



*Florida Department of
Environmental Protection*

North Indian River Lagoon Basin Management Action Plan

Policy Briefing
February 1, 2012





Meeting Overview

1. Welcome
2. Indian River Lagoon Basin Total Maximum Daily Loads (TMDLs)
3. Central Indian River Lagoon (IRL) Basin Management Action Plan (BMAP)
4. BMAP Progress to Date
5. Next Steps





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Economic Value of the Lagoon

- Lagoon is a valuable economic, recreational, and ecological asset for state and local governments.
- To quantify its value an economic study was prepared in 2008 by Hazen and Sawyer, P.C.
- Study supported by IRL Estuary Program, SJRWMD, and SFWMD.





Economic Study

- Study included sub-lagoons (Mosquito, Banana River, and IRL) and tributaries.
- Covered 5 counties:
 - Brevard, Volusia, Indian River, St. Lucie, and Martin.
- Results given in 2007 dollars and based on environmental condition of Lagoon in 2007.
- Data collected from visitor intercept surveys and resident telephone surveys.





Economic Value

- The IRL provided \$3.725 billion in benefits to residents and visitors for 2007.
- This is broken out to the county level as:

County	Value
Volusia	\$658,000,000
Brevard	\$934,000,000
Indian River	\$438,342,000
St. Lucie	\$545,041,000
Martin	\$370,240,000





Economic Value, continued

Indian River Lagoon Related	Value
Recreational Expenditures	\$1,302,000,000
Recreational Use Value	\$762,000,000
Non-use Value of Lagoon	\$3,400,000
Real Estate Value, annualized	\$934,000,000
Income Generated in Counties	\$629,700,000
Restoration, Research, Education Expenditures	\$91,000,000
Commercial Fishing Dockside Value	\$3,800,000
Total Annual Value	\$3,725,900,000





Economic Value of Seagrass, Wildlife, and Water Quality

- Seagrass value estimated as \$329 million (for 72,400 acres in 2007).
- Seagrasses are important part of Lagoon's ecology; foundation of food web for many of the animals that live in the Lagoon.
- Recreational and non-use value would increase by \$80 million per year with significant increase in diversity of wildlife on lagoon and improved water quality in the basin.





Economic Contribution

- Lagoon related activities generate close to \$630 million in income for local residents.
- Contributes almost \$112 million in state and local fee and tax revenue.
- Supports 15,000 full and part-time jobs.





Indian River Lagoon Basin

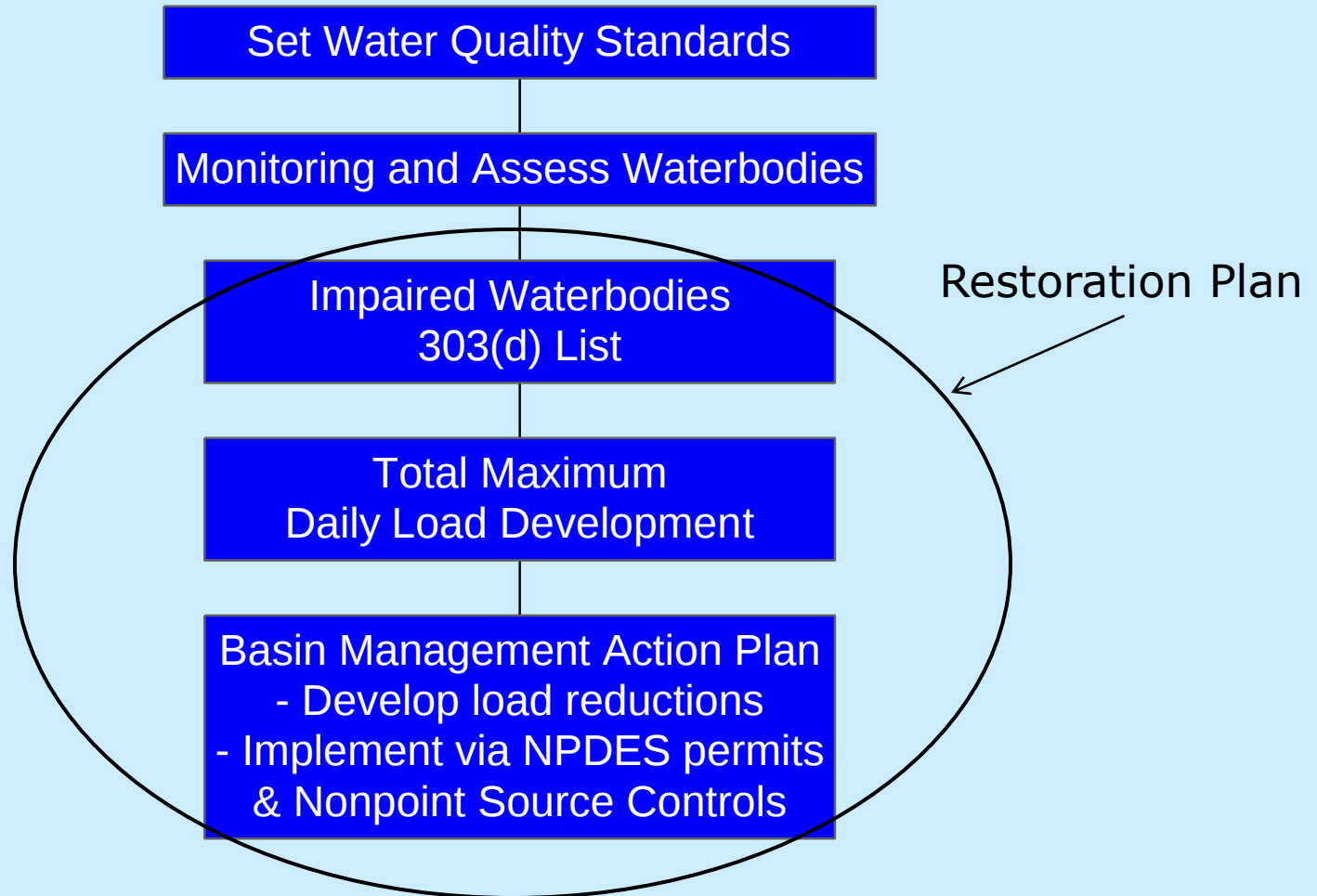


<http://www.sjrwmd.com/itsyourlagoon/index.html>





CWA/TMDL Process





Regulatory Framework for TMDLs

- Under Section 303(d) of the federal Clean Water Act, every two years each state must identify its “impaired” waters that do not meet their designated uses.
- The Florida Department of Environmental Protection (FDEP) is responsible for developing this “303(d) list” of impaired waters.
- FDEP develops and adopts TMDLs for the waterbody segments it identifies as impaired.





Regulatory Framework, continued

- The processes for listing impaired waters and establishing TMDLs are found in:
 - Section 403.067, Florida Statutes (F.S.), known as the Florida Watershed Restoration Act (FWRA); and
 - Florida's Identification of Impaired Surface Waters Rule (IWR), Rule 62-303, Florida Administrative Code (F.A.C.).





Numeric Nutrient Criteria and TMDLs

- TMDLs become the nutrient criteria for a waterbody.
- Adopted as site specific alternative criteria.





Enforcement of BMAP Activities

- For point sources, wastewater treatment facilities (WWTFs) and municipal separate storm sewer systems (MS4s), enforcement is through the National Pollutant Discharge Elimination System (NPDES) permits.
- For nonpoint sources, enforcement is through the FDEP Secretarial-adopted BMAP.
- Agricultural producers are required to implement appropriate best management practices (BMPs) for their commodities or implement FDEP designed water quality monitoring to show they are not having an impact.





TMDL and Verified Impairment

- TMDL – What is a Total Maximum Daily Load?
 - ❖ *The maximum amount of a pollutant that a waterbody can assimilate and still meet water quality standards.*
- Developing TMDLs for impaired waters verified by the State is a legal requirement.
 - ❖ *Clean Water Act Section 303(d); and*
 - ❖ *Florida Watershed Restoration Act (403.067, F.S.).*
- Nutrient impairment verification for the basin was conducted using the procedures defined in the Identification of Impaired Surface Water (Chapter 62-303, F. A. C.) based on nutrient criteria.





Florida Nutrient Criteria

- The nutrient criteria defined in the Surface Water Quality Standard (62-302, F. A. C.):

In no case shall nutrient concentrations of a body of water be altered so as to cause an imbalance in natural populations of aquatic flora or fauna.





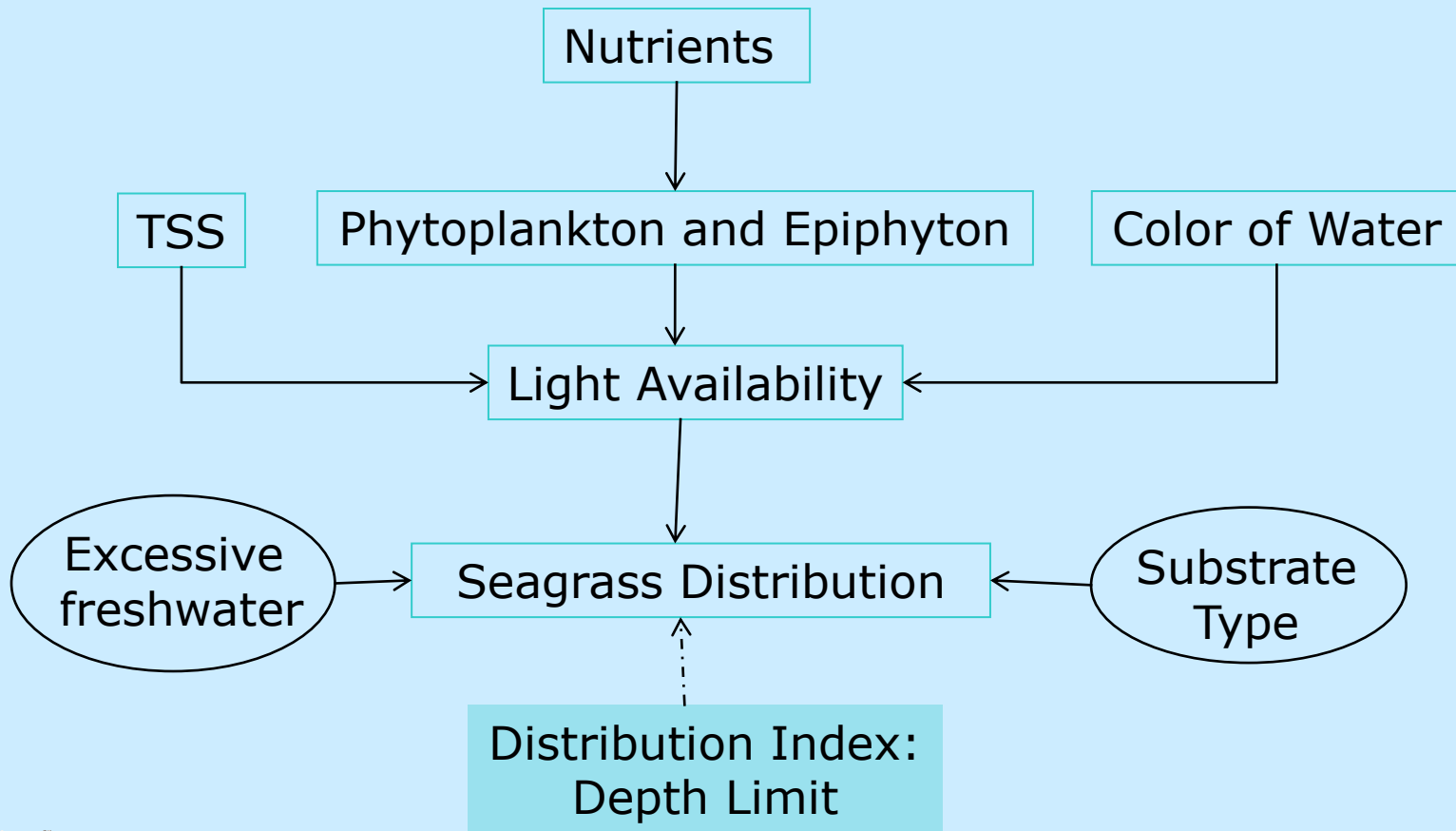
Imbalance of Seagrass Communities

- Seagrass habitat plays an important ecological role (Hanisak 2001) in the IRL.
- All seven species of seagrass found in Florida appear in the Central Indian River (IR) and four species in North IR and Banana River (BR) Lagoon areas (Dawes, et al. 1995).
- The seagrass distribution in many IR and BR lagoon segments has declined since the 1950s (Haddad 1985).
- A high management priority for IR and BR lagoons is to attain and maintain a functioning macrophyte-based ecosystem (IRLNEP 1993, Steward et al. 1994).





Seagrass and Nutrient Impairment



North Indian River Lagoon (IR1-3 to IR9-11)

== SJRWMD Segment Boundary

▭ Department WBID Boundary

IR1-3

IR4

IR5

IR6-7

IR8

IR9-11

BR1-2

BR3-5

BR6

BR7

IR12

IR13A

IR13B

IR14

IR15

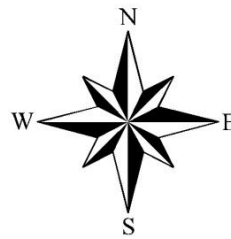
IR16-20

IR21

Banana River Lagoon (BR1-2 to BR7)

Central Indian River Lagoon (IR12 to IR21)

0 5,000 10,000 20,000 30,000 40,000 Meters



Maximum Achievable Depth-Limit

- Lagoon segmentation
- Seagrass depth-limit as the index
- Seagrass maps for 1943, 1986, 1989, 1992, 1994, 1996, and 1999 were used.
- Maximum achievable depth-limit obtained based on the deep boundary of the combined seagrass maps.



Maximum Achievable Depth-Limit Targets

Sub-lagoon	Median Seagrass Maximal Achievable Depth-Limit (m)
North Indian River Lagoon	1.5-1.8
Central Indian River Lagoon	1.2-1.7
Banana River Lagoon	1.4-1.8





TN and TP Targets

- Establish relationship between watershed loading and seagrass depth limit.
 - ❖ *Per acre TN and TP watershed loading simulated using the PLSM/HSPF and log transformed.*
 - ❖ *Seagrass depth-limit converted to percent deviation from the maximum achievable depth-limit.*
 - ❖ *Regress log transformed per acre TN and TP loadings against seagrass percent deviation.*
- Target per acre TN and TP loads identified as the loads that result in the depth-limit 10% shallower than the maximum achievable depth-limit.



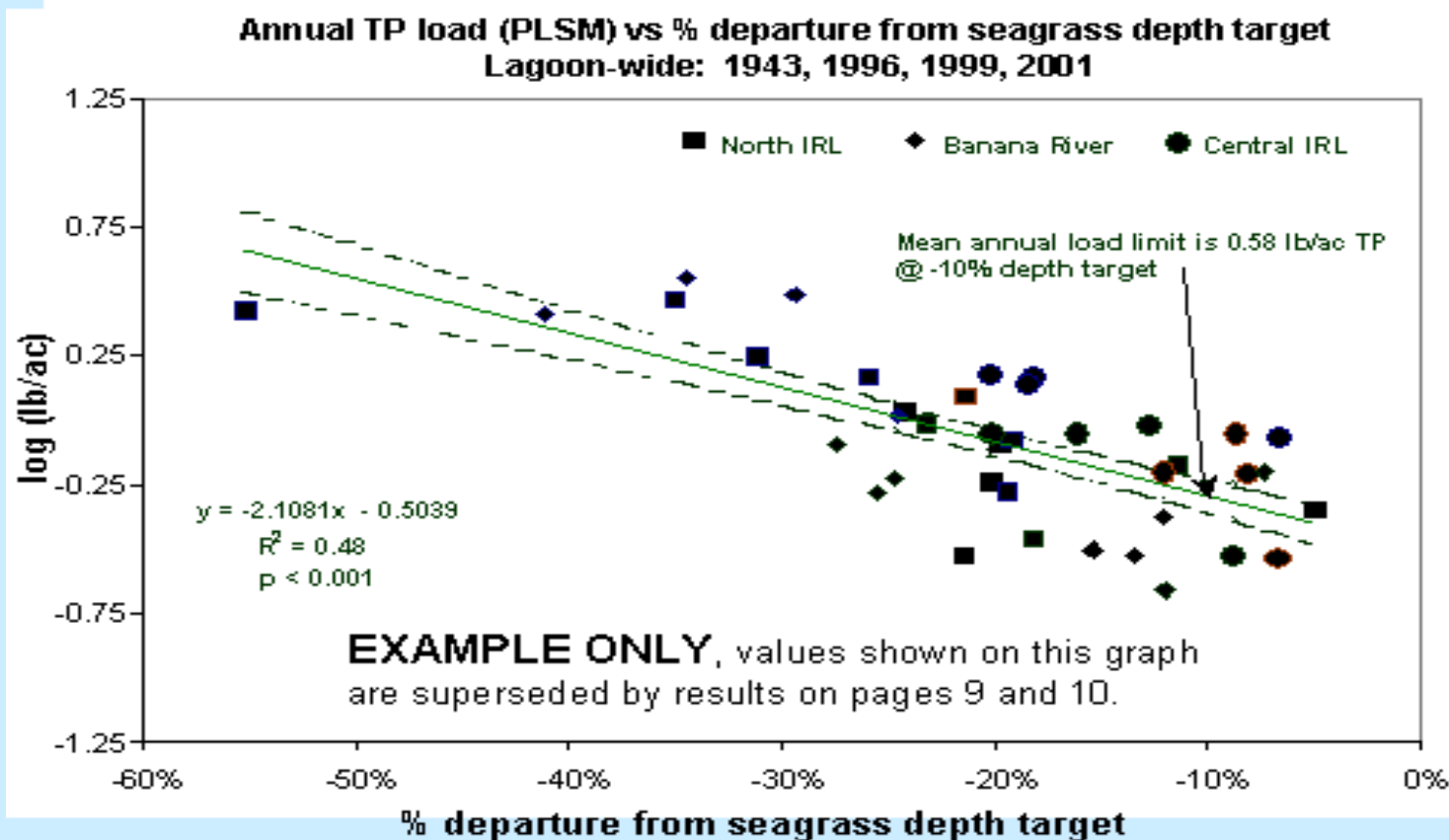


Figure 2. An example of a loading (TP) vs. seagrass depth regression plot along with its correlation and significance statistics, and the 80% confidence interval (----). The annual loading limits are based on the -10% departure from the depth target.

Lagoon-wide		
PLSM regressions	TN lb/ac/yr	TP lb/ac/yr
Based on 1943, 96, 99, and 2001 data	3.34 (R ² = 0.49 p < 0.01)	0.546 (R ² = 0.53 p < 0.01)
North IRL		
PLSM regressions	TN lb/ac/yr	TP lb/ac/yr
Based on 1943, 96, and 99 data	2.88 (R ² = 0.49 p < 0.01)	-----
HSPF regressions		
Based on 1943, 96, and 99 data	-----	0.368 (R ² = 0.47 p = 0.003)
Central IRL		
PLSM regressions	TN lb/ac/yr	TP lb/ac/yr
Based on 1996, 99, and 2001 data	2.90 (R ² = 0.87 p < 0.001)	0.574 (R ² = 0.65 p = 0.001)
Banana River Lagoon		
PLSM regressions	TN lb/ac/yr	TP lb/ac/yr
Based on 1943, 96, and 99 data	2.18 (R ² = 0.74 p = 0.001)	0.374 (R ² = 0.61 p = 0.004)



TMDL Allocation

- $TMDL = \sum WLA + \sum LA + MOS$ (waste load allocation + load allocation + margin of safety)
- WLAs for the wastewater facilities were established using the following rules:
 - ❖ *For facilities with AWT discharge concentrations ($TN \leq 3.0$ mg/L and $TP \leq 1.0$ mg/L) or discharging relatively small quantity: 95th percentile of existing load was granted as WLA.*
 - ❖ *For facility not reaching AWT, existing long-term annual average was granted as the WLA.*
- WLAs for MS4 permitted areas and LAs were calculated as the difference between the total TMDLs and WLAs for each segment.

MOS: Margin of Safety.

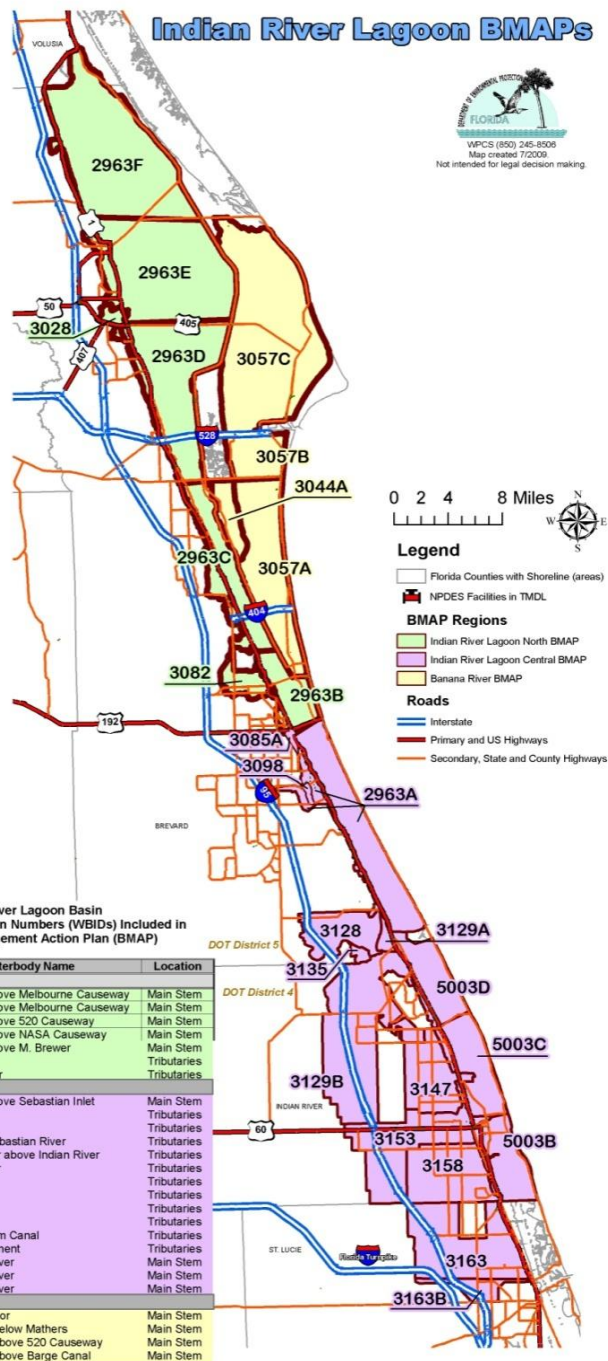




TMDL Components for the North IRL

WBID	Parameter	TMDL (lb/yr)	WLA_{NPDES} wastewater (lb/yr)	WLA_{NPDES} Stormwater[*]	LA (lb/yr)	MOS
2963F	TN	177,220	N/A	21%	21%	Implicit
2963E	TN	173,232	N/A	23%	23%	Implicit
2963D	TN	147,524	8,111	23%	23%	Implicit
2963B+2963C	TN	189,068	9,200	26%	26%	Implicit
2963F	TP	9,320	N/A	41%	41%	Implicit
2963E	TP	14,793	N/A	44%	44%	Implicit
2963D	TP	11,845	1609	49%	49%	Implicit
2963B+2963C	TP	20,592	225	46%	46%	Implicit





- TMDLs adopted March 2009.
- Cover the IRL from just south of Ponce de Leon inlet in Volusia County to just north of Fort Pierce Inlet, and the Banana River Lagoon.
 - This area includes 13 waterbody identification (WBID) numbers shown on map.
- The Central IRL portion extends from the Melbourne Causeway southward to north of the Ft. Pierce Inlet.





Questions on the TMDLs

- Allocation Stakeholders:

- Brevard County
- Volusia County
- City of Cocoa
- City of Edgewater
- City of Indian Harbour Beach
- City of Melbourne
- City of Oak Hill
- City of Rockledge
- City of Titusville
- Town of Indialantic
- Town of Palm Shores

- FDOT District 5
- Kennedy Space Center
- Reliant Energy
- Agriculture

- Other Interested Parties





North Indian River Lagoon BMAP



Courtesy of Robert Day





BMAPs

- A BMAP is developed collaboratively with stakeholders to meet provisions in Section 403.067(7), Florida Statutes (F.S.).
- BMAPs are adopted by FDEP Secretarial Order.
- BMAP is enforceable.





Key BMAP Components

- TMDLs being addressed; Define BMAP area;
- Assumptions and considerations;
- Future growth;
- Allocations to responsible sources (as needed)
 - Allocations can be made to basin;
- Projects to meet the TMDL;
- Monitoring plan;
- Process to assess progress towards the TMDL;
- Implementation timeline and commitments; and
- Appendices with supporting information.





BMAP Approach

- The TMDL reductions will be phased over a 15-year period.
- The first iteration of the BMAP will cover a 5-year period.
 - **Approximately 2013 to 2018.**
 - **First 5 years requires 15% reduction.**
- This iterative approach allows for project implementation to achieve reductions while monitoring occurs to better understand seagrass response to the nutrient reductions.





Project Zones

- The IRL Basin was divided into three subbasins with separate BMAPs:
 - Central IRL;
 - North IRL; and
 - Banana River Lagoon.
- Within these subbasins, there are hydrological differences that affect how the lagoon is impacted by nutrient loads.
- To address these differences, the subbasins were further divided into “project zones.”





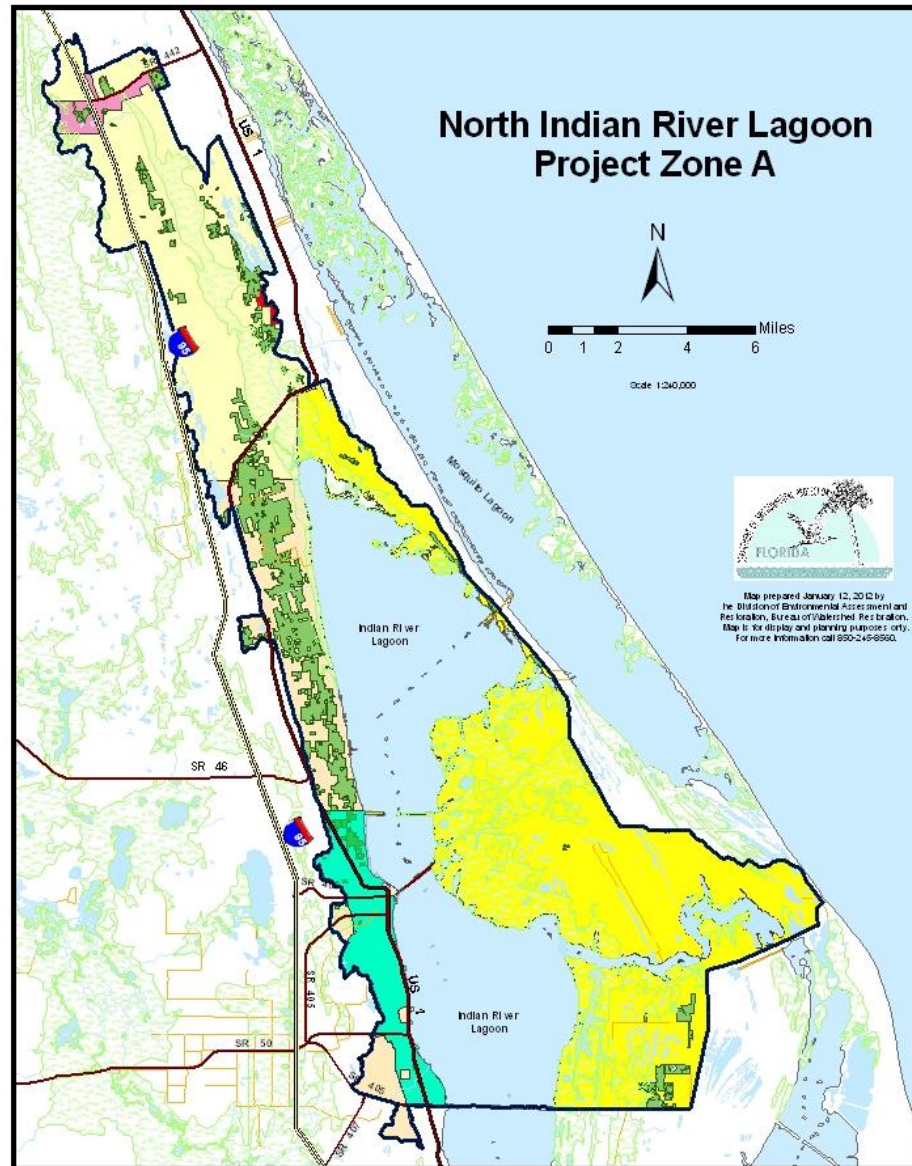
Project Zones, continued

- The North IRL was divided into two project zones:
 - **North IRL A** – from Turnbull Creek to the NASA Causeway (SR 405); and
 - **North IRL B** - from the NASA Causeway to the Melbourne Causeway (US 192).





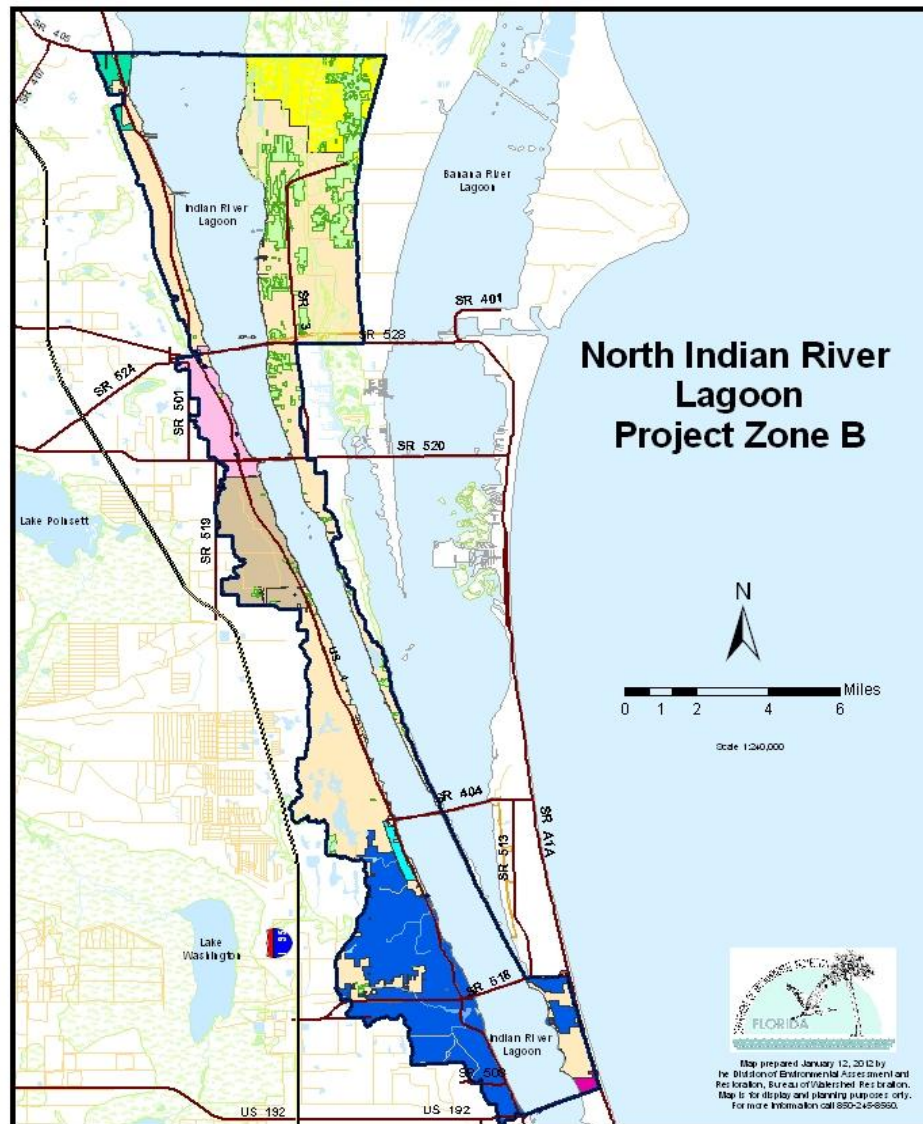
North Indian River Lagoon Project Zone A



Legend

- | | | |
|---------------------|----------------------|----------------|
| NIRL Project Zone A | Agriculture | Titusville |
| Wetlands | Edgewater | Volusia County |
| Canal/Ditch | Oakhill | Brevard County |
| | Kennedy Space Center | |





Legend

- | | | |
|---------------------|----------------------|----------------------|
| NIRL Project Zone B | Titusville | Melbourne |
| Canal/Ditch | Kennedy Space Center | Indian Harbour Beach |
| Wetlands | Rockledge | Indian River |
| Agriculture | Cocoa | Brevard County |
| Palm Shores | | |





Stakeholders in the North IRL BMAP

- WWTFs
 - Cape Canaveral Power Plant
 - Cocoa J. Sellers
 - Melbourne RO
 - Reliant Energy
 - Rockledge
- Non-MS4s
 - Kennedy Space Center
 - Town of Palm Shores
- Agriculture
- Environmental Interests
- MS4s:
 - Brevard County
 - Volusia County
 - City of Cocoa
 - City of Edgewater
 - City of Indian Harbour Beach
 - City of Melbourne
 - City of Oak Hill
 - City of Rockledge
 - City of Titusville
 - Town of Indialantic
 - FDOT District 5





Seagrass Deep Limit Target

- Goal of TMDLs is to recover the deeper-water seagrass habitats. There are water depth targets for each project zone.
- Response of seagrasses to reductions in nutrient loadings is the most important factor for evaluating the success of the TMDLs.
- Success of TMDL is based on growth of seagrass at target depths. Success can be attained without meeting full nutrient loading reductions specified in TMDLs.





Questions on the BMAP

- Allocation Stakeholders:
 - Brevard County
 - Volusia County
 - City of Cocoa
 - City of Edgewater
 - City of Indian Harbour Beach
 - City of Melbourne
 - City of Oak Hill
 - City of Rockledge
 - City of Titusville
 - Town of Indialantic
 - Town of Palm Shores
 - FDOT District 5
 - Kennedy Space Center
 - Reliant Energy
 - Agriculture
- Other Interested Parties





North IRL BMAP Progress to Date



<http://www.irclibrary.org/>





Scale for Seagrass Target Evaluation

- Success in meeting the TMDL depth limit targets is assessed at a project zone scale.
- Because project zones are hydrologically connected areas, incoming nutrient loads would be expected to affect the entire area.



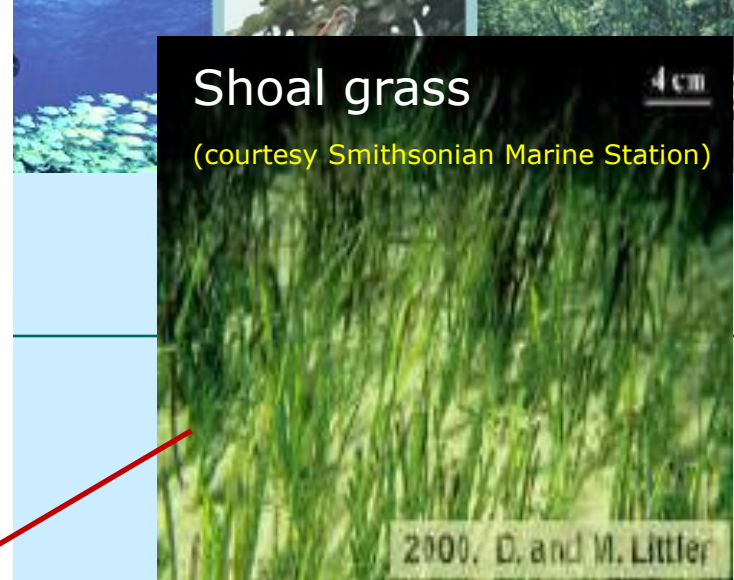
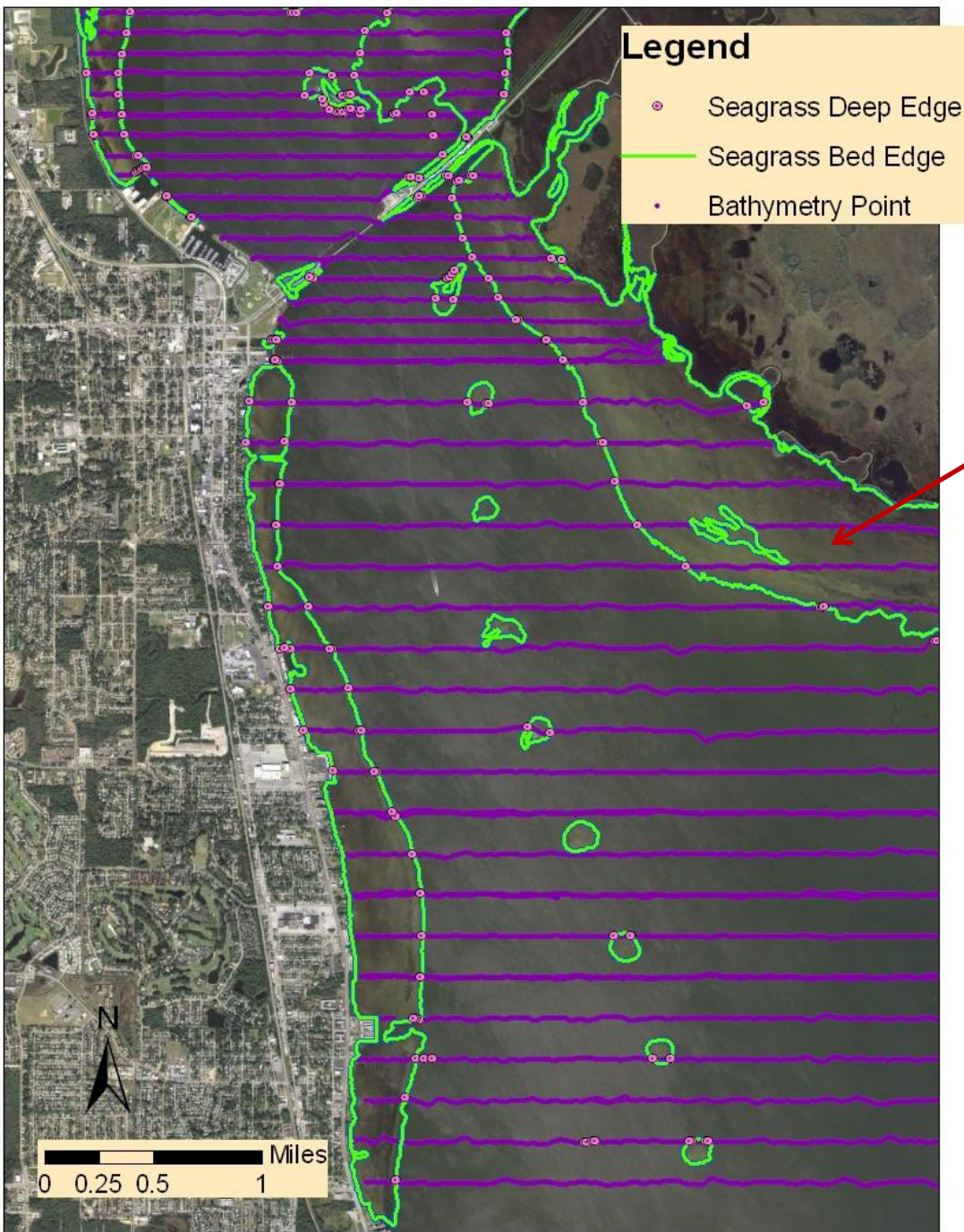


Establishing the Deep Edge of Seagrass Beds

- The four most recent mapped seagrass datasets (2003, 2005, 2006, and 2007) were joined to create a combined map or coverage in Geographic Information Systems (GIS).
- A 15 meter buffer zone was applied to the perimeter of the coverage to create the deep edge of the seagrass beds.
- The buffered coverage shows the deepest edge that seagrass grew at for each project zone.

- Not species specific





*What is
the
Deep Edge
of Seagrass?*

**Dataset of bathymetry
points that intersect
seagrass bed**



TMDL Compliance: Step 1

- TMDL compliance is evaluated over 4 year's of seagrass data.
- The determination of TMDL compliance is a two-step evaluation method:

Step 1: For each project zone, a cumulative frequency distribution of the seagrass beds deep edge depth data is created for the evaluation years (2003-2007). The evaluation period distribution is compared to the TMDL period frequency distribution (1943-1999).





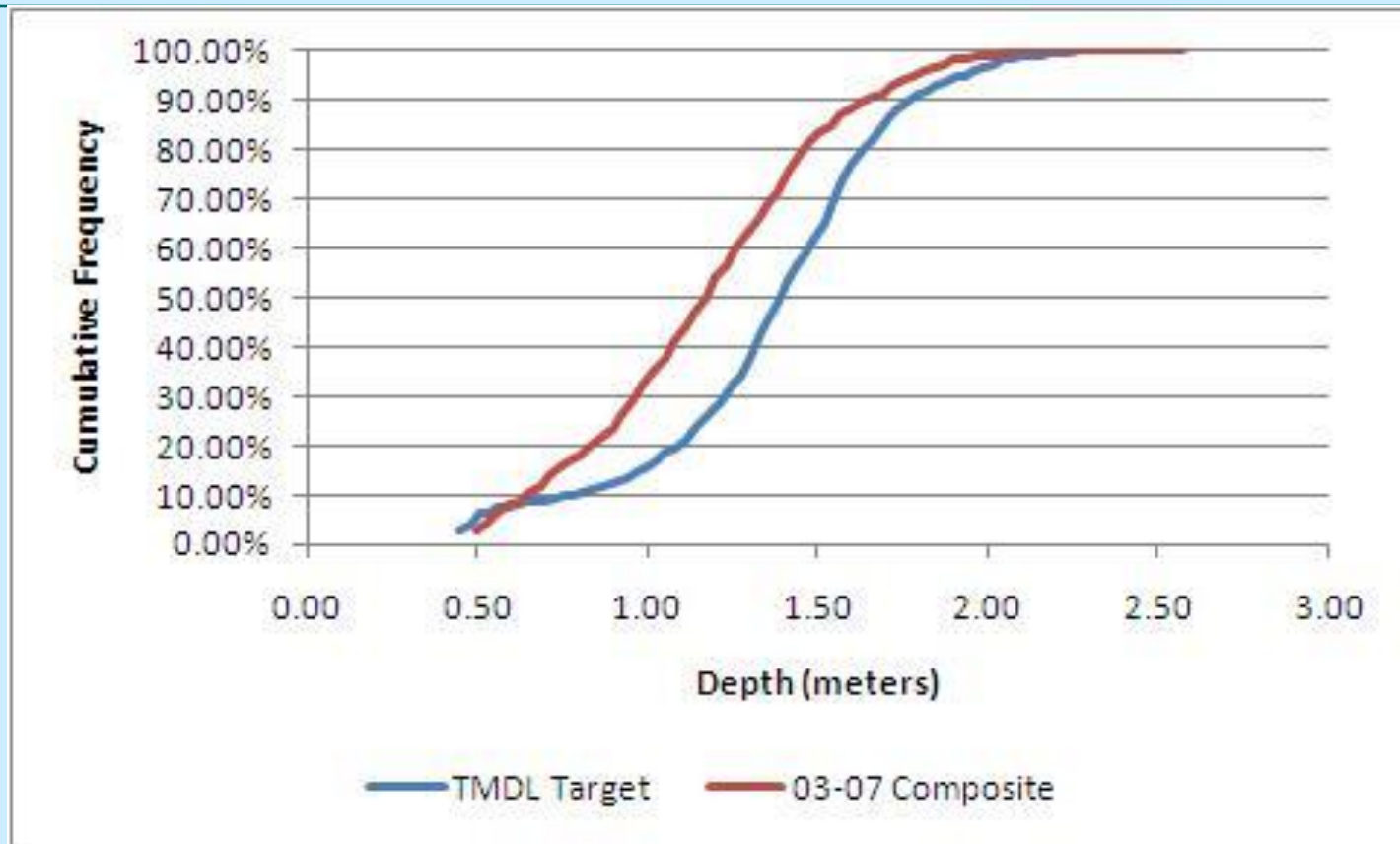
TMDL Compliance: Step 1

- **More than 50% of** the combined evaluation year's distribution curve must lie on or to the right of the TMDL curve to meet Step 1 compliance.





Project Zone North A

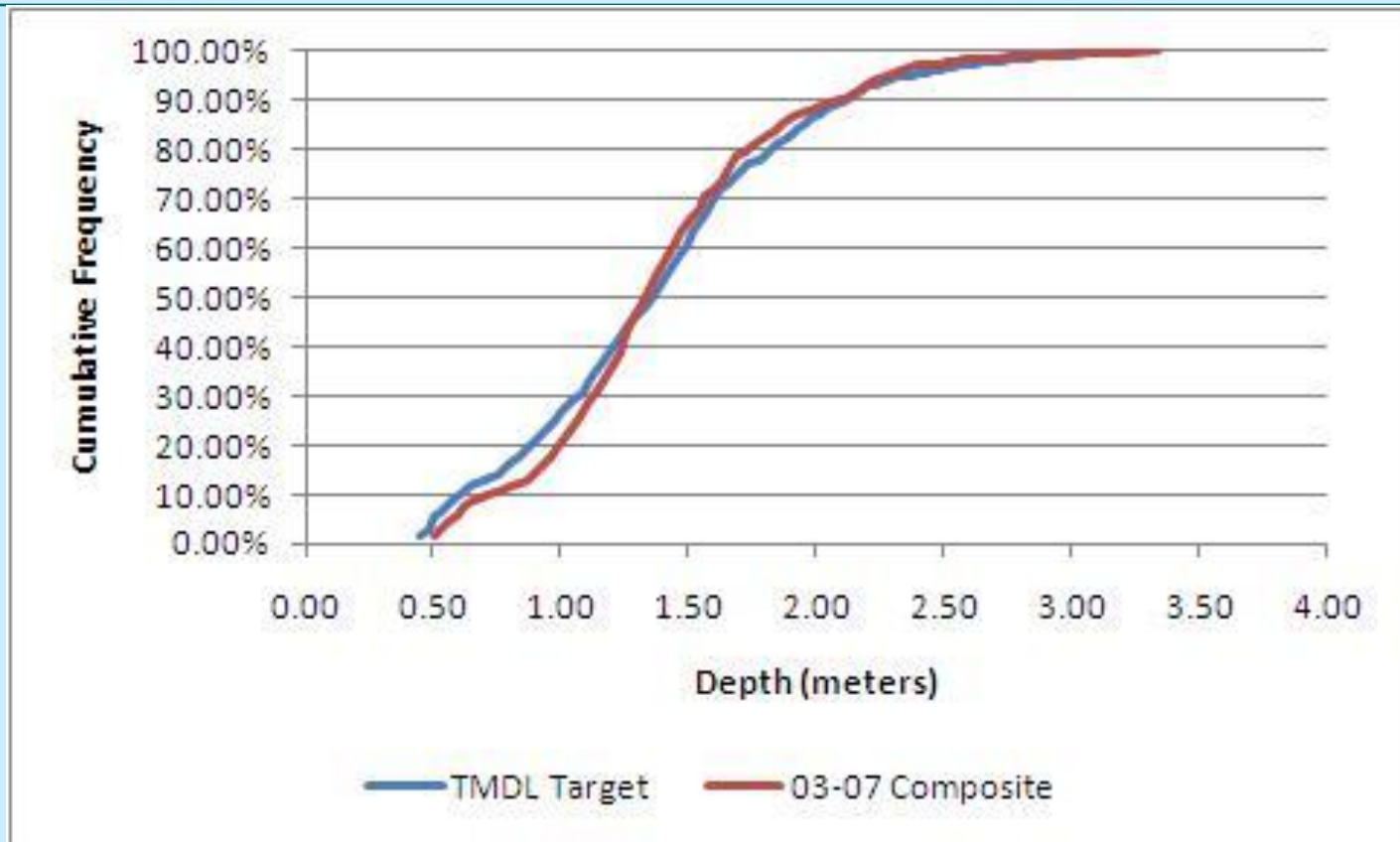


The 2003-2007 curve (red line) is not on or to the right of the TMDL curve (blue line) more than 50% of the time. Therefore, North A is not Step 1 compliant.





Project Zone North B



The 2003-2007 curve (red line) is not on or to the right of the TMDL curve (blue line) more than 50% of the time. Therefore, North B is not Step 1 compliant.





TMDL Compliance: Step 2

- **Step 2:** The median depth limit value is determined for each mapping year from the cumulative frequency distribution.
- Each mapping year's median depth:
 - **Must meet or exceed the TMDL median depth limit target.** Advantage is that one exceptional year does not overpower other years.





TMDL Compliance: Step 2 cont.

- Three of the four annual medians must meet or exceed the median TMDL depth limit target for a project zone to be Step 2 compliant.
 - One year with less seagrass does not prevent compliance.





Step 2 Compliance Summary

- Four out of the four mapping years in each project zone did not meet or exceed the TMDL median. *The North IRL is not Step 2 compliant.*

Year	North A	North B
TMDL Median	1.41	1.37
2003	0.96	1.26
2005	1.02	1.26
2006	1.08	1.32
2007	1.08	1.29
Step 2 Compliant?	No	No





Evaluating Compliance in the Future

- Reductions are required because seagrass beds are not meeting the TMDL depth targets.
- Stakeholders will be required to achieve 15% TN and TP reductions in this first five-year BMAP period.
- In year four of the BMAP, TMDL depth limit targets will be reassessed using 2007, 2009, 2011, and 2013 mapping data. This creates a new 4 year evaluation period.





Evaluating Compliance in Future, cont

- If North A and North B **are compliant using the 2007-2013 mapping years**, FDEP will not ask stakeholders to make additional TN and TP reductions in the next iteration of the BMAP.
- If the project zones **are not compliant at this time**, additional reductions will be required in the second iteration of the BMAP.





Calculating Allocations

- The following slides outline the way FDEP's is proposing to calculate allocations for reductions of TP and TN loadings for individual stakeholders.
- Some important terms to understand
 - Baseline loading
 - Allocation (allowable loading)
 - Percent reduction





Allocations - Calculating Baseline Loads

- Baseline loads or starting loads are calculated based on year 2000 landuses using the PLSM model.
- The PLSM model is a GIS based model that uses landuse, rainfall, nutrient-landuse relations, and soils data to calculate loadings.
- Loadings from water are removed from the datasets. This includes the NIRL proper.
- New area was added for Cocoa, Rockledge, and Titusville to accurately reflect their drainage to the IRL, compared to the TMDL.





Calculating Baseline Loads, cont.

- Loadings for North A and North B project zones are created separately.
- Baseline loading datasets are created in the following order:
 - Florida Department of Transportation (FDOT) roads and right-of-ways.
 - Areas with agricultural land uses.
 - Municipalities and federal facilities, each to its own jurisdictional boundary.
 - The remaining area was assigned to the counties using the jurisdictional boundaries.





HSPF Model Conversion

- The TP TMDL for the North IRL was based on loadings from the Hydrologic Simulation Program – FORTRAN (HSPF) model, not the PLSM. The models produce similar results.
- HSPF does not include the same level of detail for landuse nor does it provide spatial location.
- HSPF aggregates loading by seagrass segment. It is the total loading from each segment that is translated into PLSM output.





HSPF Model Conversion, continued

- A ratio of the total loading from the HSPF model to the total loading from the PLSM model was calculated for each seagrass segment.
- This ratio was applied to the PLSM loadings for each seagrass segment.





Net Loads in North A

Entity	Acres	Water Land Use Acres	Net Acres	TN Baseline Load (lbs/yr)	Water Land Use TN Load (lbs/yr)	TN Net Load (lbs/yr)	TP Adjusted Baseline Load (lbs/yr)	Water Land Use TP Load (lbs/yr)	TP Net Load (lbs/yr)
Agriculture	8,069	0	8,069	62,810	0	62,810	9611.3	0.0	9,611.3
Brevard County	8,305	108	8,197	37,051	194	36,857	4205.7	27.4	4,178.3
Edgewater	1,244	62	1,182	3,266	181	3,085	346	22.8	323.2
FDOT D5	354	0	354	3,917	0	3,917	1130.9	0.0	1,130.9
KSC	44,295	3,711	40,584	84,095	2,161	81,934	10277	224.8	10,052.2
Oak Hill	127	0	127	218	0	218	15.3	0.0	15.3
Titusville	5,776	34	5,742	64,967	113	64,854	12102.2	26.0	12,076.2
Volusia County	23,605	254	23,351	32,375	1,169	31,206	2632.4	110.8	2,521.6
Total	91,776	4,169	87,607	288,699	3,818	284,881	40,320.8	411.8	39,909.0





Net Loads in North B

Entity	Area (Acres)	Water Land Use Acres	Net Acres	TN Baseline Load (lbs/yr)	Water Land Use TP Load (lbs/yr)	TN Net Load (lbs/yr)	TP Adjusted Baseline Load (lbs/yr)	Water Land Use TP Load (lbs/yr)	TP Net Load (lbs/yr)
Agriculture	3,692	0	3,692	24,477	0	24,477	5,504.2	0.0	5,504.2
Brevard County	23,829	1,431	22,398	144,429	5,318	139,111	22,517.4	803.9	21,713.5
Cocoa	2,111	13	2,098	26,319	40	26,279	5,224.1	7.7	5,216.4
FDOT D5	929	3	926	8,743	12	8,731	2,804.1	1.7	2,802.4
Indialantic	168	0	168	1,756	0	1,756	318.4	0.0	318.4
Indian Harbour Beach	1	0	1	11	0	11	1.7	0.0	1.7
KSC	4,136	159	3,977	5,707	366	5,341	975.3	46.4	928.9
Melbourne	9,920	258	9,662	91,888	1,045	90,843	20,074.0	151.2	19,922.8
Palm Shores	267	2	265	1,700	6	1,694	311.3	1.3	310.0
Rockledge	3,892	69	3,823	32,175	181	31,994	6,648.3	35.8	6,612.5
Titusville	588	0	588	3,013	0	3,013	279.6	0.0	279.6
Total	49,535	1,935.0	47,600	340,218	6,968	333,250	64,658.4	1,048.0	63,610.4





De minimus *Loads*

- Some of our stakeholders total loads are very small in relation to the total loads for *both* TN and TP. Their loads are less than 0.1% of the total loads. They are considered *de minimus*.
- Two entities met the *de minimus* requirements:
 - Oak Hill – North A
 - Indian Harbour Beach – North B
- The *de minimus* load was not reassigned to other stakeholders.





Target Loads per Acre

- Target loads per acre were calculated by dividing the TMDL target load for nonpoint sources by the total non-water area in North A and North B.

Target loads are used to calculate allocations

North A	TN	TP
Non-Water Acres	86,667	86,667
TMDL Target Load (lbs)	184,254	20,349
Target Load (lbs/acre)	2.126	0.235

North B	TN	TP
Non-Water Acres	42,786	42,786
TMDL Target Load (lbs)	188,341	27,638
Target Load (lbs/acre)	4.402	0.646





Allocations and Required Reductions

- Each entity's total acreage is multiplied by the target load per acre.
 - This calculation provides each entity's allocation (allowable load).
- By subtracting the allocation from each entity's net load, the required reductions in loading were determined. Loadings are expressed in pounds of TN and TP.





Revised Required Reductions

- There are entities in both project zones that have a net loading that is less than their TMDL allocation. (These are indicated as negative values in the table in your handout.)
- This is the case for KSC and Volusia County in North A and KSC and Titusville in North B.





Revised Required Reductions, cont.

- To ensure that greater reductions were not assigned than required by the TMDL, this difference between the allocation and net loads was spread out to the other entities based on their percentage of the net load.
 - Result is that stakeholders' required reductions are now smaller than the initial calculated values.





BMAP Phase I Required Reductions

- The required reductions will be spread out over a 15-year period.
- For the first iteration of the BMAP, 15% of the required reductions must be achieved.
- This allows for some reductions to occur while providing time to see how seagrass respond to nutrient reductions.





BMAP Phase I TN Reductions for North A

Entity	TN Required Reduction (lbs/yr)	Portion of Volusia County and KSC Load Reduction (lbs/yr)	Revised TN Required Reduction (lbs/yr)	15% of TN Required Reduction (lbs/yr)
Agriculture	45,654.9	8,343.9	37,311.0	5,596.6
Brevard County	19,429.6	4,896.2	14,533.3	2,180.0
Edgewater	572.1	409.8	162.2	24.3
FDOT D5	3,164.4	520.3	2,644.1	396.6
KSC	-4,347.1	-	0.0	0.0
Titusville	52,646.2	8,615.4	44,030.7	6,604.6
Volusia County	-18,438.6	-	0.0	0.0
Oak Hill - <i>de minimus</i>	-	-	-	-
Total	98,681.3	22,785.7	98,681.3	14,802.2





BMAP Phase I TP Reductions for North A

Entity	TP Required Reduction (lbs/yr)	Portion of Volusia County Load Reduction (lbs/yr)	Revised TP Required Reduction (lbs/yr)	15% of TP Required Reduction (lbs/yr)
Agriculture	7,715.0	856.4	6,858.6	1,028.8
Brevard County	2,251.9	372.3	1,879.6	281.9
Edgewater	45.4	45.4	0.0	0.0
FDOT D5	1,047.7	100.8	946.9	142.0
KSC	515.0	515.0	0.0	0.0
Titusville	10,726.8	1,076.0	9,650.7	1,447.6
Volusia County	-2,965.9	0.0	0.0	0.0
Oak Hill - <i>de minimus</i>	-	-	-	-
Total	19,336.0	2,965.9	19,336.0	2,900.4





BMAP Phase I TN Reductions for North B

Entity	TN Required Reduction (lbs/yr)	Portion of KSC Load Reduction (lbs/yr)	Revised TN Required Reduction (lbs/yr)	15% of TN Required Reduction (lbs/yr)
Agriculture	8,224.3	908.3	7,316.0	1,097.4
Brevard County	40,513.7	5,162.1	35,351.6	5,302.7
Cocoa	17,043.6	975.2	16,068.5	2,410.3
FDOT D5	4,655.2	324.0	4,331.2	649.7
Indialantic	1,014.9	65.2	949.8	142.5
KSC	-12,167.5	-	0.0	0.0
Melbourne	48,311.8	3,371.0	44,940.8	6,741.1
Palm Shores	528.3	62.9	465.4	69.8
Rockledge	15,163.0	1,187.2	13,975.8	2,096.4
Titusville	423.7	111.8	311.9	46.8
Indian Harbour Beach- <i>de minimus</i>	-	-	-	-
Total	123,710.9	12,167.5	123,710.9	18,556.6





BMAP Phase I TP Reductions for North B

Entity	TP Required Reduction (lbs/yr)	Portion of KSC and Titusville Load Reduction (lbs/yr)	Revised TP Required Reduction (lbs/yr)	15% of TP Required Reduction (lbs/yr)
Agriculture	3,119.1	153.6	2,965.5	444.8
Brevard County	7,244.2	605.8	6,638.4	995.8
Cocoa	3,861.1	145.5	3,715.6	557.3
FDOT D5	2,204.3	78.2	2,126.1	318.9
Indialantic	209.6	8.9	200.8	30.1
KSC	-1,640.5	-	0.0	0.0
Melbourne	13,681.3	555.8	13,125.5	1,968.8
Palm Shores	138.9	8.6	130.3	19.5
Rockledge	4,142.5	184.5	3,958.0	593.7
Titusville	-100.4	-	0.0	0.0
Indian Harbour Beach- <i>de minimus</i>	-	-	-	-
Total	32,860.1	1,740.9	32,860.1	4,929.0





Types of Projects Eligible for Credit

- Projects completed since January 1, 2000 were eligible for credit, because the TMDL is based on land uses mapped circa 2000.
- Projects were only given credit for the load reduction that was over and above any permit requirements for that project.
 - Permit conditions are established to maintain the current condition (prevent further impacts from the development) and do not contribute to the improvement of water quality in the lagoon.





Types of Projects, cont.

- Stormwater treatment best management practices (BMPs):
 - Retention BMPs;
 - Wet detention ponds;
 - Dry detention;
 - Baffle boxes;
 - Nutrient (2nd generation) baffle boxes;
 - Catch basin inserts/inlet filters;
 - Swales;
 - Alum injection;
 - Stormwater reuse;
 - Stormceptor units;
 - Continuous deflective separation (CDS) units;
 - Street sweeping; and
 - Treatment trains using a combination of BMPs.





Types of Projects, continued

- Provisional credit is assigned for:
 - Floating islands/ managed aquatic plant systems (MAPS); and
 - Public education and outreach efforts.
- Other potential projects:
 - Muck/sediment removal;
 - Vegetation and algal harvesting; and
 - Tilting weir gates in canals.





Costs and Benefits of the BMAP

- IRL has an economic value of \$3.725 billion.
- IRL provides goods and services, income, jobs, and tax revenue to local and state governments (numbers are for 2007).
- Table gives IRL economic contribution.

County	Goods & Services	Income	Jobs	Tax Revenue
Brevard	\$215 million	\$100 million	3,112	\$13.7 million
Volusia	\$168 million	\$77 million	2,382	\$10.6 million



Costs and Benefits of the BMAP

- Difficult to assign a \$ per pound for TN or TP removal to estimate cost of projects that will improve water quality.
 - Land costs vary
 - Construction costs vary
 - Costs differ from county to county or even by city
 - Benefits from outreach/education do work, but are hard to quantify





Costs and Benefits of BMAP, continued

- The BMAP does have benefits
 - Gives priority for DEP grant funding.
 - DEP has provided 319 and TMDL monies for projects
 - Since 2004, \$9.3 million to Brevard County, county-wide
 - And \$2.7 million to Volusia County, county-wide
 - Provides a management plan that helps leverage other grant/loan dollars





Questions on the BMAP Progress

- Allocation Stakeholders:
 - Brevard County
 - Volusia County
 - City of Cocoa
 - City of Edgewater
 - City of Indian Harbour Beach
 - City of Melbourne
 - City of Oak Hill
 - City of Rockledge
 - City of Titusville
 - Town of Indialantic
 - Town of Palm Shores
 - FDOT District 5
 - Kennedy Space Center
 - Reliant Energy
 - Agriculture
- Other Interested Parties





Next Steps



Courtesy of Robert Day



TN Credit for Submitted Projects – North A

Entity	15% BMAP 1 TN Required Reduction (lbs/yr)	Completed Project TN Credit (lbs/yr)	TN Reduction Remaining (lbs/yr)
Brevard County	2,180.0	4,086.0	-1,906.0
Edgewater	24.3	74.0	-49.7
FDOT District 5	396.6	498.0	-101.4
Kennedy Space Center	0.0	711.0	-711.0
Titusville	6,604.6	6,828.0	-223.4
Volusia County	0.0	0.0	0.0
Oakhill – <i>de minimus</i>	-	0.0	-

15% reduction met





TP Credit for Submitted Projects – North A

Entity	15% BMAP 1 TP Required Reduction (lbs/yr)	Completed Project TP Credit (lbs/yr)	TP Reduction Remaining (lbs/yr)
Brevard County	281.9	1,289.0	-1,007.1
Edgewater	0.0	9.8	-9.8
FDOT District 5	142.0	305.2	-163.2
Kennedy Space Center	0.0	910.6	-910.6
Titusville	1,447.6	2,149.2	-701.6
Volusia County	0.0	0.0	0.0
Oakhill – <i>de minimus</i>	-	0.0	-

15% reduction met





TN Credit for Submitted Projects – North B

Entity	15% BMAP 1 TN Required Reduction (lbs/yr)	Completed Project TN Credit (lbs/yr)	TN Reduction Remaining (lbs/yr)
Brevard County	5,302.7	12,164.0	-6,861.3
Cocoa	2,410.3	4,367.0	-1,956.7
FDOT District 5	649.7	1,658.0	-1,008.3
Indialantic	142.5	0.0	142.5
Kennedy Space Center	0.0	498.0	-498.0
Melbourne	6,741.1	4,157.0	2,584.1
Palm Shores	69.8	71.0	-1.2
Rockledge	2,096.4	3,641.0	-1,554.6
Titusville	46.8	49.0	-2.2
Indian Harbour Beach – <i>de minimus</i>	-	0.0	-



Almost meets 15% reduction



TP Credit for Submitted Projects – North B

Entity	15% BMAP 1 TP Required Reduction (lbs/yr)	Completed Project TP Credit (lbs/yr)	TP Reduction Remaining (lbs/yr)
Brevard County	995.8	3,174.8	-2,179.0
Cocoa	557.3	1,467.1	-909.8
FDOT District 5	318.9	992.7	-673.8
Indialantic	30.1	0.0	30.1
Kennedy Space Center	0.0	895.5	-895.5
Melbourne	1,968.8	1,648.4	320.4
Palm Shores	19.5	13.9	5.6
Rockledge	593.7	1,587.0	-993.3
Titusville	0.0	13.9	-13.9
Indian Harbour Beach – <i>de minimus</i>	-	0.0	-

Almost meets 15% reduction





Project Collection

- Additional projects that have not yet been quantified have been received by:
 - Brevard County; and
 - Kennedy Space Center.
- Stakeholders have until March 16th to provide additional projects for the BMAP.





Monitoring Plan Development

- BMAP requires a monitoring plan.
- Plan identifies how we will measure success in achieving TMDLs.
 - **Goals and objectives** for monitoring.
 - Identifies **sampling locations** and **analytes measured**.
- Seagrass mapping is major component of monitoring plan.
 - DEP will cover 2013 mapping of seagrasses.
 - Mapping requires aerial photography.
 - Considering remote sensing techniques.
- DEP and SJRWMD preparing strawman.





Production of the BMAP Document

- Time line for completion of key tasks
 - Alternate allocation comparison– **March 2012**
 - Finish project collection – **May 2012**
 - Determine crediting of Other type projects – **May/June 2012**
 - Draft monitoring plan – **June-July 2012**
- Drafting of BMAP document
 - Goals and objectives – **summer/fall 2012**
 - Draft document – early **2013**
 - **Final Draft – 2013**





BMAP Adoption Process

- Opportunity for **review of BMAP** – 30 days
- **Support of plan** by stakeholders
 - Letter/ statement of commitment.
 - Resolution from local government.
- **Future Public briefings/meetings**
 - Today's meeting is the first.
 - At least one more policy briefing.
 - Public meeting / Workshop on BMAP.
 - Individual presentations to local governments or others as requested.





BMAP Adoption, continued

- Adoption of plan by Secretarial Order.
- Follows Chapter 120, F.S. requirements for noticing of DEP action.
- Final Order noticed for 21 days.
 - Allows for public comment and challenge.
 - Publicized in each county's local paper.





Questions on the Next Steps

- Allocation Stakeholders:
 - Brevard County
 - Volusia County
 - City of Cocoa
 - City of Edgewater
 - City of Indian Harbour Beach
 - City of Melbourne
 - City of Oak Hill
 - City of Rockledge
 - City of Titusville
 - Town of Indialantic
 - Town of Palm Shores
 - FDOT District 5
 - Kennedy Space Center
 - Reliant Energy
 - Agriculture
- Other Interested Parties





Public Comment



<http://www.sjrwmd.com/itsyourlagoon/index.html>





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