

UPPER KISSIMMEE SUBWATERSHED TECHNICAL SHEET

Subwatershed: Upper Kissimmee		
Basins:	Flow Issues¹: NO	Water Quality Issues²: MAYBE

Monitored Structure(s): S65

Inflow loads: None

Acreage: 1,028,421

Percentage of Subwatershed Acreage: N/A

Percentage of Lake Okeechobee Watershed: 29.8%

¹Flow Issues:

- The Flows appeared to stay consistent as there was no significant difference between the pre and post protection-plan periods and there were no significant trends for flow within any of the periods. While there was a large change in sen slope between the pre and post-protection plan period for flow, it was not statistically significant and seems small in magnitude (1142.84 ac-ft/yr) when compared to the flow of 835,000 ac-ft/yr.

- The Headwaters Revitalization regulation schedule for lakes Kissimmee, Cypress and Hatchineha is planned to be implemented in late 2020. It is expected that changes to the operations at S-65 based on the revised schedule will reduce extremely high discharges and extended periods of zero flow. This is likely to improve water quality.

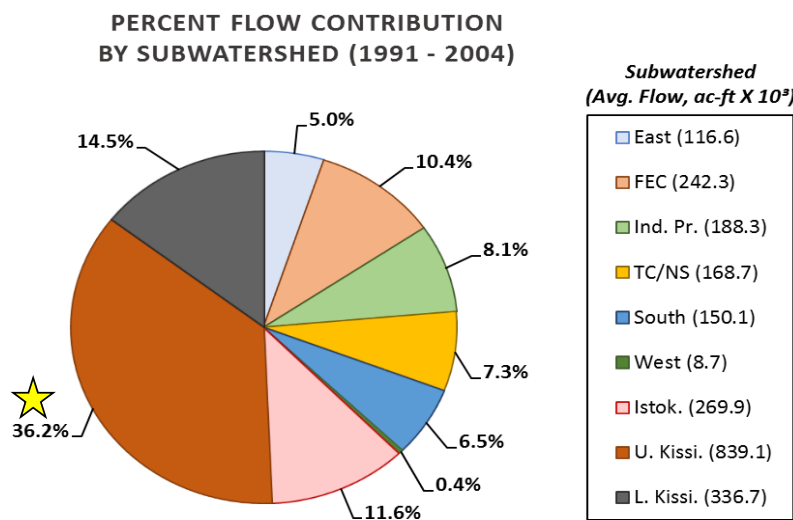
²Water Quality Issues:

- There was a statistically significant increasing trend in total phosphorus (TP) flow-weighted mean concentrations (FWMC) during the pre-protection plan period but not in the post-protection plan period. The average TP FWMC in the post-protection plan period is relatively low 89 µg/L, as is the unit area load at 0.19 lbs/acre/yr. The large area is influential to its load contribution.

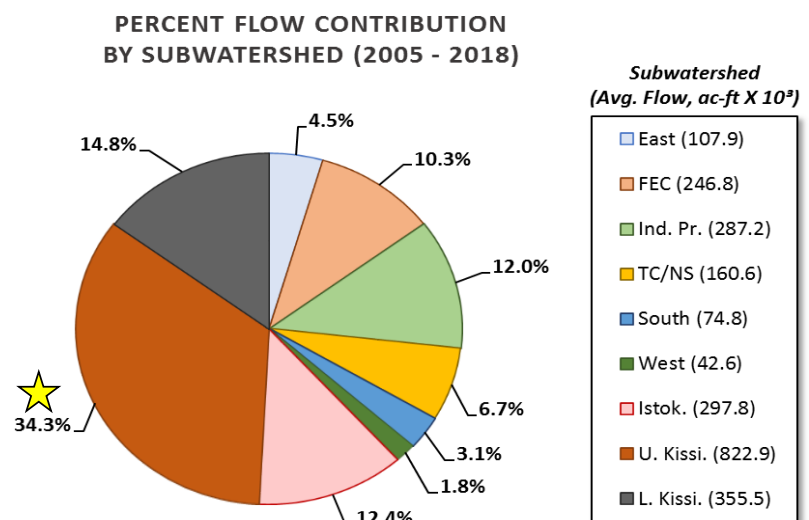
- The group recommends analyzing water quality data collected within the sub-watershed to determine if there are tributaries that have very high TP concentrations. It is also recommended to investigate TP discharged from a large parcel of land SFWMD recently acquired that is immediately upstream of the S-65 structure to see if it a significant source of TP load.

- Lake Kissimmee is immediately upstream of the discharge monitoring location where data are collected for load calculations and may influence results. May need to verify that data represents basin runoff.

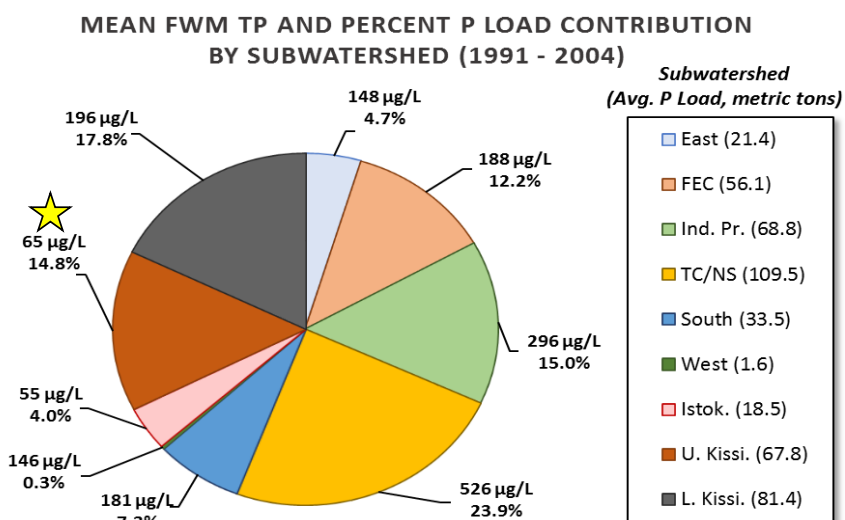
Pre-Protection Plan Flows



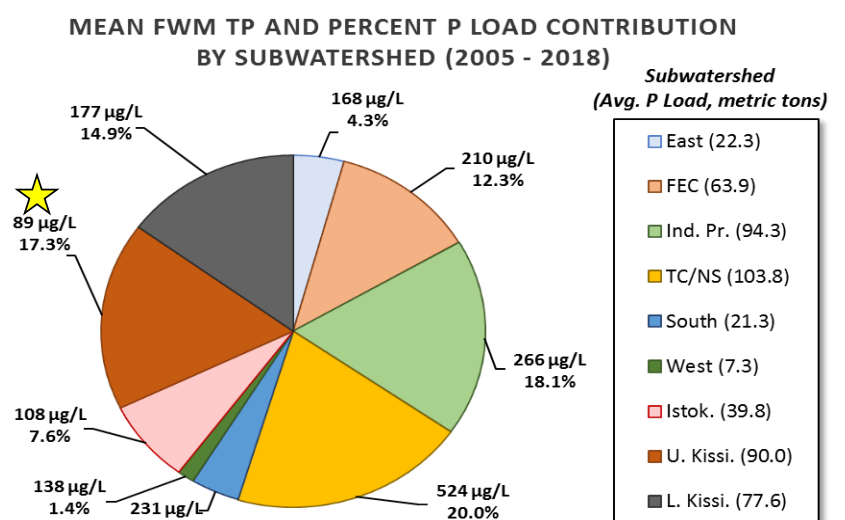
Post-Protection Plan Flows



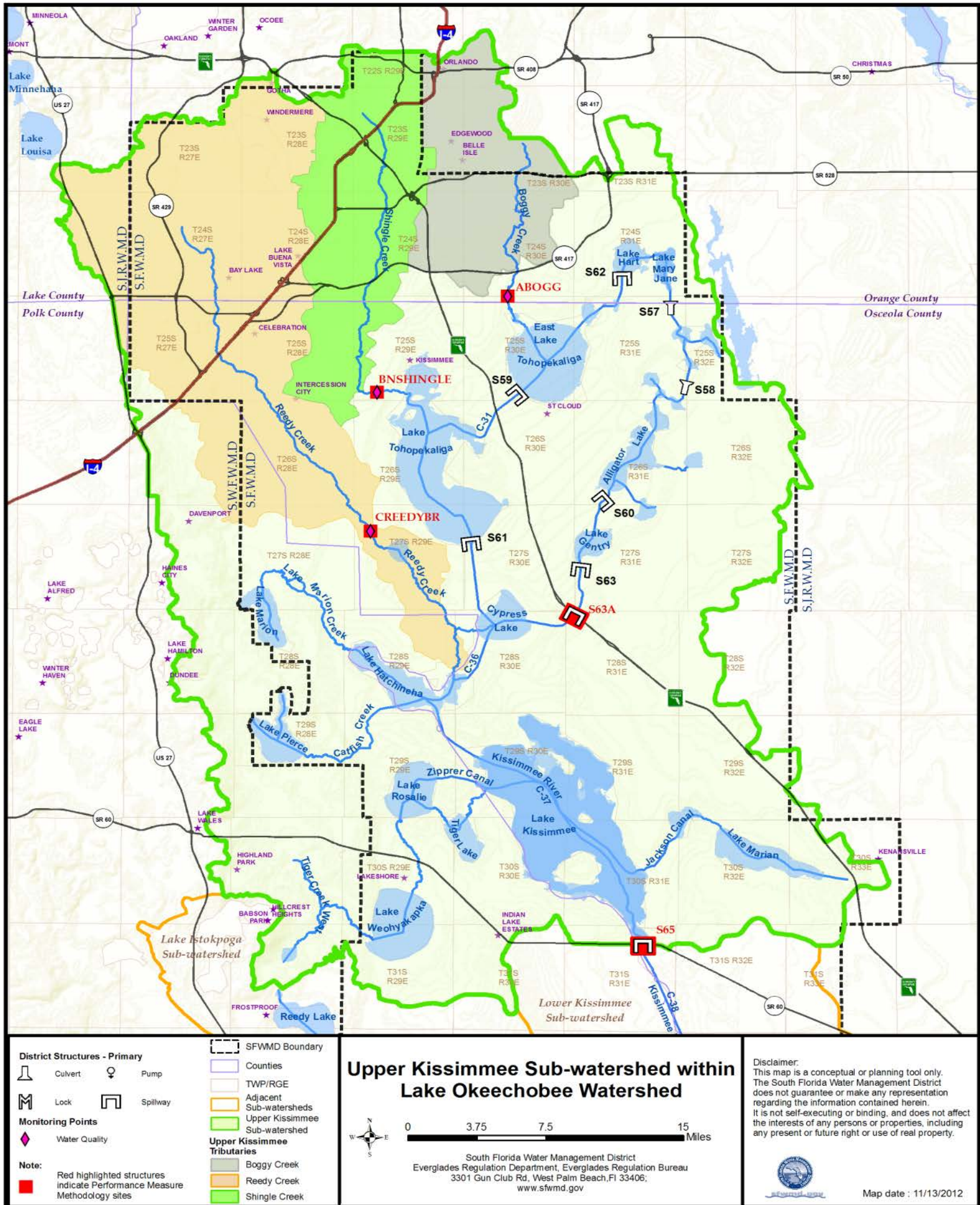
Pre-Protection Plan Loads



Post-Protection Plan Loads



UPPER KISSIMMEE SUBWATERSHED - MAP



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UPPER KISSIMMEE SUBWATERSHED - STATISTICS

Summary Statistics				
	Period of Record	Pre-Protection Plan	Post-Protection Plan	
	WY1991-WY2018	WY1991-WY2004	WY2005-WY2018	
Averages				
Avg. Flow (acft/yr)	831,000	839,081	822,919	
Avg. Load (mt/yr)	78.87	67.77	89.97	
FWMC (ug/L)	77	65	89	
Avg. UAL (lbs/acre/yr)	0.17	0.15	0.19	
Medians				Mann-Whitney Results p-values³
Median Flow (acft/yr)	835,054	832,184	835,054	0.8904
Median Load (mt/yr)	60.23	43.84	72.51	0.2148
Median FWMC (ug/L)	70	63	86	0.0274
Median UAL (lbs/acre/yr)	0.13	0.09	0.16	

Highlighted cells indicate statistical significance

³The Mann-Whitney test is a non-parametric test alternative to the two sample t-test. It is used to test the equality around the central tendency of two data sets (pre-protection plan period and post-protection plan period). A p-value of less than 0.05 indicates that a significant difference between pre-protection plan period and post-protection plan period exists. A comparison of the median values identifies which period is higher. A median is a value at the mid-point of a distribution of observed data.

Seasonal Kendall τ Results for Total Monthly Flow (ac-ft) by Sub-watershed over Three Water Year Ranges

Sub-Watershed Name	1991-2018					1991-2004					2005-2018				
	% Missing Months	Kendall's τ	Sen Slope	Intercept	p-value	% Missing Months	Kendall's τ	Sen Slope	Intercept	p-value	% Missing Months	Kendall's τ	Sen Slope	Intercept	p-value
<i>Upper Kissimmee</i>	0.0%	0.105	711.56	27643	0.251	0.0%	0.077	9.32	37852	0.594	0.0%	0.121	1142.84	28734	0.331

Seasonal Kendall τ Results for Total Monthly P Load (kg) by Sub-watershed over Three Water Year Ranges

Sub-Watershed Name	1991-2018					1991-2004					2005-2018				
	% Missing Months	Kendall's τ	Sen Slope	Intercept	p-value	% Missing Months	Kendall's τ	Sen Slope	Intercept	p-value	% Missing Months	Kendall's τ	Sen Slope	Intercept	p-value
<i>Upper Kissimmee</i>	0.0%	0.166	79.54	1862	0.078	0.0%	0.163	114.33	1934	0.271	0.0%	0.099	105.80	2682	0.439

Seasonal Kendall τ Results for Monthly FWM TP ($\mu\text{g/L}$) by Sub-watershed over Three Water Year Ranges

Sub-Watershed Name	1991-2018					1991-2004					2005-2018				
	% Missing Months	Kendall's τ	Sen Slope	Intercept	p-value	% Missing Months	Kendall's τ	Sen Slope	Intercept	p-value	% Missing Months	Kendall's τ	Sen Slope	Intercept	p-value
<i>Upper Kissimmee</i>	15.5%	0.169	1	53	0.073	27.4%	0.325	3	40	0.048	3.6%	-0.097	-1	76	0.441

Italic red font cells indicate statistical significance

Note: The Seasonal Kendall Tau analyzes data for monotonic trends (consistent upward or downward trend) and accounts for seasonality. Typically monthly data are used to identify seasons. Probability values (p-values) are derived from the tau-statistic which identifies the direction of the trend. A p-value less than 0.05 detects statistically significant trends for a period of interest. The Sen Slope provides an indication of the magnitude of the observed trend.

UPPER KISSIMMEE SUBWATERSHED - MONTHLY DATA AND SKT TRENDS

