Legislative Task Force

Final Report

December 31, 2014

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

RHODE ISLAND DIVISION OF PLANNING

www.planning.ri.gov

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 of the State Guide Plan,
- assist municipal governments with planning, and
- advise the Governor and others on physical, social, and economic planning related topics.

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Acknowledgements

Generally:

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. A working group lead by the Division of Planning coordinated the overall review of the legislative mandate, identified issues for the Task Force, developed initial recommendations and helped to compile the Report. 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

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- Alicia Good, Assistant Director, P.E.
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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
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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. Freshwater wetlands are the predominant type (forested wetlands, shrub swamps, wet meadows, marshes, bogs, and ponds) making up 88% of the States wetlands. Coastal wetlands represent the remainder of the State's wetlands.[1]

Regulation for protection 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%. Additionally, the CRMC regulates all coastal wetlands in the State. 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 R.I. Gen. Law 42-64.13-10[2]. The LTF was charged by the Legislature to evaluate the adequacy of the protection for our wetland 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. This report documents the efforts of the Division of Planning (DOP) and describes the end results of the Task Force.

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 set of state standards 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

<u>As discussed in this report</u>:

- A **buffer** is a vegetated area adjacent to a wetland or surface water that is retained in a natural condition to protect the wetland and its functions and values.
- A **setback** is a specified distance from a wetland at which an activity, such as construction of a septic system, may take place.

Other selected terms are defined in the Glossary in Appendix E.

[1] Tiner, R.W., K. McGuckin, and J. Herman. 2014. *Rhode Island Wetlands: Updated Inventory, Characterization, and Landscape-level Functional Assessment,* U.S. Fish and Wildlife Service, Northeast Region, Hadley, MA. 63 pp.
[2] http://webserver.rilin.state.ri.us/Statutes/TITLE42/42-64.13/42-64.13-10.HTM

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

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 but not limited to 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, Timeline & 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 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;

[3] http://webserver.rilin.state.ri.us/Statutes/TITLE2/2-1/INDEX.HTM

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

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*". The proposed tiered buffer model is included in Appendix F, Other Topics. This was part of the bills that failed in 1996 through 1999. The DEM contracted with the Department of Natural Resource Science from the University of Rhode Island to assist with development of anticipated revisions to the wetlands regulations should the bills have passed, including criteria for determining buffer and setback widths.

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 Appendix F, Other Topics, for information.

[4] http://www.planning.ri.gov/documents/LU/legtask/1995GovComm_Final.pdf
[5] http://www.planning.ri.gov/documents/LU/legtask/2001DEMWetlandTaskForce_Final.pdf

Part 2: Current Regulatory Framework in Rhode Island

Existing RI General Laws/ Rules/Regulations

Wetlands Regulation

Department of Environmental Management (DEM)

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 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.

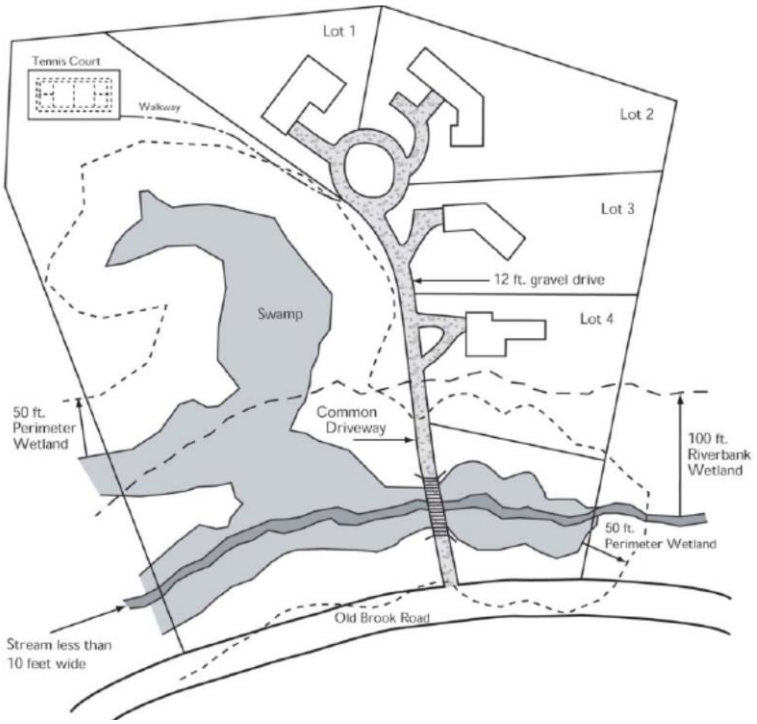
Applicants seeking a freshwater wetland permit must demonstrate through a series of steps that all probable impacts to freshwater wetlands functions and values, including to the *perimeter wetland* and to the *riverbank wetland*, are avoided, minimized, or mitigated to the maximum extent possible (Rules 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 DEM wetland 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*.



Coastal Resources Management Council (CRMC) - Wetlands

The CRMC 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

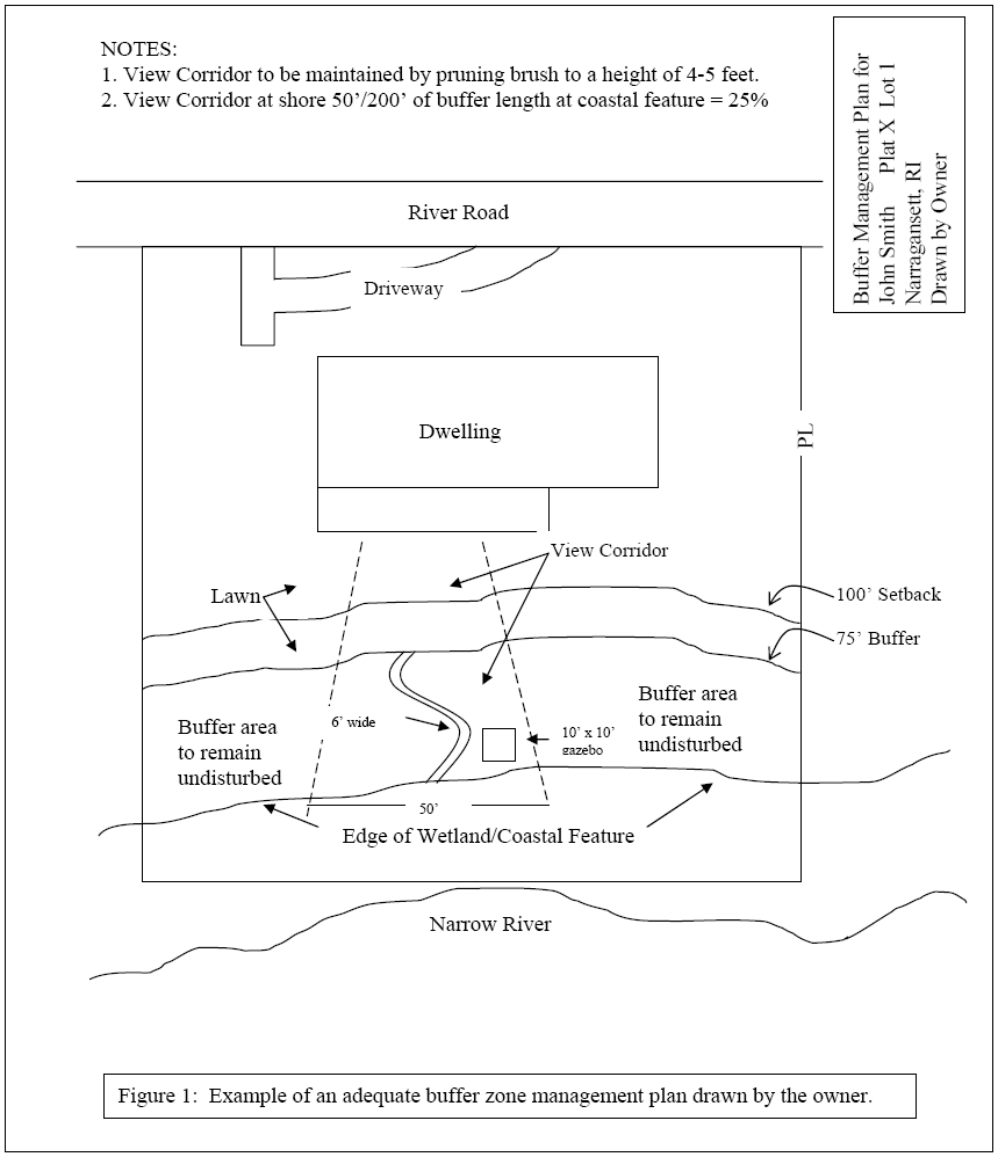


Figure 1: Example of an adequate buffer zone management plan drawn by the owner.

Coastal buffers provide multiple uses and benefits including protection of water quality, protection of coastal habitat, protection of scenic and aesthetic qualities, and erosion control. Coastal buffers 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 between 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 their 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.

Onsite Wastewater Treatment System (OWTS) Regulation

Department of Environmental 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 based on the sensitivity of these waterbodies to 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

[1] gpd = gallons per day

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

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.)*

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.

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

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 in addition to what is required by DEM and CRMC described previously.

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 4 major categories. A full copy of the inventory is included as Appendix C, Matrix 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 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)

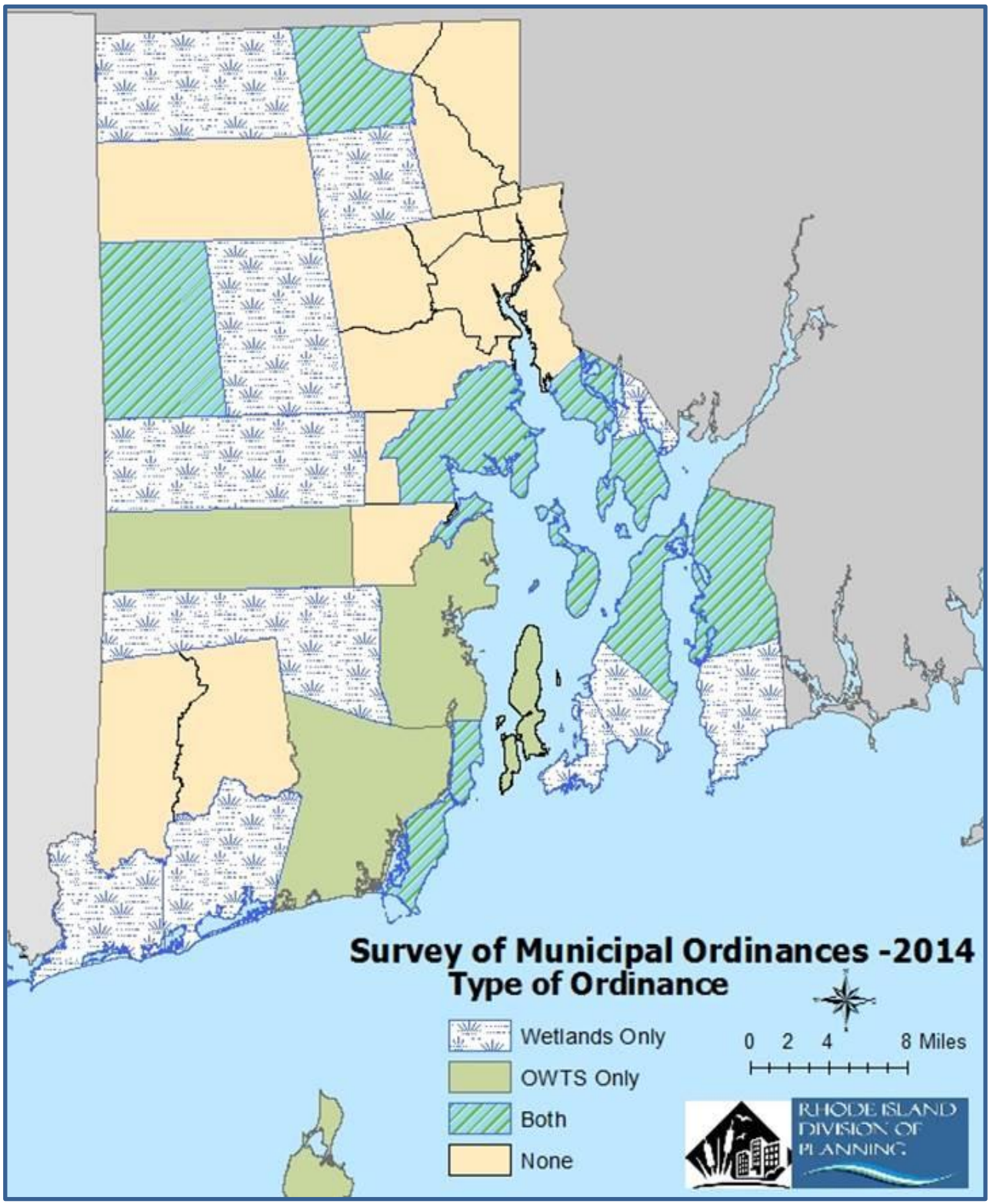
For full survey see Appendix C

Community	Setback From	Applicability (type of use/ activity)	Type of Wetland	Setback Distance (ft)
Barrington (Wetlands setback & OWTS Overlay)	Building, structure or sign		wetland, waterbody, stream	100 (≥)
			flowing water > 10 ft wide	200 (=)
	Land Disturbance	New / re construction, expansion of buildings or new / modified uses of property	Coastal and freshwater wetlands ≥ 1/2 acre	100 (>)
Bristol (OWTS setback & HWF setback)	Hazardous waste management facilities and related pavement and disturbance		Fresh water wetlands, steep slopes > 5% percent, other water-related environmentally sensitive areas.	1,000
	OWTS	OWTS shall comply with DEM and CRMC regulations		
Burrillville (Wetlands setback & aquifer zoning)	OWTS	Any lot with > 40% wetland area, including buffer.	Within 200 horizontal feet of a "fresh water wetland" or "river" as defined in RIGL	200 (≥)
Charlestown (Wetlands setback)	OWTS		Freshwater or coastal wetlands as defined in RIGL river /intermittent stream < 10 ft wide.	100 (≥)
			River ≥ 10 ft. wide	200 (=)
			floodplain - A or V zone	
Coventry (Wetlands setback)	OWTS		Freshwater wetland, stream, river, pond or lake	75 (≥)
	Structure		Freshwater wetland, stream, river, pond or lake	50 (≤)
Exeter (Wetlands setback)	Proposed Project within 300 feet of wetland	New site plans	Freshwater Wetland (As defined by RIDEM)	100 (>)
Foster (OWTS setback & Industrial PS)	Sewerage Disposal System		Freshwater wetland	200 (>)
	Proposed Project within 300 feet of wetland	Commercial and/or Industrial site plans	Freshwater wetland	100 (>)
Jamestown (OWTS setback & High water table district)	OWTS	Development - any manmade change including buildings or other structures, mining, dredging, filling, paving, excavation, or drilling on the lot.	freshwater wetland	
		Lots < 40,000 sf in mapped overlay district	na	
Little Compton (Wetlands setback)	All structures & septic systems		Freshwater and coastal wetlands	100 (≥)
Middletown (Wetlands setback)	Disposal trench, cesspool, septic tank, or other leaching facility		Any bog, marsh, swamp or pond	50 (≥)
			Freshwater wetlands and flowing bodies less than 10 feet wide	100 (≥)
			Any river or flowing body 10 feet wide or greater	200 (=)
Narragansett (OWTS setback, Coastal and freshwater wetlands overlay district, Coastal resources overlay district)	Individual sewage disposal systems		Any coastal feature adjacent to Narrow River, Pt. Judith Pond, Wesquage Pong or other poorly flushed estuarine waters	200
	Coastal and freshwater wetlands		Any coastal or freshwater wetland	150
	Tidal waters, coastal salt ponds, and shoreline features		Tidal waters, coastal salt ponds, and shoreline features	200 (≥)
New Shoreham (OWTS setback)	OWTS		150 ft. from freshwater wetland and coastal features. 200 ft from drinking water supply reservoirs and contiguous wetlands.	150, 200
Newport (Wetlands setback)	All development		Designated wetlands and coastal features	75 (>)

Summary of Municipal Ordinances (2013 – 2014)

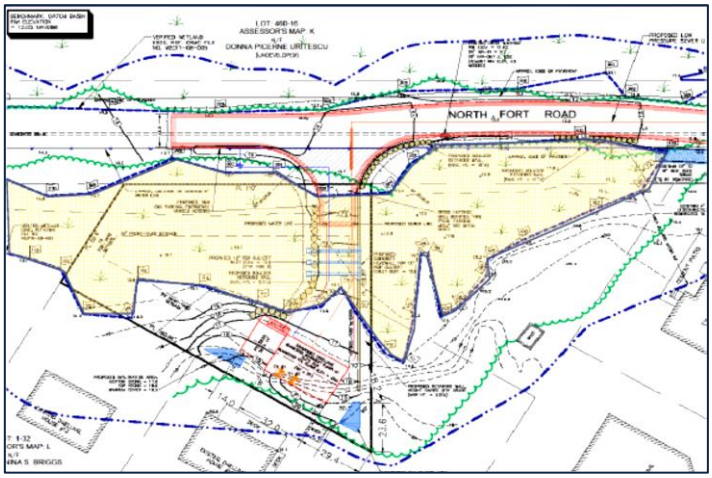
For full survey see Appendix C

Community	Setback From	Applicability (type of use/ activity)	Type of Wetland	Setback Distance (ft)
North Kingstown (OWTS Setback, overlay districts)	Any wastewater treatment system components	All lots created after effective date	All surface water bodies, wetlands, and coastal features, mean high tide line	150
		groundwater overlay district		
		Post Road Business District		
		Compact Village Development District		
North Smithfield (Wetlands and OWTS Setbacks)	OWTS (within surface water supply watersheds and town-owned school WHPAs)		freshwater wetlands	150 (>)
			Drinking water supply impoundment or tributary	200 (≥)
	Structures and Impervious Surfaces (within surface water supply watersheds and town-owned school WHPAs. Except zoning Districts RS20, MU1, and MU2, and all nonconforming RS40 lots <= 20,000 sq.ft.)		freshwater wetlands	100 (>)
Portsmouth (Overlay District)		High risk uses	All critical environmental areas, including reserviors and their tributaries	95
		OWTS	reservoir	200 (≥)
Scituate (Wetlands Setback)	Building or structure		Any pond or stream	75
	Sewage disposal facilities			150
	All construction	subdivisions	Any wetland	100
Smithfield (Wetlands Setback)	All structures		Freshwater Wetlands	100 (>)
South Kingstown (OWTS Special Use Permit)	OWTS	construction of new dwelling or complete replacement of existing.	fresh water and coastal wetlands	150 (>)
Tiverton (Wetlands Setback and Overlay District)	OWTS* town except Stafford Pond drinking water supply watershed	Townwide EXCEPT Stafford Pond Watershed	Several named (but not limited to) freshwater and coastal wetlands, unnamed perenniel streams on UGSG map, and any other waters or wetlands defined	125 ft - single family homes; 200 ft all other uses, except where exceeded by state requirements. (≤)
	Development	Stafford or Nonquit Ponds and their direct tributaries		200 (≥)
Warren (Wetlands Setback)	All development		Any wetland, water body, coastal feature, or stream	50 (≤)
	ISDS			100
	Sewage disposal facilities			150
Warwick (Coastal and Wetlands Setbacks)	All structures, impervious surfaces, ISDS, and underground utilities		Coastal features	50 (=)
	All structures, impervious surfaces, ISDS, and underground utilities		Freshwater wetlands	50 (=)
West Greenwich (OWTS Setback)	Sewage disposal facilities		Any pond or stream	200 (≥)
Westerly (Hazardous Facility Zoning)	Hazardous Waste Management Facilities		Freshwater wetlands and other water-related sensitive areas	1,000


Survey of Municipal Ordinances -2014
Type of Ordinance
Wetlands Only
OWTS Only
Both
None
0 2 4 8 Miles
RHODE ISLAND
DIVISION OF
PLANNING

There were two presentations provided by a Task Force member and a guest speaker concerning Rhode Island municipal ordinances. The Task Force greatly appreciated the time and efforts of the guest speaker who took time to inform them on this very important topic. For the full versions of each presentation consult the DOP website[2] as all are archived within the meeting materials by meeting number.

Local Wetland Review: Two Perspectives



In order to understand the local wetland permit process, the Task Force heard overviews of two applications from the different points of view of the speakers A municipal planner and a practicing consultant volunteered 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 water table 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.

[2] www.planning.ri.gov

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.

The Task Force heard how local ordinances have allowed the municipalities to apply local knowledge, however, the existence of varying State and local requirements for buffers and setbacks has been shown to be problematic for the development community and property owners in that it leads to duplicative reviews of the same aspect of a proposed project or alteration. This can add cost to the application review process as well as uncertainty due to the varying manner in which variances are approved at the local level. Additionally, municipalities generally lack the scientific expertise to apply their environmental ordinances; expertise which is available in the State wetlands and OWTS programs. Applicants typically have an environmental scientist and or engineer to present evidence while local officials typically have no experts available to help them make the appropriate findings of fact on such applications.

Other Regulatory Frameworks

Summary of Other New England States

The most frequently appearing number for wetland buffers used in New England is 100 feet.

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. The term "buffer" is not used consistently across the Region. Buffers may be no-touch protection areas or upland review areas where alterations are routinely permitted. 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 implementation to the municipalities. The basic regulatory regimes are as follows:

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 vegetation. 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 commissions are charged with protecting the public interest, and work to ensure that activities do not alter wetlands adversely. Buffers are defined in Massachusetts regulations, and extend one hundred feet from wetlands, and require permits for any activities within the buffers. The MA DEP also retains authority over certain state-level projects, and also handles any appeals from the local level. Massachusetts added in the 1990s riverfront protection areas to their wetland regulations. This resource area adjacent to perennial rivers and streams is 200 feet in most places and 25 feet within 14 specific cities or towns and in named densely developed areas.

- 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.

- 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.

Prime Wetlands in NH Communities[3]

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 additional 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[4]
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.

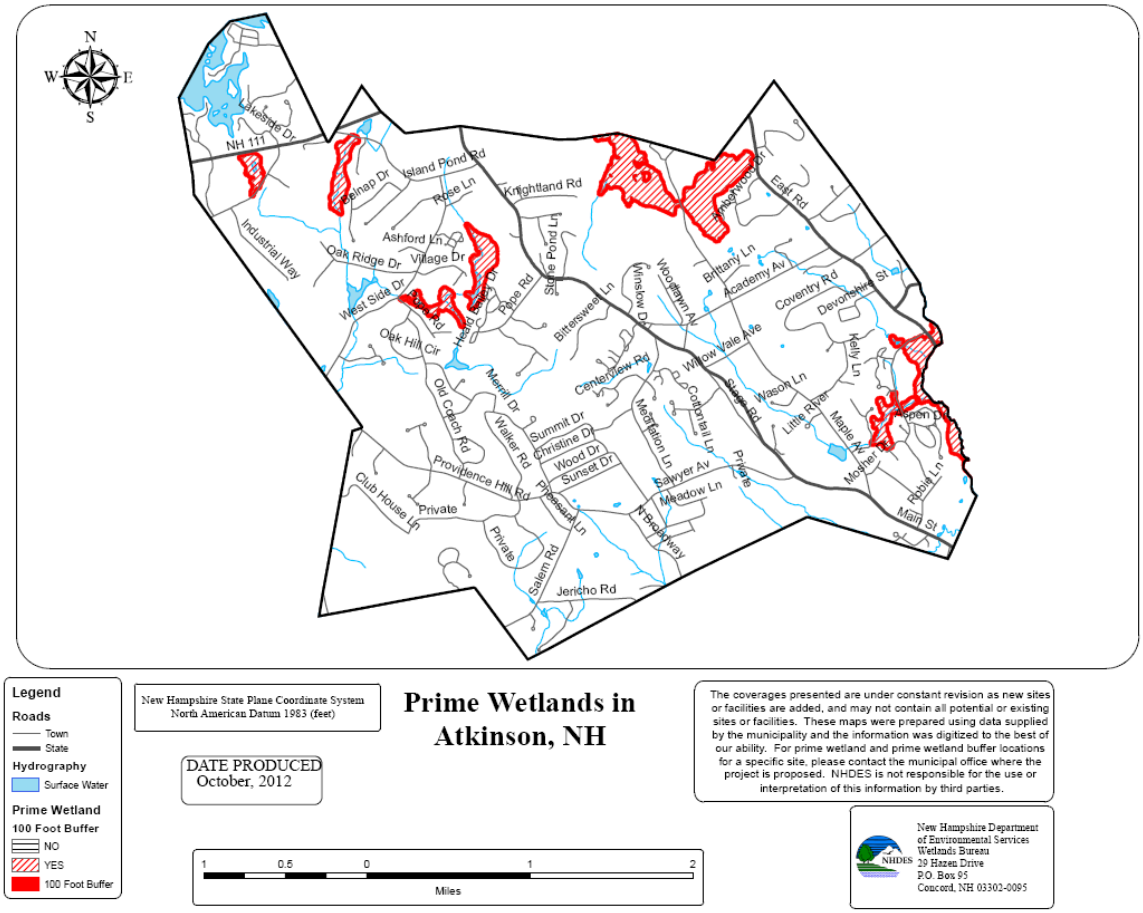
I-a. For the purposes of this chapter, "prime wetlands" shall mean any contiguous areas falling within the jurisdictional definitions of RSA 482-A:2, X and RSA 482-A:4 that, because

[3] From: http://des.nh.gov/organization/divisions/water/wetlands/prime_wetlands.htm
[4] **Source:** http://www.gencourt.state.nh.us/rsa/html/L/482-A/482-A-15.htm

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

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

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



Onsite Wastewater Treatment Systems in New England

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'

Wetlands & OWTS in Maryland

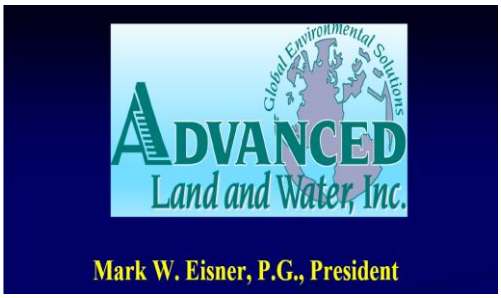
In order to further understand the issues regarding determining appropriate wetlands and OWTS setbacks, the Task Force heard an overview of how wetland setbacks for all land disturbances and OWTS were regulated in a different state. The Rhode Island Builders Association assisted the DOP with obtaining 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 *for water quality purposes*. 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. He also said to clarify buffers vs. setbacks as they are not the same.



Part 3: Today's Science as We Know It

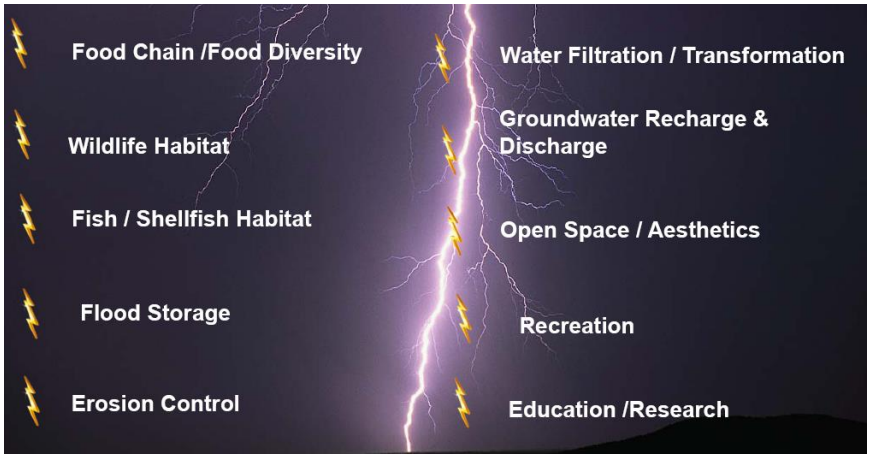
Scientific Presentations & Guest Speakers

This Section provides a summary of the four presentations on science 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. As with the presenters in the previous Section, the Task Force greatly appreciated the time and efforts of all presenters who took time to 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

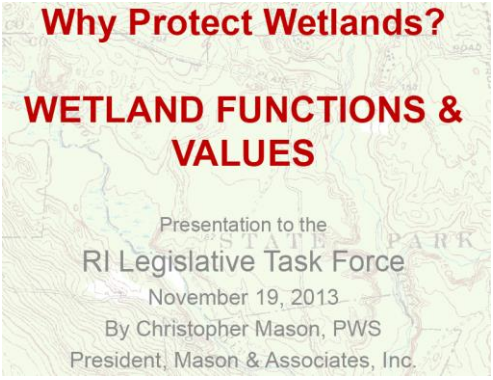
Wetlands: Functions and Values

In order to understand the issues regarding determining appropriate buffer sizes, the Task Force heard an overview from two guest speakers about the basic functions of wetlands, how they function, and the water resources impacts and concerns for buffers to address. 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 19, 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 smooths 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 sediments and pollutants absorbed onto those sediments, 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.

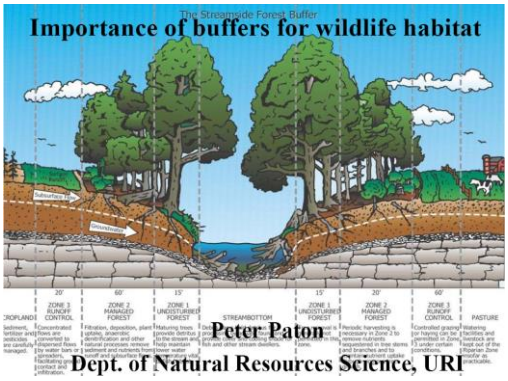
Socio-cultural or Heritage Values

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 buffers.

Sixty five different 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.

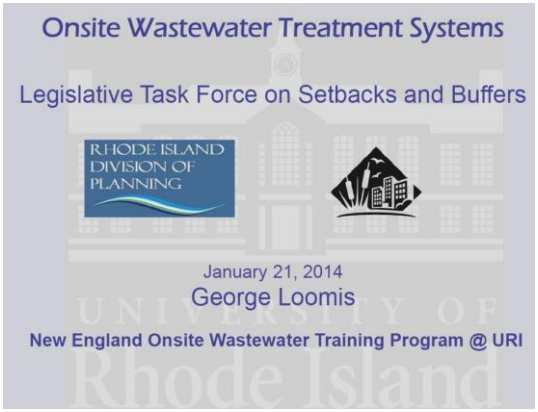
Maintenance of naturally vegetated buffers is equally important for protection of birds and for the other wetland wildlife groups. So as not to provide too much information, Dr. Paton focused on vernal pool wetlands and amphibian protection, but he offered to continue to speak about the importance of buffers for protection of other taxa or to return. Buffers, 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.

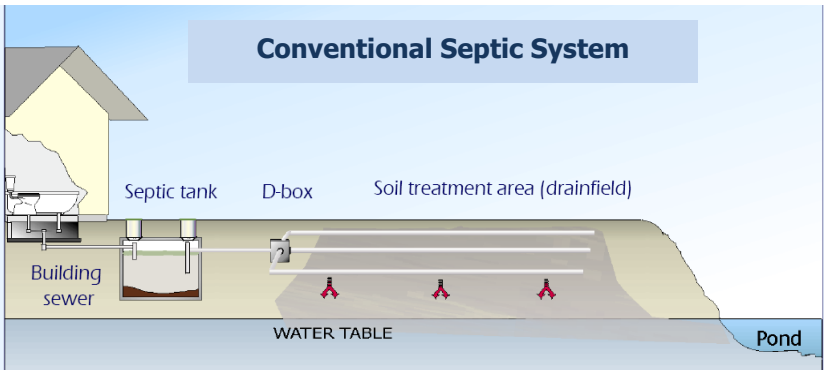
OWTS Basics
George Loomis, Program Director, NE Onsite Wastewater Training Program, Cooperative Extensive, URI



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.

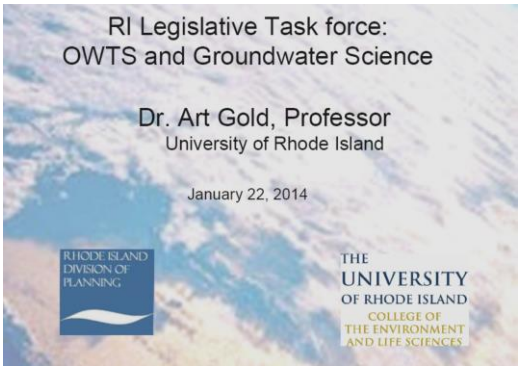


Finally, there are cesspools. Cesspools are an older substandard method of disposal that does not provide wastewater treatment and which is no longer permitted for any submission to DEM. A cesspool is any buried chamber (could be a metal tank, a perforated concrete vault, or a covered hollow or excavation) 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 buffers 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.

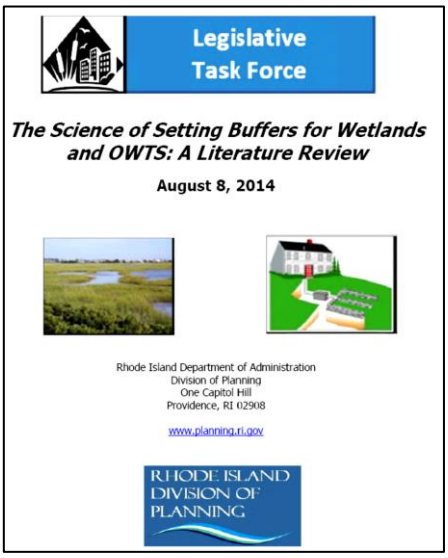
A properly sited, designed, installed and maintained OWTS will generally provide decades of use and provide treatment such that the system does not adversely impact public health or the environment. However, as discussed above, uncertainties related to subsurface fate and transport of system effluent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

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 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 documents reviewed about wetland buffers were reviews summarizing the current body of scientific literature. 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 water quality 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 phosphorus loadings are 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

Wetlands perform specific functions & values including:

- Flood protection
- Water quality protection
- Wildlife and habitat
- Surface water and groundwater quality, and
- Recreation and aesthetics.

A buffer zone is a naturally vegetated protective area adjacent to wetlands and to rivers, streams, lakes, and ponds. Buffers protect, maintain, and directly contribute to the functions and values of these resources, minimize adverse effects of nearby land uses, and they provide additional benefits.
The minimum sizes for buffer widths (and the ranges of widths) that are recommended varies depending upon the item studied, i.e., the wetland type and functions, the wildlife species, the sensitivity of the wetland type to disturbance, and other factors. In general, wider buffers are more protective than narrow buffers.
Flood protection – a vegetated buffer zone assists with flood storage by intercepting precipitation and runoff, allowing for infiltration and reducing flow to a wetland or water resources. Climate change will lead to increased frequency, intensity, and duration of storm events. Buffers may moderate the effects of climate change and protect property. Buffer widths for flood attenuation range from 66 feet to 492 feet. The RI Low Impact Development Manual recommends a 25-foot buffer adjacent to the FEMA 100-year floodplain boundary to allow for variability in flood model results at a site level and to allow for changing climate.

Water Quality Protection – Wetland buffers protect and improve water quality in adjacent wetlands, surface waters, and groundwater systems. Buffers remove sediment from water flowing through them; they treat water by plant uptake and by transformation of nutrients into other forms; they facilitate infiltration; they bind pollutants onto soil particles; and they maintain water temperatures.

Factors that influence the buffer zone effectiveness are: width, slope, slope length, soil type, surface roughness, and adjacent land uses. The buffer distance necessary to provide a reasonable likelihood of water quality protection depends upon the pollutant of concern:

- for sediment removal = 30 feet to > 100 feet
- for phosphorous removal = 30 feet to > 100 feet
- for nitrogen removal – 100 feet to > 160 feet
- **Numerous studies recommended a minimum *buffer* width of 100 feet for protective water quality purposes.**
- Maximum removal of sediment and nutrients from surface flow occurs via sheet flow through a vegetated buffer with a shallow slope <5 percent.

Wildlife and Wildlife Habitat – Buffers are core (critical) habitat for the majority of wetland-dependent species. Buffes reduce disturbance to wetland-dependent wildlife caused by noise, lights and pets, provide areas for nesting, breeding and food, serve as corridors for dispersal and travel, and areas for escape from flooding.

A buffer zone's effectiveness for habitat protection varies with the wildlife species, the buffer width, its vegetation characteristics, and the intensity of adjacent land uses. Ranges exist from 43 feet (noise attenuation) to >5000 feet (birds). Upland riparian habitat requirements range from 10 feet to > 3 miles.

Larger buffers are required for wildlife habitat protection than are required for other wetland functions (Lichtin 2008, Environmental Law Institute 2003 and 2008), and widths may vary by wildlife species. A 100-foot minimum buffer zone provides some habitat needs for certain species, widths greater than 328 feet and is commonly recommended by scientists.

Ninety percent of Massachusetts wetland-dependent reptiles, 96% of amphibians, 100% of mammals, and 55% of wetland dependent birds have upland habitat requirements. Of 65 wetland-dependent species, 50 use from the wetland edge to 100 feet, 38 use to 200 feet, and 34 species use from the wetland edge to beyond 200 feet.

RI authors summarized general wildlife habitat as fair to good with a 250 foot buffer, good with a 328 foot buffer, and excellent with a larger buffer to almost 2000 feet.

There may be situations where larger buffers are appropriate for:

- Drinking water reservoirs and groundwater protection districts
- Tributaries to drinking water reservoirs
- Rare wetland types
- Wetlands that known to have rare plants or rarer animals and Natural Heritage areas
- Streams that support cold water fisheries
- Sensitive wetlands such as bogs, fens, Atlantic White Cedar Swamps, vernal pools and scenic rivers.

Recreation and aesthetics– Wetlands and surrounding buffers are used by people for a number of recreational activities including hunting, fishing, boating, bird and nature watching, hiking, biking, swimming, and picnicking. Wetlands and surrounding buffers provide scenic vistas and relaxing atmospheres that are important quality of life benefits for many people. Wetland buffers preserve the quality of wetlands and preserve and directly contribute to the recreational and aesthetic benefits they provide.

Key Scientific Findings: Onsite Wastewater Treatment System (OWTS)

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 from OWTSs 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.
- Of growing concern are algal blooms of cyanobacteria (blue-green algae) from excess nutrients in freshwater, which release toxins that are harmful to humans, pets and livestock.
- Nitrogen is also a potential contaminant in drinking water supplies with a federal drinking water standard set at 10 mg/l nitrate.
- 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 aerobic soils 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 hundreds of feet 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 in aerobic soils – more removal will occur in finer soils. However, there is concern that the sites for soil adsorption can reach capacity allowing continued transport of phosphorus. A more permanent removal mechanism for phosphorus is precipitation out of the flow system into a mineral form.

- OWTS derived nitrogen impacts are a more significant concern in RI than phosphorus impacts from OWTSs.

Impacts from OWTS on water quality and wetlands are in most instances the result of cumulative loadings from many individual OWTSs.

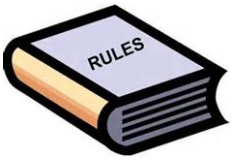
Increased separation distances between an OWTS and wetlands and waterbodies will allow for more opportunities for pollutant interactions in the soil and greater treatment potential.

Part 4: Findings / Recommendations

This Section presents the findings and recommendations that the Task Force came to a consensus upon to answer the legislative charge to:

1. Assess the adequacy of protection afforded to wetlands and/or waters of the State under RI General Laws § 2-1-18 through 2-1-25, Agricultural Functions of Department of Environmental Management, § 42-17.1, Department of Environmental Management, and § 42-64.13-10, The Rhode Island Regulatory Reform Act.
2. Identify gaps in protection for septic disposal and various wetlands.
3. Recommend statutory and/or regulatory changes that are required to protect wetlands statewide.

During the process the Task Force focused only on wetland buffers and OWTS setbacks. The Task Force discussions raised other issues related to wetlands and OWTS regulatory programs that were not part of the scope of work of the LTF. While identified, the LTF did not have sufficient time to research and discuss these additional issues. A listing of recommendations by individual members about additional topics is included in Appendix F, Other Topics.



The LTF heard from many experts on the latest science that was used to assess adequacy of protection and identify gaps. The group also acknowledged issues concerning inconsistencies between State regulations and municipal ordinances about wetland and OWTS buffers. Local zoning boards of review nearly always approve wetlands and or OWTS applications that have obtained State permit(s) sometimes causing inconsistencies between State regulations and municipal ordinance standards regarding the adequate protection of wetlands, lakes and ponds, and/or drinking water resources. There was a consensus to clarify terminology used in various RI State and local regulations. For example, the term "buffer" in particular is used interchangeably and inconsistently among the state and local programs to mean an area of naturally vegetated land adjacent to a wetland resource that must remain undisturbed, or an area (setback) where an OWTS or a building may not be located, or an area where a lawn is allowed but no structures. A listing of terms as used in this report is included in Appendix G, Glossary.

Finally, providing adequate funding for the implementation of this Report was identified as a need early in the meetings. The series of recommendations in this Report represents an evolution of how wetlands should be protected in RI. To effectively implement this proposed system for the benefit of the State, more staff and resources will be required by the DEM. Without acknowledging this and without acting on it will complicate the implementation of the new system which will could be worse than the status quo for wetland protection.

The LTF focused on developing recommendations serving four primary objectives:

1. Ensure that wetland buffers are adequate to protect and support wetland functions and values, address municipal concerns and weaknesses in the State wetland statue.
2. Strive to eliminate application of different wetland buffer and setback standards in state and local permitting processes and consider whether a single permitting authority should exist.
3. Clarify terminology in the Wetlands Act and State Regulations.
4. Ensure adequate funding and capacity for implementation and enforcement based on permit authority and responsibilities.

TASK FORCE FINDINGS - The Task Forces finds that:

Objective 1: *Ensure that wetland buffers are adequate to protect and support wetland functions and values, address municipal concerns and weaknesses in the State wetland statue.*

1. The 1971 Wetlands Act as amended contains significant gaps and is not adequate to protect some wetlands. The undeveloped areas adjacent to wetlands that are needed to fully protect the functions and values of all wetlands vary widely and, based on the scientific literature review and presentations, are generally greater than currently implemented through either State or local regulations.

a. Science indicates that water quality can be significantly improved in many cases if at least a 100-foot undisturbed buffer is maintained**.** [Larger buffers are generally required for protection of habitat for wetland-dependent wildlife.] Some wetlands may require additional protection because of their unique characteristics, site specific conditions or importance to the public. However, there has been no clear process by which to facilitate providing greater protection to these wetlands. Currently, State wetland regulations require no buffer or setback protection for certain small wetlands, and only a 50-foot perimeter jurisdictional zone surrounding large wetlands other than rivers and streams.

b. Existing regulations are inadequate to protect small wetlands that are important for biodiversity and may help filter, infiltrate and store floodwaters. Some small size wetlands often have no perimeter wetland under existing State Law and rules and are unprotected. These areas may not be mapped since they are small, and FEMA and other maps focus on larger systems, not small wetlands. Currently State wetland law and regulations require no buffer protection for certain small wetlands, including vernal pools, and only a 50-foot perimeter jurisdictional zone surrounding larger wetlands other than rivers and streams. While some small wetlands may have limited value such that a buffer requirement may be waived with proper justification and approval, others perform important functions.

c. Larger Buffers are generally required for protection of habitat for wetland-dependent wildlife. In certain circumstances, science indicates that buffers of up to 300 feet (or greater) could be supported and may be necessary protection for wetland functions and values, and may influence the condition of critical wetland resources**.**

2. In general, setbacks for OWTS established in the State OWTS regulations are sufficiently protective of the State's water resources.

Setback standards are resource-based and are greater for drinking water supplies and coastal ponds. Procedurally, OWTS applications and reviews are coordinated with the wetlands program under the same program managers and they are completed either jointly or sequentially considering both the OWTS setback and the wetlands perimeter/riverbank. Because OWTS setbacks generally follow wetland buffers, current regulations may need to be adjusted to accommodate the buffers and jurisdictions recommended in this Report. Where larger buffers are established to better protect critical resources from these impacts the OWTS setbacks should be increased accordingly.

Objective 2: *Strive to eliminate application of different wetland buffer and setback standards in state and local permitting processes and consider whether a single permitting authority should exist.*

3. To eliminate dual reviews and protect wetlands, the State authority for regulating development and other alterations in proximity to wetlands, including surface waters, should be expanded by modifying RI General Law and agency regulations to increase State jurisdiction and responsibilities, including critical wetlands as nominated by municipalities.

There needs to be consistency between State agencies and municipalities to promote a clear, predictable and reliable regulatory system within the State of RI. Currently, 24 municipalities have adopted differing ordinances that set forth requirements related to wetland buffers and OWTS setbacks that are considered more protective of wetland and water resources than the State's. As noted previously, science concerning the importance of natural vegetated buffers with respect to water quality and wildlife habitat provides justification for these larger buffers and a sound rationale for the local ordinances. Local ordinances also have allowed the municipalities to apply local knowledge, however, the existence of varying State and local requirements for buffers and setbacks has been shown to be problematic for the development community and property owners in that it leads to duplicative reviews of the same aspect of a proposed project or alteration. This can add cost to the application review process as well as uncertainty due to the varying manner in which variances are approved at the local level. Additionally, municipalities generally lack the scientific expertise to apply their environmental ordinances; expertise which is available in the State wetlands and OWTS programs. Applicants typically have an environmental scientist and or engineer to present evidence while local officials typically have no experts available to help them make the appropriate findings of fact on such applications.

4. Municipalities must have assurance that state regulations for freshwater wetlands and OWTS will be protective of local municipal interests while eliminating dual (state <u>and</u> local) permitting processes.

Currently, State approvals of freshwater wetland "insignificant alterations" do not include local municipal participation, and thereby may limit the application of local knowledge to existing problems and potential project impacts. Examples include drainage problems affecting municipal roads and neighboring properties, water quality impairments, and important wetland values. This is a serious concern of the municipal representatives on the Task Force since most State freshwater wetlands approvals are issued as "insignificant alterations". With respect to wetland buffers, proposed changes to State Law to eliminate conflicting standards and duplicative review needs to recognize the value of local input and should clarify the role of local governments in the State permitting processes. Most requests for zoning relief of local wetland standards are for lots of record that are often smaller sites with severe limitations for development. Municipal ordinances have allowed local knowledge to be used in the review of applications, which is especially valuable for marginal sites. Most local requests are approved, often with special conditions to directly mitigate impacts to wetlands, adjacent property owners, and road drainage systems beyond that required by state agencies. As part of a new system to eliminate duplicative reviews, municipalities should continue to be notified of proposed significant alterations within their borders and additionally other selected proposed alterations within identified critical wetland jurisdictional areas. Municipalities should be afforded the opportunity to have the State apply additional protection to designated critical resources in their community through state regulations. Furthermore, where larger buffers and or setbacks are established for additional protection in such areas established by the State, to the extent practicable, they should be applied equally to all qualifying similar resources; e.g. larger buffers around tributary streams to drinking water supply reservoirs.

Objective 3: *Clarify terminology in the Wetlands Act and Regulations.*

5. The terminology used in RI State regulations regarding wetland buffers and setbacks needs to be clarified for consistency and improved understanding and protection.

For example, the terms buffer and setback may be used interchangeably or inconsistently to mean an area of naturally vegetated land adjacent to a wetland resource that must remain undisturbed, or an area where an OWTS or building may not be located, or an area where a lawn is allowed but no structures. Generally, wetland buffers are areas adjacent to wetlands that are to be left undeveloped and vegetated to protect wetland functions and values or to enhance them. A setback is a specified distance between an approved activity and a wetland resource. Further development of these terms in State law and regulations will improve administration of State programs and public understanding.

Objective 4: *Ensure adequate funding and capacity for implementation and enforcement based on permit authority and responsibilities.*

6. State agencies must be provided with additional staff and other resources to develop, implement, and enforce new rules with proposed expanded jurisdiction.

State agencies must be provided with additional staff and other resources to develop, implement, and enforce new rules with expanded jurisdiction. Providing adequate funding for the implementation of this Report was identified as a need early in the Task Force meetings. The series of findings and recommendations in this Report represents an evolution of how wetlands should be protected in RI. To effectively implement these proposals for the benefit of the State, approriate staff resources will be required by the DEM. Without acknowledging this and without acting on it, implementation will be difficult and may result in permitting delays negating the regulatory reform improvements that the Act hoped to achieve.

TASK FORCE RECOMMENDATIONS: Based on the above findings and the assessment and identification of gaps, the Task Force recommends the following:

Statutory Changes

- **S** 1. Revise state law to define or redefine the terms "jurisdictional area", "buffer", and "setback" as they apply to wetlands regulation. The jurisdictional area should mean the resource to be protected (vegetated wetland to include vernal pools, type of waters, etc.) and lands adjacent to the resource where activities are directly regulated. The jurisdictional area is a regulated area containing the wetland proper, buffers, and setbacks. Buffer areas would designate lands intended to be maintained in an undisturbed, natural vegetated condition within the jurisdictional area. In certain cases (to adequately protect important wetland function and values) the buffer zone may be the same as the jurisdictional area. Strict avoidance and minimization policy would apply to wetlands and buffers. Certain activities with development standards to avoid and minimize impacts in a consistent manner within the jurisdictional area, excluding the wetland proper, may be allowed by permit or exemption as provided for in regulation.

- **S** 2. Revise state law to provide state agencies with additional authority and jurisdiction to allow for the adoption of strengthened protective requirements for freshwater wetlands as well as the lands adjacent to these resources. (Note: As used herein the term "freshwater wetlands" is inclusive of wetlands, flowing rivers and streams, and standing water bodies, including ponds.) The statutes affected include the Freshwater Wetlands Act, State laws establishing DEM and CRMC, as well as potentially other statutes as may be identified during the legal review and bill preparation.

    a. Establish a jurisdictional area of 200 feet from all rivers and streams regardless of size and from drinking water supply reservoirs.

    b. Establish a jurisdictional area of 100 feet from all wetlands and standing bodies of water. This action would afford protection to lakes and ponds and other wetlands, and critical protection to vernal pools.

    c. Establish a provision to enable petition by municipalities and DEM or CRMC to identify "Critical Resource Areas" that would be afforded additional protection. Areas designated by the State as critical areas should address providing protection for wetland functions and values and have larger buffers, increased OWTS setbacks, and other regulatory provisions to ensure their protection. Municipalities would nominate to DEM or CRMC critical wetland resources that require additional protection where activities would be regulated. Municipalities would have the option to petition the State to amend State regulations to apply these buffers where warranted to achieve appropriate resource protection.

- **S** 3. Revise state law to eliminate the terms "perimeter wetlands" and "riverbank wetlands" from the definition of "freshwater wetland" . These are not wetlands, although they are adjacent to wetlands such that activities within them need to be regulated. The purpose of the law would be revised to reflect protection of wetlands and adjacent areas. Other definitions should be clarified as needed to support this change.

- **S** 4. Revise state law to clarify that vernal pools are to be included in the definition of freshwater wetland.

S 5. Revise state law to reflect a sunset provision that would phase out municipal ordinances regarding wetland buffers and OWTS setbacks in a manner that is coordinated with the promulgation of state regulations and that avoids disruption to applications under development or in various stages of state or municipal reviews. Specify a deadline by which appropriate changes to both state regulations and municipal ordinances would be made in order to end the application of varying duplicate standards.

S 6. Revise state law to require state agencies to provide access to information that will enable the public and municipalities to become aware of applications filed with the state agencies. The process shall not be a substitute for nor replace the existing procedure for notifying cities or towns of proposed significant alteration applications and the existing veto power of the city or town to disapprove a formal application.

Regulatory Changes

R 1. Revise state (DEM, CRMC) regulations to implement consistency in the use of the terms "buffer" and "setback". Clarify and simplify the definitions used in wetland regulations where feasible.

R 2. Revise state regulations to establish and specify requirements for buffers (undisturbed areas) and setbacks within the limits of authorized jurisdictional areas taking into account the scientific findings outlined in this Report. Opportunities for municipal input shall be provided during the rule-making process. The designation of buffers would reflect the resource characteristics and watershed protection needs and take into account existing land use.

R 3. Revise state regulations to allow for municipal input during the permit review process.

R 4. Revise state regulations to allow for a provision in the wetland and OWTS regulations to enable petition by municipalities for the identification of "Critical Resource Areas" that may need added protection.

Funding

Implementing the recommendations of this report, will require additional DEM resources to write legislation, develop policies, and regulate expanded jurisdictional areas.

F 1. Conduct an assessment of the additional resources needed, identify funding sources and ensure there is adequate budget and State staff to ensure compliance with new regulations, new wetland buffers and conditions of approval during and after construction.

F 2. Increase funding for DEM to budget for program needs and hire additional staff to carry out changes of an anticipated increased workload and to ensure communication between the State and cities and towns during application reviews.

Appendices

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

F. Other Topics

Appendix A: Membership Profile

Legislative Task Force

Membership Profile

2013 – 2014

Revised 2.18.14

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

RHODE ISLAND DIVISION OF PLANNING

Revision - 11.01.13:

Changed municipal representation:

Ashley Hann-Morris – Charlestown - departed
Vincent Murray – South Kingstown - added

Revision – 2.18.14:

Changed: Rhode Island Office of Management and Budget **-**Office of Regulatory Reform representation

Leslie Taito – Director – Departed
Nancy Scarduzio - Small Business Ombudsman - added

Abstract

The Legislative Task Force was established by the General Assembly in 2013 by the respective bills, House 5425A and Senate 672A. The purpose of the Task Force is to solicit feedback from stakeholders with subject matter expertise related to Rhode Island's wetlands, water resources, onsite wastewater systems, and the business community. The Task Force will review technical topics presented to it and foster recommendations related to wetlands, water resources, and onsite wastewater systems for a final report to be submitted to the Legislature in December of 2014. Full copies of the bills creating the Task Force can be found at:

http://webserver.rilin.state.ri.us/PublicLaws/law13/law13162.htm

and

http://webserver.rilin.state.ri.us/PublicLaws/law13/law13136.htm

The Division of Planning (DOP) has assembled a Task Force of volunteers to work closely with the DOP, the Department of Environmental Management, and the Coastal Resources Management Council to gather the best available data and research findings for the final report. The names and a brief description of the backgrounds and experiences of each Task Force member are provided within this Profile for general information. More information on the Task Force as it is developed will be posted to the DOP website at:

www.planning.ri.gov

Task Force Members

James Boyd

Coastal Policy Analyst

Coastal Resources Management Council (CRMC)

James' primary responsibility is the development and implementation of the Council's Coastal Resources Management Plan, including Special Area Management Plans. He emphasizes a science-based ecosystem approach to coastal planning and policy. His duties include developing policy and regulation to address coastal adaptation to climate change and seal level rise. In collaboration with a number of state partners, Mr. Boyd successfully obtained competitive federal funding and is the project manager for a statewide evaluation of saltmarsh migration in response to sea level rise. He is also a Senior Project Advisor on the CRMC Shoreline Change Special Area Management Plan (Beach SAMP) that is designed to identify vulnerable coastal areas at risk for coastal erosion, sea level rise, and flood inundation. It is expected that the Beach SAMP will result in adaptation strategies with state and local stakeholder engagement.

James is a CRMC designee on the RI Climate Commission Key Infrastructure and Built Environment and the Natural Resource and Habitat Working Groups. He is also the CRMC designee of the Narragansett Bay Estuary Program Management Committee. James obtained a graduate degree in Natural Resources Science from the University of Rhode Island with a focus on soil science, water pollution microbiology and watershed management. He has previously worked for the State of Vermont Environmental Board, the New England Onsite Wastewater Training Program at the University of Rhode Island, and as a Water Quality Specialist for the Rhode Island Department of Environmental Management. He has been employed with the CRMC for over 13 years, is a senior fellow at the University of Rhode Island Coastal Institute, and was a commercial fisherman on Narragansett Bay for over a decade.

Joseph A. Casali, P.E.

Principal

Joe Casali Engineering, Inc.

Joe holds Civil Professional Engineering Licenses in 3 states; Rhode Island, Massachusetts, and Tennessee. He is a *Rhode Island Department of Environmental Management*-Class II ISDS Designer. He has memberships in the RI Society of Professional Engineers, The National Society of Professional Engineers, RI Public Works Association, Providence Engineering Society and the American Society of Civil Engineers. Joe also has a Master of Business Administration and Bachelor of Science in Civil Engineering from the University of Rhode Island.

For the last ten years Joe has had overall responsibilities for both management and design of various residential and commercial civil/site engineering projects for a small civil/site firm of eighteen employees, Joe Casali Engineering (JCE), Inc. This includes all aspects of operating including marketing, design, accounting, finance and management.

Joe Casali Engineering (JCE), Inc. was incorporated in Rhode Island in 2003, and provides civil and site engineering services for a wide variety of clients in both the public and private sector. As a multi-disciplined civil engineering company, JCE is organized to comprehensively develop and consult for clients at all stages of planning, design, construction and operations. Project experience ranges from complex drainage, utilities and roadway design, to land development improvements including commercial, industrial and residential projects. JCE is also experienced with site revitalization and community comprehensive permits as well as offering landscape architecture services.

JCE's staff is comprised of two Professional Engineers, two Engineers in Training, a Civil Designer, an Office Manager, a Marketing Specialist, and an intern. JCE is centrally located in the City of Warwick, Rhode Island.

Other positions Joe has held were Project Manager for Plexus Corporation in Cranston, RI, Project Engineer for Beta Group in Lincoln, RI, Assistant Town Engineer for the Town of Smithfield, RI and a Civil Engineer for LS transit Systems in Boston, MA.

Russell Chateauneuf, P.E

Chief of Groundwater & Wetlands Protection, DEM (Retired)

Civil Professional Engineer

Russ has recently retired after more than thirty years of public service in Rhode Island. A RI Professional engineer since 1983, his last position was with the Department of Environmental Management (DEM) as the Chief of Groundwater & Wetlands Protection. As Chief he was responsible for managing the state's groundwater and wetlands protection regulatory programs and staff including: permitting of onsite wastewater treatment systems (OWTS), wetlands alterations, non-sanitary groundwater discharges, and private drinking water well variances; licensing of OWTS installers, OWTS designers, soil evaluators, and well drillers; managing the surface water quality certification program. He was also responsible for policy development, rule-making, implementation of applicable statutory mandates, updating of the Rhode Island Stormwater Design and Installation Standards Manual, non-point source pollution abatement planning, and groundwater quality and wellhead protection programs.

Prior positions with DEM were Chief of Permitting of the Office of Water Resources and Chief of the Division of Groundwater & ISDS. He was responsible for planning and administering statewide programs for: issuing licenses and permits related to wastewater treatment and disposal, water quality protection, wetlands conservation, facilities construction, private drinking water well installation; and for assessing overall permit compliance with various regulated activities affecting water resources of the State.

Russ holds a Bachelor of Science, Civil Engineering, from the University of Massachusetts, Amherst and is a member of the American Society of Civil Engineers. Other positions Russ has held in his long career were; Director of the Warwick Water and Public Works Department, in Warwick , RI, an Engineer for the RI Department of Transportation, and an Engineer for Camp, Dresser & McKee, Inc. in Boston, MA.

Janet Coit

Director

Department of Environmental Management

Janet L. Coit has worked for over 20 years on environmental matters. Before coming to the Department of Environmental Management, she worked for 10 years at The Nature Conservancy, one of the world's leading environmental nonprofits. She most recently served as that organization's Rhode Island state director, where she oversaw some of Rhode Island's largest land conservation projects. Prior to joining The Nature Conservancy, she was counsel and environmental coordinator in the Providence office of the late Senator John Chafee and, subsequently, then-Senator Lincoln Chafee. She moved to Rhode Island in 1997, making a transition from her position as counsel to the US Senate Committee on the Environment and Public Works, where she worked on national environmental policy.

Director Coit has been a champion for the environment throughout her decades of environmental and legal service, including stints at the Department of the Interior, Department of Justice, and working for three U.S. Senators from New England. Clean water, clean air and our natural areas provide for an environment that supports Rhode Island's economic future, and Director Coit is dedicated to preserving the quality of our environment and protecting the natural systems critical to the health, safety and well-being of Rhode Islanders as she leads the Department.

A magna cum laude graduate of Dartmouth College, Director Coit holds a J.D. from Stanford Law School, where she was president of the Environmental Law Society and a member of the Environmental Law Journal. She enjoys spending time outdoors, learning about nature and from people, and exploring Rhode Island's waterways, historic sites, and wild places. She is married with two children and lives in the East Bay area.

Thomas D'Angelo

Principal, Consultant, Broker

Progressive Realty Group /The Terry Lane Co.

Thomas E. D'Angelo is the Principal of Terry Lane Company and Broker for Progressive Realty Group, its real estate division. The company has been in business since 1981 and Tom has been a licensed real estate broker since 1974. Tom has been actively involved in land use, septic designs and real estate for over 40 years and has served on many committees and boards regarding septic systems and land use. He holds the flowing licenses; Class I Designer #9 (Septic System Repairs), Class III Designer #3047 Angilly (Septic System – All types), Class IV Designer #3 (Soil Evaluator), Registered Septic Inspector #109908, Licensed ISDS Installer #649, Real Estate Broker #8527. Professional affiliations For Tom are; Rhode Island Builders Association, National Assoc. of Home Builders, Rhode Island Assoc. of Realtors, National Assoc. of Realtors, RI Commercial and Appraiser Board of Realtors. Tom has also worked for the Department of Environmental Management as an engineering technician who was responsible for the review of Individual Septic Disposal System designs, installation inspections, witnessing water table test holes and monitoring of wet season water table readings.

Gary Ezovski, P.E

Owner

Lincoln Environmental Properties, LLC

After graduation from URI with a BS in Civil Engineering, Gary Ezovski started his professional career in construction management of commercial buildings on locations from Maine to Florida and several states in the Mid-West. After 15 years of work in that field, he embraced the opportunity to lead and become an owner of Lincoln Environmental, Inc., a Rhode Island based engineering and environmental services firm, where he ultimately became the sole owner. During his construction and environmental experiences, he was an important part of initiatives to grow two small businesses in short periods of time. After 20 years of environmental engineering practice, he sold the assets of Lincoln Environmental, Inc. to a national environmental consulting firm. He remains active by managing real estate investments in Lincoln Environmental Properties, LLC, and Grand Banks Commerce Park, LLC. He continues to hold professional status as a RI Registered Professional Engineer. He has previously held registrations in MA as a Licensed Site Professional and Construction Supervisor, in CT as a Licensed Environmental Professional, and a RI OWTS Class III Designer.

He has served his home town of North Smithfield in multiple areas by serving on the Smithfield School Committee, as chair of the Town's Sewer Commission, as vice chairman on each of the town's Water Authority, Planning Board, and Fire Study Commission. He also has been an active member of school building needs assessment and building committees.

In 2001 he was chairman of the Board of the Northern RI Chamber of Commerce and continues his work with the chamber today as a delegate to the RI Chamber Coalition and as a member of the Chamber's Political Action Committee. Gary was previously a member of the RIPEC Board of Trustees and was co-chair of the RIDEM's Business Round Table with two former Directors of that department. Gary is a member of the Board of Directors at Freedom National Bank in Smithfield and a Trustee of Berkshire Financial Services of Lee, MA. He also currently serves as the chairman of the Regulations Subcommittee of the Annual RI SBA Economic Summit and is the RI member of the Small Business Administration Region 1 Regulatory Fairness Board. Gary is married to Doreen (Gauthier) Ezovski and they have one son Matthew.

Kevin Flynn

Associate Director

RI Division of Planning

Kevin Flynn has been the Associate Director of the State of Rhode Island Division of Planning since September of 2005. Prior to that he was the Director of Planning for the City of Cranston. He was an adjunct faculty member of the University Of Rhode Island Department Of Community Planning from 1989-2003. He currently serves on the Board of Rhode Island Housing and as a member of the Housing Resources Commission, the KeepSpace Advisory Committee and the Rhode Island Water Resources Board. He is a graduate of the University of Massachusetts (BA) and the University of Rhode Island (MCP).

Lorraine Joubert

RI NEMO Program Director

University of RI, Cooperative Extension

Lorraine Joubert is the Director of Nonpoint Education for Municipal Officials (NEMO), a University of Rhode Island Cooperative Extension program that provides training and technical assistance to communities on strategies they can use to protect water resources while accommodating growth. She has an MS in Water Resource Management from URI and more than 25 years of professional experience in environmental planning and impact assessment at both the state and local level. Since starting RI NEMO in 1993, she has developed educational materials and conducted numerous workshops on water resource management topics for local officials and environmental professionals. In partnership with RI HEALTH, she has been responsible for assessing pollution risks to drinking water supplies using GIS mapping and nutrient loading models to evaluate land use impacts. She has helped local boards use assessment results to support land use decisions, to update water resource protection ordinances focusing on wetland buffers and watershed overlay districts, and to establish onsite wastewater management programs that are recognized by the US EPA as models for the Chesapeake Bay watershed. Since 2005, she has overseen development of RI Stormwater Solutions, an award-winning statewide stormwater education project which is helping RI DOT and municipalities to achieve compliance with RIDEM Phase II Storm Water permit requirements for public education and outreach.

Thomas Kravitz

Director of Planning & Economic Development

Town of Burrillville

Tom has worked as the Director of Planning & Economic Development for the Town of Burrillville since 2001. Working under a Town Council / Appointed Manager form of government, he advises the Town on smart growth principles including affordable housing and mixed use development, redevelopment and village renewal. He is knowledgeable on Subdivision & Land Development Regulations, affordable housing and Comprehensive Community Plan requirements. He works to facilitate monthly meetings and provides technical assistance to the Town's Planning Board, Town Council and Redevelopment Agency on various policies, developments and redevelopment activities. He has authored numerous grants and obtaining approximately $12 million in funds from various Federal, State entities and private agents.

Prior to Burrillville, Tom worked as a Research Analyst for the Rhode Island Economic Development Corporation, Substitute Science Teacher for Scituate High School in Scituate, and the Newport Concrete Form Company in Cumberland. He is A member of the American Planning Association, a member of the Housing Resource Commission, and Housing Works Rhode Island.

Tom Kutcher

Bay Keeper

Save the Bay

Tom Kutcher leads the Narragansett Baykeeper program, which is Save The Bay's on-the-water advocacy and watchdog presence. Save The Bay is Rhode Island's largest independent nonprofit environmental organization, dedicated to the protection, restoration, and improvement of the ecological health of Narragansett Bay, its watershed, and adjacent coastal waters. The Narragansett Baykeeper is a licensed program of the Waterkeeper Alliance, a network of more than 200 similar programs worldwide.

Tom is a third-generation Rhode Islander living in Wickford with his wife and two children. He studied environmental science and management and advanced ecology at the University of Rhode Island, where his graduate research focused on developing biological indicators of freshwater wetland condition. Before being appointed as Narragansett Baykeeper, Kutcher worked as a wetlands scientist for the Rhode Island Natural History Survey, where he developed landscape, rapid, and biological wetland assessment methods for the State of Rhode Island. Prior to that, he served as a natural resources specialist and coastal ecologist for the Narragansett Bay National Estuarine Research Reserve (NOAA / RI DEM), where he planned and conducted research, management, and restoration in coastal and freshwater wetlands, and developed a nationally-implemented land cover classification scheme for the broader National Estuarine Research Reserve System.

Scott Moorehead, P.E., P.L.S.

Owner

SFM Engineering Associates

SFM Engineering was founded in 1986 as a small consulting civil engineering firm specializing in site planning, site design, utility design and permitting for residential and commercial development projects. In the past 26 years, they have completed the design and permitting for more than 800 development projects ranging in size from single family house lots to commercial and residential sites of several hundred acres. Scott is the primary client contact and responsible for project management, overall planning and design, project meetings and testimony at public hearings.

Scott has been actively involved in land use and septic designs and has served on many committees and boards regarding septic systems and land use. He was a member of the 2001 Wetland and 2002 ISDS Permit Streamlining Task Forces as well as the 1994 Governor's Blue Ribbon Commission on Wetlands and Septic Systems. He also serves as Chairman of the DEM OWTS Designer Licensing Review Panel. He has a B.S. in Civil Engineering from the Massachusetts Institute of Technology and holds the flowing licenses; Professional Engineer Rhode Island, Professional Land Surveyor -Rhode Island, Professional Engineer – Connecticut, R.I.D.E.M. ISDS Cl. 3 and 4 Designer Licenses. Professional affiliations For Scott are; the Institute of Transportation Engineers, National Society of Land Surveyors, American Congress on Surveying & Mapping, Rhode Island Builders Association, and R.I. Society of Professional Land Surveyors. Scott has also served as Town engineer for the Town of Scituate, was a project Manager for Beta Engineering, Inc. of Pawtucket, RI and a Senior Project Engineer for Gordon R. Archibald, Inc., also in Pawtucket, RI.

Vincent Murray

Planning Director

Town of South Kingstown

Vincent Murray is the Director of Planning for the Town of South Kingstown. He holds a Bachelor of Arts Degree in Political Science and a Master's Degree in Community Planning and Area Development (CPAD) from the University of Rhode Island. He has more than 25 years of experience in all facets of land use planning, public policy analysis and economic and community development. Mr. Murray is a member of the Rhode Island State Planning Council and a past member of the State Planning Council's Technical Committee. He previously worked for the Town of North Kingstown, City of Warwick and Town of East Greenwich in various planning and community development capacities.

Eric Prive, P.E.

Project Manager

DiPrete Engineering

Eric Prive is a registered professional engineer with a specialty in civil and environmental engineering. He graduated with a Bachelor of Science in Civil Engineering from the University of Rhode Island in 2001 and is currently a Project Manager at DiPrete Engineering in Cranston, RI. Mr. Prive is a RIDEM Class III OWTS Designer and has designed over 200 OWTS throughout the State including innovate and alterative (I/A) technologies. He also serves as the Chairman of the Attleboro (MA) Conservation Commission and has extensive stormwater and septic system regulatory experience. He specializes in groundwater, hydrology, and stormwater management control and has a broad knowledge of the Zoning Ordinances and Subdivision/Land Development Regulations of a majority of the cities and towns in Rhode Island.

Scott Rabideau

President

Natural Resources, Inc.

Scott Rabideau is the President of Natural Resource Services, Inc. (NRS), a company he started in 1988. He has a BS in Natural Resource Science from the University of Rhode Island (1982) and an MS in Management from Lesley University (1986). He is certified as a Professional Wetland Scientist (PWS) by the Society of Wetland Scientists. He is also a 25 year professional member of The Wildlife Society, where he sits on the society's Investment Review Committee. Scott has been a practicing wetland scientist in RI, MA and CT since 1986.

Scott served in the RI General Assembly as a state representative from the Town of Burrillville (then District 60) from 1995-2002. He served on the House Committee for the Judiciary for the entire 8 years, as well as the Joint Committee for Energy and Environment. He also served on the legislature's Redistricting Commission for 2000. He is the past Chairman of the Burrillville Sewer Commission, a board he served on for 4 years. Scott sits on the Legislative and Environment Committees at the Rhode Island Builders Association.

Nancy Scarduzio

Small Business Ombudsman
Office of Regulatory Reform

Rhode Island Office of Management and Budget

In June 2013, Nancy assumed the position as Small Business Ombudsman where her office is responsible for the enhancement and continual improvement to create a clear, predictable and reliable state-wide regulatory system. She assists small businesses navigate through agency regulations and permitting procedures. She also guides agencies in complying with the Administrative Procedures Act with respect to minimizing adverse economic impacts on small businesses during the rule-making process.

Prior to accepting the position as Small Business Ombudsman, she was employed by the RI Department of Environmental Management, Division of Fish and Wildlife, Marine Fisheries Section as a Principal Marine Biologist. Her background in regulatory compliance and focus on the protection of our environment has led her to a number of leadership roles. Previously, Nancy worked for the RI Department of Health, and also worked for the San Diego County Department of Environmental Health Services, as a Vector Ecologist.

Nancy has eighteen years of regulatory and code enforcement background and holds a Bachelor's degree in Biology with emphasis in Marine Biology and Entomology from the University of Rhode Island. She is also a Registered Environmental Health Specialist (REHS) with the State of California and holds the REHS credential from the National Environmental Health Association.

Appendix B Timeline and Meeting Notes

RHODE ISLAND DIVISION OF PLANNING

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 preliminary draft report

SEPTEMBER 2014
18th - 12thTask Force Meeting - DEM
Topics: Preliminary Draft Report
25th - 13thTask Force Meeting - DEM
Topics: Preliminary Draft Report
Writing Group prepares draft recommendations

OCTOBER 2014
31st- 14th Task Force meeting
Topics: Working Draft Report - adequate protection & gaps & draft recommendations
Writing Group – prepares final report & recommendations

NOVEMBER 2014
18th – 15th- Task Force Meeting - DEM
Topics: Review and census on final 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 Meeting #1

Thursday, September 26, 2013

9:00 AM – 11:00 AM
Conference Room B, 2nd Floor
Department of Administration, Powers Building
One Capitol Hill, Providence, RI

Task Force members in attendance were: Jeff Willis (for Jim Boyd-CRMC), Joseph Casali (Civil Engineer Representative), Russell Chateauneuf (Civil Engineering Representative), Janet Coit (DEM Director), Thomas D'Angelo (Builder's Trade Association), Gary Ezovski (Business Community Representative), Kevin Flynn (DOP-Associate Director), Ashley Hahn (Municipal Representative - Charlestown), Lorraine Joubert (Environmental Entity), Thomas Kravitz (Municipal Representative- Burrillville), Tom Kutcher (Wetlands Biologist), Scott Moorehead (Business Community Representative), Eric Prive (Licensed Designer/Environmental Engineer), Scott Rabideau (Business Community Representative), Leslie Taito (Office of Regulatory Reform).

The Division of Planning (DOP) and DEM also had several agency staff members present. From DEM, those present were Carol Murphy, Ernie Panciera, Terry Gray, and Nicole Pollock. Nancy Hess and Paul Gonsalves were on hand from DOP.

Greetings and Introduction of Members

Kevin Flynn kicked off the meeting by welcoming the task force members and by giving a brief explanation of the purpose of the group. Members introduced themselves and explained their interest in participating on the Task Force.

Task Force Legislative Intent and Purpose

Mr. Flynn began with discussion of the legislation that created the Task Force and the need to examine RIGL 42-64.13-10, which is the state legislation that sets the standards for wetlands and septic disposal. The current legislation is broad in scope. Some municipalities have taken the State standards a step further and have additional setback standards. There are currently believed to be 19 municipalities that have adopted their own standards. The local standards do not supersede the statewide standards, but are in addition to the DEM regulations. Director Coit then suggested that a chart or matrix be devised showing the municipal regulations.

Several in the group expressed more of a concern to examine setback issues as opposed to OWTS design standards. The sense around the table was that the Task Force charge was to look at

setback issues not OWTS design issues. However, some felt that OWTS regulations are of equal importance, and that it is sometimes difficult to separate design issues from setback issues. There may be topics that are identified as future work topics outside of the charge for this group. All agreed that science should be the key driver in setting standards. The one size fits all approach may not work as each municipality has a set of resources that should guide how their standards are set. The watershed for the Scituate Reservoir was used as an example.

In the case of permitting for homeowners, some in the group felt that the multiple layers of approvals are a time-consuming concern. The idea of "one-stop-shopping" was raised. This refers to including municipal regulations into DEM regulations. It was also noted that some local regulations pre-date the current state regulations.

In addition to thinking about wetlands and setbacks alone, it was suggested that the collective/cumulative effects from stormwater and other sources also be addressed. One member suggested a how-do- septic-systems function presentation and discussion. The terms "buffer" and "setback" are distinctly different and must be clearly defined. This will help with future discussions. Also, the statutory jurisdictional areas over which DEM and CRMC may regulate activities (e.g. require permitting) encompasses both buffers and setback areas and may need to be modified depending on the outcome of the issues being investigated by the task force. . Finally, the differences in how local ordinances apply to individual lots verses subdivisions needs review as well.

A clear, predictable, reliable process that is standardized across the state was also suggested. The process in RI was compared to that Attleboro, Massachusetts but it was thought that their process may even have more layers than ours. Massachusetts allows individual communities to set their own wetland setbacks with no uniformity. Although concerns with the wetlands permit process are very valid, this group's primary focus is on setbacks. Director Coit then suggested that a brief "scope of work" be developed which will answer what we want to understand better, what science that the Task Force will look at and what are the desired outcomes. There was general agreement that changes in legislation are the reason for the group coming together.

Existing RI Gen. Laws for Wetlands and Septic Disposal (OWTS): DEM

Carol Murphy and Ernie Panciera, DEM staff, gave an overview of several aspects of current freshwater wetlands and onsite wastewater treatment systems laws. Carol summarized the RI Freshwater Wetlands Act as related to DEM. The Act was established in 1971 and was only the second such law in the Nation at the time. The Act established regulations aimed at protecting, preserving and documenting the freshwater wetland areas in the State. The difference between a swamp, marsh and a floodplain was discussed. Also, ponds, lakes, rivers, bogs and streams were defined.

Discussion by all reviewed past history on this topic. There was a proposed major revision of the Act in 1996, but it was unsuccessful. It was suggested that the failure of this effort may have been the impetus for communities establishing their own wetlands regulations. Members suggested that this new Task Force is good opportunity to pick up where the failed 1995 bill left off. It was suggested that the Task Force review the old report and the related 1996 bill. Members discussed the seemingly arbitrary nature of the setback numbers such as "50 feet, 100 feet, 200 feet etc." Were these numbers

based on any science? A synopsis of the most relevant wetland buffer science is a critical piece going forward.

Ernie summarized the RI General Laws and the authority given to DEM to establish minimum standards for the operation of onsite wastewater treatment systems (OWTS). There are currently not many specific standards set for OWTS in State law but rather in the DEM regulations that are authorized by the Law. Several municipalities address OWTS. DEM commonly gives advice on local groundwater protection ordinances. Concern was expressed that some communities do not have the staff expertise to develop and defend extra standards.

As the municipal representatives weighed in, the group was introduced to the idea of much of the frustration having to do with the process, rather than the actual science involved. Tom Kravitz reminded everyone that most process issues involve working with people at different levels who make the process work.

The topic of sea level rise was introduced and suggested as a consideration for the Task Force as it relates to buffers and setbacks.

Existing RI Gen. Laws for Wetlands and Septic Disposal: CRMC (Coastal Wetlands)

A brief description of the CRMC Coastal Regulations was given by Jeff Willis. CRMC through their Special Area Management Plans (SAMP) regulations has jurisdiction in coastal areas. DEM and CRMC have areas of overlap, but dual jurisdiction is currently not the practice. Differences between proposed activities and location dictate CRMC's reviews. Jurisdictional maps are available on each agency web site.

Next Steps and next Meeting

Nancy Hess, DOP, reviewed the general timeline and potential future topics for the Task Force. It was agreed to reserve the last Thursday of the month for Task Force meetings. Members requested that the meetings be held earlier in the day. An 8:00 AM start time was set. The October meeting is scheduled for the 31st. *(This was subsequently rescheduled to Oct 24th at 8 AM.)*

November's meeting might coincide with an educational URI Workshop on wetlands and buffers the NEMO program. The Task Force will discuss in October.

Volunteers for a subcommittee to review technical /scientific literature were solicited. Scott Rabideau and Russell Chateauneuf volunteered.

Adjourn
11:00 AM

Legislative Task Force Meeting #2

Thursday, October 24, 2013

8:00 AM – 10:00 AM
Room 280, 2nd Floor
Department of Environmental Management (DEM)
235 Promenade Street, Providence, RI

Task Force members in attendance were: Jim Boyd (Coastal Resources Management Council), Joseph Casali (Civil Engineer Representative), Russell Chateauneuf (Civil Engineering Representative), Janet Coit (DEM Director), Thomas D'Angelo (Builder's Trade Association), Gary Ezovski (Business Community Representative), Kevin Flynn (DOP-Associate Director), Vincent Murray (Municipal Representative – South Kingstown), Lorraine Joubert (Environmental Entity), Thomas Kravitz (Municipal Representative-Burrillville), Tom Kutcher (Wetlands Biologist), Scott Moorehead (Business Community Representative), Scott Rabideau (Business Community Representative), Leslie Taito (Office of Regulatory Reform).

Task Force members absent were: Eric Prive (Licensed Designer/Environmental Engineer)

The Division of Planning (DOP) and DEM also had several agency staff members present. From DEM, those present were Alicia Good, Carol Murphy, and Ernie Panciera. Nancy Hess and Paul Gonsalves were on hand from DOP.

Amendments/Corrections to Meeting Notes

Russell Chateauneuf suggested for the group to review the previous meeting notes at the start of each meeting. In addressing the previous meeting's notes, in regards to defining buffers and setbacks, he raised the point that jurisdiction should also be defined.

Scope of Work for Task Force

As requested at the September Task force meeting a scope was presented to the Task Force. The Scope was written by Nancy Hess, DOP with help from DEM and CRMC staff and outlined the purpose and legislative charge of the Task force. It defined the approach and the work products that would be produced. All were in agreement that the Scope adequately summarized the intent and concerns of the group. It will be available on the DOP website for future reference.

Summary of Prior Wetland Task Forces

The meeting began with a review by Carol Murphy, DEM, of the work done by previous wetland task forces in 1996 and 2000. It was noted that the Task Force formed in 2000, while larger in scope, had great participation, including some members of the current Task Force, and that most of the recommended changes were fully or partially implemented. Nancy Hess, DOP, stated that the reports from the previous Task Forces would be made available on the DOP Legislative Task Force website for those interested in reviewing them.

Subject Topics and Technical Presentations

A. Existing Agency Rules and Regulations for Wetlands and Septic Disposal Setbacks

a. DEM –i. Freshwater Wetlands

Carol Murphy presented the existing regulation regarding wetlands, beginning with the legal definitions of jurisdictional wetlands. Swamps, marshes, ponds, and bogs, and the 50 foot perimeter surrounding them, are defined as jurisdictional wetlands in the Freshwater Wetlands Act. Rivers and streams enjoy a 100 or 200 foot perimeter, depending on their width. These areas in their entirety are legally considered a wetland, and the feature itself (the stream, river, swamp, marsh, pond, or bog) is referred to as the main body of the wetland. Floodplains are also regulated as jurisdictional wetlands.

There are other types of wetlands as defined by the rules- forested wetlands, emerging plant communities, special aquatic sites (vernal pools)- which do not have a 50 perimeter surrounding them. For these types of wetlands, the jurisdictional wetland is simply the feature itself. A buffer zone is defined in the rules as "[a]n area of undeveloped vegetated land, retained in its natural undisturbed condition, or created to resemble a natural vegetated area, that mitigates the negative impacts of human activities on wetland functions and values." DEM rules do not define setbacks.

Members asked what the genesis of the 50 foot perimeter is. Carol has partially researched this question, and found out that the 50 foot perimeter was added as an amendment to the Freshwater Wetlands Act three years after the original law was passed in the 1970s. She shared that, given the thoroughness of the other details in the Act, the 50 foot figure was probably not arbitrarily created. It was agreed the scientific basis of the policy would be revisited in the future. The idea that a larger buffer zone may be appropriate for some wetlands to protect them from outside activity was discussed, as it may improve predictability of regulation by the State. Leslie Taito restated the importance of using the same definitions for terms.

ii. OWTS Regulations

Ernie Panciera described the regulatory framework for onsite wastewater treatment systems (OWTS). For OWTS regulations, the term watercourse is the term of reference. Watercourses include all bodies or standing or flowing water, and the setbacks for OWTS are based off of the system's proximity to a watercourse, whether it is located in a critical resource area, and the size of the system (measured in gallons per day). In most cases, the setback from the watercourse (not a jurisdictional

wetland, so this setback is measured right up to the feature) is 50 feet. For systems over 5000 GPD, the setback from the watercourse is required to be at least 100 feet. OWTS components located near a critical resource area (such as a drinking water supply watershed or the Salt Pond/Narrow River areas) require a setback of at least 100 feet in most cases. A 200 foot setback is required for OWTS components located near the impoundment areas of the watershed and the Salt Pond/Narrow River coastline. Ernie stated that the variance of the setbacks is based on practice more so than specific scientific findings, although nutrient loading was a factor when setbacks were revised in 2008.

The discussion moved to OWTS management in other states in New England and the fact that buffer zones are not the only tools used by some states. Ernie stated that some systems require monitoring of discharge, and should the effluent be unsatisfactory, the system performance would be monitored continuously. Members discussed reviewing the data of these large, monitored systems. The subject of variances for certain projects was raised in cases where the system would have no impact on the resource.

b. CRMC - Coastal Wetlands

James Boyd, CRMC, presented the regulatory framework for coastal wetlands in the state. He described three areas that CRMC maintains regulatory jurisdiction over: within tidal waters, on a coastal shoreline feature, or within 200 contiguous feet of coastal features. There are also special area management plans, namely the Salt Pond and Narrow River areas, which each have their own regulations that apply only to their specific geographic area. For areas outside of CRMC jurisdiction, DEM manages the wetlands regulation. The agencies have nearly identical rules, however CRMC has different management procedures (such as permit extensions or appeals processes) and the management of tributary wetlands have stricter regulations under CRMC than DEM (because of their proximity to receiving waters). Members discussed the origin of this policy and some raised the point that this system creates two set of regulations depended on the site's location.

Boyd continued explaining CRMC regulations by highlighting the CRMC definitions of freshwater wetlands, buffer zones, coastal features, and setbacks. The CRMC definition of a setback is simply the minimum nominal distance the proposed development must be from a coastal feature, while a buffer zone is the actual vegetated area *within* that setback that is meant to remain undisturbed. Boyd noted that while the scientific literature on the subject recommended much larger buffer zones than were eventually enacted, for implementation and practicality purposes smaller buffers were enacted. The areas within the special management plans are resource based, and have differing setbacks for self-sustaining areas and critical areas within the management plan. Director Coit suggested creating a matrix for a future meeting that visualizes the CRMC regulations.

B. Summary of Municipal Rules and Regulations for Wetlands and Septic Disposal Setbacks

Lorraine Joubert, URI, presented a summary of the rules and regulations for wetland and septic disposal setbacks at the municipal level. Over the years, some municipalities developed wetlands regulations that go beyond the state's regulations. Twenty communities have their own wetland

setback regulations, primarily to deal with stormwater management, OWTS, and wellhead and groundwater protection. The municipal setbacks can 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 wetland setbacks can sometimes be in conflict with frontage and other zoning setbacks, which can require an appeal for a variance to the municipal zoning board. Some communities use other devices to mitigate the possible negative impacts of development near wetlands, such as restrictions on the amount of impervious surfaces there can be, development density controls, and other means. Lorraine explained that many of the municipal regulations were driven by state and federal initiatives for communities to adopt plans to protect local water resources.

Kevin Flynn began discussion by asking about the varying motivations for communities to create their own standards, which Lorraine addressed as largely being resource-based concerns. Water quality has been an issue for some towns in the more densely developed areas of the municipalities, and is addressed based on the resources, existing conditions, and development pressure. Mr. Casali raised a concern that developers, in the process of obtaining the necessary permits for development on a lot or parcel, can be stymied in seeking dimensional relief by zoning boards of appeals despite being granted approval for development by DEM or CRMC, which is an issue of predictability and consistency of regulation in regards to wetlands. It was recommended that the task force examine some case studies of such developments in order to examine the process more closely. Mr. Ezovski agreed with Mr. Casali that the two-layer system of approval, both at the state level and municipal level, complicates matters that should be science-based. He contributed that municipalities- town councils and zoning boards- examining these scientific matters may not be appropriate if they do not possess the scientific expertise to make informed decisions. Director Coit also requested creating a matrix that visualizes the varying regulations.

Next Steps and Next Meeting

Nancy Hess, DOP, reviewed the month of November for the Task Force. November's meeting was originally scheduled for the 21st, however a URI workshop on wetlands issues was scheduled for that day, which Task Force members were encouraged to attend. The Task Force agreed the new meeting date would be Nov. 19th. Nancy explained the working group was planning future sessions and that a possible subcommittee on zoning board meetings could be formed in the future.

Adjourn
10:00 AM

Legislative Task Force Meeting #3

Tuesday, November 19, 2013

8:00 AM – 10:00 AM
Room 300, 3rd Floor
Department of Environmental Management
235 Promenade Street, Providence, RI

Task Force members in attendance were: Jim Boyd (Coastal Resources Management Council), Joseph Casali (Civil Engineer Representative), Russell Chateauneuf (Civil Engineering Representative), Janet Coit (DEM Director), Thomas D'Angelo (Builder's Trade Association), Gary Ezovski (Business Community Representative), Kevin Flynn (DOP-Associate Director), Vincent Murray (Municipal Representative – South Kingstown), Lorraine Joubert (Environmental Entity), Thomas Kravitz (Municipal Representative-Burrillville), Tom Kutcher (Wetlands Biologist), Scott Moorehead (Business Community Representative), Eric Prive (Civil and Environmental Engineering Representative), Scott Rabideau (Business Community Representative), Leslie Taito (Office of Regulatory Reform).

The Division of Planning (DOP) and DEM also had several agency staff members present. From DEM, those present were Carol Murphy, Ernie Panciera, Terry Gray, and Nicole Pollock. Nancy Hess and Paul Gonsalves were on hand from DOP.

Elected officials present include Rep. Teresa Tanzi, Rep. Donna Walsh, and Rep. Arthur Handy.

Introduction

Kevin Flynn began the meeting with an introduction of the meeting's guest speaker, Christopher Mason, Principal Scientist and President of Mason Associates. Mr. Mason provided for the task force a presentation on the functions and values of wetlands, a copy of which can be found here.

Wetlands Functions and Values

The presentation began with examining the multiple and varying functions of one particular wetland in Westerly, Rhode Island. Mr. Mason highlighted the multiple roles the wetlands plays, such as a drinking and agricultural water source, floodwater storage, pollution filtration, food chain support, wildlife habitat, nutrient filtration, recreation, and others. The example showed that a single wetland can provide multiple functions for the surrounding area.

There are many different types of wetlands, however swamps are the most common type of wetlands in the state, which can vary in inundation. Mr. Mason explained that a wetlands doesn't necessary mean the land is always submerged, but the water table may be within one foot of the

surface. Other wetlands types include bogs, fens, marshes, wet meadows, rivers, (intermittent) streams, lakes, vernal (seasonal) pools, coastal features, and more. The wetlands are all hydrologically interconnected, and can support one another throughout the year as waters traverse the topography. Climate change, urban development, and other factors impact wetlands over time. These impact can be difficult to measure, as observations can provide a snapshot of the current state of a wetland but may not be apparent without data from a longer span of time. Wetlands most often occur on flat land. Topography and geology affect how water flows both above and underground. Often, where an area of land is below the local water table, wetlands will develop. However, wetlands can develop on slopes, hills, and other types of topography.

One of the most important functions wetlands provide is a source of drinking water and water for agricultural uses. Mr. Mason shared that, while industrial processes can use a large amount of water, that water often must be cleaner than drinking water, so it would require additional filtration.

Wetlands can store floodwaters after a storm, but one of the most important aspects of floodwater retention is the deceleration of waters as they are absorbed by the wetland. These waters are slowed as they spread across the wetlands, recharge the local water table, and are slowly released downstream.

Questions

Lorraine Joubert asked Mr. Mason about identifying floodplains for smaller wetlands. He said that it would need to be calculated, either by observation or by hiring an engineer to measure and model the area. Mr. Casali explained the process of how an engineer would measure a wetland for that purpose. Several members asked about variables for modeling a wetland for floodwater capacity. Mr. Mason explained that models are only as good as the data input to it, and seeking very minute measurements can easily become very expensive.

Functions and Values cont'd

The next portion of the presentation centered around nutrient and soil interactions with wetlands. Mr. Mason related the relationship between water velocity, the "solution", and nutrient particles. As water slows, microbes, metals, nutrients, and soils will separate from the water and settle in the wetland. This can have a big impact on the microbial food chain, as well as the levels of nitrogen in the wetland. Nutrients, as well as pollutants, may be trapped in the wetland depending on how fast or slow it's water moves. To demonstrate the collection of pollutants in wetlands, Mr. Mason detailed the wetland decontamination and construction project he was a part of at the University of Connecticut, as well as some examples of wildlife that use wetlands for habitat.

Questions

Ms. Joubert asked Mr. Mason to expand upon pathogen export from wetlands. He explained that many of the pathogens can be attributed to wildlife that uses the area, however studies can be performed to detect sources of viruses and pathogens, such as DNA testing.

Functions and Values cont'd

The next section of the presentation related to wildlife that interact with wetlands. Fish and shellfish an example of an obligate species, those that require the wetlands to survive. A wood duck, he explained, depends on the wetland to eat, hide from predators, breed, and would not be present in an area without the wetlands to support it. Facultative species are those that use the wetlands, but do not depend on it entirely.

Social and cultural values are those people use for enjoyment and recreation. Aesthetic value is an example of a social value. Waterviews and open space enhance property value because many people traditionally enjoy them. Many recreational purposes use wetlands, such as swimming, hiking, hunting, and many others. Mr. Mason closed his presentation with a restatement of the benefits that wetlands provide us. Viable drinking water sources are vitally important to us as a society. They add tremendous value to a local society, including economic value.

Questions

Members were invited to ask question of Mr. Mason after the conclusion of his presentation. Mr. Prive asked about the role of phosphorus in wetlands. Mr. Mason explained that phosphorus is often the limiting nutrient for plants, that their growth is stymied by the limited amount of phosphorus. Ms. Coit asked about the loss of wetlands since colonial times, and about wetlands construction. He answered that loss of wetlands over such a long period of time is difficult to measure due to the lack of measurement over time. Mr. Boyd shared that over a 200 year span, there exists about half the wetlands that there used to be, with the loss mostly due to development and land use over time. He stressed that this is an important reason to prevent unchecked development or overdevelopment. As for wetlands creation, Mr. Mason cited his University of Connecticut project. He explained that is very expensive, and can be quite complicated to engineer and monitor. Members discussed the loss of wetlands and its factors. Mr. Casali had a question about pathogen removal, and the conditions that would best remove them from a wetland. Shallow waters provide denitrification and serve this role well. Members then discussed trends in zoning setbacks from wetlands and local regulations with Mr. Mason.

Next Steps and Next Meeting

The next meeting is on December 19. Nancy Hess, DOP, shared that the materials from the presentation would be available on the Statewide Planning Program website, and that the topic of the next meeting would be the area immediately surrounding the wetlands and lands typically contained within the zoning setbacks.

Adjourn
10:00 AM

Legislative Task Force Meeting #4

Thursday, December 19, 2013

8:00 AM – 10:00 AM
Conference Room C, 2nd Floor
Department of Administration
One Capitol Hill, Providence, RI

Task Force members in attendance were: Jim Boyd (Coastal Resources Management Council), Joseph Casali (Civil Engineer Representative), Russell Chateauneuf (Civil Engineering Representative), Janet Coit (DEM Director), Thomas D'Angelo (Builder's Trade Association), Gary Ezovski (Business Community Representative), Kevin Flynn (DOP-Associate Director), Vincent Murray (Municipal Representative – South Kingstown), Tom Kutcher (Wetlands Biologist), Eric Prive (Environmental Engineering Representative), Scott Rabideau (Business Community Representative), Leslie Taito (Office of Regulatory Reform).

The Division of Planning (DOP) and DEM also had several agency staff members present. From DEM, those present were Carol Murphy, Ernie Panciera, Terry Gray, and Alicia Good. Nancy Hess and Sean Henry were on hand from DOP.

Welcome and Introduction

Director Flynn began the meeting by introducing the meeting's presenters. Dr. Peter Paton is a wildlife ecology professor at the University of Rhode Island, whose specialty is the effects of humans on wildlife populations, and his presentation was an examination of the buffer zones around wetlands. Nancy Hess (DOP) also had a short presentation which was a culmination of the information presented to the task force thus far.

Wetlands Buffer Zones

Dr. Paton began his presentation by defining what "buffer zones" are: A vegetative area designed to protect both the water quality and movement corridors (and habitats) of wildlife species. In terms of wildlife protection, buffers function as travel corridors between habitats, nesting areas, access to resources, and more for many species. Dr. Paton also highlighted that the "habitat matrix", essentially the types of habitats surrounding the wetland, will have an effect on what types of species use that particular area. Using a local example, he stated "[a] fifty foot buffer in the middle of Cranston is going to have radically different wildlife than a fifty foot buffer in western Rhode Island." The buffers create "uplands", areas of habitat in close proximity to the wetland. Large percentages of reptile, avian,

and amphibian species use the uplands as much as the wetland itself, all at different times of the year. Vernal pools are particularly important for these wildlife functions, because they do not retain water year-round and lack the presence of fish, which are predators for amphibians. There is also no buffer for vernal pools (referred to as "special aquatic sites" in Rhode Island law).

Dr. Paton offered a theory of wetlands regulation created by Ray Semlitsch called the life zone, which creates various buffers around a wetland that protects the surrounding core habitat, but still allows for some development within some of the buffers. The types of development allowed would typically be low-density housing, to minimize negative effects on the nearby habitats, and would be limited to a certain percentage of the total buffer zone. After detailing this theoretical regulatory route, members discussed vernal pool regulations at the local level and in surrounding states. Dr. Paton took several questions on the findings and examples he provided earlier in the presentation.

Wetlands Buffer Zones (cont'd)

After the discussion, Dr. Paton continued the presentation by outlining the current regulatory regime regarding vernal pools in Maine. In the Pine Tree State, vernal pools enjoy a 100 foot "envelope" on all sides in which no development can take place. Beyond that, there is a 750 foot buffer referred to as "critical terrestrial habitat" that must remain at least 75% undisturbed. There are also "significant vernal pools", which have a 250 foot "zone of consultation" around them. In the zones of consultation, no unreasonable disturbances can be made. Members then discussed the implications of this regime and compared it to aspects of current Rhode Island law and Dr. Paton fielded more questions pertaining to vernal pools and wildlife conservation considerations. Mr. Rabideau commented on the need for any plan the task force eventually presents to the legislative to be simpler and more predictable than the current regulations, and members talked about feasibility and how to make rules that provide adequate protection for the municipalities to be content with, that are simpler than current standards, and more predictable for the development and business communities to better navigate. Discussion continued in the area of vernal pools and the ways both Rhode Island and Massachusetts identify and classify vernal pools. Carole Murphy outlined the system Rhode Island has used to identify them. The members agreed that vernal pools are relatively special areas of environmental concern and need better protection than is provided under current state law.

Nancy's Top Ten Wetland Functions

Nancy Hess, DOP, next provided a summary of the task force's first two presentations (at the November and December meetings). To this end, she constructed a list of the ten most important functions and values of wetlands discussed to date:

1. Food chain and food diversity
2. Wildlife habitat
3. Fish and shellfish habitat
4. Flood storage
5. Erosion control
6. Water filtration and transformation
7. Groundwater recharge and discharge
8. Open space and aesthetics
9. Recreation
10. Education and research resources

Next Steps and Next Meeting

Nancy Hess reviewed the tentative schedule of subject matter for the meetings to take place in 2014. A presentation on OWTS (Onsite Wastewater Treatment Systems) regulations is schedule for January, but future topics include regulatory platforms for other states, examining wetlands regulation at the municipal level, case studies involving wetlands regulatory friction points, and other areas. The next meeting was scheduled for January 21st, 2014 at the Department of Administration building

Adjourn

10:00 AM

Legislative Task Force Meeting #5

Tuesday, January 21, 2014

8:00 AM – 10:00 AM Conference Room B,
2nd Floor Department of Administration One
Capitol Hill, Providence

Task Force members in attendance were: Jim Boyd (Coastal Resources Management Council), Joseph Casali (Civil Engineer Representative), Russell Chateauneuf (Civil Engineering Representative), Janet Coit (DEM Director), Tim Stasiunas (Builder's Trade Association), Gary Ezovski (Business Community Representative), Kevin Flynn (DOP-Associate Director), Lorraine Joubert (Environmental Entity), Tom Kutcher (Wetlands Biologist), Nancy Scarduzio (Office of Regulatory Reform).

The Division of Planning (DOP) and DEM also had several agency staff members present. From DEM, those present were Alicia Good, Carol Murphy, Ernie Panciera, Terry Gray, and Brian Moore. Nancy Hess and Sean Henry were on hand from DOP.

Introduction

Kevin Flynn introduced the meeting's presenters, University of Rhode Island professor Arthur Gold and URI Onsite Wastewater Treating Center Director George Loomis. The two men presented information pertaining to Onsite Wastewater Treatment Systems (OWTS) and water resource issues.

Water Pollutants

Art Gold was the first presenter. He began by outlining three main pollutants in water: pathogens, phosphorus, and nitrogen. Pathogens (bacteria, viruses, parasites, etc.) are an obvious pollutant, as well as a health risk, and can be retained in water for a very long time. Phosphorus is an issue for freshwater because algae growth is limited by a lack of phosphorus. Phosphorus is a nutrient that triggers excessive growth of algae which then reduces water clarity. As algae die and decompose, they consume dissolved oxygen in the water column, resulting in low oxygen levels, and degrading the overall health of the water resource. Blue-green algae are particularly hazardous because they can release cyanotoxins, a neuro toxin that is a health hazard to both animals and humans alike.

Nitrogen is another nutrient that that causes similar problems in coastal water resources. Even very low levels of nitrogen can generate explosive algae growth and deplete oxygen levels in water, leading to "dead zones" that are unsuitable for aquatic life

Onsite Wastewater Treatment Systems

George Loomis presented the next segment of the meeting. He presented a basic "OWTS 101" for task force members not as familiar as others with the workings of these systems. OWTSs have several components. In a conventional system, wastewater exits a structure through a sewage pipe and enters a septic tank. Here solids settle and there is some anaerobic decomposition, typically over a 2-day residence time in the tank. Liquid wastewater effluent then exits into a leach field where the effluent is dispersed and allowed to slowly seeps into the soil and into the groundwater This process relies on the unsaturated soil underlying the drainfield to treat wastewater through filtering and aerobic processes. It requires adequate vertical separation distance between the bottom of the drainfield and the groundwater table, as well as horizontal distance to wetlands and other surface waters to increase travel time before discharge to nearby wetlands and surface

waters.

In an advanced treatment system there is treatment unit between the septic tank and drainfield, which is usually designed to reduce nitrogen. Pressure-dosed drainfields are often used to distribute effluent more evenly throughout the drainfield rather than by gravity flow. In addition, these are generally shallow, placed in the upper soil to allow better pollutant removal by microbes and grass roots, and to increase separation distance from the water table. These drain fields can be in a variety of configurations, but the important fact to remember is that the longer it takes the wastewater to reach the local water table, the more time the wastewater has to potentially be treated. The composition and character of the surrounding soil is also a contributing factor to how much nitrogen and phosphorus can be removed from the wastewater during the aerobic phase before it reaches the water table.

Questions

The gentlemen paused their presentation to field several questions from task force members. Questions included subjects such as the levels of nitrogen removed by wastewater treatment systems (10-15% in tank, 50% in denitrifiying system), and what engineers do when soils around a system have become saturated. Members also discussed some of the topics Mr. Gold and Mr. Loomis had presented. The use of advanced treatment technologies, impacts of climate change, and Rhode Island wastewater treatment regulations were discussed as well.

Water Resources

Mr. Gold continued his presentation on what happens to wastewater after it leaves the OWTS drain fields. He started by sharing that water flows in the direction of least resistance. Rather than flowing downhill or towards a water resource, it will move through the soil in whichever direction provides the easiest flow. Hydrologists and developers cannot know how deep an aquifer is or in which direction it flows without digging a well to observe it, which is expensive. Urbanization and filling can also change the flow of the groundwater. He mentions that some people have begun using different substances and filters for phosphorus retention in order to prevent most of it from reaching the soil. When asked about the source of phosphorus in OTWS systems by Mr. Flynn, he shared that the main sources are fertilizers and human waste.

Beneath the soil's surface, groundwater eventually reaches a water body. If there is a sandy or gravelly layer of sand, water will move in that direction because it provides the path of least resistance. Buffers provide the necessary space for water to disperse and be treated by the soil. Mr. Gold finished his presentation by sharing his parting thoughts about buffers and buffer width. He believes there is no silver bullet distance that would prevent all forms of contamination and balance development concerns. He also noted that wetland buffers provide a measure of safety, reducing the risk of contamination while avoiding costly field investigations needed to establish a site-specific buffer distance. He then fielded several questions from task force members pertaining to water flow, OWTS, climate change, and treatment regulations.

Next Meeting

The next meeting is scheduled for February 27 at the same location. Next month's topic is the relationship between state and municipal regulations and friction points as they relate to wetlands management. Nancy Hess also stated that the materials from the meeting would be put onto the task force's webpage.

Adjourn: 10:00 AM

Legislative Task Force Meeting #6

Thursday, February 27, 2014

8:00 AM – 10:00 AM
Conference Room B, 2nd Floor
Department of Administration
One Capitol Hill, Providence, RI

Task Force members in attendance were: Jim Boyd (Coastal Resources Management Council), Joseph Casali (Civil Engineer Representative), Russell Chateauneuf (Civil Engineering Representative), Alicia Good (DEM Representative), Thomas D'Angelo (Builder's Trade Association), Gary Ezovski (Business Community Representative), Kevin Flynn (DOP-Associate Director), Lorraine Joubert (Environmental Entity), Thomas Kravitz (Municipal Representative – Burrillville), Tom Kutcher (Wetlands Biologist), Scott Moorehead (Business Community Representative), Eric Prive (Civil and Environmental Engineering Representative), Scott Rabideau (Business Community Representative), and Nancy Scarduzio (Office of Regulatory Reform).

The Division of Planning (DOP) and DEM also had several agency staff members present. From DEM, Carol Murphy and Ernie Panciera. Nancy Hess and Sean Henry were on hand from DOP.

Municipal Zoning Ordinance Matrix

Kevin Flynn started the meeting at 8:00 by introducing Sean Henry to discuss a tool he and others had created to help task force members understand wetlands regulation at the municipal level. Of the thirty-nine cities and towns that comprise the state, twenty-six of them have wetlands-related measures in their zoning ordinances. Generally, these ordinances fall into one of three categories: a setback from wetlands, a zoning overlay district that places additional requirements on the areas within it, or local onsite wastewater treatment systems (OWTS) standards. Members were provided with a hard copy of the matrix and Mr. Henry went through an example of each type of ordinance with the Task Force in order to demonstrate using the tool. He then addressed questions members had about the matrix. S. Rabideau noted that Narragansett's overlay district was not included.

Neighboring States' Regulatory Framework

The next speaker of the meeting was Carol Murphy of DEM Wetlands. She presented information on how neighboring states (Connecticut, Massachusetts, New Hampshire, Vermont, and Maine) regulate their wetlands. Members also posed questions and discussion throughout her presentation; however the basic regulatory regimes are as follows:

Connecticut:

The state regulates their wetlands under two laws: Inland Wetlands and Watercourse Act and the Tidal Wetlands Act. Freshwater wetlands are identified by their soil type, rather than vegetative surroundings. The laws do cover rivers and streams as well. The IWWA requires municipalities to establish inland wetlands agencies to implement the law, or delegate enforcement to an existing water commission. The CT DEP reviews state-level projects as well. The state also reviews (potential) structures within the tidal waters area, while municipalities review upland structures.

Massachusetts:

In Massachusetts, wetlands are all managed under 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 was revised in the 1990s to extend setbacks around rivers.

New Hampshire:

New Hampshire regulates wetlands under 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 NH DES; however the municipalities are kept involved throughout the approval processes and have the ability to identify “prime” wetlands for protection. The Shoreland Protection laws have tiered buffer systems depending on the adjacent water body.

Vermont:

Vermont's regulations are enforced under state statute as well. Vermont has two classes of wetlands, Class 1 and Class 2. Class 1 wetlands are considered "exemplary and irreplaceable" and receive a 100 foot buffer zone. Class 2 wetlands have a 50 foot buffer zone. All other wetlands have no buffer zone.

Maine:

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

Task force members then 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. E. Prive spoke on wetland regulation in Attleboro. Great interest was expressed by the Task Force in obtaining further details of the NH regulatory system. A concern voiced about local review is that the local conservation commissions and zoning boards of appeal consist of volunteers, some of whom are not educated on scientific or biological issues of wetlands. Members also discussed the basis for setback distances and levels of protection regarding wildlife habitat and floodwater storage. Summaries

of the current scientific literature on buffers will be presented to the Task Force in future meetings.

Discussion on Developing Case Studies for Identifying Friction Points

Mr. Casali and Mr. Ezovski presented an example of a project review timeline for two different projects to demonstrate the regulatory slow points from a client's perspective. Using different colors to show how much time is spent on production and how much is spent waiting for regulatory matters (appearances before planning/zoning boards, application periods, etc.), the timelines indicated that much of a project timeline is spent waiting for approvals from state and local agencies, although the scope of these periods was not limited solely to wetlands-relate issues. They also indicated that the length of the project timeline is also heavily dependent on which community the project is located in and their local regulations. Developers /land owners need predictability in reviews. It was re-discussed by the Task Force that their function was strictly concerned with the timelines /standards for local wetlands review not the entire timeline for development review in general. Members discussed how wetlands regulations could be restructured in order to alleviate some of these concerns.

Next Meeting

March had two dates reserved for meetings. The next meeting will be March 27th. S. Rabideau offered to develop for the next meeting a Narragansett resident's perspective of going through the wetlands regulation process for a residential (as opposed to commercial or industrial) project. Mike DeLuca, Narragansett Planner, will present the same examples from the municipal perspective. The Task Force agreed this would be a good topic for the next meeting.

Adjourn
10:00 AM

Legislative Task Force Meeting #7

Thursday, March 27, 2014

8:00 AM – 10:00 AM
Room 300, 3rd Floor
Department of Environmental Management
235 Promenade Street, Providence, RI

Task Force members in attendance were: James Boyd (Coastal Resources Management Council), Joseph Casali (Civil Engineer Representative), Russell Chateauneuf (Civil Engineering Representative), Alicia Good for Janet Coit (DEM Representative), Tim Stasiuanas (Builder's Trade Association), Gary Ezovski (Business Community Representative), Kevin Flynn (DOP-Associate Director), Lorraine Joubert (Environmental Entity), Thomas Kravitz (Municipal Representative – Burrillville), Tom Kutcher (Wetlands Biologist), Scott Moorehead (Business Community Representative), Eric Prive (Civil and Environmental Engineering Representative), Scott Rabideau (Business Community 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 Marty Wencek, Nancy Hess and Sean Henry were on hand from DOP.

Wetlands Regulation in Narragansett: Two Perspectives

Director Flynn began the meeting by introducing the meeting's presenters, Narragansett Community development Director, Mike DeLuca spoke first. Mr. DeLuca shared how Narragansett regulates their wetlands and several case studies to demonstrate the system in action. Narragansett had no local wetlands regulations until the 1980s. During the same time, the town hired consultants that recommended the use of 5 zoning overlays, 2 of which governed wetlands: The coastal and freshwater wetlands overlay district, and the coastal resources overlay district. The first overlay district includes wetlands themselves and a 150 foot buffer zone around them, or 100 feet in some areas, and has several prohibited uses. Special use permits can be obtained for projects within the buffers. Section 16 also permits certain smaller projects to be reviewed at the staff level.. Mr. DeLuca outlined the parameters by which a project would be required to appear before the Zoning Board of Appeals. He then answered questions asked by the task force before moving on to the case studies.

Mr. DeLuca brought 3 case studies of wetlands-related issues with properties to present to the task force some of the local issues of regulation. The first was a wetland bordering, irregularly shaped lot at the end of a road that owners wished to build a house onto. The main issue was the size of the house and its proximity to the wetland. After review, it was determined that the owners would be able to build by obtaining a variance, but they would have to make several adjustments to their plan,

including a small reduction in size, limiting the wetlands disturbance into the future, and extending the road.

The second case study is an 11,000 square foot lot that is 60% wetlands. The owners proposed to build a house with a deck on it and a gravel road leading to the property. The driveway would disturb the wetlands considerably. The construction of the house required variances to be given for dimensional setbacks, wetlands setbacks, relocation of the planned house, and elimination of the deck. Task force members then asked several questions and discussed some of the issues surrounding the properties and reviews.

The third case study involved an existing home on a wetland-bordering lot that the owners wished to demolish in order to rebuild a new house. This property was located in the coastal freshwater overlay district. This case provided an overview of the process of site plan approval that involves both the planning department and the Town's engineering department. He again fielded questions from the task force on the properties and review conducted.

The second half of the presentation was conducted by task force member, Scott Rabideau. He examined the same cases presented by Mr. DeLuca, but from the perspective of how much effort needs to be exerted on behalf of the property owner in order to comply with the Town's regulations and requirements. Most often, the property owner would need to consult with experts to submit an application or to present their case to a zoning board. This includes attorneys, environmental consultants, biologists, and others ($). For instance, in order to submit an application for alteration of a wetland, they must first map the wetland edge, which requires a land surveyor and a report submitted by a wetlands biologist. Mr. Rabideau estimated that this process would take about 18 hours of working time. In addition, presenting this application to the planning and zoning boards would also require hiring an attorney to present the application and ensure that all requirements are being met by the application. The biologist and other witnesses may have to testify before the boards would incur more costs for the property owner. In most cases, the greater the impact on the wetland, the more effort needs to be exerted by the property owner in order to seek approval from the Town. An application to significantly alter a wetland has a much higher standard than an insignificant alteration. It would require an evaluation of all the functions and values of the wetland, as well as any wetlands that are hydrologically connected to that wetland, wildlife values, and other more stringent measures. An engineer would be required to measure flood protection, water quality, soil and sedimentation controls, and other requirements. The task force members then asked questions and engaged in discussion.

Next Meeting

The next meeting is scheduled for April 17, 2014. The topics will include looking at the wetlands regulations of other New England states, as well as looking forward to the timeline for the rest of the year. Nancy Hess outlined the organization of a subgroup to do the Literature review and solicited the task force for any literature requests to be included in the literature review for the task force.

Adjourn
10:00 AM

Legislative Task Force Meeting #8

Thursday, April 17, 2014

8:00 AM – 10:00 AM
Room 300, 3rd Floor
Department of Environmental Management
235 Promenade Street, Providence, RI

Task Force members in attendance were: James Boyd (Coastal Resources Management Council), Joseph Casali (Civil Engineer Representative), Russell Chateauneuf (Civil Engineering Representative), Alicia Good for Janet Coit (DEM Representative), Tim Stasiuanas (Builder's Trade Association), Gary Ezovski (Business Community Representative), Kevin Flynn (DOP-Associate Director), Lorraine Joubert (Environmental Entity), Thomas Kravitz (Municipal Representative – Burrillville), Tom Kutcher (Wetlands Biologist), Scott Moorehead (Business Community Representative), Eric Prive (Civil and Environmental Engineering Representative), Scott Rabideau (Business Community Representative), and Nancy Scarduzio (Office of Regulatory Reform).

The Division of Planning (DOP) and DEM also had several agency staff members present. From DEM; Terry Grey, Brian Moore, Carol Murphy, Ernie Panciera, and Marty Wencek. Nancy Hess and Sean Henry were on hand from DOP.

Introduction

Kevin Flynn began the meeting at 8:00 with the announcement that the meeting notes from the previous meeting would be available as soon as possible. He then turned the meeting over to Carol Murphy, DEM, to continue outlining the regulatory landscape of neighboring New England states.

Other New England States Wetlands Protection

Connecticut

Carol Murphy has been continuing her research since first presenting about the other states at the February task force meeting. Her research has focused on Connecticut, Massachusetts, New Hampshire, and Vermont. She found out that the most common setback distance has been one hundred feet. Connecticut's wetlands protection is managed under two state laws: the Inland Wetlands and Watercourses Act and the Tidal Wetlands Protection Act. 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.

Massachusetts

Massachusetts defines both coastal and inland wetlands in one statute. 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. Task force members then discussed the mechanics of the different zones around wetlands and some of their terminology. 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. Mr. Ezovski asked about elevation and considering the vertical distance around wetlands resources.

New Hampshire

New Hampshire regulates wetlands in a similar fashion to Rhode Island. NH uses its fill and dredge act regulates freshwater and coastal wetlands. Municipalities participate in state review processes by identifying 'prime wetlands' that recognize the size, character, or other feature that provides that wetland with additional significance that affords such wetlands an additional one hundred foot buffer. The task force discussed the process the communities use to identify and vote on the prime wetlands, and the use of review areas and buffers.

Vermont

Wetlands are regulated in Vermont 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. Vermont's land use program (Act 250) may affect wetlands regulation, as other state statutes might as well.

OWTS Regulations

There was a second presentation at this meeting on the subject of OWTS-related regulations, presented by Ernie Panciera and Brian Moore of DEM. The two men explained how Rhode Island uses setbacks to manage septic systems across the state. The state requires there to be a 50 foot setback between septic systems and any watercourse. The term *watercourse* includes any body of water, including some that are not included in the RI wetlands definition. There is also a larger 200 foot setback from sensitive water resources- salt ponds, drinking water wells, and others. The two presenters also discussed regulation in other New England states, and the changes that DEM made to their septic rules in 2008. Task force members also posed several questions on these topics.

Next Meeting

The next meeting is scheduled for May 29, 2014. The next steps to consider include the results of a literature review on the best available science on wetlands setbacks and OWTS. Nancy Hess solicited the task force for any scientific or professional resources on those subjects, and then outlined the timeline for the remaining meetings of the task force.

Adjourn
10:00 AM

Legislative Task Force Meeting #9

Thursday, May 29, 2014

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

Task Force members in attendance were: James Boyd (Coastal Resources Management Council), Joseph Casali (Civil Engineer Representative), Russell Chateauneuf (Civil Engineering Representative), Janet Coit (DEM Director), Thomas D'Angelo and Tim Stasiuanas (Builder's Trade Association), Gary Ezovski (Business Community Representative), Kevin Flynn (DOP-Associate Director), Jane Weidman (Environmental Entity), Thomas Kravitz (Municipal Representative – Burrillville), Tom Kutcher (Wetlands Biologist), Douglas McLean (Municipal Representative - South Kingstown), Scott Moorehead (Business Community Representative), Eric Prive (Civil and Environmental Engineering Representative), and Nancy Scarduzio (Office of Regulatory Reform).

DOP and DEM also had several agency staff members present. From DEM; Brian Moore, Carol Murphy, Ernie Panciera, and Alicia Good. Nancy Hess and Sean Henry were present from DOP.

Introductions

The meeting began with corrections to the meeting notes of the April meeting. After which Kevin Flynn introduced Jane Weidman, Block Island and acting Charlestown Planning Director, representing Lorraine Joubert in her absence. Mr. Flynn also introduced Douglas McLean, representing Vin Murray, Planning Director of South Kingstown. He then introduced Nancy Hess, DOP, to inform the Task Force about the ongoing literature review by staff and Task Force volunteers.

Literature Review

Ms. Hess shared with the Task Force the literature review subgroup's efforts over the previous month and how they when about researching professional documents, academic, and peer-reviewed journals relevant to the Task Force responsibilities. The Subgroup consisted of; Task Force members, James Boyd, Russell Chateauneuf, Lorraine Joubert, Tom Kutcher, and Scott Rabideau and Carol Murphy, Dem and herself. The subgroup divided into two teams, one that would focus on wetlands-related setbacks and buffers, and the other would focus on the same issues as related to OWTS. Carol Murphy was the first group member to present her findings to the task force.

Ms. Murphy's research pertained to wetlands reports specific to Rhode Island and New England at large. She began with a summary of research previously presented to the task force, and reminded

the group about the terminology the state uses to define jurisdictional wetlands and the current setback requirements under state law. The literature reviewed by Carol was primarily related to water quality (both surface and groundwater) and habitats as they relate to the setback and buffer zones that surround wetlands. The first study ("Groffman") named several benefits that buffer zones provide to wetland-dependant wildlife species. In addition to breeding and nesting grounds, the benefits include functions such as dispersal corridors, sites for foraging, and areas to escape flooding. The authors were also about to provide a model for determining a recommended buffer width for the purposes of habitat needs. Task Force members also had questions about and discussed this study.

The second study was from 1991 and was commissioned by DEM. The emphasis was on using buffers for attenuation for storm waters. The authors also created a buffer model that includes variables for areas with high sensitivity, sloped areas, and/or high impact activities. The third study is from the Graduate School of Oceanography (GSO) at the University of Rhode Island. This study compiled minimum buffer sizes "to protect wetland wildlife habitat." It found that many studies determine buffer distances by determining species specific needs, and was able to describe "ideal buffers" for multiple uses.

The fourth document Carol Murphy studied was a recommendation study for DEM written in 1998 by herself and another author. This work was an attempt to develop a tiered buffer model that could be adopted by the state to regulate wetlands. The model was based on wetlands functions and values, and provided a simpler system than a case-by-case basis. The model used four tiers, which were determined by wetlands type (perennial watercourse, standing water, etc), surrounding habitat needs, and other factors. Task Force members discussed the tiered approach and its relation to other work done by DEM and CRMC.

Ms. Murphy presented three more documents as part of her review that were based on Rhode Island-specific data. Two were policy documents that were reviewed quickly, the third was a Low Impact Development (LID) guide created by the Horsley Witten Group for DEM and CRMC. The authors focused on two literature studies that were not limited to New England. The document includes a table based on those studies that outlines a range of recommendations for minimum buffer widths.

The last studies Carol presented were from the greater New England area. The first focused on habitat recommendations for the various freshwater dependent species in the area (Massachusetts was the subject of this study). The study examined how many species are dependent on wetlands, and then studied the ideal distances these species travel away from the wetland in order to make buffer distance recommendations. The second New England study was from 2002 and examined vernal pools and their relation to amphibians that breed within and around them. The study identified the distance that species will travel away from the pool, both in the mean and the maximum. The final study was performed by the Berkshire Regional Planning Commission. It is a resource for all things vegetated buffer, including functions and values, uses, and width recommendations.

After being presented with the literature review, Task Force members discussed buffer and setback models and variables such as uplands inclusion with habitat considerations. Habitat needs and flood attenuation were agreed to be the primary drivers of buffer distances. Members discussed the current floodplain regulations and how they affect development now, as well as levels of protection for

higher-priority wetlands vs. isolated wetlands, and the impact of grade and slope that could be included in determining the distances of setbacks and buffers. The concept of mapping the state's wetlands was mentioned as well, and that doing so should be plausible considering the size of the state and the resources available.

Next Meeting

The next meeting is scheduled for June 19, 2014 and will continue presenting the findings of the literature review. Topics will be wetlands literature regarding year 2000 plus report and general references for wetlands, and the area of OWTS impacts. Nancy Hess announced that the July meeting would have 2 guest speakers from the Chesapeake Bay to discuss their views and experiences from another region of the country. She asked Task Force members to think of and send her questions to prepare the speakers for the July meeting.

Adjourn
10:00 AM

Legislative Task Force Meeting #10

Thursday, June 19, 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), Tom Kutcher (Wetlands Biologist), Scott Moorehead (Business Community Representative), Eric Prive (Civil and Environmental Engineering Representative), and Nancy Scarduzio (Office of Regulatory Reform).

The DOP and DEM also had several staff members present, from DEM; Brian Moore, Carol Murphy, Ernie Panciera, and Alicia Good. Nancy Hess and Sean Henry were present from DOP.

Literature Review

Kevin Flynn opened the meeting at 8:00am. He noted that scheduled was a continuation of the literature review by the Literature Review Subgroup of the Task Force. Carol Murphy of Dem, as well as several task force members, would speak today on the subject.

Ms. Murphy continued her literature review on wetland buffers functions and values from the May meeting, and answering some of the questions task force members had asked from her previous presentation. After consulting with other DEM staff on the topic of wetlands buffers, it was confirmed that the buffers had value for flood attenuation, being able to slow and store flood waters when needed. With regards to wetland methodologies in other New England states, the New Hampshire Audubon Society attempted to incorporate a number of different factors into developing a predictable method of estimating appropriate buffers for a given wetland. They determined that the factors were too complex to calculate reliably when taken together, and recommended a standard buffer width of 100 feet that would satisfy environmental and development concerns equitably. In this capacity, 'buffer' means undisturbed vegetated area. Ms. Murphy continued with several additional general reference studies. Task force members commented on the importance of buffers for habitat and water quality concerns. The studies found that, when accounting for the various functions and values of wetlands and buffers, no specific, prescriptive distance could be determined that would ideally satisfy all the needs. It was generally conceded that the greater the size of the buffer areas, the better the wetland would function.

Nancy Hess then outlined a summary report for the State of Washington describing 3 potential tiered approaches to wetlands buffer regulations for the western part of the State. This followed up on a prior request from Task Force members about obtaining information on tiered wetland systems. The summary report recommendations for the desert ecology / environment of the eastern part of the State were not considered relevant to RI. The report provided three recommendations for tiered buffers. The first was for a system with a buffer width based on ranking the wetlands into one of four categories. The second was buffer widths set based upon wetland categories and the intensity of impacts from proposed land uses. The third was the most complex, with wetlands being ranked according to a point system, and buffers widths would be set based on the points, the wetland characteristics, and impacts of proposed land use activities. It was not determined which of the systems the State had adopted.

Tom Kutcher then provided the next presentation of literature review. Mr. Kutcher reviewed four reports pertaining to the functions and values and recommendations for wetlands buffers. The first two were planning guides for local officials, which outline the different types of buffers and setbacks that local officials can use. They also outline different distances that other source materials suggest, both in 'minimum' and 'ideal' forms. The next report was a summary update report from the State of Washington on the science behind wetland regulations. He stated that this task is more complex than we thought and this work stressed the importance of buffers for infiltration of surface waters, which is beneficial for both flood attenuation and water quality. Particles, pollutants, and other sediments are filtered out as flood waters slows down, therefore finer particles require more distance to filter out than larger, heavier sediments. The final report was a synthesis of the best available science from 2008 also by the State of Washington. All of the literature points to larger buffers being more beneficial for a variety of reasons.

Jim Boyd, CRMC, provided the next section of the literature review focusing on the value of wetland buffers. His report was a study from the Maryland DNR in 2010. The study assessed the effectiveness of vegetated buffers on tributaries of the Chesapeake Bay over a 5-year period. The lands in this area have significant agricultural uses, where pollutants are prevalent. The DNR found that nitrogen reductions were relatively significant, phosphorus was lessened, and it was noted that agriculture is a very nutrient-rich use. Task force members discussed the impact of agriculture on water quality, which is not as intense an industry in Rhode Island. Task force members then asked several questions about the program; how the buffers were planted and the State's role in it. Members commented on the differences in the base nitrogen levels for both states as well as soucres.

Russell Chateauneuf provided the final literature review presentation focusing on OWTS and water quality impacts. The first document was a meta-analysis of several studies and the effect of buffer width on nutrient and particle removal. He talked about how much buffer matter in the big picture for OWTS. It was determined that buffer width only accounted for a percentage of the removal of nutrients from waters but wider is generally better. Other variables, such as slope, soil chemistry, structure, and vegetation type also have a significant impact on the effectiveness of buffers at removing sediments and pollutants from waters. The next portion of his presentation was a synthesis of OWTS-related works. It deals primarily with setbacks and nutrient removal. It was found that setbacks are measured from the jurisdictional wetland, which could be the resource edge (depending on the type of resource) or from the 'jurisdictional wetland' edge, which includes a 50 setback. These distances are

required in order to lessen the OWTS system's impact on the water quality of any nearby sources, therefore public health is the driving force behind the regulations. Nutrients can impact wetlands in negative ways, damaging the wetland and its ecology, so site-specific reviews are best. These are required for OWTS of over 5,000 gallons per day. IN RI, nitrogen is the primary concern of OWTS regulations. Phosphorus removal is fairly effective at current distances.

Members then discussed OWTS findings and current regulations, including land use issues and loading factors, emerging and advanced technology impacts, and the concerns of cumulative impacts. J. Boyd mentioned how the CRMC SAMPs take into account watershed deposition and surface runoff. Discussion moved to how difficult it is to develop a viable model that takes all of these concerns into account and remains relatively simple and predictable. The numerous functions and values to protect make tiered systems complicated to design and use, even before the relative importance and sensitivity of individual resources are considered. Discussed turned to the differences between communities vs. the State and that local have wider buffer widths. There seems to be a need for greater buffer widths in general. The Task Force needs to recommend the best that they can.

Next Meeting

The next task force meeting is scheduled for July 17th. There will be guest speakers at the meeting from the Chesapeake Bay / Maryland area. Nancy Hess asked members if they did their homework to come up with specific questions for the speakers could address and provide insight on. Members were interested in the prior regulatory experiences of the speakers, how things function in MD state government, and how the State defines buffers. Also are there differences in jurisdictions like here in RI? Members then discussed areas where they could share their expertise and other topics before K.Flynn adjourned the meeting.

Adjourn
10:00 AM

FYI> for nonmetric people: 150 meters = 165 feet.

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 Meeting #12

Tuesday, September 16, 2014

8:00 AM – 10:00 AM
Rhode Island Department of Environmental Management
Room 300, 235 Promenade Street, Providence, RI

Task Force members in attendance: James Boyd (Coastal Resources Management Council), Joseph Casali (Civil Engineer Representative), Russell Chateauneuf (Civil Engineer Representative), Alicia Good (DEM), Thomas D'Angelo (Builder's Trade Association), Gary Ezovski (Business Community Representative), Kevin Flynn (DOP-Associate Director), Lorraine Joubert (Environmental Entity Representative), Thomas Kravitz (Municipal Representative–Burrillville), Tom Kutcher (Wetlands Biologist), Scott Moorehead (Business Community Representative), Doug McLean for Vincent Murray (Municipal Representative-S Kingstown) Eric Prive (Civil and Environmental Engineering Representative), Scott Rabideau (Business Community Representative), and Nancy Scarduzio (DOA-Office of Regulatory Reform).

Agency staff members present: from DOP; Sean Henry & Nancy Hess, from DEM; Brian Moore, Carol Murphy, and Ernie Panciera.

Mr. Flynn opened the meeting by requesting comments and or feedback on meeting notes for July 17, 2014. There was none. He introduced N.Hess who gave an overview of the Working Draft dated 9.12.14. She reviewed how the draft was created with the help of the working group. The same group which has been helping with agendas, meeting, topics, soliciting speakers and conducting the literature review.

The working draft is laid out into 4 parts; Part : Introduction, Part 2: Current Regulatory Framework in RI, Part 3:Today's Science as We Know It, and Part 4: Conclusion and Recommendations. The Introduction contains an issue statement, a description of the RI General Law that created the Task Force, a description on how the Task Force was assembled by the DOP, the scope of work agreed upon and the historical background of previous wetland task forces and committees in the State. Part 2 gives and overview of the existing RI General Laws, DEM Rules and Regulations, CRMC Rules and Regulations, a snapshot of what municipal ordinances with wetland and or OWTS buffers are in existence, and a summary of other New England laws on wetland / OWTS buffers. Part 3 details the scientific information which was presented to the Task Force either though technical presentations by guest and agency speakers or through the Literature Review. It will include a summary of key scientific findings which will be presented later in today's meeting. Finally the draft concludes with a conclusion / recommendation section which has yet to be written. This section is proposed to answer the legislative charge to ensure that standards are protective, to eliminate duplication of efforts, to clarify terminology and to ensure adequate funding for implementation. It will also include a section for those ideas from the parking lot related to wetlands and OWTS but were not necessarily buffer issues and too complex to address in the limited time frame of the group. General feedback from the Task Force was this was a good format for the report. N.Hess asked that any members who wished to send in comments /edits / typos, etc. please do so at any time via email.

The next item discussed was presentation of summaries of the key scientific findings for wetland buffers and OWTS buffers by C. Murphy & E. Panciera, both of DEM. C. Murphy went first and suggested key scientific findings for wetland buffers. She reminded the Task Force of the functions & values of wetlands which are:

- Flood protection
- Water quality protection
- Wildlife and habitat
- Surface water and groundwater quality
- Recreation and aesthetics.

Ms. Murphy used these functions and values to frame the key scientific findings suggested for the report. She stressed that the presentations and the literature said that that vegetated buffer zones adjacent to wetlands and surface waters are needed to protect the functions and values and to minimize effects of nearby land uses. Minimum buffer widths range depend upon what was the selected item studied, i.e., the wetland types, function, wildlife group and other factors. Buffer zones may moderate the effects of climate change and protect property. Buffer distances for water quality range depend upon what was the selected item studied but numerous studies recommended a minimum buffer width of 100 feet for water quality purposes. There may be situations where larger buffers are appropriate for:

- Drinking water reservoirs
- Tributaries to drinking water reservoirs
- Rare wetland types
- Wetlands that known to have rare plants or rarer animals
- Streams that support cold water fisheries
- Sensitive wetlands such as bogs, fens, Atlantic White Cedar Swamps, vernal pools and scenic rivers.

E. Panciera then outlined suggested key scientific findings for OTWS buffers. He reminded the Task Force that wastewater from an OWTS moves downward through the soil carrying pollutants into groundwater which can transport the pollutants to wetlands and waterbodies. OWTS are very situational and soil specific. Primary pollutants of concern from OWTSs are pathogens and nutrients. Pathogenic bacteria and viruses can cause human sickness from ingestion of contaminated drinking water, recreational contact or the consumption of contaminated shellfish. Nutrients such as Nitrogen (N) and Phosphorus (P) have a fertilizing effect on water quality providing nutrients that if present in sufficient quantities can fuel excess algae growth. Nitrogen has the most impact on salt waters, whereas phosphorus will impact freshwaters. Also of growing concern are algal blooms of cyanobacteria (blue-green algae) from excess nutrients in freshwater, which release toxins that are harmful to humans, pets and livestock.

Mr. Panciera further explained that the characteristics of the subsurface through which the groundwater flows will greatly influence the contamination risk and variability of buffers needed. 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. He reminded the Task Force that internationally renowned expert, Dr. Gold of URI, explained that characterizing subsurface flow requires extensive (and expensive) field work. The primary factor controlling removal of pathogens in the groundwater is filtration by the soil and time in aerobic soils to facilitate pathogen die off. OWTS derived nitrogen impacts are a more significant concern in RI than phosphorus impacts from OWTSs. Impacts from OWTS on water quality and wetlands are in most instances the result of cumulative loadings from many individual OWTSs. Increased separation distances between an OWTS and wetlands and waterbodies will allow for more opportunities for pollutant interactions in the soil and greater treatment potential.

K. Flynn then opened the meeting to discussion by asking if the working group has captured the key points for the group. Various points of concern were presented and discussed on the findings as presented concerning the wording of the findings. Details on the differences between N and P in RI soils and how they are mitigated were discussed. Using specific numbers vs. ranges were debated. Issues on sediment and stormwater management were discussed but generally the wider the buffer the more protection from sediment. Another issue was how the new Stormwater 2010 Manual provides other wetland protection beyond buffers but it was agreed that this would be placed in the parking lot of "other topics". There was also discussion on how the Section should summarize all the science not just the Literature Review. How detailed should it be? The Literature Review will be included in the report as an appendix and is available on the DOP website for the Task Force. All of the technical presentations are on the DOP website as well. It was agreed that this should be a sort, bulleted section; one page for wetland buffers and one page for OWTS buffers. Most likely people will not read the entire section but just these two critical pages.

Discussion of the key findings, forming recommendations and relevancy of what to say in the report took place. S. Rabideau pointed out that the audience for the report has to be kept in mind when forming recommendations; the General Assembly and the Governor. It is most likely that staff for each will read the report

and summarize it for them. Staff will look for the science behind the recommendations and also what other New England states are doing. G. Ezovski concurred and it is hard to just "pick a number" and suggested instead a "broad number" and be careful on how we characterize the existing protection. E. Prive thought that for OWTS the current regulations have many factors of safety built into them, the towns standards vary, and the setbacks standards should stay with the State.

Task Force Member, Lorraine Joubert, expressed concerns on an article from the RI Builders Association concerning the presentations from the Maryland consultants on OWTS & Biomats at the July meeting of the Task Force. She asked if the Task Force would consider a respectful request to the editor to clarify certain points about Biomats. It was agreed to discuss this item again at the next meeting.

The meeting concluded with a review of the next steps by N.Hess. She assigned a homework task for Members for the next meeting on September 26, 2014. The homework consisted of two parts. The first was to identify adequacies and or gaps in existing state protection (buffers) which need to be addressed. The second was to quantify what buffers are needed to fill the gaps. Additionally, she asked again that any members with comments and or edits on the working draft to please email them to her.

Adjourn

10:00 AM

Legislative Task Force Meeting #13

Friday, September 26, 2014

8:00 AM – 10:00 AM
Rhode Island Department of Environmental Management
Room 300, 235 Promenade Street, Providence, RI

Task Force members in attendance: Jeff Willis for James Boyd (Coastal Resources Management Council), Joseph Casali (Civil Engineer Representative), Russell Chateauneuf (Civil Engineer Representative), Janet Coit (DEM), Thomas D'Angelo (Builder's Trade Association), Gary Ezovski (Business Community Representative), Kevin Flynn (DOP-Associate Director), Lorraine Joubert (Environmental Entity Representative), Thomas Kravitz (Municipal Representative–Burrillville), Tom Kutcher (Wetlands Biologist), Scott Moorehead (Business Community Representative), Doug McLean for Vincent Murray (Municipal Representative-S Kingstown) Eric Prive (Civil and Environmental Engineering Representative), Scott Rabideau (Business Community Representative), and Nancy Scarduzio (DOA-Office of Regulatory Reform).

Agency staff members present: from DOP; Nancy Hess, from DEM; Brian Moore, Carol Murphy, Ernie Panciera, Charles Horbert, and Marty Wencek.

Mr. Flynn opened the meeting with discussion of the *RI Builder Report* Sept. newsletter, specifically the article on the 7/17/14 meeting of the Task Force. L Joubert will be writing an article for the newsletter on Biomats at a later date. It was agreed no further discussion or action was needed by the Task Force.

Mr. Flynn introduced a presentation on a statewide E-Permitting project which was brought to his attention by Task Force Member, N. Scarduzio. There were two guest speakers from the Department of Administration (DOA), Office of Management & Budget (OMB), Derrick Pelletier and Patrick Marr. They gave a status report on implementing a program to standardize statewide permits for the RI Building Commissioner, the State Fire Marshal offices and 10 pilot communities. The project goals are to modernize; building plans, permit management, and building inspections through e-permitting. OMB has been working since 2013 with the Office of Digital Excellence. They have gone out to bid and final award is eminent. In 2014, the selected consultant will work with the pilot communities. Launch is scheduled for 2015. Discussion ensued about the project. J. Coit mentioned the EPA E- Enterprise project her agency was working on and a desire to coordinate. Terry Grey is in charge of that. The discussion ended with concerns that ongoing financing will be needed to support the long term implementation.

The next item discussed was review of the homework assignment on identifying adequate protection and gaps. Members were to identify what gaps existed in the current system and what adequate protection should be moving forward. N.Hess distributed 2 charts with the various protections existing for wetlands and OWSTs. The 1st chart showed what the current state buffers are by wetland type. The 2nd showed the current state buffers for OWTS. On each chart there was also the municipal range for additional protections for that feature, what the state NE averages are for the features, a column for the members to make an individual recommendation and a final column for a consensus recommendation. K.Flynn suggested taking 10 minutes to work on and then discuss where the group falls with proposed numbers and begin the process in coming up with recommendations.

S.Moorehead offered an alternative approach for the Task Force to consider. The registered engineers on the Task Force grouped together to propose that rather than trying to set individual buffers for individual resources that legislation should establish jurisdictional zones and let the agencies set the buffers through rule making. This would be easier, need fewer details and much simpler for the Legislature, DEM and CRMC. K.Flynn asked how a municipality with a standard higher than DEM's would feel about the idea. Where would the process end up compared to what they have now?

S. Moorehead further outlined the proposal; that the proposed jurisdictional zones should be established from the current regulated wetlands and DEM would set the buffers within the zones by rule making. This is modeled on the CRMC system. Municipal regulations would be given a sunset date. Municipalities would be allowed to petition DEM for additional protection within the rule making for identified resources much like the critical resources areas that exist now.

Much debate took place on the proposal. Members discussed that merits and drawbacks of a proposed system where DEM would make all permit decisions not local zoning boards. The intent is science-based, clear, predictable and reliable decisions. The expertise at the state agency would make the permit decisions including any special provisions the municipalities can ask for through rule making. Collectively decisions could be standardized by watersheds which cross municipal lines which does not occur now. The permits would be based on environmental standards not zoning standards and truly about the functions and values of wetlands.

T. Kravitz described Burrillville's Zoning Section 30-153, *Lots Containing Wetlands*, setback provision of 200 feet. Upon researching variance applications, Tom located 15 petitions since 2006 that were all granted except for one which was overturned in Superior Court. The average relief granted was 140 feet yielding an average setback of 60 feet. A commonality to all applications was that they were legal non-conforming lots in most cases. The only difference is that Zoning Boards would not review wetland decisions for these types of applications.

Discussion centered on whether local applications actually provide more environmental protection or just required the applicants to go through more review and expenses. Being able to petition DEM for the enhanced protection should give the municipalities what they are looking for in a clear, straightforward way. K. Flynn asked what should the jurisdictional limits should be? G. Ezovski proposed:

- 200 feet from stream and drinking water supply areas
- 100 feet from all other wetlands including vernal pools
- All other setbacks stay as is but are promulgated by DEM within jurisdictional area

Various points of views were presented and discussed concerning this proposal and the suggested numbers. Members generally agreed that the current OWTS setbacks are protective enough with additional critical resource areas that should be added. Addressing how other impacts would be addressed was raised. Jamestown needing to address localized flooding problems was cited as an example. Items required locally and not by DEM typically are; limiting impervious coverage, prohibiting basements, prohibiting excessive filling and grading, and higher level stormwater controls. It is very rare for a Zoning Board to deny these applications but the additional standards are met by the applicants are set as conditions of approval.

Since most wetland applications are insignificant alterations which the towns do not see, how will Towns comment or give input to specific permits? Where in the process would Towns like to weigh in? Ideas for soliciting municipal input considered were; notification of permits to town staff, identifying permit thresholds that would be appropriate for notices, consideration of abutter notifications, incorporating all of the additional local standards into the State regulations, and the ability to recommend conditions for the lot as a whole. Towns would have 2 ways of interacting; one would be to get a notice of applications and make comments and the other would be to recommend to DEM the specific areas they want enhanced protection for. It was agreed it is mandatory to include the towns in rulemaking in some way as it is not realistic to leave them out entirely.

The local zoning ordinance could still require other mitigation requirements but just not wetland setbacks and buffers. Examples of communities with greater drainage standards than DEM were cited (SK and Jamestown). None of these zoning requirements would go away. DEM will address only the functions and values of wetlands and ensure that the same resources get the same protection on a watershed based system not municipal boundaries. Zoning can still do all the other items for zoning purposes. Better BMPs for these items should also be included in DEM's regulations by the rule making process.

The size of the proposed jurisdictional areas was discussed and debated. Should it be 200 or 300 feet? Could critical resources areas be made part of the jurisdictional area by petition? Example was treating the Scituate Reservoir like the Salt Pond watersheds in the CRMC SAMPs. The intent is watershed based and uniform resource based protection standards. Don't ask the Legislature to set specific buffer numbers but let the agencies do through rule making. Legislation should say only that DEM/CRMC has to set standards but the standards are not considered the minimum and through rulemaking can adjust standards for the best protection necessary. Consideration of the time needed to do the necessary rule making should be included in recommendations. Also the legislation to be proposed should state that the municipalities are required to be consulted in the rule making process.

Discussion of recommendations and relevancy of what to say in the report took place. A big topic was what to say about vernal pools and the current lack of protection for these resources. It was agreed that vernal pools should be added to the resources to be protected. DEM should set buffers through rule making for vernal pools. All agreed that a summary of the science that was preformed should be included. It was pointed out that both the literature review and the summary of key scientific findings would be included based on the 9.12.14 working draft. Members felt it would also be important to acknowledge that creating this new system may create more work for DEM. An acknowledgement that additional resources would be needed to implement the new system. It was suggested that there be a page of suggestions for the new agency rules to consider.

There seemed to be a preliminary consensus that the proposal by the engineers would be a good solution, would answer the charge to the Task Force, and simplify some very complex issues for the General Assembly to address. There would need to be 2 changes; a statutory revision and then regulatory revisions. There should also be a recommendation of more support for DEM in both staff and financial resources to implement the new system. There was overall agreement that there was good progress today on recommendations.

The meeting concluded with a review of the general time line by N.Hess. The final report is due on December 31, 2014. N.Hess will continue to work with the Working Group to write up the ideas discussed today. The next meeting is scheduled for October 31, 2014. The topic will be continued review of the working draft report regarding the recommendations and other homework ideas that were discussed today. Ms. Hess asked Task Force members to email their homework to her and she will post the ideas to the website. She also asked for Members to email her any edits to the working draft.

Adjourn

10:00 AM

Legislative Task Force Meeting #14

Friday, October 31, 2014

8:00 AM – 10:00 AM
Rhode Island Department of Environmental Management
Room 280, 235 Promenade Street, Providence, RI

Task Force members in attendance: James Boyd (Coastal Resources Management Council), Joseph Casali (Civil Engineer Representative), Russell Chateauneuf (Civil Engineer Representative), Janet Coit (DEM), Thomas D'Angelo (Builder's Trade Association), Gary Ezovski (Business Community Representative), Kevin Flynn (DOP-Associate Director), Lorraine Joubert (Environmental Entity Representative), Thomas Kravitz (Municipal Representative–Burrillville), Tom Kutcher (Wetlands Biologist), Scott Moorehead (Business Community Representative), Doug McLean for Vincent Murray (Municipal Representative-S Kingstown) Eric Prive (Civil and Environmental Engineering Representative), Scott Rabideau (Business Community Representative), and Nancy Scarduzio (DOA-Office of Regulatory Reform).

Agency staff members present: from DOP; Nancy Hess, from DEM; Sue Kiernan, Carol Murphy, Ernie Panciera, and Marty Wencek.

Comments on Meeting Notes: K. Flynn called for any changes, addition or notations to the September meeting notes. For September 16, 2014 – Page 2,1st paragraph delete the sentence "Buffers that are larger than 50 feet are likely necessary" and page 2, 2nd to last paragraph change the word verses to vs. For September 26, 2014 there were no comments.

Mr. Flynn opened the meeting with review by N.Hess of the additions to the working draft resulting from the last meeting. Ms. Hess outlined 2 new factual pages for Part 2 consisting of a new chart condensing the table of municipal ordinances previously sent to the Task force. The factual additions to Part 3: Today's Science, were 3 pages of the key scientific findings for wetland and OWTS buffers. Also added was a new Appendix F: Other Topics, for those ideas related to wetlands or OWTS that were not specifically setbacks. The Working / Writing Group decided to separate these items from the recommendations so there wouldn't be confusion as to what the actual recommendations were.

Next Ms. Hess gave an overview of the new text for Part 4: Conclusions /Recommendations. This new section was produced by the Working / Writing Group after the Sept. 26th meeting and is intended to summarize the proposal and concepts discussed at that meeting. The Section starts by explaining the charge to the Task Force and the items Task Force specifically examined; that buffers are protective, eliminating duplication of permits, clarifying terminology, and ensuring adequate funding for implementation of the recommendation. Page 1 is the introduction and summary of the legislative charge. Page 2 is the findings of the Task Force including the assessment of gaps and what those gaps are. The findings indicate that;

- there are gaps in the 1971 Wetlands act as amended
- science shows water quality could be significantly improved if a 100 foot buffer could be maintained
- existing regulations may be inadequate to protect small wetlands (vernal pools)
- the OWTS setback standards are sufficiently protective of the State's water resources
- there needs to be consistency between the state agencies and the municipalities to promote better protection for wetlands and a clear, and predictable regulatory system
- science indicates there is justification for larger buffers and rational for the local ordinances
- municipalities generally lack expertise that is available within the state of the State wetlands regulatory programs
- to eliminate duplicate reviews the State authority should be expanded in law and agency rules to increase state jurisdictional area
- the value of local input and a role in the state permitting process needs to be examined.

Page 3 presents the recommendations based on the assessment and identification of gaps and the findings. The recommendations fall under the headings of statutory changes and regulatory changes and funding. Ms. Hess pointed out 2 highlighted items for discussion points today as there did not seem to be consensus on those items at the last meeting. These were; 1) should the jurisdiction area be 200 or 300 feet and 2) should DEM in certain circumstances (such as critical resource areas) be allowed to declare the entire jurisdictional area a vegetated buffer?

Discussion that was free-wheeling took place on the findings and recommendations. The first item discussed was clarifying terminology. G. Ezovski said that confusion over use of the words "buffer" and "setbacks" interchangeably continues to occur. The report should establish what they should be to avoid confusion. A buffer zone is a naturally protected area. A setback is the distance between the wetland and land disturbance/ construction. A glossary of terms is intended to be included in the report. It was also suggested by N. Scarduzio that the terms also be put right up front for clarity.

The next item discussed was revising the wetland regulations and the adequacy of OWTS setbacks. Discussion ensued about current procedures and the order of reviews with agencies, between towns and the state, and the finding that OWTS regulations are felt to be sufficiently protective. A question was raised that if wetland buffers are increased to 100 feet do the OWTS setbacks need to change too? OWTS regulations are generally sufficient in terms of horizontal setbacks but if the wetland buffers are increased then should the OTWS setbacks be increased to be consistent with them? Currently wetland approvals are required first before one can get an OWTS permit. If buffers are to remain undisturbed then the OTWS will have to observe that requirement otherwise an OWTS variance would be needed. An OTWS in a CRMC application must be outside of the setback and the buffer. Much debate took place on the question but generally members agreed that the more inclusive language in complying with a wetlands permit first rather than changing numbers in the OWTS regulations would provide adequate protection and help with permit streamlining. The current system works very well in ensuring that the wetland and OWTS applications are coordinated. To implement the recommendations a good amount of time will be necessary to revise the regulations accordingly.

Much debate took place next on whether the recommended jurisdictional area should be 200 or 300 feet. Members discussed that merits and drawbacks of the differences between the numbers, how critical resources areas should be protected and if there should be provisions for existing lots of record. Various points of views were presented and discussed concerning the suggested numbers. Increasing the jurisdictional area will standardize protection and allow a clear predicable system. The myriad of town setbacks will go away and the towns would be able to petition DEM for increased protection based upon critical resources. The size of the proposed jurisdictional areas was discussed and debated. The consensus was as follows:

- 200 feet from all streams regardless of size and drinking water supply areas and possible 300 for critical resources, and
- 100 feet from all other vegetative wetlands and standing water bodies including vernal pools.

Next discussion on adequate funding and staff resources for handling the increased permits under the new areas, along with ensuring the Towns the opportunity for review took place. It seems very clear that the number of applications and workload for DEM will increase with the recommendation. As discussed at the last meeting, most (90% +/-) wetland applications are insignificant alterations which the towns do not see, how will Towns comment or give input on more permits? How will things be clear and predictable as it is not likely that additional money or staff will be granted to DEM? Members debated on a provision to allow the towns to comment within a defined time period that does not slow down the review process does not seem unreasonable. The decision would still be by DEM and the tradeoff is the elimination of the need for redundant permits from the Towns. For some communities the removal of an authority which they have held for a long time will be problematic if no other option is offered. This could be very problematic at the Legislature for approval of a new system. Municipalities may be comfortable if it was shown more protection is provided by DEM and they have input. Various methodologies were discussed for notice. But the "how to do it" was beyond the ability of the Task Force to decide at this meeting and should be defined in new rules.

Other discussion was that amendments to the wetlands statue on notice and allowing such and consideration of the time needed to do the necessary rule making should be included. Everyone was in agreement of continuing public notice for significant applications. There was agreement that the legislation to be proposed should include that municipalities are required to be consulted in the rule making process and a role for their input on permit reviews should be defined in new rules. Much debate took place on what type of application would be a threshold to trigger notice to the Town for review? Is there another category for notice besides insignificant or significant alterations? Another idea was making provisions for existing lots of record under the new jurisdictional areas. Much of the remaining discussion touched on items for rulemaking to implement a clear, new system rather than recommendations for the report.

Finally discussion concluded with the end point of the recommendations (report) which will be the General Assembly. S. Rabideau mentioned that most legislation does not get approval. The Task Force should put forth a report and subsequently DEM's legislation that meets current science and reflects a consensus between the environmental, local and building communities. Again it was repeated that time will be needed to develop new regulations.

The meeting concluded with a request for comments by N.Hess. She will send members the Word version of Part 4 and asked that comments be returned in the Track changes format. Also there will be an informational session that DOP will hold on Nov 19th for all municipal planners to inform them of the progress to date of the Task Force and solicit feedback on the recommendations. Members will be invited to the session. The next meeting will be November 18th.

Adjourn

10:00 AM

Legislative Task Force Meeting #15

Tuesday, November 18, 2014

8:00 AM – 10:00 AM
Department of Environmental Management
235 Promenade St, Providence, RI

Task Force members in attendance: James Boyd (Coastal Resources Management Council), Russell Chateauneuf (Civil Engineer Representative), Janet Coit (DEM), Thomas D'Angelo (Builder's Trade Association), Gary Ezovski (Business Community Representative), Kevin Flynn (DOP-Associate Director), Lorraine Joubert (Environmental Entity Representative), Tom Kutcher (Wetlands Biologist), Scott Moorehead (Business Community Representative), Doug McLean for Vincent Murray (Municipal Representative-S Kingstown) Eric Prive (Civil and Environmental Engineering Representative), and Nancy Scarduzio (DOA-Office of Regulatory Reform).

Agency staff members present: from DOP; Sean Henry and Nancy Hess, from DEM; Sue Kiernan, Carol Murphy, Ernie Panciera, Brian Moore, and Marty Wencek.

Comments on Meeting Notes: K. Flynn called for any changes, addition or notations to the October 31, 2014 meeting notes. There were none.

Discussion of Task Force Comments:

K. Flynn began the meeting with addressing the letter from the RI Builder's Association (attached). He then handed off the reins to N. Hess to go over the draft final report. She updated the Task Force on the comments received from the group, the additional information being added, and the remaining discussion points. N. Hess reviewed the 5 new pages dated 11.18.14 for Part 4 consisting of a synthesis of the last meeting and comments from the Task Force. Comments were submitted by members; Vin Murray, Tom Kravitz, and Nancy Scarduzio. She gave an overview of the revised text for Part 4: Conclusions /Recommendations. A highlight was given to 3 discussion points raised by the comments.

Discussion took place on the 3 points. The first point discussed was the definition for the word setback. All agreed that the definitions should address. The second point discussed was how long shall the time period be to the sunset date for current rules and ordinances. Everyone agreed that one year from the final enactment of the amended law to phase out current law would be adequate. J. Boyd made the point that it should be as specific as possible. There was some doubt expressed over which would happen first- new legislation or changes to DEM's regulations. The third discussion point was whether a municipal notification requirement should be included in the Law or in regulations? R. Chateauneuf suggested that it should be required in the Law, but left to the regulations as to how it will be applied to provide flexibility. That way, the Statute does not restrict DEM in instances where there is minimal impact. Consensus was it should be in the Law but how it will be done should be within the Regulations to implement without causing delay and additional notification expenses. The example of the RI Cesspool Phase Out act was used. A requirement and time was set for DEM to act on in the Law but how is handled administratively by DEM.

T. Kutcher offered his draft analysis of implications of the proposed scenario to the current law that would result (attached). It contained new wetlands definitions along with definitions for special aquatic sites and vernal pools, which the current law omits. His analysis spurred much discussion by the Task Force on the jurisdictional areas enforced by DEM and buffers. Based on discussion of these ideas, **members agreed again that it was important that municipalities should have a role in the new process where all wetlands setback regulations would remain at the State level.** The input of the municipalities on their local resources could

inform the State for better and more consistent protection of similar resources across the State.

Another issue of discussion was whether or not to recommend specific numbers for setback distances to be included in the proposed legislation. There was concern that regulatory changes could be seen as a "power grab". Most members agreed that the distances should be included in Regulations in order to provide flexibility based on science. It would also prevent arbitrary changes in the Legislature based on non-science matters or misunderstanding of the complexity of the issue. S. Moorehead voiced the concern that the Legislature could choose not to follow the recommendations of the Task Force and change the numbers. J. Coit summed up the changes as an increase in State (DEM or CRMC) jurisdiction for better protection. Regulation would be only at the State level but providing a balance because there will no longer be the need for review at the municipal level for additional protection.

J. Coit asked if there was a consensus with the recommendations after looking at all the science and that DEM/CRMC will set buffers based on science as appropriate through regulations within the jurisdictional areas to protect wetland resources. K. Flynn called for a show of hands for consensus to reflect agreement on the recommendations. The show of hands was to determine if there was consensus on the core recommendations to:

- establish a jurisdictional area of 200 feet from all rivers and streams regardless of size and from drinking water supply reservoirs
- establish a jurisdictional area of 100 feet from all vegetative wetlands and standing bodies of water, and
- establish a provision to enable petition by local communities for the identification of “Critical Resource Areas” and a jurisdictional area of up to 300 feet that may need added protection.

The result showed the majority supported the recommendations, with only 1 out of 15 members dissenting. The dissenting member was T. D'Angelo as RIBA did not agree with the 300 foot for critical areas as critical areas already have their own protection. There was discussion of the dissention and S. Moorehead suggested that there be a definition of critical resource areas included in the report.

There was also discussion on Page 4 of Part 4 concerning “areas subject to storm flow” that was added by comment. There was agreement to delete the “areas subject to storm flow” because they do not have wetland vegetation in them. They do receive review under the current regulations.

There was more discussion of impacts to the existing Wetlands Act and the charge set forth by the Law. The charge is to the Division of Planning in consultation with the Task Force to submit then report. Subsequently, legislation is to be developed by DEM and the Office of Regulatory Reform (ORR). Concern was expressed on keeping the protection of the existing act. J. Coit advised that there most likely be amendments to the Wetlands Act not a rewrite and further advised that will be a new Governor and new head of the ORR that will review the work of the Task Force. J. Boyd suggested that the report should contain the specific statutory changes agreed to and a short outline of the proposed regulatory changes envisioned. N. Hess reminded the Task Force that the report is due in 42 days, all of which will be needed to complete the report. Much debate took place on the suggestion but the reality is limited time will prevent execution of the suggestion.

The final matter brought up before the Task force was one of the topics presented by the RIBA letter. The matter discussed briefly was how changes would impact existing lots of record. It is much more difficult to minimize impacts and protect wetlands on existing lots than when carving up larger parcels. R. Chateauneuf suggested that there should be a different process for existing lots than subdivisions but pointed out how difficult a task that would be. G. Ezovski agreed out that the matter is complex and there are thousands of existing lots all over the State that need a flexible not rigid system. There was recognition along the way that there would be increases in jurisdiction in order to provide protection and the proposal is a chance to make things clearer and more predictable. The topic and letter will be included in the Appendix of Other Topics and can be taken up by CRMC/DEM at a later date.

Afterwards, N. Hess outlined the remaining schedule for completing the final report by December 31st and how members could provide additional input electronically before it is finalized. The Division of Planning is charged with writing and delivering the final report to the Governor, Senate President, and Speaker of the House. The following schedule was set:

- Nancy will circulate the word files for the report to members later today
- Members should send comments back in track changes format by Friday Dec 5th
- Nancy will make revisions and recirculate to members by Fri Dec 12th
- Last comments by members are due by Fri Dec 19th
- Revised and final report will be completed and forwarded by Wed Dec 31st
- Next steps after that are DEM and the ORR will write legislation by Jan 31st

Also N. Hess advised that there will be an informational session on Nov 19th for municipal planners by DOP to inform them of the progress to date of the Task Force and solicit feedback on the proposed recommendations. Members will be invited to the session.

To conclude, K. Flynn closed the meeting by thanking the Task Force members and agency staff for their participation and hard work over the past year. Completing this task would not have been possible without the variety of voices that came to the table to work on this. J. Coit thanked her staff especially, Carol Murphy, for all their work on the project. Task Force members complimented N. Hess who put in hours and hours to make the meetings so organized and productive.

Adjourn: 10:00 AM

Legislative Task Force Supplement: Municipal Planners Meeting

Wednesday, November 19, 2014

12:30 AM – 2:30 PM
Conference Room A
Department of Administration
One Capitol Hill, Providence, RI

Local officials in attendance: Michael Turco (Westerly), Jim Lamphere (Hopkinton), Justin Jobin (Jamestown), Lisa Bryer (Jamestown), Mike Steers (Little Compton), Rich Blodgett (Providence Water Supply Board), Jane Weidman (Block Island/Charlestown), Ron Wolanski (Middletown).

Task force members also in attendance: Joseph Casali, Gary Ezovski, Nancy Scarduzio, Thomas Kutcher, and Russ Chateauneuf.

Agency staff members present: Carol Murphy (DEM), Nancy Hess and Sean Henry (DOP)

As a benefit to municipal officials, Nancy Hess invited local planning officials to an informational session at the Department of Administration to provide an overview of the work the Task Force has done in the past year. The goal was to relate how the municipalities' wetlands regulations would be impacted with proposed revisions to the State's wetlands law and new DEM regulations.

She began the meeting with a background of the Task Force legislative charge and the activities it engaged in over the past year: the science and the "Wetlands 101" presentations, municipal regulation and zoning efforts, the representative case studies, the findings of the literature review, and selections from the current working draft of the report. Nancy also presented the key scientific findings of the Task Force: wetlands functions and values, literature review materials, science-based buffer recommendations, water quality impacts from OWTS, and other findings. Based off of these findings, the Task Force came to a consensus on several statutory and regulatory changes to the current system of regulation. The four primary themes of the report are:

1. Buffers must be protective
2. Buffer sizes and permits should be uniform
3. Terminology needs clarification
4. Regulators need adequate funding to be successful

The core recommendations are to:

- establish a jurisdictional area of 200 feet from all rivers and streams regardless of size and from drinking water supply reservoirs
- establish a jurisdictional area of 100 feet from all vegetative wetlands and standing bodies of water, and
- establish a provision to enable petition by local communities for the identification of “Critical Resource Areas” and a jurisdictional area of up to 300 feet that may need added protection.

After the presentation, Nancy answered questions from the local officials. Some of the topics included:

- What about towns with no public water supplies?
- When will current laws sunset?
- How will Critical Resource Areas be defined and status obtained?
- Is there a comment period for the LTF report?
- Will the setback distance numbers be directly in the legislation?
- Can DEM prevent towns from abusing CRA's?
- What if DEM doesn't have the resources it needs to regulate effectively?
- What about existing lots of record?
- Will there be local involvement with DEM during the rulemaking process?

The last question garnered the most discussion. After reviewing and debating, most of the planners expressed satisfaction that as long as there was a procedure to recognize local concerns they would be happy to let DEM make all the decisions on wetland and OWTS setbacks. If fact there was recognition that few municipalities have the scientific personnel to make the same findings as DEM.

Appendix C: Matrix of Municipal Ordinances

Community	Ordinance type	Setback From	Applicability (type of use/ activity)	Location Applied	Type of Wetland	Setback Distance (ft)	Prohibited Uses (within buffer)	Exemptions	Development Standards	OWTS design	Application Procedure	Adm Review	Application requirements	Source	Date Accessed
Barrington	Zoning 185-22 Setback from wetlands and waterbodies	Building, structure or sign		Townwide	wetland, waterbody, stream	100		piers, etc in Waterfront Business District						Code of Ordinances, Chapter 185. Zoning, Article VII. Supplementary Regulations, Sec. 22. Setback from wetlands and water bodies. www.generalcode.com	10/23/2013
					flowing water > 10 ft wide	200									
	Zoning 185-169 Wetland Overlay District	Land Disturbance	New / re construction, expansion of buildings or new / modified uses of property	Townwide	Coastal and freshwater wetlands > 1/2 acre	100	Discharge of pollutants, haz mat storage, solid waste or debris, thermal pollutant discharge	ZB may exempt construction that is no closer than existing construction if ZB finds no significant env impact.	yes		Special use permit w/ Conserv.Comm rec to ZB			Code of Ordinances, Chapter 185. Zoning, Article XXV. Wetlands Overlay District, Sec. 185-174. Developmental Standards. www.generalcode.com	10/23/2013
Bristol	Ordinance Article IV. Hazardous Waste Management Facilities	Hazardous waste management facilities and related pavement and disturbance		Townwide	Fresh water wetlands, steep slopes≥ 15% percent, other water-related environmentally sensitive areas.	1,000 ft								Code of Ordinances >> Part IV - Chapter 13 - Health and Sanitation, Article IV. Hazardous Waste Management Facilities >> www.municode. com	11/4/2013
	Zoning Sec. 28-146. Setback of individual sewage disposal facilities	OWTS	OWTS shall comply with DEM and CRMC regulations	Townwide										Code of Ordinances >> Part IV -Chapter 28 - Zoning >> Article V. Supplementary Regulations Sec. 28-146 >> www.municode.com	11/12/2013
Burrillville	Zoning. Sec. 153. Lots containing wetlands Setback	OWTS	Any lot with > 40% wetland area, including buffer	Townwide	Within 200 horizontal feet of a "fresh water wetland" or "river" as defined in RIGL	200			Only single family housing allowed in residential zones. Comm & Mfg. must be sewered. Min lot buildable area 12,000 sf excluding wetland and jurisdictional areas.					Code of Ordinances, Chapter 30. Zoning, Article V. Special Regulations, Sec. 153. Lots containing wetlands >> www.municode.com	7/30/2007
	Zoning Sec. 30-202 Aquifer Zoning			Townwide						Maximum wastewater flow (gpd) for non-residential development based on lot size.				Code of Ordinances >> Part II - Revised Gernal Ordinances Chapter 30 - Zoning. Article VI. Special regulations >>www.municode.com	2/12/2014
Charlestown	Zoning Sec. 78. Water Bodies setback	OWTS		Townwide	Freshwater or coastal wetlands as defined in RIGL. river /intermittent stream < 10 ft wide.	100		Repair or alteration of an existing OWTS			Special use permit			Code of Ordinances Chapter 218. Zoning. Article XII. Development Standards, Sec. 78. Water Bodies. www.generalcode.com	2/21/2014
					River ≥ 10 ft. wide	200									
					floodplain -A or V zone										
Coventry	Setbacks	OWTS		townwide	Freshwater wetland, stream, river, pond or lake	75								Zoning Ordinance Article 9. Section 925 Water Bodies. www.coventryri.org	11/12/2013
		Structure			Freshwater wetland, stream, river, pond or lake	50		Sheds (for boat & accessory storage), piers, etc						Zoning Ordinance Article 9. Section 925 Water Bodies. www.coventryri.org	11/12/2013
Exeter	Zoning Supplementary Regulations Setback	Proposed Project within 300 feet of wetland	New site plans	Townwide	Freshwater Wetland (As defined by RIDEM)	100	Soil disturbance				Review by PB within 45 days		Site Features map required	Code of Ordinances, Appendix A Zoning. Article II. Sec. 2.5 Development Plan Review. 2.16 Water Bodies. Www.municode.com	11/15/2013
Foster	Zoning Sec. 6 Sewerage Disposal Setback	Sewerage Disposal System		Townwide	Freshwater wetland	200								Zoning Ordinance. Article VI. Supplementary Regulations. Section 6 Sewerage Disposal.	11/15/2013
	Zoning Industrial Performance Standard . Sec 17 Water Bodies	Proposed Project within 300 feet of wetland	Commercial and/or Industrial site plans	Townwide	Freshwater wetland	100	Soil disturbance							Zoning Ordinance. Article IX. Site Plan Review. Section 8 Site Plan for Commercial and Industrial Development. F. Performance Standards. 17 Water bodies	11/15/2013

Community	Ordinance type	Setback From	Applicability (type of use/ activity)	Location Applied	Type of Wetland	Setback Distance (ft)	Prohibited Uses (within buffer)	Exemptions	Development Standards	OWTS design	Application Procedure		Adm Review	Application requirements	Source	Date Accessed
Jamestown	Zoning Sec. 308. Setback	OWTS	Development - any manmade change including buildings or other structures, mining, dredging, filling, paving, excavation, or drilling on the lot.	townwide	freshwater wetland				yes		Dev plan review by Planning Comm, with rec to ZB.		If < 25% relief, planner processes application for recommendation to ZB	Erosion and sed control plan; tree protection, limits of disturbance, Revegetation plan for the buffer, slopes and erodible areas, mitigation plan for vernal pools.	Code of Ordinances, Chapter 82. Zoning, Article 3. Application of District Regulations, Sec. 308. Setback from freshwater wetlands. www.municode.com	10/21/2013
	Zoning Sec. 83-214. High Ground water table and impervious overlay district		Lots < 40,000 sf in mapped overlay district	High Water Table District. Mapped area of non-conforming lots, no public water or sewer, shallow depth to water table and impervious layer. [JH]	na		*District A: no basements, in-ground swimming pools; Districts A&B: no subdrains, no footings below shwt.*		Yes					Soil testhole(s) for any dev in SubDistrict A and for a new dwelling or one that requires an OWTS suitability determination in SubDistrict B.	Code of Ordinances Chapter 82 - Zoning. High Groundwater Ordinance. http://www.jamestownri.net/plan/hgwt.html	10/21/2013
				Subdistrict A: SHWT < 18", OR Impervious layer < 42" below original grade.			Subdistrict A: no basements, in-ground swimming pools, subdrains, footings below shwt.		SUP criteria: Detailed findings on need to prevent further impacts and restore impaired areas. Minimize cutting and filling; To the extent possible, meet 6 dev. standards of Subdistrict B. Demonstrate that combined impacts from OWTS design, SW Mgt, and potential wetland buffer disturbance are minimized. Maximum impervious cover: 8-15% based on depth to shwt and imperv layer, with max 2,000 sf and with freshwater wetlands subtracted from lot size to calculate impervious. Use Variance criteria: to the extent possible meet dev standards for Subdistrict B and for SUP.		A: Special use permit after review by PB	A: Use variance for prohibited uses, after review by PB.	no	Yes, Dev Plan required for SUP and for Use Variance. The Planning Commission may require additional information they determine to be necessary to act on the application.	Code of Ordinances Chapter 82 - Zoning, RI. High Groundwater Ordinance. http://www.jamestownri.net/plan/hgwt.html	10/21/2013
				Subdistrict B: SHWT >18" and ≥ 48", OR Impervious layer > 42" to ≥ 60" below original grade.			Subdistrict B: no subdrains, no footings below shwt.	Elevated structures < 120 sf exempt from impervious.	For admin approval in Subdistrict B: 1. Separation between foundation slab and shwt 12". 2. Advanced treatment standards for OWTS; 3. Pathogen treatment if OWTS < 100 ft. from well; 4. Well and dwelling located on same lot; 5. Impervious cover <=15%; 6. Contain difference between pre- and post development RO volume for 10 yr. 24 hr. storm, with 10ft between leach field and sw infil. system. IF any standard not met, must apply for SUP. OWTS 50% denitw and <= 19mg/l; TSS and BOD5 <= 10 mg/l each; f.coliform <= 1,000 MPN/100 ml; and <=200 MPN/100 ml if well < 100 ft; OWTS and well on same lot as structure served	OWTS 50% denitw and <= 19mg/l; TSS and BOD5 <= 10 mg/l each; f.coliform <= 1,000 MPN/100 ml or <=200 MPN/100 ml if well < 100 ft. OWTS and well on same lot as structure served	B: Special use permit if one or more of the 6 development standards are not met.		Yes, if all 6 dev standards met. Review by Zoning officer, after review with planner and town engineer.	No, but must demonstrate compliance with standards	Code of Ordinances Chapter 82 - Zoning. High Groundwater Ordinance. http://www.jamestownri.net/plan/hgwt.html	10/21/2013
Little Compton	Zoning 14-8.8 Water Bodies and Wetland Setbacks	All structures & septic systems		Townwide	Freshwater and coastal wetlands	100		Administrative subdivisions, boat sheds, piers, bathhouses and fences	Advanced OWTS treatment required for new construction, alterations and repairs. Maximize distance between OWTS and house from wetland except where necessary to maintain 100 ft. between OWTS and well. No net increase in off-site runoff	OWTS 50% denitw and <= 19mg/l; TSS and BOD5 <= 30 mg/l each, or f. coliform <= 1,000 MPN/100 ml with TSS and BOD5 <= 10 mg/l each			For lots of record, administrative approval from Building Official (between the 50 ft. state wetland buffer and town 100 ft. buffer - not specified if it goes to ZB if closer)	Yes. Site plan with OEM-verified wetland edge for new construction. Soil erosion and sediment control plan for new construction and OWTS alteration.	Code of Ordinances. Chapter XIV Zoning. Sec. 14-8 Supplementary Regulations. Subsec. 8 Water Bodies and Wetlands www.clerkshq.com	11/15/2013
Middletown	Zoning Setbacks from wetlands	Disposal trench, cesspool, septic tank, or other leaching facility		Townwide	Any bog, marsh, swamp or pond	50									Code of Ordinances. Title XV Land Usage. Chapter 152 Zoning Code. Appendix A. Article 6 Application of District Regulations. Section 707 - Setback from Wetlands or Rivers. www.amlegal.com	11/19/2013
					Freshwater wetlands and flowing bodies less than 10 feet wide	100										
					Any river or flowing body 10 feet wide or greater	200										
Narragansett	Zoning ISDS Setback	Individual sewage disposal systems		Townwide	Any coastal feature adjacent to Narrow River, Pt. Judith Pond, Weekapaug Pong or other poorly flushed estuarine waters	200									Code of Ordinances. Appendix A Zoning. Section 7 Supplementary Zoning Regulations. Subsection 5 Individual sewage disposal systems. www.municode.com	11/19/2013

Community	Ordinance type	Setback From	Applicability (type of use/ activity)	Location Applied	Type of Wetland	Setback Distance (ft)	Prohibited Uses (within buffer)	Exemptions	Development Standards	OWTS design	Application Procedure	Adm Review	Application requirements	Source	Date Accessed
New Shoreham	Zoning Section 506 Onsite Wastewater Treatment Systems	OWTS		Townwide	150 ft. from freshwater wetland and coastal features. 200 ft from drinking water supply reservoirs and contiguous wetlands.	150, 200			Limits of construction and disturbance shown on plans and marked in field. Use of permeable driveways and LID to reduce runoff and maintain recharge. No net increase in off-site runoff. Must meet specified development standards and OWTS design requirements; demonstrate through engineering report that other resource protection criteria are met, and meet general zoning standards for SUP. Cesspool phase out applies townwide. Phase out of galley drainfields planned, beginning in critical water resource areas.	Advanced treatment standards established based on OWTS location within critical water resource areas, location within wetland buffers, and soil characteristics (depth to water table and impervious layer, and excessive permeability). Shallow drainfield (PSND) may be required. For OWTS located in wetland buffers to critical water resources, maximum 450 gpd design flow and <1,680 sq.ft. dwelling living area.	Application for deviation in setback may be made to building official (BO) with administrative review and approval.	SUP where building official does not approve, applicant does not modify as recommended by BO, and any site with water table <= 2.5 ft. or impervious layer <= 4 ft.	New Shoreham had first review and approval of all OWTS applications before DEM under DEM Rule 17.3. Deviations in wetland setbacks are approved administratively if building official finds there are no alternative locations.	Cumulative impact assessment, engineering report to evaluate impacts to ground and surface waters for OWTS with design flow >= 600 gpd.	Zoning Article 5, Performance Standards, Section 506 Onsite Wastewater Treatment Systems	10/21/2013
	Zoning Section 505 Uses Involving Toxic or Hazardous Waste									Groundwater quality resulting from OWTS or other onsite operations shall not fall below 5 mg/l nitrate-N at downgradient property boundary.					
Newport	Zoning Wetlands Setback	All development		Ocean Drive district	Designated wetlands and coastal features	75	All - To remain in natural state	Covenants or deed restrictions existing prior to adoption				Yes, by critical area review committee		Code of Ordinances, Title 17 Zoning, Chapter 92 Critical Area Review - Ocean Drive District, Section 070 Design Standards www.municode.com	12/5/2013
North Kingstown	Zoning Sec. 21-326. Septic System Setback	Any wastewater treatment system components	All lots created after effective date	Townwide	All surface water bodies, wetlands, and coastal features, mean high tide line	150		Systems or facilities in existence before Feb 21 2001						Code of Ordinances, Chapter 21 Zoning, Article XII Miscellaneous Provisions, Sec 21-326 Septic System setback. www.municode.com	12/5/2013
	Zoning Sec. 21-186. Groundwater recharge and wellhead protection overlay districts.			Groundwater overlay district						Maximum 5 mg/l nitrate loading standard for all new commercial and industrial development. Denite OWTS required for substandard residential lots (by area) with new construction or alteration. Average density of residential developments shall not exceed 1 dwelling unit /2 acres, no density bonuses allowed. Nutrient loading and recharge assumptions provided.	SUP		yes, including provisions of appropriate natural buffers for wetlands and surface water bodies. Nitrate loading analysis required, nutrient loading assumptions provided.	Code of Ordinances >> PART III - REVISED ORDINANCES >> Chapter 21 - ZONING >> ARTICLE VIII. - OVERLAY DISTRICTS www.municode.com	1/29/2014
	Zoning Sec. 21-94. Post Road Business District			Post Road Business District					In addition to 5 mg/l nutrient loading standard for groundwater, requires use of infiltration measures and LID to maintain pre-development recharge conditions.					Code of Ordinances >> Part II - Revised Ordinances >> Chapter 21 - Zoning Article II. - Zoning Districts >>Business Districts\ >> Sec. 21-94 Post Road district>> www.municode.com	1/29/2014
	Sec 21-95. Compact Village Development			Compact Village Development District					Nitrogen loading analysis required, maximum result of 7.5 mg/l for district. Nutrient loading and density limits based on number of bedrooms/acre.	OWTS effluent monitoring required, with nitrogen concentrations reported to town at least annually.				Code of Ordinances >> Part III - Revised Ordinances Chapter 21 - Zoning Article II. - Zoning Districts Business Districts Sec. 21-95 Compact Development district>> www.municode.com	1/29/2014

Community	Ordinance type	Setback From	Applicability (type of use/ activity)	Location Applied	Type of Wetland	Setback Distance (ft)	Prohibited Uses (within buffer)	Exemptions	Development Standards	OWTS design	Application Procedure	Adm Review	Application requirements	Source	Date Accessed
North Smithfield	Zoning: Section 6.12 Wetland Setbacks for OWTS, Buildings and Impervious Surfaces	OWTS		Surface water supply watersheds and town-owned school WHPAs	freshwater wetlands	150		OWTS replacement, major repair, alteration or modification of OWTS which exists 30 days after ordinance date provided Advanced OWTS Treatment requirements are met.	Criteria for admin review [NS1]: general, 12 inch separation between bottm elev of the structure and SHWT. All new OWTS and major repairs DEM-approved denit or enhanced pathogen removal, demonstrate OWTS and associated buildings are sited as far as possible from wetland edge. Advanced treatment OWTS, limits of disturbance, revag plan. Stormwater management plan using LID with impervious cover reduced to the maximum extent. No net increase in runoff volume between pre and post development for 25 yr storm	Advanced treatment OWTS Category 1 for water supply watersheds, other sensitive waters. Category 2 non-critical areas; O&M agreement with advanced treatment and/or mechanical components recorded in Land Evidence records. Setback from OWTS and stormwater infil system 15 ft.	Special Use Permit if standards not met for admin review (for construction of OWTS not less than 100 ft. from wetland.	Yes, if dev standards met, including advanced treatment OWTS	Development plan including: ESC / Stormwater mgt plans; plan for buffer revegetation. DEM verified wetland edge for new construction or alteration.	Zoning Section 6, Supplementary District Regulations, Section 6.12 Wetland Setbacks for Onsite Waste Water Treatment Systems, OWTS, Buildings and Impervious Surfaces. Source: North Smithfield Planning Department	October, 2013
					Drinking water supply impoundment or tributary	200									
		Structures and Impervious Surfaces		Surface water supply watersheds and town-owned school WHPAs. Except "due to economic impact", zoning Districts RS20, MU1, and MU2, and all nonconforming RS40 lots >= 20,000 sq ft	freshwater wetlands	100		Developed wetland buffers where stormwater runoff volume is maintained at pre-dev levels or restored to mep. Elevated structures < 120 sq ft in size. Certain accessory uses and structures < 200 sq ft. Construction which is no closer to the wetland than the existing construction on the lot where provided general development standards are met							
Portsmouth	Zoning Watershed Protection Overlay District		High risk uses	overlay district	All critical environmental areas, including reservoirs and their tributaries	95	All Zones - Uses which employ hazardous chemicals, chemical storage, auto repair shops		All development shall be situated as far from reservoirs, tributaries, and wetlands as reasonably possible. At least 50% of each parcel within 300 feet of the surface of a reservoir shall remain undisturbed. Discharge of stormwater into reservoir tributary wetlands granted upon adequate scientific and technical documentation that proves elimination of any measurable impact to water quality	Alternative technology septic systems shown to greatly reduce nitrogen, pathogens, BOD, and TSS shall be used in the A Zone. BMPs are required for all uses within Watershed Protection district. All septic tanks installed after effective date to be certified watertight according to ASTM standards		All proposed construction (except single family houses) shall be reviewed by Planning Board. Single family houses reviewed by Zoning Officer	Environmental Review Assessment	Zoning Ordinance, Article 3, Section H. Watershed Protection District	12/5/2013
			OWTS		reservoir	200	UD Zone - Outdoor junk storage, outdoor or underground storage of hazardous material, sewage treatment plants, incinerators, landfill, solid waste transfer stations, vehicle washing establishments, water discharge systems (except surface water), placement of ISDS with 200 feet of reservoir								
Richmond	Zoning	Sewage disposal facilities		Townwide	Any water body	50								Code of Ordinances, Title 16 Zoning, Chapter 36 Special Regulations, Section 080 Sewage disposal facilities www.municode.com	12/5/2013

Community	Ordinance type	Setback From	Applicability (type of use/ activity)	Location Applied	Type of Wetland	Setback Distance (ft)	Prohibited Uses (within buffer)	Exemptions	Development Standards	OWTS design	Application Procedure	Adm Review	Application requirements	Source	Date Accessed
Scituate	Zoning	Building or structure Sewage disposal facilities		Townwide	Any pond or stream	75 150					Special use permit			Code of Ordinances, Appendix A Zoning, Article IV Special Regulations, Section 7 Setbacks from Water Bodies www.municode.com	12/5/2013
	Subdivision, Sec. 14-55. Specifications of condition, design, layout and construction	All construction	subdivisions	Townwide	Any wetland	100			At a minimum, all lots shall have sufficient building area so that all construction will be a minimum of one-hundred (100) feet from any wetland.		Planning Board review and approval			Code of Ordinances >> Part II Chapter 14 - Sundivisions and Land Development >> Article III. Subdivision Review Sec. 14-55 (14)	2/18/2014
Smithfield	Zoning	All structures		Townwide	Freshwater Wetlands	100			Within the outermost 50 feet of the buffer, decks, swimming pools, septic systems, fences, signs, accessory structures under 200 sq feet, and parking lots are permitted					Zoning Ordinance, Article 5 - Dimensional Regulations, Section 5.3.4 Buffers	12/5/2013
South Kingstown	Zoning, Section 504 Special Use Permits (pertaining to OWTS)	OWTS	construction of new dwelling or complete replacement of existing		fresh water and coastal wetlands	150		Repair or replacement of existing OWTS or leach field IF meeting performance standards for advanced treatment	Maximum 15% impervious cover. Maintain natural drainage based on 24 hr., 25 yr. storm. Locate OWTS and dwelling as far as possible from wetland; reduce size of dwelling and configuration to minimize site disturbance. Revegetate wetland and restore compacted soils following construction. Criteria in zoning ord. to address cumulative impcts to wetland through use of OWTS, land clearing and grading and/or stormwater runoff from impervious surfaces. Res construction must meet min dimensional setbacks of the zoning district. ZB may not grant any dimensional relief for setbacks concurrent with SUP application.	Advanced treatment required within CRMC SAMP, Wellhead protection areas, groundwater overlay district, within 100 ft of a well, high water table less than 48". OWTS 50% denitr and <= 10mg/L TSS and BOD5 <= 30 mg/l each; f.coliform <= 1,000 MPN/100 ml or <=200 MPN/100 ml if well < 100 ft.	(For sake of consiliency, should be same as Barrington) Advisory review by Conservation Commission to ZB.		Yes, including site plan with DEM verified wetland edge, erosion control plan, stormwater mgt plan with use of LID, buffer revegetation plan with fencing to prevent disturbance. Post construction certification required to demonstrate compliance with approved plans and conditions of approval.	Code of Ordinances, Appendix A, Zoning, Article 5 Supplementary Regulations, Section 504 Special Use Permits (pertaining to OWTS). http://www.municode.com/library/ri	10/22/2013
Tiverton	Zoning, Article VI. Other District Regulations, Section 7 Setbacks from certain water bodies.	OWTS	Townwide EXCEPT Stafford Pond Watershed	town except Stafford Pond drinking water supply watershed	Several named (but not limited to) freshwater and coastal wetlands, unnamed perennial streams on USGS map, and any other waters or wetlands defined. Does NOT include Stafford Pond watershed.	125 ft - single family homes; 200 ft all other uses, except where exceeded by state requirements.					Special Use Permit			Code of Ordinances >> Part III Appendix A - Zoning Article VI. Other District regulations >> www.municode.com	7/31/2007
	Zoning, Article VII. Watershed Protection Overlay District Regulations, Section 7 Setbacks from certain water bodies.	Development		Stafford or Nonquit Ponds and their direct tributaries		200	Natural Vegetation shall not be disturbed. Efforts to improve existing buffers are encouraged.		Maximum 10% impervious cover	Cesspool / substandard system phase out by 2008 within overlay district	Special Use Permit for development within Overlay district	Use Variance for development within 200 ft. of water supply reservoirs and direct tributaries		Environmental Review Statement required with special use permit application	Code of Ordinances >> Part III Appendix A - Zoning Article VII. Watershed Protection Overlay district >> www.municode.com	7/31/2007
Warren	Zoning Wetlands Setback	All development ISDS Sewage disposal facilities		Townwide	Any wetland, water body, coastal feature, or stream	50 100 150	All development		Provisions of Article IV					RI Zoning Ordinance, Article XV Special Yard and Dimensional Requirements, Section 32-89 Setback from Wetlands and Water Bodies. www.townofwarren-ri.gov	12/12/2013
Warwick	Zoning Coastal Setback	All structures, impervious surfaces, ISDS, and underground utilities		Townwide	Coastal features	50	All structures, impervious surfaces, ISDS, and underground utilities	Docks, piers, boat launching ramps, or similar structures	Minimum lot area per dwelling unit requirement within 200 feet of mean high-water mark must adhere to Table 2A for the zone it is located in.					Code of Ordinances, Appendix A Zoning, Section 500 Sepcial Regulations, 503 Coastal regulations	12/12/2013
	Zoning Wetlands Setback	All structures, impervious surfaces, ISDS, and underground utilities		Townwide	Freshwater wetlands	50								Code of Ordinances, Appendix A Zoning, Section 500 Sepcial Regulations, 504 Freshwater wetlands regulations	12/12/2013
West Greenwich	Zoning OWTS Setback	Sewage disposal facilities		Townwide	Any pond or stream	200								Zoning Ordinance, Article VII Special Regulations, Section 5 Setbacks from Water Bodies	12/12/2013
Westerly	Zoning Hazardous Waste Management Facility Siting	Hazardous Waste Management Facilities		Townwide	Freshwater wetlands and other water-related sensitive areas	1,000								Code of Ordinances, Article XI Development Standards for Particular Uses, Section 250-84 Hazardous waste management facility siting. www.ecode.com	12/12/2013
Multiple Communities	Erosion and sediment control ordinance and/or regulations		Construction or alteration of a single family home or duplex	Townwide	Watercourses and coastal features	100 - 200 (varies by town)	A determination of applicability must be submitted to the town and if necessary, a soil erosion and sediment control plan must be prepared.		A performance bond may be required for any land disturbance activity within the specified buffer distance.					RI General Law, Title 45 Chapter 45-46 Section 45-46-8 Model ordinance – Soil erosion and sediment control.	2/21/2014

Appendix D: Literature Review

Legislative Task Force

The Science of Setting Buffers for Wetlands and OWTS: A Literature Review

August 8, 2014

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

www.planning.ri.gov

RHODE ISLAND DIVISION OF PLANNING

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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

Overview of Literature Reviews

What is a literature review?

A literature review discusses published information in a particular subject area, and sometimes information in a particular subject area within a certain time period. A literature review can be just a simple summary of the sources, but it usually has an organizational pattern and combines both summary and synthesis. A summary is a recap of the important information of the source, but a synthesis is a re-organization, or a reshuffling, of that information. It might give a new interpretation of old material or combine new with old interpretations. Or it might trace the intellectual progression of the field, including major debates. And depending on the situation, the literature review may evaluate the sources and advise the reader on the most pertinent or relevant.

How is a literature review different from an academic research paper?

The main focus of an academic research paper is to develop a new argument, and a research paper will contain a literature review as one of its parts. In a research paper, you use the literature as a foundation and as support for a new insight that you contribute. The focus of a literature review, however, is to summarize and synthesize the arguments and ideas of others without adding new contributions.

Why do we do literature reviews?

Literature reviews provide you with a handy guide to a particular topic. If you have limited time to conduct research, literature reviews can give you an overview or act as a stepping stone. For professionals, they are useful reports that keep them up to date with what is current in the field. For scholars, the depth and breadth of the literature review emphasizes the credibility of the writer in his or her field. Literature reviews also provide a solid background for a research paper's investigation. Comprehensive knowledge of the literature of the field is essential to most research papers.

Who writes these things, anyway?

Literature reviews are written occasionally in the humanities, but mostly in the sciences and social sciences; in experiment and lab reports, they constitute a section of the paper. Sometimes a literature review is written as a paper in itself.

Selections typically based on:

1. Relevance of published studies to topic
2. Organization
3. Current study, rationale and contribution to field of knowledge on topic
4. Clarity of writing and interpretation of literature
5. Bibliographic format w/ multiple documents reviewed.

.

Wetlands

Introduction

The following summaries address selected wetland buffers and onsite wastewater treatment systems (OWTS) literature/ reports reviewed for:

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

Brief summaries of each report are provided but are not a substitute for reading the complete paper. All findings and recommendations are those of the cited authors. Major points are highlighted in bold text. **Wetland Readers were**: Task Force members James Boyd, Coastal Resources Management Council, and Thomas Kutcher, Wetlands Biologist, Save the Bay, with staff assistance from DEM, Principal Environmental Scientist, Carol Murphy, and DOP, Supervising Land Use Planner, Nancy Hess.

Wetland Buffer Reports – New England (other than RI)

Berkshire Regional Planning Comm. 2003, *The Massachusetts Buffer Manual: Using Vegetated Buffers to Protect Our Lakes and Rivers.* Massachusetts Department of Environmental Protection. Appendix A.111pp.

Summary:

The objective of this manual is for waterfront land owners to understand the importance of vegetated buffers for the protection of water quality, providing wildlife refuge, and for maintenance of their property values. **A vegetated buffer is a protective area between water bodies and human activity, such as development or agriculture.** The manual describes for readers:

- How buffers capture pollution via chemical, physical, and biological processes;
- How shoreline buffers are transition areas where aquatic and terrestrial environments meet, and therefore where they support a great diversity of wildlife;
- That shoreline buffers serve as wildlife travel corridors and food sources, and they shade and cool water temperatures; and
- That vegetated buffers provide homeowner benefits by flood and property protection, protection of shoreline banks from erosion, increased privacy, and increased property values.

The manual also includes examples of how buffers may be improved and planted to protect a water body and to provide benefits for the property owner. **"In general, the wider the buffer and the more complex the vegetation within it, the more effective it is in meeting those purposes."**

Appendix A provides a technical description of how buffers work to protect water quality, benefit wildlife, dissipate floodwaters, and stabilize banks.

a. Vegetation layers create a barrier to surface water movement by absorbing the impact of rainfall, the forest floor acts as a sponge, and trunks and stems slow runoff velocity.
b. Vegetated buffers capture and remove sediment and nutrients in runoff over ground, thereby lowering the loads that get to the water. This is a function of the precipitation rates and the buffer width, slope, and soil type.
c. Buffers zones also capture nutrients underground as water travels through the soil, by way of plant root uptake and use by microorganisms.
d. Buffer zones along the shore directly protect aquatic species by shading and cooling waters. Runoff water gets heated and can change a cold water stream and can stress microbes, insects and fish. Temperature increases alter biological and chemical processes unfavorably.
e. Waterfront buffer areas are well used by wildlife, because they are an intersection of aquatic and terrestrial habitat. Rare species rely on these transition zones.

f. Vegetated buffer zones can break the force of floodwaters that overflow banks, and thereby protect structures and property from damage. Tree and plant roots hold soil together and stabilize banks from impacts from waves, ice, and wakes.

Boyd, L. 2001, *Buffer zones and beyond: wildlife use of wetland buffer zones and their protection under the MA Wetland Protection Act.* University of Massachusetts. 33 pp. and Appendices.

Summary:

This report focuses on upland buffer zones adjacent to wetlands and water bodies and their importance for wetland wildlife habitat. Buffer zones are essential habitat for 65 species of Massachusetts freshwater wetland-dependent wildlife. **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.** Ninety percent (90%) of Massachusetts wetland-dependent reptiles, 96 percent of amphibians, 100 percent of mammals, and 55 percent of wetland-dependent birds have upland requirements.

The importance of buffers zones to wildlife is well documented. The report discusses the regulation and adequacy of the 100 foot wetland buffer zone as compared with the 200 foot riverfront area in Massachusetts (General Law, Chap. 131, Sect. 40). The report concludes that the need for buffer protection is understood; however, **an appropriate distance is difficult to define.** It acknowledges **a need to establish more than a 100-foot buffer, because of the number of wetland species that rely on the area greater than 100 and 200 feet from wetland edges.**

Chase, V., L. Deming, F. Latawiec. 1997, *Buffers for wetlands and surface waters: A guidebook for New Hampshire Municipalities.* Audubon Society of New Hampshire. 80 pp.

Summary:

This guidance manual was developed to assist local officials by providing the science behind the importance of buffer protection. **A buffer zone is described as a naturally vegetated area adjacent to a wetland or surface water.** The manual recognizes that buffer zones reduce adverse effects of human activity, protect water quality in wetlands and surface waters, protect and provide wildlife habitat, reduce disturbances from dumping, noise, pets, and lights, and help to maintain recreational values and aesthetic diversity. The manual provides a thorough discussion of how buffers work, and it describes landscape and site-specific factors that influence a buffer's effectiveness for habitat, including, land uses, edge effects, vegetation type, and width. Soils, topography, vegetation, land uses, season, and buffer width influence a buffer's effectiveness for water quality protection.

The manual's authors and working group **recommended that 100 feet is generally a minimum required buffer width for water quality purposes.** A 100-foot buffer provides some habitat needs for some species. Table 4.2.2 provides examples of what 100 feet provides and what it does not provide for named wildlife species or groups. For example, for area-sensitive forest birds, 100 feet provides some foraging and nesting habitat, but not sufficient breeding habitat. The manual provides recommendations for when more than a minimum 100 foot width may be appropriate for species-specific needs, at water supply resources, at wetlands that provide rare habitat, at sensitive wetlands (such as bogs, fens, Atlantic white cedar swamps), at travel corridors, and at designated wetlands, as well as some situations where 100 feet may not be needed, such as adjacent to human-made wetlands.

Murphy, B.D., Position statement. "*Utilization of 100 foot buffer zone to protection of riparian areas in Connecticut".* Inland Fisheries Divisions, CT, Undated.

Summary:

This paper briefly summarizes a literature review completed by a State of Connecticut fishery biologist regarding the utility of a minimum 100-foot buffer zone at perennial streams to protect the stream and the riparian corridor. The paper discusses the benefits and limitations of implementing standard (fixed) width buffer zones versus site-specific (floating) buffer methods. **Standard methods are easier to implement, while**

site-specific buffer methods are tailored to the resource and are not arbitrary, however, they are more time consuming to develop and to implement. A discussion is presented about six riparian buffer functions: sediment control, nutrient removal, temperature control, source of woody debris, food supply for aquatic organisms, and stream flow maintenance.

- **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.**
- A buffer width more than 80 feet is needed for stream temperature maintenance.
- The literature supports a 100-foot buffer zone as a source of large woody debris to streams.
- Buffer widths less than 100 feet were not adequately protective of stream invertebrate populations because of sediment in the streams. Buffers greater than 100 feet were equivalent to unclogged streams.
- The literature documented the importance of riparian buffer zones to stream flow maintenance, especially riparian wetland areas; however, studies on specific buffer widths were not found.

Vermont Agency of Natural Resources. 2005, *Riparian Buffers and Corridors Technical Papers* Waterbury, Vermont. 39 pp.

Summary:

These papers provide thorough explanations of water quality, habitat, and channel stability functions of riparian areas, based on reviews of scientific literature on the effectiveness of riparian buffers and their widths. **The word riparian means of or pertaining to the bank of a river or lake.** The papers describe how riparian buffers work to provide these important functions.

- Riparian buffers protect the quality of the water they border by regulating water temperature by shading and by infiltrating surface runoff. Storing overland runoff moderates stream flows and base flows in low flow months. Riparian buffers trap sediment and nutrients, and vegetation roots stabilize riparian shorelines.
- The technical papers describe how riparian buffers maintain the quality of aquatic habitat by: " Protecting water quality and quantity; providing food supply; providing woody debris; maintaining lakeshore, stream channel and floodplain stability; and maintaining adjacent wetlands." Riparian terrestrial habitat is important to amphibians, reptiles, birds, and mammals, including species threatened or endangered in Vermont.
- "Riparian areas provide for channel stability via: flood attenuation, reduced effects of storm events, bank and shoreline stabilization, ice damage control, and maintenance of sediment transport and channel morphology."

Borrowing from Chase et al. (1995) the Vermont report provides tables of buffer widths for 1) riparian functions **(the averages of the ranges are from 37 feet to 225 feet**) and 2) for wildlife **(from 10 feet to 840 feet)** which is "the average distance a blue-winged teal nests from water"). Also included is a table of what a 100-foot riparian buffer provides for wildlife habitat and what it does not provide (Chase et al. 1995).

Calhoun, A.J.K. and M. Klemens. 2002. *Best Development Practices: Conserving Pool-breeding Amphibians in Residential and Commercial Developments in the Northeastern United States*. MCA Technical paper No. 5. Metropolitan Cons. Alliance, Wildlife Conservation Society, Bronx, New York.

Summary:

This publication presents an approach to ensure vernal pool protection via a multi-step model, including identification and mapping, biological assessment, and conservation planning. Based on the wetland and upland habitat needs of obligate vernal pool wildlife, the paper defines three vernal pool management zones: 1) the vernal pool depression; 2) the vernal pool envelope which is the upland area that is 100 feet around the pool depression; and 3) the critical terrestrial habitat, which is that area within 100 feet to 750 feet around the pool's edge.

The paper discusses the importance of each management zone, and it presents practical development practices applicable to ensure protection of vernal pool water quality and amphibian populations. No disturbance is recommended within the vernal pool depression itself; best development practices are recommended within the 100-foot envelope; and less than 25 % development (and best practices)are recommended within the 750-foot critical terrestrial habitat. Figures 4 and 9 graphically depict the migration distances of New England vernal pool amphibians and the defined management areas.

Wetland Buffer Reports – Year 2000 Plus

Environmental Law Institute. 2003, *Conservation Thresholds for Land Use Planners*. Environmental Law Institute. Washington, D.C. 55 pp.

Summary:

- "As with other conservation threshold, the scientific literature does not support an ideal buffer width applicable in all circumstances."
- **Survey found recommended buffer widths ranging from 1 meter up to 1600 meters, with 75% of the values extending up to 100 meters.**
- At a minimum, a riparian buffer should encompass "the stream channel and the portion of the terrestrial landscape from the high water mark towards the upland where vegetation may be influenced by elevated water tables or flooding, and by the ability of soil to hold water."(Naiman et al 1993)
- "based on the majority of scientific findings, land use practitioners should plan for buffer strips that are a minimum of:
    - 25 meters for nutrient and pollutant removal
    - 30 meters for temperature and microclimate regulation and sediment removal
    - 50 meters for detrital input and bank stabilization, and
    - Over 100 meters for wildlife habitat functions
    - At least 100 meters for water quality and wildlife protection
- See Figure 4 below for recommended minimum riparian buffers.
- "To ensure that buffers function adequately, all major sources of disturbance and contamination should be excluded from the buffer zone, including dams, stream channelization, water diversions and extraction, heavy construction, impervious surfaces, logging roads, forest clear cutting, mining, septic tank drain fields, agriculture and livestock, waste disposal sites, and application of pesticides and fertilizers. (Wenger 1999, Pringle 2001)".
- "Another consideration is the level of legal protection afforded to the areas. Whether the buffer is in preservation status or protected under a conservation easement that allows for some level of activity, for example, will also determine its ability to provide desired functions".

Figure 4

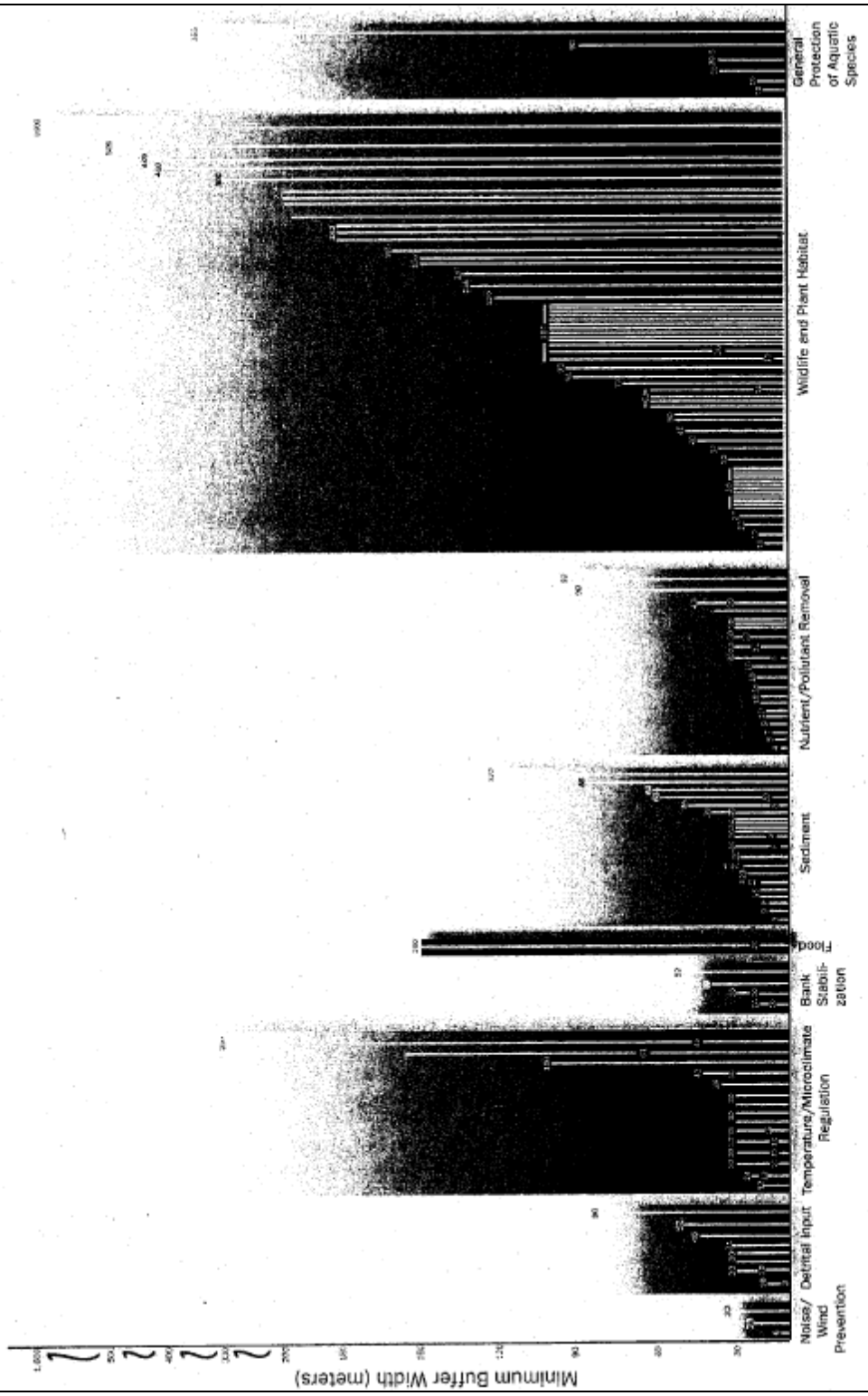


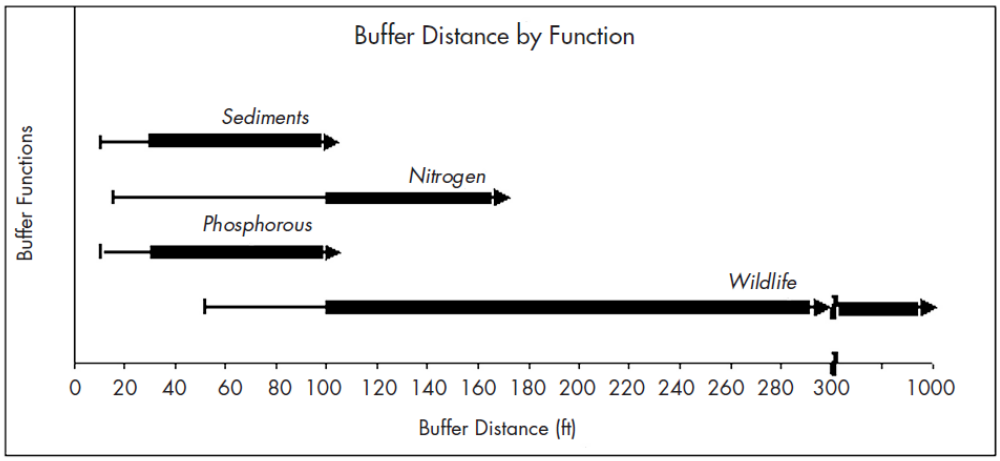
Figure 4. Recommended minimum riparian buffers (in meters) from each side of a water body (e.g. stream bank) needed to prevent noise/wind damage; provide detrital input; moderate temperature/microclimate; stabilize banks; provide flood attenuation; control sediment; reduce nutrients/pollutants; and provide wildlife habitat functions and general protection of aquatic systems in the United States, as cited in the scientific literature. Numbers represent the recommended minimum buffer widths; two numbers along one line indicate a recommended range (see Appendix D for specific findings). Lines extend from zero to the recommended buffer widths to indicate the span of habitat needed for protection.

Environmental Law Institute. 2008, *Planner's Guide to Wetland Buffers for Local Governments.* Environmental Law Institute. Washington, D.C. 29 pp.

Summary:

This report investigates municipal ordinances addressing wetlands buffers and the underlying science, under the assumption and assertion that local governments are better suited to authorize wetland buffer regulations than state or federal agencies. The authors reason that local governments are more concerned with broader implications of wetland regulation for their communities. While much of the report covers the elements of local ordinances, many points are relative to the Task Force. The report is based on 50 wetland buffer ordinances and "several hundred" scientific studies, although only 48 papers were cited. Scientific review of buffer literature was conducted and summarized as below. Refer to Figure 1 for the numbers.

Figure 1



Effective buffer distance for water quality and wildlife protection functions. The thin arrow represents the range of potentially effective buffer distances for each function as suggested in the science literature. The thick bar represents the buffer distances that may ***most*** *effectively accomplish each function (30 - > 100 feet for sediment and phosphorous removal; 100 - > 160 feet for nitrogen removal; and 100 - >300 feet for wildife protection. Depending on the species and the habitat characteristics, effective buffer distances for wildlife protection may be either small or large.*

- Water Quality is affected not just width of buffer, but also by flow pattern, vegetation type, percent slope, soil type, surrounding land use, pollutant type, and precipitation patterns. Buffer width effectiveness is therefore highly variable. **For consistent protection, wider buffers are necessary.**
- **Wildlife Habitat is also affected by buffer width, but is highly variable by species**. Upland area surrounding wetlands is considered core habitat for wetland-dependent amphibians and reptiles.
- Outlines some approaches to setting buffer widths including
  - Fixed non-disturbance width
  - Non-disturbance width plus additional regulated area of scrutiny
  - Non-disturbance width plus setback
  - Matrix based (see Figure 2).

Figure 2

The water quality calculation includes differing buffers based on wetland type (A-E) and whether there is a surface water outlet from the wetland.

Water Quality Buffers						
Land Use Intensity	Wetland Category					
	Wetland Outlet	A	B	C	D	E
Low	Yes	40 ft	35 ft	30 ft	25 ft	20 ft
	No	75 ft	50 ft	40 ft	35 ft	25 ft
Moderate	Yes	90 ft	65 ft	55 ft	45 ft	30 ft
	No	105 ft	90 ft	75 ft	60 ft	40 ft
High	Yes	125 ft	110 ft	90 ft	65 ft	40 ft
	No	175 ft	150 ft	125 ft	90 ft	50 ft

The water quality value is then adjusted for slope:

Slope Adjustment	
Slope Gradient	Additional Buffer Multiplier
5-14%	1.3
15-40%	1.4
>40%	1.5

This matrix approach is more complex than a single number, but can better reflect scientific understanding, particularly with diverse wetland types and land use conditions in a locality. With appropriate public outreach and technical support, a matrix-driven buffer can gain public support and achieve good results.

Wetland Buffer Reports – General References

Nitrogen Attenuation in Wetlands. 2007, Woods Hole Group, Inc**.** Final Report Prepared for Massachusetts DEP, Lakeville, MA

Summary:

This report summarized the latest literature regarding Nitrogen attenuation capacity of wetlands. Much of the information was not relevant to the group. However, the following information on forested buffers is relevant.

- Forested uplands retain substantial nitrogen (N)
- Forested uplands, particularly NLE mature forests, can become N saturated
- N saturated uplands can leach N to groundwater
- Vegetation type does not drive N removal; % carbon, LU history, water table dynamics, roots, and organic matter are primary contributors
- Riparian wetland soils can denitrify NO3 from groundwater
- Microbial community is an important factor

Assessing Forest Buffer Zones after 5 Years. 2010, A. Hairston-Strang, Maryland Forest Service

Summary:

- Quantitative assessment of riparian forest buffer functions at 34 sites abutting tributary streams within three Chesapeake Bay watersheds from 2000-2008.
- 20 sites were monitored yearly for 8 years, while 14 sites were monitored only once 5 years after buffer establishment.
- Buffers were newly planted with trees (seedlings) and averaged over 100 feet in width and abutted agricultural land use located in mostly small rural sub-watersheds ranging from 38 to 19,000 acres in drainage area (average size is 2756 acres)
- Impervious cover within the drainage areas was mostly 2-11% of watershed area with an average of 5% impervious cover, but ranged up to 66%
- Tree survival in restored riparian forest buffers was 80% in the 1st year with losses continuing at up to 12%/year and stabilizing in the 5th year at 50%
- Understory richness increased significantly from 165 to 276 species during the study period, a 67% increase

Key Points:

- The State of Maryland has planted over 1300 linear miles of riparian forest buffers since 1996 to help restore the Chesapeake Bay and tributaries
- Forest buffers are an essential tool for meeting water quality and habitat goals
- Timely riparian restoration and development of expected ecological functions depend on sufficient site preparation, matching species to site conditions, and actively managing good growing conditions around planted trees for at least 3-5 years is required to gain water quality benefits
- Growth rate and tree density affect the speed of development of functions
- In stream water quality monitoring adjacent to buffers showed a reduction of 1mg/L nitrate (not significant) and a decline of phosphate from 0.13mg/L to 0.05 mg/L (significant) between 2001 and 2008
- Nitrate and phosphorus generally showed improved trends, but widespread variability resulted in insignificant reductions for nitrate
- Develop policies and incentives to support long-term retention (>20 years) of restored buffers to obtain nutrient reduction goals and other environmental benefits.

Wetland Buffer Reports – Rhode Island Specific Summaries

Desbonnet, A., P. Pogue, V. Lee, and N. Wolff. 1994, *Vegetated buffers in the coastal zone - A summary review and bibliography.* Coastal Resources Center Technical Report No. 2064. University of Rhode Island Graduate School of Oceanography. Narragansett, RI.

Summary:

This report provides a synthesis of the literature about vegetated buffers in the coastal zone. It provides sample definitions of buffer zones and discusses the importance of vegetated buffers for many public benefits, including nonpoint source pollution removal and control, erosion and flood control, scenic and aesthetic values, and for wildlife habitat protection.

The authors compiled minimum buffer widths to protect wildlife habitat ranging from 15 to 200 meters. They found it difficult to define a best fit vegetated buffer width for general habitat value, and found that many studies relied on species specific needs, especially of rare species. Factors that influence the effectiveness of a buffer for habitat are its width, vegetation type, proximity to other habitats and to predators, noise levels, etc. **The report summarizes general wildlife habitat as fair to good with a 75 meter buffer width, good at 100 meters, and excellent at 200 to 600 meters.**

The authors discuss four approaches for implementation of multipurpose vegetated buffers: fixed-width buffers, fixed-tiered buffer zones, minimum widths based on the size of the property, and based on site-specific characteristics. An ideal buffer for multiple uses is nearly level and has a diversity of native vegetation.

Groffman, P., A. Gold, T. Husband, R. Simmons, and W. Eddleman. 1991, *An investigation into multiple uses of vegetated buffer strips*. Narragansett Bay Project Report No. NBP-91-63.

Summary:

The goal of this study was to provide Rhode Island-specific information on the ability of land areas to serve as buffers for water quality protection and for wildlife habitat, based on a site's soils, vegetation, geomorphology, and land uses. The site-specific water quality studies measured pollutant removal effectiveness for above ground and below ground flows through buffers to red maple swamps. The study also developed a microbial index of pollutant removal effectiveness.

The wildlife studies determined species richness of birds, reptiles, and amphibians in red maple swamps and developed a model to describe the buffer requirements for protection of wetland-dependent wildlife in Rhode Island. Buffer zones are important sites for foraging, corridors for dispersal, areas to escape from flooding, sites for hibernation, areas for breeding and nesting, areas of low predation, and areas that buffers land disturbances from outside the wetland. The buffer model was based on 1) habitat suitability; 2) wildlife spatial requirements; 3) access to upland habitats; and 4) noise impacts. The report describes that, if the habitat suitability guidelines are not met, the buffer should be restored.

- **The minimum recommended buffer is 100 meters (328 feet) if there are threatened / endangered species or neotropical migrant birds.**
- The minimum recommended buffer is 15 meters (49 feet) for access to upland nesting sites for turtles.
- The minimum wetland buffer required if amphibians or small mammals are present was undetermined.
- **The minimum buffer requirements for noise attenuation range from 13 to 85 meters (43 to 279 feet).**

Rhode Island Low Impact Development Site Planning and Design Guidance Manual. Rhode Island Department of Environmental Management and Coastal Resources Management Council, 2011.
http://www.dem.ri.gov/programs/benviron/water/permits/ripdes/stwater/t4guide/lidplan.pdf
Summary:
Chapter 3 of this manual addresses the importance of riparian buffer zones for the protection of water quality, for wildlife habitat, for flood protection, and for protection of reservoirs. **A riparian buffer is defined as the land area along streams and rivers and other open water bodies.** They are described as a "conservation bargain" because of all of the services they provide.

Function	Range of Riparian Buffer Widths		Minimum Recommended Buffer Width
	Environmental Law Institute (2003)	*Fischer and Fischneich (2000)*	
Stream Stabilization	30-170 ft	30-65 ft	50 ft[1]
Water Quality Protection	15-300 ft (remove nutrients)[2] 10-400 ft (remove sediment)	15-100 ft	100 ft[2]
Flood Attenuation	65-500 ft	65-500 ft	FEMA 100-year floodplain plus an additional 25 ft[4]
Riparian/Wildlife Habitat	10 ft-1 mile	100 ft-0.3 mile	300 ft[5]
Protection of Cold Water Fisheries	>100 ft (5 studies) 50-200 ft (1 study)	--	150 ft[6]

1. Larger buffers may be necessary based on steep slopes and highly erodible soils.
2. Different buffer designs should be considered for protection of different resources (coastal vs. inland).
3. Larger buffers may be necessary based on land use, resource goals, slope, and soils.
4. Additional buffer recommended to compensate for variability in flood model results at a site level and due to a changing climate.
5. Larger buffers may be necessary based on species and vegetation.
6. Larger buffers are necessary as the impervious cover in the watershed exceeds 8%.

- **Summarized a range of buffers {50 to 300 feet}** researched by the Environmental law Institute (2003) and US Army Corps of Engineers (Fischer, R.A. and J.C. Fischenich. 2000) and provides recommended distances for five functions
- Stream stabilization = 50 feet
- Water quality protection = 100 feet
- Flood attenuation is FEMA 100 year floodplain plus 25 feet
- Riparian wildlife habitat = 300 feet
- Protection of cold water fisheries = 150 feet

Litchtin, N. Water Quality Function of Wetland Buffers: A Brief annotated Bibliography, URI Cooperative Extension, Nonpoint Education for Municipal Officials, Kingston, RI 2008.
Summary:

- **Buffer width recommendations in the papers reviewed ranged from 50 feet to 200 feet** depending on the function of the buffer and the study author. Emphasis on water quality with recognition of benefits of buffers for flood control, erosion control, and wildlife habitat. Riparian buffers have been reported to have a major effect on flood mitigation by increasing the opportunity for infiltration, reducing the velocity of runoff, and minimizing impervious cover.
- **Most studies have found that much larger buffers are required to provide wildlife habitat than are required for any of the other buffer benefits.**

Murphy, M.C. and F. C. Golet. 1998. *Criteria for determining buffer zone and setback widths*. In Development of revisions to the State of Rhode Island's freshwater wetland regulations. Final report prepared for Rhode Island Department of Environmental Management. University of Rhode Island, Kingston, RI.
Summary:
This research was undertaken at the Department's request to assist with policy development specific to the Governor's Commission of Wetlands and Septic Systems. The objective was to make recommendations for a method to determine suitable buffer zones for vegetated wetlands, water bodies and watercourses as defined in legislation being considered at the time. The report describes how buffers protect the functions and values that these resources provide. The authors reviewed four buffer literature summaries and two reports about the effectiveness of buffers over time. One study in Washington found that all buffers that

were initially less than 50 feet "showed a significant decrease in effective size within the first few years. Thirty-five percent of the buffers that were greater than 50 feet wide were directly altered." A New Jersey study concluded that "25 foot buffers were not effective in reducing disturbance to the adjacent wetland over the short or long term." Murphy and Golet also reviewed and summarized the RI coastal zone buffer program and buffer programs in other nearby states.

The authors recommended a tiered approach to identify buffer zones and setbacks within a bordering jurisdictional land, based on the wetland types, their functions and values, and sensitivity to human disturbances. **The buffer zone is the portion of the bordering land maintained in a natural, undisturbed condition. The setback is the minimum distance from the landward edge of freshwater wetland at which certain approved activities or alterations may take place.** Working within the limitations of the bordering land distances, the method recommended and discussed the following **buffer tiers**:

- Tier 1 is a 150 foot buffer to perennial watercourses.
- Tier 2 is a 100 foot buffer for permanent or semi-permanent flooded water bodies and vegetated wetlands, bogs, and fens, natural heritage areas, and critical amphibian habitat.
- Tier 3 is a 75 foot buffer for seasonal standing water bodies other than critical amphibian habitat and intermittent water courses.
- Tier 4 is a 50 buffer to seasonally saturated wetlands.

Palstrom, N. 1991. *Vegetated Buffer Strip Designation Method Guidance Manual.* IEP, Inc., Northborough, MA

Summary:

The objective of this manual is to provide guidance for identifying buffer widths for attenuation of pollutants from storm water runoff. While protection of wetland habitat is largely due to buffer widths, wildlife needs, and nearby land uses, water quality protection involves chemical, physical, and biological processes. The author developed a multi-step buffer model, including evaluation of "special conditions" for sensitive wetlands and high impact activities. The model identifies that:

- **A 300 foot buffer is required between a wetland and a commercial/ industrial facility with hazardous materials onsite.**
- **A buffer consistent with the existing buffers of adjacent properties, but not less than 25 feet, should be maintained at residential infill areas.**
- Buffers with slopes greater than 15% or with less than 80% vegetative cover are not suitable for water quality protection, and other measure need to be incorporated.
- Where wetlands are habitat for endangered or threatened species, the buffer should not be less than the buffer required to remove 85% suspended sediment.
- Sensitive wetlands are defined as those in water supply watersheds, vernal pools, cedar swamps, scenic rivers, conservation lands and coastal ponds.

Rhode Island Rivers Council. 2005. *Findings and recommendations: Establishment of riparian and shoreline buffers and the taxation of property included in buffers.* A report to the Governor, Senate and House. Rhode Island Rivers Council. Providence, RI.

Summary:

- Charged to make recommendations with respect to riparian buffers and taxation of property included as buffers. Riparian are along rivers, streams, open waters and coastal waters.
- Stated that preservation and restoration of natural riparian buffers is considered to be the single most important practice to protect water resources.
- Recommended that DEM investigate the NJ 300 foot buffer to high quality river segments and consider adopting regulations.

Wetland Reports – Washington State

Volume 1: A Synthesis of the Science (2005)

@ http://www.ecy.wa.gov/programs/sea/wetlands/bas/vol1final/Cover_Table%20of%20Contents.pdf

Summary:

Increases in nutrients may have the beneficial function of slowing flood flows by thickening of plant growth and increasing numbers of some invertebrate species but may also have many negative impacts including lowering water quality, changing the chemistry of bogs, and decreasing species richness, where fewer species dominate and invasives may thrive. Nutrient loads from agricultural applications have been studied and have shown impacts on amphibians, water-birds, and other wildlife.

Update on Wetland Buffers: The State of the Science (October 2013), State of Washington, Department of Ecology, Publication #13-06-11.

@ http://www.ecy.wa.gov/programs/sea/wetlands/bas/BufferUpdate.html

@ https://fortress.wa.gov/ecy/publications/publications/1306011.pdf

Summary 1:

- Effectiveness of a buffer on removal phosphorus depends on many factors including:
  - Soil Type (sorbents, redox state, pH)
  - Degree of saturation on soil particles
  - Slope of the land
  - Type of plants present and how managed
  - Amount of phosphorus generated by the surroundings
  - Flow path of groundwater and its interaction with iron, aluminum oxides, or other minerals that react with dissolved phosphorus
- Removal of nitrogen in groundwater flowing through buffers does not appear to be related to buffer width, while removal of nitrogen from surface water was only partially related to the width of the buffer. The reduction of nitrate in groundwater flowing through a buffer has been attributed to denitrification, uptake by vegetation as a function of its density, and immobilization by micro-organisms.
- The relative removal of nitrate in a buffer is reduced as the concentration of nitrate in the incoming water is increased. (In one study of 14 sites, nitrate removal dropped to 0% when the concentration of nitrate was above 20 mg/l.)
- Contrarily, modelling at the watershed scale supports the view that20m (66ft) is a sufficient buffer for nitrate removal. But other studies indicate that coarse soils in the buffer, the presence of seeps, and the specific site flow path are other factors that need to be taken into account.

Summary 2:

This report is based on a national literature search using relevant keywords to identify the most up-to-date and best available science on wetland buffer functions. Main conclusions of the research are as follow.

Pollutants

- The function of buffers in flood attenuation has still not been well-studied
- Buffers protect water quality by infiltrating surface water
- Buffers remove pollutants from groundwater via soil and root interactions
- Buffers may become saturated with pollutants and lose effectiveness over time
- Buffer width, slope, infiltration rate, rugosity, adjacent LU, vegetation type, vegetation density and spacing, and flow convergence are all important characteristics for pollution removal
- Coarse sediments may be removed by narrow buffers (16-66 feet)
- Finer sediments are better removed by wider buffers (66 to 328 feet)
- Trapping of sediments is tied to pollutant removal
- Buffer width accounts for 35-60% of buffer effectiveness for water pollution
- **Wider buffers are more reliably effective** (Fig. 3)

Wildlife

- Buffers considered core habitat for many species (and this core habitat needs a buffer)
- Undisturbed uplands between wetlands are important for species
- Effective buffer for wildlife is very complex and depends on width, vegetation type, etc. per species
- **Mean minimum core habitat for herps from literature ranges from 117m to 205m depending on species**
- Protecting upland habitats is necessary for the sustained survival of amphibians
- Many bird and mammal species rely on wetland buffers and require huge buffers to maintain populations
- **Recent documents recommend buffers exceeding 300 feet** (Fig. 4)
- Protecting wildlife will protect other functions

Figure 3

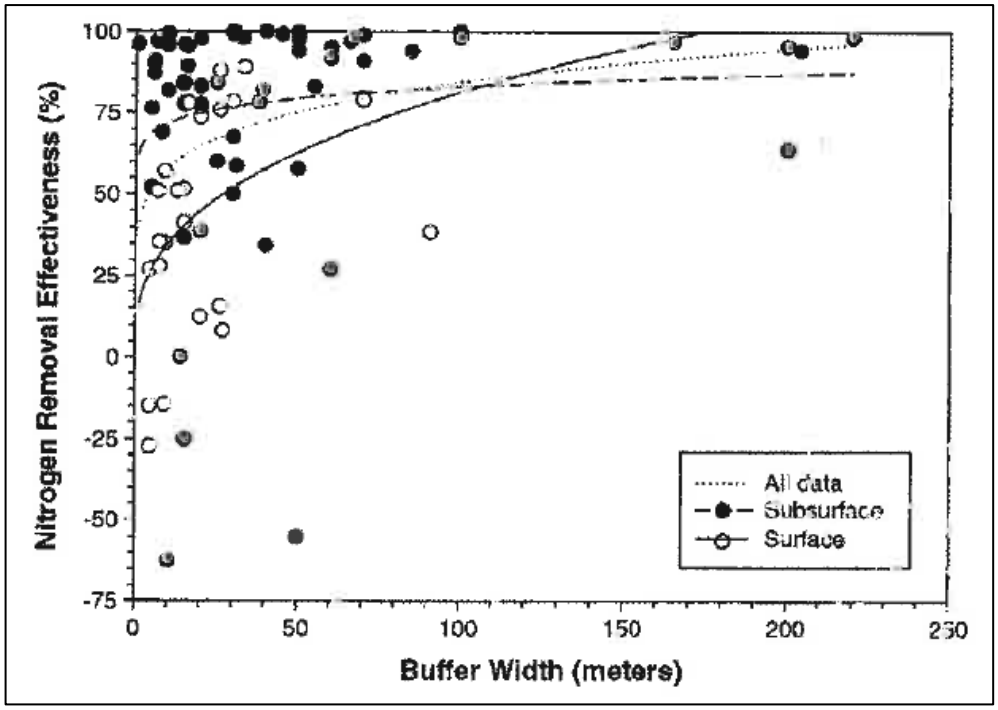
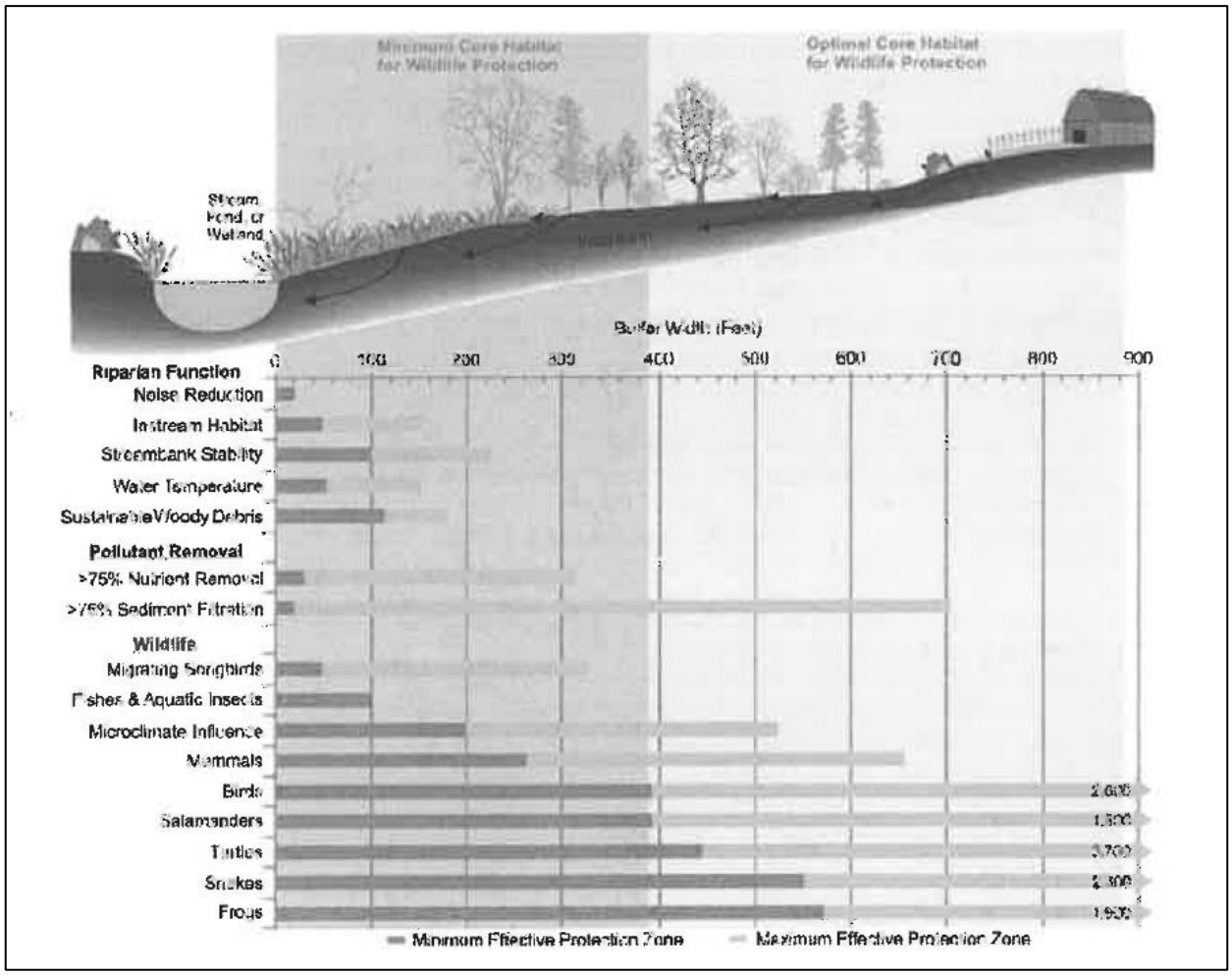


Figure 4



Appendix 8-C- Guidance on Widths of Buffers and Ratios for Compensatory Mitigation for Use with the Western Washington Wetland Rating System, Volume 2, Protecting & Managing Wetlands, Washington state, April 2005.

Summary:

- Proposal for guidance on width of buffers linked to the *Washington State Wetland Rating System for Western Washington*
- System recommendations would:
  - Standardize a system that classifies wetlands in 4 categories; I - IV
  - Set widths of buffers are based on wetland category & adjacent land uses
  - Land uses are classified into 3 categories based on threat of impacts to adjacent wetlands: low, moderate and high
- Buffers are defined as the uplands adjacent to an aquatic resource that can through various physical, chemical, and biological processes reduce impacts to wetlands from adjacent land uses.
- Widths of the buffer are measured along the horizontal plane.
- Three alternatives which increase in complexity.

❖ **Widths of buffers ranged from 25 to 300 feet.**

Onsite Wastewater Treatment Systems (OWTS)

Introduction & Context

The following references focus on field investigations conducted in RI and other research applicable to southern New England. The following summaries address selected OWTS & water quality reports 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

Brief summaries provided but are not a substitute for reading the complete paper. All findings and recommendations are those of the cited authors, except where readers have added comments marked as * Notes. Major points are highlighted in bold text. **OWTS Readers were:** Task Force members Russell Chateauneuf, Civil Engineering Representative, and Lorraine Joubert, Environmental Entity – URI NEMO, with staff assistance from DOP, Supervising Land Use Planner, Nancy Hess.

* Notes: OWTS may impact wetland habitat functions, but the scientific literature on the topic is limited. Wetland setbacks are primarily based on risk to public health as some treated wastewater typically enters the surface environment with the groundwater recharging the vegetated wetland or stream where contact with humans is possible.

* Notes: Current RIDEM OWTS setbacks are distances to the resource, not the buffer. In some cases, the setback is equal to the jurisdictional wetland (perimeter wetland). In other cases, the setback is less than the jurisdictional wetland (riverbanks). In such cases, the wetland impacts are reviewed and decided upon first through the wetland permit process. The wetland program does not generally review the WQ impact from the OWTS, giving deference to the OWTS rules and WQ rules. Systems over 5,000 gallons per day require a site specific review under DEM regulations. > 90% of the OWTSs serve single family homes.

* Notes: Some information included here was also summarized by Dr. Arthur Gold in his presentation to the Legislative Task Force on 1/21/14, which is available in notes from meeting #5 at http://www.planning.ri.gov/. His closing remarks reflected the uncertainties involved in determining adequate buffer distance and value in taking a conservative approach to prevent pollution.

* Notes: Major Findings:

- **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. (Gold)**
- 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 Rhode Island, 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 (Barnstable County Board of Health).
- Aquifer characteristics are highly uncertain and have strong influence on contamination reaching receiving waters.
- **Buffer length reduces contamination "risks".**

Nitrogen and Phosphorus

Gold, A. J. and J.T. Sims. 2000. Risk Based Decision Making for On-site Wastewater Treatment. U.S.EPA/EPRI. pp. 114-146

Summary: This "Zhang Paper" develops research priorities to improve risk assessment and management of decentralized wastewater treatment systems to reduce nutrients from these systems. Included is a summary of factors affecting removal of nitrogen and phosphorus from OWTS in riparian zones. The authors note that nitrogen removal in riparian areas is site-specific. "Great uncertainty surrounds the fate of nitrogen in groundwater. **A number of studies suggest that N removal cannot be simply related to residence time or travel distance. Instead, N removal depends on the specific characteristics of the receiving aquifer and more specifically with the characteristics that occur in selected environments along the groundwater flowpath."**

Excerpts:

IV.B.1.c. Streamside Buffers and Groundwater Nitrate Removal:

"Riparian Zones: There is a substantial body of research documenting groundwater nitrate-N removal in riparian zones (Pavel, et al., 1996; Hill, 1996; Correll, 1997; Lowrance, 1998). The extent of removal may be influenced by the hydrology, soils and vegetation of the riparian zone. Removal can occur through plant uptake, immobilization in organic matter or denitrification. In certain settings these streamside zones have been found to be a major sink for groundwater nitrate-N leaving upland agricultural and suburban lands. Their preservation, protection and restoration could be a key factor in sustaining or restoring watershed functions in certain watersheds. (Gilliam et al. 1997)."

"Riparian zones display a great variation in groundwater nitrate-N removal. Groundwater nitrate-N removal appears to be limited to riparian zones where the water table is shallow and organic deposits accumulate in surface soils. Soil mappers often use the hydric classification to identify these types of soils. Conversely, riparian zones with deep water tables and non-hydric soils may not serve as groundwater nitrate-N sinks (Correll, 1997)."

"Flowpaths influence the extent of groundwater nitrate-N removal in riparian zones (Hill, 1996). Substantial nitrate-N removal has been noted where nitrate-N laden groundwater flows through the

upper 1 to 2 m of soil – while minimal removal has been observed when groundwater moves at greater depths below the soil and upwells directly beneath streams and other sources of surface water. If groundwater emerges in surface seeps upgradient of riparian wetlands, surface flow can occur rapidly (i.e., 1–2 hours) across the riparian zones, minimizing the potential for N removal. Within riparian zones research is needed on the factors that control the depth of the biologically active zone (i.e., water table dynamics, soils, geomorphology, type of vegetation, age of vegetation) and the relationship between the width of different riparian settings and groundwater nitrate-N removal."

IV.B.1.d. In-stream nitrate-N removal:
"The result of recent USGS stream monitoring and modeling (Sparrow Model) also stress the importance of in-stream nitrate-N dynamics to the delivery of land based N to coastal waters. Alexander et al. (2000) concluded **that nitrate-N removal is higher in small streams than large rivers.** They theorize that denitrification in the bottom sediments of in small, shallow streams can be a significant source of nitrate-N removal. In larger streams they suggest that the proportion of interaction between stream and bottom sediments is too small to have notable effects on nitrate-N dynamics."

IV.B.2. Phosphorus: [Note: DWTS = decentralized wastewater treatment systems]
The more effective attenuation of P transport (relative to nitrate-N) from DWTS to surface waters by soils and aquifer materials has resulted in fewer macro-scale concerns about P impacts on most surface waters, and thus fewer watershed scale research efforts to quantify P losses. In most cases, the general opinion on the impact of P from DWTS on water quality has changed little in the past 25 years. Jones and Lee (1979) assessed the effects of P from DWTS on ground water quality in northwestern Wisconsin from 1972-1976 and stated "...No evidence for phosphate transport from septic tank effluent was found in any of the monitoring wells, even though this is a sand aquifer with a relatively high groundwater velocity" and "in general, phosphate will not be transported from septic tank wastewater disposal systems and thereby contribute to excessive fertilization problems". The authors speculated that a very limited number of water bodies directly adjacent to septic tank disposal systems might be at risk.

Gilliam and Patmont (1983) conducted a similar study in the Puget Sound watershed n Washington and developed a mathematical analysis (Monte Carlo simulation) of P transport rom DWTS to a small lake. They concluded that "movement of more than1% of effluent P to the lake was rare" and that any P loading to the lake was mostly associated with "septic systems in wet areas that may contribute P to the lake by both shallow groundwater flow and the surfacing of septic effluent and subsequent movement to the lake by overland flow".

Chen(1988) investigated P movement in ground waters from 17 septic tank disposal systems located near the shores of eight lakes in New York State. All systems showed "good removal of ortho-P". Groundwater in three of the 57 wells monitored exceeded the current USEPA water quality goal of 0.10 mg P/L; one site was located on a steeply sloping (>10%) soil, and he other on a soil with a very shallow water table.

Reneau et al. (1989) reviewed the literature on P transport from DWTS to ground and surface waters and stated "...the limited movement of P away from onsite wastewater disposal systems is well-documented" and that "..most field studies indicate that P contamination is limited to shallow groundwater adjacent to the systems". As noted earlier, Reneau et al. (1989) identified coarse-textured soils with low P sorption capacity, poorly drained soils, and soils with poor effluent distribution as situations with the greatest likelihood for P loss.

Weiskel and Howes (1992) monitored "near-field effluent" and groundwater quality in a densely populated (~10 houses/ha) coastal watershed served by DWTS (Buttermilk Bay, Massachusetts).

Virtually all (99.7%) of the effluent P was retained in the aquifer at this site. Some "near-field" (5 m down gradient) enrichment of groundwater with P was noted and attributed to reducing conditions induced by DWTS effluent. The authors concluded that while "...septic systems are clearly a major potential source of N and P to coastal waters"...septic effluent was a "minor source" of P to coastal waters.

Finally, Robertson et al. (1998) conducted a detailed study of 10 "mature" septic system plumes in central Canada. Six of the 10 sites had P plumes > 10 m in length with P concentrations elevated about 2 orders of magnitude (0.5 to 5.0 mg/L) compared to natural background concentrations. The authors concluded that "...phosphate plume velocities are substantially retarded compared to groundwater velocities at all sites (R=20 to 100)"…but that P migration velocities at some sites (calcareous sands) were fast enough to be of concern.

Based on this research, and other studies such as the "micro-scale" research cited earlier, the major "macro-scale" environmental issues with regard to P and DWTS today are: (i) siting considerations related to the proximity of the DWTS to surface waters, such as any site properties that will facilitate more rapid P movement to surface waters. Examples include a better understanding of site hydrology and soil/aquifer geochemistry, both of which affect P retention and the rate of P movement in the landscape;

(ii) density of DWTS in a watershed, which relates to annual loading and water body sensitivity to P. For example in Delaware where total maximum daily loads have been established for the Inland Bays watershed (a national estuary), reductions in P loadings of 40-65% of present values will be required for these estuaries and their tributaries to meet "fishable" and "swimmable" criteria under the Clean Water Act. Thus, the long-term concern is whether the current, (or future, as coastal development proceeds) loading of P to shallow ground waters will eventually deliver, in base flow, P in excess of the TMDLs for the watershed;

(iii) system design and management particularly as this affects the likelihood of system failures which can result in more rapid, surface transport of P. Or, the value of innovative designs for new systems that can more efficiently retard P transport and/or remediating existing systems to improve their effectiveness in removing P from ground water discharge.

Denitrification in Riparian Areas

Gold, A.J., P.M. Groffman, K. Addy, D.Q. Kellogg, M. Stolt, and A.E. Rosenblatt. 2001. *Landscape attributes as controls on ground water nitrate removal capacity of riparian zones*. Journal of the American Water Resources Association. 37:1457-1464.

Summary:

At riparian sites high groundwater nitrate-N removal rates of more than 80% were found in wetlands and hydric soils. **The extent of groundwater nitrate removal within the riparian zone is related to the flowpath and travel time through the riparian zone.** Higher denitrification rates were observed in outwash soils with shallow groundwater flow paths through the riparian area. Till sites were more steeply sloping and surface seeps were more common resulting in surface flow through the riparian area, bypassing opportunity for denitrification in shallow groundwater. In deep outwash aquifers, a significant portion of the ground water recharge from distant sources may move deep below the riparian zone and upwell vertically to the stream, potentially "bypassing" the biologically active upper portions of hydric soils.

Management findings:

- Any channelized surface flow through a riparian area, direct stormwater discharges to riparian areas, tile drains and shoreline alteration were identified as factors bypassing natural N sinks.
- In addition to direct alteration of stream banks, urban and suburban land use can impair denitrification potential at a watershed scale. Increased imperviousness and storm drains induce flashy runoff events often leading to stream bank erosion and incised stream channels. The deeper stream channels in combination with reduced groundwater recharge can lower the depth of the water table in urbanized riparian zones, causing them to shift from a hydric to non-hydric setting. As a result, groundwater flowing towards streams at greater depths is more likely to bypass organic-rich deposits typically found much closer to the ground surface in riparian areas. For example the authors cite research in Baltimore, MD by Groffman et al. (2002) where riparian water table depths were greater than 3 feet in suburban and urban watersheds, those in a similar but undisturbed forested watershed were less than 1 foot of the soil surface.

Addy, K.L., A.J. Gold, P.M. Groffman, P.A. Jacinthe. 1999. Groundwater nitrate removal in forested and mowed riparian buffer zones. J. of Environ. Qual. 28:962-970.

Summary:
This study examined groundwater nitrate removal in the subsurface of mowed vegetation vs hardwood forest at two riparian sites in Rhode Island. Both sites were similar in soil texture, drainage class, and morphology. Sampling was restricted to the poorly drained class [seasonal high water table of 1-1.5 ft. and hydrologic soil group C or D based the 2014 RIGIS Soil Attribute Table, prepared by USDA NRCS
http://www.nrcs.usda.gov/wps/portal/nrcs/main/ri/soils/

Nitrogen removal rates were evaluated using mesocosms constructed from undisturbed soil cores extracted from the site. These researchers found that groundwater nitrogen removal rates were correlated with carbon-rich patches of organic matter that function as hotspots of microbial activity in the subsoil, consistent with previous studies. No significant difference in nitrogen removal rates was found in forested vs. mowed areas. **Results show that riparian zones composed of a mix of forest and mowed vegetation, common in suburban land uses, may remove substantial amounts of groundwater nitrogen**. The authors caution against ascribing specific groundwater nitrogen removal rates based on above ground vegetation types without recognizing the importance of site differences such as water table dynamics, land use legacy and adjacent vegetation.

* Notes: *findings underscore the importance of using soil indicators to identify wetland edges without relying on vegetation alone.*

Mayer, P.M., S.K. Reynolds Jr., M.D. McCutchen, and T.J. Canfield (2007), Meta-analysis of nitrogen removal in riparian buffers.

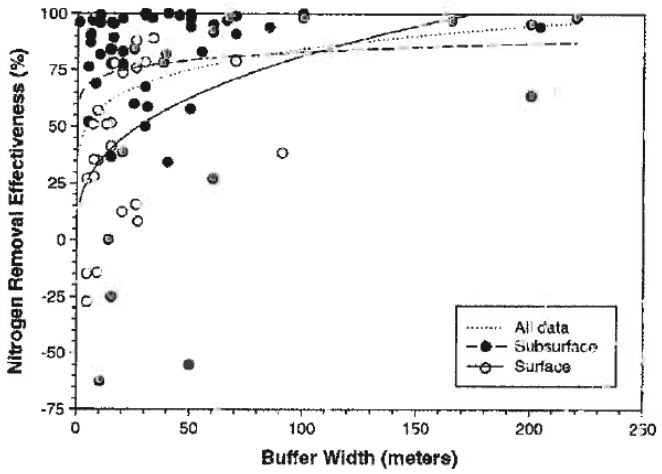


Figure 1: An example of the removal of nitrogen as a function of the width of the buffer based on data published for 89 individual measurements (figure is from 49).

Managing Nitrogen

Schipper, L., A.J. Gold and E. Davidson. 2010. Managing Denitrification in Human Dominated Landscapes. Ecological Engineering. 36:1503-1506.

Summary:

Management recommendations:

- Reduce N inputs to avoid problems.
- Use onsite N controls. "The closer to the source of nitrogen the mitigation strategy is placed, the better."
- Use a watershed scale treatment approach to protect and restore denitrification sinks to augment onsite controls. (wetlands and buffers are N sinks).

Oakely, S.M., A. J. Gold and A. J. Oczkowski. 2010. Nitrogen Control through Decentralized Wastewater Treatment: Process Performance and Alternative Management Strategies. Ecological Engineering. doi:10.1016/j.ecoleng.2010.04.030

Summary:

Buffer distance necessary for treatment is highly site specific. Wastewater effluent pathways and transformations are site specific and highly variable:

> "While limited or negligible transformations and dilution of OWT plumes have been observed in aerobic, unconfined sand aquifers (Robertson et al., 1991;Ptacek,1998;Harmanetal.,1996), NO3– plumes can exhibit rapid declines in nitrate levels over very short distances (3m) if the plume traverses denitrification hotspots (Groffman et al.,2009), such as carbon enriched deposits along shorelines (Robertson etal.,1991); in these instances the plume must contact carbon-rich medium for denitrification to occur.
>
> Most OWTS design cannot meet the rigorous performance targets set by regulators. Variability in treatment performance is high, especially when compared to centralized wastewater treatment facilities where wastewater collection and treatment is closely managed and monitored by staff. The effects of erratic performance from any individual OWTS is moderated by the relatively small scale of the system loading and travel time before it reaches an aquifer, lake or estuary over weeks, months or years. The authors find average loading from decentralized systems is therefore more reflective of the aggregated risks to the aquifer recharge area or coastal watersheds.

Management recommendations:

- Use shallow drainfields such as pressurized shallow narrow drainfields (psnd) or drip irrigation with advanced treatment systems for enhanced N removal.
- Apply watershed scale perspective to identify opportunities for denitrification from the discharge point to receiving waters.

*Notes:

Variability in OWTS treatment performance has also been reported by the Barnstable County Board of Health. Summary data is provided at http://www.barnstablecountyhealth.org/ia-systems/information-center/data-and-statistics/.

Nitrogen Removal In Small Streams

Kellogg, D.Q., A.J. Gold, S. Cox, K. Addy, and P.V. August, 2010. A geospatial approach for assessing denitrification sinks within lower-order catchments. Ecological Engineering 36: 1596-1606.

Summary:

Nitrate sinks include riparian wetlands, lakes and reservoirs, and headwater streams. Riparian Wetlands, reservoirs, and lower (first and second) order streams can function as nitrogen sinks. Particular stream feature such as pools or organic debris play an important role in N removal. Water residence time was a controlling factor for reducing N load in all these settings. In contrast, where landscape sinks are bypassed by land management practices such as tile drains or stormwater conveyance systems, N sources pose a greater risk of watershed N export. Low order streams generally comprise 70-85 of total stream length within a watershed; contribute 80% of stream flow, and > 50% of the total N load delivered to all stream reaches.

Alexander, R,B, R.A. Smight and G.E. Schwarz. 2000. "Effect of stream channel size on the delivery of Nitrogen to the Gulf of Mexico. Nature 403:756-761.

Summary:

Small headwater streams (first and second order) are most effective in protecting water quality despite their small size. These small tributaries, which typically comprise 60-80% of stream miles in less developed watersheds, are considered to have much greater ability to remove pollutants because of their extensive shoreline contact. In larger streams, the proportion of stream flow interacting with bottom sediments is considered too small to have notable effects on nitrogen dynamics.

Center for Watershed Protection, 2000. The impact of stormwater on Puget Sound Wetlands. Watershed Protection Techniques 3(2): 670-675.

Summary:

"Small streams are more susceptible to disturbance because they are abundant in the landscape and may be perceived to be le*ss* important. Because of their small size they are more likely to be impaired through direct disturbance during subdivision construction, secondary backyard "improvements", and by related changes in flow and sedimentation. To protect these valuable small streams, **maximum buffer distances are often recommended for third order streams and smaller**."

Phosphorus

Multiple documents without dates from website of Barnstable County Board of Health: http://www.barnstablecountyhealth.org/ (Accessed 7.02.14)

Summary: Advanced treatment systems - Advanced treatment systems are not designed to remove phosphorus. Sand filter drain fields are not effective in removing phosphorus. Monitored data for one sand filter showed some phosphorus attenuation initially following construction but within one year the P concentrations entering and leaving the sand filter were the same, with no removal.

Summary: Alternative treatment systems - No recommendations provided on horizontal buffer distance but addresses risks.

Findings: In a conventional system "any phosphorus which is removed in the septic system probably is removed under the leaching facility by chemical precipitation. To date, no alternative on-site technologies are capable of significant phosphorus removal." Phosphorus can become mobile in anaerobic conditions such as

may occur with groundwater rise into the drainfield. Phosphorus concentrations in wastewater average about 10 mg/l.

*Note: Advanced treatment systems typically used in RI are not designed to remove phosphorus (G.Loomis, Director, URI New England Onsite Wastewater Training Center). However, Holden et.al. (2004) found between 55% to 100% phosphorus reductions in pressurized shallow narrow drainfields.

Relationship between RMFs and Water Table Rise

Morgan, C.P. 2002. *An investigation of soil morphology-water table relationships on Block Island*. M.S. thesis. Dept. of Natural Resources Science, College of the Environment and Life Sciences, University of Rhode Island, Kingston, RI.

Morgan, C.P. and M.H. Stolt. 2006. *Soil morphology-water table cumulative duration relationships in southern New England*. Soil Sci. Soc. Am. J. 70:816-824. http://www.soils.org/publications/sssaj/pdfs/70/3/816

Stolt, M.H. 2013. *Relationships between soil morphology and water table levels*. Presentation at the Rhode Island Regulatory Setbacks and Buffers workshop. November 21, 2013. URI, Kingston RI. http://www.uri.edu/ce/wq/nemo/Workshops-Support/Previous_Workshops.htm#Buffers2013

Combined Summary:
Morgan and Stolt examined the relationship between redoximorphic features (RMFs) and the frequency and duration of water table rise in Rhode Island soils. This study focused on marginal soils where the seasonal high water table (shwt) is estimated to be 18 to 30 inches from the ground surface based on the RIDEM soil site evaluation procedure. Data loggers and other field monitoring devices were used to record actual water table fluctuations.

Results show that RMFs are a good indicator of the "average shwt", defined as the average depth of the water table between the low and high points during the spring. However, RMFs do not identify the highest the water table rises, or how long the water table remains high. This is a concern because OWTS design is based on the depth to the SHWT where common abundance (2-20%) of RMFs is found. If the water table rises above this level, the separation distance between the bottom of the OWTS drainfield and the water table will be compromised, increasing risk that untreated bacteria will enter groundwater.

Nutrient Treatment in Shallow Drain Fields

Holden, S.A. 2004. The effectiveness of shallow narrow drainfields to treat domestic wastewater. Master's Thesis, Department of Natural Resources Science, University of Rhode Island, Kingston, RI, 02881. (pdf not available)

Holden, S.A., M.H. Stolt, G.W. Loomis, and A.J. Gold. 2004. Seasonal variation in nitrogen leaching from shallow-narrow drainfields. Proceedings of the Tenth National Symposium on Individual and Small Community Sewage Systems, ASAE.

Combined Summary:
Seven residential sites using onsite wastewater treatment systems were monitored in coastal Rhode Island to examine nitrogen removal by pressurized shallow narrow drainfields (PSND) following advanced treatment units. Sites varied in age from four to six years. Five suction-cup lysimeters were installed at each site, three within the PSND and two within a control plot outside the drainfield area. In the SND, lysimeters were installed in the undisturbed soils adjacent to each trench at a depth of 12 inches below the drainfield lines. Control lysimeters were placed at approximately 28 inches below the soil surface. Soil porewater samples were

collected through the lysimeters twice seasonally from the winter of 2001 until the summer of 2003 and analyzed for total N. Average concentrations of N entering the groundwater for these seven sites ranged from 2 to 41 mg/l. Six of the seven sites showed a 33 to 73% overall reduction in N levels as a result of treatment in the SND. Higher chloride to nitrogen ratios in porewater below the SND indicates removal of N by plant uptake or denitrification rather than dilution.

Seasonal affects were recognized for inputs of N into the groundwater for two of the sites – with highest levels measured in the winter and lower levels in the spring and summer and increased levels in the fall. This trend is likely due to reduced biological activity during colder temperatures. There were no observed seasonal effects on the amount that N levels were reduced as a result of treatment in the SND. Porewater samples collected from the control area of two sites had considerably higher levels of total nitrogen (TN) than those below the SND. The higher N levels outside the SND are likely the result of excess fertilizer additions to the lawns. Unpublished data from the Master's thesis shows that phosphorus reduction below the SND was 55 to 100 % due to adsorption by the soil and uptake by vegetation.

Other Papers and Reports

Introduction

The following wetland buffer studies and synopsis papers focus on:

- General references for other types of regulatory reviews
- Buffer Zones for Amphibians / Reptiles
- Buffers Zones and Other Taxa

The topics are addressed by a variety of organizations from governmental to nonprofits. Not all of these collected and listed here have been read on behalf of the Task Force but represent a collective knowledge of the Literature Review Subgroup of the Task Force on the subject of wetland buffers. The publications were scanned for additional information to supplement the wetlands and OWTS topics that were read above. A brief summary is provided for one key paper but is not a substitute for reading the complete paper. All findings and recommendations are those of the cited authors.

General References

- A Local Officials Guide to Regulating Land Use in Wetland Buffers and High Water Tables to Protect Water Quality, Pamela Cunningham, Sea Grant Law Fellow, Roger Williams University School of Law, 2009

- Berkshire Regional Planning Commission, 2003, The Massachusetts buffer manual: using vegetated buffers to protect our lakes and rivers. Massachusetts Department of Environmental Protection

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- *Water Quality Function of Wetland Buffers*: A Brief Annotated Bibliography, Nathaniel Lichtin, University of Rhode Island Coastal Fellow, URI Cooperative Extension, RI Nonpoint Education for Municipal Officials, November, 2008

- Wenger, S. 1999. A review of the scientific literature of riparian buffer width, extent, and vegetation. Institute of Ecology, University of Georgia. Athens, GA.

- From Zhang, X., X. Liu, M. Zhang, and R.A. Dahlgren, 2010. A review of vegetated buffers and meta-analysis of their mitigation efficacy in reducing nonpoint source pollution.

  Summary: Buffer width alone explains only part of the effectiveness of buffers: (surface and groundwater sources)
  - 37% sediments
  - 60% pesticides
  - 44% nitrogen
  - 35% phosphorus
  -

  Slope, soil chemistry, soil structure, and vegetation type are other variables that correlate with removal efficiency. Moreover, there is great variability on the effectiveness of buffers for nutrient removal; the R^2 of the data is often less than 0.7, the generally accepted value of a good fit, if not far less in most cases.

Buffer Zones and Amphibians / Reptiles

- Baldwin, R. F., A.J. K. Calhoun, P. G. deMaynadier. 2006. Conservation planning for amphibian species with complex habitat requirements: a case study using movements and habitat selection of the wood frog Rana sylvatica. Journal of Herpetology, 40(4), 442-453.

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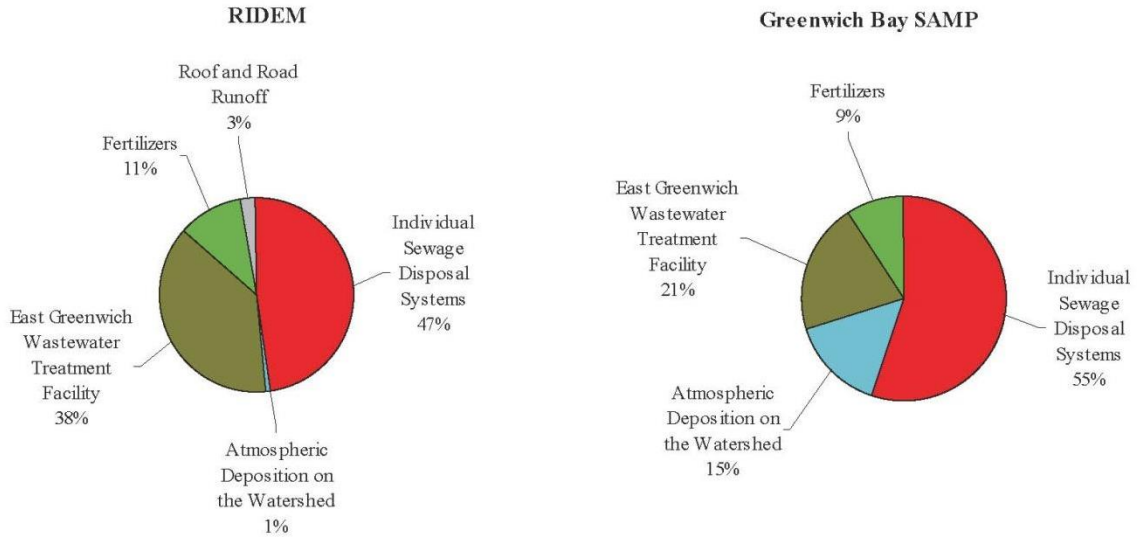
OWTS

- *Greenwich Bay Special Area Management Plan*, 2005, RI Coastal Resources Management Council, Wakefield, RI

http://www.crmc.ri.gov/samp_gb.html

Figure 39. Comparison of RIDEM summer nitrogen loadings to the Greenwich Bay Special Area Management Plan annual nitrogen loadings for similar sources



- *Rhode Island's Salt Pond Region: A Special Area Management Plan* (Maschaug to Point Judith Ponds), 1984 (amended 1999), RI Coastal Resources Management Council, Wakefield, RI
http://www.crmc.ri.gov/samp_sp.html

1984 Salt Pond Region Special Area Management Plan

TABLE 3-2. Preliminary Estimates of Inorganic Nitrogen Inputs to the Salt Ponds (lbs. N/yr.) (from field measurements by Nixon et al. 1982)

Source	Ninigret Pond	Green Hill Pond	Trustom Pond	Cards Pond	Potter Pond	Ft. Judith Pond
Groundwater	66,920	37,080	9,260	13,910	24,317	59,830
Precipitation on ponds surface	7,400	1,860	680	180	1,420	6,790
Storm runoff	500	230	70	150	140	810
Streams	2,800	2,460	0	570	0	16,000
Block Island Sound	6,000	1,000	0	0	in prep.	in prep.
TOTAL	83,620	42,540	10,010	14,820	25,880	83,440

Groundwater is the single largest source of nitrogen loading to the salt ponds accounting for 72 – 94% of all sources

- *Final Watershed Management Plan for Green Hill and Eastern Ninigret Ponds*, South Kingstown and Charlestown ,Rhode Island, RI DEM; Salt Ponds Technical Advisory Committee and the salt Ponds Coalition, Horsley Witten Group 2007

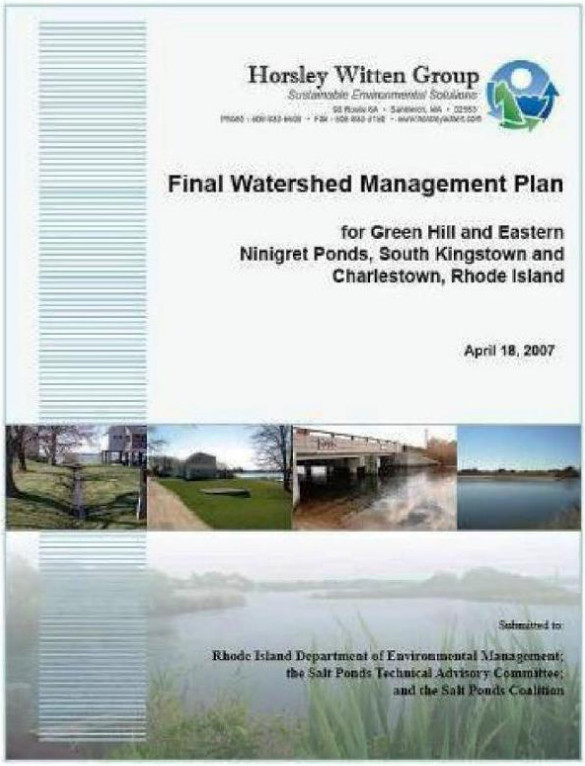


Figure 8: Land Use Derived Sources of Nitrogen Loading to Green Hill Pond from Groundwater (source: URI MANAGE Model, 2005)

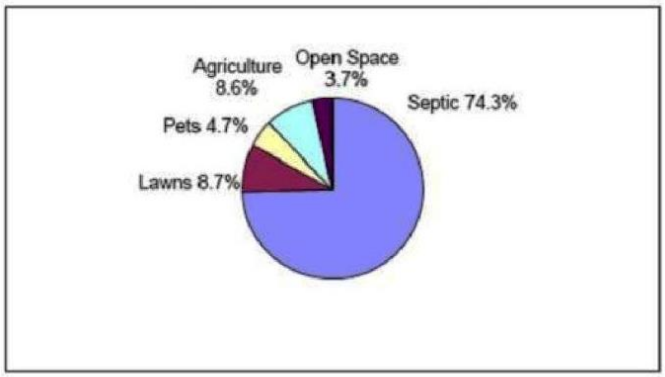
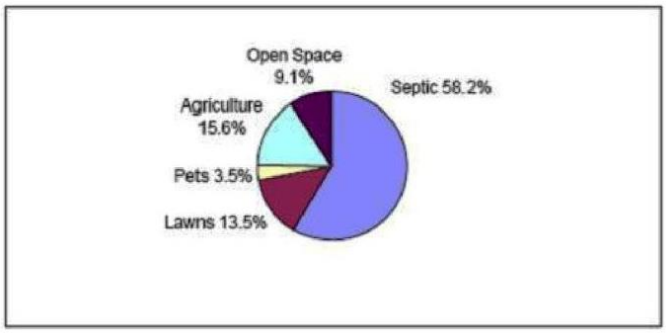


Figure 9: Land Use Derived Sources of Nitrogen Loading to Ninigret Pond from Groundwater (source: URI MANAGE Model, 2005)



Gill, L.W., O'Luanaigh, N., Johnston, P.M., Misstear, B.D.R., O`Suilleabhain, C. *Nutrient Loading on Subsoils from On-site Wastewater Effluent, Comparing septic Tank and Secondary Treatment Systems*, Water Research (2009), doi: 10.1016/j.watres.2009.03.02
http://www.tara.tcd.ie/bitstream/handle/2262/37766/Gill%20et%20al%20%28Nutrient%20Loading%20on%20Subsoils%29.pdf?sequence=1

Appendix E: Glossary

This is a list of selected terms as used in this Report. Rhode Island based terms have been color coded by origin or agency to help the reader distinguish between the different sources as follows (other sources have not been colored):

- DEM is green: for example: as defined or used by DEM or [Wetlands Rule 4.00]
- CRMC is blue: for example: as defined or used by CRMC or [CRMP Section 150.A]
- Rhode Island General Law is purple: for example: as defined by RI Gen. Law or [R.I.G.L. 2-1-20(3)]

Anadromous fish are those that spawn in freshwater, migrate to and spend most of their life in the saltwater, and then return to freshwater to spawn and complete their life cycles. Rhode Island anadromous fishes include herring, shad, and salmon.

Anaerobic means the absence of oxygen.

Area of Land Within Fifty Feet (50') as defined by DEM and used interchangeably with the term *Perimeter Wetland* is a freshwater wetland 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. [Wetlands Rule 4.00]

Best Management Practices (BMPs) are generally accepted practices, procedures and management techniques that include, but are not limited to, schedules of activities, prohibitions, maintenance procedures, structural and non-structural methods, and other management approaches to prevent or minimize any reduction of the functions and values associated with freshwater wetlands. [Wetland Rule 4.00]

Buffer zone is generally a vegetated upland area adjacent to a wetland that is maintained in an undisturbed condition to protect the wetland and its functions and values from degradation. Buffers also enhance or augment the functions and values that wetlands provide.

1. Buffer zone as defined by DEM is 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. [Wetlands Rule 4.00]

2. Buffer zone as defined by CRMC is the land area on or contiguous to a shoreline feature that is retained in its natural undisturbed condition. [CRMP Glossary]

3. Buffer zone as defined by Massachusetts means any area of land extending 100 feet horizontally outward from the boundary of any bank, freshwater wetland, coastal wetland, beach, dune, flat, marsh, or swamp. [CMR 10.04 and 10.02(1)(a)]

4. Buffer Zone as defined by Vermont means the area contiguous with a significant wetland which serves to protect those values and functions sought to be preserved by its designation, consistent with 10 V.S.A. 902 (9). [Vermont Rule 2.05]

CRMC means the RI Coastal Resources Management Council.

CRMP means the RI Coastal Resources Management Program.

Class 1 Wetland as defined by Vermont means a wetland that: (A) is identified on the Vermont significant wetlands inventory maps as Class 1 wetland; or (B) the Panel determines, based on an evaluation of the extent to which the wetland serves the functions and values set forth in the Vermont wetlands law and rules, is exceptional or irreplaceable in its contribution to Vermont's natural heritage and, therefore, merits the highest level of protection, [Vermont Rule 2.06]

Coastal Buffer Zone as used by CRMC is a land area adjacent to a Shoreline (Coastal) Feature that is, or will be, vegetated with native shoreline species and which acts as a natural transition zone between the coast and adjacent upland development. A Coastal Buffer Zone establishes a natural area adjacent to a shoreline feature that must be retained in, or restored to, a natural vegetative condition. [CRMP Section 150.A]

Coastal Wetlands as defined by CRMC include salt marshes and freshwater or brackish wetlands contiguous to salt marshes or physiographical features. In addition, coastal wetlands also include freshwater and/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. [CRMP Glossary]

Contiguous Area as used by CRMC includes all lands and waters directly adjoining shoreline features that extend inland two hundred (200) feet from the inland border of that shoreline feature, within which any proposed alteration or activity requires a CRMC assent. [CRMP Section 100.1]

Critical Resource Areas as used by DEM OWTS are areas particularly sensitive to the detrimental effects of nutrients, pathogenic organisms, organic chemicals and other substances that may be present in effluent from OWTSs. These areas are in need of special protection from such effects due to the unique and irreplaceable value of the resource as a public water supply, fisheries habitat or public recreation area. (Currently, three critical resource areas have been designated: Salt Pond, Narrow River, and Drinking Water Supply Watersheds.) [OWTS Rule 38.1]

Cumulative Impact as defined by DEM means the combined impact on the wetland environment and its functions and values which may result from past, present, and future alterations to the same wetland system, regardless of what agency or person undertakes such alterations. [Wetland Rule 4.00]

DEM means the Rhode Island Department of Environmental Management.

Denitrification is a microbial process that converts nitrate to nitrogen gas in an anaerobic environment.

Facultative Wildlife Species as defined by DEM means wildlife that utilizes wetlands as habitat, but generally do not require wetlands for survival or reproduction. [Wetland Rule 4.00]

Floodplain as defined by RI Gen. Law is a freshwater wetland that is the area of land adjacent to a river, stream, or intermittent stream that is on average likely to be covered with flood waters resulting from a one hundred (100) year frequency storm, which is a storm that is likely to be equaled or exceeded once in one hundred years. [R.I.G.L. 2-1-20(3)]

Freshwater Wetland as defined by RI Gen. Law includes but is not limited to, 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. [R.I.G.L. 2-1-20(4)]

Freshwater Wetlands in the Vicinity of the Coast are freshwater wetlands that are seaward of the Rhode Island freshwater wetland jurisdictional boundary that are regulated by the Coastal Resources Management Council (CRMC) consistent with the R.I.G.L Sections 46-23-6 and the *Rules and Regulations Governing the Protection and Management of Freshwater Wetlands in the Vicinity of the Coast*.

Hydric Soil is a soil formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part which favors the growth and regeneration of hydrophytes. [NRCS 1995]

Hydrophyte is a plant that grows in water, or in or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content. [Wetland Rule 4.00]

Insignificant Alteration as defined by DEM is in the opinion of the DEM, a proposed alteration, limited in scope, area or duration, which appears to result in no more than a minimal change or modification to the characteristics, functions or values of any freshwater wetland(s), and is not random, unnecessary or undesirable. [Wetland Rule 4.00]

Jurisdictional Boundary is the line determined by the DEM and the CRMC, pursuant to RI Gen. Law. that designates areas of freshwater wetland jurisdiction between the agencies. With few exceptions, freshwater wetlands landward of the jurisdictional boundary are under the authority of the DEM, and freshwater wetlands seaward of the boundary are under the jurisdiction of the CRMC.

Leachfield as defined by DEM is a group of one (1) or more dispersal chambers or trenches designed for the final treatment and dispersal of wastewater into the underlying soil. The leachfield shall be held to mean the horizontal and vertical lines circumscribing the outermost edges including the area between the chambers or trenches and the depth to the bottom of stone. [OWTS Rule 7]

Mitigation is a process undertaken by single or cumulative actions to avoid or lessen the damaging effects of human activities upon freshwater wetlands and the functions and values that they provide prior to, during, or after completion of any project. [Wetland Rule 4.00]

Obligate Wildlife Species as defined by RI DEM means wildlife that depend upon freshwater wetlands for all or part of their life cycle. [Wetland Rule 4.00]

Onsite Wastewater Treatment System (OWTS) is 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. [OWTS Rule 7]

Perimeter Wetland as defined by DEM is a freshwater wetland consisting of the land within fifty feet (50') of the edge of any freshwater wetland consisting in part, or in whole, of a bog, marsh, swamp or pond. [Wetland Rule 4.00]

Prime Wetlands as used in the New Hampshire *Fill and Dredge in Wetlands Act* means any contiguous areas falling within the jurisdictional definitions of the law 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. [NH 482-A:15 (1a)]

Rare as defined by DEM means when used in the context of species or freshwater wetland types, those invertebrate and vertebrate animals or plant species or those freshwater wetland types that are listed as threatened, endangered, or special interest or special concern under the DEM Natural Heritage Program;

by the DEM Division of Fish and Wildlife; or under the federal Endangered Species Act. [Wetlands Rule 4.00]

Riverbank 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. [R.I.G.L. 2-1-120(9)]

Runoff is that portion of precipitation which is not absorbed into the ground and which drains naturally or through manmade channels to surface water bodies. [CRMP Glossary]

Significant Alteration as defined by DEM is in the opinion of DEM, a proposed project which by its area, scope or duration, appears to represent more than a minimal change or modification to the characteristics, functions or values of any freshwater wetland(s); may be detrimental to the natural capabilities or values associated with any freshwater wetland(s); or appears to be random, unnecessary or undesirable.

Tributary as defined by DEM is any flowing body of water or watercourse that provides intermittent or perennial flow to down-gradient watercourses that eventually discharge to the waters of concern (e.g., reservoir impoundment or salt pond). [OWTS Rule 7]

Setback as used by DEM is the horizontal distance between the parts of an Onsite Wastewater Treatment System (OWTS) and the parts of the OWTS specified in the Rules, such as a well, wetland, or drinking water supply. [OWTS Rule 22]

Setback as used by CRMC is the minimum distance from the inland boundary of a coastal feature at which an approved activity or alteration may take place. A setback establishes a minimum distance between a shoreline feature and construction activities. [CRMP Section 140 A]

Vernal pool as defined by the U.S. Army Corps of Engineers State of Rhode Island General Permit is a confined basin depression with water for two or more continuous months in the spring and/or summer, for which evidence of one or more of the following indicator vernal pool species: wood frogs (*Rana sylvatica*), mole salamanders (*Ambystoma* spp.), and fairy shrimp (*Eubranchipus* spp.) has been documented or for which evidence of two or more of the following facultative organisms: caddisfly (*Trichoptera*) larvae casings, fingernail clams (*Sphaeriidae*), or amphibious snails (*Basammatophora*) and evidence that the pool does not contain an established reproducing fish population has been documented. [USACE 2012]

View Corridor as used by CRMC is an area where selective tree removal and pruning and thinning of natural vegetation may be allowed within a defined corridor within a Coastal Buffer Zone in order to promote a view of the shoreline, provided the area is not a sensitive or critical habitat area. [CRMP Section 150 F]

Watercourse as defined by DEM is 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 watercourses affected by the tides. [OWTS Rule 7]

Watershed is the area of land where all of the water that is under it or drains off of it goes into the same place. [EPA 112414]

Appendix F: Other Topics

The following are a list of other 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]*

- State regulations do not address the cumulative effects of multiple wetland alterations, OWTS approvals, and stormwater discharges within a watershed or neighborhood over time (except to some degree in CRMC SAMP areas). Each OTWS application is reviewed individually based on system function without addressing associated impacts of other development impacts, land disturbances, and stormwater runoff. Nor is the cumulative effect of all existing OWTS and new systems together with other non-point source impacts, comprehensively addressed in combination with future growth in most OWTS reviews. *[Task Force Members - Lorraine Joubert and Russell Chateauneuf]*

- The Freshwater wetland regulations provide guidance on minimizing and avoiding impacts but compliance can be subjective. In addition, the guidelines are generic for all types of wetlands and sites. The previous wetlands task force recommended measurable performance standards. *[Task Force Member - Lorraine Joubert]*

- <u>Statutory Changes</u>

    - Revise state law to provide state agencies with the authority to establish performance standards for land use activities and discharges affecting jurisdictional areas and which consider the cumulative effects of such activities. Such standards shall be consistent with existing RIDEM permitting programs, including the RIPDES general permits for Storm Water Discharges from Small Municipal Separate Storm Sewer Systems and for Construction Activity. *[Task Force Member - Lorraine Joubert]*

- <u>Regulatory Changes</u>

    - Revise regulations to establish performance standards to avoid and minimize impacts associated with land disturbance, stormwater runoff, and OWTS design specific to the type of wetlands and receiving waters affected. This would create incentives for landowners to design projects that avoid encroachment on jurisdictional areas and buffers while also

providing clear, consistent, and defensible guidance on required measures where disturbance is unavoidable. *[Task Force Member - Lorraine Joubert]*

- Consider eliminating municipal veto of FWW permits and develop better preliminary/conceptual plan review to engage local community for input during state review process of major projects. Alternatively, develop specific criteria for substantive objection only based on biological impacts under which the local community could veto. *[Task Force Member – James Boyd]*

    - Although infrequent the formal application usually are very constricted properties. State approvals for such properties are often perceived as "punting" the taking issue to the Town. *[Task Force Member Vincent Murray]*

- Consider establishing jurisdictional area around streams and rivers along with associated buffers based on stream order. Prioritized protection for upper order streams (headwaters). *[Task Force Member – James Boyd]*

- Setback reduction/credit for enhanced leach-field treatment beyond the primary treatment unit, including Cat 1 soils. *[Task Force Member – Thomas D'Angelo]*

- Mechanism for further reducing or crediting future advanced treatment technologies and credit / reduction for stormwater BMP are employed. *[Task Force Member – Thomas D'Angelo]*

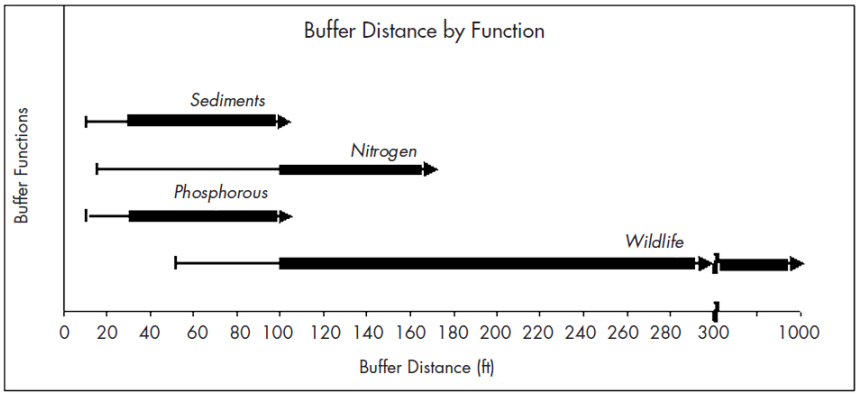
- Rules should consider differing standards for existing lots of record, enhanced streamline permitting for variances, which would otherwise be approved anyway. Eliminate owner financial/ time burden. *[Task Force Member – Thomas D'Angelo]*

- The area of jurisdiction for critical resource areas should be 300 feet. *[Task Force Member – Scott Rabideau]*

    The Task Force supported all of the recommendations by consensus with one exception. The lone exception was the proposal to increase the jurisdictional areas for critical areas to 300 feet. There was 1 dissenting member out of 15 members on supporting this particular recommendation. The dissenting member was the RIBA representative as the Association did not agree with the 300 foot distance proposed. It was their position that critical areas currently exist in the Rules and already have their own protection. See the meeting notes for meeting #15 in Appendix B for more details. Since the final Task Force meeting, numerous others have expressed concern over the 300 feet and it was decided by the DOP to separate this idea from the others which were fully supported by the Task Force.

- Include the tables from the Literature Review for the newer approaches for buffer ranges based on water quality functions and site specific conditions. *[Task Force Member - Lorraine Joubert]* {Tables are below and are fully explained in Appendix B, Literature Review}

Environmental Law Institute 2008 Planner's Guide to Wetland Buffers for Local Governments



Rhode Island LID Site Planning and Design Guidance Manual

Function	Range of Riparian Buffer Widths		Minimum Recommended Buffer Width
	Environmental Law Institute (2003)	*Fischer and Fischneich (2000)*	
Stream Stabilization	30-170 ft	30-65 ft	50 ft[1]
Water Quality Protection	15-300 ft (remove nutrients)[2] 10-400 ft (remove sediment)	15-100 ft	100 ft[3]
Flood Attenuation	65-500 ft	65-500 ft	FEMA 100-year floodplain plus an additional 25 ft[4]
Riparian/Wildlife Habitat	10 ft-1 mile	100 ft-0.3 mile	300 ft[5]
Protection of Cold Water Fisheries	>100 ft (5 studies) 50-200 ft (1 study)	--	150 ft[6]

- Include the table from the Golet/Murphy that was originally introduced as a result of the earlier Blue Ribbon Commission (1995) effort to provide some insight as to what a buffer matrix might look like. It could be used as a starting point for rule making discussions. Readers would benefit by seeing examples of:

  1) where the buffer width is NOT (typically) the same width as the jurisdictional zone, and

  2) how the buffer zone/setback concept is very different than the current state law in which all wetlands so defined must be protected from random, undesirable and/or unnecessary alterations.[*Task Force Member – Russell Chateauneuf]* Tables follow on subsequent pages.

Table 8. Tiered buffer zones and setbacks for Rhode Island's freshwater wetlands.

Tier/ Wetland type	Bordering land [1] (ft)	Buffer zone[2] (ft)	Setback[3] (ft)
TIER 1 • Perennial watercourses	200	150	175
TIER 2 • Permanent or semi-permanent standing water bodies • Permanent or semi-permanently flooded vegetated wetlands • Bogs and fens • Natural Heritage sites • Critical amphibian habitat (CAH)[4]	100	100	100
TIER 3 • Seasonal standing water bodies other than CAH • Seasonally or temporarily flooded vegetated wetlands other than CAH • Intermittent watercourses	100	75	100
TIER 4 • Seasonally saturated vegetated wetlands	100	50	75

[1]DEM jurisdictional zone.
[2]Portion of bordering land maintained in a natural, undisturbed condition.
[3]Minimum distance from landward edge of freshwater wetland at which certain approved activities or alterations (e.g., homes, septic systems) may take place.
[4]Any freshwater wetland habitats that are known to support breeding wood frogs, spotted salamanders, marbled salamanders.