



Florida Department of Environmental Protection

Crystal River/Kings Bay Basin Management Action Plan (BMAP)

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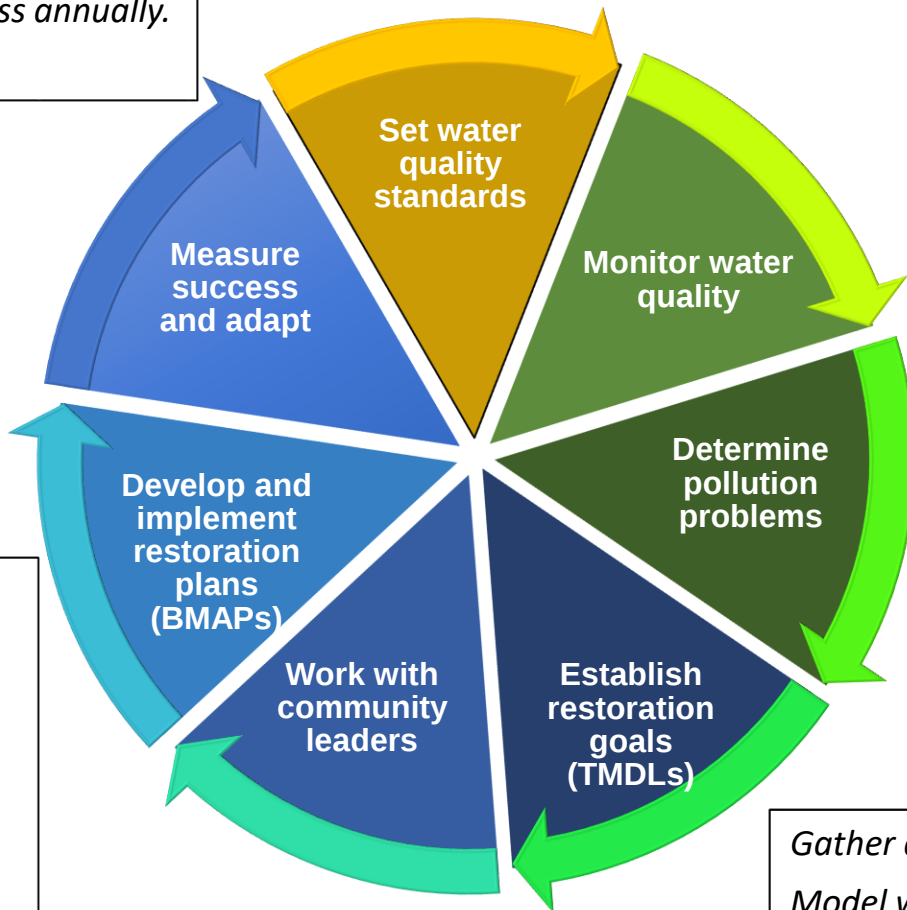
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Water Quality Framework

*Monitor and report progress annually.
Adapt and change.*



*Collect data.
Analyze and verify.
List "impaired" waters.*

REPEAT

Excessive nutrients

*Bacteria
Mercury*

*Allocate responsibilities.
Identify projects.*

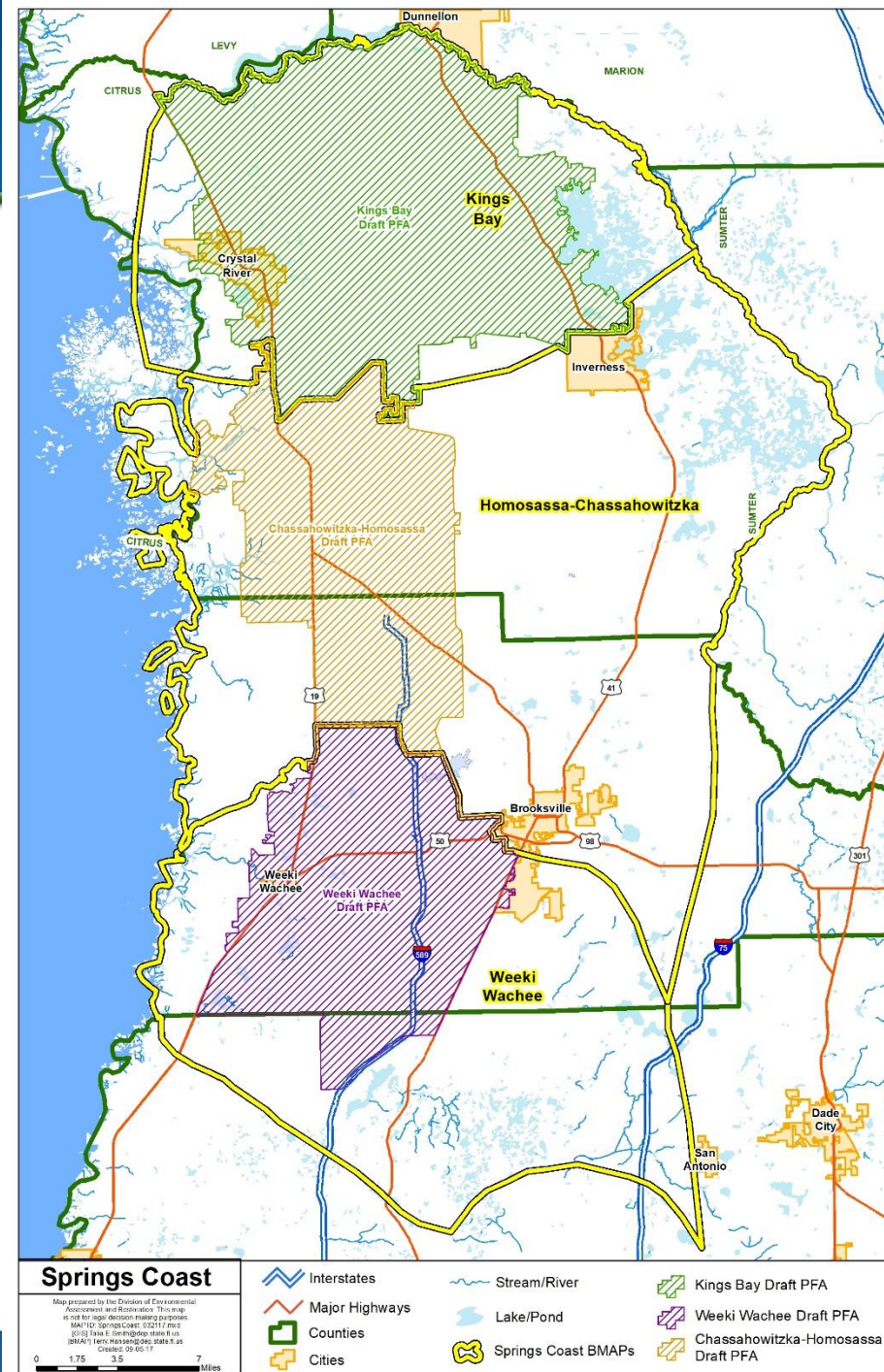
- Infrastructure
- Best Management Practices (BMPs)

*Establish schedules.
Identify success criteria.*

*Gather additional data.
Model water quality.
Adopt pollutant reduction targets.*



Springs Coast BMAP Study Areas and Priority Focus Areas (PFAs)

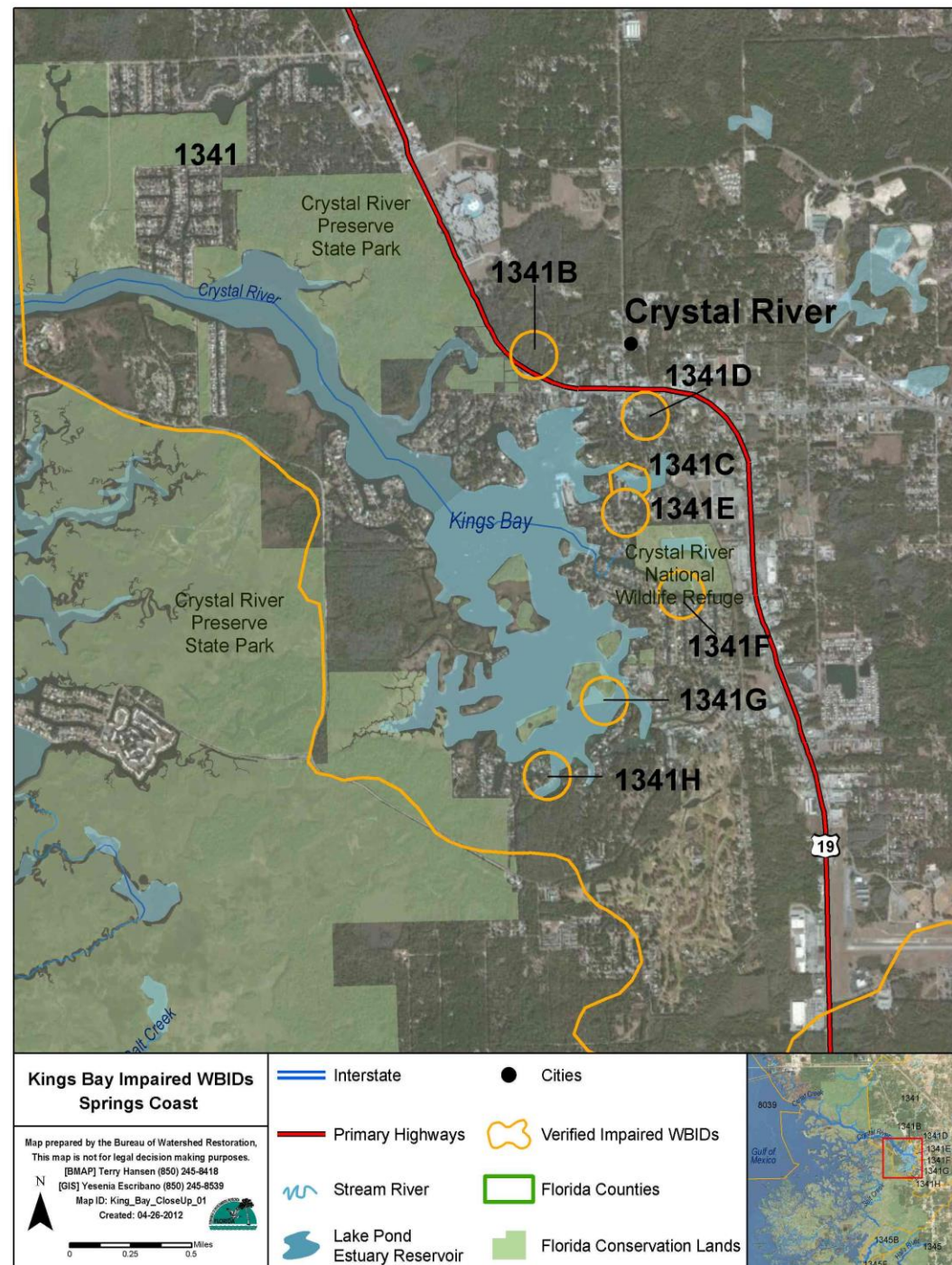




Total Maximum Daily Loads (TMDLs)

TMDLs adopted in 2013.

Water Body Identification (WBID)	Reduction-Total Nitrogen (TN)	Reduction-Total Phosphorus (TP)
1341	22%	14% TP
1341C	64%	0% ortho-P
1341D	53%	0% ortho-P
1341F	26%	7% ortho-P
1341G	21%	10% ortho-P
1341H	26%	0% ortho-P



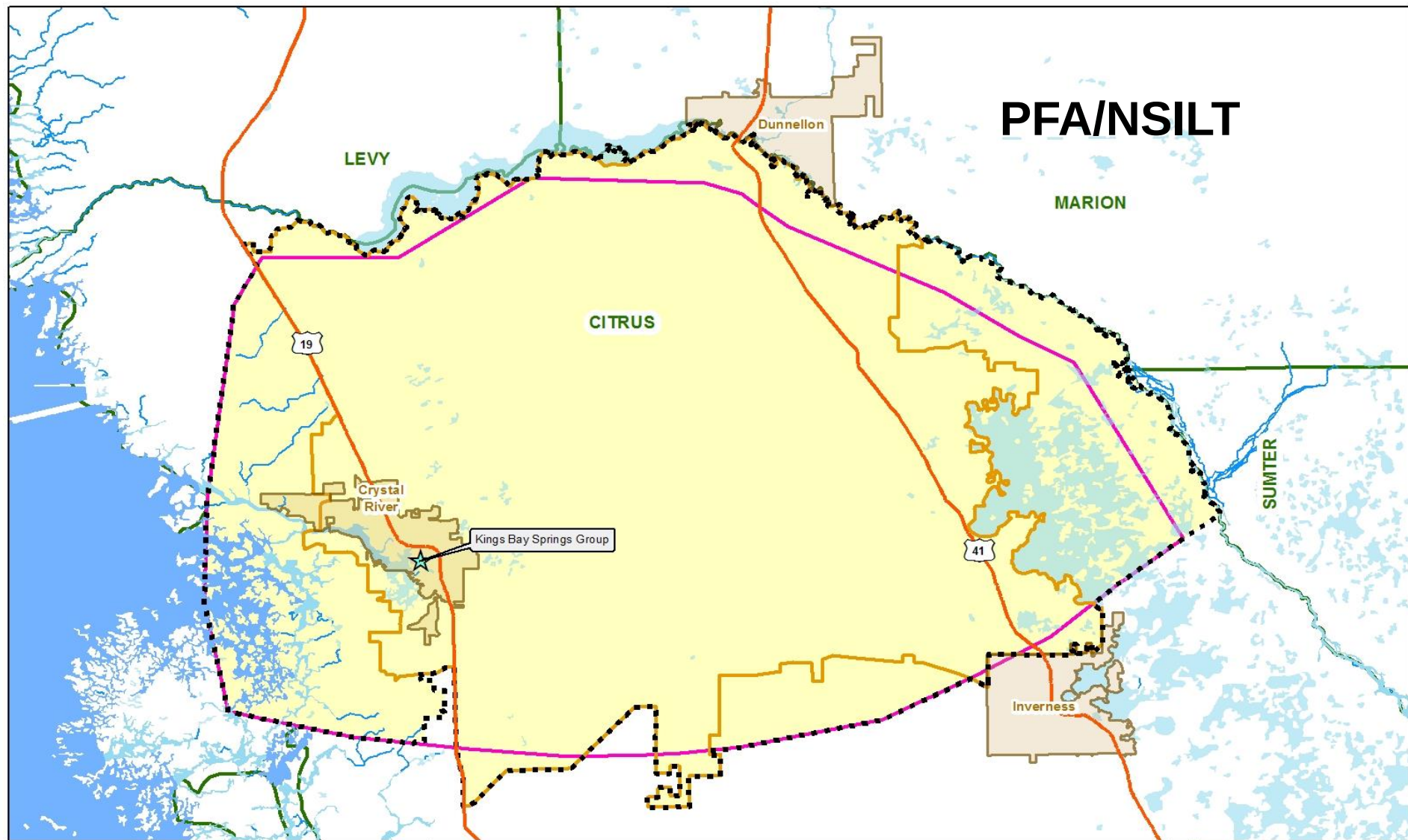


Regulatory Framework

The process for preparing BMAPs is found in:

- Section 403.067, Florida Statutes (F.S.), known as the Florida Watershed Restoration Act .
- The *2016 Florida Springs and Aquifer Protection Act* lists requirements for BMAPs for Outstanding Florida Springs (OFS).
- PFA and Nitrogen Source Inventory Loading Tool (NSILT) completed for Kings Bay OFS by the Florida Department of Environmental Protection (DEP).

PFA/NSILT



Kings Bay BMAP

Map prepared by the Division of Environmental Assessment and Restoration. This map is not for legal decision making purposes.
 MAP ID: KB_071217.mxd
 [GIS] Benjamin.Mittler@dep.state.fl.us
 [BMAP] Terry.Hansen@dep.state.fl.us
 Created: 07-12-17



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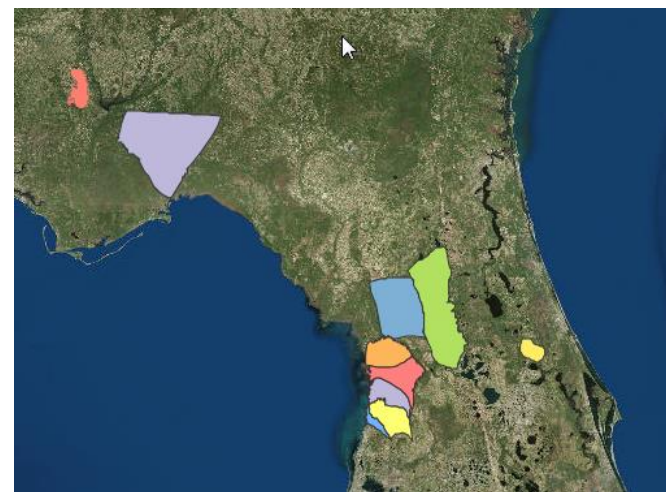
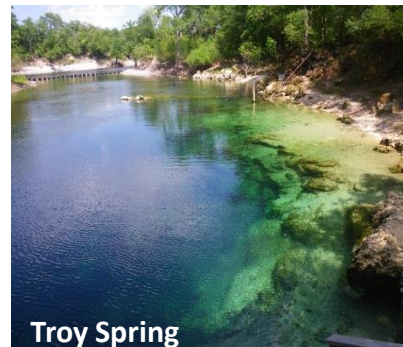
- | | | | |
|--|------------------|--|-------------------------|
| | Springs | | PFA |
| | Springsheds | | Cities |
| | Stream River | | Interstate |
| | Waterbodies | | Primary and US Highways |
| | Florida Counties | | Kings Bay BMAP |





NSILT

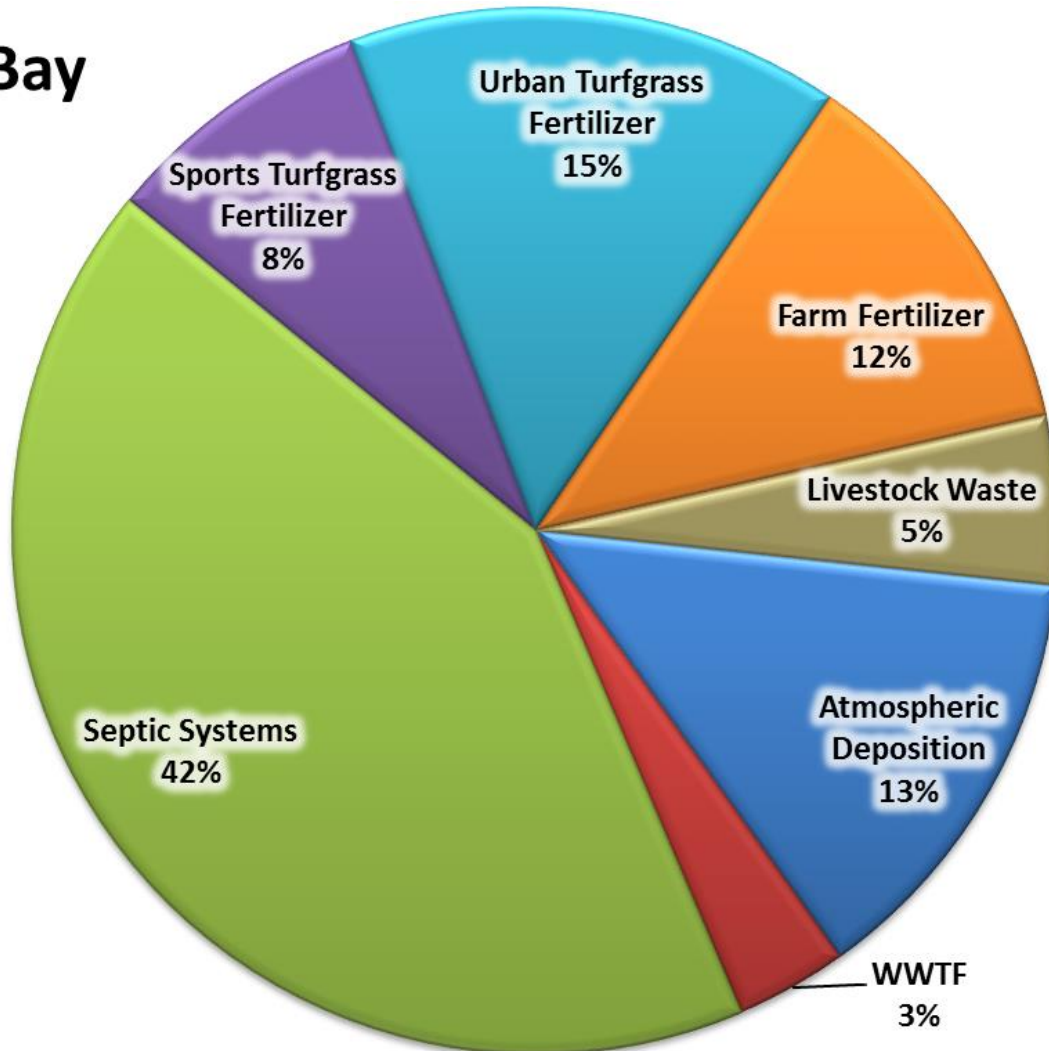
- Quantifies nitrogen sources and loading to groundwater, and highlights source categories where reductions in nitrogen loading could help achieve restoration of impaired waters.
- DEP customizes the inventory for each spring basin or BMAP area to account for hydrogeologic and land use differences.
- Inventories have been completed for several BMAP areas (Wakulla, Jackson Blue, Silver, Rainbow, Volusia Blue, and Springs Coast Springs).





Kings Bay Nitrogen Loading to Groundwater

Kings Bay



Estimated Load to Groundwater: 592,440 pounds of nitrogen per year (lb-N/yr)

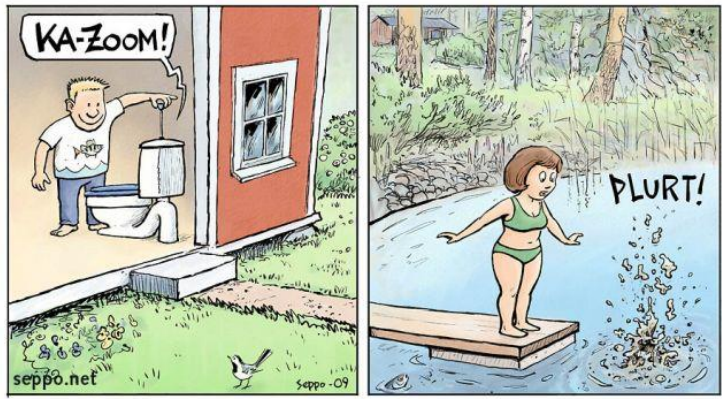
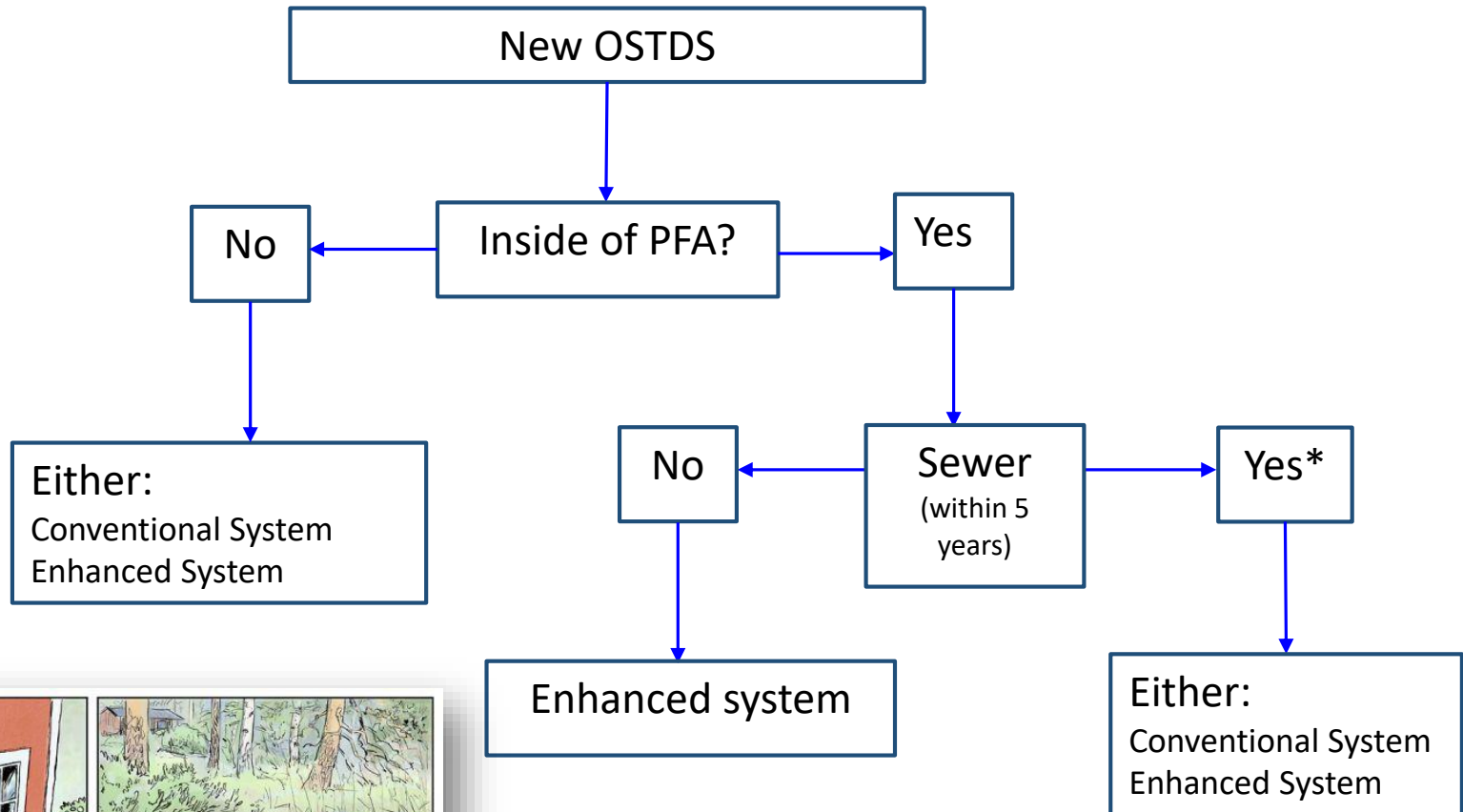


Kings Bay Onsite Sewage Treatment and Disposal System (OSTDS) Remediation Plan

- The *Florida Springs and Aquifer Protection Act* mandates that a BMAP with OSTDS contributing at least 20 % of nonpoint source load within a PFA include an OSTDS Remediation Plan (here, 42 %).
- The Crystal River/Kings Bay (CR/KB) Plan includes:
 - Public education plan.
 - Scientific information on effect of nutrients on springs.
 - Projects designed to reduce nutrient impacts from OSTDS.
- The OSTDS Remediation Plan is included as an appendix in the BMAP.



BMAP Policies – OSTDS



*Must connect to sewer when available



TMDL / BMAP

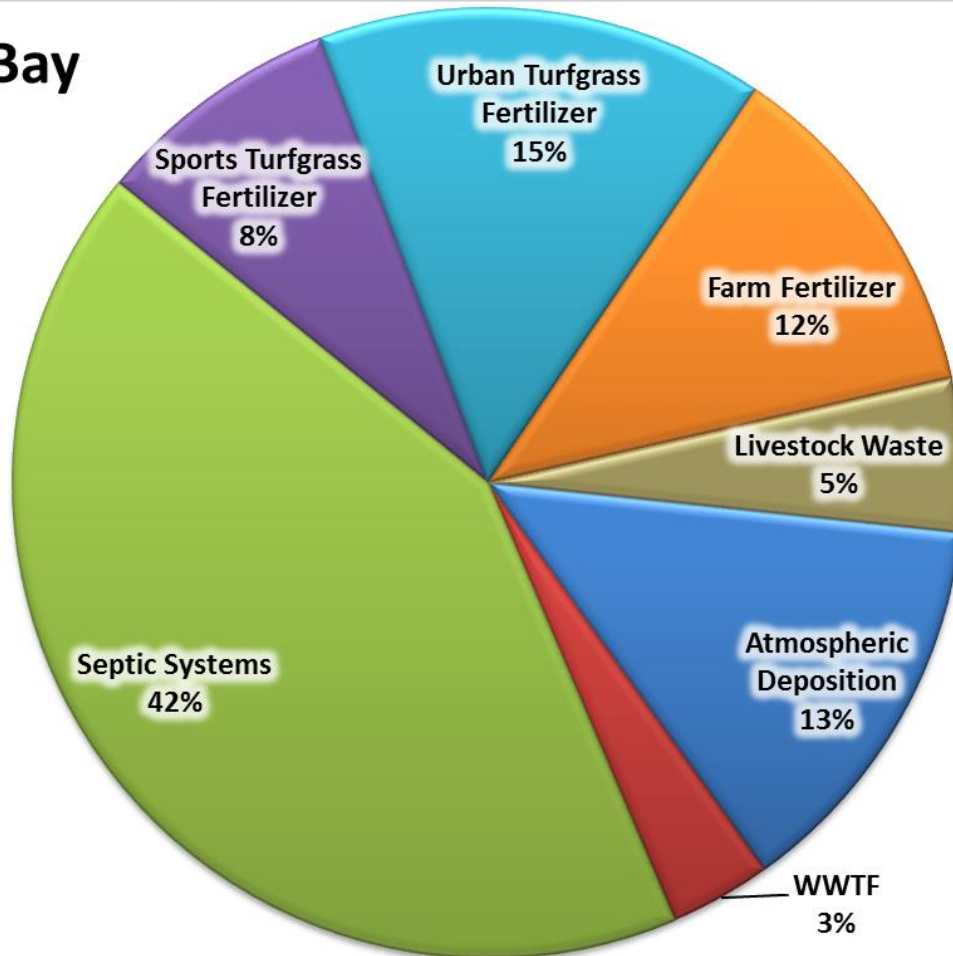
- To achieve the TMDL, BMAP implementation will be a 20-year process.
- Plan will define nitrogen reduction milestones:
 - 30% reduction within 5 years.
 - 50% reduction within 10 years.
 - 20% reduction within 15 years.
 - Use last 5 years to finish up and see results.





Source Reductions

Kings Bay



Determining Reductions

- Load reduction required to meet TMDL.
- Project load reductions.
- Gap.
- Options to reduce the gap.



CR/KB Reduction to Meet the TMDL

Required Reduction to Meet the TMDL		
Description	Nitrogen Loads (lb-N/yr)	Source
Load at Spring Vents	487,000	Upper 95 % confidence interval - nitrate data and flow data from 2010-2016 (470 cfs and 0.526 mg/L)
TMDL Load	213,000	TMDL target is 0.23 mg/L and using flow data from 2010-2016 (470 cfs)
Required Reduction	274,000	

cfs = cubic feet per second
mg/L = milligrams per liter



CR/KB Gap Analysis

Nitrogen Source	Credits Based on Project Tables (lb-N/yr)	Description
OSTDS	103,868	Credits identified for stakeholder OSTDS projects (enhancement or sewer)
Urban Turf Fertilizer	4,050	DEP approved credits (up to 6%) for public education activities as well as credits identified for stakeholder stormwater projects
Atmospheric Deposition	–	No reduction
Farm Fertilizer (FF)	10,604	15% BMP credit on FF load to groundwater, assuming 100% owner-implemented BMPs on all fertilized lands
Sports Turf Fertilizer (STF)	4,886	6% BMP credit for sports fields and 10% BMP credit for golf courses on STF load to groundwater, assuming 100% BMP implementation on golf courses and sports fields
Livestock	3,079	10% BMP credit on load to groundwater, assuming 100% owner-implemented BMPs at all livestock facilities
Wastewater Treatment Facility	9,454	Achieved by BMAP WWTF policy (achieving 3 or 6 mg/L)
Total Credits	135,942	
Required Reduction	274,000	Load Remaining: 138,058



Options to Reduce Remaining Load

Estimated Reduction Credits for Additional OSTDS Enhancement OR Sewer

Recharge Area	Total OSTDS in BMAP	Remaining OSTDS Parcels Less Than One Acre in Size	Credit for Sewer (lb-N/yr)	Credit for Enhancement (lb-N/yr)	Remaining OSTDS Parcels One Acre and Greater	Credit for Sewer (lb-N/yr)	Credit for Enhancement (lb-N/yr)
High	27,522	2,731	22,121	14,474	11,315	91,652	59,970
Medium	1,485	0	0	0	1,485	6,683	4,307
Total	29,007	2,731	22,121	14,474	12,800	98,334	64,276

OSTDS That Could Be Converted to Sewer

Project #	OSTDS #	Estimated Reduction (lb-N/yr)
CC-3	250	2,025
CC-17	400	3,240
CC-18	2,800	22,680
CC-19	5,021	40,670
CC-20	2,555	20,696
CC-21	4,307	34,887
Total	15,333	124,197



Ag Options to Reduce Remaining Load

Estimated Reduction Credits for Advanced Agricultural Practices

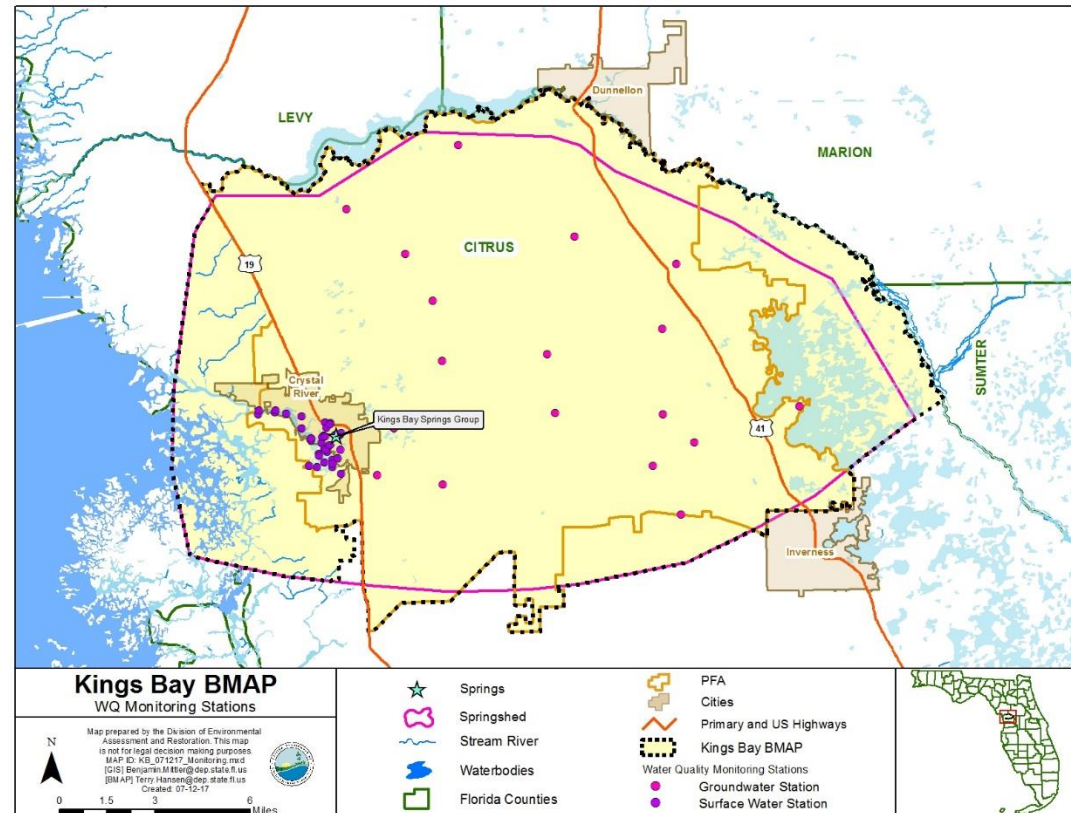
Best Management Practice (BMP)	Estimated Reduction Credit (lb-N/yr) High Recharge	Estimated Reduction Credit (lb-N/yr) Medium Recharge
Precision Irrigation	1,145	636
Soil Moisture Probes	4,104	2,052
Cover Crops	2,475	1,238
Total	7,724	3,926





Next Steps

- Water quality monitoring to determine improvements
- Annual review of project accomplishments and adherence to schedule
- Five year revisions of BMAP and NSILT





QUESTIONS??



Photo: SWFWMD



Basin Management Action Plan

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

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

