



*Florida Department of
Environmental Protection*

Allocations

North Indian River Lagoon BMAP Meeting

March 2, 2012



Target Load Per Acre Approach





Target Load Per Acre Approach

- Assigns the required reduction to each entity based on achieving a target load per acre for each project zone.
- FDEP believes this is the most fair and equitable allocation approach because it focuses on achieving reductions in areas with higher loading.
 - These areas will have a higher existing load per acre and will need to make greater reductions to meet the target load per acre than less developed areas.





Calculating Baseline Loads

- Baseline loads are those loads that were used to calculate the TMDL based on 2000 land use from PLSM. –Starting loads
- The first step was to remove the areas associated with the land use land cover code 5400, which is the Indian River Lagoon.
- The resulting file was then clipped to the North A and North B project zone boundaries.
- Project zones include new areas for Cocoa, Rockledge, and Titusville.





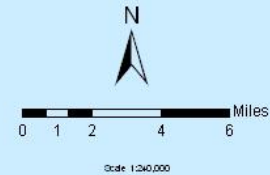
Calculating Baseline Loads, con't

- The individual entity shapefiles were then created by clipping each of the project zone files as follows:
 - Florida Department of Transportation (FDOT) roads and right-of-ways.
 - Areas with agricultural land uses.
 - Municipalities, each to its own jurisdictional boundary.
 - The remaining area was assigned to the counties using the jurisdictional boundaries.

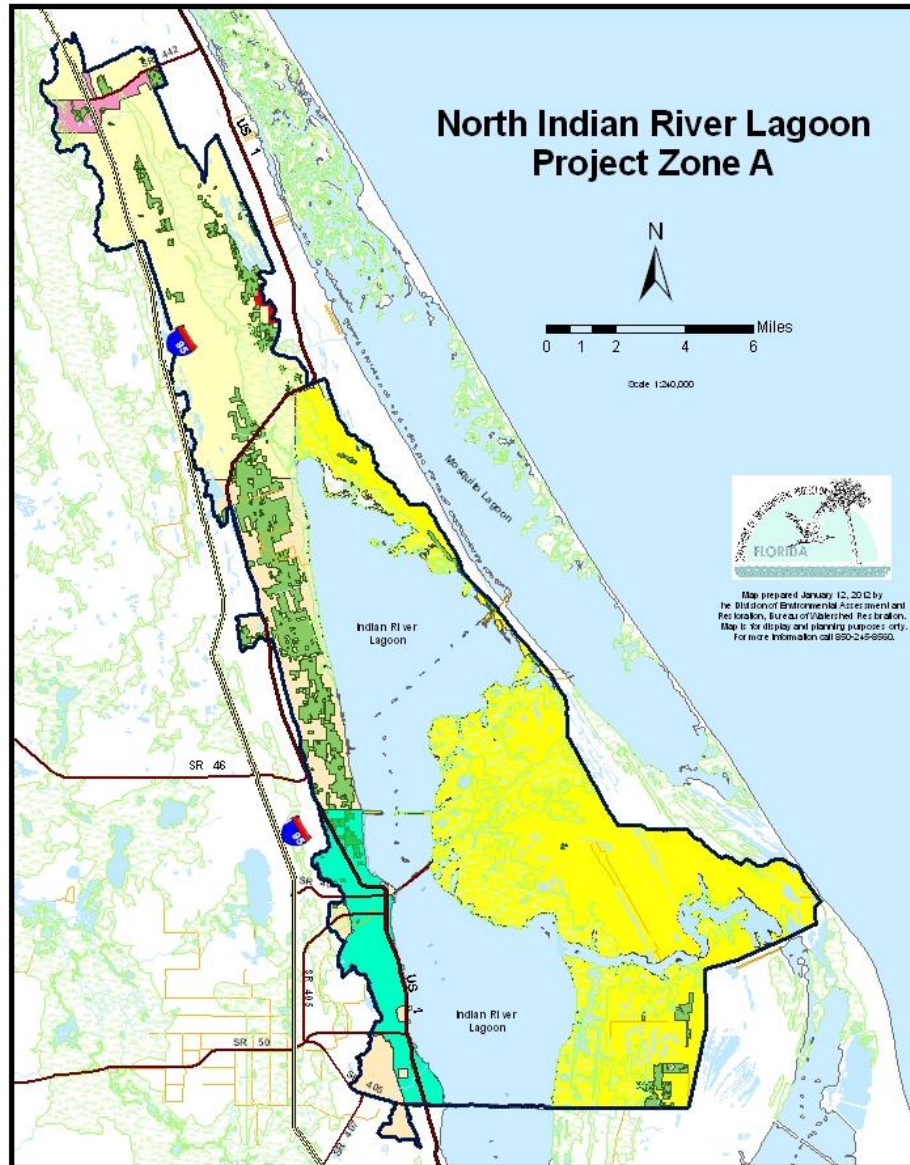




North Indian River Lagoon Project Zone A



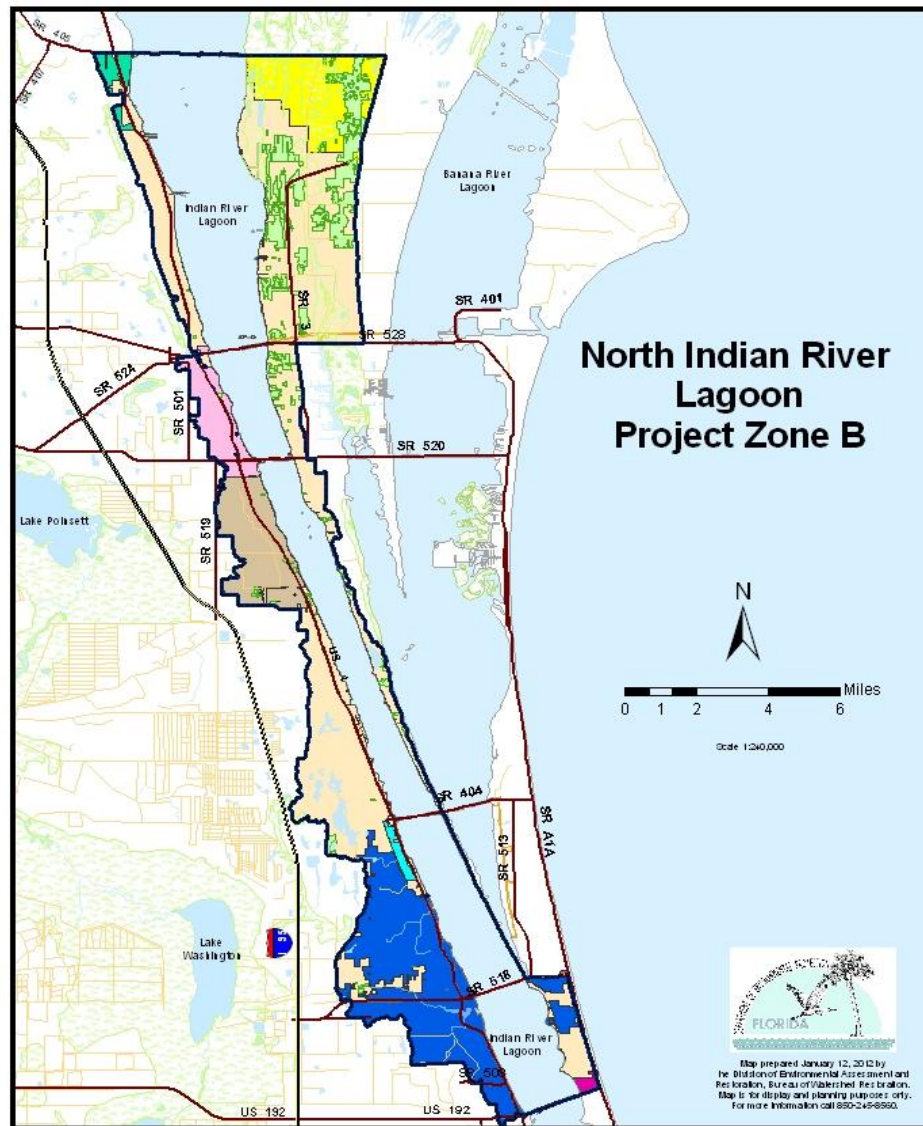
Map prepared January 12, 2012 by
the Division of Environmental Assessment and
Restoration, Bureau of Watershed Restoration.
Map is for display and planning purposes only.
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Legend

- | | | |
|---------------------|----------------------|----------------|
| 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 Shores |
| Agriculture | Cocoa | Brevard County |
| Palm Shores | | |





Baseline TN and TP Loads in North A

Entity	Area (Acres)	TN Baseline Load (lbs/yr)	TP Baseline Load (lbs/yr)
Agriculture	8,069	62,810	13,734.5
Brevard County	8,305	37,051	5,144.4
Edgewater	1,244	3,266	516.9
FDOT D5	354	3,917	1,183.1
Kennedy Space Center (KSC)	44,295	84,095	10,870.4
Oak Hill	127	218	22.7
Titusville	5,776	64,967	11,713.7
Volusia County	23,605	32,375	3,953.4
Total	91,776	288,699	47,139.1





Baseline TN and TP Loads in North B

Entity	Area (Acres)	TN Baseline Load (lbs/yr)	TP Baseline Load (lbs/yr)
Agriculture	3,692	24,477	6,157.6
Brevard County	23,829	144,429	23,485.3
Cocoa	2,111	26,319	5,745.2
FDOT D5	929	8,743	2,931.3
Indialantic	168	1,756	309.7
Indian Harbour Beach	1	11	1.7
KSC	4,136	5,707	1,099.7
Melbourne	9,920	91,888	19,528.4
Palm Shores	267	1,700	303.3
Rockledge	3,892	32,175	6,286.2
Titusville	588	3,013	315.4
Total	44,513	340,218	66,163.8





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 results of HSPF are not directly transferable to PLSM, but the model results are very similar.
- HSPF does not include the same level of detail for land use nor does it provide spatial location.





HSPF Model Conversion (continued)

- HSPF aggregates loading by segment.
- To account for the differences in loading between the two models, a ratio was calculated.
- This factor is based on the proportion of the HSPF model TP loads to the PLSM TP loads for each lagoon segment – basically a ratio of model outputs.





TP Factors by Segment in North IRL

- These factors were multiplied by the TP baseline loads for each polygon in PLSM.
- The resulting load by entity is the adjusted TP load used in the allocation calculations.

Segment	PLSM TP (lbs/yr)	TMDL TP (lbs/yr)	TP Factor
IR1-3	21,083.6	13,901	0.659327629
IR4	3,795.5	4,435	1.168489000
IR5	20,772.4	20,377	0.980965127
IR6-7	21,106.5	18,618	0.882097932
IR8	4,173.5	4,418	1.058583922
IR9-11	30,857.7	31,758	1.029175862





Adjusted TP Loads in North A

Entity	TP Baseline Load (lbs/yr)	Adjusted TP Load (lbs/yr)
Agriculture	13,734.5	9,611.3
Brevard County	5,144.4	4,205.7
Edgewater	516.9	346.0
FDOT D5	1,183.1	1,130.9
KSC	10,870.4	10,277.0
Oak Hill	22.7	15.3
Titusville	11,713.7	12,102.2
Volusia County	3,953.4	2,632.4
Total	47,139.1	40,320.8



Adjusted TP Loads in North B

Entity	TP Baseline Load (lbs/yr)	Adjusted TP Load lbs/yr)
Agriculture	6,157.6	5,504.2
Brevard County	23,458.3	22,517.4
Cocoa	5,745.2	5,224.1
FDOT D5	2,931.3	2,804.1
Indialantic	309.7	318.4
Indian Harbour Beach	1.7	1.7
KSC	1,099.7	975.3
Melbourne	19,528.4	20,074.0
Palm Shores	303.3	311.3
Rockledge	6,286.2	6,648.3
Titusville	315.4	279.6
Total	66,163.8	64,658.4





Loads Associated with 5000 Land Uses

- From each entity's baseline load, the loading associated with all 5000 series land uses was subtracted and set aside.
- This is surface water other than the Indian River Lagoon.
- Addressing reductions for the surrounding anthropogenic land uses that drain to these surface waters should improve the condition of these waters.





Net Loads in North A

Entity	Acres	5000 Land Use Acres	Net Acres	TN Baseline Load (lbs/yr)	5000 Land Use TN Load (lbs/yr)	TN Net Load (lbs/yr)	TP Adjusted Baseline Load (lbs/yr)	5000 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)	5000 Land Use Acres	Net Acres	TN Baseline Load (lbs/yr)	5000 Land Use TP Load (lbs/yr)	TN Net Load (lbs/yr)	TP Adjusted Baseline Load (lbs/yr)	5000 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*

- The net loads for TN and TP were sorted from highest to lowest to determine *de minimus* entities.
- Those entities whose total loads are very small in relation to the total loads for *both* TN and TP are considered *de minimus*.
- Two entities met the *de minimus* requirements:
 - Oak Hill – North A
 - Indian Harbour Beach – North B
- Their loads were less than 0.1% of the total loads for both TN and TP in each project zone.
- The *de minimus* load was not reassigned to other stakeholders for reductions.





Target Loads per Acre

- The 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.

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





Required Reductions

- The total required load reductions by project zone were calculated by multiplying each entity's acreage by the target load per acre.
 - This resulted in each entity's allocation (allowable load).
- By subtracting the allocation from each entity's net load, the required reductions were determined.





TN Initial Allocations for North A

Entity	Area (Acres)	TN Target Load per Acre (lbs/ac/yr)	TN Allocation (lbs/yr)	TN Net Load (lbs/yr)	TN Required Reduction (lbs/yr)
Agriculture	8,069	2.126	17,155.1	62,810	45,654.9
Brevard County	8,197	2.126	17,427.4	36,857	19,429.6
Edgewater	1,182	2.126	2,512.9	3,085	572.1
FDOT D5	354	2.126	752.6	3,917	3,164.4
KSC	40,584	2.126	86,281.1	81,934	-4,347.1
Titusville	5,742	2.126	12,207.8	64,854	52,646.2
Volusia County	23,351	2.126	49,644.6	31,206	-18,438.6
Oak Hill - <i>de minimus</i>	127	2.126	270.5	218	-
Total	87,607	N/A	186,252.2	284,881	98,681.3





TP Initial Allocations for North A

Entity	Area (Acres)	TP Target Load per Acre (lbs/ac/yr)	TP Allocation (lbs/yr)	TP Net Load (lbs/yr)	TP Required Reduction (lbs/yr)
Agriculture	8,069	0.235	1,896.3	9,611.3	7,715.0
Brevard County	8,197	0.235	1,926.4	4,178.3	2,251.9
Edgewater	1,182	0.235	277.8	323.2	45.4
FDOT D5	354	0.235	83.2	1,130.9	1,047.7
KSC	40,584	0.235	9,537.2	10,052.2	515.0
Titusville	5,742	0.235	1,349.4	12,076.2	10,726.8
Volusia County	23,351	0.235	5,487.5	2,521.6	-2,965.9
Oak Hill - <i>de minimus</i>	127	0.235	29.9	15.3	-
Total	87,607	N/A	20,587.6	39,909.0	19,336.0





TN Initial Allocations for North B

Entity	Area (Acres)	TN Target Load per Acre (lbs/ac/yr)	TN Allocation (lbs/yr)	TN Net Load (lbs/yr)	TN Required Reduction (lbs/yr)
Agriculture	3,692	4.402	16,252.7	24,477	8,224.3
Brevard County	22,398	4.402	98,597.3	139,111	40,513.7
Cocoa	2,098	4.402	9,235.4	26,279	17,043.6
FDOT D5	926	4.402	4,075.8	8,731	4,655.2
Indialantic	168	4.402	741.1	1,756	1,014.9
KSC	3,977	4.402	17,508.5	5,341	-12,167.5
Melbourne	9,662	4.402	42,531.2	90,843	48,311.8
Palm Shores	265	4.402	1,165.7	1,694	528.3
Rockledge	3,823	4.402	16,831.0	31,994	15,163.0
Titusville	588	4.402	2,589.3	3,013	423.7
Indian Harbour Beach – <i>de minimus</i>	1	4.402	6.3	11	-
Total	47,600	N/A	209,534.4	333,250	123,710.9





TP Allocations for North B

Entity	Area (Acres)	TP Target Load per Acre (lbs/ac/yr)	TP Allocation (lbs/yr)	TP Net Load (lbs/yr)	TP Required Reduction (lbs/yr)
Agriculture	3,692	0.646	2,385.1	5,504.2	3,119.1
Brevard County	22,398	0.646	14,469.3	21,713.5	7,244.2
Cocoa	2,098	0.646	1,355.3	5,216.4	3,861.1
FDOT D5	926	0.646	598.1	2,802.4	2,204.3
Indialantic	168	0.646	108.8	318.4	209.6
KSC	3,977	0.646	2,569.4	928.9	-1,640.5
Melbourne	9,662	0.646	6,241.5	19,922.8	13,681.3
Palm Shores	265	0.646	171.1	310.0	138.9
Rockledge	3,823	0.646	2,470.0	6,612.5	4,142.5
Titusville	588	0.646	380.0	279.6	-100.4
Indian Harbour Beach – <i>de minimus</i>	1	0.646	0.9	1.7	-
Total	47,600	N/A	30,749.5	63,610.4	32,860.1





Revised Required Reductions

- In the initial allocations, there are stakeholders that have negative values in the required reductions column.
- The negative value indicates that the net load from the PLSM is lower than the allocation.
- This is the case for KSC and Volusia County in North A and KSC and Titusville in North B.





Revised Required Reductions, con't

- To ensure that greater reductions were not assigned than required by the TMDL, this difference between the allowable and net loads was spread out to the other entities based on their percentage of the net load.
 - This reduced the stakeholders' reductions from the initial reductions that were calculated.





TN Load Adjustments for North A

Entity	TN Net Load (lbs/yr)	% of Net Load	Portion of KSC and Volusia County Load Reduction (lbs/yr)
Agriculture	62,810	36.62%	8,343.9
Brevard County	36,857	21.49%	4,896.2
Edgewater	3,085	1.80%	409.8
FDOT D5	3,917	2.28%	520.3
Titusville	64,854	37.81%	8,615.4
Total	171,523	100.00%	22,785.7

Stakeholders received a portion of the KSC and Volusia County allocation based on their percentage of the net load.





TP Load Adjustments for North A

Entity	TP Net Load (lbs/yr)	% of Net Load	Portion of Volusia County Load Reduction (lbs/yr)
Agriculture	9,611.3	35.60%	856.4
Brevard County	4,178.3	15.48%	372.3
Edgewater	-	-	45.4
FDOT D5	1,130.9	4.19%	100.8
KSC	-	-	515.0
Titusville	12,076.2	44.73%	1,076.0
Total	26,996.7	100.00%	2,965.9

In North A, Edgewater and KSC were assigned a portion of the load based on meeting their required reduction. The other stakeholders received a portion of the allocation based on their percentage of the net load.





TN Load Adjustments for North B

Entity	TN Net Load (lbs/yr)	% of Net Load	Portion of KSC Load Reduction (lbs/yr)
Agriculture	24,477	8,224.3	908.3
Brevard County	139,111	40,513.7	5,162.1
Cocoa	26,279	17,043.6	975.2
FDOT D5	8,731	4,655.2	324.0
Indialantic	1,756	1,014.9	65.2
Melbourne	90,843	48,311.8	3,371.0
Palm Shores	1,694	528.3	62.9
Rockledge	31,994	15,163.0	1,187.2
Titusville	3,013	423.7	111.8
Total	327,898	123,710.9	12,167.5





TP Load Adjustments for North B

Entity	TP Net Load (lbs/yr)	% of Net Load	Portion of KSC and Titusville Load Reduction (lbs/yr)
Agriculture	5,504.2	3,119.1	153.6
Brevard County	21,713.5	7,244.2	605.8
Cocoa	5,216.4	3,861.1	145.5
FDOT D5	2,802.4	2,204.3	78.2
Indialantic	318.4	209.6	8.9
Melbourne	19,922.8	13,681.3	555.8
Palm Shores	310.0	138.9	8.6
Rockledge	6,612.5	4,142.5	184.5
Total	62,400.0	32,860.1	1,740.9



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





Questions on the Target Load Per Acre Approach





Alternate Allocation Option 1 – Percent of Net Load





Percent of Net Load Approach

- Assigns the required reduction to each entity based on the entity's percentage of the total net load.
- Results in all the stakeholders receiving the same percent required reduction.
- FDEP does not believe this is the most fair and equitable allocation approach because a jurisdiction that is mainly natural lands will be required to make the same percent reduction as a jurisdiction that is highly developed.





Baseline Loading

- The baseline loading was calculated following the same steps as the target load per acre approach.
- The TP load was adjusted using the same factors.
- The 5000 land use loads were subtracted from the baseline loads to calculate the net loads.





De Minimus Entities

- The *de minimus* entities were identified following the same steps as in the target load per acre approach.
- *De minimus* entities are:
 - Oak Hill in North A
 - Indian Harbour Beach in North B





Allocations

- Each entity's net load was divided by the total net load to determine their percentage of the net load.
- This percentage was multiplied by the TN and TP required reductions from the TMDL to determine the entity's required reduction.

Project Zone	TN Required Reduction (lbs/yr)	TP Required Reduction (lbs/yr)
North A	104,445.0	19,560.0
North B	144,898.0	35,970.7





BMAP Phase I TN Reductions for North A

Entity	TN Net Load (lbs/yr)	TN Required Reduction (lbs/yr)	% TN Reduction	15% of TN Required Reduction (lbs/yr)
Agriculture	62,810	22,723.3	36.2%	3,408.5
Brevard County	37,051	13,404.2	36.2%	2,010.6
Edgewater	3,266	1,181.6	36.2%	177.2
FDOT D5	3,917	1,417.1	36.2%	212.6
KSC	84,095	30,423.7	36.2%	4,563.6
Titusville	64,967	23,503.6	36.2%	3,525.5
Volusia County	32,375	11,712.6	36.2%	1,756.9
Oak Hill - <i>de minimus</i>	218	-	-	-
Total	288,699	104,366.1	N/A	15,654.9



BMAP Phase I TP Reductions for North A

Entity	TP Net Load (lbs/yr)	TP Required Reduction (lbs/yr)	% TP Reduction	15% of TP Required Reduction (lbs/yr)
Agriculture	9,611.3	4,710.6	49.0%	706.6
Brevard County	4,178.3	2,047.8	49.0%	307.2
Edgewater	323.2	158.4	49.0%	23.8
FDOT D5	1,130.9	554.3	49.0%	83.1
KSC	10,052.2	4,926.7	49.0%	739.0
Titusville	12,076.2	5,918.7	49.0%	887.8
Volusia County	2,521.6	1,235.9	49.0%	185.4
Oak Hill - <i>de minimus</i>	15.3	-	-	-
Total	39,909.0	19,552.5	N/A	2,932.9



BMAP Phase I TN Reductions for North B

Entity	TN Net Load (lbs/yr)	TN Required Reduction (lbs/yr)	% TN Required Reduction	15% of TN Required Reduction (lbs/yr)
Agriculture	24,477	10,643.0	43.5%	1,596.5
Brevard County	139,111	60,487.8	43.5%	9,073.2
Cocoa	26,279	11,426.6	43.5%	1,714.0
FDOT D5	8,731	3,796.4	43.5%	569.5
Indialantic	1,756	763.5	43.5%	114.5
KSC	5,341	2,322.4	43.5%	348.4
Melbourne	90,843	39,500.1	43.5%	5,925.0
Palm Shores	1,694	736.6	43.5%	110.5
Rockledge	31,994	13,911.5	43.5%	2,086.7
Titusville	3,013	1,310.1	43.5%	196.5
Indian Harbour Beach- <i>de minimus</i>	-	-	-	-
Total	333,239	144,898.0	43.5%	21,734.7





BMAP Phase I TP Reductions for North B

Entity	TP Net Load (lbs/yr)	TP Required Reduction (lbs/yr)	% TP Required Reduction	15% of TP Required Reduction (lbs/yr)
Agriculture	5,504.2	3,112.6	56.5%	466.9
Brevard County	21,713.5	12,279.0	56.5%	1,841.8
Cocoa	5,216.4	2,949.9	56.5%	442.5
FDOT D5	2,802.4	1,584.8	56.5%	237.7
Indialantic	318.4	180.1	56.5%	27.0
KSC	928.9	525.3	56.5%	78.8
Melbourne	19,922.8	11,266.3	56.5%	1,690.0
Palm Shores	310.0	175.3	56.5%	26.3
Rockledge	6,612.5	3,739.4	56.5%	560.9
Titusville	279.6	158.1	56.5%	23.7
Indian Harbour Beach- <i>de minimus</i>	-	-	-	-
Total	63,608.7	35,970.7	56.5%	5,395.6





Questions on the Percent of Net Load Approach





Alternate Allocation Option 2 – Percent of Net Load Without Natural Lands





Percent of Net Load without Natural Approach

- Assigns the required reduction to each entity based on the entity's percentage of the total anthropogenic load.
 - Land use codes 1000, 2000, 7000, and 8000
- Results in all the stakeholders receiving the same percent required reduction.
- FDEP does not believe this is the most fair and equitable allocation approach because a jurisdiction that is mainly natural lands will be required to make the same percent reduction as a jurisdiction that is highly developed.





Baseline Loading

- The same steps as the target load per acre approach were followed to clip the areas for each entity.
- The same factors were used to adjust the TP loading.
- However, the baseline loads for each stakeholder are only based on the anthropogenic land uses.





Anthropogenic Baseline Loads for North A

Entity	Area (Acres)	TN Baseline Load (lbs/yr)	TP Baseline Load (lbs/yr)	Adjusted TP Load (lbs/yr)
Agriculture	8,069	62,810	13,734.5	9,611.3
Brevard County	2,795	27,667	4,262.6	3,568.1
Edgewater	200	1,405	279.4	187.5
FDOT D5	324	3,859	1,178.9	1,126.6
KSC	2,616	27,991	7,425.3	7,237.7
Oak Hill	12	85	10.3	7.1
Titusville	3,745	60,874	11,334.7	11,716.1
Volusia County	1,414	9,805	1,683.1	1,122.8
Total	19,176	194,496	39,908.8	34,577.2





Anthropogenic Baseline Loads for North B

Entity	Area (Acres)	TN Baseline Load (lbs/yr)	TP Baseline Load (lbs/yr)	Adjusted TP Load (lbs/yr)
Agriculture	3,692	24,477	6,157.6	5,504.2
Brevard County	12,886	126,781	21,566.2	20,700.3
Cocoa	1,682	25,665	5,680.5	5,165.3
FDOT D5	856	8,636	2,922.6	2,795.6
Indialantic	168	1,756	309.7	318.4
Indian Harbour Beach	1	11	1.7	1.7
KSC	318	3,989	951.1	842.4
Melbourne	8,002	86,106	19,035.5	19,572.8
Palm Shores	145	1,426	271.6	278.9
Rockledge	2,467	28,011	5,954.8	6,300.6
Titusville	174	2,254	259.9	230.3
Total	30,391	309,112	63,111.2	61,710.5





De Minimus *Entities*

- The *de minimus* entities were identified following the same steps as the target load per acre approach.
- The *de minimus* entities are:
 - Oak Hill and Edgewater in North A
 - Indian Harbour Beach in North B





Allocations

- Each entity's baseline load was divided by the total anthropogenic baseline load to determine their percentage of the load.
- This percentage was multiplied by the TN and TP anthropogenic required reductions from the TMDL to determine the entity's required reduction.
- The anthropogenic TN and TP reductions were calculated by subtracting the natural lands load from the TMDL allowable loading.
- The difference between the anthropogenic baseline load and the allowable load is the anthropogenic required reduction.





Calculating Required Reductions

North A	TN Required Reduction (lbs/yr)	TP Required Reduction (lbs/yr)
TMDL Target	184,254	20,349.0
Natural Loads	94,203	5,743.6
Anthropogenic Target	90,051	14,605.4
Anthropogenic Baseline Load	194,496	34,577.2
Anthropogenic Reduction	104,445	19,971.8

North B	TN Required Reduction (lbs/yr)	TP Required Reduction (lbs/yr)
TMDL Target	188,341	27,638.0
Natural Loads	31,106	2,947.9
Anthropogenic Target	157,235	24,690.1
Anthropogenic Baseline Load	309,112	61,710.5
Anthropogenic Reduction	151,877	37,020.4





BMAP Phase I TN Reductions for North A

Entity	TN Anthropogenic Baseline Load (lbs/yr)	TN Required Reduction (lbs/yr)	% TN Reduction	15% of TN Required Reduction (lbs/yr)
Agriculture	62,810	33,729.2	53.7%	5,059.4
Brevard County	27,667	14,857.3	53.7%	2,228.6
FDOT D5	3,859	2,072.3	53.7%	310.8
KSC	27,991	15,031.3	53.7%	2,254.7
Titusville	60,874	32,689.5	53.7%	4,903.4
Volusia County	9,805	5,265.3	53.7%	789.8
Edgewater – <i>de minimus</i>	1,405	-	-	-
Oak Hill – <i>de minimus</i>	85	-	-	-
Total	194,496	103,644.9	N/A	15,546.7



BMAP Phase I TP Reductions for North A

Entity	TP Anthropogenic Baseline Load (lbs/yr)	TP Required Reduction (lbs/yr)	% TP Reduction	15% of TP Required Reduction (lbs/yr)
Agriculture	9,611.3	5,551.5	57.8%	832.7
Brevard County	3,568.1	2,060.9	57.8%	309.1
FDOT D5	1,126.6	650.7	57.8%	97.6
KSC	7,237.7	4,180.5	57.8%	627.1
Titusville	11,716.1	6,767.2	57.8%	1,015.1
Volusia County	1,122.8	648.5	57.8%	97.3
Edgewater – <i>de minimus</i>	187.5	-	-	-
Oak Hill – <i>de minimus</i>	7.1	-	-	-
Total	34,577.2	19,859.4	N/A	2,978.9





BMAP Phase I TN Reductions for North B

Entity	TN Anthropogenic Baseline Load (lbs/yr)	TN Required Reduction (lbs/yr)	% TN Required Reduction	15% of TN Required Reduction (lbs/yr)
Agriculture	24,477	12,026.4	49.1%	1,804.0
Brevard County	126,781	62,291.7	49.1%	9,343.8
Cocoa	25,665	12,610.1	49.1%	1,891.5
FDOT D5	8,636	4,243.2	49.1%	636.5
Indialantic	1,756	862.8	49.1%	129.4
KSC	3,989	1,959.9	49.1%	294.0
Melbourne	86,106	42,306.7	49.1%	6,346.0
Palm Shores	1,426	700.6	49.1%	105.1
Rockledge	28,011	13,762.7	49.1%	2,064.4
Titusville	2,254	1,107.5	49.1%	166.1
Indian Harbour Beach- <i>de minimus</i>	11	-	-	-
Total	309,112	151,871.6	49.1%	22,780.7





BMAP Phase I TP Reductions for North B

Entity	TP Anthropogenic Baseline Load (lbs/yr)	TP Required Reduction (lbs/yr)	% TP Required Reduction	15% of TP Required Reduction (lbs/yr)
Agriculture	5,504.2	3,302.0	60.0%	495.3
Brevard County	20,700.3	12,418.2	60.0%	1,862.7
Cocoa	5,165.3	3,098.7	60.0%	464.8
FDOT D5	2,795.6	1,677.1	60.0%	251.6
Indialantic	318.4	191.0	60.0%	28.7
KSC	842.4	505.4	60.0%	75.8
Melbourne	19,572.8	11,741.8	60.0%	1,761.3
Palm Shores	278.9	167.3	60.0%	25.1
Rockledge	6,300.6	3,779.8	60.0%	567.0
Titusville	230.3	138.2	60.0%	20.7
Indian Harbour Beach- <i>de minimus</i>	1.7	-	-	-
Total	61,710.5	37,019.4	60.0%	5,552.9





Questions on the Percent of Net Load Without Natural Lands Approach





Comparison of Approaches





Comparison of Phase I TN Reductions for North A

Entity	Target Load per Acre Approach (lbs/yr)	Alternate Approach Option 1 (lbs/yr)	Alternate Approach Option 2 (lbs/yr)
Agriculture	5,596.6	3,408.5	5,059.4
Brevard County	2,180.0	2,010.6	2,228.6
Edgewater	24.3	177.2	-
FDOT D5	396.6	212.6	310.8
KSC	0.0	4,563.6	2,254.7
Titusville	6,604.6	3,525.5	4,903.4
Volusia County	0.0	1,756.9	789.8
Oak Hill - <i>de minimus</i>	-	-	-
Total	14,802.2	15,654.9	15,546.7





Comparison of Phase I TP Reductions for North A

Entity	Target Load per Acre Approach (lbs/yr)	Alternate Approach Option 1 (lbs/yr)	Alternate Approach Option 2 (lbs/yr)
Agriculture	1,028.8	706.6	832.7
Brevard County	281.9	307.2	309.1
Edgewater	0.0	23.8	-
FDOT D5	142.0	83.1	97.6
KSC	0.0	739.0	627.1
Titusville	1,447.6	887.8	1,015.1
Volusia County	0.0	185.4	97.3
Oak Hill - <i>de minimus</i>	-	-	-
Total	2,900.4	2,932.9	2,978.9





Comparison of BMAP Phase I TN Reductions for North B

Entity	Target Load per Acre Approach (lbs/yr)	Alternate Approach Option 1 (lbs/yr)	Alternate Approach Option 2 (lbs/yr)
Agriculture	1,097.4	1,596.5	1,804.0
Brevard County	5,302.7	9,073.2	9,343.8
Cocoa	2,410.3	1,714.0	1,891.5
FDOT D5	649.7	569.5	636.5
Indialantic	142.5	114.5	129.4
KSC	0.0	348.4	294.0
Melbourne	6,741.1	5,925.0	6,346.0
Palm Shores	69.8	110.5	105.1
Rockledge	2,096.4	2,086.7	2,064.4
Titusville	46.8	196.5	166.1
Indian Harbour Beach- <i>de minimus</i>	-	-	-
Total	18,556.6	21,734.7	22,780.7





Comparison of BMAP Phase I TP Reductions for North B

Entity	Target Load per Acre Approach (lbs/yr)	Alternate Approach Option 1 (lbs/yr)	Alternate Approach Option 2 (lbs/yr)
Agriculture	444.8	466.9	495.3
Brevard County	995.8	1,841.8	1,862.7
Cocoa	557.3	442.5	464.8
FDOT D5	318.9	237.7	251.6
Indialantic	30.1	27.0	28.7
KSC	0.0	78.8	75.8
Melbourne	1,968.8	1,690.0	1,761.3
Palm Shores	19.5	26.3	25.1
Rockledge	593.7	560.9	567.0
Titusville	0.0	23.7	20.7
Indian Harbour Beach- <i>de minimus</i>	-	-	-
Total	4,929.0	5,395.6	5,552.9





Next Steps





Next Steps

- For this first 5 year BMAP iteration, stakeholders are only being asked to make a reduction of 15% of the required overall reductions. Most stakeholders have already accomplished a 15% reduction using already completed projects.
- It is possible that improvements to the models may be identified before the next iteration of the BMAP. FDEP will work with stakeholders to update the TMDL model with the newer data to the extent that is possible.





Next Steps, continued

- Based on a potentially updated TMDL model and progress made towards reaching seagrass depth limit targets, the next iteration of required reductions could be revised.
- After evaluating other allocation options, FDEP believes that the target load per acre allocation approach is the most fair and equitable.





Next Steps, continued

- In future BMAP iterations, a different allocation approach can be used, if appropriate.
- In summary, focus efforts, where possible, on identifying loading reduction activities that generate the greatest reductions.