Legislative Task Force

Meeting #8

Thursday, April 17, 2014
8:00 – 10:00 AM

Room 300, 3rd Floor
Department of Environmental Management
235 Promenade Street Providence, RI

Agenda

8:00 Welcome and Overview of Agenda– *Kevin Flynn, DOP*

8:05 Review/ Feedback on meeting notes for March 27, 2014 - *Kevin Flynn & All*

8:10 Subject Topics and Technical Presentations:

A. Summary of NE Agency Rules and Regulations for Wetlands and Septic Disposal Setbacks
   - **a.** Wetlands – *Carol Murphy, DEM*
   - **b.** OWTS - Ernie Panciera, Brian Moore, DEM

B. Questions & Task Force Discussion – (*All) - moderated by Kevin Flynn, DOP*

9:45 Next Steps– *Nancy Hess, DOP*

A. Recap – Scope and Topics to date
B. Preview for Literature Review Team
C. May Meeting Date & Location

10:00 Adjourn

DRAFT	CONNECTICUT	MASSACHUSETTS	NEW HAMPSHIRE	VERMONT
State authorities	-Inland Wetlands and Watercourses Act (IWWCA) -Tidal Wetlands Act (TWA) (C.G.S. Sect. 22a 36-45 and 22a 28-35)	Wetlands Protection Act (M.G.L. Chap. 131, Sect. 40)	- Fill and Dredge in Wetlands Act - Shoreland Water Quality Protection Act (NH R.S.A. 482-A and 483-B)	Vermont Statute Ann. Title 10 and Wetland Rules
Administration	Re: IWWCA - The state law requires municipal regulation of activities affecting *Wetlands and Watercourses* - Each municipality establishes an *Inland Wetland Agency* - CT DEEP reviews state projects Re: TWA - CT DEEP for *Tidal Wetlands* - Municipalities review projects in upland adjacent to *Tidal Wetlands*	- The Wetlands Protection Act is implemented by municipal Conservation Commissions; - MA DEP oversees administration and develops regulations, policies, training for the municipalities, and hears appeals. - The purpose is to protect eight public interests that wetlands freshwater and coastal wetlands provide.	- The NH DES regulates impacts to areas where the tide ebbs and flows, or freshwater flows or stands. - Projects classified according to potential impacts as major, minor, or minimum impact projects. - Municipalities may designate wetlands as *prime wetlands* based on criteria identified in the Act and Regulations.	- By legislation wetlands are VT's most productive ecosystem. - The purpose is to protect ten functions and values that VT wetlands provide. -Wetlands deemed significant based on the functions and values are regulated by the VT Wetland Rules.
Buffer zones	- Municipal *Inland Wetland Agencies* can regulate activities outside of *Wetlands* or *Watercourses* if the activity may have an impact on the *Wetland* or *Watercourse.* - The CT DEEP *Upland Review Area* Guidance advises that a 100 foot wide area is sufficient for most situations. (1997)	- A *Buffer Zone* is the review area extending 100 feet from the boundary of the bordering resource areas within which the municipality or DEP requires a permit. Proposed activities within the 100 foot *Buffer Zone* must meet performance standards and BMPs in state regulations. (310 CMR 10.53 (1)) -Some minor activities in the *Buffer Zone* are not subject to	-Upland buffer is the area contiguous to a jurisdictional resource that contributes to the functions and values of that resource. -*Tidal buffer zone* is the area extending 100 feet from the highest observable tide line. -*Prime wetland buffer* is the 100 foot upland area for wetlands that have been municipally designated as *prime wetlands* and at the time	-Vermont regulates buffer zones contiguous to Class 1 and Class 2 wetlands which may be designated by the state. These are considered significant wetlands. -VT maintains significant wetland inventory maps. -Class 1 wetlands have a 100 foot buffer zone and are exceptional or irreplaceable. -Activities may be permitted

	- It describes three *Upland Review Area* models: 1) A fixed distance from all *Wetlands* and *Watercourses* within which regulated activities are subject to *Inland Wetland Agency* approval; 2) A larger *Upland Review Area* for some *Wetlands* or *Watercourses* that may be more sensitive or valuable (these are then identified and named in municipal regulations); 3) The *Upland Review Area* distance considers site-specific factors, i.e., soils and slopes.	regulation. (310 CMR 10.02 (2) (b)) - The *Riverfront Area* is land between a perennial river or stream mean annual high water line and a parallel line 200 feet away. - The *Riverfront Area* is 25 feet away in 14 named cities and in named densely developed areas. (310 CMR 10.58 (2))	of their designation a 100-foot upland buffer was required. - Any activity within the 100 foot buffer zone of a prime wetland is a major impact project. -The Shoreland Protection Act for coastal waters, rivers, and lakes and ponds designate a 50 foot Waterfront Buffer and a 150 foot Woodland Buffer with management requirements.	in Class 1 wetlands if they provide a compelling public purpose. -Class 2 wetlands have a 50 foot buffer zone. - A class 3 wetland is neither class 1 or 2 -The buffer zones protect wetlands from disturbance, and protect functions.
In place	- 70 percent of municipalities have adopted regulations for *Upland Review Areas* that range from 25 to 500 feet (Brooks and Castello 2013)	-70% of municipalities have larger buffers than the state's (131 of 187 studied) (Dain and Schuetz 2006) - Many local zoning by-laws include "no disturb" and/or "no build" zones around wetlands. -Also, buffer zones around isolated wetlands may be regulated through local by-laws.	--111 municipalities regulate development in wetlands and 62 of these regulate development next to wetlands from 25 to 125 feet (NH DEP 2007). Some municipalities have building setbacks only.	-By legislation municipalities are enabled to protect wetlands through ordinances and regulations.
Vernal pools	-38 municipalities define Vernal Pools. -11 municipalities have adopted vernal pool *Upland Review Areas* ranging from 100 to 500 feet wide.	-The depression and the area within 100 feet are regulated to the extent that such habitat is within an area subject to protection under the Act.		-Protected if part of designated class 1 or class 2 wetlands or contiguous to these wetlands.

	(Brooks and Castello 2013)			
Attachments	Guidelines Upland Review Area Regulations (CT DEP Wetlands Management Section 1997)		Definition of prime wetlands. Shoreland protection standards. (RSA and NH DES)	
draftcm/041014				

New Hampshire Prime Wetlands

Prime Wetlands in NH Communities

Under RSA 482-A:15 and administrative rules Env-Wt 700, individual municipalities may elect to designate wetlands as “prime-wetlands” if, after thorough analysis, it is determined that high-quality wetlands are present. Typically, a wetland receives this designation because of its large size, unspoiled character and ability to sustain populations of rare or threatened plant and animal species. Field and “desk top” data are used for the evaluation process.

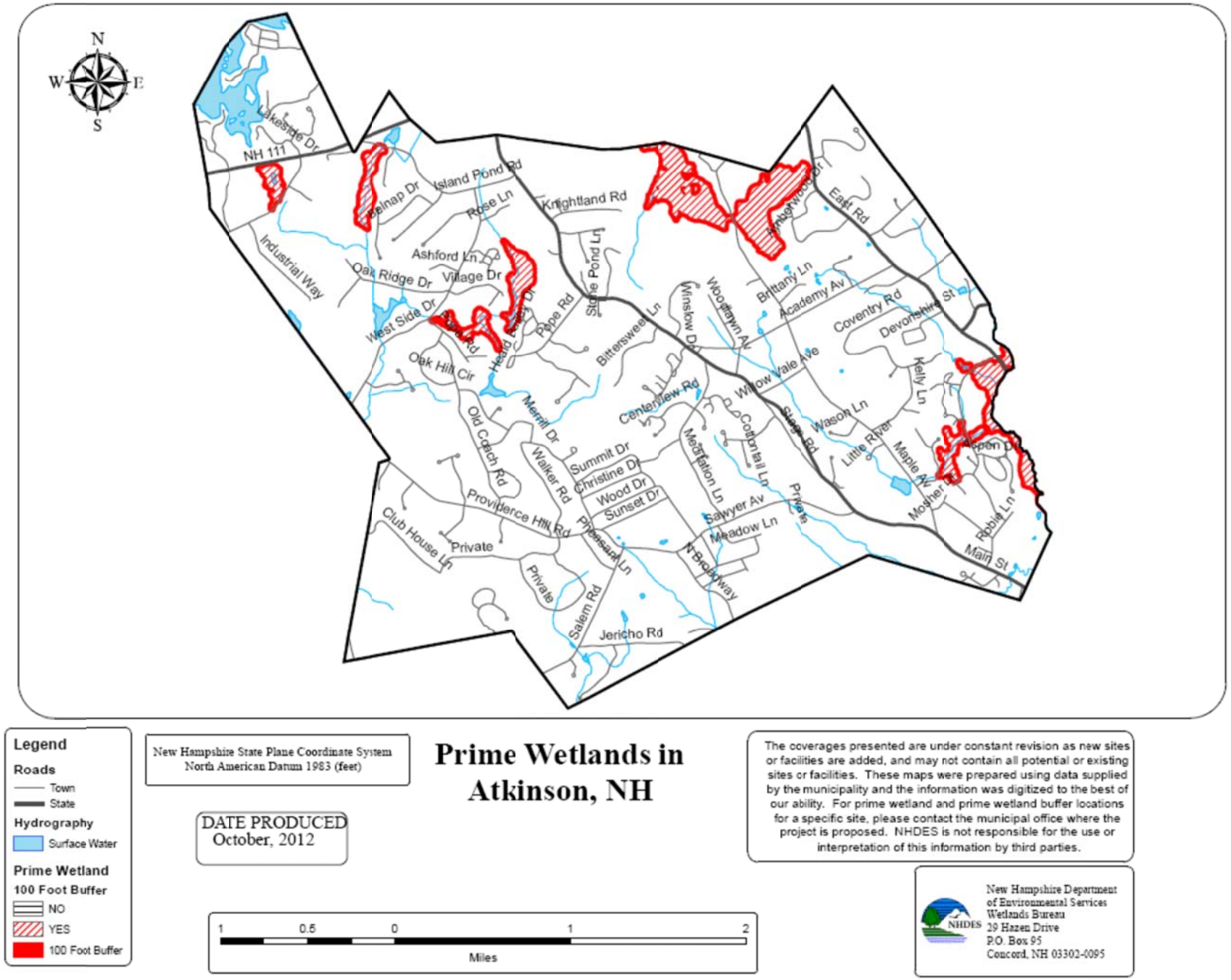
After high value wetlands are identified, the municipality holds a public hearing before the residents of the community to vote on the designation. Once the municipality approves the wetlands for designation as prime, the municipality provides to the DES Wetlands Program a copy of the study and tax maps with the designated prime wetlands identified. DES reviews the submission from the municipality to ensure that it is complete and in accordance with Env-Wt 702.03.

Once the town's prime wetland submission is considered complete and approved, DES will apply the law and rules that are applicable to any future projects that are within the prime wetland or the 100 foot prime wetland buffer.

Review the following town prime wetland and prime wetland buffer maps to determine if your project is within these town designated protection areas. The original files can also be found at the town municipal offices.

Towns may have other local buffers or setbacks that are not addressed under the prime wetland or prime wetland buffer statute or rules.

04.10.14 For informational purposes only.
From: http://des.nh.gov/organization/divisions/water/wetlands/prime_wetlands.htm



Legend

Roads
- Town
- State

Hydrography
- Surface Water

Prime Wetland
100 Foot Buffer
- NO
- YES
- 100 Foot Buffer

New Hampshire State Plane Coordinate System
North American Datum 1983 (feet)

Prime Wetlands in Atkinson, NH

DATE PRODUCED
October, 2012

1 0.5 0 1 2
Miles

The coverages presented are under constant revision as new sites or facilities are added, and may not contain all potential or existing sites or facilities. These maps were prepared using data supplied by the municipality and the information was digitized to the best of our ability. For prime wetland and prime wetland buffer locations for a specific site, please contact the municipal office where the project is proposed. NHDES is not responsible for the use or interpretation of this information by third parties.

New Hampshire Department
of Environmental Services
Wetlands Bureau
29 Hazen Drive
P.O. Box 95
Concord, NH 03302-0095

04.10.14 For informational purposes only.
From: http://des.nh.gov/organization/divisions/water/wetlands/prime_wetlands.htm

New Hampshire Prime Wetlands

TITLE L
WATER MANAGEMENT AND PROTECTION
CHAPTER 482-A
FILL AND DREDGE IN WETLANDS
Section 482-A:15

482-A:15 Local Option; Prime Wetlands. –

I. (a) Any municipality, by its conservation commission, or, in the absence of a conservation commission, the planning board, or, in the absence of a planning board, the local governing body, may undertake to designate, map, and document prime wetlands lying within its boundaries, or if such areas lie only partly within its boundaries, then that portion lying within its boundaries. The conservation commission, planning board, or governing body shall give written notice to the owner of the affected land and all abutters 30 days prior to the public hearing, before designating any property as prime wetlands.

(b) Prior to municipal vote under paragraph II, maps that depict wetland boundaries shall be prepared and landowners having proposed prime wetlands on their property shall be informed of the boundary delineation. The acceptance of any prime wetland designation by the department prior to the effective date of this paragraph shall remain in effect; however, any revision to the boundary shall be delineated using wetland delineation methods as adopted by the department and by the standards of this section.

I-a. For the purposes of this chapter, "prime wetlands" shall mean any contiguous areas falling within the jurisdictional definitions of RSA 482-A:2, X and RSA 482-A:4 that, because of their size, unspoiled character, fragile condition, or other relevant factors, make them of substantial significance. A prime wetland shall be at least 2 acres in size, shall not consist of a water body only, shall have at least 4 primary wetland functions, one of which shall be wildlife habitat, and shall have a width of at least 50 feet at its narrowest point. The boundary of a prime wetland shall coincide, where present, with the upland edge of any wetland, as defined in RSA 482-A:2, X, that is part of the prime wetland. On-site verification of proposed prime wetland boundaries shall be performed where landowner permission is provided.

I-b. The commissioner shall adopt rules under RSA 541-A relative to the form, criteria, and methods that shall be used to designate, map, and document prime wetlands, determine boundaries in the field, and amend maps and designations once filed and accepted by the department under paragraph II.

II. Any municipal conservation commission or that local body which has mapped and designated prime wetlands in accordance with paragraph I may, after approval by any town or city council meeting, file such maps and designations with the department, which shall accept and maintain them and provide public access to such maps during regular business hours. The procedure for acceptance by the local legislative body of any prime wetland designations as provided in paragraph I shall be the same as set forth in RSA 675:2 or RSA 675:3, as applicable.

Source: http://www.gencourt.state.nh.us/rsa/html/L/482-A/482-A-15.htm

04.10.14 For informational purposes only.
From: http://des.nh.gov/organization/divisions/water/wetlands/prime_wetlands.htm

NEW HAMPSHIRE DEPARTMENT OF Environmental Services

RSA 483-B
Shoreland Water Quality Protection Act (SWQPA)
A Summary of the Standards

A STATE SHORELAND PERMIT is required for most new construction[1], excavation[2] and filling[3] activities within the Protected Shoreland. (*See definitions below*) Forest management not associated with shoreland development or land conversion, and conducted in compliance with RSA 227-J:9 and agricultural activities and operations defined in RSA 21:34-a and governed by RSA 430 are exempt from the provisions of the SWQPA. Impacts that receive a wetlands permit under RSA 482-A, e.g., beaches, docks and shoreline retaining walls do not require a shoreland permit. A complete list of activities that ***do not*** require a shoreland permit can be found on the Shoreland Program Page by visiting www.des.nh.gov.

250 feet from Reference Line — THE PROTECTED SHORELAND:

Impervious Area[6] Limitation. Best management practices recommend no greater than 30% of the area of a lot within the protected shoreland be composed of impervious area[6]. If one wishes to exceed this recommendation, a stormwater management system must be designed and installed by a professional engineer and, if any waterfront buffer grid segment does not meet the minimum required 50 point tree and sapling point score, each deficient grid segment must be planted with additional vegetation so that it at least achieves the minimum required point score. All projects that propose to exceed 20% impervious area of the lot within the protected shoreland must implement a stormwater management plan to infiltrate increased stormwater from development.

Other Restrictions/ Notes:

- No establishment/expansion of salt storage yards, auto junk yards, solid waste and hazardous waste facilities.
- Setback requirements for all new septic systems are determined by soil characteristics.
  - 75 feet for rivers and areas where the there is no restrictive layer within 18 inches and where the soil down gradient is not porous sand and gravel (perc>2 min.).
  - 100 feet for soils with a restrictive layer within 18 inches of the natural soil surface.
  - 125 feet where the soil down gradient of the leachfield is porous sand and gravel (perc rate equal to or faster than 2min/in.).
- In accordance with RSA 485-A, when selling developed waterfront property, a *Site Assessment Study* is required for all properties with on-site septic that are contiguous to or within 200 feet of waterbodies jurisdiction under the SWQPA. For more information relative to site assessments, contact the NH Subsurface Systems Bureau at (603) 271-3711.
- In accordance with RSA 485-A:17, an Alteration of Terrain Permit is required for any project that proposes to disturb more than 50,000 sq ft of contiguous terrain if any portion of the project is within the protected shoreland or disturbs an area having a grade of 25% or greater within 50 feet of any surface water.

Within 50 feet to 150 feet from Reference Line — NATURAL WOODLAND BUFFER LIMITATIONS:

- At least 25 percent of the area between 50 feet and 150 feet from the reference line must be maintained in an unaltered state[5].(see Vegetation Maintenance within the Protected Shoreland FACT SHEET)

50 feet from Reference Line — WATERFRONT BUFFER

- All primary structures must be set back at least 50 feet from the reference line[4]. Towns may maintain or enact greater setbacks.
- Within 50 feet from the reference line[4], a vegetative buffer must be maintained. Within the waterfront buffer, tree coverage is managed with a 50 x 50 foot grid and point system. Trees and saplings may be removed provided the sum point score of the remaining trees and saplings within the affected grid segment is at least 50 points. (see Vegetation Maintenance within the Protected Shoreland FACT SHEET)
- No ground cover shall be removed except for a footpath to the water that does not exceed 6 feet in width and does not concentrate stormwater or contribute to erosion.
- Ground cover must remain intact. No cutting or removal of vegetation below 3 feet in height (excluding previously existing lawns and landscaped areas). Stumps, roots, and rocks must remain intact within the ground. Stumps of legally removed trees may be ground flush to the ground.
- Pesticide and herbicide applications can be applied by a licensed applicator only.
- Only low phosphorus, slow release nitrogen fertilizer can be applied beyond 25 feet of the reference line.

"[1]**CONSTRUCTION**"- Erecting, reconstructing or altering any structure(s) that result in an increase in impervious area.

"[2]**EXCAVATION**" - To dig, remove, or form a cavity or hole within the ground with mechanized equipment.

"[3]**FILL**" - To place or deposit materials such as rocks, soil, gravel, sand or other such materials.

"[4]**REFERENCE LINE**"- The reference line is the point from where all setbacks are determined. For ***coastal waters*** it is the highest observable tide line; for ***rivers*** it is the ordinary high water mark and for ***lakes and ponds*** it is the surface elevation listed on the Consolidated List of Waterbodies subject to the SWQPA.

"[5]**UNALTERED STATE**" - native vegetation allowed to grow without cutting, limbing, trimming, pruning, mowing, or other similar activities except as needed for renewal or to maintain or improve plant health.

"[6]**IMPERVIOUS AREA**" - means any modified surface that cannot effectively absorb or infiltrate water. Examples of impervious surfaces include, but are not limited to, roofs, and unless designed to effectively absorb or infiltrate water, decks, patios, and paved, gravel, or crushed stone driveways, parking areas, and walkways.

OWTS DISCUSSION TOPICS
LEGISLATIVE TASK FORCE
April 17, 2014

I. Highlights of New England/NY State OWTS Rules – Separation Distances

(All distances from the leachfield)

A. Connecticut

CT Public Health Code Regulations and Technical Standards for Subsurface Sewage Disposal Systems:

- Open water: 50'
- Public supply reservoir: 100'
- Private well: 75'
- Public well: 75' – 200' depending on well pump rate

B. Massachusetts

310 CMR 15.00 Title 5 for systems with design flow <10,000 gpd. Systems wth design flow >10,000 gpd must apply for a groundwater discharge permit:

- Surface waters (except wetlands): 50'
- Bordering vegetated wetland, salt marshes, inland and coastal banks: 50'
- Wetlands bordering surface water supply or tributary thereto: 100'
- Certified vernal pools: 100'/ 50' if OWTS is downgradient
- Surface water supply – reservoir and impoundments: 400'
- Tributaries to surface water supply: 200'
- Private well: 100'
- Public well: No system shall be constructed within a Zone I of a public water supply well or wellfield, which ranges from 100' to 400' depending on the well's approved yield.

C. New Hampshire:

Chapter Env-WQ 1000. Subdivision and Individual Sewage Disposal System Design Rules:

- Very poorly drained jurisdictional wetland: 75'
- Poorly drained jurisdictional wetland: 50'
- Surface water: 75'
- Reservoirs: 75'
- Community wells: 200'
- Municipal wells: 400'
- Private wells: 75' for OWTS design flow up to 750 gpd. Graduated setbacks up to 400' for larger flows.

Shoreland Water Quality Protection Program – Applies to all lakes, ponds and impoundments greater than 10 acres, all 4th order and greater streams and rivers, all designated rivers and river segments under RSA 483 (The Rivers Management & Protection Act) and all waters subject to the ebb and flow of the tide (including tidal marshes, rivers and estuaries):

- Adjacent to ponds, lakes, estuaries and the open ocean.
  - Where the receiving soil down gradient of the leaching portions of a septic system is a porous sand and gravel material with a percolation rate equal to or faster than two minutes per inch, the setback shall be at least 125 feet.
  - For soils with restrictive layers within 18 inches of the natural soil surface, the setback shall be at least 100 feet.
  - For all other soil conditions the setback is 75 feet.
- Adjacent to rivers and streams – The setback for a septic system must be at least 75 feet.

D. Vermont

Environmental Protection Rules, Chapter 1, Wastewater System and Potable Water Supply Rules (<6,500 gpd):

- Lakes, ponds, impoundments: 50'
- River, streams: 50'
- Private Wells: 100 - 200' depending on well pump rate and OWTS design flow
- Public water system: site specific

Environmental Protection Rules, Chapter 14, Indirect Discharge Rules (>6,500 gpd):

- Standing water: 200'
- Streams and rivers: 150'
- Private wells: 200'
- Public water system: site specific

E. Maine:

10-444 Chapter 241 Subsurface Wastewater Disposal Rules: (*Setback distances are from disposal field for three different design flows gpd: <1000/1000-2000/>2000)*

- Water body/course, major (depicted in blue on USGS 7.5 min maps): 100'/200'/300'
- Water body/course, minor (anything not major): 50'/100'/150'
- Public well: 300'/300'/300'
- Private well: 100'/200'/300'

F. New York:

Dept of Health, Chapter II, Part 75 Appendix 75-A Wastewater Treatment Standards – Individual Household Systems (design flow <1000 gpd):

- Stream, lake, watercourse or wetland: 100'
- Well: 100' (When the OWTS is located upgradient and in the direct path of surface water drainage to a well, the closest part of the system shall be at least 200' from the well.)

Design Standards for Wastewater Treatment Systems for Intermediate-Sized Facilities (design flow >1000 gpd):

- Surface water: 100'
- Drinking water reservoir: 200'
- Public well drilled: 200'
- Private drinking water well drilled: Gravel soils – 200'; Other – 100'
- Private well dug: Gravel soils – 200'; Other – 150'

II. RI DEM OWTS RULES

A. Setbacks

- **"Watercourse"** means any river, stream, brook, pond, lake, swamp, marsh, bog, fen, wet meadow, area subject to storm flowage, or any other standing or flowing body of water, including such watercourses that may be affected by the tides.
- General 50' setback is consistent with Freshwater Wetlands statutorily defined setback for most regulated wetlands (except riverbank wetlands). Increased OWTS setback distances are established for sensitive areas: drinking water supplies and coastal salt ponds.
- The increased setbacks (2X) for large systems (design flow ≥5,000 gallons per day) was adopted in 2008.

Table 22.1 Areas not located within a Critical Resource Area

	All other OWTS Components		Leachfield	
	Design Flow <5000 gpd	Design Flow ≥5000 gpd	Design Flow <5000 gpd	Design Flow ≥5000 gpd
Coastal Shoreline Feature (Note 11) not in a Critical Resource Area, Flowing Water (Rivers and Streams), Open Bodies of Water (Lakes and Ponds), Other Watercourses Not Mentioned Above, and Any Stormwater Management Structure That Potentially Intercepts Groundwater	25	50	50	100

Table 22.2 Drinking water supply critical resource areas: (Distances from any OWTS Component)

	OWTS Design Flow < 5000 gpd	OWTS Design Flow >5000 gpd
Impoundment with Intake for Drinking Water Supply and Adjacent Wetlands	200	400
Subsurface Drains and Foundation Drains that Discharge Directly to the Impoundment	200	400
Subsurface Drains and Foundation Drains that Discharge to a Drainage Swale that Subsequently Discharges to the Impoundment:		
Paved Swale	200	400
Unpaved Swale <200 feet long	200	400
Unpaved Swale ≥200 feet long	100	200

Tributaries, Tributary Wetlands, Swales, and Storm Drains that Discharge Directly to the Impoundment	100	200
Subsurface Drains, Foundation Drains, and Storm Drains that Discharge to Tributaries and Tributary Wetlands	100	200
Any other Watercourse in the Drinking Water Supply Watershed (Not Connected to the Impoundment) or Areas Subject to Storm Flowage	50	100

Table 22.3 Salt Ponds & Narrow River Critical Resource Area: (distances from any OWTS component)

Feature	OWTS Design Flow < 5000 gpd	OWTS Design Flow >5000 gpd
Salt Pond/Narrow River Coastal Shoreline Features, excluding the ocean	200	400
Subsurface Drains and Foundation Drains that Discharge Directly to the Salt Pond/Narrow River	200	400
Subsurface Drains and Foundation Drains that Discharge to an open Drainage Swale that Subsequently Discharges to the Salt Pond/Narrow River: Paved Swale Unpaved Swale <200 feet long Unpaved Swale ≥200 feet long	 200 200 150	 400 400 300
Tributaries, Tributary Wetlands, Swales, and Storm Drains that Discharge Directly to the Salt Pond/Narrow River	150	300
Subsurface Drains, Foundation Drains, and Storm Drains that Discharge to Tributaries and Tributary Wetlands	150	300
Any Other Watercourse in Salt Pond/Narrow River Critical Resource Area (Not Connected to Salt Pond/Narrow River), Areas Subject to Storm Flowage, or the inland edge of the coastal shoreline feature of the ocean. (Note 3)	50	100

Table 22.4 Minimum Setback Distances from Drinking Water Wells

OWTS Design Flow (gpd)	Distance in Feet from Leachfield/Septic Tank Effluent Pipe, Tanks/Building Sewer(Notes 1,5)	Distance in Feet From All OWTS Components (Notes 1,5)	
	Private Drinking Water Well (Note 2)	Public Well – Drilled (rock), Driven, or Dug	Public Well- Gravel Packed, Gravel Developed
<1000	100/75/50 **(Note 3,4)**	200	400
1000-<2000	150/75/50	200	400
2000 - <5000	200/75/50	200	400
5000- <10000	300/75/50	300	400
≥10000	400/75/50	400	400

- This graduated setback for private wells based on design flow was adopted in 2008.

Notes Table 22.4:

(1) Large Systems- These distances are minimum distances for large systems as defined in Rule 35.1.1. **Greater distances may be required based on the Impact Analysis in Rule 35.3.**

(3) The minimum setback distances to wells on the subject property may be reduced to 80/60/40 (leachfield/tank/building sewer) feet for residential OWTSs on lots ten-thousand (10,000) square feet and larger under the following conditions:

(A) The design flow is less than five hundred (500) gallons per day;

(B) The OWTS utilizes a Department-approved nitrogen reducing technology;

(C) The OWTS discharges to a pressurized shallow narrow drainfield designed in accordance with DEM guidelines; and

(D) The OWTS separation distance between the infiltration surface and groundwater is three (3) feet or greater.

(4) The minimum setback distances shall be increased to 150/75/50(leachfield/tank/building sewer) for OWTSs with a design flow of less than one thousand (1000) gallons per day if the OWTS is designed for Category 1 soils per Rule 32. For such OWTSs utilizing a Department approved nitrogen reducing technology discharging to a bottomless sand filter or pressurized shallow narrow drainfield constructed in accordance with DEM guidelines, the minimum setback distances may be 100/75/50 (leachfield/tank/building sewer).

(Category 1 soils are sandy soils with a high loading rate.)

B. Rule 35 Large OWTS Requirements

35.1 Applicability- Large OWTSs defined below shall comply with all other applicable provisions of these Rules in addition to the requirements in this Rule 35. A large OWTS shall be any OWTS designed, installed or operated that meets any of the criteria in Rule 35.1.1-35.1.4 below.

35.1.1 Any single OWTS designed to treat five thousand (5,000) gallons or more per day;

35.1.2 Multiple OWTSs for any project on one or more parcels of land, excluding residential subdivisions, where the total design flow for the project is five thousand (5,000) gallons or more per day;

35.1.3 Multiple OWTSs serving more than one (1) unit in a residential subdivision provided that the total design flow of these OWTSs, each serving more than one (1) unit, is five thousand (5,000) gallons or more per day; or

35.1.4 Proposed OWTSs and existing OWTSs on the parcel that will result in a total design flow for the parcel exceeding five thousand (5,000) gallons per day.

35.2 Application Requirements .....

35.3 Impact Analysis- Applicants shall be required to demonstrate that the proposed disposal site is capable of accepting, treating and transmitting effluent at the proposed application rate without adverse impact to surface water or groundwater. Such analysis shall include, but not necessarily be limited to:

35.3.1 Surface Water: Applicants shall submit an evaluation of the effect of estimated pollutant loading to surface waters; and

35.3.2 Groundwater: **Applicants shall conduct modeling of nitrate concentrations in groundwater downgradient of the OWTS at any compliance point defined as the property boundary, drinking water well, or other sensitive receptor as determined by the Director.** This compliance point may extend downgradient beyond the applicant's property line if the adjacent property is designated as a groundwater discharge zone in accordance with the DEM "Rules and Regulations for Groundwater Quality." The nitrate concentration modeling shall be done in accordance with the following:

(A) For a single OWTS designed to treat five thousand (5,000) gallons or more per day (Rule 35.1.1), the applicant shall conduct a nitrate impact analysis that models a contaminant plume emanating from the OWTS;
(B) For large OWTS defined pursuant to Rules 35.1.2, 35.1.3, or 35.1.4 where one or more of the OWTSs is designed to treat one thousand (1,000) gallons or more per day but less than five thousand (5,000) gallons per day, the nitrate impact analysis may use the entire project site for nitrate dilution modeling unless the Director requires a nitrate impact analysis that models a contaminant plume emanating from any of the OWTSs; or
(C) For large OWTS defined pursuant to Rules 35.1.2, 35.1.3, or 35.1.4 where all of the OWTSs are designed to treat less than one thousand (1,000) gallons per day, the nitrate impact analysis may utilize the entire project site for nitrate dilution modeling.

35.4 Groundwater Monitoring- Groundwater monitoring for nitrate and other possible contaminants, at a frequency to be determined by the Director, may be a required condition of the permit approval. Pursuant to the DEM "Rules and Regulations for Groundwater Quality," the Department may require that actions be taken by the applicant when concentrations of nitrate in the groundwater at the point of compliance exceed the preventive action limit of five (5) mg/l.

C. Groundwater Impact Analysis – Large System Nitrate Impacts

Overview:

- Since nitrate is highly soluble and does not adsorb to soil particles or precipitate out of solution, a mass balance approach provides a representative method of estimating nitrate concentrations within the groundwater.
- Mass balance models estimate mass inputs of nitrate and estimate the dilution of this mass by a calculated volume of water to yield a concentration of nitrate at the point of compliance. The MANAGE model, developed at URI, is a mass balance model routinely used in Rhode Island for larger scale estimates of nitrogen loading to watersheds.
- Point of compliance: property boundary, drinking water well, or other sensitive receptor as determined by the Director.
- 10mg/l (the drinking water standard for nitrate) is the target at the point of compliance.

Models:
2 model approaches can be used:

- Simple: uses only the area of the nitrate plume as the area for nitrate dilution.
- Advanced: includes nitrogen dilution from upgradient groundwater baseflow. Requires site specific data.

Model Assumptions:

- Once in effluent, all nitrogen assumed to be converted to nitrate.
- Landscape sinks for denitrification (e.g., wetlands) are not taken into account.
- No plant uptake.
- Uniform mixing of septic effluent over the OWTS effluent plume.

Model inputs:

- Nitrate concentration of 38 mg/l, unless denitrification system (19 mg/l).
- OWTS design flow is used.
- Infiltration is based on soil type.

Results:
Based on model results, one or more of the following will be done:

- Approve system
- Move system
- Reduce system design flow
- Require advanced treatment
- Install groundwater monitoring wells

III. Issues

1) How far can nitrate travel from an OWTS?

- Nitrate transport is variable depending on soil types, presence or absence of sinks (areas where conditions are favorable for denitrification), and groundwater flow rates (Rivett 2008).
- Wastewater plume from a treatment plant on Cape Cod has been observed to extend approximately 11,000' (LeBlanc, USGS Water Supply Paper #2218).
- For an individual septic system in sandy soils in Ontario, Robertson (1991) observed a distinct plume of nitrate at over 50% of the source concentration over 130m in length. Harman (1996) observed at the same site phosphorus at a distance of 75m downgradient.
- Weiskel and Howes (1992) observed approximately 60% of total dissolved nitrogen can be exported from neighborhoods served by septic systems over distances of 400m.

References:

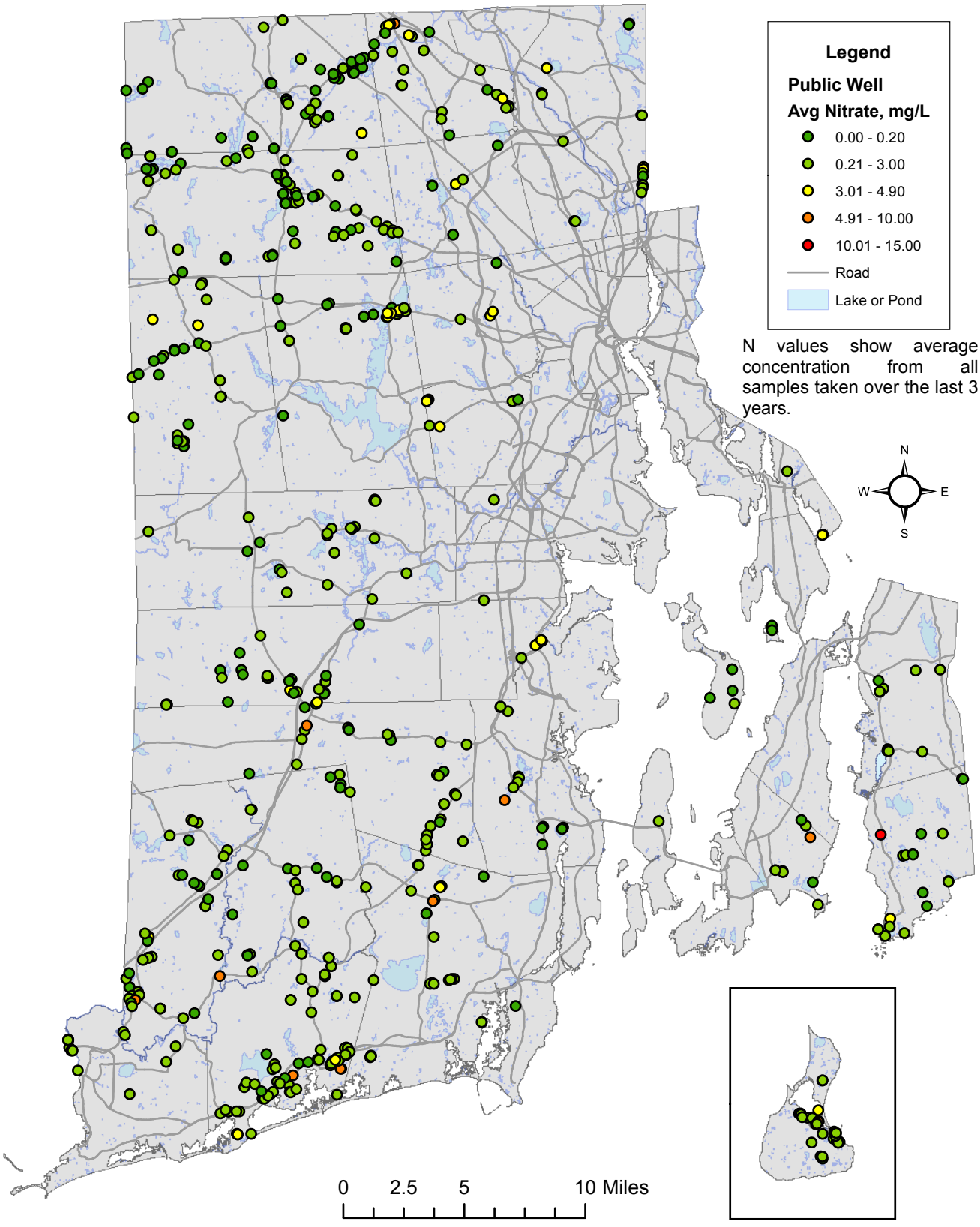
- Harmon, J. et al. 1996. "Impacts on a sand aquifer from an old septic system: nitrate and phosphate." Ground Water v34 n6, 1105-1114.
- Rivett, Michael O. et al. 2008. "Nitrate attenuation in groundwater: A review of biogeochemical controlling processes." Water Research 42, 4215-4232.
- Robertson, WD, JA Cherry, and EA Sudicky. 1991. "Ground-water contamination from two small septic systems on sand aquifers." Ground Water v29, n1, 82-92.
- Weiskel, Peter K., and Brian L. Howes. 1992. "Differential transport of sewage-derived nitrogen and phosphorus through a coastal watershed." Environmental science & technology 26.2, 352-360.

2) Is 10 mg/l of nitrate the proper model compliance target for wetlands?
- Concentration v. Load
- Maps of nitrate concentrations in public wells

3) What About Phosphorus?
- Phosphorus is the limiting nutrient in freshwater systems.
- There are no accepted methods for efficiently and effectively modeling phosphorus fate and transport in the subsurface.
- Phosphorus removal very site specific.
- Phosphorus can bind to soil particles. Sites of adsorption in soil can reach capacity.
- Acidic soil conditions best for P removal. Acidic conditions leads to leaching of aluminum and iron from the soil. Aluminum and iron cause precipitation of the phosphate. Precipitation is a more permanent removal mechanism for P.

4) Advanced treatment systems have the same setbacks as conventional systems for water resources. Setbacks to private wells (see Table 22.4) is the only exception where advanced treatment systems are allowed closer to a feature than a conventional system.

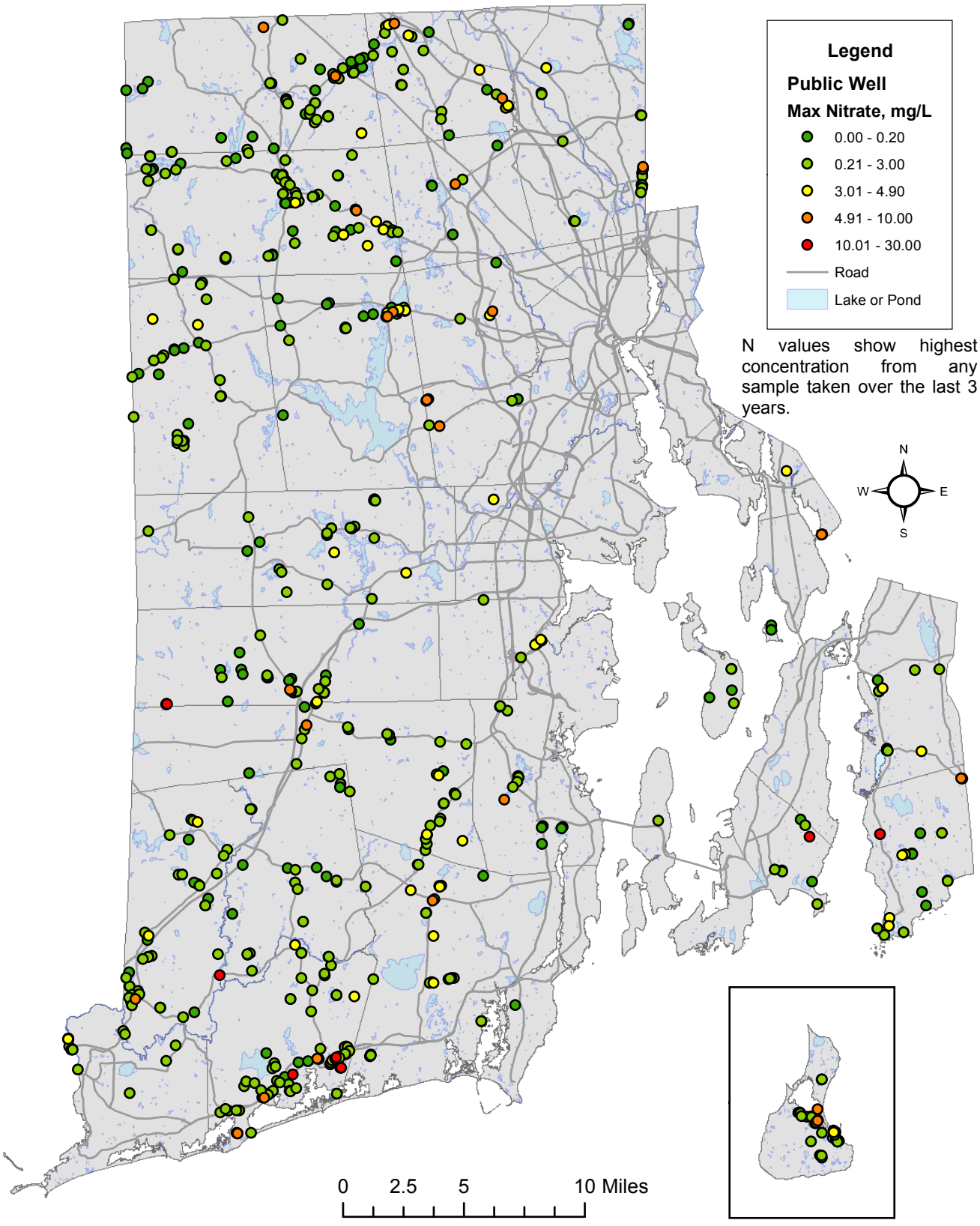
Average Nitrate Levels in Rhode Island Public Wells



N values show average concentration from all samples taken over the last 3 years.

April 14, 2014

Maximum Nitrate Levels in Rhode Island Public Wells



N values show highest concentration from any sample taken over the last 3 years.

April 14, 2014