

Florida Department of Environmental Protection



Everglades West Coast and Caloosahatchee Estuary Basin Management Action Plans 2014 Annual Report

January 28, 2015





Agenda

- Overview of the Caloosahatchee and Everglades West Coast BMAP Annual Reports.
- Stakeholder Activities During the Reporting Period from Both BMAPs.
- Department Activities During the Reporting Period.



Year in Review



Updates

- Lake Okeechobee BMAP Adoption
 - Estimated TN Reductions: 123.1 MT/yr
 - Estimated TP Reductions: 145.8 to 148.1 MT/yr
- Continue work on TMDL model
- Community Forums



Overview of BMAP Annual Reports



BMAP Process

BMAP process is a phased approach to:

- Implement the TMDLs.
- Itemize set of total nitrogen (TN) load reduction activities and projects.
- Identify needs for additional studies and monitoring.
- Allow for participation of stakeholders, partners and interested parties.



Annual Reports Overview

- Everglades West Coast and Caloosahatchee BMAPs were adopted in November 2012.
- This is the second annual progress report on BMAP activities.
- Information was provided by the stakeholders on activities from December 1, 2013 through November 30, 2014.
- The reports include:
 - Background on the total maximum daily loads (TMDLs) and BMAP.
 - Activities during the reporting period.
 - Water quality and biological monitoring.



Everglades West Coast



Adjustment of TMDL in the BMAP

- For purposes of initial allocation, loading assigned to stakeholders based on land uses.
- Allocation based on relative amount of developed (non-natural) loading:
- **Hendry Creek**
 - Lee County.
 - Catalina.
 - Florida Department of Transportation (FDOT).
 - Agriculture.
- **Imperial River**
 - Lee County.
 - Bonita Springs.
 - FDOT.
 - Agriculture.



Activities

Hendry Creek

- FDOT increased its street sweeping activities.
- Lee County increased its street sweeping activities, as well as its public education and outreach efforts.
- To date, the Florida Department of Agriculture and Consumer Services (FDACS) has enrolled 26.7 acres out of a total of 97.9 total acres based on the 2004 land use coverage.



Activities, continued

Imperial River

- City of Bonita Springs continued its education and outreach activities, and is exploring a pilot project for a woodchip-based denitrifying bioreactor.
- Lee County increased its street sweeping activities, as well as its public education and outreach efforts.
- To date, FDACS has enrolled 4,125.8 acres out of a total of 11,604.6 total acres based on the 2004 land use coverage.



Activities, continued

Hendry Creek

ENTITY	PROJECT NUMBER	PROJECT NAME	TN REDUCTION (LBS/YR)
FDOT	HC-FDOT-3	Street Sweeping – additional reductions	72
Lee County	LC-2	Street Sweeping – additional reductions	50
Agriculture	N/A	Agricultural BMPs	78
Total	N/A	Total Reductions in Reporting Period*	200

Imperial River

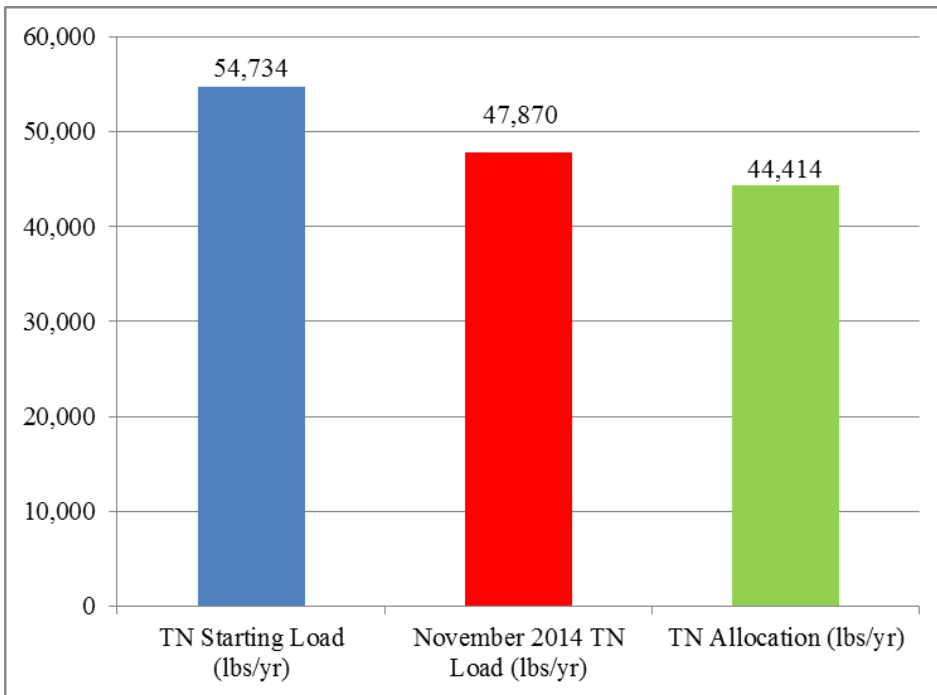
ENTITY	PROJECT NUMBER	PROJECT NAME	TN REDUCTION (LBS/YR)
Lee County	LC-3	Street Sweeping – additional reductions	108
Agriculture	N/A	Agricultural BMPs	9,955
Total	N/A	Total Reductions in Reporting Period*	10,063

*The FDACS enrolled acres is the total to date, not only those enrolled in BMPs during the reporting period.

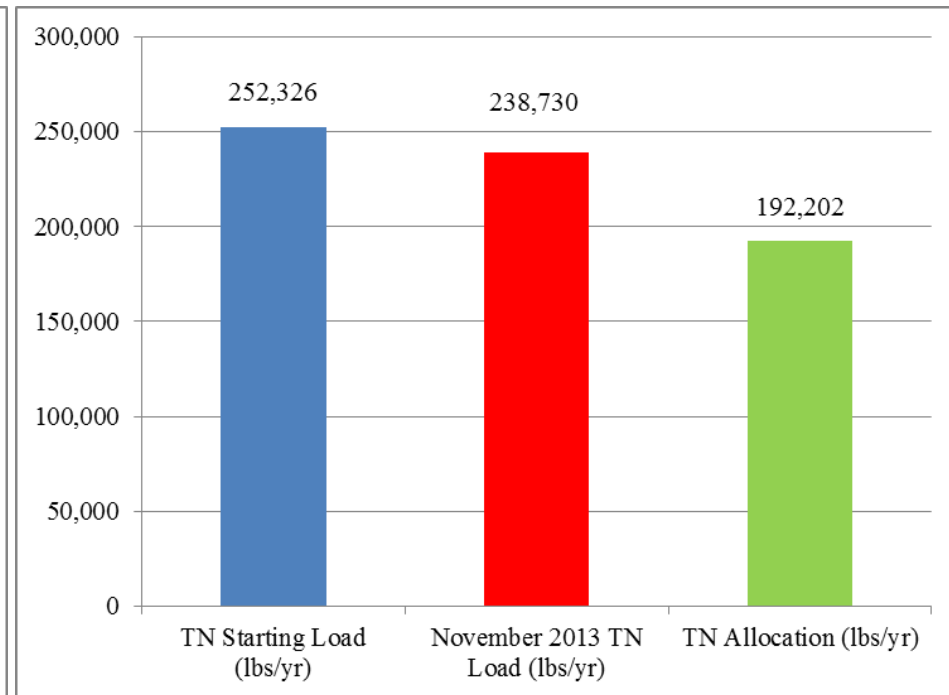


Progress to the TMDL

- The total project reductions, including those shown as completed in the BMAP are 6,864 lbs/yr TN in the Hendry Creek Basin and 13,596 lbs/yr TN in the Imperial River Basin.



Hendry Creek Basin Project Reductions



Imperial River Basin Project Reductions



Monitoring

- The BMAP monitoring plan was designed to enhance the understanding of basin loads, identify areas with high nutrient concentrations, and track long-term water quality trends.
- Water quality monitoring continues, and is being conducted by:
 - Lee County (Hendry Creek and Imperial River).
 - Department, South District (Hendry Creek).
 - Bonita Springs (Imperial River).



Caloosahatchee Estuary



Activities

- Charlotte County continued its education and outreach efforts.
- The City of Cape Coral continued its outreach program, which includes Florida Yards and Neighborhoods Program and illicit discharge awareness.
- East County Water Control District continued its education and outreach effort, including the annual Wings over Water Festival.



Activities, continued

- FDOT increased its street sweeping and continued its education outreach efforts.
- Lee County designed the Nalle Grade Stormwater Park, and continued its street sweeping and education efforts.
- To date, FDACS has enrolled 17,722.3 acres out of a total of 36,180.5 acres based on land use.

Activities, continued

- City of Ft. Myers completed the Carrell Canal Water quality retrofit project.





Activities, continued

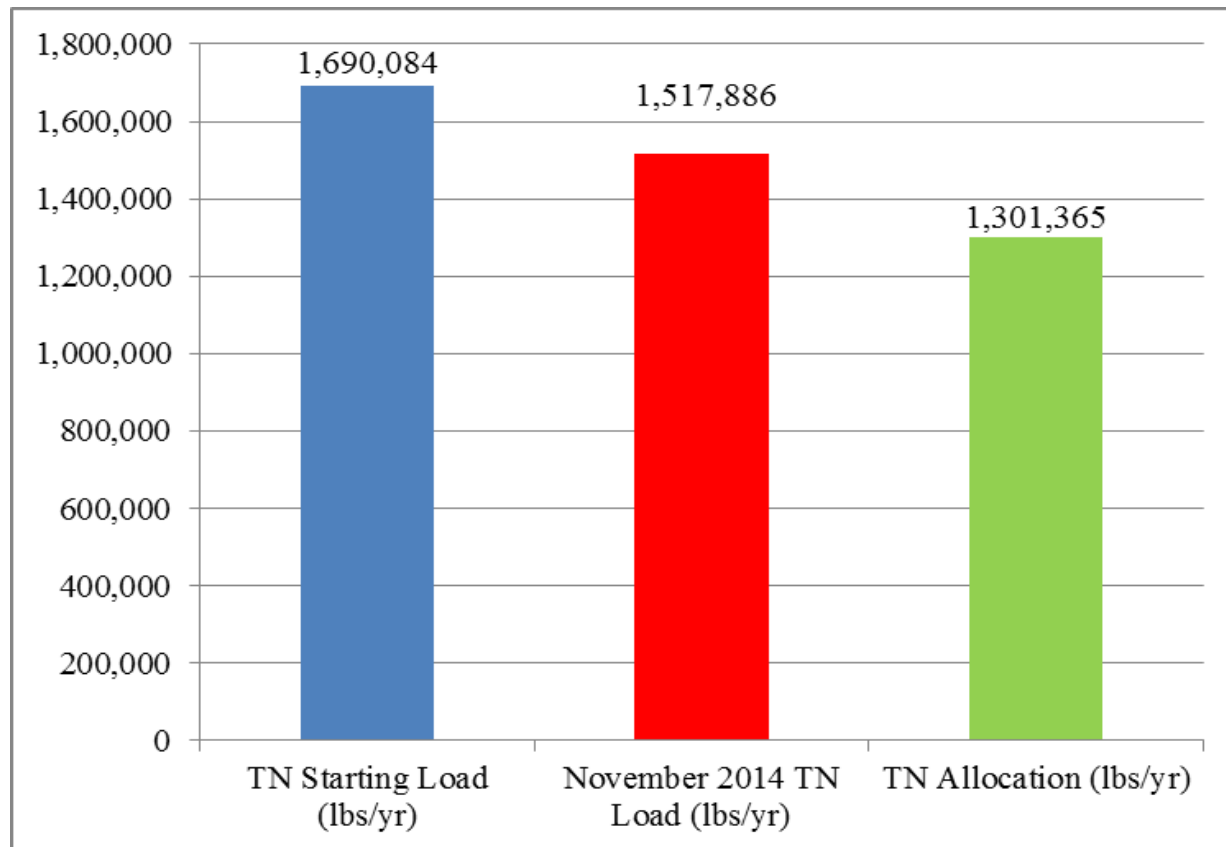
ENTITY	PROJECT NUMBER	PROJECT NAME	TN REDUCTION (LBS/YR)
Cape Coral	CC-2	Street Sweeping	676
FDOT	FDOT-4	Street Sweeping – New Reductions	473
Fort Myers	FM-11	Carrell Canal Water Quality Retrofit	1,275
Lee County	LC-16	Street Sweeping – New Reductions	220
Agriculture	Not applicable	Agricultural BMPs	29,089
Total	N/A	Total Reductions in Reporting Period*	31,733

*The FDACS enrolled acres is the total to date, not only those enrolled in BMPs during the reporting period.



Progress to the TMDL

- The total project reductions, including those shown as completed in the BMAP, are 172,198 lbs/yr TN.





Monitoring

- Water quality monitoring continues, and is being conducted by:
 - City of Cape Coral.
 - City of Ft. Myers.
 - Lee County.
 - SFWMD.
 - Department, South District.
- Seagrass sampling is being conducted by:
 - SFWMD monthly.
 - Department, South District bi-monthly
- Oyster monitoring is being conducted monthly by SFWMD, with density evaluated semi-annually.



City of Ft. Myers



City of Bonita Springs



Department Activities During the Reporting Period



Update on BMAP Considerations



BMAP Considerations

- Both the Caloosahatchee and Everglades West Coast BMAPs included the following consideration:
 - Septic tank loading.
- The Everglades West Coast BMAP included a consideration for:
 - DO research.
- The Caloosahatchee BMAP included considerations for:
 - Revising the allocations.



Septic Tank Loading



Septic Tank Loading

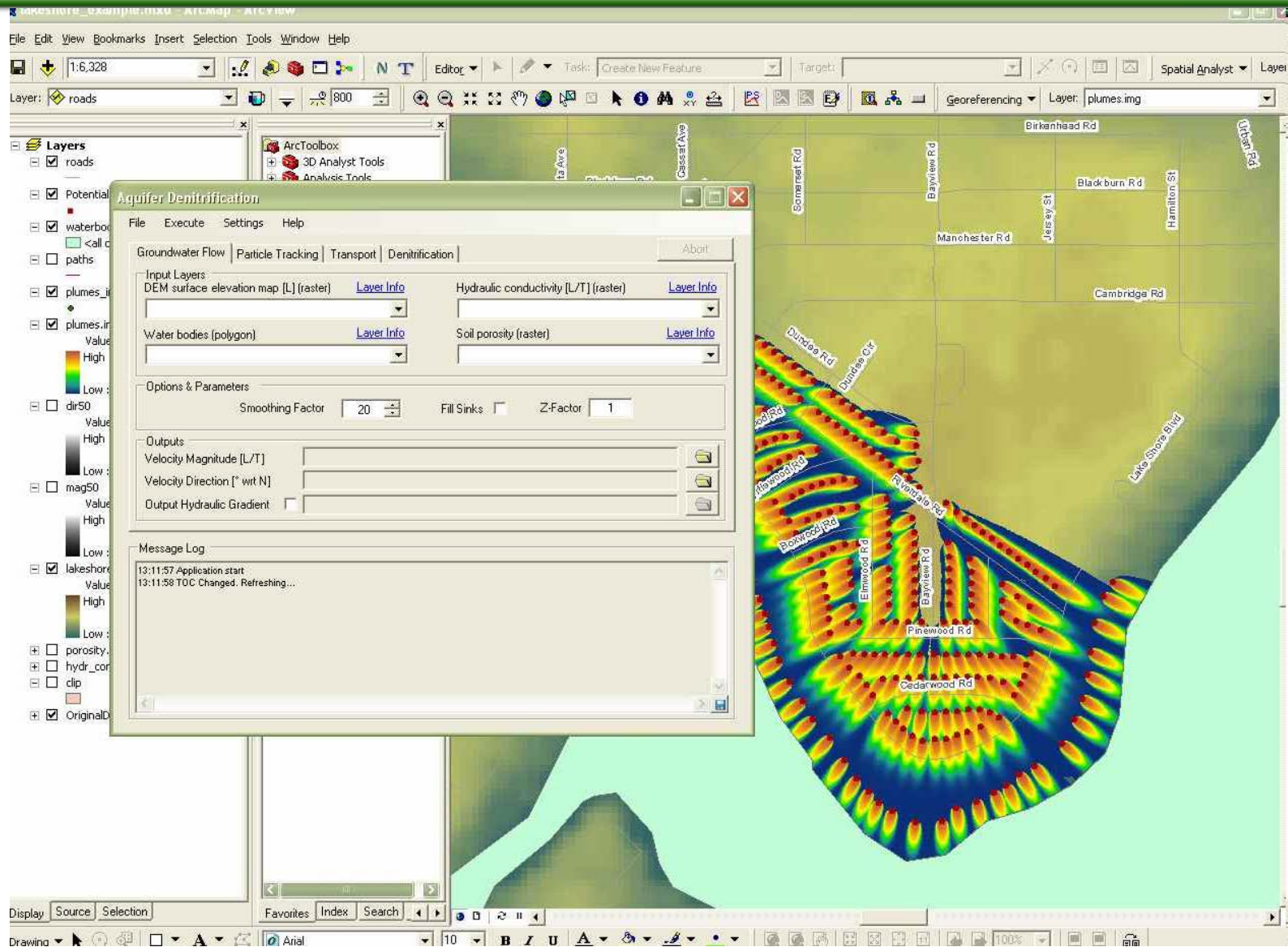
- The Department contracted with Dr. Ming Ye at Florida State University to develop the ArcGIS-Based Nitrate Load Estimation Toolkit (ArcNLET).
- This model estimates nitrogen loads from septic systems to surface waterbodies.



What is ArcNLET?

- A simplified model that considers key hydrogeologic processes of groundwater flow and nitrate fate and transport.
- The model is implemented in ArcGIS to:
 - Simulate nitrate fate and transport, including the denitrification process.
 - Consider multiple septic tanks.
 - Provide a management and planning tool for environmental management and regulation.
- ArcNLET is publicly available at:
<http://people.sc.fsu.edu/~mye/ArcNLET>.

ArcNLET





ArcNLET Input Data

All input data files are in ArcGIS format.

- Locations of septic tanks.
- Locations of waterbodies.
- Topography (DEM: Digital Elevation Model).
- Hydrogeological and transport parameters.



ArcNLET Requirements

- Users of ArcNLET need to have
 - Basic knowledge of hydrogeology such as concepts of groundwater flow and solute transport.
 - Intermediate level of ArcGIS skills for preparing input files and visualizing software output files.
- Interpretation and improvement of ArcNLET results require:
 - Fundamental understanding of groundwater flow and solute transport.
 - Familiarity with site-specific information such as geology and hydrogeology.

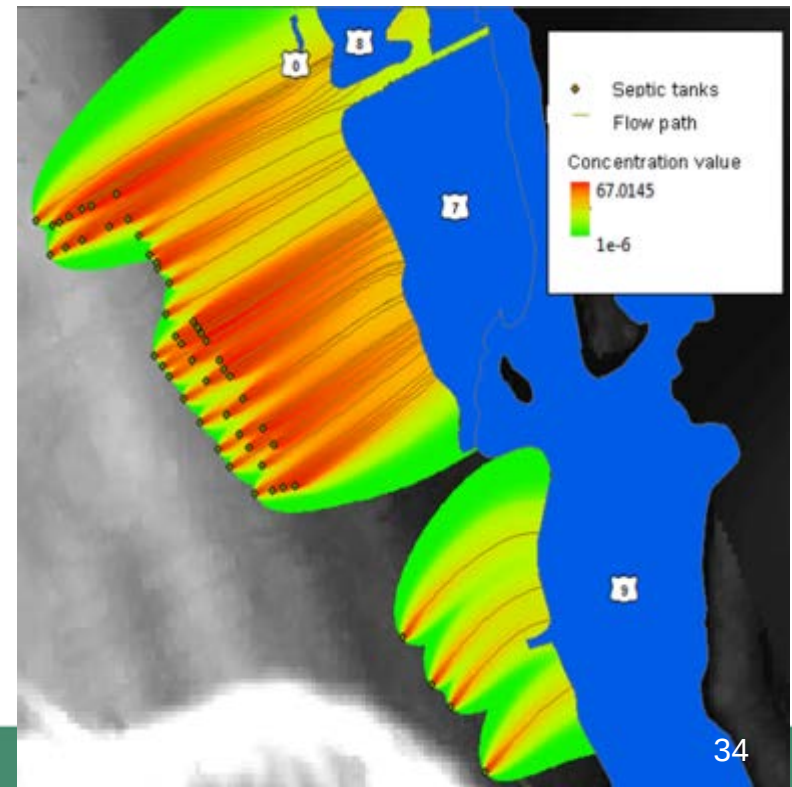


Use of ArcNLET

- ArcNLET has been used to simulate septic tank loading in the following areas:
 - Lower St. Johns River Basin (City of Jacksonville).
 - St. Lucie River and Estuary Basin (City of Port St. Lucie, City of Stuart, and Martin County).
 - Indian River Lagoon Basin (model being calibrated to the Indian River County conditions).
- The technical report with the modeling results can be obtained from the Department.

ArcNLET Spatial Variability of Nitrogen Plumes

Spatial variability is obvious at different modeling sites, e.g., Seagate Harbor (left) (reduction ratio of 10.8%) and Hobe sound (right) (reduction ratio of 70.5%) in the Martin County.





ArcNLET St. Lucie Results

Category	Basin 4-5-6	C-23	C-24	C-44/ S-153	North Fork	South Fork
Percentage of nitrogen load from septic systems to BMAP estimated load	22.87%	0.03%	1.66%	0.00%	31.20%	10.33%
Percentage of load reduction of removed septic systems to BMAP required reduction	33.67%	0.05%	1.71%	0.00%	17.02%	1.35%
Percentage of load reduction to BMAP required reduction	81.02%	0.06%	3.25%	0.00%	85.75%	25.76%

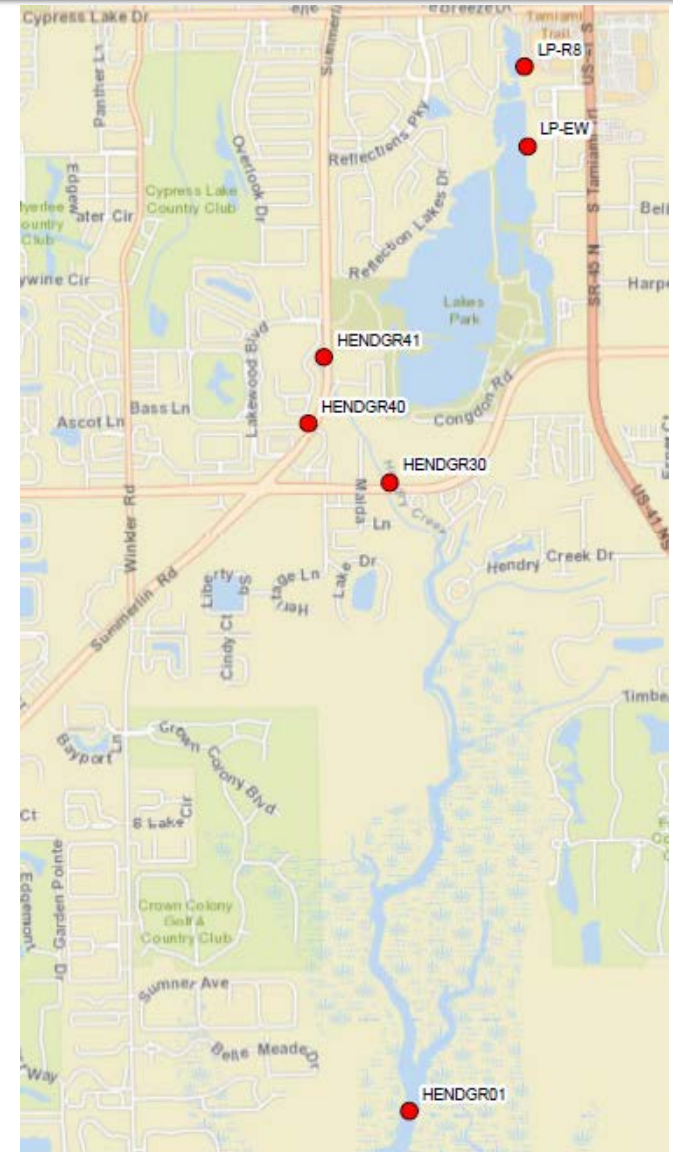


Source Identification Sampling



Hendry Creek Source ID

- Walk the WBID October 2013.
- Additional sampling October 2014:
 - 6 Sites
 - Fecal Coliform, Sucralose, Acetaminophen, Enterococci, qPCR – HF183
- Dry season sample.

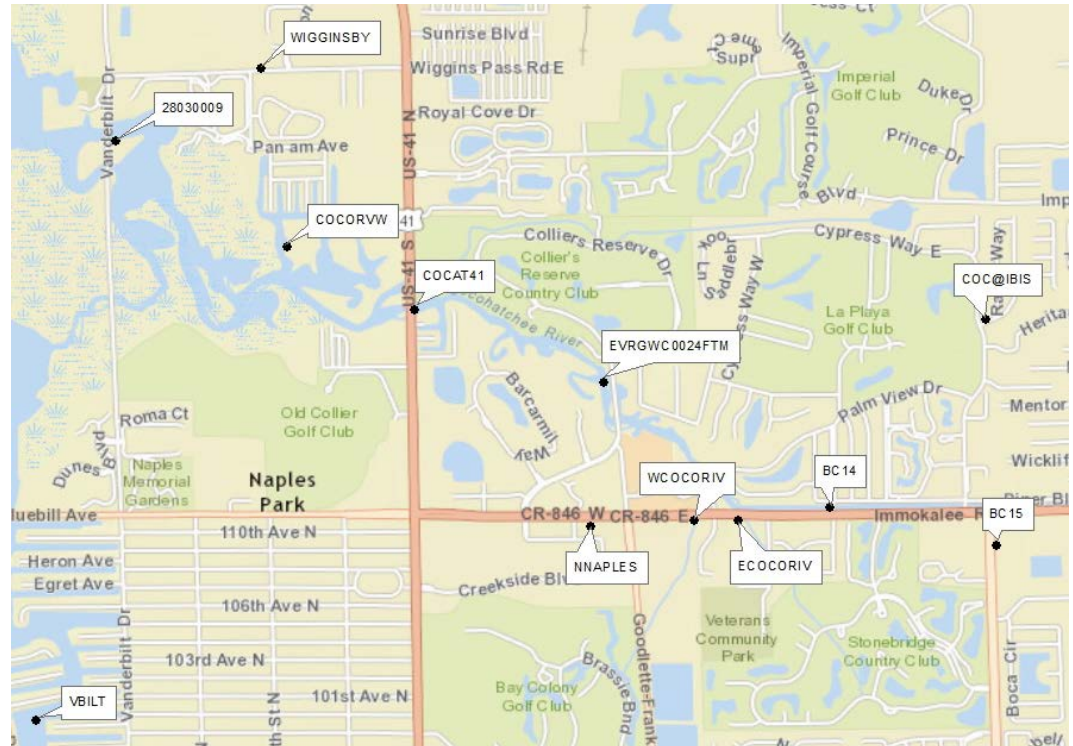


Source ID

Trout Creek



Cocohatchee River





Ground Water Nutrient Study



Ground Water Nutrient Study

- Understand sources of nitrogen in the basin:
 - Ground water contribution.
 - Source identification.
- Network of 30 shallow water wells throughout 4 basins, including Hendry Creek and Imperial River.
- Goal: Quarterly sampling for 2 years.
- To date, 3 quarters have been sampled.



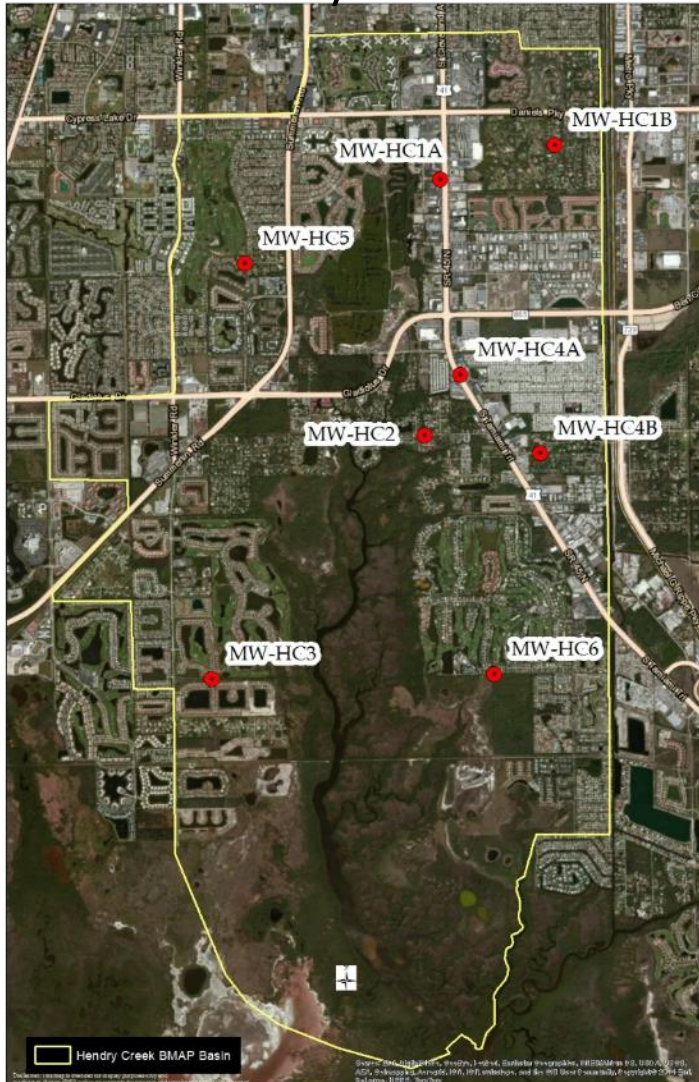


Core Parameters

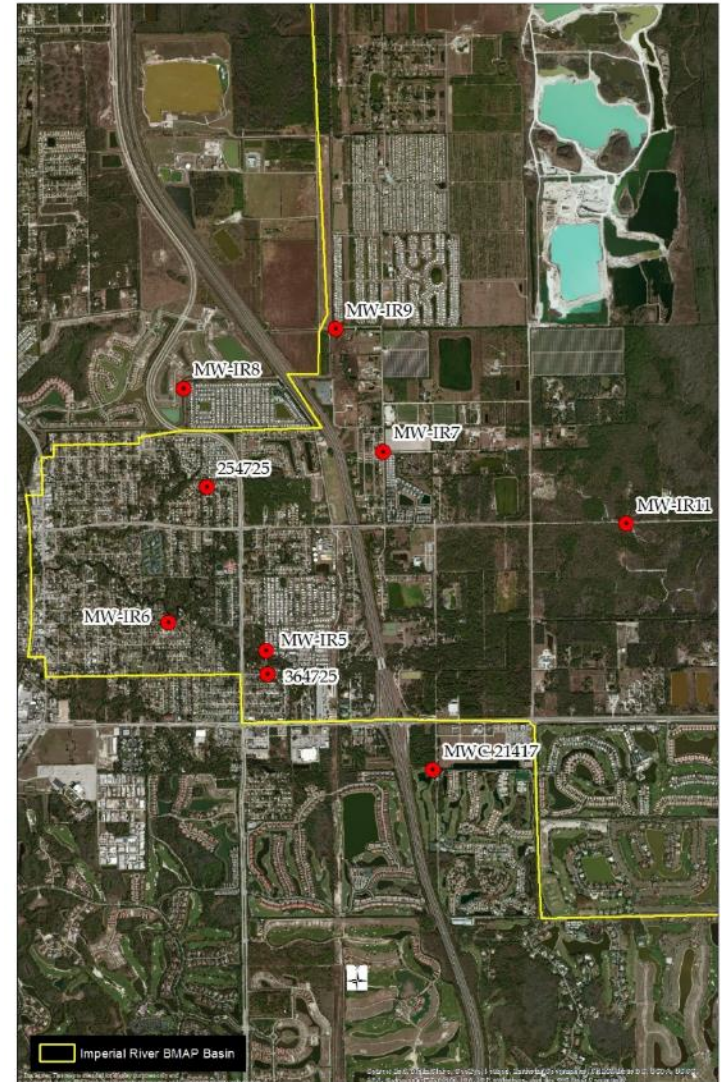
- Boron
- Chloride
- Ammonia.
- Nitrite+Nitrate
- Potassium
- Total Kjehldahl Nitrogen
- Sucralose
- Total Phosphorus
- Depth to water
- pH
- Temperature
- Specific Conductance
- Dissolved Oxygen
- Turbidity
- Oxidation Reduction Potential

Well Locations in BMAP Basins

Hendry Creek



Imperial River

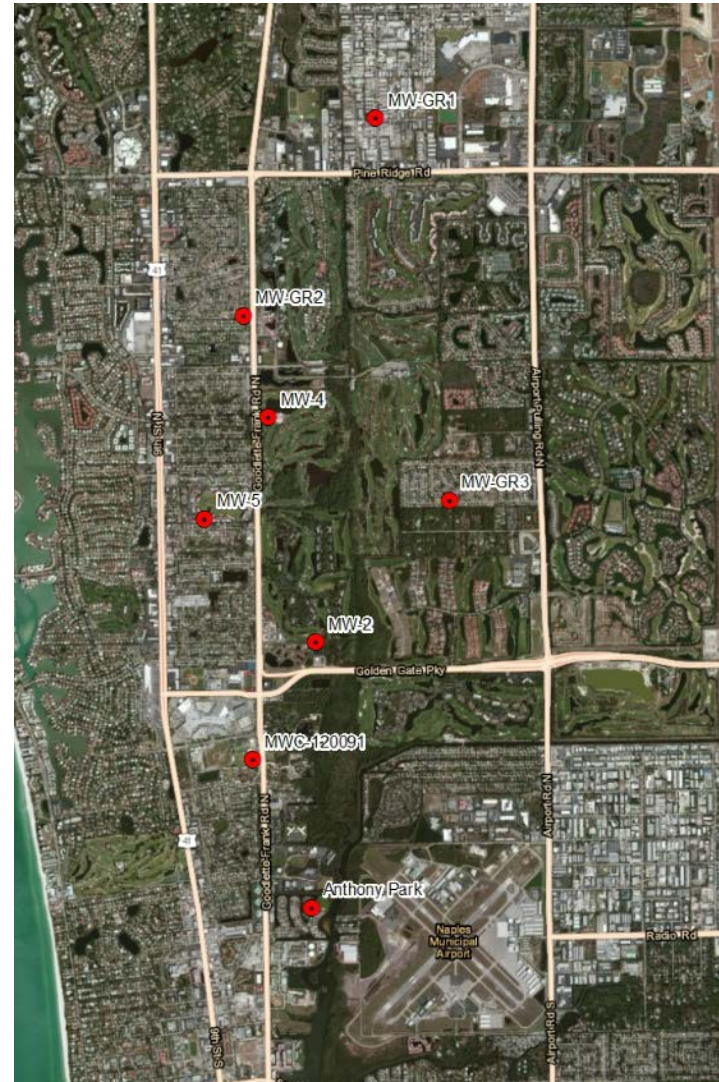


Additional Well Locations

Lake Trafford



Gordon River





Further Investigation



- WaterReuse Research Foundation.
- Develop additional indicators to determine nutrient loading attributable to reclaimed water versus septic tank effluent.
- Laboratory and field data.
- Final report.



Caloosahatchee Modeling Status

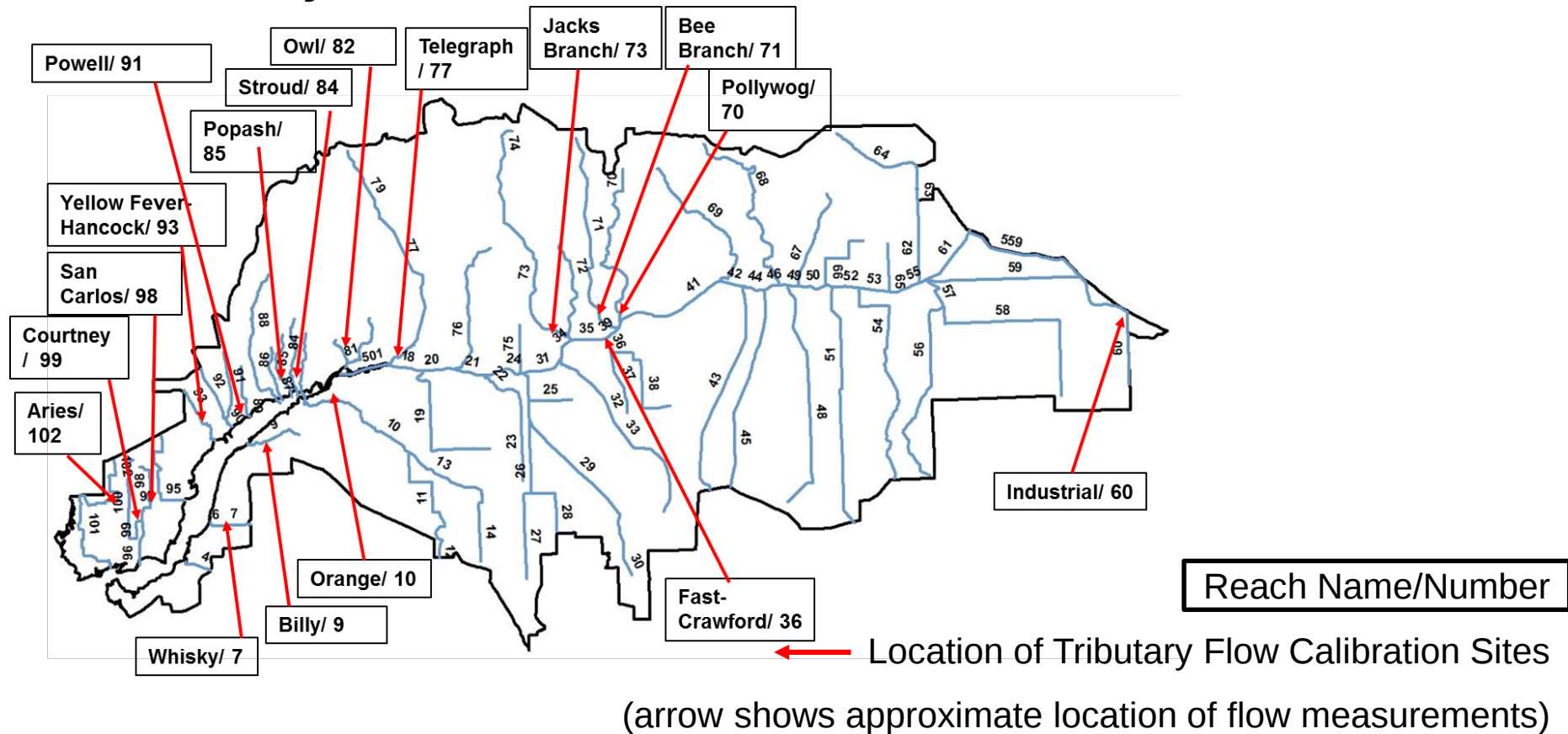


Modeling Status

- Dr. Xueqing Gao and Douglas Gilbert met with the modeling technical subgroup on October 22, 2014 and FDACS staff on October 24th.
- The Department has been working with SFWMD modeling staff, FDACS and other stakeholders to address remaining water budget issues with the watershed model.

HSPF Reach Network

HSPF daily flow calibration was done for the freshwater streams/canals tributary to the Caloosahatchee River and Estuary.





HSPF Daily Flow Calibration

- Calibration at some locations was good, while other locations were not as good because of reversing flows.
- The Department has committed to work with stakeholders to address remaining HSPF flow calibration issues at the S79 structure, before drafting TMDLs for the estuary.
- Contact Doug Gilbert for more information.
Douglas.Gilbert@dep.state.fl.us



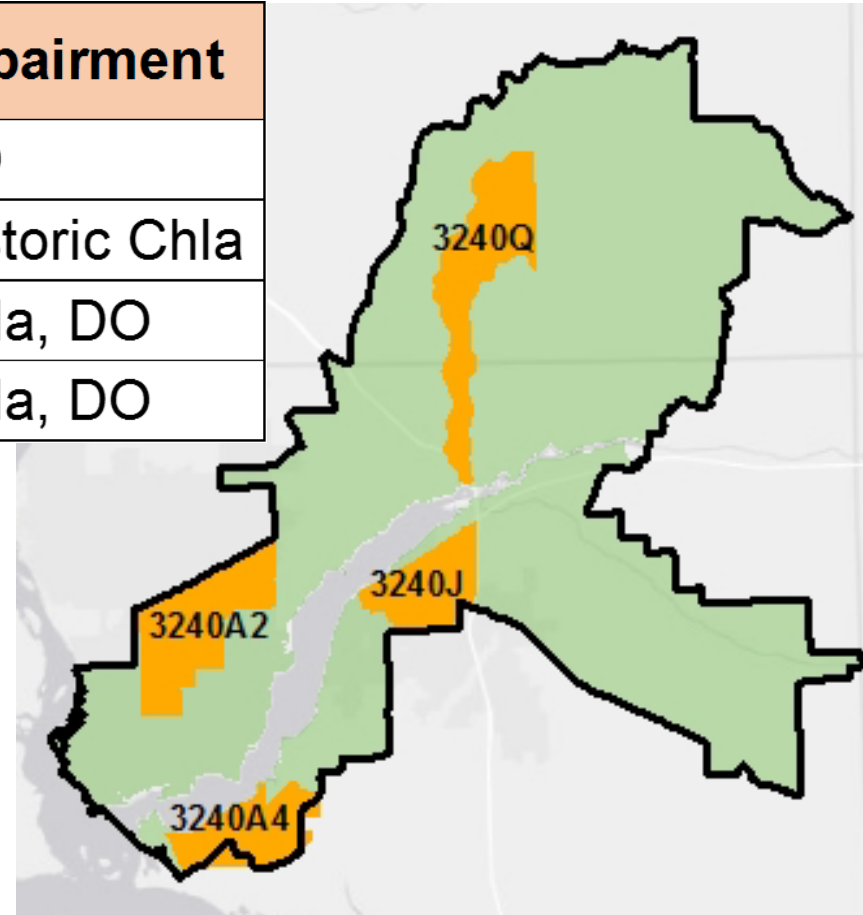
Caloosahatchee Tributaries

- TN data since 2009 has been compiled for stations tributary to the Caloosahatchee Estuary
- An analysis is underway, and a detailed discussion is planned for the meeting to be held in March 2015.
- Stakeholder involvement is essential to ensure all data is being considered.

Tributaries TMDLs

TMDLs are planned for the following tributaries

Tributary Name	WBID	Impairment
Billy Creek	3240J	DO
Cape Coral	3240A2	Historic Chla
Deep Lagoon Canal	3240A4	Chla, DO
Popash Creek	3240Q	Chla, DO





Next Steps



Upcoming Events

- The Department plans to hold the next meeting in early March 2015.
- Upcoming funding opportunities:
 - TMDL state grant.
 - Section 319(h) federal grant.
 - For more information contact Connie Becker
 - Connie.L.Becker@dep.state.fl.us
 - 850-245-8505



Contact Information

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