March 1, 2011

To: File

From: Gail Cowie

The attached was drafted by Jim Kennedy in February 2011 to describe the supplemental modeling conducted for the Cretaceous and Claiborne aquifers. The modeling evaluated sensitivity to baseline groundwater withdrawals and then developed sustainable yield models for the two aquifers calibrated using 2010 baseline groundwater withdrawals.

The attached was distributed to ABCs for use with Councils whose water sources include the Cretaceous and Claiborne aquifers.

2010 Sustainable Yield Modeling of the Claiborne and Cretaceous Aquifers

Modeling of ranges of sustainable yield for prioritized aquifers in Georgia was completed in 2009. The modeled sustainable yield ranges and baseline groundwater withdrawals available at the time of modeling were:

- Upper Floridan aquifer in south-central Georgia: 622 to 836 million gallons per day (mgd) from a baseline of 329 mgd
- Upper Floridan aquifer in south-central Georgia and the eastern Coastal Plain: 868 to 982 mgd from a baseline of 475 mgd
- Claiborne aquifer: 100 to 250 mgd from a baseline of 67 mgd
- Cretaceous aquifer between the cities of Macon and Augusta: 198 to 201 mgd from a baseline of 124 mgd

The 2009 sustainable yield models were calibrated using the baseline withdrawals available at the time of modeling. Updated information on baseline withdrawals became available during 2010. The updated 2010 baseline withdrawals were close to the 2009 baseline withdrawals for the Upper Floridan aquifer and were higher than the 2009 baseline withdrawals for the Claiborne and Cretaceous aquifers.

Sensitivity of the sustainable yield ranges of the Claiborne and Cretaceous aquifers to baseline groundwater withdrawals was tested by doing initial calibrations of the aquifer models to the 2010 baseline withdrawals and running the 2009 sustainable yield simulations. With the initial calibration to 2010 baseline withdrawals simulated groundwater level drawdowns were much smaller than the sustainable yield metric of 30 feet simulated in the 2009 models. Sustainable yield models of the Claiborne and Cretaceous aquifers were sensitive to the baseline groundwater withdrawals used for model calibration.

Sustainable yield models for the Claiborne and Cretaceous aquifers were calibrated to the 2010 baseline withdrawals by:

- Increasing baseline groundwater withdrawals from 67 to 93 mgd in the Claiborne aquifer model and from 124 to 219 mgd in the Cretaceous aquifer model
- Increasing aquifer tranmissivities so that simulated groundwater levels reasonably matched measured groundwater levels at the 2010 baseline groundwater withdrawals
- Increasing the length of streams allowing recharge from groundwater contributions to stream baseflow, and increasing recharge from rainfall in aquifer outcrop areas, so that calibrated aquifer tranmissivities could be kept within the range of aquifer tranmissivities reported in literature

Calibration to 2010 baseline groundwater withdrawals resulted in the following sustainable yield ranges:

- Claiborne aquifer: 140 to 635 mgd

- Cretaceous aquifer: 347 to 445 mgd

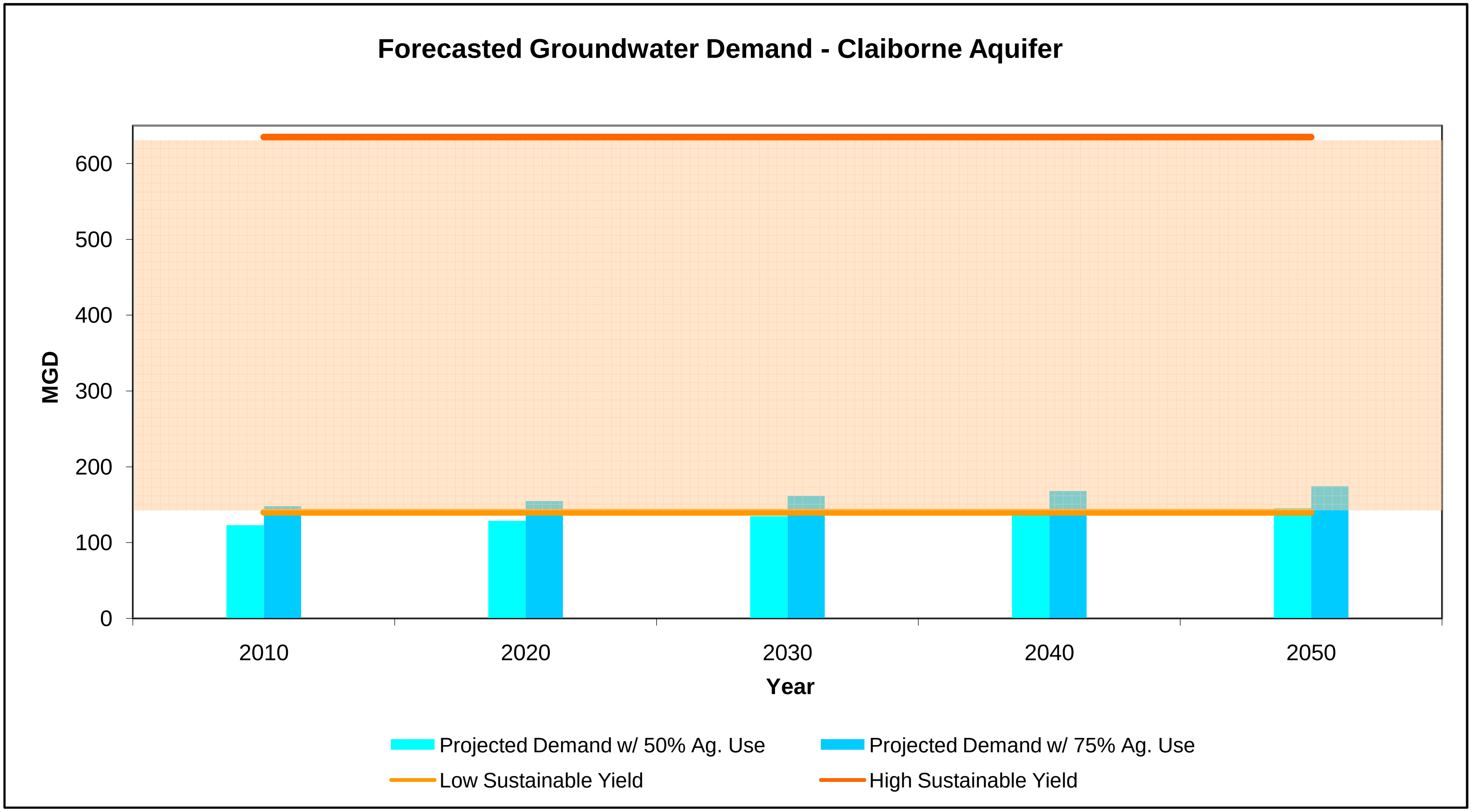
The lower ends of the 2009 sustainable yield ranges were 33 mgd higher than the 2009 baseline withdrawal for the Claiborne aquifer and 74 mgd higher than the 2009 baseline withdrawal for the Cretaceous aquifer. The lower ends of the 2010 sustainable yield ranges were 47 mgd higher than the 2010 baseline withdrawal for the Claiborne aquifer and 128 mgd higher than the 2010 baseline withdrawal for the Cretaceous aquifer. The differences between the lower ends of the sustainable yield ranges and baseline withdrawals increased from the 2009 models to the 2010 models:

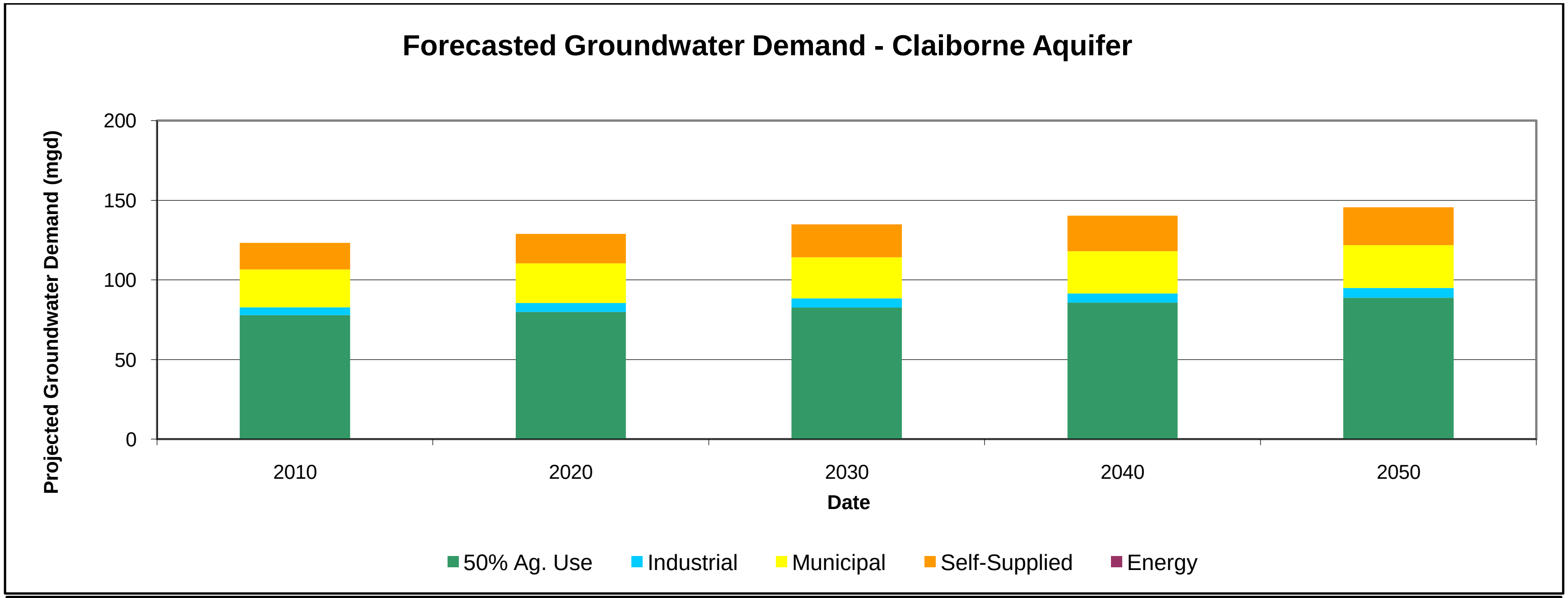
- Claiborne aquifer: 47 mgd - 33 mgd = 14 mgd
- Cretaceous aquifer: 128 mgd - 74 mgd = 54 mgd

The percentage increases of the 2010 model differences above the 2009 model differences were about 42% (14 mgd/33 mgd = 42.2%) for the Claiborne aquifer and 73% for the Cetaceous aquifer.

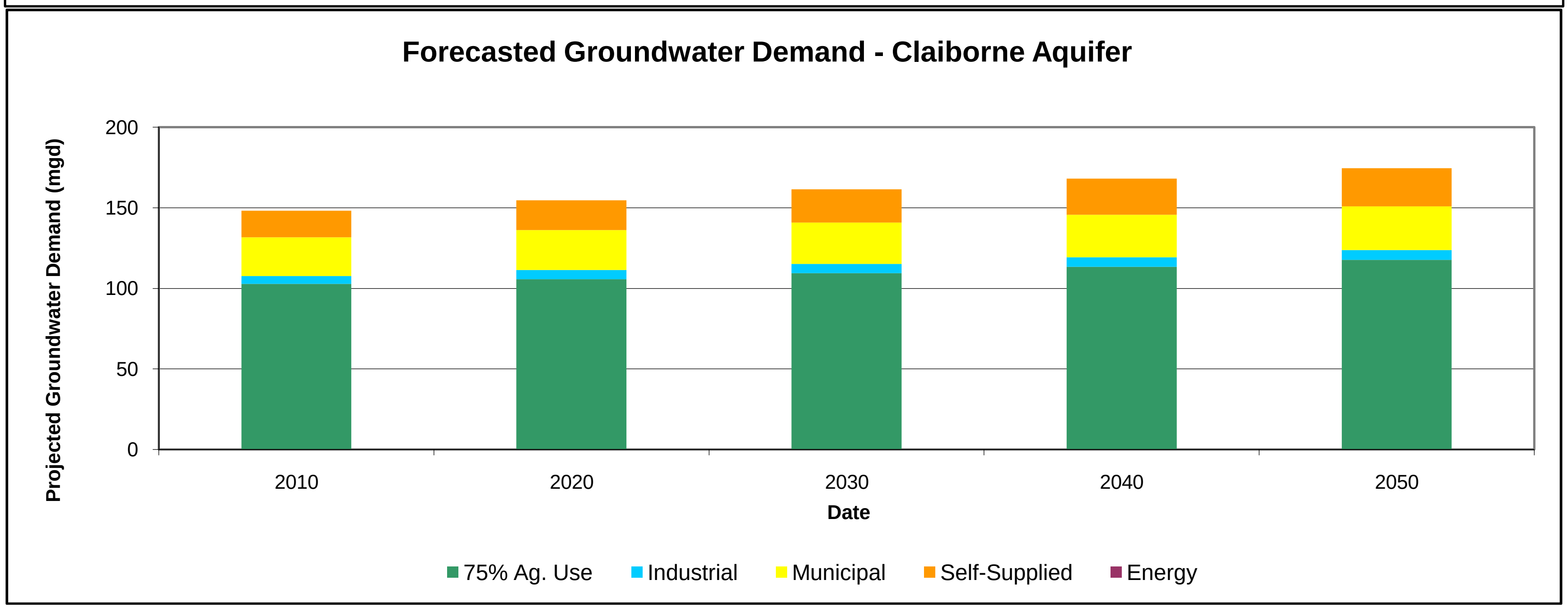
Claiborne Aquifer

Year	Range of Suatainable Yield (mgd)		Forecasted Groundwater Demand (mgd by use category)						Total Forecasted Demand (mgd)	
			Agricultural Use							
	Low	High	50%	75%	Municipal	Industrial	Self-Supplied	Energy	50% Ag.	75% Ag.
2010	140	635	77.80	102.79	23.89	4.92	16.53	0.00	123.14	148.13
2020	140	635	79.94	105.70	24.78	5.61	18.56	0.00	128.89	154.65
2030	140	635	82.65	109.37	25.70	5.79	20.63	0.00	134.77	161.49
2040	140	635	85.61	113.37	26.41	5.93	22.30	0.00	140.25	168.01
2050	140	635	88.83	117.74	26.95	6.08	23.68	0.00	145.54	174.45

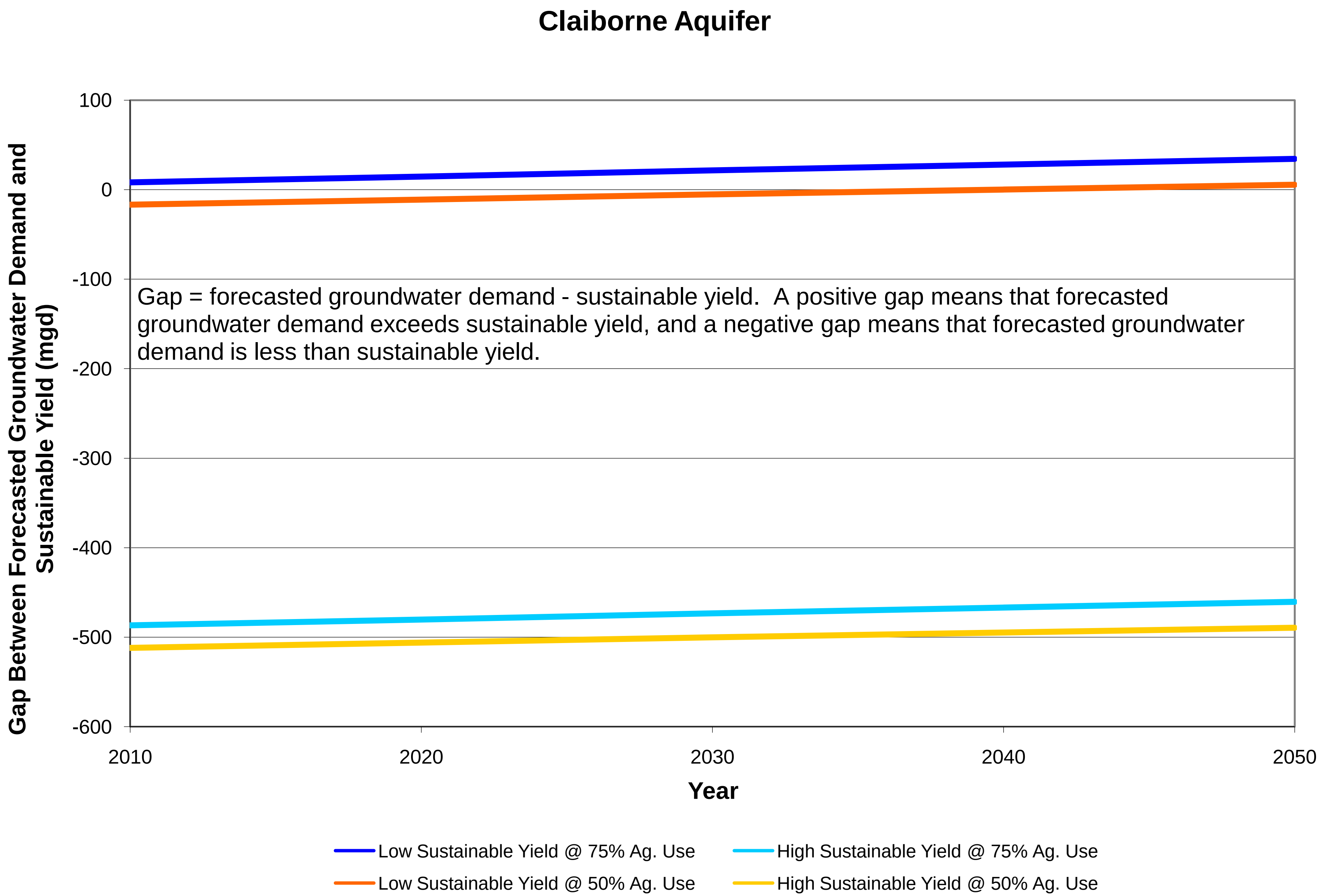




Forecasted Groundwater Demand - Claiborne Aquifer
Projected Groundwater Demand (mgd)
200
150
100
50
0
2010
2020
2030
2040
2050
Date
50% Ag. Use
Industrial
Municipal
Self-Supplied
Energy



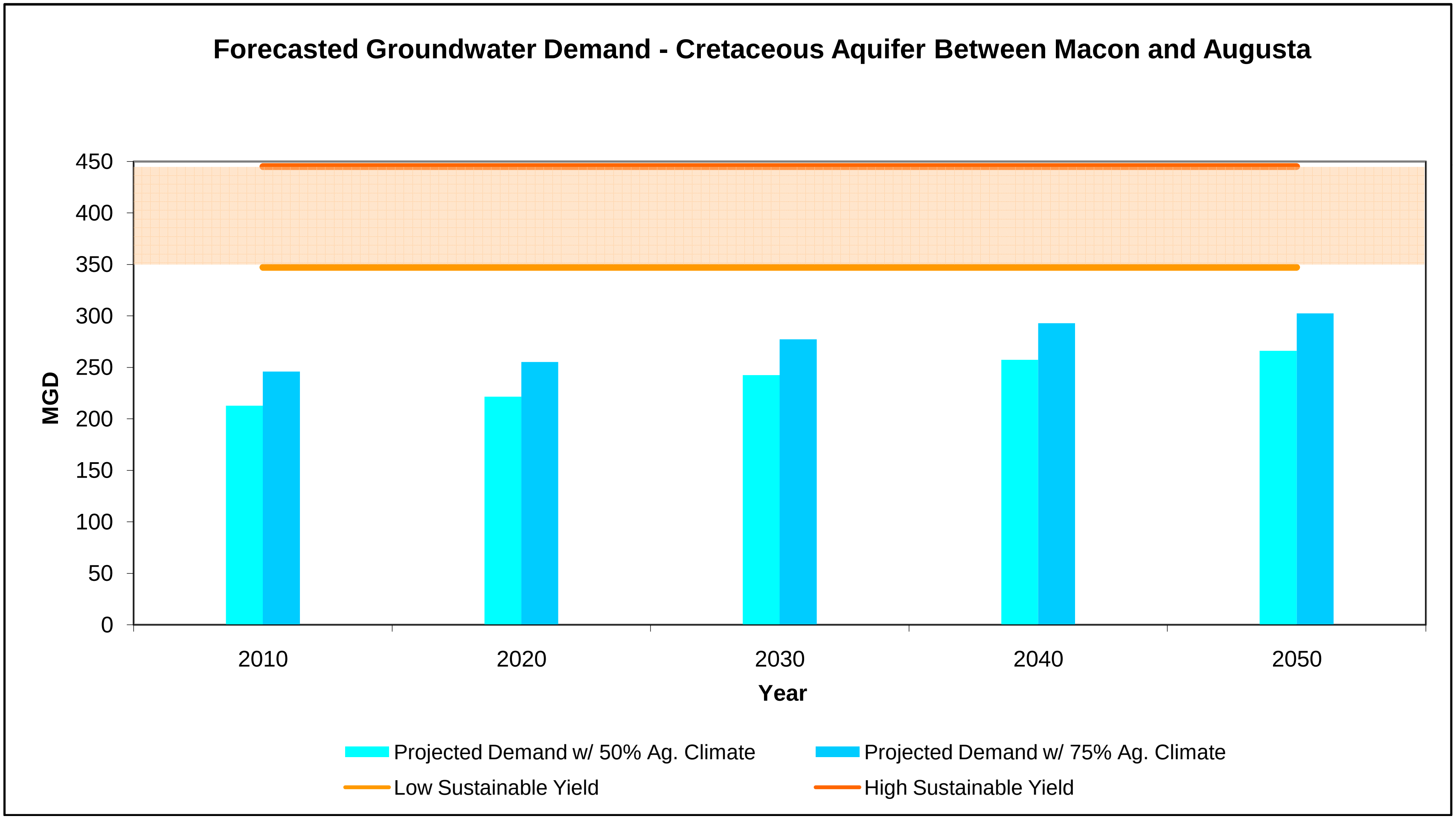
Forecasted Groundwater Demand - Claiborne Aquifer
Projected Groundwater Demand (mgd)
200
150
100
50
0
2010
2020
2030
2040
2050
Date
75% Ag. Use
Industrial
Municipal
Self-Supplied
Energy

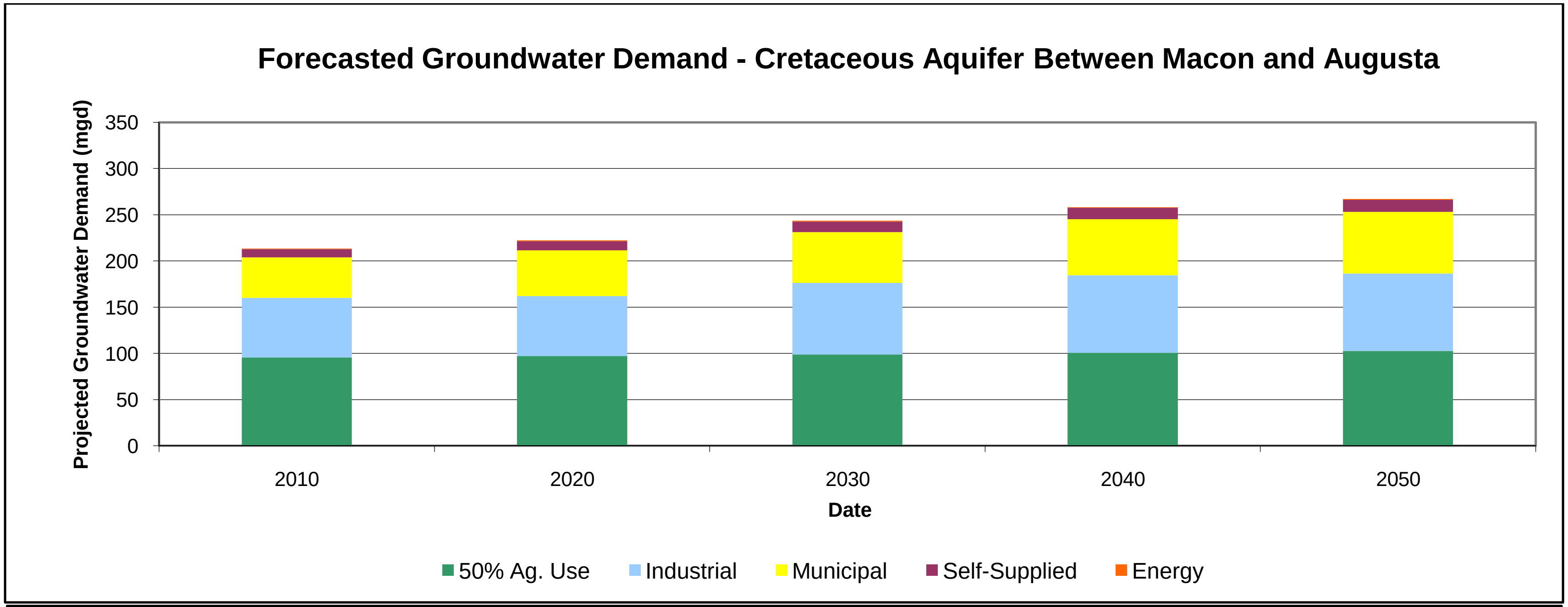


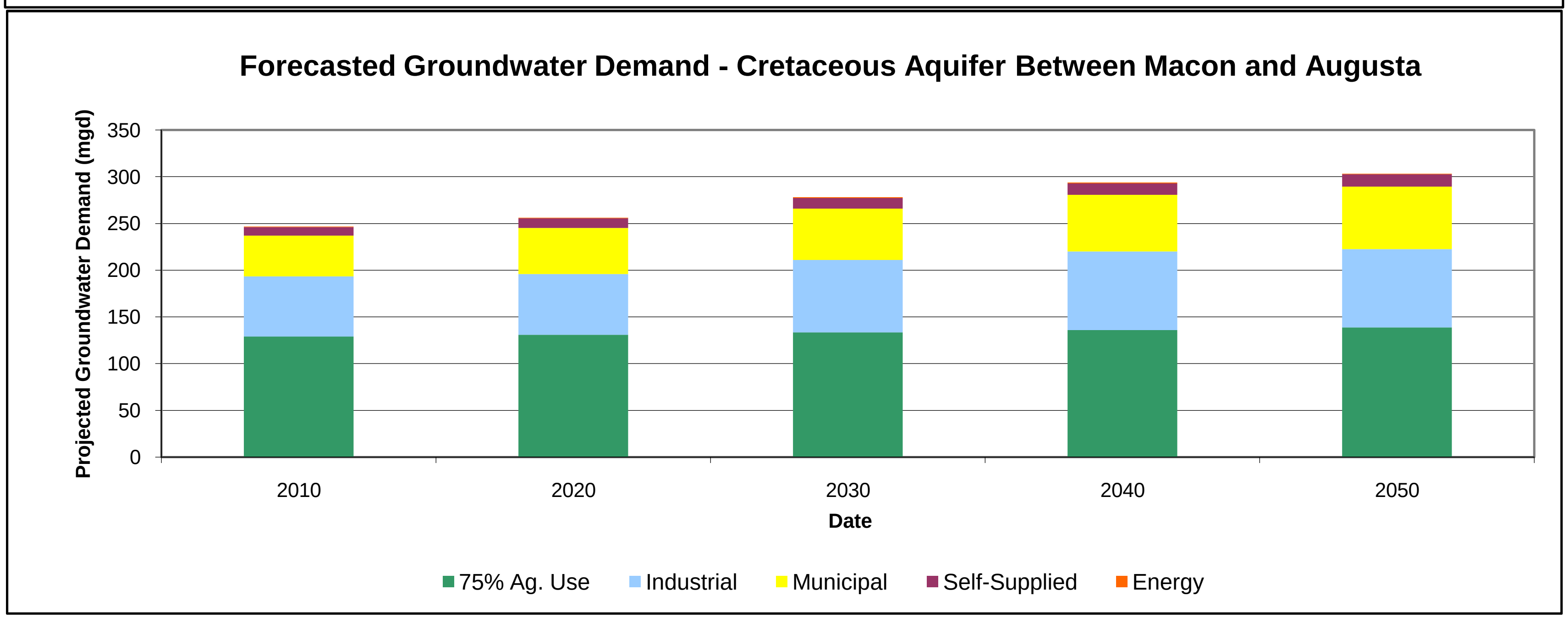
Claiborne Aquifer
Gap Between Forecasted Groundwater Demand and Sustainable Yield (mgd)
100
0
-100
-200
-300
-400
-500
-600
2010
2020
2030
2040
2050
Year
Gap = forecasted groundwater demand - sustainable yield. A positive gap means that forecasted groundwater demand exceeds sustainable yield, and a negative gap means that forecasted groundwater demand is less than sustainable yield.
Low Sustainable Yield @ 75% Ag. Use
High Sustainable Yield @ 75% Ag. Use
Low Sustainable Yield @ 50% Ag. Use
High Sustainable Yield @ 50% Ag. Use

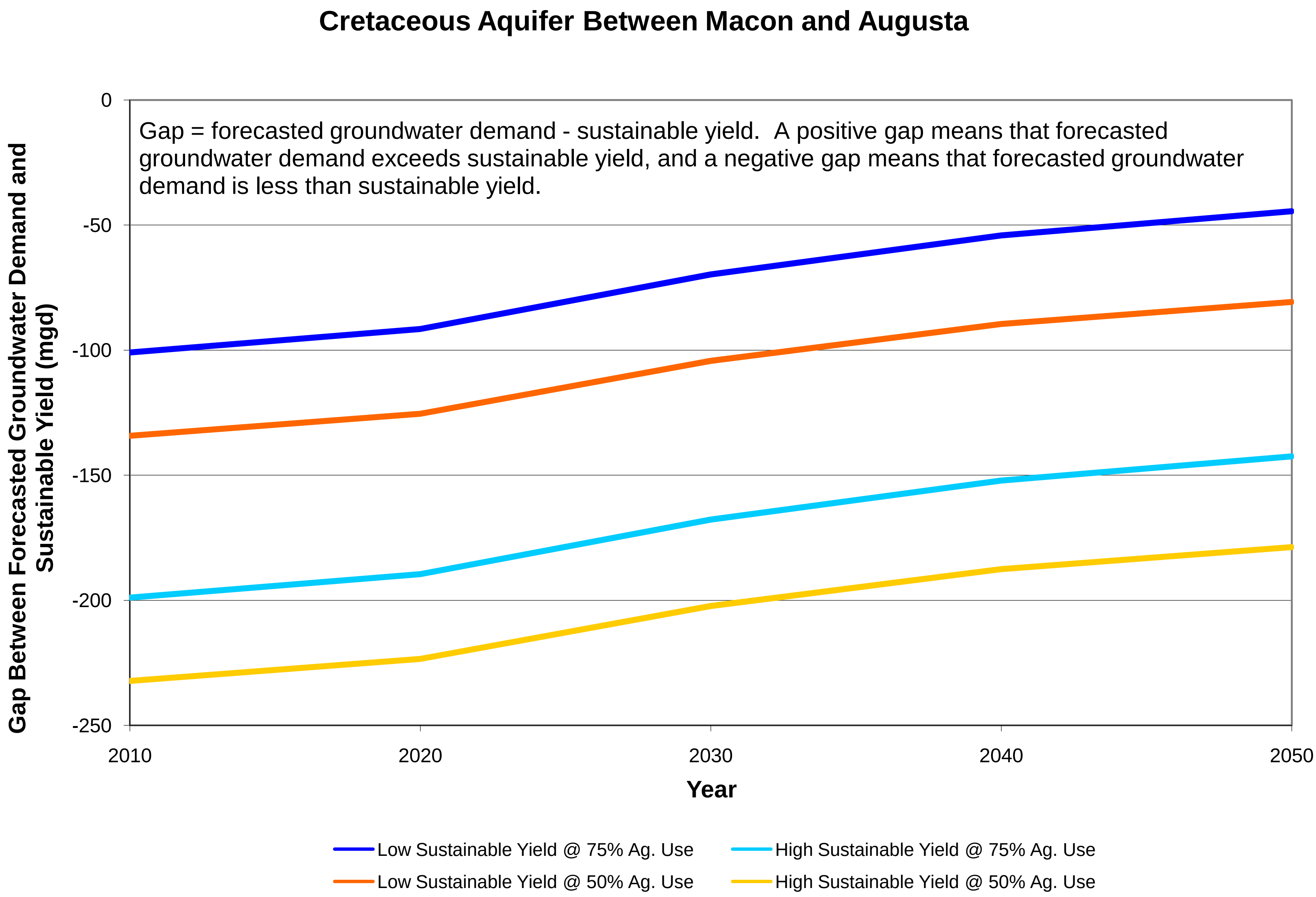
Cretaceous Aquifer Between Macon and Augusta

Year	Range of Suatainable Yield (mgd)		Forecasted Groundwater Demand (mgd by use category)						Total Forecasted Demand (mgd)	
			Agricultural Use				Self-Supplied			
	Low	High	50%	75%	Municipal	Industrial		Energy	50% Ag.	75% Ag.
2010	347	445	0.84	95.69	128.97	43.84	64.25	8.95	212.73	246.01
2020	347	445	0.84	97.09	130.96	49.37	64.94	10.11	221.51	255.38
2030	347	445	0.84	98.78	133.38	55.13	77.46	11.26	242.64	277.24
2040	347	445	0.84	100.62	136.02	60.64	83.95	12.25	257.45	292.85
2050	347	445	0.84	102.63	138.89	66.65	83.72	13.22	266.22	302.48




Forecasted Groundwater Demand - Cretaceous Aquifer Between Macon and Augusta
Projected Groundwater Demand (mgd)
350
300
250
200
150
100
50
0
2010
2020
2030
2040
2050
Date
50% Ag. Use
Industrial
Municipal
Self-Supplied
Energy

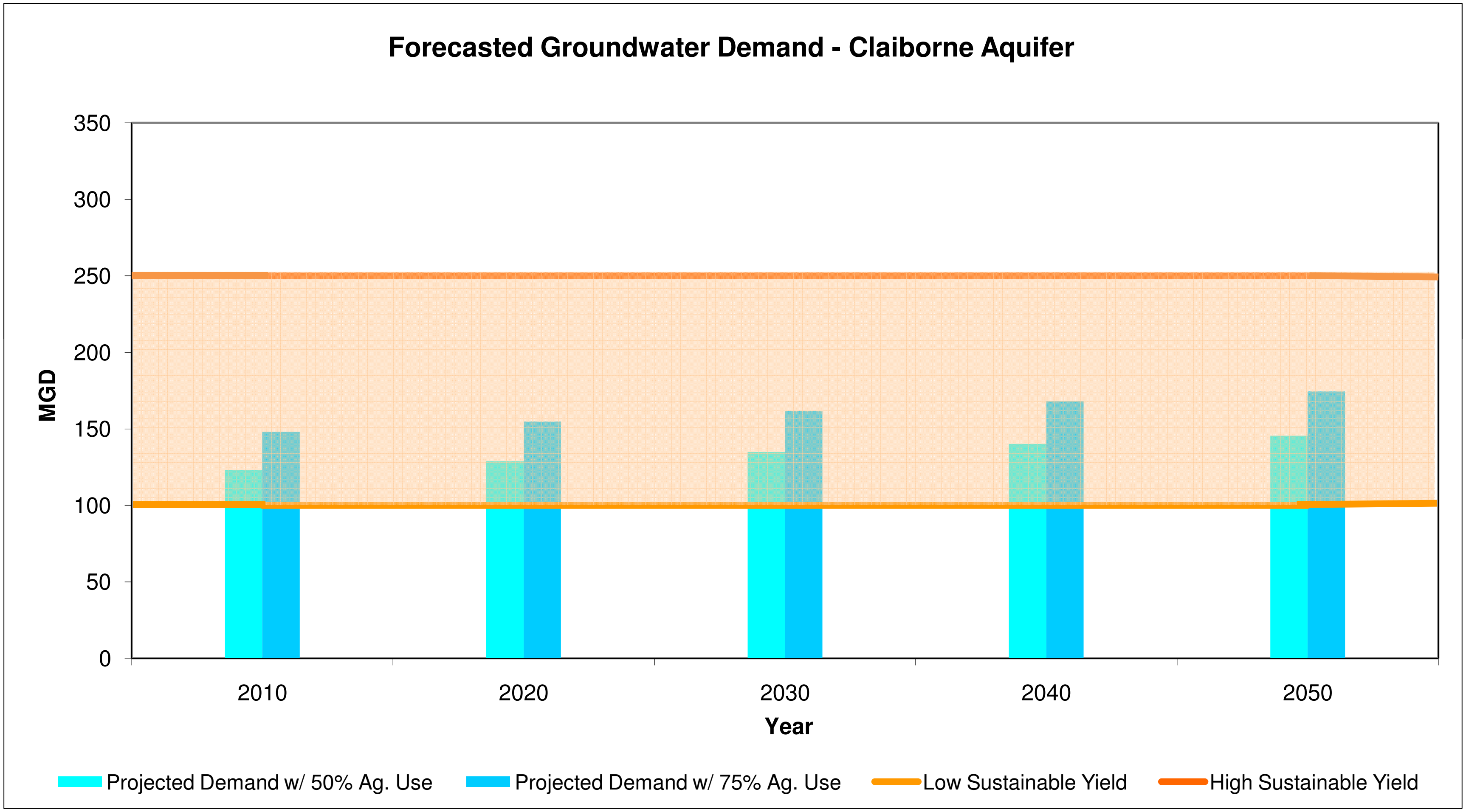

Forecasted Groundwater Demand - Cretaceous Aquifer Between Macon and Augusta
Projected Groundwater Demand (mgd)
350
300
250
200
150
100
50
0
2010
2020
2030
2040
2050
Date
75% Ag. Use
Industrial
Municipal
Self-Supplied
Energy

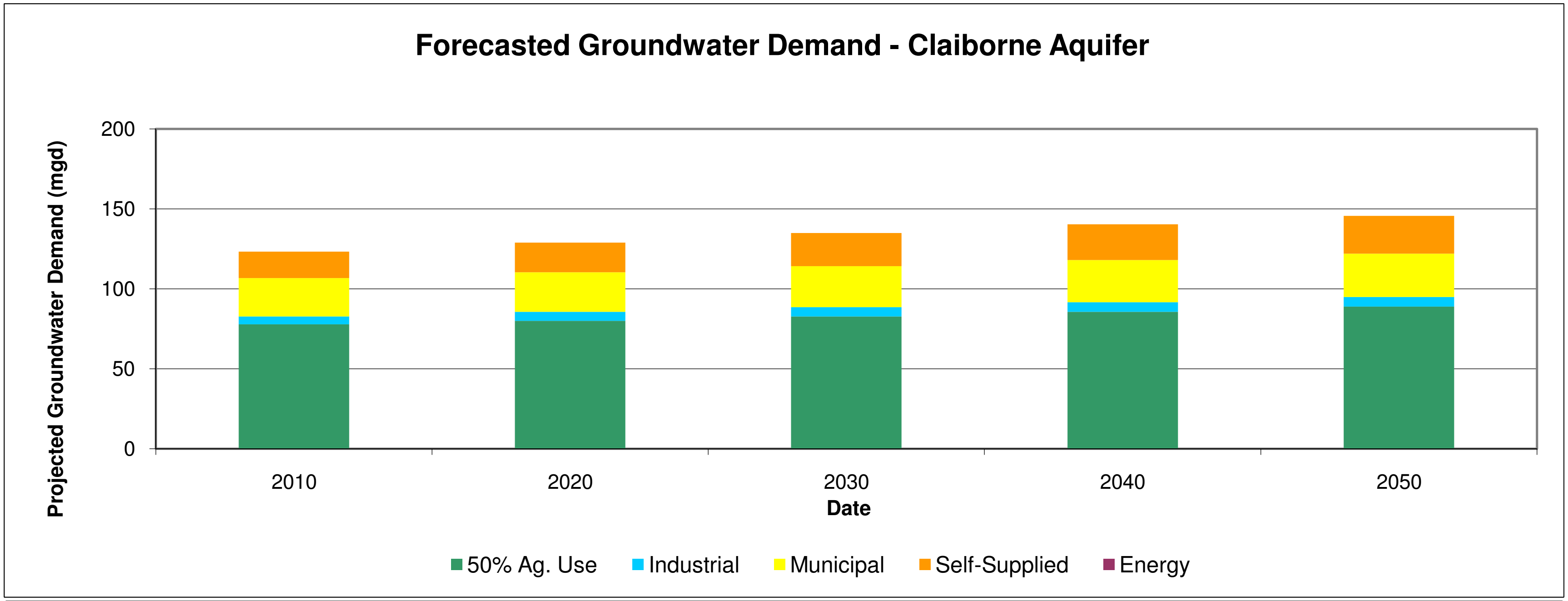


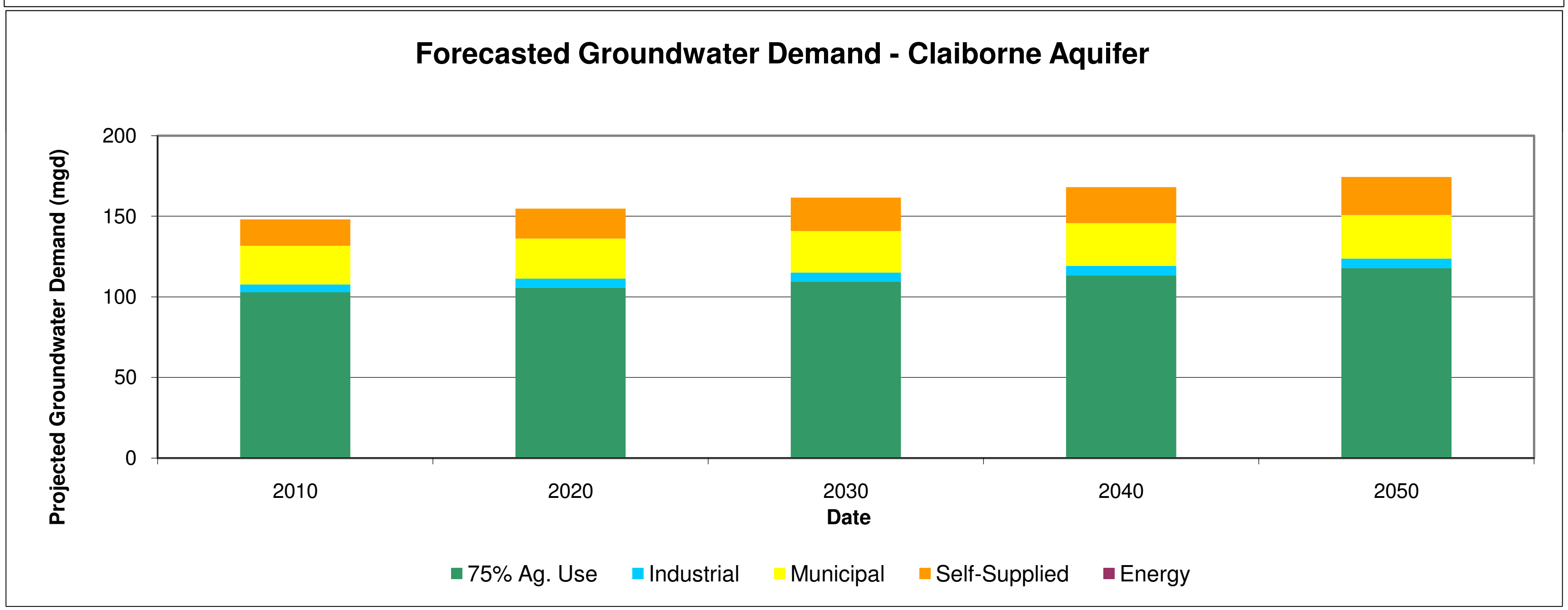
Cretaceous Aquifer Between Macon and Augusta
Gap = forecasted groundwater demand - sustainable yield. A positive gap means that forecasted groundwater demand exceeds sustainable yield, and a negative gap means that forecasted groundwater demand is less than sustainable yield.
Gap Between Forecasted Groundwater Demand and Sustainable Yield (mgd)
0
-50
-100
-150
-200
-250
2010
2020
2030
2040
2050
Year
Low Sustainable Yield @ 75% Ag. Use
High Sustainable Yield @ 75% Ag. Use
Low Sustainable Yield @ 50% Ag. Use
High Sustainable Yield @ 50% Ag. Use

Claiborne Aquifer

Year	Range of Suatainable Yield (mgd)		Forecasted Groundwater Demand (mgd by use category)						Total Forecasted Demand (mgd)	
			Agricultural Use		Municipal	Industrial	Self-Supplied	Energy		
	Low	High	50%	75%					50% Ag.	75% Ag.
2010	100	250	77.80	102.79	23.89	4.92	16.53	0.00	123.14	148.13
2020	100	250	79.94	105.70	24.78	5.61	18.56	0.00	128.89	154.65
2030	100	250	82.65	109.37	25.70	5.79	20.63	0.00	134.77	161.49
2040	100	250	85.61	113.37	26.41	5.93	22.30	0.00	140.25	168.01
2050	100	250	88.83	117.74	26.95	6.08	23.68	0.00	145.54	174.45

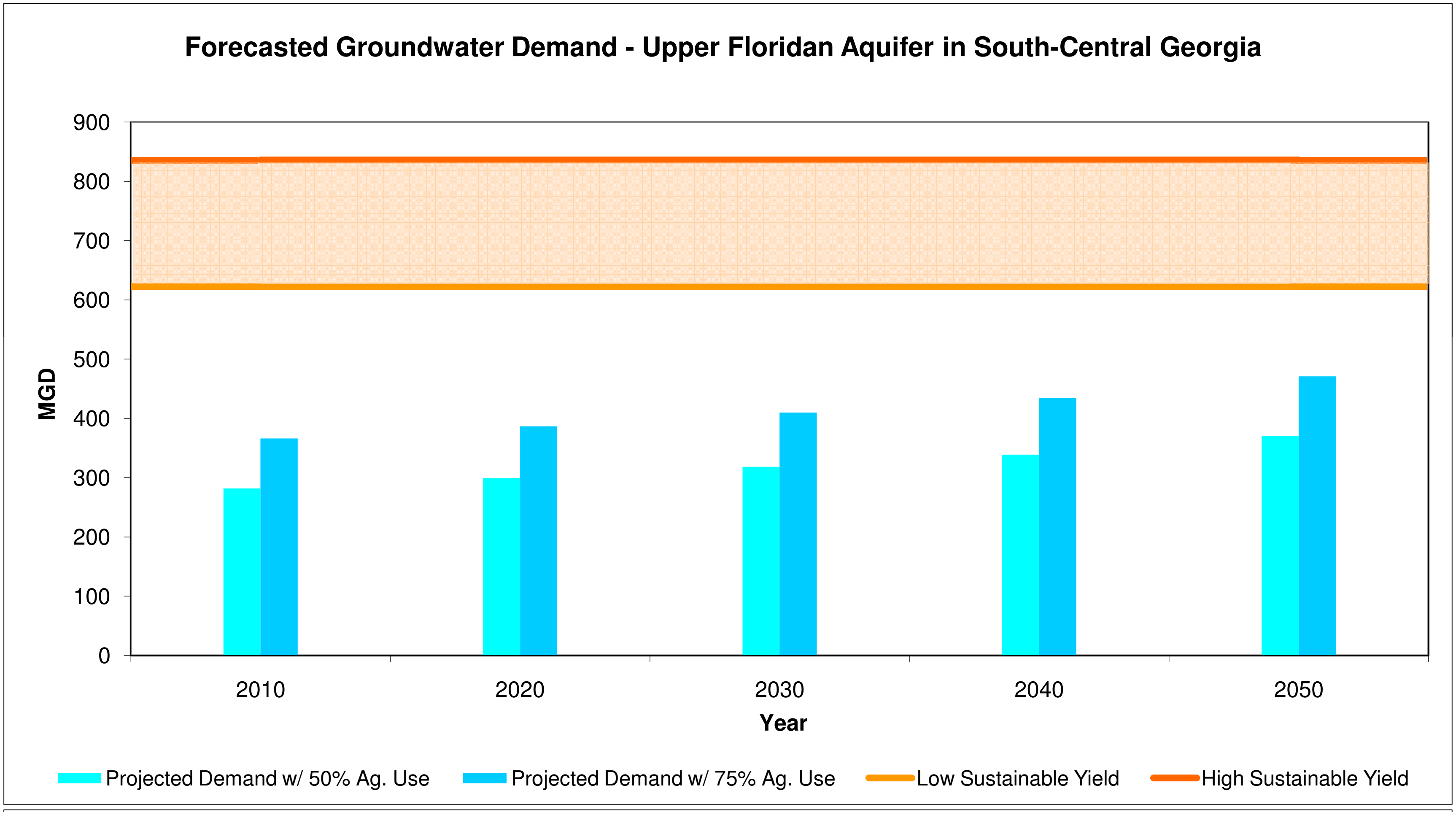


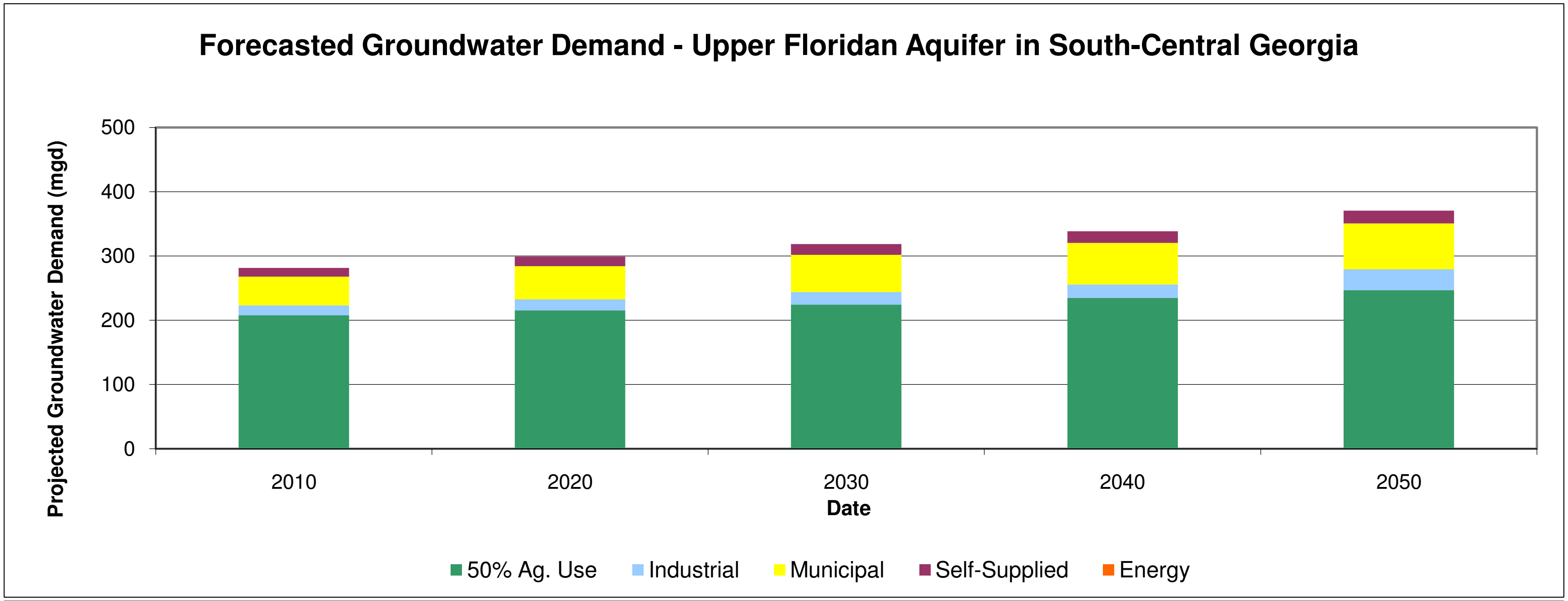

Forecasted Groundwater Demand - Claiborne Aquifer
Projected Groundwater Demand (mgd)
200
150
100
50
0
2010
2020
2030
2040
2050
Date
50% Ag. Use
Industrial
Municipal
Self-Supplied
Energy

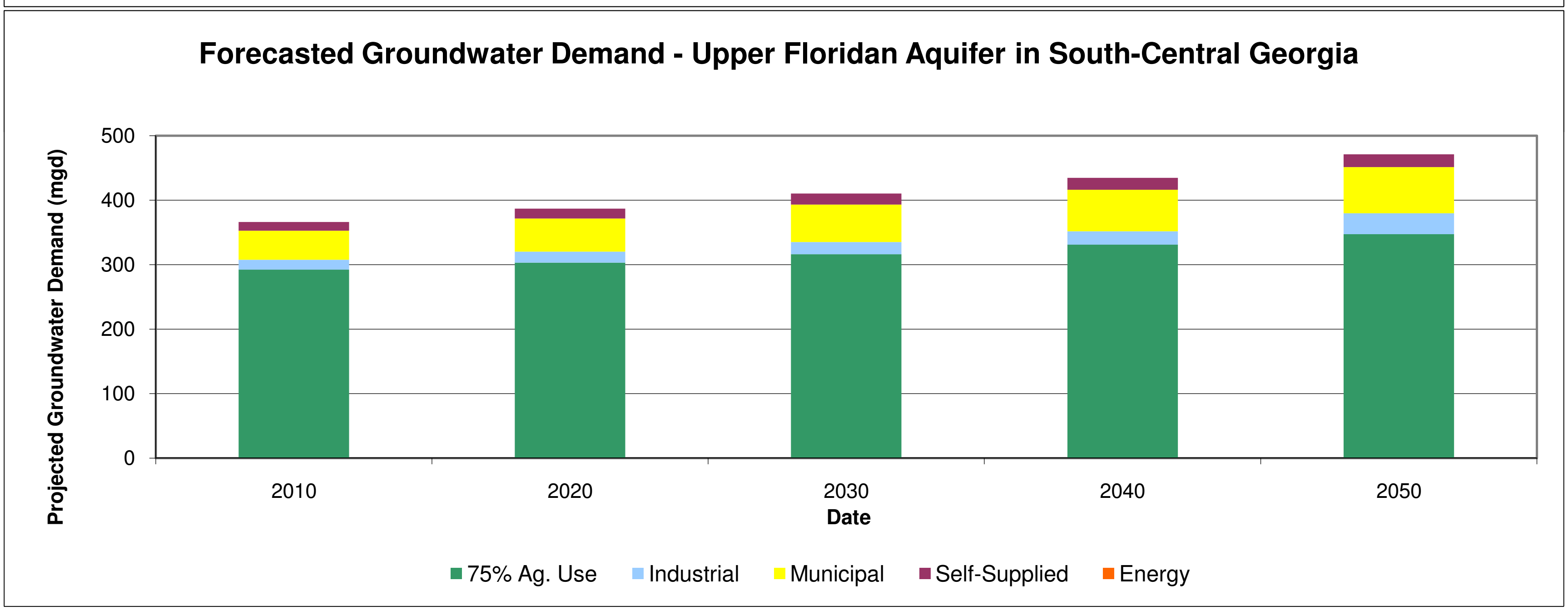

Forecasted Groundwater Demand - Claiborne Aquifer
Projected Groundwater Demand (mgd)
200
150
100
50
0
2010
2020
2030
2040
2050
Date
75% Ag. Use
Industrial
Municipal
Self-Supplied
Energy

Upper Floridan Aquifer in South-Central Georgia

Year	Range of Suatainable Yield (mgd)		Forecasted Groundwater Demand (mgd by use category)						Total Forecasted Demand (mgd)	
			Agricultural Use		Municipal	Industrial	Self-Supplied	Energy		
	Low	High	50%	75%					50% Ag.	75% Ag.
2010	622	836	207.67	292.36	45.23	15.14	13.56	0.00	281.60	366.29
2020	622	836	215.13	302.90	51.37	17.40	15.11	0.00	299.00	386.77
2030	622	836	224.56	316.19	58.04	19.05	16.76	0.00	318.41	410.04
2040	622	836	234.99	330.86	64.66	20.72	18.28	0.00	338.64	434.51
2050	622	836	246.51	347.05	71.63	32.57	19.79	0.00	370.50	471.04

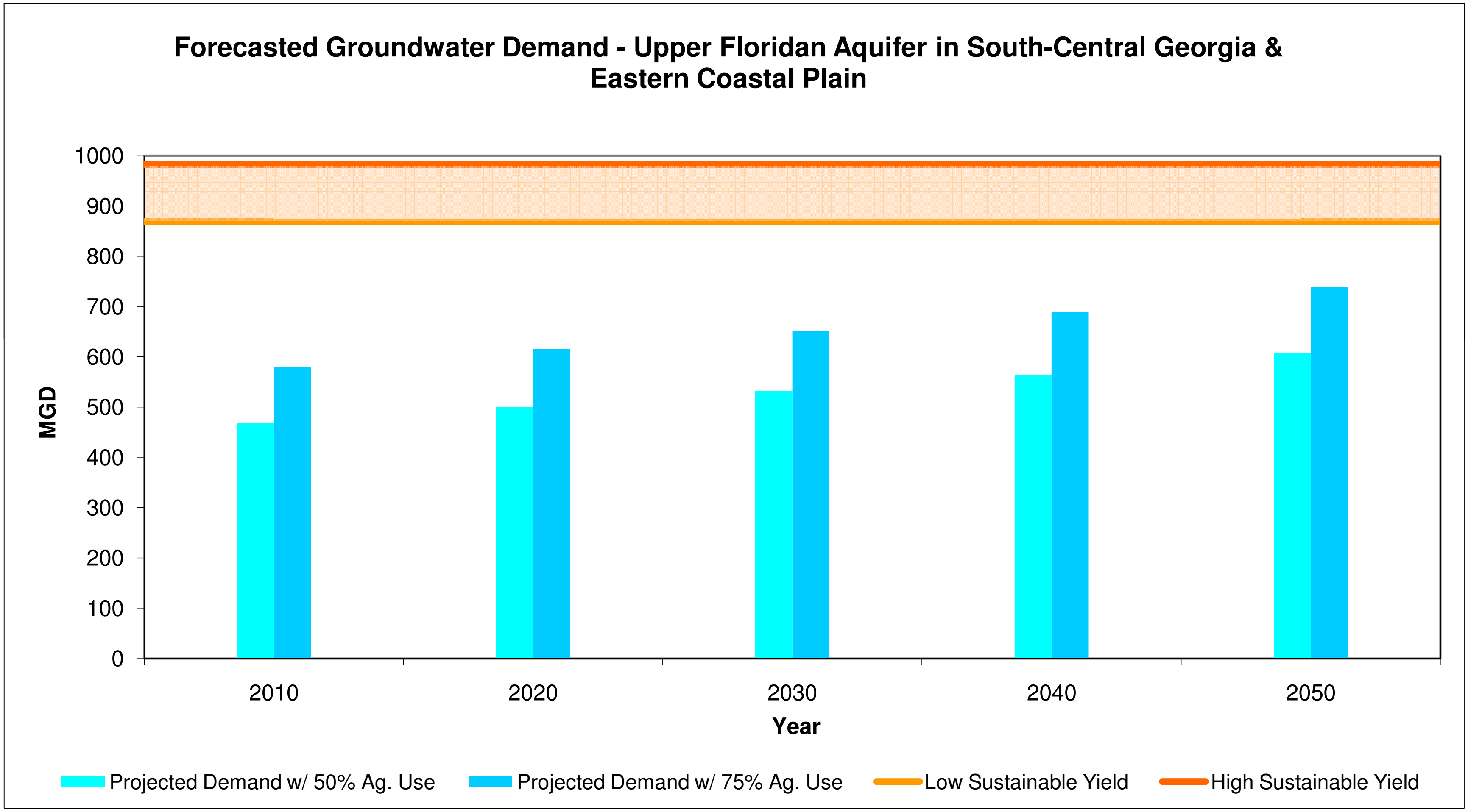


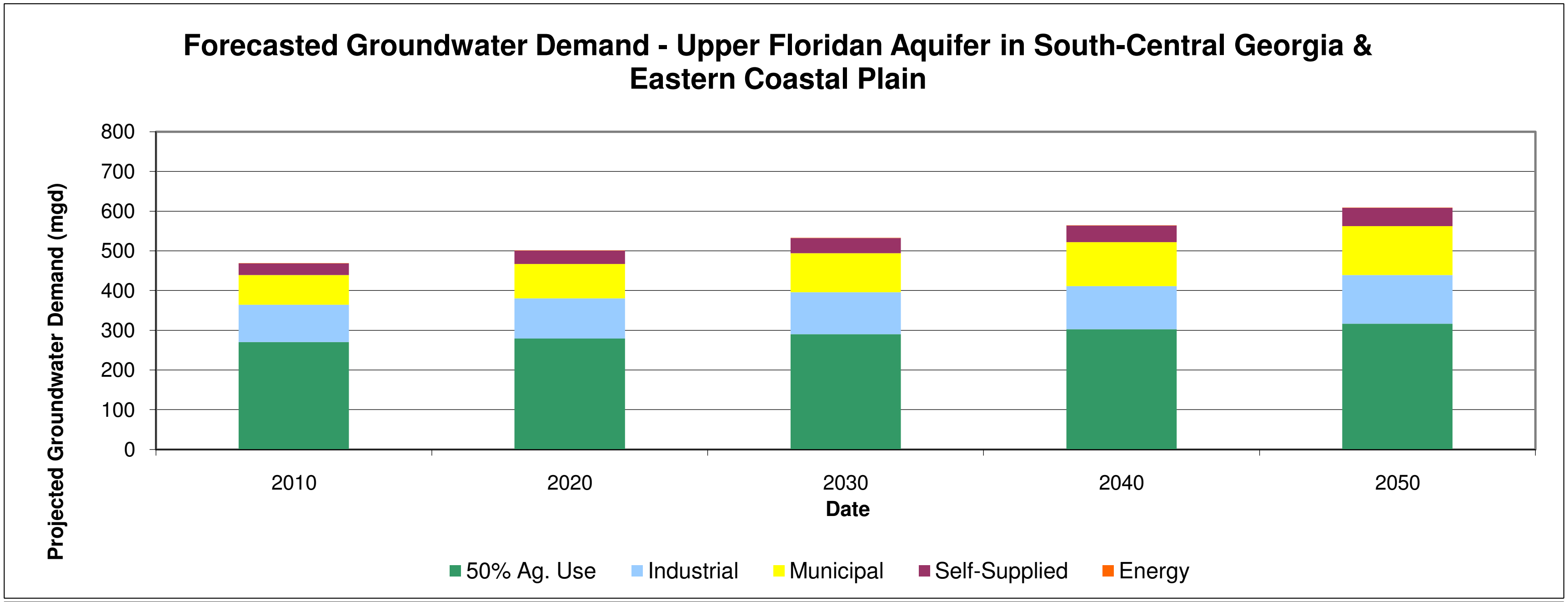

Forecasted Groundwater Demand - Upper Floridan Aquifer in South-Central Georgia
Projected Groundwater Demand (mgd)
500
400
300
200
100
0
2010
2020
2030
2040
2050
Date
50% Ag. Use
Industrial
Municipal
Self-Supplied
Energy

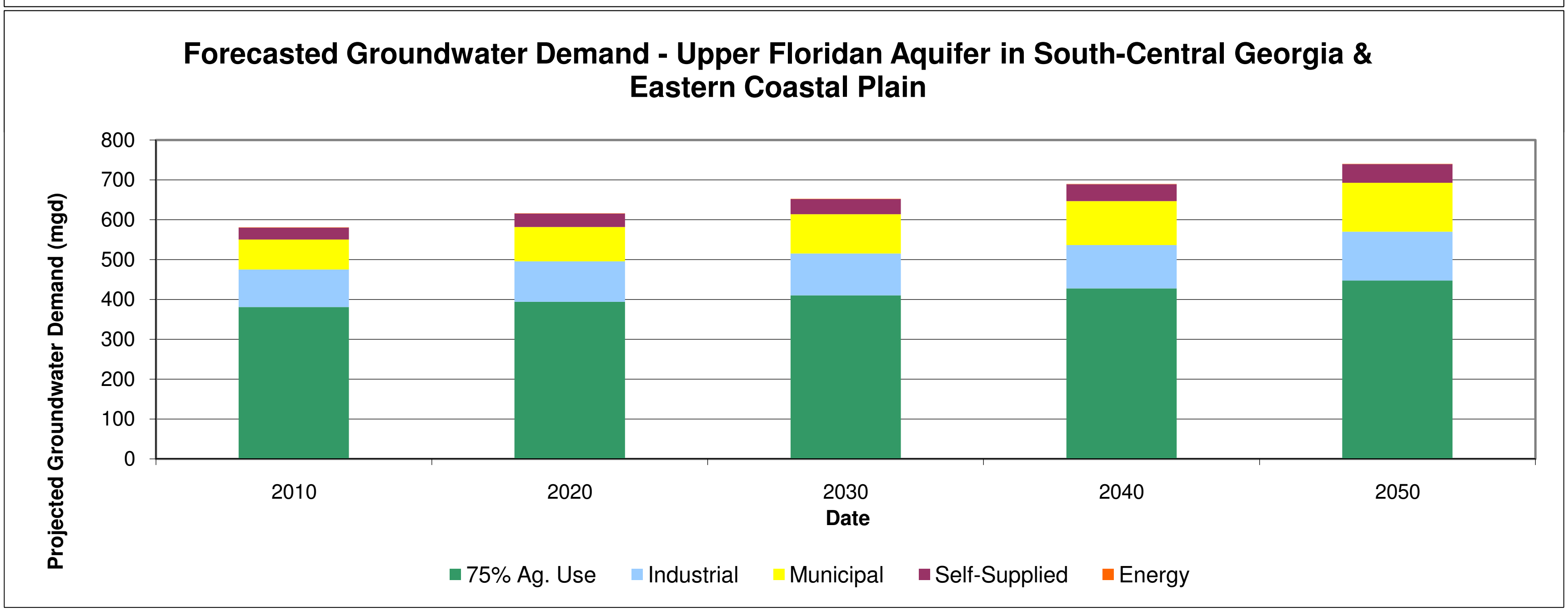

Forecasted Groundwater Demand - Upper Floridan Aquifer in South-Central Georgia
Projected Groundwater Demand (mgd)
500
400
300
200
100
0
2010
2020
2030
2040
2050
Date
75% Ag. Use
Industrial
Municipal
Self-Supplied
Energy

Upper Floridan Aquifer in South-Central Georgia & Eastern Coastal Plain

Year	Range of Suatainable Yield (mgd)		Forecasted Groundwater Demand (mgd by use category)						Total Forecasted Demand (mgd)	
			Agricultural Use		Municipal	Industrial	Self-Supplied	Energy		
	Low	High	50%	75%					50% Ag.	75% Ag.
2010	868	982	270.20	381.12	75.38	93.85	29.43	0.18	468.85	579.77
2020	868	982	279.01	393.68	86.62	101.49	33.47	0.18	500.59	615.26
2030	868	982	290.27	409.71	98.72	105.42	37.81	0.18	532.23	651.67
2040	868	982	302.74	427.42	110.49	108.88	41.89	0.18	564.00	688.68
2050	868	982	316.53	446.99	123.03	122.73	46.20	0.18	608.49	738.95

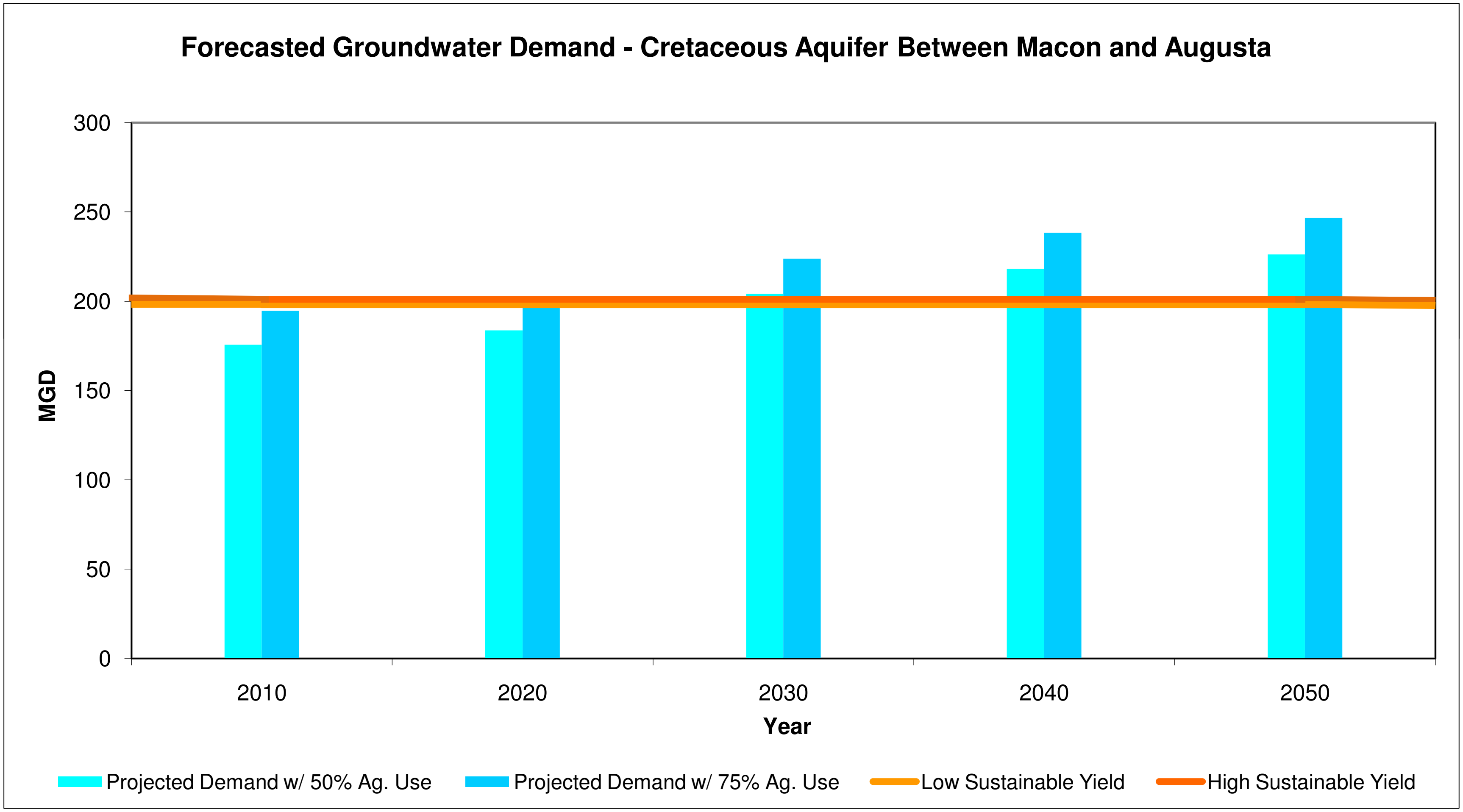


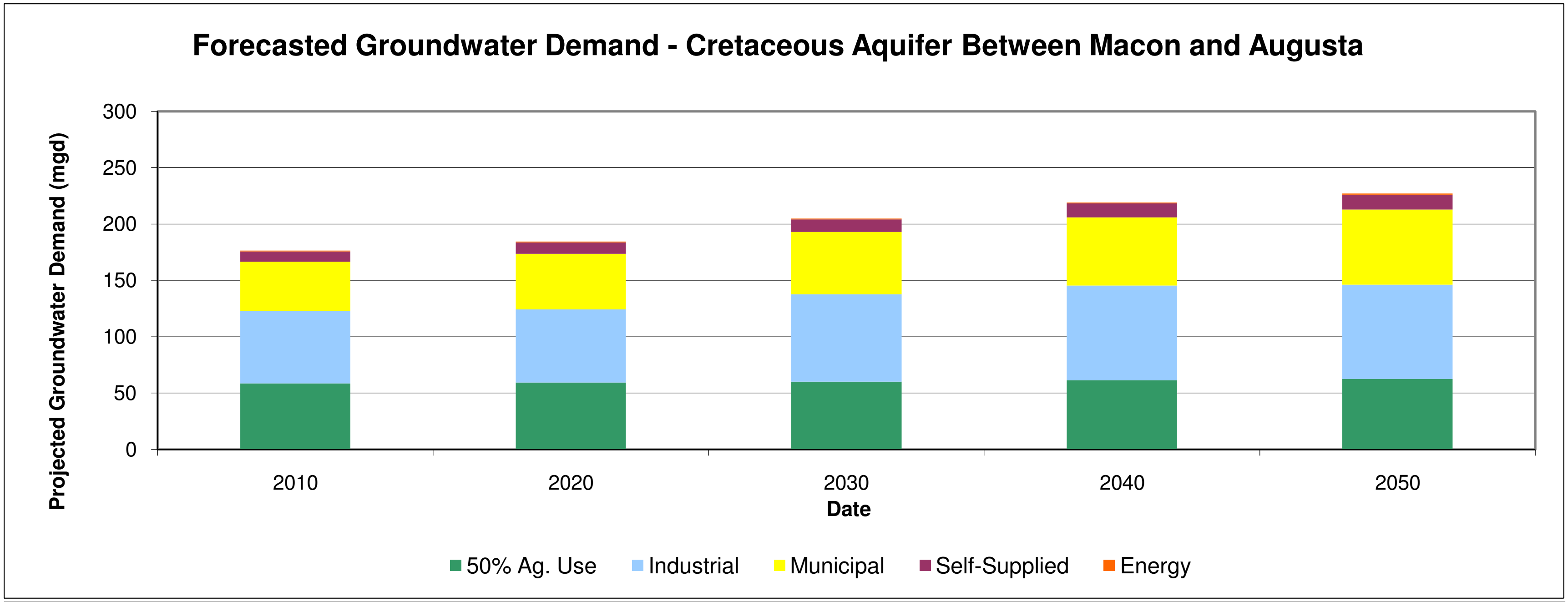

Forecasted Groundwater Demand - Upper Floridan Aquifer in South-Central Georgia & Eastern Coastal Plain
Projected Groundwater Demand (mgd)
800
700
600
500
400
300
200
100
0
2010
2020
2030
2040
2050
Date
50% Ag. Use
Industrial
Municipal
Self-Supplied
Energy

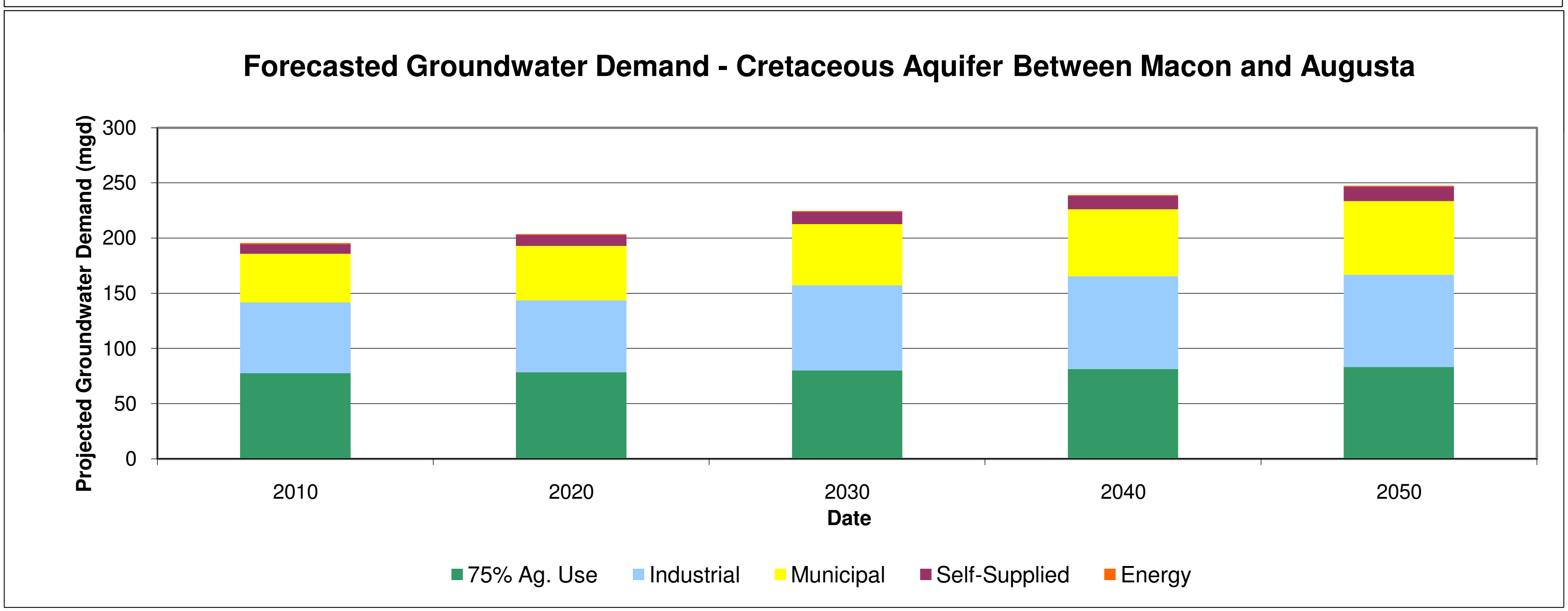

Forecasted Groundwater Demand - Upper Floridan Aquifer in South-Central Georgia & Eastern Coastal Plain
Projected Groundwater Demand (mgd)
800
700
600
500
400
300
200
100
0
2010
2020
2030
2040
2050
Date
75% Ag. Use
Industrial
Municipal
Self-Supplied
Energy

Cretaceous Aquifer Between Macon and Augusta

Year	Range of Suatainable Yield (mgd)		Forecasted Groundwater Demand (mgd by use category)						Total Forecasted Demand (mgd)	
			Agricultural Use		Municipal	Industrial	Self-Supplied	Energy		
	Low	High	50%	75%					50% Ag.	75% Ag.
2010	198	201	58.54	77.55	43.84	64.25	8.95	0.84	175.58	194.59
2020	198	201	59.26	78.56	49.37	64.94	10.11	0.84	183.68	202.98
2030	198	201	60.26	79.95	55.13	77.46	11.26	0.84	204.12	223.81
2040	198	201	61.35	81.47	60.64	83.95	12.25	0.84	218.18	238.30
2050	198	201	62.54	83.11	66.65	83.72	13.22	0.84	226.13	246.70

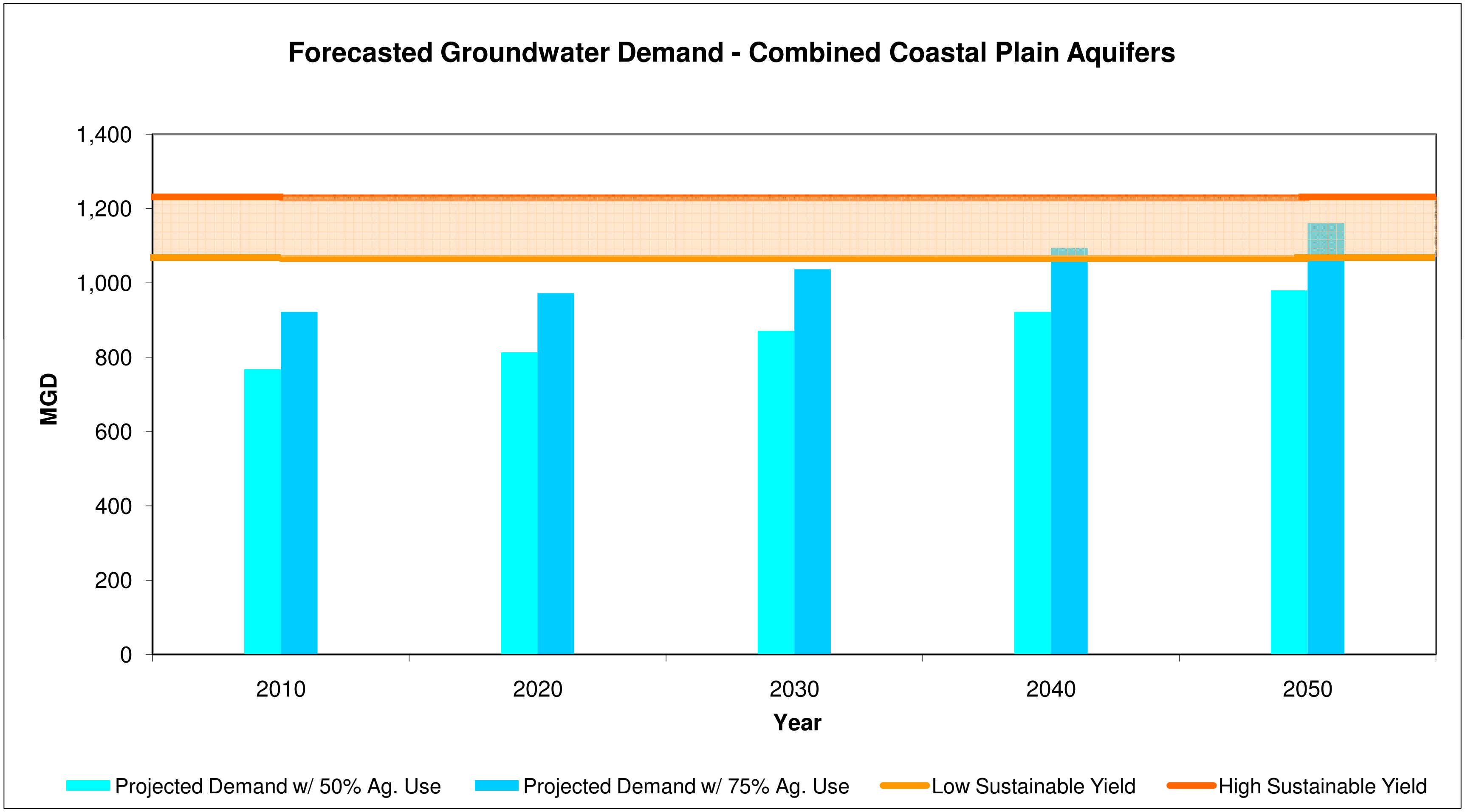


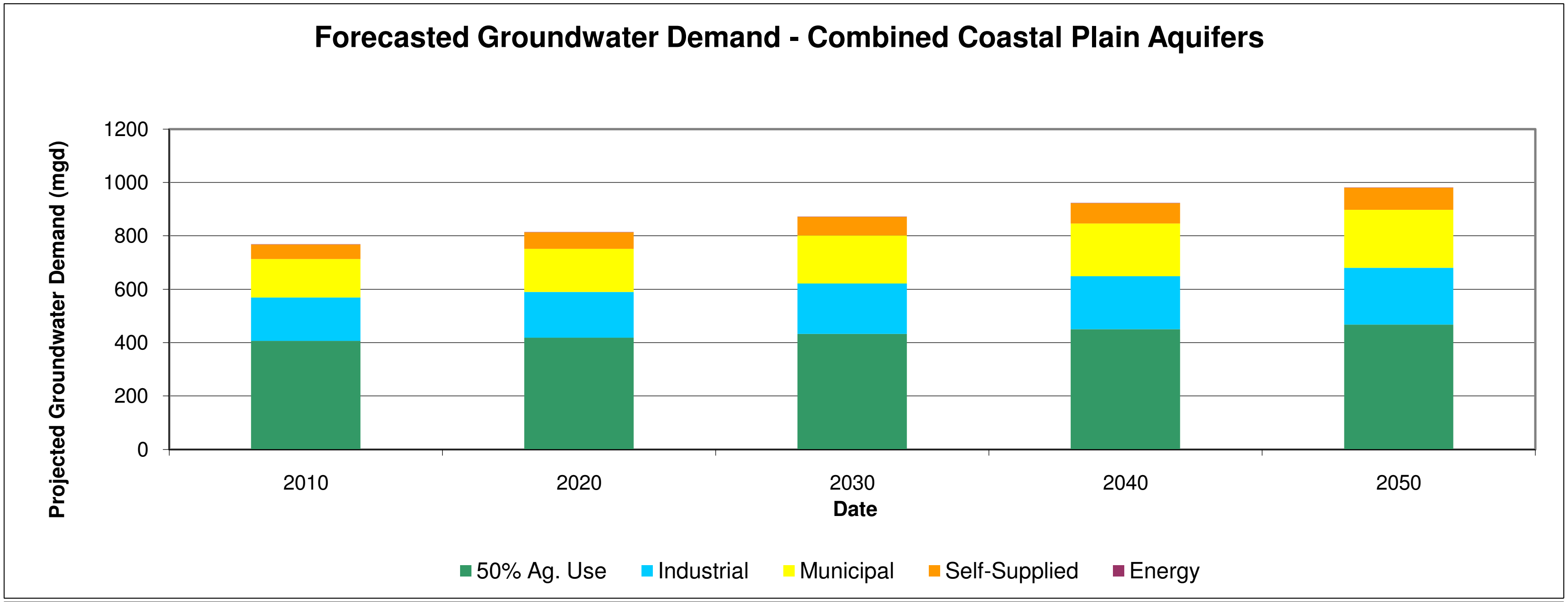

Forecasted Groundwater Demand - Cretaceous Aquifer Between Macon and Augusta
Projected Groundwater Demand (mgd)
300
250
200
150
100
50
0
2010
2020
2030
2040
2050
Date
50% Ag. Use
Industrial
Municipal
Self-Supplied
Energy

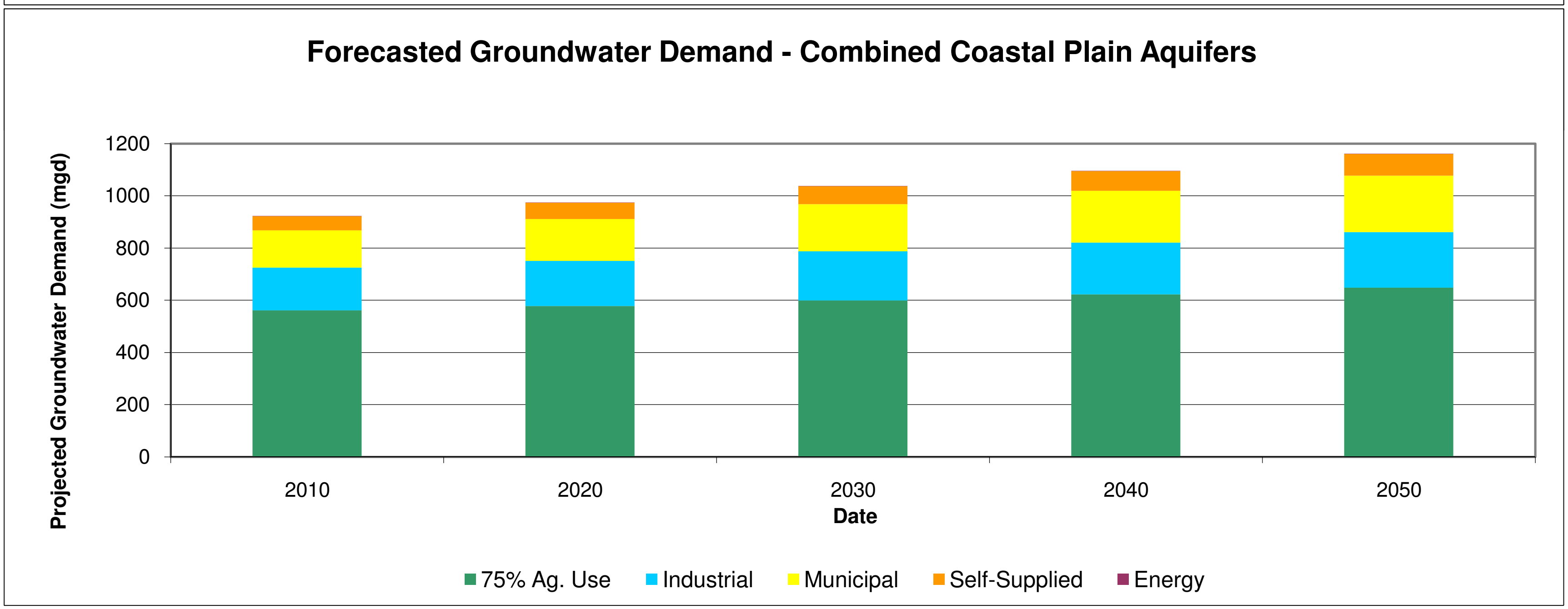

Forecasted Groundwater Demand - Cretaceous Aquifer Between Macon and Augusta
Projected Groundwater Demand (mgd)
300
250
200
150
100
50
0
2010
2020
2030
2040
2050
Date
75% Ag. Use
Industrial
Municipal
Self-Supplied
Energy

Combined Coastal Plain Aquifers

Year	Range of Suatainable Yield (mgd)		Forecasted Groundwater Demand (mgd by use category)						Total Forecasted Demand (mgd)	
			Agricultural Use							
	Low	High	50%	75%	Municipal	Industrial	Self-Supplied	Energy	50% Ag.	75% Ag.
2010	1,066	1,229	406.54	561.46	143.11	163.02	54.90	1.02	767.57	922.49
2020	1,066	1,229	418.21	577.94	160.77	172.04	62.14	1.02	813.16	972.89
2030	1,066	1,229	433.18	599.03	179.56	188.67	69.70	1.02	871.11	1036.96
2040	1,066	1,229	449.70	622.26	197.54	198.76	76.43	1.02	922.43	1094.99
2050	1,066	1,229	467.90	647.84	216.63	212.53	83.10	1.02	980.16	1160.10

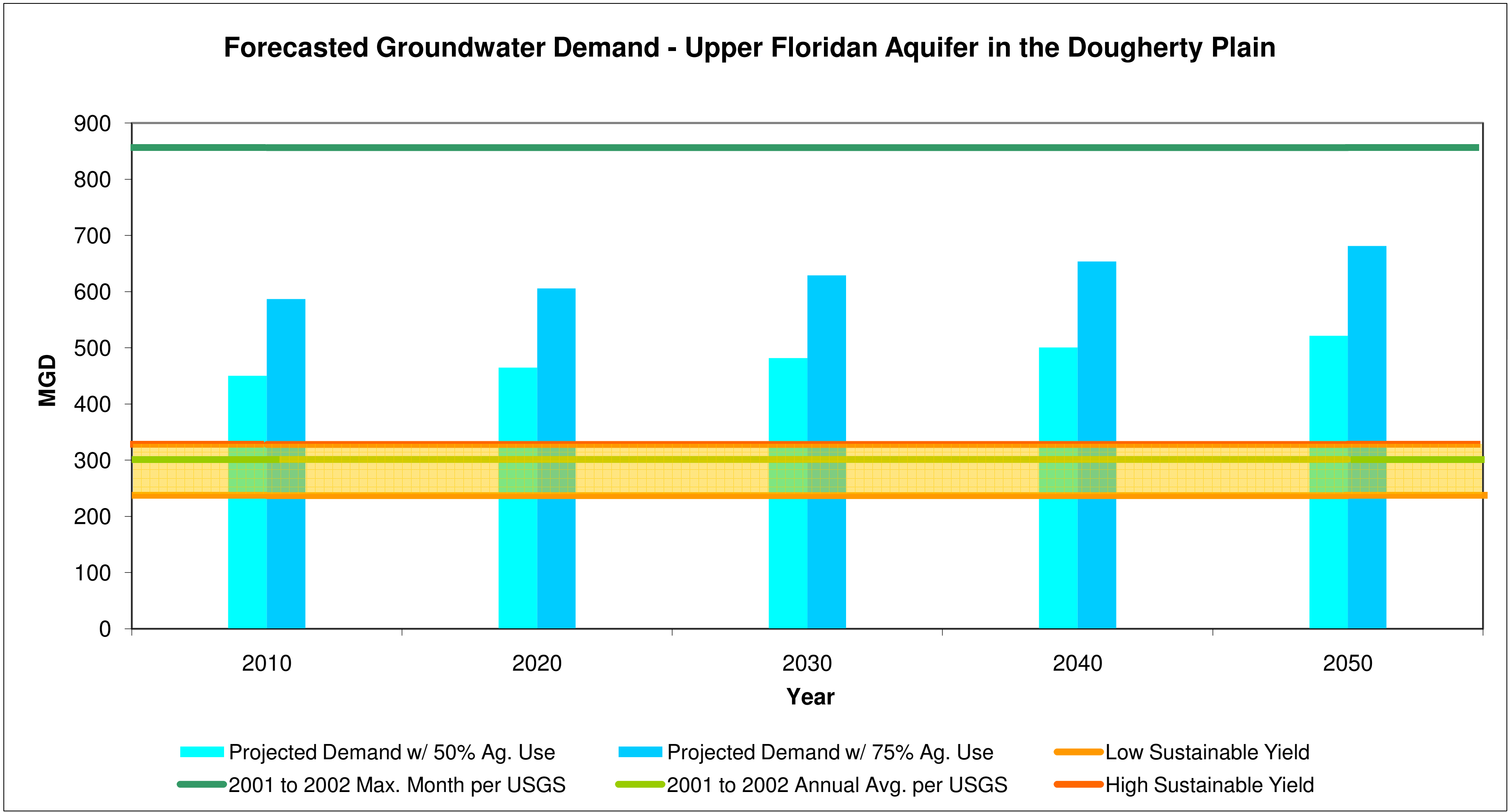


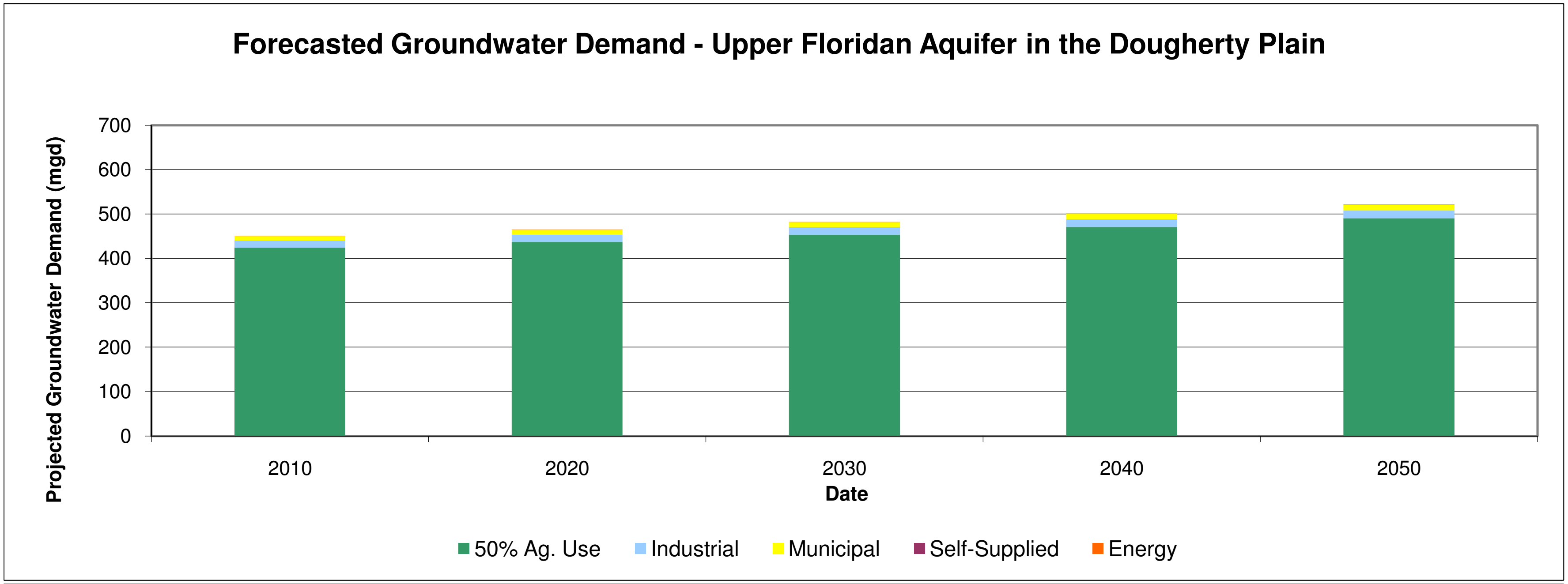

Forecasted Groundwater Demand - Combined Coastal Plain Aquifers
Projected Groundwater Demand (mgd)
1200
1000
800
600
400
200
0
2010
2020
2030
2040
2050
Date
50% Ag. Use
Industrial
Municipal
Self-Supplied
Energy


Forecasted Groundwater Demand - Combined Coastal Plain Aquifers
Projected Groundwater Demand (mgd)
1200
1000
800
600
400
200
0
2010
2020
2030
2040
2050
Date
75% Ag. Use
Industrial
Municipal
Self-Supplied
Energy

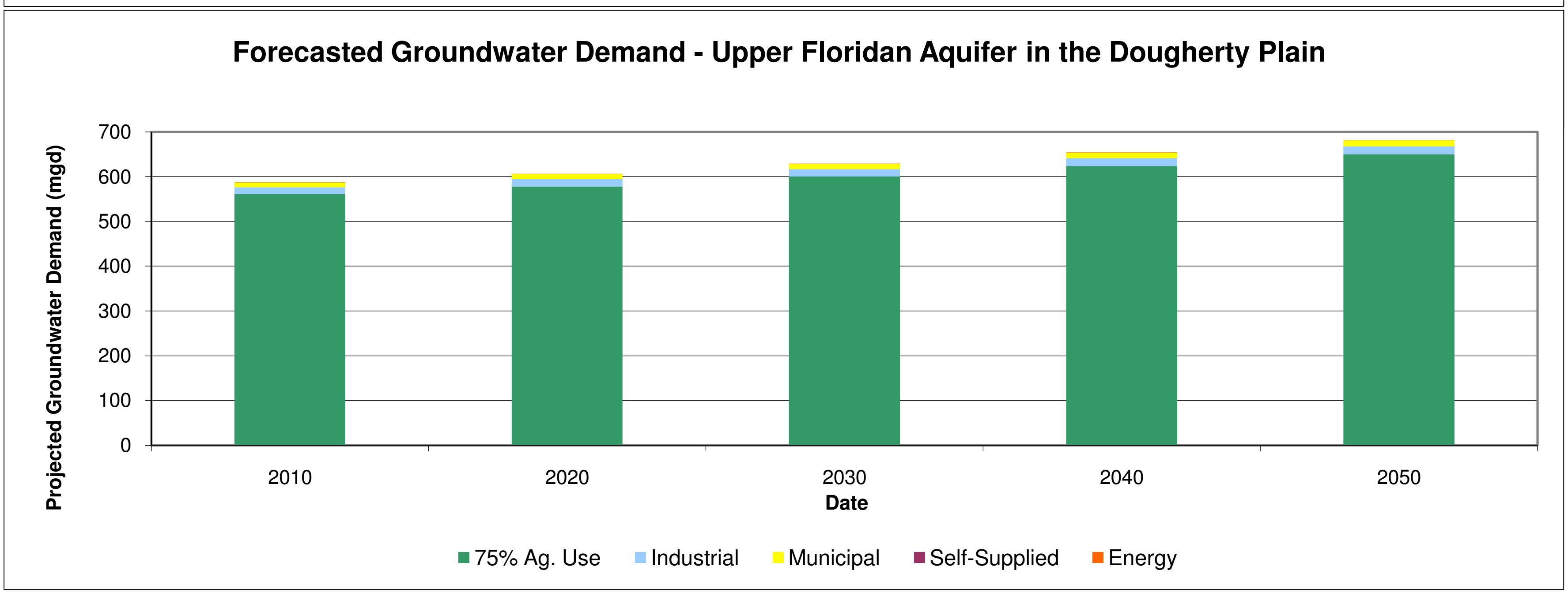
Upper Floridan Aquifer in the Dougherty Plain

Year	2001 to 2002 Model		Range of Sustainable Yield (mgd)		Forecasted Groundwater Demand (mgd by use category)						Total Forecasted Demand (mgd)	
	Annual Average	Maximum Month	Low	High	Ag. Use 50%	Ag. Use 75%	Municipal	Industrial	Self-Supplied	Energy	50% Ag.	75% Ag.
2010	301	856	237	328	424.44	561.06	10.13	15.49	0.00	0.08	450.06	586.68
2020	301	856	237	328	437.04	578.19	11.02	16.49	0.00	0.08	464.55	605.70
2030	301	856	237	328	453.11	599.94	11.79	16.92	0.00	0.08	481.82	628.65
2040	301	856	237	328	470.80	623.86	12.55	17.30	0.00	0.08	500.65	653.71
2050	301	856	237	328	490.27	650.17	13.29	17.68	0.00	0.08	521.24	681.14





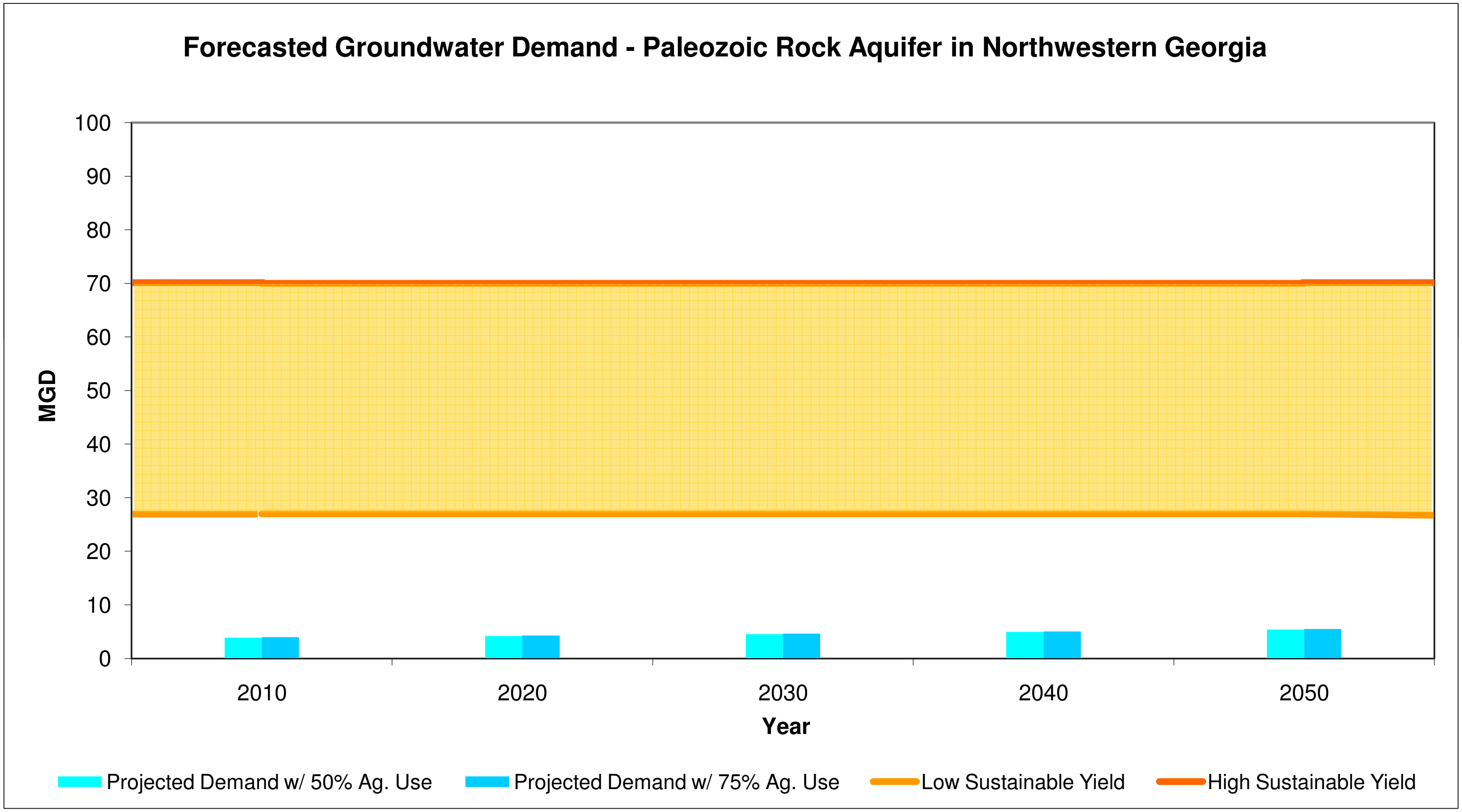
Forecasted Groundwater Demand - Upper Floridan Aquifer in the Dougherty Plain
Projected Groundwater Demand (mgd)
700
600
500
400
300
200
100
0
2010
2020
2030
2040
2050
Date
50% Ag. Use
Industrial
Municipal
Self-Supplied
Energy

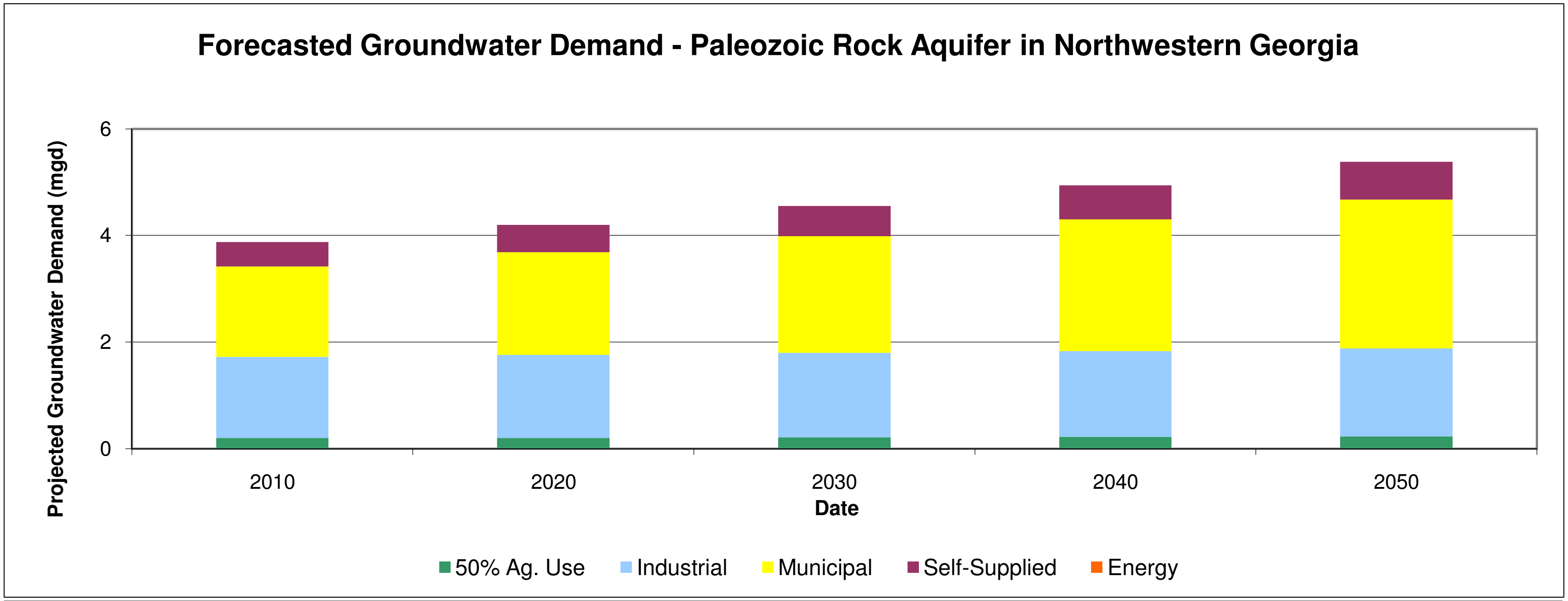


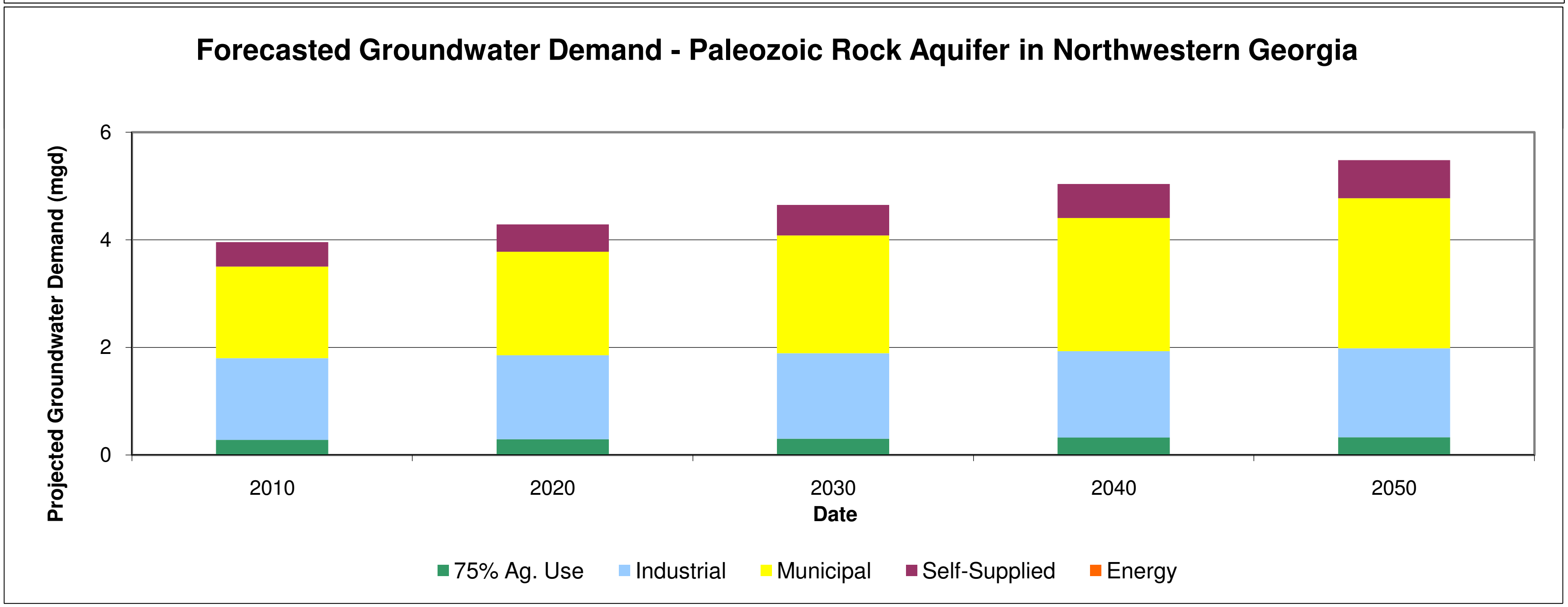
Forecasted Groundwater Demand - Upper Floridan Aquifer in the Dougherty Plain
Projected Groundwater Demand (mgd)
700
600
500
400
300
200
100
0
2010
2020
2030
2040
2050
Date
75% Ag. Use
Industrial
Municipal
Self-Supplied
Energy

Paleozoic Rock Aquifer in Northwestern Georgia

Year	Range of Suatainable Yield (mgd)		Forecasted Groundwater Demand (mgd by use category)						Total Forecasted Demand (mgd)	
			Agricultural Use							
	Low	High	50%	75%	Municipal	Industrial	Self-Supplied	Energy	50% Ag.	75% Ag.
2010	27	70	0.20	0.28	1.70	1.52	0.46	0.00	3.87	3.95
2020	27	70	0.20	0.29	1.93	1.56	0.51	0.00	4.20	4.29
2030	27	70	0.21	0.30	2.19	1.59	0.57	0.00	4.56	4.65
2040	27	70	0.22	0.32	2.47	1.61	0.64	0.00	4.94	5.04
2050	27	70	0.23	0.33	2.79	1.65	0.71	0.00	5.38	5.48




Forecasted Groundwater Demand - Paleozoic Rock Aquifer in Northwestern Georgia
Projected Groundwater Demand (mgd)
0
2
4
6
2010
2020
2030
2040
2050
Date
50% Ag. Use
Industrial
Municipal
Self-Supplied
Energy


Forecasted Groundwater Demand - Paleozoic Rock Aquifer in Northwestern Georgia
Projected Groundwater Demand (mgd)
0
2
4
6
2010
2020
2030
2040
2050
Date
75% Ag. Use
Industrial
Municipal
Self-Supplied
Energy

Sustainable Yields and Forecasted Groundwater Demands

Modeled Aquifer	Sustainable Yield (mgd)		Forecasted Groundwater Demand @ 50% Ag. Use (mgd)				
	Low	High	2010	2020	2030	2040	2050
Claiborne	100	250	123.14	128.89	134.77	140.25	145.54
Upper Floridan in Sotuh-Central Georgia	622	836	281.60	299.00	318.41	338.64	370.50
Upper Floridan in Sotuh-Central Georgia & Eastern Coastal Plain	868	982	468.85	500.59	532.23	564.00	608.49
Cretaceous	198	201	175.58	183.68	204.12	218.18	226.13
Combined Coastal Plain Aquifers	1,066	1,229	767.57	813.16	871.11	922.43	980.16
Upper Floridan in the Dougherty Plain	237	328	450.06	464.55	481.82	500.65	521.24
Paleozoic Rock in NW Georgia	27	70	3.87	4.20	4.56	4.94	5.38
Modeled Aquifer	**Sustainable Yield (mgd)**		**Forecasted Groundwater Demand @ 75% Ag. Use (mgd)**				
	Low	**High**	**2010**	**2020**	**2030**	**2040**	**2050**
Claiborne	100	250	148.13	154.65	161.49	168.01	174.45
Upper Floridan in Sotuh-Central Georgia	622	836	366.29	386.77	410.04	434.51	471.04
Upper Floridan in Sotuh-Central Georgia & Eastern Coastal Plain	868	982	579.77	615.26	651.67	688.68	738.95
Cretaceous	198	201	194.59	202.98	223.81	238.30	246.70
Combined Coastal Plain Aquifers	1,066	1,229	922.49	972.89	1036.96	1094.99	1160.10
Upper Floridan in the Dougherty Plain	237	328	586.68	605.70	628.65	653.71	681.14
Paleozoic Rock in NW Georgia	27	70	3.95	4.29	4.65	5.04	5.48

Gaps Between Forecasted Groundwater Demands and Ranges of Sustainable Yields

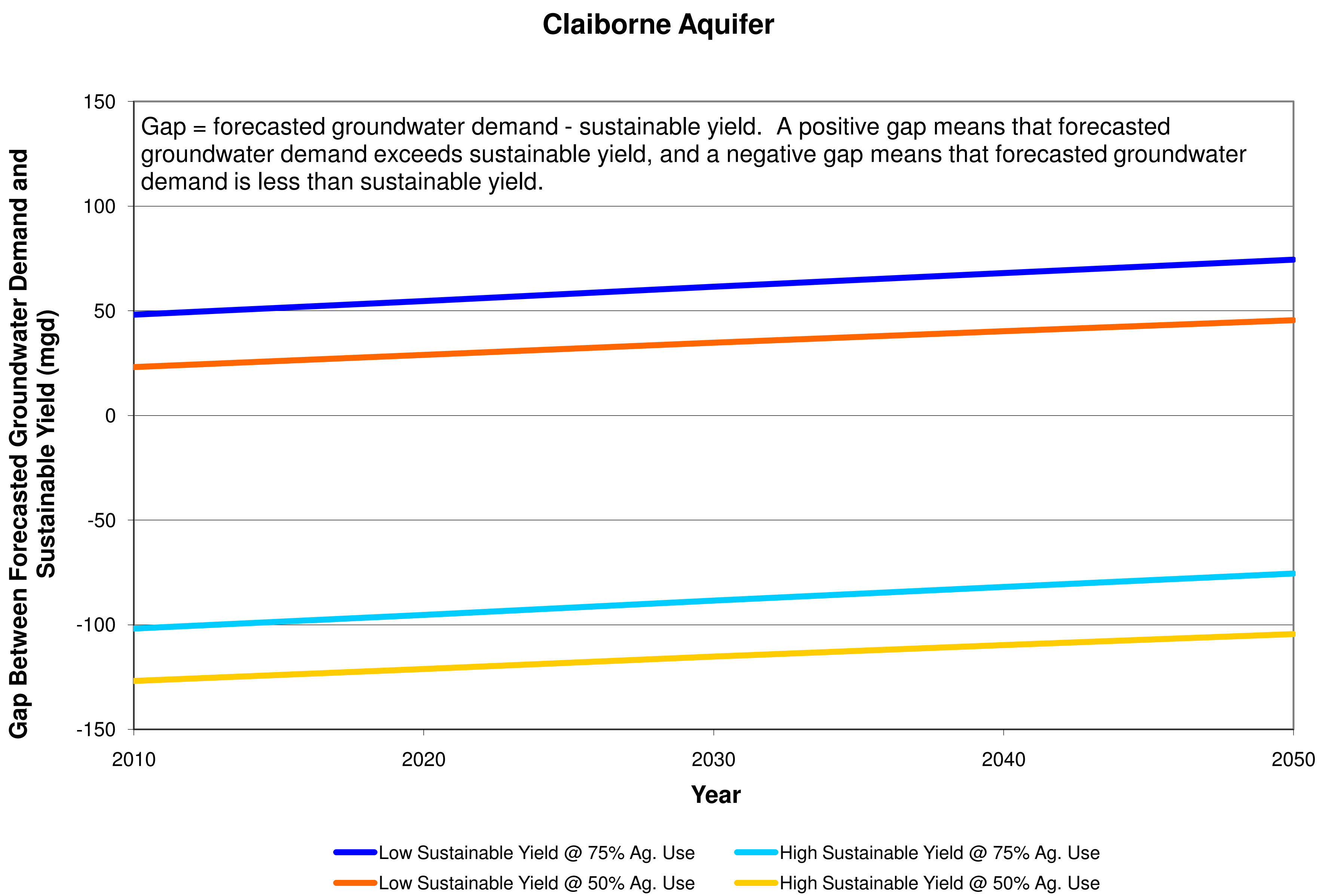
Gap = forecasted groundwater demand minus sustainable yield. A positive gap means that the forecasted groundwater demand exceeds the sustainable yield, and a negative gap means that the forecasted groundwater demand is less than the sustainable yield.

Claiborne Aquifer					
Gap Between Forecasted Groundwater Demand and Sustainable Yield @ 50% Ag. Use	**2010**	**2020**	**2030**	**2040**	**2050**
Low Sustainable Yield	23.14	28.89	34.77	40.25	45.54
High Sustainable Yield	-126.86	-121.11	-115.23	-109.75	-104.46
Gap Between Forecasted Groundwater Demand and Sustainable Yield @ 75% Ag. Use	**2010**	**2020**	**2030**	**2040**	**2050**
Low Sustainable Yield	48.13	54.65	61.49	68.01	74.45
High Sustainable Yield	-101.87	-95.35	-88.51	-81.99	-75.55
Upper Floridan Aquifer in South-Central Ggeorgia					
Gap Between Forecasted Groundwater Demand and Sustainable Yield @ 50% Ag. Use	**2010**	**2020**	**2030**	**2040**	**2050**
Low Sustainable Yield	-340.40	-323.00	-303.59	-283.36	-251.50
High Sustainable Yield	-554.40	-537.00	-517.59	-497.36	-465.50
Gap Between Forecasted Groundwater Demand and Sustainable Yield @ 75% Ag. Use	**2010**	**2020**	**2030**	**2040**	**2050**
Low Sustainable Yield	-255.71	-235.23	-211.96	-187.49	-150.96
High Sustainable Yield	-469.71	-449.23	-425.96	-401.49	-364.96
Upper Floridan Aquifer in South-Central Ggeorgia & Eastern Coastal Plain					
Gap Between Forecasted Groundwater Demand and Sustainable Yield @ 50% Ag. Use	**2010**	**2020**	**2030**	**2040**	**2050**
Low Sustainable Yield	-399.15	-367.41	-335.77	-304.00	-259.51
High Sustainable Yield	-513.15	-481.41	-449.77	-418.00	-373.51
Gap Between Forecasted Groundwater Demand and Sustainable Yield @ 75% Ag. Use	**2010**	**2020**	**2030**	**2040**	**2050**
Low Sustainable Yield	-288.23	-252.74	-216.33	-179.32	-129.05
High Sustainable Yield	-402.23	-366.74	-330.33	-293.32	-243.05
Cretaceous Aquifer					
Gap Between Forecasted Groundwater Demand and Sustainable Yield @ 50% Ag. Use	**2010**	**2020**	**2030**	**2040**	**2050**
Low Sustainable Yield	-22.42	-14.32	6.12	20.18	28.13
High Sustainable Yield	-25.42	-17.32	3.12	17.18	25.13
Gap Between Forecasted Groundwater Demand and Sustainable Yield @ 75% Ag. Use	**2010**	**2020**	**2030**	**2040**	**2050**
Low Sustainable Yield	-3.41	4.98	25.81	40.30	48.70
High Sustainable Yield	-6.41	1.98	22.81	37.30	45.70

Gaps Between Forecasted Groundwater Demands and Ranges of Sustainable Yields

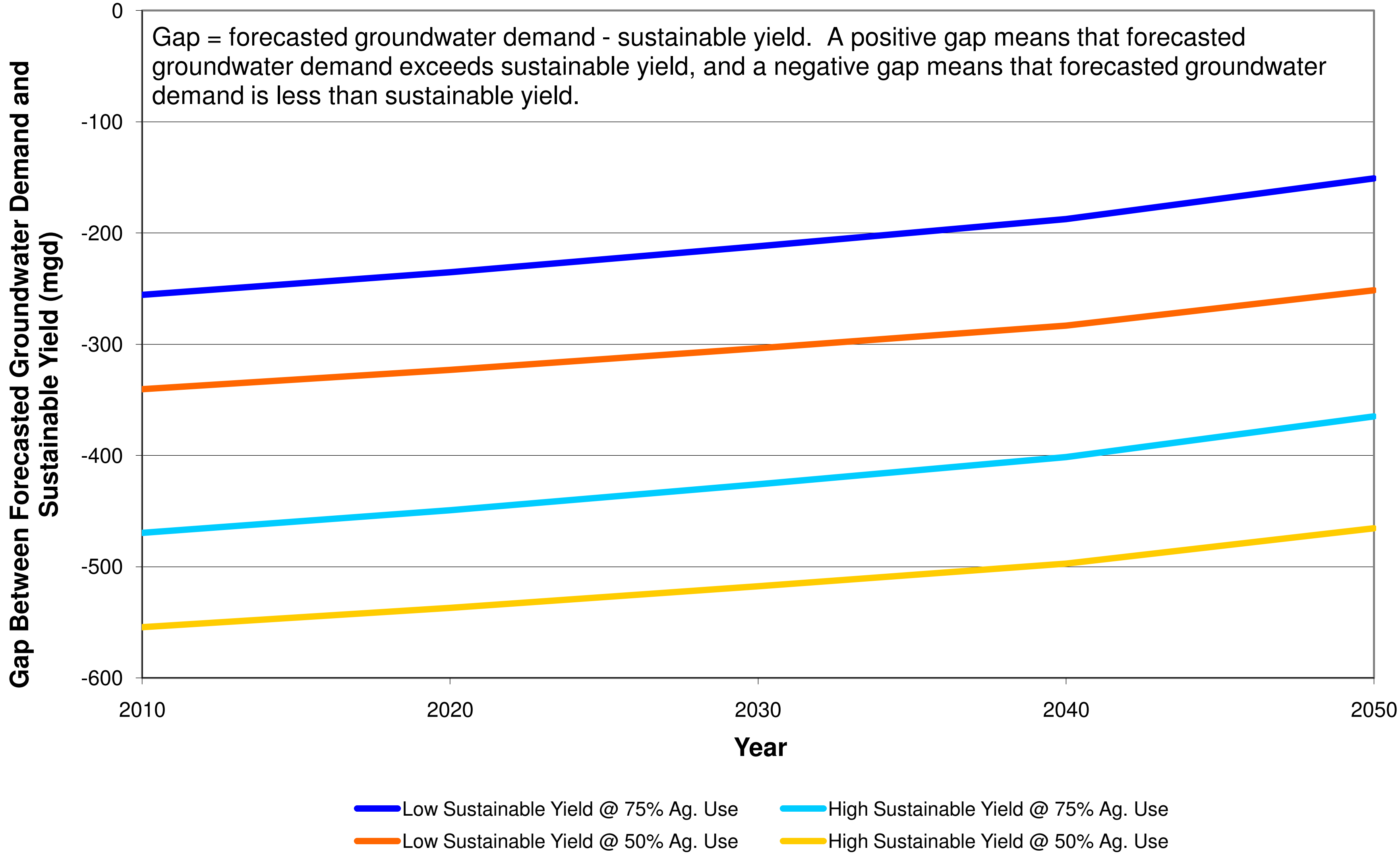
Gap = forecasted groundwater demand minus sustainable yield. A positive gap means that the forecasted groundwater demand exceeds the sustainable yield, and a negative gap means that the forecasted groundwater demand is less than the sustainable yield.

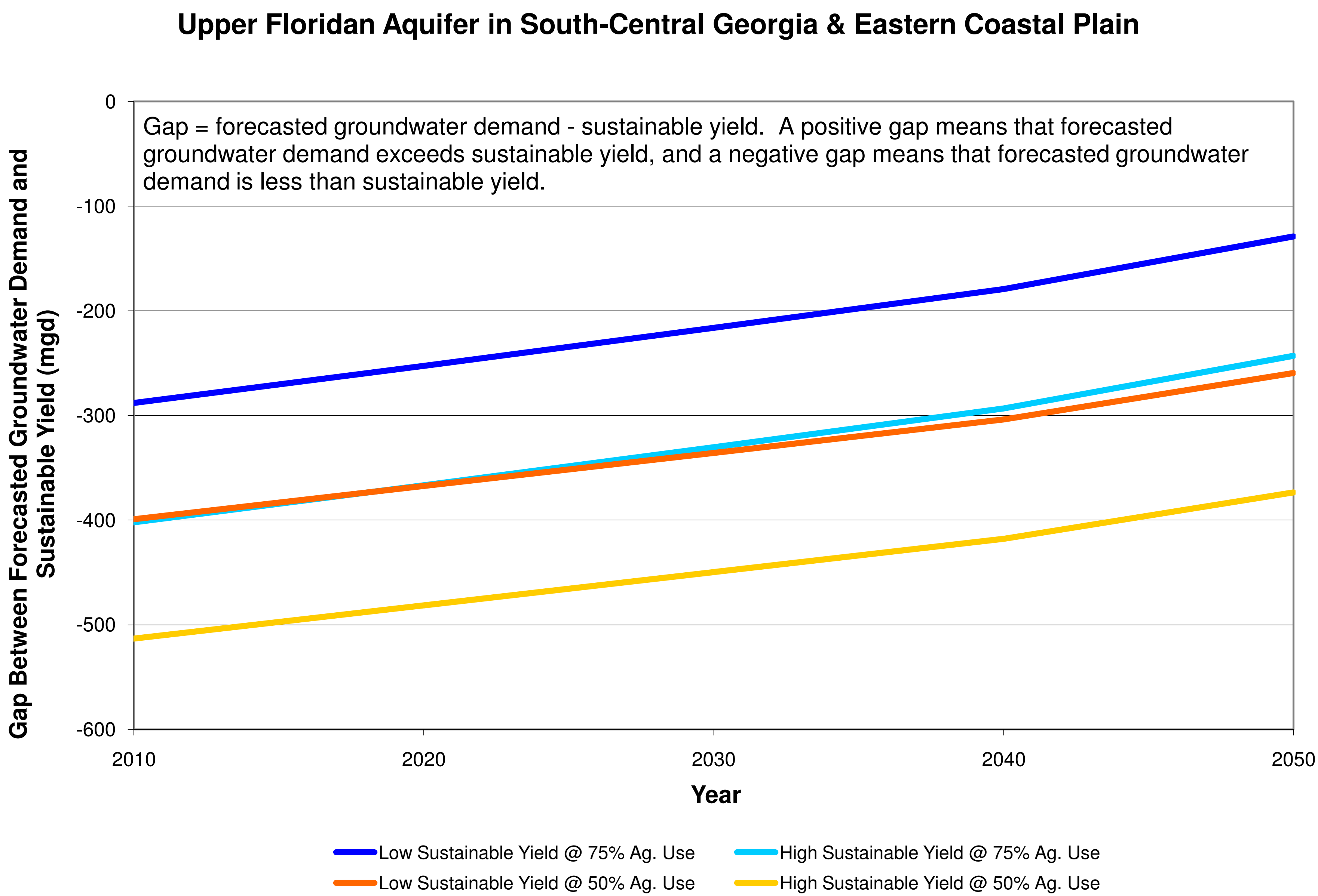
Combined Coastal Plain Aquifers					
Gap Between Forecasted Groundwater Demand and Sustainable Yield @ 50% Ag. Use	**2010**	**2020**	**2030**	**2040**	**2050**
Low Sustainable Yield	-298.43	-252.84	-194.89	-143.57	-85.84
High Sustainable Yield	-461.43	-415.84	-357.89	-306.57	-248.84
Gap Between Forecasted Groundwater Demand and Sustainable Yield @ 75% Ag. Use	**2010**	**2020**	**2030**	**2040**	**2050**
Low Sustainable Yield	-143.51	-93.11	-29.04	28.99	94.10
High Sustainable Yield	-306.51	-256.11	-192.04	-134.01	-68.90
Upper Floridan Aquifer in the Dougherty Plain					
Gap Between Forecasted Groundwater Demand and Sustainable Yield @ 50% Ag. Use	**2010**	**2020**	**2030**	**2040**	**2050**
Low Sustainable Yield	213.06	227.55	244.82	263.65	284.24
High Sustainable Yield	122.06	136.55	153.82	172.65	193.24
Gap Between Forecasted Groundwater Demand and Sustainable Yield @ 75% Ag. Use	**2010**	**2020**	**2030**	**2040**	**2050**
Low Sustainable Yield	349.68	368.70	391.65	416.71	444.14
High Sustainable Yield	258.68	277.70	300.65	325.71	353.14
Paleozoic Rock Aquifer in Northwestern Georgia					
Gap Between Forecasted Groundwater Demand and Sustainable Yield @ 50% Ag. Use	**2010**	**2020**	**2030**	**2040**	**2050**
Low Sustainable Yield	-23.13	-22.80	-22.44	-22.06	-21.62
High Sustainable Yield	-66.13	-65.80	-65.44	-65.06	-64.62
Gap Between Forecasted Groundwater Demand and Sustainable Yield @ 75% Ag. Use	**2010**	**2020**	**2030**	**2040**	**2050**
Low Sustainable Yield	-23.05	-22.71	-22.35	-21.96	-21.52
High Sustainable Yield	-66.05	-65.71	-65.35	-64.96	-64.52

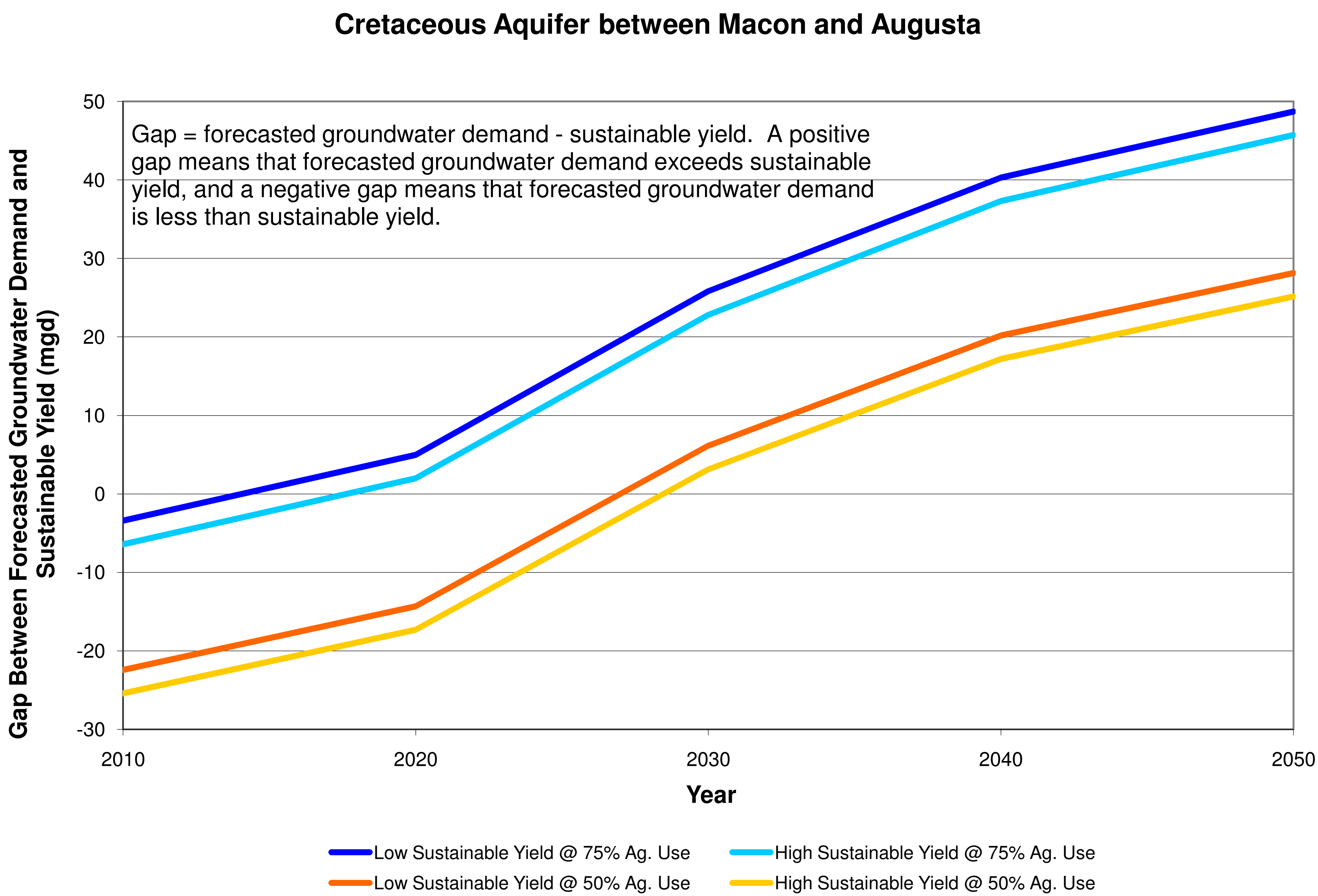


Claiborne Aquifer
Gap = forecasted groundwater demand - sustainable yield. A positive gap means that forecasted groundwater demand exceeds sustainable yield, and a negative gap means that forecasted groundwater demand is less than sustainable yield.
Gap Between Forecasted Groundwater Demand and Sustainable Yield (mgd)
150
100
50
0
-50
-100
-150
2010
2020
2030
2040
2050
Year
Low Sustainable Yield @ 75% Ag. Use
High Sustainable Yield @ 75% Ag. Use
Low Sustainable Yield @ 50% Ag. Use
High Sustainable Yield @ 50% Ag. Use

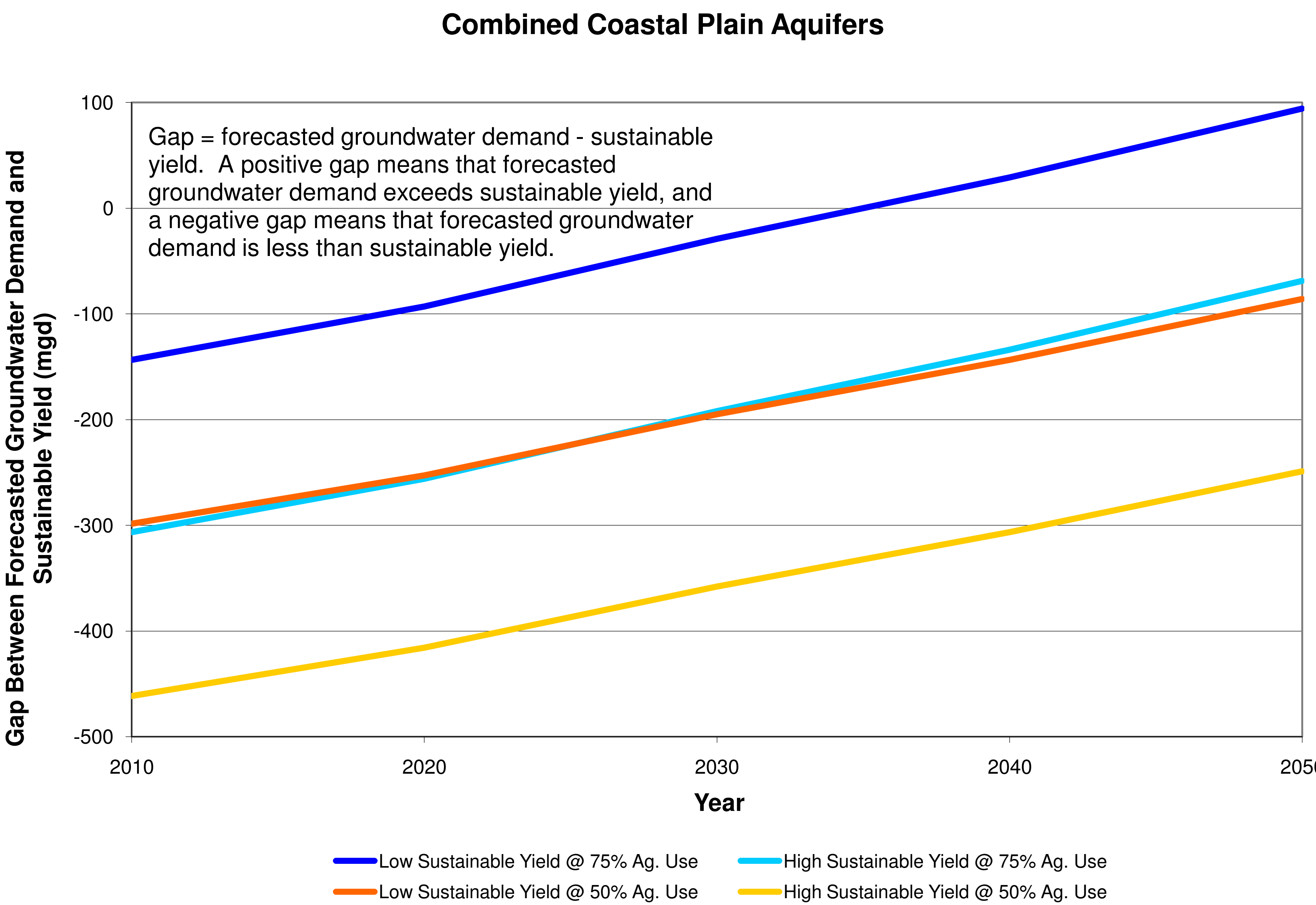
Upper Floridan Aquifer in South-Central Georgia

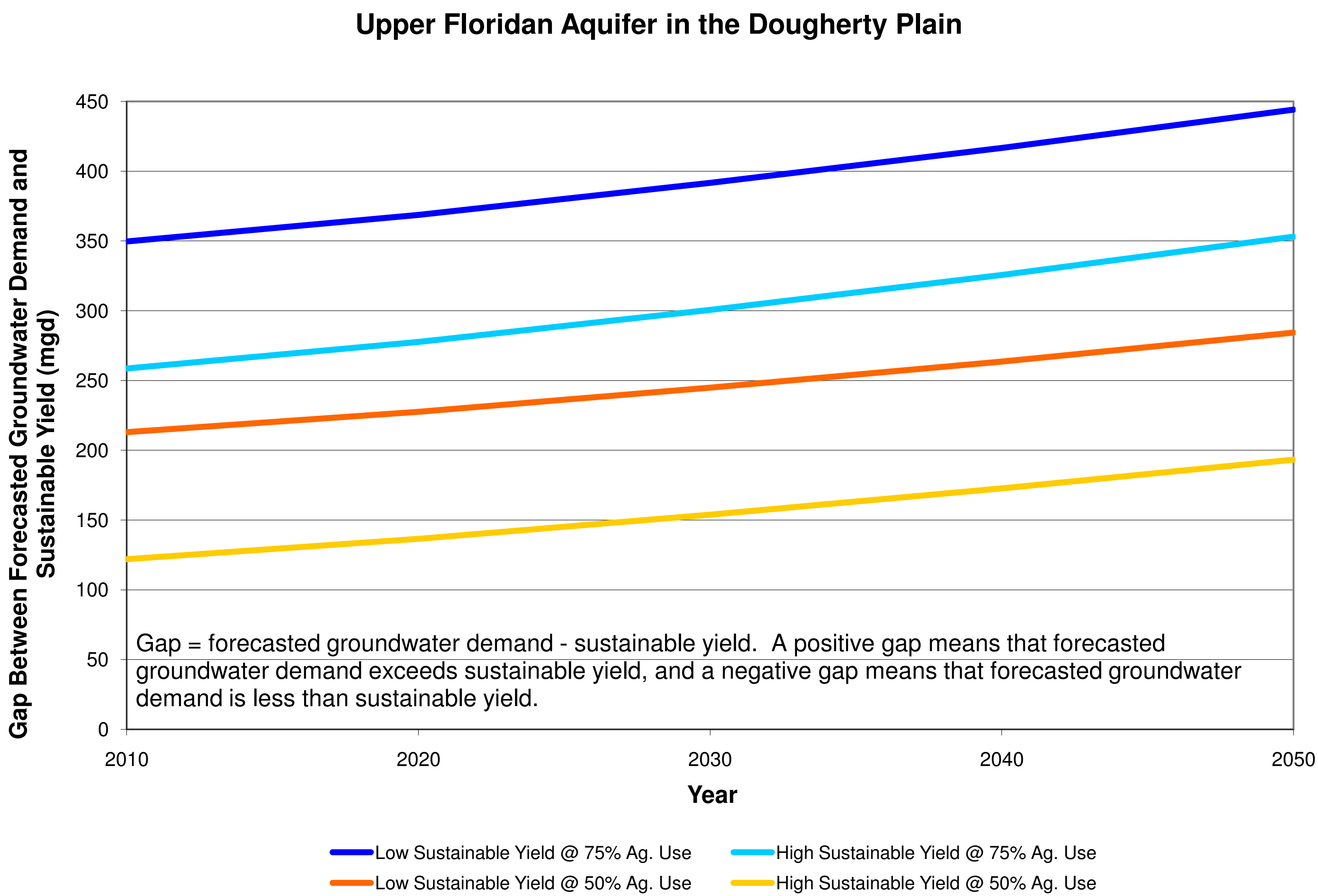



Upper Floridan Aquifer in South-Central Georgia & Eastern Coastal Plain
Gap = forecasted groundwater demand - sustainable yield. A positive gap means that forecasted groundwater demand exceeds sustainable yield, and a negative gap means that forecasted groundwater demand is less than sustainable yield.
Gap Between Forecasted Groundwater Demand and Sustainable Yield (mgd)
0
-100
-200
-300
-400
-500
-600
2010
2020
2030
2040
2050
Year
Low Sustainable Yield @ 75% Ag. Use
High Sustainable Yield @ 75% Ag. Use
Low Sustainable Yield @ 50% Ag. Use
High Sustainable Yield @ 50% Ag. Use

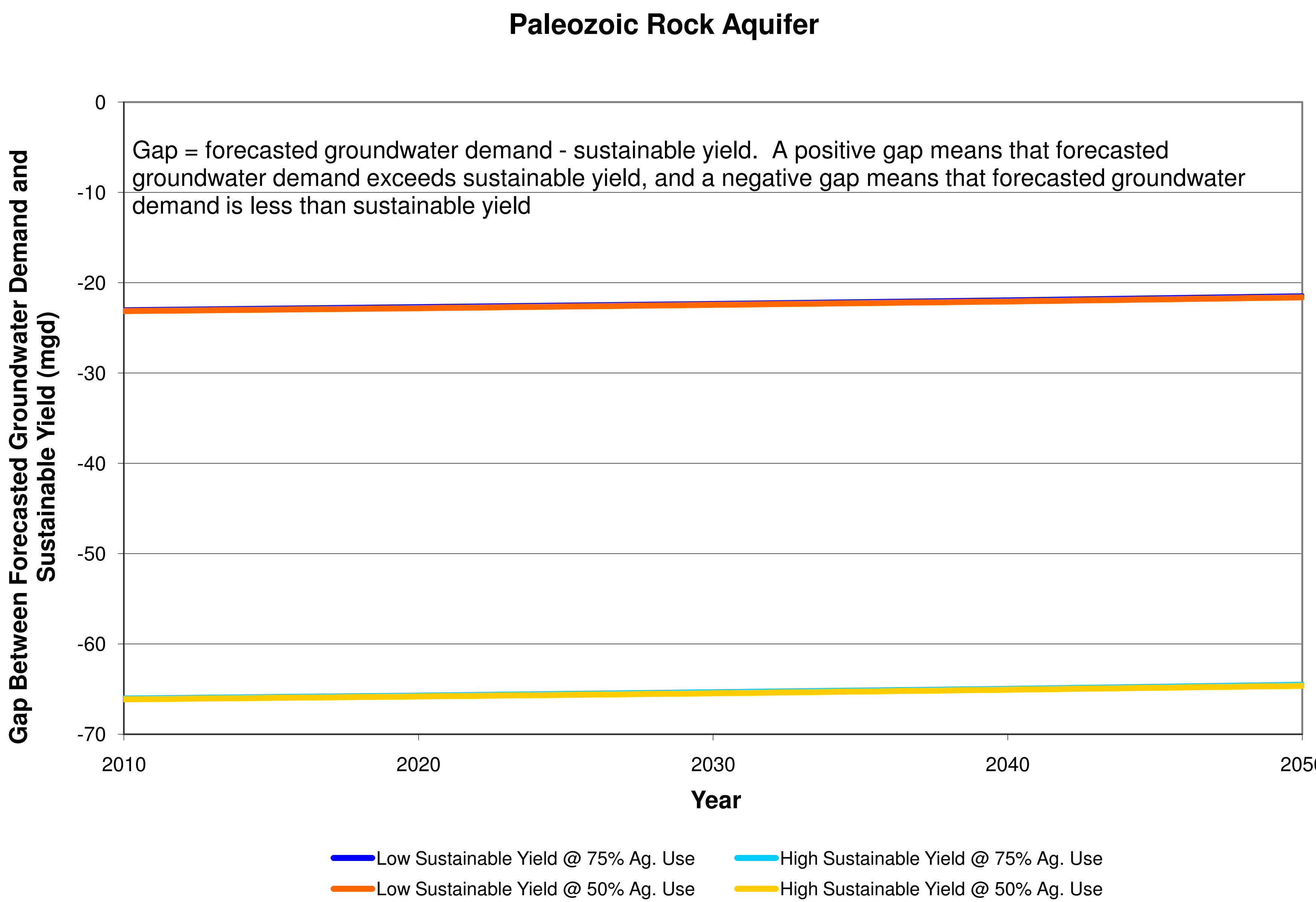


Cretaceous Aquifer between Macon and Augusta
Gap = forecasted groundwater demand - sustainable yield. A positive gap means that forecasted groundwater demand exceeds sustainable yield, and a negative gap means that forecasted groundwater demand is less than sustainable yield.
Gap Between Forecasted Groundwater Demand and Sustainable Yield (mgd)
50
40
30
20
10
0
-10
-20
-30
2010
2020
2030
2040
2050
Year
Low Sustainable Yield @ 75% Ag. Use
High Sustainable Yield @ 75% Ag. Use
Low Sustainable Yield @ 50% Ag. Use
High Sustainable Yield @ 50% Ag. Use


Combined Coastal Plain Aquifers
Gap = forecasted groundwater demand - sustainable yield. A positive gap means that forecasted groundwater demand exceeds sustainable yield, and a negative gap means that forecasted groundwater demand is less than sustainable yield.
Gap Between Forecasted Groundwater Demand and Sustainable Yield (mgd)
100
0
-100
-200
-300
-400
-500
2010
2020
2030
2040
2050
Year
Low Sustainable Yield @ 75% Ag. Use
High Sustainable Yield @ 75% Ag. Use
Low Sustainable Yield @ 50% Ag. Use
High Sustainable Yield @ 50% Ag. Use



Upper Floridan Aquifer in the Dougherty Plain
Gap Between Forecasted Groundwater Demand and Sustainable Yield (mgd)
450
400
350
300
250
200
150
100
50
0
2010
2020
2030
2040
2050
Year
Gap = forecasted groundwater demand - sustainable yield. A positive gap means that forecasted groundwater demand exceeds sustainable yield, and a negative gap means that forecasted groundwater demand is less than sustainable yield.
Low Sustainable Yield @ 75% Ag. Use
High Sustainable Yield @ 75% Ag. Use
Low Sustainable Yield @ 50% Ag. Use
High Sustainable Yield @ 50% Ag. Use


Paleozoic Rock Aquifer
Gap = forecasted groundwater demand - sustainable yield. A positive gap means that forecasted groundwater demand exceeds sustainable yield, and a negative gap means that forecasted groundwater demand is less than sustainable yield
Gap Between Forecasted Groundwater Demand and Sustainable Yield (mgd)
0
-10
-20
-30
-40
-50
-60
-70
2010
2020
2030
2040
2050
Year
Low Sustainable Yield @ 75% Ag. Use
High Sustainable Yield @ 75% Ag. Use
Low Sustainable Yield @ 50% Ag. Use
High Sustainable Yield @ 50% Ag. Use