Backyard Stream Buffers

Backyard without streamside buffer. | Backyard with streamside buffer.

Guidelines for Maintaining, Improving, and Restoring Streamside Vegetation

U.S. Department of Agriculture
Natural Resources Conservation Service

United States
Environmental Protection Agency

Norwalk River
Watershed Initiative

Fairfield County
Conservation District

Connecticut Department of
Environmental Protection

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The intent of this booklet is to present streamside property owners with information about the importance of streamside vegetation, and to provide guidelines on maintaining, improving, and restoring streamside vegetative buffers.

The information presented in this booklet is not intended for regulatory purposes. For guidelines on regulatory setback distances from watercourses and wetlands, see Connecticut DEP's *Guidelines for Upland Review Area Regulations Under Connecticut's Inland Wetlands and Watercourses Act.*

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To obtain additional information, contact a local USDA Natural Resources Conservation Service or Soil and Water Conservation District office.

RIPARIAN STREAM BUFFERS

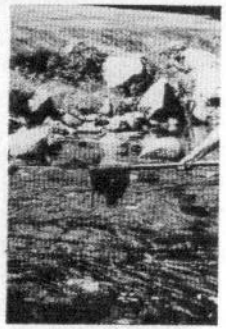
Riparian zone refers to the areas adjacent to streams, rivers, and other fresh water bodies. Riparian vegetation refers to the plants that occur naturally in riparian zones. Riparian or streamside vegetation performs many functions important to streams. Streamside vegetation provides streams with erosion control, water quality protection, fish and wildlife habitat, and scenic beauty. Human land uses within riparian zones often cause a reduction or loss of streamside vegetation, which usually results in the degradation of the stream.

Maintaining, improving, or restoring areas of trees and/or shrubs adjacent to streams helps maintain or improve stream quality. These vegetated areas or "stream buffers" protect the stream from the adverse impacts of developed landscapes. Property owners can help preserve or improve streams by maintaining or restoring adequate stream buffers.

OUR IMPACTS ON STREAMS

When we live or work close to water courses, we often clear streamside vegetation to obtain a better view of or gain accessibility to the stream. When we clear streamside vegetation, we eliminate many of the beneficial functions performed by riparian vegetation.

Changes in the landscape caused by development can negatively impact our water resources. Urban and suburban areas can be major sources of nonpoint source pollution. Nonpoint source pollution occurs when water becomes contaminated as it falls through contaminated air as rain, or as it flows over the land surface. Water flowing over parking lots, industrial sites, roads, lawns, and landscaped areas picks up sediments, nutrients, hydrocarbons, heavy metals, and other pollutants that often end up reaching streams and other surface waters.



Land use changes associated with urban and suburban development often increase the amount of impervious or compacted areas such as roofs, roads, sidewalks, lawns, and parking lots. Rain water cannot infiltrate the ground through these impervious surfaces and becomes runoff; consequently, more water reaches the stream faster than under natural conditions. These developed conditions can increase erosion and flooding hazards along streams.

FUNCTIONS OF STREAMSIDE VEGETATION

Erosion Control - The roots and stems of streamside vegetation stabilize streambanks by binding soil and by reducing the velocity of flowing water.

Fish and Wildlife Habitat - Leaves, branches, and fruits are major sources of food and shelter for aquatic organisms in streams. Streamside vegetation also plays a major role in moderating water temperatures in streams, which helps to maintain suitable habitat for fish and aquatic invertebrates. Streamside vegetation also provides habitat and travelways for birds, mammals, amphibians, and reptiles.

Water Quality Protection - During the summer lack of streamside vegetation can increase stream temperatures because of increased water exposure to solar radiation. As water temperatures increase, oxygen levels in the water decrease.

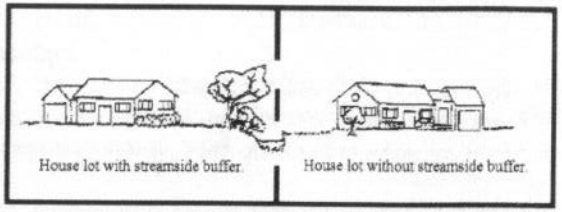
In nutrient rich waters, excessive algae growth can be detrimental to the quality of the stream. Streamside vegetation can filter nutrients, sediments, and other contaminants that may be reaching streams in surface runoff and shallow subsurface flows.

Open grassed areas adjacent to streams and ponds are inviting to Canada geese and ducks. Large numbers of these birds can negatively impact water quality by contributing nutrients, bacteria, and organic matter to surface waters. Streamside vegetation discourages these birds from using areas adjacent to streams and ponds.

WHAT IS THE APPROPRIATE WIDTH FOR A STREAM BUFFER?

The adequate width of a buffer will vary depending on the function(s) desired by the landowner and the land available.

The width of the buffer should be measured starting at the upper edge of the stream channel extending perpendicular from the stream.



Most stream buffers can be divided into two zones, a "streamside zone" and an "upper zone."

The primary functions of the streamside zone are to provide streambank erosion control, provide shade, provide some filtering of pollutants, and maintain suitable habitat for aquatic organisms. The width of the streamside zone should range between 15 and 25 feet.

The primary functions of the upper zone are to improve or protect water quality by filtering pollutants from runoff and to provide wildlife habitat. The width of the upper zone should range from 20 to 135 feet.

The total width of a completely functional buffer will range between 35 and 150 feet (this range of widths may not be adequate habitat for many wildlife species).

Keeping it simple: In many cases a streamside buffer zone may be sufficient to maintain stream quality. The

need for an upper zone buffer for the treatment of polluted runoff will depend on the presence of sources of pollution and on the absence of concentrated flows (channels or stormwater pipes).

Concentrated flows in channels and stormwater discharge pipes can bypass buffers, making them inefficient for filtering pollutants. By addressing pollution at the source, the need for an upper zone buffer is reduced.

When deciding how wide a buffer should be, consider: Are there landscaped areas or gardens where fertilizers and pesticides are frequently used? Are there parking lots and roads discharging runoff into the stream? If not, water quality may not be an issue and an upper zone may not be needed.

REDUCING POLLUTION FROM RESIDENTIAL AREAS

Green lawns are popular in residential neighborhoods and in landscaped commercial areas. In an effort to maintain green lawns, yards are frequently fertilized and watered. Often when it rains or when yards are over-watered, fertilizers and other chemicals used for maintaining green lawns reach streams. This can be harmful to the water quality of the stream.

Household chemicals and auto fluids may also find their way into streams. Improperly disposed of household chemicals, or spilled auto fluids may be polluting a nearby stream. Here are some ways of reducing pollution from backyards:

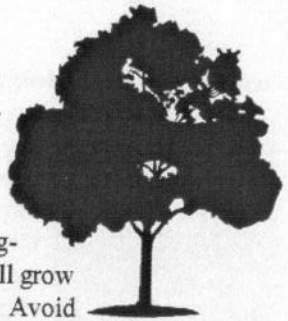
- ❑ Test the soil to determine the need for fertilizer and lime. Apply only as much fertilizer as the lawn needs. (Soil samples can be sent to the University of Connecticut soil testing laboratory in Storrs.)
- ❑ Water lawns only when needed. Lawns only need about 1 inch of water per week. Use a garden rain gauge to determine if the lawn needs to be watered.
- ❑ Plant shrubs and ground covers (myrtle, pachysandra, and forsythia) to add some diversity to the yard. These plants require less maintenance than grass lawns.

- ❑ Never dump into stormdrains, streams, or wetlands. Contact the municipality for information about proper disposal of hazardous materials such as pesticides, auto fluids, and household cleaners.
- ❑ Take cars to the car wash. That soapy dirty water flowing away from a driveway may eventually reach a watercourse.
- ❑ Do not wait on car leaks. Always check the driveway for oil spots or signs of other car fluid leaks. Have them repaired as soon as possible.

WHAT TO PLANT IN A BUFFER

Once it has been decided how wide a riparian buffer should be, decide what to plant. **In some sites, natural regenerations of streamside vegetation can be achieved by not mowing close to the stream.**

Consider the Plants



Always favor plants that are native and have multiple values such as erosion control, wildlife habitat, and aesthetics. Look at nearby streamside vegetation to identify plants that will grow successfully in the local area. Avoid invasive plants such as: multiflora rose, euonymus, and autumn olive. Tables 1 and 2 (see pages 5 and 6) contain lists of commonly used streamside buffer plants.

Consider the Stream

Consider the width of the stream. To provide adequate shade, the height of the streamside vegetation should equal or exceed the width of the stream.

Consider the Soils

Determining the types of soils present on the property, can help choose plants that are well suited for the site.

Riparian soils occur along flood plains, in depressions, or in areas adjacent to springs and seeps. They generally are either saturated with water for some period during the year, or are subject to periodic overflow from ponding or flooding.

Soils are better defined by their texture. Coarse soils include sandy and gravely soils. Fine soils include silts and clays. Soils that have a good mixture of coarse and fine materials are called loams.

Sandy and gravely soils do not hold water for long periods of time. During the summer, when water flows are low, these well drained areas may become dry and droughty.

Fine soils take and give up water slowly. Fine soils tend to remain wet for long periods of time and may pond.

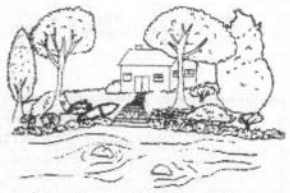
Other important soil properties for plants to be grown in buffer areas are: flooding frequency and duration, pH, presence or absence of root restricting layers (bedrock), aspect (direction the slope faces), and organic matter content.

Consider Landscaping and Aesthetics:

Plant characteristics to consider for aesthetics include seasonal foliage color, flowers, fruits, and form of branching.

The more natural the buffer the better it will perform its functions. This is especially important in the streamside

zone. The dominant vegetation in the buffer should consist of trees and shrubs selected for their suitability to the site and intended purpose. Herbaceous vegetation can be used on buffers for small streams and ponds.



Landscaped buffer with view and access to stream.

Protecting streams does not require that all backyards resemble a natural forest. Maintaining easy accessibility and a year round view to the stream may be an important consideration for many property owners. Buffers can be landscaped to protect stream quality and at the same time provide accessibility and views to the stream by following these two principles:

1. Keep the stream shaded with a tree canopy.
2. Protect the streambanks with a dense root system and soft woody vegetation. *(See Figure 1 for streamside buffer landscaping ideas.)*

Views and accessibility to the stream may be maintained by pruning low tree branches, reducing use of evergreen trees and shrubs, and strategically spacing plantings. However, these practices will reduce the wildlife habitat value of the buffer by reducing important wildlife cover.

An alternative to thinned or open buffers would be to keep an open access path 10 to 15 feet wide leading to the stream. Where pedestrian access to the waters is desired, a hard surface or trail with steps or a ramp may be appropriate.

Planting Guidelines for Woody Vegetation:

- ❑ Shrubs less than 10 feet in height at maturity - plant 3 to 5 feet apart
- ❑ Shrubs and trees from 10 to 25 feet in height at maturity – plant 5 to 10 feet apart
- ❑ Trees greater than 25 feet in height at maturity - plant 10 to 30 feet apart.

For open areas, double the plant to plant spacing.

TREES THAT GROW WELL TOGETHER

The following mixtures of trees are often found adjacent to streams in natural landscapes:

- ❑ River Birch, Silver Maple, and Black Willow
- ❑ Green Ash, Red Maple, and Pin Oak
- ❑ Sycamore, Cottonwood, and Red Maple
- ❑ Black Ash, White Cedar, White Spruce

OTHER CONSIDERATIONS

Eroding and Unstable Banks or Shores - Streams are dynamic systems that are in constant motion and change, which can cause erosion problems. In ponded areas, fluctuating water levels can also result in shoreline erosion problems. In many cases, establishing streamside vegetation may help stabilize the streambank or shoreline, but in sites undergoing severe erosion an erosion control specialist should be consulted.

Wildlife Damage - Browsing deer or beaver activity might ruin efforts to establish a stream buffer.

Beaver forage on the bark and twigs of trees such as Ash, Aspen, Willow, Birch, Maple, Apple, Alder, Cherry, Pine, and Poplar. Most damage caused by beavers results from dam building, bank borrowing, tree cutting, or flooding.

Deer feed on a variety of vegetation. During the summer deer feed on grasses, the buds of Maple, Sumac and Oak Trees, and on farm crops. During the winter deer feed on Cedar, White Pine, Oak, Maple, and other trees.

To prevent or reduce damage to stream buffers from deer or beaver, consider using one or more of the following measures:

- ❑ *Use plants that are considered less palatable to beaver or deer.* Using plants that may not be attractive to these animals might help reduce browsing damage. However, starving beaver and deer will feed on anything they can reach.

  Some plants considered less palatable to beaver are: Spruce, White Cedar, Hemlock, Tamarack (Larch), Beech, Red Maple, and White Birch. Avoid plants that are preferred by beaver such as Poplars (tulip tree), Yellow Birch, and Ash.

  Some plants considered of low value to deer are: Alder, Spruce, Hemlock, Tamarack (Larch), Beech, Hornbeam (Iron wood), Hawthorn, and Sycamore.

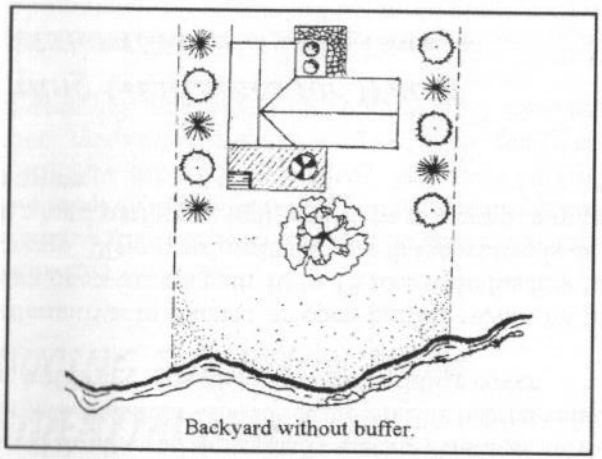
  Some plants that are preferred deer or beaver foods, but will endure heavy browsing are: Dogwoods, Willows, Ash, and Yellow Birch.

- ❑ *Protect young seedlings.* Wire mesh fences may be erected around individual plants you might wish to protect from browsing. Planting tubes are also commercially available to protect young seedlings from browsing.

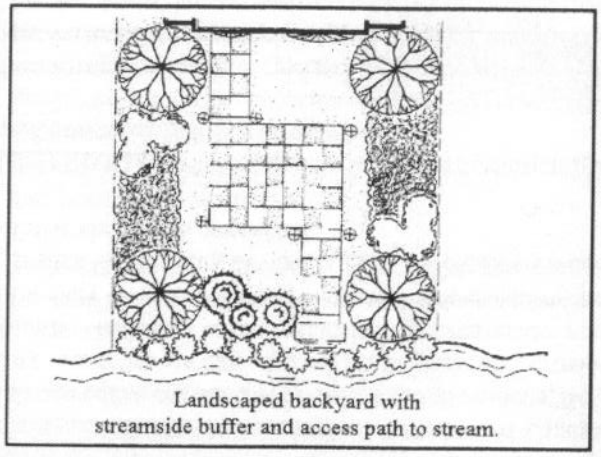
- ❑ *Deer Repellents:* Homemade repellents such as bone meal, human hair, and soap have been used with limited success. Commercial taste and odor repellents are also available. Repellent performance will vary depending on the density of the deer population and the availability of other sources of food.

For more information on beaver and deer control in residential areas contact the Connecticut DEP Wildlife Division.

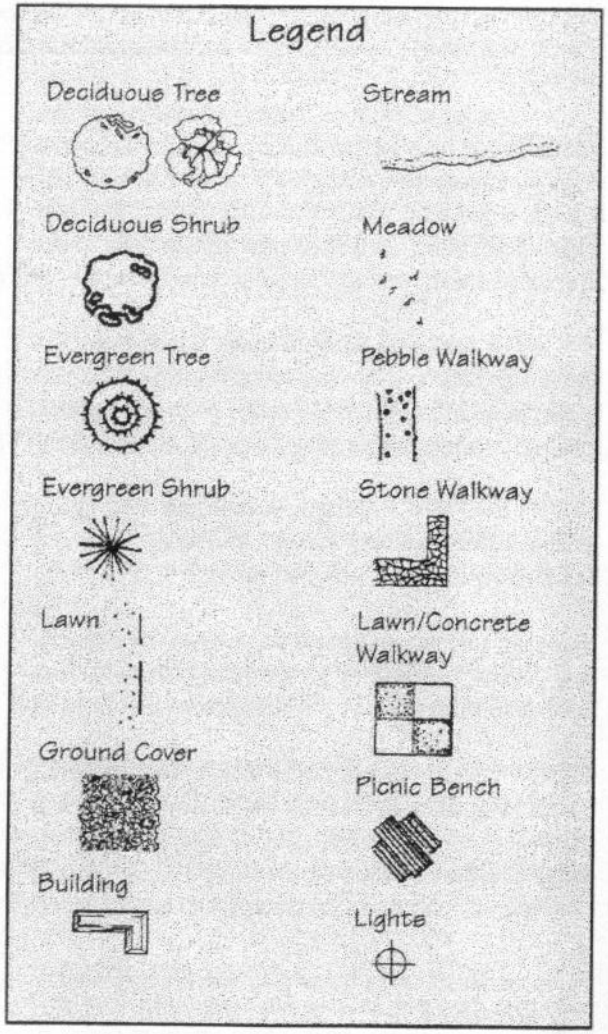
Figure 1. Examples of Landscape Plans for Backyard Stream Buffers

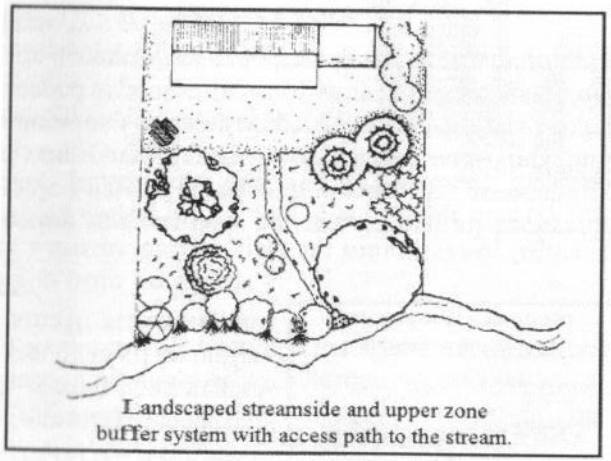


Backyard without buffer.

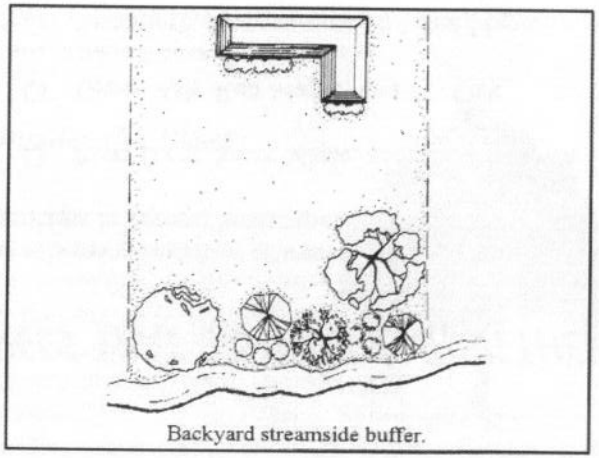


Landscaped backyard with streamside buffer and access path to stream.





Landscaped streamside and upper zone buffer system with access path to the stream.



Backyard streamside buffer.

Table 1. Common Streamside Trees and Shrubs

Common Name	Scientific Name	Mature Height (ft.)	Tolerance to Wet Soils	Tolerance to Shade	Tolerance to Dry Soils	Tolerance to Flooding	Aesthetics	Wildlife Habitat	Remarks
			L = Low , M = Medium, H = High						
Hardwood Trees									
Red Maple	*Acer rubrum*	50 to 70	H	M	H	H	H	M	Red flower in early spring, Bright red foliage, Fast growing
Silver Maple	*Acer saccharinum*	60 to 80	H	L	L	M	M	M	Reddish-brown flower, Yellow foliage, Weak wood
Speckled Alder	*Alnus rugosa*	30 to 40	H	H	M	H	M	M	Often grows in shrubby form, Forms dense thickets
River Birch	*Betula nigra*	49 to 82	H	M	M	H	H	L	Yellow foliage, Exfoliating bark
White Ash	*Fraxinus americana*	75 to 100	H	L	M	H	H	H	Fast growing, most common native ash
Green Ash	*Fraxinus pennsylvanica*	30-50	H	L	H	H	L	H	Strong wood, Yellow foliage
American Sycamore	*Platanus occidentalis*	110 to 120	H	L	H	H	M	L	Fast growing, Bark forms scaled pattern, Ball like fruit
Cottonwood	*Populus deltoides*	80 to 100	H	L	M	H	H	M	Fast growing, Weak wood
Swamp White Oak	*Quercus bicolor*	60 to 70	H	M	L	H	L	H	Fast growing, Strong wood, Large acorn production
Pin Oak	*Quercus palustris*	40 to 80	M	M	H	H	M	H	Fast growing, Strong wood, Large acorn production, Scarlet foliage
Black Willow	*Salix nigra*	30-60	H	L	L	M	H	L	Short lived, fast growing
Bass Wood	*Tilia americana*	65 to 82	M	H	L	M	M	M	
Coniferous Trees									
Eastern Red Cedar	*Juniperus virginiana*	20 to 50	H	H	H	H	M	H	Slow growing, Grayish-blue fruit
Tamarack	*Larix laricina*	49 to 82	M	L	L	M	H	L	Deciduous, looses needles in the Fall
White Spruce	*Picea glauca*	60 to 70	M	M	H	M	M	H	Often used for Christmas trees
White Pine	*Pinus strobus*	60 to 100	M	H	M	L	H	M	Largest conifer of the eastern forest
Northern White Cedar	*Thuja occidentalis*	50 to 65	M	M	M	M	H	M	Weak wood easily damaged by snow, wind, or ice
Shrubs									
Shadbush	*Amelanchier candensis*	20 to 30	H	M	H	H	H	H	White flowers, Yellow to red foliage, Purplish-blue fruit
Silky Dogwood	*Cornus amomum*	7 to 10	H	L	M	H	M	H	White or yellow flower, Good for streambank stabilization
Hawthorn	*Crataegus L.*	5 to 25	H	L	H	H	M	H	Thorns on branches. Small berry-like fruit.
Winterberry	*Ilex verticillata*	10	H	M	M	H	H	H	Greenish-white flower, Red berry stays on shrub through winter
Bankers Dwarf Willow	*Salix cotteti*	6	H	M	M	H	L	L	Good for streambank stabilization
Pussy Willow	*Salix bicolor*	26	H	M	M	H	H	L	
Elderberry	*Sambucus canadensis*	12	H	L	M	M	M	H	White or Yellowish-white flower, Black-blue fruit
Highbush Blueberry	*Vaccinium corymbosum*	6 to 12	H	M	M	H	H	H	Blooms May to June. Berries July to August
Nannyberry	*Virburnum lentago*	33	M	M	M	M	H	H	

Table 2. Recommended Grass Seeding Mixtures for Herbaceous Riparian Buffers

Recommended Use	Common Name	Variety	Seeding Rate (lb. - pure live seed/acre)
Wildlife habitat, Dry Soils	Switchgrass	Shelter	2.0
	Big bluestem	Niagara	3.0
	Eastern gamagrass	Pete	1.0
	Indiangrass	Rumsey or NE-54	1.0
	Little bluestem	Aldous or Camper	2.0
	Sideoats grama	El Reno or Trailway	1.0
			Total 10.0
Wildlife habitat, Wet Soils	Switchgrass	Shelter	8.0
	Deertongue	Tioga	2.0
	White clover or	Common	
	Birdsfoot treefoil	Empire	1.0
			Total 11.0
Erosion Control	Birdsfoot treefoil or	Empire	3.0
	White clover	Common	
	Orchardgrass	Pennlate	6.0
	Timothy	Climax	5.0
	Perennial ryegrass	Turf type	1.0
			Total 15.0