



Florida Department of Environmental Protection

Water Quality Restoration Program

Everglades West Coast (EWC) Basin Management Action Plan Annual Meeting

March 30, 2016

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Agenda

- Overview of the 2015 EWC BMAP Annual Progress Report
- Activities During the Reporting Period
- Monitoring Program Update
- Comments and Next Steps
- Regional Watershed Working Group



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Overview of the EWC BMAP 2015 Annual Progress Report





2015 EWC Annual Report

- Total Maximum Daily Load (TMDL) adopted in 2008
 - Total nitrogen (TN) reductions
 - Dissolved oxygen (DO) impairments
- BMAP adopted in 2012
- Third annual report compiled
- Reporting period: December 2014 - November 2015

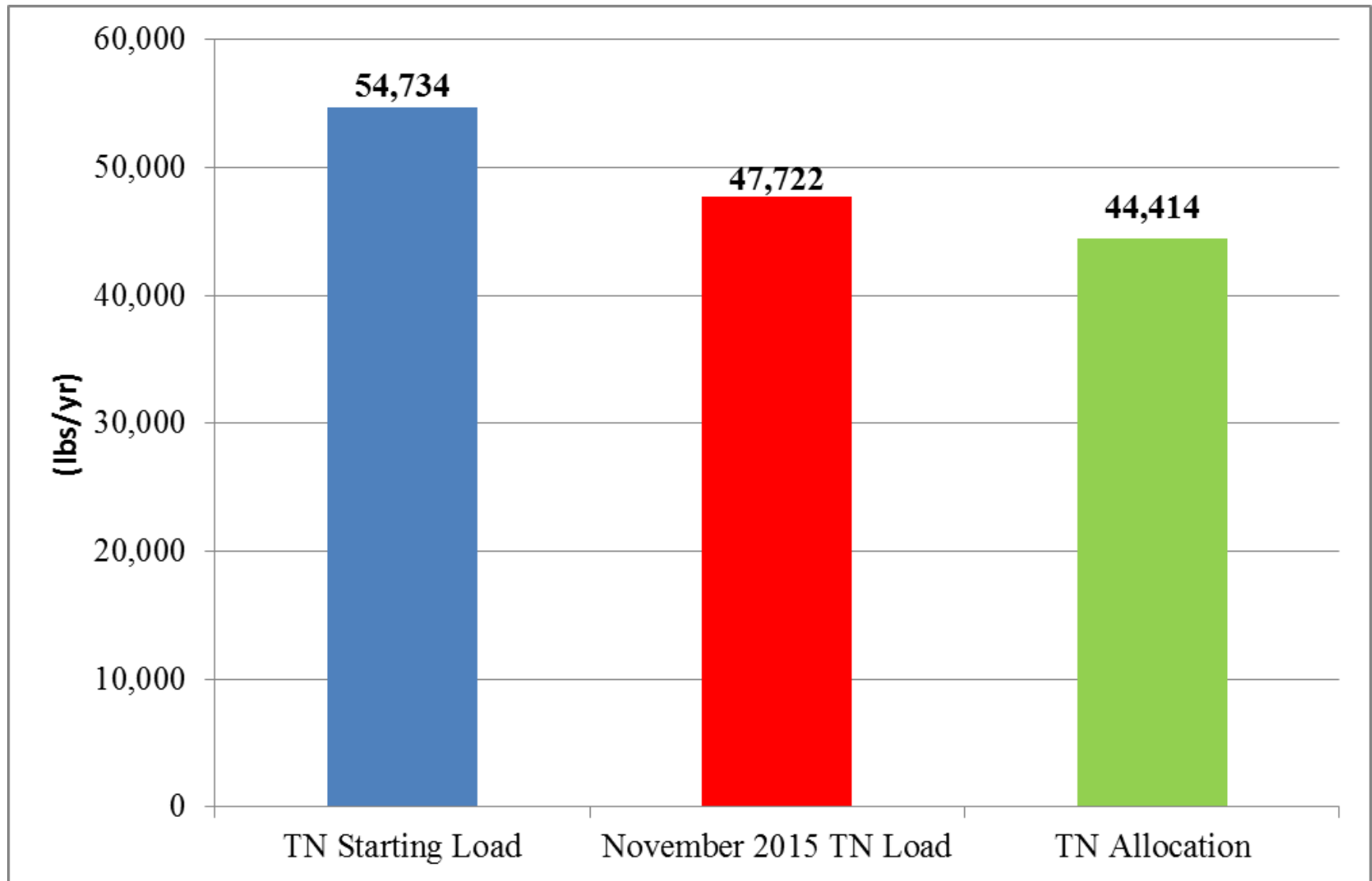


Reductions Achieved

- For Hendry Creek, 65% of the necessary TN reductions have been achieved
- For Imperial River, 24% of the necessary TN reductions have been achieved



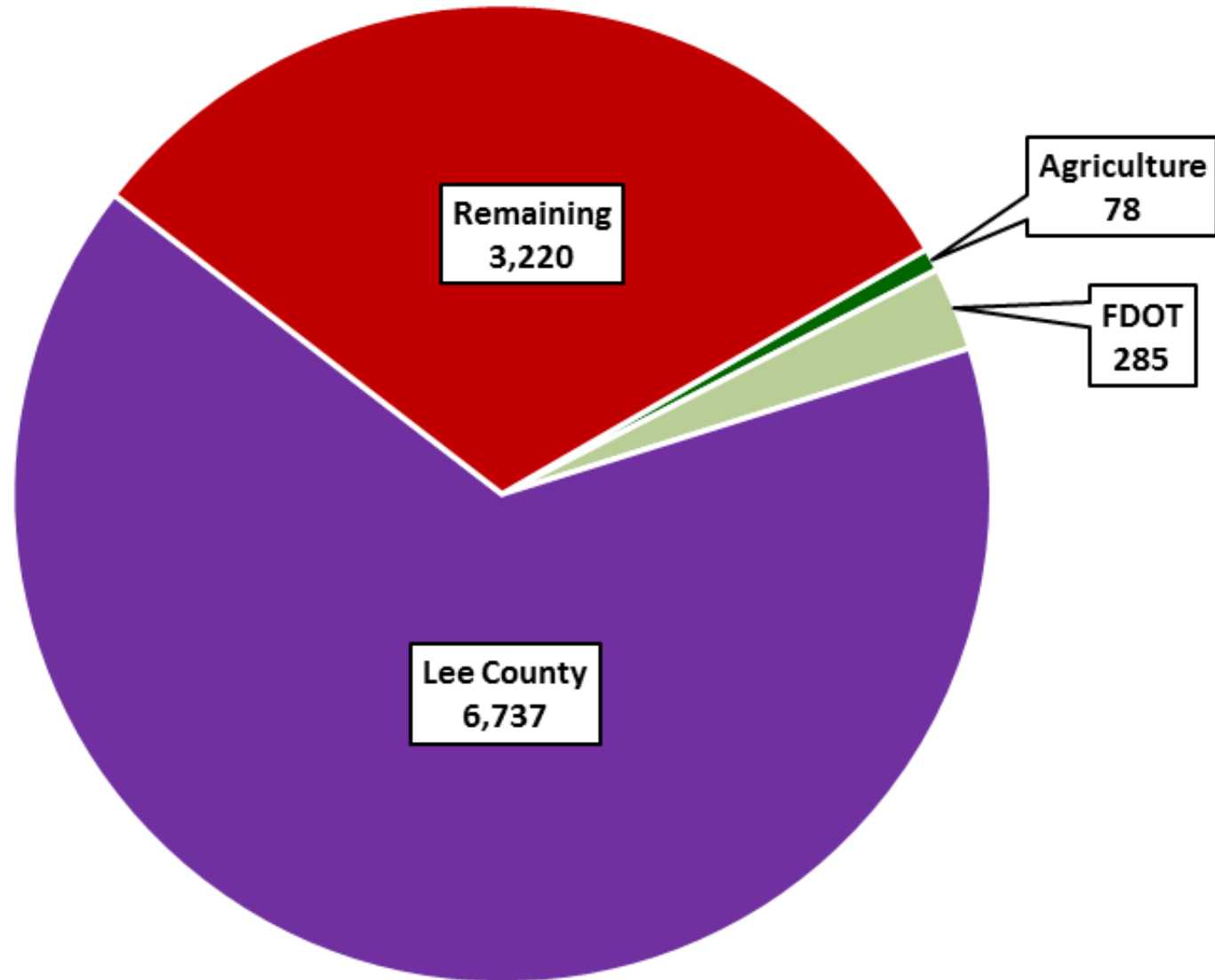
Hendry Creek Progress Toward the TN TMDL





Hendry Creek Progress Toward the TN TMDL

TN Reductions
(lbs/yr)
including
completed
and submitted
projects



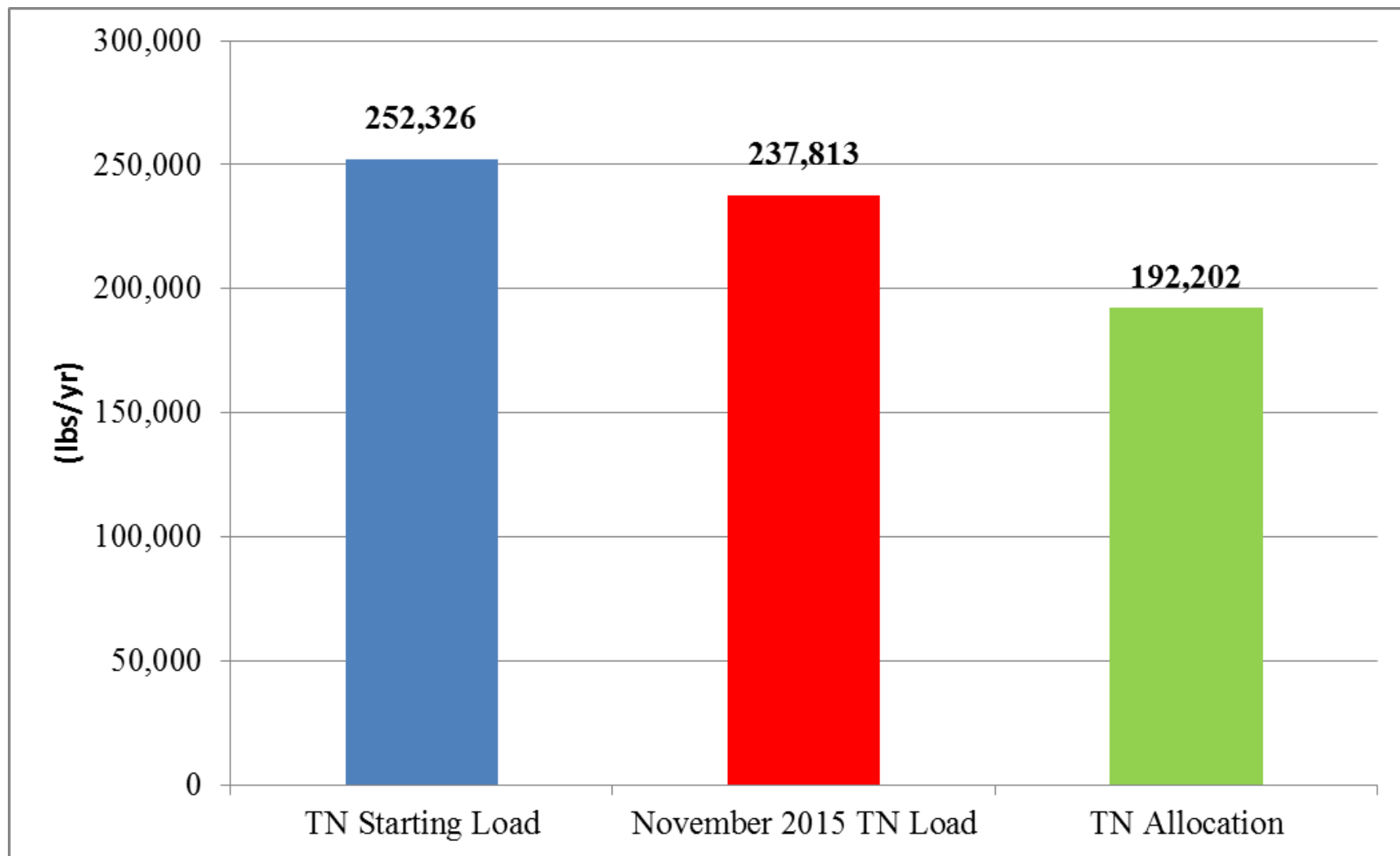


Hendry Creek Progress Toward the TN TMDL

Entity	Reductions (lbs/yr)	Required (lbs/yr)	Remaining (lbs/yr)	%
Agriculture	78	173	95	45
Catalina Community Development District (CDD)	0	0	0	0
Florida Department of Transportation (FDOT)	285	63	-222	452
Lee County	6,737	10,084	3,347	67
Total	7,100	10,320	3,220	69



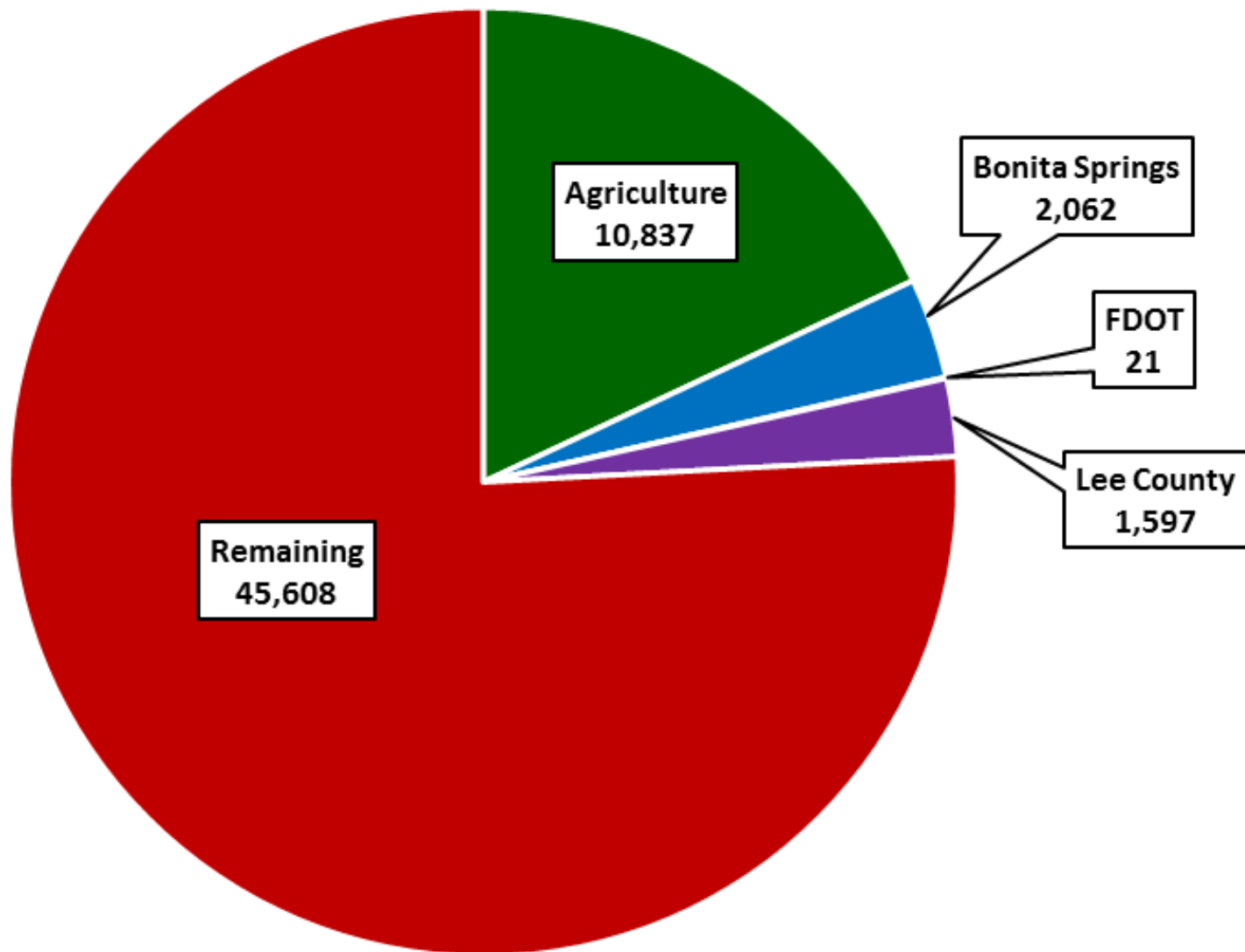
Imperial River Progress Toward the TN TMDL





Imperial River Progress Toward the TN TMDL

TN Reductions
(lbs/yr)
including
completed
and submitted
projects





Imperial River Progress Toward the TN TMDL

Entity	Reductions (lbs/yr)	Required (lbs/yr)	Remaining (lbs/yr)	%
Agriculture	10,837	48,570	37,733	22
Bonita Springs	2,062	9,903	7,841	21
FDOT	21	95	74	22
Lee County	1,597	1,556	-41	103
Total	14,517	60,125	45,608	24



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Hendry Creek Activities During the Reporting Period





2015 Completed Efforts

- Lee County: Increased street sweeping efforts
- Various on-going efforts continue:
 - Public education
 - Street sweeping and maintenance
 - Local ordinances for source control
 - Agricultural producers are required to enroll in best management practices (BMPs) or conduct monitoring



“Fertilize Smart” Billboard in Lee County





Lakes Park Filter Marsh in Lee County





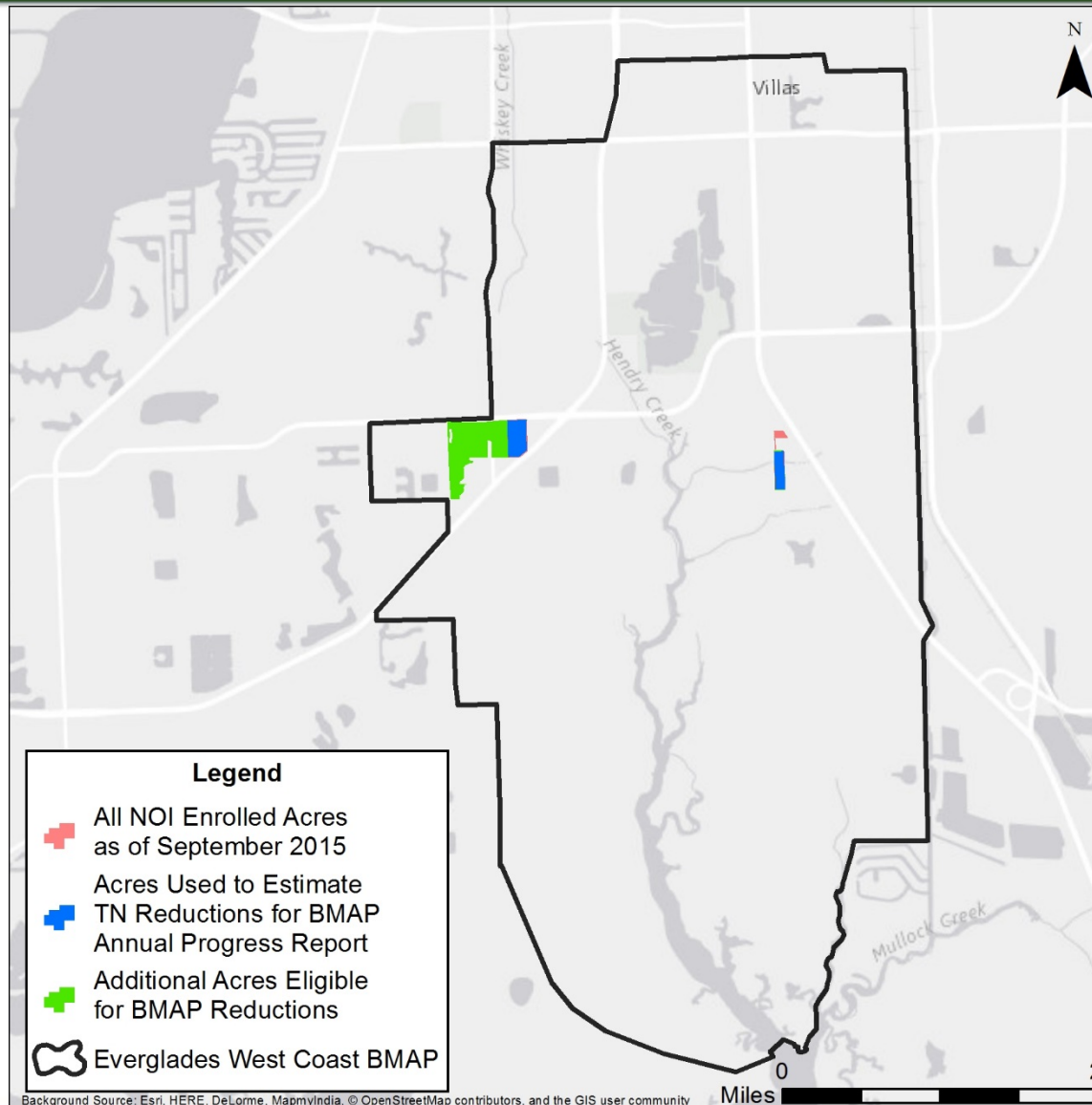
Hendry Creek Agricultural Lands Enrollment

CATEGORY	ACRES
Total Agricultural Acres in BMAP	98
FDACS Adjusted Agricultural Acres in BMAP	91
BMAP Phase I FDACS Enrollment Goal (50%)	45
Enrolled Acres Used for TN Reduction Estimates	27
BMAP Phase I remaining acres to enroll	18
Total Remaining Acres To Enroll	71

Estimated TN Reduction 78 lbs/yr



Hendry Creek Agricultural Lands Enrollment





Summary of Hendry Creek Reductions in Reporting Period

December 2014 to November 2015

ENTITY	PROJECT NUMBER	PROJECT NAME	TN REDUCTION (LBS/YR)
Lee County	LC-2	Street Sweeping – additional reductions	148
TOTAL	N/A	TOTAL REDUCTIONS IN REPORTING PERIOD	148



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Imperial River Activities During the Reporting Period





2015 Efforts

- City of Bonita Springs--Two Projects Underway:
 - Woodchip Bio-Reactor
 - Pine Lake Preserve Re-Hydration
 - ~Reductions will be included in a future report
- Lee County
 - Increased street sweeping
 - Fertilizer ordinance inspections
 - Fertilize Smart campaign



City of Bonita Springs 2015 Florida Yards & Neighborhoods Workshop





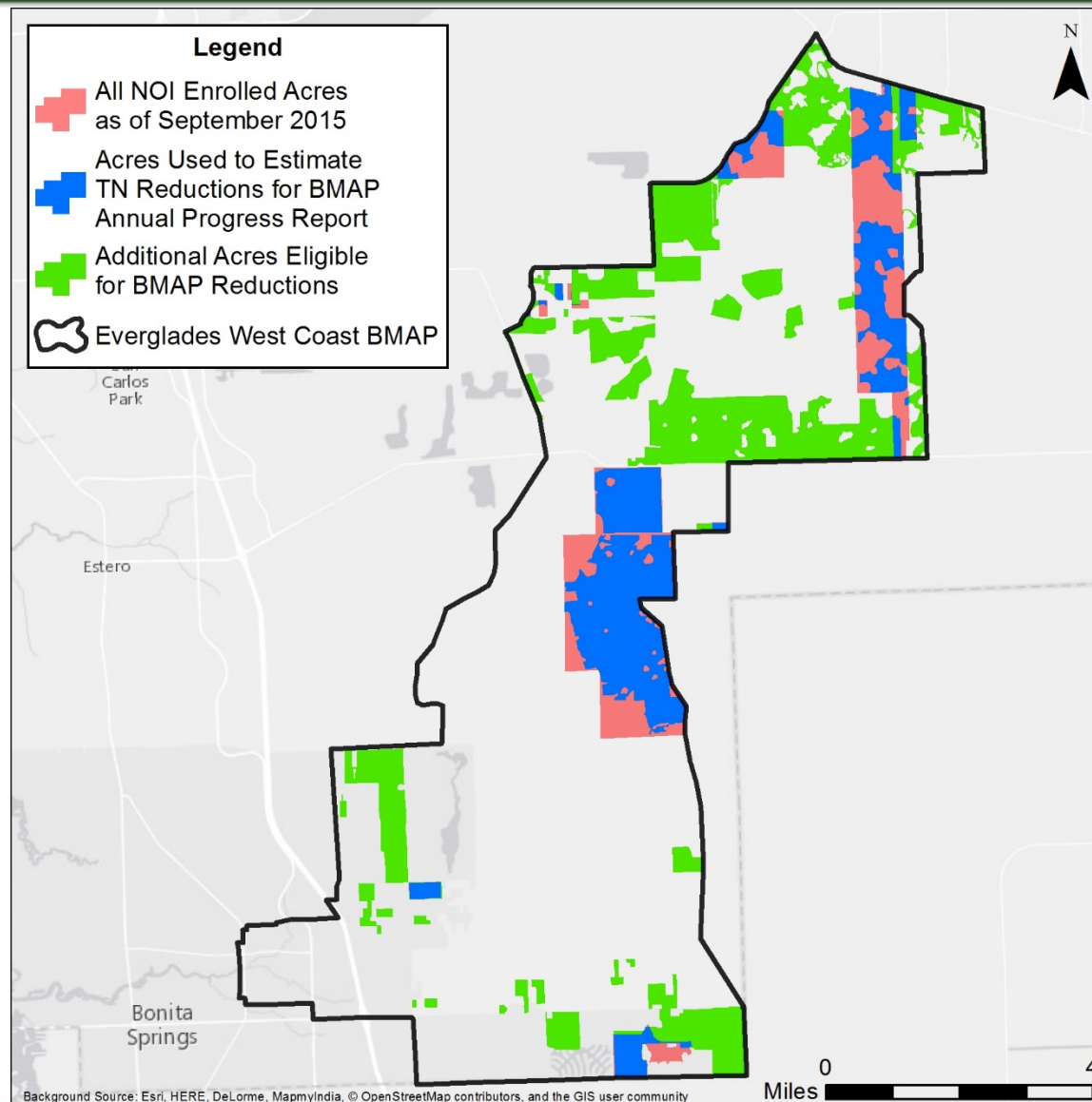
Imperial River Agricultural Lands Enrollment

CATEGORY	ACRES
Total Agricultural Acres in BMAP	11,605
FDACS-Adjusted Acres for Enrollment	6,586
BMAP Phase I FDACS Enrollment Goal (50%)	3,293
Enrolled Acres Used for TN Reduction Estimates	4,399
BMAP Phase I Remaining Acres To Enroll	0
Total Remaining Acres To Enroll	7,286

Estimated TN Reduction 10,837 lbs/yr



Imperial River Agricultural Lands Enrollment





Summary of Imperial River Reductions in Reporting Period

December 2014 to November 2015

ENTITY	PROJECT NUMBER	PROJECT NAME	TN REDUCTION (LBS/YR)
Lee County	LC-3	Street Sweeping – additional reductions	35
Agriculture	N/A	Agricultural BMPs – additional reductions	882
TOTAL	N/A	TOTAL REDUCTIONS IN REPORTING PERIOD	917



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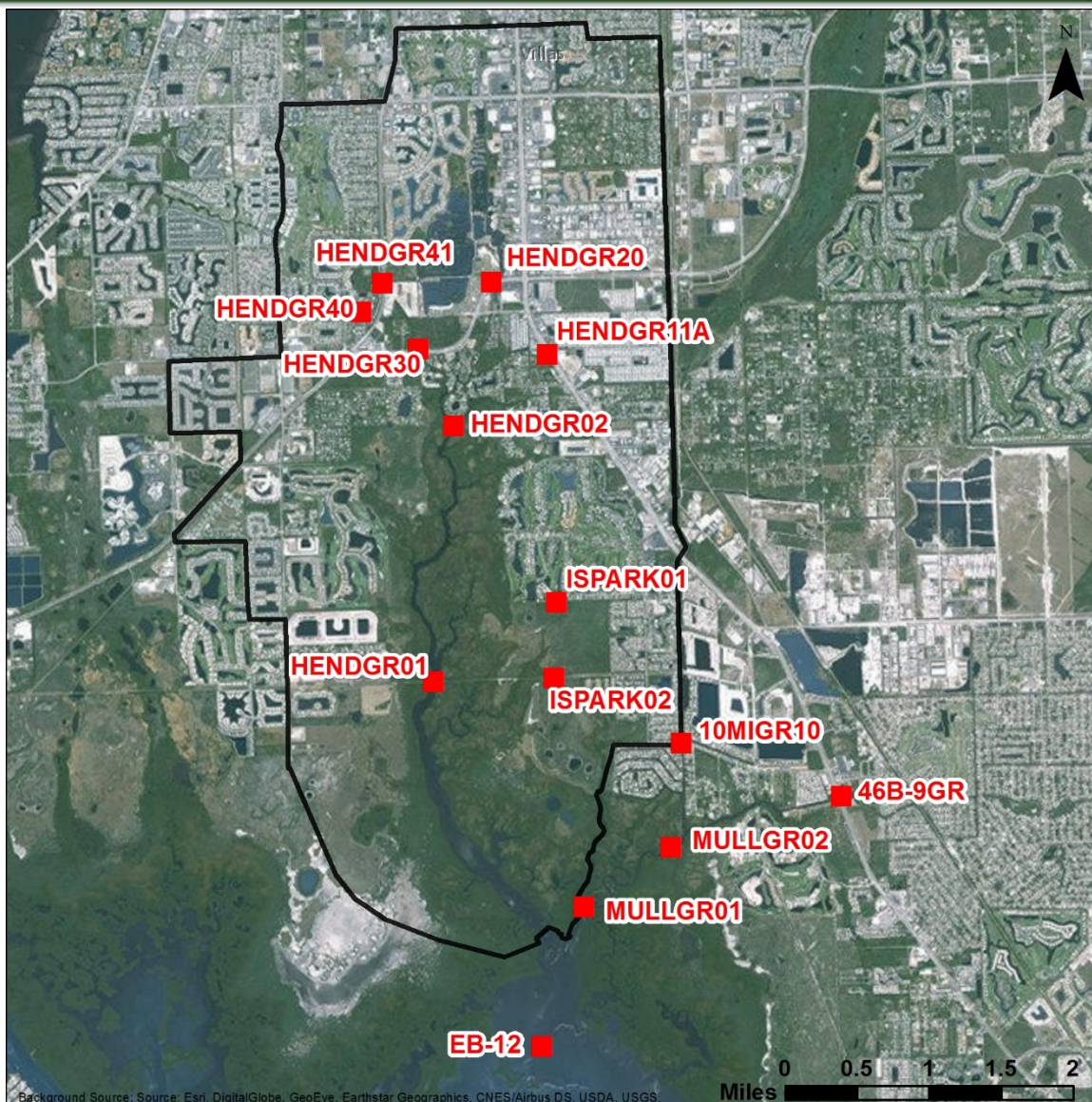
Monitoring Program Update





Monitoring – Hendry Creek

- Hendry Creek water quality monitoring is being conducted by:
 - Lee County
 - DEP-South Regional Operations Center (ROC)





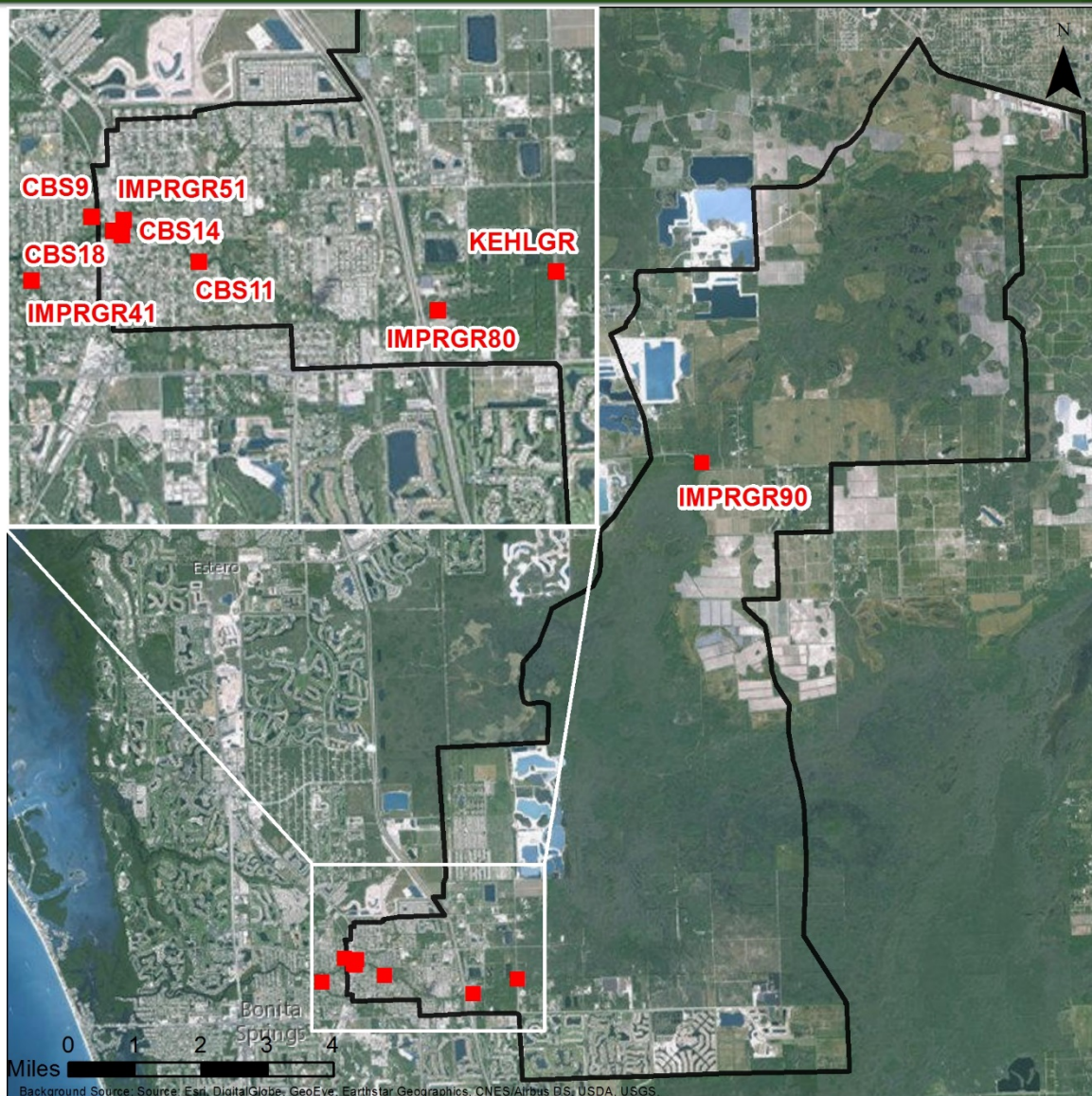
Hendry Creek Data Availability

Agency	Tier	Type	Station ID	Available Period of Record (POR)
DEP & Lee County	1	River	HENDGR01 **	6/2010 - 12/2013
DEP & Lee County	1	River	HENDGR02 **	3/2003 - 10/2014
Lee County	1	Watershed	ISPARK02	10/2003 – 10/2014
Lee County	1	Watershed	ISPARK01	10/2003 - 11/2014
Lee County	1	River	HENDGR30	1/2000 - 10/2014
Lee County	1	Watershed	HENDGR20*	1/2000 - 10/2014
Lee County	1	Watershed	HENDGR11A	7/2008 - 10/2014
Lee County	1	Watershed	HENDGR40	8/2007 - 10/2014
Lee County	1	Watershed	HENDGR41	10/2011 – 10/2014
DEP & Lee County	2	River-Mullock	MULLGR01 **	3/2003 - 10/2014
DEP & Lee County	2	River-Mullock	MULLGR02 **	3/2003 – 10/2014
Lee County	2	River-Ten Mile	10MIGR10	1/2000 - 9/2014
Lee County	2	Watershed-Mullock	46B-9GR	1/2000 - 11/2014
Lee County	2	Estero Bay	EB-12	3/2000 – 11/2014



Monitoring – Imperial River

- Imperial River water quality monitoring is being conducted by:
 - City of Bonita Springs
 - Lee County
 - DEP-South ROC





Imperial River Data Availability

Agency	Tier	Type	Station ID	Available POR
Bonita Springs	1	River	CBS 11	8/2009 - 12/2015
Bonita Springs	1	Watershed	CBS 14 *	10/2010 - 9/2015
Bonita Springs	1	River	CBS 18	10/2011 - 12/2015
Lee County	1	River	KEHLGR *	8/2003 – 10/2014
Lee County	1	Watershed	IMPRGR90 **	8/2000 - 10/2014
Lee County	1	River -Leitner Creek	IMPRGR51	10/2011 - 10/2014
Lee County	1	River	IMPRGR80	1/2004 - 10/2014
Bonita Springs	2	River- Marine	CBS 9	1/2008 - 9/2015
Lee County	2	River -Oak Creek	IMPRGR41	10/2011 - 10/2014

* Stations that are currently listed as an NPDES outfall station; the station data will not be included in any ambient monitoring analysis.

** Stations will continue to only be sampled every other month.



Water Quality (WQ) Analyses

- Time series and trend analyses of monthly TN concentration data were conducted for Everglades West Coast Stations with adequate available data
- **We need to work together to get all pertinent data uploaded so it can be used for future analyses**



WQ Analyses Approach

- All data were filtered to only include surface water grab samples, which included water depths between 0.1 meters (m) and 0.6 m
- All non-detect TN data were converted to $\frac{1}{2}$ *minimum detection limit (MDL)
- Monotonic trend analyses used the non-parametric Mann-Kendall test to identify trends in a statistically rigorous way



WQ Analyses Approach

- Annual geometric means (AGMs) were calculated using monthly values for each year in the POR for data available since January 2000
- AGMs are less sensitive to outliers than annual arithmetic mean and more appropriate for comparing to targets/standards
- AGMs were overlaid on top of the long term time series and trend results

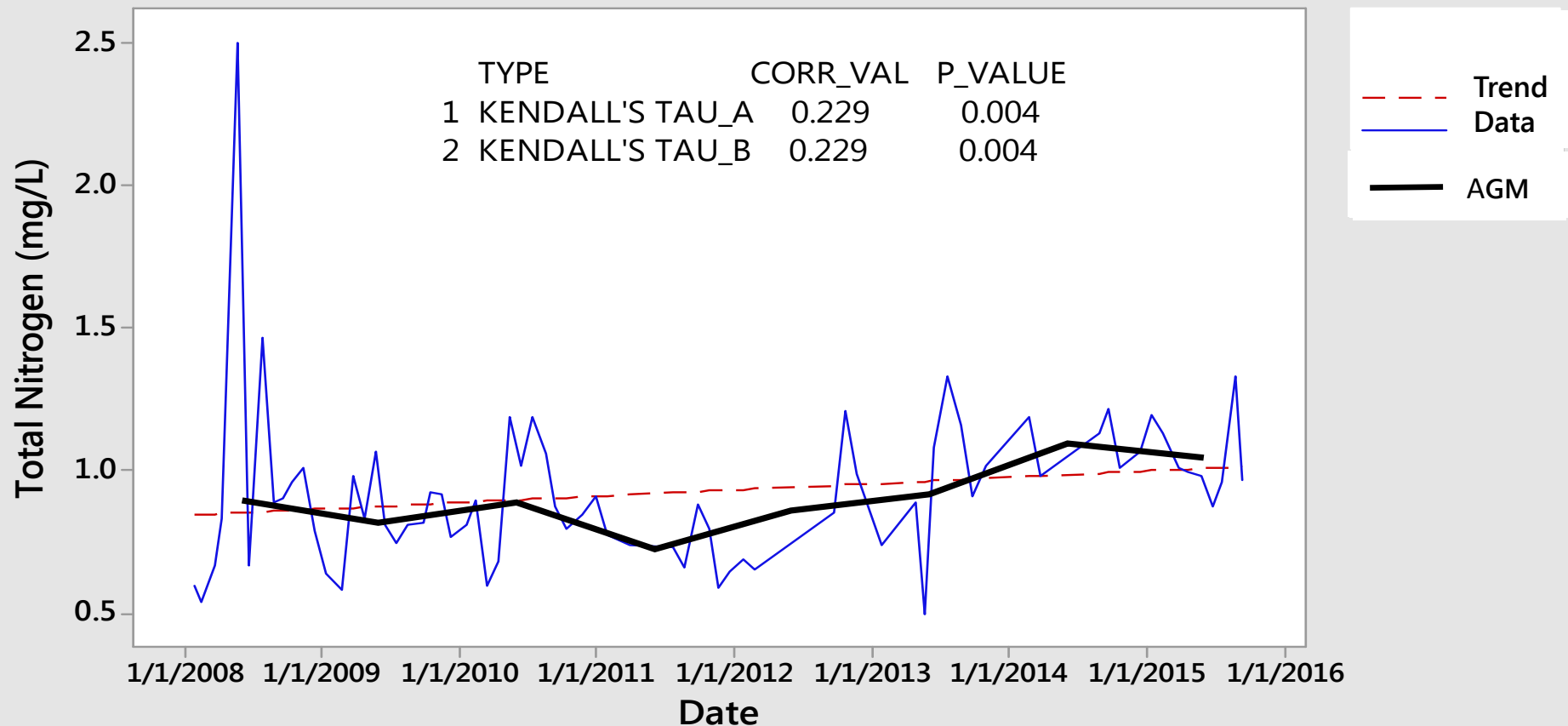


Bonita Springs CBS 9

Mann-Kendall Test For trend (Station CBS 9)

SEN-THEIL-KENDALL LINE

SLR LINE





CBS 9 Annual Geometric Means

*CBS 9 has data gaps in 2011, 2012, 2013, and 2014

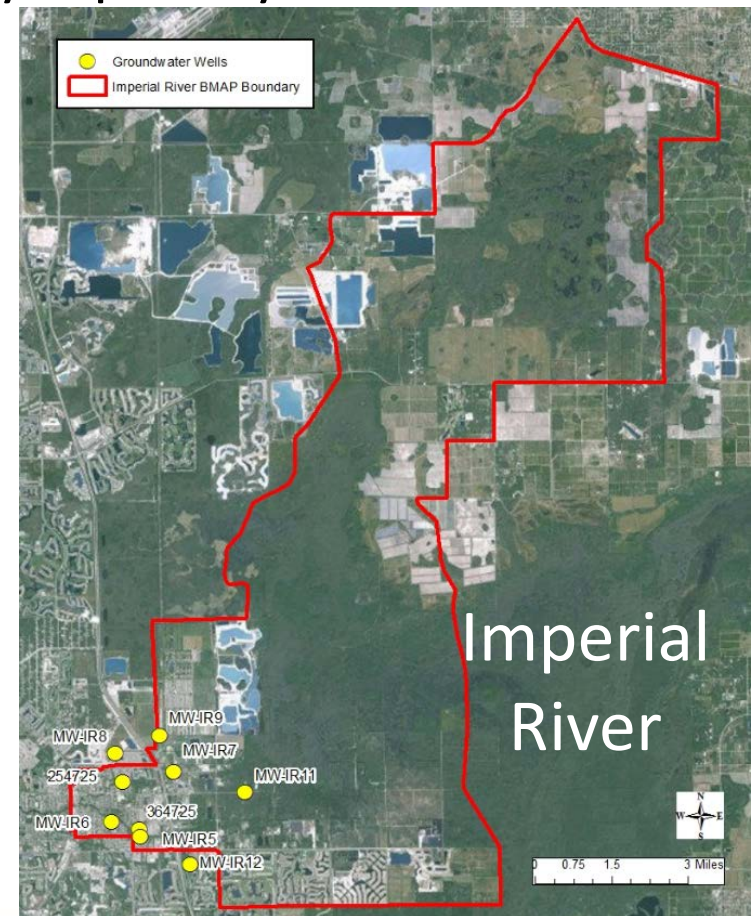
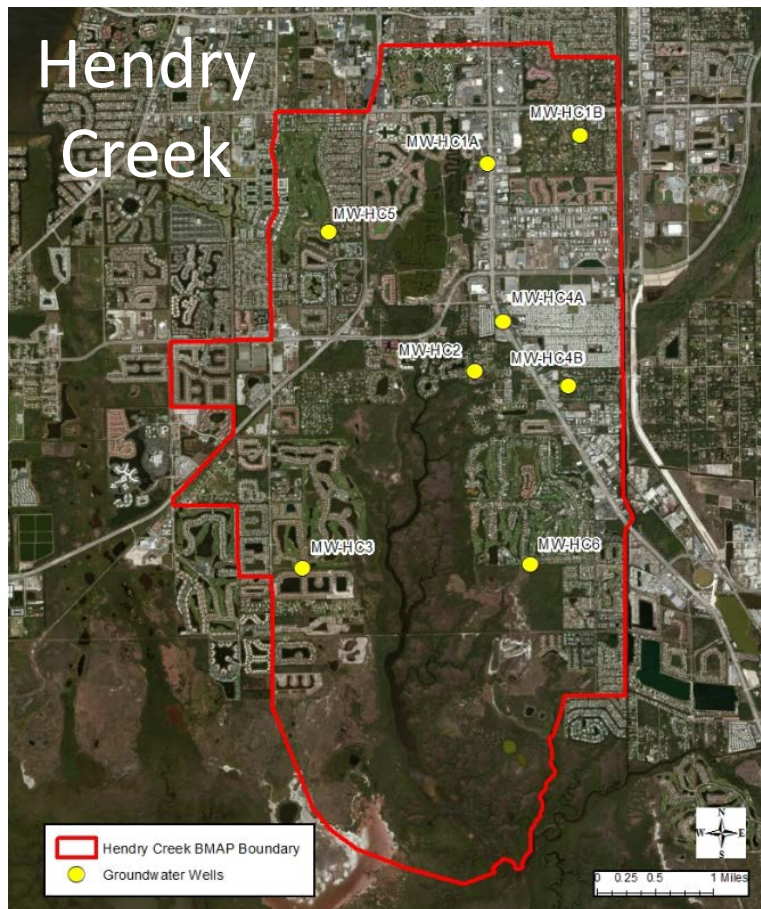
**Data for site CBS 9 are only through September of 2015

TN Annual Geometric Means	
Year	Station CBS 9*
2008	0.90
2009	0.82
2010	0.89
2011	0.72
2012	0.86
2013	0.92
2014	1.10
2015**	1.04



Ground Water Study

- Two-Years of Monitoring Completed
 - Additional sampling event in March 2016
 - Results being compiled into a study report by DEP





Ground Water Study

- Draft results presented include sampling through July 2015

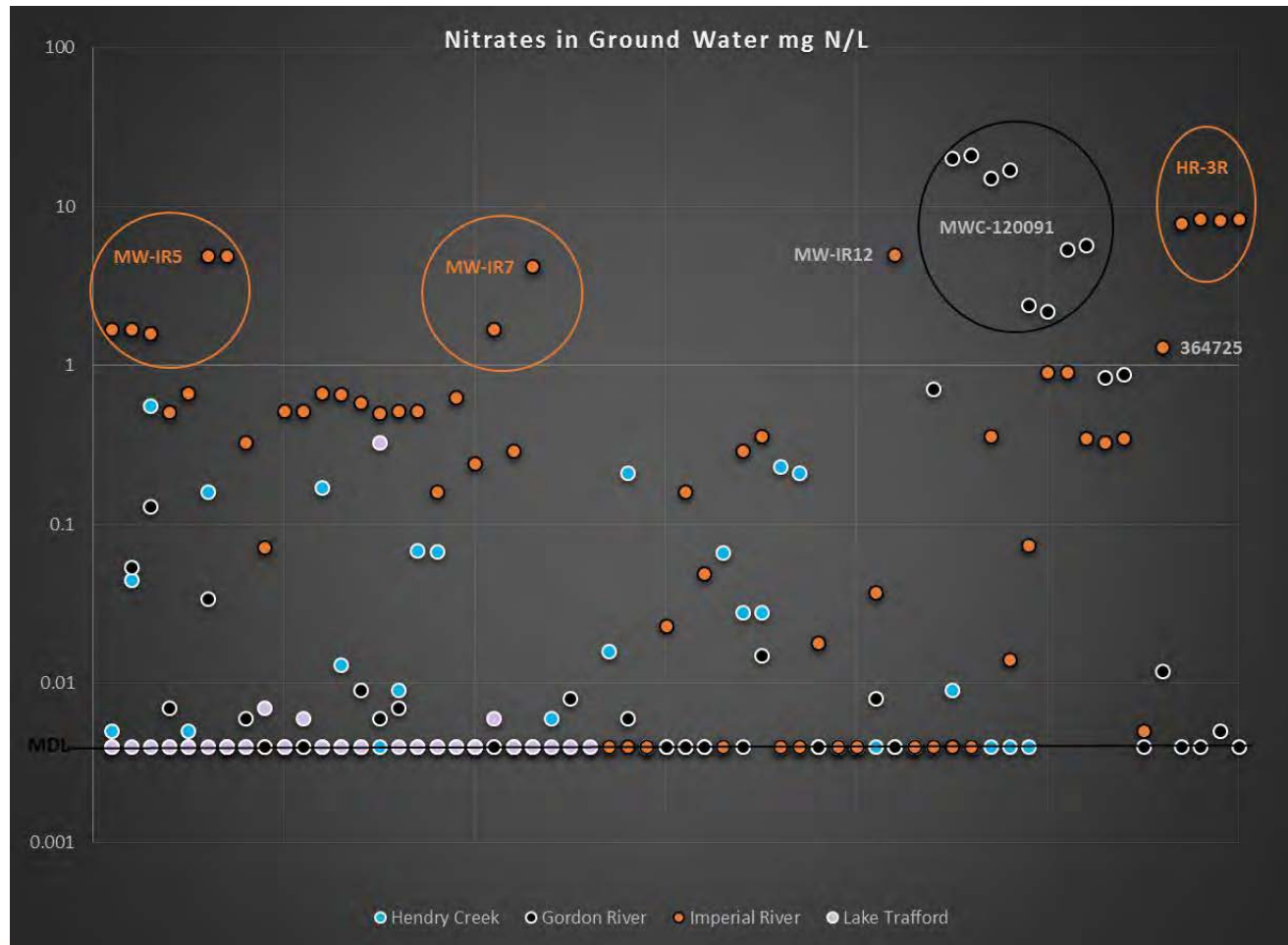
Well Group	Temperature ° Centigrade	Specific Conductance mS/cm	pH standard units	DO % saturation	ORP mV
Hendry Creek	26.3 – 30.5 Avg. 28.4	258 – 1255 Avg. 642	6.80 – 7.02 Avg. 6.92	1.7 – 8.9 Avg. 3.3	-150.0 – -24.0 Avg. -80.0
Imperial River	26.8 – 30.6 Avg. 28.3	150 – 836 Avg. 360	6.76 – 7.36 Avg. 6.98	2.1 – 53.5 Avg. 16.0	-197.0 – 140.4 Avg. -4.48
Gordon River	23.7 – 30.9 Avg. 26.9	427 – 5871 Avg. 1415	6.45 – 7.09 Avg. 6.86	2.5 – 18.3 Avg. 10.3	-256.0 - -13.0 Avg. -137.0
Lake Trafford	26.0 – 28.8 Avg. 26.9	84 – 792 Avg. 418	5.62 – 6.98 Avg. 6.37	2.9 – 38.1 Avg. 13.8	-75.0 - -10.0 Avg. -32.0

Range and average values in ground water purged
prior to sampling for each well group



Ground Water Study – Nitrite + Nitrate (NO_2/NO_3)

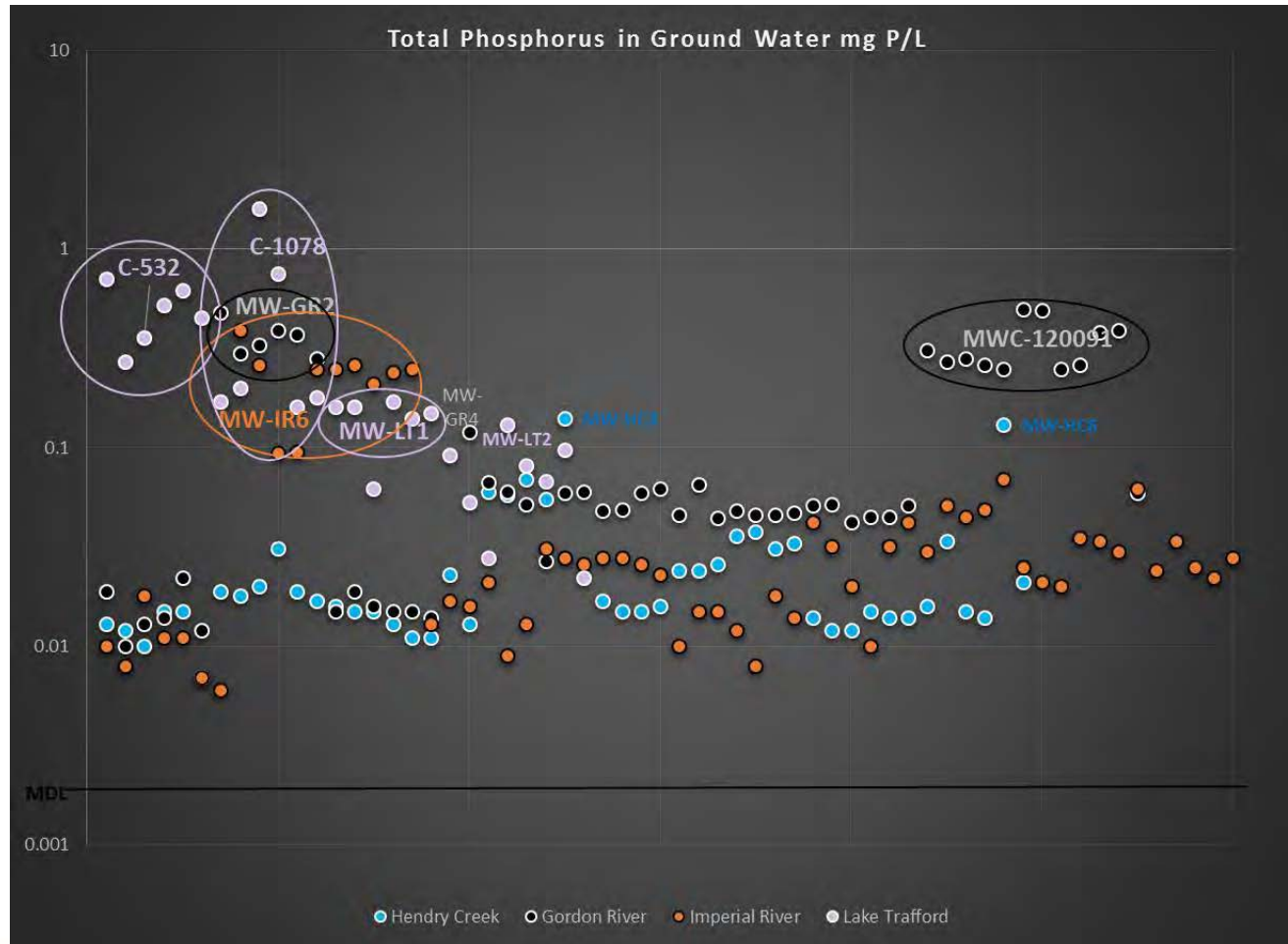
- Draft results for NO_2/NO_3 concentrations trended non-detect or at trace levels in 22 of the 32 wells





Ground Water Study – Total Phosphorus (TP)

- Draft results show highest TP concentrations are NOT collocated with the highest NO_2/NO_3 concentrations





Ground Water Study – Ammonia (NH_3)

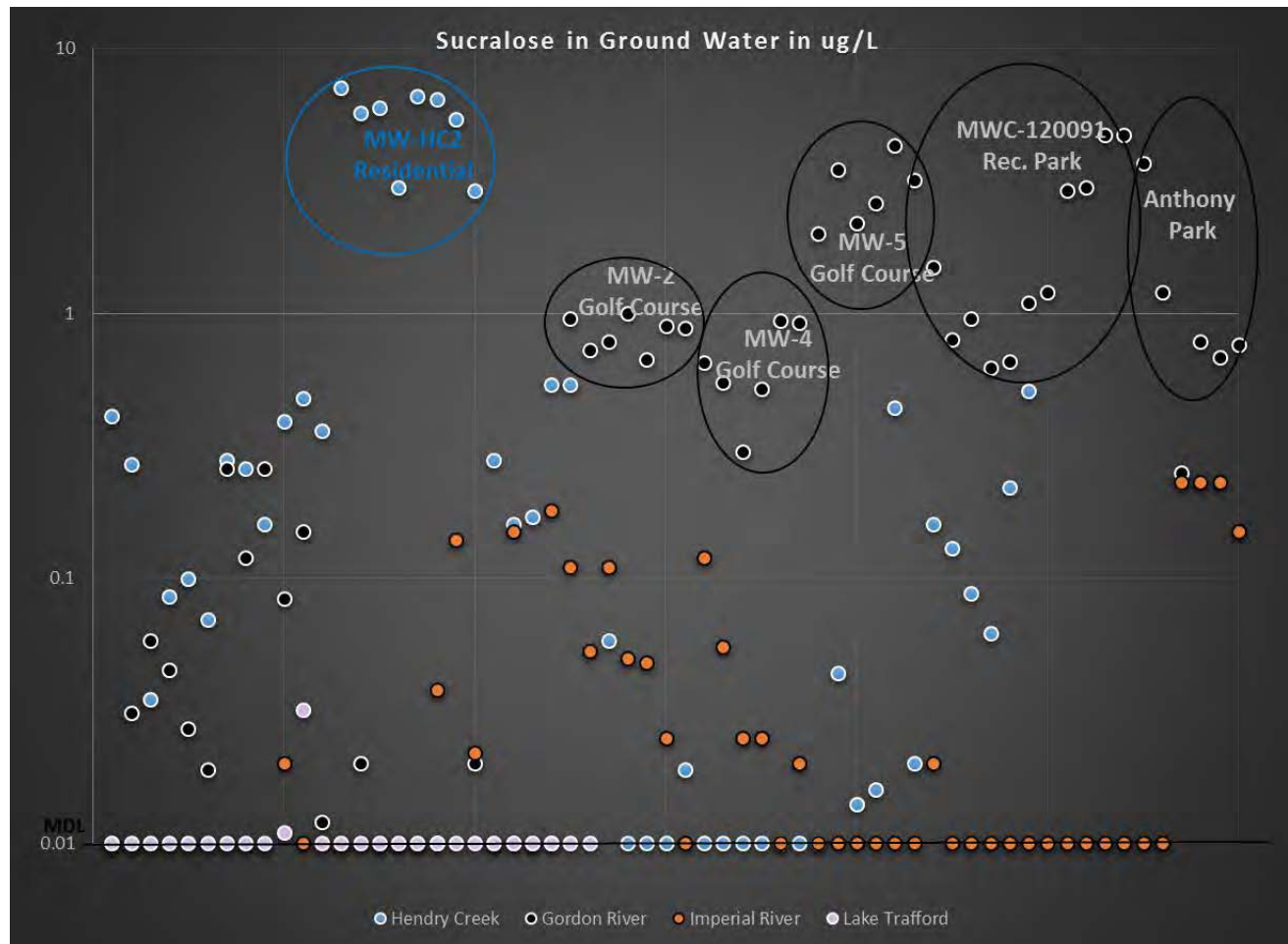
- Draft results show ammonia concentrations greater than 0.1 mg N/L in 22 of the 32 monitor wells
- Highest concentrations of ammonia were detected in two Hendry Creek monitor wells (average concentration of ~ 3 mg/L N) and one Gordon River monitor well (average concentration of ~ 5 mg/L N)





Ground Water Study - Sucralose

- Draft results show sucralose present in all but nine monitor wells





Questions About Monitoring?





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Next Steps





New Requirements

- Revisions to Section 373.4595, Florida Statutes (F.S.) during 2016 Legislative session
- New requirements for Northern Everglades watersheds
 - Lake Okeechobee
 - Caloosahatchee
 - St. Lucie
- Enhanced integration of Water Management District (WMD) protection plans and BMAPs
- Additional reporting
 - 5-year BMAP progress reports
 - Annual Northern Everglades Coordinating Agencies Report



New Requirements

New elements for Northern Everglades and Estuaries Protection Program (NEEPP) BMAPs

- Projects to achieve the TMDL in 20 years
- 5-year milestones to measure progress
- 5-year progress report

New elements for all new or revised BMAPs

- Additional Project Information
- Additional Funding information



- [illegible]



Project Information Collection

- To date, received information on 18 projects
- Project Types: Aquatic Plant Harvesting, Water Farming, Managed Aquatic Plan Systems (MAPS), Stormwater Treatment Areas (STAs), Baffle Boxes, Dispersed Water Management (DWM), and Alum Treatment
- Schedules: April 2016 through April 2028
- Cost: \$75,000 to \$124,000,000
- Annual O&M: \$1,500 to \$5,500,000
- Acres Treated: 14.5 to 35,000
- Estimated TN Reductions: 0 to 110,025 lbs/yr
- Estimated TP Reductions: 1 to 18,471 lbs/yr



Action Items

- Comments on the draft annual report due Friday, April 8th, 2016
- Storage and Retrieval (STORET) database uploads completed
- Continue water quality analyses
- Next annual meeting Spring 2017
- Development of Phase II BMAP
- Continue project information collection
- Muddy Water Blues event April 26, 2016



Contact Information

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Florida Department of Environmental Protection

Regional Watershed Working Group





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