Water Quality Protection

SAFE AND HEALTHY LIVES
IN SAFE AND HEALTHY
COMMUNITIES

Rhode Island Department of HEALTH

UNIVERSITY OF Rhode Island

Residential Series
March 2004

Shoreland Buffers

RHODE ISLAND IS A STATE RICH IN WATER RESOURCES. From our freshwater lakes and ponds, rivers and streams, and abundant groundwater resources to our coastal ponds, estuaries, Narragansett Bay, and the Atlantic Ocean, our water resources sustain our livelihood. Our land use activities affect the quality of these water resources. There are many things that each of us can do to protect water resources. In this factsheet, we focus on Shoreland or Riparian Buffers to protect water quality. To find out more about other ways of reducing pollution, refer to the factsheet *What You Can Do About Nonpoint Source Pollution.*

Shoreland Buffers

Shoreland buffers provide a link between the water and the land. They are transition zones between upland areas and surface waters (Addy et al, 1999). Under natural conditions, these areas are often wet at least part of the year and contain a variety of trees, shrubs, or other vegetation. In an undisturbed state, these areas provide habitat for wildlife and help to improve water quality. They serve to slow down the flow of stormwater runoff and remove some of its contaminants before entering a water body.

Natural or maintained shoreland buffers are largely responsible for the many benefits that water resources provide us such as:

- ***Protecting water quality*** by trapping nutrients and sediments in stormwater runoff. The plants act as a barrier slowing down water flow and giving sediments and other contaminants time to settle out of the runoff. Additionally, plant roots can take up nutrients within the stormwater.

- ***Renovating groundwater quality.*** The plant roots within the buffer can take up dissolved nutrients within the shallow groundwater, thus removing nutrient pollution. This is especially important near coastal areas where increased levels of nitrogen can result in algal blooms in coastal ponds and rivers.

- ***Protecting against flooding*** acting as both a barrier and a sponge to slow down water flow and allow it to move into the soil. This increases groundwater recharge, temporarily stores and slowly discharges precipitation and snowmelt to surface waters over a longer period of time. This is crucial in maintaining a natural balance in the water cycle.

- ***Providing habitat for both aquatic and terrestrial life.*** They provide areas for birds, fish, and other wildlife to breed, eat, and nest. Under natural conditions, they also consist of many aquatic plants. Buffers are extremely important in that they provide shade to shoreline areas, which helps to regulate water temperatures.

- ***Providing shoreline aesthetic value*** adding appeal to the Rhode Island shoreline with its native plant life and wildlife. They add a sense of privacy, providing both visual and noise barriers.

- ***Reducing lawn maintenance*** by reducing the size of your lawn, saving you time and money. A manicured lawn, planted with high maintenance grass species, requires intensive watering, mowing, fertilizing, and pest management. Buffers containing native plants are usually more drought tolerant, grow well in less fertile conditions, will not require frequent mowing or trimming, and are less susceptible to insects and disease.

Some native plants for re-establishing a coastal buffer and an upland freshwater buffer.

SHORELINE SITES – EITHER FRESH OR SALT WATER

- **Grasses/sedges for Grassland Habitats**

Little Bluestern (*Schizachyrium scoparium*), Pennsylvania Sedge (*Carex pensylvanica*), Big Bluestem (*Andropogon gerardii*), Broomsedge (*Andropogon virginicus*), Switchgrass (*Panicum virginicum*), Indian Grass (*Sorghastrum nutans*),

- **Plants for Marshy habitats and Wet Meadows:** Tussock sedge (*Carex stricta*), Blue Flag (*Iris versicolor*), Soft Rush (*Juncus effuses*), Wool-grass (*Scirpus cyperinus*), Joe-pye Weed (*Eupatorium maculatum, E. dubium, E. purpueum, E. fistulosum*), New York Ironweed (*Vernonia noveboracensis*), Boneset (*Eupatorium perfoliatum* + others), New York Aster (*Aster novi-belgii),* Cardinal-flower *(Lobelia cardinalis),* Swamp-milkweed (*Asclepias incarnata)*, Turk's Cap Lily (*Lilium superbum)*, Smooth Goldenrod (*Solidago gigantean)*

© Hilton Pond Center

- **Plants for Dry Meadows:** Pearly Everlasting (*Anaphalis margaritacea*), New England Blazing-star (*Liatris scariosa* var. *novae-angliae*; = *Liatris borealis*), Evening Primrose (*Oenothera biennis*), Butterfly Weed (*Asclepias tuberosa*), New England Aster (*Aster novae-angliae*), Wild Lupine (*Lupinus perennis*), Stiff-leaved Aster *(Aster linarifolium)*, Round-headed Bush Clover (*Lespedeza capitala)*, Mountain-mint *(Pycnanthemum* spp.), Goldenrods (*Solidago* spp.)

- **Plants for Beach sites/dunes:** Beach-heath (*Hudsonia tomentosa*), Seaside-goldenrod (*Solidago sempervirens*), Shadbush *(Amelanchier canadensis),* Beach-plum *(Prunus maritime),* Northern Bayberry *(Myrica pensylvanica*), Dwarf Sumac (*Rhus copallinum)*

- ***Providing recreational opportunities*** including fishing, shellfishing, boating, swimming, nature observation, and photography. Buffer zones can restore and enhance surface waters for these many recreational activities.

Create your own buffer zone

You can also incorporate buffers around other areas of your home to provide noise barriers from the street, to capture roof runoff and prevent it from flowing into the driveway and a nearby storm drain, or for visual or weather barriers.

Buffers come in all shapes and sizes and can contain a variety of plants – grasses, perennials, shrubs, and trees. The way stormwater moves through a buffer is very important. You do not want stormwater to concentrate or channel and form gullies through the buffer. Whether you are establishing new buffers or protecting and maintaining existing buffers, survey your property and observe how water moves over it. Fix any channel or gully flow that may be occurring on your property as stormwater leaves gutters, driveways, and any paved areas. This is often accomplished by dissipating stormwater flow with splash blocks or crushed stone and directing it to level, well-vegetated areas or small depressional areas. Rain barrels and rain gardens can also be installed.

Below, we have outlined some of the basic principles for establishing a buffer and some simple steps to help you get started.

- If you live right on the water's edge, one of the easiest ways to start is to simply create a no-mow zone between the managed lawn or landscape and the water body. Do not apply fertilizers and pesticides. Over time, this area will revert back to its natural state. There is the potential for invasive plant species, such as Autumn Olive to establish. Frequent inspection and mechanical removal of these species is recommended. Contact the Rhode Island Wild Plant Society for more information on native and invasive species, (401) 783-5895 or visit their website at www.riwps.org.

- When establishing specific plantings, incorporate native and other sustainable landscape plantings into the buffer. Choosing plants that are naturally suited to the site conditions promotes healthy, vigorous growth without as many added inputs such as fertilizers and pesticides. There is a list of some suggested plants for both fresh and saltwater areas included in this publication. In addition, you can refer to the Sustainable Trees and Shrubs for Southern New England publication available from the URI Cooperative Extension GreenShare Program and on-line at www.uri.edu/ce/factsheets/sheets/sustplant.html for a more complete listing.

- Take advantage of natural berms and depressions in the landscape as these areas help to slow stormwater flow and allow it to move into the soil. If these features don't exist, you can create them such as a rain garden.

Modifications and plantings in the buffer area should be carried out in phases during the growing season when vegetation can re-establish and water levels are usually lower. This will limit the amount of soil disturbance close to the water's edge. Large areas of disturbed land can result in erosion and sedimentation, especially during the wet season (late fall through early spring).

The buffer width can be a minimum of 20 – 25 feet. However, if your lot size is restricted and unable to accommodate this width, consider working within your property limitations and establishing an area that works for your particular situation - try for a 10 ft. minimum. Alternatively, if your lot size allows, you can go wider than 25 feet.

A buffer width of 20 – 25 feet allows for a variety of plantings. You can incorporate trees, shrubs, and perennials. To maintain access to the water's edge, establish a narrow, winding footpath to prevent runoff water from channeling and creating gullies. Depending on how steep and heavily used the path is, consider lining it with crushed stone to further absorb runoff and prevent soil erosion.

Maintaining a buffer

As with other landscaped areas around your home, there may be some maintenance required within the buffer area, such as pruning, weeding, or thinning of plants. If you choose to use shrubs and trees in the buffer, there may be minimal maintenance required over time.

If sediment builds up in the buffer, remove and redistribute it to upland areas so that the buffer continues to function. Otherwise, runoff water will start to channel and find ways to by-pass this sediment-laden area, resulting in pollution to the water body. Furthermore, high levels of trapped sediments could indicate a need to further address upland erosion and runoff problems.

Regulations Protecting Riparian Areas

Check to see if the modifications you plan to make are subject to federal, state, and local rules and regulations. In some cases you may need to obtain a permit to make improvements to your landscape. Allowing areas to revert back to a natural state versus managing a landscaped buffer may affect how regulations apply to these areas in the future. It is important that you contact the proper agencies before starting any projects. If you live in a coastal area contact the Coastal Resources Management Council. If you live inland, contact the RI DEM Office of Water Resources. Also, contact your town hall to find out what local rules and regulations may apply.

• • •

Nova Scotia Museum, Mary Primrose

• **Shrubs for Dry/Moist, Shady/Sunny sites:** Arrowwood (*Viburnum dentatum*), Highbush Blueberry (*Vaccinium corymbosum*), Inkberry Holly (*Ilex glabra*), Black Huckleberry (*Gaylussacia baccata*), Virginia creeper (vine) (*Parthenocissus quinquefolia*), Virginia rose (*Rosa virginiana*), Black Chokeberry (*Aronia melanocarpa*), Shadbush *(Amelanchier canadensis)*, Dangleberry *(Gaylussacia frondosa)*, Pasture-rose (*Rosa carolina)*

• **Shrubs for Sunny Dry sites:** Sweet Fern (*Comptonia peregrina*), Northern Bayberry (*Myrica pensylvanica*), Common Juniper (*Juniperus communis)*

• **Shrubs for shady moist sites:** Sweet Pepperbush (*Clethra alnifolia*)

• **Trees for Dry Shady/Sunny sites:** Red oak (*Quercus rubra*), Black oak (*Quercus velutina*), Black Cherry (*Prunus serotina*), Sassafras (*Sassafras albidum*), Red cedar (*Juniperus virginiana*), Pitch pine (*Pinus rigida*), Grey Birch *(Betula populifolia*)

• **Trees for Moist Shady/Sunny sites:** Red maple (*Acer rubrum*), Pagoda dogwood (*Cornus alternifolia*), Shadbush (*Amelanchier arborea*), Pussy Willow (*Salix discolor*), Yellow Birch (*Betula allegheniensis)*, Black Birch (*Betula lenta)*

• **Shoreline sites – out of reach of salt spray** Shrubs for Dry/Moist, Shady/Sunny sites: Mountain Laurel (*Kalmia latifolia*), sheep laurel (*Kalmia angustifolia*), Early Azalea (*Rhododendron prinophyllum*),

• **Shrubs for shady moist sites:** Swamp-azalea (*Rhododendron viscosum*), Winterberry Holly (*Ilex verticillata*), Witch Hazel (*Hamamelis virginiana*), Spicebush *(Lindera benzoin*), Rosebay Rhododendron (*Rhododendron maximum)*

• **Trees for Moist Shady/Sunny sites:** White pine (*Pinus strobus*), American Holly *(Ilex opaca)*

Recommendations from Save the Bay, Coastal Property And Landscape Management Guidebook, 1999 and Lisa Gould, Rhode Island Natural History Survey:

For More Information:

University of Rhode Island Cooperative Extension Home*A*Syst Program
Offers assistance, information, and workshops on residential pollution prevention including private well water protection, septic system operation and maintenance, landscaping for water quality protection, and actions residents can take to reduce pollution.
401-874-5398 www.uri.edu/ce/wq

Refer to our website www.healthylandscapes.org for more information on sustainable landscaping and stormwater runoff control.

URI CE GreenShare Program
(401) 874-2900 www.uri.edu/ce/ceec
The GreenShare Program provides scientifically accurate and environmentally sound information on management of suburban and urban landscapes. Integrated pest management, pollution prevention and sustainable landscaping are the guiding principles of all GreenShare programs.
The Sustainable Trees and Shrubs publication is available on-line at:
http://www.uri.edu/ce/factsheets/sheets/sustplant.html

RI Department of Health, Office of Drinking Water Quality
Offers assistance, information on testing and state certified laboratories.
401- 222-6867 http://www.health.ri.gov/environment/dwq/Home.htm
For a listing of HEALTH's certified private laboratories in Rhode Island http://www.health.ri.gov/labs/instate.htm

RI Coastal Resources Management Council
4808 Tower Hill Rd
Stedman Building
Wakefield, RI 02879
Phone: (401) 783-3370
Phone: (401) 222-2476
Fax: (401) 783-3767
http://www.crmc.state.ri.us

RI Department of Environmental Management, Office of Water Resources
235 Promenade Street
Providence, RI 02908
(401) 222-3961
www.dem.ri.gov

This project is a collaboration of the staff at the Rhode Island Department of Health: Dana McCants, Clay Commons, and the University of Rhode Island Cooperative Extension Water Quality Program: Alyson McCann, Holly Burdett, Brianne Neptin. Issued in furtherance of Cooperative Extension work and Acts of May 8 and June 30, 1914. Jeffrey Seemann, Dean and Director, College of the Environment and Life Sciences. The University of Rhode Island U.S. Department of Agriculture, and local governments cooperating. Cooperative Extension in Rhode Island provides equal opportunities in programs and employment without regard to race, sex, color, national origin, sex, or preference, creed or disability. This is contribution number 3997 of the College of the Environment and Life Sciences, University of Rhode Island.

Funding for this project is supported by HEALTH.

This project is a collaboration of the staff at HEALTH and the University of Rhode Island Cooperative Extension Water Quality Program.

Rhode Island Department of HEALTH

UNIVERSITY OF Rhode Island