

Pollutant Load Modeling Reporting and Assessment of Monitoring Results

Modeling provides reasonable estimates of the amount, trends and sources of pollutants to a water body.

Summary of Monitoring Data from 2016 Reporting Year

In 2016, the SIMPLE-Monthly (SIMPLE) Model was updated and run for the years 2001, 2006, 2011 and 2016, which corresponds to the last four periods when modeling was required by the NPDES MS4 permit. Modeling results were included in the Year 3 Annual Report as required. SIMPLE estimates loading from baseflow, direct runoff, irrigation, point source, atmospheric and septic systems for Nitrogen, Total Phosphorus, Fecal Coliform, Biochemical Oxygen Demand, Chemical Oxygen Demand, Total Suspended Solids, Total Dissolved Solids, Dissolved Phosphorus, Total Kjeldahl Nitrogen, Nitrite, Lead, Copper, Zinc, Cadmium, Ammonia, and Oil.

Subsequent to the Annual Report for 2016, the model was run again in 2017. It was determined that some basin boundaries could be improved. In addition, more refined delineations of drainage from coastal areas and barrier islands would provide a stronger understanding about sources of loading to the bays. Forty-nine basins or coastal or island drainage areas were used for this model run. This report provides the results and analysis of the 2017 model run.

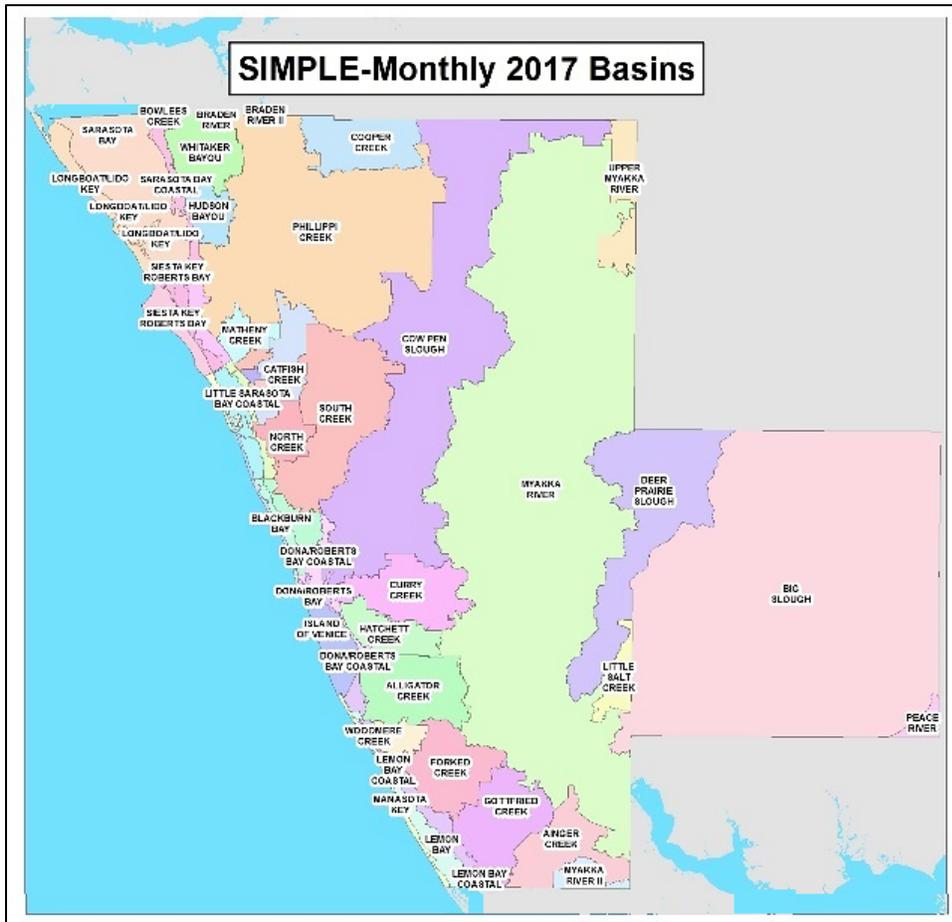
Long Term Assessment

The NPDES Permit Year 3 Annual Report asks for estimates of annual pollutant loadings and a table comparing the current calculated loadings with those from the previous two Year 3 Annual Reports. This report accomplishes that objective by comparing trends between 2006 and 2016, which includes the 2011 reporting year but does not include 2001. Results were summed for watersheds and also reported by basin or other contributing area. Atmospheric deposition of nutrients directly to the bays is not included in this report.

A Standard Rainfall Year (SRF) was used instead of actual measured rainfall. Using a SRF prevents natural variations in the amount of rainfall from being the dominant cause of variations in pollutant loading estimates and allows changes in land use, wastewater practices or other causes to be seen in the results.

One should understand that large changes in percentage of loading in a very small basin is insignificant to the receiving bay water quality. Similarly, large changes, such

as doubling of pollutant load, in a place with very low loading is insignificant to overall water quality because the total load remains small.



Watershed	Basin	N	TP	Fecal	BOD	TKN	NH3	NO2	DP	COD	TSS	TDS	Oil	Pb	Cu	Zn	Cd
Sarasota Bay	Not Applicable	-2.98%	-0.54%	-1.00%	-0.59%	-3.60%	-10.15%	0.01%	-0.28%	-0.20%	-0.06%	-0.04%	-1.39%	-0.01%	0.00%	-0.01%	0.01%
Roberts Bay	Not Applicable	-14.49%	5.06%	4.42%	-3.30%	-16.28%	-38.36%	9.36%	-11.43%	-1.13%	-0.23%	-5.53%	-9.22%	-17.89%	-11.16%	-5.71%	-13.31%
Little Sarasota Bay	Not Applicable	-6.91%	-0.72%	-2.68%	-0.96%	-8.22%	-24.64%	0.14%	-0.14%	-0.17%	0.05%	0.22%	-2.83%	0.76%	0.54%	0.62%	0.79%
Blackburn Bay	Not Applicable	-3.45%	1.13%	0.49%	2.07%	-4.63%	-20.61%	0.74%	1.75%	2.60%	1.32%	1.22%	-0.50%	0.00%	0.13%	2.77%	1.85%
Dona/Roberts Bay	Not Applicable	-2.43%	-0.81%	-0.95%	0.03%	-3.07%	-11.72%	-0.38%	-0.39%	0.32%	-0.05%	-0.44%	-1.19%	-0.05%	-0.01%	1.16%	-0.21%
Lemon Bay	Not Applicable	-1.20%	1.18%	-0.28%	0.90%	-1.65%	-4.81%	1.00%	2.09%	1.14%	0.63%	0.72%	-0.37%	0.20%	0.21%	1.15%	1.56%
Myakka River	Not Applicable	-1.62%	2.15%	0.84%	3.08%	-3.53%	-15.44%	3.93%	3.60%	4.78%	4.70%	0.78%	-1.84%	4.72%	4.83%	5.99%	3.37%
Braden River	Not Applicable	4.73%	1.76%	4.02%	5.02%	6.78%	20.85%	0.68%	2.01%	4.61%	1.54%	0.22%	4.05%	0.30%	0.43%	3.38%	1.93%
Peace River	Not Applicable	1.40%	0.44%	0.74%	0.51%	1.65%	5.64%	0.01%	0.30%	0.19%	0.06%	0.02%	0.66%	0.01%	0.00%	0.01%	0.01%
Sarasota Bay	Hudson Bayou	-2.63%	-0.49%	-0.83%	-0.45%	-3.12%	-11.55%	-0.02%	-0.26%	-0.15%	-0.05%	-0.05%	-1.20%	-0.01%	0.00%	-0.01%	0.00%
Sarasota Bay	Bowlees Creek	-13.28%	-2.96%	-3.08%	-2.92%	-14.44%	-36.42%	-0.19%	-1.98%	-1.12%	-0.47%	-0.20%	-4.38%	-0.05%	-0.01%	-0.04%	-0.03%
Sarasota Bay	Sarasota Bay Coastal	-3.92%	-0.64%	-0.99%	-0.65%	-4.82%	-19.38%	-0.02%	-0.35%	-0.22%	-0.07%	-0.06%	-1.39%	-0.01%	0.00%	-0.01%	0.00%
Sarasota Bay	Whitaker Bayou	-5.05%	-0.84%	-1.56%	-0.98%	-5.98%	-18.06%	-0.02%	-0.41%	-0.34%	-0.10%	-0.08%	-2.20%	-0.02%	0.00%	-0.02%	0.02%
Sarasota Bay	Longboat/Lido Key	-0.10%	-0.02%	-0.09%	-0.03%	-0.14%	-0.30%	0.07%	-0.01%	0.00%	0.01%	0.04%	-0.11%	0.01%	0.01%	0.01%	0.04%
Roberts Bay	Matheny Creek	-8.45%	-1.82%	-3.20%	-1.74%	-9.78%	-26.86%	-0.07%	-1.16%	-0.63%	-0.23%	-0.78%	-4.34%	-0.04%	0.00%	-0.03%	-0.02%
Roberts Bay	Phillippi Creek	-15.09%	-1.67%	-4.83%	-3.37%	-16.46%	-39.52%	-9.49%	-2.95%	-1.14%	-0.22%	-3.94%	-8.23%	-14.86%	-8.78%	-4.16%	-10.07%
Roberts Bay	Roberts Bay Coastal	-39.10%	-43.63%	-5.17%	-13.31%	-40.64%	-58.54%	-31.95%	-57.59%	-4.86%	-1.12%	-44.68%	-43.21%	-71.18%	-54.74%	-38.42%	-69.37%
Roberts Bay	Siesta Key Roberts Bay	12.87%	-5.19%	-0.38%	4.60%	5.56%	4.06%	5.74%	30.05%	1.60%	0.26%	8.77%	7.71%	15.50%	11.30%	7.64%	14.42%
Little Sarasota Bay	Catfish Creek	-1.62%	0.75%	-0.36%	0.41%	-2.05%	-8.04%	0.96%	1.11%	0.51%	0.33%	0.50%	-0.26%	1.35%	1.01%	1.12%	1.47%
Little Sarasota Bay	Clower Creek	-8.62%	-1.61%	-2.92%	-1.37%	-9.50%	-35.83%	-0.10%	-0.90%	-0.52%	-0.18%	-0.15%	-3.86%	-0.03%	0.00%	-0.02%	-0.02%
Little Sarasota Bay	Flirrigay Bayou	-9.56%	-2.20%	-4.82%	-2.23%	-11.05%	-40.03%	-0.09%	-1.75%	-0.88%	-0.38%	-0.16%	-5.79%	-0.06%	-0.01%	-0.05%	-0.07%
Little Sarasota Bay	Holliday Bayou	-20.78%	-4.61%	-6.15%	-4.12%	-23.39%	-53.64%	-0.21%	-2.90%	-1.61%	-0.65%	-0.42%	-8.76%	-0.08%	-0.01%	-0.06%	-0.05%
Little Sarasota Bay	Little Sarasota Bay Coastal	-15.79%	-3.31%	-5.68%	-3.36%	-17.85%	-32.03%	-1.63%	-1.95%	-0.96%	-0.15%	0.04%	-7.75%	0.43%	0.35%	0.78%	0.65%
Little Sarasota Bay	North Creek	-10.60%	-1.72%	-5.22%	-2.20%	-13.21%	-47.55%	-0.20%	-1.20%	-0.91%	-0.26%	0.00%	-4.07%	0.01%	0.06%	0.05%	0.12%
Little Sarasota Bay	Siesta Key Little Sarasota Bay	-2.86%	-0.59%	-1.31%	-0.61%	-3.81%	-14.60%	-0.01%	-0.35%	-0.20%	-0.05%	-0.05%	-1.99%	-0.01%	0.00%	-0.01%	-0.01%
Little Sarasota Bay	Casey Key Little Sarasota Bay	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Blackburn Bay	Casey Key Blackburn Bay	-1.35%	-0.54%	-0.94%	-0.55%	-1.50%	-2.25%	-0.01%	-0.39%	-0.21%	-0.08%	-0.05%	-1.14%	-0.01%	0.00%	-0.02%	-0.01%
Blackburn Bay	South Creek	1.37%	2.46%	3.95%	3.89%	1.44%	-1.26%	0.91%	2.78%	3.73%	1.69%	1.75%	2.08%	0.38%	0.42%	4.09%	3.07%
Blackburn Bay	Blackburn Bay Coastal	-26.27%	-6.49%	-7.31%	-6.56%	-30.68%	-59.86%	-0.39%	-4.48%	-2.45%	-0.81%	-1.32%	-11.03%	-3.89%	-1.87%	-1.10%	-3.08%
Dona/Roberts Bay	Cow Pen Slough	-1.71%	-0.85%	-0.56%	0.15%	-2.18%	-7.39%	-0.22%	-0.39%	0.37%	-0.12%	-0.69%	-0.91%	-0.04%	-0.01%	1.72%	-0.42%
Dona/Roberts Bay	Curry Creek	-1.19%	-0.08%	-0.28%	0.61%	-1.63%	-7.02%	0.34%	-0.01%	0.75%	0.32%	0.37%	-0.32%	0.23%	0.26%	1.22%	0.64%
Dona/Roberts Bay	Dona/Roberts Bay Coastal	-16.65%	-2.61%	-6.84%	-3.59%	-18.74%	-35.56%	-3.89%	-1.57%	-1.31%	-0.40%	0.22%	-8.38%	2.00%	1.07%	0.40%	1.67%
Dona/Roberts Bay	Hatchett Creek	-3.40%	-1.20%	-0.20%	0.41%	-3.48%	-17.71%	-3.36%	-0.64%	0.60%	0.30%	-0.13%	-0.99%	-2.14%	-1.34%	-0.02%	-1.21%
Dona/Roberts Bay	Island of Venice	-0.73%	-0.11%	-0.26%	-0.13%	-0.94%	-4.28%	0.00%	-0.06%	-0.04%	-0.01%	-0.01%	-0.32%	0.00%	0.00%	0.00%	0.00%
Dona/Roberts Bay	Casey Key Dona Roberts Bay	-1.05%	-0.32%	-0.71%	-0.36%	-1.14%	-1.86%	0.01%	-0.22%	-0.15%	-0.05%	-0.02%	-0.65%	-0.01%	0.00%	0.01%	0.00%
Lemon Bay	Ainger Creek	0.56%	0.10%	0.33%	0.11%	0.59%	2.16%	0.47%	0.06%	0.04%	0.07%	0.01%	0.18%	0.01%	0.00%	0.01%	0.07%
Lemon Bay	Alligator Creek	-0.11%	1.22%	0.58%	1.28%	-0.49%	-1.85%	2.57%	1.75%	1.35%	0.72%	0.92%	0.54%	0.57%	0.39%	1.16%	1.71%
Lemon Bay	Forked Creek	1.18%	5.56%	2.29%	3.22%	1.13%	-1.70%	1.22%	8.53%	2.79%	1.24%	1.72%	2.58%	0.50%	0.51%	2.74%	4.69%
Lemon Bay	Gottfried Creek	0.86%	0.75%	1.33%	1.35%	0.70%	0.38%	1.41%	0.63%	1.26%	0.57%	0.68%	0.87%	0.25%	0.26%	1.11%	1.22%
Lemon Bay	Lemon Bay Coastal	-1.34%	-0.57%	-0.50%	-0.41%	-1.33%	-2.34%	-1.40%	-0.40%	-0.16%	-0.05%	-0.26%	-0.82%	-0.88%	-0.45%	-0.31%	-0.79%
Lemon Bay	Woodmere Creek	-13.08%	-4.99%	-9.92%	-4.19%	-14.41%	-20.88%	-2.03%	-3.58%	-0.82%	0.18%	0.33%	-11.57%	-0.36%	-0.05%	1.13%	0.26%
Lemon Bay	Manasota Key	0.37%	0.08%	0.12%	0.10%	0.42%	0.73%	0.00%	0.06%	0.04%	0.01%	0.01%	0.15%	0.00%	0.00%	0.00%	0.00%
Braden River	Braden River	26.18%	5.28%	6.13%	6.44%	35.35%	174.65%	0.11%	3.79%	2.30%	0.89%	0.30%	9.75%	0.05%	0.01%	0.15%	0.05%
Braden River	Braden River II	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Braden River	Cooper Creek	3.37%	1.54%	3.92%	4.98%	4.83%	9.89%	0.72%	1.94%	4.80%	1.57%	0.22%	3.46%	0.31%	0.44%	3.48%	2.12%
Myakka River	Myakka River II	-29.16%	-28.24%	28.95%	-25.00%	-30.53%	-30.50%	-25.21%	-25.05%	-23.09%	-25.85%	-30.12%	-33.05%	-17.24%	-15.05%	-8.43%	-23.02%
Myakka River	Myakka River	3.10%	7.11%	13.17%	8.66%	0.83%	-17.96%	8.28%	9.47%	11.24%	10.33%	2.67%	-0.10%	9.62%	9.70%	11.67%	7.92%
Myakka River	Upper Myakka River	-12.05%	-7.95%	14.06%	-6.93%	-14.69%	-42.64%	-2.75%	-5.17%	1.30%	1.45%	-13.18%	-10.35%	-16.73%	-12.12%	3.06%	-3.88%
Myakka River	Big Slough	-4.69%	-0.93%	-3.33%	-0.84%	-6.05%	-14.29%	0.40%	-0.52%	-0.01%	0.21%	0.19%	-2.55%	0.06%	0.10%	1.33%	0.49%
Myakka River	Deer Prairie Slough	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Myakka River	Little Salt Creek	-13.85%	-3.40%	-5.89%	-4.27%	-15.69%	-26.35%	-0.14%	-2.70%	-1.95%	-0.66%	-0.22%	-4.85%	-0.04%	-0.01%	-0.09%	-0.04%
Peace River	Peace River	1.40%	0.44%	0.74%	0.51%	1.65%	5.64%	0.01%	0.30%	0.19%	0.06%	0.02%	0.66%	0.01%	0.00%	0.01%	0.01%

Percent Change	Increase >10%	Increase 5-10%	Increase 1-5%	Change <1%	Decrease 1-5%	Decrease 5-10%	Decrease >10%
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The results are depicted as change in percent loading per watershed, basin or other contributing area for the time period from 2006 to 2016. The cells are color coded with red depicting increasing load and green depicting decreasing load with vibrant colors for the most extreme changes. Nitrogen is the left-most column because of its importance to water quality in this area.

Many of the basins and watersheds show improving conditions, meaning reduced pollutant loads. Generally speaking, the main contributor of pollutant load is stormwater runoff. Among areas predominantly within Sarasota County, the model results indicate that increasing loads are found in these locations:

- The portion of Siesta Key that drains to Roberts Bay
- South Creek
- Forked Creek
- Cooper Creek
- Myakka River

Relationship of Data to Stormwater Management Plan (SWMP)

Modeling is a strong tool for identifying portions of the watersheds that can be targeted for load reduction projects or programs. The model results indicate that the existing SWMP has reduced pollutant loading in many locations. Areas with increased loading are more appropriate locations for additional BMPs.

The Sarasota Water Atlas is developing pages about pollutant load modeling that will provide more in-depth analysis of model results from SIMPLE as well as other models. Load reductions are on the Atlas on the Projects Catalog pages that can be found at <http://www.sarasota.wateratlas.usf.edu/projects-catalog/>.