

A PLANTING GUIDE FOR RIPARIAN SITES ALONG THE CONNECTICUT COAST

A publication of the Connecticut Sea Grant College Program, the NEMO program, and the University of Connecticut Department of Extension.



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September, 2009
CTSG-09-12

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With more than 1000 miles of coastal shoreline, Connecticut residents value and appreciate the unique natural resources of Long Island Sound and associated rivers, coves and embayments. Unfortunately, these waterways are heavily impacted by intense coastal development. With polluted runoff one of the primary sources of nitrogen pollution to the Sound, residents along the coast can help mitigate impacts to the water, as well as protect coastal habitats and their own properties by establishing and maintaining riparian buffers. This pamphlet describes some of our coastal habitats, the functions and values of riparian buffers, and how to plant a riparian buffer.

WHAT ARE OUR COASTAL HABITATS?

Tidal marshes*: These include all vegetated wetlands along the coast and along tidal stretches of coastal rivers. There are salt, brackish and freshwater tidal marshes in Connecticut, with salt marshes considered some of the most ecological productive areas on Earth. Tidal marshes are critical as nursery habitat for fish, habitat for numerous invertebrate species, and as nesting and feeding areas for wading birds and waterfowl. About 45% of all endangered and threatened species rely on estuarine and coastal waters for survival; many specifically need salt marshes. Not only do tidal marshes provide critical wildlife habitat, they increase shoreline stabilization, dampen storm surges, provide flood storage capacity, and provide natural filtration of water flowing into the coastal estuary.

Estuary waters, open water rivers and streams*: Many nearshore, open water areas provide important habitat for finfish, shellfish, waterfowl and benthic organisms, with highly productive fish and shellfish areas. In many places along the estuarine shoreline, there is appropriate substrate and sheltered conditions for the formation of submerged aquatic vegetation beds (see below) which in turn provide shelter, breeding and nursery habitat for numerous aquatic species.

Submerged Aquatic Vegetation*: Abbreviated as SAV, the rooted, vascular (having veins to transport fluids) plants that grow underwater or just up to the water's surface often form large stands or "beds." These beds are a critical component of aquatic systems and play an important role in energy cycling within the estuary. These plants provide food and habitat for fish, shellfish and other invertebrates, as well as migratory waterfowl. They add oxygen to the water, filter and trap sediments and absorb nutrients such as nitrogen and phosphorous, high levels of which can be harmful. SAV also help to slow waves that may cause shoreline erosion.

Beaches and dunes*: These areas are formed by water and wind currents and erosion. Because Long Island forms a protective barrier, Connecticut's coast is not subject to the same intensity of water and wind currents as coastal areas directly adjacent to the ocean. As a result, Connecticut's dune systems are smaller and less well developed than those in other coastal states. American beach grass is the most common and important plant of these dune systems aiding in dune stabilization. Many birds, plants, invertebrates and even reptiles depend on these areas for survival. Numerous rare bird species use the beaches and dune system as nesting and feeding areas.

Coastal grasslands and shrublands: These habitats are found on sandy or gravelly soils of glacial origin with vegetation influenced by a maritime climate. Bunch forming grasses such as little bluestem, poverty grass and common hairgrass are often found in these grasslands. In post-agricultural fields, asters, goldenrods and other perennials often mix with the grasses. Woody plants such as blueberries, huckleberries, red cedar, and sumac are also found here. If not managed, these areas are particularly susceptible to infestations by invasive species.

Coastal forests: Coastal forests are found along the coast and are subject to a maritime climate. These forests do not receive daily salt spray (as a true maritime forest does), but can be subject to wind and salt spray during storm events. Oaks, black cherry, sassafras, white pine, and pitch pine are common trees of these forests often with ericaceous plants in the understory. Due to intense coastal development and agriculture, very little is left of Connecticut's coastal forests.

Bluffs and escarpments: Bluffs and escarpments are steep-faced, dynamic features that are a result of natural erosional processes of the shoreline. Some of Connecticut's bluffs and escarpments are underlain by bedrock and others by glacial deposits of sand and gravel. Those areas underlain by sand and gravel are particularly unstable and through the process of erosion, provide sediment for beaches, dunes and sand bars. Vegetation helps to stabilize the soil and decreases erosion rates.

**Please remember: Any area below mean high water is directly subject to state regulation under the Connecticut Coastal Management Act. Any work or planting that you propose to do in or near a tidal wetland or watercourse, beach or dune may require a state permit.*

WHAT IS A RIPARIAN BUFFER AND WHY ARE THEY IMPORTANT?

Any land that runs along a water body (stream, river, lake, sound, etc.) is known as a riparian area. A riparian area managed to moderate the effects of adjacent land use is called a riparian buffer.

Riparian buffers (Figure 1) are critical because they are the site of an intersection between a natural system (a water body) and a human-based system (residential, agricultural, or industrial). Buffers are often the first line of defense against the impacts of impervious surfaces (driveways, streets, parking lots, patios, roofs, etc.) by filtering pollutants and slowing runoff. They also protect shorelines from erosion, aid in flood control, provide habitat for wildlife, shade waters for fish, and offer scenic value.



Figure 1. Schematic drawing of a residential riparian buffer.

Maintaining vegetation along waterways is critical to the protection of water quality. A vegetated buffer intercepts and filters runoff, and allows increased percolation to replenish groundwater. In addition, the buffer is a living filter for sediments and toxins. Excess nitrogen and phosphorous from fertilizers and animal waste, pollutants from herbicides and pesticides, as well as household chemicals and cleaners are just some of the pollutants human development has introduced into our water systems. Population pressures along the coast have brought an increase in impervious surfaces, leading to greater stormwater runoff that carries pollutants and sediments directly into the waterways. The increased volume of surface water may overwhelm and pollute waterways and erode adjacent wetlands and marshes already threatened by human development.

Establishing and maintaining a riparian buffer along the coast may be difficult as the climate tends to be harsh with salt spray, wind, poor and sandy soil conditions, and storms. These conditions present problems for many traditional landscaping plants. The Appendix provides resources on native plants, as naturalized species require less maintenance. However, you may wish to consider other horticultural recommendations. Please avoid the use of invasive species (See Appendix for resources on identifying invasive species).

AT A GLANCE: THE BENEFITS OF RIPARIAN BUFFERS

Establishing and maintaining a riparian buffer serves several critical functions. In addition to improving your local environment, a well-maintained riparian buffer enhances the natural beauty of waterside property and can increase property value.

ENVIRONMENTAL BENEFITS OF RIPARIAN BUFFERS (See Figure 2)

- **Protect water quality:** Native plants trap sediment and filter nutrients and chemicals from runoff as well as shallow groundwater.
- **Reduce flood damage and stream bank erosion:** Plants slow flood waters and waves, and the roots help stabilize soil.
- **Provide habitat for wildlife:** Riparian vegetation enhances habitat for both terrestrial and aquatic organisms and helps to maintain cool water temperatures for aquatic life.
- **Replenish groundwater sources:** Plants slow water flow and root systems keep the soil porous so excess water is absorbed into the ground, replenishing groundwater supplies.

FINANCIAL BENEFITS

- Minimize property damage by reducing erosion and flood damage
- Increase property values and aesthetics
- Reduce property maintenance costs
- Decrease cost of public investment in stormwater management and reduce maintenance costs

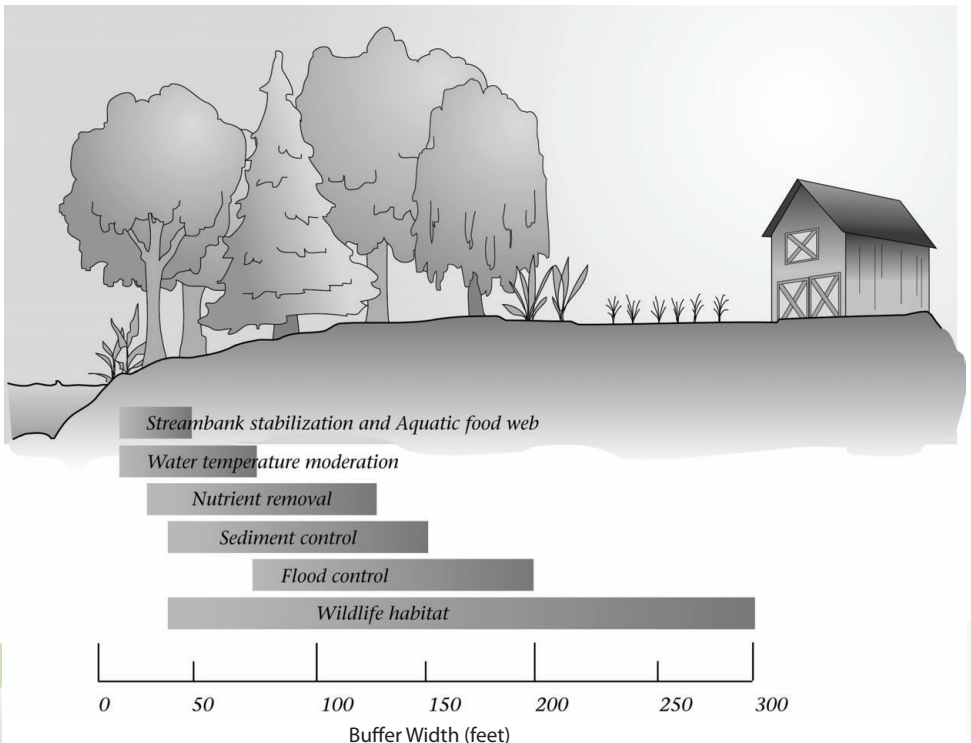


Figure 2. Buffer widths necessary to achieve specific objectives. (used with permission from the University of Maryland Cooperative Extension Fact Sheet 725)

PROTECT YOUR PROPERTY AND THE ENVIRONMENT

As an owner of coastal property, you see how the shoreline changes and are witness to the dynamic ecological system of which it is a part. You may also be aware of how sensitive riparian environments are to the impacts from land use and surrounding uplands, as watershed land use practices are associated with soil erosion and diminished water quality. Here are some suggestions as to what landowners with property adjacent to riparian areas can do to best protect coastal habitats, protect water quality, and benefit their properties.

WHAT TO AVOID IF YOU HAVE COASTAL PROPERTY

- Excessive mowing, fertilizing, or watering of your lawn. Excessive nutrient content in runoff from fertilizer damages fragile coastal habitats and water quality.
- Clear cutting or significantly altering the density of vegetation near the water. Reduced vegetative density accelerates erosion and runoff, and makes the shore more vulnerable to flood damage.
- Blowing leaves and brush into the water, as such activity damages coastal habitats and may affect water quality.
- Constructing multiple access paths to the water as they may destabilize the bluffs, dunes and tidal shoreline.

WHAT YOU CAN DO TO MANAGE YOUR COASTAL PROPERTY

If you have property along a riparian area it can be very easy to establish and maintain a riparian buffer. Also, by creating a buffer of native coastal plants and reducing the size of your lawn you can save time and money that would otherwise go toward maintenance. An easy way to begin is to establish an area adjacent to the coastal resource that is not mown. One just needs to watch for and eliminate any invasive plants that try to colonize this buffer.

Although the riparian buffer width depends on the landowner and the size of the property, the wider the buffer, the greater the environmental benefits. Buffer widths between 35-100 ft (15-100 meters) are recommended for water quality and aquatic habitat protection. However, buffer widths of even 15 feet (4.6 meters) can provide benefits. Steeper slopes reduce the effectiveness of a riparian buffer by increasing the speed of polluted runoff and thus allowing less time for infiltration. Therefore, consider a wider buffer for a property with steep slopes adjacent to the riparian area.

RIPARIAN BUFFER CONSTRUCTION

Before you begin:

Before constructing a riparian buffer, you should consider some of the following points for analyzing and preparing the site:

PROPERTY CHARACTERISTICS

- Exposure to sun, wind and salt spray
- Soil type, soil moisture and pH
- Type of coastal habitat your property borders; the slope of the land can be particularly important in buffer planning. Some bluffs and soil types are particularly susceptible to erosion.
- Current vegetation: What is growing in your planned buffer area? If there are invasive plants present, the elimination of these species should be part of your plan.

WATER ACCESS

If you desire access to the water, try to limit the clearing of vegetation for views and access to **one third** of the property adjacent to the waterway. Strive to place docks, ramps, and access walkways within this area to reduce the overall habitat disturbance.

Determine if a permit is required prior to buffer construction. If you are unsure, contact Connecticut's Coastal Permit Program for all tidal wetlands and water bodies. Please remember, there are also numerous wetlands along the coast that are considered inland wetlands. These are under the jurisdiction of the local inland wetlands commission and you may need to contact your town for a permit.

Contact information for Connecticut's **Coastal Permit Program:**

Office of Long Island Sound Programs
Bureau of Water Protection and Land Reuse
Department of Environmental Protection
79 Elm Street
Hartford, CT 06106-5127
Phone: 860-424-3034

Create a plan for your buffer:

Determine how wide your buffer will be. Remember bigger is better for buffer widths. Use native species whenever possible. They are acclimated to the local climate and soil conditions, and they are less susceptible to disease and insect infestation. Do you already have native plants in the buffer area? Research the native plants that appeal to you. Try to choose a variety of plants (trees, shrubs and herbaceous – See Table 1) such that different layers are created in the canopy. If maintaining a view is important, there are numerous low growing shrubs that can be mixed in with grasses and herbaceous perennials. There are numerous websites that provide detailed information on native plants – see Appendix.

Create a map of your yard and buffer site in order to conceptualize how many plants you will need and how you will distribute them.

Clear the area of invasive species before you begin planting. Invasive species such as Oriental bittersweet have overwhelmed many coastal areas and can kill mature shrubs and trees. Visit the online **Connecticut Invasive Plant List** for a comprehensive list of invasive species in Connecticut.

Table 1.

Relative effectiveness of different vegetation types for specific benefits

Benefit	Vegetation Type		
	Grass	Shrub	Tree
Stabilize bank erosion	Low/ Medium	Medium/ High	High
Filter sediment	High	Low/ Medium	High
Filter nutrients, pesticides, microbes <ul style="list-style-type: none">• sediment-bound• soluble	High Medium	Low/ Medium Low	High Medium
Aquatic habitat	Low	Medium	High
Wildlife habitat <ul style="list-style-type: none">• range/pasture• forest wildlife	High Low	Medium Medium	Low High
Economic products	Medium	Low/ Medium	High
Visual diversity	Low	Medium	High
Flood protection	Low	Medium	High

Source: Adapted from *Agroforestry Notes*. AF Note-4, Jan. 1997. U.S. Department of Agriculture Forest Service/NRCS.

(Used with permission from the University of Maryland Cooperative Extension Fact Sheet 733)

Construction

SITE PREPARATION: Site preparation is essential to a successful planting scheme. Generally, site preparation should begin the fall prior to planting. Soils along the coast tend to be sandy with little organic matter. Therefore, it is best to add a minimum of 3" of organic material, such as compost or peat moss. Be sure to know what type of soil you have as well as its pH level. You can get your soil tested at soil testing labs throughout Connecticut (See Appendix). If your soil is poor, or needs supplementary nutrients, consult your local nursery for recommendations.

Because there are a limited number of plants that can withstand direct exposure to wind and salt spray, it may be wise to build a "plant screen" of more hardy species that can shield less tolerant plants. For example, Northern bayberry and red cedar are shrubs/small trees that may be used to form a screen.

GENERAL PLANTING GUIDELINES FOR TREES AND SHRUBS:

Be sure to read planting suggestions for each plant or ask nursery staff for specifics. Dig holes the depth of the root ball and 3-5 times the width of the root ball. If the roots are tightly wrapped you may want to gently loosen them to ensure their even spread. Familiarize yourself with the spacing requirements for each species.

1. Pour soil around the root ball, making sure to fill in air pockets. When hole is half way filled with soil, fill hole with water and let it soak in before filling the rest of the hole.
2. Use remaining soil to create a small berm (2 to 3 inches high) around the edge of the planting hole that will help retain and direct water.
3. Add a 2 to 3 inch layer of mulch around the plant to ensure moisture retention. If you are planting trees, be sure that the trunk flare is above ground and do not cover with mulch.
4. Determine the water needs of each plant species. Water plants per directions while taking into account rainfall amounts. Once established, native plants should not require much additional water.
5. Weed out invasive or competing plants as they appear. Established invasive plants are far more difficult to eliminate than seedlings.

A SPECIAL NOTE ABOUT BLUFFS and ESCARPMENTS:

Vegetation adjacent to and on bluffs and escarpments is particularly important in protecting this fragile habitat. Vegetated buffers adjacent to steep embankments can help protect property from erosion. Along the face of the slope, grasses are particularly good to plant, where possible, as they have fibrous root systems that help reduce erosion.

REFERENCES

Bentrup, Gary. 2008. *Conservation Buffers, Design Guidelines for Buffers, Corridors, and Greenways*. Department of Agriculture, Forest Service, Southern Research Station. <http://www.bufferguidelines.net/>

Clark, R. 2006. "Selection and Maintenance of Plant Materials for Coastal Landscapes". UMASS Extension. http://www.umassgreeninfo.org/fact_sheets/plant_culture/coastal_landscaping.pdf

Cromwell, N., W. Ferguson, and A. Lipsky. 1999. *Backyards on the Bay, A yard care guide for the coastal homeowner*. Save The Bay, Inc. of Providence, Rhode Island. <http://www.savebay.info/backyardbay/index.htm>

Gordon, S. and B. Maynard. 2007. *Rhode Island Coastal Plant Guide*. University of Rhode Island <http://www.uri.edu/cels/ceoc/coastalPlants/CoastalPlantGuide.htm>

Tjaden, R.L. and G.M. Weber. *Riparian Buffer Fact Sheets 724 – 729, 733*. University of Maryland Cooperative Extension System. <http://www.riparianbuffers.umd.edu/>

APPENDIX

PERMITTING AGENCIES

Department of Environmental Protection

Office of Long Island Sound Programs
Bureau of Water Protection and Land Reuse
79 Elm Street
Hartford, CT 06106-5127
Phone: 860-424-3034

Your town Planning and Zoning and Inland Wetland Commissions

SOIL TESTING

Soil samples can be tested for a variety of elements. Soil testing laboratories in Connecticut are located at Agricultural Experiment Stations in New Haven and Windsor. There is no fee for State of Connecticut residents. For specific instructions on how to sample an area call one of the Agricultural Experiment Stations or visit <http://www.caes.state.ct.us/Soiloffice/soiltesting.htm>

CONN. AGRICULTURAL EXPERIMENT STATION

Soil Testing/Plant Disease Testing/Pest Testing
123 Huntington St.
New Haven, CT 06511
Phone: (203) 974-8500
Fax: (203) 974-8502

CONN. AGRICULTURAL EXPERIMENT STATION - VALLEY LABORATORY

Soil Testing/Plant Disease Testing/Pest Testing
Valley Lab
153 Cook Hill Rd.
Windsor, CT 06095
Phone: (860) 683-4977

TECHNICAL ASSISTANCE AND INFORMATION

Natural Resource and Conservation Services of Connecticut (NRCS)

Visit their staff directory for specialists in: Community Planning, Civil Engineering, Hydrology, Soil Conservation, Landscape Architect:

http://www.ct.nrcs.usda.gov/contact/community_team.html

Connecticut Department of Environmental Protection (DEP)

Phone: (860) 424-3000

www.ct.gov/dep/

Conservation Districts of Connecticut

<http://www.conservect.org/>

NEMO Program, University of Connecticut, Planning for Stormwater

<http://nemo.uconn.edu/tools/stormwater/index.htm>

GARDEN AND LANDSCAPE MANAGEMENT

Connecticut Chapter of the American Society of Landscape Architects

<http://www.ctasla.org/>

Connecticut Master Gardener Association

<http://www.ctmga.org/>

Lawn and Garden Care tips from NRCS

<http://www.nrcs.usda.gov/feature/highlights/homegarden/lawn.html>

Organic Lawn Care Tips from the DEP

http://www.ct.gov/dep/cwp/view.asp?a=2708&q=382644&depNav_GID=1763

University of Connecticut's Integrated Pest Management Program

Phone: (860) 486-0869

<http://www.hort.uconn.edu/ipm/>

The Connecticut Invasive Plant Working Group

<http://www.hort.uconn.edu/CIPWG/>

Connecticut DEP Invasive Species Resources

General:

http://www.ct.gov/dep/cwp/view.asp?a=2702&q=323494&depNav_GID=1641

Invasive Species Identification Sheets:

<http://www.ct.nrcs.usda.gov/invas-factsheets.html>

PLANT INFORMATION

Connecticut Botanical Society

<http://www.ct-botanical-society.org/>

UConn Plant Database

<http://www.hort.uconn.edu/Plants/>

Connecticut College Arboretum

<http://www.conncoll.edu/ccrec/greenet/arbo/nativeplant.html>

USDA Plants Database

<http://plants.usda.gov/>

List of Native Species and Nurseries offering Native Species

http://www.ct.gov/dep/lib/dep/wildlife/pdf_files/habitat/ntvtree.pdf

NURSERIES

Department of Environmental Protection list of nurseries that sell Connecticut native trees and shrubs

http://www.ct.gov/dep/lib/dep/wildlife/pdf_files/habitat/ntvtree.pdf

This publication is based upon work supported by the Cooperative State Research, Education, and Extension Service, U.S. Department of Agriculture under Agreement No. 2004-51130-03108. Any opinions, findings, conclusions, or recommendations expressed in this publication are those of the author(s) and do not necessarily reflect the view of the U.S. Department of Agriculture.



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