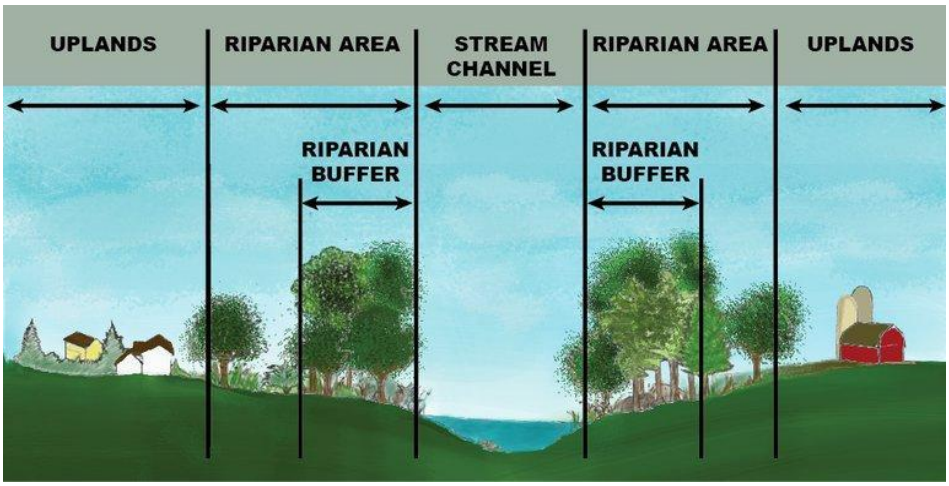
Maidford River Buffer Restoration Guide

August 2020

This guide is intended to assist property owners who are interested in restoring and improving riparian buffers along the Maidford River. While this guide is not an exhaustive resource, it is intended to give buffer property owners enough information and resources to design and implement their own restoration project. Property owners who need or want more assistance with designing and implementing a buffer restoration plan for their property may contact the project partners listed at the end of this guide.

About Riparian Buffers



The health of any river or stream depends upon the upland area that drains into it. A **riparian buffer** is the land next to a river or stream that is usually vegetated with trees, shrubs, ferns and other perennials, with a natural layer of previous year's growth. This vegetation protects the river system by slowing runoff from upland areas and filtering contaminants. The environmental and economic benefits of riparian buffers are well documented, and include:

- Reducing flooding by slowing stormwater runoff that travels over the land into the river and providing room for flood waters during large rain storms
- Improving water quality by trapping pollutants, sediment and debris that would otherwise end up in the river
- Reducing streambank erosion and increasing streambank stability
- Providing wildlife habitat
- Improving aesthetics for human residents

Property owners with land adjacent to the Maidford River can help protect the island's drinking water source by taking steps to re-establish natural buffers or improve existing buffers. The Southeast New England Network is working with the Aquidneck Land Trust and the Town of Middletown to restore the Maidford River to reduce flooding and protect water quality. If your property includes a buffer area, we can help you restore or improve it.

Each property is unique and options for riparian buffer restoration will vary for each. Generally speaking, the wider the riparian buffer, the greater the benefits. Buffers of 35' to 100' width are considered a minimum to protect water quality, and the State of Rhode Island uses a standard of 200' riparian buffer as protective for drinking water supply tributaries, as well as water quality and some habitat functions. Where lot size prevents buffers of these widths, restoring the area immediately next to the river to stabilize the streambank can reduce bank erosion and provide some water quality benefits.

A buffer with diverse plant species is better than one with fewer species, and native species are preferable. Specific buffer restoration options (described in more detail below) could include:

- Creating a "no mow" buffer. Moving the mowed area away from the riverbank is one of the simplest steps a property owner could take.
- Seeding an area with a conservation seed mix, tailored to the soil conditions on your property. Over time, and without mowing, new plants grow in the buffer. This is an easy and cost-effective way to get a lot of diverse plants, but it takes time.
- Planting a combination of native trees, shrubs and perennial plants is a great way to build a more established riparian buffer without waiting for seeds to mature.

Restoration Options

Once you've decided that you want to restore buffer on your property, the first thing you'll likely do is decide where you want the buffer to be and how much space you are able to allocate to it. Remember that the wider the buffer, the greater the benefit for water quality.

After you've selected your buffer area, it can be helpful to do a simple assessment of the location. Some questions to ask could include:

- What is the condition of the soil?
- What is the condition of the streambank? Is it eroding?
- Does the area flood frequently and will there be frequent standing water?
- What vegetation is currently present? Are there desirable species you want to keep? Are there invasive species you need to remove?
- How much sunlight does the location receive?

If your streambank is heavily eroded, you may need to consider an alternate location, as rapidly eroding streambanks may undermine seedlings. Streambank stabilization may need to occur prior to riparian buffer restoration.

These questions will help you decide what types of vegetation will do well in your buffer and how best to prepare the location for planting.

Once you have selected a location for restoration and assessed it, the next questions to ask are:

- What do I want my buffer to look like?
- How much work am I able to put into maintenance?
- What is my budget?

The answers to these questions will help you choose between the following restoration options. Property owners can choose one of – or a combination of – the following options.

Option 1 - Establishing a "No Mow" Buffer

Perhaps the easiest option for buffer property owners is to establish a "no mow" buffer area. Simply speaking, this is where you decide to stop mowing, raking or performing other lawn maintenance near the river, and allow the grasses and other vegetation in the newly-established buffer to grow freely. Over time the existing vegetation will grow, new species will colonize, and the buffer will provide some water quality and wildlife habitat benefits.

The installation of signage is often important for the success of a "no mow" buffer area (particularly if someone else routinely mows your property as buffers are often mowed down by well-intentioned landscapers.) The most effective sign will ideally clearly communicate to any groundskeeper that the area beyond is to revegetate naturally. Pictograms or multi-lingual signs should be considered. (The sign pictured here can be obtained and installed free-of-charge from the project partners.)

The "no mow" buffer can be mowed annually, but it shouldn't be done until September to protect ground nesting birds.

Option 2 - Planting a Conservation Seed Mix

Another great option for buffer restoration is to plant a conservation seed mix. Conservation seed mixes are often a mix of native grasses, forbs (flowering perennials) and even shrubs, and can be tailored for specific planting goals such as reducing erosion or attracting birds and pollinators. Planting a conservation seed mix is a bit more work (initially) than the "no mow" option, but can result in a more aesthetically pleasing buffer that accomplishes multiple goals.

As with most plantings, the best time to plant is mid to late spring. (See more on "when to plant" below.) Existing lawn will need to be cleared and prepared with a "slice seeder" or "lawn aerator." (These will help the seeds germinate and can be rented from your local hardware store.) For large areas the site could be harrowed to ensure seed-to-soil contact and be seeded in late fall. Seeds will start to grow starting the following spring.

Most seed should be planted no deeper than ½ inch and spread at a rate of 20-40 seeds per square foot. (Follow any planting instructions provided with your specific seed mix.) Summer seeding will benefit from a light mulching of clean, weed-free straw to conserve soil moisture. If an herbaceous buffer is desired, annual mowing to a height of 8" is recommended. No mowing is required if shrubs and a more diverse buffer is desired.

A buffer area planted with a conservation seed mix will take some time to establish until the seeds mature, and watering may be needed if conditions are dry. As with the "no mow" option, it will be helpful to place signage to keep your new buffer from being mowed or cut. Care must be taken to prevent invasive plant species from taking over.

Some suggested options for conservation seed mixes

Manufacturer	Seed Blend	Price (per lb)*
New England Wetland Plants, Inc *www.NEWP.com*	New England Erosion Control / Restoration Seed Mix	$37.00
New England Wetland Plants, Inc	New England Conservation/Wildlife Mix	$39.50
New England Wetland Plants, Inc	New England Wildflower Mix	$75.00
Ernst Seeds *www.ernstseed.com*	Retention Basin Wildlife Mix	$30.87
Ernst Seeds	Riparian Buffer Mix	$30.39
Ernst Seeds	Showy Northeast Native Wildflower & Grass Mix	$34.40

**Prices listed, as of July 2020*

Option 3 – Mixed Vegetated Buffer

In some ways, the ideal riparian buffer will contain a mix of trees, shrubs and herbaceous plants (wildflowers, ferns, groundcover plants.) The more vertical layers in your buffer, the better it will be at retaining stormwater through coating leaves and stems. Shrubs and trees also have deeper root systems to help stabilize streambanks and can shade out invasive plants such as Japanese knotweed.

While trees, shrubs and perennials can be grown from seed, doing so can take several seasons to establish (particularly with trees and shrubs.) Many property owners who wish to "speed up" the restoration process will opt to acquire potted plants and bare rootstock such as those available from a nursery or garden center. This option is generally more expensive than simply stopping mowing or planting a conservation seed mix, but can be faster and give you more control over the final look of your buffer.

When to Plant

Planting is generally a spring activity, with fall also being an acceptable time to plant. Summer planting is not recommended as planting during hot, dry conditions could delay seed germination and plant growth, and require extensive watering for new plants to survive. As with any planting, watering may be necessary while plants are becoming established and developing roots, especially during a drought or heat wave. Adding a mulch of dead leaves or compost will help maintain moisture in the soil for young plants.

How to Plant a Tree or Shrub

Always follow any instructions specific to your tree or shrub provided by your nursery or garden center.

- Dig the hole as deep as the root ball and twice as wide.
- Check to see if the soil around the hole is too hard and, if it is, loosen it up a bit with the shovel.
- Remove the plant's root ball from the container. The roots are like the plant's blood vessels, so they work best if they are not all twisted and knotted up; you might need to straighten them out if they are circling around inside the container, slicing through the outer layer of dense roots can also help.
- Place the tree's root ball in the hole, making sure the soil is at the same level as when the tree grew in the garden center. If the root ball is covered with burlap, place the tree in the hole and then carefully untie the burlap covering. Leave the burlap lying in the bottom of the hole; it will turn into organic matter over time.
- Fill around the root ball with soil and pack the soil with your hands and feet to make sure that there are no air pockets.
- Make a little dam around the base of the plant, as wide as the hole with left over soil or grass clumps, to hold in the water.
- Place fine and coarse woody debris and leaf litter within the restored area, including logs, various sized branches to provide wildlife habitat features.
- Depending on the species you plant, you may need to consider temporary enclosures to prevent deer browsing on shrubs as they establish. This could be a product such as tree tubes, chicken wire fence, or another product. Certain plants are also deer resistant.

You can follow a similar process for planting potted shrubs and perennials.

Native plants

Native plants have evolved over thousands of years to adapt to the geography, hydrology, and climate of a particular region. As a result, native plants form communities with other plants that provide habitat for a variety of wildlife species, such as songbirds and butterflies. Because native plants are adapted to local conditions, they provide a beautiful, hardy, drought resistant, low maintenance landscape option while also benefiting the environment. Once established, they often save time and money by eliminating the need for fertilizers, pesticides, water and lawn maintenance equipment.

When selecting plants, keep in mind the amount of light and water that the restoration location receives, as well as the type of soil. A sunny, dry location with sandy soil will need different plants than a shady, wet one with acid soil. Also, keep in mind plants that provide natural foods for wildlife such as plants that have fruits, seeds, nuts, and/or nectar.

Maintenance

Maintenance should begin immediately after the buffer has been planted. The following steps are recommended to improve the survivability of your riparian buffer, although this may not be an all-inclusive list:

- Visually inspect the buffer annually and after major storm events to see if any damage or problems have occurred.
- Control weeds and invasives as soon as possible, before they grow out of control. Weed control will vary, but may include mowing, selective use of herbicides, mulching, and other techniques.
- Replant/reseed any areas where your plants have died or been washed away by flood waters. Empty soil spaces are invitations to weeds and invasive plants.
- Ensure that any planted trees or shrubs are properly cared fair, including watering during dry spells in the first year.

If tree tubes are used, regularly inspect them to make sure they are not too tight on the tree, that small animals or insects have not built nests inside the tubes, and that the tree is growing properly. Replace or remove the tubes as needed. In later years, prune and thin trees and shrubs to ensure adequate growing space and optimal growth rates.

Maintenance will need to be budgeted for through the life of the buffer, which will be decades. Of course, maintenance will be more intense in the early years, as new plants are established. Once the trees are mature, they will shade out many of the competing weeds.

Maintenance will also vary depending on the surrounding land uses – if the neighboring property is full of weeds that are not managed, chances are they will grow into your buffer. Because riparian buffer maintenance requires holistic thinking about how the plants, water, wildlife, and land uses function together, the person(s) performing the maintenance should have at least a basic knowledge of each of these elements. It is not enough to know how to operate a mower or be certified in herbicide application; they should also know why water quality is important and why minimizing impacts to wildlife is essential.

Invasive Plants

The following is a partial list of some common invasive species frequently found on Aquidneck Island. Try to remove invasive plants early before their roots have become well established.

Most Common:
Alliaria petiolata - Garlic mustard
***Ailanthus altissima* - Tree of heaven**
Celastrus orbiculatus - Asian or, Asiatic bittersweet, oriental bittersweet

Elaeagnus umbellata - Autumn olive
Lonicera japonica - Japanese honeysuckle
Lythrum salicaria - Purple loosestrife
Phragmites australis - common reed
Polygonum cuspidatum - Japanese knotweed; Japanese Bamboo
Rosa multiflora - Multiflora rose

Tree of Heaven

Common:
Aegopodium podagraria - Bishop's goutweed, bishop's weed, goutweed
Berberis thunbergii - Japanese barberry
Cynanchum louiseae - Black swallow-wort, Louise's swallow-wort
Frangula alnus - European buckthorn, glossy buckthorn
Glaucium flavum - sea or horned poppy, yellow hornpoppy
Hesperis matronalis - Dame's rocket
Iris pseudacorus - Yellow iris
Lepidium latifolium - broad-leaved pepperweed, tall pepperweed
Lonicera x bella Zabel - Bell's honeysuckle
Lonicera morrowii - Morrow's honeysuckle
Lysimachia nummularia - Creeping jenny, moneywort
Myriophyllum heterophyllum - Twoleaved water-milfoil, variable water-milfoil
Myriophyllum spicatum - Eurasian or European water-milfoil, spike water-milfoil
Rhamnus cathartica - Common buckthorn
Trapa natans - Water-chestnut

Native Plants (Partial List)

Easy Plants for Dry Soils

Trees
Sassafras albidum – Sassafras
Quercus prinoides - Dwarf Chinkapin Oak
Quercus rubra - Red Oak
Pinus strobus – Eastern White Pine
Sorbus americana - American Mountain-ash

Shrubs
Amelanchier arborea – Tall Shadbush
Cornus racemosa - Gray Dogwood
Gaylussacia baccata - Black Huckleberry
Ilex glabra - Inkberry Holly
Kalmia angustifolia - Sheep Laurel
Myrica pensylvanica - Bayberry
Prunus maritima - Beach Plum
Rhododendron vaseyi - Pink-shell Azalea
Rosa virginiana - Virginia Rose
Spiraea alba var latifolia - Meadowsweet
Vaccinium angustifolium - Lowbush Blueberry
Vaccinium vacillans - Woodland Blueberry
Viburnum cassinoides - Wild Raisin
Viburnum dentatum – Smooth Arrowwood

Groundcover and Herbaceous Plants
Antennaria species - Pussy-toes
Aquilegia species - Columbine
Arctostaphylos uva-ursi - Bearberry
Asclepias tuberosa - Butterfly Weed
Carex pensylvanica - Pennsylvania Sedge
Gaultheria procumbens - Wintergreen
Heuchera cultivars - Alumroot, Coralbells
Iris verna v. smalliana - Clumping Dwarf Iris
Maianthemum canadense - Canada Mayflower
Potentilla tridentata - Three-toothed Cinquefoil
Rudbeckia fulgida v. sullivantii - Black-eyed Susan
Schizachyrium scoparium - Little Bluestem
Waldsteinia fragarioides - Barren Strawberry

Ferns
Dennstaedtia punctilobula - Hayscented Fern
Polystichum acrostichoides – Christmas Fern

Easy Plants for Moist Soils

Trees
Acer Rubrum - Red Maple
Betula nigra 'Heritage' - River Birch
Cercis canadensis - Eastern Redbud
Liriodendron tulipifera - Tulip Tree
Nyssa sylvatica – Tupelo (Black tupelo)
Quercus palustris - Pin Oak

Shrubs
Alnus serrulata - Common Alder
Amelanchier canadensis – Thicket Shadbush
Clethra alnifolia - Sweet Pepperbush
Cornus amomun - Silky Dogwood
Hamamelis virginiana - Common Witchhazel
Ilex verticillata - Winterberry
Lindera benzoin - Spicebush
Myrica gale - Sweet Gale
Rosa palustris - Swamp Rose
Sambucus canadensis - Elderberry
Taxus canadensis - Eastern Yew
Vaccinium corymbosum - Highbush Blueberry
Viburnum cassinoides – Wild Rasin
Viburnum dentatum – Smooth Arrowwood
Viburnum recognitum - Arrowwood
Viburnum lantanoides - Hobblebush

Groundcover and Herbaceous Plants
Arisaema triphyllum - Jack-in-the-Pulpit
Eupatorium - Eupatoriadelphus - Joe-Pye Weed
Lobelia cardinalis - Cardinal Flower
Maianthemum - Smilacina stellatum - Star Flower

Phlox divaricata - Wood Phlox
Podophyllum peltatum - Mayapple
Symphyotrichum novae-angliae – New England Aster
Trillium grandiflorum - Showy Trillium
Vaccinium macrocarpon – Cranberry

Ferns
Athyrium filix-femina - Lady Fern
Matteuccia struthiopteris - Ostrich Fern

Easy Plants for Wet Soils

Trees
Platanus occidentalis - American Sycamore
Quercus palustris - Pin Oak
Acer Rubrum - Red Maple
Fraxinus Pennsylvania - Green Ash

Shrubs
Amelanchier Canadensis (Canadian Serviceberry)
Aronia arbutifolia - Red Chokeberry
Ilex glabra - Inkberry Holly
Ilex verticillata – Winterberry
Lindera benzoin - Spicebush
Rhododendron viscosum - Swamp Azalea
Vaccinium corymbosum - Highbush Blueberry

Groundcover and Herbaceous Plants
Asclepias incarnata - Swamp Milkweed
Caltha palustris - Marsh Marigold
Camassia species - Camas Lily
Iris versicolor - Blue Flag Iris
Liatris spicata - Marsh Blazing
Star Lobelia cardinalis - Cardinal Flower
Rubus hispidus – Dewberry
Symplocarpus foetidus - Skunk Cabbage

Ferns
Osmunda cinnamomea - Cinnamon Fern
Osmunda claytoniana - Interrupted Fern
Osmunda regalis - Royal Fern

Additional Resources

Conservation seed mixes for buffer plantings can be purchased online at:
https://newp.com/catalog/seed-mixes/
https://www.ernstseed.com/

University of Rhode Island Cooperative Extension's Native Plant Guide:
http://cels.uri.edu/nativeplants/searchpage.aspx

Soil testing
https://web.uri.edu/mastergardener/soil-testing-service/

Rhody Native™ Native Plant Guide:
http://rinhs.org/who-we-are-what-we-do/programs-projects/rhody-native-home/plants/plant-guide/

Information regarding the benefits of placing a portion of your property in a conservation easement can be obtained from the Aquidneck Land Trust:
https://ailt.org/protect-your-land/conservation-easements/

USDA's Environmental Quality Incentives Program (EQIP) provides financial and technical assistance to agricultural and forestry producers to address natural resource concerns and deliver environmental benefits such as improved water and air quality, conserved ground and surface water, reduced soil erosion and sedimentation, and improved or created wildlife habitat:
https://www.nrcs.usda.gov/wps/portal/nrcs/main/ri/programs/financial/eqip/

For More Information

To schedule a free on-site assessment of your property and discuss specific restoration options, contact Jed Thorp with Save The Bay at 401-272-3540 x113 or jthorp@savebay.org.

Project Partners

The Maidford River Restoration Project is a pilot project of the Southeast New England Network, funded by a US EPA grant. The Network was formed to assist Southeast New England communities to advance stormwater management and ecological restoration, and develop sustainable revenue streams to support these efforts into the future. The Maidford River Restoration Project is a partnership that includes the Town of Middletown, Aquidneck Land Trust and Save The Bay with assistance from local consultants and technical experts, and funding support from the Eastern RI Conservation District.