Florida Department of Environmental Protection

Division of Environmental Assessment and Restoration

Basin Management Action Plan
Crystal River / Kings Bay

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Springs Coast

BMAPs in development

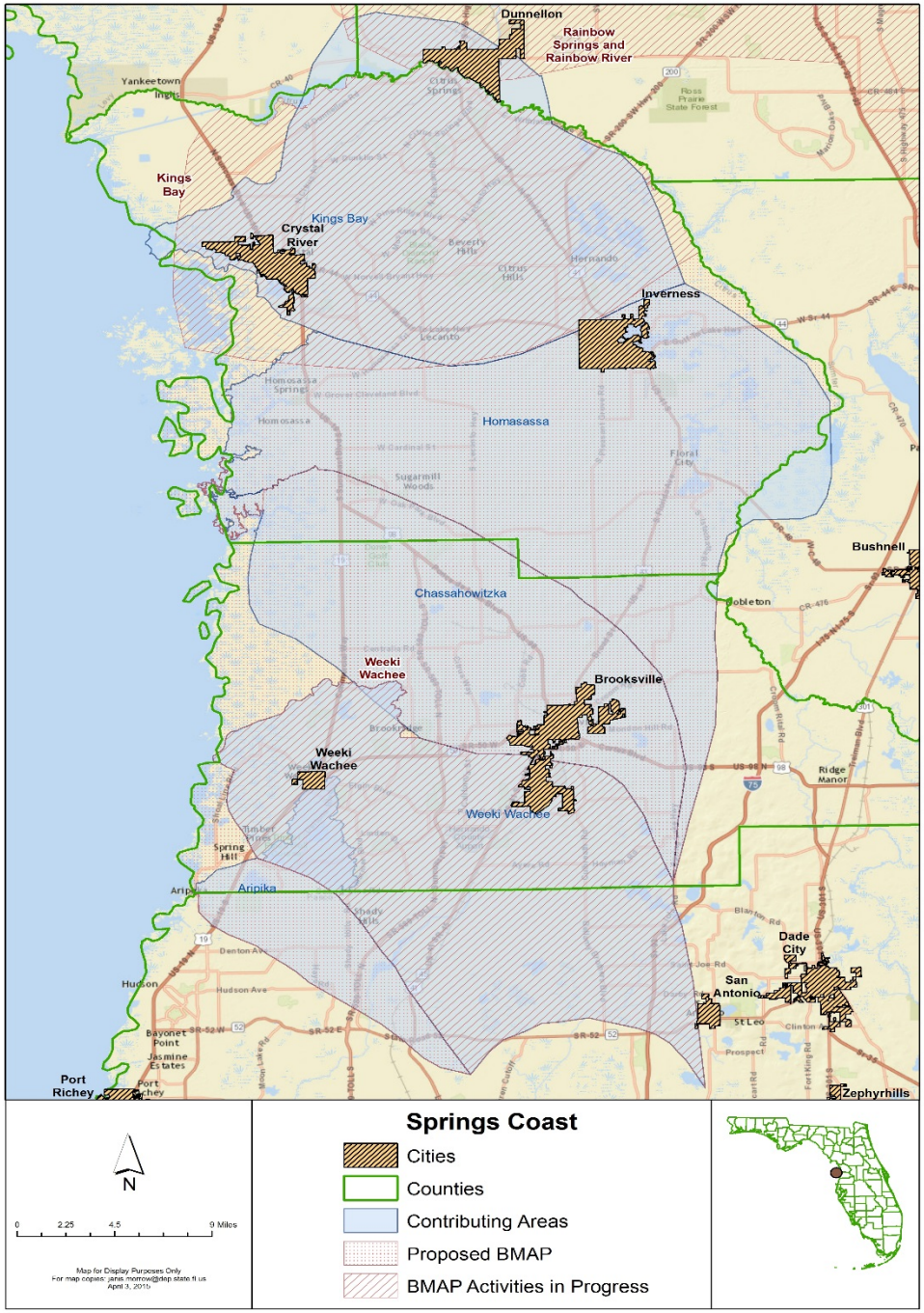
- Crystal River / Kings Bay
- Weeki Wachee

TMDL finalized

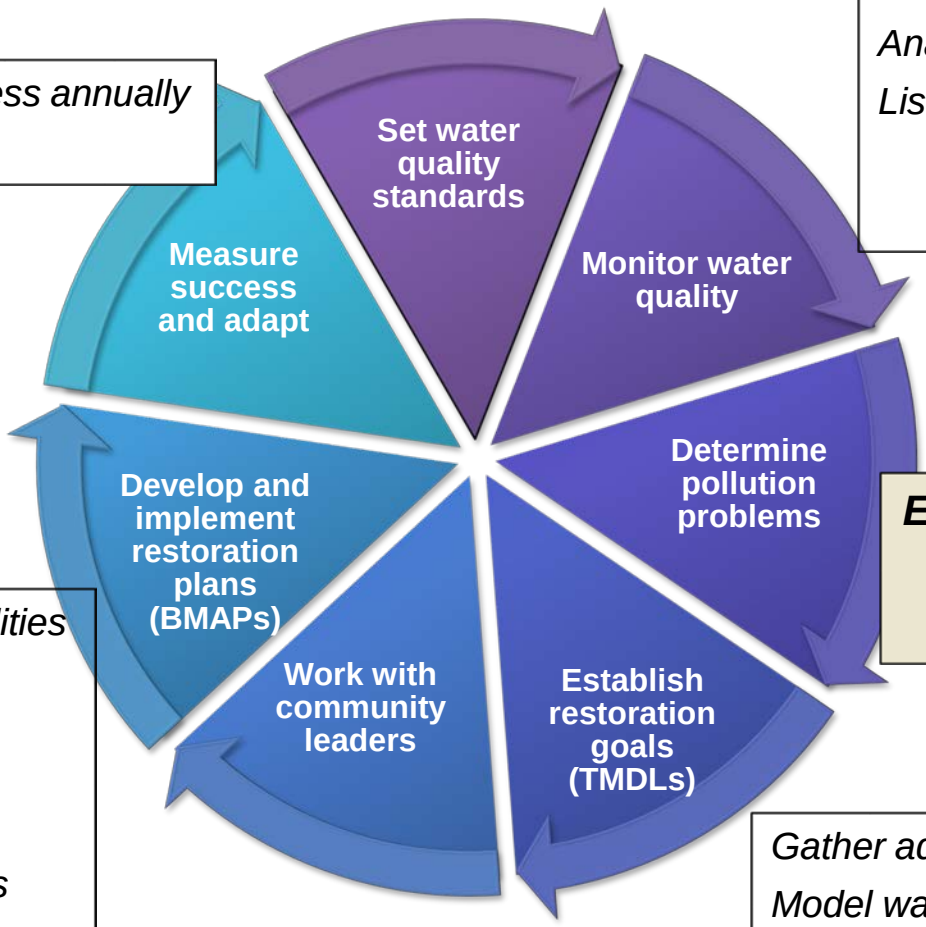
- Homosassa
- Chaz

TMDL in development

- Aripeka



Water Quality Framework



Collect data
Analyze and verify
List "impaired" waters

REPEAT

Excessive nutrients
Bacteria
Mercury

Gather additional data
Model water quality
Adopt pollutant reduction targets

Allocate responsibilities
Identify projects
- *Infrastructure*
- *BMPs*
- *Land acquisition*

Establish schedules
Identify success criteria

Monitor and report progress annually
Adapt and change

Basin Management Action Plan

- FDEP's method for restoring water quality to an impaired water body.
- BMAPs are adopted by FDEP through a Secretarial Order.
- BMAPs are enforceable.
- BMAPs are reviewed annually and updated every 5 yrs.

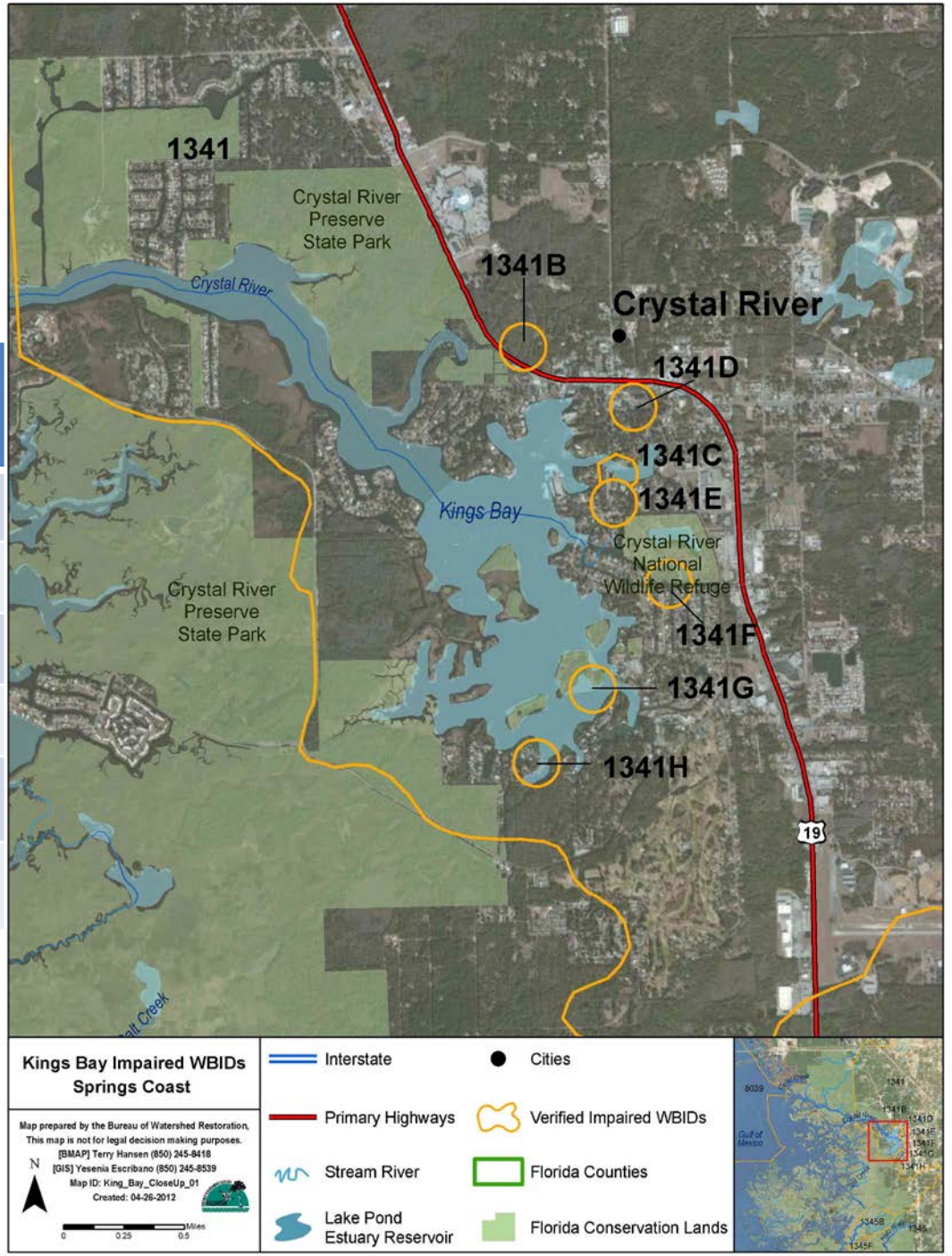
Regulatory Framework

The process for preparing BMAPs is found in:

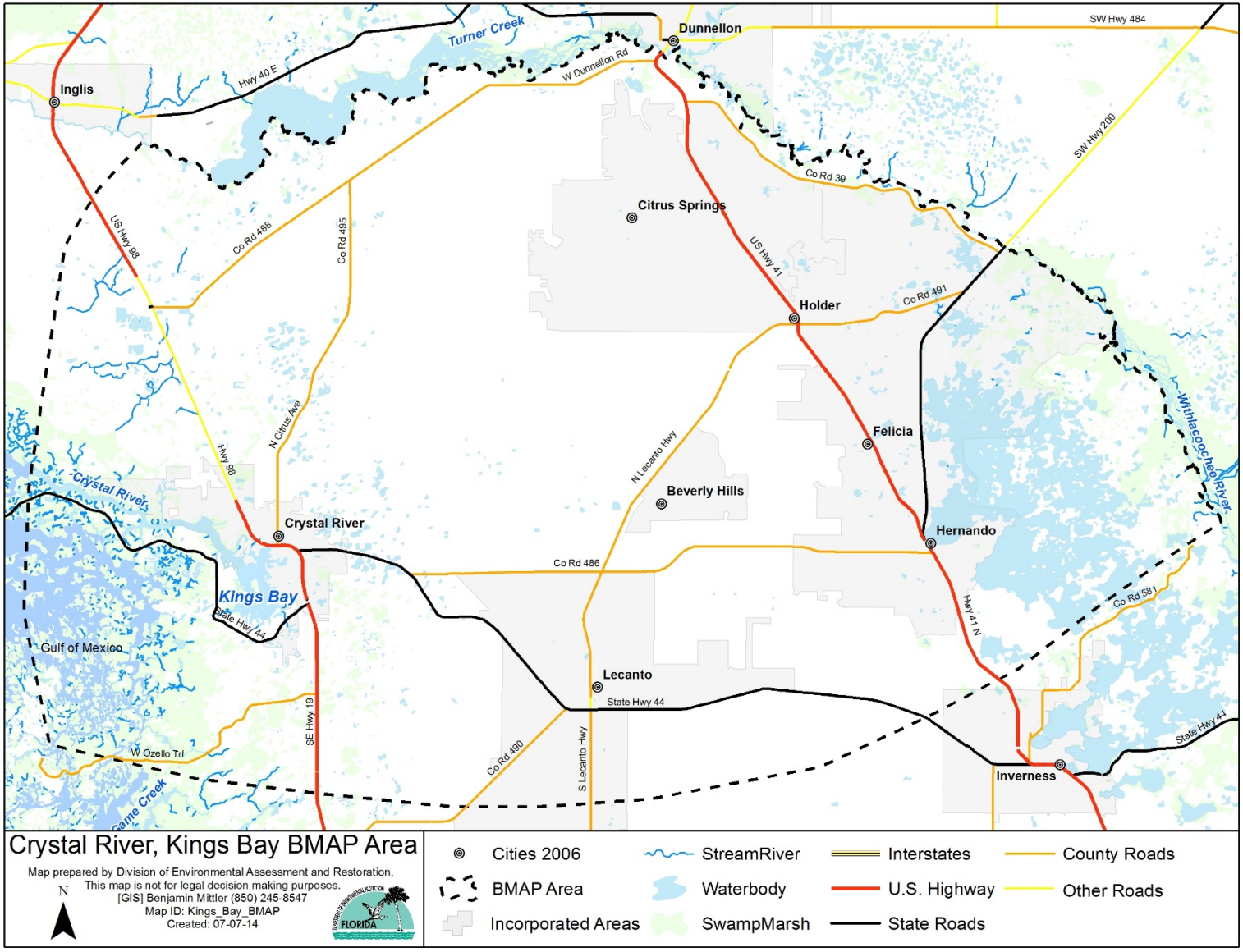
- Section 403.067, Florida Statutes (F.S.), known as the Florida Watershed Restoration Act (FWRA).
- Spells out issues that are addressed within a BMAP.

TMDL

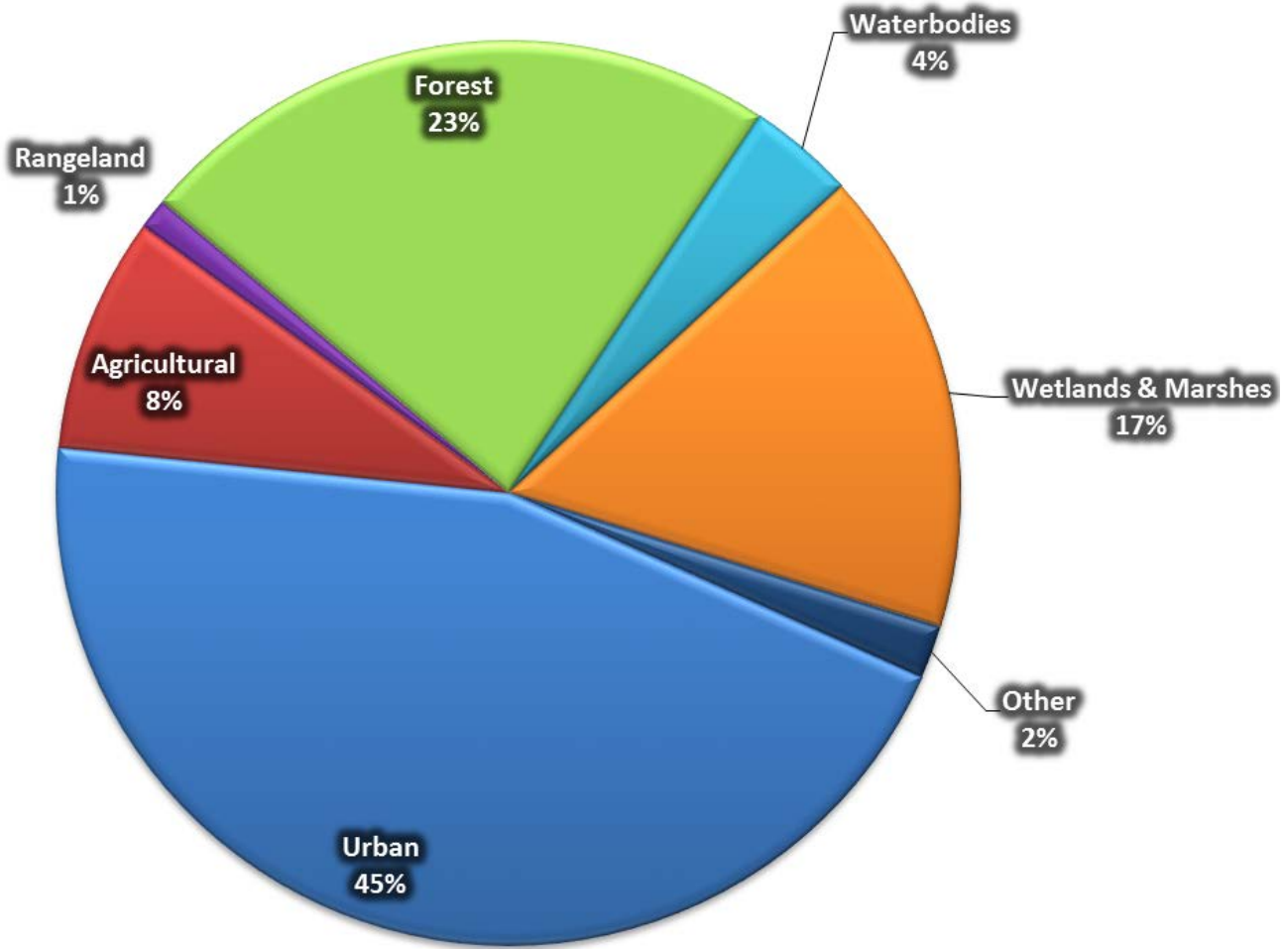
WBID	Reduction TN	Reduction P
1341	22%	14% TP
1341C	64%	0% orthoP
1341D	53%	0% orthoP
1341F	26%	7 % orthoP
1341G	21%	10% orthoP
1341H	26%	0% orthoP



BMAP Area


Turner Creek
Dunnellon
SW Hwy 484
Inglis
Hwy 40 E
W Dunnellon Rd
SW Hwy 200
Co Rd 39
Citrus Springs
US Hwy 98
Co Rd 488
Co Rd 495
US Hwy 41
Holder
Co Rd 491
Withlacoochee River
Felicia
N Citrus Ave
Hwy 98
N Lecanto Hwy
Crystal River
Beverly Hills
Hernando
Co Rd 486
Kings Bay
State Hwy 44
Co Rd 581
Hwy 41 N
Gulf of Mexico
Lecanto
State Hwy 44
SE Hwy 19
W Ozello Trl
Co Rd 490
S Lecanto Hwy
Inverness
State Hwy 44
Crystal River, Kings Bay BMAP Area
Map prepared by Division of Environmental Assessment and Restoration,
This map is not for legal decision making purposes.
[GIS] Benjamin Mittler (850) 245-8547
Map ID: Kings_Bay_BMAP
Created: 07-07-14
N
Cities 2006
BMAP Area
Incorporated Areas
StreamRiver
Waterbody
SwampMarsh
Interstates
U.S. Highway
State Roads
County Roads
Other Roads

Kings Bay Land Use



- Majority of inputs occur within agricultural and urban landscapes
- Nitrogen sources are concentrated in 53% of the BMAP land use

Sources of Nitrogen in BMAP area

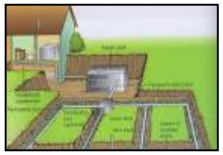
- Atmospheric Deposition

- Fertilizers (cropland, pasture, turfgrass)



- Land application of treated wastewater/ biosolids

- Septic Tanks



- Animal wastes


- Stormwater runoff

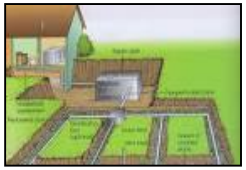
Estimating Nitrogen Loads to Ground Water

A multi-step process:

1. Estimate the inputs of nitrogen to the land surface from the source inventory information (a work in progress).
2. Apply attenuation factors based on the various environmental processes that could transform the various forms of nitrogen in the subsurface (such as denitrification, nitrification of ammonia, uptake by vegetation, mineralization of organic nitrogen).
3. Apply an areal weighting factor that is based on the rate of recharge to ground water to get nitrogen loads to ground water.
4. Account for proximity of N source to spring. Fine-tune estimates after getting feedback from stakeholders.

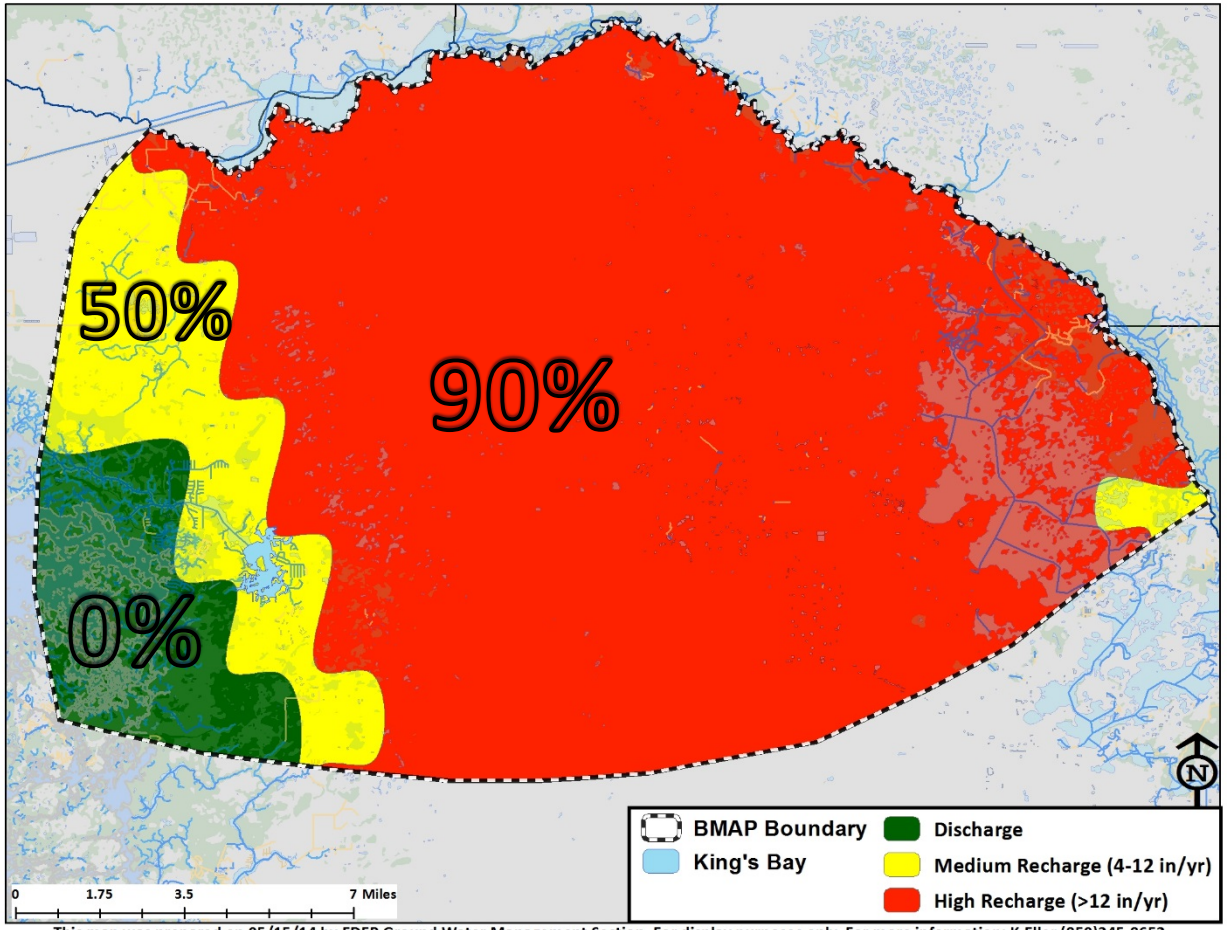







Recharge Factors

- Recharge factors are used to estimate the percentage of the non-attenuated nitrogen expected to reach the aquifer



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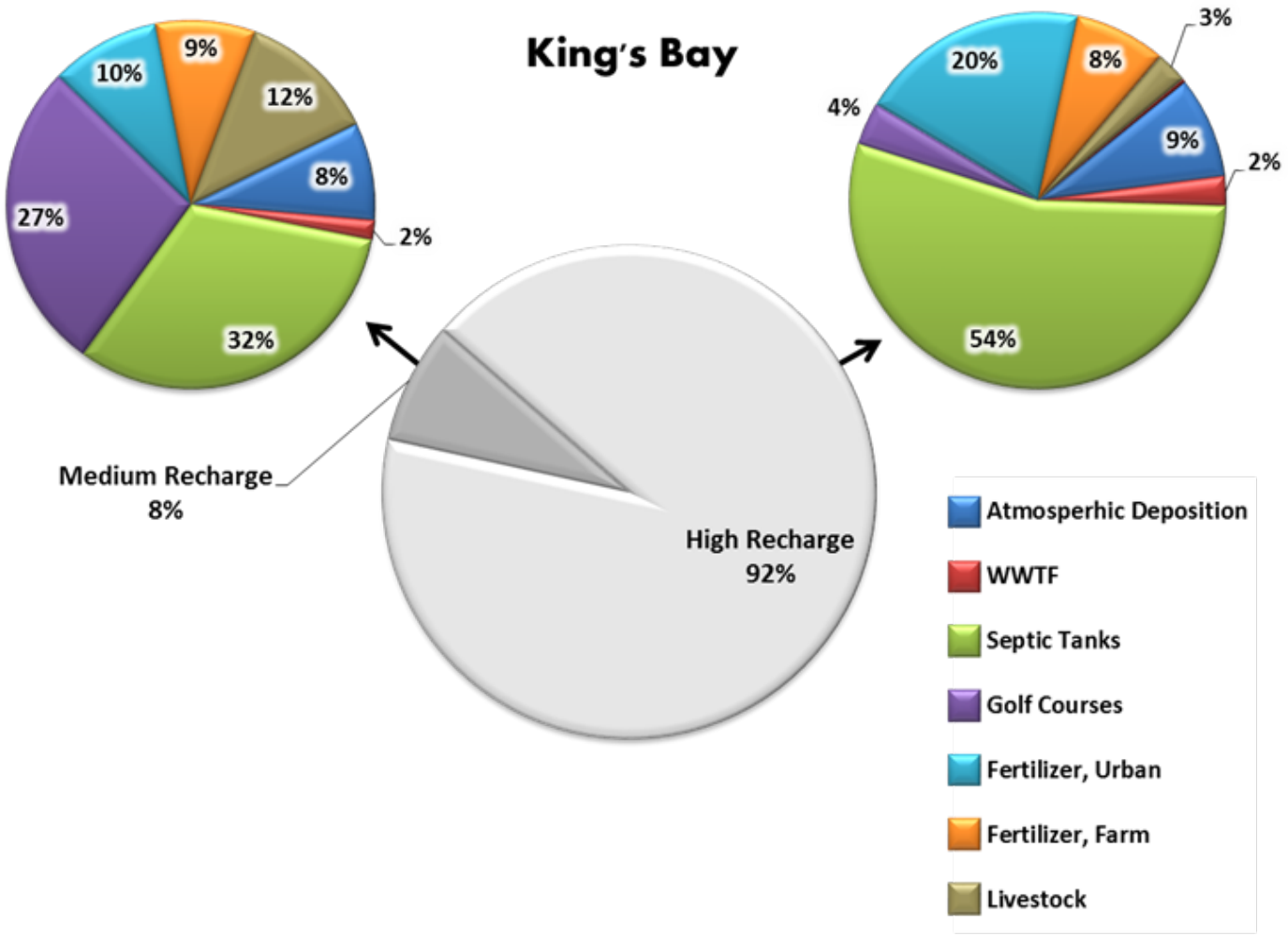
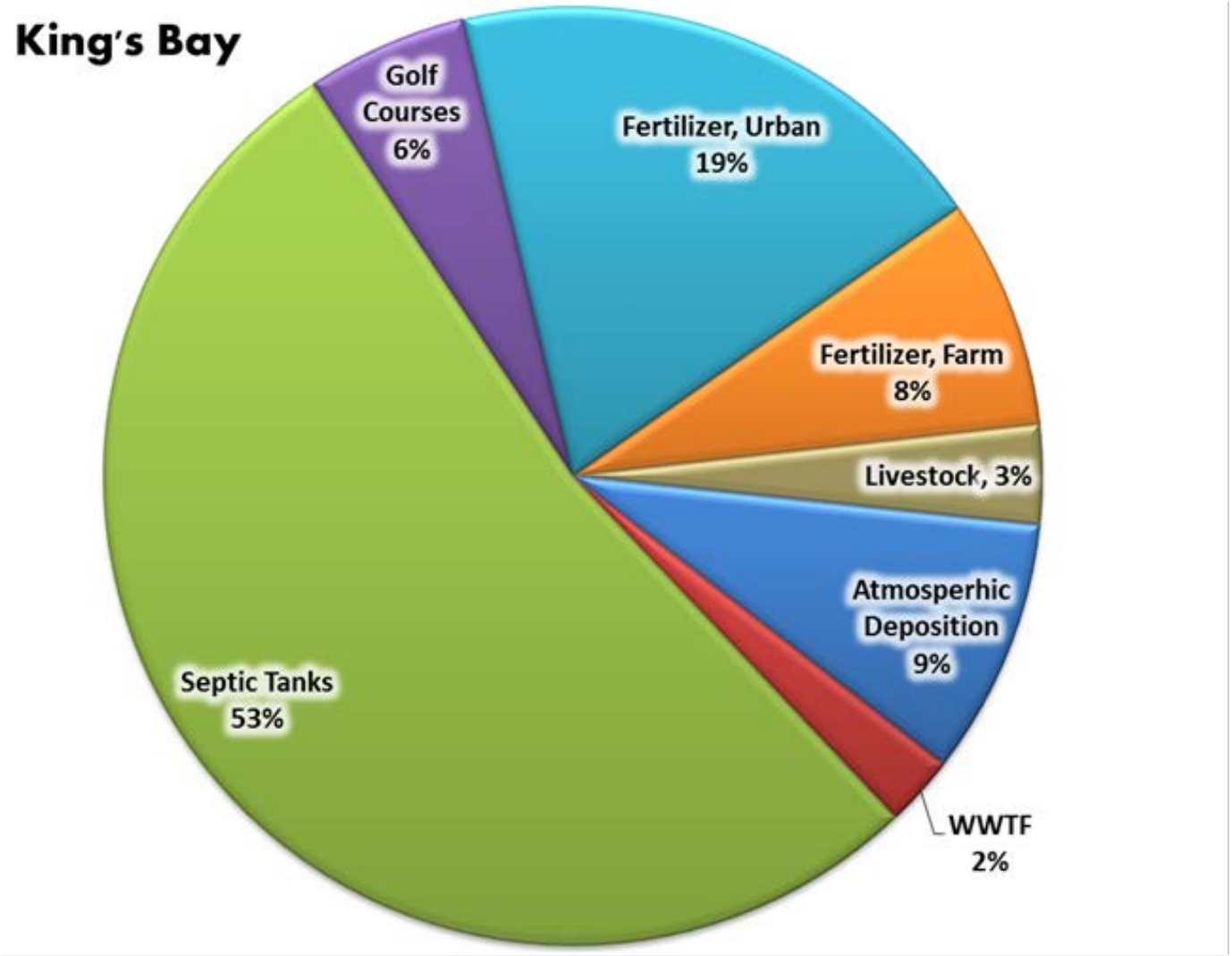
Loading by Recharge Area



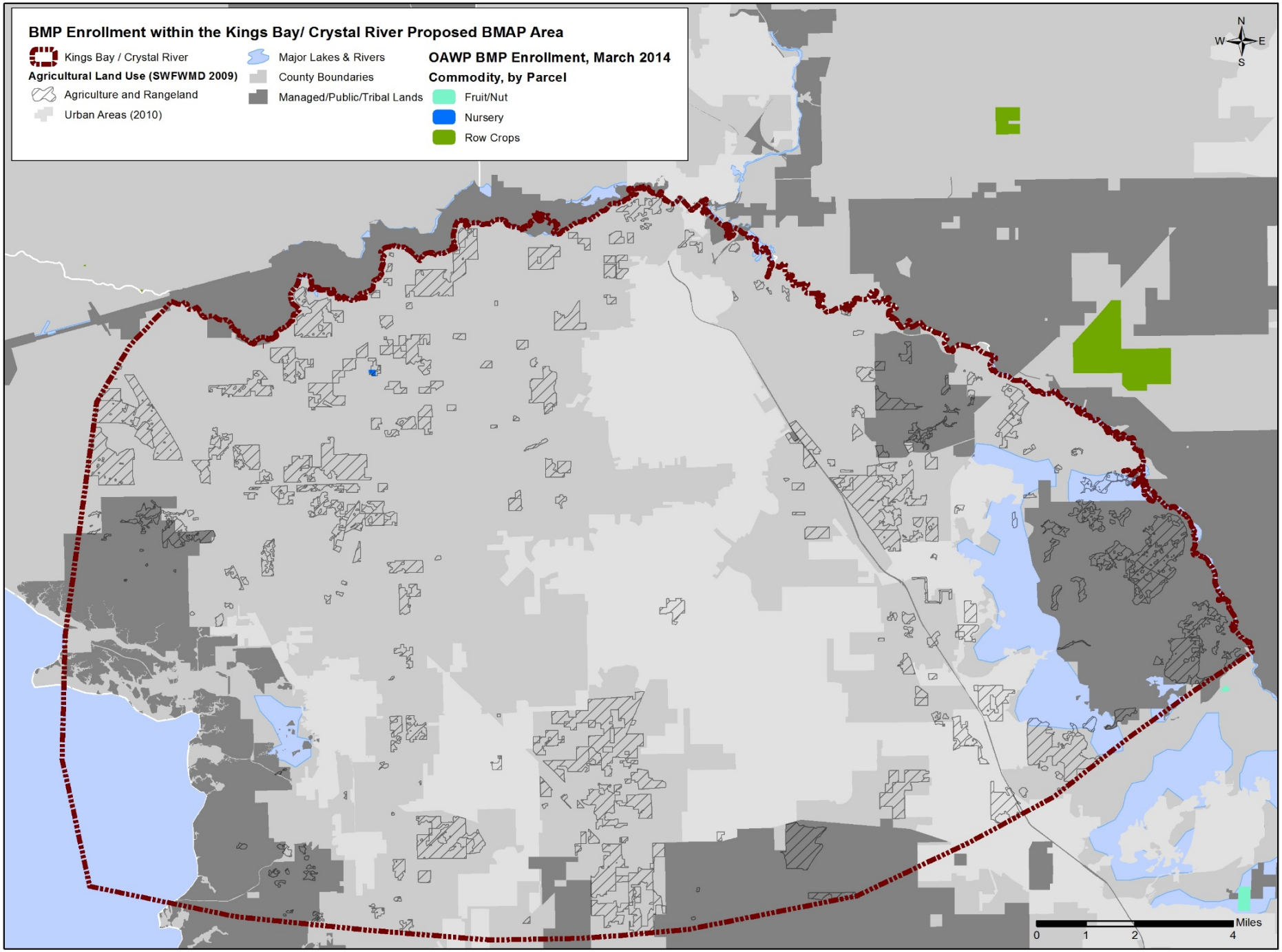
Annual Average Loading to Ground Water



Projects

Major Source Categories

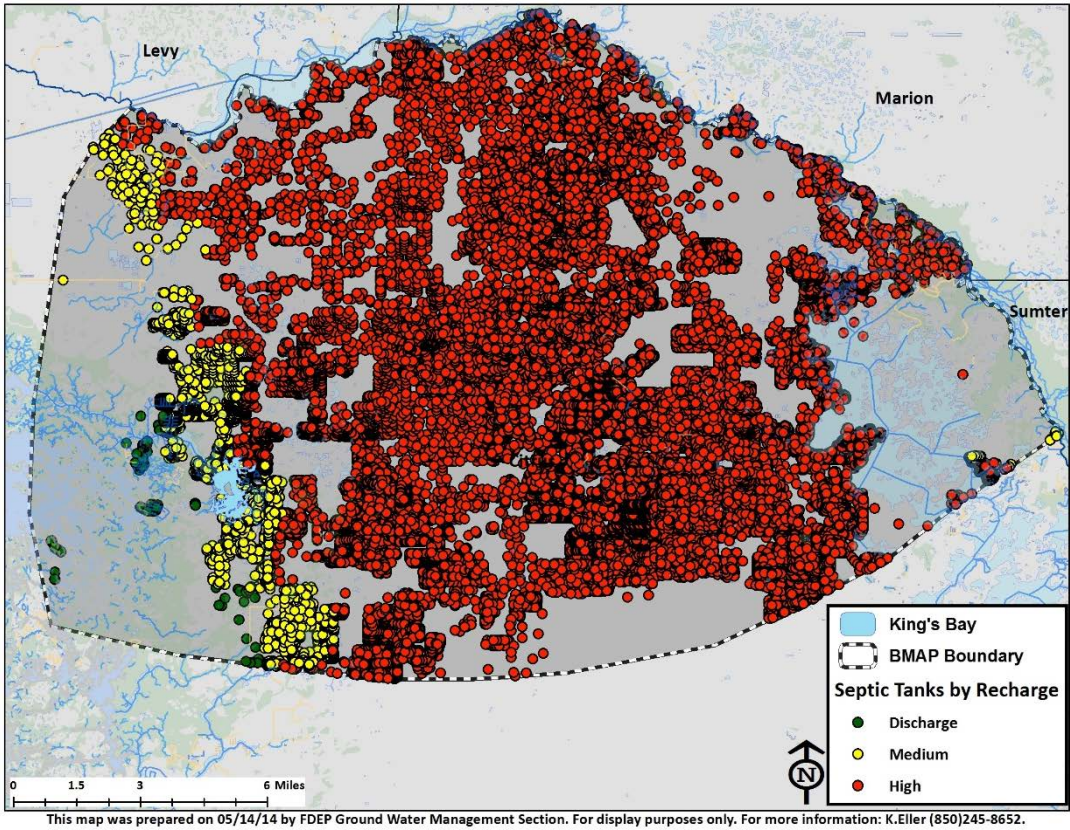
- Agriculture - implement and document BMPs
  - Fertilizer & Livestock
- Urban Fertilizer - Fertilizer ordinance
- WWTF - Projects
- Stormwater - Projects
- Golf Courses
- Septic Tanks


BMP Enrollment within the Kings Bay/ Crystal River Proposed BMAP Area
Kings Bay / Crystal River
Agricultural Land Use (SWFWMD 2009)
Agriculture and Rangeland
Urban Areas (2010)
Major Lakes & Rivers
County Boundaries
Managed/Public/Tribal Lands
OAWP BMP Enrollment, March 2014
Commodity, by Parcel
Fruit/Nut
Nursery
Row Crops
N
W
E
S
Miles
0
1
2
4

Septic Tanks

- DOH model relying on tax parcel data and sewer service areas
- Calculate # of people relying on septic tanks from 2010 Census
  - 2.23 people per household in Citrus County
  - 41,504 tanks in BMAP boundary
- Average annual input to septic tank = 9.92 lb-N/person (FDOH)

Recharge Area	Input to Land Surface (lb-N)
Medium	76,268
High	836,865



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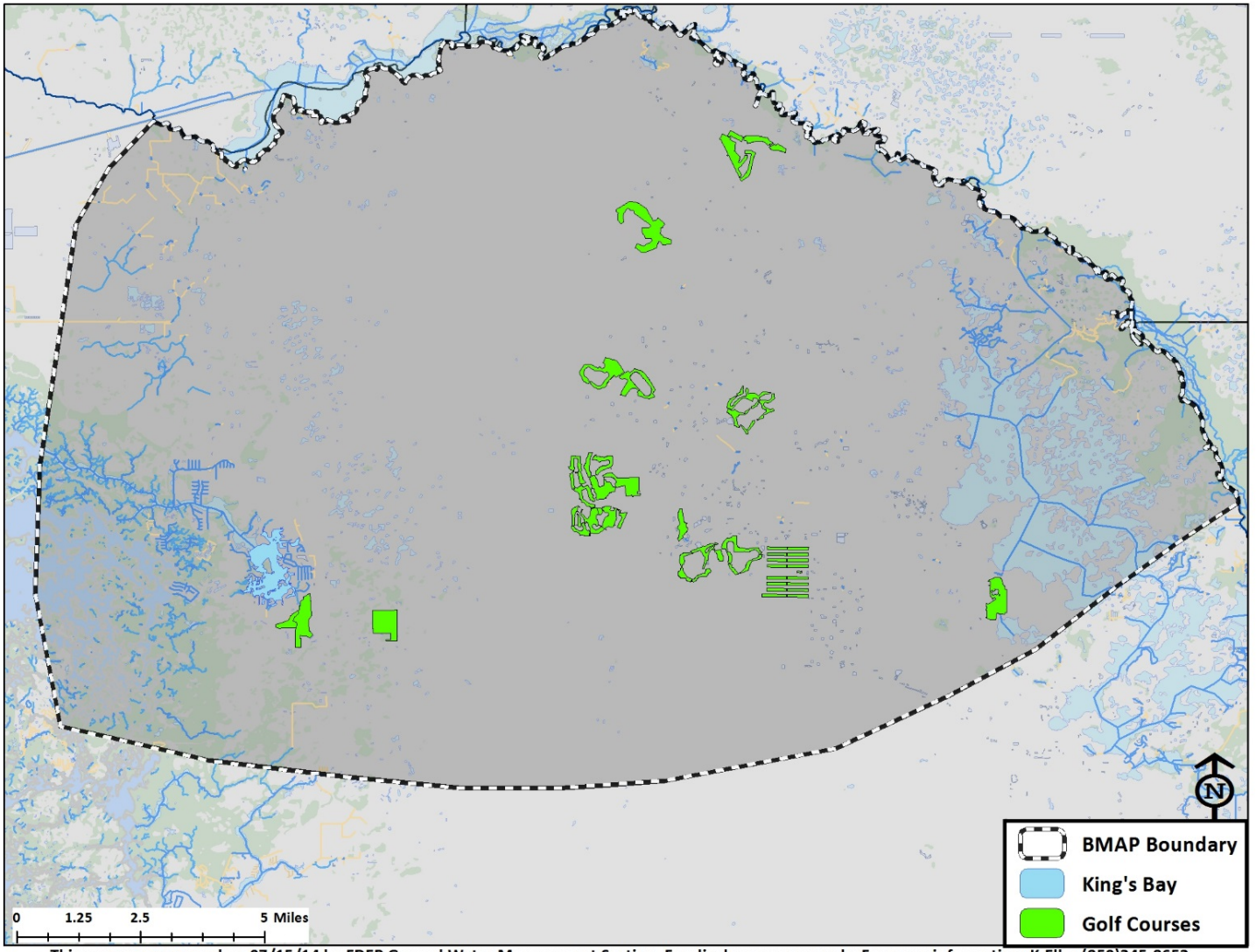
Golf Courses

9 open courses
1 closed course



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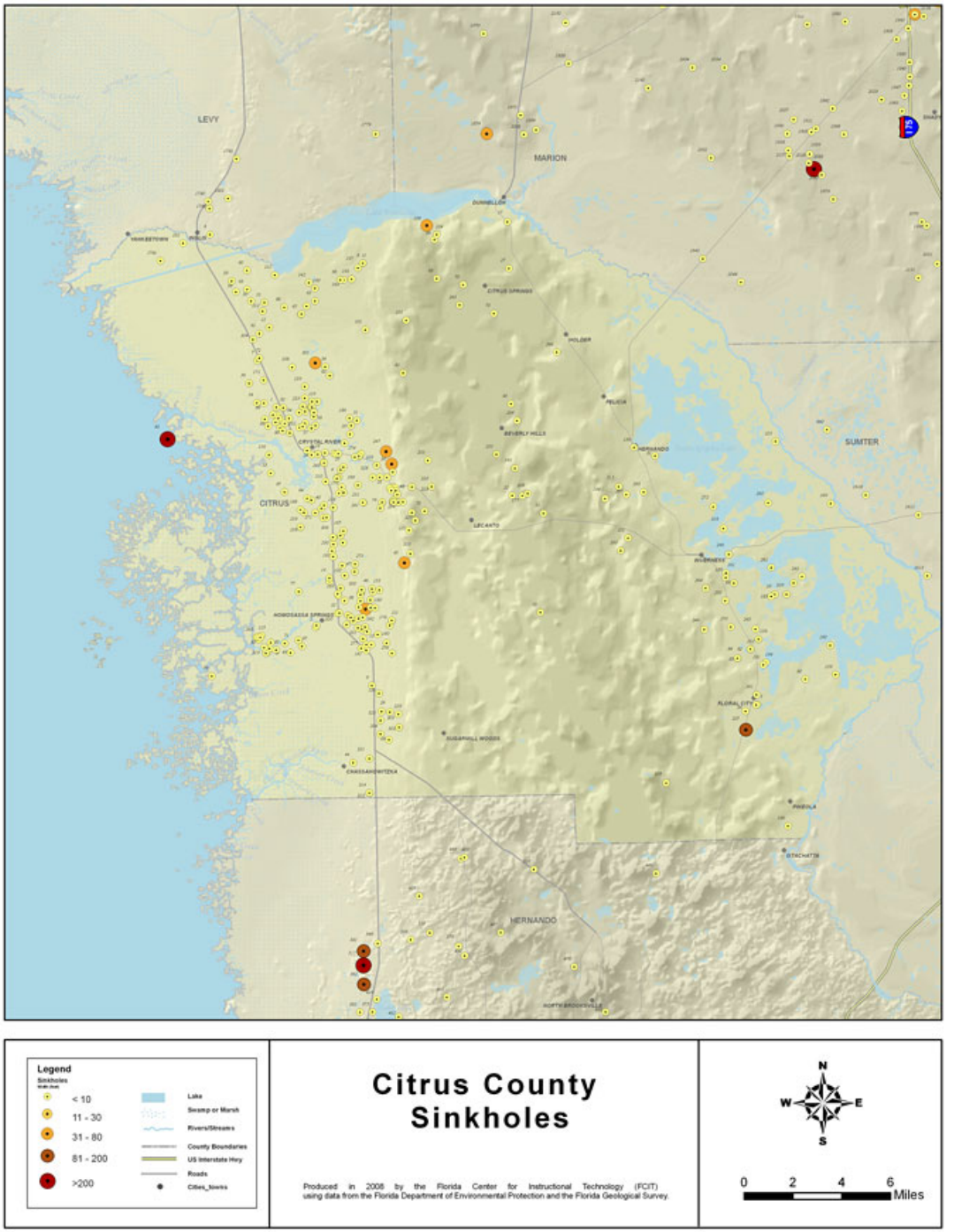
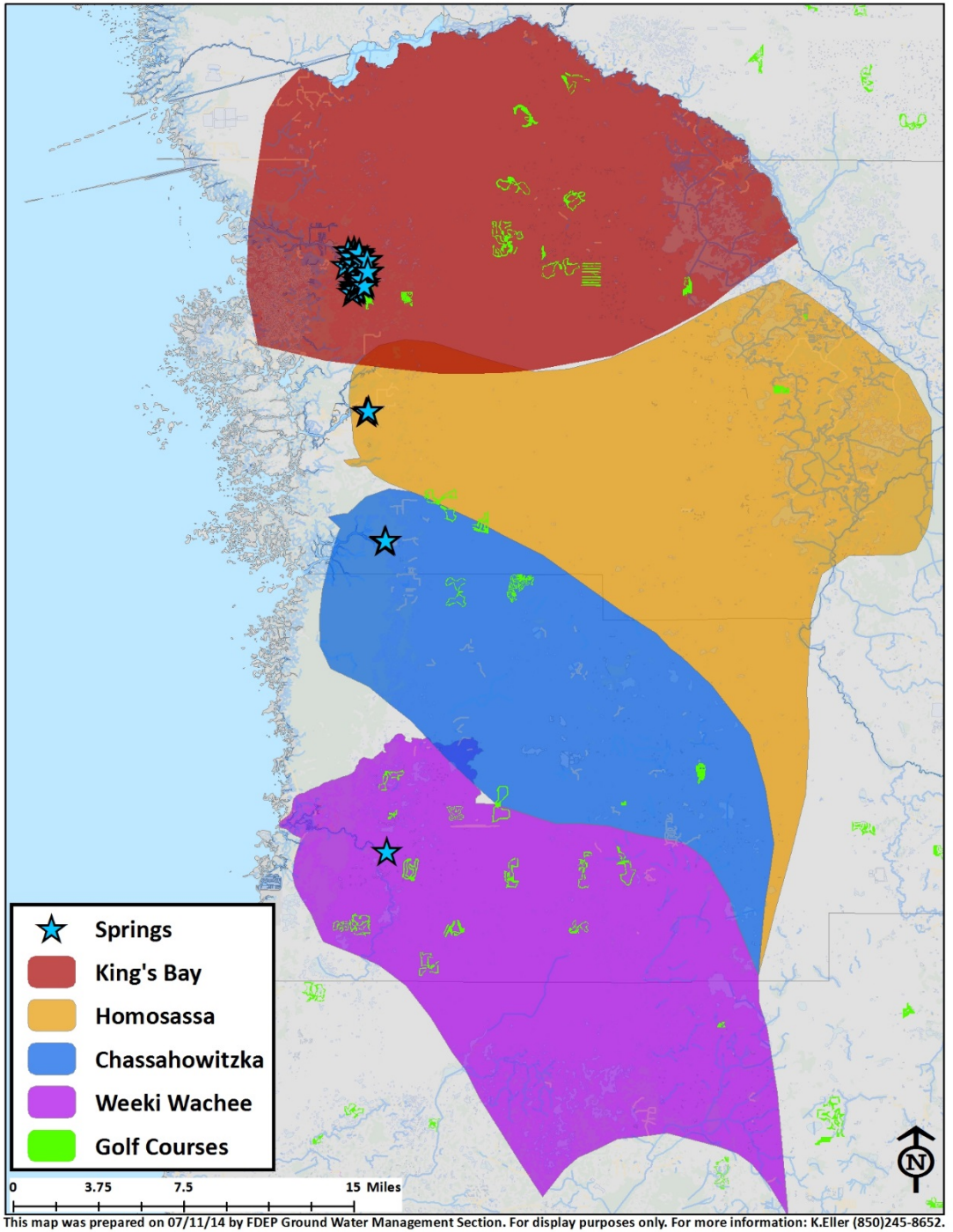
Subsidence Incidents



Springs Coast Golf Courses

Possible Solution (still in development)

- Supervisor certification
- BMP Manual implementation



OSTDS Initiative

Advisory Committee

- FDEP organized
- Representatives
  - FDOH, utilities, government, businesses, homeowners

GOAL - develop & implement management strategies necessary to reduce nutrient loading from OSTDS within realistic timeframe

OSTDS Initiative

Objectives:

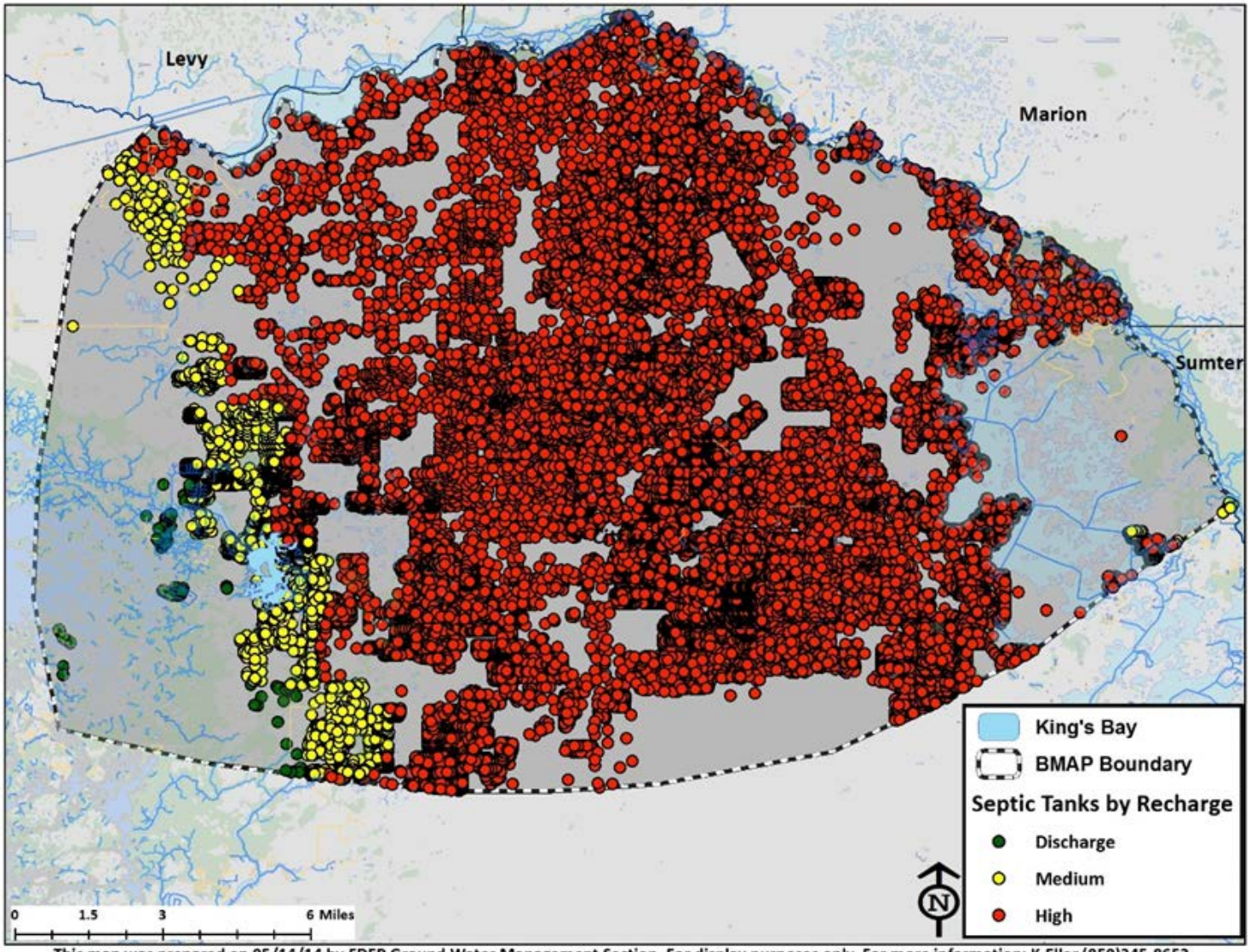
- Scientific Information Collection
- Develop Education Plan
- Identify and develop nutrient reduction projects for OSTDS

Plan:

- Prioritize areas where greatest risk exists
- Determine areas of opportunity (cost/benefit ratio)

Funding Dependent

Crystal River Septic Tanks



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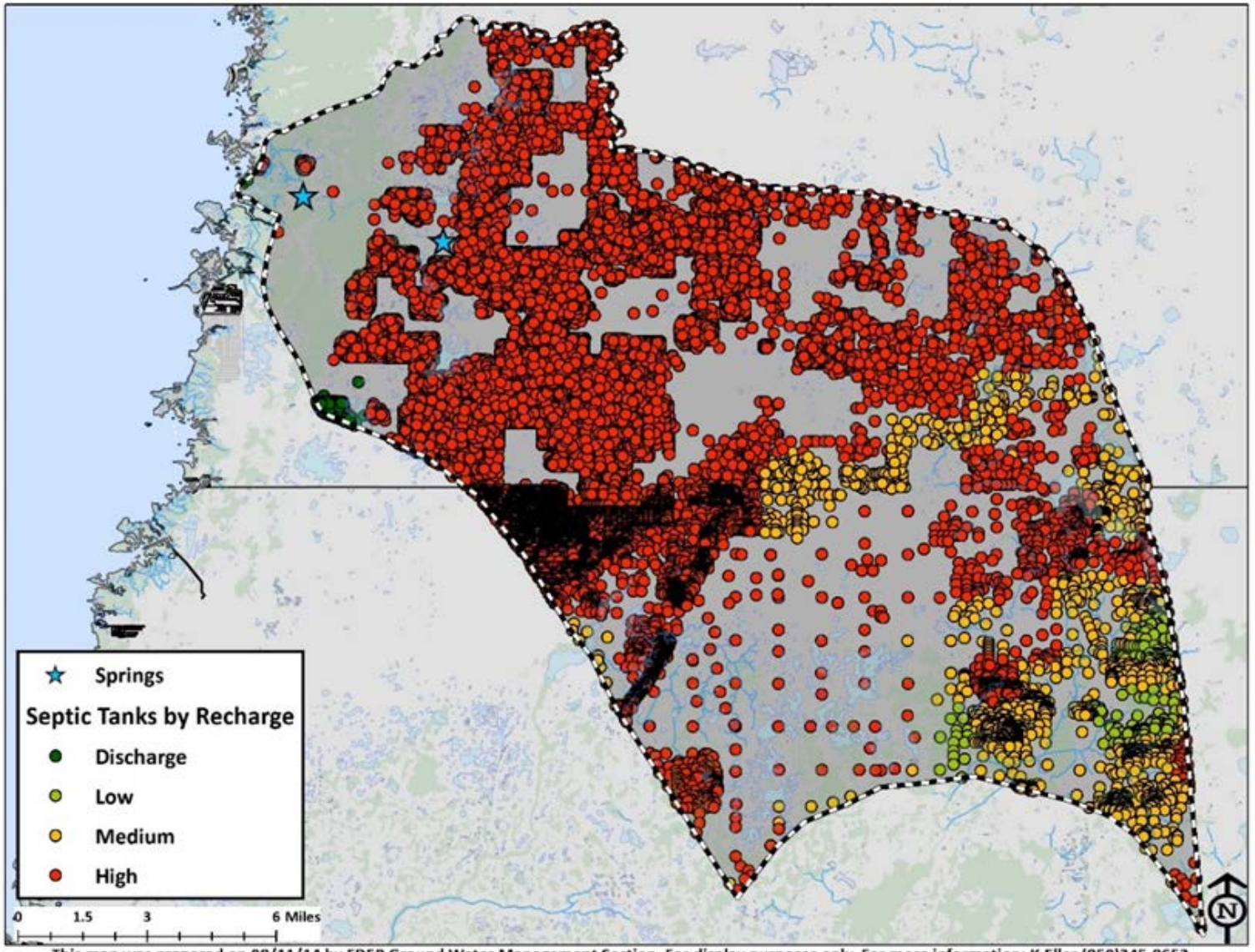
Weeki Wachee Septic Tanks



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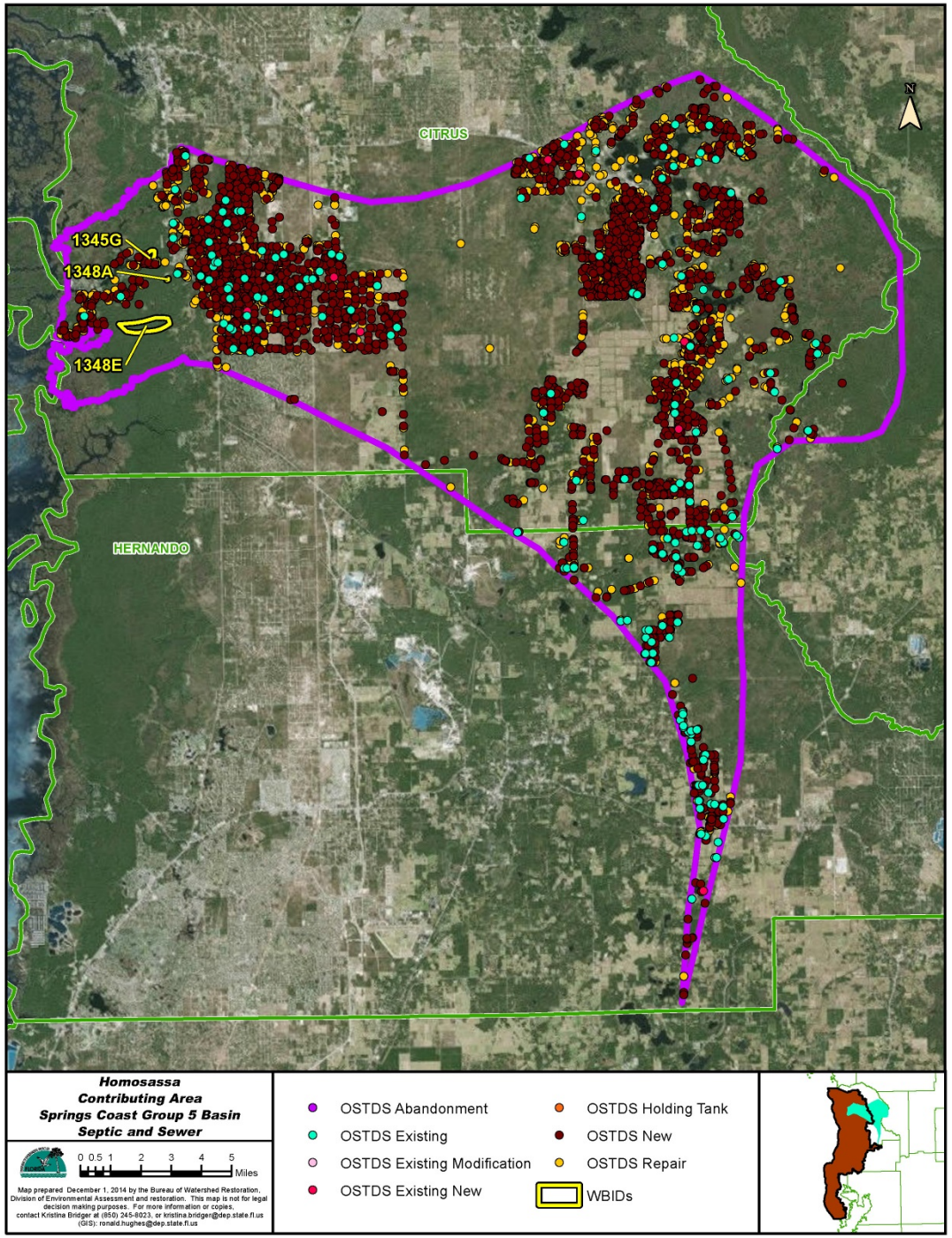
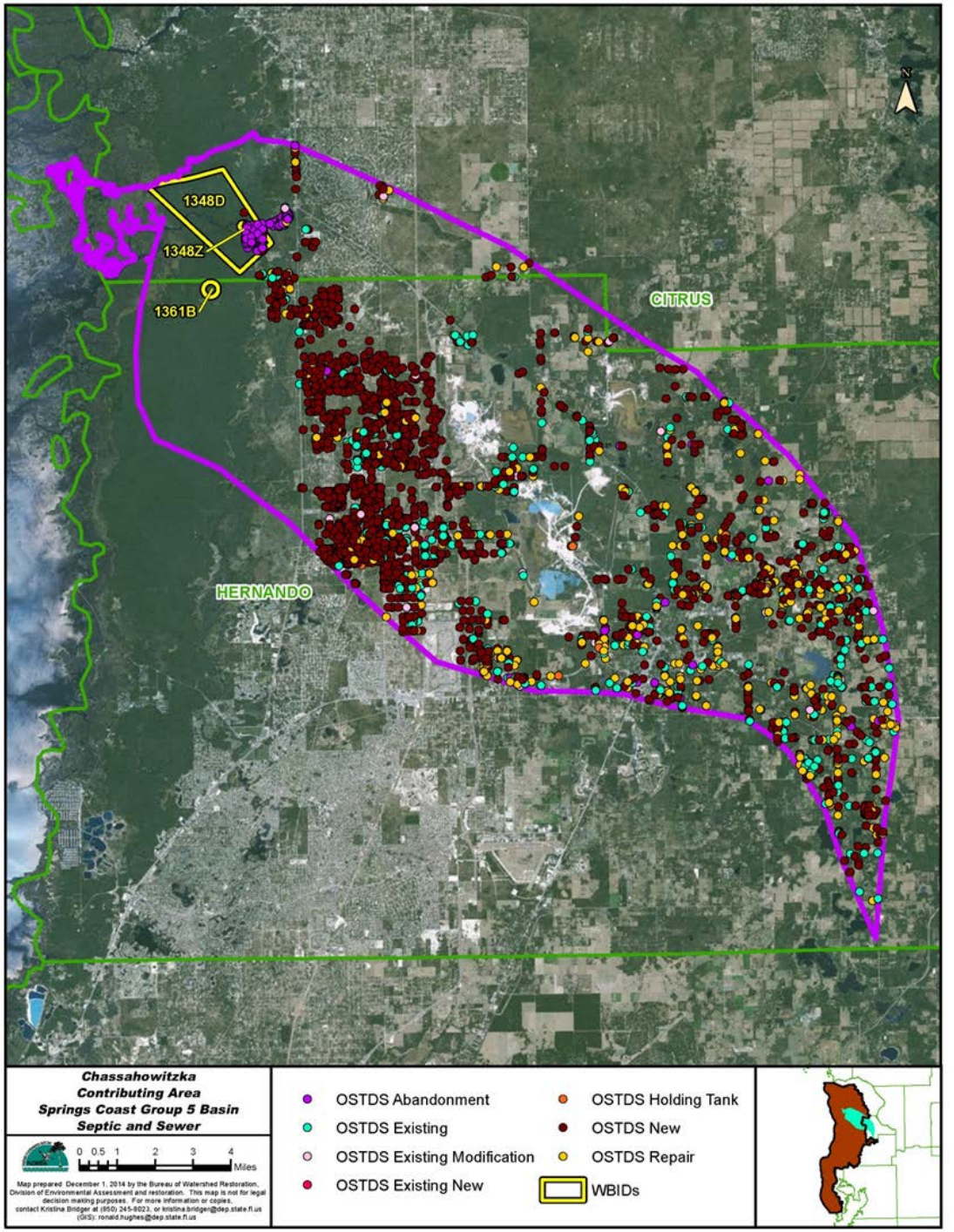
Homosassa Septic Tanks



Chaz Septic Tanks



Basin Management Action Plan

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