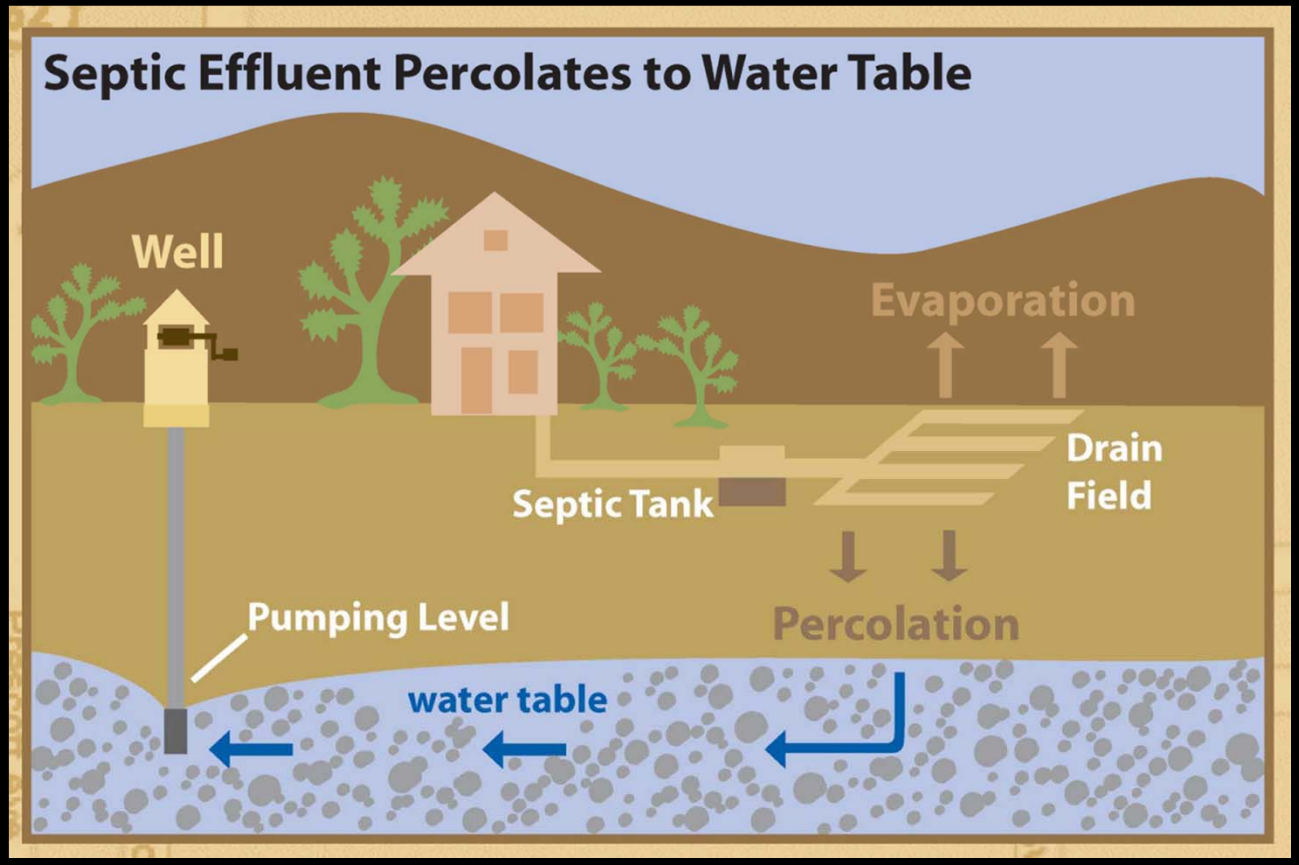
Onsite Wastewater Treatment Systems Pilot Program

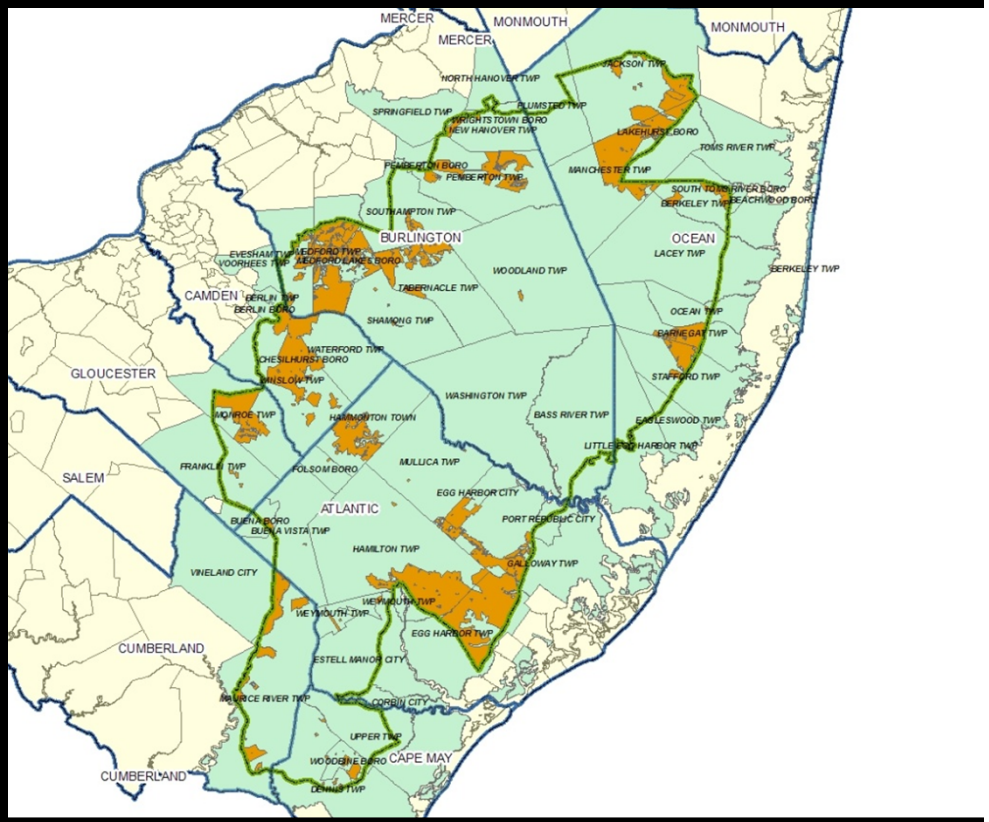


Twelfth Annual Report to the Pinelands Commission

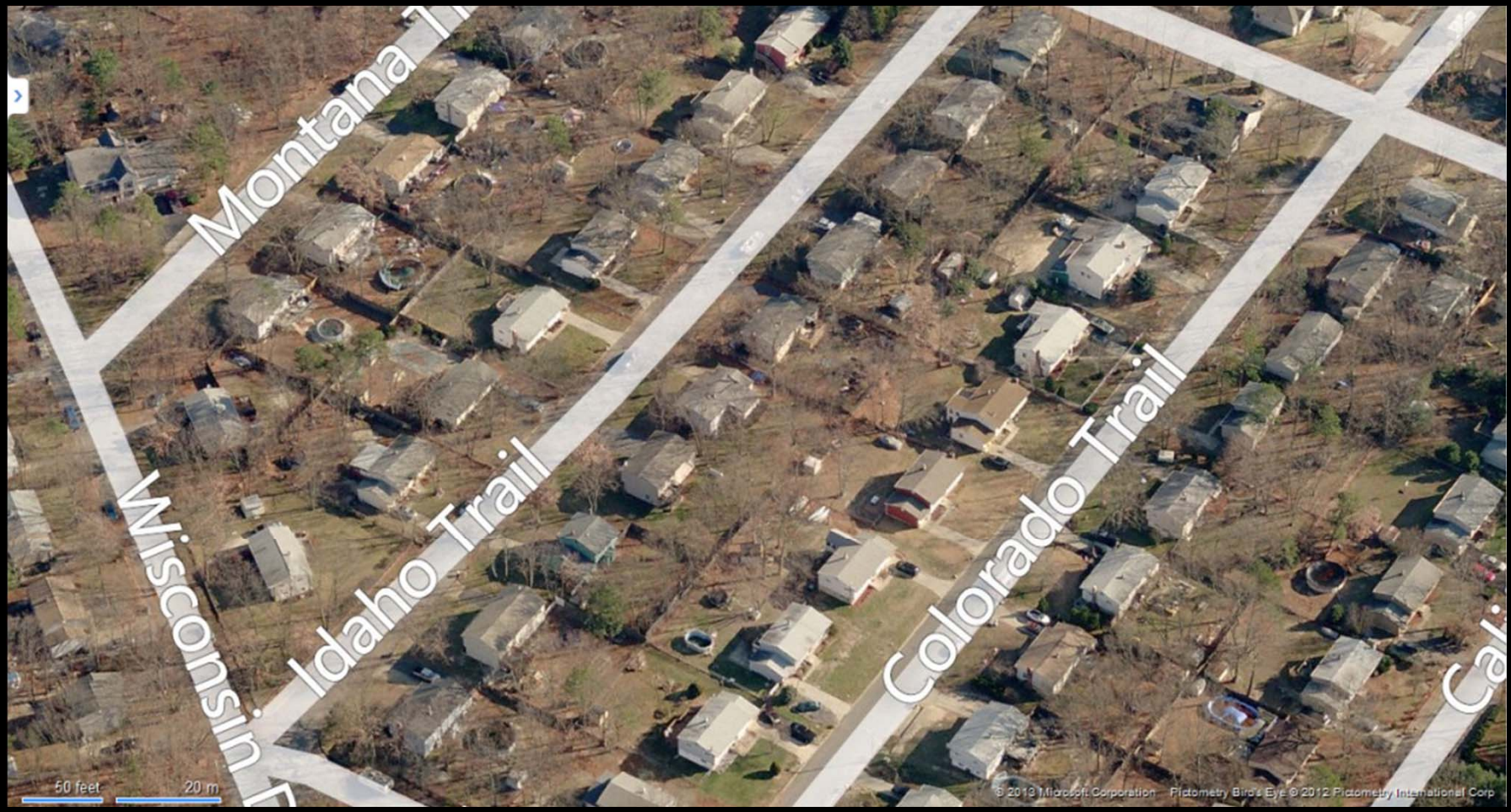
September 12, 2014

Pinelands Centralized Sewer and Onsite System Service Areas

- Centralized sewers are permitted only in designated growth areas. (RGA, Towns and Villages)
- Onsite (septic and advanced) systems are relied upon in the Pinelands protection areas and are a permanent component of the region's wastewater infrastructure.
- Standard septic systems achieve nitrogen standard through dilution on larger lots.
- Advanced systems meet nitrogen standard through active treatment and dilution on smaller lots.



Onsite Septic Systems in the Pinelands



Approximately 22,000 existing septic systems in the Pinelands Area

The Pinelands Septic Dilution Model

$$At = Af + \frac{\left(\frac{FLf}{C} - Df\right)}{Do} Af$$

Land use planning tool where:

At = total parcel area
Af = area of disposal field
F = unit conversion factor of 10
Lf = flux of nitrate-nitrogen below disposal field (kg/ha/yr)
C = concentration of nitrate-nitrogen (ppm)
Df = equivalent depth of percolate below disposal field (cm/yr)
Do = equivalent depth of percolate below open acres (cm/yr)

Parameter	Assumption
Number of persons/dwelling	3.5
Number of persons/age restricted dwelling	2.0
Residential wastewater flow (gal/capita/day)	75
Plant uptake of nitrogen	4.5% A soils / 9.0% B soils
Infiltration rainfall	20.0 inches/year
Nitrogen production (grams/capita/day)	11.2
Distribution of nitrogen in wastewater	83% blackwater / 17% greywater
Nitrogen concentration in residential wastewater	39.45 ppm

Requires 3.2 acres to meet water quality standard if using a conventional septic system

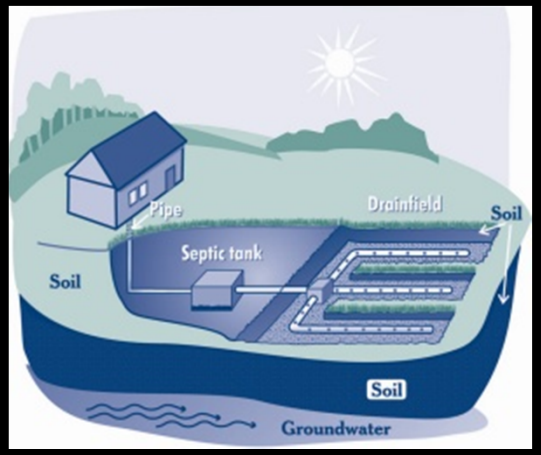
Nitrogen Dilution Modeling

Minimum lot size requirements

Effluent Total [N] mg/l	% Reduction N removal rate	Lot Area (acres) to meet 2 mg/l
39.45	0	3.2
32	20	2.5
26	35	2.0
19	50	1.5
14	65	1.0

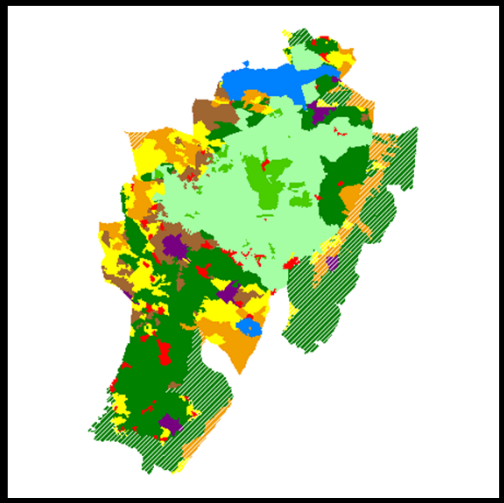
Rules Governing Onsite Wastewater Systems in the Pinelands

STANDARDS FOR INDIVIDUAL SUBSURFACE SEWAGE DISPOSAL SYSTEMS



New Jersey Department
Of Environmental
Protection
N.J.A.C 7:9A

PINELANDS COMPREHENSIVE MANAGEMENT PLAN



New Jersey
Pinelands Commission
N.J.A.C 7:50

Rules Governing Onsite Wastewater Systems in the Pinelands

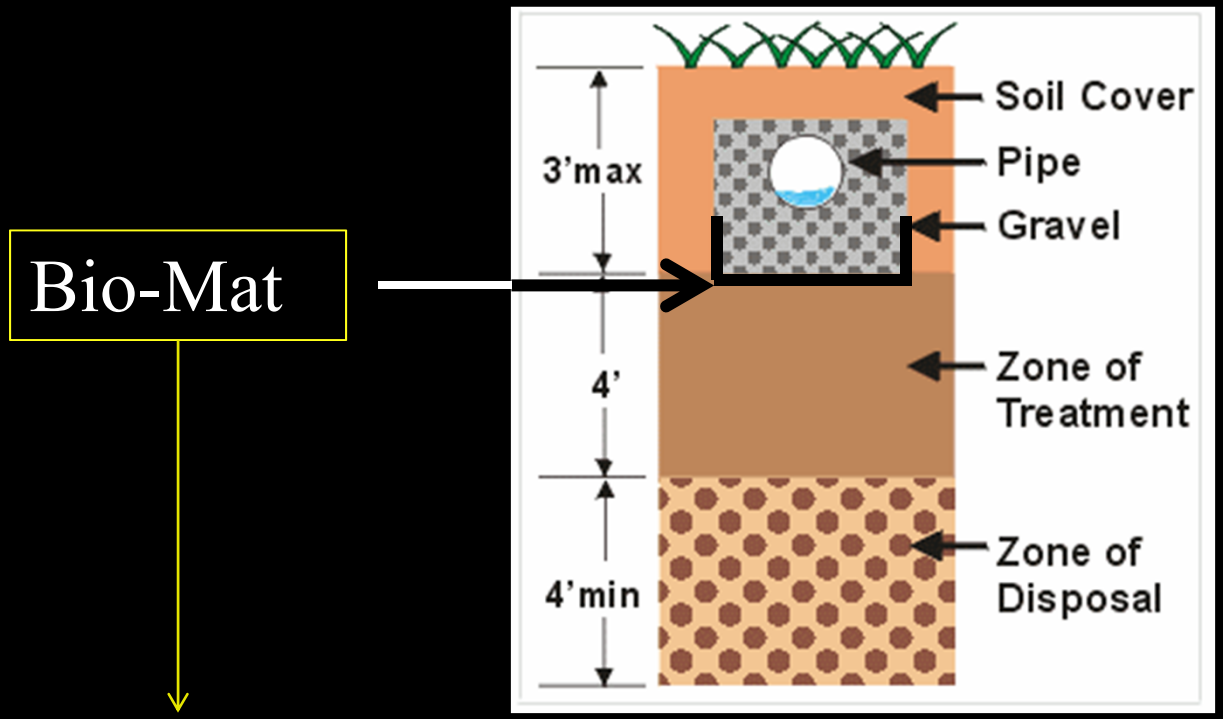
New Jersey Department Of Environmental Protection
N.J.A.C 7:9A

Emphasis on treatment and isolation of wastewater pathogens for public health protection

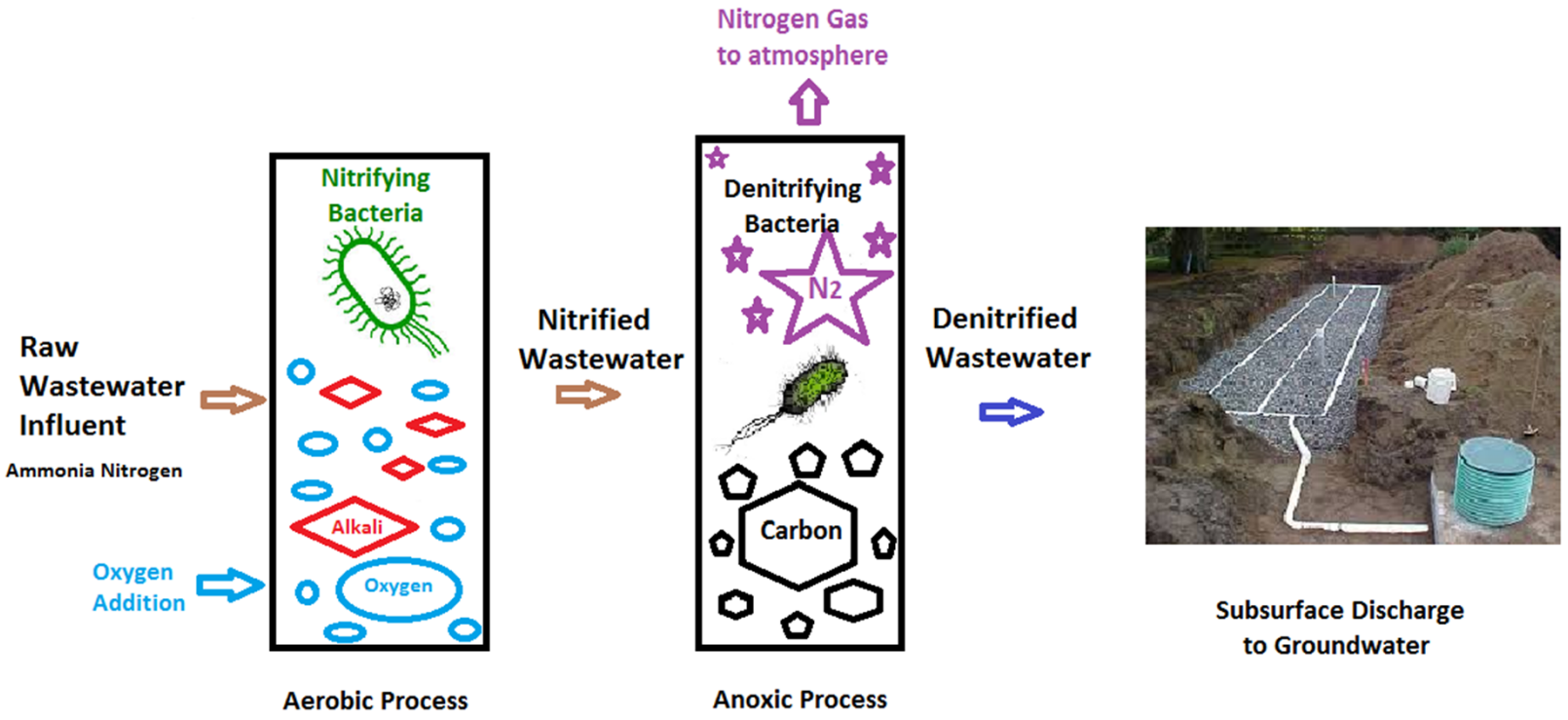
New Jersey Pinelands Commission
N.J.A.C 7:50

Emphasis on wastewater - borne nitrogen for ecological protection

Wastewater renovation via soil-treatment systems



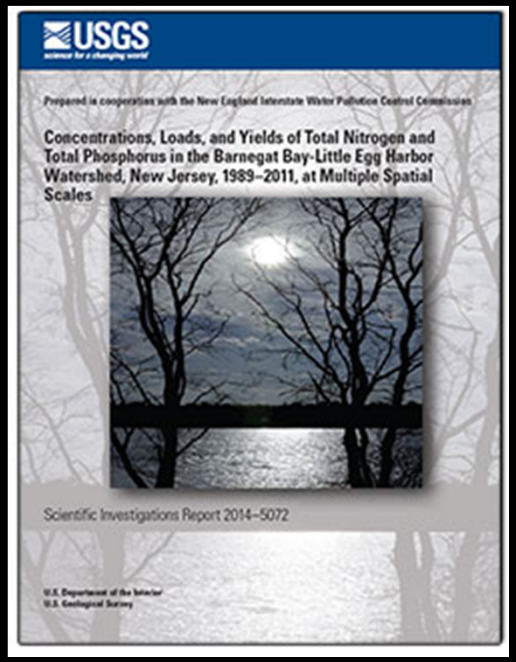
- Wastewater solids, dead and living microorganisms, microbial secretions, insoluble compounds and non-degradable synthetic fibers.
- 3/16 to 1-3/8 thick with permeability on the order of 0.25 inches per hour (K1)
- Removes organic material and pathogens



Onsite Treatment Process for Biological Nitrogen Removal

(Required in Pinelands if < 3.2 acres)

Nutrient Pollution in the News



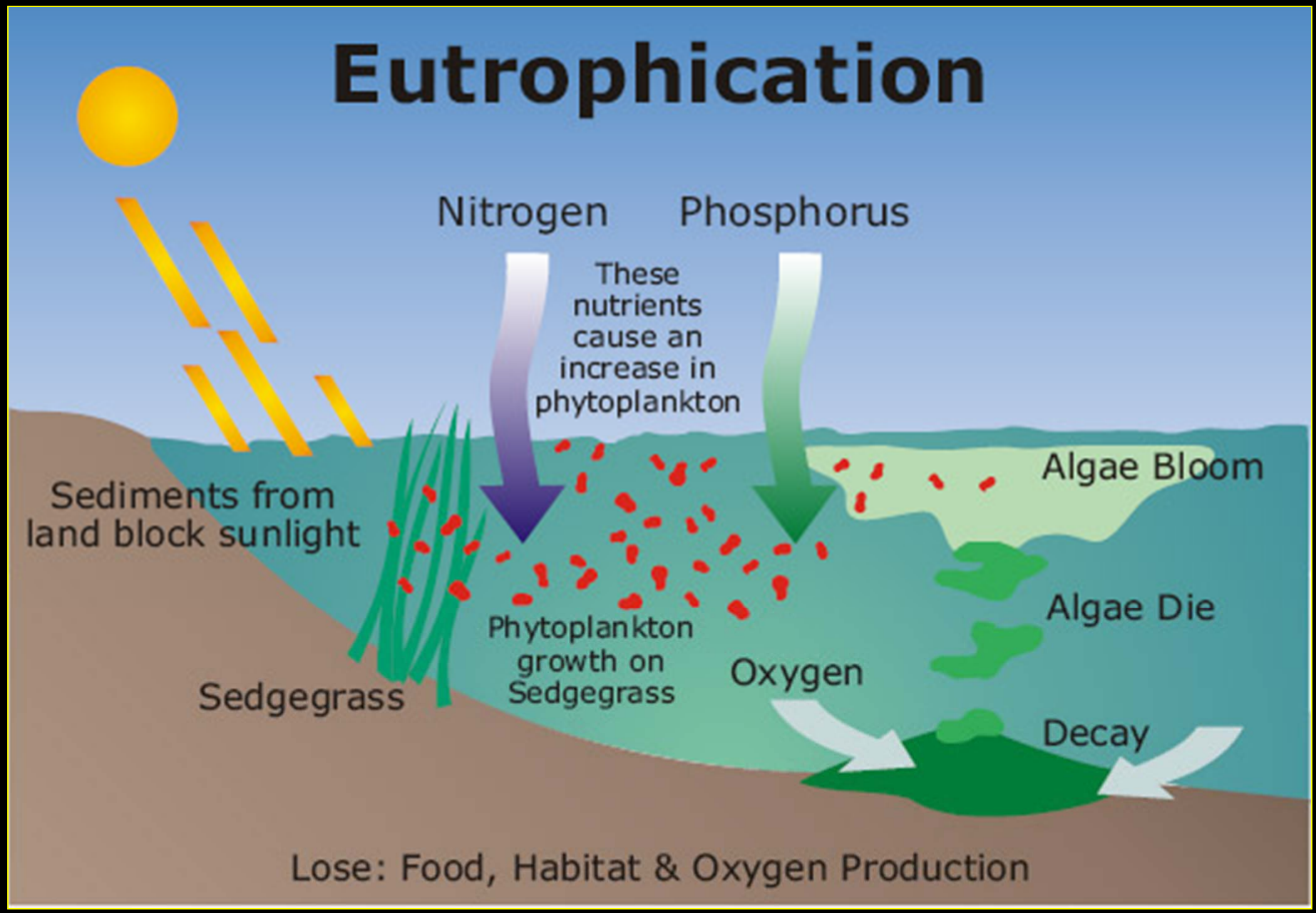
Nutrient Pollution in the News

Toledo water woes stir call for national standards, strategy to fight algae toxins

Aug. 3, 2014 sample of Lake Erie water near Toledo City water supply intake

Local Nutrient Pollution

Sept. 11, 2014 Pancoast Mill Pond, Buena Vista Township

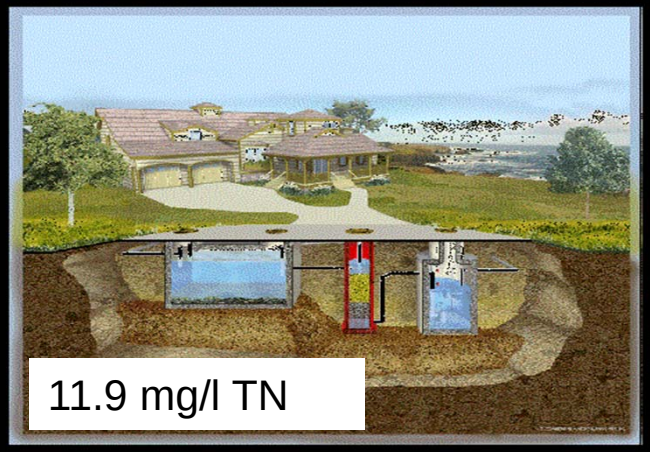

Eutrophication
Nitrogen
Phosphorus
These nutrients cause an increase in phytoplankton
Sediments from land block sunlight
Algae Bloom
Algae Die
Phytoplankton growth on Sedgegrass
Oxygen
Sedgegrass
Decay
Lose: Food, Habitat & Oxygen Production

Original Five Pilot Program Wastewater Systems Selected for their Ability to Reduce Nitrogen

System	Pilot Program Status
Amphidrome	Permanently approved for use on min. one acre lots
Bioclere	Permanently approved for use on min. one acre lots
Cromaglass	Eliminated from the pilot program (Sept. 2014)
Fast	To be authorized for use on minimum 1.5 acre lots
Ashco RFS^{III}	Removed from pilot program Dec. 2007

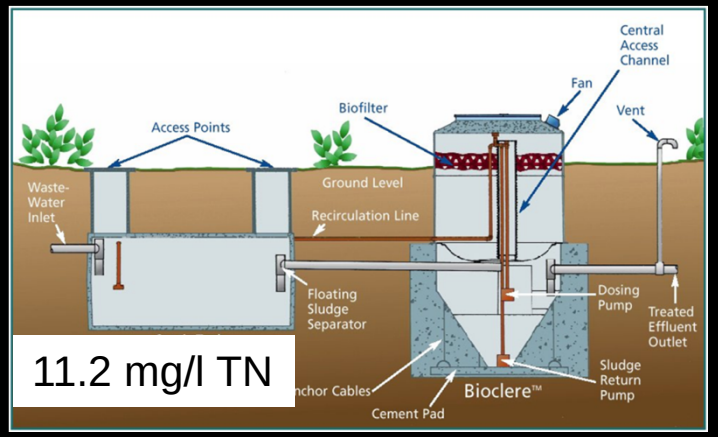
Original Pilot Program Technologies

Amphidrome



11.9 mg/l TN

Bioclere

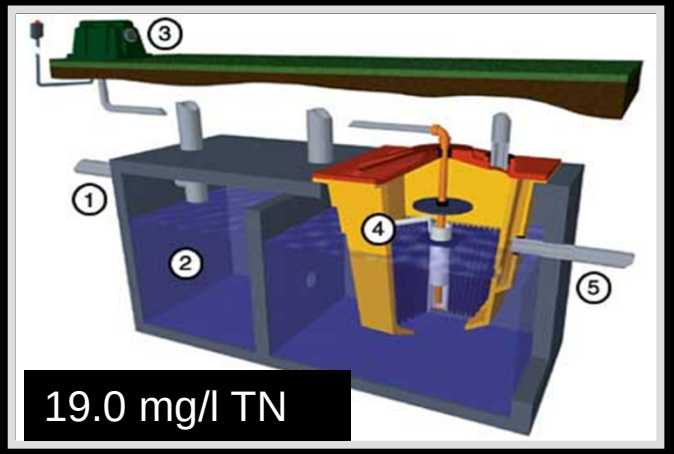


11.2 mg/l TN

Cromaglass

31.5 mg/l TN

FAST



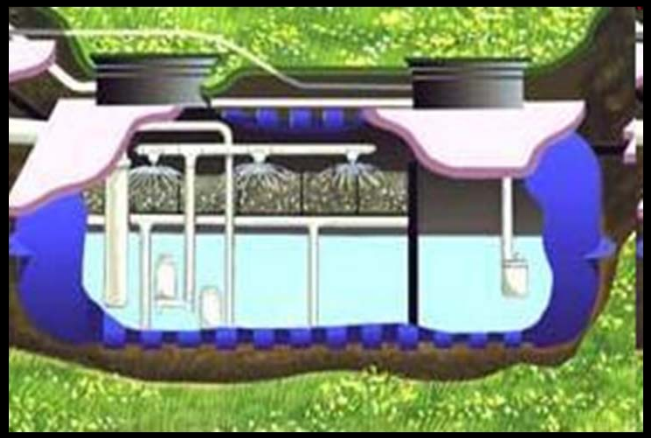
19.0 mg/l TN

Four New Pilot Program Wastewater Systems

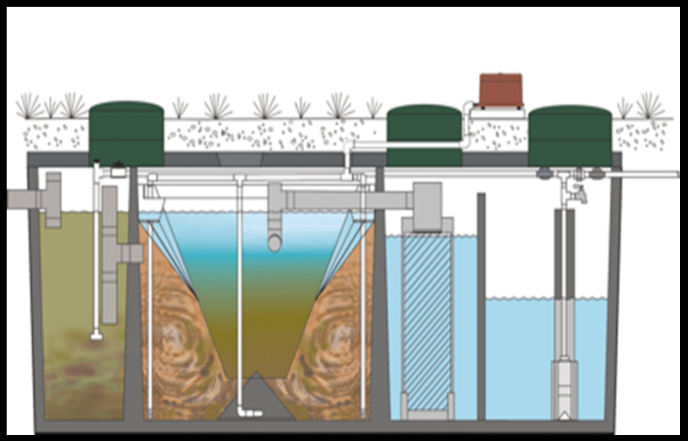
System Name	System Vendor	Treatment Process
Bio Barrier	Bio-Microbics, Inc.	Membrane Bioreactor
Busse GT	Busse Green Technologies, Inc.	Membrane Bioreactor
Hoot ANR	Hoot Systems, LLC.	Extended Aeration/Activated Sludge
SeptiTech	SeptiTech, LLC	Fixed Film Trickling Filter

Newest Pilot Program Technologies

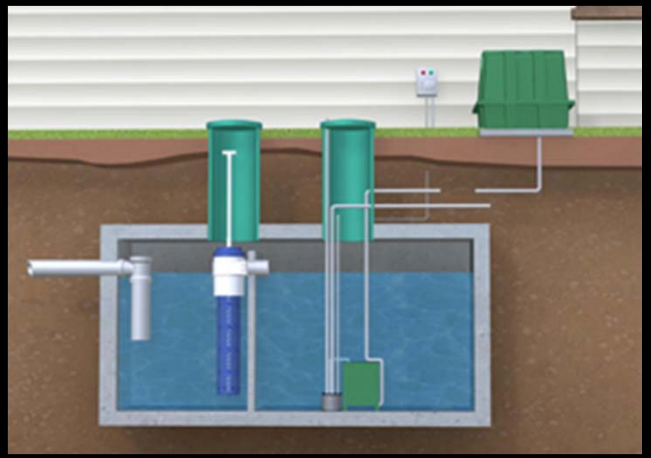
Septi Tech



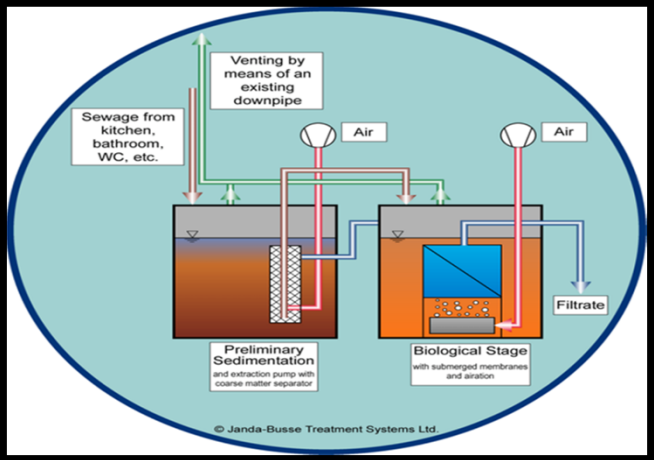
Hoot ANR



Bio Barrier



Busse GT



Installed Pilot Program Technologies

Technology	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	Total Installed
Amphidrome	7	10	11	29	13	7	5	8	4	6	1	101
Bioclere	0	2	11	9	7	9	6	5	3	5	6	63
Cromaglass	0	5	39	7	4	1	0	0	0	0	0	56
FAST	0	0	0	0	2	5	3	3	3	5	2	23
SeptiTech	Not yet active in pilot program										3	3
BioBarrier	Not yet active in pilot program										5	5
Total	7	17	61	45	26	22	14	16	10	16	17	251

Pilot Program Technologies: Reported Costs

Technology	Average Treatment System & Five Year Service Cost	Ave. Total Reported Cost
Amphidrome	$ 19,212	$31,509
Bioclere	$ 17,518	$ 28,076
Cromaglass	$ 22,553	$ 35,265
FAST	$ 17, 819	$29,633
Bio Barrier	$ 18,275	$28,275
SeptiTech	$ 19,800	$28,900
Hoot ANR	$ 14,500	N/A
Busse GT	$ 24,000	N/A

Environmental protections achieved through our septic system program

- Disease transmission from sewage-borne pathogens is minimized through the application of NJDEP's regulations that ensure septic systems are installed in suitable soils.

- Nutrient enrichment of wetlands and surface waters is minimized through the Pinelands Commission's septic density standards and through the use of Pinelands advanced (denitrifying) pilot program systems.

Pilot Program Report Summary - Cromaglass

Cromaglass technology has been permanently removed from the pilot program.

Cromaglass Corp is no longer in business and is no longer servicing existing systems.

Former officers / employees of Cromaglass Corp. are offering O&M service to owners of existing systems.

Pilot Program Report Summary - Cromaglass

The CMP expressly states that owners of systems that do not reduce nitrogen are to be held harmless – they are not required to replace the system with another alternate technology.

The Commission is providing owners with the option to continue to use the existing system, provided it's maintained in conformance with NJDEP's pathogen protection standards.

Alternatively, owners may convert the system to a conventional septic tank and leach field system by modifying or replacing the Cromaglass tank. Staff will seek bids to develop generic plans for this conversion and will make the plans available to Cromaglass owners.

Pilot Program Report Summary - FAST

September 2, 2014 CMP amendment reauthorizes use of the FAST technology (and BioBarrier, Busse GT, Hoot ANR and SeptiTech) through Aug. 8, 2018.

Based upon latest review of effluent data, staff will be authorizing FAST for use on minimum 1.5 acre parcels (up from previous authorization for use on min. 1.0 acre parcels).

Pending a future CMP amendment, we will call-up applications that propose to use the FAST system on lots that are smaller than 1.5 acre. (Few are likely due to previous sunset requirement of CMP).

Pilot Program Report Summary - FAST

We will provide a limited window of opportunity for applicants to proceed with plans to build a FAST system on < 1.5 acres if they have incurred engineering design costs.

The FAST technology manufacturer has agreed limit future sales to applicants with minimum 1.5 acre building lots. The manufacture (BioMicrobics) considers approval in the Pinelands a success, even if at the 1.5 acre min. lot size.

Staff is notifying interested parties of the new minimum lot size requirement via a website posting and mailings to NJPE's and county health departments.

Pilot Program Report Summary - General

2013-2014

- First of the newest alternate design pilot program technologies installed (5 BioBarriers and 3 SeptiTech systems).

- Continued success with commercial use of alternate design treatment systems (regulated outside the pilot program).

    - Two Amphidrome systems serving two CVS retail stores attaining median TN values below 6 mg/l TN.

    - Demonstrates ability to serve commercial development with advanced treatment systems where dilution through parcel size alone doesn't meet water quality standards.

Pinelands Alternate Design Wastewater Treatment System Pilot Program

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www.nj.gov/pinelands