMA 12 models extended to 2069; MAG values for 2069 shown here for 2070 decade.*

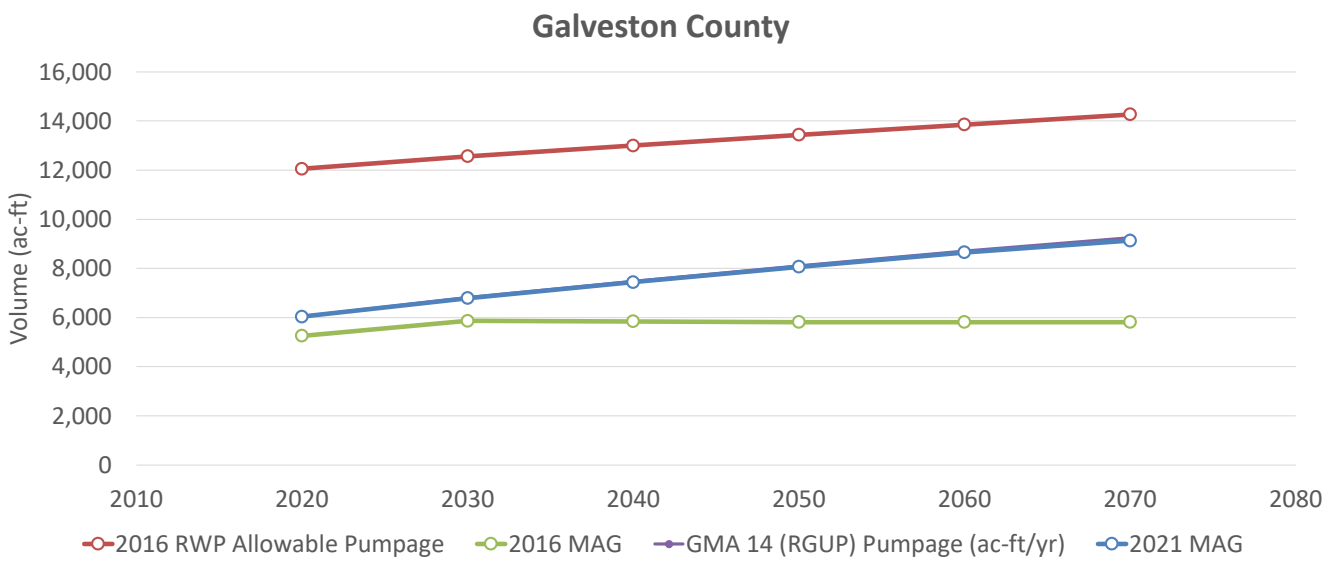
Agenda Item 5
Modeled Available Groundwater



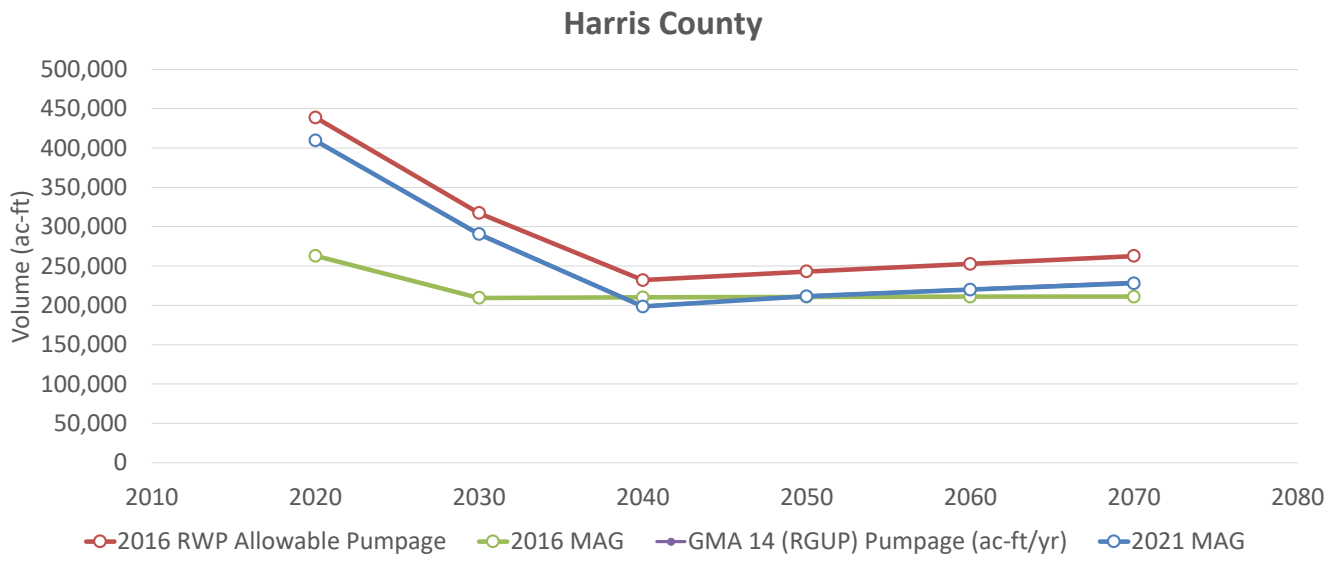
Agenda Item 5
Modeled Available Groundwater



Agenda Item 5
Modeled Available Groundwater



Agenda Item 5
Modeled Available Groundwater

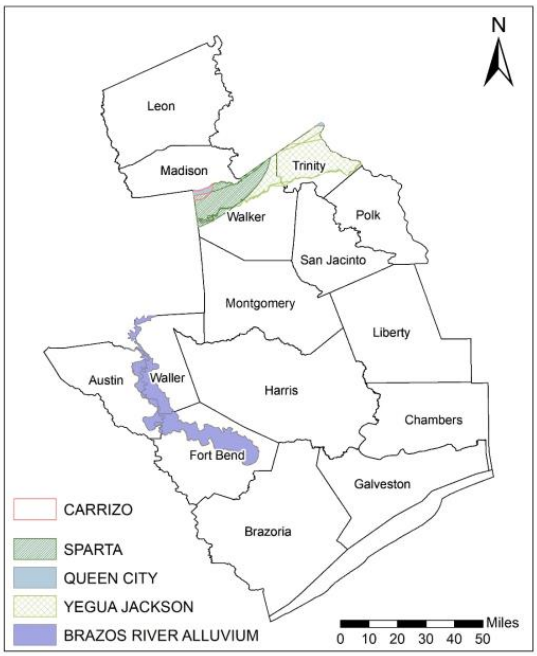


Agenda Item 6

Receive update from Consultant Team regarding evaluation of existing groundwater supplies in portions of aquifers deemed non-relevant by the Joint Planning process, and consider making recommendations to the Region H Water Planning Group to approve supply estimates.

REGION H
Water Planning Group

Agenda Item 6
Non-MAG Groundwater Supply



Non-relevant aquifers

- Austin, Waller, and Fort Bend Counties
  - Brazos River Alluvium
- Austin and Walker Counties
  - Other alluvial formations
- Trinity County
  - Queen City and Yegua-Jackson
- Walker County
  - Carrizo-Wilcox, Queen City, Yegua-Jackson, and Sparta

Agenda Item 6
Non-MAG Groundwater Supply

Non-MAG Supplies – up to RWPG determination

- Portions of aquifers excluded from DFC process
- Local supplies

Data sources

- Local GCD management plans
- TWDB GAMs
- Previous RWP estimates

Agenda Item 6
Non-MAG Groundwater Supply

2016 RWP Supplies

Aquifer	County	Available Groundwater (ac-ft/yr)					
		2020	2030	2040	2050	2060	2070
Brazos River Alluvium	Austin	7,944	7,944	7,944	7,944	7,944	7,944
Brazos River Alluvium	Waller	12,027	12,027	12,027	12,027	12,027	12,027
Carrizo-Wilcox	Walker	2,099	2,099	2,099	2,099	2,099	2,099
Gulf Coast | Catahoula Formation*	Montgomery	4,391	4,391	4,391	4,391	4,391	4,391
Queen City	Trinity	0	0	0	0	0	0
Queen City	Walker	229	229	229	229	229	229
San Bernard River Alluvium	Austin	520	520	520	520	520	520
San Jacinto River Alluvium	Walker	1,450	1,450	1,450	1,450	1,450	1,450
Sparta	Walker	2,350	2,350	2,350	2,350	2,350	2,350
Trinity River Alluvium	Walker	3,913	3,913	3,913	3,913	3,913	3,913
Yegua-Jackson	Trinity	2,191	2,191	2,191	2,191	2,191	2,191
Yegua-Jackson	Walker	4,174	4,174	4,174	4,174	4,174	4,174

** Catahoula Aquifer supplies based on historical use.*

Agenda Item 6
Non-MAG Groundwater Supply

- Carrizo-Wilcox, Queen City, Sparta, and Yegua-Jackson
  - Option: use values in 2016 RWP
  - Option: extract pumping from GAM Run 17-030 (GMA 12)
- Brazos River Alluvium Aquifer
  - Option: use values in 2016 RWP (from 2011 GTA Aquifer Assessment)
  - Option: extract pumping from GAM Run 17-030 (GMA 12)
- Other alluvium formations
  - Option: use values in 2016 RWP (from 2011 GTA Aquifer Assessment)

Agenda Item 7

Receive update from Consultant Team regarding the addition of MAG Peaking Factors to the RWP process, and consider development of Peaking Factors for groundwater supplies in the Region H Water Planning Area.

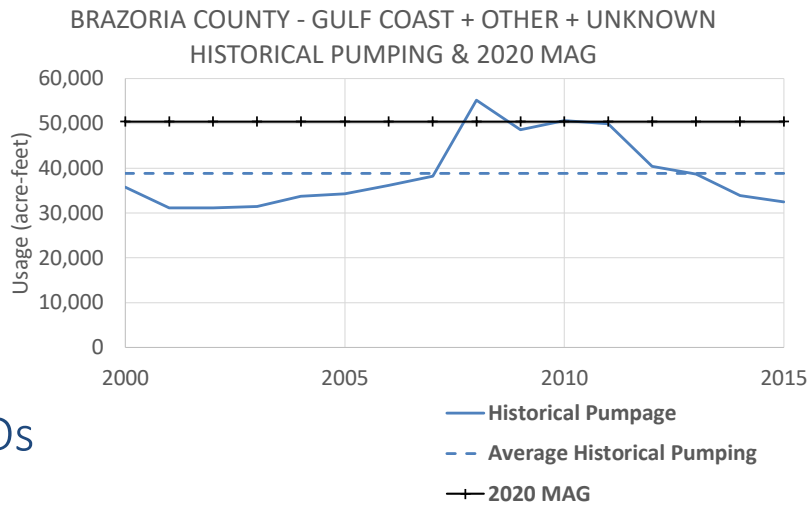
REGION H
Water Planning Group

Agenda Item 7
MAG Peak Factors

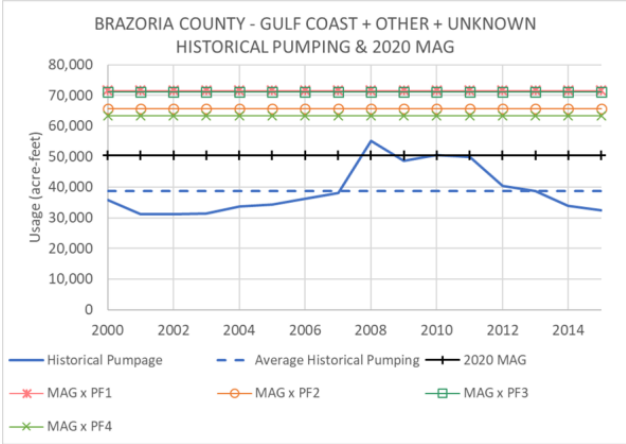
- Percentage factor (>100%) applied to MAG volumes
- Applied for each decade
- Requires approval prior to IPP
  - From GCD (if applicable), GMA, and EA

Agenda Item 7
MAG Peak Factors

- Addresses concerns from 2016 RWP
- Allows for pumping > MAG in drought years
- Should not prevent GCDs from achieving DFCs



Agenda Item 7
MAG Peak Factors



Proposed methodology based on historical pumping (2000 – 2015)

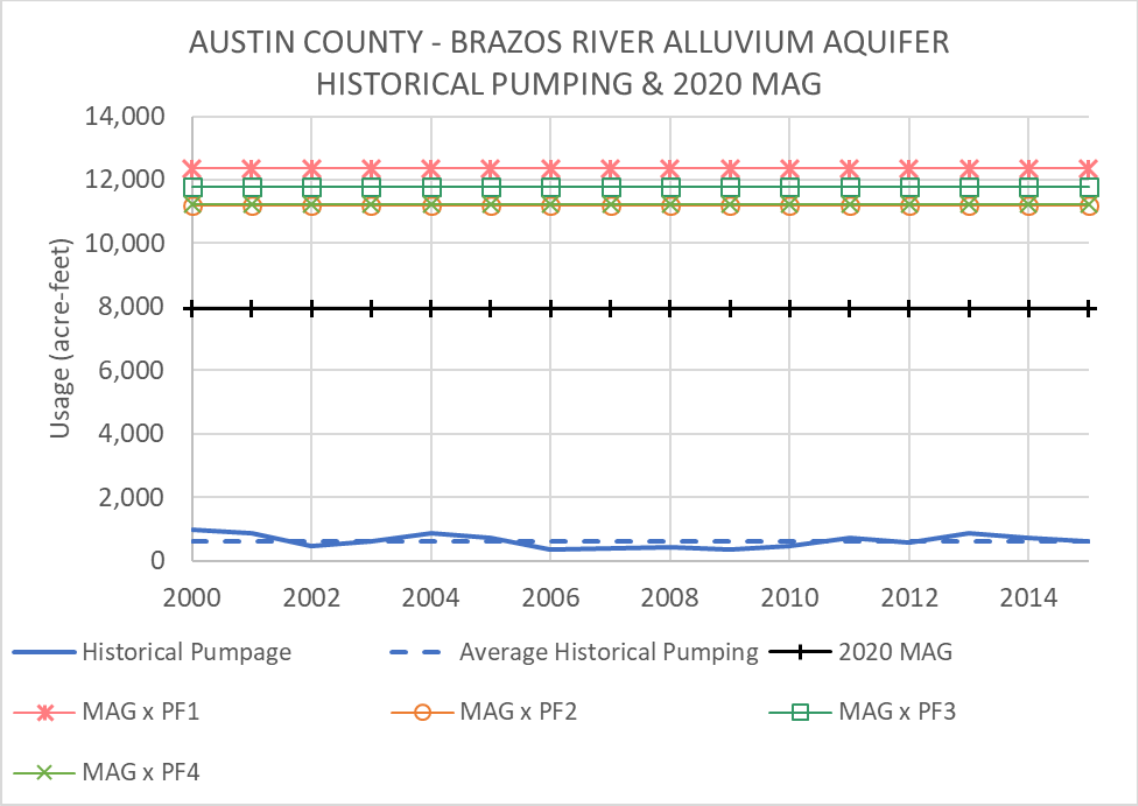
(248.4%) PF_1 = largest pump volume / average
(204.9%) PF_2 = 2nd largest pump volume / average
(375.6%) PF_3 = largest pump volume / linear prediction
(118.8%) PF_4 = 2nd largest pump volume / linear prediction

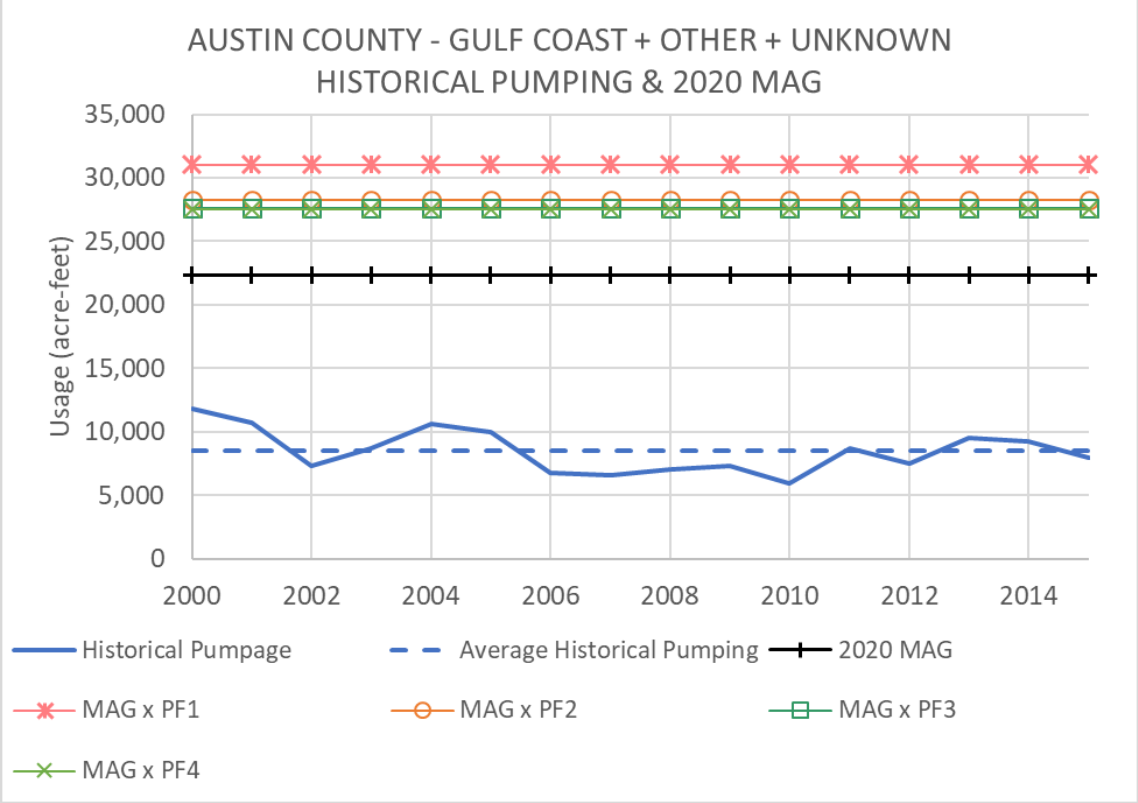
Agenda Item 7
MAG Peak Factors

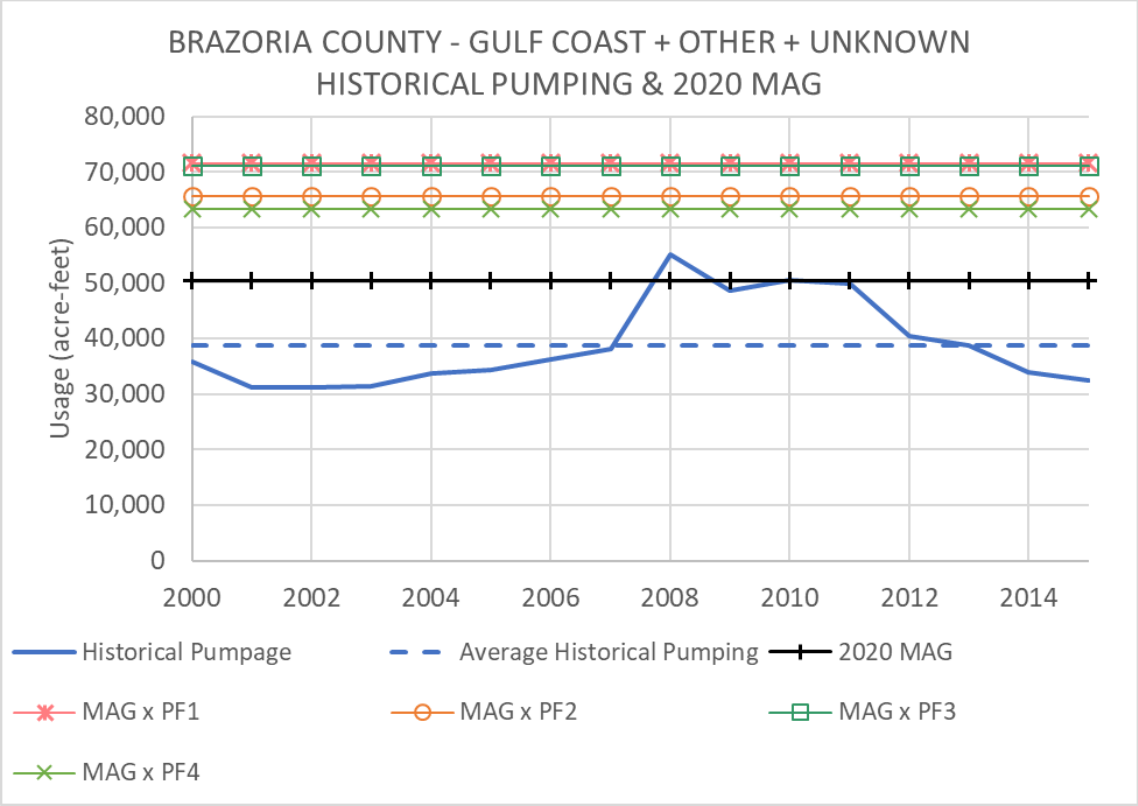
Recommendations?

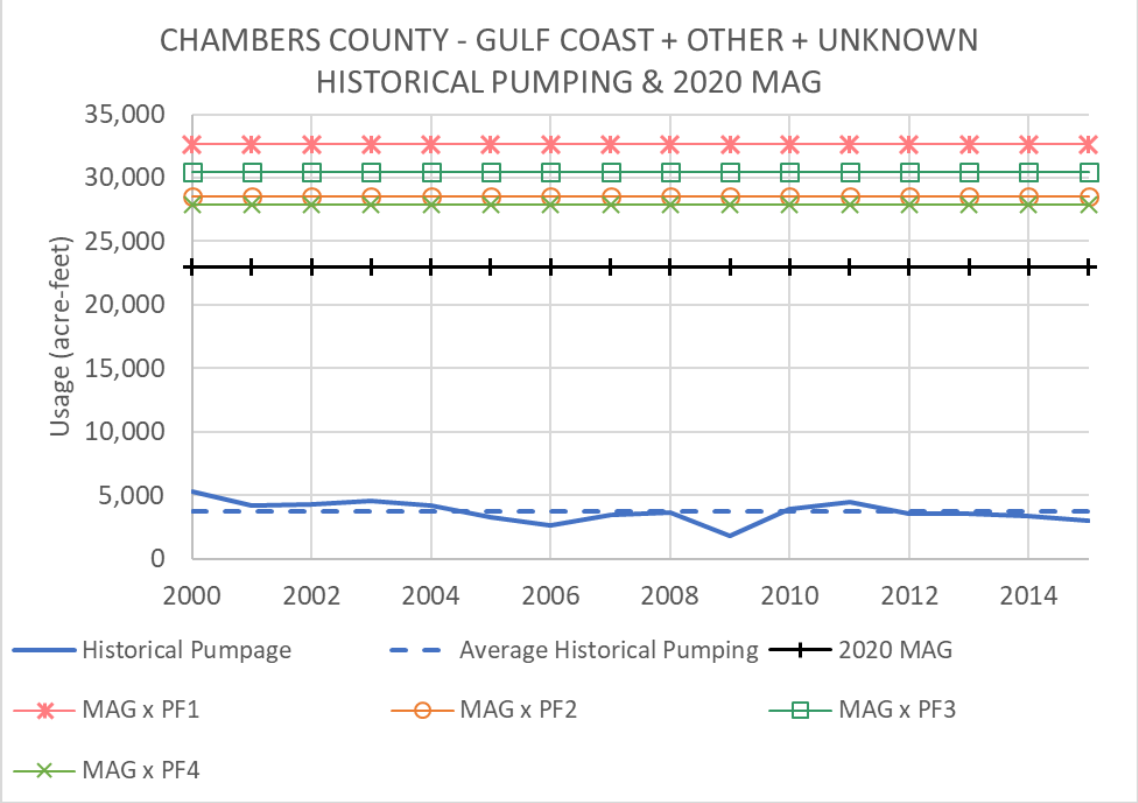
GMA	County	Aquifer	Peaking Factor Options*			
			PF1	PF2	PF3	PF4
14	AUSTIN	GULF COAST AQUIFER	1.39	1.26	1.24	1.14
14	AUSTIN	BRAZOS RIVER ALLUVIUM AQUIFER	1.56	1.41	1.41	1.35
14	AUSTIN	GULF COAST + OTHER + UNKNOWN	1.39	1.27	1.24	1.14
14	BRAZORIA	GULF COAST AQUIFER	1.55	1.36	1.56	1.37
14	**BRAZORIA**	**GULF COAST + OTHER + UNKNOWN**	**1.42**	**1.30**	**1.41**	**1.26**
14	CHAMBERS	GULF COAST AQUIFER	1.53	1.34	1.17	1.13
14	CHAMBERS	GULF COAST + OTHER + UNKNOWN	1.42	1.24	1.21	1.13
14	FORT BEND	GULF COAST AQUIFER	1.35	1.21	1.40	1.17
14	FORT BEND	GULF COAST + OTHER + UNKNOWN	1.30	1.23	1.31	1.24
14	GALVESTON	GULF COAST AQUIFER	2.48	2.05	3.76	1.19
14	GALVESTON	GULF COAST + OTHER + UNKNOWN	2.51	2.02	3.70	1.19
14	HARRIS	GULF COAST AQUIFER	1.55	1.33	1.06	0.96
14	HARRIS	GULF COAST + OTHER + UNKNOWN	1.32	1.16	1.14	1.10
12	LEON	CARRIZO-WILCOX AQUIFER	1.20	1.16	1.22	1.12
12	**LEON**	**QUEEN CITY AQUIFER**	**1.49**	**1.38**	**1.06**	**1.16**
12	**LEON**	**SPARTA AQUIFER**	**1.64**	**1.50**	**1.68**	**1.48**
14	LIBERTY	GULF COAST AQUIFER	1.44	1.39	1.03	1.04
14	LIBERTY	GULF COAST + OTHER + UNKNOWN	1.30	1.26	1.06	1.06
12	MADISON	CARRIZO-WILCOX AQUIFER	2.21	2.12	1.50	1.06
12	MADISON	QUEEN CITY AQUIFER	1.48	1.28	1.57	1.17
12	MADISON	SPARTA AQUIFER	1.31	1.27	1.17	1.07
12	MADISON	YEGUA-JACKSON AQUIFER	2.16	2.00	1.49	1.27
14	MONTGOMERY	GULF COAST AQUIFER	1.29	1.24	1.31	1.25
14	**MONTGOMERY**	**GULF COAST + OTHER + UNKNOWN**	**1.49**	**1.26**	**1.33**	**1.10**
14	POLK	GULF COAST AQUIFER	1.19	1.18	1.16	1.13
14	POLK	GULF COAST + OTHER + UNKNOWN	1.20	1.15	1.14	1.11
14	SAN JACINTO	GULF COAST AQUIFER	1.61	1.21	1.40	0.92
14	SAN JACINTO	GULF COAST + OTHER + UNKNOWN	1.48	1.11	1.38	0.97
11	TRINITY	YEGUA-JACKSON AQUIFER	2.17	1.99	1.57	1.33
14	WALKER	GULF COAST AQUIFER	1.44	1.30	1.22	0.94
14	WALKER	QUEEN CITY AQUIFER	1.66	1.62	1.64	1.54
14	WALKER	YEGUA-JACKSON AQUIFER	3.50	3.36	2.28	1.29
14	WALKER	GULF COAST + OTHER + UNKNOWN	1.21	1.20	1.15	1.31
14	WALLER	GULF COAST AQUIFER	1.29	1.29	1.08	1.04
14	WALLER	BRAZOS RIVER ALLUVIUM AQUIFER	1.31	1.28	1.08	1.02
14	WALLER	GULF COAST + OTHER + UNKNOWN	1.29	1.27	1.45	1.08

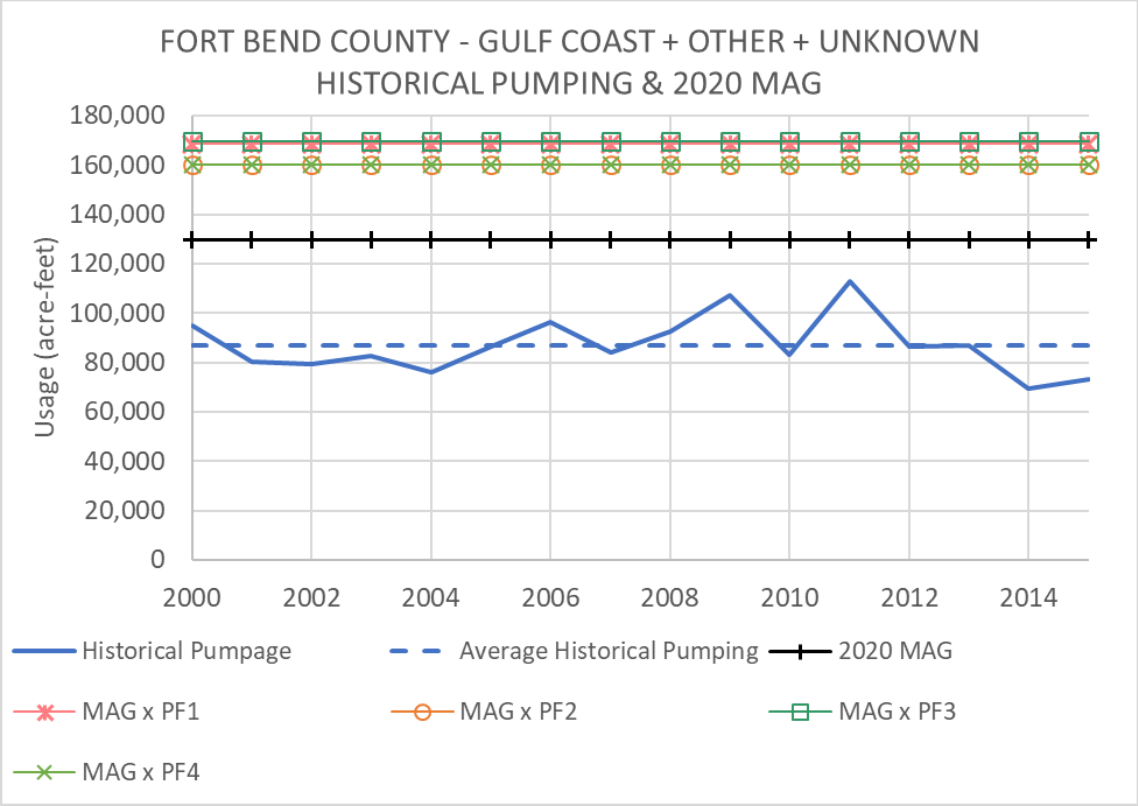
*Values in blue reflect non-Subsidence District counties with historical pumpage exceeding the MAG for one or more years.

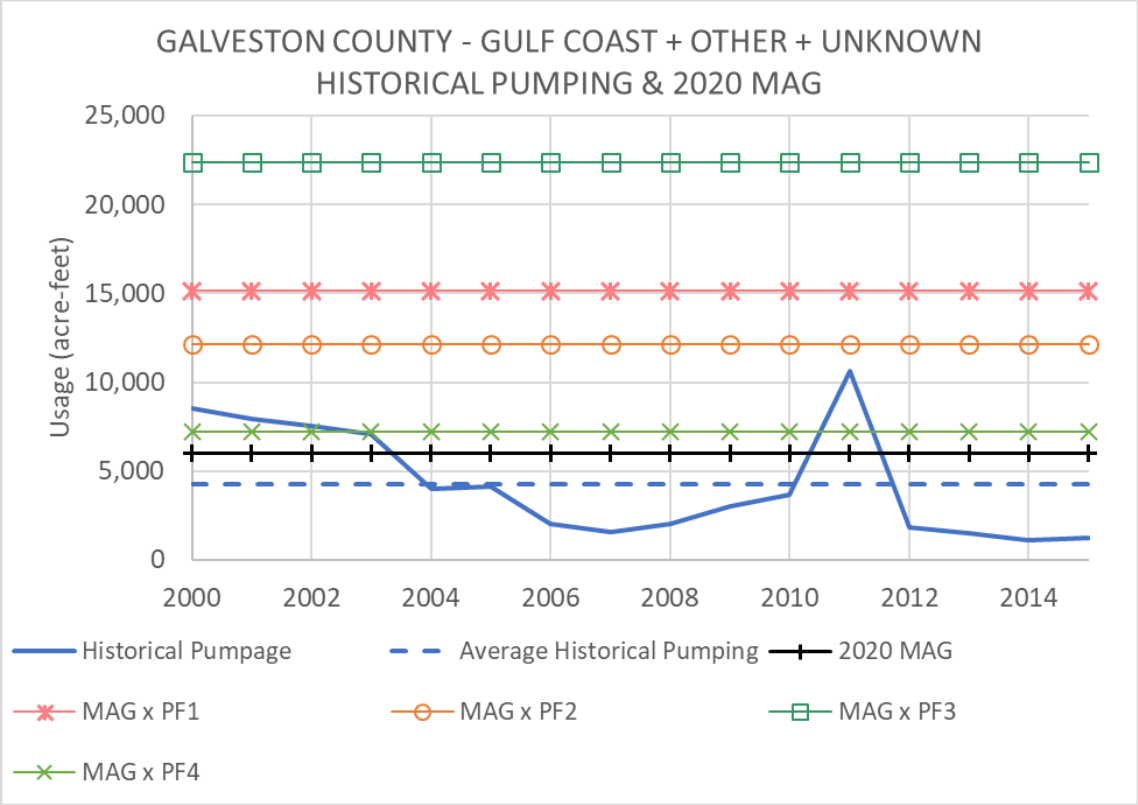

AUSTIN COUNTY - BRAZOS RIVER ALLUVIUM AQUIFER
HISTORICAL PUMPING & 2020 MAG
Usage (acre-feet)
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
2000
2002
2004
2006
2008
2010
2012
2014
Historical Pumpage
Average Historical Pumping
2020 MAG
MAG x PF1
MAG x PF2
MAG x PF3
MAG x PF4

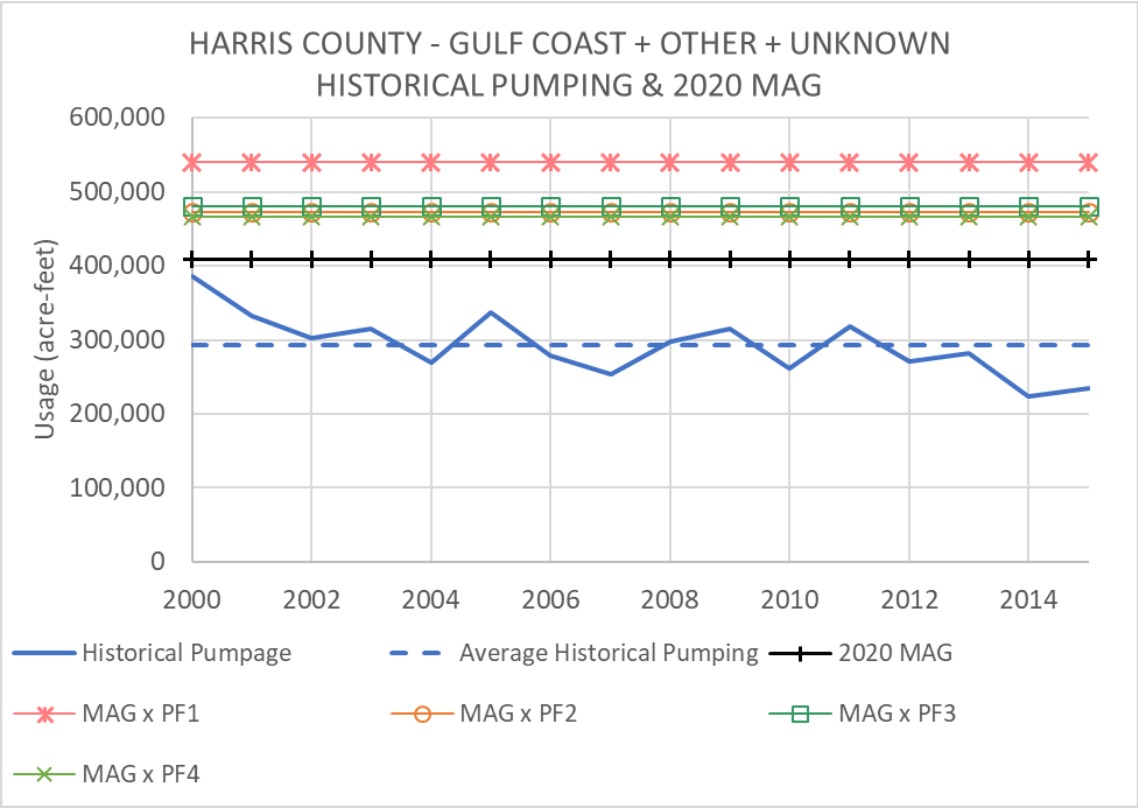

AUSTIN COUNTY - GULF COAST + OTHER + UNKNOWN
HISTORICAL PUMPING & 2020 MAG
Usage (acre-feet)
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
2000
2002
2004
2006
2008
2010
2012
2014
Historical Pumpage
Average Historical Pumping
2020 MAG
MAG x PF1
MAG x PF2
MAG x PF3
MAG x PF4

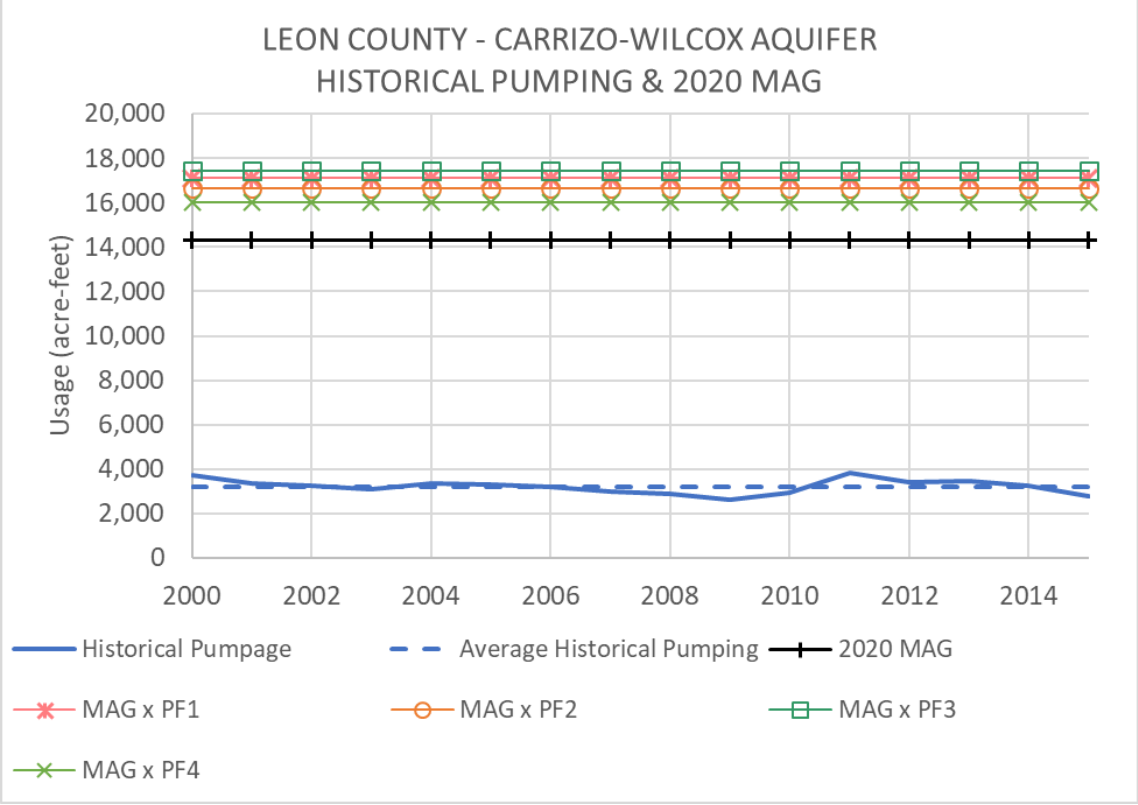

BRAZORIA COUNTY - GULF COAST + OTHER + UNKNOWN
HISTORICAL PUMPING & 2020 MAG
Usage (acre-feet)
80,000
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
2000
2002
2004
2006
2008
2010
2012
2014
Historical Pumpage
Average Historical Pumping
2020 MAG
MAG x PF1
MAG x PF2
MAG x PF3
MAG x PF4

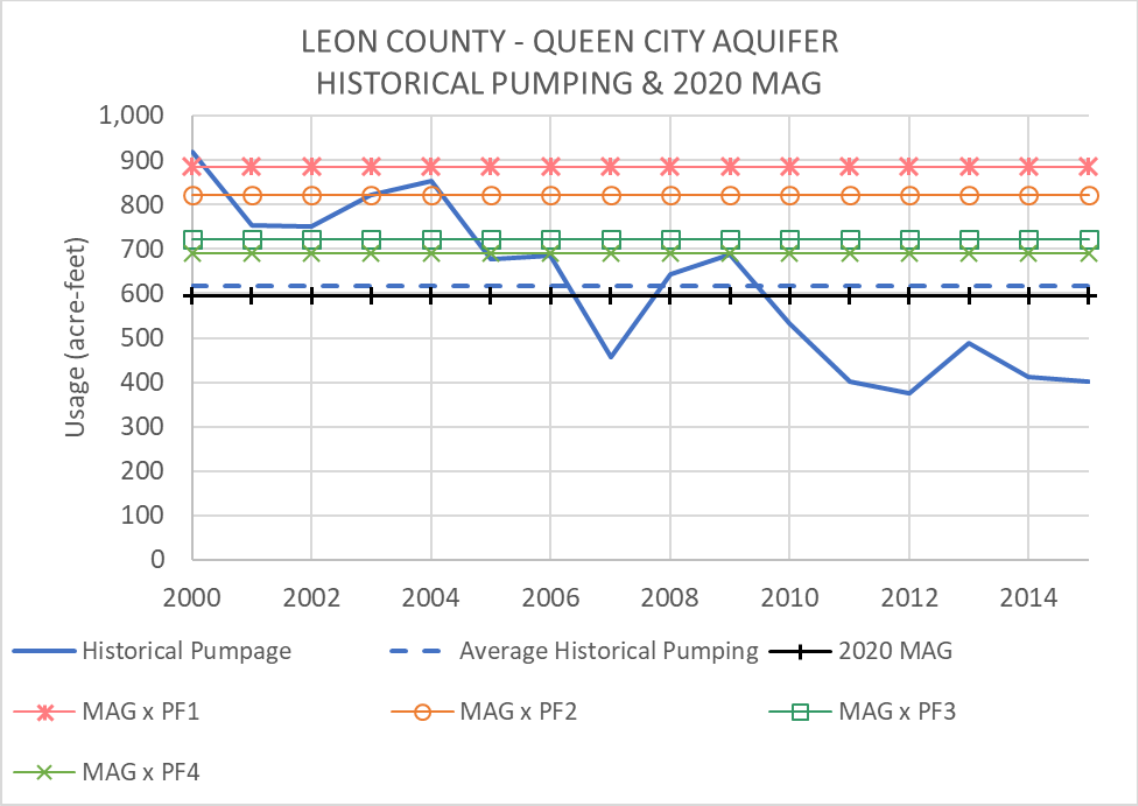

CHAMBERS COUNTY - GULF COAST + OTHER + UNKNOWN
HISTORICAL PUMPING & 2020 MAG
Usage (acre-feet)
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
2000
2002
2004
2006
2008
2010
2012
2014
Historical Pumpage
Average Historical Pumping
2020 MAG
MAG x PF1
MAG x PF2
MAG x PF3
MAG x PF4

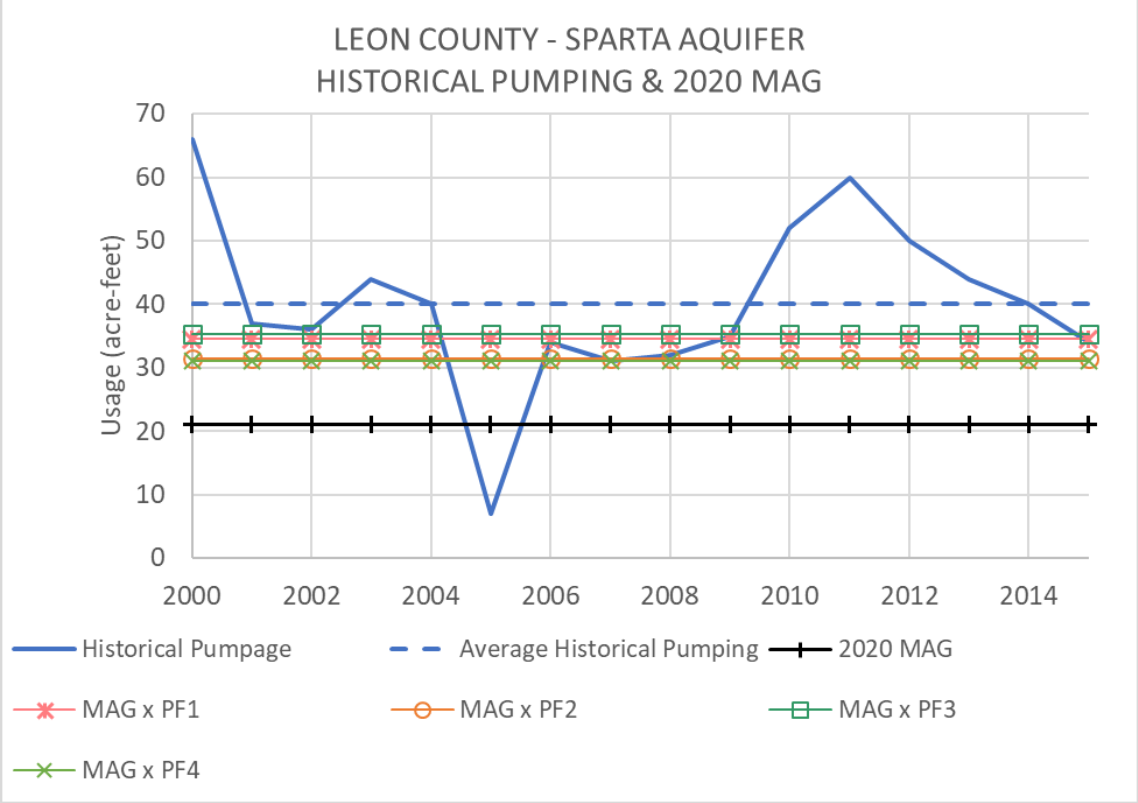

FORT BEND COUNTY - GULF COAST + OTHER + UNKNOWN
HISTORICAL PUMPING & 2020 MAG
Usage (acre-feet)
180,000
160,000
140,000
120,000
100,000
80,000
60,000
40,000
20,000
0
2000
2002
2004
2006
2008
2010
2012
2014
Historical Pumpage
Average Historical Pumping
2020 MAG
MAG x PF1
MAG x PF2
MAG x PF3
MAG x PF4

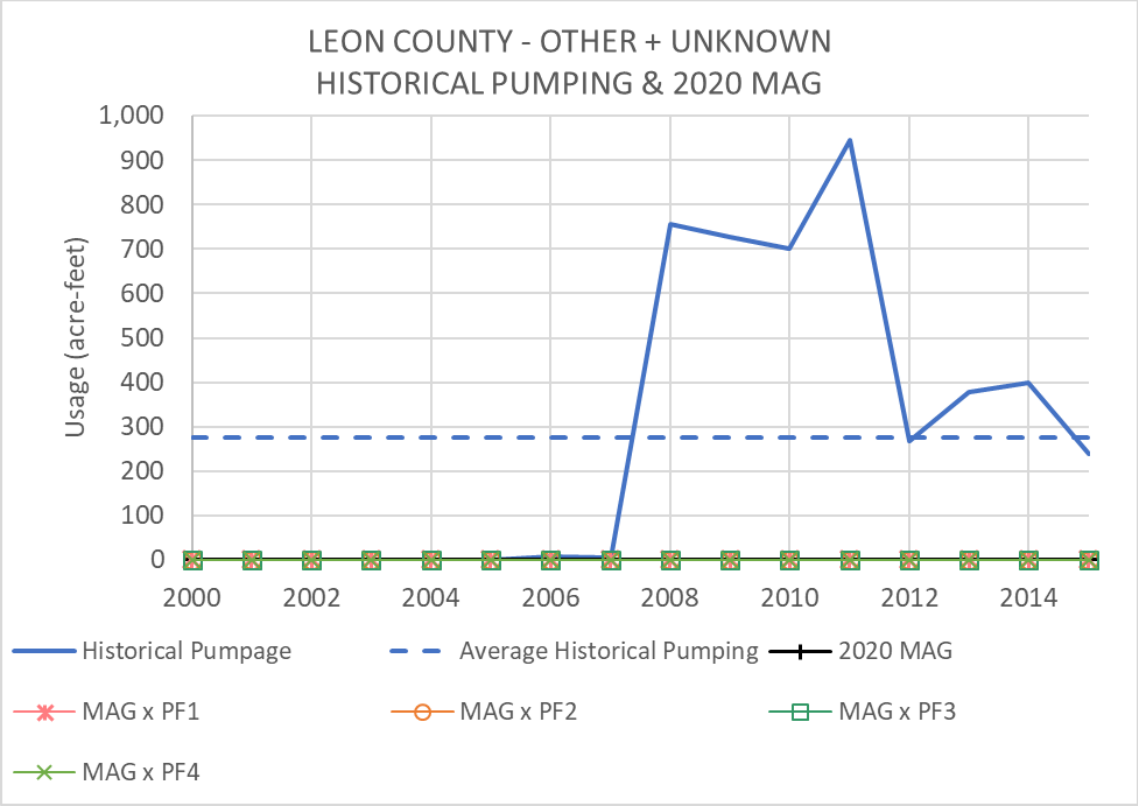

GALVESTON COUNTY - GULF COAST + OTHER + UNKNOWN
HISTORICAL PUMPING & 2020 MAG
Usage (acre-feet)
25,000
20,000
15,000
10,000
5,000
0
2000
2002
2004
2006
2008
2010
2012
2014
Historical Pumpage
Average Historical Pumping
2020 MAG
MAG x PF1
MAG x PF2
MAG x PF3
MAG x PF4

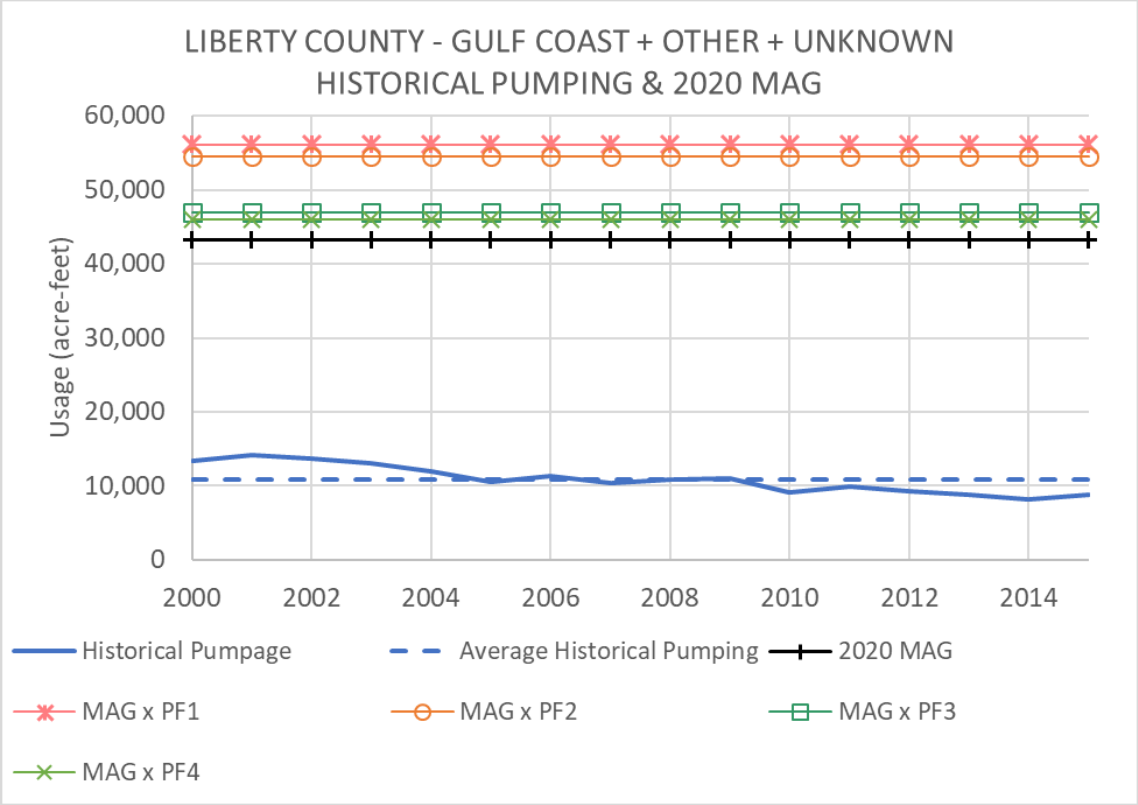

HARRIS COUNTY - GULF COAST + OTHER + UNKNOWN
HISTORICAL PUMPING & 2020 MAG
Usage (acre-feet)
600,000
500,000
400,000
300,000
200,000
100,000
0
2000
2002
2004
2006
2008
2010
2012
2014
Historical Pumpage
Average Historical Pumping
2020 MAG
MAG x PF1
MAG x PF2
MAG x PF3
MAG x PF4

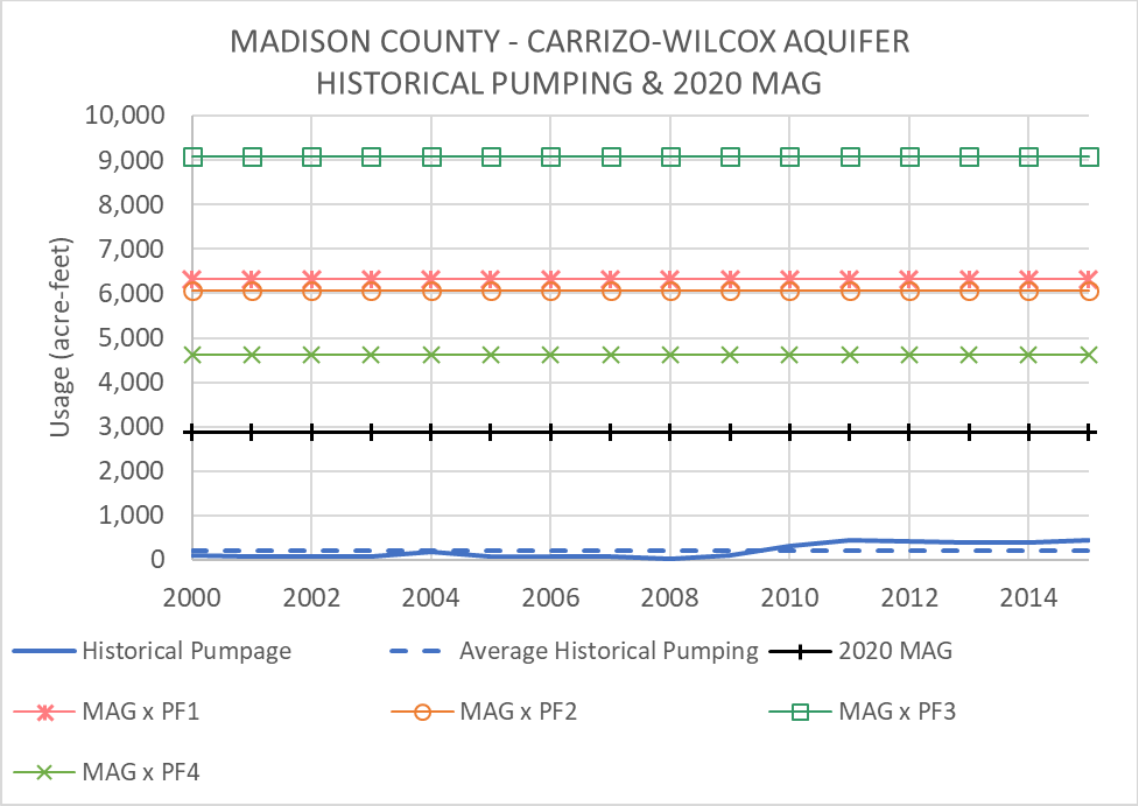

LEON COUNTY - CARRIZO-WILCOX AQUIFER
HISTORICAL PUMPING & 2020 MAG
Usage (acre-feet)
20,000
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
2000
2002
2004
2006
2008
2010
2012
2014
Historical Pumpage
Average Historical Pumping
2020 MAG
MAG x PF1
MAG x PF2
MAG x PF3
MAG x PF4

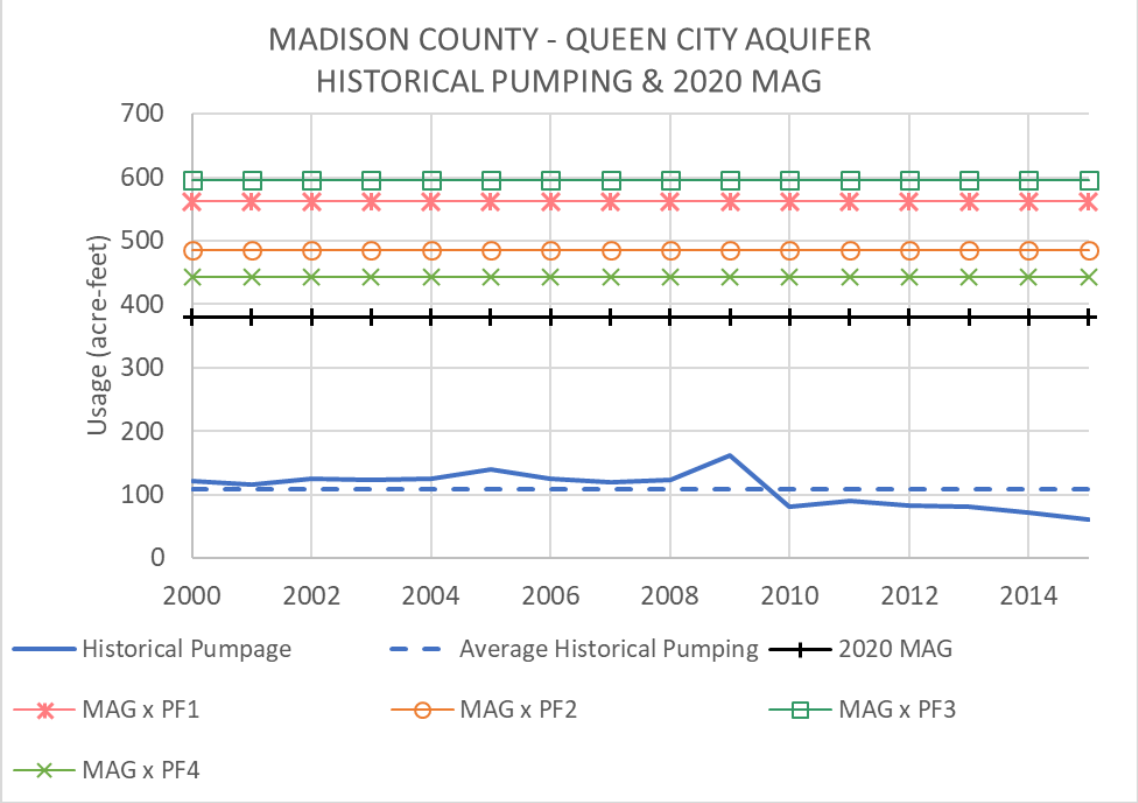

LEON COUNTY - QUEEN CITY AQUIFER
HISTORICAL PUMPING & 2020 MAG
Usage (acre-feet)
1,000
900
800
700
600
500
400
300
200
100
0
2000
2002
2004
2006
2008
2010
2012
2014
Historical Pumpage
Average Historical Pumping
2020 MAG
MAG x PF1
MAG x PF2
MAG x PF3
MAG x PF4

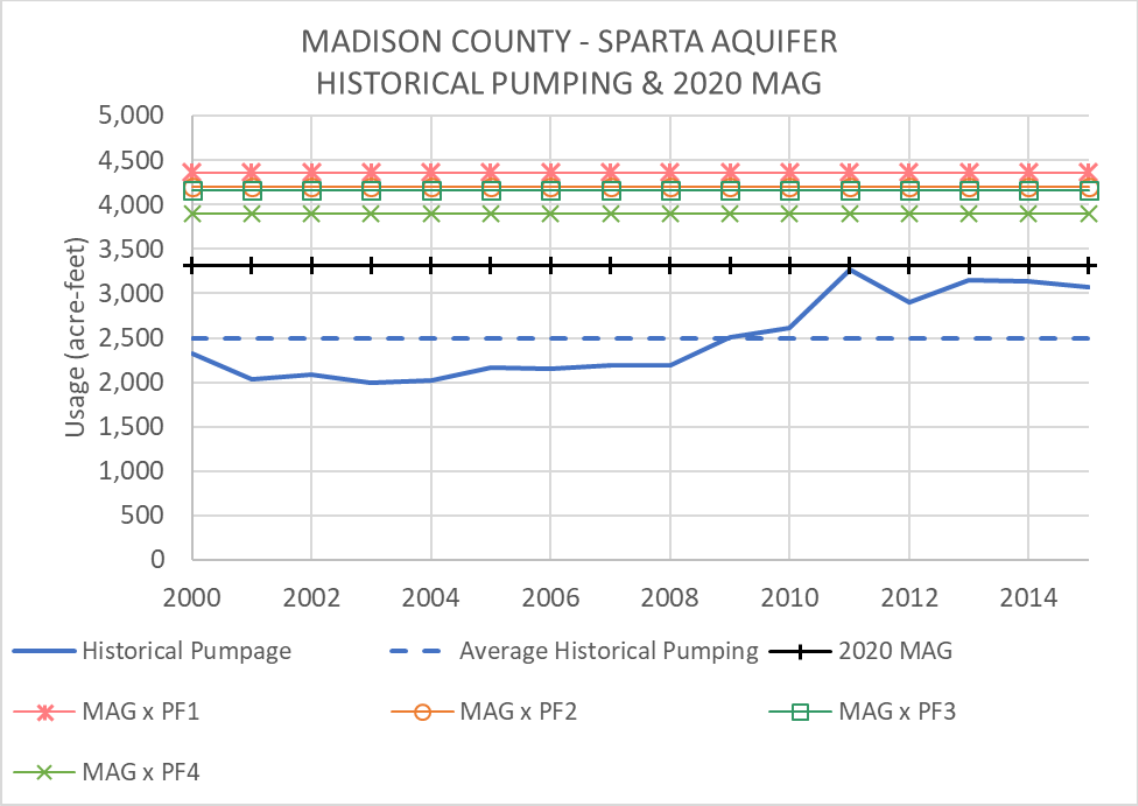

LEON COUNTY - SPARTA AQUIFER
HISTORICAL PUMPING & 2020 MAG
Usage (acre-feet)
70
60
50
40
30
20
10
0
2000
2002
2004
2006
2008
2010
2012
2014
Historical Pumpage
Average Historical Pumping
2020 MAG
MAG x PF1
MAG x PF2
MAG x PF3
MAG x PF4

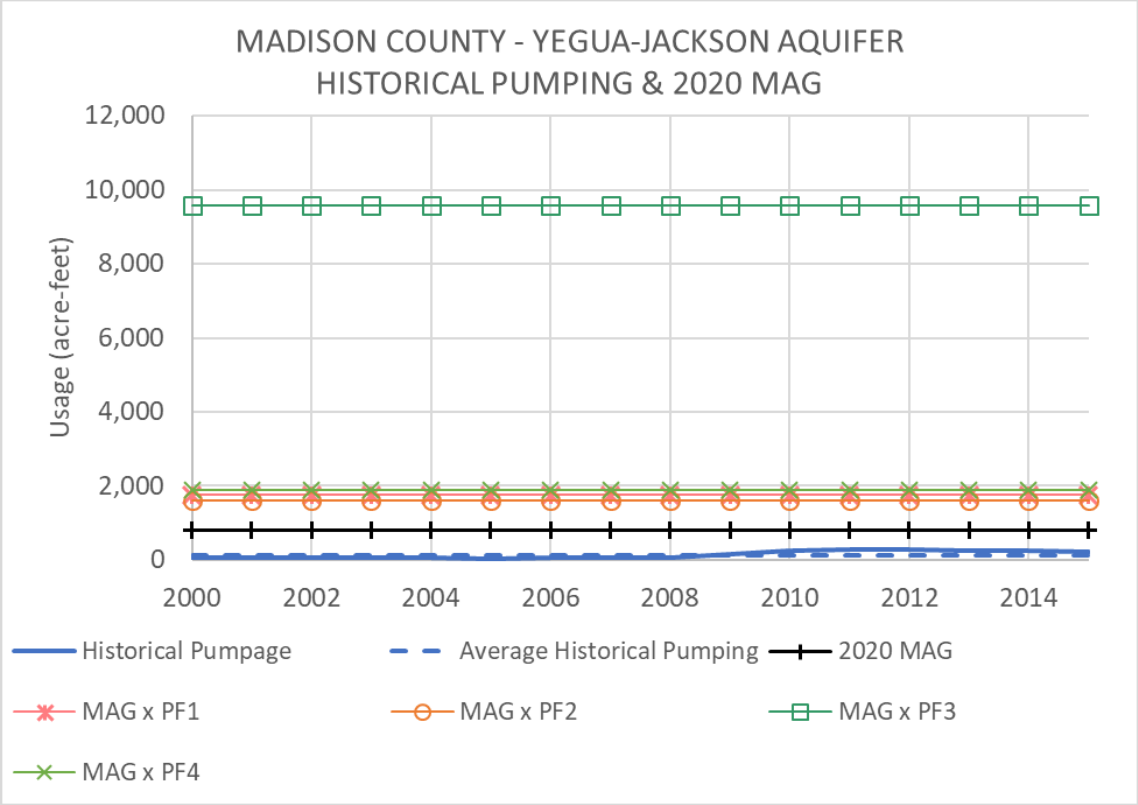

LEON COUNTY - OTHER + UNKNOWN
HISTORICAL PUMPING & 2020 MAG
Usage (acre-feet)
1,000
900
800
700
600
500
400
300
200
100
0
2000
2002
2004
2006
2008
2010
2012
2014
Historical Pumpage
Average Historical Pumping
2020 MAG
MAG x PF1
MAG x PF2
MAG x PF3
MAG x PF4

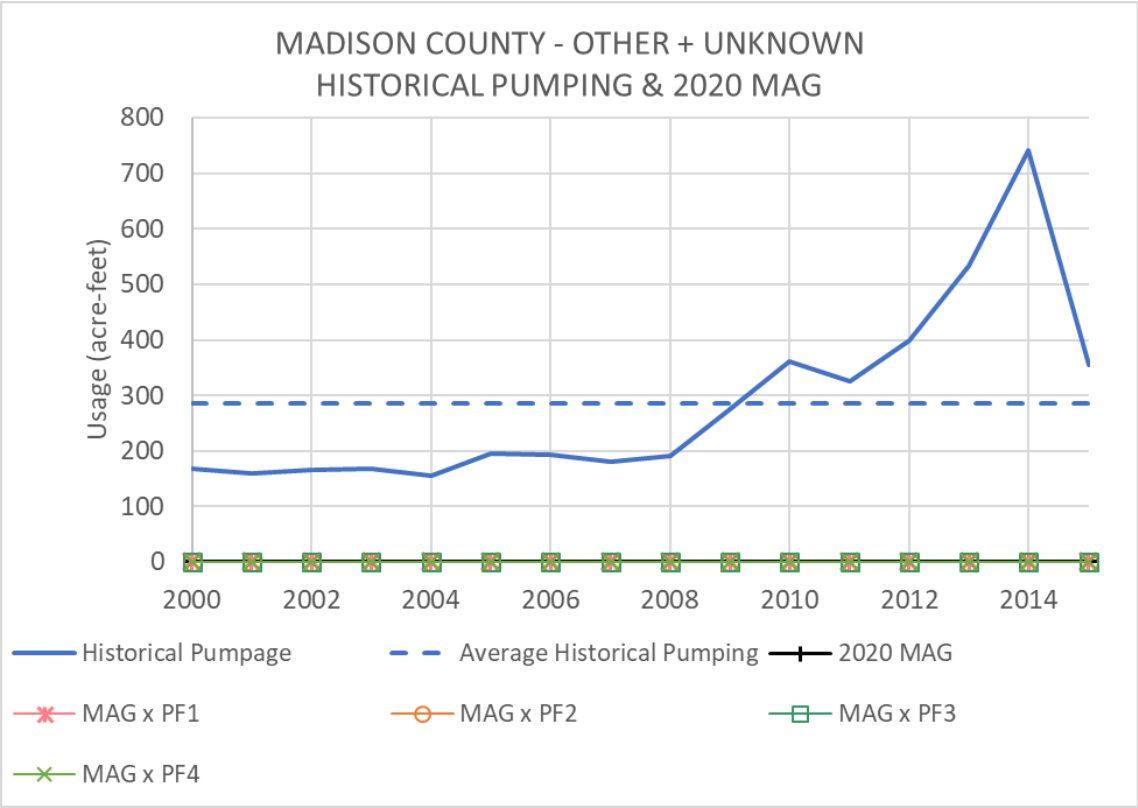

LIBERTY COUNTY - GULF COAST + OTHER + UNKNOWN
HISTORICAL PUMPING & 2020 MAG
Usage (acre-feet)
60,000
50,000
40,000
30,000
20,000
10,000
0
2000
2002
2004
2006
2008
2010
2012
2014
Historical Pumpage
Average Historical Pumping
2020 MAG
MAG x PF1
MAG x PF2
MAG x PF3
MAG x PF4

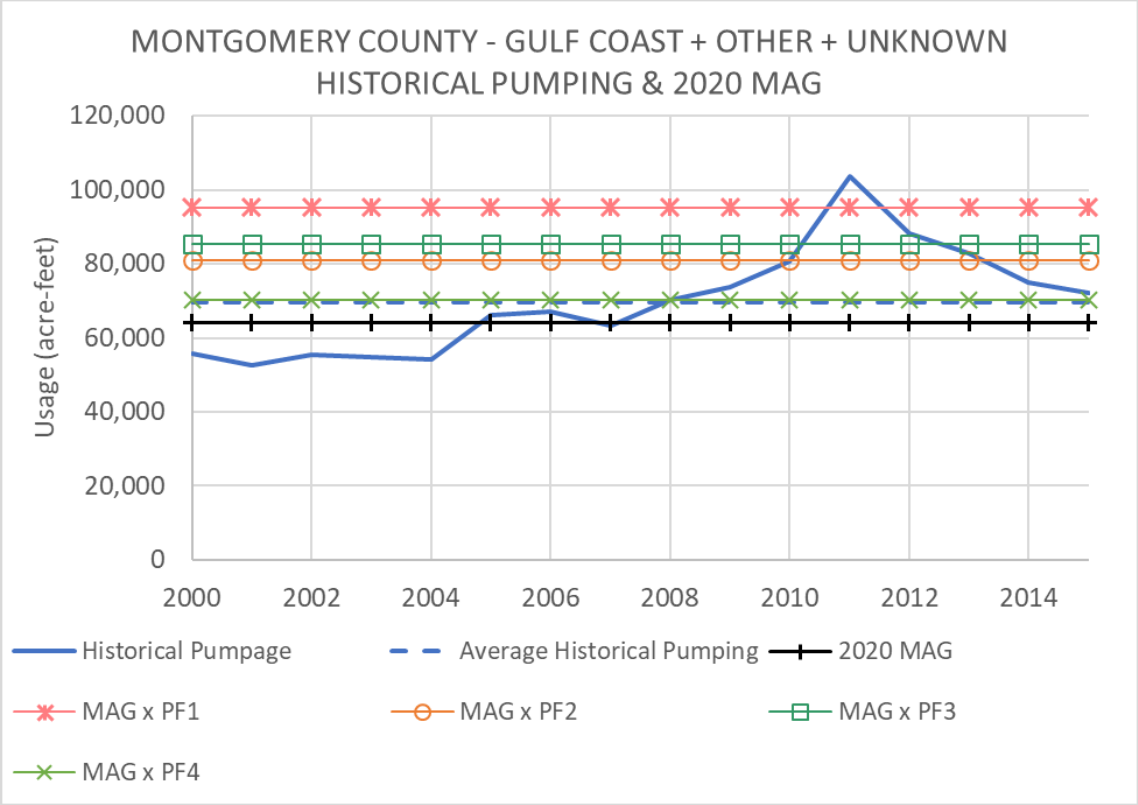

MADISON COUNTY - CARRIZO-WILCOX AQUIFER
HISTORICAL PUMPING & 2020 MAG
Usage (acre-feet)
10,000
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
2000
2002
2004
2006
2008
2010
2012
2014
Historical Pumpage
Average Historical Pumping
2020 MAG
MAG x PF1
MAG x PF2
MAG x PF3
MAG x PF4

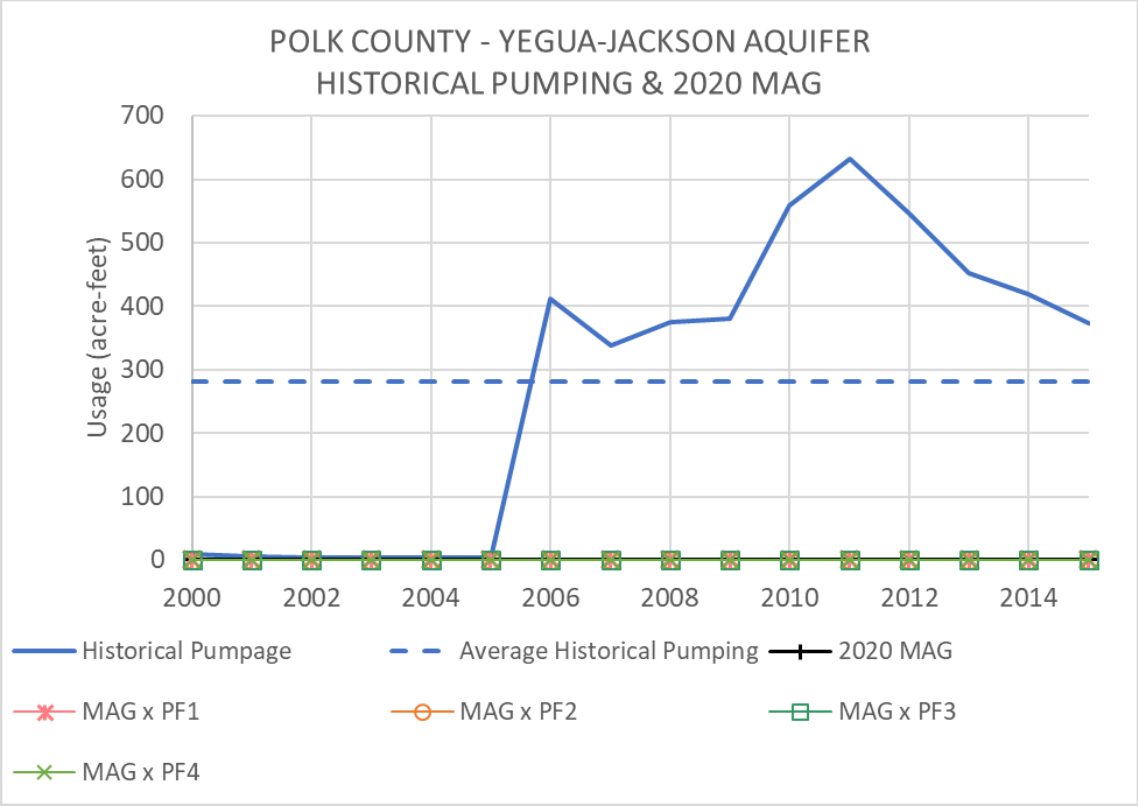

MADISON COUNTY - QUEEN CITY AQUIFER
HISTORICAL PUMPING & 2020 MAG
Usage (acre-feet)
700
600
500
400
300
200
100
0
2000
2002
2004
2006
2008
2010
2012
2014
Historical Pumpage
Average Historical Pumping
2020 MAG
MAG x PF1
MAG x PF2
MAG x PF3
MAG x PF4

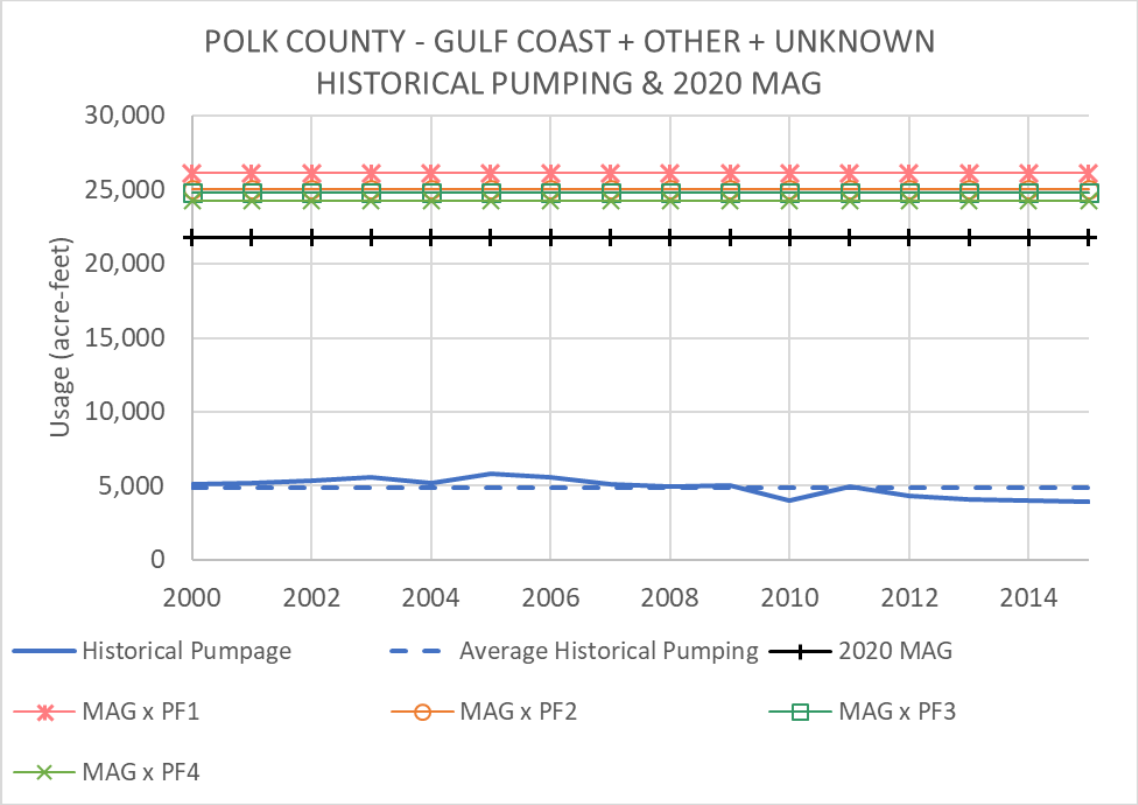

MADISON COUNTY - SPARTA AQUIFER
HISTORICAL PUMPING & 2020 MAG
Usage (acre-feet)
5,000
4,500
4,000
3,500
3,000
2,500
2,000
1,500
1,000
500
0
2000
2002
2004
2006
2008
2010
2012
2014
Historical Pumpage
Average Historical Pumping
2020 MAG
MAG x PF1
MAG x PF2
MAG x PF3
MAG x PF4

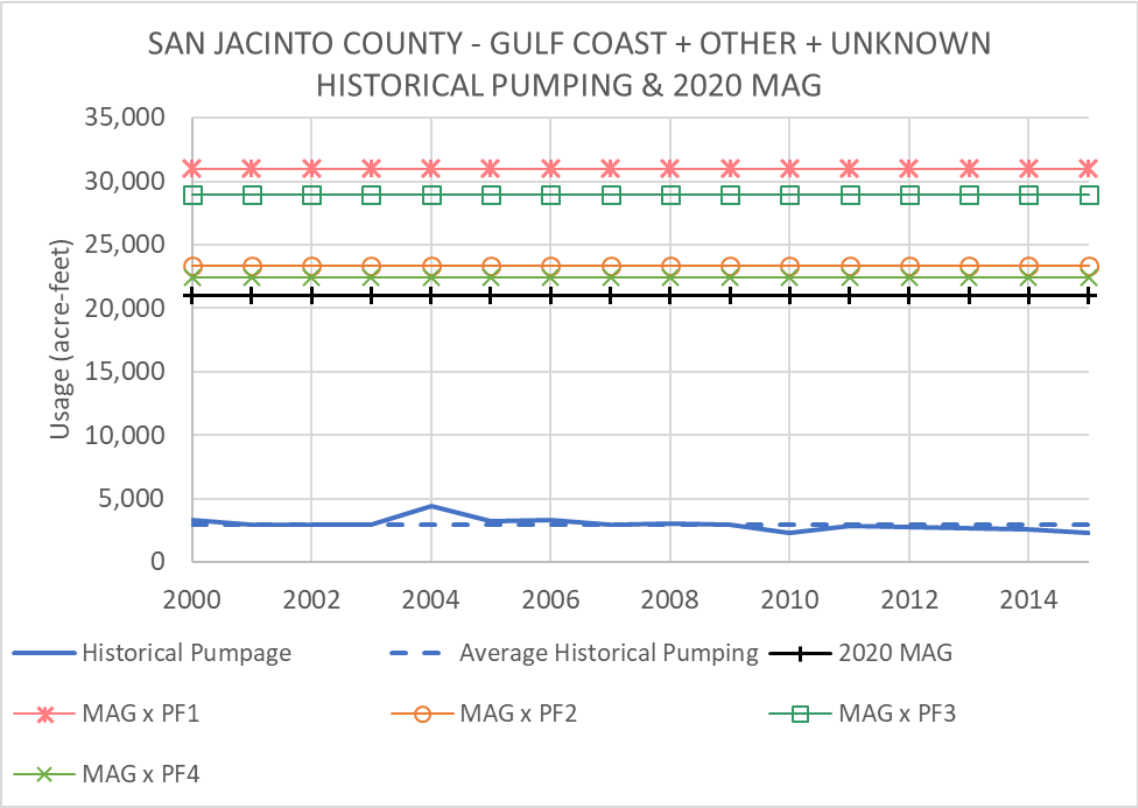

MADISON COUNTY - YEGUA-JACKSON AQUIFER
HISTORICAL PUMPING & 2020 MAG
Usage (acre-feet)
12,000
10,000
8,000
6,000
4,000
2,000
0
2000
2002
2004
2006
2008
2010
2012
2014
Historical Pumpage
Average Historical Pumping
2020 MAG
MAG x PF1
MAG x PF2
MAG x PF3
MAG x PF4

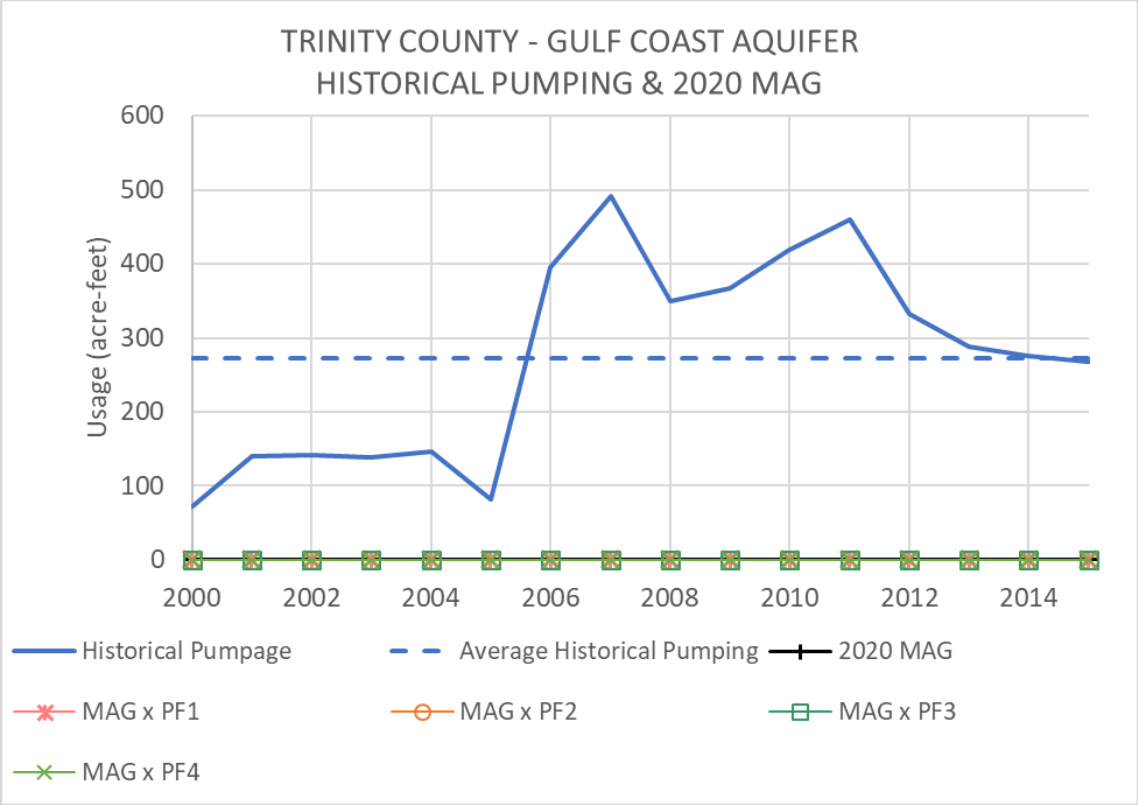

MADISON COUNTY - OTHER + UNKNOWN
HISTORICAL PUMPING & 2020 MAG
Usage (acre-feet)
800
700
600
500
400
300
200
100
0
2000
2002
2004
2006
2008
2010
2012
2014
Historical Pumpage
Average Historical Pumping
2020 MAG
MAG x PF1
MAG x PF2
MAG x PF3
MAG x PF4

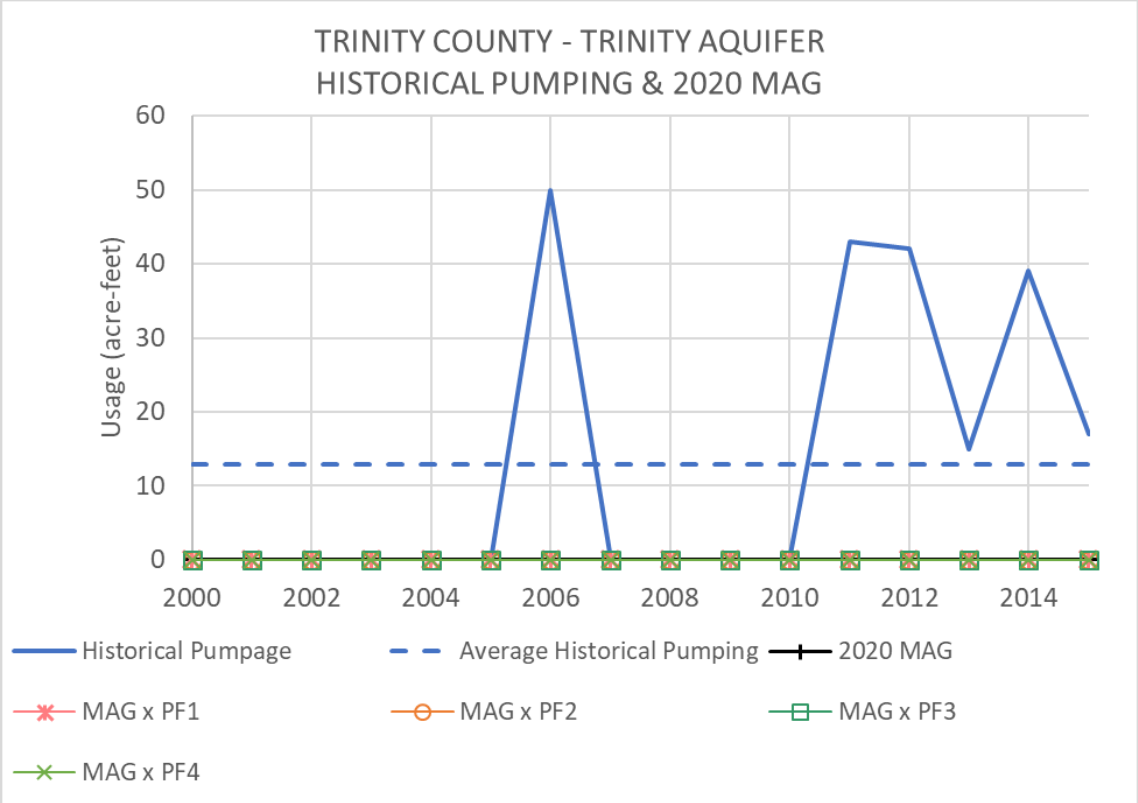

MONTGOMERY COUNTY - GULF COAST + OTHER + UNKNOWN
HISTORICAL PUMPING & 2020 MAG
Usage (acre-feet)
120,000
100,000
80,000
60,000
40,000
20,000
0
2000
2002
2004
2006
2008
2010
2012
2014
Historical Pumpage
Average Historical Pumping
2020 MAG
MAG x PF1
MAG x PF2
MAG x PF3
MAG x PF4

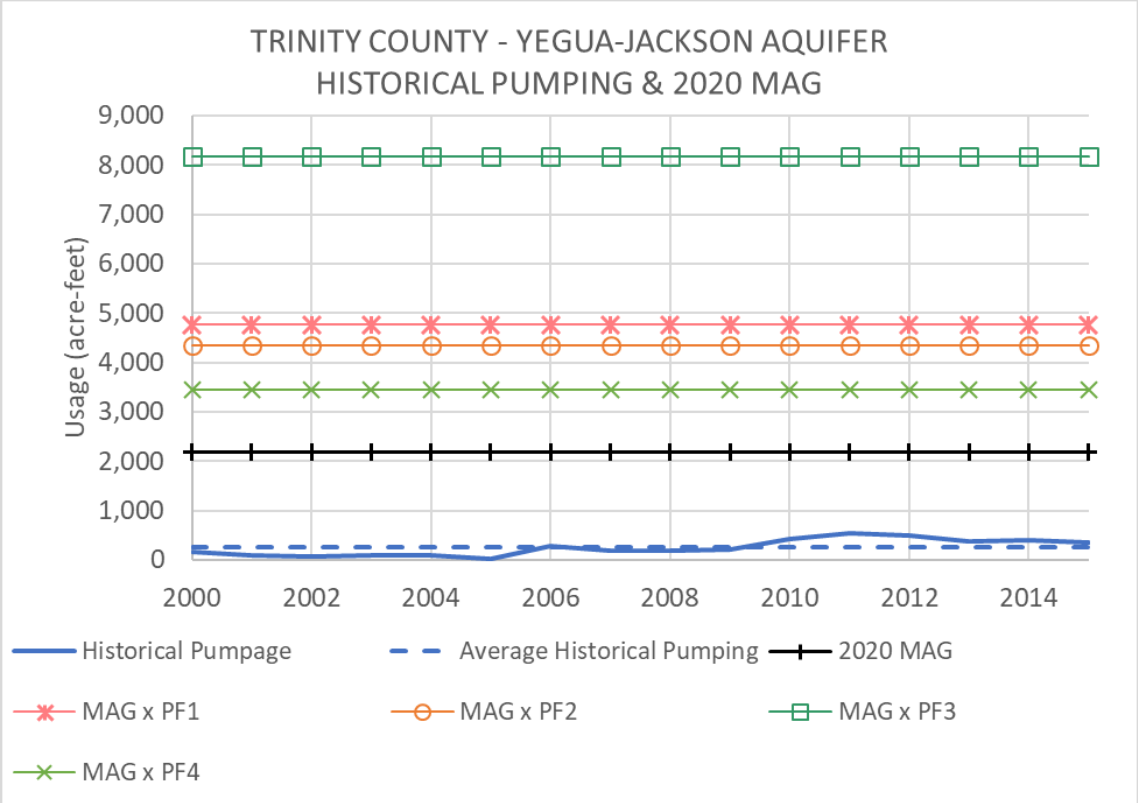

POLK COUNTY - YEGUA-JACKSON AQUIFER
HISTORICAL PUMPING & 2020 MAG
Usage (acre-feet)
700
600
500
400
300
200
100
0
2000
2002
2004
2006
2008
2010
2012
2014
Historical Pumpage
Average Historical Pumping
2020 MAG
MAG x PF1
MAG x PF2
MAG x PF3
MAG x PF4

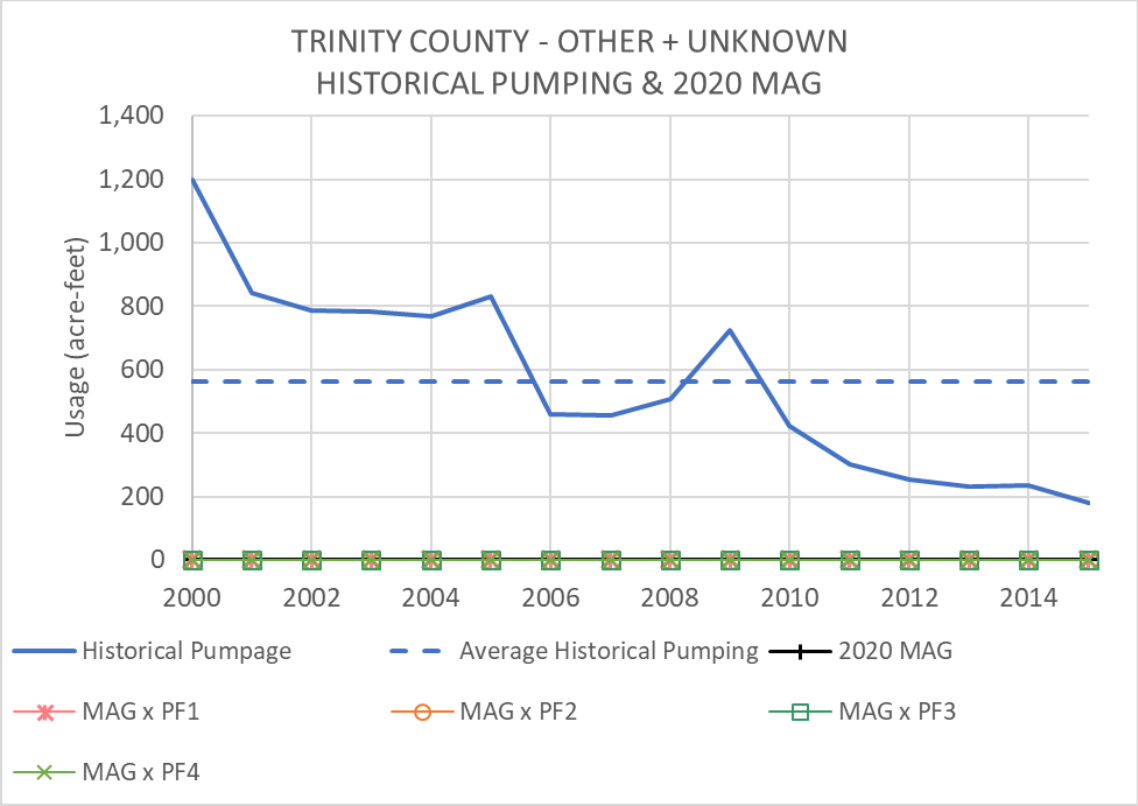

POLK COUNTY - GULF COAST + OTHER + UNKNOWN
HISTORICAL PUMPING & 2020 MAG
Usage (acre-feet)
30,000
25,000
20,000
15,000
10,000
5,000
0
2000
2002
2004
2006
2008
2010
2012
2014
Historical Pumpage
Average Historical Pumping
2020 MAG
MAG x PF1
MAG x PF2
MAG x PF3
MAG x PF4

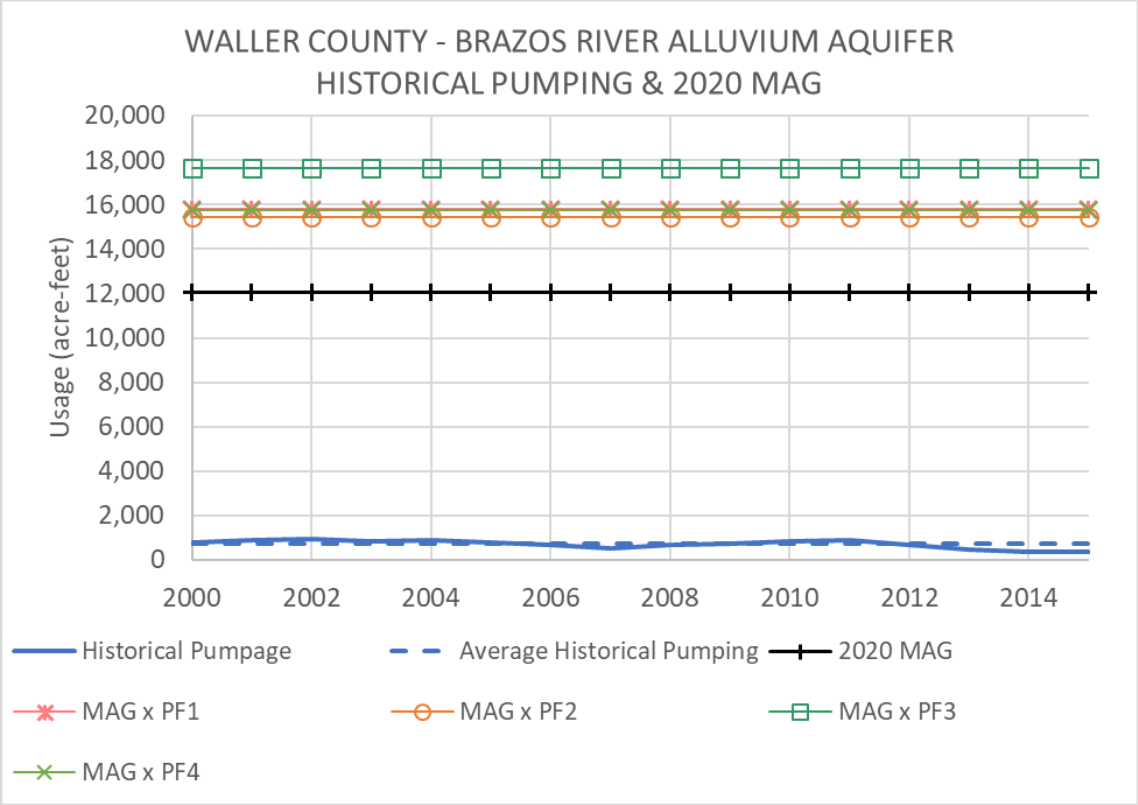

SAN JACINTO COUNTY - GULF COAST + OTHER + UNKNOWN
HISTORICAL PUMPING & 2020 MAG
Usage (acre-feet)
35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
2000
2002
2004
2006
2008
2010
2012
2014
Historical Pumpage
Average Historical Pumping
2020 MAG
MAG x PF1
MAG x PF2
MAG x PF3
MAG x PF4

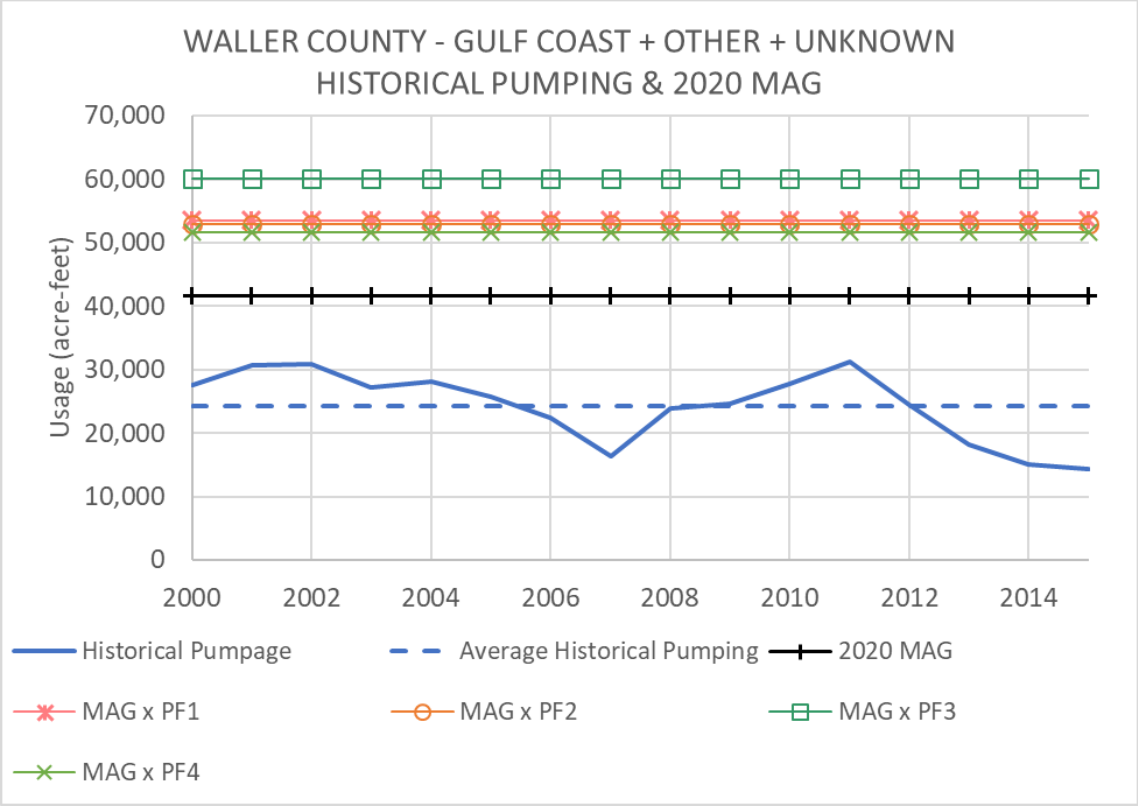

TRINITY COUNTY - GULF COAST AQUIFER
HISTORICAL PUMPING & 2020 MAG
Usage (acre-feet)
600
500
400
300
200
100
0
2000
2002
2004
2006
2008
2010
2012
2014
Historical Pumpage
Average Historical Pumping
2020 MAG
MAG x PF1
MAG x PF2
MAG x PF3
MAG x PF4

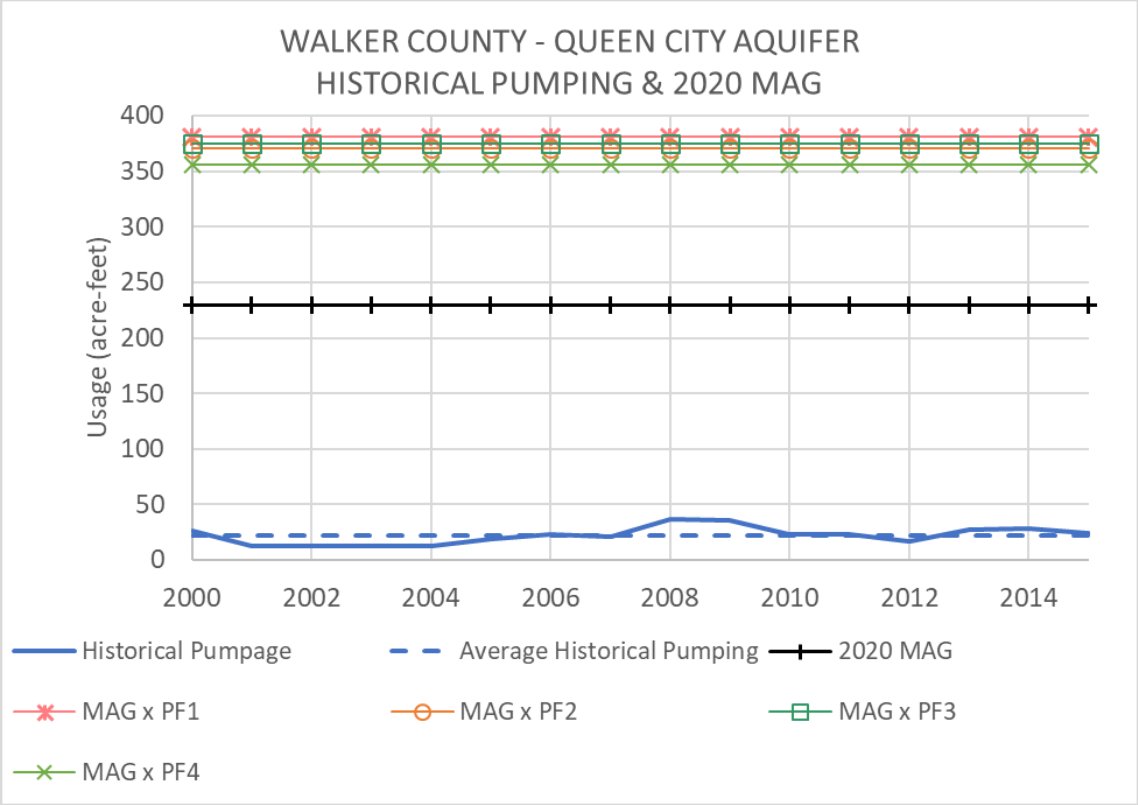

TRINITY COUNTY - TRINITY AQUIFER
HISTORICAL PUMPING & 2020 MAG
Usage (acre-feet)
60
50
40
30
20
10
0
2000
2002
2004
2006
2008
2010
2012
2014
Historical Pumpage
Average Historical Pumping
2020 MAG
MAG x PF1
MAG x PF2
MAG x PF3
MAG x PF4

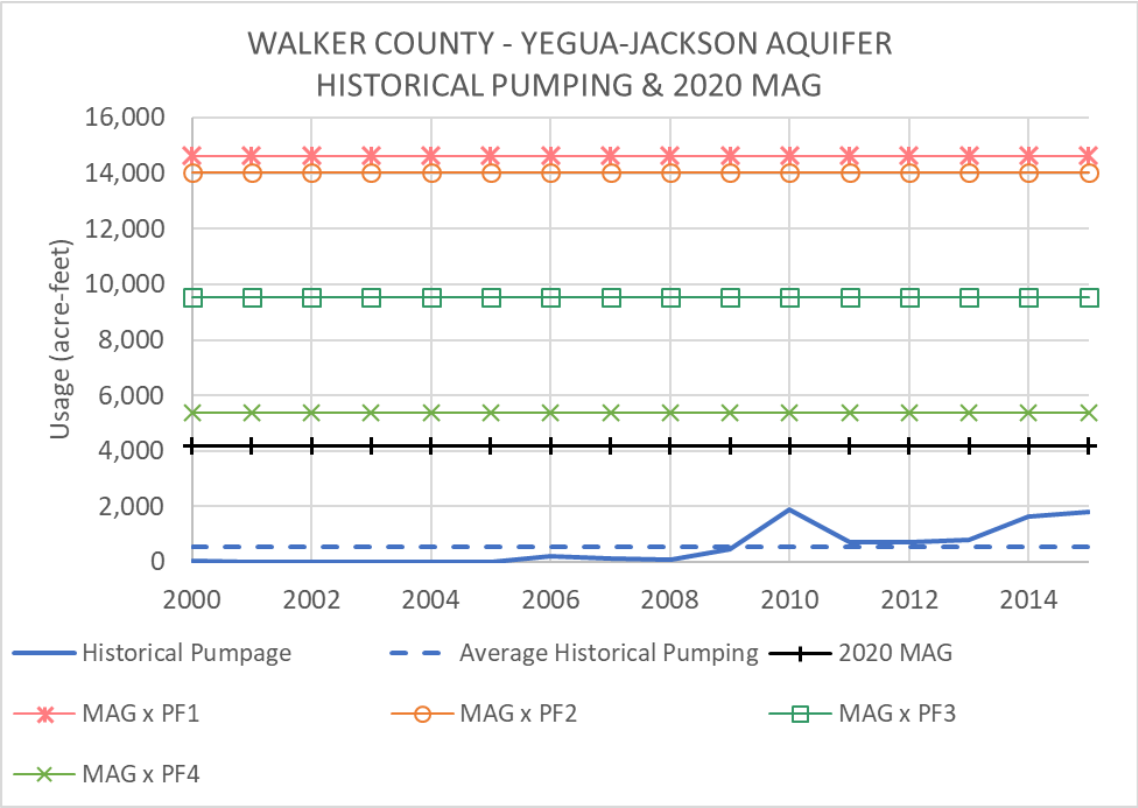

TRINITY COUNTY - YEGUA-JACKSON AQUIFER
HISTORICAL PUMPING & 2020 MAG
Usage (acre-feet)
9,000
8,000
7,000
6,000
5,000
4,000
3,000
2,000
1,000
0
2000
2002
2004
2006
2008
2010
2012
2014
Historical Pumpage
Average Historical Pumping
2020 MAG
MAG x PF1
MAG x PF2
MAG x PF3
MAG x PF4

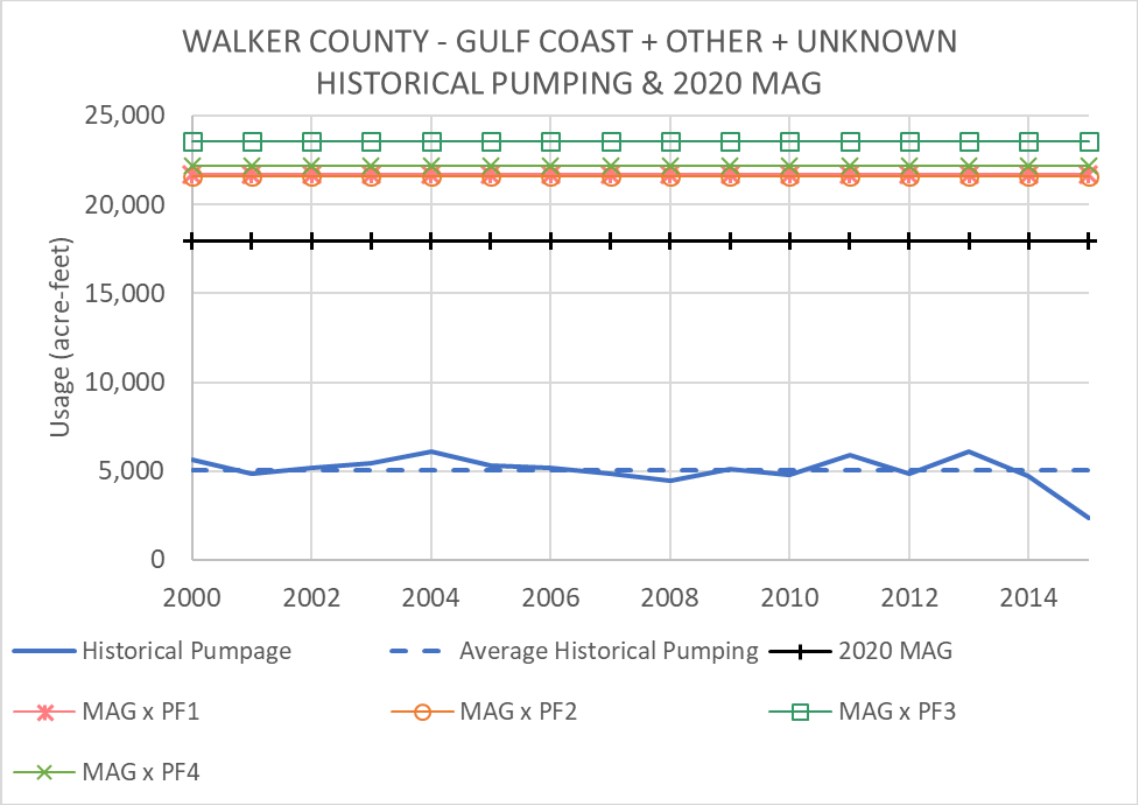

TRINITY COUNTY - OTHER + UNKNOWN
HISTORICAL PUMPING & 2020 MAG
Usage (acre-feet)
1,400
1,200
1,000
800
600
400
200
0
2000
2002
2004
2006
2008
2010
2012
2014
Historical Pumpage
Average Historical Pumping
2020 MAG
MAG x PF1
MAG x PF2
MAG x PF3
MAG x PF4


WALLER COUNTY - BRAZOS RIVER ALLUVIUM AQUIFER
HISTORICAL PUMPING & 2020 MAG
Usage (acre-feet)
20,000
18,000
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
2000
2002
2004
2006
2008
2010
2012
2014
Historical Pumpage
Average Historical Pumping
2020 MAG
MAG x PF1
MAG x PF2
MAG x PF3
MAG x PF4


WALLER COUNTY - GULF COAST + OTHER + UNKNOWN
HISTORICAL PUMPING & 2020 MAG
Usage (acre-feet)
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
2000
2002
2004
2006
2008
2010
2012
2014
Historical Pumpage
Average Historical Pumping
2020 MAG
MAG x PF1
MAG x PF2
MAG x PF3
MAG x PF4


WALKER COUNTY - QUEEN CITY AQUIFER
HISTORICAL PUMPING & 2020 MAG
Usage (acre-feet)
400
350
300
250
200
150
100
50
0
2000
2002
2004
2006
2008
2010
2012
2014
Historical Pumpage
Average Historical Pumping
2020 MAG
MAG x PF1
MAG x PF2
MAG x PF3
MAG x PF4


WALKER COUNTY - YEGUA-JACKSON AQUIFER
HISTORICAL PUMPING & 2020 MAG
Usage (acre-feet)
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
2000
2002
2004
2006
2008
2010
2012
2014
Historical Pumpage
Average Historical Pumping
2020 MAG
MAG x PF1
MAG x PF2
MAG x PF3
MAG x PF4


WALKER COUNTY - GULF COAST + OTHER + UNKNOWN
HISTORICAL PUMPING & 2020 MAG
Usage (acre-feet)
25,000
20,000
15,000
10,000
5,000
0
2000
2002
2004
2006
2008
2010
2012
2014
Historical Pumpage
Average Historical Pumping
2020 MAG
MAG x PF1
MAG x PF2
MAG x PF3
MAG x PF4