



*Florida Department of
Environmental Protection*

Allocations and Project Credit

Banana River Lagoon BMAP Meeting

April 26, 2012



Target Load Per Acre Allocation Approach

- The BRL A project zone is achieving seagrass depth limit targets; therefore, reductions are not required in this BMAP iteration.
- The allocations in the BRL B project zone were assigned to each entity based on achieving a target load per acre for the project zone.





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 Banana River Lagoon.
- The resulting file was then clipped to the BRL A and BRL B project zone boundaries.





Calculating Baseline Loads, con't

- For the BRL B project zone, the individual entity shapefiles were then created by clipping each entity's jurisdiction, 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 Brevard County.





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 Banana 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 BRL B

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 Baseline Load (lbs/yr)	5000 Land Use TP Load (lbs/yr)	TP Net Load (lbs/yr)
Agriculture	126	0	126	702	0	702	174.5	0	174.5
Brevard County	9,988	1,401	8,587	72,540	6042	66,498	14,525.1	565.3	13,959.8
Cape Canaveral	857	1	857	8,976	1	8,975	2,031.4	0.2	2,031.2
Cocoa Beach	1,842	33	1,809	18,616	97	18,519	3,845.7	22.2	3,823.5
FDOT District 5	518	1	517	5,161	8	5,153	1,605.6	0.7	1,604.9
Indian Harbour Beach	1,244	45	1,199	11,800	225	11,575	2,143.3	22.1	2,121.2
Melbourne	4	0	4	30	0	30	5.5	0	5.5
Patrick AFB	1,835	70	1,765	24,897	334	24,563	6,508.6	41.4	6,467.2
Port Canaveral	146	0	146	720	0	720	132.3	0	132.3
Satellite Beach	1,737	56	1,681	17,572	327	17,245	3,342.6	29.1	3,313.5
Total	18,299	1,607	16,692	161,014	7,034	153,980	34,314.6	681	33,633.6





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*.
- Agriculture, Port Canaveral, and Melbourne met the *de minimus* requirements.
- Combined they contribute approximately 1% of the total TN and TP load in the 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 BRL B.

BRL B	TN	TP
TMDL Target Load (lbs/yr)	63,028	11,823
Non-Water Acres	16,692	16,692
Target Load (lbs/acre/yr)	3.78	0.71



Required Reductions

- The total required load reductions 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.





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 BRL B

Entity	Area (acres)	TN Target (lbs/acre/yr)	TN Target (lbs/yr)	TN Net Load (lbs/yr)	TN Required Reduction (lbs/yr)	BMAP 1 TN Required Reduction (lbs/yr)
Brevard County	8,587	3.78	32,460	66,498	34,038	5,105.7
Cape Canaveral	857	3.78	3,239	8,975	5,736	860.4
Cocoa Beach	1,809	3.78	6,839	18,519	11,680	1,752.0
FDOT District 5	517	3.78	1,955	5,153	3,198	479.7
Indian Harbour Beach	1,199	3.78	4,531	11,575	7,044	1,056.6
Patrick Air Force Base	1,765	3.78	6,673	24,563	17,890	2,683.5
Satellite Beach	1,681	3.78	6,354	17,245	10,891	1,633.7
Agriculture - <i>de minimus</i>	126	3.78	-	702	-	-
Melbourne - <i>de minimus</i>	4	3.78	-	30	-	-
Port Canaveral - <i>de minimus</i>	146	3.78	-	720	-	-
Total	16,692	N/A	62,051	153,980	90,477	13,571.6





BMAP Phase I TP Reductions for BRL B

Entity	Area (acres)	TP Target (lbs/acre/yr)	TP Target (lbs/yr)	TP Net Load (lbs/yr)	TP Required Reduction (lbs/yr)	BMAP 1 TP Required Reduction (lbs/yr)
Brevard County	8,587	0.71	6,097.0	13,959.8	7,862.8	1,179.4
Cape Canaveral	857	0.71	608.0	2,031.2	1,423.2	213.5
Cocoa Beach	1,809	0.71	1,285.0	3,823.5	2,538.5	380.8
FDOT District 5	517	0.71	367.0	1,604.9	1,237.9	185.7
Indian Harbour Beach	1,199	0.71	851.0	2,121.2	1,270.2	190.5
Patrick Air Force Base	1,765	0.71	1,253.0	6,467.2	5,214.2	782.1
Satellite Beach	1,681	0.71	1,194.0	3,313.5	2,119.5	317.9
Agriculture - <i>de minimus</i>	126	0.71	-	174.5	-	-
Melbourne - <i>de minimus</i>	4	0.71	-	5.5	-	-
Port Canaveral - <i>de minimus</i>	146	0.71	-	132.3	-	-
Total	16,692	N/A	11,655.0	33,633.6	21,666.3	3,249.9





Questions on the Allocations





Alternate Approach: Target Load Per Acre without Natural Lands

- Assigns the required reduction to each entity based on a target load per acre using the anthropogenic loading only.
 - 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 greater than the reductions under the target load per acre approach.





Baseline Loading

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



Anthropogenic Baseline Loads for BRL B

Entity	Area (Acres)	TN Baseline Load (lbs/yr)	TP Baseline Load (lbs/yr)
Agriculture	126	702	174.5
Brevard County	5,393	64,236	13,774.0
Cape Canaveral	610	8,393	1,987.4
Cocoa Beach	1,709	18,300	3,811.5
FDOT District 5	474	5,076	1,598.3
Indian Harbour Beach	1,101	11,266	2,101.2
Melbourne	4	30	5.5
Patrick AFB	1,729	24,468	6,459.1
Port Canaveral	53	584	124.2
Satellite Beach	1,525	16,692	3,283.9
Total	12,724	149,747	33,319.6



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:
 - Agriculture; There is little if any active agriculture.
 - Port Canaveral; and
 - Melbourne.





Allocations

- The target loads per acre were calculated by dividing the TMDL anthropogenic target load by the total anthropogenic area in the BRL B project zone.
- 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

BRL B	TN	TP
TMDL Target (lbs/yr)	63,028	11,823
Natural Loading (lbs/yr)	11,267	995
Anthropogenic Target Loads (lbs/yr)	51,761	10,828
Anthropogenic Acres	12,724	12,724
Target Load (lbs/acre/yr)	4.07	0.85



BMAP Phase I TN Reductions for BRL B

Entity	Area (acres)	TN Target (lbs/acre/yr)	TN Allocation (lbs/yr)	TN Baseline Load (lbs/yr)	TN Required Reduction (lbs/yr)	15% of TN Required Reduction (lbs/yr)
Brevard County	5,393	4.07	21,949	64,236	42,287	6,343.1
Cape Canaveral	610	4.07	2,484	8,393	5,909	886.4
Cocoa Beach	1,709	4.07	6,954	18,300	11,346	1,701.9
FDOT District 5	474	4.07	1,930	5,076	3,146	471.9
Indian Harbour Beach	1,101	4.07	4,482	11,266	6,784	1,017.6
Patrick AFB	1,729	4.07	7,037	24,468	17,431	2,614.7
Satellite Beach	1,525	4.07	6,206	16,692	10,486	1,572.9
Agriculture – <i>de minimus</i>	126	4.07	-	702	-	-
Melbourne – <i>de minimus</i>	4	4.07	-	30	-	-
Port Canaveral – <i>de minimus</i>	53	4.07	-	584	-	-
Total	12,724	N/A	51,042	149,747	97,389	14,608.4





BMAP Phase I TP Reductions for BRL B

Entity	Area (acres)	TP Target (lbs/acre/yr)	TP Allocation (lbs/yr)	TP Baseline Load (lbs/yr)	TP Required Reduction (lbs/yr)	15% of TP Required Reduction (lbs/yr)
Brevard County	5,393	0.85	4,584.0	13,774.0	9,190.0	1,378.5
Cape Canaveral	610	0.85	519.0	1,987.4	1,468.4	220.3
Cocoa Beach	1,709	0.85	1,452.0	3,811.5	2,359.5	353.9
FDOT District 5	474	0.85	403.0	1,598.3	1,195.3	179.3
Indian Harbour Beach	1,101	0.85	936.0	2,101.2	1,165.2	174.8
Patrick AFB	1,729	0.85	1,470.0	6,459.1	4,989.1	748.4
Satellite Beach	1,525	0.85	1,296.0	3,283.9	1,987.9	298.2
Agriculture – <i>de minimus</i>	126	0.85	-	174.5	-	-
Melbourne – <i>de minimus</i>	4	0.85	-	5.5	-	-
Port Canaveral – <i>de minimus</i>	53	0.85	-	124.2	-	-
Total	12,724	N/A	10,660.0	33,319.6	22,355.4	3,353.3





Comparison of Approaches





Comparison of BMAP Phase I TN Reductions for BRL B

Entity	Reductions: Banana River Lagoon Basin Target Load Per Acre Approach (lbs/yr)	Reductions: Target Load per Acre Approach (lbs/yr)	Reductions: Target Load per Acre without Natural Lands Approach (lbs/yr)
Brevard County	7,017.5	5,105.7	6,343.1
Cape Canaveral	1,078.7	860.4	886.4
Cocoa Beach	2,202.8	1,752.0	1,701.9
FDOT District 5	644.1	479.7	471.9
Indian Harbour Beach	1,348.1	1,056.6	1,017.6
Patrick AFB	3,111.6	2,683.5	2,614.7
Satellite Beach	2,044.7	1,633.7	1,572.9
Agriculture - <i>de minimus</i>	-	-	-
Melbourne - <i>de minimus</i>	-	-	-
Port Canaveral - <i>de minimus</i>	-	-	-
Total	17,447.5	13,571.6	14,608.4





Comparison of BMAP Phase I TP Reductions for BRL B

Entity	Reductions: Banana River Lagoon Basin Target Load Per Acre Approach (lbs/yr)	Reductions: Target Load per Acre Approach (lbs/yr)	Reductions: Target Load per Acre without Natural Lands Approach (lbs/yr)
Brevard County	1,595.0	1,179.4	1,378.5
Cape Canaveral	260.4	213.5	220.3
Cocoa Beach	478.4	380.8	353.9
FDOT District 5	226.8	185.7	179.3
Indian Harbour Beach	254.0	190.5	174.8
Patrick AFB	875.3	782.1	748.4
Satellite Beach	407.3	317.9	298.2
Agriculture - <i>de minimus</i>	-	-	-
Melbourne - <i>de minimus</i>	-	-	-
Port Canaveral - <i>de minimus</i>	-	-	-
Total	4,097.2	3,249.9	3,353.3





Final Allocations

- The overall reductions required in the target load per acre without natural areas approach are higher than the target load per acre approach.
- There is little benefit to local partners or the state to change approach.
- Therefore, the target load per acre approach will be used in the first BMAP iteration.
- In future BMAP iterations, a different allocation approach could be used, if appropriate.





TN Project Credit in BRL B

Entity	15% BMAP I TN Required Reduction (lbs/yr)	Project TN Credit (lbs/yr)	% BMAP I TN Reduction Achieved	TN Reduction Remaining (lbs/yr)
Brevard County	5,105.7	5,181.0	101.5%	-75.3
Cape Canaveral	860.4	1,821.0	211.6%	-960.6
Cocoa Beach	1,752.0	2,769.0	158.0%	-1,017.0
FDOT District 5	479.7	2,246.0	468.2%	-1,766.1
Indian Harbour Beach	1,056.6	970.5	91.9%	86.1
Patrick AFB	2,683.5	4,012.0	149.5%	-1,328.5
Satellite Beach	1,633.7	2,521.0	154.3%	-887.3





TP Project Credit in BRL B

Entity	15% BMAP I TP Required Reduction (lbs/yr)	Project TP Credit (lbs/yr)	% BMAP I TP Reduction Achieved	TP Reduction Remaining (lbs/yr)
Brevard County	1,179.4	1,421.9	120.6%	-242.5
Cape Canaveral	213.5	613.3	287.3%	-399.8
Cocoa Beach	380.8	782.0	205.4%	-401.2
FDOT District 5	185.7	495.5	266.8%	-309.8
Indian Harbour Beach	190.5	277.9	145.9%	-87.4
Patrick AFB	782.1	1,059.2	135.4%	-277.1
Satellite Beach	317.9	576.6	181.4%	-258.7





Project Credit in BRL A

- The stakeholders in BRL project zone A also provided projects, although reductions are not required in this project zone.

Entity	Project TN Credit (lbs/yr)	Project TP Credit (lbs/yr)
Brevard County	142.0	48.0
Cape Canaveral Air Force Station	3,436.0	1,813.1
FDOT District 5	152.0	31.7
Kennedy Space Center	18,301.0	2,787.4





Questions?

