

Everglades West Coast Basin BMAPS

Technical Meeting

Wednesday, February 23, 2010, 1:30 – 3:30 pm.
Southwest Florida Regional Planning Council
First Floor Conference Room
1926 Victoria Avenue, Fort Myers, FL 33901

Agenda

1. Welcome and Opening Remarks
2. Draft Annual TN Loadings
3. Hypothetical TN Allocation
4. Nutrient Reduction Projects
5. Next Steps

Hendry Creek Watershed

REVISED



REVISED

Imperial River Watershed Sub Basin

-  Imperial River FINAL
-  Leitner Creek Watershed
-  Counties
-  FDOT1 Imperial River ROW
-  Interstates
-  US Routes
-  Special Districts
-  Bonita Springs
-  Caloosahatchee Basin

0 0.5 1 2 Miles
Scale: 1:800,000



Map prepared December 17, 2008 by the Bureau of Watershed Protection, Division of Environmental Management and Information. This map is neither legal nor binding purposes. For more information or copies, contact Florida Highway Department, or visit the Florida Department of Transportation website.



Surf
of
Mexico

BMAP Milestones

1. Consensus Watershed Boundary 
2. Designation of BWG Members 
3. Current Stakeholder Loadings 
4. Initial Stakeholder Allocations
5. Adjusted Stakeholder Allocations
6. Stakeholder Required Reductions
7. List of Projects and Management Actions
8. “Standardized” Estimate of Load Reductions
9. Draft BMAP Documents
10. BMAP Commitments

Everglades West Coast Basin BMAPS

DRAFT ANNUAL TN LOADINGS

Allocation Calculations

- Determine the latest and most exact contributing watershed areas for Hendry Creek and Imperial River Watershed.
- These areas are input into the computer model and are a major determining factor of the modeled watershed runoff (flow).

Detailed Allocation Details

● **Allocation**

- Identify Entities & Geographic Areas of Responsibility

Allocation = relative proportion of loads

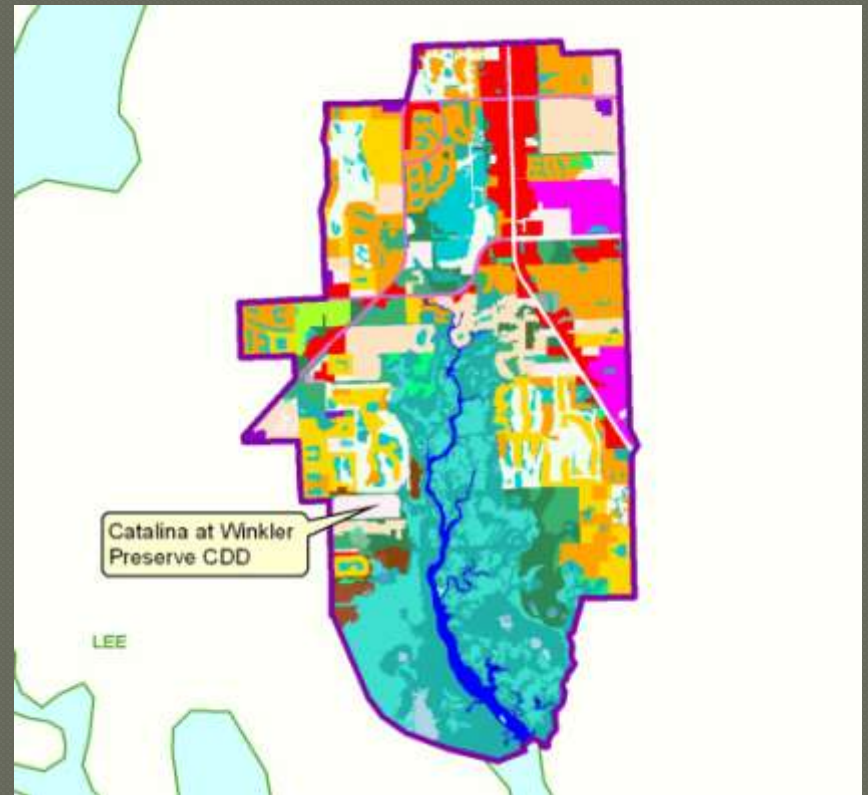
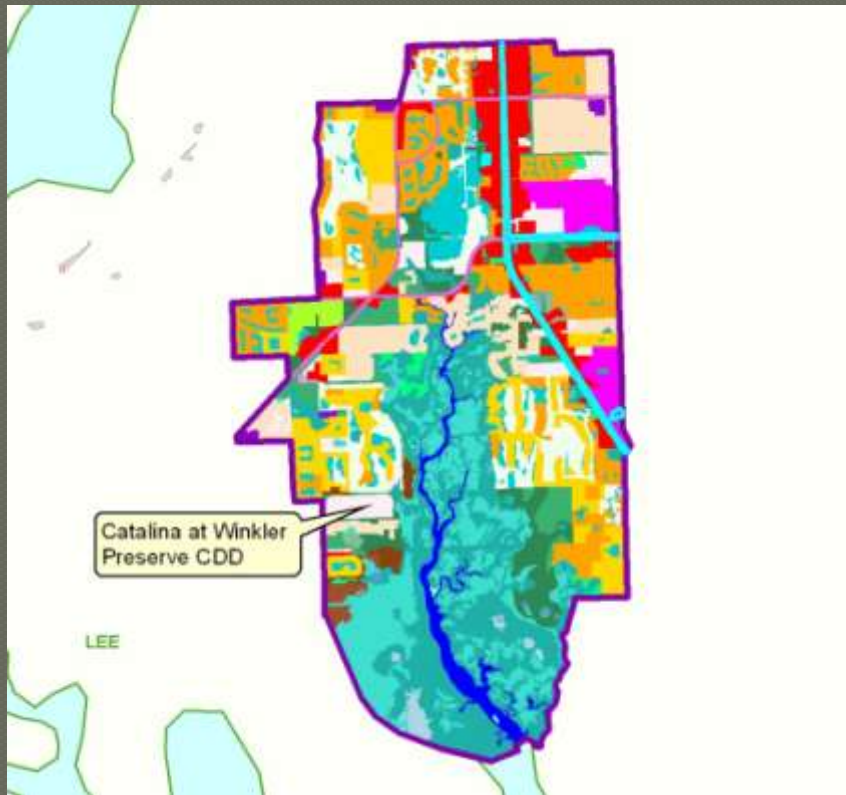
Required reduction = implementation obligation

Stakeholders – Hendry Creek

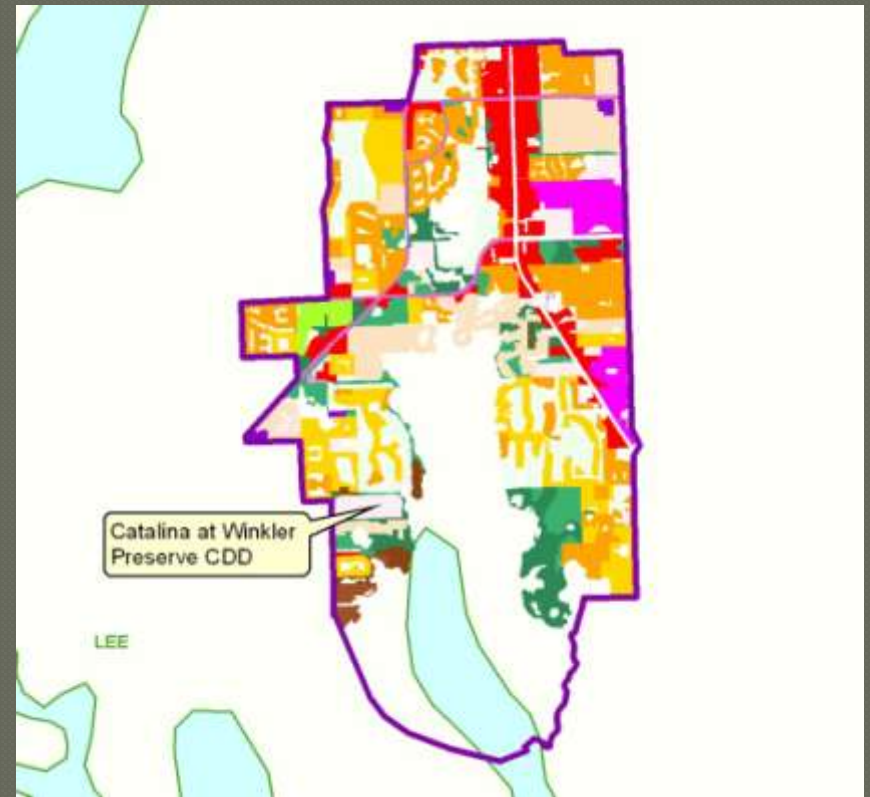
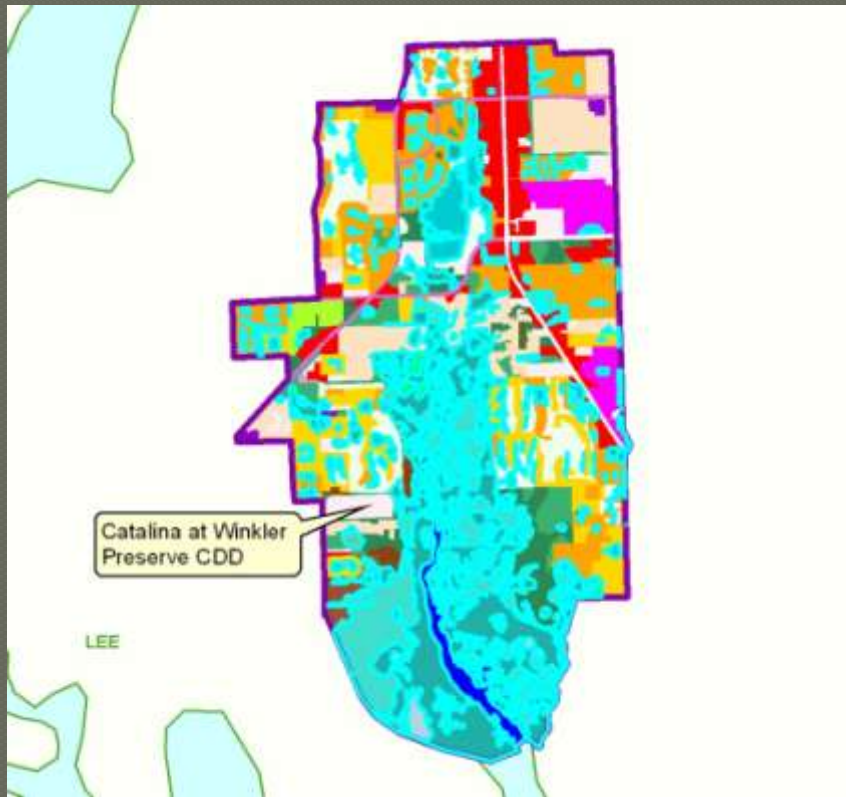
- ◉ Lee County
- ◉ Catalina at Winkler CDD
- ◉ FDOT
- ◉ FDACS

GIS Processing Steps

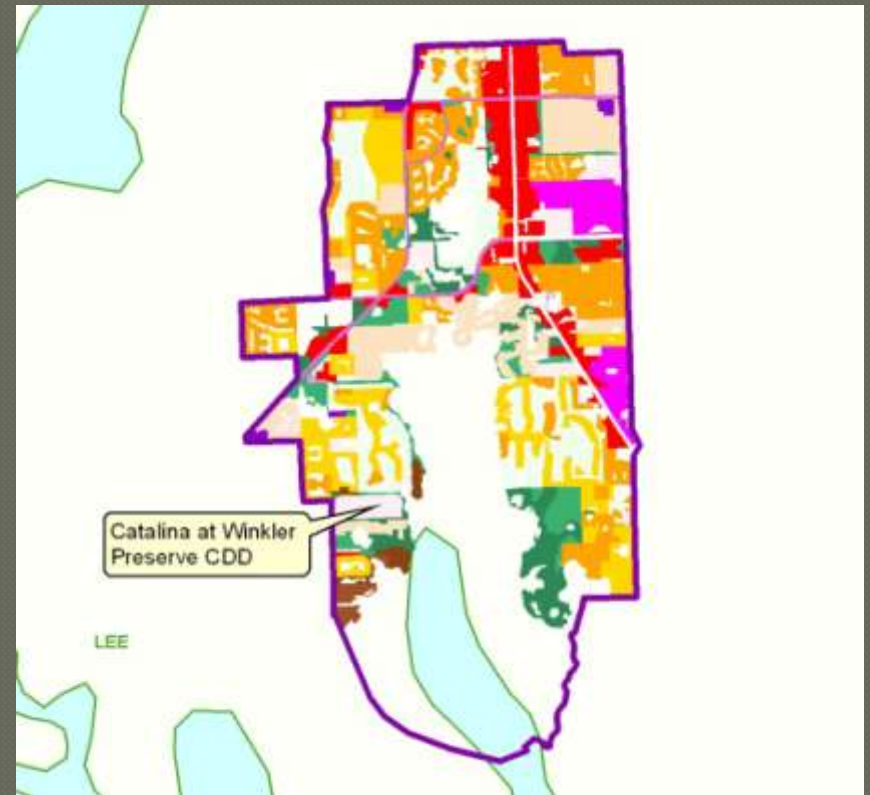
FDOT Roads Removed



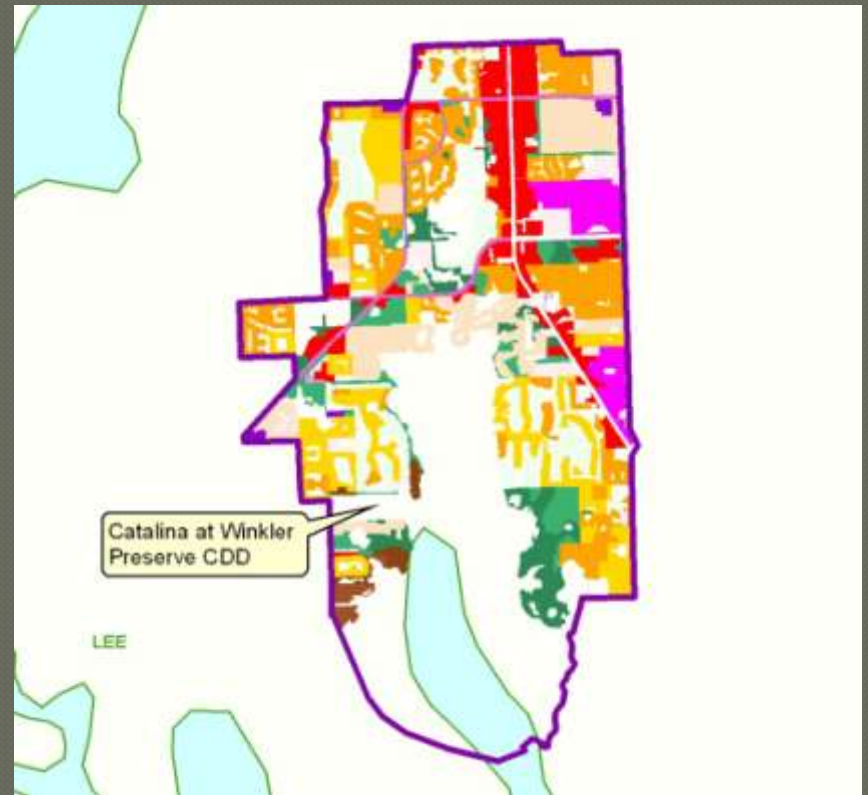
Water and Wetlands Removed



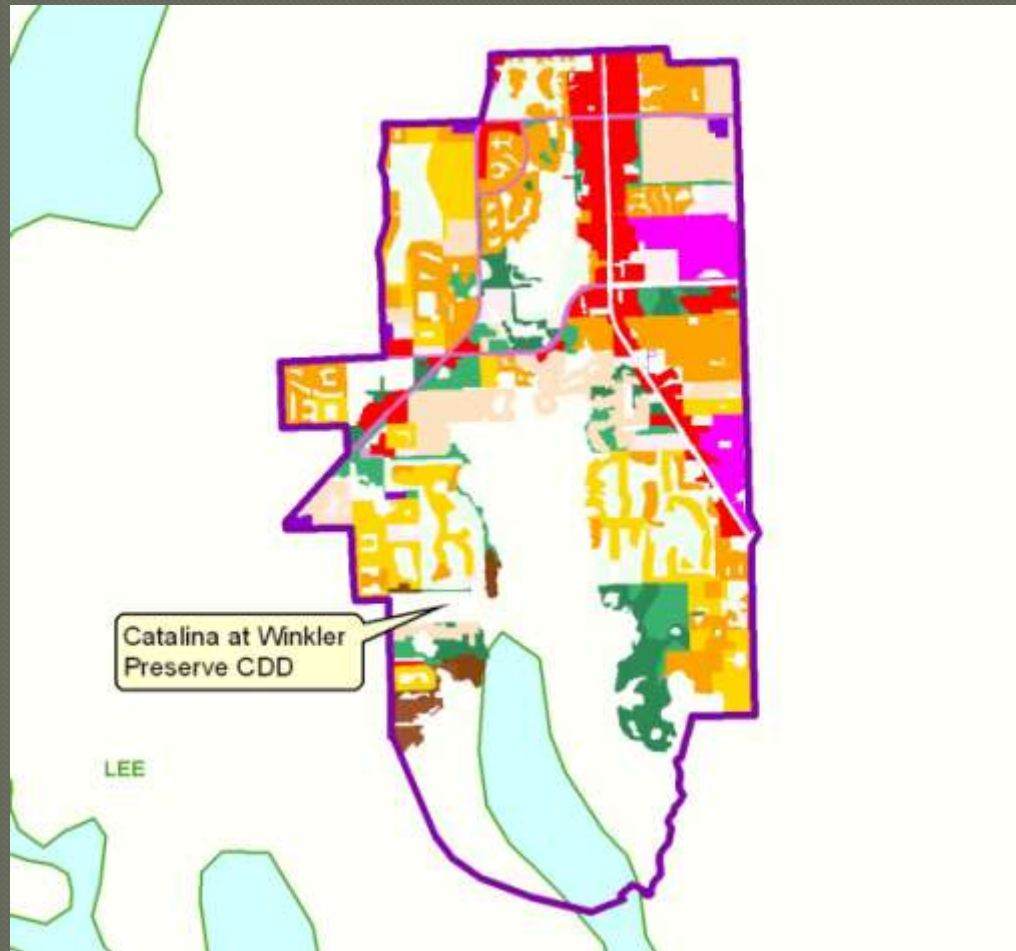
Agriculture Removed



Jurisdictions Removed



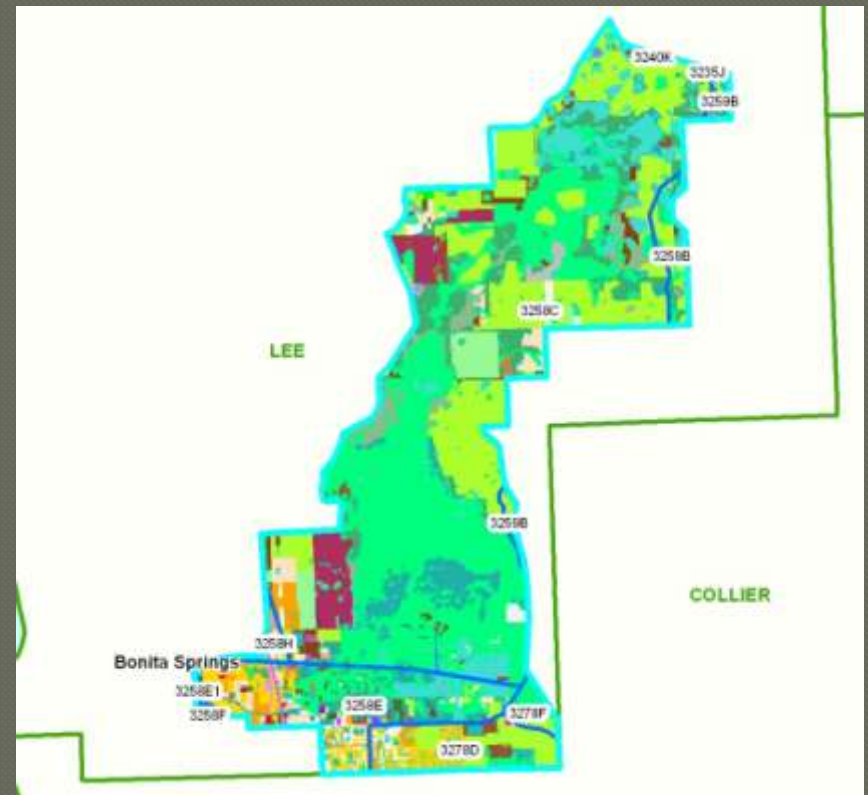
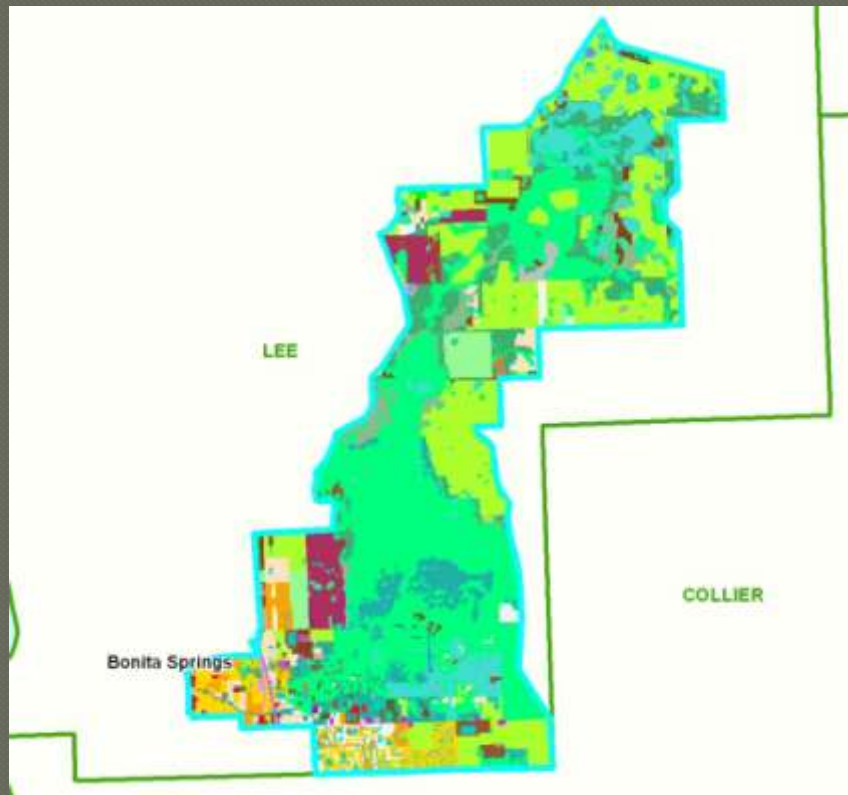
Reminder – Lee County



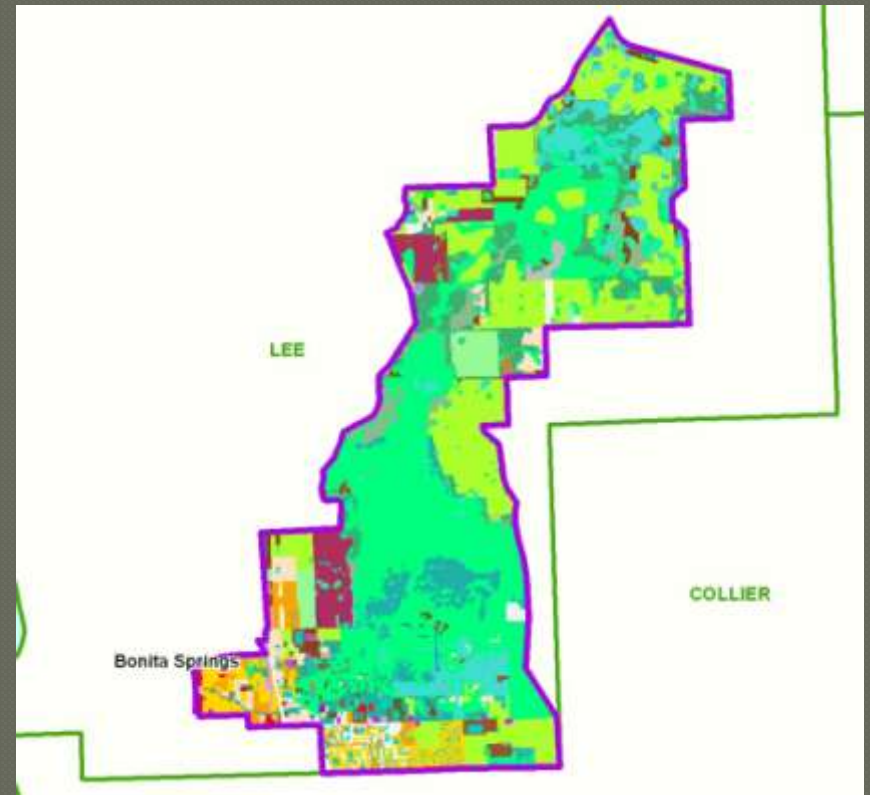
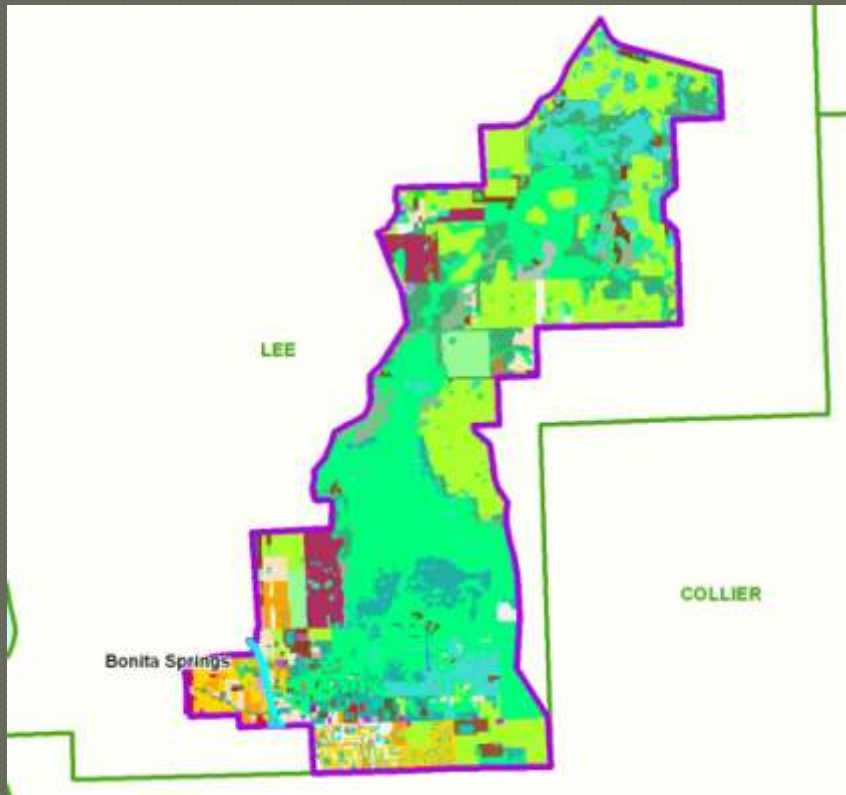
Stakeholders - Imperial River

- ◉ Lee County
- ◉ City of Bonita Springs
- ◉ FDACS
- ◉ FDOT

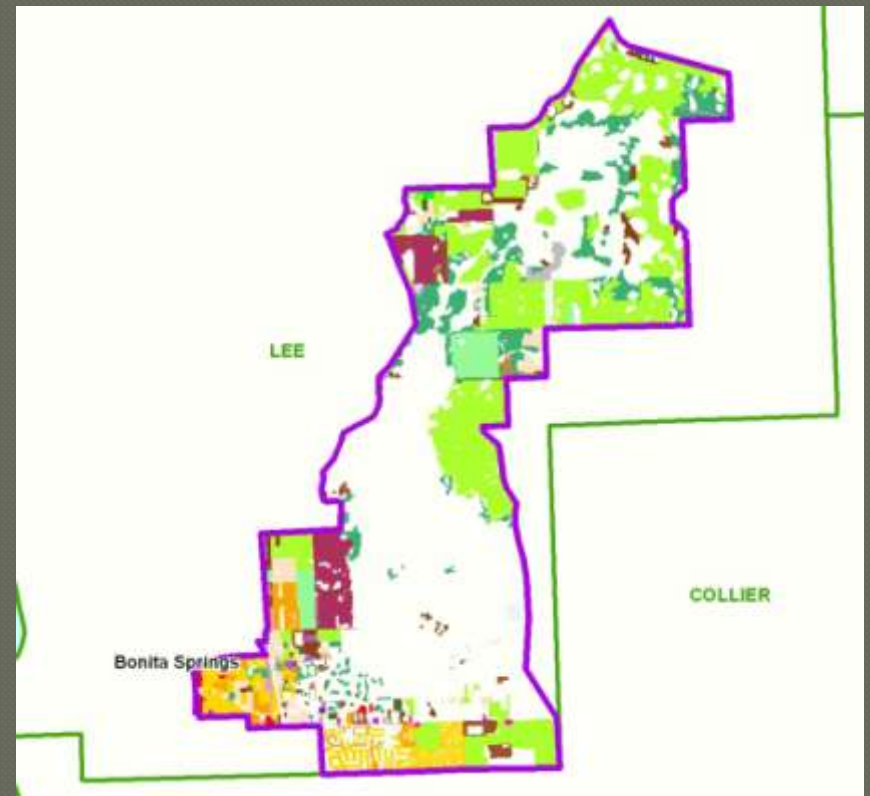
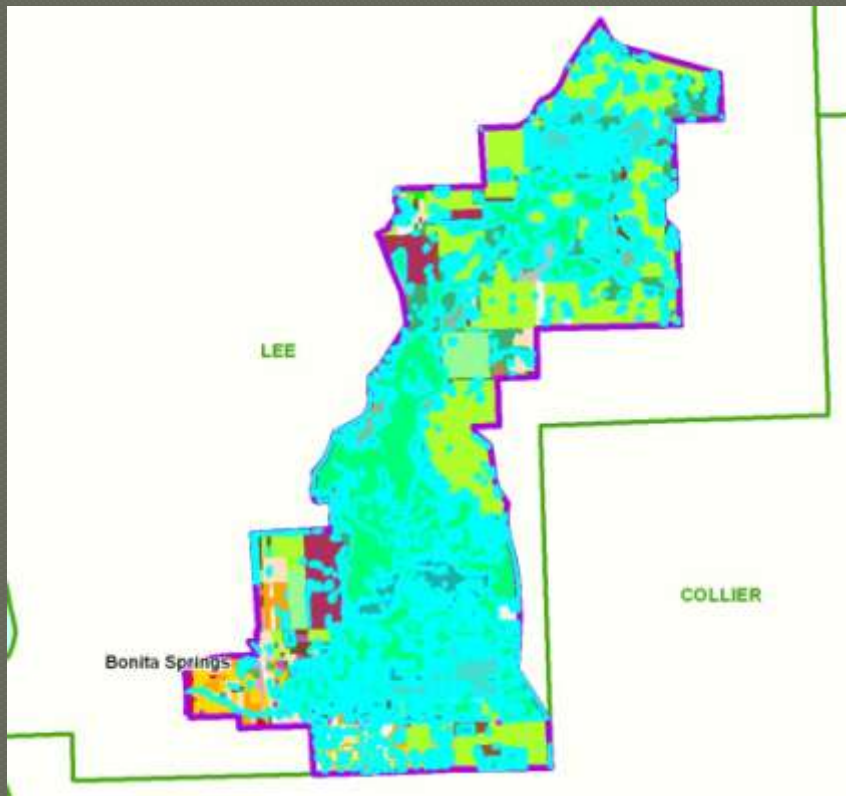
Imperial River Basin



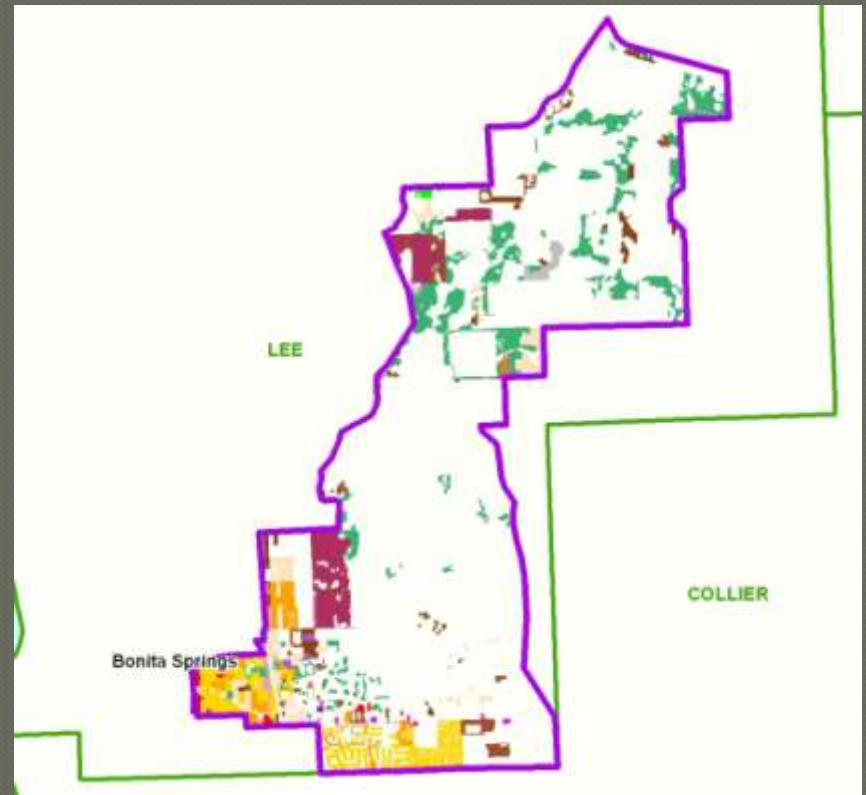
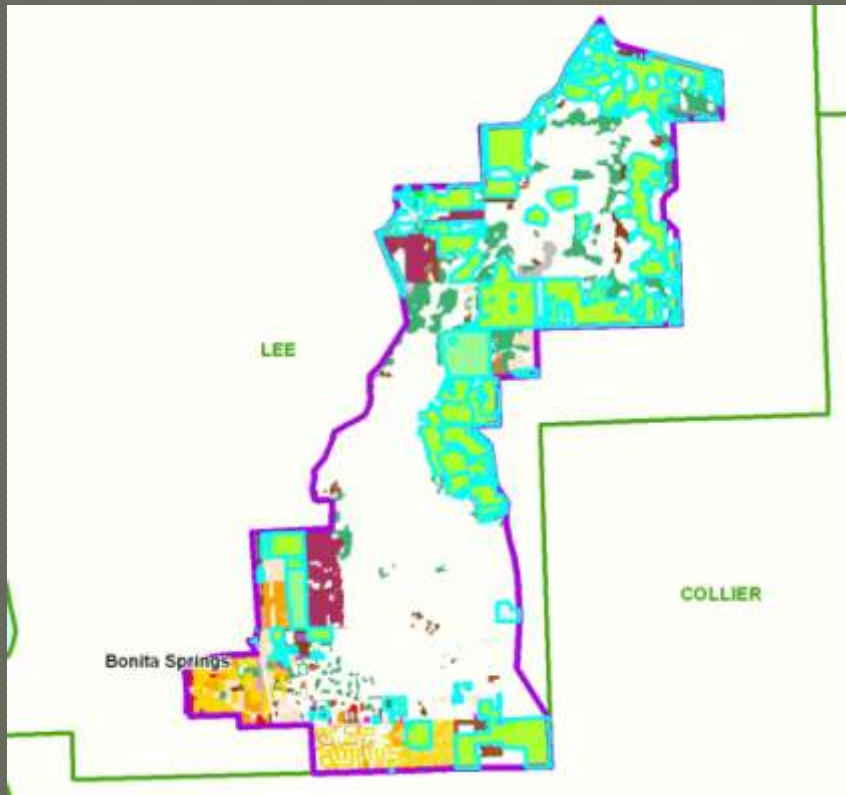
FDOT Roads Removed



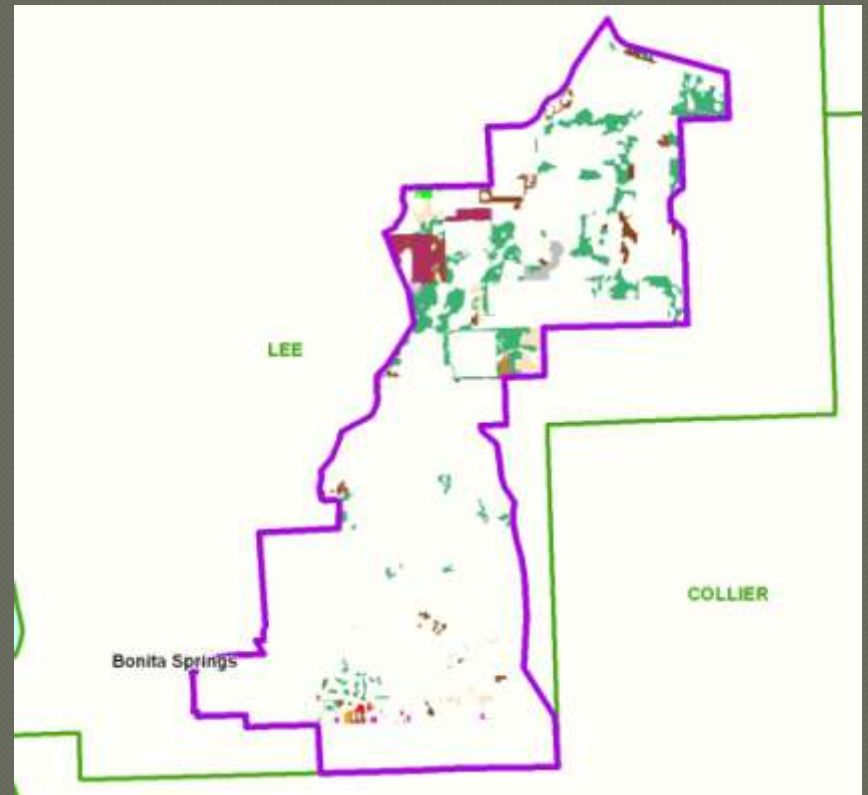
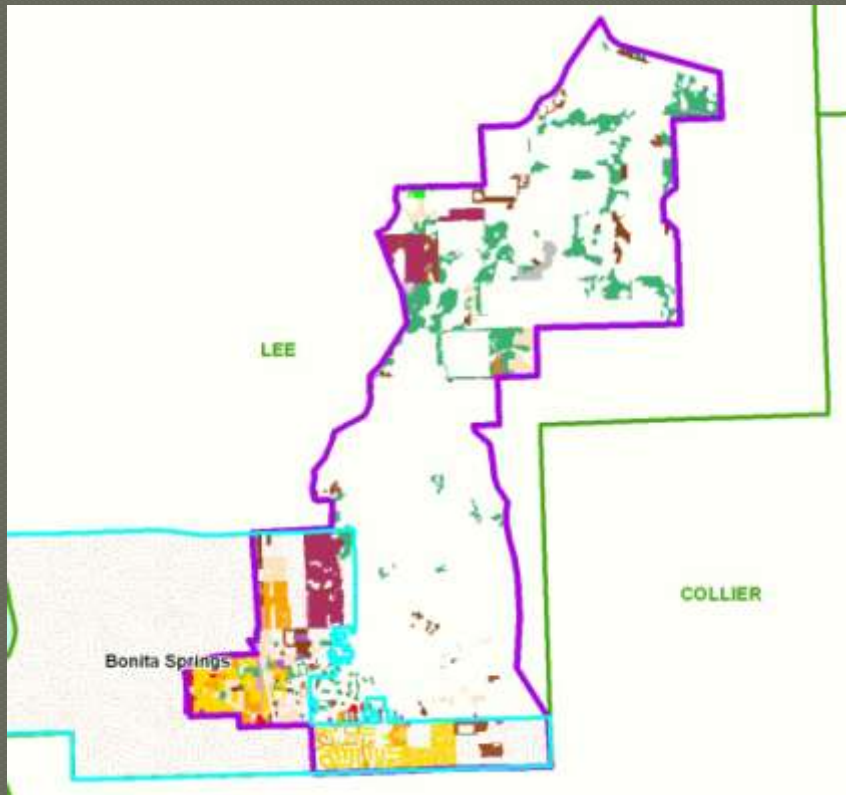
Water and Wetlands Removed



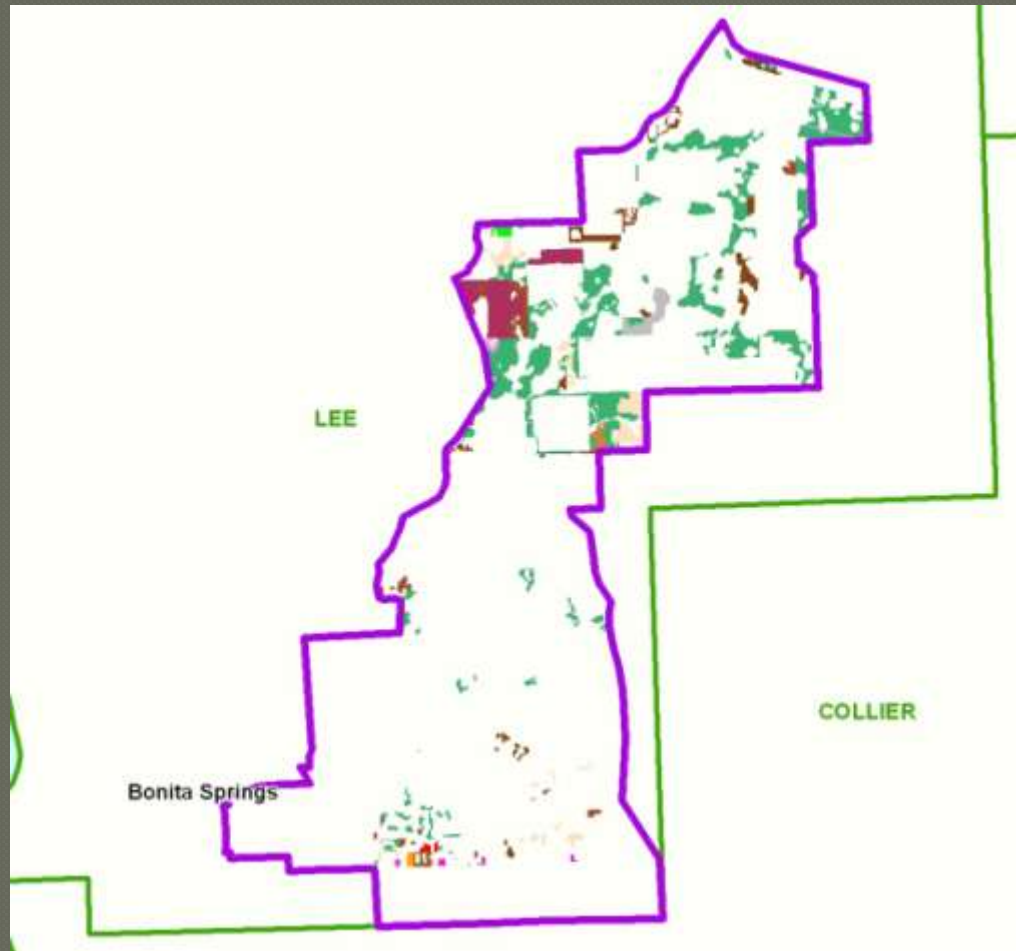
Agriculture Removed



Jurisdiction Removed



Remainder – Lee County



Processing Steps

- Jurisdiction/ Land- Use/Soil Hydrography
- Conformance table
- WMM spreadsheet
 - ROCs
 - EMCs
 - Rainfall

WMM Model Calculations

◎ Data Sources

- Land Use: 2004 WMD coverage
- Runoff coefficients (regional, cluster 4) and event mean concentrations: Harper 2007
- Rainfall: average annual rainfall from Lee County website

◎ Major Assumptions

- Correspondence between FLUCCS codes and Harper categories (available on FTP site)

Hendry Creek Loads

	Area (acres)	TN (lbs/yr)
Lee	10,161	52,783
Catalina	111	209
Agriculture	98	613
Roads	111	1,479
Total	10,481	55,084

Lee fresh	4,494	38,487
% of Lee	44.2%	72.9%

Loads by Land Use Compared with TMDL

Land Use	TMDL		BMAP Calculations	
	Area (acres)	TN (lbs/yr)	Area (acres)	TN (lbs/yr)
Urban and Built-Up	1,927	22,003	0	0
Low-Density Residential	797	5,060	812	4,157
Medium-Density Residential	844	8,712	899	6,551
High-Density Residential	1,070	20,081	1,342	19,566
Agriculture	98	779	0	0
Upland Forests/Rangeland	923	2,177	950	1,974
Water	904	6,436	883	0
Wetlands	2,970	11,849	2,989	0
Barren Land	13	30	0	0
Transportation, Communication, & Utilities	279	4,117	201	2,666
Other			2,197	18,087
Total	9,824	81,243	10,273	53,001

Checks with TMDL

Watershed Area check

BMAP calculations total acreage (acres)	10,489	
TMDL acreage (acres)	9,824	
Difference (acres)	665	6.3%

Total Load check

BMAP calculations total TN (lb/yr)	55,094	
BMAP TN water and wetlands (lb/yr)	18,285	
BMAP Sum (lb/yr)	73,379	
TMDL TN (lb/yr)	81,243	
Difference (lb/yr)	-7,864	-9.7%

Road Loads check

BMAP calculations DOT roads (lb/yr)	1,479	
BMAP calculations 8000 (lb/yr)	2,666	
BMAP calculations DOT roads plus 8000 (lb/yr)	4,145	
TMDL TN 8000 (lb/yr)	4,117	
Difference (lb/yr)	-28	-0.7%

Agriculture Loads check

BMAP calculations agriculture (lb/yr)	613	
TMDL Agriculture (lb/yr)	779	
Difference (lb/yr)	-166	-21.3%

NOTE:

- Lower loads predominantly from revised Harper coefficients
- Agricultural runoff probably underestimated (agriculture probably irrigated, which would increase runoff coefficient from the one used [undeveloped land])

Imperial River Loads

	Area (acres)	TN (lbs/yr)
Lee	26,101	13,350
Bonita Springs	7,174	30,046
Agriculture	11,597	72,725
Roads	85	1,137
Total	44,957	117,259

Everglades West Coast Basin BMAPS

HYPOTHETICAL TN ALLOCATION

Hypothetical Allocation

Annual TN Loadings Analysis

Stakeholder	Annual TN Load (lbs)	Percentage of Annual Load
City of Sparkling Waters	200	10%
Village of Sandy Beach	300	15%
Mossy Oaks County	500	25%
FDOT	50	3%
Agriculture	600	30%
Agency Conservation Holdings	350	18%
Annual TN Loading	2,000	100%

Hypothetical Allocation

Required Annual TN Load Reduction

Stakeholder	Annual TN Load (lbs)	Percentage of Annual Load
City of Sparkling Waters	200	10%
Village of Sandy Beach	300	15%
Mossy Oaks County	500	25%
FDOT	50	3%
Agriculture	600	30%
Agency Conservation Holdings	350	18%
Annual TN Loading	2,000	100%
Adopted TN TMDL	1,200	60%
Required Reduction	800	40%

Hypothetical Allocation

Adjusted TN Basis (No Allocation to Conservation Lands)

Stakeholder	Annual TN Load (lbs)	Percentage of Annual Load	Basis of Allocation
City of Sparkling Waters	200	10%	200
Village of Sandy Beach	300	15%	300
Mossy Oaks County	500	25%	500
FDOT	50	3%	50
Agriculture	600	30%	600
Agency Conservation Holdings	350	18%	-
Annual TN Loading	2,000	100%	1,650
Adopted TN TMDL	1,200	60%	
Required Reduction	800	40%	

Hypothetical Allocation

Calculated Allocation Rate to Remaining Lands

Stakeholder	Annual TN Load (lbs)	Percentage of Annual Load	Basis of Allocation
City of Sparkling Waters	200	10%	200
Village of Sandy Beach	300	15%	300
Mossy Oaks County	500	25%	500
FDOT	50	3%	50
Agriculture	600	30%	600
Agency Conservation Holdings	350	18%	-
Annual TN Loading	2,000	100%	1,650
Adopted TN TMDL	1,200	60%	
Required Reduction	800	40%	
Reduction = $\frac{800}{1,650}$		48.48%	

Hypothetical Allocation

Annual TN Load Reduction

Stakeholder	Annual TN Load (lbs)	Percentage of Annual Load	Basis of Allocation	Allocated Reduction
City of Sparkling Waters	200	10%	200	97
Village of Sandy Beach	300	15%	300	145
Mossy Oaks County	500	25%	500	242
FDOT	50	3%	50	24
Agriculture	600	30%	600	291
Agency Conservation Holdings	350	18%	-	0
Annual TN Loading	2,000	100%	1,650	800
Adopted TN TMDL	1,200	60%		
Required Reduction	800	40%		
Reduction = $\frac{800}{1,650}$		48.48%		

Hypothetical Allocation

Allowable Annual TN Load Discharge

Stakeholder	Annual TN Load (lbs)	Percentage of Annual Load	Basis of Allocation	Allocated Reduction	Allocated Annual TN Load
City of Sparkling Waters	200	10%	200	97	103
Village of Sandy Beach	300	15%	300	145	155
Mossy Oaks County	500	25%	500	242	258
FDOT	50	3%	50	24	26
Agriculture	600	30%	600	291	309
Agency Conservation Holdings	350	18%	-	0	350
Annual TN Loading	2,000	100%	1,650	800	1,200
Adopted TN TMDL	1,200	60%			
Required Reduction	800	40%			
Reduction = $\frac{800}{1,650}$		48.48%			

Prototype Allocation Table

Hendry Creek (3258B & 3258B1) Allocation Table

September 1, 2009

All values are gross loads of Total Nitrogen in pounds/year.

Column: A B C D E F G H I J K L M N O

Allocation Entity	TN Loading		Reductions Required						Projects				Projects for 2015-2019 Reductions	Projects for 2020-2024 Reductions	Final 2009-2014 Load Reduction Remaining
			Total			Distributed Across BMAP Implementation Periods			Completed/Funded		Future				
	Total Input Load	Total Load for BMAP Allocation	Total Nonpoint Source Reduction Required	Noncontributing Areas Load	Total Reduction Required	2009-2014 Required Reduction*	2015-2019 Required Reduction*	2020-2024 Required Reduction *	TMDL BMPs	Completed/ Funded Projects	Planned Projects	Interagency Project Participation			
Agriculture															
City of Ft. Myers															
FDOT															
Lee County (unincorporated area)															
Water/Wetland/ Conservation Areas															
TOTAL (lbs)															
TOTAL (MT)															

Example

* Reductions in future years are subject to change as new information on the noncontributing areas, natural attenuation, and lake assimilation become available.

Everglades West Coast Basin BMAPS

NUTRIENT REDUCTION PROJECTS

BMAP Project Credits

- Eligibility Dates for BMAP Load Reduction Credits are Based on the Data Period Preceding the TMDL
- Pounds reduced will be subtracted from the total allocation for those projects completed **January, 2007** and later.
- Credit only counts for treatment above and beyond any permitted requirements.

BMAP Project Credits

- Projects Must be Operated and Properly Maintained as Permitted.
- Operation and Maintenance records may be requested as part of the Project Review process.
- Projects not operated as permitted, *including older projects not included for specific credit*, could result in additional reduction requirements by the responsible entity.

Stakeholder Projects and Management Activities

PROJECTS

- Structural BMPs
 - Quantifiable Load Reductions
 - Reductions Not Currently Quantified
- Restoration and WQ Improvement Projects
- Basic Stormwater Management Program Implementation

ACTIVITIES

- Regulations, Ordinances, and Guidelines
- Special Studies and Planning Efforts
- Streetsweeping
- Enhanced O&M Program
- Certain Agricultural BMPs
- Public Education and Outreach Efforts

Assessment of Stakeholder Projects & Practices Information

● Goals

- Transparent Assessment Process
- Realistic Estimates of Nutrient Load Reductions
- Consistency Between the BMAPs

● Multi-Step Assessment Process

- Initial BMAP Cycle
 - Screen Each Potential Project for BMAP Credits
 - Assess Cycle One TN Credit Value
- Subsequent BMAP Cycles
 - Review Performance and/or O&M Data
 - Adjust TN Credit for Each Cycle

Assessment of Stakeholder Projects & Practices Information

◎ Assessment Process

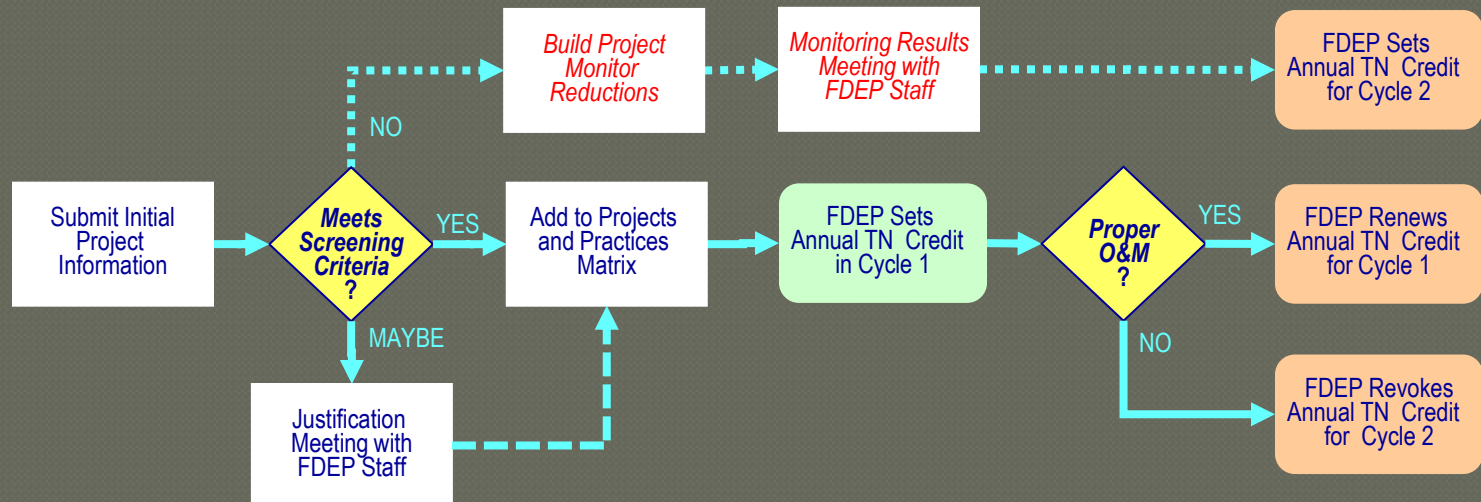
1. Stakeholders Provide Information for Their Proposed Projects
2. FDEP Qualifies Individual Stakeholder Projects for Credit
3. Stakeholders Complete the Matrix for Their Individual Projects
4. FDEP Assembles the Master Project Matrix for Each BMAP
5. FDEP Conducts Completeness Checks
6. FDEP Confirms the Estimates
7. FDEP Calculates the Initial Estimate of Reductions
8. Stakeholders Review the Projects Matrix

Project Screening Process

● Cycle One Screening Criteria

- Generalized BMAP/Facility Type
- Established Default TN Reduction Values
- Project Specific Monitoring Results

Screening Process



Screening Information

● Required

- BMAP
- Project Name
- Project Type
- Description
- Status
- In-Service Date
- Lead Entity
- Project Partner(s)
- Contact Information

● Supplemental

- Permit Number(s)
- Construction Schedule
- Capital / O&M Costs
- Footprint/Drainage Area
- Annual Load Reductions
- Funding Sources
- Comments

The “Matrix”

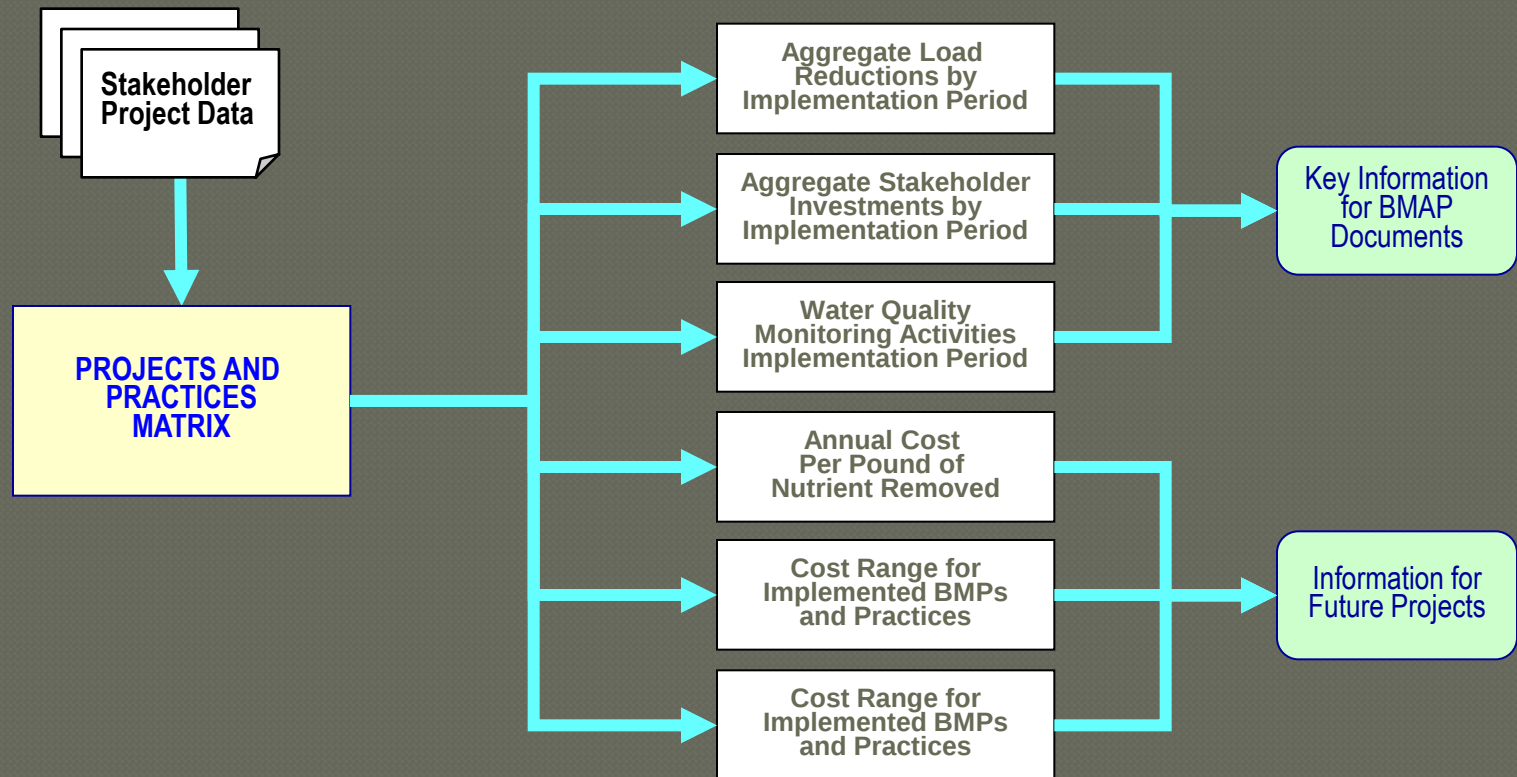
Master Stakeholder Projects & Practices Listing

- ◎ General Project Information

- ◎ Specific Project Information

- Retention Projects
- Wet Detention Project Info
- Alum Injection Projects Info
- Second Generation Baffle Box Project Info

Projects and Practices Matrix



Standardizing Removal Estimates

● Evaluation of Treatment Facilities

- Location and Physical Setting
- Upstream Watershed Characteristics
- Facility Design Basis
- Constructed Characteristics
- O&M Practices

Factors Impacting BMP TN Reduction Rates

● Weather

- Rainfall Intensity, Total Event Volume & Antecedent Rainfall Conditions

● Watershed

- Land Use Mix, Gross Input Loads, Time of Concentration, Tides and Backwater Conditions, DCIA, Design Basis of Channels and Culverts, Topography, Depression Storage, Channel Vegetation, Channel Stabilization & Soils Erosivity

● Ponds

- Original Storm Event Basis of Design, Water Table Elevations, On- vs. Off-Line Design, Single vs. Dual Pond Configuration, Use of Underdrain, VIN vs. VPOND, Littoral Shelf, Residence Time, Full Recovery Prior to Event, Depth of Accumulated Sludge, Discharge Control Structure Design, Illicit Direct Dumping, Groundwater Inputs & Losses to Groundwater

● Maintenance

- Methods and Means Used, Frequency, Seasonal Execution, Collection System Maintenance vs. Pond Maintenance Regimes, Disposal Methods, & Frequency and Nature of Inspections

Standardizing Removal Estimates

◉ Evaluation of Treatment Facilities

- Location and Physical Setting
- Upstream Watershed Characteristics
- Facility Design Basis
- Constructed Characteristics
- O&M Practices

◉ Standardizing Removal Rates

- Literature Values vs. Monitoring Results
- Adjustments Based on Actual Experiences
- Sidebar Conferences When Required

Structural BMPs

Reported TN Removal Rates

Management Practice	Mean	FDEP Approved TN Reduction Value
Dry Detention	10%-20%	TBD
Wet Detention	20%-45%	TBD
Retention	80%-90%	TBD
Swales	30%-50%	TBD
Infiltration Trenches	Variable*	TBD
Porous Pavement Systems	Variable*	TBD
G1 Baffle Boxes	1%	TBD
G2 Nutrient Baffle Boxes	38%-63%	TBD
Proprietary Wet Cyclonic Treatment Technologies <i>CDS Units, Stormceptors</i>	Variable*	TBD

*Depends on Specific Location, Design, Operation and Maintenance Factors

Structural BMPs

Reported TN Removal Rates

Management Practice	Minimum	Mean	Maximum	FDEP Approved Value
Wet Detention	12%	37%	63%	TBD
Off-Line Dual Ponds	30%	58%	85%	TBD
Alum/Coagulant Systems		Variable*		TBD
PAM Logs		Variable*		TBD
Flow-way Filter Marsh	36%		68%	TBD
Manmade Wetlands		Variable*		TBD
Modular Wetland Systems		Variable*		TBD
Floating Gardens		Variable*		TBD
Stormwater Reuse		Variable*		TBD
Solarbees		Variable*		TBD

*Depends on Specific Location, Design, Operation and Maintenance Factors

Non-Structural Management Practices

Reported TN Removal Rates

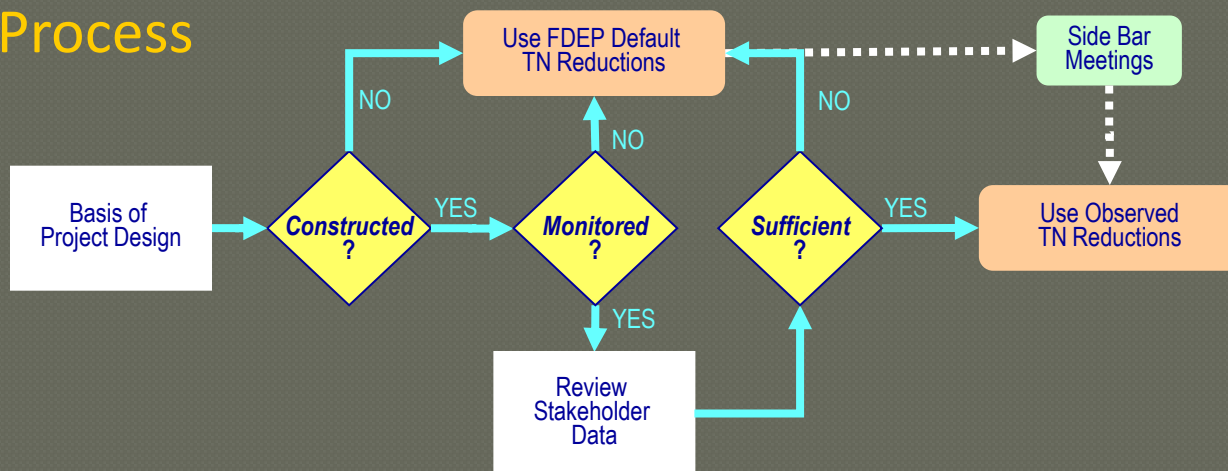
Management Practice	Minimum	Mean	Maximum	FDEP Approved Value
Street Sweeping		Variable*		TBD
Street Vacuuming		Variable*		TBD
Enhanced Annual Maintenance Activities		Variable*		TBD
LID Practices		Variable*		TBD
Florida Yards and Neighborhoods		Variable*		TBD
Public Education Programs		Variable*		TBD

*Depends on Specific Location, Design, Operation and Maintenance Factors

Determination of BMAP Credits

- Project Setting
- Basis of Project Design
- FDEP Default TP Reduction Values
- Project Specific Monitoring Results

Review Process



Determination of BMAP Credits

◎ *Submittal Dates*

- Preliminary Project Information for Potential Projects

March 31, 2010

- FDEP Response on Qualifying Projects Project

April 14, 2010

- Matrix Inputs for Each Qualifying Project

May 14, 2010

Everglades West Coast Basin BMAPS

NEXT STEPS

Nitrogen Source Tracking Study

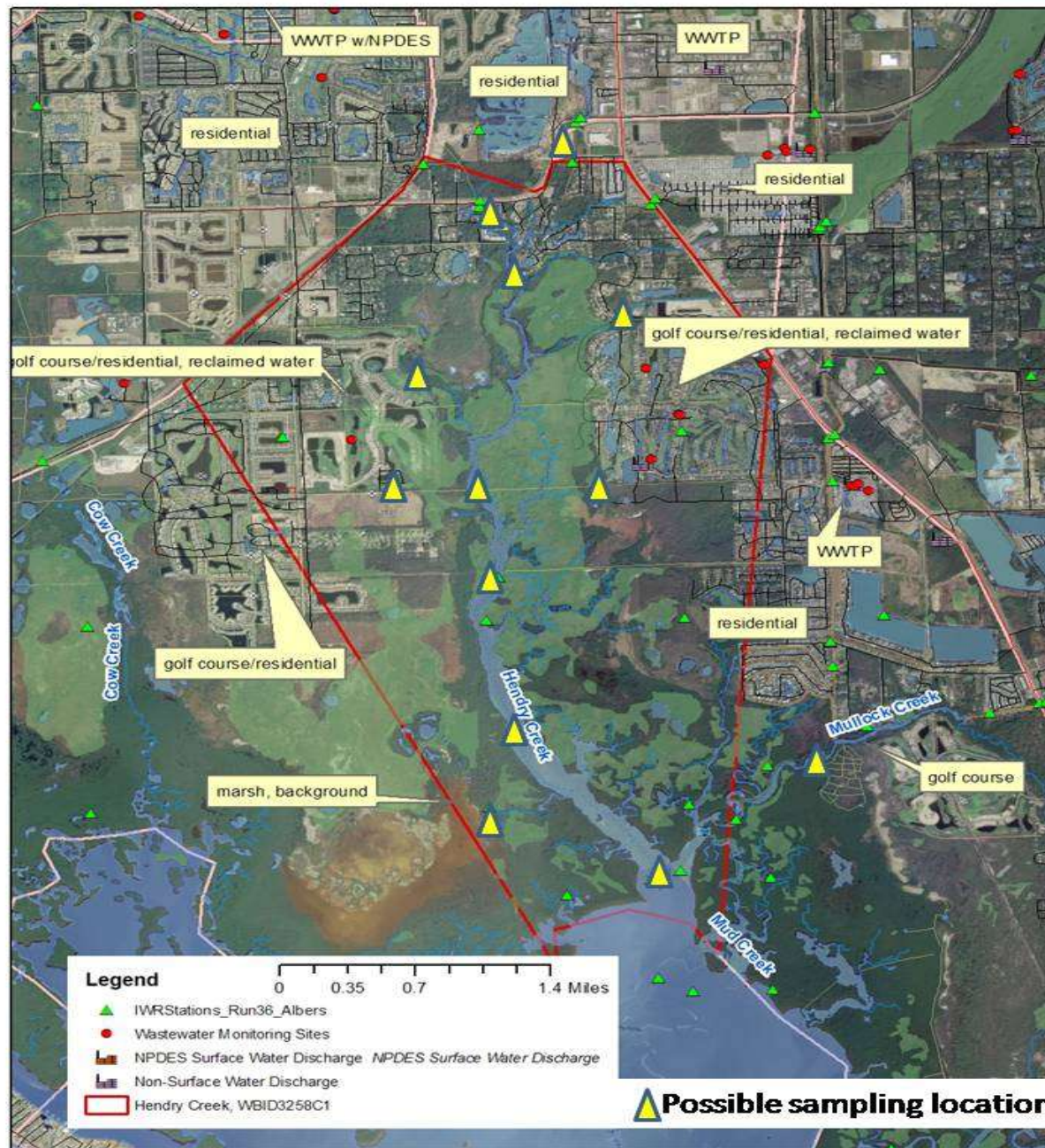
- Scope
- Current Schedule
- Stakeholder Participation

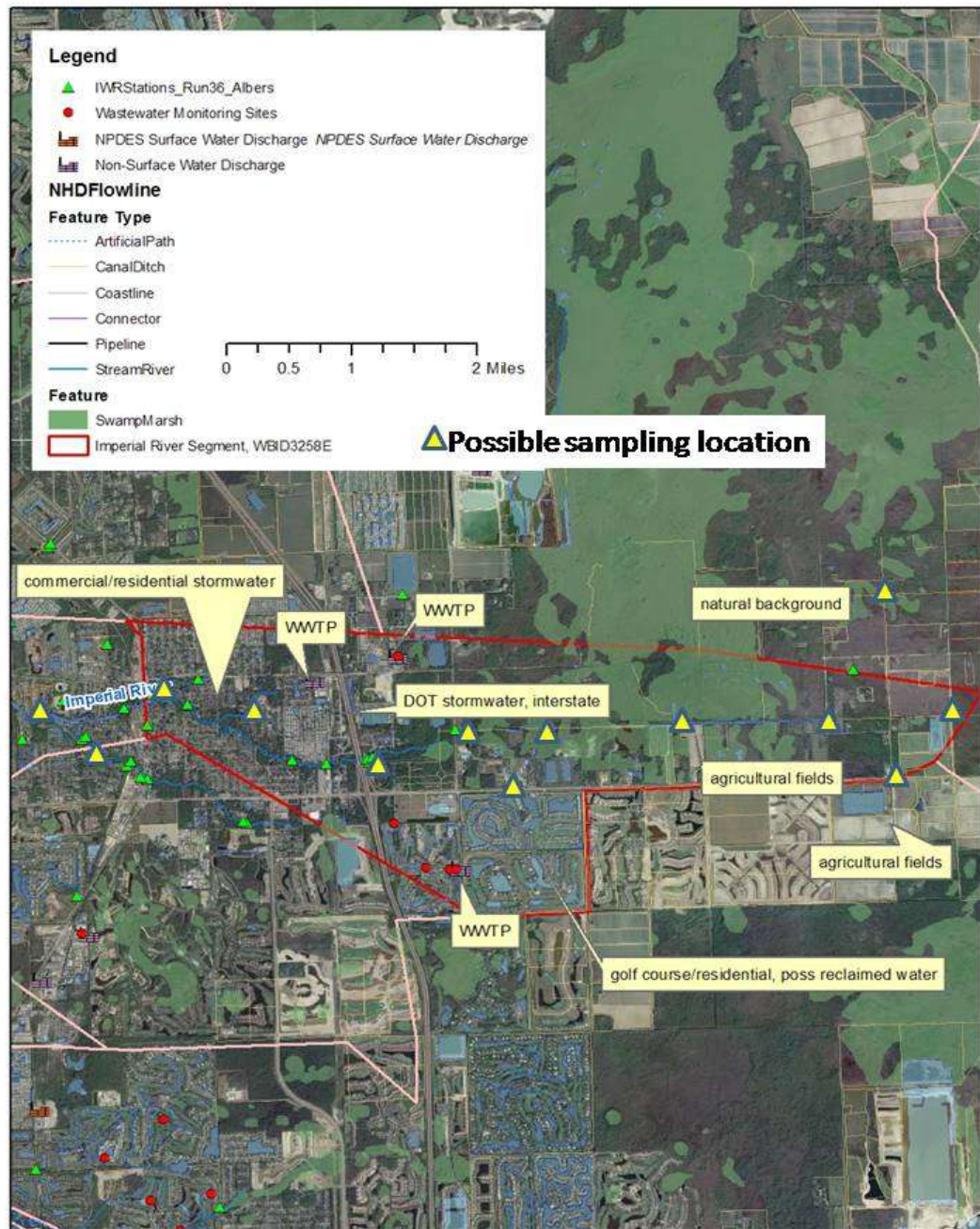
Objectives

- Obtain baseline of nitrogen concentrations
- Identify inputs of nitrogen
- Characterize nitrogen pick up along stream segments
- Attempt to use tracers

Approach

- Collect near-synoptic samples
- Focus on latter half of falling tide
- Analyze samples for nutrients, field parameters, tracers and Radon
- Samples from approximately 15 stations





Analytes

● Nutrients

- Ammonium
- Nitrate-Nitrite
- Total Kjeldahl Nitrogen
- Total Phosphorus

● Tracers

- Boron
- Chloride
- Potassium
- Radon*
- Sucralose

* Groundwater Tracer

Local Assistance

- ◉ Collaboration on Plan of Study
- ◉ Reality Check
- ◉ Assistance with Sampling Site Selection and Field Program Execution
 - FDEP Tallahassee
 - FDEP South District
 - Stakeholders

Stakeholder Action Items

- ✓ Designate Your BWG Member
- ✓ Summarized Your Candidate Projects and Management Actions Information
 - Project Name and Location
 - Anticipated Reductions
 - Preliminary Project to FDEP by March 31, 2010

Next Meetings

● **Technical Meeting No. 3**

- Finalization of Watershed and Stakeholder Loads
- Initial Presentation of Stakeholder Allocations
- FDEP Standardized TN Reduction Rates
- Initial Projects Matrix Presentation

April 20, 2010 (*Tentative*)

● **First Basin Working Group**

- TMDL Overview
- BMAP Process
- Discussion of Loads and Allocations

TBD

Everglades West Coast Basin BMAPS

Technical Meeting

Wednesday, February 23, 2010, 1:30 – 3:30 pm.
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First Floor Conference Room
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