



Everglades West Coast BMAP 3rd TECHNICAL MEETING

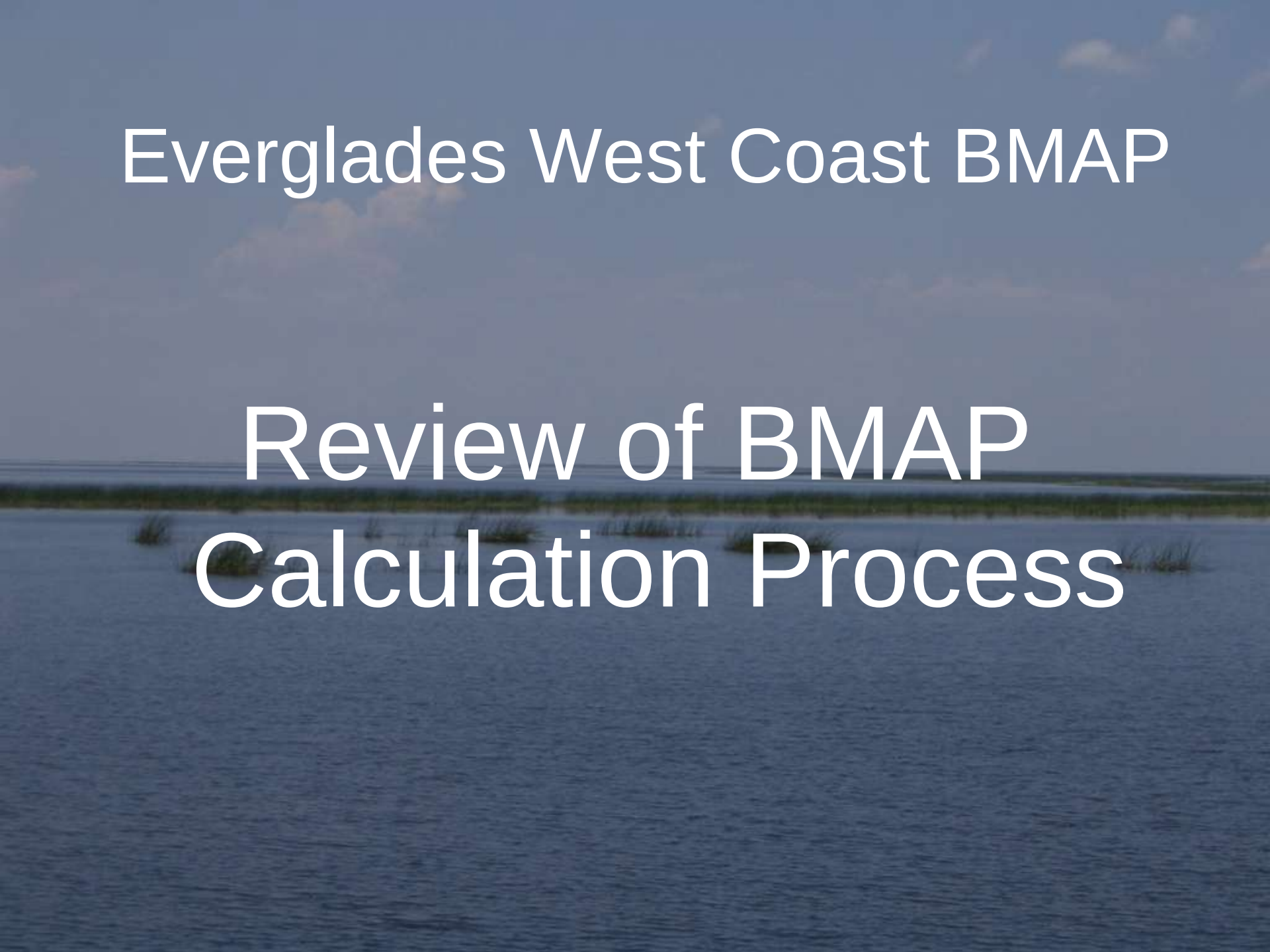
September 21, 2010 ❖ 1:30 pm

South Florida Water Management District

2301 McGregor Boulevard, Ft. Myers Florida 33901

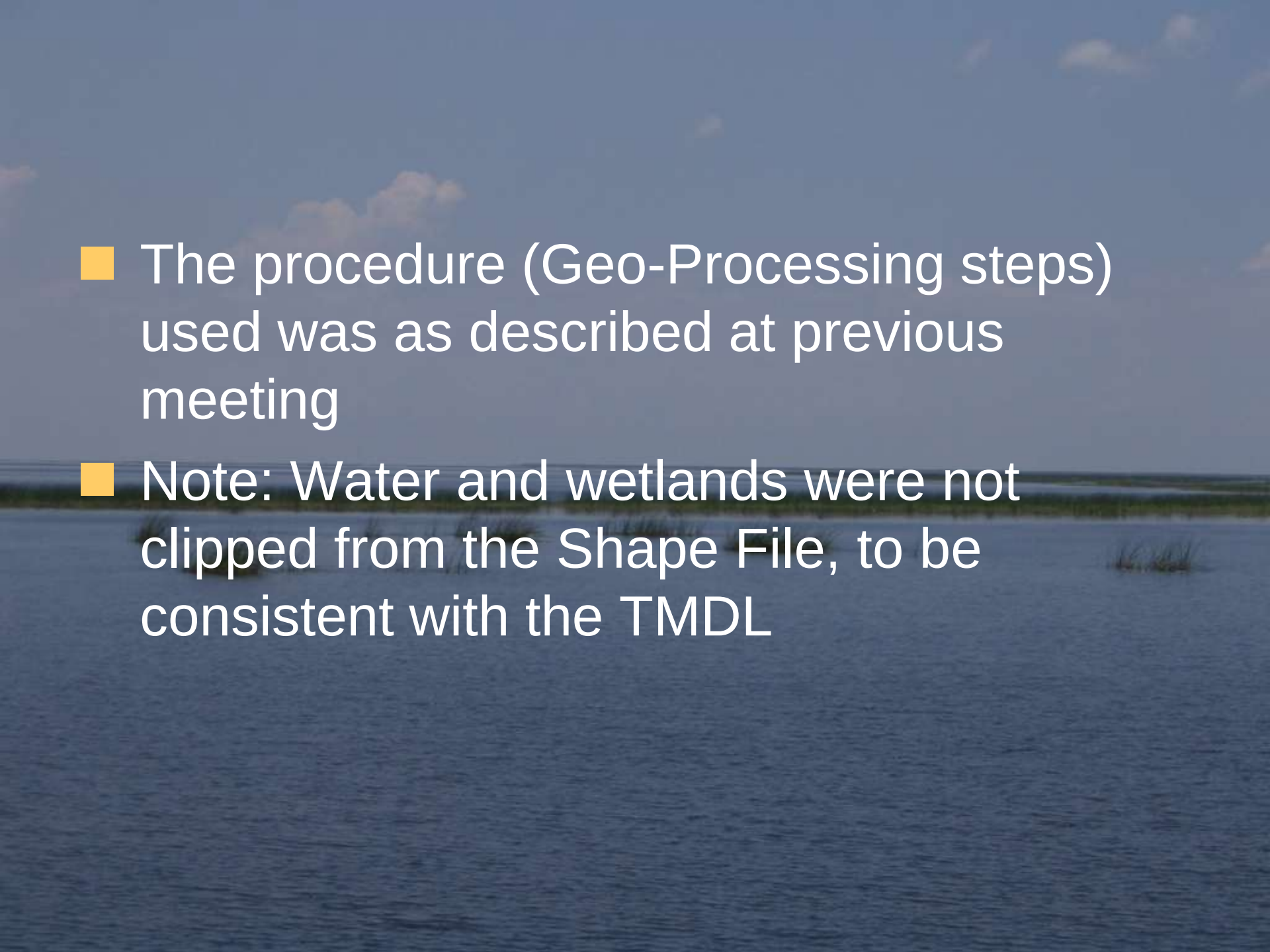
Agenda

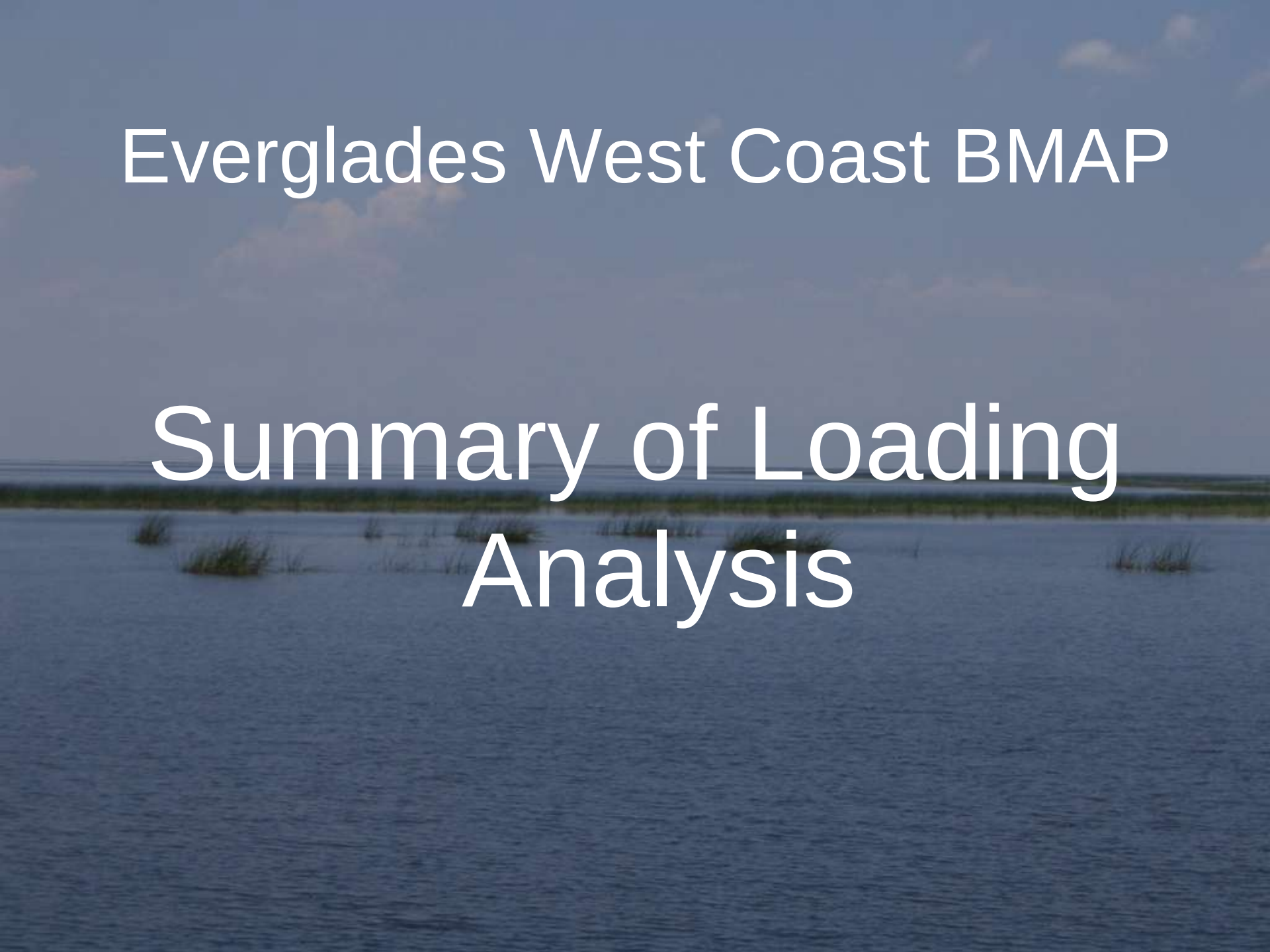
1. Welcome and Opening Remarks
2. Review of BMAP Calculation Process
3. Summary of Loading Analysis & Interim Targets
4. Recent Sampling Results
5. Basin Working Groups
6. Project Credit Information



Everglades West Coast BMAP

Review of BMAP
Calculation Process

- 
- The procedure (Geo-Processing steps) used was as described at previous meeting
 - Note: Water and wetlands were not clipped from the Shape File, to be consistent with the TMDL

A photograph of a vast, flat landscape, likely the Everglades, featuring a body of water in the foreground and a distant horizon under a blue sky with scattered clouds. The text is overlaid on this background.

Everglades West Coast BMAP

Summary of Loading Analysis

Loading Model Calculations

■ Data Sources

- ❖ Land Use: 2004 WMD coverage
- ❖ Runoff coefficients and event mean concentrations: Harper 2007
- ❖ Rainfall: average annual rainfall from Harper 2007

■ Major Assumptions

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

Model Calculations

$$\text{Runoff (m}^3\text{/yr)} = 0.0254 \times \text{Runoff Coefficient} \times \text{Area (ac)} \times \text{Annual Rainfall (in)}$$

$$\text{Load (lb/yr)} = 0.00220462 \times \text{Runoff (m}^3\text{/yr)} \times \text{EMC (mg/l)}$$

Runoff Coefficients Based on Soil Types

Harper Land Use for ROCs	A	B	C	D	NA
Undeveloped Land	0.011	0.050	0.105	0.149	0.079
Low-Density Residential Areas	0.079	0.144	0.210	0.262	0.174
Single-Family Residential Areas (25% Impervious)	0.144	0.188	0.243	0.285	0.215
Single-Family Residential Areas (40% Impervious)	0.231	0.273	0.324	0.362	0.298
High-Density Residential Areas	0.436	0.467	0.503	0.529	0.484
Commercial Areas	0.628	0.642	0.658	0.671	0.650
Pasture	0.355	0.355	0.355	0.355	0.355
Citrus	0.401	0.401	0.401	0.401	0.401
Row Crops	0.204	0.204	0.204	0.204	0.204
General Agriculture	0.320	0.320	0.320	0.320	0.320
Water	0.435	0.435	0.435	0.435	0.435
Wetlands	0.435	0.435	0.435	0.435	0.435
Highway Areas (50% Impervious)	0.427	0.459	0.492	0.519	0.474
Highway Areas (75% Impervious)	0.627	0.642	0.659	0.672	0.650

Event Mean Concentrations (EMCs) Based On Land Use Type

Harper Land Use for EMCs	TN	TP
Low-Density Residential	1.61	0.191
Single-Family	2.07	0.327
Multi-Family	2.32	0.520
Low-Intensity Commercial	1.18	0.179
High-Intensity Commercial	2.40	0.345
Light Industrial	1.20	0.260
Highway	1.64	0.220
Pasture	3.47	0.616
Citrus	2.24	0.183
Row Crops	2.65	0.593
General Agriculture	2.79	0.431
Water	1.39	0.015
Wetlands	0.76	0.020
Undeveloped / Rangeland / Forest	1.15	0.055
Mining / Extractive	1.18	0.150

Hendry Creek Total Loads

TOTAL				
Jurisdiction	Area (acres)	Runoff (m3/yr)	TN (lbs/yr)	% of Total
Lee	10,161	21,159,226	68,623	97.7%
Catalina	111	106,821	248	0.4%
Agriculture	98	113,319	668	1.0%
Roads	89	259,245	721	1.0%
Total	10,459	21,638,611	70,261	100.0%

Hendry Creek TMDL Requirements

- TMDL Based on Reference Site Analysis is 0.74 mg/l
- TMDL Load Results
 - ❖ Load at 0.74 mg/l = 35,302 lb/yr
 - ❖ Reduction is 34,960 lb/yr

Background Load

Jurisdiction	Area (acres)	Runoff (m ³ /yr)	TN (lbs/yr)	Background (lb/yr)
Lee	10,161	21,159,226	68,623	30,626
Catalina	111	106,821	248	247
Agriculture	98	113,319	668	197
Roads	89	259,245	721	659
Total	10,459	21,638,611	70,261	31,729

Background Load = Total Load from Natural Land Uses

Allocation Process

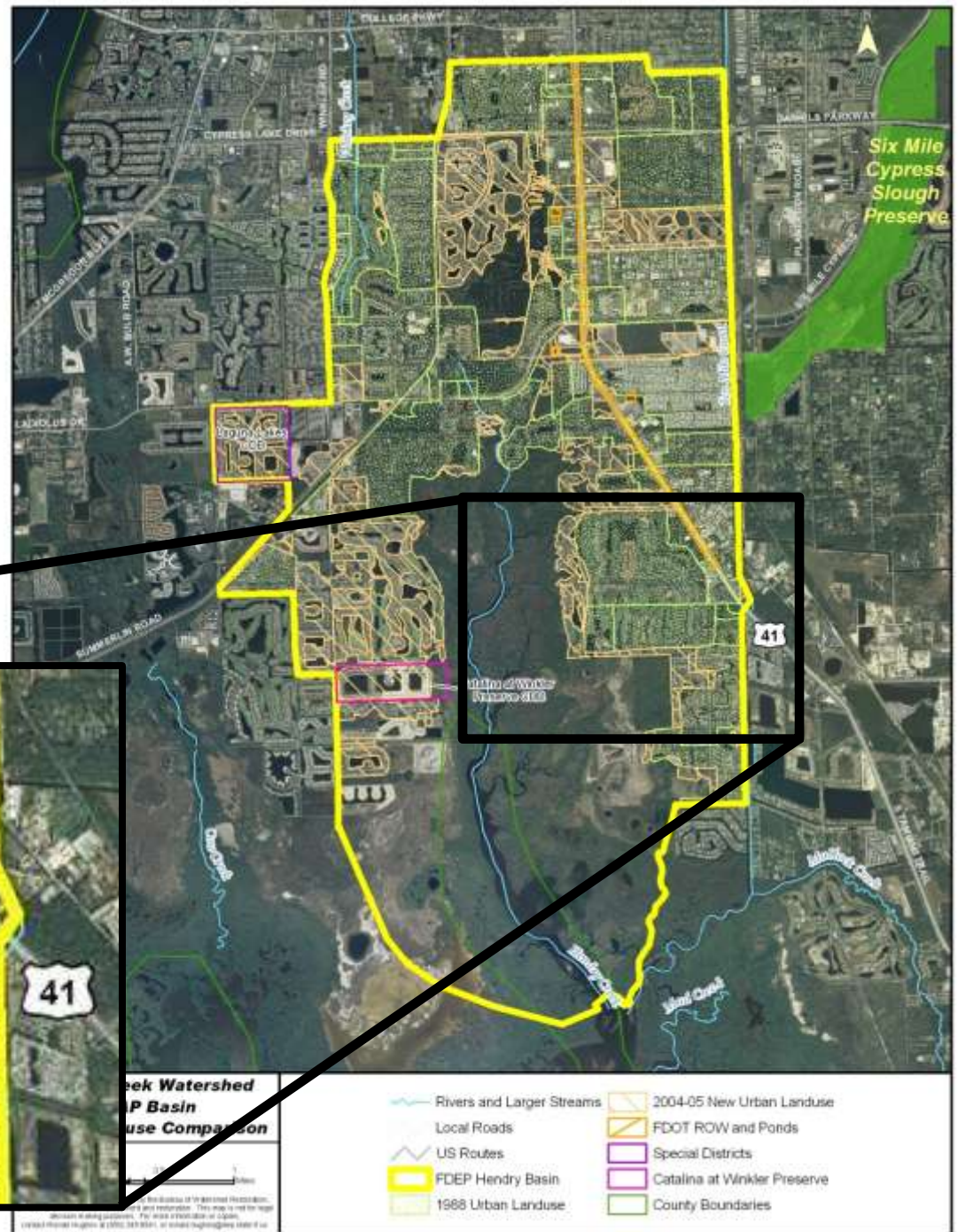
- Start with The TMDL Requirement
- Calculate Background Load
- Difference Between the Two is Non-Background Load
- Allocate by Stakeholders Percent of Non-Background Load
- Add Background Load
- Result is Allocated Loading

Allocation by % of Non-Background Loading

Jurisdiction	Area (acres)	TN (lbs/yr)	Background (lb/yr)	Non-Background (lb/yr)	% of Non-Background	Portion of Non-Background	Allocation	% Reduction	1st 5-yr Load Reduction (lb/yr)
Lee	10,161	68,623	30,626	37,997	98.6%	3,523	34,149	50.2%	11,491
Catalina	111	248	247	1	0.0%	0	247	0.6%	0
Agriculture	98	668	197	471	1.2%	44	241	64.0%	142
Roads	89	721	659	62	0.2%	6	665	7.8%	19
Total	10,459	70,261	31,729	38,532	100.0%	3,573	35,302	49.8%	11,653
Allocatable	3,573								

Non-Background Load at TMDL = TMDL Load – Background Load
 = 35,302 - 31,729 = 3,573 lb/yr

Hendry Creek Urban Land-use 1988-2004



**Imperial River
Sub Basin Aerial Map
Bonita Springs - FDOT**

-  Interstates
-  US Routes
-  Local Roads
-  Rivers and Larger Streams
-  Imperial River Basin
-  FDOT Jurisdiction
-  Bonita Springs
-  Counties

Imperial River
Watershed



Map prepared August 17, 2010 by the Bureau of Watershed Restoration,
Division of Environmental Assessment and Restoration. This map is not for legal
decisions making purposes. For more information or copies,
contact Ronald Hughes at (850) 345-6547, or ron.hughes@fldnr.state.fl.us

Imperial River Total Loads

TOTAL				
Jurisdiction	Area (acres)	Runoff (m3/yr)	TN (lbs/yr)	% of Total
Lee	26,101	53,332,952	95,653	36.8%
Bonita Springs	7,150	12,582,591	43,265	16.7%
Agriculture	11,597	17,867,195	120,084	46.2%
Roads	96	265,607	739	0.3%
Total	44,945	84,048,346	259,741	100.0%

TMDL Requirements

- TMDL Based on Reference Site Analysis is 0.74 mg/l
- Calculate Load from Target Concentration
- Target Load:
 - ❖ Load at 0.74 mg/l = 137,492 lbs/yr
 - ❖ Reduction is 122,249 lbs/yr

Background Load

Jurisdiction	Area (acres)	TN (lbs/yr)	Background (lb/yr)
Lee	26,101	95,653	93,195
Bonita Springs	7,150	43,265	20,212
Agriculture	11,597	120,084	23,426
Roads	96	739	659
Total	44,945	259,741	137,492

Background Load = Total Load from Natural Land Uses

Allocation Process

- Start with The TMDL Requirement
- Calculate Background Load
- Difference Between the Two is Non-Background Load
- Allocate by Stakeholders Percent of Non-Background Load
- Add Background Load
- Result is Allocated Loading

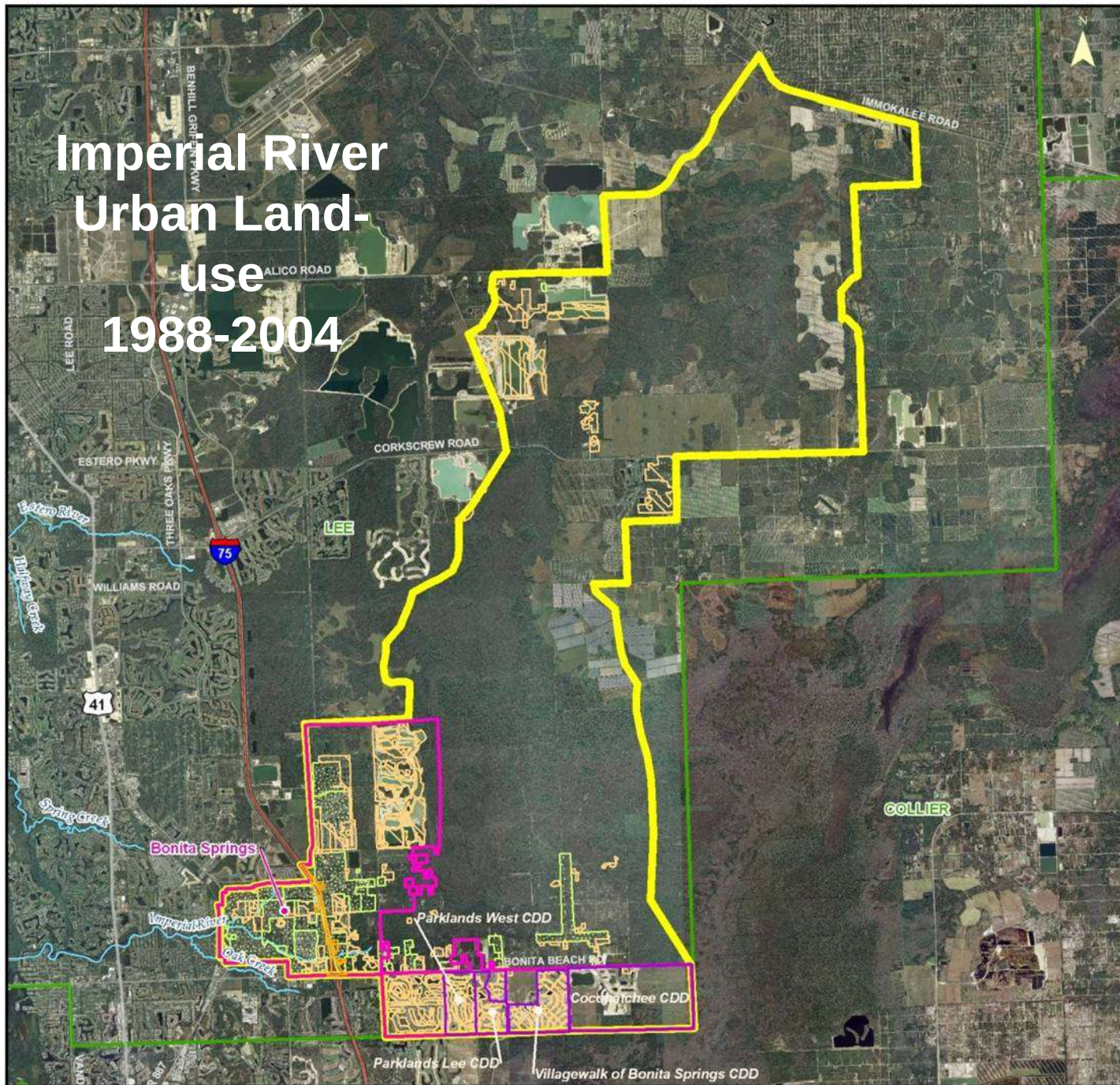
Allocation by % of Non-Background Loading

Jurisdiction	Area (acres)	TN (lbs/yr)	Background (lb/yr)	Non-Background (lb/yr)	% of Non-Background	Portion of Non-Background	Allocation	% Reduction	1st 5-Year Reduction (lb/yr)
Lee	26,101	95,653	93,195	2,458	2.0%	0	93,195	2.6%	819
Bonita Springs	7,150	43,265	20,212	23,053	18.9%	0	20,212	53.3%	7,684
Agriculture	11,597	120,084	23,426	96,658	79.1%	0	23,426	80.5%	32,219
Roads	96	739	659	80	0.1%	0	659	10.9%	27
Total	44,945	259,741	137,492	122,249	100.0%	0	137,492	47.1%	40,750
Allocatible	-374								

Non-Background Load at TMDL = TMDL Load – Background Load
 = 137,492 - 137,492 = 0

Imperial River Urban Land- use 1988-2004

Imperial River BMAP 1988 and 2004 Urban Landuse Comparison



- Rivers and Larger Streams
- Local Roads
- US Routes
- Interstates
- Imperial River Basin
- 1988 Urban Landuse
- 2004-05 New Urban Landuse
- FDOT Jurisdiction
- Bonita Springs
- Special Districts
- Counties

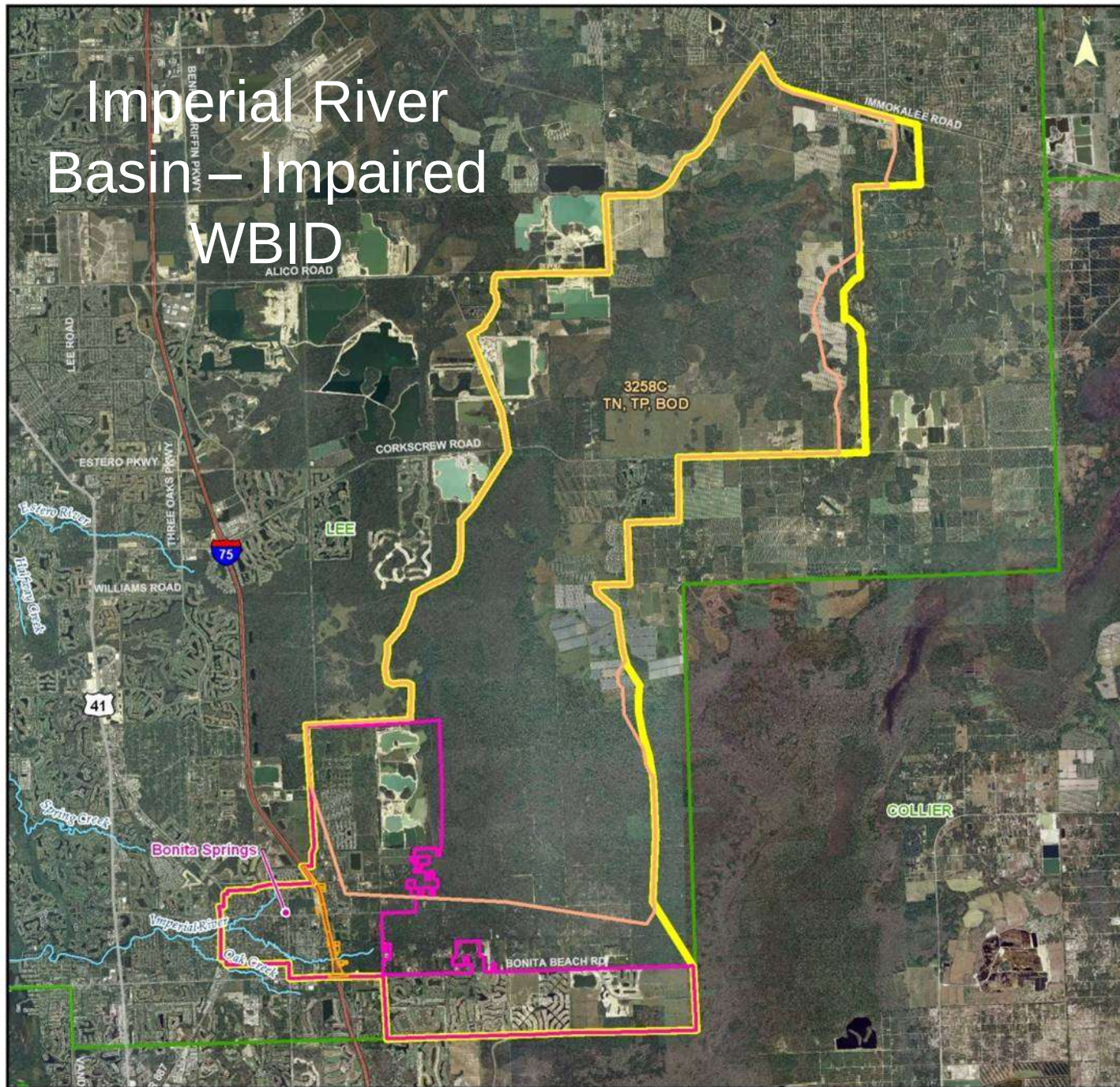
0 0.5 1 2 Miles



Map prepared: September 15, 2010 by the Bureau of Watershed Restoration, Division of Environmental Assessment and Restoration. This map is not for legal decision making purposes. For more information or copies, contact Ronald Hughes at (850) 245-0541, or ronald.hughes@dep.state.fl.us

Imperial River Basin – Impaired WBID

Imperial River BMAP Impaired WBID Waterbody



- Rivers and Larger Streams
- Local Roads
- US Routes
- Interstates
- Imperial River Basin
- DO Impaired WBD3258C
- FDOT Jurisdiction
- Bonita Springs
- Counties

0 0.5 1 2 Miles

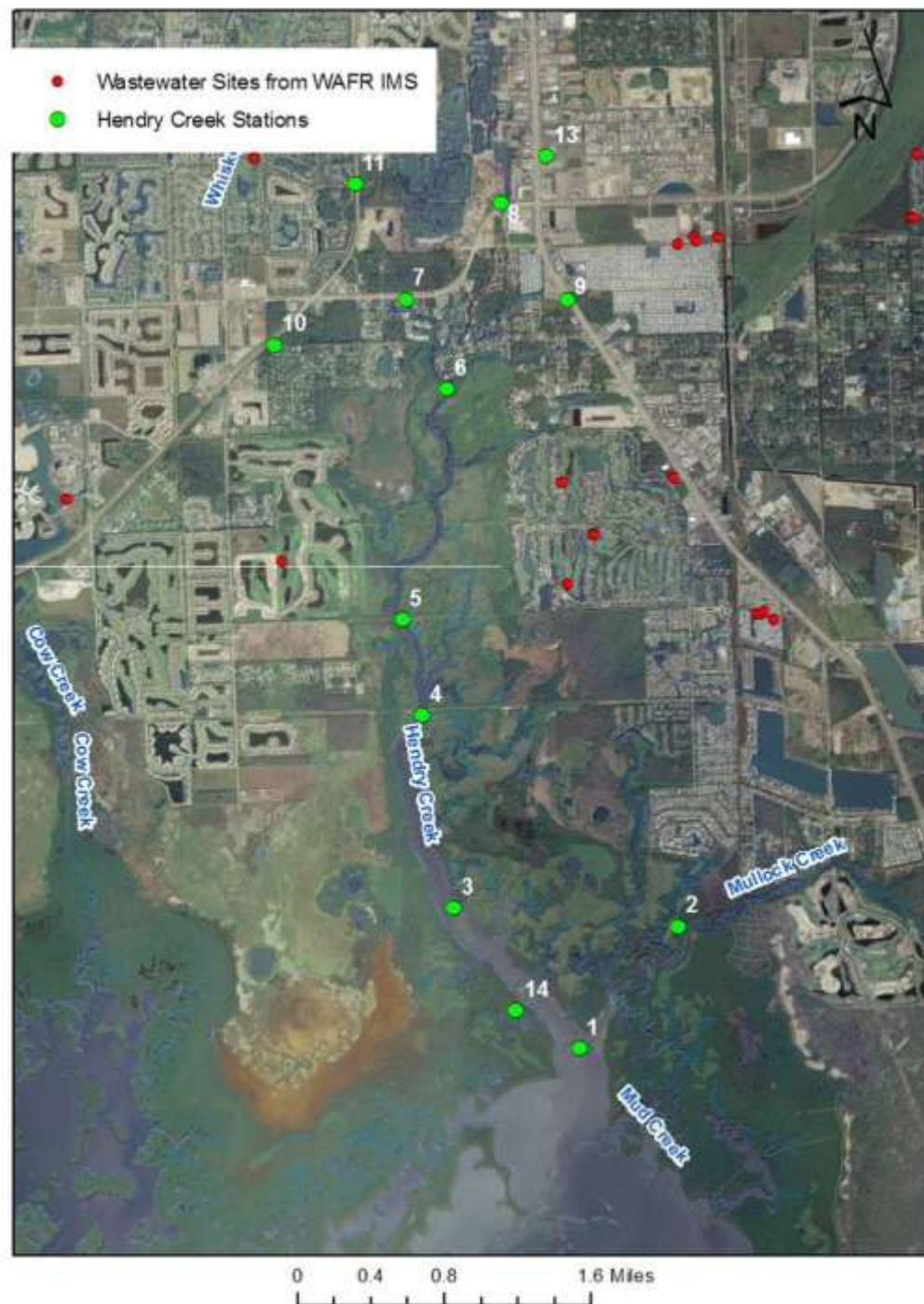


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Nitrogen Sourcing Study, Hendry Creek and Imperial River

- Conducted Week of June 7
- Sampling During Major Falling Tide, Collecting Water Samples From Selected Tributaries And Points Along The Rivers
- Objective To Help Understand Potential Inputs Of Nitrogen From Base Flow (Ground Water)
- Looked At Nitrogen And Several Potential Tracers

Sampling Locations at Hendry Creek



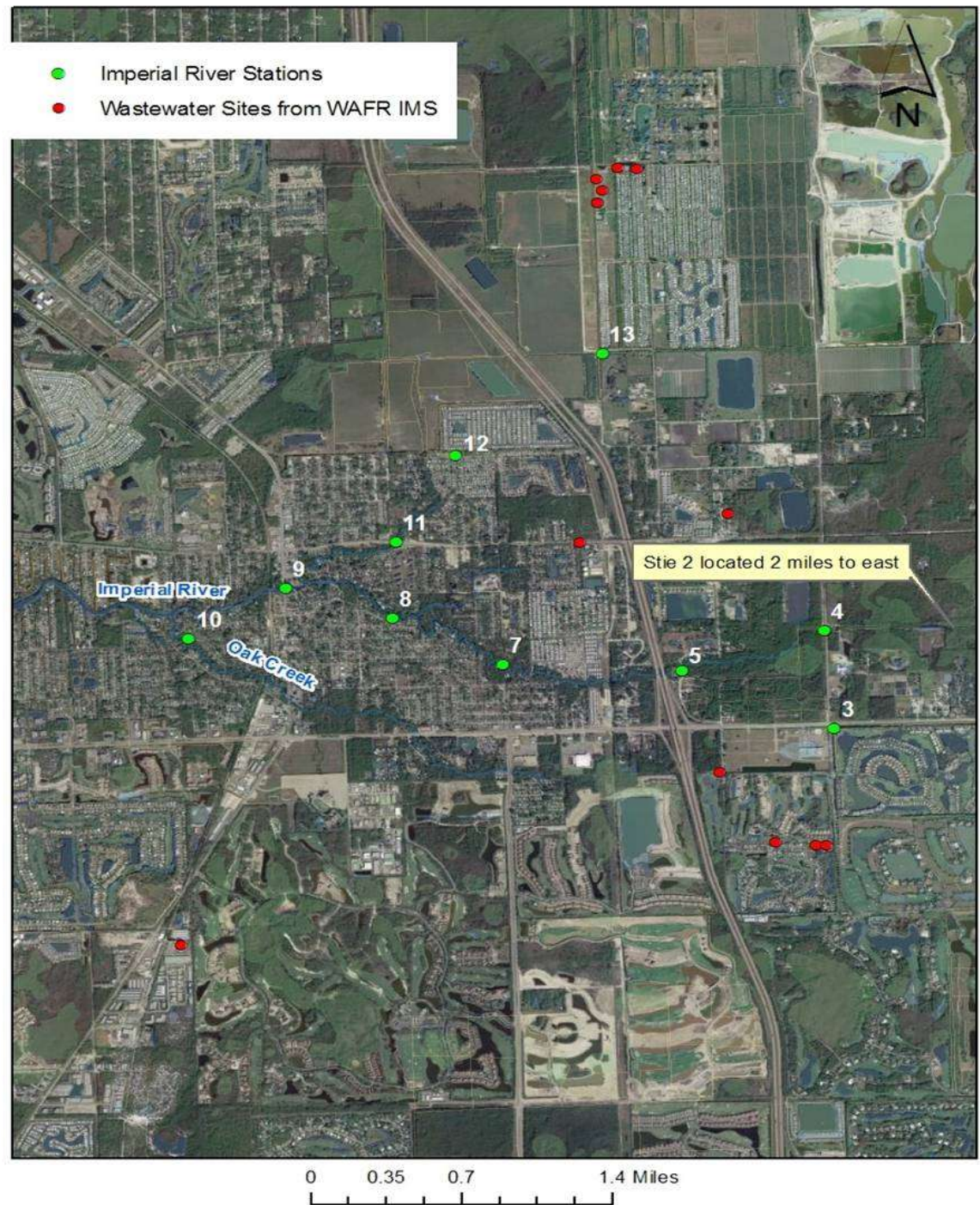
Hendry Creek Sampling Results

Site No.	NH3	NO2NO3	TKN	Organic N	Total N
1	0.1	0.053	0.72	0.62	0.77
2	0.042	0.026	0.64	0.60	0.67
3	0.081	0.041	0.89	0.81	0.93
4	0.024	0.02	0.81	0.79	0.83
5	0.034	0.013	0.84	0.81	0.85
6	0.048	0.006	1.2	1.15	1.21
7	0.054	0.008U	1.1	1.05	1.10
8	0.022	0.004U	0.66	0.64	0.66
9	1.4	0.02U	11	9.60	11.00
10	0.013	0.004	1.5	1.49	1.50
11	0.034	0.004	1.1	1.07	1.10
13	0.014	0.004U	0.6	0.59	0.60
14	0.05	0.018	0.88	0.83	0.90
1	0.1	0.053	0.72	0.62	0.77
MEDIANS	0.042	0.018	0.88	0.81	0.90

Hendry Creek Data Observations

- TN Median is 0.9 mg/l; Referenced Target in TMDL is 0.74 mg/l
- Other Than One Sample, Data From None Of The Stations Show Any Indication Of Input From A Specific Source
- Background Site TN = 0.90 mg/L, Which is Lower Than TN at 5 of the Sites and Higher Than TN at 6 of the Sites

Sampling Locations at Imperial River



Imperial River Sampling Results

Site No.	NH3	TKN	NO2NO3	Organic N	TN
2	0.017	0.88	0.02U	0.86	0.88
3	0.051	1.5	0.026	1.45	1.53
4	0.18	0.93	0.007	0.75	0.94
5	0.18	1	0.13	0.82	1.13
7	0.22	0.9	0.18	0.68	1.08
8	0.051	0.66	0.25	0.61	0.91
9	0.042	0.66	0.18	0.62	0.84
10	0.074	0.79	0.11	0.72	0.90
11	0.046	0.74	0.081	0.69	0.82
12	0.019	0.74	0.005	0.72	0.75
13	0.02	0.78	0.004U	0.76	0.78
MEDIANS	0.051	0.79	0.11	0.72	0.9

Imperial River Data Observations

- TN is Median 0.9 mg/l; Referenced Target in TMDL is 0.74 Mg/L
- Nitrate Data Suggest Some Inputs At Several Of The Sites, But Concentrations Are Not Very High
- Background Site TN = 0.88 mg/l, Which Is Lower Than TN At 6 Of The Sites But is Still Higher Than The Target

Questions

- How Do These TN Compare Against Those In A Natural Background Setting?
- Is Ground Water (Base Flow) Seepage A Major Potential Input After All?

Next Steps

- Repeat Sampling To Evaluate Seasonal Variations.
- Duplicate This Sampling Effort in Natural Background Areas for Comparison.
- Design a Stormwater Sampling Study to See if Inputs of TN Associated With Storm Events Are Comparable.

BMAP Process

- Allocation to Stakeholders
- Consideration of Existing Projects
- Development of New Projects
- Monitoring Plan
- BMAP Documentation

A photograph of a vast, flat landscape under a clear blue sky with a few wispy clouds. The foreground is a body of water, likely a bayou or marsh, with several small, dark green clumps of vegetation protruding from the surface. The horizon line is straight and distant.

Everglades West Coast BMAP

Basin Working Group
Discussion

Historical Need for BWG

- Provide Policy on BMAP Process
- Forum for Discussion, Critique:
 - ❖ Allocation Approach
 - ❖ BMAP Document
 - ❖ Monitoring Requirements
- Official Endorsement of BMAP

What Has Changed for BMAPs?

- FDEP Has Established, and Is Establishing Common Approaches for BMAP Allocations and Policies
- The Sunshine Requirements on the BWG Members Hindered Communications
- Since BMAP Approaches Have Been Established, There are Limited Options Subject to a Vote
- Difficulty in Establishing BWG Membership

Approach to BMAP Input

- Continue The Technical Working Group, All Of Which Are Advertised
- Hold Special Informational Meetings with Local Policy Makers
- Offer Potential for FDEP Presentation to Councils and Commissions
- No Formal Appointments or Elections of Representatives to Group/Committee

Reasons for a Modified Approach

- Feedback from stakeholders: the Sunshine communication restraints on inter-organization collaboration are significant when trying to coordinate joint projects, MS4 permittee efforts, etc.
- Communications are still needed between policy makers and FDEP to engage them in the BMAP and implementation requirements, and to ensure that FDEP hears concerns from the policy level.
- Designing meetings that preserve and target these communications while removing the “membership” label is a better approach.

A wide-angle photograph of a vast, flat landscape, likely the Everglades, featuring a mix of blue water and green marshland under a clear sky with a few wispy clouds. The text is overlaid on this background.

Everglades West Coast BMAP

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 1, 2000** and later.
- Credit counts for treatment above and beyond permit requirements.
 - ❖ Example 1 – BMP To Mitigate Construction
 - ❖ Example 2 – Regional BMP
 - ❖ Example 3 – Retrofit BMP

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

■ Process

- ❖ Stakeholders Complete the Matrix for Their Individual Projects
- ❖ FDEP Assembles the Master Project Matrix for Each BMAP
- ❖ FDEP Conducts Completeness Checks
- ❖ FDEP Confirms the Estimates
- ❖ FDEP Calculates the Initial Estimate of Reductions
- ❖ Stakeholders Review the Projects Matrix

Preliminary Projects Eligible for Credit

- Structural BMPs (Wet Detention, Baffle Boxes, etc.)
- Source Controls (Street Sweeping, Education)
- Special Consideration:
 - Conservation Land Purchases Unless Land Use Changed After Purchase
 - Note – May be Exchange of Loading from Original Owner to New Owner

Everglades West Coast BMAP

NEXT
STEPS

Action Items

- Stakeholders - Finalize Project List
Including Spatial Information (i.e., Project Location and Drainage Area)
- FDEP
 - ❖ Provide % Reductions to be Allowed
 - ❖ Reference Sites Sampling
 - ❖ Model Reference Sites
 - ❖ Hendry Storm Event Sampling
 - ❖ Additional Ambient Sampling in EWC
- Begin Monitoring Plan Development

Questions & Comments?

