FOSNRS 1: The Florida Onsite Sewage Nitrogen Reduction Strategies (FOSNRS) Study, Project Overview

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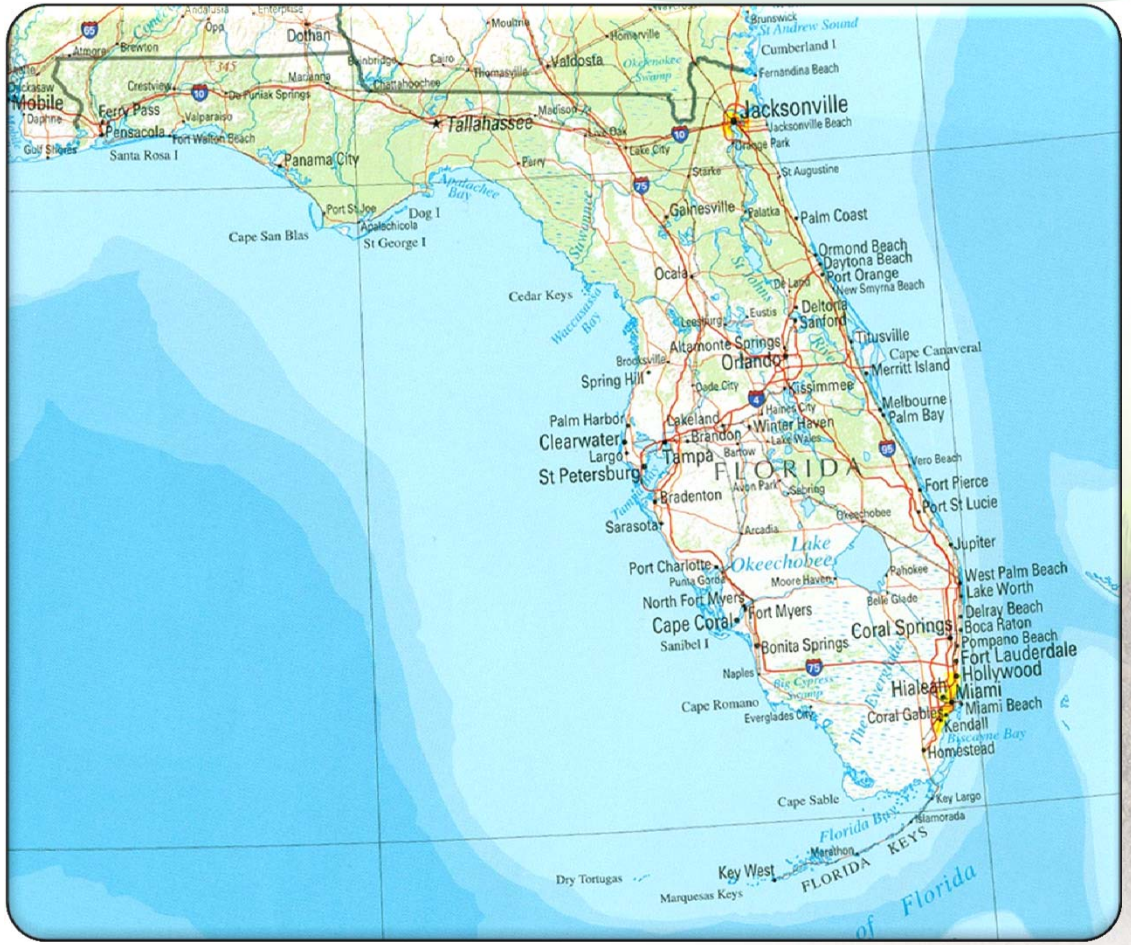
Overview

- Florida onsite wastewater systems
- Assessment of system performance
- Current research:
  - Nitrogen removal technologies
  - Fate and transport

Onsite sewage systems in Florida

There are approximately 2.6 million onsite sewage systems in Florida



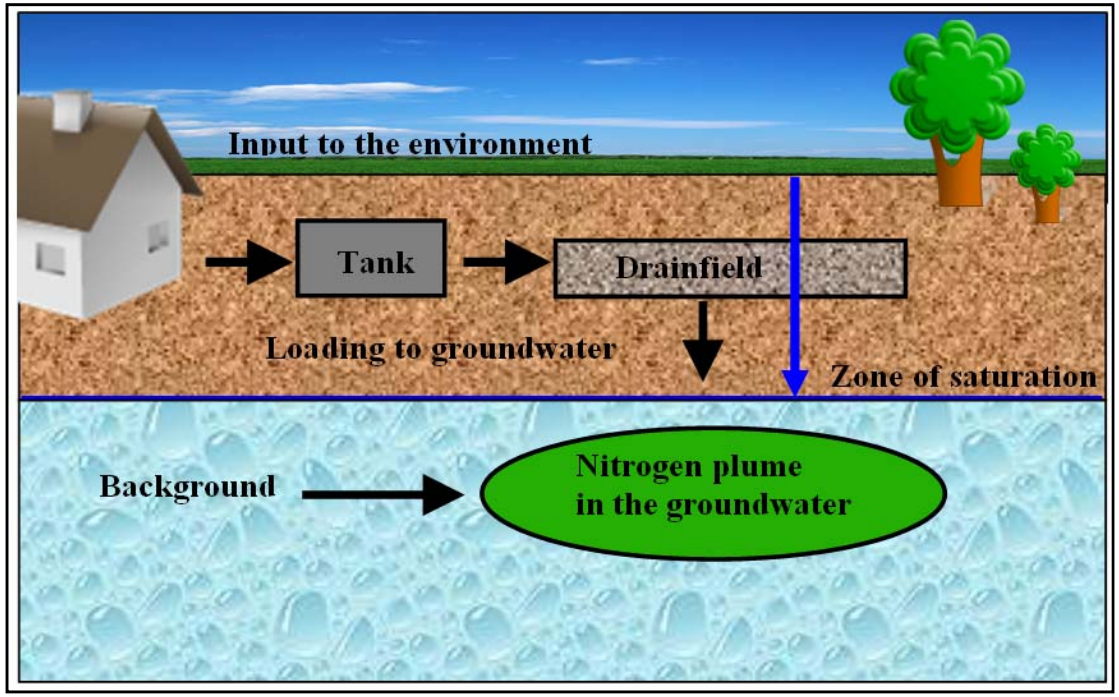
Florida Department of Health

Statewide rule

implemented by

67 county offices

Nitrogen from onsite systems depends on:



- System usage
- Treatment level
- Groundwater
- Soil type

“Advanced Systems”

- Aerobic Treatment Units (ATUs)
- Performance-based Treatment Systems (PBTS)

Regulatory requirements for advanced systems

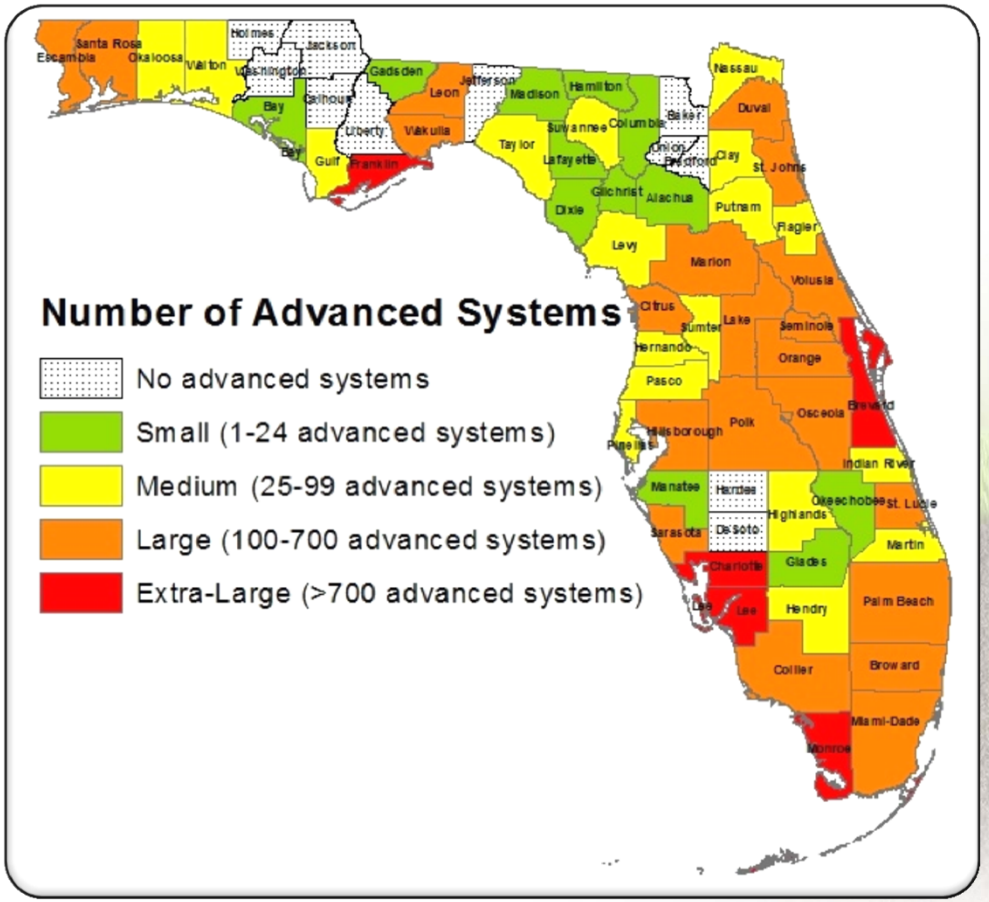
- Florida DOH
  - Biennial operating permit
  - Annual DOH inspection
- Maintenance entity
  - Maintenance contract
  - Two annual inspections

How are these systems working?

- What are the options?
- How effective are they?
- How are systems working day-to-day?
- How are these systems perceived?

Where are Florida's advanced systems?

There are approximately 12,000 advanced systems in Florida



Sampling protocol

Three groups of measurements:

1. Initial system assessment
2. System operation evaluation
3. Sample analysis

Sampling

Sampling results

Median	$cBOD_5$ (mg/L)	TSS (mg/L)	TN (mg/L)	TP (mg/L)
Influent (n=42)	95	66	45	7.9
Effluent (n=301)	5.5	19	30	7.5
% Removal	94%	72%	33%	6%

Comparison of results aerating and non-aerating systems

Parameter	Influent n=42	Aerating n=237		Non-Aerating n=42	
		Result	% Removal	Result	% Removal
$cBOD_5$ (mg/L)	95	4.6	95%	38	60%
TSS (mg/L)	66	18	73%	23	65%
TN (mg/L)	45	29	36%	47	-4%
TKN (mg/L)	45	4.9	89%	42	8%
TP (mg/L)	7.9	7.3	7%	8.7	-10%

Current paperwork

+

Regular inspections

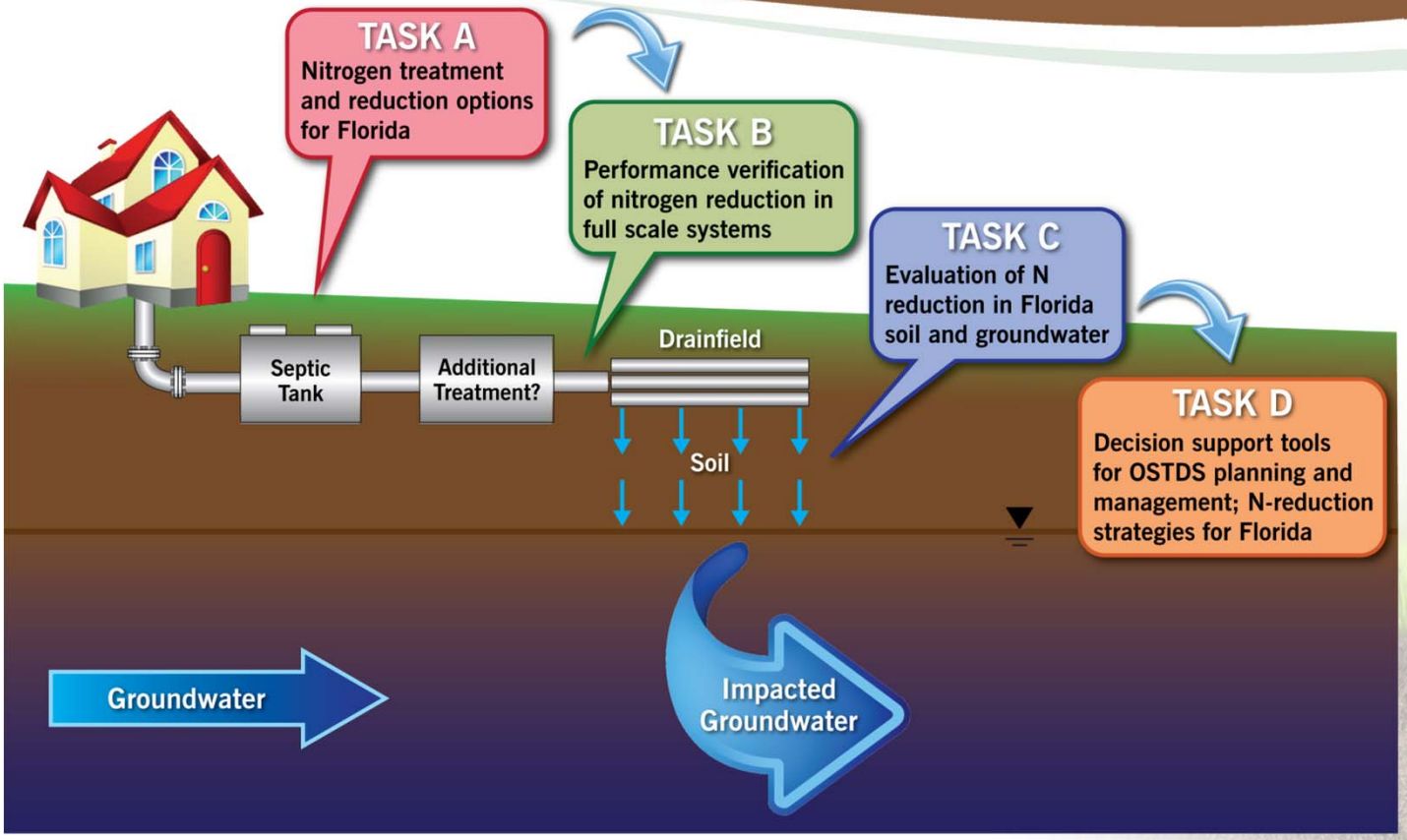
=

Satisfactory system operation

=

Sample results meet standards

Florida Onsite Sewage Nitrogen Reduction Strategies Study



Study cost-effective ways to reduce nitrogen from onsite wastewater treatment systems

Project Timeline

2008
Study authorized by Florida Legislature

2009-2015
Project executed, funding appropriations ongoing

2015-2016
Anticipated contract completion

FDOH Research Review & Advisory Committee

Florida HEALTH

Elke Ursin
Eberhard Roeder

Florida Department of Environmental Protection

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Support Services

Environmental Drilling Service Inc.

Mechling Engineering & Consulting, Inc.

Southern Analytical Laboratories, Inc.

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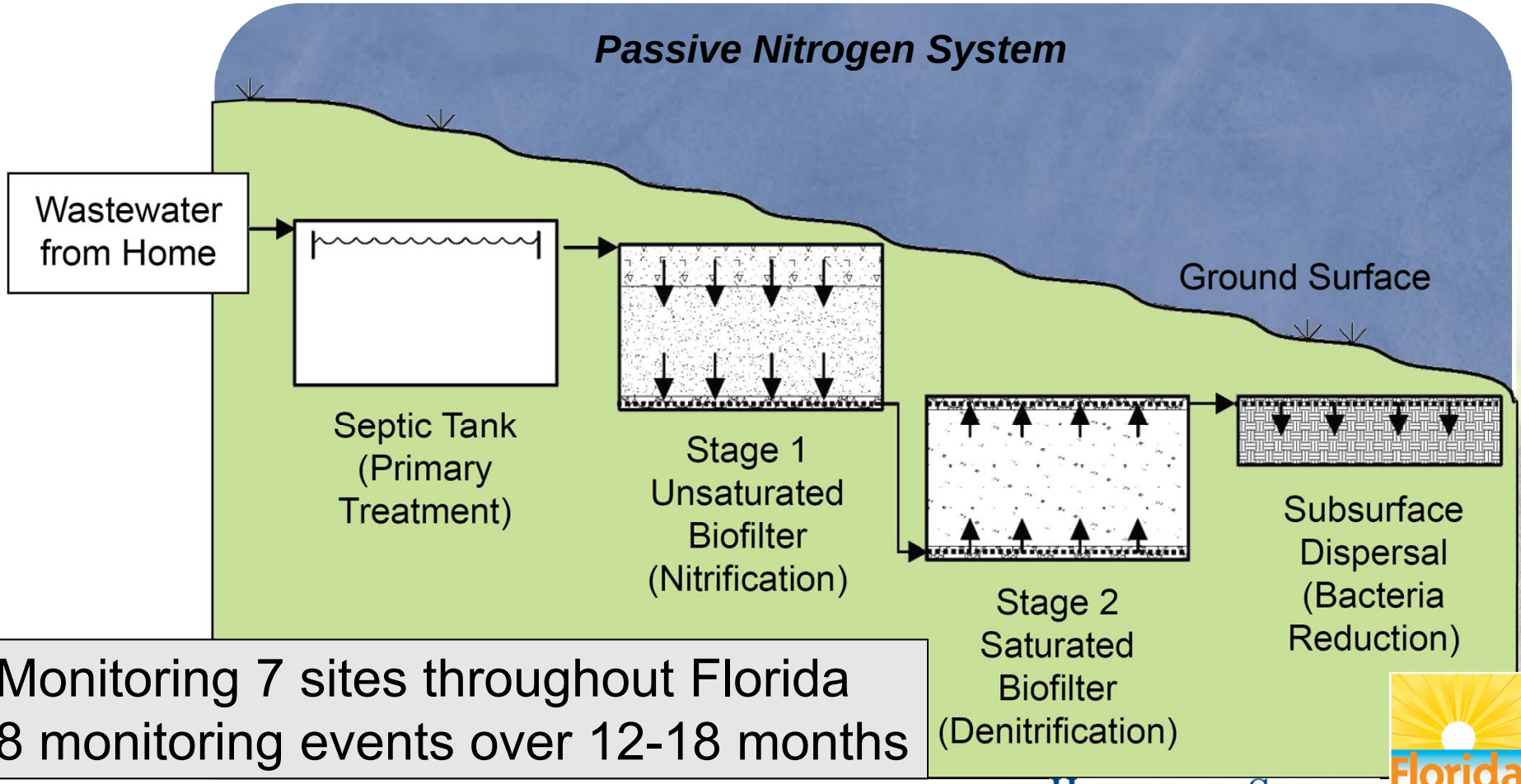
Study goals

- Develop passive strategies for nitrogen reduction
- Complement use of conventional systems
- Develop cost-effective and ecologically protective nitrogen reduction strategies
- Evaluate nitrogen transport

Evaluate technologies

- Determine what nitrogen reduction strategies to study
- Bench-scale testing to develop design criteria

Install Full-Scale Systems at Actual Home Sites



Monitoring 7 sites throughout Florida
8 monitoring events over 12-18 months

Illustration courtesy of HAZEN AND SAWYER Environmental Engineers & Scientists

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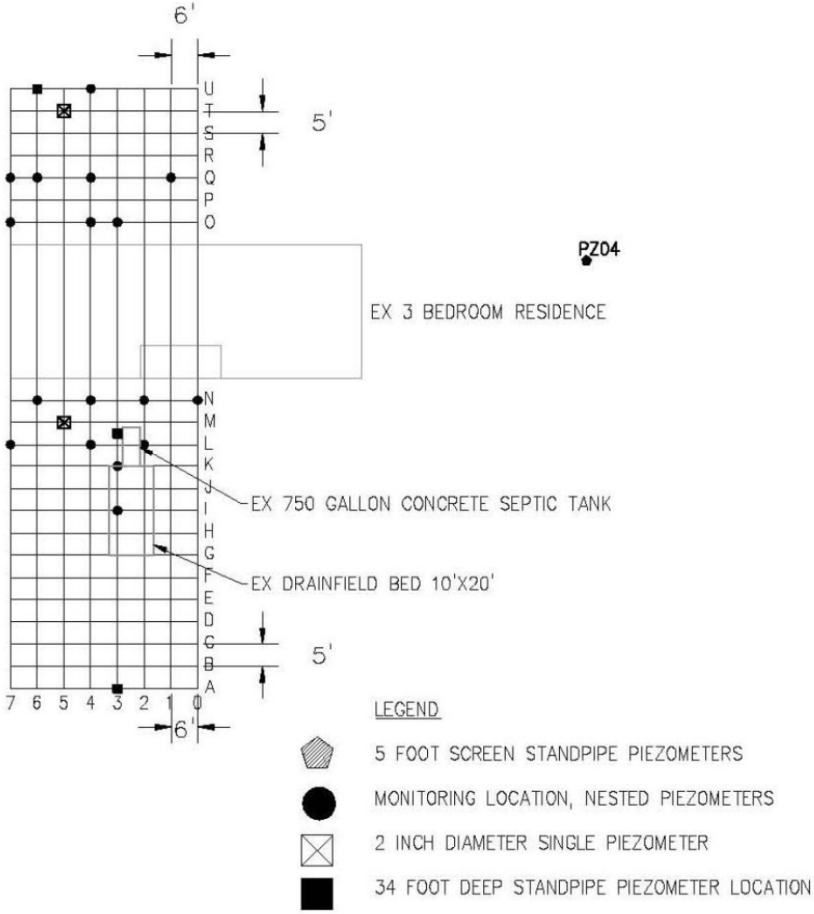
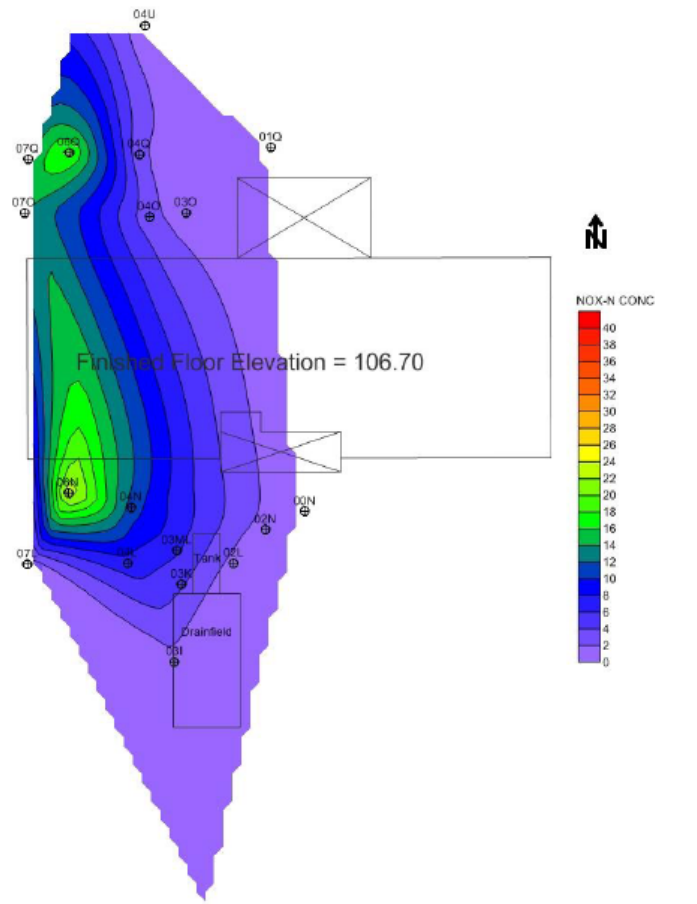
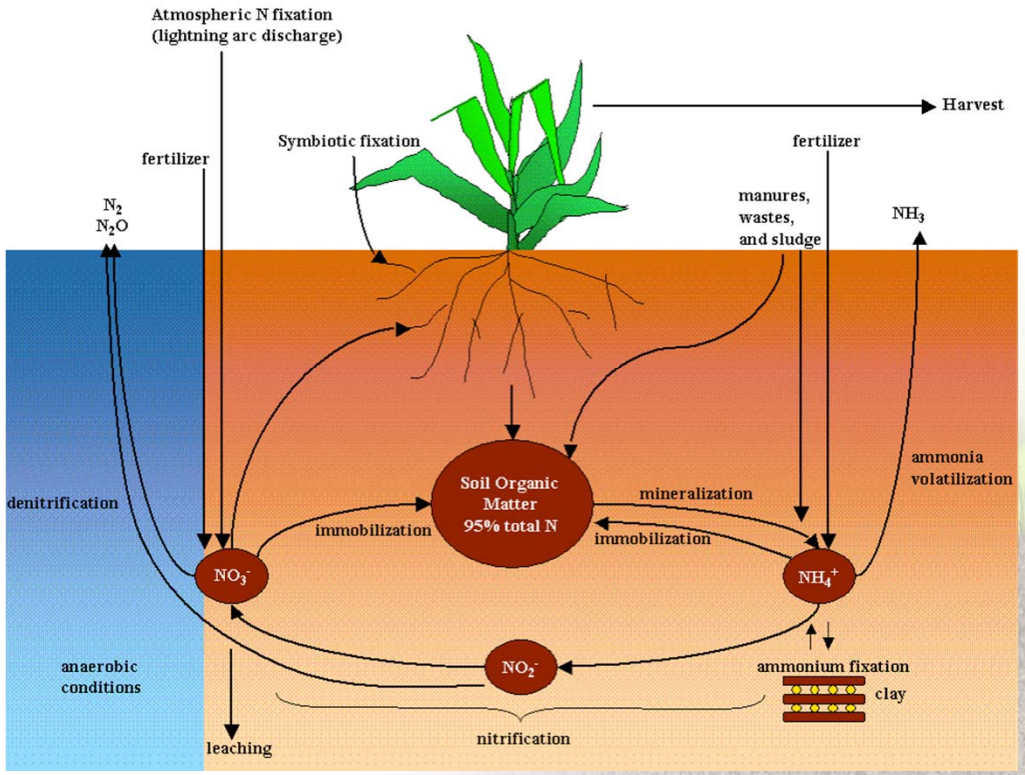
Evaluate nitrogen reduction in Florida soils and groundwater





Model Nitrogen Removal

- Shows treatment in soil and groundwater
- Use for assessment, planning, and siting
- Simple to use
- Calibrate to site specific data



Neitsch et al., 2002

What's next?

Florida Department of Health

Research Review

and

Advisory Committee

Summary

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SSSA Onsite
Wastewater Conference
April 7-8, 2014

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