Legislative Task Force

Meeting #12

Tuesday September 16, 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 July 17, 2014 – (*All*)

8:10 Topics and Presentations:

A. Overview of ***Working Draft***: 9.12.14 –– *Nancy Hess, DOP*

B. Key Scientific Findings – *(Carol Murphy & Ernie Panciera, DEM)*

1. Questions & Task Force Discussion – *All - moderated by Kevin Flynn*

9:45 Task Force Member - Lorraine Joubert - OWTS & Biomats

9:55 Next Steps– *Nancy Hess*

A. Homework for Task Force Members:
   a. Identifying Adequacies and Gaps to be addressed
   b. Comments & edits on Report

B. Upcoming meeting dates

10:00 Adjourn

Legislative Task Force Meeting #11

Thursday, July 17, 2014

8:00 AM – 10:00 AM
Rhode Island Builders Association
450 Veterans Memorial Parkway, East Providence, RI

Task Force members in attendance were: James Boyd (Coastal Resources Management Council, Russell Chateauneuf (Civil Engineering Representative), Janet Coit (DEM Representative), Thomas D'Angelo (Builder's Trade Association), Gary Ezovski (Business Community Representative), Kevin Flynn (DOP-Associate Director), Thomas Kravitz (Municipal Representative – Burrillville), Scott Moorehead (Business Community Representative), Eric Prive (Civil and Environmental Engineering Representative), and Nancy Scarduzio (Office of Regulatory Reform).

The Division of Planning (DOP) and DEM also had several agency staff members present. From DEM; Brian Moore, Carol Murphy, Ernie Panciera, and Alicia Good. Nancy Hess was present from DOP.

Mr. Flynn opened the meeting by explaining that there were two guest speakers for this meeting provided by the Rhode Island Builders Association. The subject today was how wetland buffers and OWTS setbacks are regulated in the State of Maryland. Both speakers have backgrounds of state government and private sector experience. Andrew Der is a Principal and Environmental Consultant of Andrew T. Der & Associates, LCC. Mark Eisner is a Professional Geologist, and President of Advanced Land and Water, Inc. Both gentlemen are from Maryland.

Mr. Der presented first and spoke about stream buffers and their role in wetlands management. He began by highlighting the difference between a buffer and a setback. A buffer is the "surface distance between nonpoint pollution source and receiving water for the purpose of water quality management by filtration, biological uptake, and attenuation." A setback is "horizontal spacing between activity and sensitive features for the purpose of establishing a safety zone allowing for the adequate dispersion and dilution of potential effects." Mr. Der focused on the functions and values of stream buffers and how best management practices (BMP) function. The need for buffers is to reduce and or eliminate impacts from mostly the 3 big key concerns; phosphorus, nitrogen and sediment. The Counties in Maryland would be equivalent to RI's cities and towns. The municipalities rely on the County for most services. There are 24 counties in Maryland. All have different ordinances but primarily use a 100 foot buffer as the minimum protective buffer. There is no state level buffer requirement because the Counties already have one. He cited a number of literature sources, notably the EPA National Pollutant Discharge Elimination System Stormwater menu of BMPS. There are a few areas where the State has determined that higher levels of protection is needed, such as the Chesapeake Bay Watershed and any stream supporting colder water fish such as trout. The County typically has three biology staff and can ask the State for assistance. He suggested that RI needs to clarify some it its terminology. For example buffers vs. setbacks; they are not the same thing. He also suggested that modern stormwater management technology could be more effective for redevelopment in lieu of additional buffers. His presentation explained the needs for these spaces, pollutants like nitrogen and phosphorus. Task force members asked several questions of Mr. Der pertaining to the administration and finer details of the Chesapeake Bay cleanup efforts, including topics such as staffing, time tables, and planning.

Mr. Eisner's presentation was more focused on OWTS policies and OWTS setbacks. He focused on the Maryland experience with OWTS setbacks and practices and presented some suggestions for consistent, science-based approach. He said the Chesapeake Bay and Narragansett Bay experiences were pretty similar. Generally the design requirements between the two states are very similar. He complimented Rhode Island on the high quality of our design standards for OWTS. In Maryland the State sets the standards and dictates the process for review but delegates it to the Counties for implementation. This ensures everyone is reviewing applications the same

way. He discussed the differentiation of water based features which would have different distance based setbacks for different parts of the OWTS. For example, drainage ways and gullies have a 25 foot setback while water bodies not serving as potable water supplies have a 100 foot setback. There are various reasons why setbacks will differ for public health, practical and legal reasons. He talked about the nitrogen cycle and OWTS biomats. His conclusions were the soil type at discharge is critical. Sandy soils should have IA denitrification because little natural Nitrogen reduction occurs in drainfield. Continuation of the current setback with IA is ok. A setback of 100 feet on sandy soils on a 40,000 sq. ft. lot will achieve N dilution to background levels without a biomat or IA for Silt/Clay Soils. He also said to clarify buffers vs. setbacks as they are not the same. Task force members asked several questions of Mr. Eisner pertaining to the administration and finer details of the Chesapeake Bay cleanup efforts, regulation of sewers; use of IA technology and buffers, what the 1000 foot critical areas was in the Chesapeake Bay Watershed. Discussion ensued about how Maryland regulated cesspools but MD does not have a phase-out law like RI. They also asked questions including topics such as staffing at county verse state levels, and time tables for reviews. The discussion concluded with the topics of how lot sizes, soil types and buffer sizes relate to OTWS.

The final presentation was from Nancy Hess, DOP, regarding a recap of the Task Force meeting to date. She began with the adoption of the 2013 Law 42-64.13.10. She outlined the legislative charge to assess the adequacy and gaps of wetland protection in wetland buffers and OWTS setbacks and to recommend statutory or regulatory changes to protect wetlands statewide. She gave an overview of the meeting topics to date which were reviewing the; prior stakeholder processes, existing Gen. Laws for wetlands and OWTS, DEM and CRMC Rules/Regulations, municipal ordinances, regulations in other New England states. She gave a summary of the technical presentations and guest speakers received by the Task Force up to and including today's speakers. A recap of the scientific literature review followed leading to an assessment of draft issues which seemed to jump out from the meetings held to date. Ms. Hess stressed that these issues were her attempt to highlight key points to initiate discussion among the Task Force today. The draft issues identified were under the two headings of the identifying the adequacy of wetland protection and gaps and needed statutory or regulatory changes to protect wetlands. Under the adequacy of wetland protection & gaps the following were listed;

- Overview of literature says need buffers larger than 50 feet
- Buffers should be larger than 50 feet for effectiveness >>>>>but how big?
- *(75 % of most functions & values supported at 100')*
- Need to define & protect vernal pools
- Higher standards for smaller steams vs. already urbanized large rivers

Under the statutory or regulatory changes to protect wetlands the following were listed;

- Permitting:
    - Most discussion centered on freshwater wetlands
    - A single, clear & predictable regulatory review process at state level
    - Eliminate dual permitting on setbacks
    - Eliminate varying standards on setbacks due to dual permits
- Statutory Implications
    - Change definitions & clarify buffer vs setback
    - 50-Foot Perimeter around swamps, marshes, bogs, and ponds
    - 100-Foot or 200-Foot Riverbank adjacent to rivers and streams
    - Define authorities

The meeting concluded with discussion by the members on the issues identified by Ms. Hess. There was overall agreement that these were a good summary. Items discussed focused on wetland buffers and OWTS setbacks. How could elimination of the dual efforts be accomplished and how that would that impact state staffing? It was a concern of Janet Coit that funding be available for adequate staffing levels. Making the application process more predictable was another topic. Ensuring that applications submitted are complete goes a long way in easing the approve process. Are the current setbacks protective enough? Could a tiered approach be adopted? Permits need to be issued by qualified staff. We need to clarify the confusion between buffer and setback terminology and establish one uniform statewide system. The OWTS standards are pretty good. How

should a science based system work which allows municipal input to the State standards? Some members advocated for taking the Towns out of OWTS regulations altogether and some members lobbied for their municipal viewpoint. Nobody disagreed that science should be the basis for all decisions.

Next Meeting

There is no meeting in August. The next meeting is scheduled for September 18, 2014. The topic will be review of a preliminary report that the Working Group will be compiling based upon the meeting held to date and the discussion today. Ms. Hess asked Task Force members to think of any additional issues for the report to address and email them to her.

Adjourn

10:00 AM

Legislative Task Force

General Timeline 2013 -2014

9/12/2014 – The Task Force intends to meet the last Thursday of every month (except for November and December of 2013/14). The Division of Planning will work with the Task Force members to confirm specific dates and locations. In the meantime, the general expectation for timing is below.

SEPTEMBER 26, 2013 –Meeting 1 - DOA
Topics: Organizational, Purpose, Summaries of 2013 Public Law 42-64.13-10 and Existing RI Gen. Laws for wetlands and OWTS

OCTOBER 24, 2013 – Meeting 2 - DEM
Topics: Scope of Work, Summary of Prior Wetland Task Forces, DEM and CRMC Rules/Regulations for Wetland and OWTS, Overview of Municipal Regulations **Speakers:** Carol Murphy, Ernie Panciera, DEM, James Boyd, CRMC, Lorrain Joubert, URI

NOVEMBER 19, 2013 - Meeting 3 - DEM
Topic: Wetlands Functions and Values - **Guest Speaker:** Chris Mason, President, Mason and Associates, Inc.

DECEMBER 19, 2013 – Meeting 4 - DOA
Topic: Habitat Functions for Wetland Buffers - **Guest Speaker**: Dr. Peter Paton, Professor of Wildlife Ecology, Department of Natural Resources Science, URI

JANUARY 21, 2014 - Meeting 5 - DOA
Topics: OWTS basics & Groundwater Science: Water Resource Issues, Impacts & Nutrients in Buffer and Riparian Zones **Guest Speakers:** - Dr. Arthur Gold, Dep. of Natural Resources Science, URI, OWTS 101 - George Loomis, Program Director, NE Onsite Wastewater Training Program, Cooperative Extension, URI

FEBRARY 27, 2014 - Meeting 6 - DOA
Topics: Summary of NE States buffers/ regulatory requirements, Summary of RI municipal ordinance inventory, Discussion on case studies for identifying regulatory friction points – **Speakers:** Carol Murphy, DEM, Sean Henry, DOP

MARCH 27, 2014- Meeting 7 - DEM
Topics: Local Wetland Review: Two Perspectives – **Guest & Speakers**: Michael Deluca, Narragansett Community Development Director & Scott Rabideau, Task Force Member

APRIL 17, 2014 - Meeting 8 - DEM
Topics: Summary of NE States –Wetland and OWTS buffers, Recap to date **Speakers:** Carol Murphy, Ernie Panciera, DEM, Nancy Hess, DOP

MAY 29, 2014 - Meeting 9 - RIBA
Topics: Literature Review- Part 1: Summary of Wetland Buffer Reports & Manuals; RI & New England Specific
Speaker: Carol Murphy, DEM

JUNE 19, 2014 – Meeting 10 - DOA
Topics: Literature Review- Part 1 continued, Wetland Buffer Reports & Manuals and Part 2; OWTS
Speakers: C. Murphy, DEM, J. Boyd, CRMC, N.Hess, DOP, T. Kutcher & R. Chateauneuf, LTF Members

JULY 17, 2014 - Meeting 11- RIBA
Topics: Wetlands/OWTS Issues in the Chesapeake Bay Region, Recap of topics / feedback on Issues from Task Force **Guest Speakers from Maryland:** Andrew Der, Environmental Consultant, Mark Eisner, Professional Geologist

AUGUST 2014
No meeting – Writing Group prepares working draft report

SEPTEMBER 2014
16th TUESDAY - - 12thTask Force Meeting – DEM
Topics: Report – Overview 1st Working Draft – Parts 1-3, Summary of Key Scientific Findings **Speakers:** Nancy Hess, Carol Murphy, and Ernie Panciera

26th FRIDAY - 13thTask Force Meeting – DEM
Topics: Working Draft & Identifying adequate protection & Gaps

OCTOBER 2014
31st FRIDAY - 14thTask Force Meeting – DEM
Topics: Report –Working Draft - adequate protection & gaps & draft recommendations

NOVEMBER 2014
18thTUESDAY - 15th- Task Force Meeting - DEM
Topics: Review and census on report & recommendations

DECEMBER 2014
DOP produces final report and submits by 12-31-2014

To learn more look on line at: **www.planning.ri.gov**

Legislative Task Force

WORKING DRAFT

9.12.14

Rhode Island Department of Administration
Division of Planning
One Capitol Hill
Providence, RI 02908

RHODE ISLAND DIVISION OF PLANNING

The Rhode Island Statewide Planning Program, Division of Planning. Department of Administration is established by § 42-11-10, Statewide Planning Program, of the Rhode Island General Laws as the central planning agency for Rhode Island. The State Planning Council, comprised of federal, state, local, public representatives, and other advisors, guides the work of the Program. The objectives of the Program are to:

- prepare Guide Plan Elements for the State,
- coordinate activities of the public and private sectors within the framework the State Guide Plan,
- assist municipal governments with planning, and
- advise the Governor and others on physical, social, and economic planning related topics.

For more information on the Legislative Task Force

Please contact:

Kevin Flynn
Associate Director
Rhode Island Division of Planning
(401) 222-6496
Kevin.Flynn@doa.ri.gov

or

Nancy Hess
Supervising Land Use Planner
Rhode Island Division of Planning
(401) 222-6480
Nancy.Hess@doa.ri.gov

Task Force Members

Name	Representation
James Boyd, designee for Grover Fugate	Coastal Resources Management Council*
Joseph Casali, P.E.	Civil Engineer Representative
Russell Chateauneuf, P.E.	Civil Engineer Representative*
Janet Coit, Director	Department of Environmental Management*
Thomas D'Angelo, RI Builders Association	Builder's Trade Association*
Garry Ezovski, P.E.	Business Community Representative 1*
Kevin Flynn, Associate Director	Division of Planning*
Lorraine Joubert, URI NEMO	Environmental Entity*
Thomas Kravitz – Burrillville	Municipal Representative 1*
Thomas Kutcher, Save the Bay	Wetlands Biologist*
Scott Moorehead, P.E., P.L.S.	Business Community Representative
Vincent Murray – South Kingstown	Municipal Representative 2*
Eric Prive, P.E.	Licensed Designer/ Environmental Engineer*
Scott Rabideau	Business Community Representative 2*
Nancy Scarduzio, designee	Office of Regulatory Reform*

* = Statutorily required

Acknowledgements

Generally:

A working group coordinated the overall review of the legislative mandate, identified issues for the Task Force, developed initial recommendations and helped to compile the Report. The Division of Planning facilitated the consensus of the Task Force on the proposed recommendations, edited and submitted the Report to the Governor, the Speaker of the House and the Senate President. The members of the working group were:

Division of Planning

- Kevin Flynn, Associate Director
- Land Use & Natural Resources Unit: Nancy Hess, Supervising Planner
- Sean Henry, Planning Intern

Coastal Resources Management Council

- James Boyd, Coastal Policy Analyst

Department of Environmental Management – Office of Water Resources

- Alicia Good, Assistant Director
- Brian Moore, OWTS Supervisor
- Ernie Panciera, Supervising Environmental Scientist
- Carolyn Murphy, Principal Environmental Scientist

Task Force Member

- Garry Ezovski, P.E.

Literature Review:

Special thanks go to the following persons (both Task Force and agency staff) who took time from busy schedules and workloads to read, review and summarize technical scientific papers and journals related to wetland buffers and onsite wastewater treatment systems (OWTS) setbacks for the Task Force:

- James Boyd
- Russell Chateauneuf, Task Force Member
- Nancy Hess
- Lorraine Joubert, Task Force Member
- Thomas Kutcher, Task Force Member
- Carolyn Murphy

Table of Contents

Page No.

Part 1: Introduction

Issue Statement

Rhode Island encompasses 1,544 square miles: freshwater and coastal wetlands cover over 71,000 acres of Rhode Island or about 11 percent of the State's area. Palustrine wetlands are the predominant type as they are the "inland wetlands" (forested wetlands, shrub swamps, wet meadows, marshes, bogs, and ponds). They make up 88% of the State's wetlands. Estuarine wetlands represent most of the remainder of the State's wetlands. The emergent type (salt and brackish marshes) accounts for 51% of the estuarine wetlands[1].

Regulation of wetlands is primarily at the State level; different agencies regulate coastal and freshwater wetlands. The Department of Environmental Management (DEM) regulates most of the freshwater wetlands (93%) while the Coastal Resources Management Council (CRMC) regulates freshwater wetlands in the vicinity of the coast about 7%. Local land-use controls are an additional wetland-protection measure but vary in their complexity and application. Some municipalities have taken the State requirements a step further and have more restrictive setback standards. There are 25 municipalities (out of 39) that have adopted their own standards. The local standards do not supersede the statewide standards, but are in addition to the State regulations. This tiered system of protecting wetland resources through overlapping state and municipal regulations sometimes results in repetitive reviews for property developers, whether they are large or small, that require additional time for wetland and onsite wastewater treatment system (OWTS) applications. A concern raised by those trying to improve the State's business climate.

As a result in 2013, this Legislative Task Force (LTF) was established by Public Law 42-64.13-10[2]. The LTF was charged by the Legislature to evaluate the adequacy of the protection for our natural resources by both the State and municipalities, to evaluate if gaps exist in that protection based on current scientific data, and to recommend such standards that could foster a business climate to grow our economy while ensuring the protection of our natural resources.

The Task Force engaged in extensive discussions focused exclusively on wetland buffers and OWTS setbacks. They heard from numerous experts in the fields of natural resource and groundwater science and others. Central to the discussion was whether in a State this size, would it be more protective and cost effective to have a single, centralized state program rather than the tiered system currently in place? Would Rhode Island benefit from a stronger, centralized program which provides more consistent resource protection and that is a clear and predictable process? On the flip side, it is difficult to apply a uniform approach as each municipality has different resources to protect and desired land use patterns. Establishing uniform setbacks is complicated by the need to address both site specific and watershed scale impacts to wetlands and water quality. The discussion centralized recommendations around three questions to answer the Legislative charge:

- Does our current system ensure adequate protection of our wetland resources?
- Is there duplication of efforts between the levels of government and various regulations?
- What terminology should be clarified for the benefit of all?

[1] *Rhode Island Wetlands: Updated Inventory, Characterization, and Landscape-level Functional Assessment*, U.S. Fish and Wildlife Service, May 2014

[2] http://webserver.rilin.state.ri.us/Statutes/TITLE42/42-64.13/42-64.13-10.HTM

Rhode Island General Law 42-64.13-10

The following is the text of the Law:

§ 42-64.13-10 Statewide standards for wetlands and septic disposal.

(a) The General assembly finds and declares:

(1) Under § 42-17.1-2, the director of the department of environmental management is charged with regulating septic systems, alterations of freshwater wetlands, and other activities which may impact waters of the state; under chapter 46-23, the coastal resources management council is charged with regulating alteration of freshwater wetlands in the vicinity of the coast and other activities that impact coastal resources.

(2) The statewide standards established pursuant to these authorities may be inadequate to protect the natural resources of our state and need to be reevaluated based on current scientific data.

(3) Many municipalities have implemented stricter setback and septic disposal standards to strengthen protection of critical local environmental resources including groundwater, coastal and fresh water wetlands, rivers and streams, and drinking supplies.

(4) Dissimilar municipal standards have resulted in a land use system wherein local governments manage watersheds and groundwater aquifers using a variety of methods resulting in diverse outcomes.

(5) The lack of a uniform process tends to burden businesses and property owners that require a predictable regulatory environment in order to be successful.

(6) Clear, predictable and reliable standards and a regulated process are needed to foster a business climate that will grow our economy while ensuring the protection of our natural resources.

(b) No later than December 31, 2014, the Rhode Island Division of Planning in consultation with the task force established in subsection (c), shall prepare and submit to the Governor, the Senate President and the Speaker of the House a report that is based upon current science, water resources and wetlands protection needs, and addresses onsite waste water treatment system (OWTS) regulation, and watershed planning. The report shall make recommendations that ensure the protection of this State's natural resources while balancing the need for economic development and shall:

(1) Include an assessment of the adequacy of protection afforded to wetlands and/or waters of the state under §§ 2-1-18 through 2-1-25, subdivisions 42-17.1-2(2) and (12), and section 46-23 of the general laws;

(2) Identify gaps in protection for septic disposal and various wetlands; and

(3) Recommend statutory and/or regulatory changes that are required to protect wetlands statewide, including, that upon the establishment of such standards by the legislature, municipalities shall not adopt or enforce any local ordinances or requirements for OWTS or wetland buffers and setbacks that exceed or otherwise conflict with such recommended statewide standards.

(c) The Rhode Island Division of Planning shall establish a task force and appoint members thereto representing a balance of the interests to ensure the protection of this State's natural resources while recognizing the need for economic development and at a minimum shall include:

(1) The director of the department of environmental management, or designee;
(2) The director of the office of regulatory reform, or designee;
(3) The executive director of the coastal resources management council, or designee;
(4) One representative each from an environmental entity and a builders' trade association;
(5) At least two (2) municipal representatives;
(6) At least two (2) representatives from the business community; and
(7) At least one civil engineer, or one environmental engineer with experience in OWTS and wetlands regulation, and one wetlands biologist.

(d) Implementation. The Director of the Department of Environmental Management in consultation with the Director of the Office of Regulatory Reform shall submit to the Governor, the Speaker of the House and the Senate President, proposed legislation establishing statewide standards identified in the report issued pursuant to subsection (b) no later than January 31, 2015.

(e) This section shall not apply to OWTSs maintenance and cesspool phase-outs.

Assembling the Task Force

The Division of Planning (DOP) began in the summer of 2013 working closely with DEM and CRMC on implementing the Law. The DOP recognized the directive of the Law to create

"*a balance of the interests to ensure the protection of this State's natural resources while recognizing the need for economic development*".

The DOP used existing professional associations, recommendations from DEM and CRMC, and professional contacts to assemble a Task Force. A representative for each of the seven mandated stakeholders mentioned in the Law was solicited along with eight additional constituents. Numerous persons were contacted and a total of fifteen volunteers were selected to serve on the Task Force. A profile of the backgrounds and experiences of each Task Force member are provided within Appendix A, Membership Profile.

All proceedings of the Task Force - agendas, meeting notes including recommendations offered in the Task Force meetings, presentations, technical reports, and scientific literature presented to the Task Force are maintained by the Division of Planning. An archive of materials is available on the Division's website, www.planning.ri.gov, and the meeting agendas and notes are included in Appendix B, Agendas & Meeting Notes.

Scope of Work

The Division of Planning in consultation with the Task Force prepared this report based on current science and review of the current adequacy of wetland protection in the State. The primary effort of the Task Force (agreed upon at the organizational meeting on 9.26.13) focused exclusively on wetland buffers for land disturbances and Onsite Wastewater Treatment Systems (OWTS) setbacks. The Task Force reviewed the topics listed below in order to meet the legislative charge:

- prior wetland stakeholder processes
- state and municipal regulatory authorities and frameworks as they relate to wetland buffers and setbacks for land disturbances and for OWTS including:
    - R.I. General Laws for wetlands and OWTS
    - DEM rules and regulations
    - CRMC rules and regulations
    - A summary of municipal ordinances or regulations
    - An overview of municipal wetland review processes from two perspectives
- wetland buffers and setbacks of neighboring states
- the functions and values of wetlands
- the important role of buffers
- the economic benefits of wetlands
- what an OWTS is and how it works
- water quality issues related to OWTS, and
- the current scientific literature regarding wetland buffers.

The Task Force was provided technical presentations on these topics, conducted open discussion on the topics, and fostered discussion and proposed recommendations to address identified problems. This report is the result of the review of the existing practices, law, rules and regulations, and current science on freshwater wetlands and OWTS (setback issues for OWTS, not design issues). The Task Force held **15 meetings in 14 months.** In addition the Task Force and DOP consulted with a working group consisting of Task Force members and agency staff. The working group helped DOP accomplish necessary tasks such as doing research, scheduling meetings, securing meeting locations, setting agenda topics, soliciting technical and guest speakers, providing historical and current overviews of agency procedures, and preparing a draft report for review and discussion by the entire Task Force.

The responsibility for this final report is legislatively charged to the Division of Planning. The Division of Planning submitted this Final Report with recommendations for the protection of the State's wetland resources while balancing the need for economic development.

Historical Background

"Whoever wishes to foresee the future must consult the past; for human events ever resemble those of preceding times." --Machiavelli

Although Rhode Island has been in the forefront of wetland protection since the 1970's there continues to be much to do. The RI Freshwater Wetlands Act was passed in 1971 [3], the second of its kind in the Nation. Since that time, however, the Act has not been recently amended to address ever changing knowledge and increased scientific understanding despite some legislative efforts. There have been several wetland-related task forces or advisory groups since the Act was adopted, some of which also included review of the OWTS program. The Task Force, with the help of DEM staff, reviewed two prior efforts;

- the Governor's Advisory Committee on Wetlands and Septic Systems [4] from 1995, and
- the DEM Director's Wetlands Task Force [5] from 2001.

[3] http://webserver.rilin.state.ri.us/Statutes/TITLE2/2-1/INDEX.HTM
[4] http://www.planning.ri.gov/documents/LU/legtask/1995GovComm_Final.pdf
[5] http://www.planning.ri.gov/documents/LU/legtask/2001DEMWetlandTaskForce_Final.pdf

Governor's Advisory Committee on Wetlands and Septic Systems (1995)

The 1995 Report of this Committee provided numerous recommendations, and it discussed the background and the benefits of each. There were 44 wetland specific or wetland-related recommendations including about funding, general administration, and enforcement. According to DEM staff, approximately ~45 % of the recommendations were partially or fully implemented. Many of the recommendations were to be implemented via revisions to the wetlands statute, which was attempted 4 times unsuccessfully. One of the noteworthy recommendations was to "*Redefine what are now considered perimeter wetlands and riverbank wetlands to regulate them as buffer zones and transition zones*". This was part of the bills that failed in 1996 through 1999.

DEM Director's Wetlands Task Force (2001)

This effort was led by the Director of DEM. Specific administrative, policy, regulatory and statutory changes were examined that could be used to streamline program operations, increase customer satisfaction and meet the mandates of the Wetlands Law. The Final Report (2001) did not recommend statutory changes. It did recommend regulatory, policy, and outreach changes or projects to streamline the program. The Department implemented ~84 % of them, notably, the significant re-authoring of the rules in 2007 for improved clarity. This Task Force's statutory subgroup and the watershed working group discussed and provided recommendations on buffers and setbacks.

Many members of the current task force participated in these prior efforts. They were from DOA, CRMC, RI Builder's Association, Save the Bay, and consultants Gary Ezovski and Scott Moorehead. Scott Rabideau was then a State Representative and participated on behalf of the House. In discussion by the current Task Force of the history of wetlands regulation in the State, the past proposals, and results, it was suggested that the failure of the efforts on strengthening the Law in the 1990's may have been the impetus for communities establishing their own wetlands regulations that bring us to today's issues.

The remainder of this Report will provide an explanation of the efforts of the current Task Force. The section following this introduction will provide an overview of the current regulatory framework in Rhode Island at all levels. The third section will describe how the Task Force went about examining the science behind setting wetland buffers and OWTS setbacks. The Conclusions /Recommendations Section will outline and discuss the issues defined by the Task Force as needing review and will also present recommendations for action on the issues. Finally, from time to time there would be other wetland and OWTS related topics that would arise from discussions. Because these topics were considered important but outside of the finite scope of work and beyond the ability the Task Force to discuss in its limited timeframe, they are included within the Conclusion / Recommendations in a subsection entitled, Other Noteworthy Topics, for information.

Part 2: Current Regulatory Framework in Rhode Island

Existing RI General Laws/ Rules/Regulations

Department of Environmental Management

Wetlands

The Rhode Island Freshwater Wetlands Act (R.I.G.L Sections 2-1-18 et. seq.), which was enacted in 1971, defines *freshwater wetlands* as "marshes, swamps, bogs, ponds, rivers, river and stream flood plains and banks, areas subject to flooding or storm flowage, emergent and submergent plant communities in any body of fresh water including rivers and streams, and that area of land within fifty feet (50') of the edge of any bog, marsh, swamp, or pond."

The definition is broad and includes not only vegetated wetlands (i.e., swamps, marshes, bogs), but also standing water wetlands (i.e., ponds), flowing bodies of water (i.e., rivers and streams), and the areas of land adjacent to some of the wetlands as *freshwater wetlands* for regulatory purposes (i.e. the area of land within fifty feet (50'), river bank, and flood plain).

The Act establishes the policy of the state "to preserve the purity and integrity" of all freshwater wetlands for the protection of people and property from the hazards of freshwater wetlands, and to protect the important functions that freshwater wetlands perform and the values that they provide. The Act also sets forth processes by which property owners must obtain approval of the Department of Environmental Management (DEM) for any activity that may alter the character of any fresh water wetland (RIGL Section 2-1-21 and 2-1-22). The authority to regulate some *freshwater wetlands - in the vicinity of the coast* - was transferred to the Coastal Resources Management Council (CRMC) in 1996 by a change to R.I.G.L. Chap. 46-23.

The DEM *Rules and Regulations Governing the Administration and Enforcement of the Act* (2014) elaborate on jurisdictional definitions that are relevant to the Task Force's discussions:

- *Area of land within fifty feet (50')* (used interchangeably with *Perimeter Wetland)* is a freshwater wetlands consisting of the area of land within 50' feet of the edge of any freshwater wetland consisting in part, or in whole, of a bog, marsh, swamp or pond; and
- *Riverbank* W*etland* is that area of land within 200 feet of the edge of any flowing body of water having a width of 10 feet or more, and that area of land within 100 feet of the edge of any flowing body of water having a width of less than 10 feet during normal flow.

The *Perimeter Wetland* is technically upland, even though it is regulated as *freshwater wetland*. A *Riverbank Wetland* may be upland, it may be a wetland (as in the case of a swamp that borders a river or a stream), or it may consist of both upland and wetland areas.

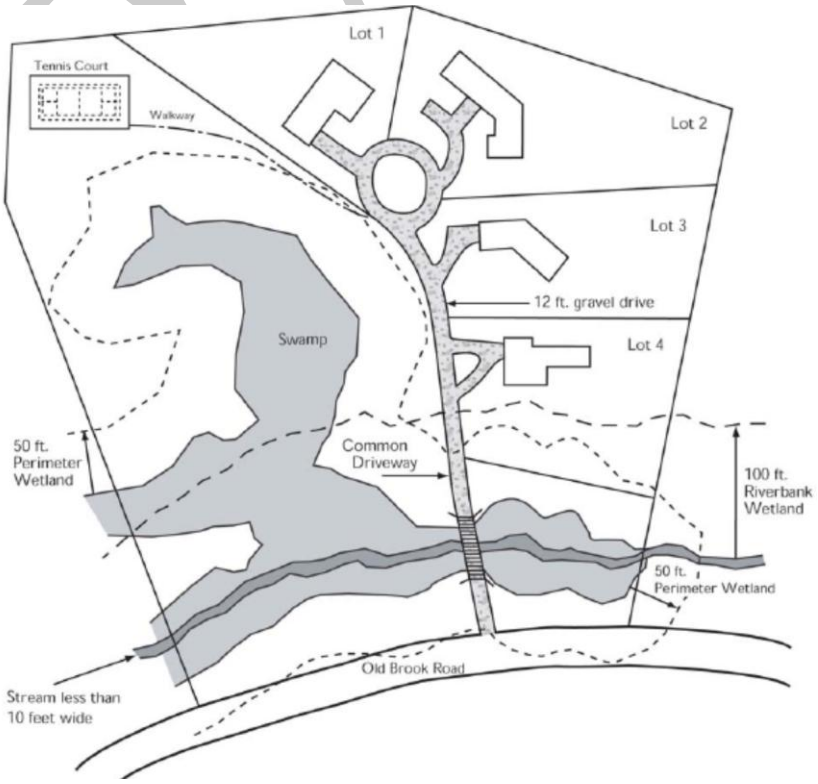
Applicants seeking a freshwater wetland permit must demonstrate through a series of steps that all probable impacts to freshwater wetlands functions and values, including to the *perimeter wetland* and to the *riverbank wetland*, are avoided, minimized, or mitigated to the maximum extent possible (Rules 9.02 D and 10.02 D). Proposed alterations may not be random, unnecessary or undesirable, and protective review criteria must be met before a freshwater wetlands permit may be granted for insignificant or significant alterations of wetlands (Rules 9.03 and 10.05). Some exempt activities (Rule 6.00) that have little or no impact on wetlands do not need a wetland permit provided conditions in the

Rule are met. A property owner may file a "Request for Regulatory Applicability" application with Dem to receive written confirmation that a proposed project does not require a wetland permit. In many cases, this type of application may be completed without hiring a private wetland scientist.

The Rules define *buffer zone* as an area of undeveloped vegetated land retained in its natural undisturbed condition, or created to resemble a naturally occurring vegetated area, that mitigates the negative impact of human activities on wetland functions and values (Rule 4.00).

The DEM permitting program uses the term *buffer zone* to describe the area of a property that is to remain vegetated and undisturbed *after a permit is granted*. It is the remaining jurisdictional area, beyond an approved project's limit of clearing and disturbance and up to the edge of the wetland feature. As such, the buffer zone is frequently located within a *perimeter wetland* or a *riverbank wetland.* The compliance program may use the term *buffer zone* in conversation with property owners, as the concept of protecting a buffer zone from unauthorized alterations is easier to explain and understand than the concept of protecting a perimeter wetland or riverbank wetland.

The term *setback* is not defined in the Act or Rules, and it is seldom used by the programs. One instance where it is used is as a mitigation measure to "maximize setbacks of septic systems and other land disturbances from wetlands" (Rule 9.02 D(3)(n)). The Rules stipulate that a wetland permit is required for new septic systems with leaching fields proposed within 50 feet of the small wetland types that do not otherwise have an associated perimeter wetland (Rule 5.01 B(4)). This results in a 50-foot septic-wetland setback at emergent, shrub, and forested wetlands, special aquatic sites, areas subject to flooding, and areas subject to storm flowage which are freshwater wetland types that do not otherwise benefit from having an associated *perimeter wetland* or *riverbank wetland*.



OWTS Management

There are approximately 157,000 OWTS in Rhode Island, serving about 30% of the state's population and 80% of the state's land area. Design flow from OWTS range from 345 gallons per day for a 3 bedroom residence to greater than 20,000 gallons per day for some schools and other institutions. Over 90% of OWTSs serve single family homes. In many areas of the state, it is not cost-effective or desirable to extend public sewer service. Therefore, many communities dependent on OWTSs will continue to utilize them to treat their wastewater into the foreseeable future.

Unlike wetlands, the RI General Laws have only a very general statement regarding state regulation of OWTS that is found in section 42-17.1-2 (12) Powers and Duties of DEM: "(12) To establish minimum standards, subject to the approval of the environmental standards board, relating to the location, design, construction and maintenance of all sewage disposal systems."

All OWTS are regulated and permitted by DEM through implementation of the DEM "Rules Establishing Minimum Standards Relating to Location, Design, Construction and Maintenance of Onsite Wastewater Treatment Systems." These rules set prescriptive standards for the OWTS components, size of systems based on intended use and soil conditions on each site, and the location of systems based on maintaining minimum separation distances from drinking water wells, wetlands and waterbodies,

OWTS Horizontal Separation Distances

OWTS separation distances in the OWTS Rules are based on risk to protect public health from pathogens in surface waters and groundwaters and for protection of sensitive receiving waters:

- Setbacks from drinking water supplies (water bodies or wells) are to ensure that the public does not ingest OWTS contaminated water.
- Setbacks from non-drinking water resources are to ensure that the public does not come into contact (e.g., swimming and boating) with unhealthy waters or harvest contaminated shellfish.
- Setbacks from coastal ponds are a based on the sensitivity of these waterbodies to nitrogen pollution.
- Setbacks from wetlands and water resources in general also provide insurance that the system will function properly and provide adequate treatment, since the closer a system is to a wetland the shallower the water table will be.

The information below is in regards to the minimum horizontal distances specified in the Rules between an OWTS and a watercourse or a drinking water well. "Watercourse" is defined as "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." As such, any wetland is also a watercourse. In some cases, the type of watercourse is specifically identified – e.g, drinking water supply. Where it is not specified, the all-encompassing term "watercourse" is used. The DEM OWTS setbacks for all watercourses are in the following tables.

Summary notes about these tables:

- DEM setbacks between the OWTS and the watercourse are determined from the edge of the identified (flagged) watercourse.
- The setback applies to all wetlands/watercourses, regardless of size. Therefore, it will apply to some small "wetlands" that do not have a DEM jurisdictional review area ("perimeter wetland").
- OWTS design flow: setbacks are increased for systems with a design flow greater than 5,000 gallons per day ("large system") to 2 times the setbacks for systems less than 5,000 gallons per day.
- The general setback for an OWTS to a watercourse is 50 feet. This distance is consistent with the DEM Wetlands Program 50 foot setback for non-flowing waterbodies. It also provides a minimum distance to ensure that the system will function as designed and provide protection to public health from pathogens entering waterways.
- Setbacks to watercourses are increased if the OWTS is in a Critical Resource Area -- salt pond and Narrow River watershed or drinking water supply watershed.
- Setbacks to drinking water wells use a graduated scale based on the design flow of the system being proposed, with larger flows requiring a greater setback to a well.

In addition to these setback tables, applicants with large systems are required pursuant to Rule 35.3 "… 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." This analysis and subsequent Departmental review may result in a required setback that exceeds the tables below.

From OWTS Rules Table 22.1: Areas Not Located within a Critical Resource Area

Feature	All other OWTS Components		Leachfield	
	Design Flow <5000 gpd[1]	Design Flow ≥5000 gpd	Design Flow <5000 gpd	Design Flow ≥5000 gpd
Coastal Shoreline Feature 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

From OWTS Rules Table 22.2: Drinking Water Supply Critical Resource Areas (Distances from any OWTS Component)

Feature	OWTS Design Flow < 5000 gpd	OWTS Design Flow >5000 gpd
Impoundment with Intake for Drinking Water Supply and Adjacent Wetlands	200	400
Tributaries, Tributary Wetlands, Swales, and Storm Drains that Discharge Directly to the Impoundment	100	200
Any other Watercourse in the Drinking Water Supply Watershed (Not Connected to the Impoundment) or Areas Subject to Storm Flowage	50	100

[1] gpd = gallons per day

From OWTS Rules 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
Tributaries, Tributary Wetlands, Swales, and Storm Drains that Discharge Directly to the Salt Pond/Narrow River	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

From OWTS Rules 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

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.)*

Coastal Resources Management Council (CRMC) Rules/Regulations

CRMC - Wetlands

The Coastal Resources Management Council is authorized by statute to regulate *coastal wetlands* of the State and *freshwater wetlands in the vicinity of the coast* pursuant to R.I.G.L. § 46-23-6. Coastal wetlands are defined in Section 210.3 of the Coastal Resources Management Program (CRMP) to include salt marshes and freshwater or brackish wetlands that are contiguous to salt marshes or a coastal physiographic feature. Areas of open water within coastal wetlands are considered a part of the wetland. In addition, coastal wetlands also include freshwater or brackish wetlands that are directly associated with non-tidal coastal ponds and freshwater or brackish wetlands that occur on a barrier beach or are separated from tidal waters by a barrier beach. All contiguous freshwater wetlands are protected under the CRMP regardless of their size because they are considered coastal wetlands as defined under CRMP Section 210.3.

An overriding policy of the CRMC is to preserve and, where possible, restore all coastal wetlands. See CRMP Section 210.3.C.1. The CRMC regulates activities and establishes prohibitions based upon the adjoining CRMC-designated water type. For example, there are more permissible activities for a priority use within coastal wetlands that abut CRMC Type 6 waters (Industrial Waterfronts) than would be allowed in coastal wetlands abutting CRMC Type 1 (Conservation Areas). The permissible activities and prohibitions for coastal wetlands are specified in CRMP Section 210.3 and in Table 1 of the CRMP. The CRMC water type maps for all 21 coastal communities are available online at: http://www.crmc.ri.gov/maps/maps_wateruse.html.

The CRMP establishes *setback* and *coastal buffer zone* requirements for activities that are adjacent to coastal wetlands. The setback is the minimum distance from the location of the inland boundary of a coastal wetland (or other shoreline features) at which an approved activity or alteration may take place. It may also be referred to as a construction setback. See CRMP Section 140. A coastal buffer zone is the upland area directly abutting a coastal wetland that is, or will be, vegetated with native shoreline species and which acts as a natural transition zone between the coastal wetland and adjacent upland development. A coastal buffer zone differs from a construction setback (CRMP Section 140) in that the setback establishes a minimum distance between the coastal wetland (or other shoreline features) and construction activities, while a buffer zone establishes a natural area adjacent to a shoreline feature that must be retained in, or restored to, a natural vegetative condition. The coastal buffer zone is generally contained within the established construction setback. A typical setback and coastal buffer zone are shown in Figure 1 below, taken from the CRMC Application for Buffer Zone Management. See: http://www.crmc.ri.gov/applicationforms/BZGuidance_Invasives_Checklist.pdf

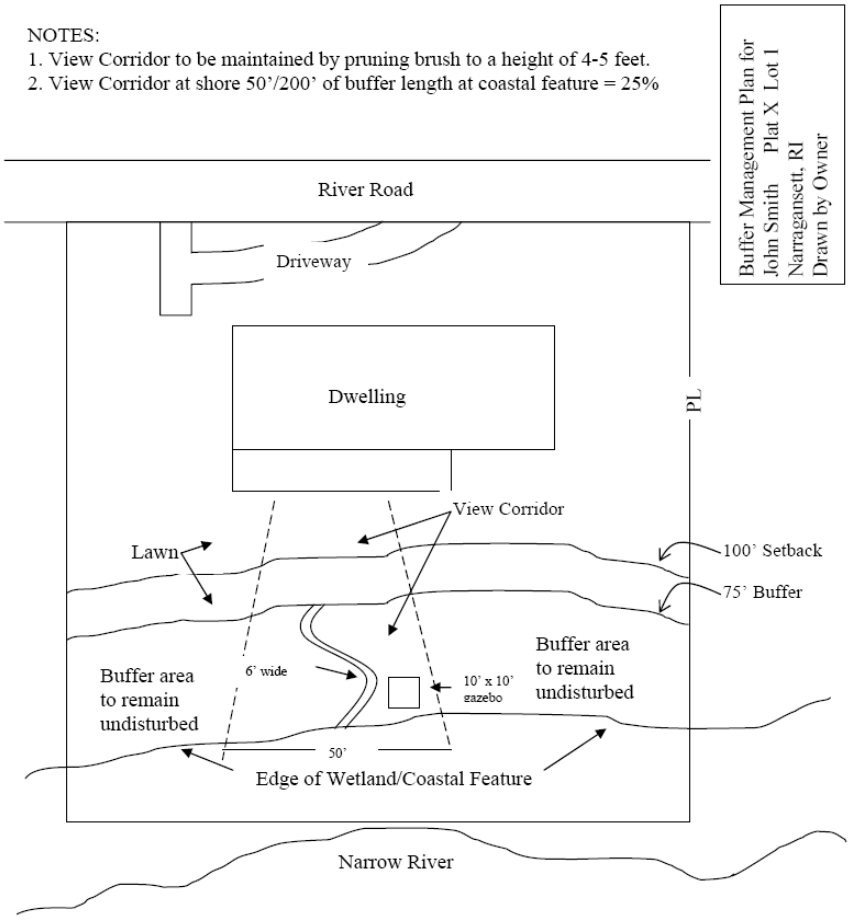


Figure 1: Example of an adequate buffer zone management plan drawn by the owner.

Coastal buffer zones provide multiple uses and benefits including protection of water quality, protection of coastal habitat, protection of scenic and aesthetic qualities, and erosion control. Coastal buffer zones are determined by Table 2A in CRMP Section 150 and are based on the parcel size and the abutting CRMC-designated water type. See Table 2a below. Generally, the setback distance will be 25 feet greater than the coastal buffer zone width so that new structures do not directly abut the coastal buffer zone and allow for an area of lawn between the structure and the vegetated buffer. This setback area also provides access for fire and emergency response and maintenance of structures without having to cut back and alter the coastal buffer zone.

Table 2a. Coastal Buffer Zone Designations for Residential Development

Water Use Category			
Residential Lot Size (sq. ft.)	**Type 3, 4, 5 & 6**	**Required Buffer (ft)**	**Type 1 & 2**
<10,000	15	.....	25
10,000 – 20,000	25	.....	50
20,001 – 40,000	50	.....	75
40,001 – 60,000	75	.....	100
60,001 – 80,000	100	.....	125
80,001 – 200,000	125	.....	150
>200,000	150	.....	200

During the 1996 legislative session the RI General Assembly enacted state law that divided freshwater wetland jurisdiction among the two state resource management agencies, the Department of Environmental Management and the Coastal Resources Management Council. Pursuant to the state law, the two agencies agreed upon a series of maps depicting the separate freshwater wetlands jurisdictional areas. These maps are available online at: http://www.dem.ri.gov/maps/wetjuris.htm. Additionally, the two agencies have agreed to procedures for dealing with applications that straddle the jurisdictional line, for agricultural activities involving freshwater wetlands and for enforcement matters.

The CRMC regulates these freshwater wetlands under it rules titled *Rules and Regulations Governing the Protection and Management of Freshwater Wetlands in the Vicinity of the Coast*. The CRMC rules are nearly identical to the DEM Freshwater Wetland Rules to ensure that applications are reviewed and processed under similar criteria and procedures. There are, however, some exceptions regarding the application process for consistency with the CRMC Management Procedures. For example, permit extensions, decisions and notifications, objections and appeals must be done in accordance with the Management Procedures. Both DEM and CRMC rules have the same application fee structure. Activities adjacent to and alterations to freshwater wetlands are evaluated in accordance with the rules.

There is one significant difference with the CRMC rules regarding tributary wetlands as defined within the CRMC's Narrow River and Salt Pond Region Special Area Management Plans (SAMPs). Tributary wetlands are defined as freshwater wetlands within the watersheds that are connected via a watercourse to a coastal wetland or tidal waters. Activities abutting these tributary wetlands within the SAMPs require a 200 foot setback for Self-Sustaining Lands and a 225 foot setback in Lands of Critical Concern. See Section 920.1.A and 920.1.B, respectively in the SAMPs. These setbacks are greater than what would typically be required under the freshwater wetland rules, but are required to protect water quality within the coastal watersheds and the downstream coastal resources.

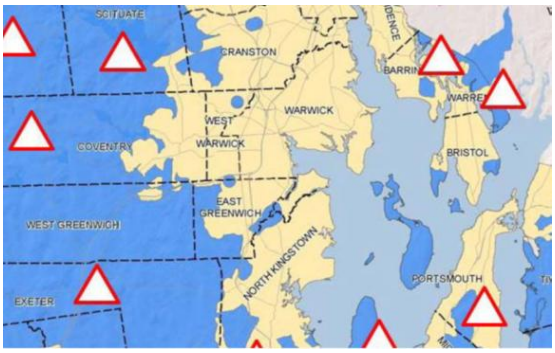
CRMC - OWTS

The CRMC requires that the construction, repair or alteration of all OWTS and components conform to the standards set forth in the DEM's most recent *Rules Establishing Minimum Standards relating to Location, Design, Construction and Maintenance of Onsite Wastewater Treatment Systems.* The CRMC regulates the construction of onsite wastewater treatment systems (OWTS) through CRMP Section 300.6. – Treatment of Sewage and Stormwater and the CRMC Salt Pond Region and Narrow River SAMPs. In 1992, denitrification OWTS were required by the CRMC for new installations within many portions of these watersheds to reduce nitrate loading to groundwater and reduce impacts to the sensitive coastal waters. The 2008 DEM OWTS Rules require denitrification OWTS for consistency with the CRMC SAMPs. Due to the ongoing coordination between CRMC and DEM the standards and setbacks required within the DEM OWTS Rules are considered to be protective of coastal resources, and therefore the CRMC defers to DEM for the review and approval of OWTS.

Following previous coastal storm events that caused significant erosion the CRMC and DEM worked together to develop the DEM *OWTS Guidance for Repairs in Critical Erosion Areas*. See: http://www.dem.ri.gov/programs/benviron/water/permits/isds/pdfs/coastrpr.pdf. The collaborative effort has continued between the agencies as more recent storms and information becomes available with a need to modify the guidance document. Applications for OWTS repairs with an eroding coastal feature that are located on properties within the Critical Erosion Areas (the shoreline from Watch Hill in Westerly to Point Judith in Narragansett) must be filed concurrently with both CRMC and DEM. This procedure allows the permitting staff of both agencies to discuss siting and design concerns with confirmation of the coastal feature by CRMC staff to result in a timely OWTS repair permit.

In the aftermath of Superstorm Sandy in October 2012, the CRMC, DEM, State Building Commissioner and the municipal building officials from Westerly, Charlestown, South Kingstown and Narragansett collaborated to develop a post storm procedure for reviewing damaged residential and commercial structures needing OWTS repairs or replacements. Staff from CRMC and DEM were specifically assigned to work with municipal building officials and conducted site assessments with onsite determinations that resulted in expedited permits being issued for repairs or replacement that were consistent with the *OWTS Guidance for Repairs in Critical Erosion Areas.* In addition, specified minor OWTS repairs were waived from the application process during this emergency post storm permitting by both CRMC and DEM. These procedures for coordinated review and permitting in a post-storm environment were so successful and welcomed by property owners and the municipalities that they will be used in the future for significant coastal storm events.

Municipal Ordinances



This section provides an overview of selected provisions of municipal zoning ordinances of Rhode Island's thirty-nine municipalities to better understand wetland regulation at the municipal level. Every Rhode Island community has adopted a community comprehensive plan, zoning ordinance and set of land development regulations. All communities must adopt zoning ordinances under the provisions of RI general Law Sections 45-24-27 through 45-24-72 known as the "Rhode Island Zoning Enabling Act of 1991". The zoning ordinances must be adopted and contain procedures for the administration of the zoning ordinance, including, but not limited to, variances, special-use permits, and, where adopted, procedures for modifications consistent with the Act.

While most have incorporated alternative and conservation design techniques, standards, and processes aimed at resource protection and preservation of community character in their zoning regulations. Not all have wetland related provisions. This inventory was preformed to understand the amount and type of regulations adopted by municipalities that establish setbacks from wetlands for all land disturbances and OWTS separate and in addition to what is required by DEM and CRMC described previously.

25 communities have adopted regulations regarding wetland buffers and OWTS setbacks.

Rhode Island's municipal ordinances are always evolving especially in relation to the State legislative and regulatory environment. They are dynamic and increasingly complex. In the course of this review, multiple scans using online ordinances posted on municipal web pages were used. The review was conducted between October 2013 and June 2014 for all 39 communities. Sean Henry, a Division of Planning Intern, preformed most of the effort in reading and summarizing the ordinances. Task Force Member, Lorraine Joubert, provided prior work from university students on the topic, assisted with the review and helped summarize the data into understandable categories. Nancy Hess, Supervising Land Use Planner also of the DOP, oversaw the work, the drafting of understandable categories, and the editing and production of the final matrix for the website and this report.

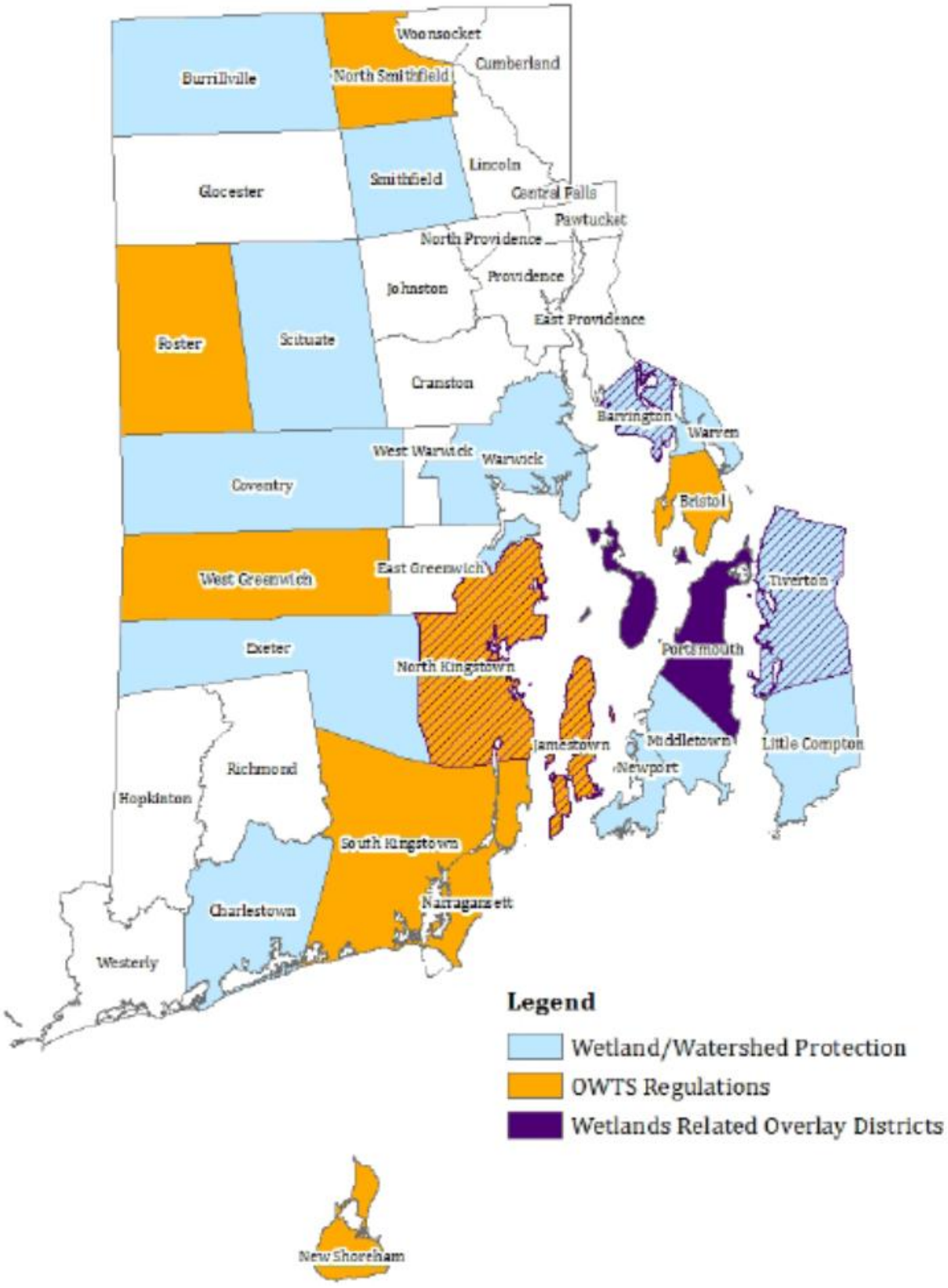
Each zoning ordinance was reviewed from beginning to end. Provisions related to the inventory were noted as found. The inventory is designed to recognize local differences while presenting data that can be compared and summarized statewide to inform the Task Force. The participation of municipal planning staff contributed greatly to the accuracy of this inventory. All 25 communities discovered to have a local wetlands or OWTS regulation were sent the draft tables. One quarter of the communities with pertinent ordinances responded with helpful feedback and verification of the accuracy in the capture and summary of information as it related to their community. The abridged inventory that follows has __major categories. A full copy of the inventory is included as Appendix C, Matric of Municipal Ordinances.

Most of the provisions primarily deal with structures, stormwater management, OWTS, drinking water, and groundwater protection. The municipal setbacks vary in application, as some communities apply setbacks town-wide and others have setbacks only in certain locations (such as within water supply watersheds and groundwater overlay districts). The Task Force examined the inventory at two meetings on October 25, 2013 and April 17, 2014. Discussion by the Task Force centered on that municipal regulations may also be driven by state and federal mandates for communities to protect water resources. A full copy of the inventory can be found in Appendix C. Matrix of Municipal Ordinances. A summary map follows showing which communities have wetland protection, watershed, OWTS regulations or wetlands related overlay districts. Users of the inventory are cautioned to be aware of the following limitations:

- The inventory was limited to zoning ordinances in force at the time of the review.
- While objective, the inventory has a subjective component: interpreting zoning ordinance language and assessing applicability to the search criteria.
- The inventory is quantitative; it records the most basic attribute of regulatory provisions - generally what they are and their existence.
- No qualitative assessments were made as to the content of various provisions or their implementation. There is no assessment of how well a particular approach or technique works in practice, or whether they are effectively administered and enforced.
- The inventory does not evaluate the legality of provisions as they relate to state enabling legislation, case law and local charters, comprehensive plans, and other local regulations.

Summary of Municipal Ordinances (2013 – 2014)
INSERT SUMMARY CHART FROM SEAN

Survey of Rhode Island Municipal Ordinances – 2014



Summary of Other New England States

This section provides an overview of selected regulatory previsions for wetland and OWTS buffers in other New England states. DEM and DOP staff presented information the Task Force on how neighboring states (Connecticut, Massachusetts, New Hampshire, Vermont, Maine, and New York) regulate their wetlands and OWTS. Task force members discussed the different approaches of the other states in contrast with Rhode Island's regulatory structure. Many members agreed that Rhode Island's structure is more consistent and predictable than the neighboring states that leave enforcement to the municipalities. The basic regulatory regimes are as follows:

The most common wetland buffer used in New England is one hundred feet.

Wetlands

- Connecticut: Wetlands protection is managed under two state laws: the Inland Wetlands and Watercourses Act and the Tidal Wetlands Protection Act. Freshwater wetlands are identified by their soil type, rather than vegetative surroundings. The laws do cover rivers and streams as well. The Inland Wetlands and Watercourses Act is implemented by the municipalities, who are responsible for establishing an inlands wetlands agency. Some permits are administered by the Connecticut Department of Energy and Environmental Protection (CT DEEP) for projects at the State level and shoreline alterations. The CT DEEP provides guidance to the municipal inland wetlands agencies regarding upland review areas. The guidance supports three different models that municipalities can use: a fixed distance from all resources, different distances depending on the resources and other criteria, or a case-by-case basis of site-specific data. The distances the municipalities use as a setback in Connecticut vary from 25-500 feet. Many communities also regulate vernal pools and intermittent wetlands as resources. The State also reviews (potential) structures within the tidal waters area, while municipalities review upland structures.

- Massachusetts: Massachusetts defines both coastal and inland wetlands in one statute, the Wetlands Protection Act. Like Connecticut, this law is also implemented at the local level, here in the form of conservation commissions. There are 351 municipalities in MA with varying wetland standards. The law is administered by each community's conservation commission, and is monitored by the MA DEP. The conservation commission is charged with protecting the public interest, and work to ensure that activities do not alter wetlands adversely. Buffer zones are defined in Massachusetts regulations, and extend one hundred feet from bordering wetlands, and require permits for any activities within the buffer zones. The MA DEP also retains authority over certain state-level projects, and also handles any appeals from the local level. Massachusetts changed their wetlands regulations in the mid-1990s to add riverfront protection areas. This resource area has a 200 foot review area in most places, and a 25' setback within fourteen specific cities and towns..

  New Hampshire: New Hampshire regulates wetlands in a similar fashion to Rhode Island using the Fill and Dredge and Shoreland Water Quality Protection laws. All freshwater flows are protected under the Law, with some qualifications for great ponds and other types. The laws are enforced by the Department of Environmental Protection and the municipalities are kept involved throughout the approval processes. Also municipalities participate in state review processes by identifying 'prime wetlands' that provides those wetlands with additional significance and affords such wetlands an additional one hundred foot buffer. The communities vote on the prime wetlands to submit to the State. (See end of this section for more information on prime wetlands.) Shoreland Protection laws have tiered buffer systems depending on the adjacent water body.

- Vermont: Vermont's regulations are enforced under state statute as well based on their functions and values as applied to a classification system. Those determined to be Class 1 (exceptional and irreplaceable) or Class 2 wetland, the State regulates. Class 1 and 2 wetlands are mapped at the State level. All other wetlands are regulated at the municipal level, or perhaps the federal government in certain few instances. Class 1 wetlands have a 100 foot buffer, while Class 2 wetlands have a 50 foot buffer.

- Maine: Maine regulates their wetlands under the Natural Resource Protection Act (for organized territories) and by Land Use Regulatory Commission (for unorganized territories).

OWTS: Highlights of New England/NY State OWTS Rules – Separation Distances *(All distances from the leachfield)*

- 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

- 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 down gradient
  - 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.

- 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.

- 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

- 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'

- New York: Department 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'

Prime Wetlands in NH Communities[2]

The topic of municipal designation for state consideration through the New Hampshire prime wetlands process was of interest to the Task Force. In New Hampshire, under Chapter 482-A:15 of the New Hampshire State Law and Administrative Rules (Env-Wt 700) of the Department of Environmental Protection, 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 prime wetlands are nominated, 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. Towns may have other local buffers or setbacks that are not addressed under the prime wetland or prime wetland buffer statute or rules.

STATE OF NEWHAMPSHIRE TITLE L[3]
WATER MANAGEMENT AND PROTECTION
CHAPTER 482-A
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

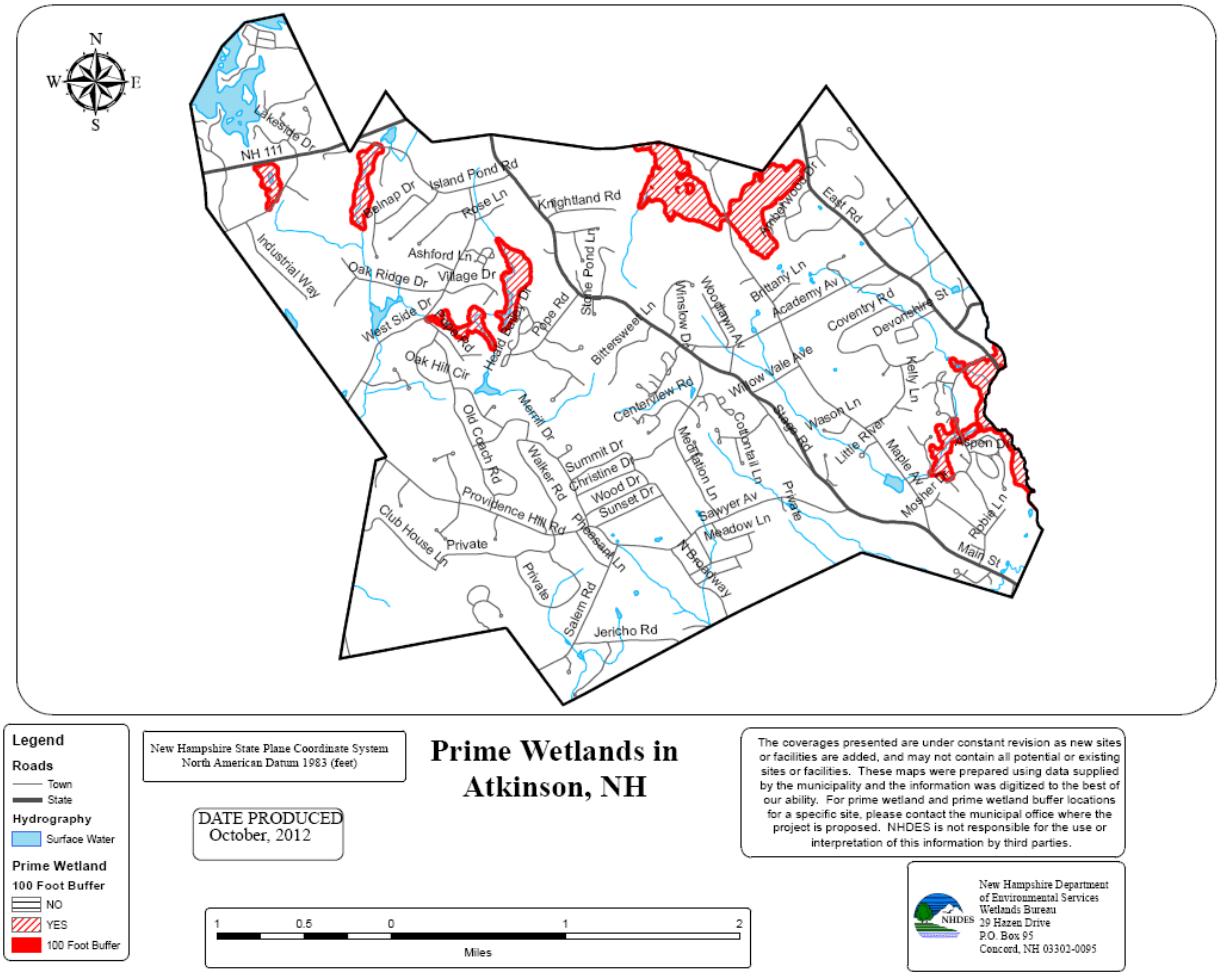
[2] From: http://des.nh.gov/organization/divisions/water/wetlands/prime_wetlands.htm

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

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.



Part 3: Today's Science as We Know It

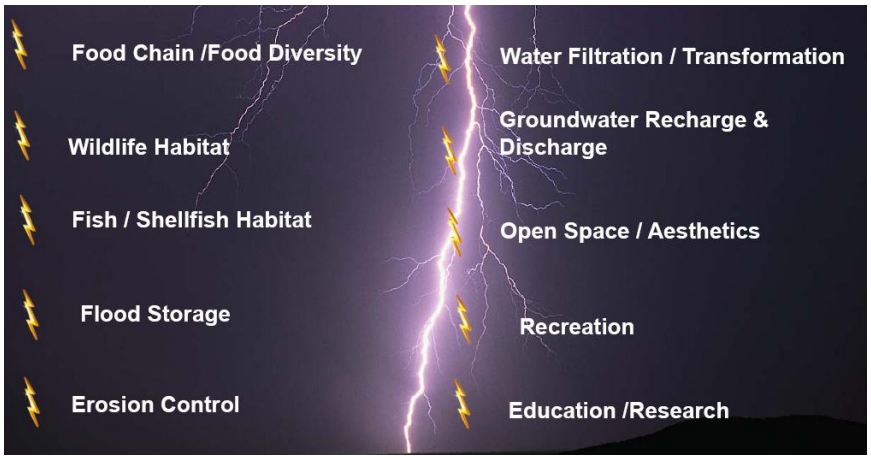
Technical Presentations & Guest Speakers

This Section provides a summary of the various technical presentations that were provided to the Task Force by topical experts, practicing consultants and guest speakers that are not covered by other parts of this report. The Task Force greatly appreciated the time and efforts of all who took time to present and inform them on these very important topics. The following were the speakers and their topics. The rest of this section briefly summaries the information that was presented to the Task Force and used in their deliberations. For the full versions of each presentation consult the DOP website[1] as all are archived within the meeting materials by meeting number.

Meeting#	Speaker(s)	Topic
3	Christopher Mason	Wetland Functions & Values
4	Dr. Peter Paton	Habitat Functions for Wetland Buffers
5	Dr. Arthur Gold George Loomis	A Snapshot of Water Resources Issues & Impacts & Nutrients in Buffer & Riparian Zones OWTS 101
7	Michael DeLuca Scott Rabideau	Local wetlands review - Narragansett Municipal Perspective Local wetlands review – Private Sector Perspective
11	Andrew T. Der Mark W. Eisner	Overview of OWTS regulations in Maryland Overview of Wetlands regulations in Maryland

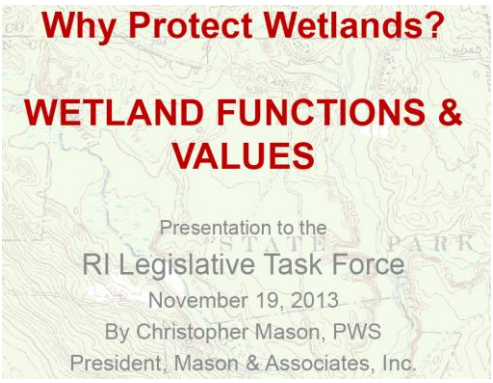
<u>Wetlands: Functions and Values</u>

In order to understand the issues regarding determining appropriate wetland setbacks, the Task Force heard an overview from two guest speakers about the basic functions of wetlands, how they function, and the impacts and concerns for buffers to address for water resources. One speaker is a certified Professional Wetland Scientist and the other is a renowned researcher from the University of Rhode Island in the field of wetlands. This is a brief summary of the presentations given to the Task Force on November 19, 2014 and December 29, 2014. Full copies of these technical presentations are on the DOP website.



[1] www.planning.ri.gov

Functions and Values - Christopher Mason, PWS



Because of the functions and values wetlands provide, they must be properly protected from individual and cumulative impacts. Their protection is vital to the long term quality of life for people, to the overall health of the environment, and to the health of the economy. Wetlands contribute to the protection of the quality of our waters, the value of which is priceless. They reduce the potential for flood damages which can be life-threatening and costly. They are a basis for recreation and tourism. They enhance property values, and they improve our quality of life by providing us with open spaces.

Freshwater wetlands are areas where water covers the land or where water is at or near the surface of the ground long enough during the growing season to support the development of wetland or "hydric" soils and to support the dominance of wetland indicator plants or "hydrophytes." Wetlands are often situated between uplands and deeper waters, and may therefore be transitional in nature, whereas other wetlands may be isolated features located throughout a watershed.

There are many definitions of wetlands, and common amongst them is the presence of water, the driving factor in wetland formation and persistence. Included for purposes of this discussion are vegetated wetlands, such as swamps, marshes, and bogs; as well as other areas regulated as wetland in Rhode Island, standing water wetlands such as lakes, ponds, and special aquatic sites; and flowing waters such as rivers and streams. Freshwater wetlands perform functions and support values that no other feature in a watershed does. That is why so many federal and state laws have been established to protect them.

a) Drinking water supply
b) flood control and storm damage prevention
c) pollution filtration and transformation
d) productivity and food chain support
e) protection of fisheries and shellfish
f) wildlife habitat and biodiversity
g) open space, recreation, and
h) education opportunities

A wetland function is an action or ecological process that a wetland performs, i.e. storage of rainwater and surface runoff water after a storm, and the value is the benefit or usefulness of that function to people, i.e. prevention of flood damage to a property. Most wetlands perform multiple functions, and all wetlands perform at least one function. The type of wetland and its hydrology are major factors that affect a wetland's functions and values, along with its size, location in the watershed, and its interconnection with other wetlands, habitats and land uses. Because wetlands are so diverse, it is difficult to identify a wetland's functions without site-specific analysis.

Water Supply

Wetlands are important sources of surface water and ground water for drinking and for other uses. Some Rhode Island wetlands - regulated as ponds - are drinking water reservoirs. The Scituate Reservoir and Green End Pond, for example, are major public drinking water sources. Other ponds may be used for agricultural, manufacturing, industrial purposes, or for fire suppression. Other freshwater wetlands may interact with groundwater reservoirs by seasonally recharging the groundwater or more frequently in Rhode Island freshwater wetlands are areas where groundwater is discharged to the surface at a wetland. This wetland and groundwater interchange replenishes water supplies and wetlands, maintains water supplies during drought periods, and maintains and cools rivers and streams.

Flood Control, Storm Damage Prevention and Sea Level Rise

Flood control is a wetland function of increasing importance in light of climate change. This function may reduce flooding along rivers, streams and coastal areas, and thereby protect people and property from damage or even loss of life. Wetlands store precipitation, intercept storm water that is running over the land, and receive and store overflow water from adjacent rivers, streams, lakes, and ponds. The collected and stored water is held in the wetland for a period of time, and then it is slowly released down-gradient or downstream. This temporary storage and delay results in the reduction of storm height, and it smooth's the storms' flow, thereby reducing its impacts on people, property, and infrastructure.

In addition to a wetland's capacity to store water, wetland vegetation has the capacity to reduce the velocity of storm or flood waters flowing through, and this can prevent damage to land or structures. The vegetation and the velocity reduction also help to anchor shorelines and prevent erosion of properties and banks. Without wetlands distributed through a watershed, a storm's peak and flow velocities may be higher and therefore potentially more damaging. By providing storage and by buffering waves and tides, wetlands in the coastal zone have the capability of reducing flooding and erosion of shorelines. This is of increasing importance as sea level rise is expected to continue to rise in Rhode Island.

Pollution Filtration and Transformation

Wetlands have the ability to improve the quality of surface water or ground water that flows through them via chemical, biological and physical processes that they perform. Wetlands can trap and hold sediment and pollutants absorbed onto the sediment, they can transform nutrient pollutants by way of plant uptake and denitrification by microbes, and they can trap or treat heavy metals and other chemicals. These processes, when performed by wetlands located between upland development and water bodies, are effective in protecting the water quality of the receiving water body, which may be a drinking water source. Although valuable, an individual wetland's pollution attenuation function is limited and the wetland may be impacted overtime.

Productivity and Food Chain Support

Freshwater wetlands and salt marshes are among the most productive natural systems regionally and worldwide. They produce more plant and animal biomass than upland forests and grasslands, and people can benefit from this by harvesting wetland crops (fish, shellfish, furbearing animals, and wood products), by hunting and by fishing. For recreation, people may fish, bird-watch, or duck hunt all of which are tied to a wetland's productivity. The production and contribution to the economy may be measured in terms of human harvest yields, trap yields, or fish catch. In the coastal zone, high productivity supports the food chains of the coastal ponds and estuaries and subsequently the fish and shellfish industries.

Wildlife Habitat and Biodiversity

Freshwater and coastal wetlands provide habitat for wetland wildlife species, including birds, mammals, reptiles, amphibians, and invertebrates. Many species are wetland-dependent, i.e., they require wetlands for survival. They need wetlands for nesting, breeding, food, water, or cover. Other wildlife species are "facultative", i.e., they may live in wetlands or uplands, and they do not require wetlands for survival. The intensity of nearby human activity may influence the suitability of wetland and upland habitats, especially for wildlife species that are sensitive to disturbances. Fifty nine species of facultative birds and 44 species of facultative mammals utilize the State's most common wetland type – red maple swamps. Swamps and other wetlands may be especially important in urban areas where other upland areas have been developed and the wetland is the only remaining habitat. Nationwide, wetlands and deep water habitats cover 9 percent of the United States; however, disproportionately 50 percent of the nationally threatened and endangered animals and 28 percent of the threatened and endangered plants are wetland-dependent.

Protection of Fisheries and Shellfish

Wetlands are required habitat for many freshwater, anadromous and saltwater fish and shellfish. Freshwater fish depend on wetlands for clean water, food, spawning and nursery areas, and for plant cover. Common freshwater fish that use wetlands are pickerel, sunfish, herring, perch, and shad. Several anadromous fish spawn in the freshwater portions of rivers, including blue back herring and American shad. Salt marshes, flats, and tidal creeks are habitat for numerous commercially harvested species, including menhaden, bluefish, striped bass, and clams.

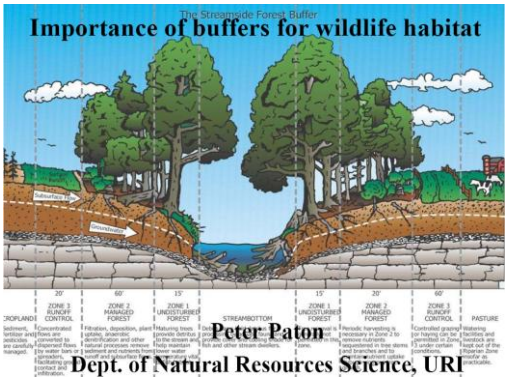
Socio-cultural or Heritage Values

Wetlands are popular and attractive places for many recreational activities, including swimming, fishing, canoeing, hiking, hunting, bird-watching, and photography. These recreational activities also contribute to Rhode Island's economy by generating money spent on travel, lodging, licenses, and equipment. According to a recent American Sport fishing report, residents and tourists in RI spend about $38 million in total on freshwater fishing, while generating about $5.6 million in federal, state and local tax revenues. A 2011 survey conducted by U.S. Fish and Wildlife and the U.S. Census Bureau estimated that total expenditures on recreational fresh and salt water anglers for that year exceeded $130 million. In addition to fishing, the hunting of waterfowl in RI generates over $18 million and watching wildlife generated $200 million in spending as of 2011.

Wetlands often provide unique and scenic water views, natural landscapes, greenways, undeveloped land, and privacy. Many artists paint natural scenes of open water and marshes. Certain wetland types provide unique opportunities for education and research projects. As open space becomes scarcer with increased urbanization, wetlands offer an enduring form of open space.

Habitat Functions for Wetland Buffers

Dr. Peter Paton, Depart of Natural Resources Science,
University of Rhode Island



A naturally vegetated buffer zone adjacent to wetlands and waters protects and supports biodiversity by providing habitat connectivity, serving as travel corridors, providing habitat area for wildlife's life needs, by protecting sensitive resources, and shading aquatic habitats. The effectiveness of a buffer zone for wildlife protection is related to its width, vegetation composition and structure, the adjacent habitats and the intensity of the land uses. All wildlife groups - birds, mammals, amphibians, reptiles, fish and invertebrates benefit from the presence of diverse, vegetated, and wide buffer zones.

Sixty five wetland-dependent species in Massachusetts (or 76 % of the wetland-dependent wildlife species), require upland habitat to satisfy their life needs. Ninety % of reptiles, 95 % of amphibians, 100 % of mammals, and 55 % of wetland dependent birds require upland. Fifty two % of these species use the wetland and the area that is more than 200 feet away from the wetland.

Vernal pools are a specialized wetland wildlife habitat. They are small, seasonally flooded wetlands that are essential breeding habitat for some amphibians that are adapted to the specialized vernal pool conditions of flooding (in the fall to spring) and drying (in the spring to summer). Approximately 60 percent of the vernal pools in a Rhode Island study were one-quarter acre or smaller. The obligate vernal pool amphibians (wood frogs, spotted salamanders, and marbled salamanders in Rhode Island) rely on surrounding upland and wetlands as core habitat for most of each year for their life needs after they disperse from the breeding pools. The mean travel distances for the adult amphibians from the vernal pools range from 637 feet to over 1300 feet.

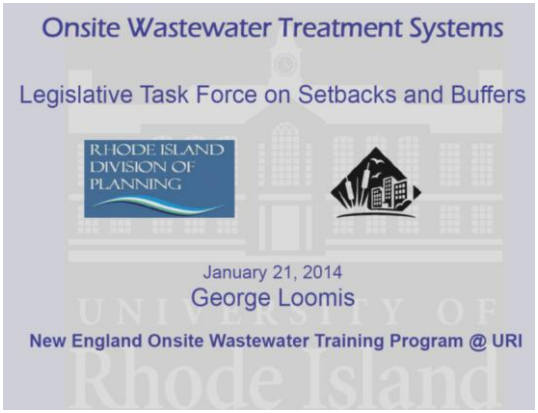
State wetland regulations generally do not adequately protect the core life zone required for the sustainability of the obligate vernal pool species. The Maine regulations are the most protective in the region as they regulate activities within 250 feet of from a Significant Vernal Pool depression. This buffer helps to shade and moderate a pool's temperature, it provides a detritus source for a pool's food chain, and it provides a buffer against water quality degradation of the pool. A permit may be granted for an activity in this zone provided that 75 percent of the area is maintained as forest.

Maintenance of naturally vegetated buffer zones is equally important for protection of birds and for the other wetland wildlife groups. So as not to provide too much information, Dr. Paton focused on vernal pool wetlands and amphibian protection, but he offered to continue to speak about the importance of buffer zones for protection of other taxa or to return. Buffer zones, regardless of their width, should be a mix of native vegetation which provides habitat structure and niches for different species. Natural buffer features including snags, woody debris, rocks, etc., should be maintained within buffers or restored. Dr. Paton pointed out that in order to understand the limitations of wetland laws and regulations to protect biodiversity and habitat, Massachusetts has developed a strategic approach to protection titled Biomap2 available at:
http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/land-protection-and-management/biomap2

Onsite Wastewater Treatment Systems (OWTS): Basics & Groundwater Science

In order to understand the issues regarding determining appropriate OWTS setbacks, the Task Force heard an overview from two guest speakers about the basics of groundwater science, a description of what OWTS are and how they function, and the impacts and concerns for OWTS wastewater on water resources. The speakers are nationally renowned researchers from the University of Rhode Island in this field. This is a brief summary of the presentations given to the Task Force on January 21, 2014. As mentioned earlier, copies of these technical presentations are on the DOP website.

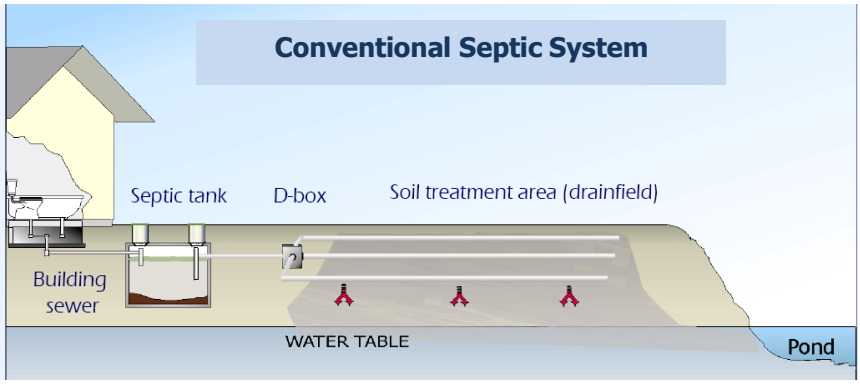
OWTS Basics
George Loomis, Program Director, NE Onsite Wastewater Training Program, Cooperative Extensive, URI



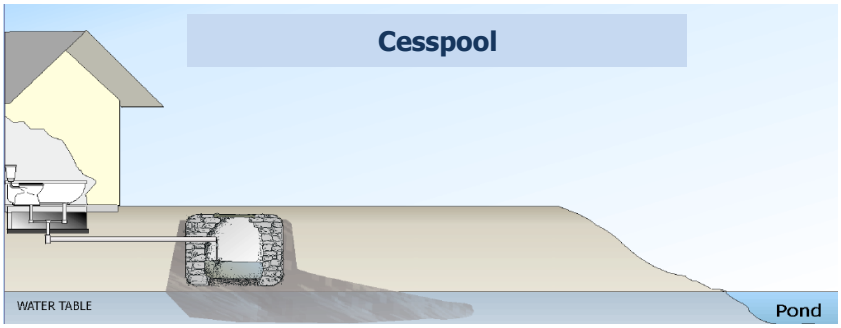
An OWTS is defined in the DEM OWTS Rules ("Rules Establishing Minimum Standards Relating to Location, Design, Construction and Maintenance of Onsite Wastewater Treatment Systems") as "any system of piping, tanks, dispersal areas, alternative toilets or other facilities designed to function as a unit to convey, store, treat or disperse wastewater by means other than discharge into a public wastewater system." The most common OWTSs are considered "conventional" systems that operate as follows

1) Wastewater from interior plumbing drains (kitchen and bath sinks, toilet, bath/shower) exits the structure through the building sewer line and empties into a septic tank.
2) Solids in the septic tank sink to the bottom, floatables (oil and grease) rise to the surface. The tank is designed to allow only the wastewater from between these two zones to exit the tank. Typically solids in the tank accumulate faster than they can decompose. The tank must be periodically pumped to prevent the solids from building up to the point where they will flow out of the tank and cause the system to clog and fail at the next steps.
3) Wastewater effluent from the septic tank goes into a distribution box ("d-box") which evenly distributes the effluent to pipes exiting the box.
4) Wastewater flows from the distribution box to the leachfield (aka drainfield or soil treatment area). Different types of leachfield are allowed to be installed, but all are designed to allow the effluent to filter down through the constructed leaching area into the natural soil below.

In addition to "conventional" OWTS, there are numerous approved alternative systems that have demonstrated to DEM that the system is capable of treating wastewater to a level equal to or better than the conventional system described above. There are also "alternative toilets" that include composting systems and incineration as a means to treat and/or dispose of the waste.

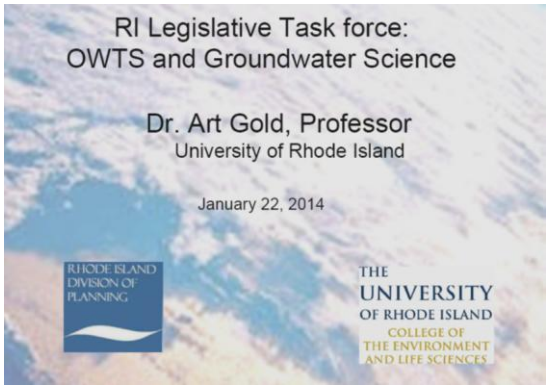


Finally, there are cesspools. Cesspools are an older substandard method of disposal that does not provide wastewater treatment and which is no longer permitted for any submission to DEM. A cesspool is any buried chamber (could be a metal tank, a perforated concrete vault, or a covered hollow or excavation) that receives sewage from a building for disposal into the ground. As of 2014, there are approximately 20,000 cesspools still in use in RI. The RI Cesspool Act of 2007 (RIGL § 23-19.15) mandates that all cesspools located within 200 feet of the inland edge of the coastal shoreline or within 200 feet of a drinking water reservoir or public well must be abandoned and the home upgraded with a new onsite wastewater treatment system or connected to available municipal sewer lines. Phasing out the continued use of other cesspools in RI is a major goal for DEM.



An OWTS can fail if it is improperly sited, designed, installed or maintained, causing health and water quality concerns as wastewater backs up onto the land surface and flows directly into surface waters or stormwater collection systems. Failing OWTSs can also allow the wastewater to move untreated into groundwater. Lack of maintenance is considered to be the primary cause of system failure.

Impacts & Nutrients in Buffer and Riparian Zones
Dr. Arthur Gold, Department of Natural Resources Science, University of Rhode Island



Buffers are generally defined by CRMC and DEM as a vegetated area retained in its natural undeveloped condition (or replanted and restored to such condition) that is located between a resource such as a wetland, water body or a coastal feature and adjacent to existing or new development. Buffers provide important areas to improve water quality by reducing the levels of pathogens and nutrients through chemical and physical binding and transformation within the underlying soils as well as plant uptake within the buffer itself. Riparian buffer zones are vegetated areas that abut a stream or river, which protects the water body from the impacts of adjacent land uses.

Impacts of OWTS Wastewater

Typically phosphorus is the limiting nutrient in freshwaters while nitrogen is the limiting nutrient in marine waters.

The primary pollutants of concern contained in septic system effluent are pathogens (enteric bacteria and viruses), phosphorus and nitrogen. Pathogens are a concern to human health and may impact drinking water supplies, both surface and groundwater, and result in bathing beach closures or shellfish harvesting restrictions. Phosphorous and nitrogen are nutrients that can cause impairments to water bodies by causing algal blooms that result in depressed dissolved oxygen levels that stress aquatic organisms. Excessive nitrogen in coastal waters is responsible for causing dead zones and results in ecosystem changes that degrades eelgrass beds, which are important estuarine habitats.

The level of treatment provided by the OWTS depends on many factors – type of system used, system design and installation, system use (loading rates, types of waste), system maintenance, and the onsite soil characteristics. Wastewater from an OWTS moves downward through the soil into groundwater carrying with it bacteria and viruses, nutrients (nitrogen and phosphorus), pharmaceuticals and personal care products and other contaminants that may be improperly disposed of into the system.

Groundwater travels slowly from the area of the leachfield downslope towards a point where it is either withdrawn from the subsurface by a well or the groundwater flows to and into a surface water body. The characteristics of the subsurface through which the groundwater flows will greatly influence the contamination risk. These subsurface characteristics are highly variable across the state and often vary from one neighboring lot to another. The materials may be coarse and sandy providing for less treatment and faster transport or the materials may be very fine grained providing better treatment and very slow transport. Travel time in the groundwater from the leachfield to the receiving well or waters is highly variable from many feet per day to a few inches per day. As Dr. Art Gold points out, "Characterizing subsurface flow requires extensive (and expensive) field work."

Contaminants carried by the groundwater from the OWTS can have adverse impacts on public health and the environment. Bacteria and viruses in the groundwater can cause human sickness from ingestion of contaminated water or shellfish. The primary factor controlling removal of pathogens in the groundwater is filtration by the soil and time in the subsurface to facilitate pathogen die off. Increased separation distances will increase both of these processes and reduce contamination risks.

Nitrogen and phosphorus have a fertilizing effect on surface waters providing nutrients that enhance algae growth. Nitrogen has the most impact on salt water environments, whereas phosphorus will impact freshwater environments. The increase in algae, sometimes so dramatic as to cause an "algae bloom," decreases water clarity and can alter the long-term ecosystem structure. When these algae die their decomposition can result in low oxygen concentrations in the water causing significant impacts to aquatic life, including fish kills. In addition, algal blooms in freshwater from cyanobacteria (blue-green algae) have been a growing concern because the cyanobacteria release toxins that can be harmful to humans, pets and livestock.

The impacts of increased nutrients on vegetated wetland systems are not as well documented. Nutrients transported into wetlands will be utilized by the plant community with the result that over time there are likely to be changes in the community structure reducing species richness and often favoring non-native species (Wetlands in Washington State, March 2005). Studies have also shown that "excessive nutrients can cause long-term and short-term shifts in invertebrate communities" and impact amphibians (Wetlands in Washington State, March 2005).

Nitrogen and phosphorus behave differently in the subsurface. Nitrogen from the OWTS is in the form of nitrate. It is among the most soluble and therefore one of the most mobile constituents of system effluent. The mechanisms for removal are denitrification, which is a microbial process that converts nitrate to nitrogen gas, and plant uptake described above. Denitrification requires an environment with a lack of oxygen and organic matter for the microbes. These conditions are typical of wetland soils and in riparian areas bordering wetlands and waterbodies. However, the effectiveness of an area in removing nitrogen will depend on the site-specific characteristics regarding the depth of the organic matter and the groundwater flow path. The organic layer must be deep enough and the groundwater flow path shallow enough to intersect and provide the conditions necessary for denitrification.

Phosphorus in the subsurface can bind to soil particles. However there is concern that these sites for soil adsorption can reach capacity, allowing phosphorus to travel farther with groundwater. A more permanent removal mechanism for phosphorus is precipitation out of the flow system into a mineral form. This happens under acidic soil conditions, common in RI, where aluminum and iron are leached from the soil and cause the precipitation of phosphate.

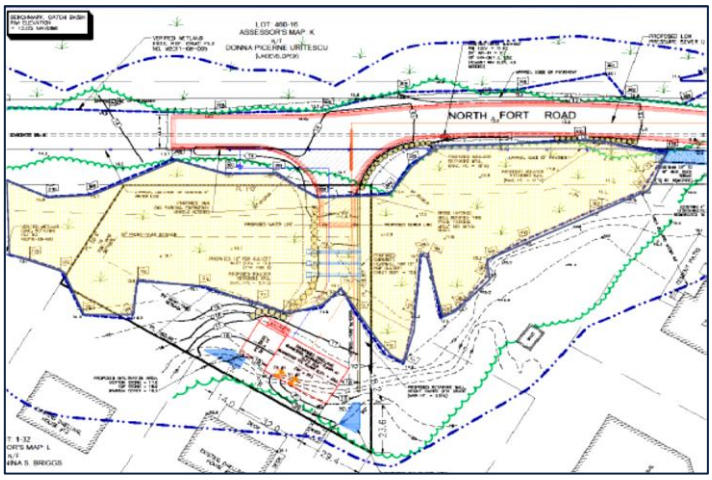
A properly sited, designed, installed and maintained OWTS will generally provide decades of use and provide treatment such that the system does not adversely impact public health or the environment. However, as discussed above, uncertainties related to subsurface fate and transport of system effluent require use of appropriate setback distances between an OWTS and the receiving waters or wells..

The retention time of wastewater effluent through the subsurface soil (or vadoze zone) is critical to the level of treatment that occurs. Phosphorus removal depends on soils particle surface area. Thus, gravelly soils are not good phosphorus removal soils. Aerobic conditions and long retention times are crucial to good treatment. Nitrogen removal in buffer zones is highly variable and depends upon the aquifer depth and flow paths, the depth of organic soils and the extensiveness of wetland buffers along a shoreline. Nitrogen is typically removed at higher rates through denitrification when shallow groundwater laden with nitrate-nitrogen moves through rich organic anaerobic soils (hydric soils) associated with vegetated wetlands. Unfortunately, in deep aquifers nitrate-enriched groundwater may bypass these organic hydric soils and discharge without the benefit of denitrification into nearby waters.

Water follows the path of least resistance. Whether flowing across the surface or through subsurface soils stormwater runoff or septic system effluent generally flow downhill towards a water resource, but will move through the soil in whichever direction provides the easiest flow path. Urbanization and filling can also significantly change the flow of the groundwater by short circuiting the original flow path, thus decreasing treatment potential. Urbanization also can lower local groundwater tables and disconnect flow paths from riparian areas where some level of treatment may have occurred. Hydrologists and developers cannot characterize how deep an aquifer is or in which direction it flows without installing numerous observation wells, which is expensive. Buffers provide the necessary area for water to disperse and to be treated by the vadoze zone and anaerobic hydric soils. The more extensive the buffer is the more opportunities for interaction with the soil and greater treatment potential. Dr. Gold summarized his presentation as follows:

- There is no "magic' distance
- Aquifer characteristics are highly uncertain and have strong influence on contamination reaching receiving waters
- Characterizing subsurface flow requires extensive (and expensive) field work
- Buffer length reduces contamination risks

Local Wetland Review: Two Perspectives



In order to understand the impacts of wetlands permitting at both the State and local level, The Task Force heard an overview of applications requiring municipal wetland reviews from two points of view. A municipal planner and a practicing consultant were solicited to describe to the Task Force what kind of expertise is required, what level of effort is needed, and the various costs of preparing and reviewing "typical" municipal wetland applications, above and beyond the requirements of DEM. This is a brief summary of the presentations given to the Task Force on March 27, 2014. As mentioned earlier in this Section, copies of these technical presentations are on the DOP website.

Municipal Perspective

Narragansett Community Development Director, Michael DeLuca, shared the history of how Narragansett regulates wetlands. Environmental overlay districts were adopted by the town in 1987 for coastal 7 freshwater wetlands, coastal resources, high watertable limitation, special flood hazards and steep slopes.. Narragansett has both a coastal and freshwater wetlands and coastal resources overlay district. The freshwater wetlands district includes all land within 150 feet of a DEM verified wetland edge if unsewered and or 100 feet in sewered areas. Mr. DeLuca provided a review of three case studies of wetlands-related issues highlighting the local concerns and reasoning behind them. He presented and described several recent applications. One was an application eligible for staff review, another that would require site plan approval from both the planning department and the engineering department, and a third which required a Special Use Permit from the Zoning Board of Review. He described the actions and review procedures used for each type of application and the resulting decisions and the conditions for each. The presentation provided insight on the level of detail that has been built into the community's regulations with the obvious intent to provide protection for wetlands and water resources at levels that exceed those afforded by state standards.

Property Owner /Consultant's Perspective
Scott Rabideau, PWS, Natural Resource Services, INC

Task force member, Scott Rabideau, a certified Professional Wetland Scientist, Gave a brief overview of the State regulations and review procedures applicable to the three applications presented by Mr. DeLuca. He examined the three cases from a property owner /consultant's viewpoint. He explained the steps necessary to prepare an application and the amount of effort and costs that need to be exerted in order to comply with Narragansett's regulations. Most often, a property owner would need to consult with experts to submit an application or to present their application. This

includes attorneys, environmental consultants, biologists, engineers, and others. In most cases, the greater the impact on the wetland, the more effort and money needs to be exerted by the property owner in order to obtain approval from the DEM and the Town. An application to significantly alter a wetland has a much higher standard than an insignificant alteration. It requires an evaluation of all the functions and values of the wetland, as well as any wetlands that are hydrologically connected to that wetland. The case study which required a variance and special use permit from the Town required an additional 18 hours of professional effort above and beyond the 18 hours needed for DEM approval to receive approval from the Town. It was noted that the additional effort to achieve local approval for the case studies, which had already been approved at the State level, resulted in requirements to change the development plans in manners that were difficult to characterize as having significant beneficial impact for the nearby wetlands.

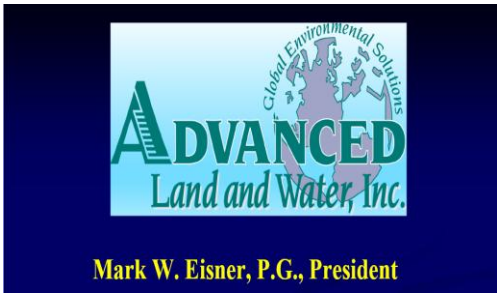
Wetlands & OWTS in Maryland

In order to further understand the issues regarding determining appropriate wetlands and OWTS setbacks, the Task Force heard an overview of how wetland setbacks for all land disturbances and OWTS were regulated in a different state. The Rhode Island Builders Association assisted the DOP with obtaining two regionally known practicing consultants from Maryland to provide an outside view of Rhode Island's system and a comparison to the Maryland system. This is a brief summary of the presentations given to the Task Force on July 17, 2014. Again, a full copy of all technical presentations is on the DOP website.

Andrew Der
Principal and Environmental Consultant of Andrew T. Der & Associates, LCC

Mr. Der focused on the functions and values of stream buffers and how best management practices (BMP) function. The need for buffers is to reduce and or eliminate impacts from mostly the 3 big key concerns; phosphorus, nitrogen and sediment. The Counties in Maryland would be equivalent to RI's cities and towns. The municipalities rely on the County for most services. There are 24 counties in Maryland. All have different ordinances but primarily use a 100 foot buffer as the minimum protective buffer. There is no state level buffer requirement because the Counties already have one. He cited a number of literature sources, notably the EPA National Pollutant Discharge Elimination System Stormwater menu of BMPS. There are a few areas where the State has determined that higher levels of protection is needed, such as the Chesapeake Bay Watershed and any stream supporting colder water fish such as trout. The County typically has three biology staff and can ask the State for assistance. He suggested that RI needs to clarify some it its terminology. For example buffers vs. setbacks; they are not the same thing. He also suggested that modern stormwater management technology could be more effective for redevelopment in lieu of additional buffers.

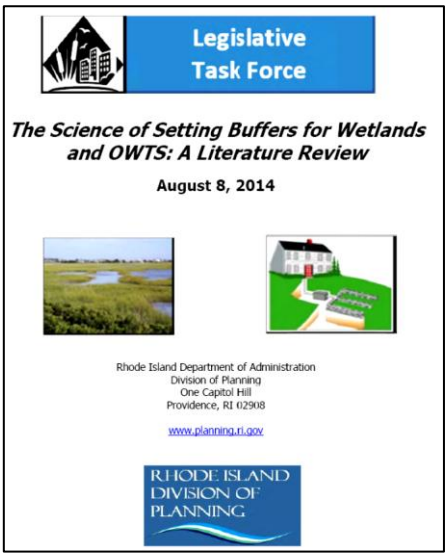
Mark Eisner
Professional Geologist, President of Advanced Land and Water, Inc.



Mr. Eisner focused on the Maryland experience with OWTS setbacks and practices and presented some suggestions for consistent, science-based approach. Generally the design requirements between the two states are very similar. He discussed the differentiation of water based features which would have different distance based setbacks. For example, drainage ways and gullies have a 25 foot

setback while water bodies not serving as potable water supplies have a 100 foot setback. He talked about the nitrogen cycle and OWTS biomats. His conclusions were the soil type at discharge is critical. Sandy soils should have IA denitrification because little natural Nitrogen reduction occurs in drainfield. Continuation of the current setback with IA is ok. A setback of 100 feet on sandy soils on a 40,000 sq. ft. lot will achieve N dilution to background levels without a biomat or IA for Silt/Clay Soils. He also said to clarify buffers vs. setbacks as they are not the same.

Scientific Literature Review



Overview

A literature review discusses published information in a particular subject area, and sometimes information in a particular subject area within a certain time period. This Review evaluated scientific references and advised the Task Force on the most pertinent or relevant. A team of readers made up of Legislative Task Force members and agency staff undertook the Review. It was split into two broad categories based on the primary topics of the Task Force. The two categories were:

- the science of buffers and functions and values of different wetland types; and
- the science of setbacks related to impacts from OWTS.

Most of the titles reviewed came from journal articles published in diverse fields: agriculture, engineering, forestry, geology, land use planning, resource management, and wildlife biology. There are also summaries of government publications from the federal, state, and local levels. The readers were:

Task Force Members:
- James Boyd, Coastal Resources Management Council
- Russell Chateauneuf, Civil Engineering Representative
- Lorraine Joubert, Environmental Entity – URI NEMO
- Thomas Kutcher, Wetlands Biologist, Save the Bay

Department of Environmental Management:
- Carol Murphy, Principal Environmental Scientist

Division of Planning:
- Nancy Hess, Supervising Land use Planner

The readings selected were based on: the relevance of published studies to the work of the Task Force, the organization publishing the report, the timeliness of the work, the rationale and contribution to field of knowledge on the topic, the clarity of the writing, the interpretation of other literature, and finally a bibliographic format that covered the review of multiple documents. In the short time available, the readers scanned over 150 documents for relevancy. This part summarizes the major findings of the literature review. The purpose of the literature review was to provide a summary of current research. A full copy of the review is included as Appendix D, *The Science of Setting Buffers for Wetlands and OWTS: A Literature Review.*

The review provides a guide to understanding the two particular categories for the Task Force. There was no time or budget to conduct any actual research. Instead a summary of useful reports of

what is current in the field has been provided. It was also intended to provide a sound scientific background for the deliberations of the Task force. The citations concern the protection of wetland functions and values from many different perspectives. This review does not represent an exhaustive or exclusive listing of work conducted concerning the protection of wetlands. The literature search focused on technical information from journal articles, government documents, and research reports, rather than on text or general information books. On-line searches were also conducted. Brief summaries of each report were provided to the Task Force in oral presentations by the readers. These are not a substitute for reading the complete papers. All findings and recommendations were those of the cited authors.

Highlights of Literature: Wetlands & Buffers

The readers addressed selected wetland buffer literature/ reports for the following areas:

- New England relevance(other than RI)
- timeliness; issued since year 2000
- general wetland setback references
- Rhode Island specific summaries
- the State of Washington.

The wetland readers were: Task Force members James Boyd, and Thomas Kutcher, with staff assistance from Carol Murphy, and Nancy Hess. The highlighted major points were:

- A buffer zone is described as a naturally vegetated area adjacent to a wetland or surface water.
- A vegetated buffer is a protective area between water bodies and human activity, such as development or agriculture.
- Buffers are most effective around low order streams
- Buffers are most effective closer to the source of pollution
- Wider buffers are needed where flow is concentrated (i.e. valleys)
- Buffers are more effective on flatter slopes
- Narrow buffers remove coarse sediments more effectively than fine sediments
- Buffers can reduce pathogens, nitrogen, phosphorus from surface and groundwater, but the mechanisms are complex and vary with pollutant
- In general, the wider the buffer and the more complex the vegetation within it, the more effective it is in meeting those purposes.
- Most studies have found that much larger buffers are required to provide wildlife habitat than are required for any of the other buffer benefits.
    - Recommended buffer widths ranged from 1 meter up to 1600 meters, with 75% of the values extending up to 100 meters.
    - General wildlife habitat as fair to good with a 75 meter buffer width, good at 100 meters, and excellent at 200 to 600 meters.
    - Widths wider than 100m (328ft) are needed for habitat values and corridors.
- In Massachusetts - Of the 65 species, 50 use from the wetland edge to 100 feet; 38 use to 200 feet; and 34 use from the edge to beyond 200 feet.
- In New Hampshire - 100 feet is generally a minimum required buffer width for water quality purposes.
- In Connecticut – A 100 foot riparian buffer will assist with sediment control and nutrient removal; however, the effectiveness will vary according to site conditions and may not result in complete removal.
- In Vermont - buffer widths for riparian functions (the averages of the ranges are from 37 feet to 225 feet)

Highlights of Literature: OWTS & Setbacks

The readings focused on field investigations conducted in RI and other research applicable to southern New England. Selected OWTS & water quality reports were reviewed for:

- Nitrogen & Phosphorus Generally
- Denitrification in Riparian Areas
- Managing Nitrogen
- Nitrogen Removal in Small Streams
- Phosphorus Specific
- Relationships between RMFS and Water Table Rise
- Nutrient Treatment in Shallow Drain Fields

The OWTS Readers were Task Force members James Boyd, Russell Chateauneuf, and Lorraine Joubert, Environmental Entity – URI NEMO, and with staff assistance from Nancy Hess. Major points were:

- In the general, the literature does not recommend specific buffer distances based on the WQ impacts to wetlands from OWTS. "There is no "magic" distance but larger buffers reduce risks.
- The majority (>80%) of nitrogen and phosphorus entering a septic tank is discharged into the ground.
- Nutrients impact wetland habitat and WQ functions, but the effectiveness of buffers in removing nutrients is mixed.
- Nutrient treatment and removal in the subsurface is primarily related to site specific factors including saturation of the soil beneath the leachfield, soil chemistry and biology the flow path of the effluent, and the presence of riparian "sinks" along the flow path (GOLD, A.J. and J.T. Sims. 2000) "characterizing subsurface flow requires extensive (and expensive) field work" – hydrologists are not cheap. (Gold)
- In non-calcareous acidic soils common in RI, the majority of phosphorus is removed in the vadose zone below the leachfield; the remainder moves laterally away but more slowly than the movement of groundwater. Retardation factors of between 20 and 100 have been recorded. (Cesspools are poor treatment devices partly because there is often no vadose zone below.)
- Nutrient impacts on water quality are the result of cumulative loadings from individual OWTS systems and other non-point pollution sources into a receiving waterbody and the ability of the waterbody to accommodate the loading and still meet water quality standards. (e.g. not exceed the TMDL established for that waterbody).
- Nitrogen is mostly converted to nitrate in the leachfield and moves laterally away from the system in groundwater.
- OWTS derived nitrogen impacts are a much more significant concern in Rhode Island than OWTS derived phosphorus impacts (excepting cesspools and failures).
- OWTS technology solutions for added phosphorous are not readily available. Where residual P loadings area a concern, additional removal may be possible by improved soil categorization and alternative leachfield design.
- OWTS technology solutions for partial nitrogen removal are readily available and are used extensively in RI, Cape Cod, and Chesapeake Bay.
- Periodic monitoring of alternative systems and some compliance oversight is needed to ensure optimum performance of OWTS.
- Aquifer characteristics are highly uncertain and have strong influence on contamination reaching receiving waters.

Key Scientific Findings

Wetland Buffers

OWTS Setbacks

Part 4: Conclusions / Recommendations

This Section will present the recommendations that the Task Force agreed will answer the Legislative charge to evaluate the adequacy of the protection for our natural resources by both the State and municipalities, to evaluate if gaps exist in that protection based on current scientific data, and to recommend such standards that could foster a business climate to grow our economy while ensuring the protection of our natural resources. During the process the Task Force focused on wetland buffers and OWTS setbacks. From the Task Force discussions there were many issues raised on wetland buffers and OWTS setbacks. They heard from numerous experts in the fields of natural resource and groundwater science and others. Other noteworthy topics were offered and are listed under the last part of this Section. The issues and recommendations may be captured under three primary headings. There are;

- to ensure that standards are protective.
- to eliminate duplicate efforts, and
- to clarify terminology

Assessment of Adequacy of Existing Protection & Gaps

Adequacy of Existing Protection

Identification of Gaps

Recommendations

Ensure Protection

Eliminate Duplication of Effort

Clarify terminology

Other Noteworthy Topics

The following are a list of other noteworthy topics that came up during discussion of the Task force but were not wetland buffer or OWST setback items. The Task Force could not address these within the limited time frame assigned to them by the Legislature but thought they were worthy of recording. These are merely related ideas generated through discussions and have not been subject to the extensive review and consensus process of the Task Force. Where possible the author of the idea is cited should anyone wish to pursue the thought further.

- The challenge presented to this Legislative Task Force resulted in review and discussion of multiple aspects of the development permitting process at both the state and local level. As the recommendations section of this report indicates, there are aspects of the process at the State level that can and should be changed to encourage our regulatory system to provide the clear, predictable and reliable paths to approvals for economic development that will also afford appropriate protection of our wetlands and water resources. The Task Force stands by those recommendations as important steps to a better process, but we must also make it very clear that changes on the State level alone will not achieve the desired outcome unless equal effort is made at the municipal level to assess the worthiness and efficiency of local processes which have too often evolved out of reaction to unattractive individual proposals and/or inadequate planning. Local zoning and land planning processes must in themselves be adequate to guide community planning and growth so environmental regulations can exist for the specific purpose of protecting wetlands and water resources without being used as de facto tools for control of density or management of utility services. *[Task Force Member - Gary Ezovski]*

Appendices

(Most of this is already online; text will be included at final report stage)

A. Membership Profile

B. Timeline & Meeting Notes

C. Matrix of Municipal Ordinances

D. Literature Review - *The Science of Setting Buffers for Wetlands and OWTS: A Literature Review*

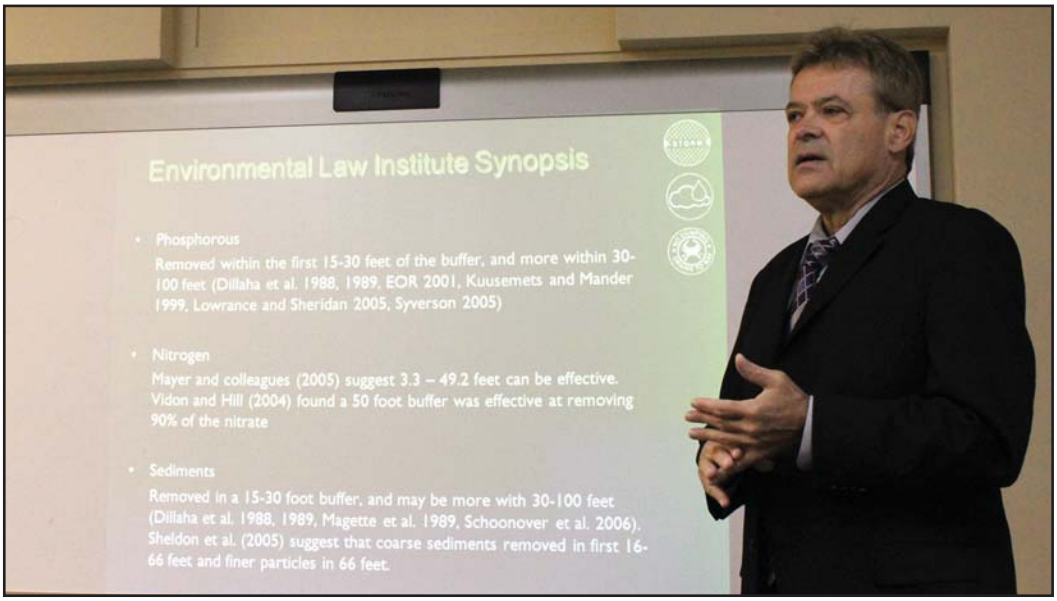
E. Glossary (To be created)

The Rhode Island builder report

Rhode Island Builders Association

Award-Winning Monthly Magazine of the Rhode Island Builders Association September 2014

Unified R.I. environmental rules would be great benefit, experts say



Stormwater-management expert Andrew T. Der of Baltimore-based Andrew T. Der & Associates LLC addresses a meeting of the Legislative Task Force on Wetland and OWTS Setbacks at Rhode Island Builders Association headquarters on July 17th.

Tangle of local regulations in R.I. unnecessary, out of step with current science, two speakers tell Legislative Task Force; unified rules are recommended.

By Paul F. Eno *Editor*

When it comes to septic systems and wetlands, Rhode Island's multi-layered, local and state regulatory structure might not be the best approach scientifically.

That was the message from two environmental experts who addressed the July 17th meeting of the Legislative Task Force on Wetland and OWTS Setbacks, which is laying the groundwork for unified statewide standards on wetlands and onsite wastewater treatment systems (OWTS), and the elimination of local regulations. The panel, chaired by Kevin Flynn, director of the Division of Planning, met at the Rhode Island Builders Association's headquarters in East Providence.

The presenters were Andrew T. Der of Baltimore-based Andrew T. Der & Associates, and Mark W. Eisner of Advanced Land and Water Inc., also based in Maryland. Mr. Der specializes in water-resource regulation and stormwater-management issues, and Mr. Eisner in the environmental effects of OWTS. Both believe that Rhode Island's regulations are sometimes confusing, particularly because the terms "setback" and "buffer" are often used interchangeably.

"On the regulatory level, a buffer is the ecological practice of horizontal distancing of hu-

see REGULATIONS...page 32

REGULATIONS...from page 1

man activity from a sensitive feature such as a stream. The idea is to disconnect any surface runoff from any impervious, graded area, allowing the stormwater to dissipate and filter," Mr. Der explained. "A setback is more of a safety measure to allow for separation of human activity from something else. It could be set on a property line, and not necessarily be related to surface-water quality."

When both wetlands buffers and setbacks are used together, developers should receive a "credit" depending on site character and conditions, he suggested. He cited Maryland criteria as an example.

"When contemporary stormwater management is used at a given site, buffers could be reduced; even to 25 feet to wetlands. A larger buffer in certain soils could be redundant, creating little net gain environmentally, relative to the measure," Mr. Der pointed out.

He also explained how new development can actually help provide net environmental gain over pre-development conditions.

"When new development that employs good stormwater management replaces old development that had no controls, water quality can actually improve."

Mr. Eisner echoed Mr. Der's points, also explaining the difference between setbacks and buffers, and pointing out that Rhode Island OWTS regulations can be confusing and antiquated.

"The Rhode Island wetlands statute dates to 1971, and there has been new science since then. I would update the wetlands law for conformity with federal statutes and guidelines, and I would distinguish between buffers and setbacks, and stop using the terms interchangeably," Mr. Eisner said.

Part of the new science since 1971 is the discovery of the filtration effect of biological material or "biomat" that naturally grows around OWTS in conducive soils.

"This is a recent finding, and the definitive paper on it was published only in 2009," he explained. This study is "Microbial Diversity of Septic Tank Effluent and a Soil Biomat," published in *Applied and Environmental Microbiology* (May 2009) and cited by the National Institutes of Health.

Mark W. Eisner of Advanced Land and Water Inc., an expert on the environmental effects of onsite wastewater treatment systems, reviews the subject with the Legislative Task Force at RIBA headquarters on July 17th.

"A 50-foot setback with biomat will work just as well (to protect sensitive environmental features from OWTS effluent) as an engineered denitrification system (EDS) would, depending on soil conditions."

Sandy soils would require a 100-foot setback with an OWTS, but in soils that encourage biomat growth, a traditional septic system with a 50-foot setback is just as effective as an EDS, Mr. Eisner indicated.

"Also, I'd separate the wetlands and OWTS regulations. Right now, there appears to be some wetlands material in the OWTS regulations."

He also saw little need for local wetlands and OWTS rules.

"The smaller the state, the more alike the conditions from one jurisdiction to another, hydrogeologically, from a groundwater perspective, will be. So there's less technical need for different requirements every time you cross a boundary. Scientifically, Rhode Island towns don't differ enough to justify wholly different rules."

He cited local regulations that far exceed both state rules and scientific justification, such as South Kingstown's required 150-foot OWTS-to-wetlands buffer. He explained that a statewide system of regulation could be far more consistent for developers and communities, and well within the bounds of good environmental science.

Both men answered numerous questions from panel members, including Dept. of Environmental Management (DEM) Director Janet Coit, and Coastal Resources Management Council (CRMC) Coastal Policy Analyst James Boyd.

While Mr. Der and Mr. Eisner stopped short of suggesting specific regulatory changes for Rhode Island, Mr. Der summed up their opinion: "Rhode Island needs a process that works, not confuses. There's a need for consistency in regulations."

Both presentations are available online at www.RIBuilders.org. See the in-depth interview with both experts on page 28.

The two presentations were well received by the task force, and there was much discussion on the questions, to the point that the meeting ran for four hours instead of its planned three.

"The most significant point for me was that, since we put the state's stormwater regulations into effect in 2010, we have probably been duplicating the protection to the point of excess, with no benefit," said Task Force member Gary Ezovsky CE of the Rhode Island Small Business Economic Summit.

"The fact that some buffers can be reduced because of the investment in engineered stormwater systems created, I

continued on next page...

Rita Bentz, 97, mother of John Bentz

Rita Bentz, mother of John Bentz of the Property Advisory Group, passed away on August 4th at Elmhurst Extended Care, Providence. Mrs. Bentz was 97.

Born in Providence, daughter of the late Oscar and Mary Nelson, she was the wife of the late Charles Bentz. Mrs. Bentz was a waitress for many years at the Grist Mill Restaurant, Seekonk and the TK Club, Pawtucket. She was a lifelong communicant of Grace Church, Providence.

Along with John Bentz, she is survived by another son, Charles F. Bentz, five grandchildren and eight great-grandchildren.

Memorial donations may be made to the Rhode Island Chapter of the American Parkinson Disease Association P.O. Box 41659, Providence, RI 02940.

Online condolences may be made at WoodlawnGattone.com.

...from previous page

think, a mind-shift for some people around the table," Mr. Ezovski added.

The Task Force has 15 members. Along with Mr. Flynn, Director Coit, Mr. Boyd and Mr. Ezovski, members present included Russell J. Chateauneuf CE, Thomas E. D'Angelo of RIBA's Environmental Committee, Burrillville Director of Planning and Economic Development Thomas Kravitz, Scott Moorehead CE of RIBA, Eric Prive PE of DiPrete Engineering Associates, and Nancy Scarduzio of the Office of Regulatory Reform.

Other Task Force members are Joseph A. Casali CE, Lorraine Joubert of the University of Rhode Island, South Kingstown Planning Director Vincent Murray, Scott Rabideau of Natural Resources Inc., and biologist Thomas E. Kutcher of Save the Bay. Others present at the meeting included South Kingstown Senior Planner Douglas McLean, Planning Consultant Jane Weidman and several staffers.

The General Assembly established the Task Force in 2013 because "dissimilar municipal standards have resulted in a land-use system wherein local governments manage watersheds and groundwater aquifers using a variety of methods resulting in diverse outcomes," and called for a uniform statewide regulatory process for OWTS and wetlands.

The Task Force is scheduled to submit its recommendations to the General Assembly by December 31st with the goal of replacing local wetlands and OWTS regulations with a statewide system.

OSHA...from page 16

builders about OSHA's requirements for house foundations/basement excavations. For parts of the country where basements are common, the area between the house foundation and basement excavation becomes a trench (by OSHA's definition) when constructing formwork, foundations or walls.

In 1995, OSHA issued a memo: "Suspension of 29 CFR 1926.652 to House Foundation/Basement Excavations," whereby the agency altered the requirements as they apply to house construction, which is still in effect at the present time. This memo essentially requires house foundations to be benched 2 feet horizontal for every 5 feet vertical (for a diagram of what this looks like, see page 2 of NAHB's "Trenching Safety Card") when other conditions outlined in the memo exist.

More information for OSHA's trenching and excavation requirements can also be found in NAHB's *Trenching and Excavation Safety Handbook.*

Finally, there are additional resources to assist builders:

- NAHB's "Construction Safety & OSHA" webpage, which contains compliance-assistance information and safety toolkits: www.NAHB.org/safety.
- NAHB's "OSHA Inspection Toolkit" that provides information on dealing with OSHA's stepped-up enforcement.
- Easy-to-use handbooks and videos that present key safety issues builders and workers need to focus on to reduce accidents and injuries, which can be found at https://builderbooks.com/book/safety.html.
- "OSHA Assistance for the Residential Construction Industry": www.OSHA.gov/SLTC/residential/index.html.

If you have questions or need additional information, NAHB can help. Contact the NAHB Labor, Safety and Health Policy staff: Robert Matuga, at rmatuga@nahb.org or (800) 368-5242 Ext. 8507, or Chelsea Vetick at cvetick@nahb.org, (800) 368-5242 Ext. 8590.

DRAFT for LTF Meeting #12 September 16, 2014
DRAFT Key Scientific Findings Wetland Buffers

- RI freshwater wetlands perform specific functions and support specific values:
    - Flood protection;
    - Water quality protection;
    - Wildlife and wildlife habitat;
    - Surface water and groundwater; and
    - Recreation and aesthetics. (Rule 2.00)

- The need for vegetated buffer zones adjacent to wetlands and surface waters is well supported in the literature to protect the functions and values, to minimize effects of nearby land uses on wetlands, and to provide additional benefits.

- The minimum buffer widths and the ranges presented in or recommended in the summary reports, are varied depending upon what was studied, i.e., the wetland type, the wetland function, the wildlife group, and other factors.

Regarding flood protection:

- A vegetated buffer zone may assist with flood storage by intercepting precipitation and runoff, allowing for infiltration, and reducing flow to a wetland or water resource.
- Climate change will lead to the increased frequency, intensity, and duration of storm events in this region. Buffer zones may moderate the effects of climate change and protect property.

- Buffer widths for flood attenuation provided in two reports range from 66 feet to 492 feet. (Fischer and Fischneich 2000, Environmental Law Institute 2003)
- One paper recommended a 25 foot buffer adjacent to the 100-year floodplain elevation.

Regarding water quality protection:

- Buffer zones may do the following to protect water quality: 1) remove sediment from water flowing through them; 2) treat water by plant uptake and by transformation of nutrients into other forms; 3) allow for infiltration; 4) bind pollutants onto soil particles; and they 5) maintain water temperatures. (Hruby 2013)

- Factors that influence buffer zone effectiveness are: width, slope, slope length, soil type, surface roughness, and adjacent land uses. (Hruby 2013)

- Buffer distances that "may most effectively" perform water quality protection are:
    - For sediment removal = 30 feet to >100 feet;
    - For phosphorous removal = 30 feet to >100 feet; and
    - For nitrogen removal = 100 feet to >160 feet. (Environmental Law Institute 2008)

- A number of studies recommend a minimum buffer width of 100 feet for water quality purposes.

Regarding wildlife and wildlife habitat:

- Buffer zones may reduce disturbances to wetland-dependent wildlife caused by noise, lights, and pets; they provide areas for nesting, breeding, and foraging; they are corridors for dispersal and travel; and they may be areas for wildlife to escape from flooding. (Groffman et al. 1991)

- Factors that contribute to a buffer zones effectiveness for habitat protection are: width, vegetation, and adjacent land uses.

- Ranges of distances
  - The summary reports present upland requirements for wildlife of *vegetated wetlands* that range from 43 feet (noise attenuation) to >5000 feet (birds)
  - Following is a summary on the usage of upland areas adjacent to wetlands and waters by wildlife groups:
    Birds from 49 feet to >5000 feet; Mammals from 93 feet to 600 feet; Reptiles core terrestrial habitat from 417 to 948 feet; and Amphibians core terrestrial habitat 521 to 951 feet. The recommended buffer on the core habitat is an additional 164 feet. (Environmental Law Institute 2003, Semlitsch and Bodie 2003)

  - While a 100 feet minimum provides some habitat needs for some species, recommended widths of >328 feet or >100 meters are common.

- The summary reports provide upland distances for wildlife of *riparian habitat* for that range from 10 feet (detrital input) to >3 miles (large predator mammals).
- Buffer widths to support physical functions: noise reduction; stream stabilization; water temperature; and providing woody debris, are smaller than those necessary for support of the wildlife itself.

Other:

- The summary reports recommend situations where larger buffers may be appropriate, including at:
  - drinking water reservoirs (RI ponds);
  - tributaries to drinking water reservoirs;
  - rare wetland types;
  - wetlands that are known to have rare plants or rare animals;
  - streams that support cold water fisheries; and
  - sensitive wetlands, such as bogs, fens, Atlantic white cedar swamps, vernal pools, and scenic rivers.

- Buffers that are larger than 50 feet wide are "likely necessary" to be effective over time. (ELI 2008)
- Draftcm/09152014

DRAFT Key Scientific Findings: Onsite Wastewater Treatment System (OWTS) and Wetland Setbacks

September 16, 2014

Wastewater from an OWTS moves downward through the soil carrying pollutants into groundwater which can transport the pollutants to wetlands and waterbodies. Primary pollutants of concern are pathogens and nutrients.

Pathogens:

- Pathogenic bacteria and viruses can cause human sickness from ingestion of contaminated drinking water, recreational contact or the consumption of contaminated shellfish.

Nutrients:

- Nitrogen and phosphorus have a fertilizing effect on surface waters providing nutrients that if present in sufficient quantities can fuel excess algae growth resulting in adverse water quality impacts. Nitrogen has the most impact on salt waters, whereas phosphorus will impact freshwaters.

- The impacts of increased nutrients on vegetated wetland systems are not as well documented. Nutrients transported into wetlands will be utilized by the plant community with the result that over time there are likely to be changes in the community structure reducing species richness and often favoring non-native species (Wetlands in Washington State, March 2005).

The characteristics of the subsurface through which the groundwater flows will greatly influence the contamination risk. Sands and gravels will generally have high flow rates, while compact till soils will have slower flow rates. Subsurface characteristics are highly variable across the state. "Characterizing subsurface flow requires extensive (and expensive) field work" (Dr. Gold).

The primary factor controlling removal of pathogens in the groundwater is filtration by the soil and time in the subsurface to facilitate pathogen die off.

Nitrogen (in the form of nitrate-NO_3) is very soluble in groundwater and does not adsorb onto soils and can travel long distances with groundwater. The mechanisms for removal are plant uptake and denitrification. Denitrification is a microbial process that converts nitrate to nitrogen gas.

- Denitrification requires an environment with a lack of oxygen and organic matter. These conditions are typical of wetland (hydric) soils and may also occur in riparian areas bordering wetlands and waterbodies.

Phosphorus in the subsurface can bind to soil particles – more removal will occur in finer soils. A more permanent removal mechanism for phosphorus is precipitation out of the flow system into a mineral form.

Increased separation distances between an OWTS and wetlands and waterbodies will reduce contamination risks from pathogens and nutrients.

URI Comments on OWTS Biomat Function in Response to the Sept. 2014 RI Builder Report

Lorraine Joubert, Jose A. Amador and George W. Loomis

The concept that the biomat formed in a conventional OWTS drainfield can remove pathogens is not new but the statement made by RIBA consultants that "A 50-foot setback with biomat will work just as well (to protect sensitive environmental features from OWTS effluent) as an engineered denitrification system would, depending on soil conditions." is not substantiated by current research.

A recent URI study by J. Cooper et al. (in review) evaluated the treatment potential of a conventional OWTS drainfield (with a biomat) compared to pressurized shallow narrow drainfields (PSND; without a biomat). The conventional, pipe and stone drainfield received septic tank effluent. Two different types of PSNDs received treated effluent from a single-pass sand filter, which is designed to remove BOD, TSS and pathogens. The single pass sand filter removes about 22% total nitrogen but does meet the DEM standard for a nitrogen removal technology.

Results

- Both the conventional and PSND drainfields removed 97.1 and 100% of fecal coliform bacteria and total phosphorus.
- Nitrogen removal averaged 12% for the conventional drainfield and 4.8% to 5.4% for the PSNDs.
- When the whole treatment train was taken into account, the advanced treatment system with PSND removed 26-27% of the total nitrogen (TN) inputs, whereas the conventional drainfield with a biomat removed only 12% of the TN inputs.
- Even more N removal would occur when a state-approved N removal technology with a PSND is utilized and meeting the state required minimum of 50% TN reduction. The single-pass sand filter used in the Cooper et al. study is not on the state list of N removal technologies.

Findings

The authors conclude that pre-treatment using advanced treatment systems results in better N removal than in conventional treatment systems with a biomat; and that using pressurized shallow narrow drainfields provides additional TN removal. This is important because nitrogen is a drinking water contaminant affecting groundwater wells. Excess nitrogen causes over-fertilization of Narragansett Bay and other coastal waters, leading to excessive growth of algae, degradation of fish and shellfish habitat, and fish kills.

Summary of factors affecting biomat formation and wastewater treatment:

- Conventional OWTS
  - Biomats form in conventional drainfields receiving septic tank effluent.
  - Biomats are less likely to form in sandy soils.

- Biomats are less likely to form with seasonal or intermittent use.

- Advanced treatment OWTS
  - Biomats do not form in drainfields receiving treated effluent, whether the drainfield is conventional, PSND or BSF.
  - Removal of bacteria, phosphorus and nitrogen in in pressurized shallow narrow drainfields results from placement in upper, biologically active soils. Bottomless sand filter drainfields commonly used with advanced treatment systems are not likely to have the same treatment capabilities.
  - Understanding pollutant removal capabilities of various OWTS technologies is important since advanced technologies account for more than 30% of all OWTS permits issued.

References

Cooper, J.A., G.W. Loomis, D.V. Kalen, and J.A. Amador. 2014. Evaluation of Water Quality Functions of Conventional and Advanced Soil-Based Onsite Wastewater Treatment System. Laboratory of Soil Ecology and Microbiology and New England Onsite Wastewater Training Center, University of Rhode Island, Kingston, RI. (Journal of Environmental Quality, In review).

Authors:
Lorraine Joubert is Director of the Nonpoint Education for Municipal Officials (NEMO) program at the URI Cooperative Extension
Jose A. Amador is a Professor of Soil Science and Microbial Ecology at the URI Department of Natural Resources Science.
George W. Loomis is Director of the New England Onsite Wastewater Training Center at the URI Cooperative Extension