

Coastal Buffer Zone Planting Guide

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RI Coastal Resources Management Council

In cooperation with the URI College of the Environmental and Life Sciences Outreach Center



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I. Purpose and Goals

The purpose of planting within a coastal buffer zone is to restore or enhance the buffer zone's functions (wildlife habitat, pollutant attenuation, erosion control, flood control, and aesthetic enhancement) that have been compromised by the removal of vegetation and other human disturbances, or by the encroachment of invasive non-native plant species. Restorative planting may be required as a condition of a CRMC permit. Restorative planting may also be done on a voluntary basis by coastal property owners who wish to enhance the functions of their coastal buffer zones. The goal of restorative planting is to create a restored native coastal plant community that mimics naturally vegetated shoreline areas.

While it is not possible to immediately recreate a mature, fully functioning natural forest or shrub plant community, this document offers guidance on selecting appropriate plants and planting them to create a functional coastal buffer zone. It also outlines the minimum requirements for coastal buffer zone restoration plans submitted to the CRMC.

II. A Note on Permitting...

Restorative planting within a coastal buffer zone, even when done on a voluntary basis, is a regulated activity that requires a permit from the CRMC. An application must be submitted to the CRMC that details all planting and maintenance activities. Be sure that your application meets the minimum requirements outlined in section VII. of this document. Please note that actual permit requirements may exceed the requirements outlined in this document.

Keep in mind that the CRMC buffer zone regulations require that once a buffer zone planting is established, it must be "left alone" and allowed to re-vegetate naturally. Certain maintenance activities are allowed, **but they must be part of a restoration plan that has been approved by the CRMC.** For a description of maintenance activities considered acceptable, and guidelines for submitting an application for buffer zone management and restoration, see CRMC's "Buffer Zone and Invasive Plant Management Guidance" at www.crmc.ri.gov/pubs/index.html#coastlandscapes.

III. General Restoration Plan Considerations

Restorative planting within a coastal buffer zone is different than typical backyard landscaping. Rather than creating a neat and tidy landscape, the goal of restorative planting is to develop a robust community of native plants that will thrive without intensive management, and provide habitat for wildlife. In a typical landscaped area, we might "clean up" things such as leaf litter and dead woody material. In a buffer zone, leaf litter and dead woody material and trees should be left in place because they provide benefits such as helping to prevent the germination of invasive plants, improving soil quality and providing habitat for wildlife.

The following are concepts to keep in mind when developing a coastal buffer zone restoration plan.

Preserve existing native vegetation. Existing native vegetation should always be preserved. This reduces the disturbance within the coastal buffer zone as well as reducing the need for new plant

materials. Add new native plants from the URI / CRMC Coastal Plant List to your existing native vegetation to meet restoration requirements such as percent cover and diversity of species.

Plant natives. Since native plants have evolved in Rhode Island and are suited to the conditions found here, they can be grown with relatively few inputs of additional nutrients (fertilizer) or water, and little maintenance. This makes them ideal candidates for restorative planting. They also provide the best quality wildlife habitat, and have life cycle characteristics, natural pests and competitors for resources that prevent them from becoming invasive.

Choose the right plant for the right spot. Choose plants that are suited to the conditions of your site (sun, shade, strong winds, sandy soil, etc.). Remember that conditions may vary within a site depending upon existing vegetation and wind breaks. Look at your lot and neighboring lots to see what species of native vegetation are growing on or near your site. If native vegetation is scarce, refer to the plant community lists in this document as well as the URI / CRMC Coastal Plant List (found at www.crmc.ri.gov/pubs/) for groups of native plants that are suited to your site conditions.

Layer to mimic natural plant community structure. When planning a coastal buffer zone restoration, keep in mind that the structure (height, density, etc.) of vegetation is as important for creating habitat as the plants that you choose. Maximize the vegetative layers of a restored area by planting understory shrubs and vines with a canopy layer of overstory trees above them and herbaceous plants including perennials and grasses, and groundcovers below them. This will result in a “multi-tiered” habitat system. Note that over time, plants will grow into one another and form denser coverage, providing additional habitat for wildlife and discouraging the growth of invasive plants.









Cluster like species. Create clusters of plants that can be found growing together in nature. Avoid the temptation to plant in straight rows, leave large spaces between plants or create isolated specimen plantings. Overlap one cluster with the next to create contiguous areas of vegetated cover.

Create diversity. Include many different species within your buffer zone to create a more ecologically healthy landscape. A diversity of trees, shrubs, herbaceous plants and groundcovers will provide food and shelter to a wider variety of wildlife species, and increase the chances of establishing a successful community of native vegetation. For aesthetic interest throughout the year, consider mixing evergreen and deciduous species.

Don't rake those leaves! A thick layer of leaf litter improves the wildlife habitat value of vegetated areas and helps to suppress the growth of invasive non-native species. A one-time application of 1 to 2 inches of non-dyed, shredded hardwood mulch can be used underneath planted areas, and then left alone to promote the establishment of a leaf litter or “duff” layer. In addition, it is recommended that dead fallen trees be left in place (where they are not a safety threat) to improve the wildlife habitat function of the buffer zone.

Use a “buffer transition zone.” If you are concerned about the “unmanaged” look of your coastal buffer zone, design a more intensively managed landscaped border just before the landward edge

General Considerations

-  Preserve existing native plants
-  Plant natives
-  Choose the right plant for the right spot
-  Layer plant types to mimic nature
-  Plant in clusters
-  Create diversity
-  Preserve leaf litter layer
-  Use a buffer transition zone

of the buffer zone. This can create an aesthetically pleasing visual transition between the managed landscape of your backyard and the unmanaged coastal buffer zone. Just be sure that the landscaped transition area does not encroach upon the coastal buffer zone itself.

IV. Plant Selection

A. Native Vegetation

The goal of coastal buffer zone restoration and enhancement is to create a plant community that mimics naturally vegetated shoreline areas. This requires planting a variety of native species and vegetation types. Remember that, within a coastal buffer zone, **only native species and native, non-sterile cultivars may be used.** Plants native to Rhode Island are indicated on the URI / CRMC Coastal Plant List (found at www.crmc.ri.gov/pubs/). **Be sure that each plant is a native species or native, non-sterile cultivar, and not a hybrid.** Hybrids generally have an “X” between their genus and species names, though that is not always found. (An example is *Viburnum X burkwoodii*, which is a cross between *V. carlesii* and *V. utile*).

A typical restoration plan should include multiple layers of vegetation that consist of a diversity of species. The canopy layer should contain **at least two different tree species.** The understory layer should contain **at least, four different shrub species and two different herbaceous plant species.** If there is existing native vegetation within the coastal buffer zone, it may be counted towards these requirements. It should be noted that **once a coastal buffer zone is replanted, any volunteer (not planted) native vegetation that becomes established must not be removed.**

When selecting species to include in your coastal buffer zone planting, it is important to pick native species that are suited to a site’s conditions. To do this, you can:

- 1) Look at the adjacent properties, or a property with the same characteristics as yours and identify native vegetation that is growing there
- 2) Refer to the URI / CRMC Coastal Plant List (found at www.crmc.ri.gov/pubs/) to select native plants suited to specific site conditions
- 3) Select plants from typical native upland plant communities found in your area

B. Native Plant Communities of Rhode Island

A plant community is a natural community that is defined by the plant species that are most abundant and most commonly found within it. There are several plant communities that are likely to be found in upland shoreline areas. (The following information on plant communities was adapted from Enser 2006).

Maritime Dune

Maritime dunes are communities that are dominated by grasses and low shrubs on sand dunes inland of and adjacent to maritime beaches. Vegetation in these communities occurs in patches resulting from past disturbances such as erosion, sand deposition, and dune migration. The composition and structure of the vegetation is dependent on dune stability, degree of deposition and erosion, and distance from the ocean.

Species Typical of Maritime Dunes

Common Name	Latin Name
Northern bayberry	<i>Morella pensylvanica</i>
Beach grass	<i>Ammophila brevigulata</i>
Beach pea	<i>Lathyrus japonicus</i>
Seaside goldenrod	<i>Solidago sempervirens</i>
Sandy sedge	<i>Carex silicea</i>
Switchgrass	<i>Panicum virgatum</i>
Beach heather	<i>Hudsonia tomentosa</i>
Bearberry	<i>Arctostaphylos uva-ursi</i>
Jointweed	<i>Polygonella articulata</i>
Beach pinweed	<i>Lechea maritima</i>
Beach plum	<i>Prunus maritima</i>

Maritime or Coastal Shrubland

If the coastal buffer zone area is located on a site that is landward of a dry seaside bluff or headland, or in an area of the coast that is directly exposed to ocean winds and salt spray (e.g., southern coastal areas and Narragansett Bay islands), it may be appropriate to choose plants found in Maritime or Coastal Shrubland communities. These plant communities are typically dominated by shrub species and scattered small trees. Invasive plant species often found in these areas include honeysuckles (*Lonicera spp.*), rugosa rose (*rosa rugosa*), and multiflora rose (*rosa multiflora*). See the note at the end of this section for additional information on rugosa rose.

Species Typical of Maritime Shrublands

Trees	Latin Name
Shadbush	<i>Amelanchier spp.</i>
Arrowwood	<i>Viburnum dentatum</i>
Eastern Red Cedar	<i>Juniperus virginiana</i>
Black Cherry	<i>Prunus serotina</i>
Pitch Pine	<i>Pinus rigida</i>

Shrubs	Latin Name
Highbush Blueberry	<i>Vaccinium corybosum</i>
Bayberry	<i>Morella pensylvanica</i>
Beach Plum	<i>Prunus maritima</i>
Wild Rose	<i>Rosa virginiana</i>

Maritime Woodland / Forest

If the coastal buffer zone is located on a site that is slightly more sheltered than a Maritime Shrubland area but is still exposed to salt spray and on-shore winds (e.g., lower Narragansett Bay), it may be appropriate to choose plants typically found in Maritime Woodland / Forest communities. These plant communities are typically dominated by taller shrubs and small trees around 10 to 20 feet tall.

Species Typical of Maritime Woodland / Forest

Trees

	Latin Name
Shadbush	<i>Amelanchier spp.</i>
Eastern Red Cedar	<i>Juniperus virginiana</i>
Sassafras	<i>Sassafras albidum</i>
Black Oak	<i>Quercus velutina</i>
Scarlet Oak	<i>Quercus coccinea</i>
White Oak	<i>Quercus alba</i>
Beech	<i>Fagus grandifolia</i>
Black Gum	<i>Nyssa sylvatica</i>

Shrubs

Bayberry	<i>Morella pensylvanica</i>
Arrowwood	<i>Viburnum dentatum</i>

Vines

Virginia creeper	<i>Parthenocissus quinquefolia</i>
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Forested Upland Communities

In areas that are not regularly exposed to excessive wind and salt spray, it may be appropriate to choose species found in Forested Upland Communities. These communities have greater than 60% canopy cover of trees, and are generally identified by the dominant canopy species. Examples include:

Oak / Heath Forest. These are deciduous forests with ericaceous shrub layers that are often found on well-drained, acidic soils.

Species Typical of Oak/Heath Forests

Trees

Black Oak*	<i>Quercus velutina</i>
Scarlet Oak*	<i>Quercus coccinea</i>
White Oak*	<i>Quercus alba</i>
Sassafras	<i>Sassafras albidum</i>
Black Gum	<i>Nyssa sylvatica</i>
Black Birch	<i>Betula lenta</i>
Red Maple	<i>Acer rubrum</i>
Pitch Pine	<i>Pinus rigida</i>
White Pine	<i>Pinus strobus</i>

Latin Name

Shrubs

Black Huckleberry	<i>Gaylussacia bacata</i>
Mountain Laurel	<i>Kalmia latifolia</i>
Lowbush blueberry	<i>Vaccinium angustifolium</i>

Herbaceous Layer

Early Sedge	<i>Carex pensylvanica</i>
Wild Sarsaparilla	<i>Aralia nudicaulis</i>
Wintergreen	<i>Gaultheria procumbens</i>

*dominant species

Oak-Holly Forest. These are oak dominated forests with a sub-canopy dominated by American holly (*Ilex opaca*). They are generally found on moist, moderately well-drained silt and sandy loam soils, often at the upper edge of forested wetlands.

Species Typical of Oak/Holly Forests

Trees

Black Oak*	<i>Quercus velutina</i>
Scarlet Oak*	<i>Quercus coccinea</i>
White Oak*	<i>Quercus alba</i>
Red Maple	<i>Acer rubrum</i>
Beech	<i>Fagus grandifolia</i>
Shadbush	<i>Amelanchier spp.</i>
Ironwood	<i>Ostrya virginiana</i>

Latin Name

Shrubs

American Holly**	<i>Ilex opaca</i>
Sweet Pepperbush	<i>Clethra alnifolia</i>
Highbush Blueberry	<i>Vaccinium corymbosum</i>

Ilex opaca

Clethra alnifolia

Vaccinium corymbosum

Herbaceous Layer

New York Fern	<i>Thelypteris noveboracensis</i>
Cinnamon Fern	<i>Osmunda cinnamomea</i>
Greenbriar	<i>Smilax spp.</i>
Wild Grape	<i>Vitis spp.</i>

Thelypteris noveboracensis

Osmunda cinnamomea

Smilax spp.

Vitis spp.

*dominant canopy species

**dominant understory species (greater than 25% cover)

Pitch Pine-Oak Forest. These are mixed coniferous / deciduous forest communities that occur on well-drained, sandy soils of glacial outwash plains and moraines, and thin rocky soils of ridgetops.

Species Typical of Pitch Pine / Oak Forests

Trees

Pitch Pine*	<i>Pinus rigida</i>
Black Oak	<i>Quercus velutina</i>
Scarlet Oak	<i>Quercus coccinea</i>
White Oak	<i>Quercus alba</i>

Latin Name

Pinus rigida

Quercus velutina

Quercus coccinea

Quercus alba

Shrubs

Scrub Oak	<i>Quercus ilicifolia</i>
Black Huckleberry	<i>Gaylussacia bacata</i>
Lowbush Blueberry	<i>Vaccinium angustifolium</i>

Quercus ilicifolia

Gaylussacia bacata

Vaccinium angustifolium

Herbaceous Layer (usually sparse)

Bracken Fern	<i>Pteridium aquilinum</i>
Wintergreen	<i>Gaultheria procumbens</i>
Early Sedge	<i>Carex pensylvanica</i>

Pteridium aquilinum

Gaultheria procumbens

Carex pensylvanica

White Pine-Oak Forest. These are mixed coniferous/deciduous forests on sandy soils or on slopes with rocky well-drained soils. The canopy is co-dominated by a variable mixture of oaks and white pine.

Species Typical of White Pine / Oak Forests

Trees

	Latin Name
White Pine*	<i>Pinus strobus</i>
Black Oak	<i>Quercus velutina</i>
Scarlet Oak	<i>Quercus coccinea</i>
White Oak	<i>Quercus alba</i>
Chestnut Oak	<i>Quercus prinus</i>
Red Oak	<i>Quercus rubra</i>
Pitch Pine	<i>Pinus rigida</i>
Red Maple	<i>Acer rubrum</i>
Hemlock	<i>Tsuga Canadensis</i>
Beech	<i>Fagus grandifolia</i>
Black Cherry	<i>Prunus serotina</i>

Shrubs

Black Huckleberry	<i>Gaylussacia bacata</i>
Lowbush Blueberry	<i>Vaccinium angustifolium</i>
Highbush Blueberry	<i>Vaccinium corymbosum</i>

Herbaceous Layer (usually sparse)

Bracken Fern	<i>Pteridium aquilinum</i>
Wintergreen	<i>Gaultheria procumbens</i>
Early Sedge	<i>Carex pensylvanica</i>

*dominant canopy species

A Note on Rugosa Rose...

Rugosa rose (*rosa rugosa*) is an exotic invasive species that has become naturalized here in Rhode Island. Historically, it has been planted on dunes and barriers because of its ability to create dense, widespread coverage, stabilize the sand and survive in harsh coastal conditions. Despite its status as an invasive plant, the planting of rugosa rose may be permitted in certain areas such as developed barrier and dune systems and other urban sites, as deemed appropriate by CRMC staff. Where feasible, alternative species such as beach plum (*Prunus maritima*) should be planted to achieve the desired functions.



V. Planting Density and Coverage

A. General Considerations

Buffer zone plantings, as they mature, should provide dense coverage and multiple layers of habitat. Planting plans should specify three overlapping layers: trees, shrubs and herbaceous plants. Trees comprise the tallest vegetation layer, and provide canopy and shade for the plants beneath them. Below the tallest trees is an understory layer comprised of shrubs and smaller trees. Herbaceous plants (perennials, native grasses, groundcovers) grow beneath trees and shrubs where they provide additional habitat, help to stabilize the soil and suppress the growth of invasive plants. When installing a buffer restoration project, plant the canopy or tallest layer first, then understory trees and shrubs, followed by the herbaceous layer.

B. Trees and Shrubs

Buffer zone functions generally increase with the density of vegetated cover within the buffer zone. However, considerations must be made for cost, plant survival and maintenance requirements when creating a restoration plan. Plants should be represented on restoration plans **at their size at the time of planting** (Fig. 1). In general, **understory trees shrubs should cover at least 50% of the buffer zone area** as they are represented on the restoration plan. **Tree canopy should cover at least 25% of the buffer zone area**, and should overlap understory trees and shrubs. Existing native trees and shrubs may be counted towards this requirement. When planting to restore an area where invasive vegetation has been removed, **mature invasive trees and shrubs should be replaced at a 1 to 1 ratio with native species.**

Use the spacing guidelines in Table 1 for trees and shrubs.

Table 1. Generic spacing recommendations for trees and shrubs (Fischer and Fischenich, 2000).

Small shrubs (< 10' tall)	3' to 6' apart
Large shrubs (> 10' tall)	5' to 8' apart
Evergreen trees	6' to 10' apart
Deciduous trees	8' to 12' apart

B. Herbaceous Layer

Ideally, herbaceous plants such as native grasses, perennials and groundcovers should be planted densely enough to protect the soil from erosion due to rainfall and to minimize invasive plant germination. This can be achieved more easily by choosing groundcovers that will spread, rather than growing in isolated clumps. **Herbaceous plants should be planted to cover at least 25% of the ground surface beneath trees and shrubs (12.5% of the total buffer zone area).** Existing native perennials and groundcovers that are preserved may be counted towards this requirement. However, it should be noted that turf grass maintained as lawn will NOT be counted towards this requirement. Use the spacing guidelines in Table 2 for herbaceous plants and groundcovers:

Table 2. Generic spacing for perennials and groundcovers.

plugs	3 in. on center
4" pots	6 in. on center
1 gallon containers	1 ft. on center

C. Mulching

Planted areas may receive a **one-time application of 1 to 2 inches of non-dyed, shredded hardwood mulch** to discourage the germination of invasive plants. Mulch should be applied between plants, but never touch plant stems. The mulch layer should be left alone so that a “duff” or leaf litter layer may develop over time. **Areas between buffer zone plantings should never be mowed or cleared, unless part of an approved shoreline access path or recreation area.** Native volunteer species that become established in the buffer zone should not be removed.

VI. Minimum Planting Size

The more mature the plant community within a coastal buffer zone, the better the buffer zone performs its intended functions. Minimum size requirements for plant materials will help to ensure that plant communities become established more quickly, and are not damaged by adjacent upland activities. **Trees should be at least 1.5 to 2 inches caliper size (20 gallon container size) at the time of planting. Shrubs should have a minimum container size of 5 gallons.**

VII. Restoration Planting Checklist

Refer to this checklist when developing your coastal buffer zone restoration application:

- Preserve existing native vegetation.** Native vegetation should always be preserved. Identify existing native vegetation on submitted plans.
- Use native species only.** Only plants indicated as “native” on the URI / CRMC Coastal Plant List should be used for coastal buffer zone planting. Hybrids or sterile cultivars should not be used. Include a species list with your application as well as indicating species to be planted on all submitted plans.
- Species diversity.** A minimum of two (2) different tree species, four (4) different shrub species, and two (2) different herbaceous species should be planted. Existing native vegetation may be counted towards this requirement, and should be identified on submitted plans.
- Replace woody invasive vegetation.** When planting to restore an area where invasive vegetation has been removed, trees and shrubs must be replaced at a 1 to 1 ratio.
- Use species suited for your site.** Look at adjacent lots; refer to the URI / CRMC Coastal Plant List or natural plant community lists within this document to determine which plant communities are suited to conditions at your site.
- Planting density.** Plants should be represented on plans at their size at the time of planting. Spaces between plants should be minimized at each layer (canopy, understory and herbaceous plant layer) to create dense clusters of vegetation.
- Minimum understory and canopy coverage.** Buffer zone restoration should include canopy, understory and herbaceous plant layers. The shrub and understory tree layer should be designed so that planted shrubs and understory trees will cover at least 50% of the total buffer zone area. The canopy tree layer should be designed so that, at maturity, planted canopy trees will cover at least 25% of the total buffer zone area. The canopy tree and understory layers should overlap. Existing native vegetation may be counted towards this requirement.
- Use groundcovers between understory plants.** Areas beneath trees or shrubs should be planted with native herbaceous plants or groundcovers. Native herbaceous plants and groundcovers should cover 25% of the area beneath tree and shrub canopies. Existing native vegetation may be counted towards this requirement.
- Mulching.** Planted areas may receive a one-time application of 1 to 2 inches of non-dyed, shredded hardwood mulch then must be left as an undisturbed leaf litter layer. Areas between buffer zone plantings may not be mowed or cleared, unless part of an approved shoreline access path or approved recreation area.
- Minimum planting size.** Trees should be at least 1.5 to 2 inches caliper size (20 gallon container size) at the time of planting. Shrubs should have a minimum container size of 5 gallons.

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