Weeki Wachee BMAP

# Recognizing the Role of Onsite Wastewater

July 19, 2016

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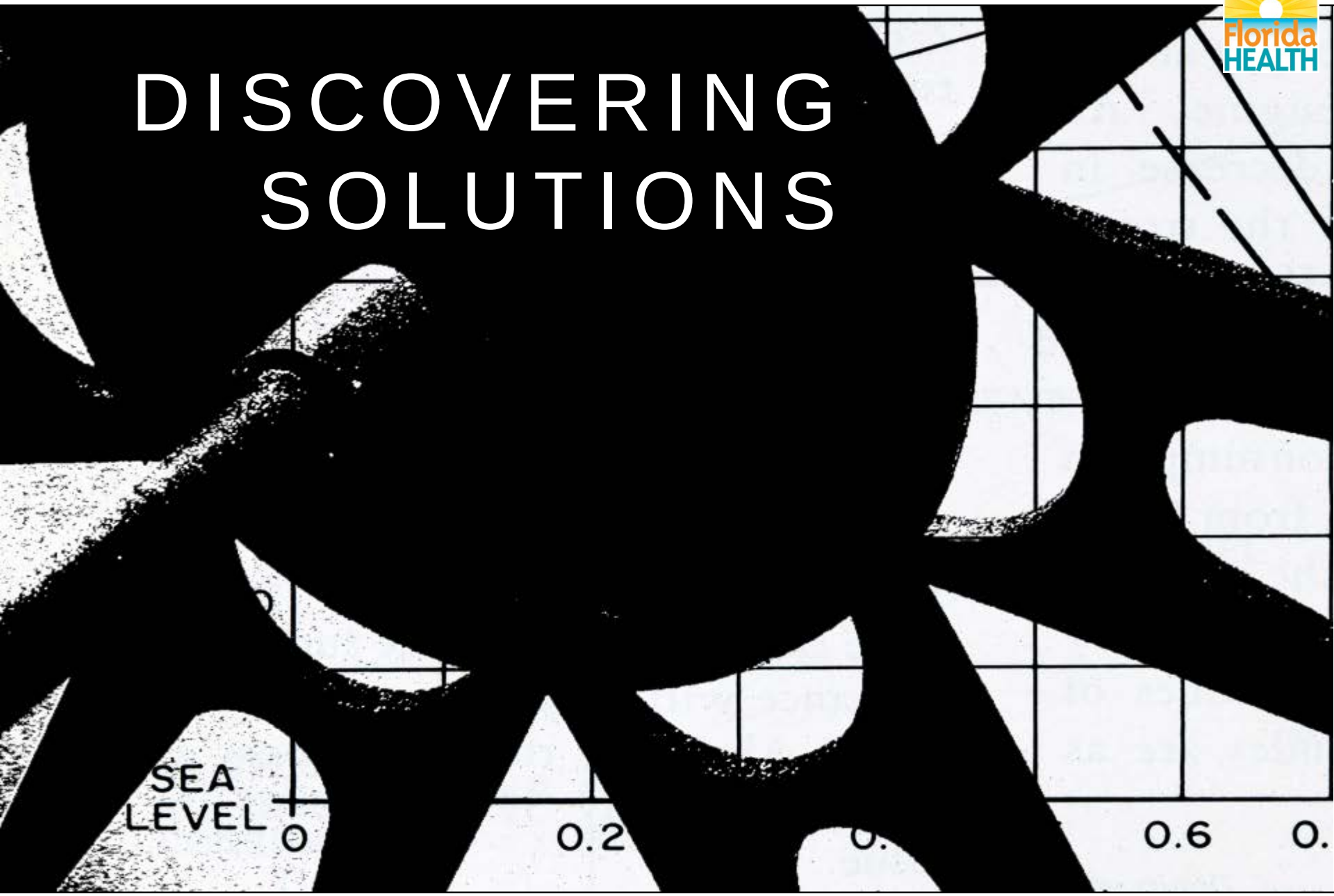
Onsite Sewage Research and Engineering
Division of Disease Control and Health Protection

To protect, promote and improve the health of all people in Florida through integrated state, county, and community efforts.

# DISCOVERING SOLUTIONS

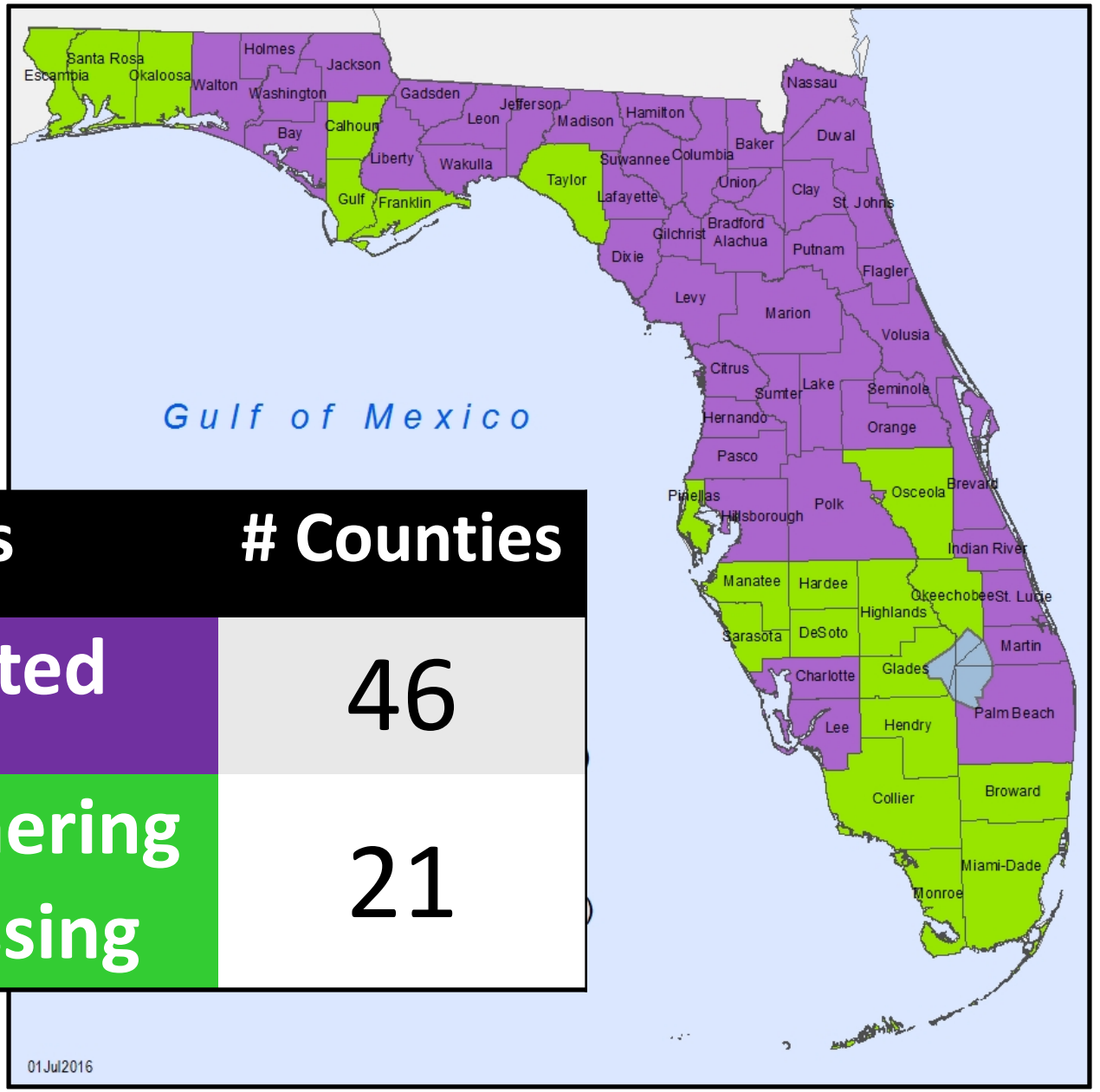



floridahealth.gov/FLWMI

**GOAL:**

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

# Florida Water Management Inventory




| Status | # Counties |
|---|---|
| Completed | 46 |
| Data Gathering & Processing | 21 |

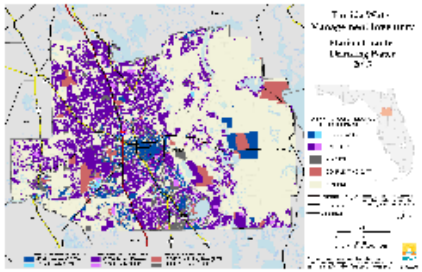
# County Dashboard Webpages

Status


The mapping for this county was completed on 5/1/2015.

Download the project maps and data (opens in new window)

**Drinking Water**



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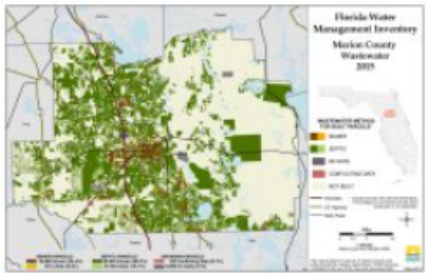
**Wastewater**



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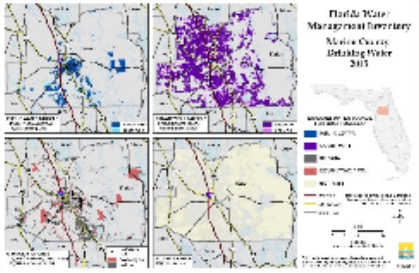

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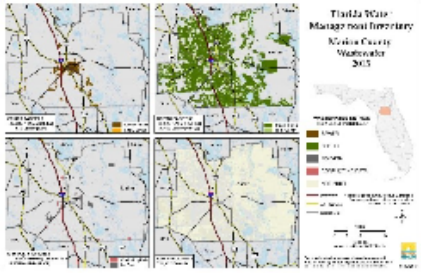

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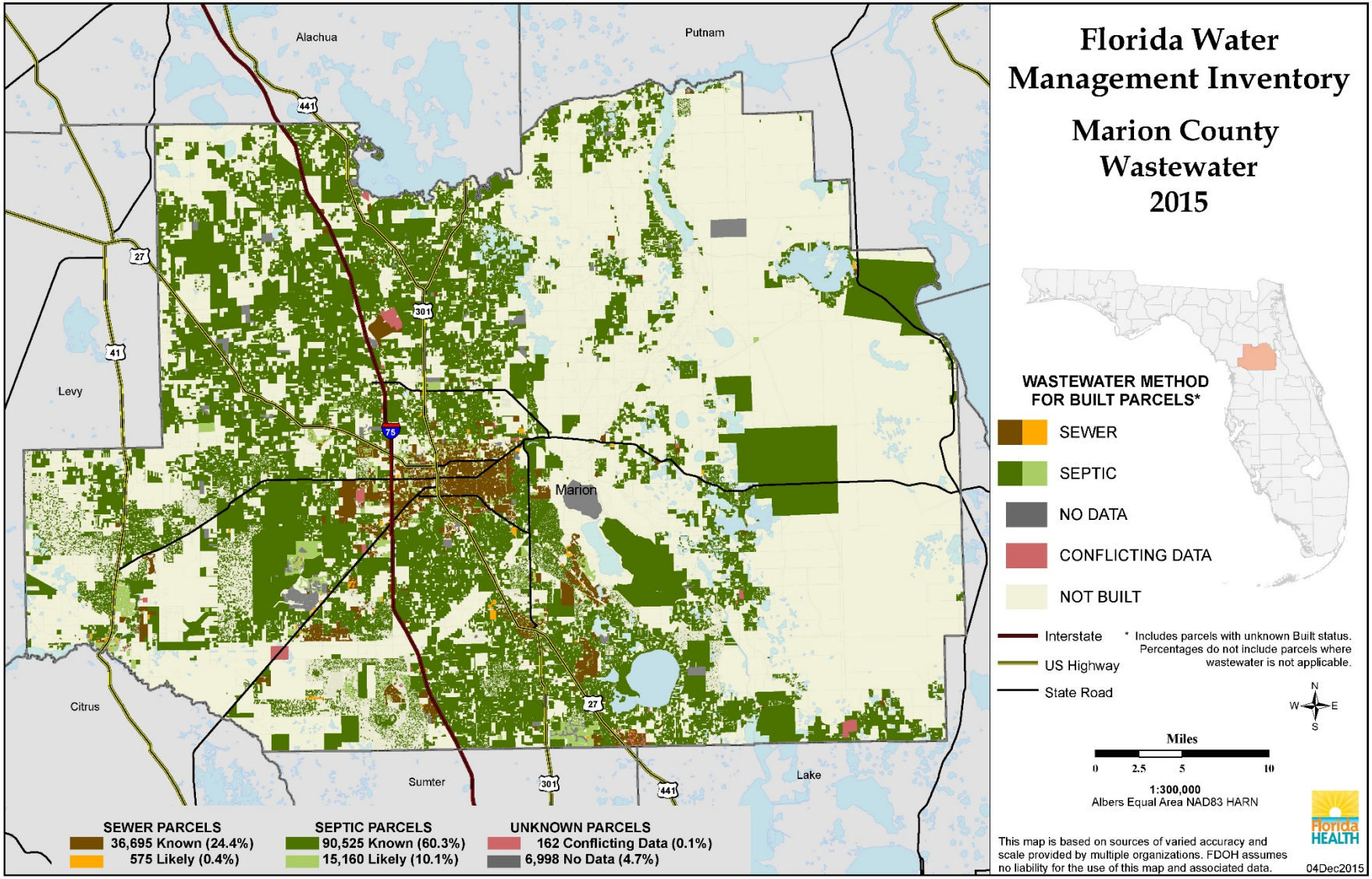
**Drinking Water Summary**

Known public water parcels = 48,461
Known well parcels = 57,998
Percent of built parcels with known drinking water = 70.8%
Estimated public water parcels= 5,246
Estimated well parcels = 6,670
Percent of built parcels with estimated drinking water = 7.9%

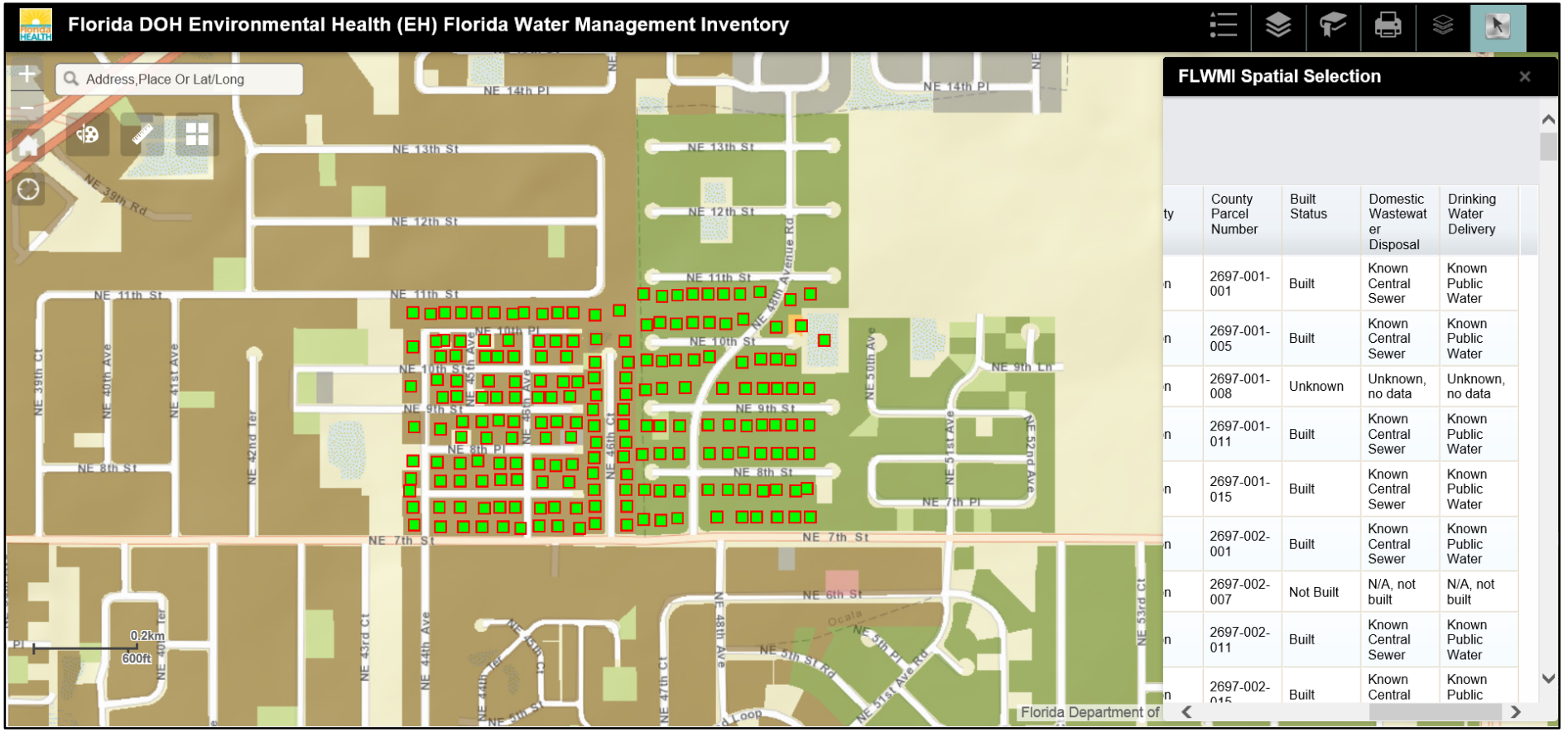
**Sewer Summary**

Known sewer parcels = 36,695
Known septic parcels = 90,525
Percent of built parcels with known wastewater = 84.7%
Estimated sewer parcels = 575
Estimated septic parcels = 15,160
Percent of built parcels with estimated wastewater = 10.5%

# Final Maps


Florida Water Management Inventory
Marion County Wastewater 2015
WASTEWATER METHOD FOR BUILT PARCELS*
SEWER
SEPTIC
NO DATA
CONFLICTING DATA
NOT BUILT
Interstate
US Highway
State Road
* Includes parcels with unknown Built status. Percentages do not include parcels where wastewater is not applicable.
Miles
0 2.5 5 10
1:300,000
Albers Equal Area NAD83 HARN
This map is based on sources of varied accuracy and scale provided by multiple organizations. FDOH assumes no liability for the use of this map and associated data.
04Dec2015
Alachua
Putnam
Levy
Marion
Citrus
Sumter
Lake
SEWER PARCELS
36,695 Known (24.4%)
575 Likely (0.4%)
SEPTIC PARCELS
90,525 Known (60.3%)
15,160 Likely (10.1%)
UNKNOWN PARCELS
162 Conflicting Data (0.1%)
6,998 No Data (4.7%)

# Searchable Web Application




https://gis.flhealth.gov/FLWMI

# Nitrogen Reduction Options for Onsite Wastewater

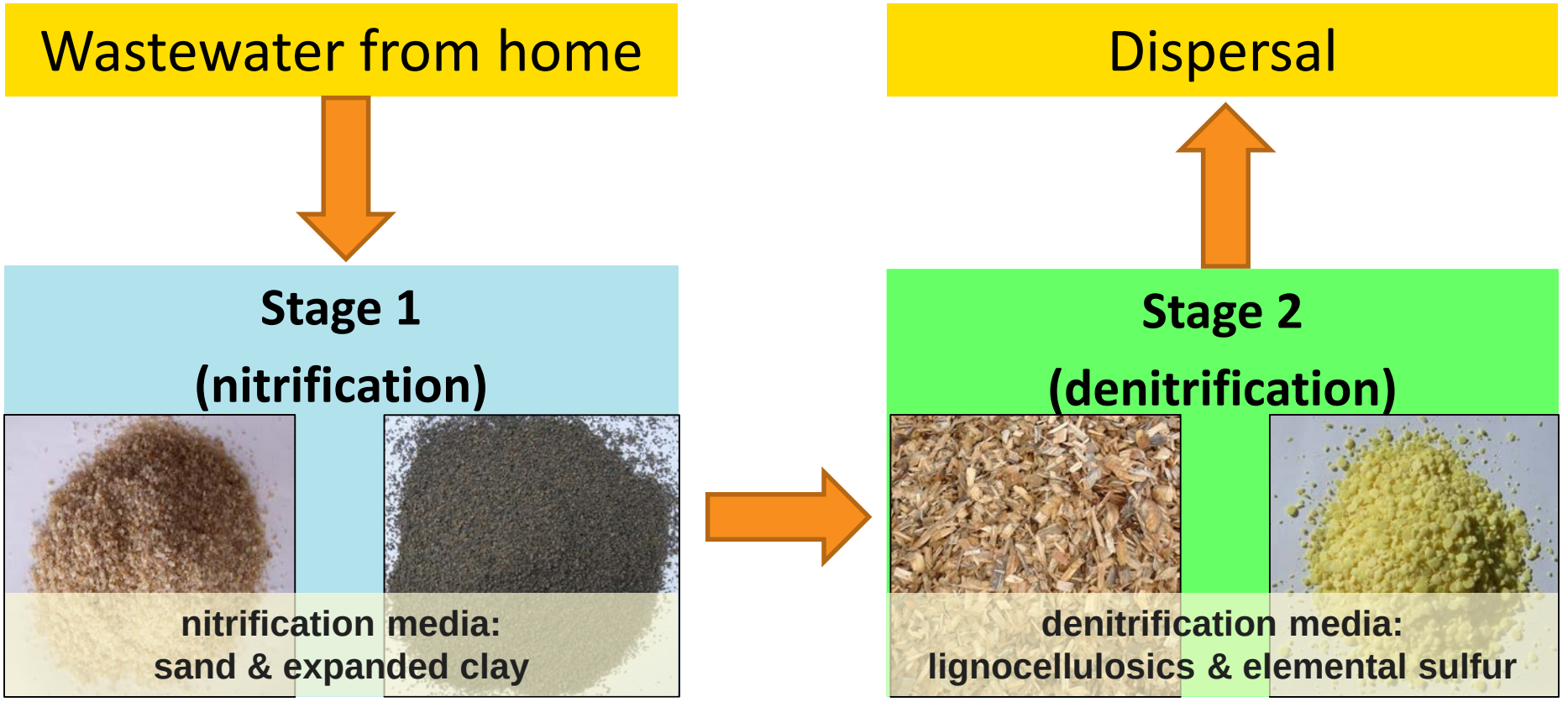

Conventional systems

Lined drainfield & existing advanced technologies

Nitrogen reducing systems

# “Passive” Nitrogen Reduction Systems

Reduce effluent N using **reactive media** for denitrification and a **single liquid pump**, if necessary.



# Test Facility

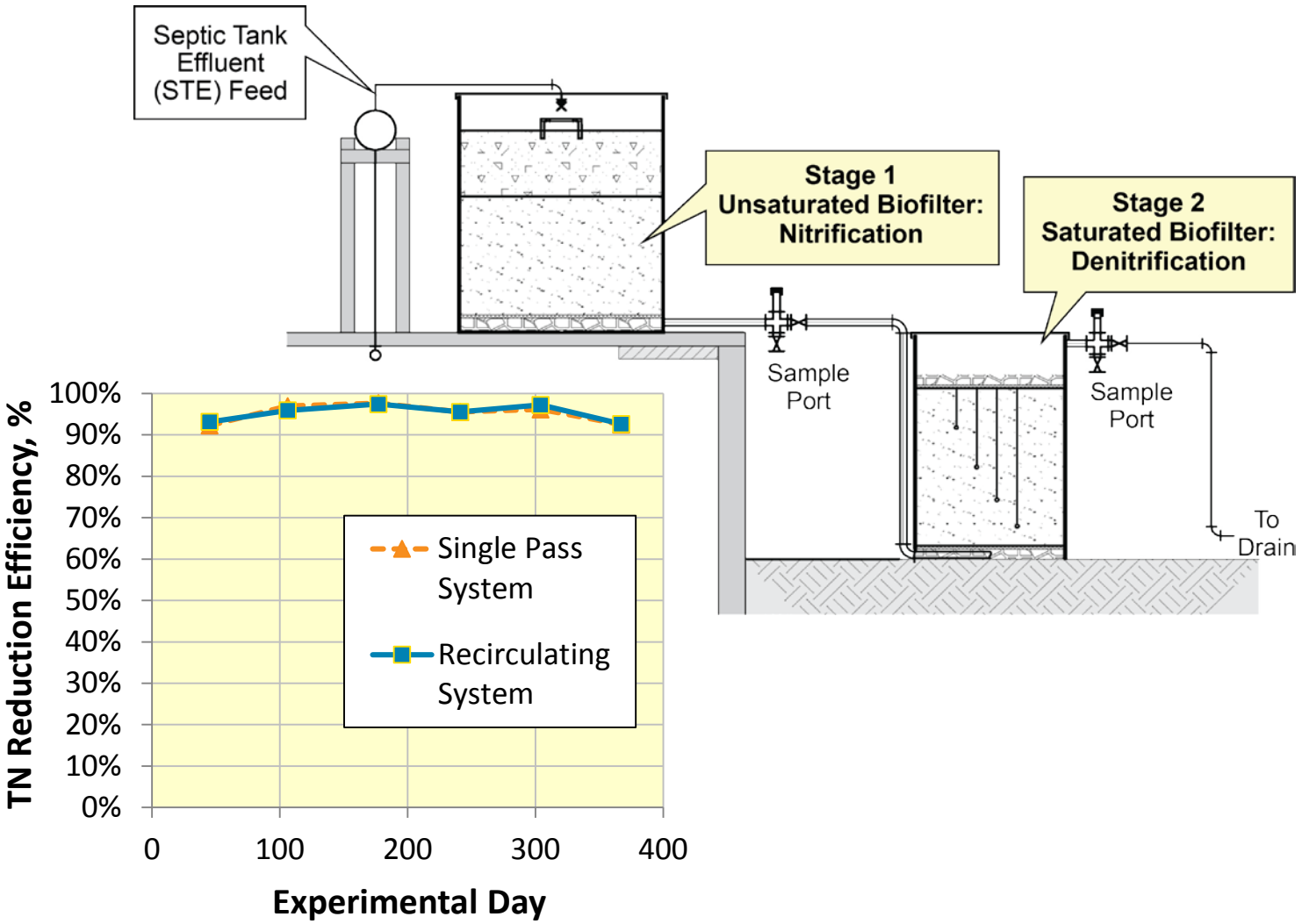
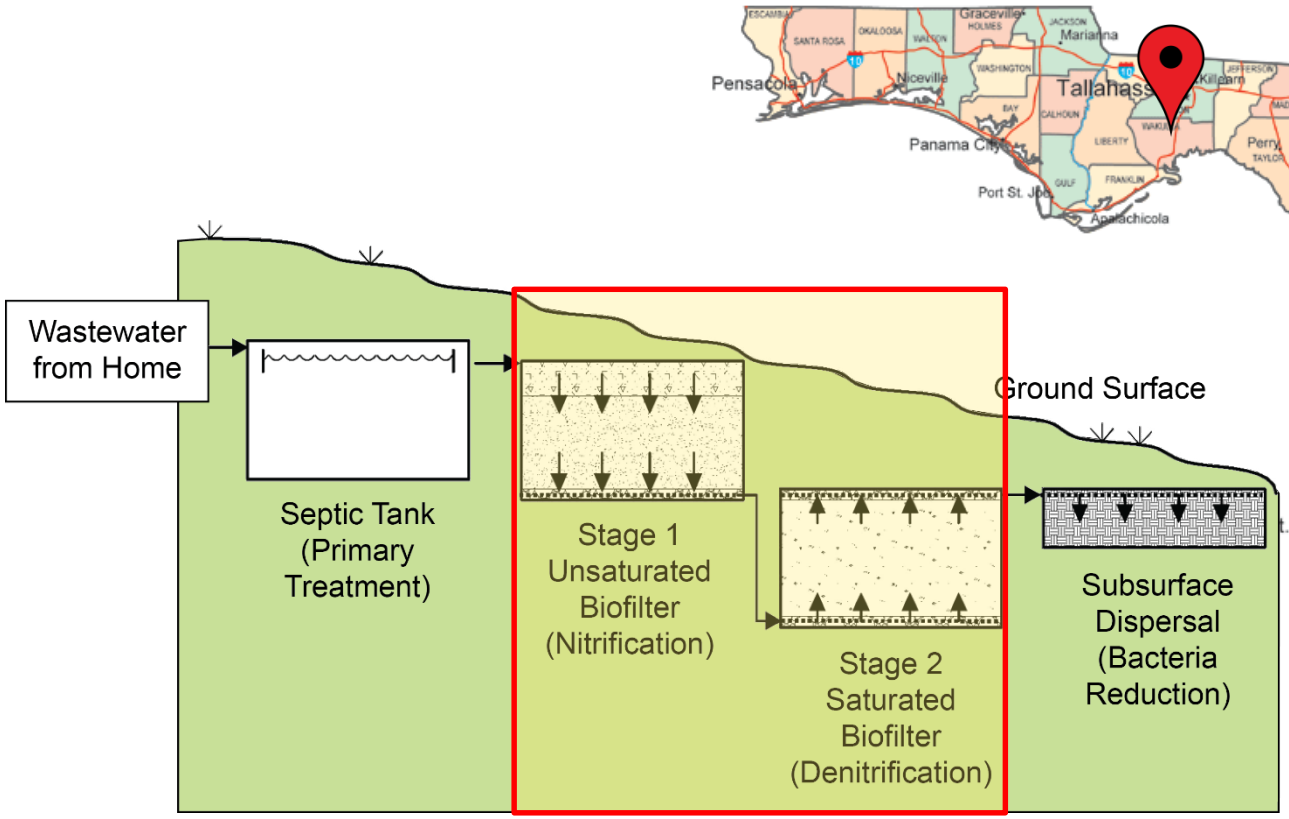
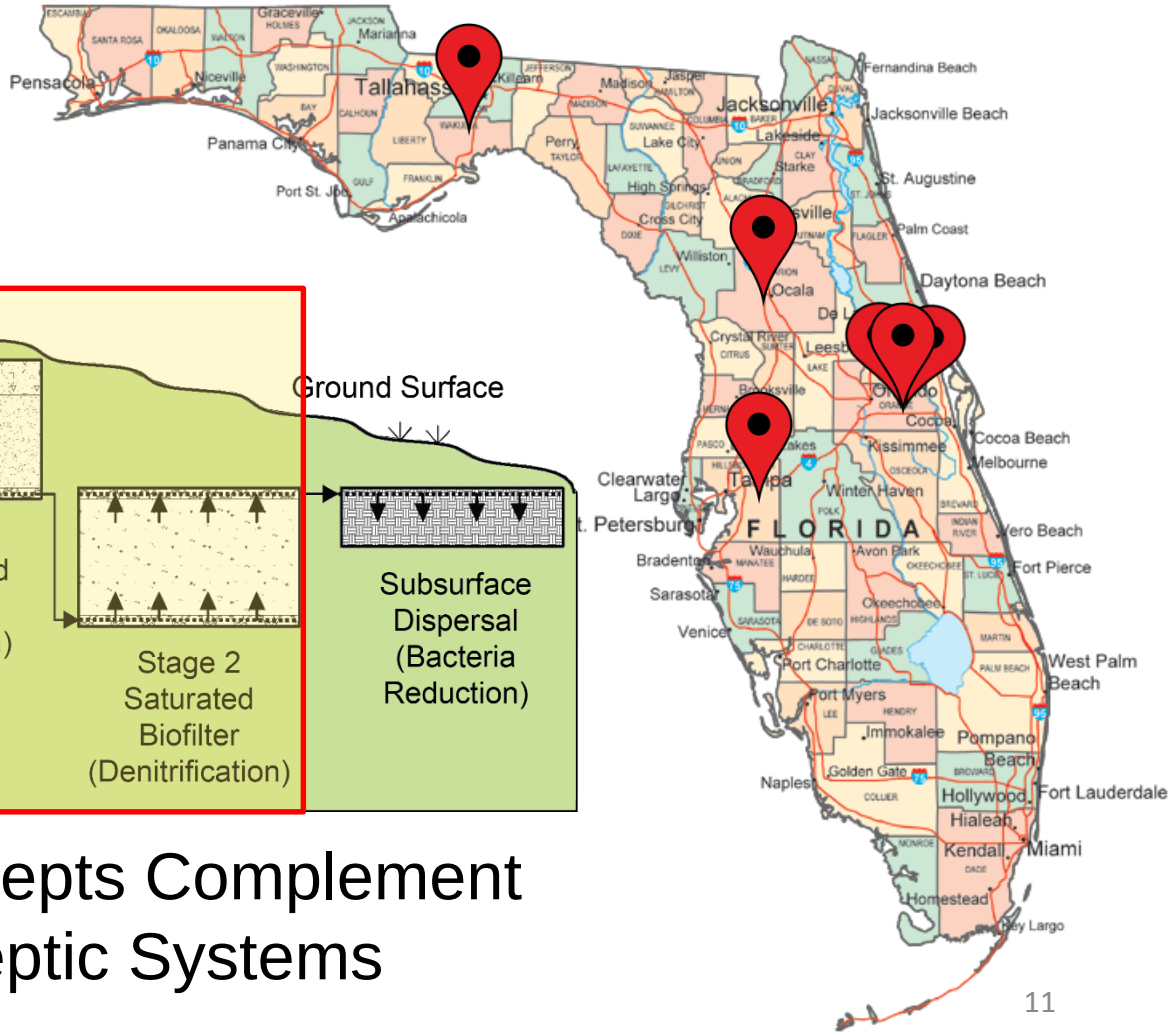



Image Credit: Hazen and Sawyer

# Nitrogen Reduction at Field Sites




Full Scale Concepts Complement Existing Septic Systems

# Case Study: Groundwater Monitoring

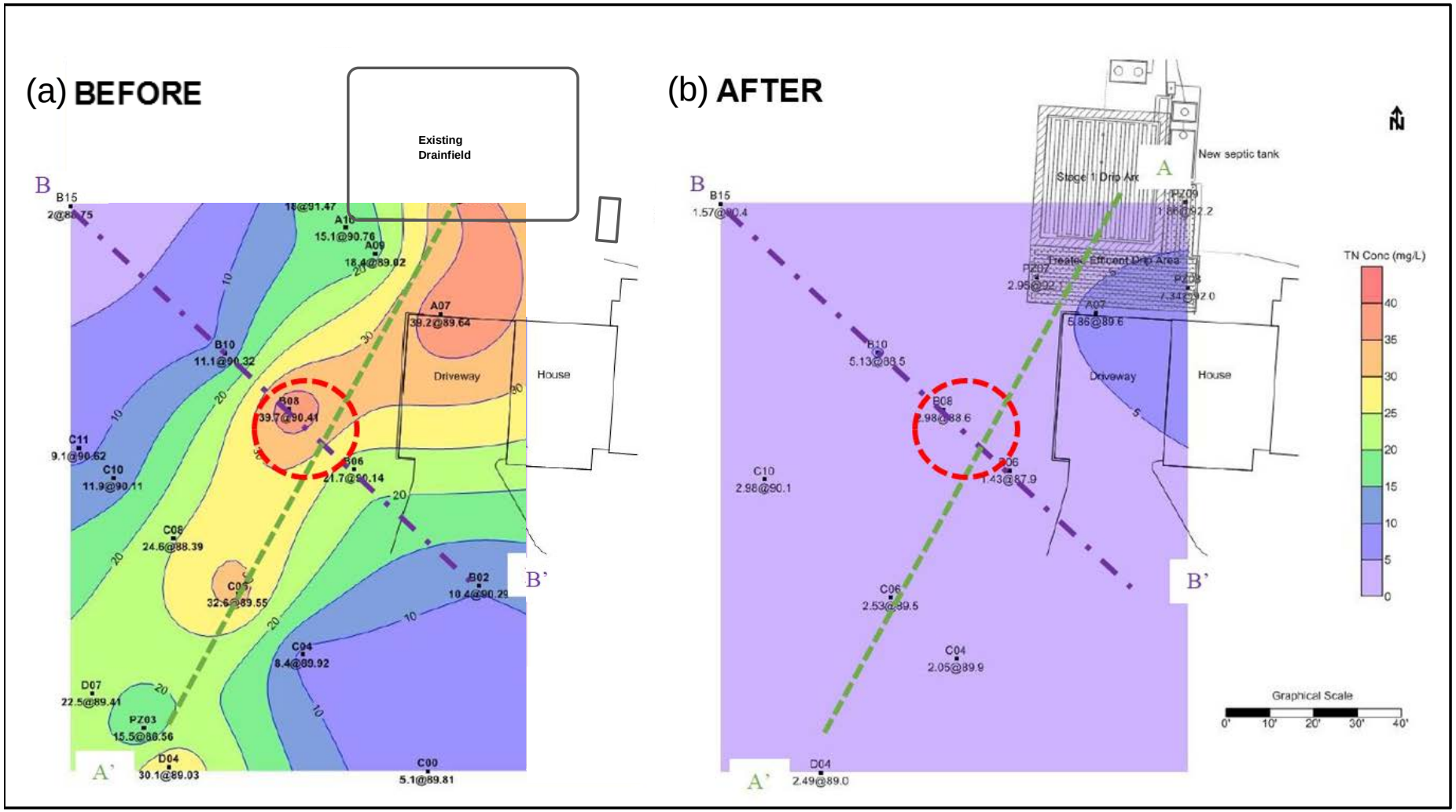
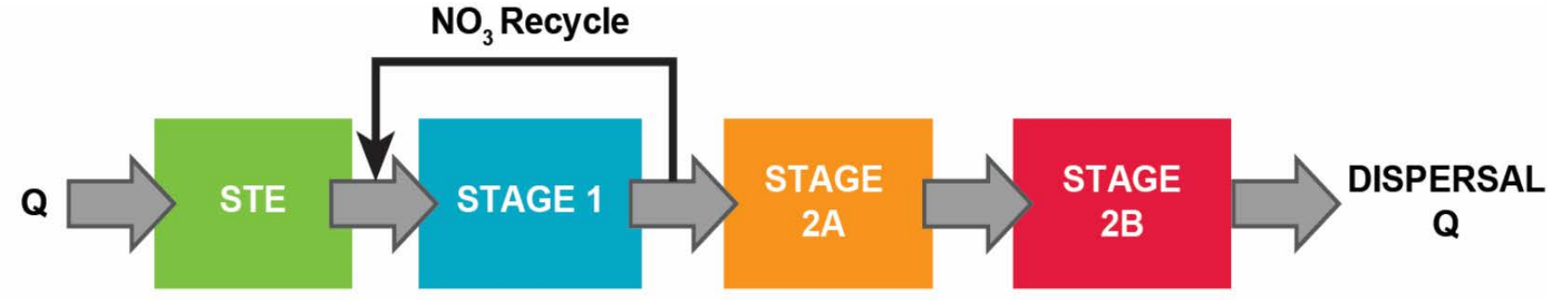
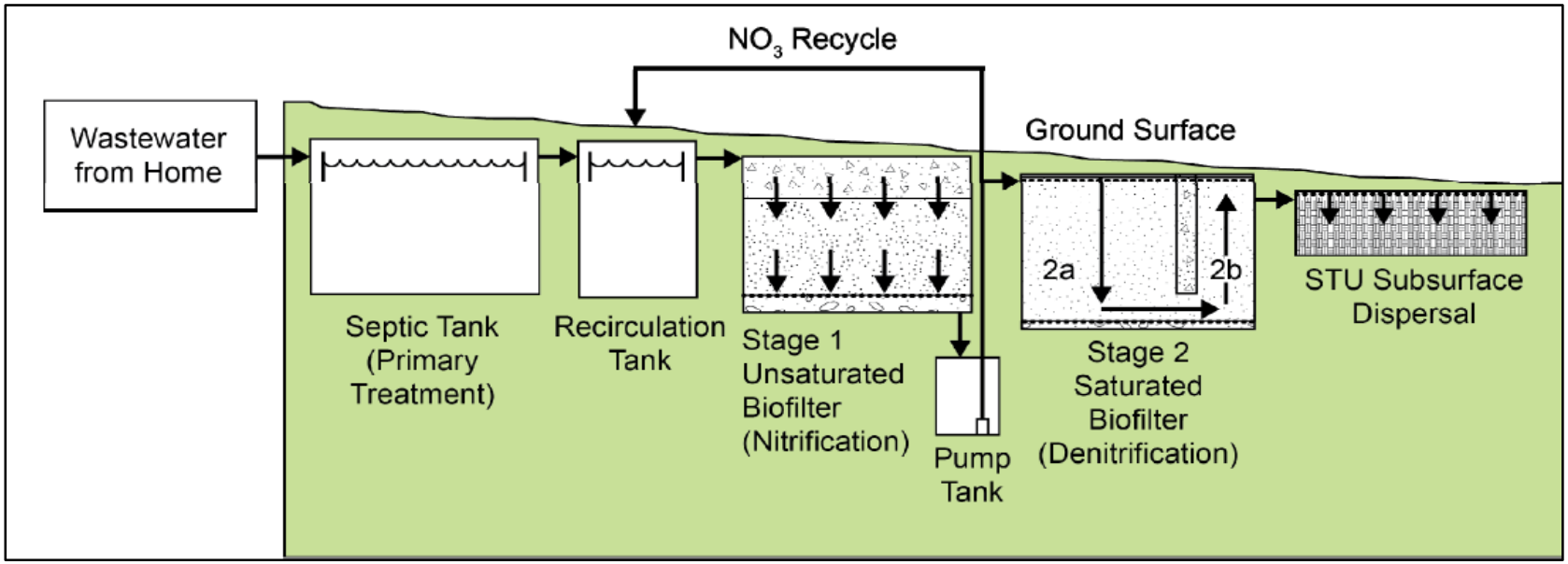



Image Credit: Hazen and Sawyer

# In-Tank Passive Nitrogen System

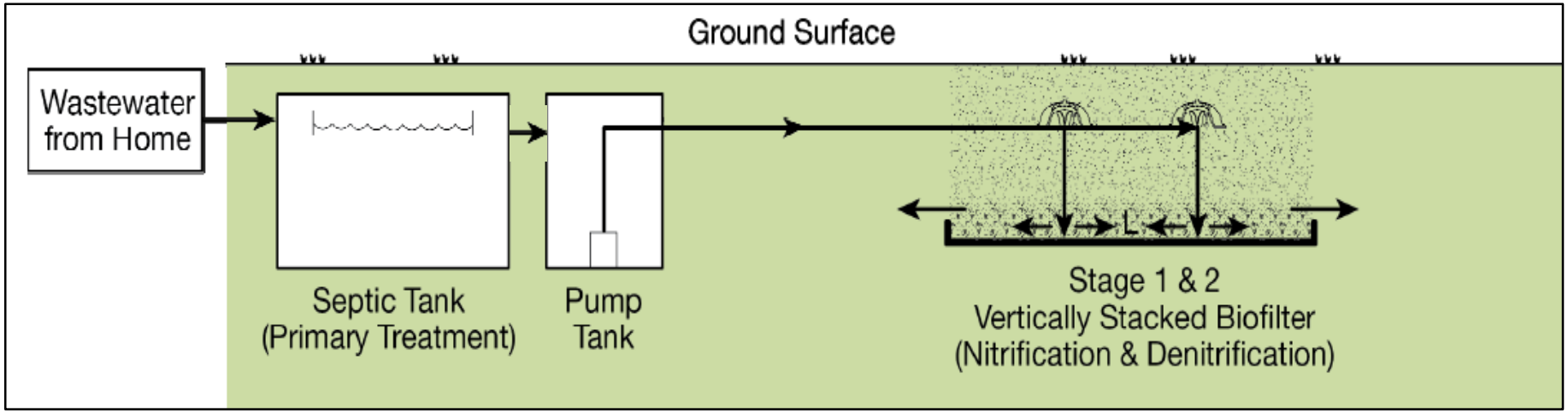



In-tank two stage biofilter with recirculation stage 1, dual media stage 2 lignocellulosic (2a) followed by elemental sulfur (2b)



# In-Ground Passive Nitrogen System


In-ground stacked biofilter, single pass stage 1 over stage 2 lignocellulosic



# OKAY LET'S DO THIS


| | |
|---|---|
| Name: | Mayor Smith |
| Location: | Anywhere |
| Daily Wastewater Volume (gpd): | 7,500 |
| Number of Connections: | 30 |
| Selected Soil Texture: | Silt Loam |
| Typical Distance Between Sources: | 200 |

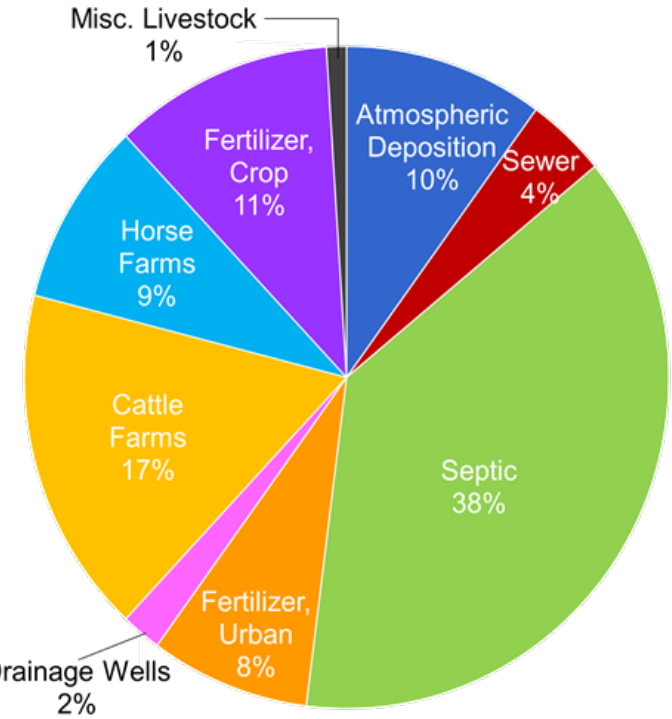
**Collection Technologies:** in cell C7, the user needs to i model uses the number of ca frontage. Part of the assumg The estimated road frontage If the user is interested in eft be served by STEG. This acti STEG/STEP ratio is unknown

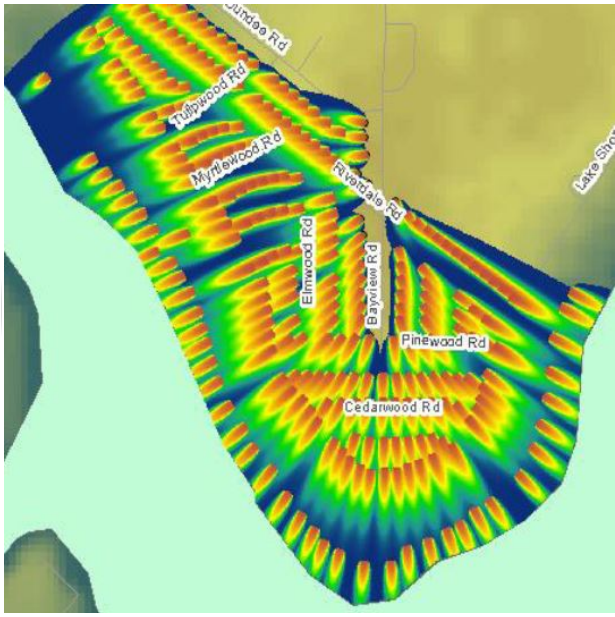
Estimated Road Frontage (feet): 3,000 Assumes that Half of Sources are on opposite S

Enter the percentage of the effluent-sewer network that will be a gravity-based: 0 percentage (0 to 100%)

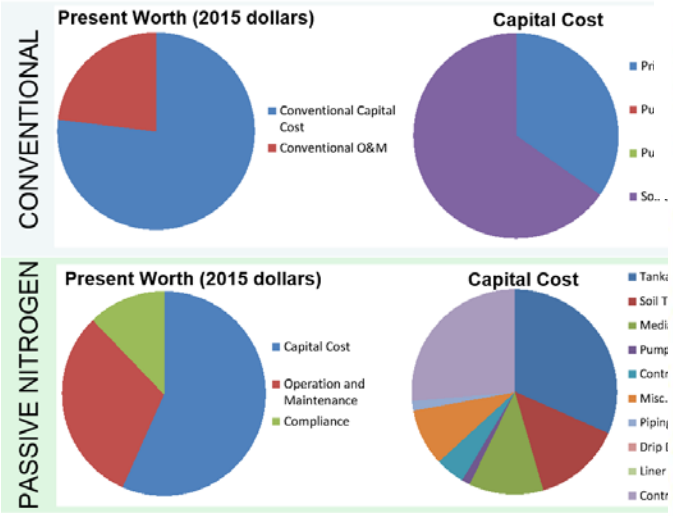
| Cost Description (Not Including Engineering and other Professional Fees) | Collection Low Pressure Sewer | Collection Effluent Sewer |
|---|---|---|
| Installation Cost of Collection Network[1] | $49,325 to $73,987 | $48,713 to $73,069 |
| Installation Cost of On-Lot Components (one connection) | $4,985 to $7,477 | $2,806 to $4,208 |
| Total Installation Cost for Collection Network & On-Lot Components | $198,869 to $298,303 | $132,881 to $199,321 |
| Total Collection System Cost on a per Connection Basis | $6,629 to $9,943 | $4,429 to $6,644 |
| Annual On-Lot Maintenance Costs (assuming lot owner is responsible for maintenance) | $234 to $351 | $56 to $70 |
| Annual Maintenance Cost for both Collection Network & On-Lot Components (assuming the utility conducts the on-lot maintenance) | $22,872 to $34,308 | $10,663 to $15,995 |

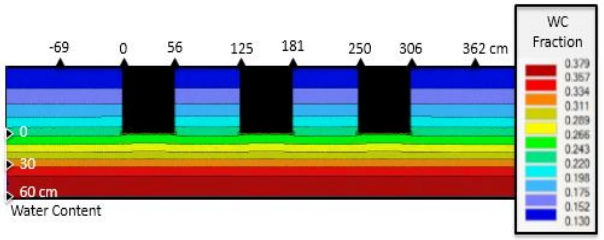
[1]These cost do not include the purchase and installation of the on-lo
[2]These cost include one vacuum pod for every two connections

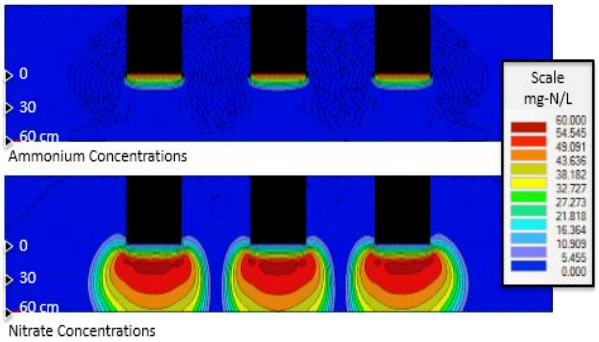


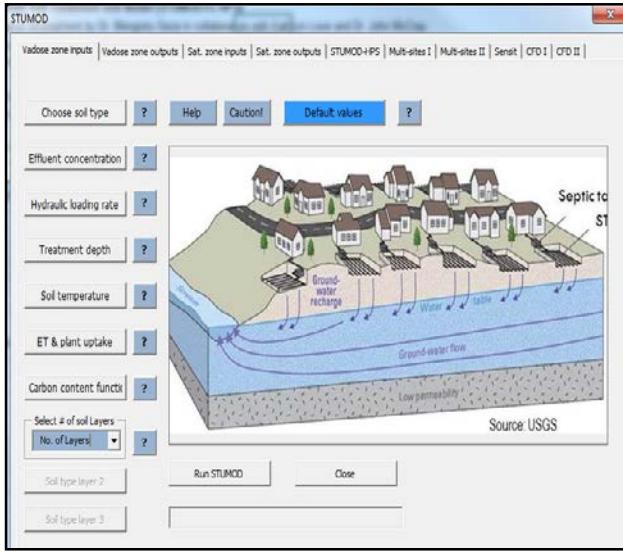




NEW
TOOLS


CONVENTIONAL
Present Worth (2015 dollars)
Capital Cost
Conventional Capital Cost
Conventional O&M
PASSIVE NITROGEN
Present Worth (2015 dollars)
Capital Cost
Capital Cost
Operation and Maintenance
Compliance

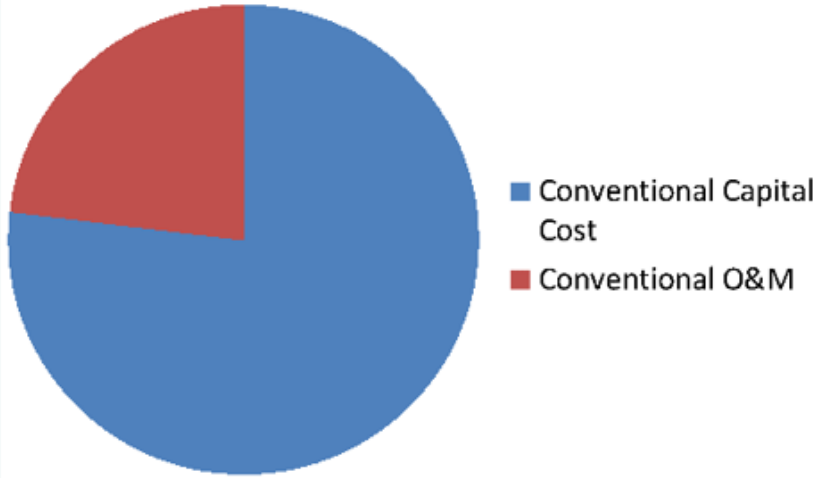

-69
0
56
125
181
250
306
362 cm
WC Fraction
0.379
0.357
0.334
0.311
0.289
0.266
0.243
0.220
0.198
0.175
0.152
0.130
0
30
60 cm
Water Content

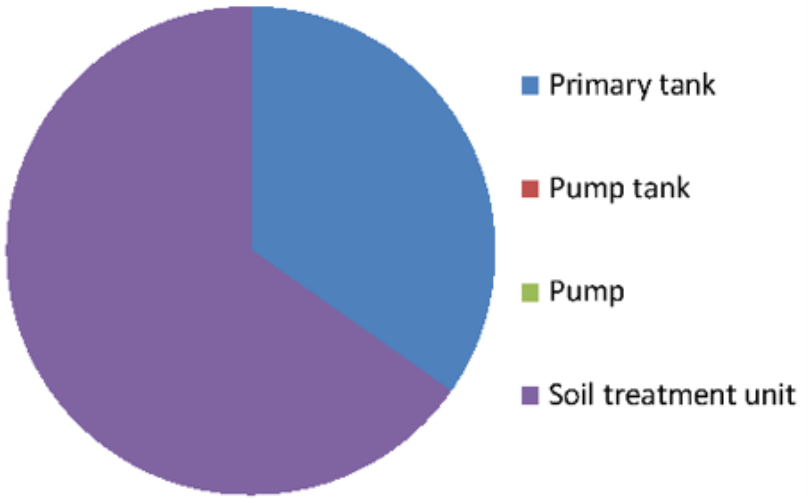

Scale mg-N/L
60.000
54.545
49.091
43.636
38.182
32.727
27.273
21.818
16.364
10.909
5.455
0.000
0
30
60 cm
Ammonium Concentrations
0
30
60 cm
Nitrate Concentrations


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
Run STUMOD
Close
Septic to
ST
Ground-water recharge
Water table
Ground-water flow
Low permeability
Source: USGS

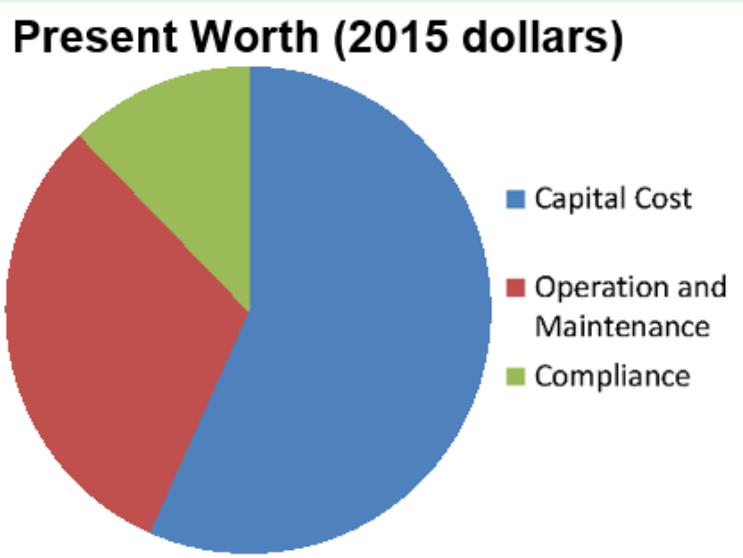
# Life Cycle Costs

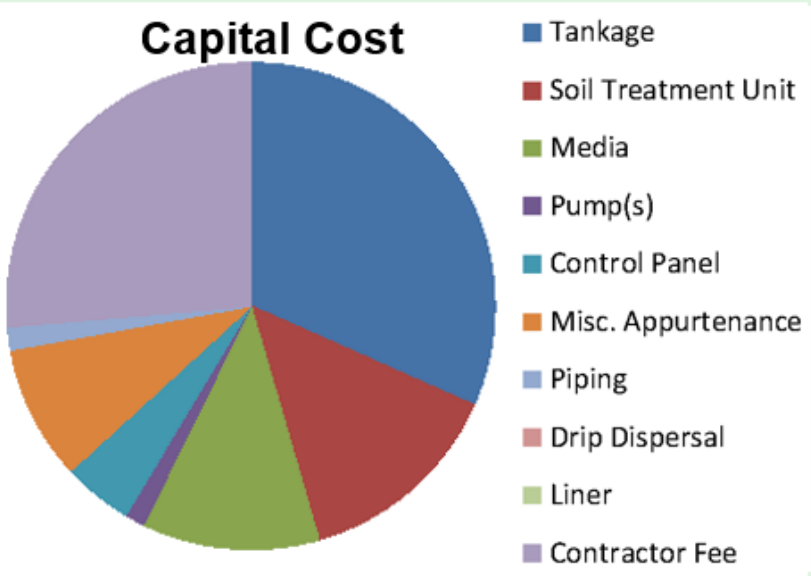
CONVENTIONAL




PASSIVE NITROGEN



# Vadose Zone Model Example

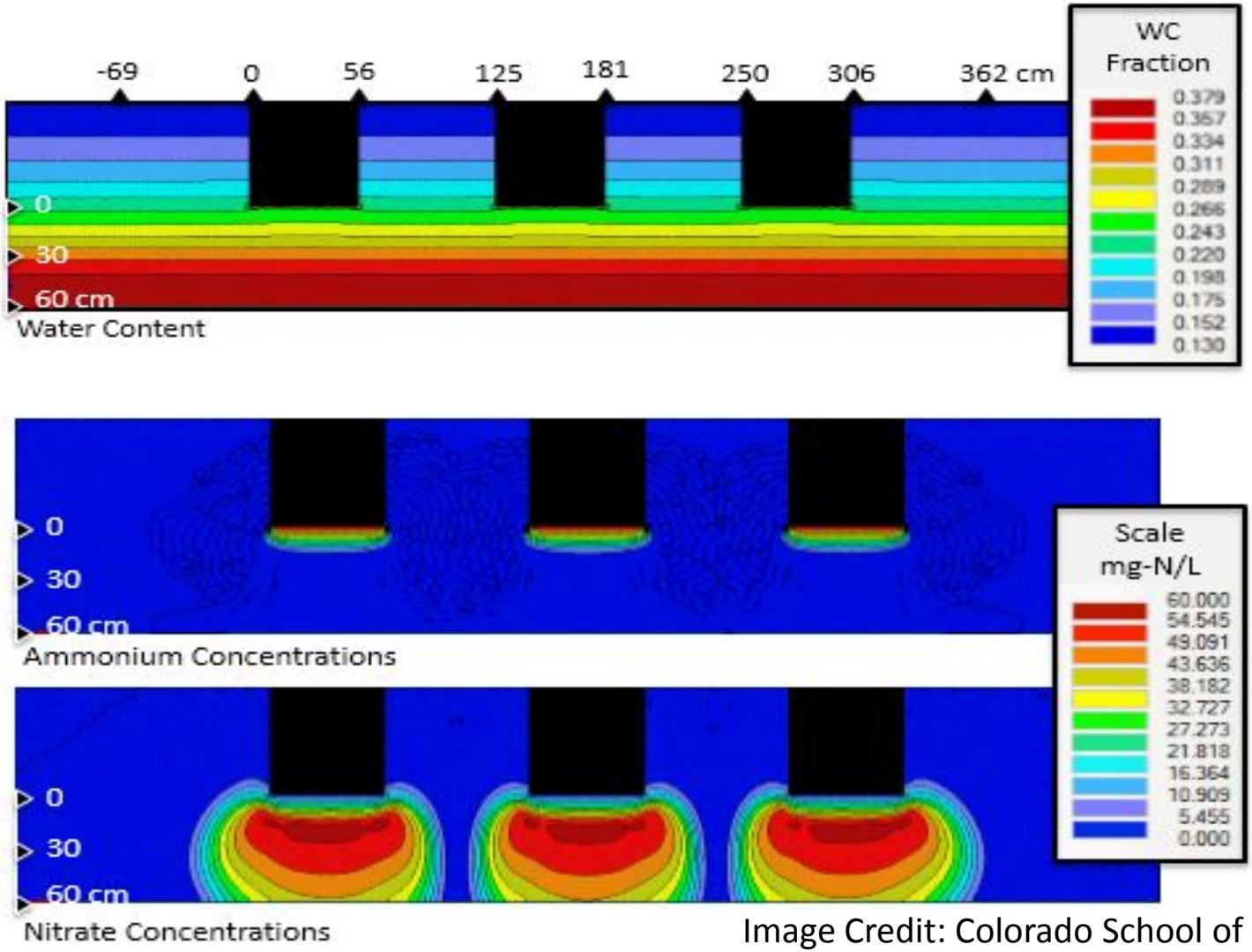



Image Credit: Colorado School of Mines

# Modeling Nitrogen Under Drainfields

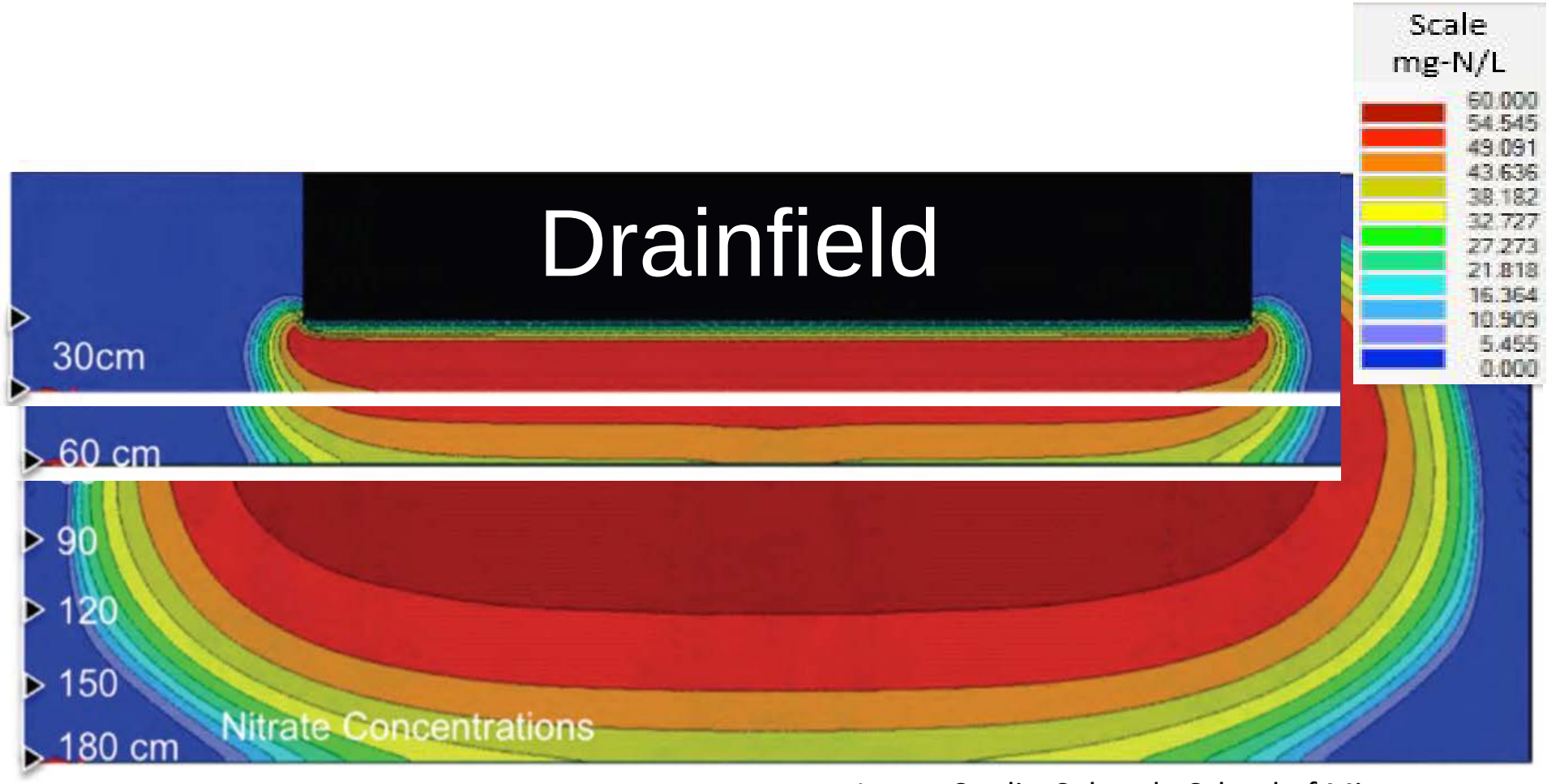



Image Credit: Colorado School of Mines

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

# Nitrogen Model

Choose soil type ? Help Caution! Default values ?

Effluent concentration ?

Hydraulic loading rate ?

Treatment depth ?

Soil temperature ?

ET & plant uptake ?

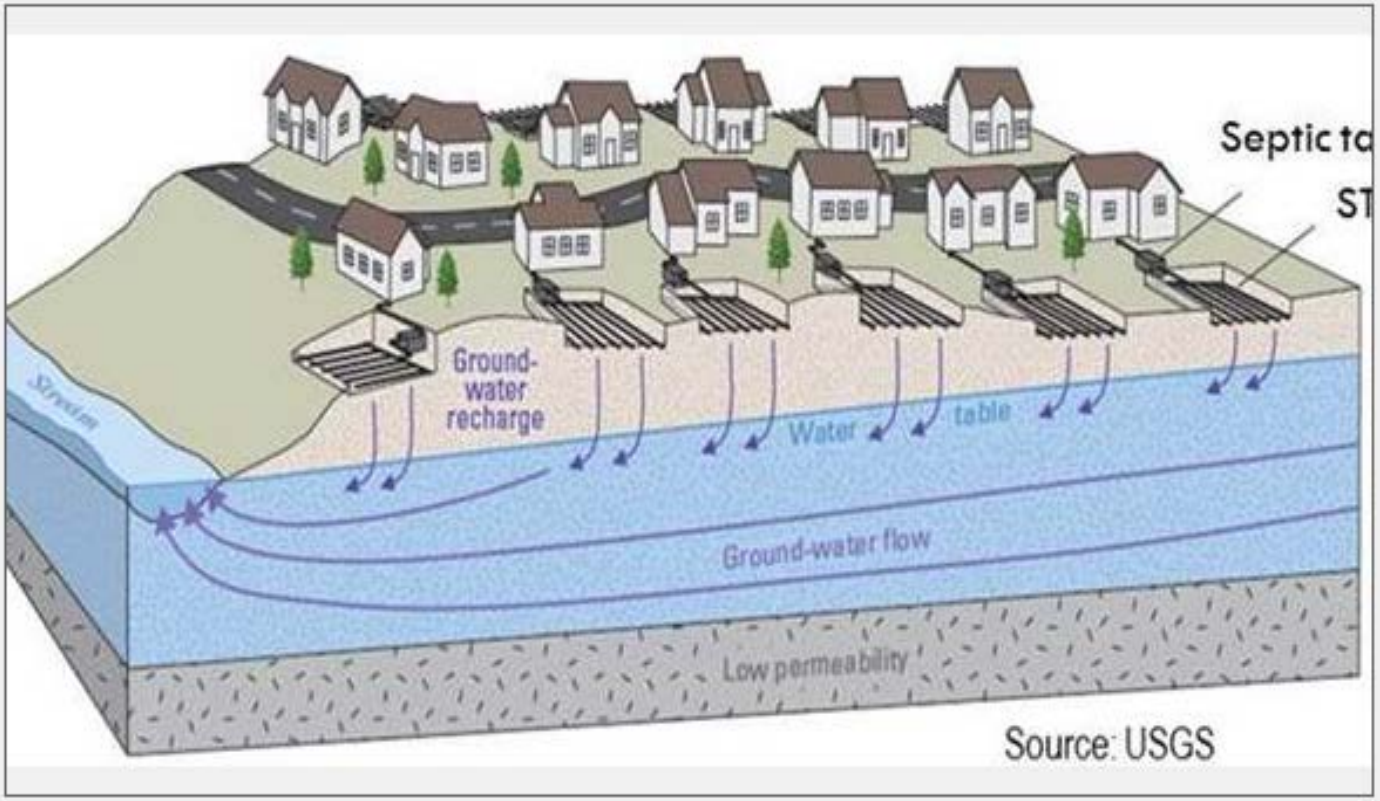
Carbon content functi ?

Select # of soil Layers

No. of Layers ?

Soil type layer 2

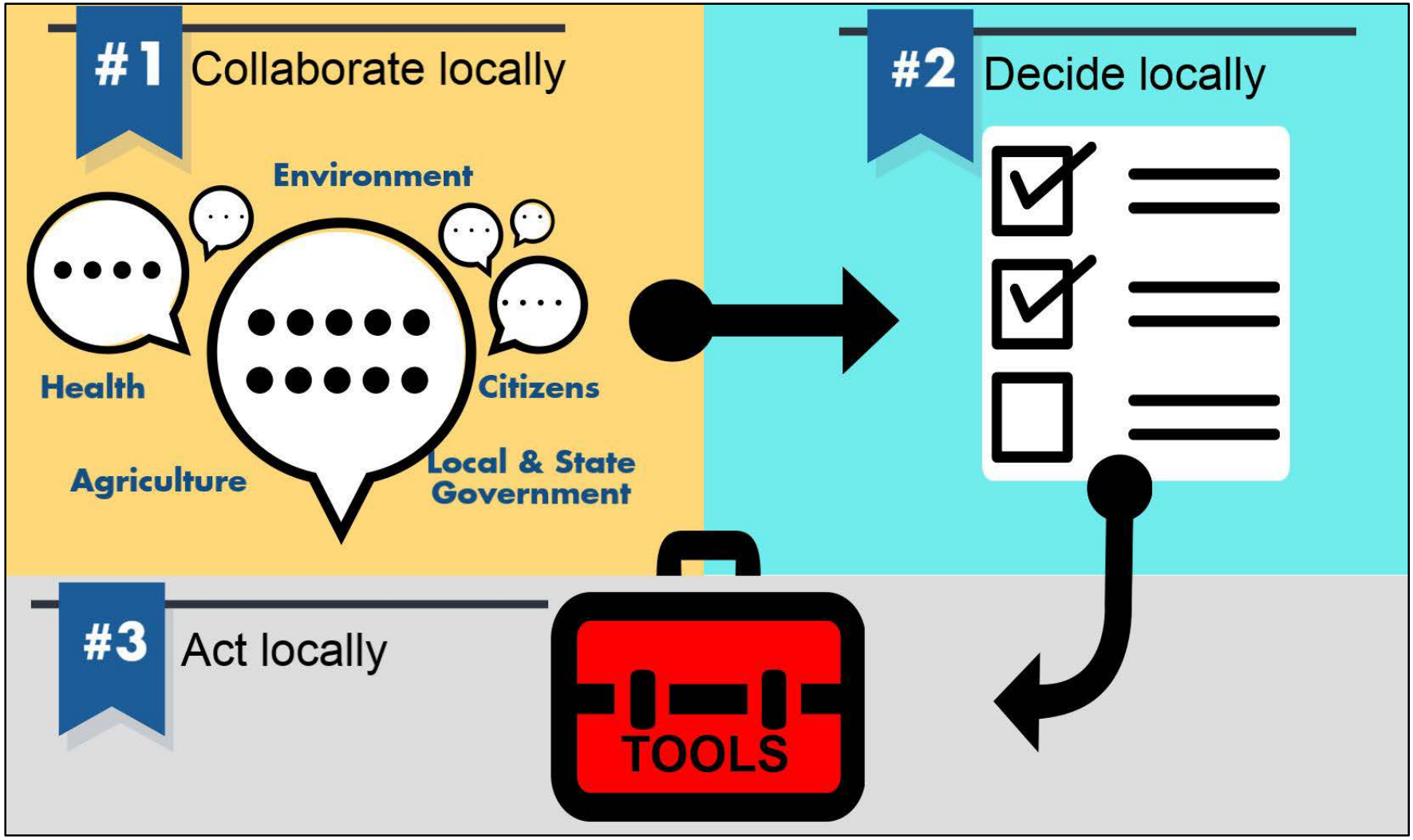
Soil type layer 3




Run STUMOD Close

Image Credit: Colorado School of Mines

# Get Involved



# Water Bill

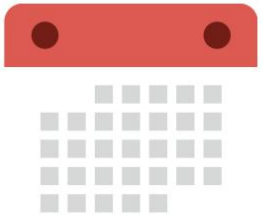
## "Florida Springs and Aquifer Protection Act" 373.807, F.S.

Dock and diving platform on Santa Fe River O'Leno State Park, Florida, 1940

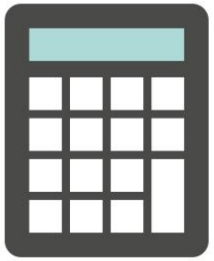
Photo Credit: State Archives of Florida, *Florida Memory*, https://floridamemory.com/items/show/152931

# OSTDS Advisory Committee

**Priority project list**



**Implementation schedule**



**Load reduction targets**

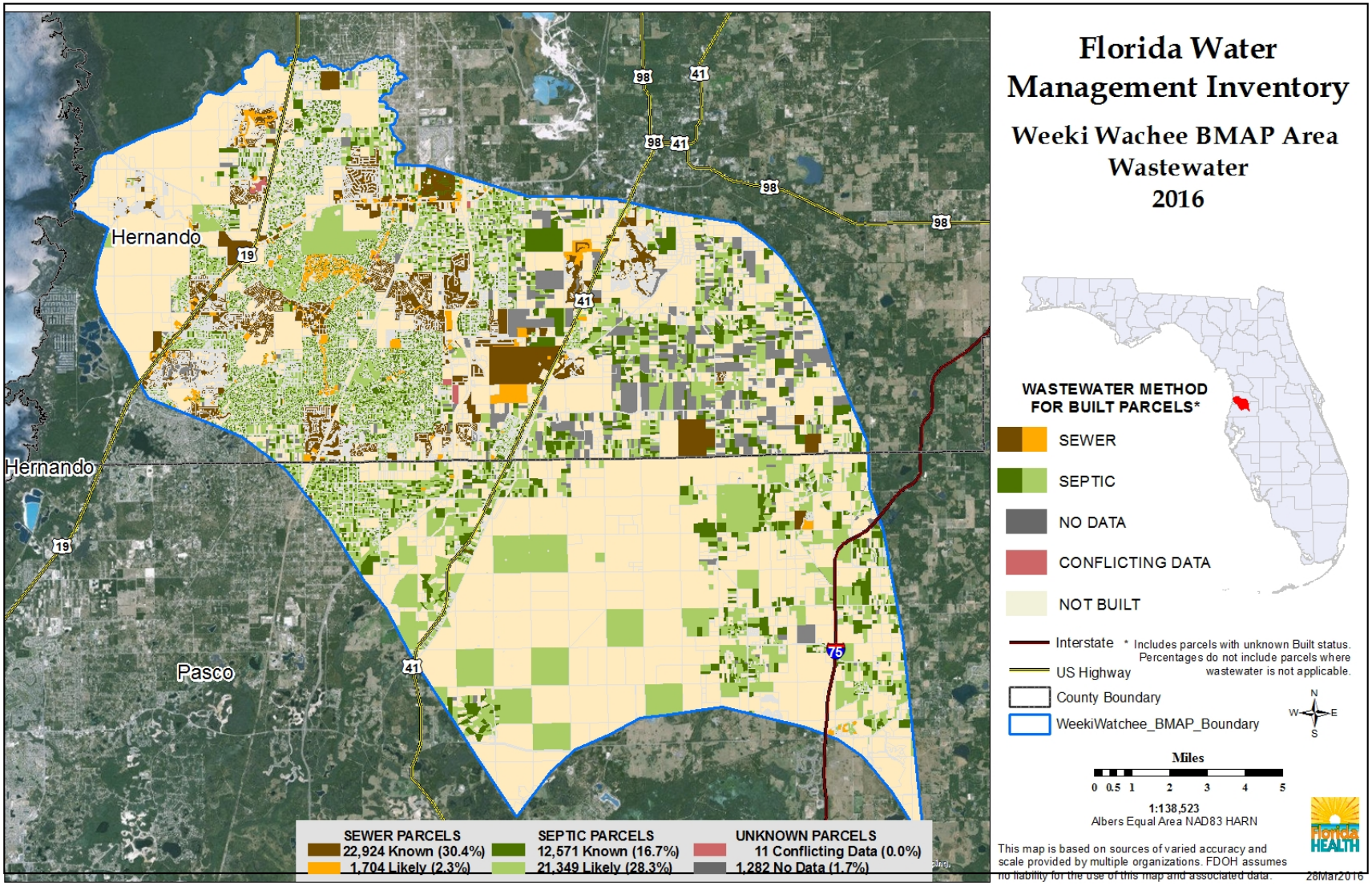
**List of data needs**

**Ideas for public education**

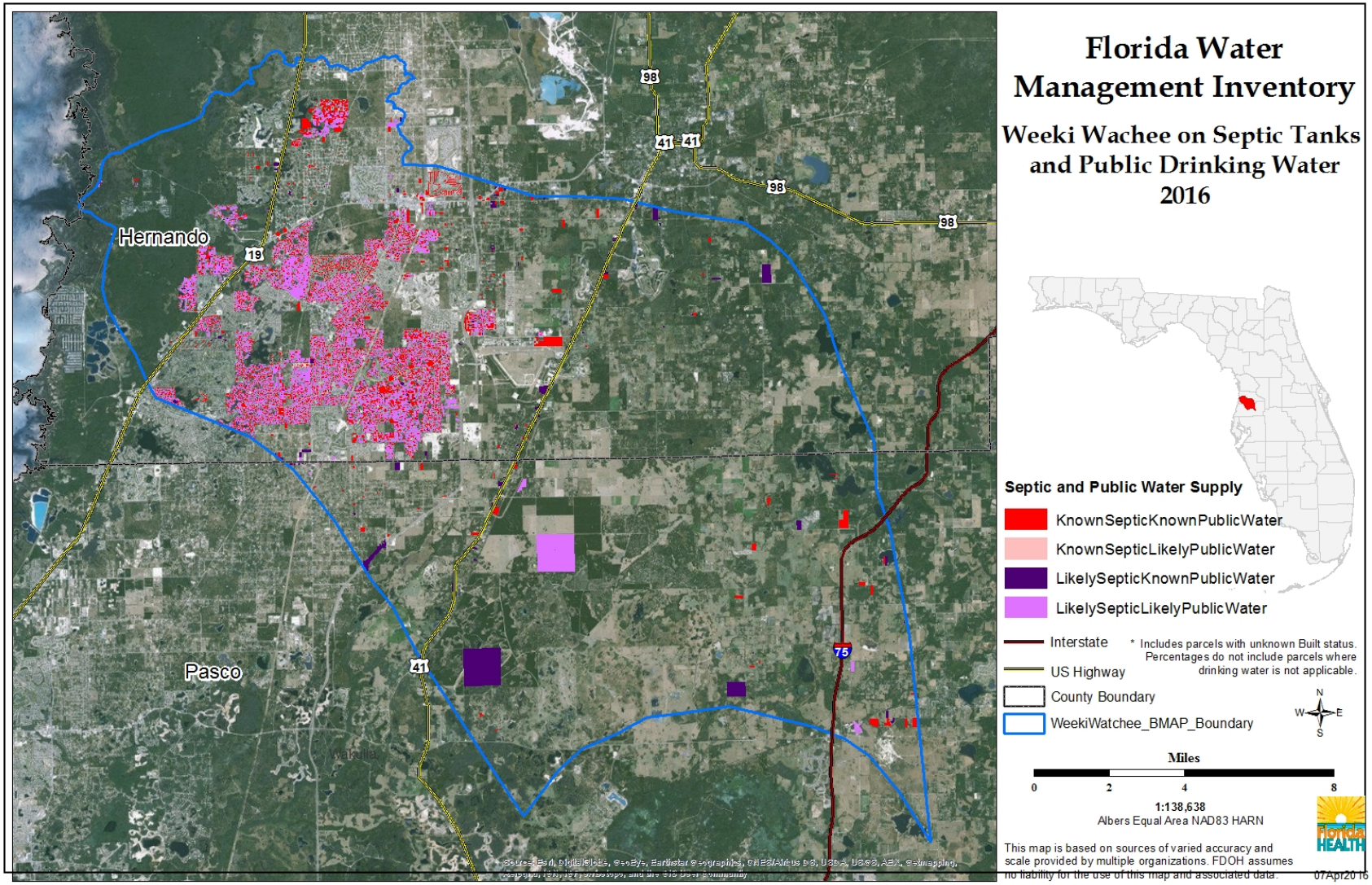
**List of existing studies & results**

# How OSTDS Research Fits In

# Wastewater Distribution



# Expanding the Analysis



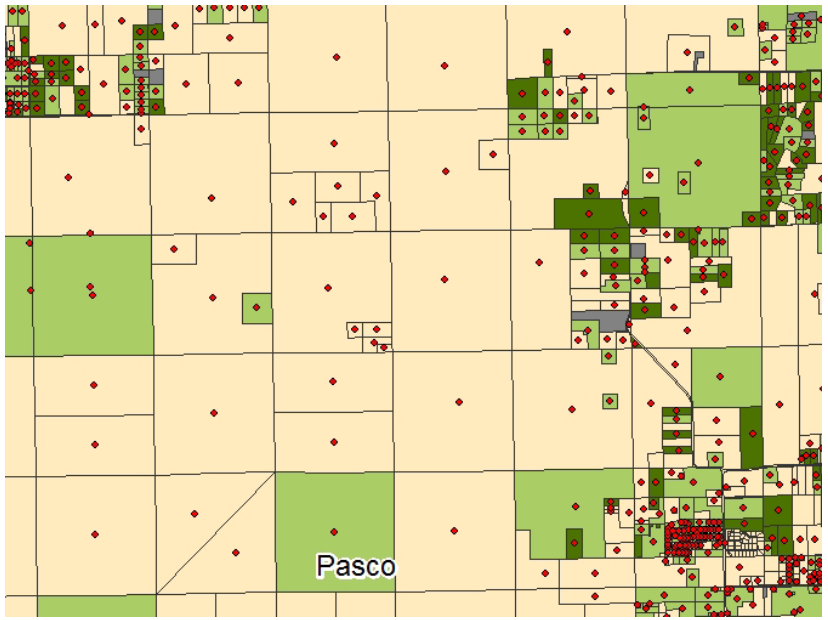
# Comparison of Tools

Compared DOH's Florida Water Management Inventory (FLWMI) #'s to DEP's Nutrient Source Inventory Loading Tool (NSILT) #'s:

| | FLWMI | NSILT | Matching parcels |
|---|---|---|---|
| # septic systems (BMAP) | 34,132 | 34,610 | 33,316 (98%) |

For the ones that don't match, main differences are:

- NSILT septic parcels are on parcels identified as not built



1

Implementation Plan

Approve baseline conventional septic system enhanced for nitrogen reduction (in-ground system)

Requires rule change.

Status: Tabled by Technical Review and Advisory Panel on October 22, 2015 for more details

2

Implementation Plan

Incorporate nitrogen study systems as approved performance-based systems

Requires development of system specifications

Status: Being developed

3

Implementation Plan

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

Requires rule and possibly statute changes

Status: Requires multiple public meetings

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

# Research Benefits Floridians

- Field-tested designs
- Cost estimates
- Nitrogen model
- Options

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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