Wekiva River Basin Commission

Onsite Sewage Nitrogen Study

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Nitrogen Reduction Options for Septic Systems

History

Nitrogen levels in springs have increased, harming our environment and economy. Septic systems are one of several sources of nitrogen. We have conducted research looking at how much nitrogen comes from septic systems and ways to reduce that contribution. The results of our research provide options that can be used at the local level to address nitrogen from septic systems.

Photo Credit: State Archives of Florida, *Florida Memory*, http://floridamemory.com/items/show/8905

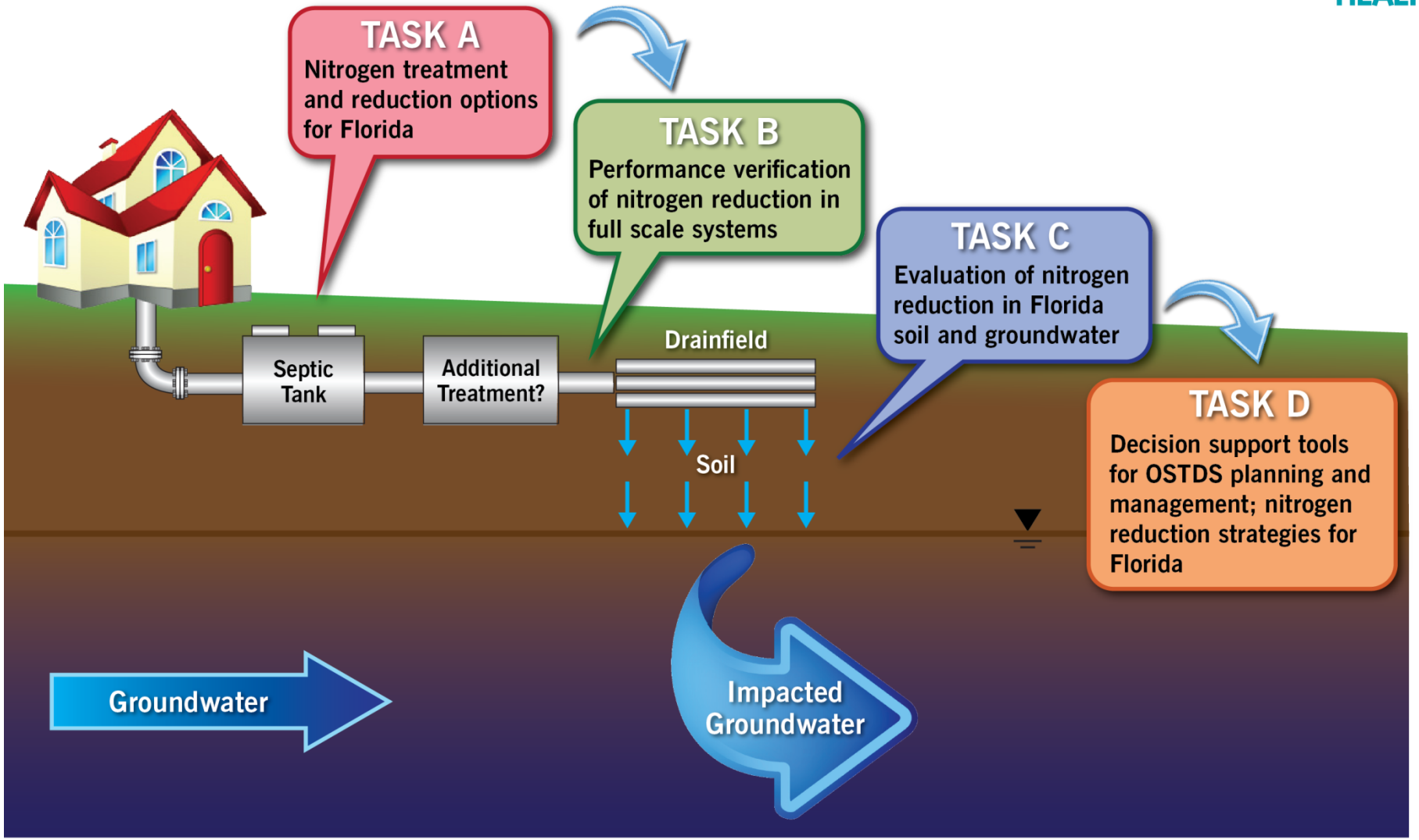
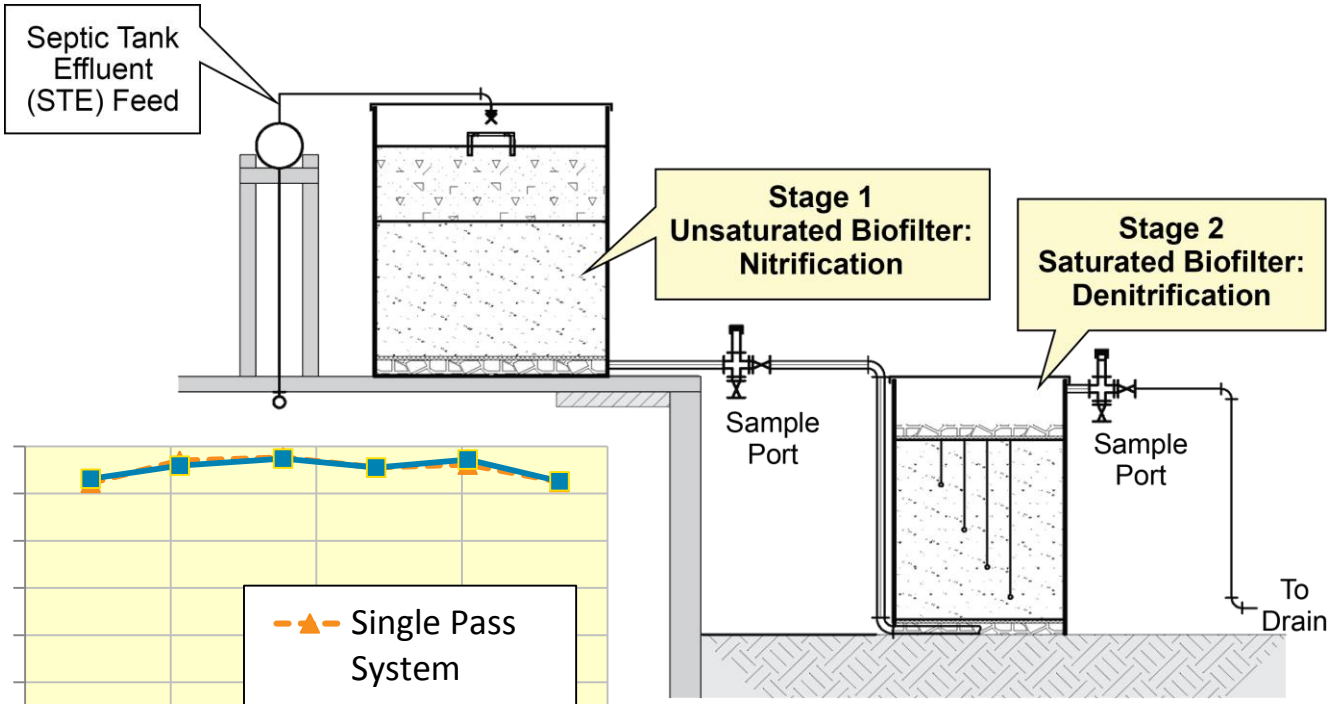


Image Credit: Hazen and Sawyer

Test Facility



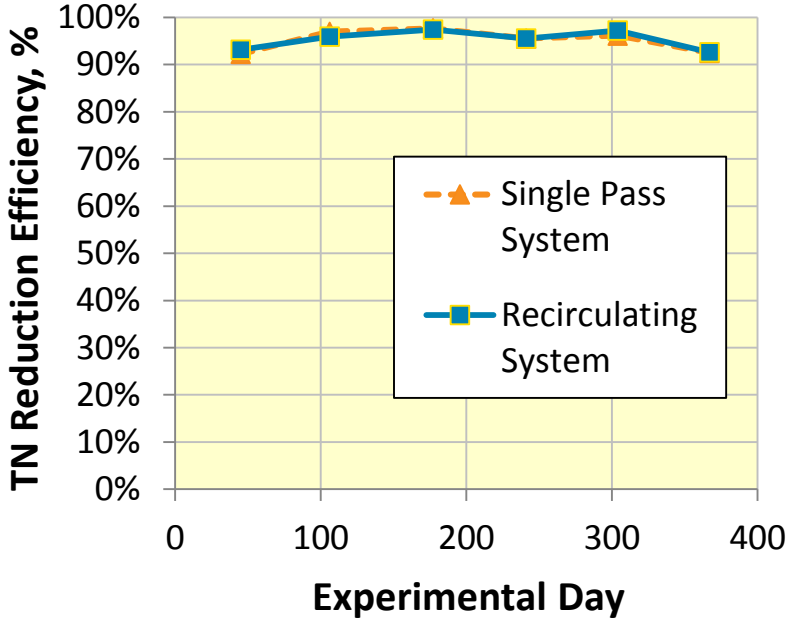
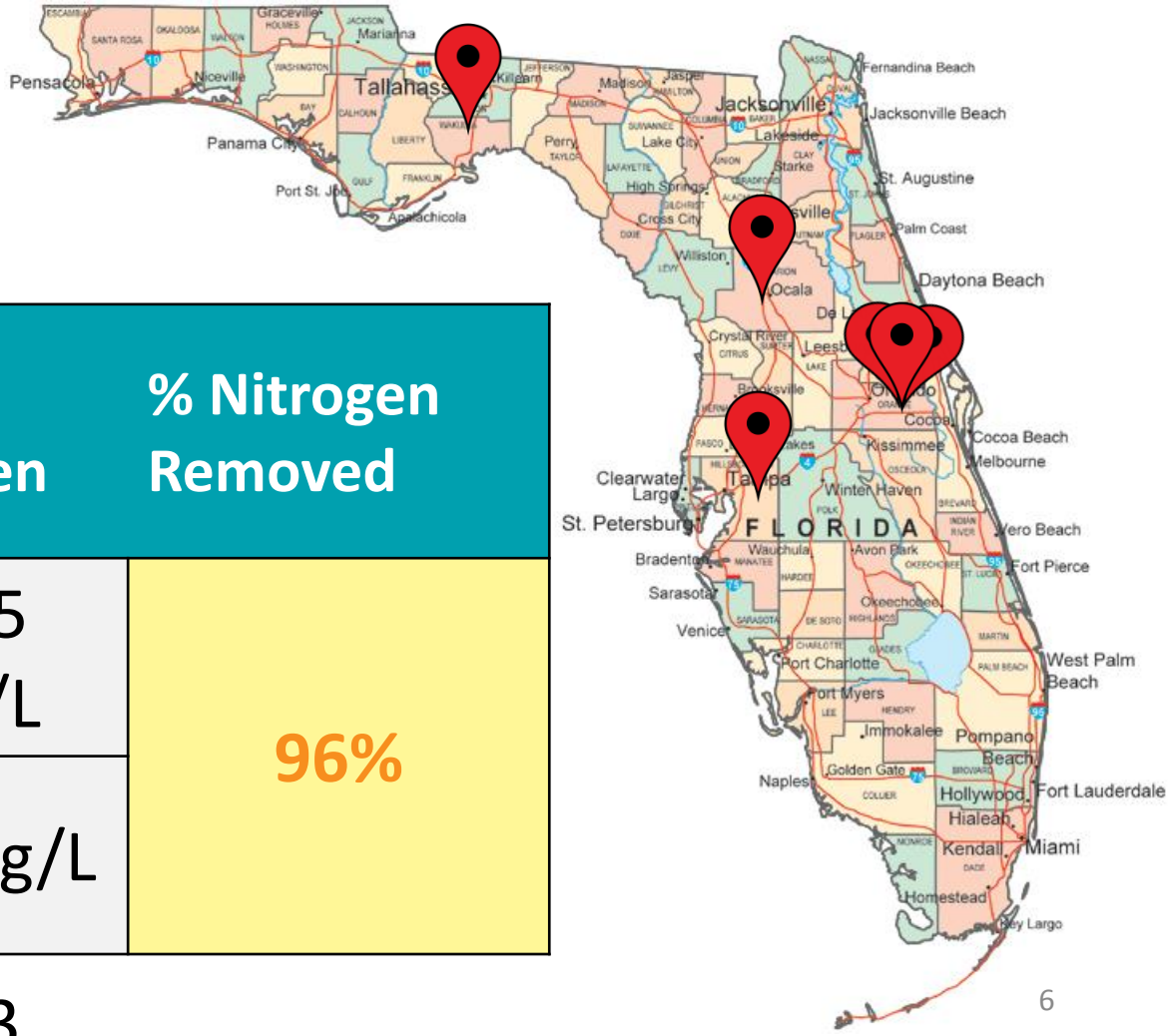


Image Credit: Hazen and Sawyer

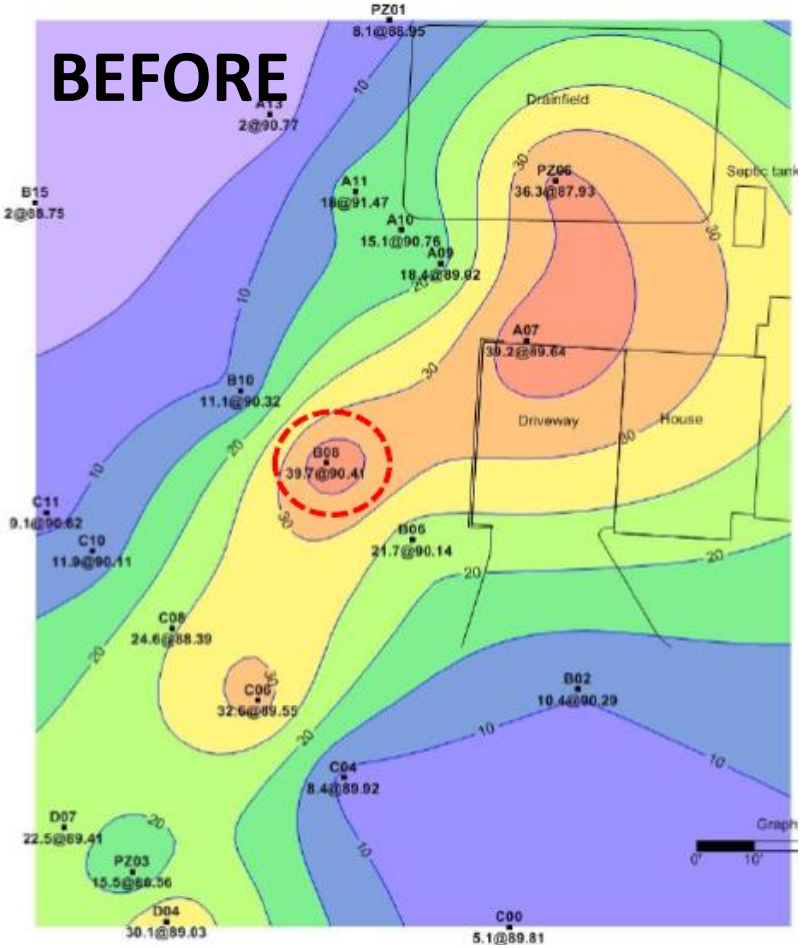
Nitrogen Reduction at Field Sites



Results from Seminole County field site:	Total Nitrogen	% Nitrogen Removed
Wastewater **Before**	50.5 mg/L	**96%**
Wastewater **After**	1.9 mg/L	

n = 13

Case Study: Groundwater Monitoring



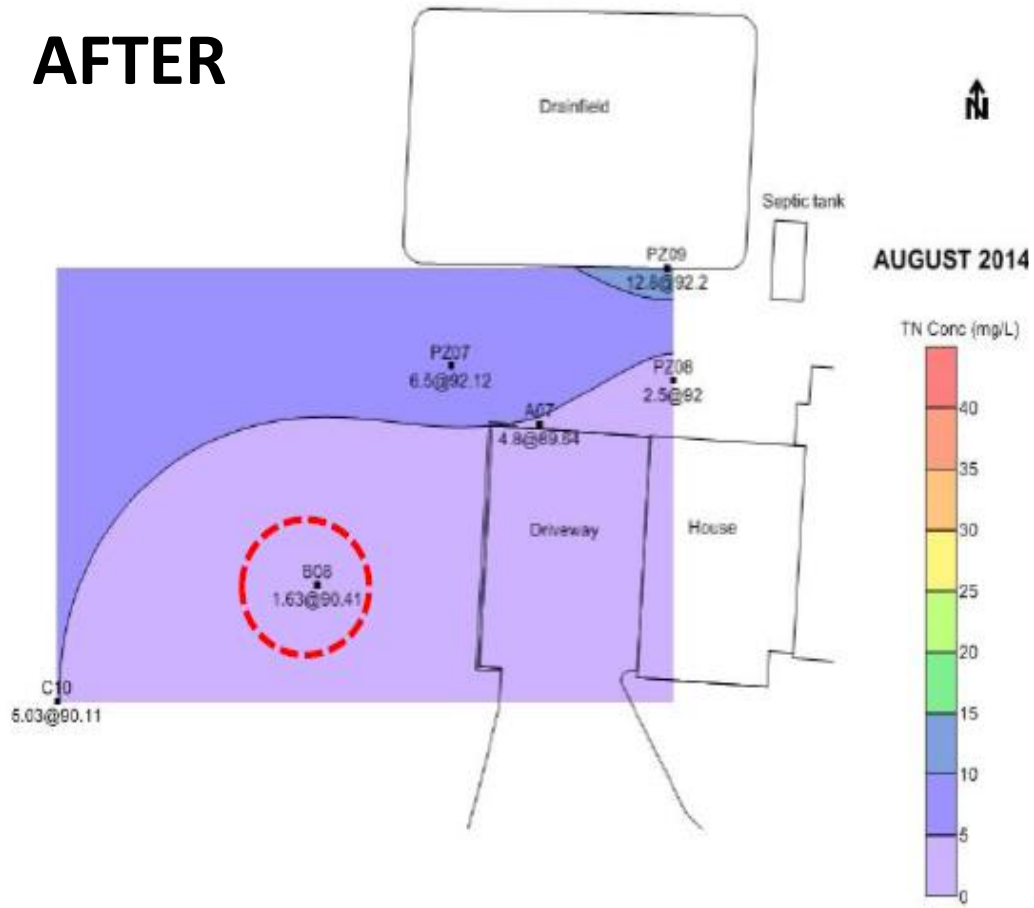


Image Credit: Hazen and Sawyer

Lined Drainfield

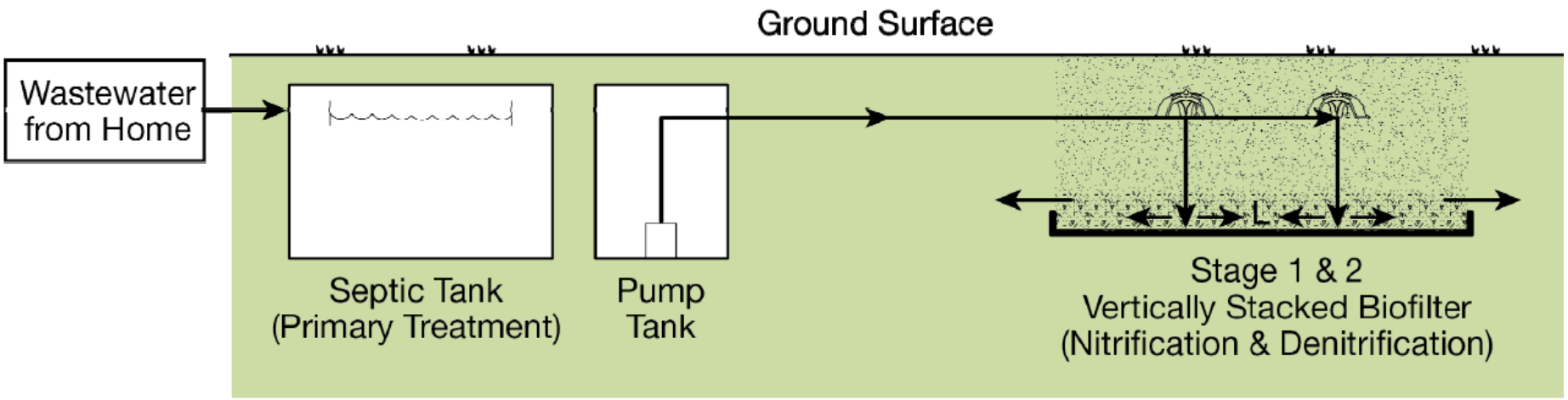


Image Credit: Hazen and Sawyer

Description: Engineer-designed nitrogen-reducing liner beneath a conventional drainfield.

Benefit: Low-cost alternative to other performance-based nitrogen-reduction systems. Requires no operating permit or maintenance contract.

Nitrogen Model

STUMOD

Vadose zone inputs | Vadose zone outputs | Sat. zone inputs | Sat. zone outputs | STUMOD-HPS | Multi-sites I | Multi-sites II | Sensit | CFD I | CFD II

Choose soil type ? Help Caution! Default values ?

Effluent concentration ?

Hydraulic loading rate ?

Treatment depth ?

Soil temperature ?

ET & plant uptake ?

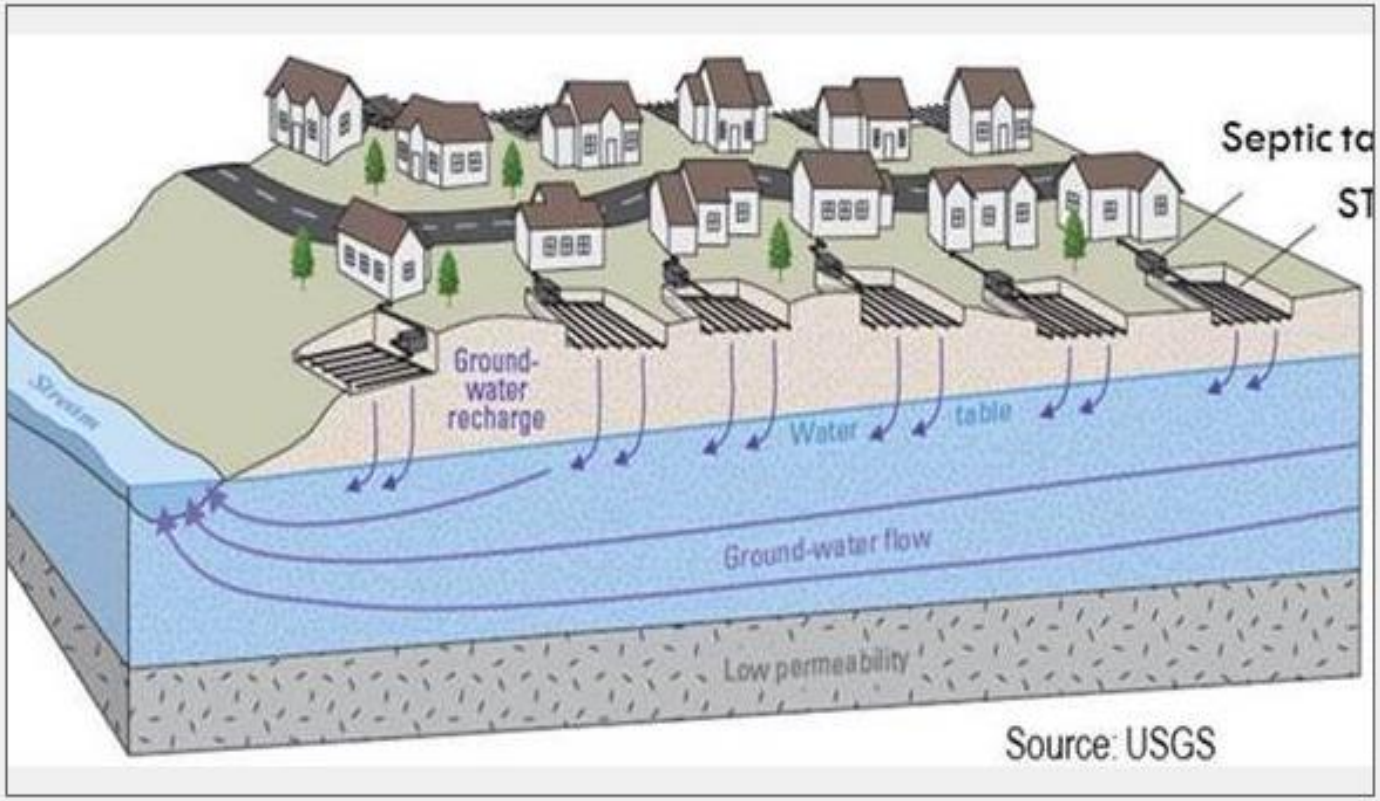
Carbon content functi ?

Select # of soil Layers

No. of Layers ?

Soil type layer 2

Soil type layer 3



Run STUMOD Close

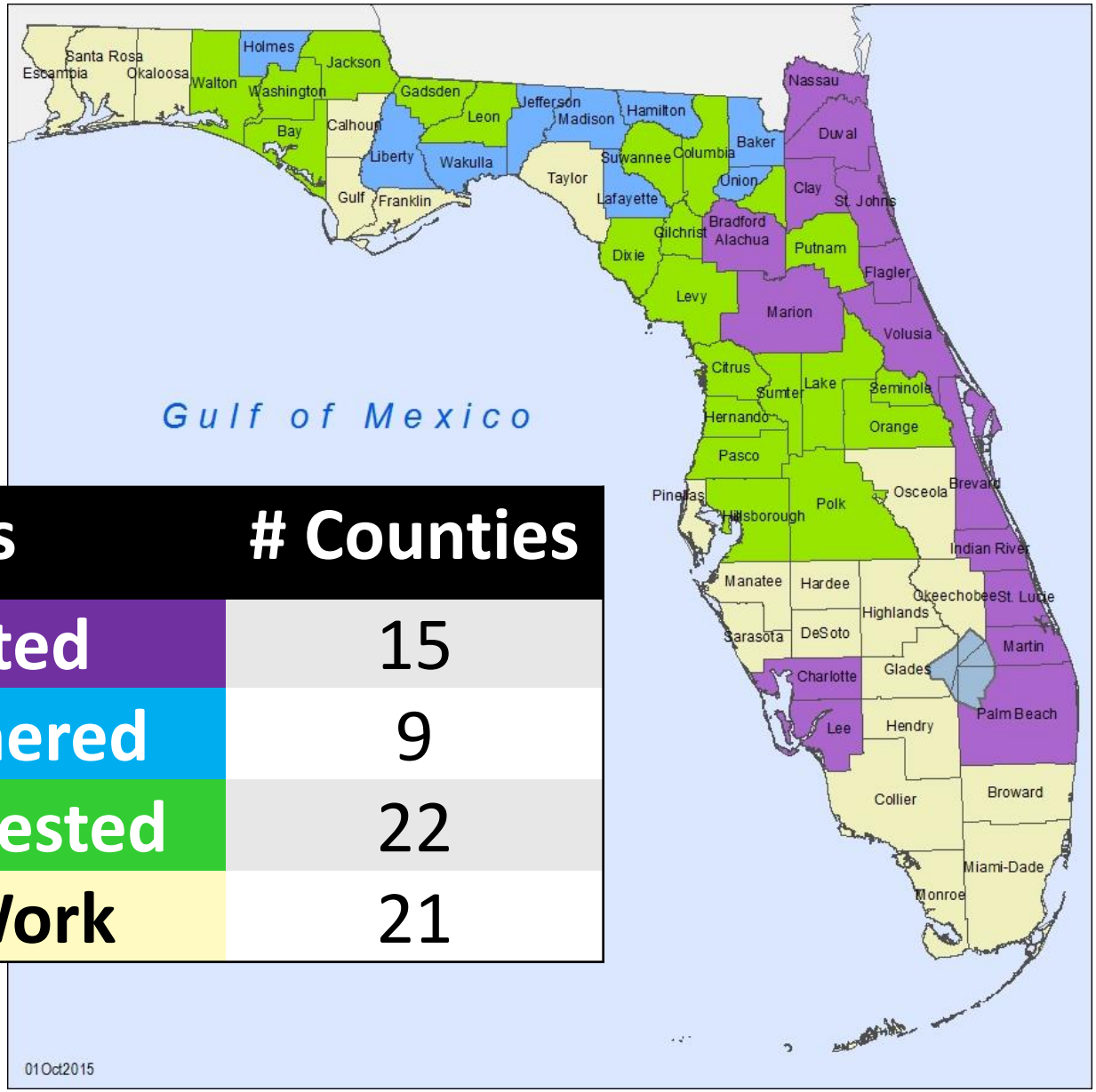
Image Credit: Colorado School of Mines

http://floridahealth.gov/FLWMI

GOAL:

Map the drinking water source and wastewater treatment method for every built property in Florida

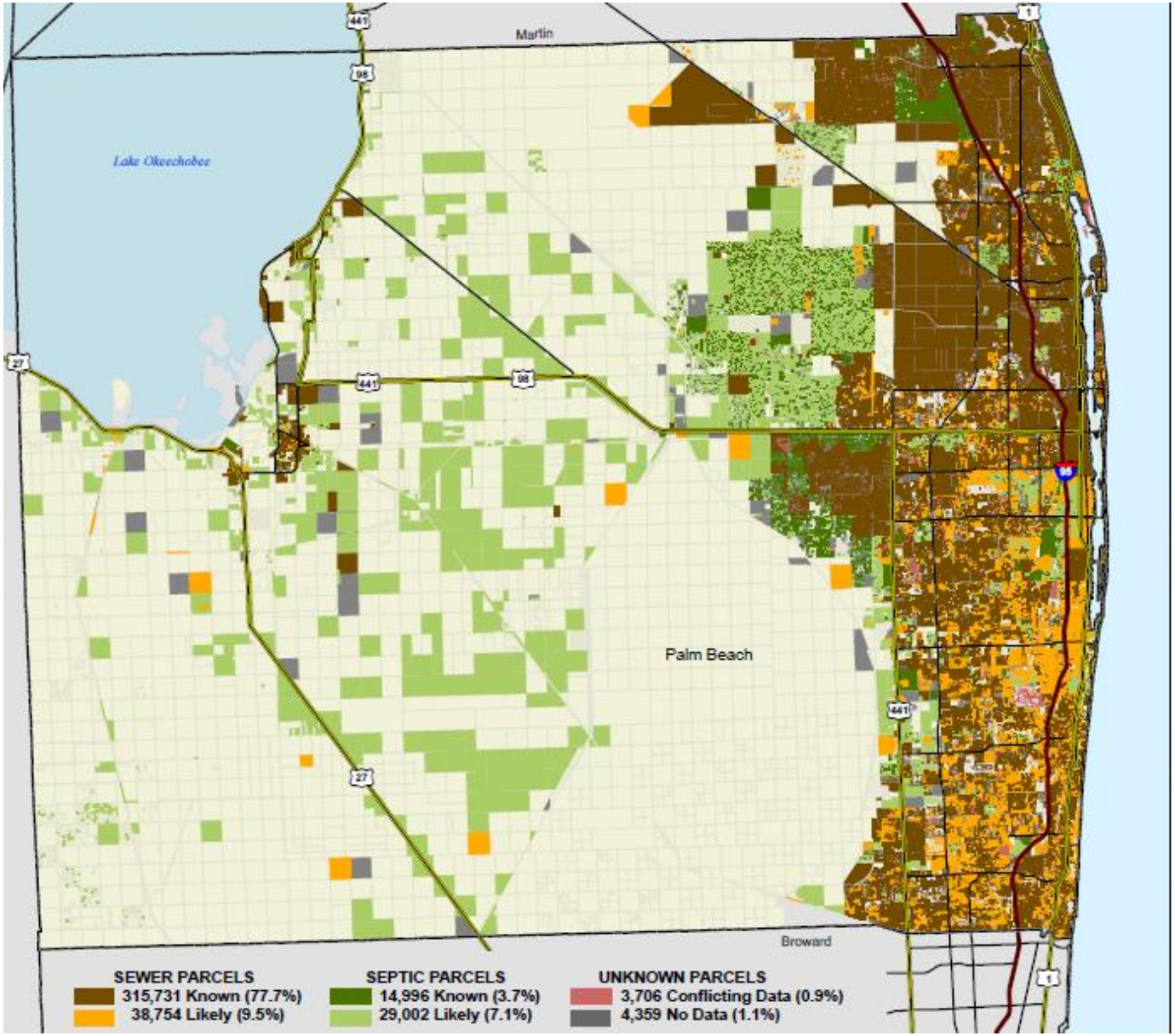
Florida Water Management Inventory

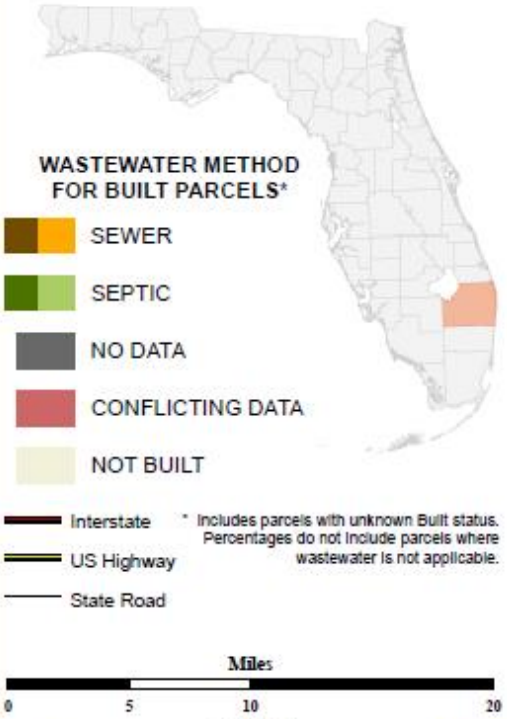


Status	# Counties
Completed	15
Data Gathered	9
Data Requested	22
Future Work	21

Florida Water Management Inventory

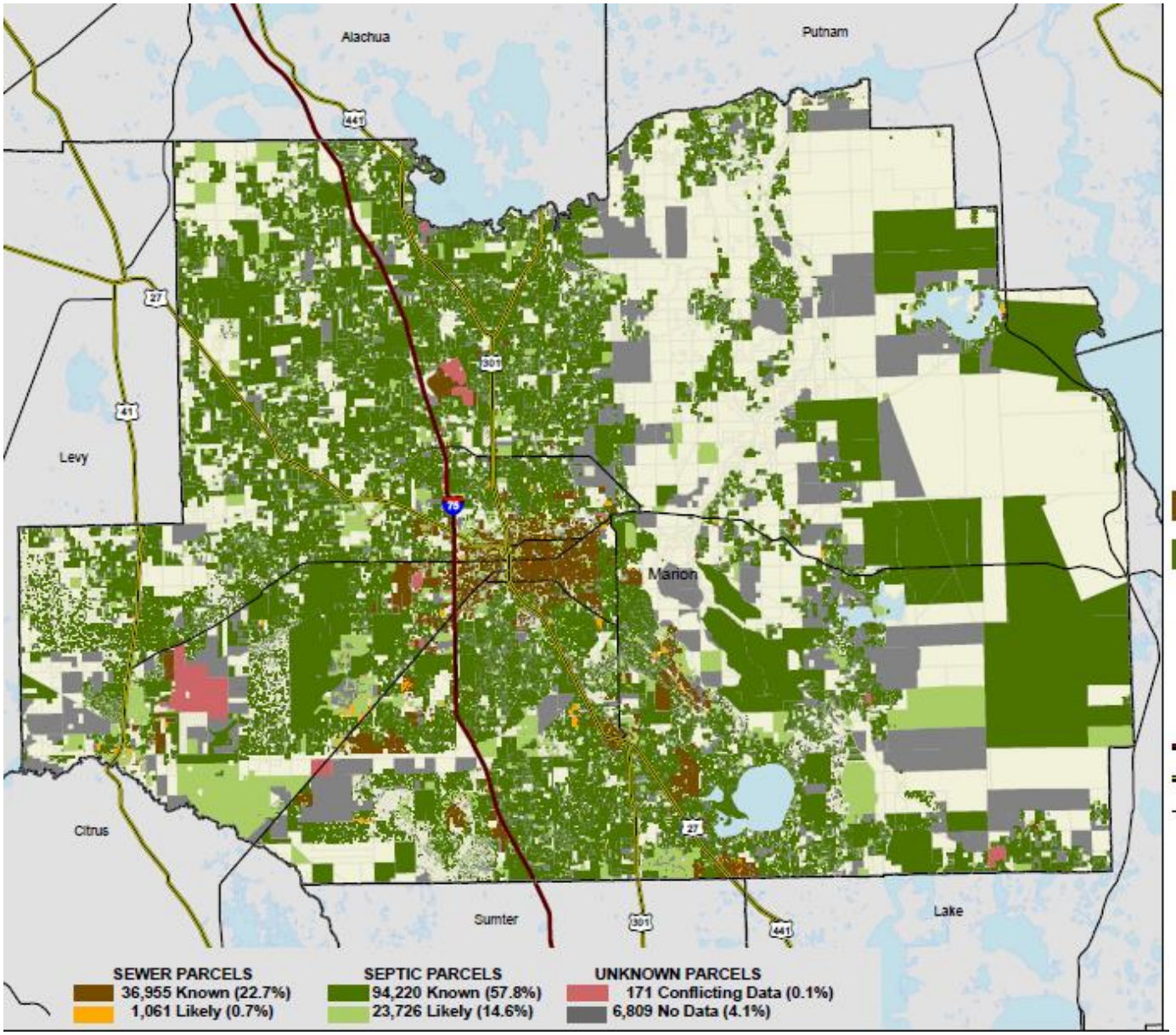
Palm Beach County Wastewater 2015

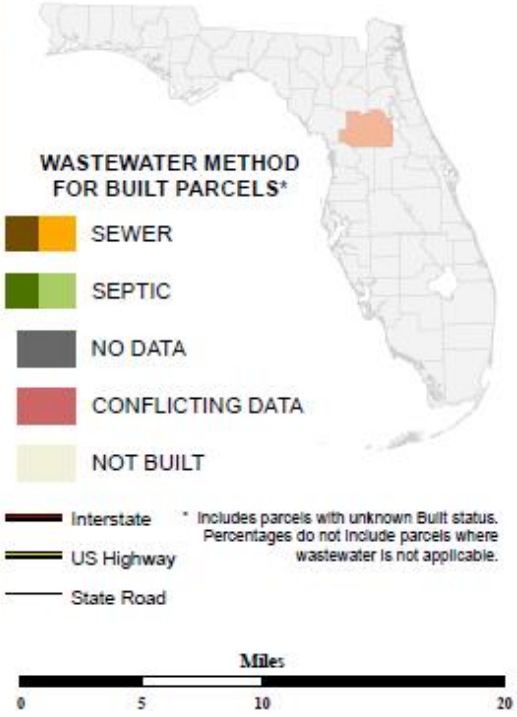




Florida Water Management Inventory

Marion County Wastewater 2015



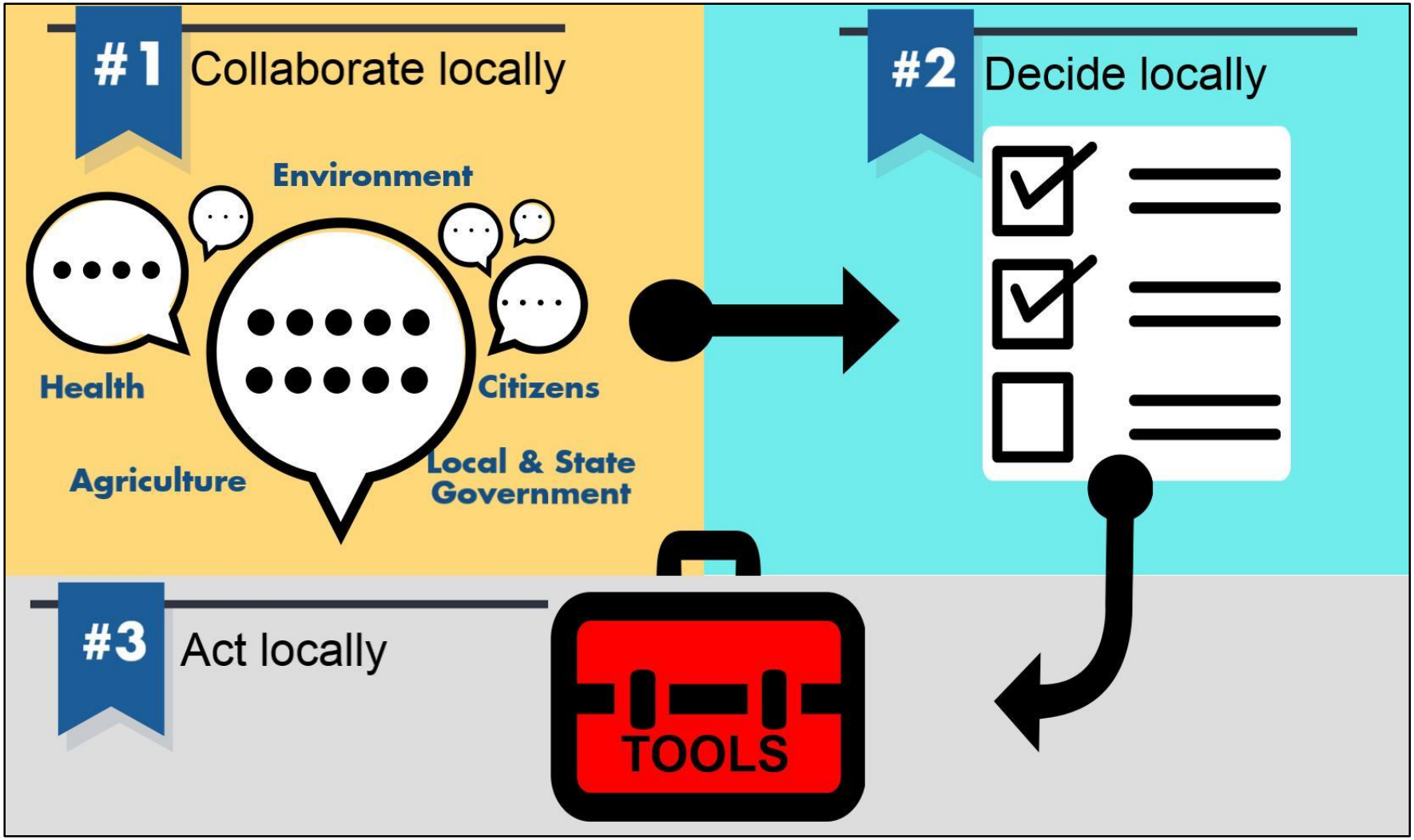


Final Department Report Due 12/31/2015 Containing:

1. Analysis of field monitoring of performance and cost of technologies
2. Analysis of soil and groundwater sampling to determine how nitrogen moves
3. Analysis to show how nitrogen is affected by treatment in Florida-specific soils
4. Final reporting on all tasks with recommendations for science-based nitrogen reduction options for septic systems

Implementation Plan:

Goal: Make tools available to reduce nitrogen contributions from septic systems


#1 Collaborate locally
Environment
Health
Citizens
Agriculture
Local & State Government
#2 Decide locally
#3 Act locally
TOOLS

PLAN

- Inventory locations
- Estimate loading
- Determine costs

TEACH

- Public meetings
- Education campaigns
- Train installers & inspectors

BUILD

- Conventional systems
- Lined drainfield & existing technologies
- Nitrogen reduction systems

1

Implementation Plan

Approve baseline conventional septic system enhanced for nitrogen reduction (lined drainfield)

Requires rule change

Status: Evaluation by Technical Review and Advisory Panel on October 22, 2015

2

Implementation Plan

Incorporate nitrogen study systems as approved performance-based systems

Requires development of system specifications

Status: Being developed, with target implementation in December 2015

3

Implementation Plan

Develop new nitrogen reducing systems section in Florida Administrative Code Chapter 64 E-6

Requires rule and possibly statute changes

Status: Requires multiple public meetings, with target implementation in September 2016

4

Implementation Plan

Provide public education and training on nitrogen reduction strategies

Requires training development and message standardization

Status: Ongoing

5

Implementation Plan

Share planning-level tools to assess nitrogen reducing strategies (inventory, model)

Requires coordination with local stakeholders

Status: Ongoing

6

Implementation Plan

Determine funding solutions for nitrogen reduction efforts

Requires coordination with Department of Environmental Protection and local stakeholders

Status: Pending

Basin Management Action Plan (BMAP) Activities

BMAPs with significant septic system contributions are planned to have an advisory committee focused on developing locally appropriate solutions.

Three-pronged approach:

1. Projects
2. Research
3. Education

Seeing Silver Springs in glass bottom boats

Photo Credit: State Archives of Florida, *Florida Memory*, http://floridamemory.com/items/show/161202

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