



*Florida Department of
Environmental Protection*

Allocations

North Indian River Lagoon BMAP Meeting

April 26, 2012



Allocation Options

- Option A: Target load per acre (FDEP recommendation)
- Option B: Percent of net load (all stakeholders are assignment the same percent reduction)
- Option C: Percent of net load without natural lands (all stakeholders are assignment the same percent reduction)
- (New) Option D: Target load per acre without natural lands





New Alternate Allocation Option D: Target Load Per Acre Without Natural Lands





Target Load Per Acre without Natural Approach

- Assigns the required reduction to each entity based on a target load per acre using the anthropogenic loading.
 - Land use codes 1000, 2000, 7000, and 8000
- This approach focuses on those anthropogenic areas of the watershed with high nutrient loadings, which would have the most impact on the lagoon.
- However, the overall required reductions under this approach are higher than the reductions under the target load per acre approach.





Calculating Baseline Loads

- Baseline (starting) loads are those loads that were used to calculate the TMDL based on 2000 land use from PLSM.
- 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.
- The baseline loads were calculated based only on the anthropogenic land uses.





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.
- 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.





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 by sorting the anthropogenic loads from lowest to highest for both TN and TP.
- The *de minimus* entities are:
 - Oak Hill and Edgewater in North A
 - Indian Harbour Beach in North B
- These entities would not receive a reduction in this iteration of the BMAP.





Allocations

- The target loads per acre were calculated by dividing the TMDL anthropogenic target load by the total anthropogenic area in the North A and North B project zones.
- The anthropogenic TN and TP target loads were calculated by subtracting the load associated with the natural lands from the TMDL target loading.



Calculating Target Loads Per Acre Without Natural Lands

North A	TN	TP
TMDL Target (lbs/yr)	184,254	20,349
Natural Loading (lbs/yr)	94,203	5,744
Anthropogenic Target Loads (lbs/yr)	90,051	14,605
Anthropogenic Acres	19,176	19,176
Target Load (lbs/acre/yr)	4.696	0.762

North B	TN	TP
TMDL Target (lbs/yr)	188,341	27,638
Natural Loading (lbs/yr)	31,106	2,948
Anthropogenic Target Loads (lbs/yr)	157,235	24,690
Anthropogenic Acres	30,391	30,391
Target Load (lbs/acre/yr)	5.174	0.812



Option D: BMAP Phase I TN Reductions for North A

Entity	Area (Acres)	TN Target Load per Acre Without Natural Lands (lbs/ac/yr)	TN Allocation (lbs/yr)	TN Net Load (lbs/yr)	TN Required Reduction (lbs/yr)	15% of TN Required Reduction (lbs/yr)
Agriculture	8,069	4.696	37,893.0	62,810	24,917.0	3,737.5
Brevard County	2,795	4.696	13,127.3	27,667	14,539.7	2,181.0
FDOT D5	324	4.696	1,522.7	3,859	2,336.3	350.5
KSC	2,616	4.696	12,283.8	27,991	15,707.2	2,356.1
Titusville	3,745	4.696	17,588.2	60,874	43,285.8	6,492.9
Volusia County	1,414	4.696	6,641.8	9,805	3,163.2	474.5
Edgewater - <i>de minimus</i>	200	4.696	-	1,405	-	-
Oak Hill - <i>de minimus</i>	12	4.696	-	85	-	-
Total	19,176	N/A	89,056.7	194,496	103,949.3	15,592.4





Option D: BMAP Phase I TP Reductions for North A

Entity	Area (Acres)	TP Target Load per Acre Without Natural Lands (lbs/ac/yr)	TP Allocation (lbs/yr)	TP Net Load (lbs/yr)	TP Required Reduction (lbs/yr)	15% of TP Required Reduction (lbs/yr)
Agriculture	8,069	0.762	6,148.7	9,611.3	3,462.6	519.4
Brevard County	2,795	0.762	2,130.1	3,568.1	1,438.0	215.7
FDOT D5	324	0.762	247.1	1,126.6	879.5	131.9
KSC	2,616	0.762	1,993.2	7,237.7	5,244.5	786.7
Titusville	3,745	0.762	2,854.0	11,716.1	8,862.1	1,329.3
Volusia County	1,414	0.762	1,077.7	1,122.8	45.1	6.8
Edgewater – <i>de minimus</i>	200	0.762	-	187.5	-	-
Oak Hill – <i>de minimus</i>	12	0.762	-	7.1	-	-
Total	19,176	N/A	14,450.9	34,577.2	19,931.7	2,989.8





Option D: BMAP Phase I TN Reductions for North B

Entity	Area (Acres)	TN Target Load per Acre Without Natural Lands (lbs/ac/yr)	TN Allocation (lbs/yr)	TN Baseline Load (lbs/yr)	TN Required Reduction (lbs/yr)	15% of TN Required Reductions (lbs/yr)
Agriculture	3,692	5.174	19,103.0	24,477	5,374.0	806.1
Brevard County	12,886	5.174	66,670.3	126,781	60,110.7	9,016.6
Cocoa	1,682	5.174	8,700.5	25,665	16,964.5	2,544.7
FDOT D5	856	5.174	4,429.7	8,636	4,206.3	630.9
Indian River	168	5.174	871.0	1,756	885.0	132.7
KSC	318	5.174	1,645.8	3,989	2,343.2	351.5
Melbourne	8,002	5.174	41,400.4	86,106	44,705.6	6,705.8
Palm Shores	145	5.174	750.3	1,426	675.7	101.4
Rockledge	2,467	5.174	12,764.7	28,011	15,246.3	2,286.9
Titusville	174	5.174	900.6	2,254	1,353.4	203.0
Indian Harbour Beach- <i>de minimus</i>	1	5.174	-	11	-	-
Total	30,391	N/A	157,236.3	309,112	151,864.7	22,779.7





Option D: BMAP Phase I TP Reductions for North B

Entity	Area (Acres)	TP Target Load per Acre Without Natural Lands (lbs/ac/yr)	TP Allocation (lbs/yr)	TP Baseline Load (lbs/yr)	TP Required Reduction (lbs/yr)	15% of TP Required Reductions (lbs/yr)
Agriculture	3,692	0.812	2,998.0	5,504.2	2,506.2	375.9
Brevard County	12,886	0.812	10,463.1	20,700.3	10,237.2	1,535.6
Cocoa	1,682	0.812	1,365.4	5,165.3	3,799.9	570.0
FDOT D5	856	0.812	695.2	2,795.6	2,100.4	315.1
Indialantic	168	0.812	136.7	318.4	181.7	27.3
KSC	318	0.812	258.3	842.4	584.1	87.6
Melbourne	8,002	0.812	6,497.3	19,572.8	13,075.5	1,961.3
Palm Shores	145	0.812	117.7	278.9	161.2	24.2
Rockledge	2,467	0.812	2,003.3	6,300.6	4,297.3	644.6
Titusville	174	0.812	141.3	230.3	89.0	13.3
Indian Harbour Beach- <i>de minimus</i>	1	0.812	-	1.7	-	-
Total	30,391	N/A	24,676.4	61,710.5	37,032.4	5,554.9





Alternate Allocation Option B: Percent of Net Load (previously discussed)





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 without natural lands 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 without natural lands approach.
- *De minimus* entities are:
 - Oak Hill in North A
 - Indian Harbour Beach in North B
- These entities would not receive a reduction in this iteration of the BMAP.





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





Option B: BMAP Phase I TN Reductions for North A

Entity	TN Net Load (lbs/yr)	TN Required Reduction, Based on Percent of Net Load (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





Option B: BMAP Phase I TP Reductions for North A

Entity	TP Net Load (lbs/yr)	TP Required Reduction Based on Percent of Net Load (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





Option B: BMAP Phase I TN Reductions for North B

Entity	TN Net Load (lbs/yr)	TN Required Reduction Based on Percent of Net Load (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
Indianalantic	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





Option B: BMAP Phase I TP Reductions for North B

Entity	TP Net Load (lbs/yr)	TP Required Reduction Based on Percent of Net Load (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





***Alternate Allocation Option C:
Percent of Net Load Without
Natural Lands
(previously discussed)***





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 without natural lands approach were followed to clip the areas for each entity.
- The same factors were used to adjust the TP loading.



Anthropogenic Baseline Loads for North A

Entity	Area (Acres)	TN Baseline Load Without Natural Lands (lbs/yr)	TP Baseline Load Without Natural Lands (lbs/yr)	Adjusted TP Load Without Natural Lands (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 Without Natural Lands (lbs/yr)	TP Baseline Load Without Natural Lands (lbs/yr)	Adjusted TP Load Without Natural Lands (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 without natural lands approach.
- The *de minimus* entities are:
 - Oak Hill and Edgewater in North A
 - Indian Harbour Beach in North B
- These entities would not receive a reduction in this iteration of the BMAP.





Option C 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





Option C: BMAP Phase I TN Reductions for North A

Entity	TN Anthropogenic Baseline Load (lbs/yr)	TN Required Reduction Without Natural Lands (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





Option C: BMAP Phase I TP Reductions for North A

Entity	TP Anthropogenic Baseline Load (lbs/yr)	TP Required Reduction Without Natural Lands (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





Option C: BMAP Phase I TN Reductions for North B

Entity	TN Anthropogenic Baseline Load (lbs/yr)	TN Required Reduction Without Natural Lands (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





Option C: BMAP Phase I TP Reductions for North B

Entity	TP Anthropogenic Baseline Load (lbs/yr)	TP Required Reduction Without Natural Lands (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





Option A: Proposed Allocations - Target Load Per Acre Approach





Option A: 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.





Baseline Loading

- The baseline loading was calculated following the same steps as the target load per acre without natural lands 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.





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 *Entities*

- The *de minimus* entities were identified following the same steps as the target load per acre without natural lands approach.
- The *de minimus* entities are:
 - Oak Hill and Edgewater in North A
 - Indian Harbour Beach in North B
- These entities would not receive a reduction in this iteration of the BMAP.





Option A: 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





Revised Required Reductions

- In the initial allocations, some stakeholders had negative values for the required reductions, which 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.
- To ensure that greater reductions were not assigned than required by the TMDL, this difference 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.





Option A: 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





Option A: 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





Option A: 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





Option A: 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





Comparison of Approaches





Comparison of Phase I TN Reductions for North A

Entity	Option A: Target Load per Acre Approach (lbs/yr)	Option B: Alternate Approach Percent of Net Load (lbs/yr)	Option C: Alternate Approach Percent of Net Load without Natural (lbs/yr)	Option D: Alternate Approach Target Load per Acre without Natural (lbs/yr)
Agriculture	5,596.6	3,408.5	5,059.4	3,737.5
Brevard County	2,180.0	2,010.6	2,228.6	2,181.0
Edgewater	24.3	177.2	-	-
FDOT D5	396.6	212.6	310.8	350.5
KSC	0.0	4,563.6	2,254.7	2,356.1
Titusville	6,604.6	3,525.5	4,903.4	6,492.9
Volusia County	0.0	1,756.9	789.8	474.5
Oak Hill - <i>de minimus</i>	-	-	-	-
Total	14,802.2	15,654.9	15,546.7	15,592.4





Comparison of Phase I TP Reductions for North A

Entity	Option A: Target Load per Acre Approach (lbs/yr)	Option B: Alternate Approach Percent of Net Load (lbs/yr)	Option C: Alternate Approach Percent of Net Load without Natural (lbs/yr)	Option D: Alternate Approach Target Load per Acre without Natural (lbs/yr)
Agriculture	1,028.8	706.6	832.7	519.4
Brevard County	281.9	307.2	309.1	215.7
Edgewater	0.0	23.8	-	-
FDOT D5	142.0	83.1	97.6	131.9
KSC	0.0	739.0	627.1	786.7
Titusville	1,447.6	887.8	1,015.1	1,329.3
Volusia County	0.0	185.4	97.3	6.8
Oak Hill - <i>de minimus</i>	-	-	-	-
Total	2,900.4	2,932.9	2,978.9	2,989.8





Comparison of BMAP Phase I TN Reductions for North B

Entity	Option A: Target Load per Acre Approach (lbs/yr)	Option B: Alternate Approach Percent of Net Load (lbs/yr)	Option C: Alternate Approach Percent of Net Load without Natural (lbs/yr)	Option D: Alternate Approach Target Load per Acre without Natural (lbs/yr)
Agriculture	1,097.4	1,596.5	1,804.0	806.1
Brevard County	5,302.7	9,073.2	9,343.8	9,016.6
Cocoa	2,410.3	1,714.0	1,891.5	2,544.7
FDOT D5	649.7	569.5	636.5	630.9
Indialantic	142.5	114.5	129.4	132.7
KSC	0.0	348.4	294.0	351.5
Melbourne	6,741.1	5,925.0	6,346.0	6,705.8
Palm Shores	69.8	110.5	105.1	101.4
Rockledge	2,096.4	2,086.7	2,064.4	2,286.9
Titusville	46.8	196.5	166.1	203.0
Indian Harbour Beach- <i>de minimus</i>	-	-	-	-
Total	18,556.6	21,734.7	22,780.7	22,779.7



Comparison of BMAP Phase I TP Reductions for North B

Entity	Option A: Target Load per Acre Approach (lbs/yr)	Option B: Alternate Approach Percent of Net Load (lbs/yr)	Option C: Alternate Approach Percent of Net Load without Natural (lbs/yr)	Option D: Alternate Approach Target Load per Acre without Natural (lbs/yr)
Agriculture	444.8	466.9	495.3	375.9
Brevard County	995.8	1,841.8	1,862.7	1,535.6
Cocoa	557.3	442.5	464.8	570.0
FDOT D5	318.9	237.7	251.6	315.1
Indialantic	30.1	27.0	28.7	27.3
KSC	0.0	78.8	75.8	87.6
Melbourne	1,968.8	1,690.0	1,761.3	1,961.3
Palm Shores	19.5	26.3	25.1	24.2
Rockledge	593.7	560.9	567.0	644.6
Titusville	0.0	23.7	20.7	13.3
Indian Harbour Beach- <i>de minimus</i>	-	-	-	-
Total	4,929.0	5,395.6	5,552.9	5,554.9



Next Steps

- After evaluating other allocation options, FDEP believes that the target load per acre allocation approach is the most fair and equitable.
 - *Reduces effect of requiring reductions on largely natural lands.*
 - *Focuses reductions where loading is concentrated and not where it is diffuse (natural lands). "Low hanging fruit" concept.*





Next Steps, continued

- For this BMAP iteration, stakeholders are only being held to 15% of the required reductions.
- Most stakeholders have already achieved 15% of the required reductions using this approach with projects submitted.
 - *There is no one approach that benefits everyone to support a change in approach at this time.*
 - *Any change would require full agreement from all affected parties.*





Next Steps, continued

- Before the next iteration of the BMAP, FDEP will work with stakeholders to update the TMDL model with the latest data.
- Based on the updated TMDL model and progress made towards seagrass depth limit targets, the required reductions would be revised.
- In future BMAP iterations, a different allocation approach can be used, if appropriate.

