Coastal Features

INFORMATION ABOUT THE RHODE ISLAND COASTAL RESOURCES MANAGEMENT PROGRAM

Winter 1998 Volume VI No. 2

Land Use and Water Quality

Because healthy, diverse and abundant coastal resources require clean water, the impacts of land-based activities on water quality is a primary concern of the Council. Accordingly, many of the regulations contained in the Rhode Island Coastal Resources Management Program (RICRMP), including the Special Area Management Plans (SAMPs), are implemented to minimize the impacts of land development activities on coastal waters.

While revising the Salt Pond and Narrow River SAMPs, Council staff had the opportunity to revisit the relationship between land use and coastal water quality using new data and the latest scientific information. Paramount in its findings is that the quality of both surface and groundwater is largely dependent upon how adjacent land areas are developed. Based on this most recent research, the Council is taking steps to insure that development needs continue to be balanced against the requirements for sustainable coastal resources.

Generally, pollution resulting from land use activities is nonpoint source; that is, it does not originate from a particular point such as a pipe or other discreet conveyance. Nonpoint pollution results when rain or melting snow, traveling through the watershed as either surface or groundwater, picks up and deposits material which degrades water quality. With the success of the Clean Water Act over the past twenty-five years in controlling point sources of pollution, the Environmental Protection Agency has determined that nonpoint pollution is now the number one cause of water quality impairment in the U.S.

Often, the materials which cause nonpoint pollution are naturally occurring and do not pose a threat to coastal waters in small quantities. However, the most benign or even a desirable material can become a pollutant when introduced in large quantities to coastal waters. For example, although nitrogen is essential for plant and animal life, excessive levels can have catastrophic impacts on coastal resources. Furthermore, nonpoint pollution is a personal matter: it is the cumulative result of individual actions and the development context in which they occur.

As a result of the high population density and commensurate level of land development, as well as historic development patterns, stormwater runoff from intensely developed areas is a major source of nonpoint pollution to Rhode Island's coastal waters. Septic systems that are poorly sited, designed, installed or maintained, and failing and substandard septic systems also are a significant nonpoint pollution source. Therefore, the focus of this issue of Coastal Features is on these two nonpoint pollution problems; their causes and effects, and examples of some of the projects being undertaken to address them. This newsletter provides only a sampling, however, of the numerous valuable efforts being conducted throughout the state by the Council and many others.

Inside This Issue

Urban Runoff

Stormwater runoff from impervious surfaces in densely developed areas is a major source of nonpoint pollution to coastal waters. Although Rhode Island ranks 42nd among the 50 states in population, it is the second most densely populated state. It is not surprising, therefore, that urban runoff is a major source of nonpoint pollution in Rhode Island's coastal waters.

The concentration and sources of pollutants found in stormwater runoff are largely dependent upon the type and intensity of land use. Activities taking place in densely developed residential, commercial and industrial areas generate much higher concentrations of pollutants than do activities taking place in low density residential areas and woodlands. Moreover, densely developed areas contain a greater percentage of impervious surfaces. Impervious surfaces prevent infiltration of storm water and include roads, roofs, parking lots, sidewalks, etc. These surfaces are significant due to their impact on the velocity, volume, and quality of surface runoff.

When impervious surfaces are created, hydrologic changes take place that can have serious impacts on water quality. Because water can no longer naturally infiltrate into the ground, the actual volume and velocity of surface runoff increase. This can result in greater erosion, and more frequent and severe flooding. Decreases in infiltration threaten drinking water supplies by lowering water tables and reduce the contribution of groundwater to stream flow, particularly during dry weather periods. Natural pollutant attenuation through infiltration and plant uptake is also prevented by impervious surfaces. Additionally, urban land uses generate pollutants which, due to the impervious surfaces associated with this type of development, are then more easily transported to coastal waters.

Methods for Treating Polluted Runoff

During the planning phase, certain practices and mechanisms can be incorporated into project design to mitigate stormwater impacts following development. Structural approaches rely on three basic mechanisms to treat runoff: infiltration, filtration and detention.

Infiltration systems rely on absorption to treat runoff. Through the use of devices such as infiltration trenches and basins and porous pavement, water is percolated through soils, where filtration and biological action remove pollutants. Filtration systems require deep, permeable soils at separation distances of at least 4 feet between the bottom of the structure and seasonal ground water levels. Although it can be useful in maintaining or restoring the natural hydrology of a watershed, infiltration may not be appropriate where groundwater levels are high or where groundwater resources require special protection.

Filtration practices such as filter strips, grassed swales, and sand filters treat sheet flow by using vegetation or sand to filter and settle pollutants. In some cases filtration practices are combined with infiltration devices. After passing through the filtration media, the treated water can be directed into a receiving waterbody, evaporated, or allowed to percolate into ground water.

Detention involves the temporary impoundment of runoff to control runoff rates, and settle and retain suspended solids and associated pollutants. These systems include extended detention ponds, wet ponds and constructed wetlands. When constructed, landscaped and maintained properly, these detention systems can provide wildlife habitat and reduce nutrient loads in runoff through plant uptake. More innovative and high tech detention technologies, such as the Vortech™ system, that are designed to allow settlement of solids, have also been successfully used to treat stormwater.

Runoff Pollutants

The following are the principal types of pollutants found in runoff from intensely developed areas.

Sediment

Suspended sediments constitute the largest mass of pollutant loadings to surface waters and can have significant long and short term impacts on coastal water quality. (USEPA 1993) Among the adverse effects of high concentrations of sediment are increased turbidity, decreased light penetration and decreases in submerged aquatic vegetation (see shaded box on next page). By causing changes in the water column and sea floor, these impacts can have significant long-term consequences for shell and fin fishing resources.

Nutrients

Excessive levels of nutrients in coastal waters can have catastrophic consequences for coastal resources. Of concern in Rhode Island, particularly in the salt ponds region, is nitrogen enrichment which can result in eutrofication (alteration of the aquatic environment characterized by excessive growth of aquatic plants and algae and low levels of dissolved oxygen) and have severe effects on marine life and habitat. Although typically associated with failed or poorly functioning septic systems, nutrients contained in fertilizers can also be a significant nonpoint pollution source.

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Coastal features

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This issue of *Coastal Features* was edited by Laura Miguel. To comment on any article or to make address changes, write the CRMC at the Oliver Stedman Government Center, 4808 Tower Hill Road, Wakefield, RI 02879 or contact us on-line at ricrmc@riconnect.com.

Runoff Pollutants

Oxygen-Demanding Substances

Among the effects of excessive levels of nitrogen in coastal waters is escalated aquatic plant growth which depletes dissolved oxygen necessary for aquatic life. This problem is compounded by increased levels of decaying organic matter which is transported to coastal waters in runoff. The National Urban Runoff Program found in some cases that oxygen-demanding substances in runoff reached concentrations similar to secondary sewage treatment discharges (USEPA 1988).

Pathogens

While pathogen contamination is often associated with failed or poorly functioning septic systems, pets can be a significant source of pathogens to coastal waters. Wildfowl have also been identified as a potentially significant source of pathogen contamination. (SAIC Engineering Inc. 1994).

Road Salts

Runoff from roads treated with salt and from salt storage areas can be a major pollutant toxic to benthic (bottom dwelling) organisms and interfere with crucial water column mixing that occurs in the spring. Groundwater contamination from salt storage areas has also significantly affected several private wells in the state. (RIDEM 1995)

Hydrocarbons

Identified with automobiles and automobile-related activities, hydrocarbons can have particularly toxic impacts on marine resources. Once transported to coastal waters via runoff, hydrocarbons often attached to bottom sediments where they persist for long periods and adversely impact benthic communities. (USEPA 1993) While no study has documented any widespread water quality problems associated with hydrocarbon runoff in Rhode Island, certain troublespots have been identified. (RIDEM 1995)

Heavy Metals

Although heavy metals are typically associated with point sources of pollution, heavy metals such as copper lead and zinc are often found in urban runoff. These metals can be toxic to aquatic life, bioaccumulate in fin fish and shellfish and contaminate ground water supplies.

Submerged Aquatic Vegetation

Submerged aquatic vegetation (SAV) refers to rooted, vascular, flowering plants that, except for some flowering structures, live and grow beneath the water line. In Rhode Island waters the most common type of SAV is eelgrass (Zostera marina).

SAV communities perform a broad range of important functions and are among the most productive ecosystems in the world. They provide food for waterfowl and critical habitat for many important shell fish and finfish species including winter flounder, lobster and striped bass. SAV beds can also aid in baffling wave energy and slowing water currents, consequently reducing erosion and the amount of suspended sediments in the coastal environment. SAV cycle nutrients, taking them out of the water column and removing them as a food source for microalgae.

Like all plant life, SAV requires nutrients. However, excessive levels of nutrients in coastal waters, particularly nitrate-nitrogen, can have serious impacts on SAV communities. Excessive nutrients stimulate the growth of marine algae which collect on the leaves and in the water column. High amounts of algae limit the ability of light to reach SAV and therefore interfere with the plants' capacity for photosynthesis. In addition, high levels of sediments within the water column can also prevent adequate levels of light from reaching the plants.

Greenwich Bay Watershed Stormwater Management Program

The CRMC, the City of Warwick and others have identified the Greenwich Bay watershed is a priority area and significant resources have been invested in its restoration. Among the ongoing efforts is the Greenwich Bay Watershed Stormwater Management Program. As part of this project, under an Aquafund grant the Southern Rhode Island Conservation District (SRICD), in cooperation with the City of Warwick, is working to address nonpoint source pollution by evaluating storm drain systems for maintenance needs and retrofit potential for the watershed. With the assistance of numerous local, state and private agencies, including the CRMC, the project will serve as a model to be used statewide for reducing nonpoint source pollution from previously developed areas.

The objectives of this project are threefold. First, a method for identifying, evaluating, and ranking existing stormwater facilities according to their ability to improve water quality in a selected watershed will be developed. This method, which will be tested in a sub-basin of the Greenwich Bay watershed, will be developed so that it can serve as a model to be used statewide.

A second objective of the project is to develop guidance materials to assist municipalities in the maintenance and retrofit of storm drain systems for improving water quality. The guidance materials will assist municipalities in deciding where to focus their efforts by providing standards for comparison and a ranking system. A final objective of the project is to provide the City of Warwick with a priority listing of stormwater systems in need of maintenance and/or retrofit to achieve water quality improvements.

The Greenwich Bay Stormwater Management Program is one step toward implementation of Rhode Island's Coastal Nonpoint Pollution Control Program, developed in accordance with requirements contained in section 6217 of the Coastal Zone Act Reauthorization Amendments of 1990. It also addresses recommendations contained in Rhode Island's Nonpoint Source Management Plan as well as in the Narragansett Bay Comprehensive Conservation and Management Plan. This project is expected to be completed by the end of 1998.

For more information contact Kris Stuart, SRICD, (401)828-8832

How the Septic System Works

The basic conventional septic system is composed of a septic tank followed by a drainfield (also called a leach field or soil absorption field). Wastewater flows out of the house and into the septic tank through the building sewer pipe. Once in the septic tank, most solids in the wastewater settle to the bottom of the tank to form a sludge layer. Other solids, such as grease and fats, float and form a scum mat on top of the wastewater. The primary function of the septic tank is to trap and store solids, most of which can be broken down by anaerobic (without oxygen) digestion. In a properly functioning septic tank, up to 80% of the solids can be broken down into gases and liquids.

The liquid leaving the septic tank is usually cloudy and contains many pollutants and disease-causing microbes. This liquid flows into the drainfield through a network of perforated plastic pipes surrounded by crushed stone. The drainfield acts mainly to store wastewater until it is absorbed by the underlying soil. Treatment of the effluent occurs as it flows through the soil between the drainfield and the groundwater table.

Household waste enters the septic tank, whereupon biological treatment of that waste, as well as settling of solids, begins. Wastewater flows from the septic tank and travels to the drain field, beneath which should be a zone of unsaturated soil. Many of the harmful bacteria and microbes are filtered out as the wastewater passes through this soil. Some of the smaller microbes (viruses) and nutrients such as phosphorous and some forms of nitrogen are trapped and held (adsorbed) by soil particles.

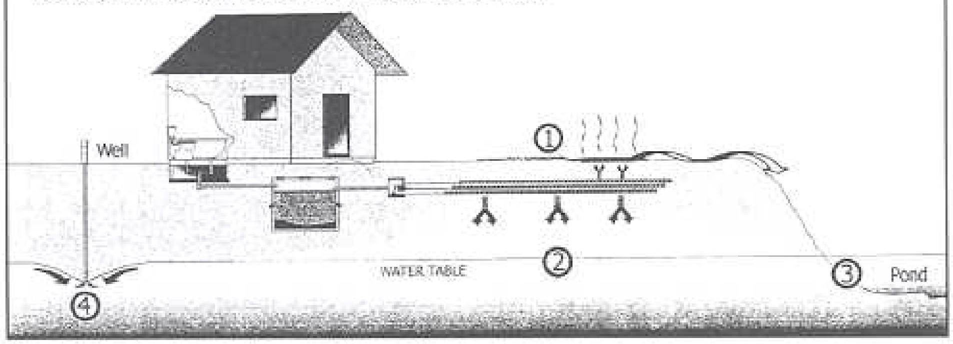
Once effluent reaches the groundwater table or underlying bedrock, little treatment occurs. Soils can differ markedly in their pollutant removal efficiency and are a principal determinant of the quality of wastewater eventually reaching the groundwater beneath the drainfield.

Adapted from, Loomis and Fullerton, Maintaining Your Septic System, Fact Sheet No. 96-1.URI Cooperative Extension, July 1996.

How Septic Systems Fail

One type of septic system failure happens when wastewater effluent is unable to seep into the ground because of system damage, clogged soils, a solids-filled septic tank, or high water table in the leach field. Sluggish drains and wastewater backups into the house are the most obvious problems. **Lush growth of grass, squishy patches above the leachfield, and odor (1)** are other tell tale signs of this classic hydraulic failure.

Less visible but equally harmful to water quality is treatment failure where wastewater reaches **groundwater (2)** without adequate purification. Treatment failure is most common in quick-draining sandy soils where rapid movement short-circuits natural treatment, in high water table areas, and in shallow soils where effluent channels along compacted soil layers or bedrock fractures. Once in the groundwater, pathogens and nutrients persist. Because the direction of groundwater flow is generally towards surface waters or pumping wells, improperly treated effluent can eventually **enter wetlands, streams, ponds (3), and wells (4).**



The Problem

Approximately 22 million households (or about 1/3 of the U.S. population) use a septic system to treat their domestic wastewater. In Rhode Island alone, over 140,000 septic systems are presently in use.

When a septic system is suitably located, adequately designed, carefully installed and properly maintained, it serves as a wastewater treatment system that is simple, effective and economical. But improper use, lack of maintenance, outdated systems, poor soil conditions or thickly settled neighborhoods can lead to expensive repairs or unsanitary conditions.

Homes built before 1970 frequently rely on cesspools or other systems which would not meet RI septic system standards today. Since the typical life span of a septic system is about twenty years, many have probably outlived their usefulness. Also, many homes which were originally constructed as summer homes have been converted to year-round residences or expanded without adequate septic system upgrades.

Dense development along the shore presents problems since effluent from systems located along the shore has only a short distance to travel before reaching surface waters. In addition, not only does the effluent have a short distance to travel but, very often effluent from shoreline development is inadequately treated due to the sandy nature of shoreline soils.

Septic systems have been implicated by numerous studies as major contributors of nutrients, bacteria and viruses to ground and surface waters in Rhode Island. Total and fecal coliform contamination of several surface water areas has been associated with runoff from failed septic systems where ponding of effluent on the ground surface has occurred. As a result of high bacteria rates, recreational activities have been restricted and shellfish beds have been closed.

Excessive nutrient levels, particularly nitrate-nitrogen is a problem of particular concern in the coastal zone. Traditional septic systems are capable of removing only 10 - 20 percent of nitrate-nitrogen, a form of nitrogen that moves readily in the environment, from septic system effluent. In coastal regions, high inputs of this form of nitrogen can have significant adverse impacts on aquatic habitats and marine life. In addition, high concentrations of nitrate-nitrogen have been associated with methemoglobinemia in infants (blue baby syndrome).

Many of the impacts of excessive nutrient levels in coastal regions are associated with eutrofication, where nutrient inputs result in alterations to the aquatic environment characterized by excessive growth of aquatic plants and algae and low levels of dissolved oxygen. In coastal waters these impacts include:

- reduced biodiversity
- increased seaweed biomass
- shift from large to small phytoplankton
- shift in species composition of phytoplankton from diatoms to flagellates (which are less desirable as a food source for shellfish and other filter feeders)
- loss of eelgrass habitat
- shift from filter feeding to deposit feeding benthos
- increased organic matter in bottom sediments
- increased disease in fish, crabs and lobsters
- increased frequency and aerial extent of low oxygen events resulting in depletion of fish and shellfish populations
- phytoplankton blooms
- loss of aesthetic quality and recreational use

SEPTIC TANKS: Then and Now

Past - Circa 1970 and older

Cesspool – an unlined pit, perforated chamber, or covered hollow that receives and collects sewage and discharges liquids to the surrounding soil.

1970 to Present

Concrete tank, not tested for watertightness and frequently found to leak.[1]

Single compartment

Access manhole buried below ground surface.

Alternative – low cost, low-tech solutions to improve system performance

Concrete or fiberglass tank, certified water-tight

Dual compartment to promote solids settling before discharge to leach field

Access riser with manhole cover at ground surface for easy inspection and maintenance.

Effluent filter – a low-cost, low-tech way to keep solids out of the leach field.

[1] URI On-Site Wastewater Training Center.

Are you interested in learning how to reduce pollution risks in and around your home? Or maybe you would like to work with people in your community - your neighbors – to reduce pollution risks? If so, then you may want to join with others in becoming a Rhode Island Home*A*Syst volunteer. The University of Rhode Island Cooperative Extension Water Quality Program is gearing up for its annual Home*A*Syst volunteer training program. This nine session course is taught by specialists on a variety of topics including: drinking water well protection, indoor air quality, septic system operation and maintenance, composting, and yard and garden care.

The Rhode Island Home*A*Syst program is a voluntary residential pollution prevention program that trains residents to protect their family's health and the environment. To do this, the program focuses on our own backyards. Your home is often your most valuable investment. Home*A*Syst helps residents identify environmental risks and encourages preventative, cost effective actions before problems occur.

POLLUTION PREVENTION IS THE GOAL OF THE PROGRAM

Participants in the training program receive 24 hours of instruction over nine weeks. After completing the training, each person is encouraged to volunteer 20 hours with the Rhode Island Home*A*Syst program in activities of their choice. You may help conduct workshops with program staff, give presentations at a local school, or lend your specific talents and assist in other aspects of program development and delivery. Last year's class of volunteers worked in teams within specific targeted areas, educating their neighbors at workshops and community events.

Trained volunteers serve as a link between resource agencies, like URI's Cooperative Extension, and residents. The role of the volunteer is to work with residents in their community to help them understand how their actions can impact environmental quality in and around the home. As a result of the Home*A*Syst Program, residents throughout the state are properly maintaining their septic systems, having their well water tested, properly disposing of household hazardous waste, and evaluating their home site for potential pollution sources.

As a volunteer, you will be trained in techniques to reduce pollution from residential areas and given the opportunity to develop skills to work with the public. You can have the satisfaction of using your talents while serving your community. Volunteers will gain experience and meet professionals in the filed of natural resource management and protection. If you are concerned with the quality of the environment, being a Home*A*Syst volunteer gives you the opportunity to make a very real difference for your community and the environment.

The training program is held Thursday evenings from 6:30 - 9:30 PM and two Saturday morning sessions. It begins March 5, 1998 and runs through April 30, 1998. There is a $25.00 registration fee. Once volunteer time is completed, the registration fee will be returned.

For more information on the program or to become a RI Home*A*Syst volunteer, contact Alyson McCann at the University of Rhode Island, Cooperative Extension Water Quality Program at (401)874-5398 or e-mail at alyson@uriacc.uri.edu.

Contributed by Alyson McCann, U.R.I. Cooperative Extension

Demonstration, Research, and Monitoring Projects

Background

In the spring and summer of 1997, seventeen failed septic systems were replaced with alternative and innovative (A&I) septic systems in the communities of North Kingstown, Portsmouth, and Warwick under the auspices of two State-funded projects. The Rhode Island Aqua Fund Project funded A&I installations to replace four failed septic systems in each of these three communities. Under a separate initiative, the Narragansett Bay National Estuary Project funded replacement of an additional five failed systems with A&I systems in Warwick.

Coordination of projects was done by the University of Rhode Island On-site Wastewater Training Center. These installations were part of a joint collaboration between U.R.I., CRMC, Rhode Island Department of Environmental Management (RIDEM), the Rhode Island Independent Contractors and Associates, the Warwick Sewer Authority, and three communities. Site plan surveying and drafting for the sites were donated by two local firms - Frisella Engineering in Wakefield, and Narragansett Engineering in Portsmouth. Product donations and educational discounts were contributed by several area businesses and national companies. Both of these programs are administered by the RIDEM.

Project Objectives

Project objectives are several-fold: 1) perform A&I system installation training for participating contractors, 2) using these installations, train septic systems designers, regulatory agencies, municipal officials and board members, and homeowners about how to design, operate and maintain A&I systems, 3) evaluate system performance and monitor pollutant removal efficiency of the systems and convey this information to local and state agencies to help formulate policy and regulations, and 4) based on system treatment performance, promote the use of proven technologies to help protect and improve water quality in sensitive areas.

Status Report

Twenty-seven contractors received training while participating in the installations of these systems. Several participating contractors are now using the knowledge gained from this project to successfully bid on, receive contract awards for, and install A&I systems.

These systems have already been used to promote better understanding of A&I septic system function. Field tours of backyard installations have been held for several audiences and will actively continue in 1998-99. Municipal outreach activities with target town/city planning, public works, zoning and building official staffs are being coordinated through the U.R.I. Cooperative Extension Municipal Watershed Training Program. Homeowner outreach activities are being done by the U.R.I. Home*A*Syst Program and the Cooperative Extension Education Center.

System performance evaluation is underway on the twelve systems funded by the Aqua Fund Project and will continue through mid-summer 1998. Start-up monitoring funds for the systems installed under the Narragansett Bay Project, as well as continued funding for the Aqua Fund system performance monitoring is being investigated. Start-up performance and operation and maintenance needs information is already being integrated into policy documents which will help develop Rhode Island sand filter system regulations.

Green Hill Pond Demonstration Sites Wanted

The U.R.I. On-site Wastewater Training Center is looking for owners of failed septic systems in the Green Hill Pond watershed of South Kingstown and Charlestown to qualify for a fifty percent cost sharing on a new septic system. Under a national septic system demonstration program, the Center will replace five failed or substandard systems with alternative and innovative systems and pay half the cost. The objectives of this study are similar to those mentioned above. If you have a failed system or cesspool, you live year-round in the Green Hill Pond area, and you want to be considered, please call David Dow at 874-5950 or George Loomis at 874-4558 for more information. All information about your existing system will be held in strict confidence, and will not be used against you.

Contributed by George Loomis, U.R.I. On-site Wastewater Training Center

Innovative Solutions for Coastal Communities

New options for on-site wastewater treatment

In the early 1980s the first nitrogen-reducing septic systems were installed, by CRMC order, in the south shore coastal ponds area. Prompted by the need for independent long-term evaluation of these technologies, URI researchers in the Department of Natural Resources Science, led by Dr. Art Gold and George Loomis constructed a field laboratory to monitor the long-term performance monitoring of these systems. This work ultimately led to establishment of the URI On-Site Wastewater Training Center — an outdoor training center with numerous innovative technologies built above ground for training in the design, function and maintenance of advanced treatment systems.

Today, on-site wastewater technologies are being installed in residential and commercial properties throughout Rhode Island. A wide variety of technologies are available for new construction and repairs to meet water quality goals and overcome site problems. Some, specifically classified as "nitrogen reducing" systems, are capable of cutting total wastewater nitrogen by 50 percent. The favored technology for nitrogen-sensitive coastal zones for 15 years, these are now being used more commonly to safeguard aquifer recharge areas. State regulations have already been revised to allow use of these systems through either the standard application process or through a variance procedure, depending on the technology used.

A wide range of options are now available, with an equally wide range of pollutant removal efficiencies and applications to meet specific site constraints. Some technologies are designed to be used as a single treatment assemblage, from septic tank to final disposal at the drainfield. In many cases, however, system components can be mixed and matched to provide optimum performance based on the effluent quality desired, site constraints, maintenance needs, and cost.

Despite this variety, alternative systems do share common features. Innovative systems generally include an additional treatment step after the septic tank, producing higher quality effluent before it reaches the drainfield. This is a big step forward for two reasons: (1) reduced

(continued on next page)

nutrient and pathogen levels protects vulnerable water resources, and (2) cleaner effluent helps prevent clogging of the drainfield. Where soils are suitable, high-quality effluent can be discharged to reduced-size conventional drainfields or to shallow alternative drainfields. Shallow drainfields place effluent in biologically active upper soil layers where additional treatment is most likely to take place through natural processes. In addition, they can be installed on compact sites with limited disturbance.

Selecting the right system for your site depends on site-specific features and the vulnerability of local water resources. Treatment units and drainfield options can be combined to greatly reduce solids, pathogens, or nutrients. It is important to keep in mind however, that improved treatment efficiency general corresponds to increased system complexity. With alternative technologies, maintenance is essential for optimum performance. All on-site wastewater system need at least regular pumping for best function and longevity but alternative technologies are certain to malfunction without regular inspection and maintenance.

What's being done

CRMC has been a driving force behind use of nitrogen-reducing technologies in Rhode Island's coastal areas. Several coastal communities are now leading efforts to improve local management of on-site disposal systems through either voluntary or mandatory septic system maintenance programs. The Town of New Shoreham has adopted a wastewater management ordinance that calls for mandatory inspection and pumping as necessary. With funding from the RI Clean Water Finance Agency, the towns of Charlestown, South Kingstown, Narragansett, and Westerly are currently developing wastewater management plans to identify the extent of the problem and put a management structure into place.

What you can do

- Support adoption of your town's wastewater management efforts. Learn about proposed regulations and attend hearings.
- Have your system inspected every one to three years and pump as necessary. Consider upgrading if yours is substandard.
- Properly dispose of motor oil and household chemicals. Do not dump hazardous waste down drains – the well you contaminate may be your own.

A great deal of information is available, from URI Cooperative Extension and other sources, to help you keep your septic system functioning, to protect your own well, and to safeguard water quality in your neighborhood through the URI Cooperative Extension hotline at 1-800-448-1011. For more information specifically about alternative on-site technologies, contact George Loomis (874-4558) or David Dow (874-5950) at the URI Cooperative Extension On-Site Wastewater Training Program.

Contributed by
Lorraine Joubert, George Loomis, and David Dow

MANAGE: A Tool for Managing Impacts to Coastal Watersheds

The URI Cooperative Extension (CE), with funding from USDA Cooperative State Research Education and Extension Service, has developed a community-based training and technology transfer program to assist municipal officials identify sources of pollution and develop effective strategies to protect local water resources. Working closely with the RI Office of Municipal Affairs, CE offers: 1) educational programs on land use and resource management topics ranging from statewide conferences to customized multi-session workshops for town officials sharing a watershed; 2) direct technical assistance to town staff and boards based on local needs and interests; and 3) tools for watershed management, such as training in use of Geographical Information Systems (GIS) and application of the MANAGE watershed assessment method.

MANAGE – the Method for Assessment, Nutrient-loading And Geographical Evaluation of watersheds is a GIS-based watershed management tool developed specifically for use in RI. This method combines readily available coverages of the RIGIS database and an Excel spreadsheet to summarize soils and land use characteristics and identify high risk areas where pollutants are most likely to move into groundwater and surface waters. The method incorporates a hydrologic model to estimate nitrogen and phosphorous loading to surface runoff and recharge groundwater as one measure of pollution risk. A number of other indicators are used, such as watershed impervious area, percent forested land, and vegetated stream buffers. Pollution "hot spots" - areas where natural features and high intensity land uses combine to increase risk of nutrient movement to aquifers and surface waters - are identified, then mapped and displayed using ArcView GIS software. By running alternative and development scenarios, the relative change in pollution risk can be compared for changing land uses. A unique feature of MANAGE is its ability to easily evaluate the change in pollution risk under various management scenarios, such as improved septic system maintenance, upgrading septic systems with innovative technologies, and improved stormwater management. Development and testing of MANAGE was funded by RI AquaFund. It has been successfully applied in the Hunt-Potowomut, Block Island, and Green Hill Pond watersheds where the results are being used to support wastewater management planning. Because the quality of coastal ecosystems is a direct reflection of landscape features and activities throughout a watershed, this work promises to provide a powerful tool for managing terrestrial inputs to coastal ecosystems.

For more information about MANAGE contact Lorraine Joubert, URI Cooperative Extension at (401)874-2134 (Ljoubert@uriacc.uri.edu).

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