



**Florida Department of Environmental Protection**

# **Springs Coast Basin Management Action Plans (BMAPs)**

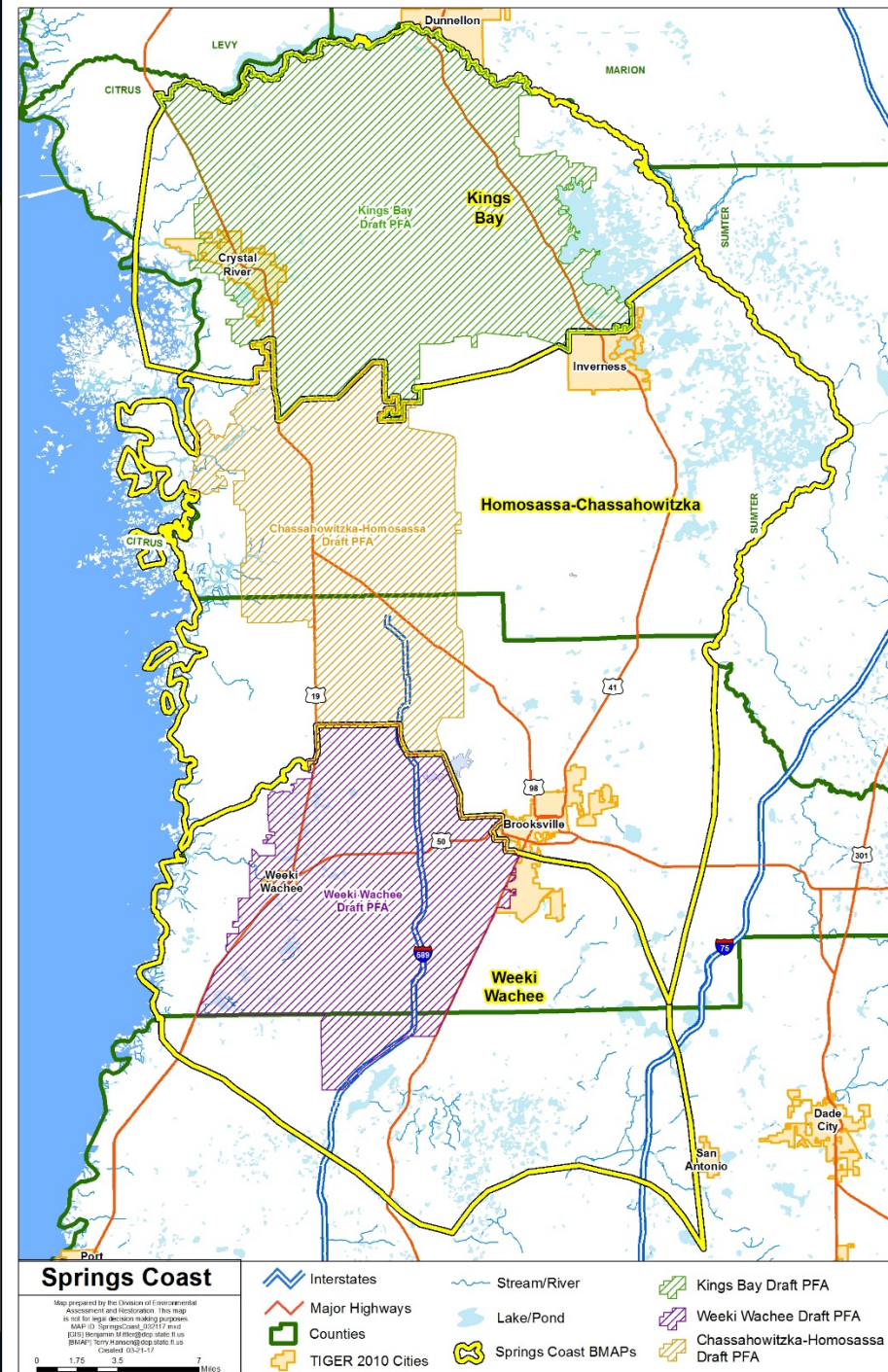
**April 6, 2017**

Terry Hansen P.G., Basin Coordinator

850-245-8561

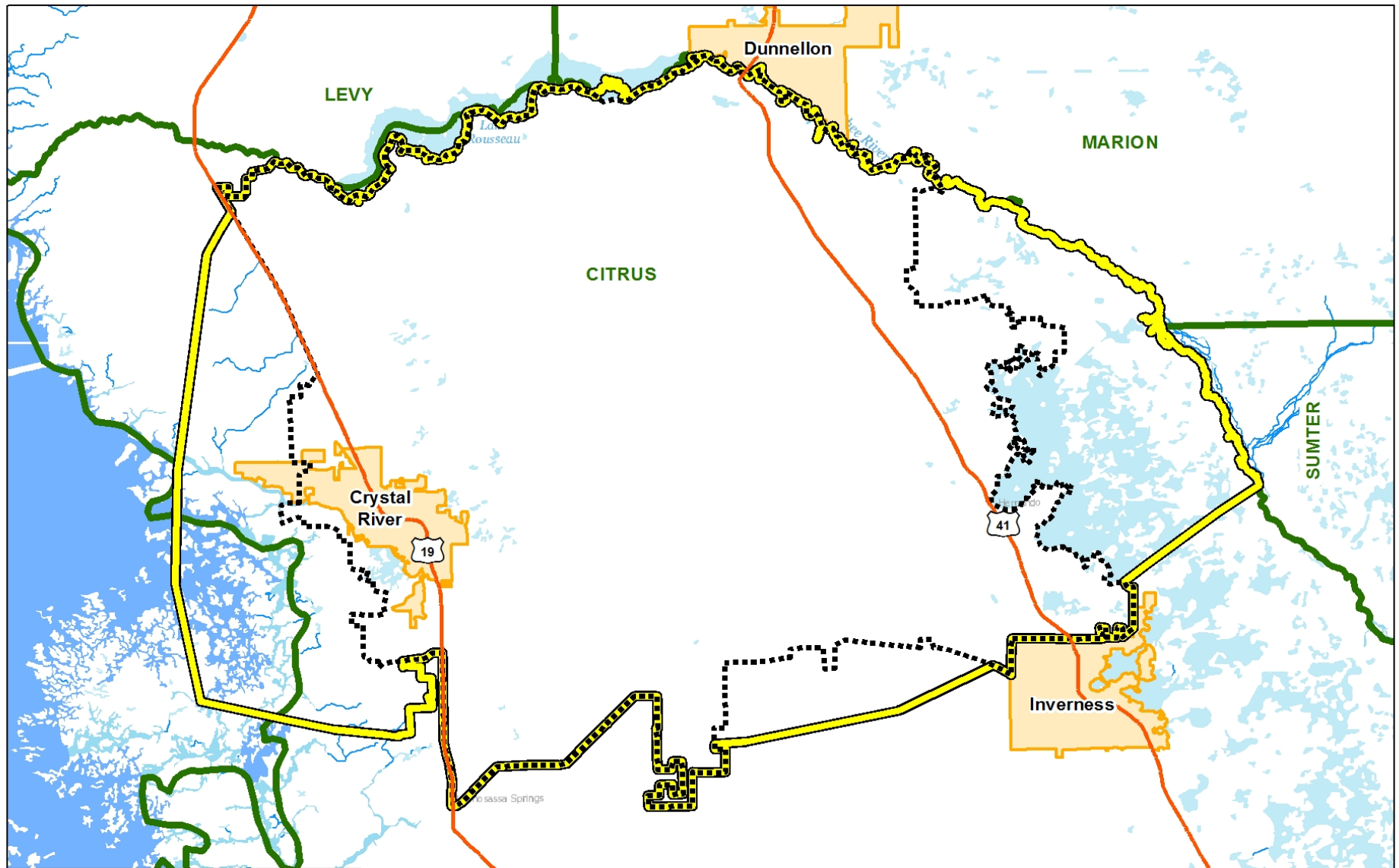
[terry.hansen@dep.state.fl.us](mailto:terry.hansen@dep.state.fl.us)







# **Pollutant Source Reduction Obligations of Stakeholders**



## Kings Bay

Map prepared by the Division of Environmental Assessment and Restoration. This map is not for legal decision making purposes.  
 MAP ID: KB\_032217.mxd  
 [GIS] Benjamin.Mittler@dep.state.fl.us  
 [BMAP] Terry.Hansen@dep.state.fl.us  
 Created: 03-22-17

0 1.5 3 6 Miles



Interstates



Major Highways



TIGER 2010 Cities



Counties



Kings Bay BMAP



Kings Bay Draft PFA



Stream/River

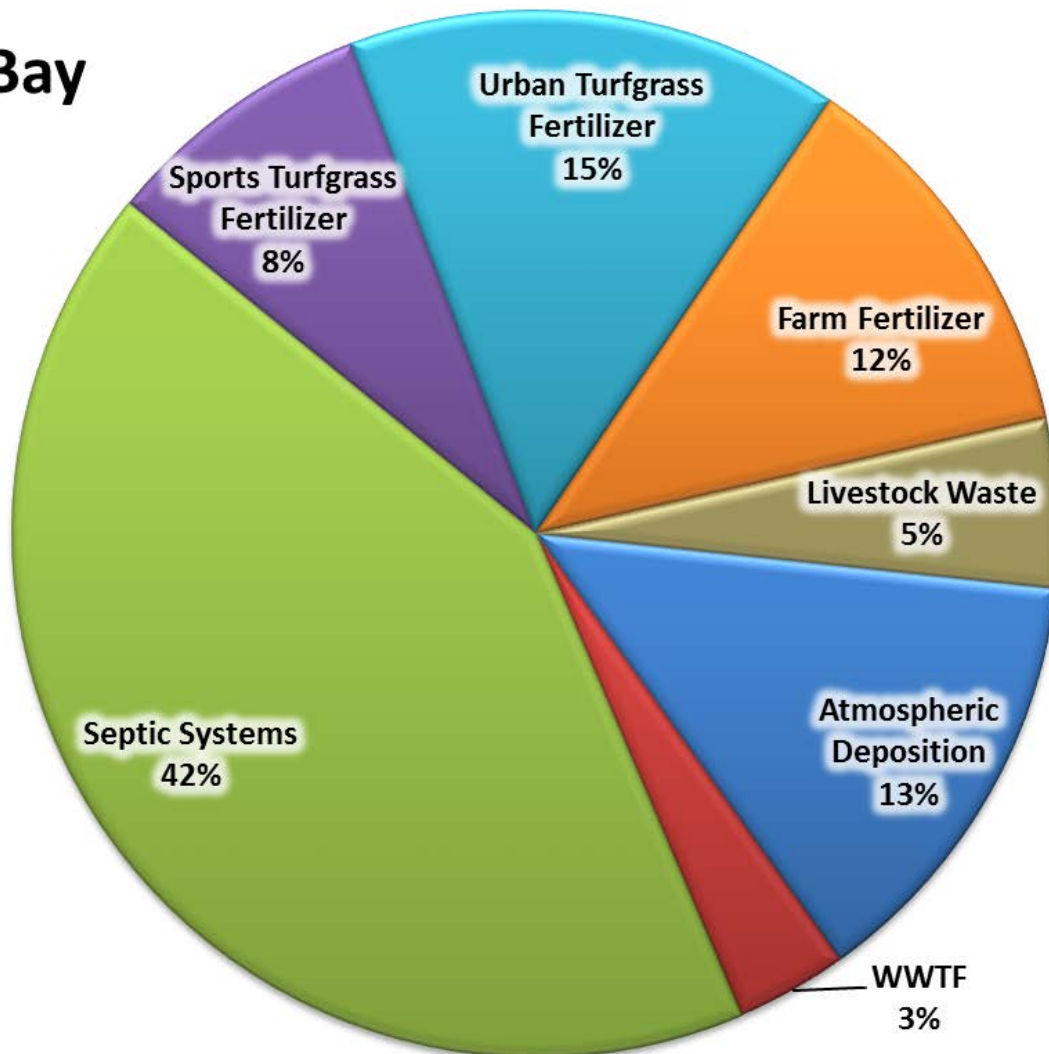


Lake/Pond



# Kings Bay Nitrogen Loading to Groundwater

## Kings Bay



Estimated Load to Groundwater: 600,000 lbs-N/yr

Estimated TMDL Load: 200,000 lbs-N/yr



# CR/KB Nitrogen Reductions by Source

| Source                      | Estimated Portion of Total Load (%) | Estimated Total Nitrogen Load to Groundwater (pounds of Nitrogen per year [lbs-N/yr]) | Estimated Load Reduction (lbs-N/yr) [Groundwater Load – TMDL Load (x) %] |
|-----------------------------|-------------------------------------|---------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| Septic systems              | 42 %                                | 252,000                                                                               | 168,000                                                                  |
| Urban turfgrass fertilizer  | 15 %                                | 91,500                                                                                | 60,000                                                                   |
| Atmospheric deposition      | 13 %                                | 81,000                                                                                | 56,000                                                                   |
| Farm fertilizer             | 12 %                                | 71,500                                                                                | 48,000                                                                   |
| Sports turfgrass fertilizer | 8 %                                 | 50,500                                                                                | 32,000                                                                   |
| Livestock waste             | 5 %                                 | 31,500                                                                                | 20,000                                                                   |
| WWTF                        | 4 %                                 | 22,000                                                                                | 16,000                                                                   |
| Totals                      | 100 %                               | 600,000                                                                               | 400,000                                                                  |

**Draft April 2017**



# CR/KB Reduction Obligations by Entity by Source (lbs-N/yr)

| Source                      | Citrus County  | Crystal River | Agricultural Producers | Golf Courses  | Total Nitrogen Reduction |
|-----------------------------|----------------|---------------|------------------------|---------------|--------------------------|
| Septic systems              | 167,586        | 414           |                        |               | <b>168,000</b>           |
| Urban turfgrass fertilizer  | 59,201         | 799           |                        |               | <b>60,000</b>            |
| Atmospheric deposition      | *              | *             | *                      | *             | <b>56,000</b>            |
| Farm fertilizer             |                |               | 48,000                 |               | <b>48,000</b>            |
| Sports turfgrass fertilizer | 1,301          |               |                        | 30,699        | <b>32,000</b>            |
| Livestock waste             |                |               | 20,000                 |               | <b>20,000</b>            |
| WWTF                        | **             | **            | **                     | **            | <b>16,000</b>            |
| <b>Totals</b>               | <b>228,088</b> | <b>1,213</b>  | <b>68,000</b>          | <b>30,699</b> | <b>400,000</b>           |

\*Atmospheric deposition is an uncontrollable load, but will likely be reduced through stormwater treatment and WWTF uptake.

\*\*WWTF owners/operators in the BMAP study area are 100 % responsible for achieving the appropriate source reductions based on their facility loads, with consideration for attenuation and locations in the high, medium, or low recharge areas.

**Draft April 2017**



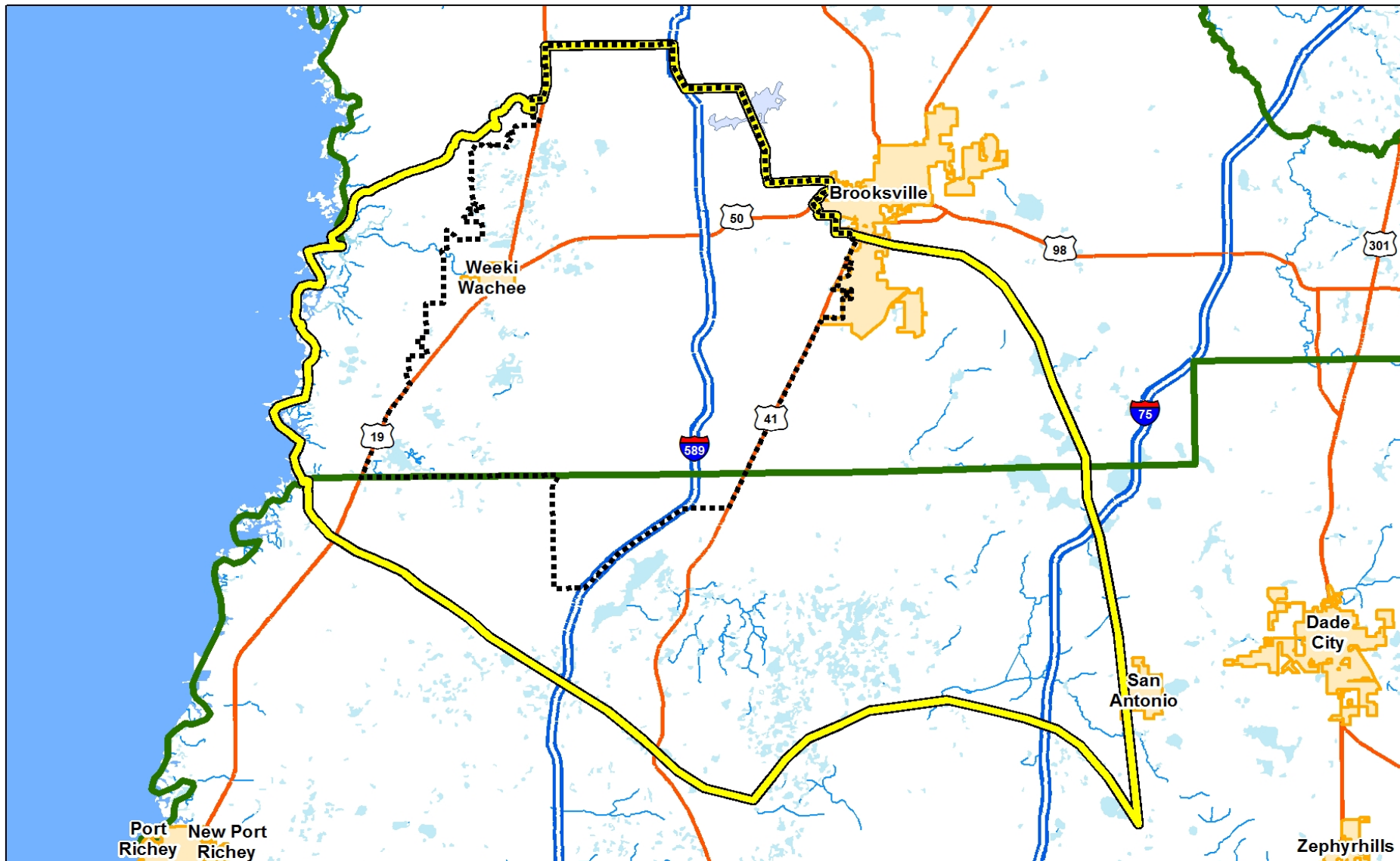
# CR/KB Reductions by Source Category by Milestone

| Entity                         | 5-Year Milestone<br>(30 % of Total)<br>(lbs-N/yr) | 10-Year Milestone<br>(50 % of Total)<br>(lbs-N/yr) | 15-Year Milestone<br>(20 % of Total)<br>(lbs-N/yr) | Total Nitrogen<br>Reduction (100 %)<br>(lbs-N/yr) |
|--------------------------------|---------------------------------------------------|----------------------------------------------------|----------------------------------------------------|---------------------------------------------------|
| Septic systems                 | 50,400                                            | 84,000                                             | 33,600                                             | 168,000                                           |
| Urban turfgrass<br>fertilizer  | 18,000                                            | 30,000                                             | 12,000                                             | 60,000                                            |
| Atmospheric<br>deposition*     | 16,800                                            | 28,000                                             | 11,200                                             | 56,000                                            |
| Farm fertilizer                | 14,400                                            | 24,000                                             | 9,600                                              | 48,000                                            |
| Sports turfgrass<br>fertilizer | 9,600                                             | 16,000                                             | 6,400                                              | 32,000                                            |
| Livestock waste                | 6,000                                             | 10,000                                             | 4,000                                              | 20,000                                            |
| WWTF**                         | 4,800                                             | 8,000                                              | 3,200                                              | 16,000                                            |
| <b>Totals</b>                  | <b>120,000</b>                                    | <b>200,000</b>                                     | <b>80,000</b>                                      | <b>400,000</b>                                    |

\*Atmospheric deposition is an uncontrollable load, but will likely be reduced through stormwater treatment and WWTF uptake.

\*\*WWTF owners/operators in the BMAP study area are 100 % responsible for achieving the appropriate source reductions based on their facility loads, with consideration for attenuation and locations in the high, medium, or low recharge areas.

**Draft April 2017**



## Weeki Wachee

Map prepared by the Division of Environmental Assessment and Restoration. This map is not for legal decision making purposes.  
 MAP ID: Weeki\_PFA\_Springshed\_032317.mxd  
 [GIS] Benjamin.Mittler@dep.state.fl.us  
 [BMAP] Terry.Hansen@dep.state.fl.us  
 Created: 03-23-17

0 1.75 3.5 7 Miles

 Interstates

 Major Highways

 TIGER 2010 Cities

 Counties

 Weeki Wachee BMAP

 Weeki Wachee Draft PFA

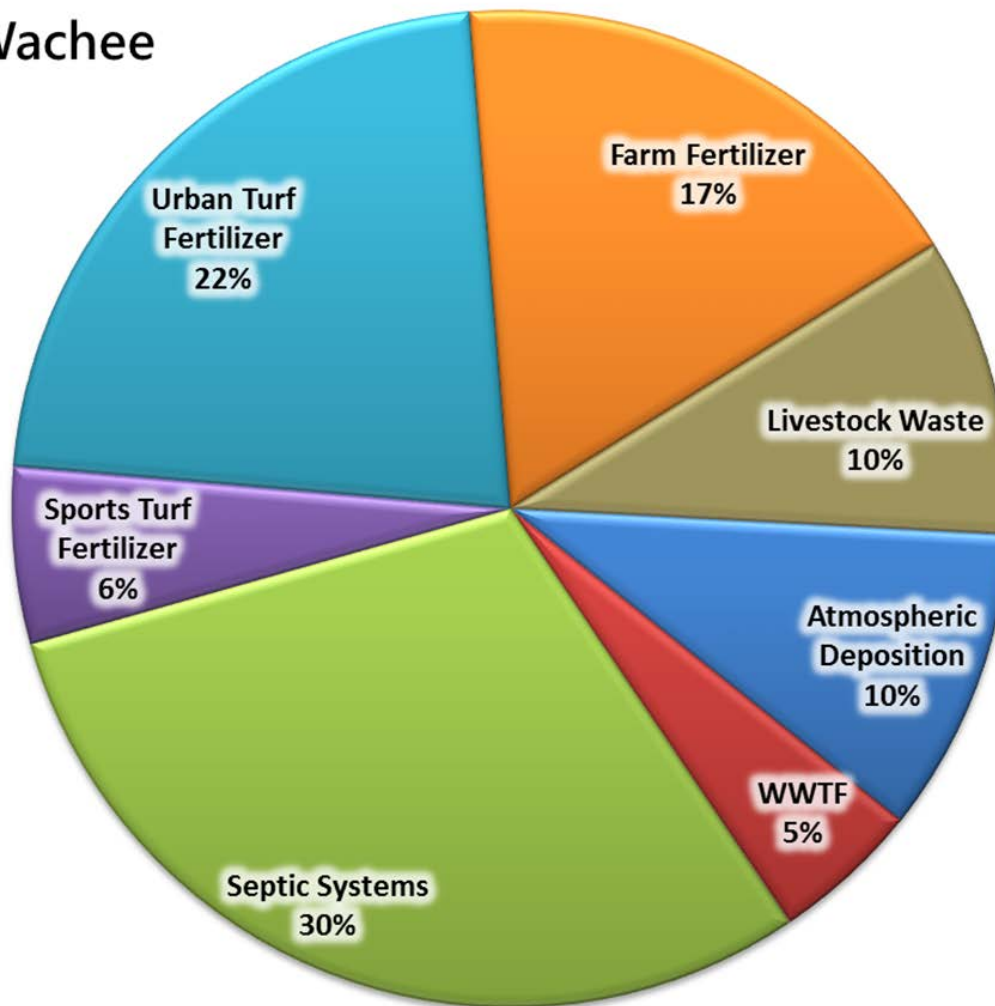
 Stream/River

 Lake/Pond



# Weeki Wachee (WW) Nitrogen Loading to Groundwater

## Weeki Wachee



Estimated Load to Groundwater: 940,000 lbs-N/yr

Estimated TMDL Load: 103,000 lbs-N/yr



# WW Nitrogen Reductions by Source

| Source                      | Estimated Portion of Total Load (%) | Estimated Total Nitrogen Load to Groundwater (lbs-N/yr) | Estimated Load Reduction (lbs-N/yr)<br>[Groundwater Load – TMDL Load (x) %] |
|-----------------------------|-------------------------------------|---------------------------------------------------------|-----------------------------------------------------------------------------|
| Septic systems              | 30 %                                | 282,875                                                 | 251,100                                                                     |
| Urban turfgrass fertilizer  | 22 %                                | 209,689                                                 | 184,140                                                                     |
| Farm fertilizer             | 17 %                                | 163,935                                                 | 142,290                                                                     |
| Atmospheric deposition      | 10 %                                | 93,208                                                  | 83,700                                                                      |
| Livestock waste             | 10 %                                | 91,347                                                  | 83,700                                                                      |
| Sports turfgrass fertilizer | 6 %                                 | 53,841                                                  | 50,220                                                                      |
| WWTF                        | 5 %                                 | 45,105                                                  | 41,850                                                                      |
| Totals                      | 100 %                               | 940,000                                                 | 837,000                                                                     |

**Draft April 2017**



# WW Reduction Obligations by Entity by Source (lbs-N/yr)

| Source                      | Hernando County | Pasco County  | Brooksville  | Agricultural Producers | Golf Courses  | Total Nitrogen Reduction |
|-----------------------------|-----------------|---------------|--------------|------------------------|---------------|--------------------------|
| Septic systems              | 220,215         | 29,881        | 1,004        |                        |               | <b>251,100</b>           |
| Urban turfgrass fertilizer  | 165,542         | 17,309        | 1,289        |                        |               | <b>184,140</b>           |
| Atmospheric deposition      | *               | *             | *            | *                      | *             | <b>83,700</b>            |
| Farm fertilizer             |                 |               |              | 142,290                |               | <b>142,290</b>           |
| Sports turfgrass fertilizer | 2,511           |               |              |                        | 47,407        | <b>50,220</b>            |
| Livestock waste             |                 |               |              | 83,770                 |               | <b>83,700</b>            |
| WWTF                        | **              | **            | **           | **                     | **            | <b>41,850</b>            |
| <b>Totals</b>               | <b>388,268</b>  | <b>47,190</b> | <b>2,293</b> | <b>225,990</b>         | <b>47,709</b> | <b>837,000</b>           |

\*Atmospheric deposition is an uncontrollable load, but will likely be reduced through stormwater treatment and WWTF uptake.

\*\*WWTF owners/operators in the BMAP study area are 100 % responsible for achieving the appropriate source reductions based on their facility loads, with consideration for attenuation and locations in the high, medium, or low recharge areas.

**Draft April 2017**



# WW Reductions by Source Category by Milestone

| Entity                         | 5-Year Milestone<br>(30 % of Total)<br>(lbs-N/yr) | 10-Year Milestone<br>(50 % of Total)<br>(lbs-N/yr) | 15-Year Milestone<br>(20 % of Total)<br>(lbs-N/yr) | Total Nitrogen<br>Reduction (100 %)<br>(lbs-N/yr) |
|--------------------------------|---------------------------------------------------|----------------------------------------------------|----------------------------------------------------|---------------------------------------------------|
| Septic systems                 | 75,330                                            | 125,550                                            | 50,220                                             | 251,100                                           |
| Urban turfgrass<br>fertilizer  | 55,242                                            | 92,070                                             | 36,828                                             | 184,140                                           |
| Atmospheric<br>deposition*     | 25,110                                            | 41,850                                             | 16,740                                             | 83,700                                            |
| Farm fertilizer                | 42,687                                            | 71,145                                             | 28,458                                             | 142,290                                           |
| Sports turfgrass<br>fertilizer | 15,066                                            | 25,110                                             | 10,044                                             | 50,220                                            |
| Livestock waste                | 25,110                                            | 41,850                                             | 16,740                                             | 83,700                                            |
| WWTF**                         | 12,555                                            | 20,925                                             | 8,370                                              | 41,850                                            |
| <b>Totals</b>                  | <b>251,100</b>                                    | <b>418,500</b>                                     | <b>167,400</b>                                     | <b>837,000</b>                                    |

\*Atmospheric deposition is an uncontrollable load, but will likely be reduced through stormwater treatment and WWTF uptake.

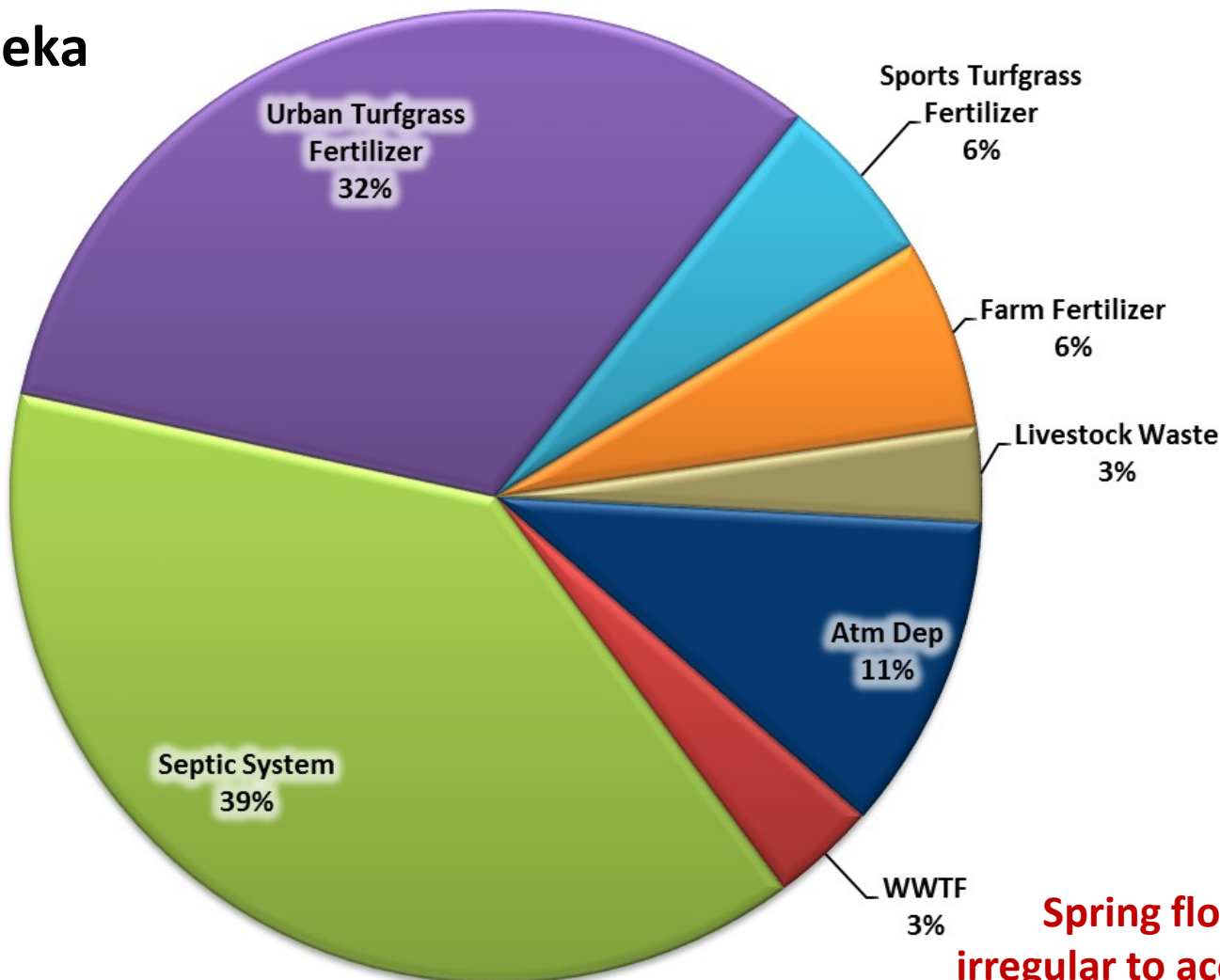
\*\*WWTF owners/operators in the BMAP study area are 100 % responsible for achieving the appropriate source reductions based on their facility loads, with consideration for attenuation and locations in the high, medium, or low recharge areas.

**Draft April 2017**



# Magnolia-Aripeka Springs Nitrogen Loading to Groundwater

## Magnolia-Aripeka Springs



**Spring flow is too irregular to accurately calculate TMDL load.**

**Estimated Load to Groundwater: 138,000 lbs-N/yr**



# Suggested Magnolia-Aripeka Springs Nitrogen Reduction Guidelines by Source

| Source                      | Estimated Portion of Total Load (%) | Estimated Total Nitrogen Load to Groundwater (lbs-N/yr) |
|-----------------------------|-------------------------------------|---------------------------------------------------------|
| Septic systems              | 39 %                                | 53,129                                                  |
| Urban turfgrass fertilizer  | 32 %                                | 43,719                                                  |
| Atmospheric deposition      | 11 %                                | 14,550                                                  |
| Farm Fertilizer             | 6 %                                 | 8,710                                                   |
| Sports turfgrass fertilizer | 6 %                                 | 8,710                                                   |
| Livestock Waste             | 3 %                                 | 4,358                                                   |
| WWTF                        | 3 %                                 | 4,824                                                   |
| Totals                      | 100 %                               | 138,000                                                 |

**Draft April 2017**



# Suggested Magnolia-Aripeka Springs Reduction Obligations by Entity by Source (lbs-N/yr)

| Source                      | Hernando County | Pasco County | Agricultural Producers | Golf Courses | Total Nitrogen Reduction |
|-----------------------------|-----------------|--------------|------------------------|--------------|--------------------------|
| Septic systems              | 21,783          | 31,346       |                        |              | 53,129                   |
| Urban turfgrass fertilizer  | 13,553          | 30,166       |                        |              | 43,719                   |
| Atmospheric deposition      | *               | *            | *                      | *            | 14,550                   |
| Farm fertilizer             |                 |              | 8,710                  |              | 8,710                    |
| Sports turfgrass fertilizer |                 | 1,568        |                        | 7,142        | 8,710                    |
| Livestock waste             |                 |              | 4,358                  |              | 4,358                    |
| WWTF                        | **              | **           | **                     | **           | 4,824                    |
| Totals                      | 35,336          | 63,080       | 13,068                 | 7,142        | 138,000                  |

\*Atmospheric deposition is an uncontrollable load, but will likely be reduced through stormwater treatment and WWTF uptake.

\*\*WWTF owners/operators in the BMAP study area are 100 % responsible for achieving the appropriate source reductions based on their facility loads, with consideration for attenuation and locations in the high, medium, or low recharge areas.

## Draft April 2017



# Suggested Magnolia-Aripeka Reductions by Source Category by Milestone

| Entity                         | 5-Year Milestone<br>(30 % of Total)<br>(lbs-N/yr) | 10-Year Milestone<br>(50 % of Total)<br>(lbs-N/yr) | 15-Year Milestone<br>(20 % of Total)<br>(lbs-N/yr) | Total Nitrogen<br>Reduction (100 %)<br>(lbs-N/yr) |
|--------------------------------|---------------------------------------------------|----------------------------------------------------|----------------------------------------------------|---------------------------------------------------|
| Septic systems                 | 15,939                                            | 26,565                                             | 10,626                                             | 53,129                                            |
| Urban turfgrass<br>fertilizer  | 13,116                                            | 21,860                                             | 8,744                                              | 43,719                                            |
| Atmospheric<br>deposition*     | 4,365                                             | 7,275                                              | 2,910                                              | 14,550                                            |
| Farm fertilizer                | 2,613                                             | 4,355                                              | 1,742                                              | 8,710                                             |
| Sports turfgrass<br>fertilizer | 2,613                                             | 4,355                                              | 1,742                                              | 8,710                                             |
| Livestock waste                | 1,307                                             | 2,179                                              | 872                                                | 4,358                                             |
| WWTF**                         | 1,447                                             | 2,412                                              | 965                                                | 4,824                                             |
| Totals                         | 41,400                                            | 69,000                                             | 27,600                                             | 138,000                                           |

\*Atmospheric deposition is an uncontrollable load, but will likely be reduced through stormwater treatment and WWTF uptake.

\*\*WWTF owners/operators in the BMAP study area are 100 % responsible for achieving the appropriate source reductions based on their facility loads, with consideration for attenuation and locations in the high, medium, or low recharge areas.

## Draft April 2017



# **Stakeholder Projects – Source Reduction and Education (Handouts)**



# **Remaining BMAP Schedule**



# Remaining Schedule

- **April 11, 2017** – Deadline for stakeholders to submit project edits or comments.
- **April 19, 2017** – Deadline for Terry to route draft BMAP for internal DEP review.
- **May 31, 2017** – Release draft BMAP to stakeholders for review.
- **June 2017** – BMAP public meeting with stakeholders prior to DEP adoption.



# **Nitrogen Source Inventory Loading Tool (NSILT) Revisions**

# Florida Department of Environmental Protection



Division of Environmental Assessment  
and Restoration

## 5 Year Updates Nitrogen Source Inventory and Loading Tool (NSILT) for Springs Coast BMAP areas

*Celeste Lyon*  
*Groundwater Management Section*

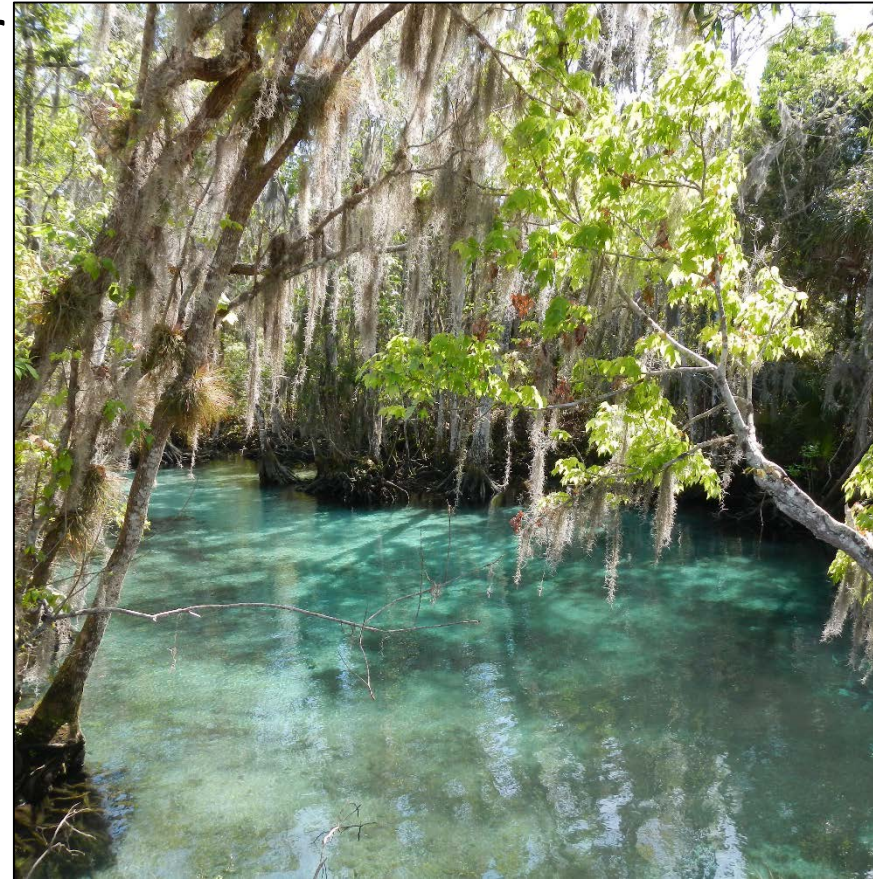
*April 6, 2017*

[Celeste.Lyon@dep.state.fl.us](mailto:Celeste.Lyon@dep.state.fl.us)



# NSILT

- Estimate N loading to groundwater within BMAP areas.
- Identify sources for which reductions in N loading could achieve restoration of impaired waters.
- Customize for individual spring basins.



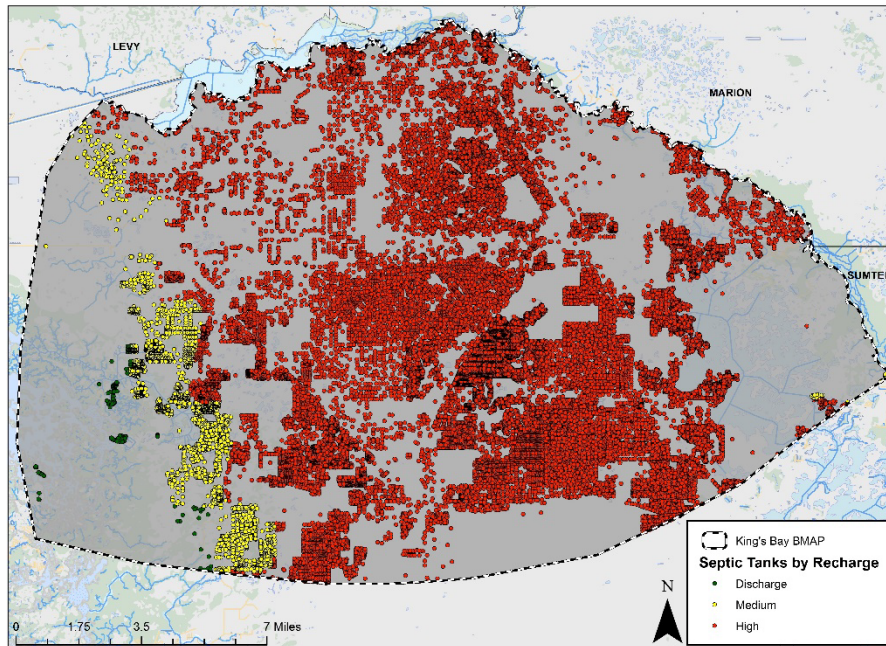


# NSILT 5-Year Updates

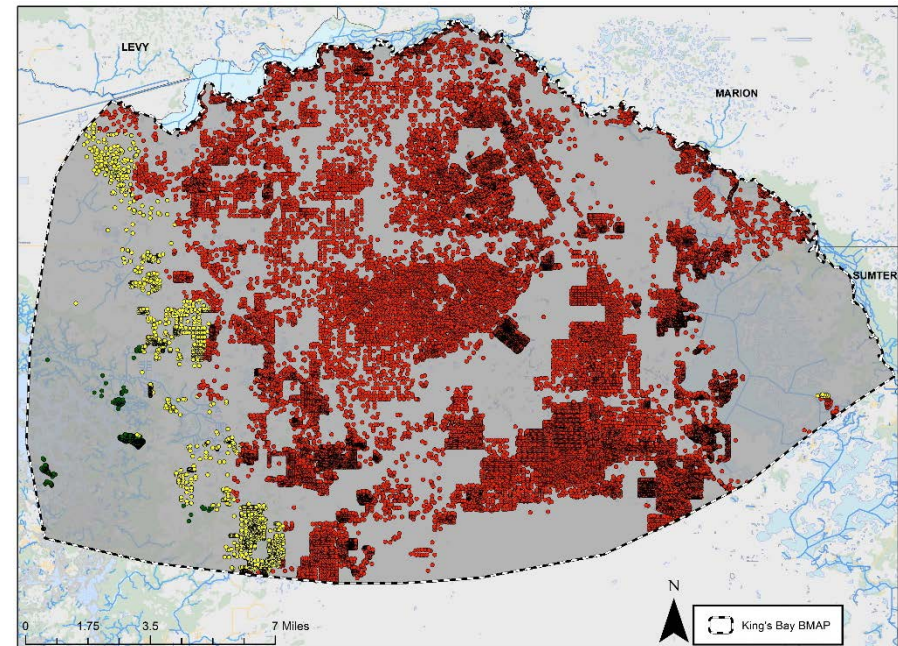
- Use 25 % of total acreage from PA classified grazing lands instead of 100 %.
  - Consistent methodology throughout Springs Coast.
- Update acreages for agricultural land use.
- Correct any errors in Excel.
- Incorporate FDOH data for updated OSTDS inventory.



# Example of Updates



Hall and Clancy Model: 32,913 septic systems



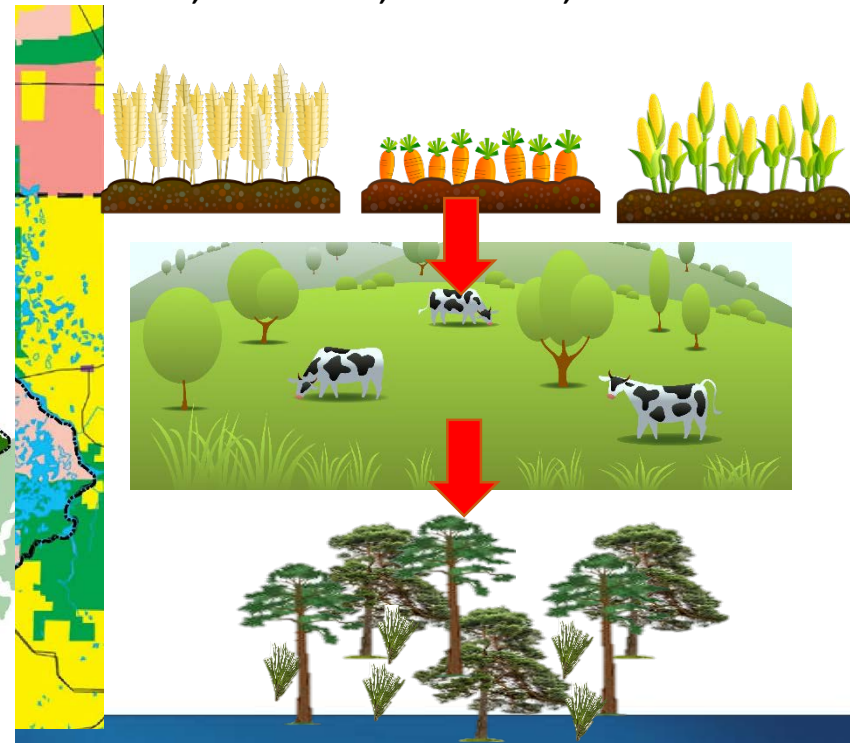
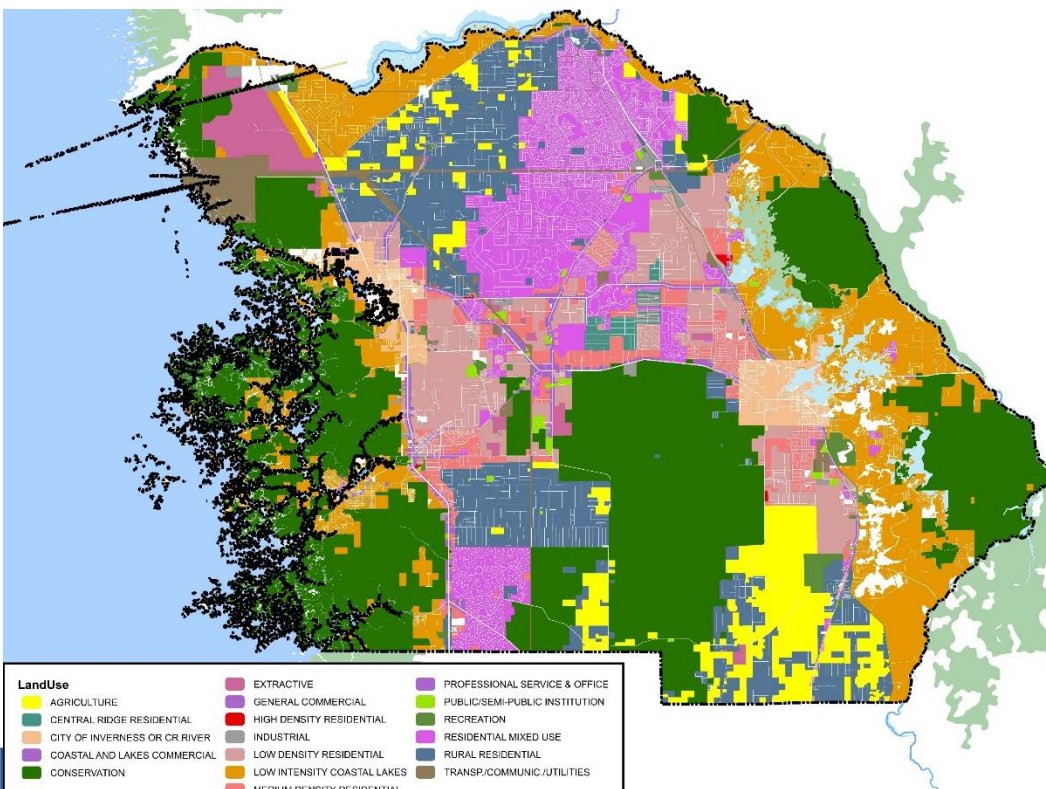
FLWMI: 28,573 septic systems



# Future Land Use

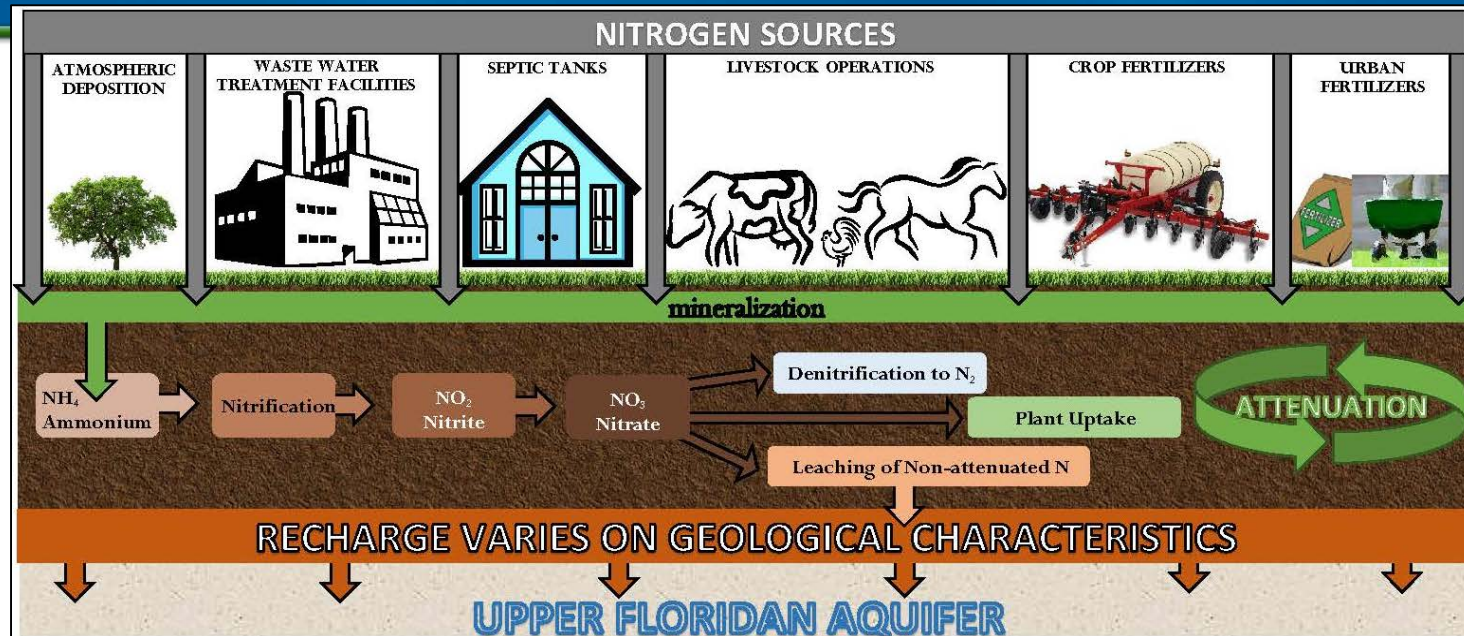
- ◊ Acreage likely to receive fertilizer estimated from **PA data** and property values.
  - ◊ Residential
  - ◊ Nonresidential
- ◊ Impervious surfaces estimated based on **zoning laws**.

- ◊ Agricultural acreage receiving fertilizer estimated from PA and WMD land use.
  - ◊ **Single land use coverage** is being developed for agricultural estimations.
- ◊ Crops produced may change based on climate, land use, demand, etc.





# Biochemical Attenuation Factors

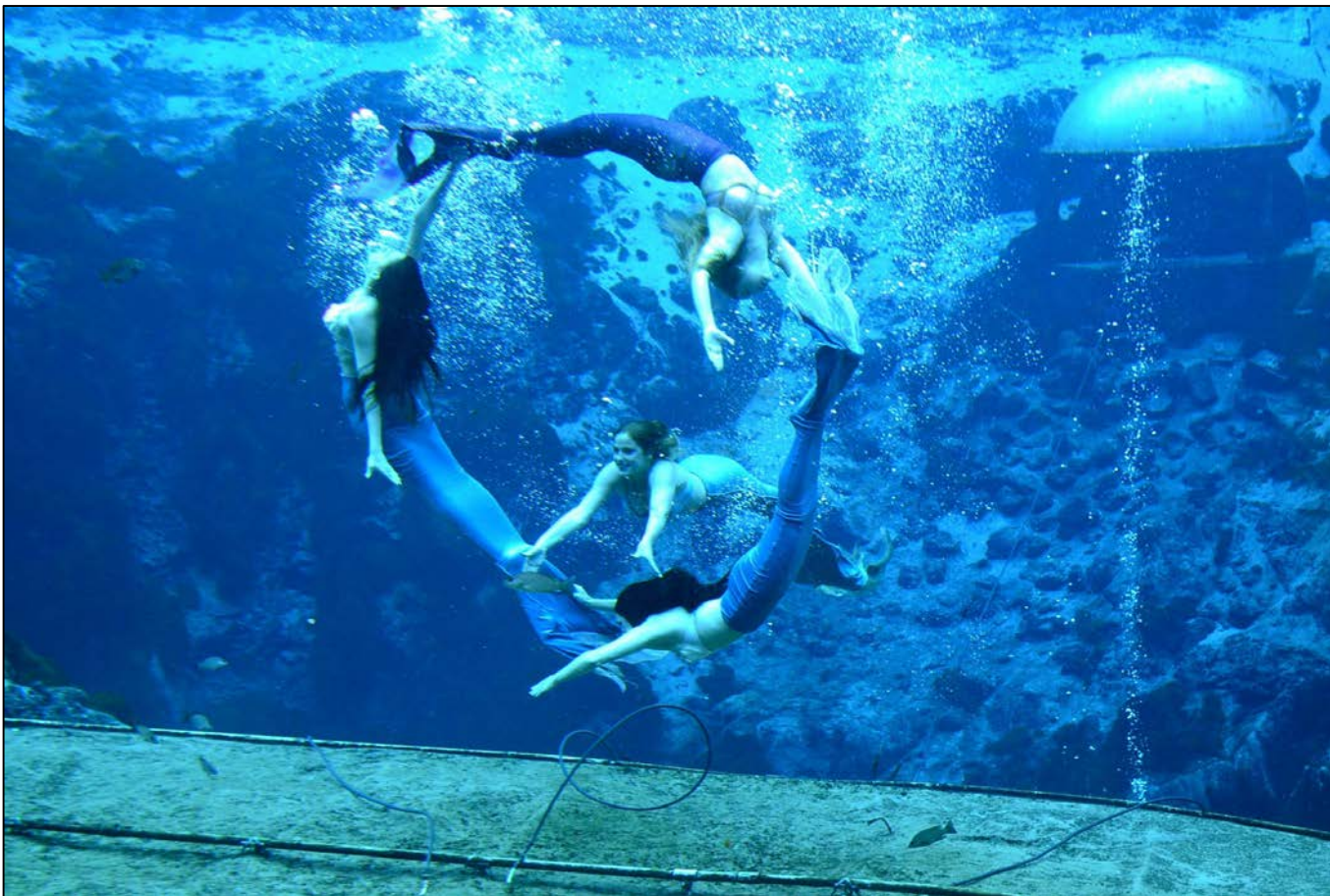


- ◇ Represent the percentage of N removed and therefore not available for leaching to groundwater.
- ◇ Based on factors used in similar past studies and found in relevant literature.

| Loading Category             | N Attenuation Factor |
|------------------------------|----------------------|
| Atmospheric Deposition       | 90%                  |
| Septic Systems               | 50%                  |
| WWTF-RIB                     | 25%                  |
| WWTF-Sprayfield              | 60%                  |
| WWTF-Reuse                   | 75%                  |
| Urban Turfgrass Fertilizers  | 70%                  |
| Sports Turfgrass Fertilizers | 70%                  |
| Farm Fertilizers             | 80%                  |
| Livestock                    | 90%                  |



# QUESTIONS??



Division of Environmental Assessment and Restoration  
Ground Water Management Section

[Celeste.Lyon@dep.state.fl.us](mailto:Celeste.Lyon@dep.state.fl.us)



# Basin Management Action Plan

Contact: Terry Hansen, P.G.

[terry.hansen@dep.state.fl.us](mailto:terry.hansen@dep.state.fl.us)

<http://www.dep.state.fl.us/water/>

<http://publicfiles.dep.state.fl.us/DEAR/BMAP/Springs Coast/BMAPs>

