

## Key information

### **Please note: data are for modeling purposes only**

This spreadsheet is intended to document the assumptions that were used to estimate future raw water withdrawals from the Floridan Aquifer System (FAS) for the 2040 Base Case for utilities. These demands include the following: a) those which rely exclusively on the FAS b) those which use both the Surficial Aquifer System (SAS) and FAS; and c) some utilities that have more than one FAS wellfield.

For each user (demand), staff considered: Consumptive Use Permit (CUP) allocations and source limits; Florida Department of Environmental Protection's (FDEP) rated capacity of SAS and FAS water treatment plants; recent trends in pumpage by utility and by individual wellfield, available information on proposed new wellfields (if permitted) and proposed projects (submitted for the 2016 Upper East Coast Water Supply Plan (UEC WSP) Update).

Staff included information submitted to the 2013 Lower East Coast (LEC) Plan Update from three utilities with FAS allocations in Northern Palm Beach County: Jupiter, Tequesta and Seacoast.

To update the utility service area population projections, county total populations were used from the 2014 Bureau of Economic and Business Research (BEBR) release. Using this county population, the shift-share method was then applied. The 2011 UEC WSP utility service area population shares were applied to the BEBR county level projections (April 2014 release), to arrive at an updated population projection for each utility service area in the county. These projections for the modeling were made prior to the development of population projections for the 2016 Update of the UEC Water Supply Plan. Differences between projected demands for PWS are expected between the model assumptions and the Plan Update. It should be noted that any slight differences in final population projections do not affect the modelling results because the overall demands are relatively close in magnitude.

#### •Other assumptions:

- a) No increases were made above existing SAS allocations. This assumption does not affect the ability of permittees to request increases from the SAS in the permitting process.
- b) Attempted to maintain existing blending ratio of FAS to SAS where possible.

UEC PWS Permitted Allocation and Demand Projection Summary											
	2013 total raw water demand (MGD)	2040 total raw water demand (MGD)	SAS allocation (MGD)	FAS allocation (MGD)	Approx. FAS/SAS ratio <sup>a</sup>	Estimated 2040 FAS/SAS ratio <sup>b</sup>	2013 FAS Volume modelled (MGD)	Assumed 2040 FAS volume by wellfield (MGD)	Assumed 2040 FAS volume by wellfield (MGM)	# of Wells / Aquifer <sup>c</sup>	
<b>St. Lucie County</b>											
Fort Pierce Utilities Authority	8.05	9.79	8.00	13.13	40/60	40/60	3.22	3.92	117.60	22 UFA	
Port St. Lucie Utilities	16.75	27.89	5.00	46.38	85/15	91/9					
JEA					100/0	100/0	9.25	9.25		277.50	5 UFA 8 UFA/APPZ
Prineville					67/33	78/22	4.98	6.14		184.20	5 UFA
Southwest <sup>d</sup>						100/0	N/A	10.00		300.00	14 UFA/APPZ
St. Lucie County Utilities	0.13	6.40	0.17	6.65			N/A				
North (Airport) <sup>d</sup>					N/A	96/4	N/A	4.23		126.90	5 UFA
Central (Fairgrounds) <sup>d</sup>					N/A	100/0	N/A	2.00		60.00	5 UFA
St. Lucie West Services District	2.04	2.79	0.00	2.33	100/0	100/0	2.04	2.79		83.70	3 APPZ
<b>Subtotal</b>	<b>26.97</b>	<b>46.87</b>	<b>13.17</b>	<b>68.49</b>			<b>19.49</b>	<b>38.33</b>		<b>1149.90</b>	
<b>Martin County</b>											
Martin County Utilities	10.90	13.58	6.69	15.09	85/15	85/15			225.00	8 APPZ	
Tropical Farms					86/14	88/12	6.02	7.50			
North Jensen					80/20	84/16	3.24	4.04		121.20	5 UFA 5 APPZ 2 APPZ
South Martin Regional Utility	4.02	7.13	4.83	4.76	25/75	35/65	1.00	2.50		75.00	
<b>Subtotal</b>	<b>14.92</b>	<b>20.71</b>	<b>11.52</b>	<b>19.85</b>			<b>10.26</b>	<b>14.04</b>	<b>421.20</b>		
<b>N. Palm Beach County</b>											
Town of Jupiter	18.54	22.80	18.8	11.71	53/47	50/50	9.82	11.41	342.30	4 UFA 9 APPZ	
Seacoast Utility Authority	19.13	22.57	22.30	8.90	0/100	9/91	N/A	2.01		60.30	5 APPZ
Village of Tequesta	2.86	3.29	1.10	4.40	50/50	67/33	1.43	2.19		65.70	5 UFA
<b>Subtotals</b>	<b>40.53</b>	<b>48.66</b>	<b>42.20</b>	<b>25.01</b>			<b>11.25</b>	<b>15.61</b>		<b>468.30</b>	

- a. Ratios typically vary year to year; the approximation is based on historic data from recent years.
- b. For modeling purposes only; 2040 ratios by SFWMD staff based on a series of assumptions described in the "Read Me" tab.
- c. Some utilities have multiple production wells situated in a single model cell. The model handles this situation as a single well. Most PWS wells pull water from a single layer of the FAS, however in the course of model development several wells appear to be open in two layers. The UFA is the Upper Floridan Aquifer (Layer 1 in the model) and APPZ is the Avon Park Permeable Zone (Layer 3). In one case there appears to be a well that penetrates the UFA and the confining unit (Layer 2) aquifer.
- d. These wellfields are permitted but have not been built.

## Fort Pierce Utility Authority

SFWMD CUP Allocation (Raw Water)				FDEP Permitted Capacity (Finished Water)						Bulk Water	
Permit Expires	Surfical Aquifer	Floridan Aquifer	Total Allocation	2013	2013	2013 Total Capacity (MGD)	2040	2040	2040	Bulk Water Purchased 2013 (MGD)	Bulk Water Sold 2013 (MGD)
				Surficial Capacity (MGD)	Floridan Capacity (MGD)		Proposed Surficial Capacity (MGD)	Proposed Floridan Capacity (MGD)	Proposed Total Capacity (MGD)		
2027	8.00	13.13	21.13	13.00	6.00	19.00	13.50	6.00	19.50	0.00	0.92

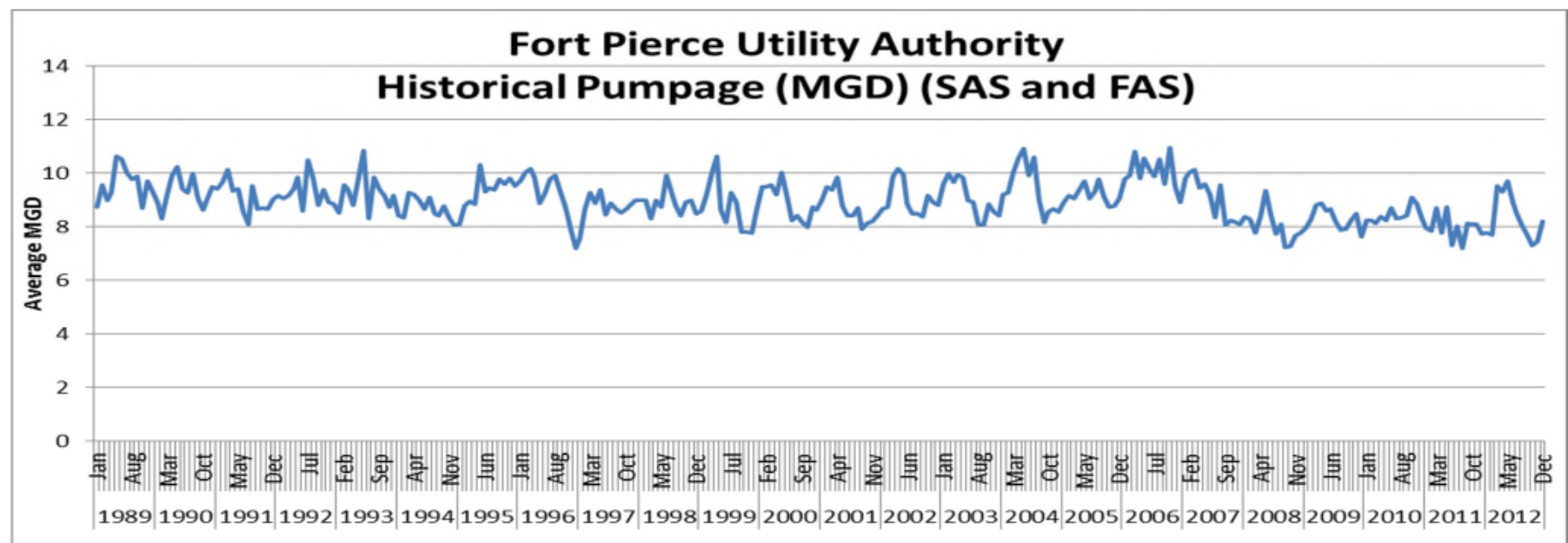
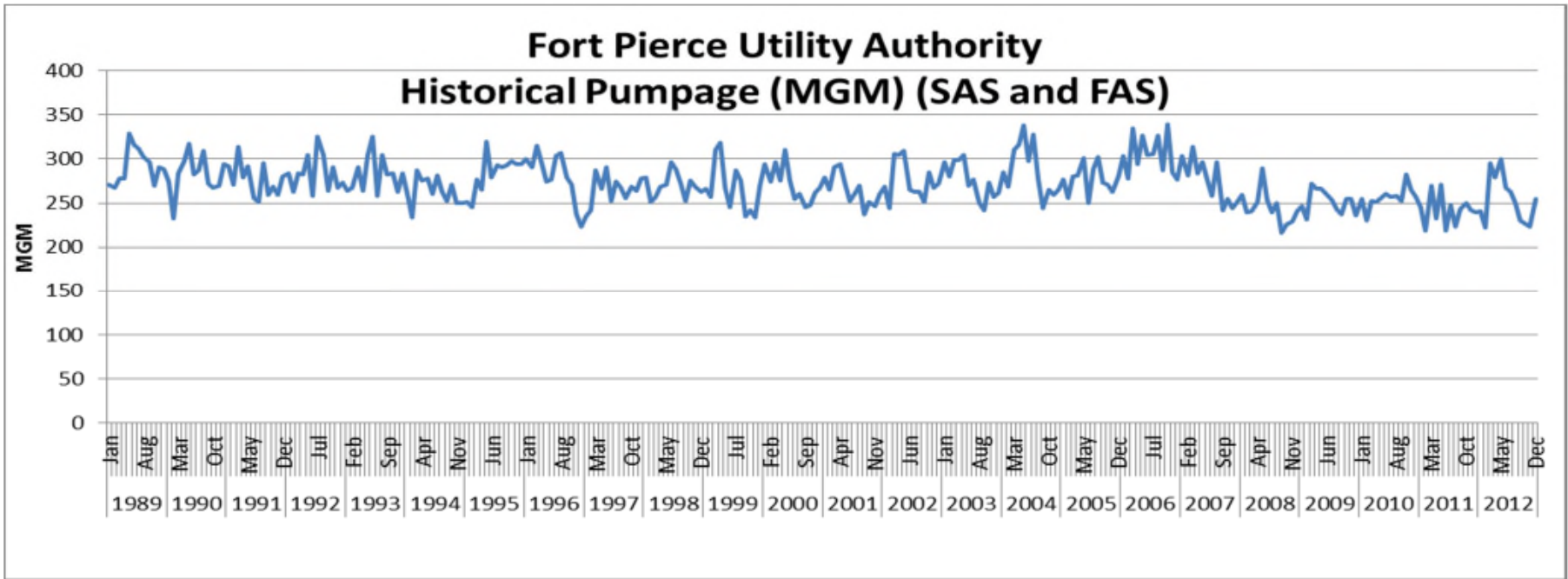
Population		Finished Water Demand		Raw Water Demand	
2011 WSP data	2014 projections	2013 FDEP MOR data (MGD)	based on 2014 BEBR data (MGD)	(MGD)	(MGD)
2011	2040	2013	2040	2013	2040
82,020	80,333	7.54	9.32	8.05	9.79

Aquifer and Well Information			
Approx. FAS/SAS ratio <sup>a</sup>	Estimated 2040 FAS/SAS ratio <sup>b</sup>	Assumed 2040 FAS volume by wellfield (MGD)	Assumed 2040 FAS volume by wellfield (MGM)
40/60	40/60	3.92	117.60

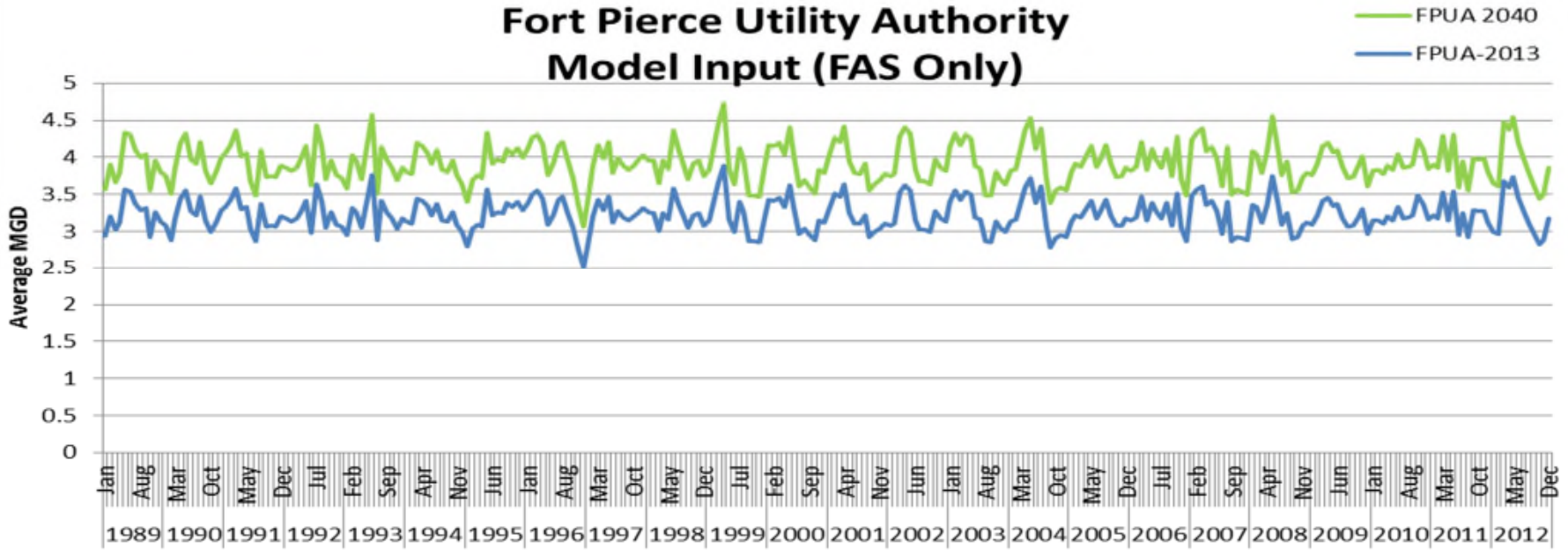
a. Ratios typically vary year to year; the approximation is based on historic data from recent years.

b. For modeling purposes only; 2040 ratios by SFWMD staff based on a series of assumptions described in the "Read Me" tab.

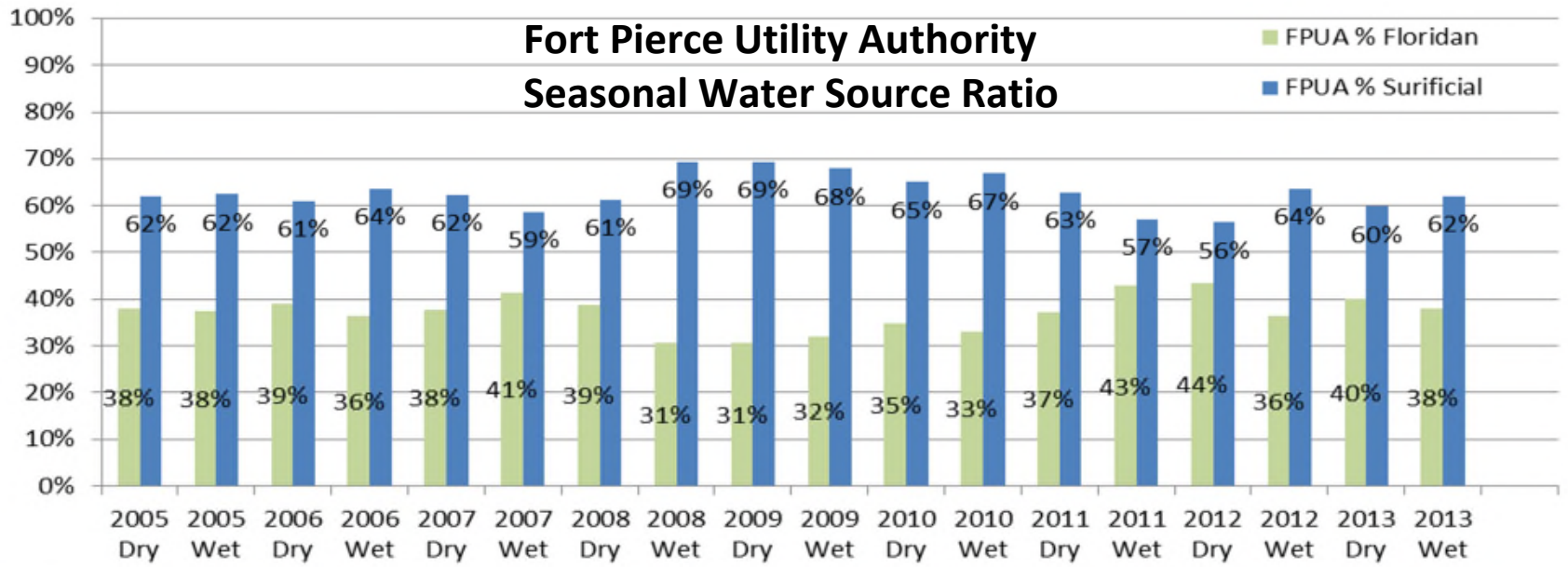
**Assumptions:** Maintained FPUA's 40/60 ratio of FAS to SAS, which results in consistency with CUP and existing treatment capacities.



### Fort Pierce Utility Authority Model Input (FAS Only)



### Fort Pierce Utility Authority Seasonal Water Source Ratio



## Port St. Lucie Utilities

SFWMD CUP Allocation (Raw Water)				FDEP Permitted Capacity (Finished Water)						Bulk Water	
Permit Expires	Surfical Aquifer	Floridan Aquifer	Total Allocation	2013	2013	2013 Total Capacity (MGD)	2040	2040	2040	Bulk Water Purchased 2013 (MGD)	Bulk Water Sold 2013 (MGD)
				Surficial Capacity (MGD)	Floridan Capacity (MGD)		Proposed Surficial Capacity (MGD)	Proposed Floridan Capacity (MGD)	Proposed Total Capacity (MGD)		
2028	5.00	46.38	51.38	8.00	33.65	41.65	8.00	43.65	51.65	0.00	0.18

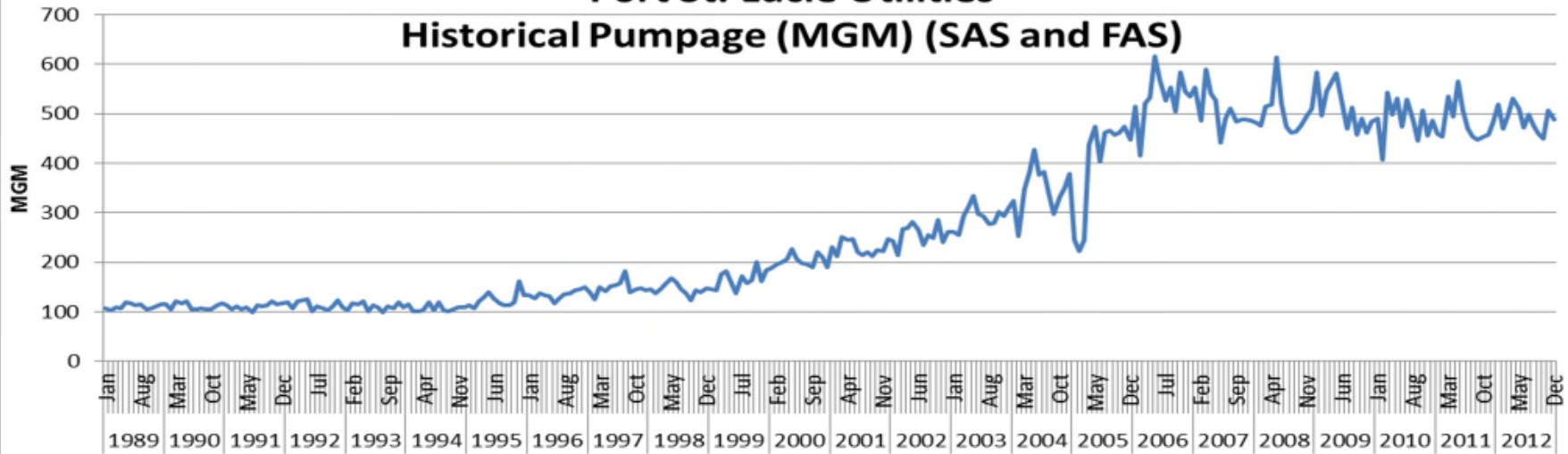
Population		Finished Water Demand 2013 FDEP based on 2014		Raw Water Demand	
2011 WSP data	2014 projections	MOR data (MGD)	BEBR data (MGD)	(MGD)	(MGD)
2011	2040	2013	2040	2013	2040
158,678	290,346	13.66	22.71	16.75	27.89

Aquifer and Well Information				
	Approx. FAS/SAS ratio <sup>a</sup>	Estimated 2040 FAS/SAS ratio <sup>b</sup>	Assumed 2040 FAS volume by wellfield (MGD)	Assumed 2040 FAS volume by wellfield (MGM)
	85/15	91/9		
JEA	100/0	100/0	9.25	277.50
Prineville	67/33	78/22	6.14	184.20
Southwest <sup>c</sup>		100/0	10.00	300.00

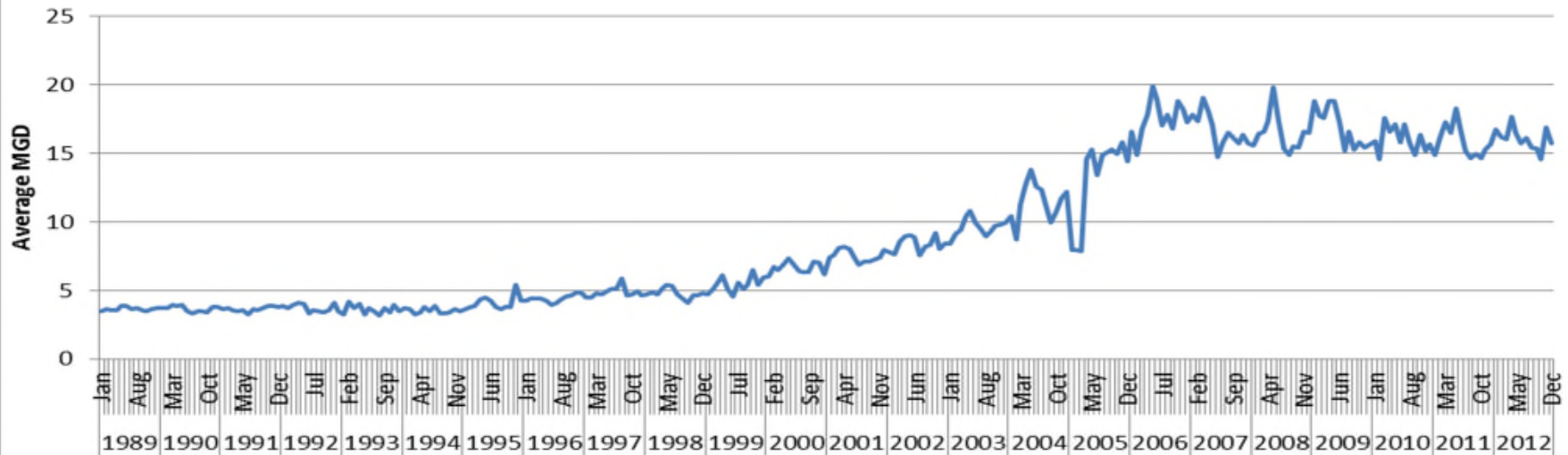
- Ratios typically vary year to year; the approximation is based on historic data from recent years.
- For modeling purposes only; 2040 ratios by SFWMD staff based on a series of assumptions described in the "Read Me" tab.
- These wellfields are permitted but have not been built.

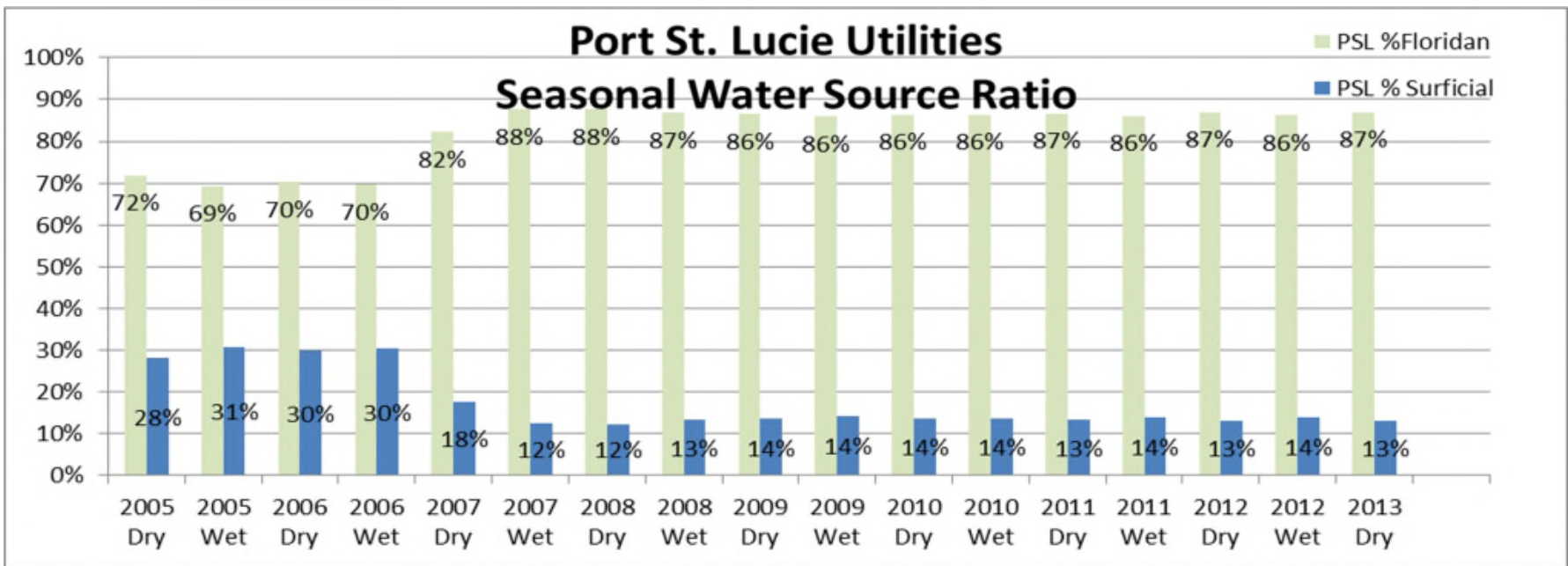
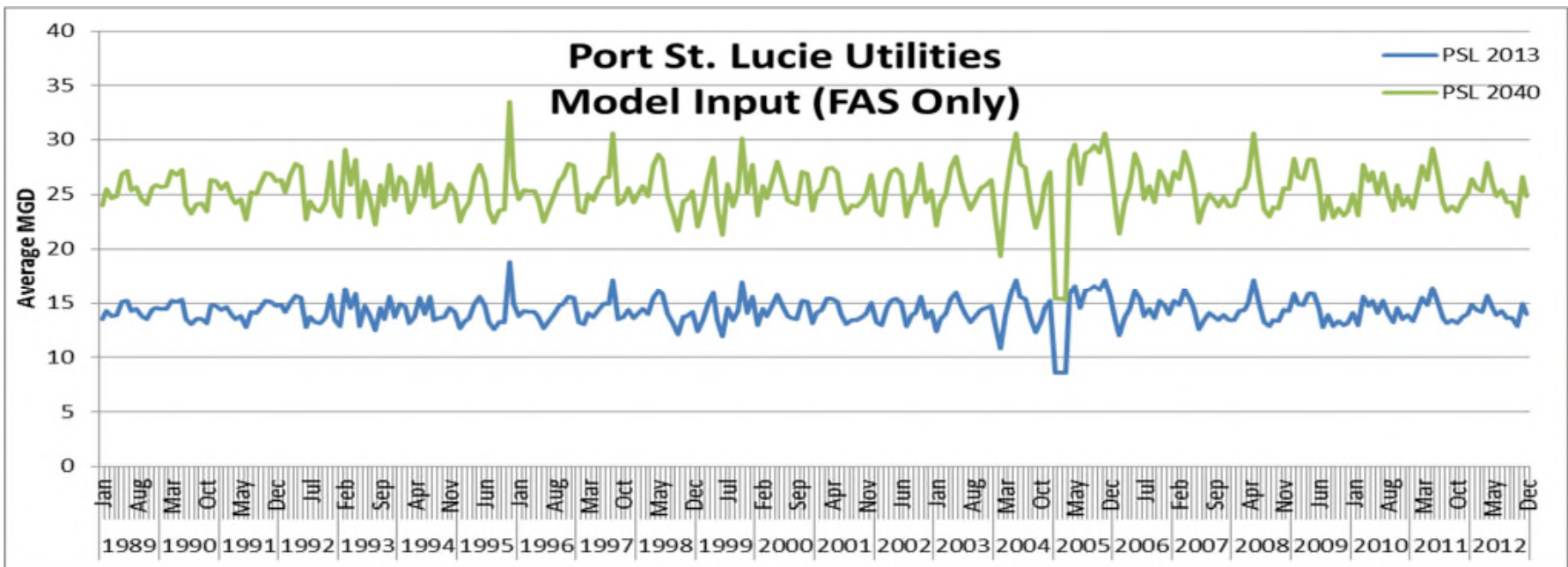
**Assumptions:** SAS held constant at 2.5 MGD, tracking PSL's withdrawal rate since mid-2007. The existing FAS facilities have sufficient allocation and treatment capacity although JEA has more FAS wells (12 to 6) and treatment capacity 22.5 mgd to 11.19 mgd to meet 2040 demand. Nonetheless, PSL's proposed Southwest Plant and wellfield were included in the 2040 model run. PSL current ratio is JEA (65%) and Prineville (35%) for Floridan raw water supply. For 2040, the PSL ratio was assumed to be JEA (36%), Prineville (24%), and Southwest (39%). When staff added wells for Port St. Lucie's proposed Southwest Wellfield, each well was assumed to pull 50 percent from the UFA and 50 percent from the APPZ.

### Port St. Lucie Utilities Historical Pumpage (MGM) (SAS and FAS)

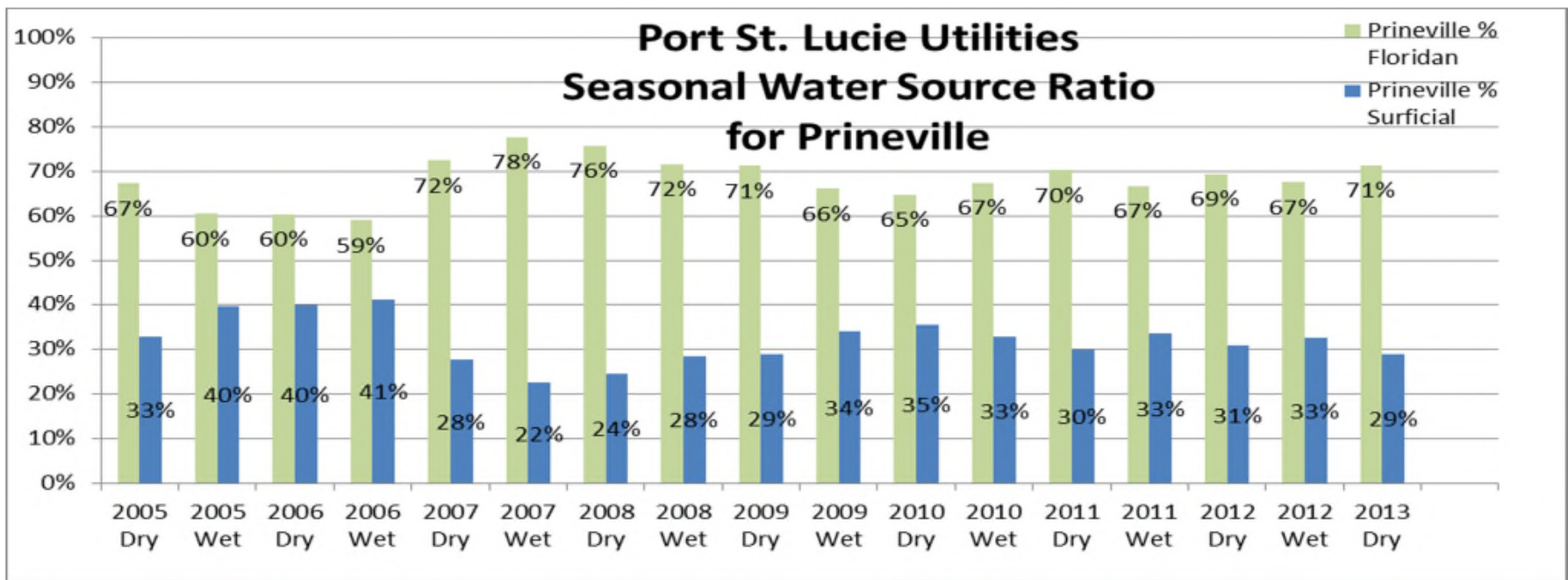
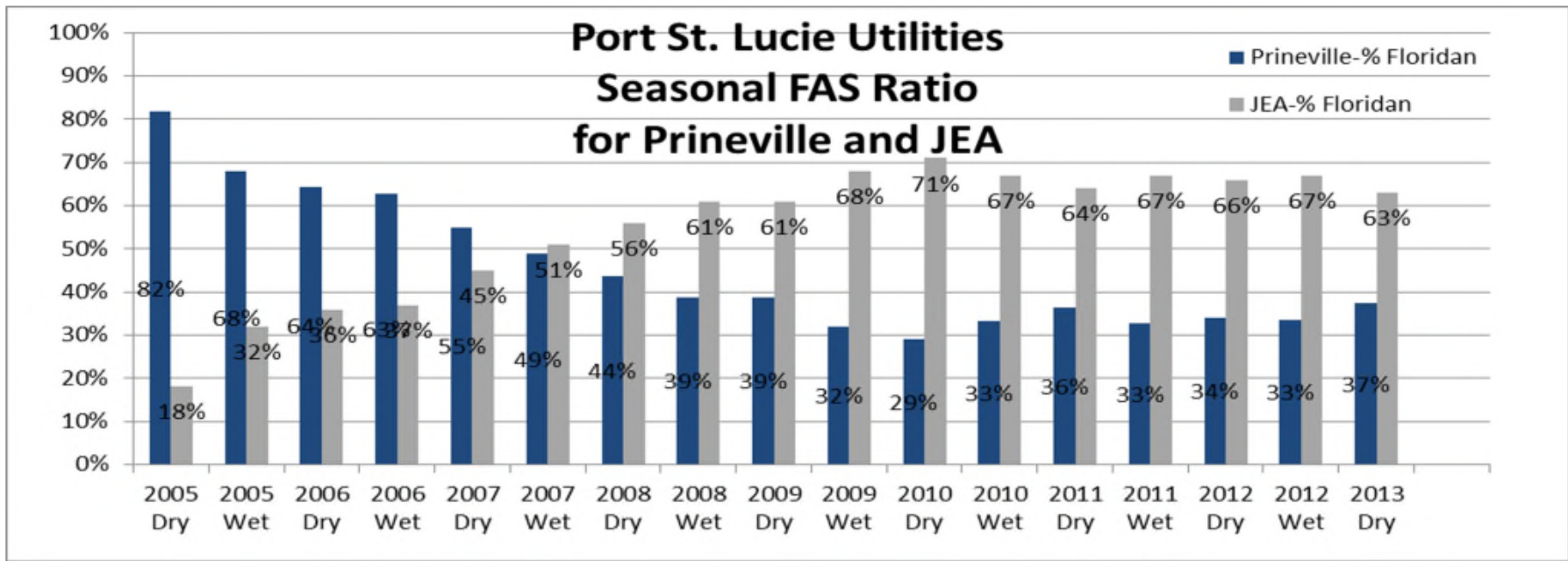


### Port St. Lucie Historical Pumpage (MGD) (SAS and FAS)









## St. Lucie County Utilities

SFWMD CUP Allocation (Raw Water)				FDEP Permitted Capacity (Finished Water)						Bulk Water	
Permit Expires	Surfical Aquifer	Floridan Aquifer	Total Allocation	2013	2013	2013 Total Capacity (MGD)	2040	2040	2040	Bulk Water Purchased 2013 (MGD)	Bulk Water Sold 2013 (MGD)
				Surficial Capacity (MGD)	Floridan Capacity (MGD)		Proposed Surficial Capacity (MGD)	Proposed Floridan Capacity (MGD)	Proposed Total Capacity (MGD)		
2028	0.17	6.65	6.82	0.29	0.00	0.29	0.80	5.00	5.80	0.92	0.00

Population		Finished Water Demand		Raw Water Demand	
2011 WSP data	2014 projections	2013 FDEP MOR data (MGD)	based on 2014 BEBR data (MGD)	(MGD)	(MGD)
2011	2040	2013	2040	2013	2040
2,038	46,001	0.11	5.21	0.13	6.40

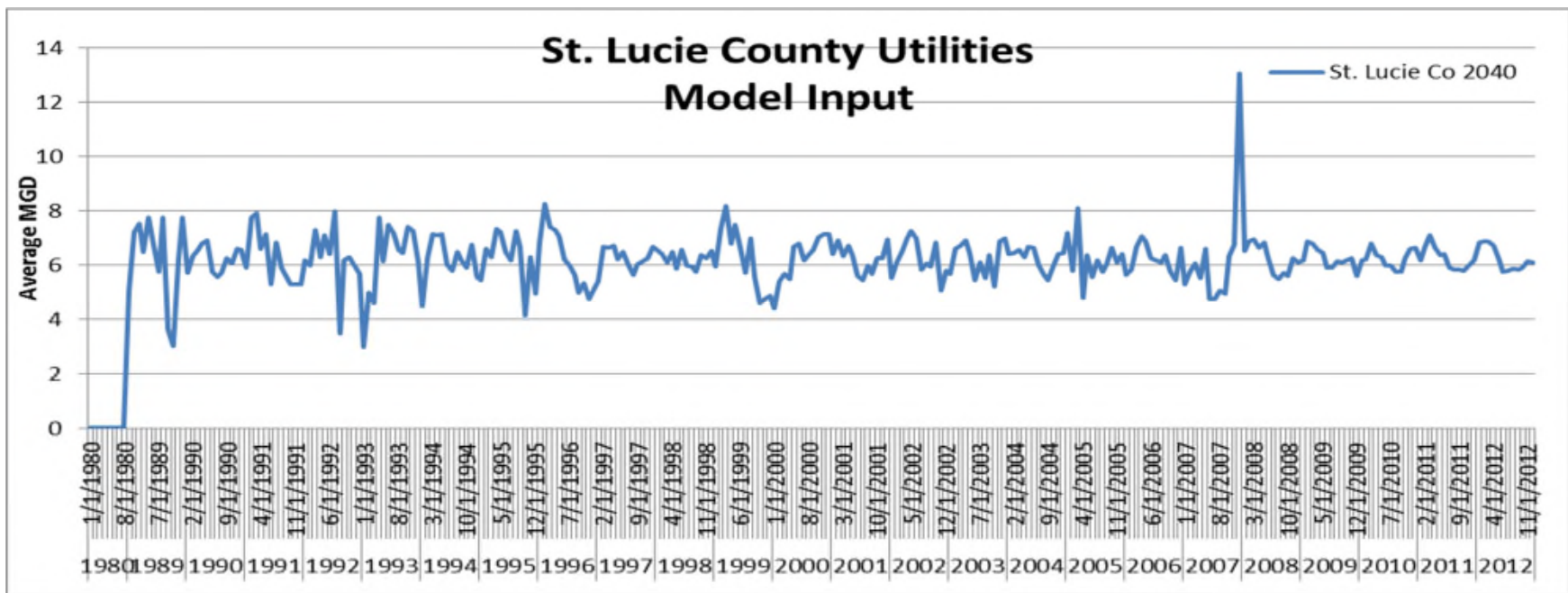
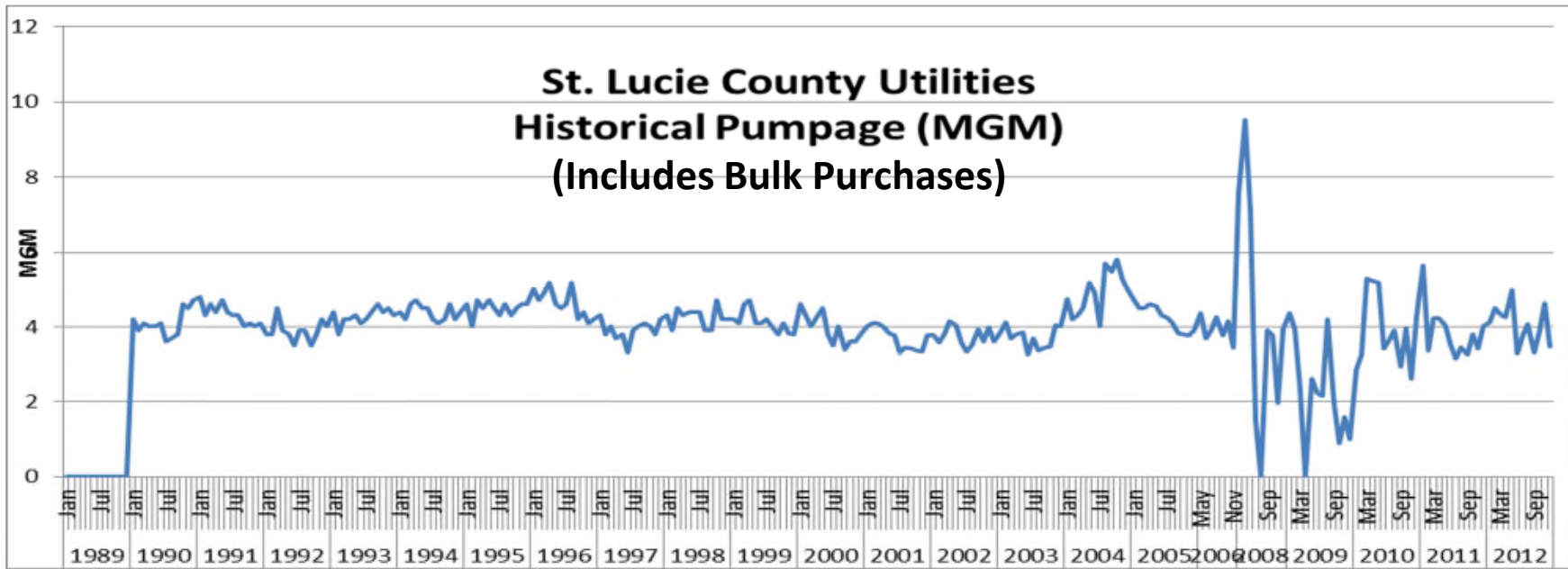
Aquifer and Well Information				
	Approx. FAS/SAS ratio <sup>a</sup>	Estimated 2040 FAS/SAS ratio <sup>b</sup>	Assumed 2040 FAS volume by wellfield (MGD)	Assumed 2040 FAS volume by wellfield (MGM)
North <sup>c</sup>	N/A	96/4	4.23	126.90
Central <sup>c</sup>	N/A	100/0	2.00	60.00

a. Ratios typically vary year to year; the approximation is based on historic data from recent years.

b. For modeling purposes only; 2040 ratios by SFWMD staff based on a series of assumptions described in the "Read Me" tab.

c. These wellfields are permitted but have not been built.

**Assumptions:** Assumes SAS allocation remains at 0.17 MGD and is maximized. Assumes 1.0 MGD of water currently purchased from FPUA is provided from the County's proposed North (Airport) wellfield and treatment plant in 2040. Because the County has identified a single well site in each wellfield, all withdrawals were made from a single grid cell in the model.



## St. Lucie West Seviles District

SFWMD CUP Allocation (Raw Water)				FDEP Permitted Capacity (Finished Water)						Bulk Water	
Permit Expires	Surfical Aquifer	Floridan Aquifer	Total Allocation	2013	2013	2013 Total Capacity (MGD)	2040	2040	2040	Bulk Water Purchased 2013 (MGD)	Bulk Water Sold 2013 (MGD)
				Surficial Capacity (MGD)	Floridan Capacity (MGD)		Proposed Surficial Capacity (MGD)	Proposed Floridan Capacity (MGD)	Proposed Total Capacity (MGD)		
2025	0.00	2.33	2.33	0.00	3.40	3.40	0.00	3.40	3.40	0.00	0.24

Population		Finished Water Demand		Raw Water Demand	
2011 WSP data	2014 projections	2013 FDEP MOR data (MGD)	Based on 2014 BEBR data (MGD)	(MGD)	(MGD)
		2013	2040		
16,755	18,000	1.53	2.06	2.04	2.79

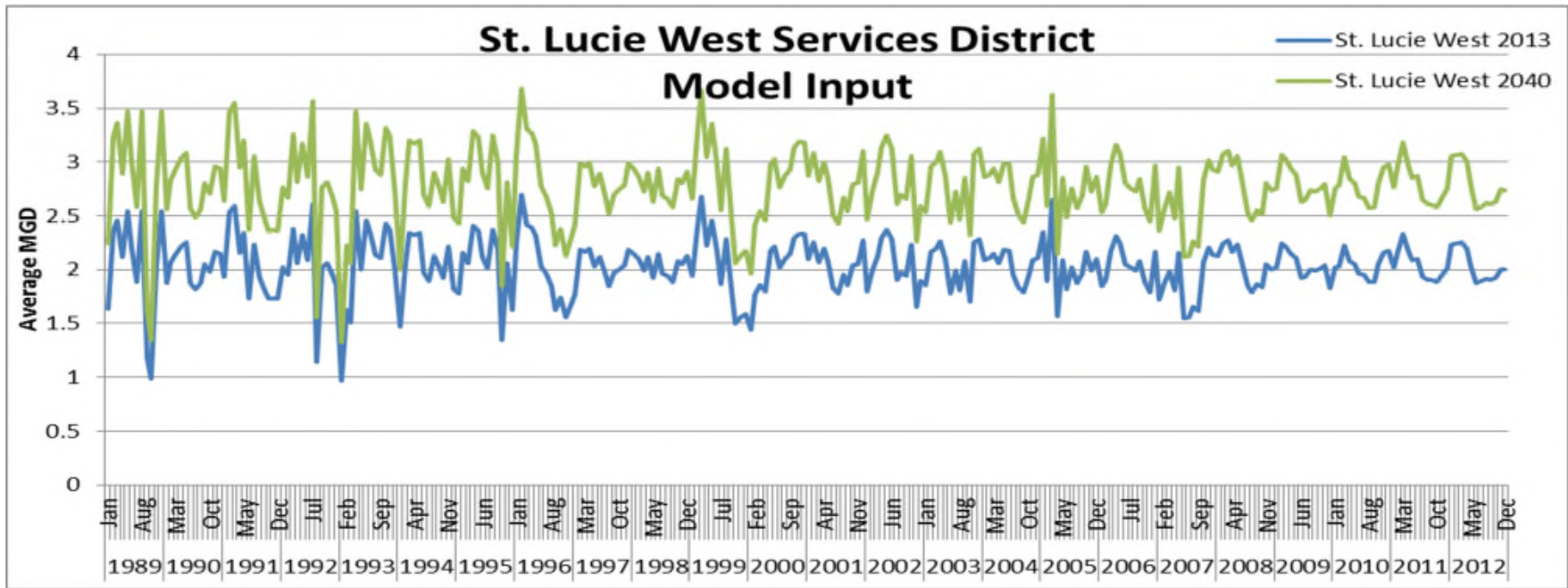
Aquifer and Well Information			
Approx. FAS/SAS ratio <sup>a</sup>	Estimated 2040 FAS/SAS ratio <sup>b</sup>	Assumed 2040 FAS volume by wellfield (MGD)	Assumed 2040 FAS volume by wellfield (MGM)
100/0	100/0	2.79	83.70

a. Ratios typically vary year to year; the approximation is based on historic data from recent years.

b. For modeling purposes only; 2040 ratios by SFWMD staff based on a series of assumptions described in the "Read Me" tab.

**Assumptions:** For planning purposes only, St. Lucie West was assumed to seek an increased permit allocation to cover the projected 2040 demand. St. Lucie West will likely reach build-out and remain within the existing allocation.





# Martin County Utilities

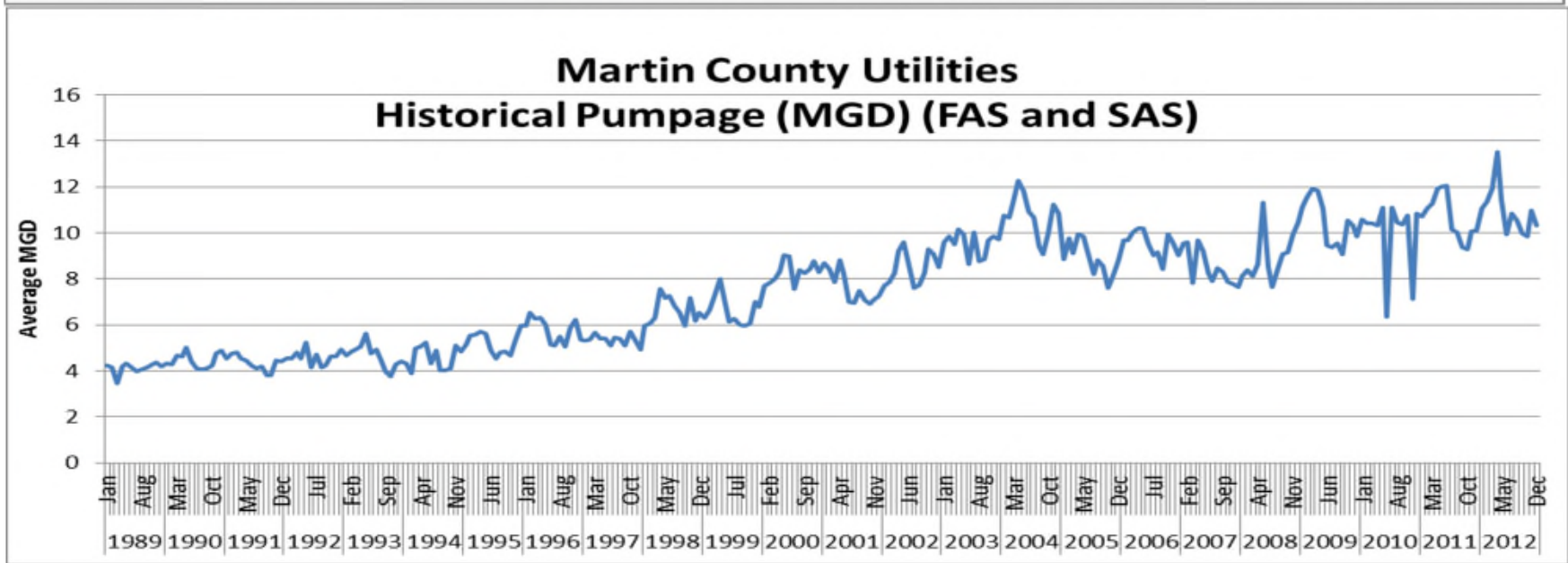
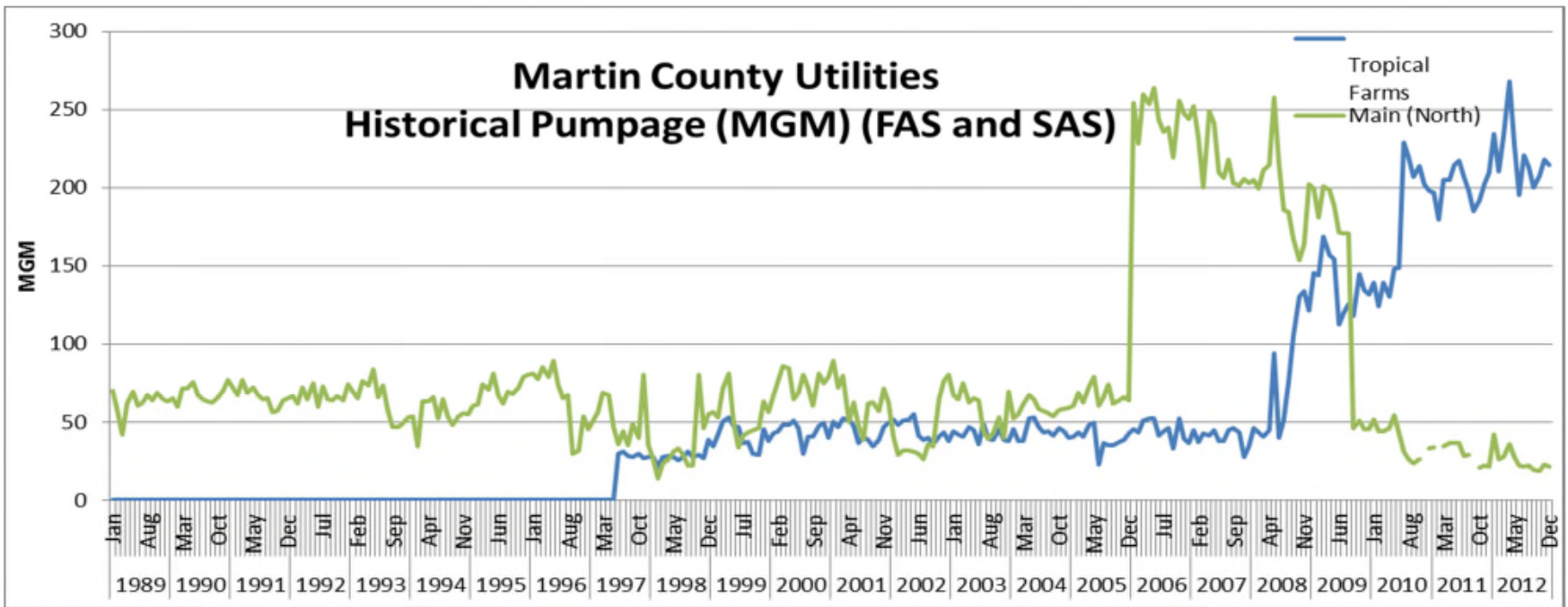
SFWMD CUP Allocation (Raw Water)				FDEP Permitted Capacity (Finished Water)						Bulk Water	
Permit Expires	Surfical Aquifer	Floridan Aquifer	Total Allocation	2013	2013	2013 Total Capacity (MGD)	2040	2040	2040	Bulk Water Purchased 2013 (MGD)	Bulk Water Sold 2013 (MGD)
				Surficial Capacity (MGD)	Floridan Capacity (MGD)		Proposed Surficial Capacity (MGD)	Proposed Floridan Capacity (MGD)	Proposed Total Capacity (MGD)		
2028	6.69	15.09	21.77	5.55	13.50	20.55	3.30	19.75	24.55	0.00	0.84

Population		Finished Water Demand		Raw Water Demand	
2011 WSP data	2014 projections	2013 FDEP MOR data (MGD)	Based on 2014 BEBR data (MGD)	(MGD)	(MGD)
2011	2040	2013	2040	2013	2040
77,675	104,259	9.07	10.68	10.90	13.58

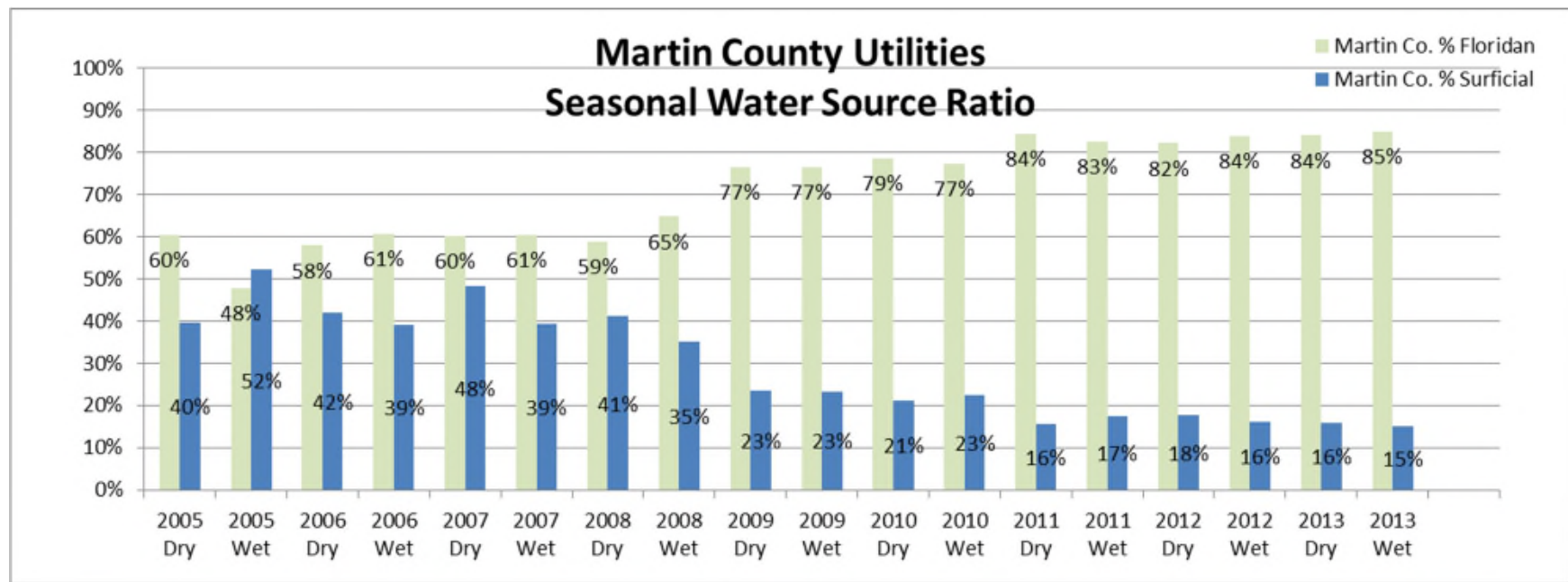
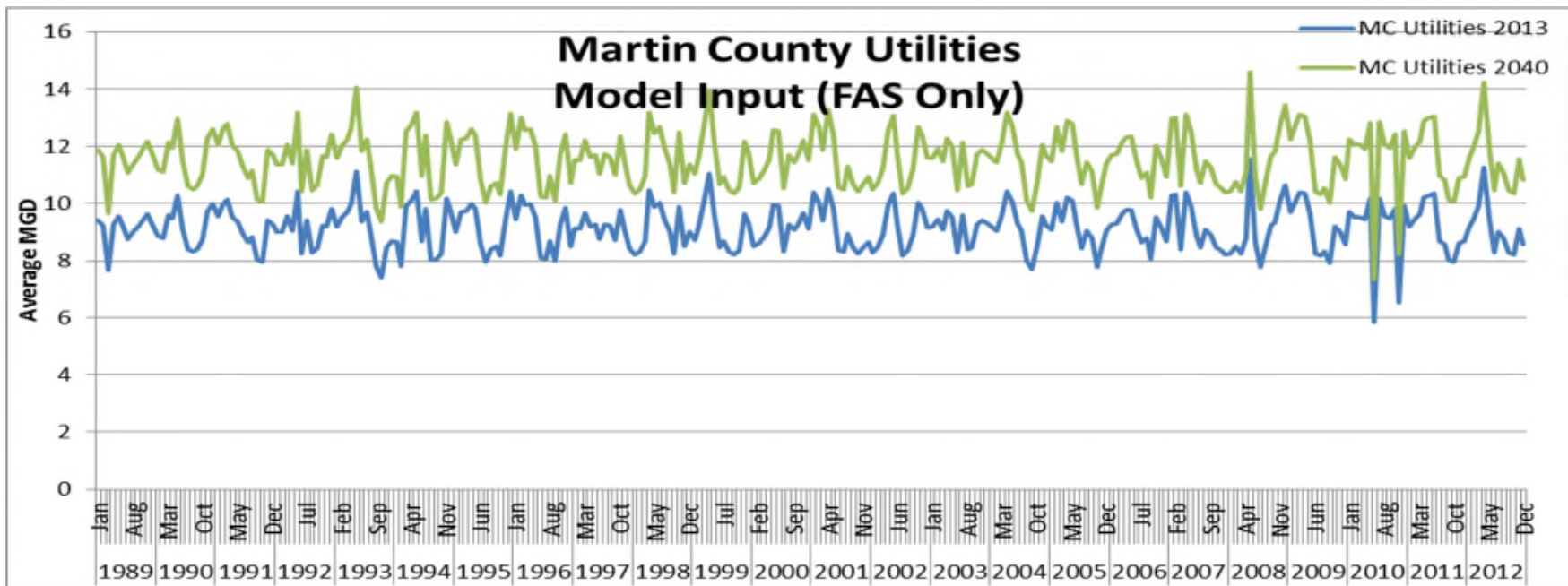
	Aquifer and Well Information			
	Approx. FAS/SAS ratio <sup>a</sup>	Estimated 2040 FAS/SAS ratio <sup>b</sup>	Assumed 2040 FAS volume by wellfield (MGD)	Assumed 2040 FAS volume by wellfield (MDM)
MCU (combined)	85/15	85/15	11.54	346.20
Tropical Farms	86/14	88/12	7.50	225.00
North Jensen	80/20	84/16	4.04	121.20

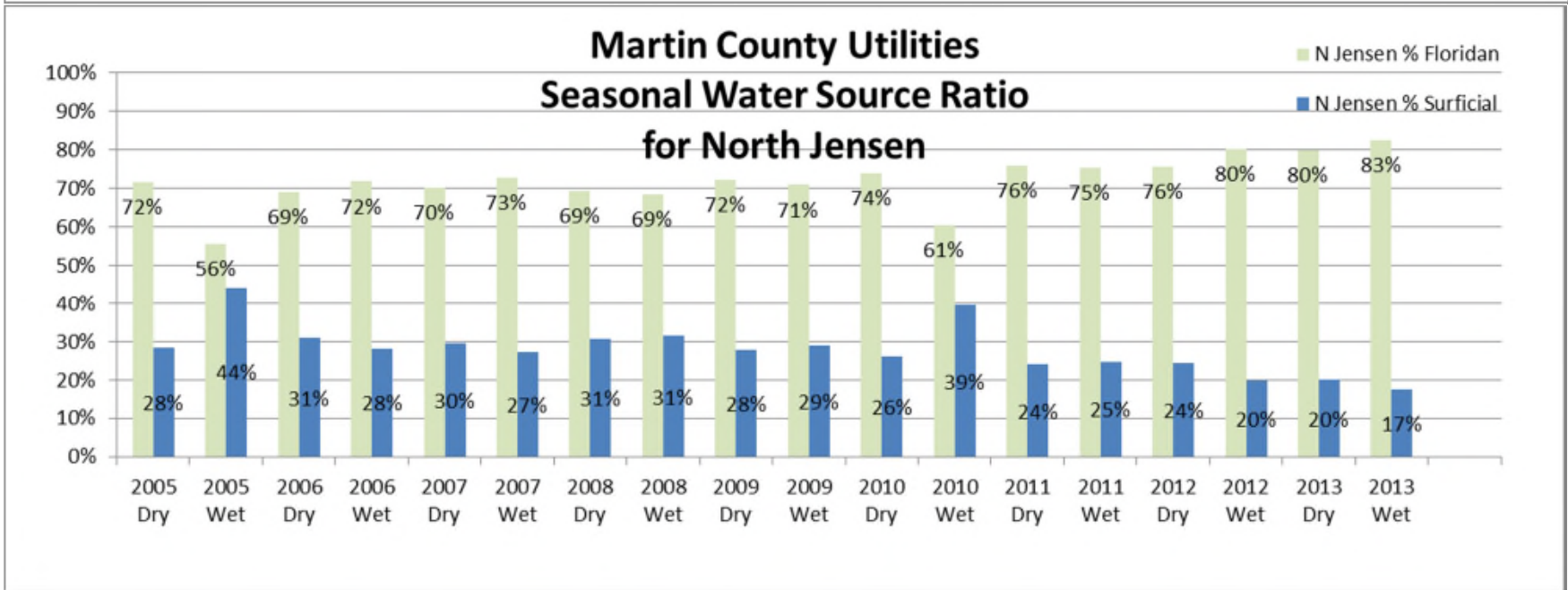
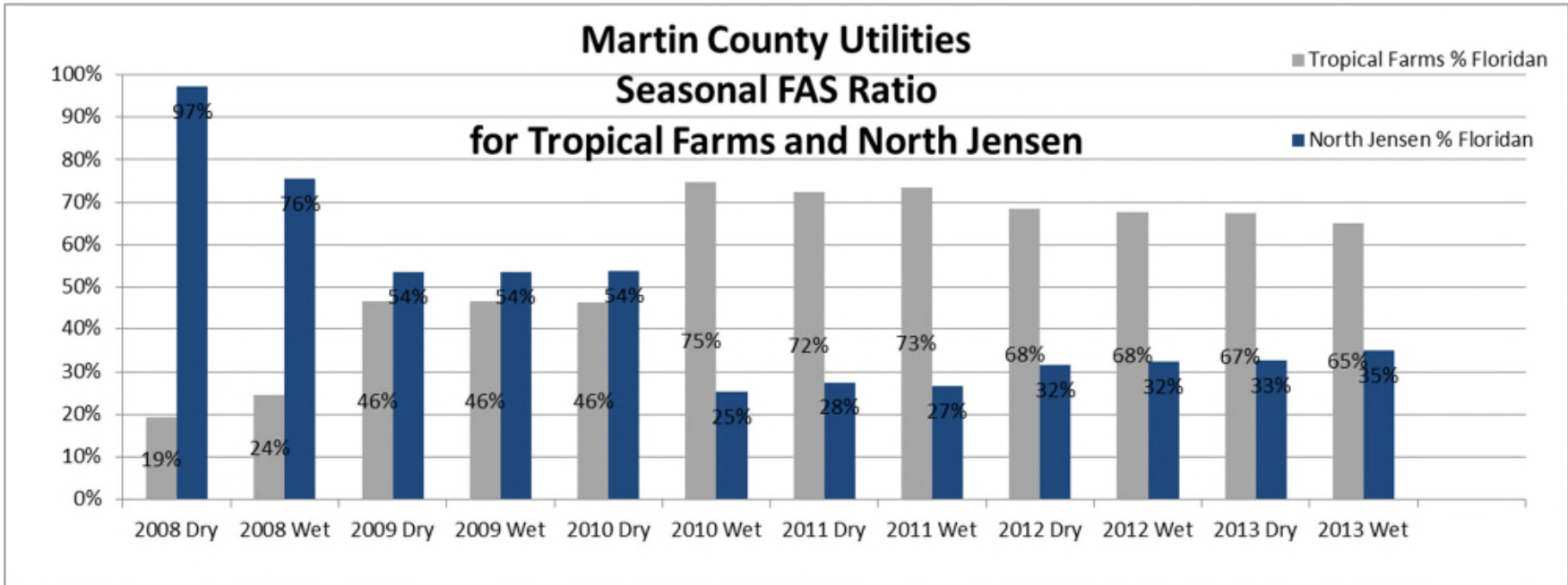
- a. Ratios typically vary year to year; the approximation is based on historic data from recent years.
- b. For modeling purposes only; 2040 ratios by SFWMD staff based on a series of assumptions described in the "Read Me" tab.

**Assumptions:** Assumed MCU would maintain overall 85/15 ratio of FAS to SAS, and stay close to the current ratio for withdrawals from the two FAS wellfields. Assumed 65% of Floridan pumpage from Tropical Farms, keeping within existing RO treatment capacity. Assumed 35% FAS withdrawals from North Jensen System.

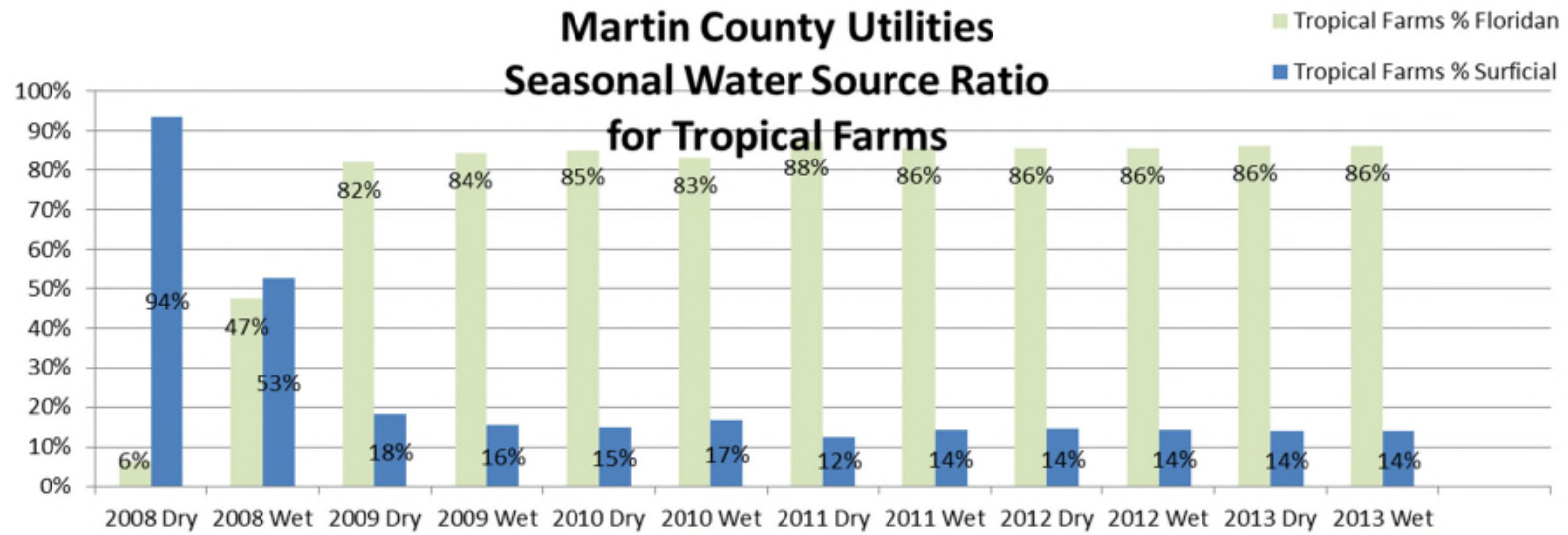








## Martin County Utilities Seasonal Water Source Ratio for Tropical Farms



## South Martin Regional Utility

SFWMD CUP Allocation (Raw Water)				FDEP Permitted Capacity (Finished Water)						Bulk Water	
Permit Expires	Surfical Aquifer	Floridan Aquifer	Total Allocation	2013	2013	2013 Total Capacity (MGD)	2040	2040	2040 Proposed Total Capacity (MGD)	Bulk Water Purchased 2013 (MGD)	Bulk Water Sold 2013 (MGD)
				Surficial Capacity (MGD)	Floridan Capacity (MGD)		Proposed	Proposed			
2032	4.83	4.76	8.64	6.14	2.00	8.14	6.14	4.20	10.34	0.00	0.00

Population		Finished Water Demand		Raw Water Demand	
2011 WSP data	2014 projections	2013 FDEP MOR data (MGD)	Based on 2014 BEBR data (MGD)	(MGD)	(MGD)
2011	2040	2013	2040	2013	2040
23,372	35,982	3.21	5.73	4.02	7.13

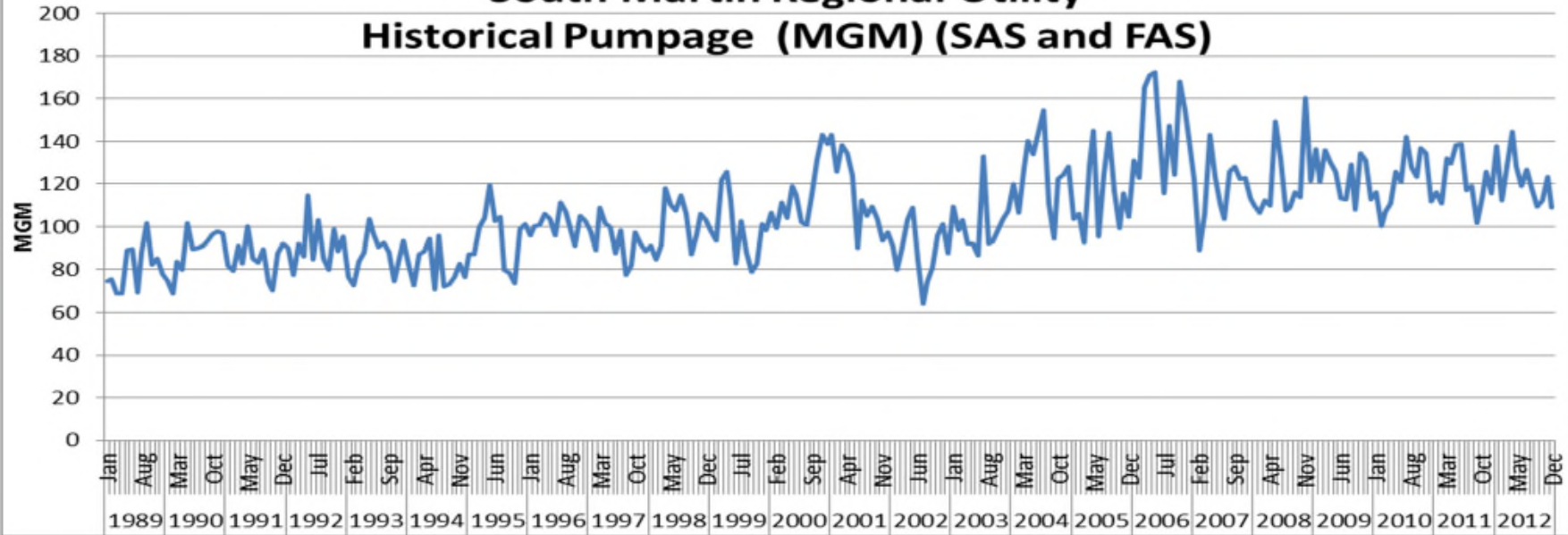
Aquifer and Well Information			
Approx. FAS/SAS ratio <sup>a</sup>	Estimated 2040 FAS/SAS ratio <sup>b</sup>	Assumed	Assumed
		2040 FAS volume by wellfield (MGD)	2040 FAS volume by wellfield (MGM)
25/75	35/65	2.50	75.00

a. Ratios typically vary year to year; the approximation is based on historic data from recent years.

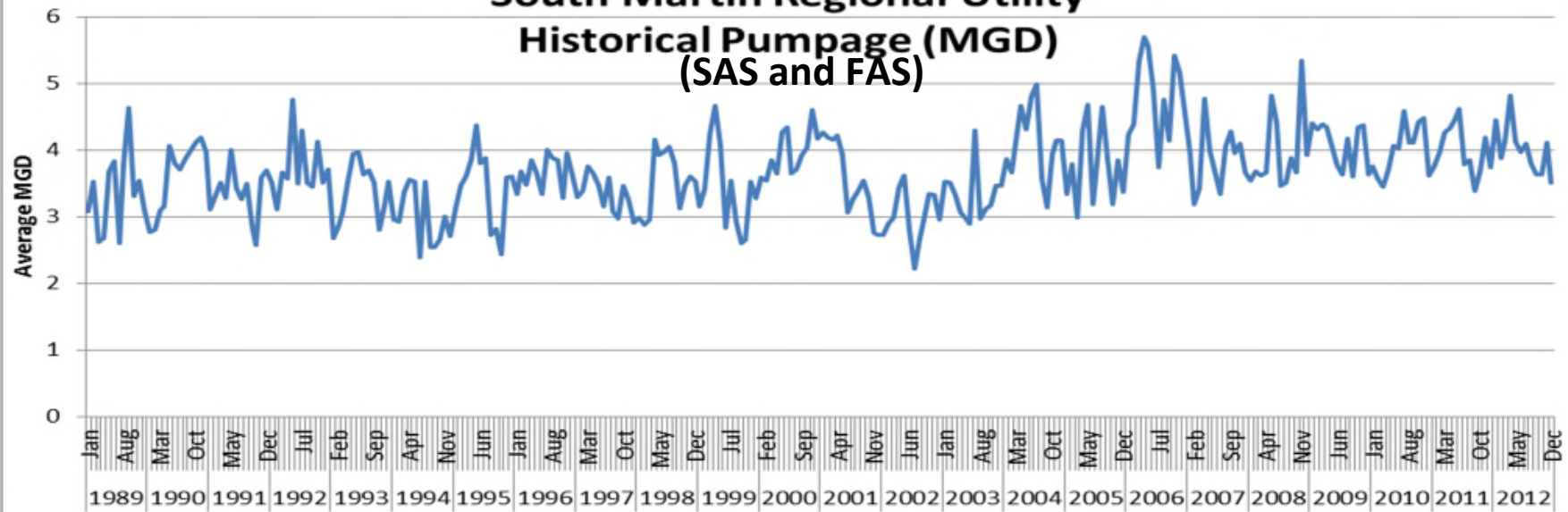
b. For modeling purposes only; 2040 ratios by SFWMD staff based on a series of assumptions described in the "Read Me" tab.

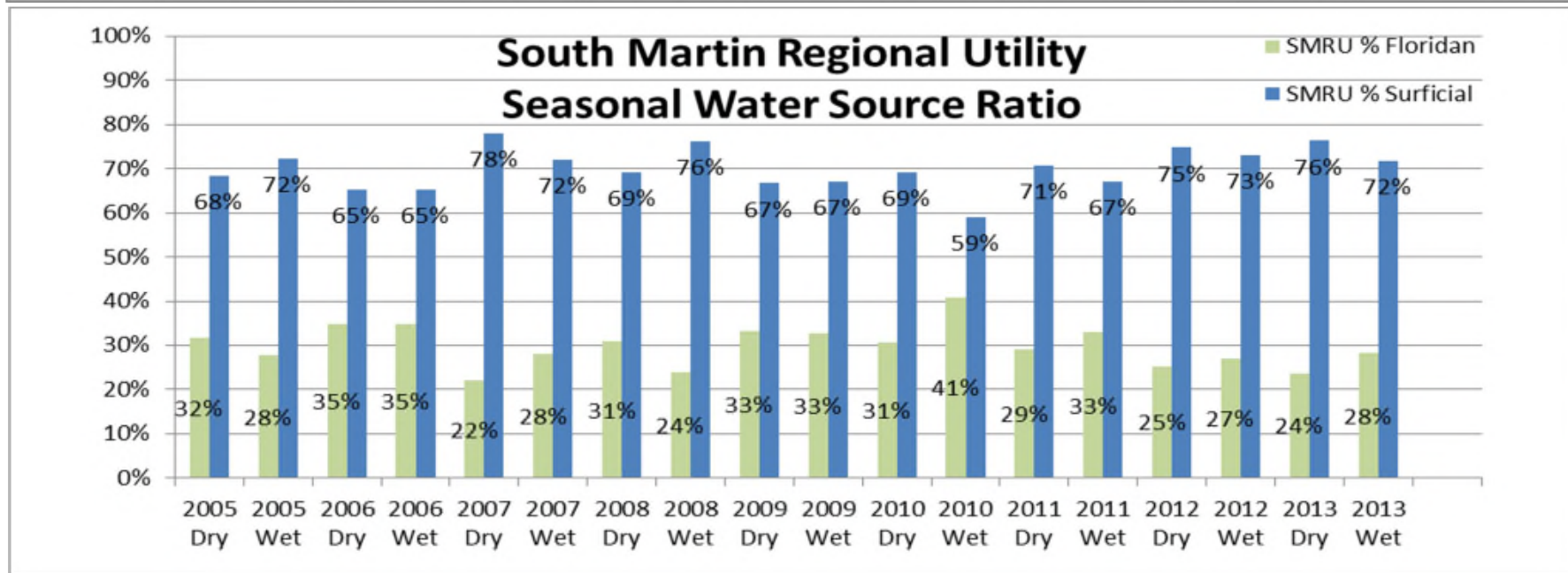
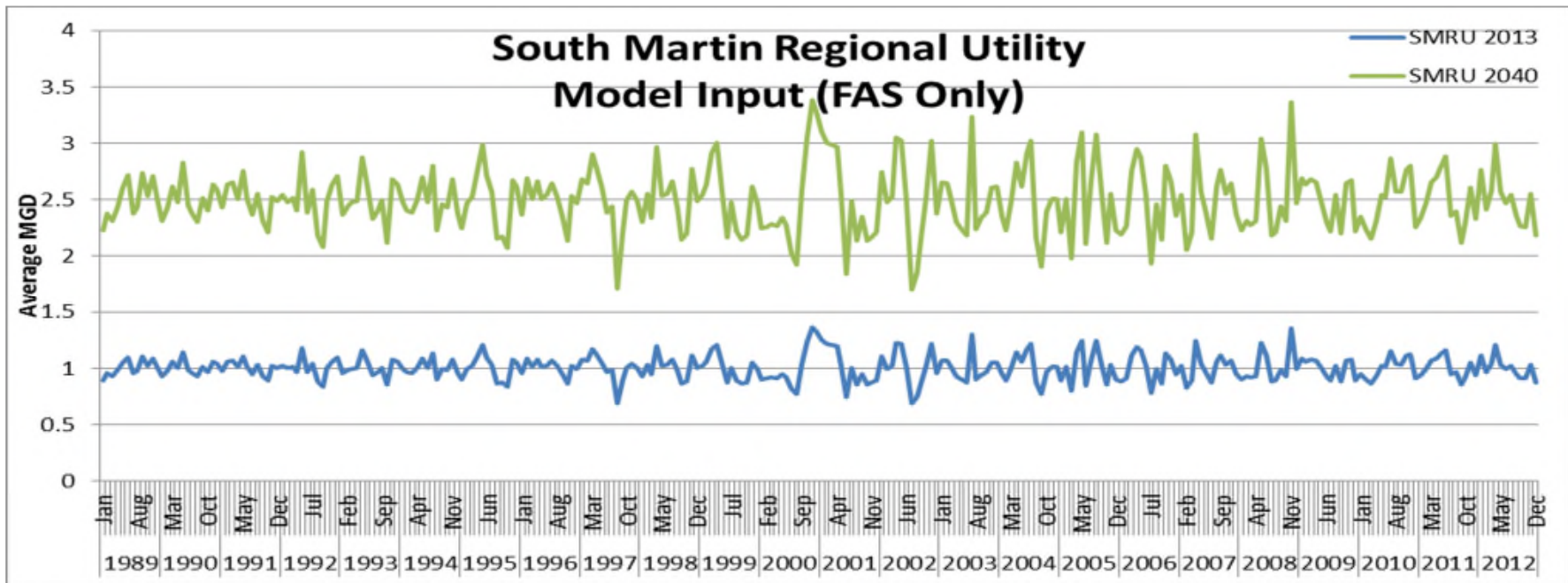
**Assumptions:** Applied SMRU's full SAS allocation to avoid exceedance of current permitted SAS source limit, the result was a higher percentage of FAS use in 2040.

### South Martin Regional Utility Historical Pumpage (MGM) (SAS and FAS)



### South Martin Regional Utility Historical Pumpage (MGD) (SAS and FAS)





## Town of Jupiter

SFWMD CUP Allocation (Raw Water)				FDEP Permitted Capacity (Finished Water)						Bulk Water	
Permit Expires	Surfical Aquifer	Floridan Aquifer	Total Allocation	2013	2013	2013 Total Capacity (MGD)	2040	2040	2040	Bulk Water Purchased 2013 (MGD)	Bulk Water Sold 2013 (MGD)
				Surficial Capacity (MGD)	Floridan Capacity (MGD)		Proposed Surficial Capacity (MGD)	Proposed Floridan Capacity (MGD)	Proposed Total Capacity (MGD)		
2030	18.80	11.71	24.41	16.30	13.70	30.00	16.30	13.70	30.00	0.00	0.00

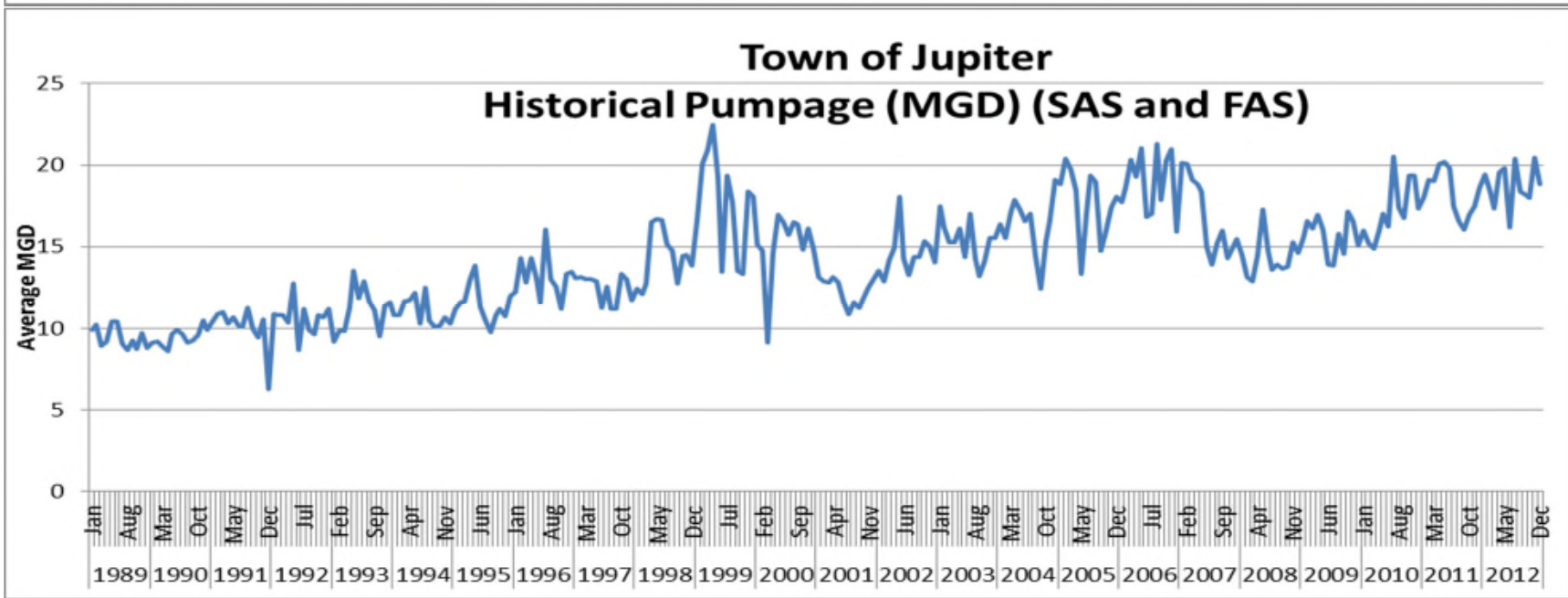
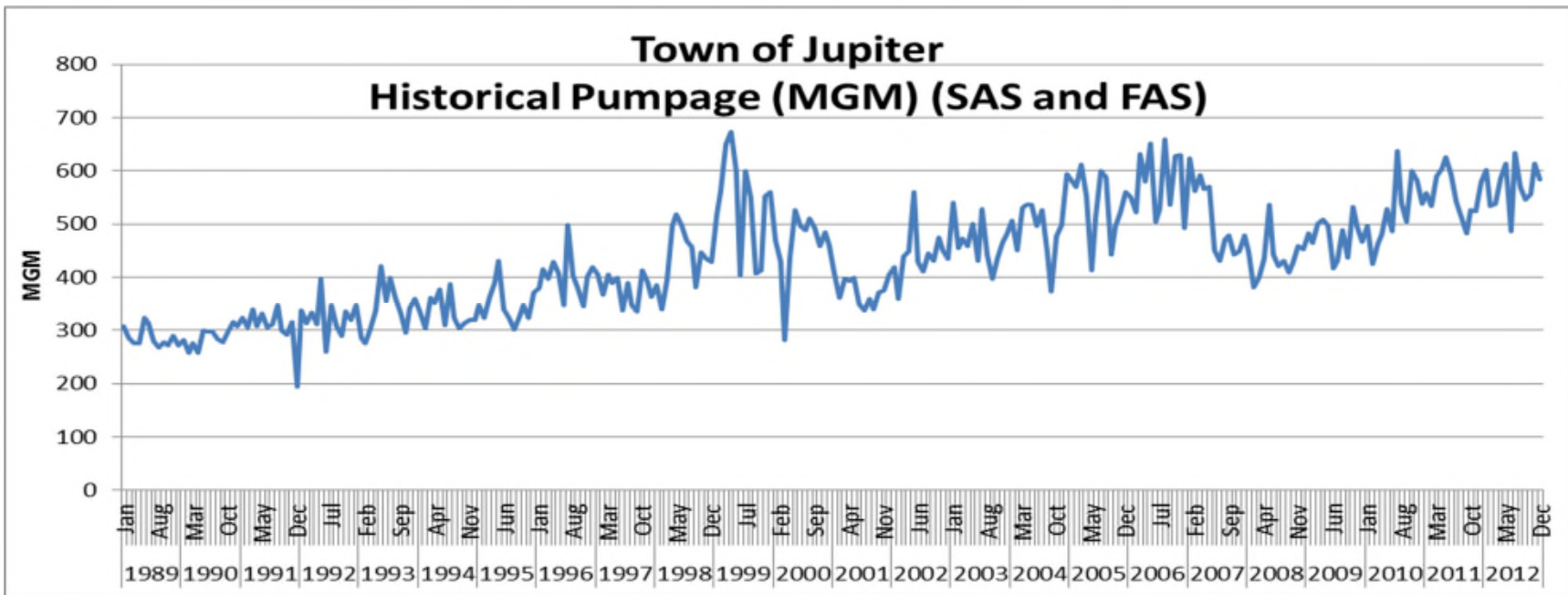
Population		Finished Water Demand		Raw Water Demand	
2013 LEC WSP data	2014 projections	2013 FDEP MOR data (MGD)	Based on 2014 BEBR data (MGD)	(MGD)	(MGD)
2011	2040	2013	2040	2013	2040
72,056	91,850	15.06	15.36	18.54	22.80

Aquifer and Well Information			
Approx. FAS/SAS ratio <sup>a</sup>	Estimated 2040 FAS/SAS ratio <sup>b</sup>	Assumed 2040 FAS volume by wellfield (MGD)	Assumed 2040 FAS volume by wellfield (MGM)
		53/47	50/50

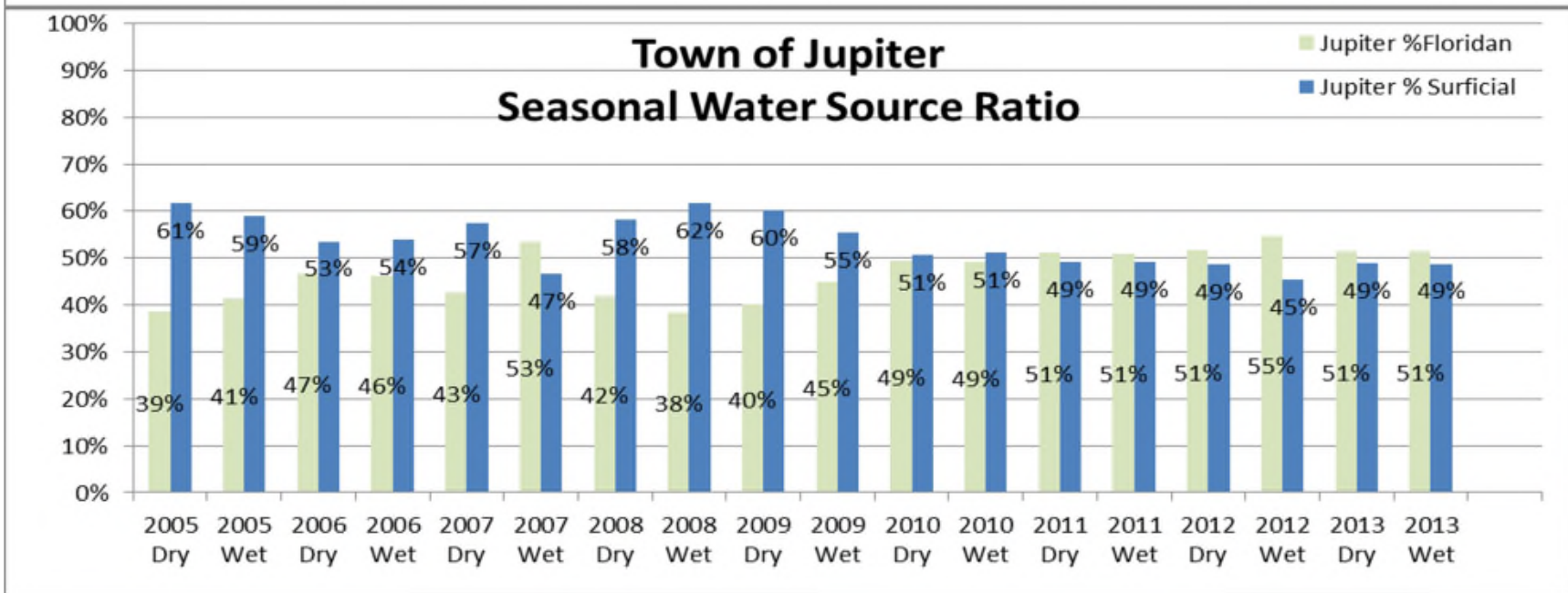
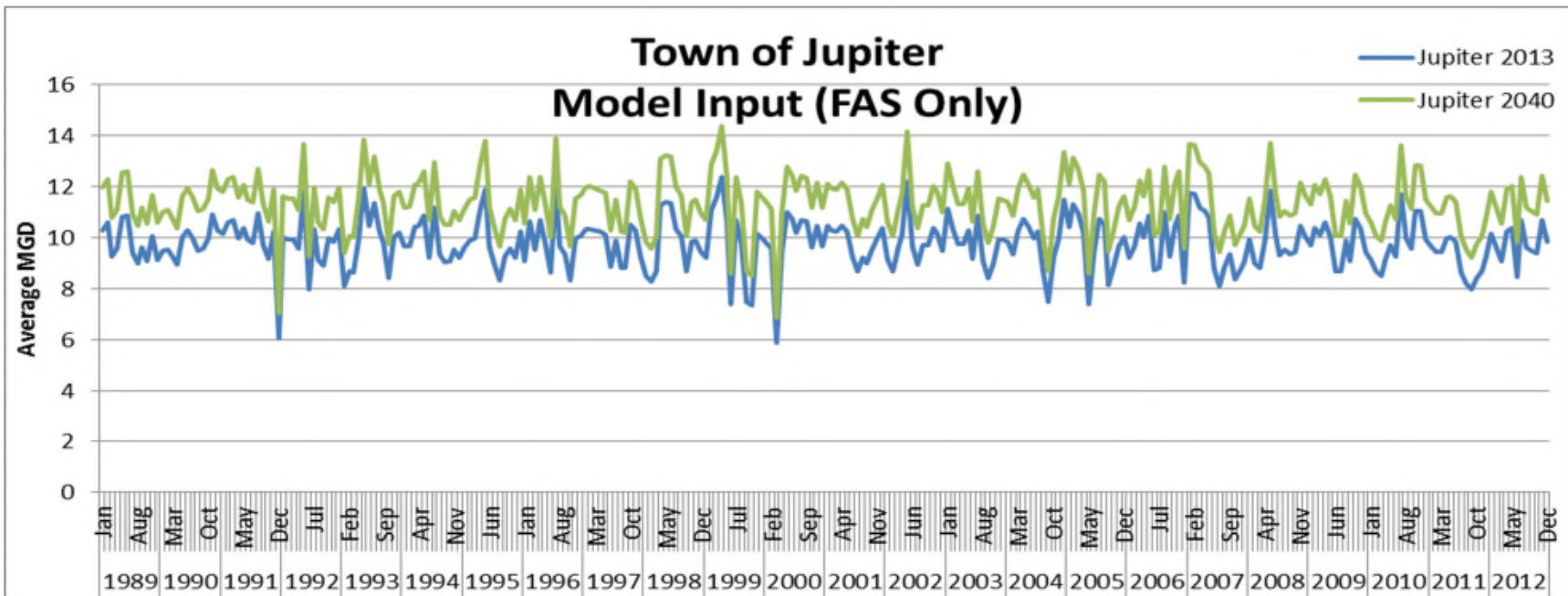
a. Ratios typically vary year to year; the approximation is based on historic data from recent years.

b. For modeling purposes only; 2040 ratios by SFWMD staff based on a series of assumptions described in the "Read Me" tab.

**Assumptions:** Applied Jupiter's full SAS allocation to avoid CUP source limits exceedance.







## Seacoast Utility Authority

SFWMD CUP Allocation (Raw Water)				FDEP Permitted Capacity (Finished Water)						Bulk Water	
Permit Expires	Surfical Aquifer	Floridan Aquifer	Total Allocation	2013	2013	2013 Total Capacity (MGD)	2040	2040	2040	Bulk Water Purchased 2013 (MGD)	Bulk Water Sold 2013 (MGD)
				Surficial Capacity (MGD)	Floridan Capacity (MGD)		Proposed Surficial Capacity (MGD)	Proposed Floridan Capacity (MGD)	Proposed Total Capacity (MGD)		
2032	22.30	8.9	26.92	26.00	3.00	29.00	26.00	3.00	29.00	0.00	0.00

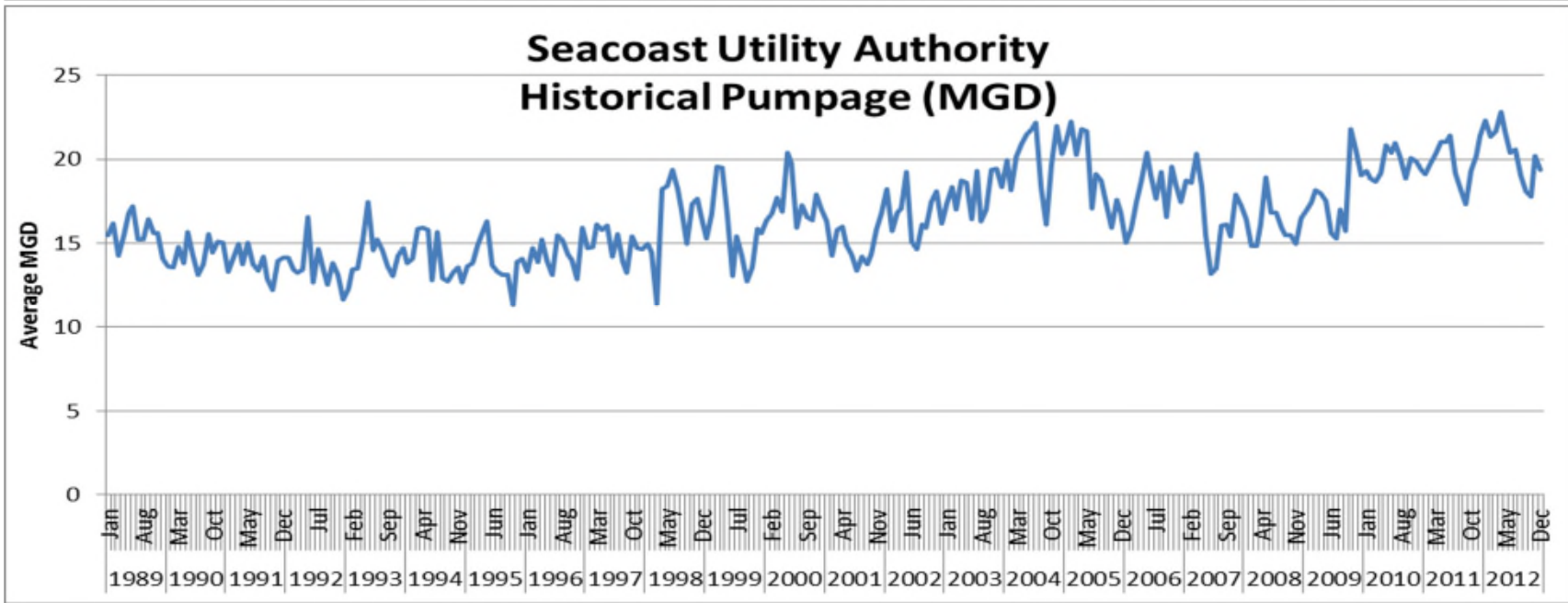
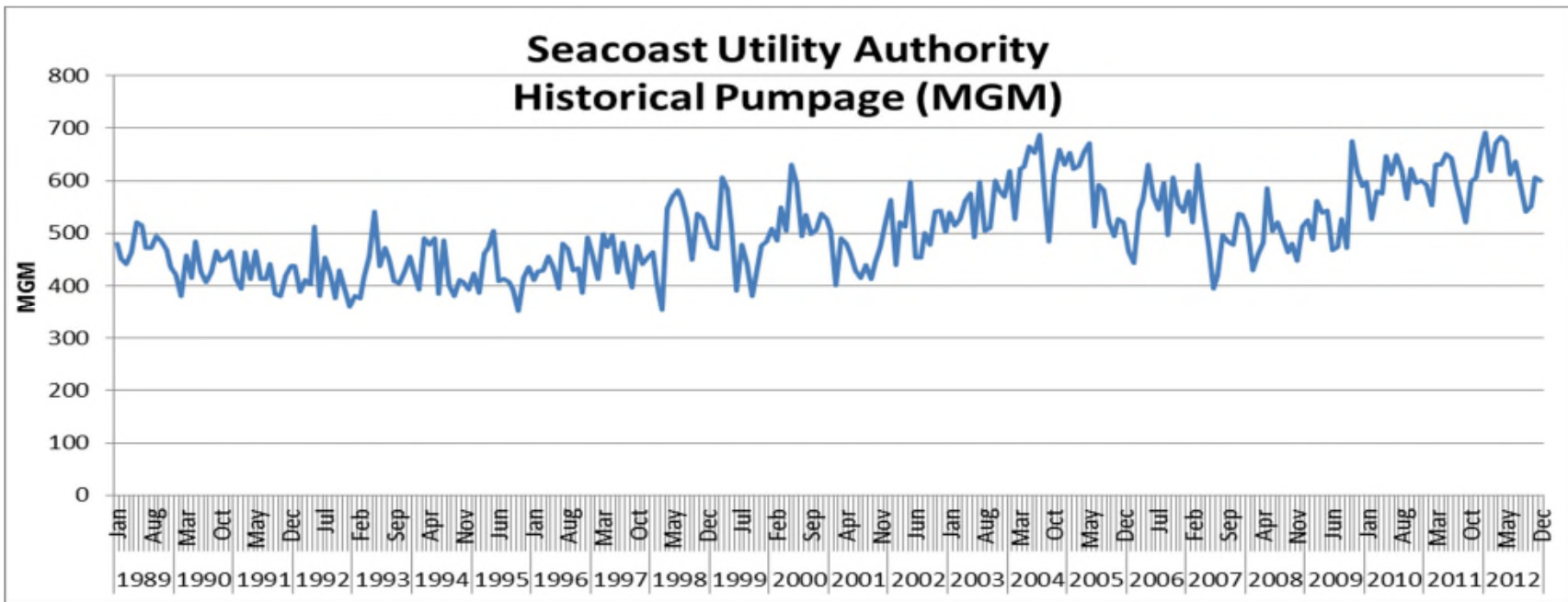
Population		Finished Water Demand 2013 FDEP Based on MOR data		Raw Water Demand	
2013 LEC WSP data	2014 projections	2013 (MGD)	2014 BEBR data (MGD)	(MGD)	(MGD)
2011	2040	2013	2040	2013	2040
90,845	115,800	16.15	20.38	19.13	22.57

Aquifer and Well Information			
Approx. FAS/SAS ratio <sup>a</sup>	Estimated 2040 FAS/SAS ratio <sup>b</sup>	Assumed 2040 FAS	Assumed 2040 FAS
		volume by wellfield (MGD)	volume by wellfield (MGM)
0/100	09/91	2.01	60.30

a. Ratios typically vary year to year; the approximation is based on historic data from recent years.

b. For modeling purposes only; 2040 ratios by SFWMD staff based on a series of assumptions described in the "Read Me" tab.

**Assumptions:** Seacoast had not fully activated its FAS wellfield and treatment system when the demand projections for this modeling exercise were developed. Without FAS operating history, including FAS/SAS blending, staff assumed that Seacoast would maximize its use of the SAS.





# Village of Tequesta

SFWMD CUP Allocation (Raw Water)				FDEP Permitted Capacity (Finished Water)						Bulk Water	
Permit Expires	Surfical Aquifer	Floridan Aquifer	Total Allocation	2013	2013	2013 Total Capacity (MGD)	2040	2040	2040	Bulk Water Purchased 2013 (MGD)	Bulk Water Sold 2013 (MGD)
				Surficial Capacity (MGD)	Floridan Capacity (MGD)		Proposed Surficial Capacity (MGD)	Proposed Floridan Capacity (MGD)	Proposed Total Capacity (MGD)		
2031	1.10	3.43	4.37	2.73	3.60	6.33	2.73	3.36	6.33	0.00	0.00

Population		Finished Water Demand		Raw Water Demand	
2013 LEC WSP data	2014 projections	2013 FDEP MOR data (MGD)	Based on 2014 BEBR data (MGD)	(MGD)	(MGD)
2011	2040	2013	2040	2013	2040
11,779	15,015	2.48	2.65	2.86	3.29

Aquifer and Well Information			
Approx. FAS/SAS ratio <sup>a</sup>	Estimated 2040 FAS/SAS ratio <sup>b</sup>	Assumed 2040 FAS volume by wellfield (MGD)	Assumed 2040 FAS volume by wellfield (MGM)
50/50	67/33	2.19	65.70

a. Ratios typically vary year to year; the approximation is based on historic data from recent years.

b. For modeling purposes only; 2040 ratios by SFWMD staff based on a series of assumptions described in the "Read Me" tab.



