Planting Trees Along Streams and Shorelines

Description

Trees planted along streams and shorelines provide many benefits, including regulation of stream temperature, stabilization of streambanks, enhancement of habitat for both aquatic and terrestrial species, and pollutant removal. The urban stream corridor is an ideal place for reforestation because of these many benefits, and because it often includes land that cannot otherwise be developed due to its location within the floodplain or inclusion of steep ravines. Three typical urban stream corridor scenarios and related reforestation goals are described below.

Natural forested stream buffer	Provides habitat for wildlife, stream shading, pollutant removal, large woody debris, leaf litter, bank stabilization
Landscaped buffer (residential backyards, parks, and other managed spaces)	Provides access to stream, passive recreation and water views for residents and park users, stream shading and bank stabilization, some pollutant removal
Highly modified buffer (ultra-urban channelized stream)	Provides beautification opportunities even though the forestable area may be limited. Daylighting or removal of impervious cover may increase tree planting opportunities.

Pre-Planting Considerations

- ☐ Do floodway regulations prohibit trees?
- ☐ How do I manage invasive plants?
- ☐ How do I address potential damage to trees from deer?
- ☐ How do I address potential conflicts between trees and utilities?
- ☐ Do I need to use different methods for planting trees on steep slopes?
- ☐ How do I address illegal dumping?
- ☐ Is there an opportunity to create habitat for wildlife?
- ☐ How do I address concerns about safety, nuisance rodents, weeds, esthetics, and wildlife?
- ☐ How do I address urban stream impacts, such as lowered baseflow?

Species Selection

Selecting appropriate tree species is key because it can address most site conditions and is often more efficient than trying to change the site characteristics. Select a diverse mix of hardy, native species that are adapted to soils and site conditions.

Use large trees for small streams with shallow banks, and shrubs or small trees to provide stability for steep banks or larger streams with high flows. Mix canopy and understory species to create vertical structure. Other desirable species characteristics include the following:

- ☐ Tolerates inundation (although upland species may do well where the riparian zone is drying out)
- ☐ Wide, spreading canopy
- ☐ Provides food, cover, or nesting sites for wildlife.

Site Preparation

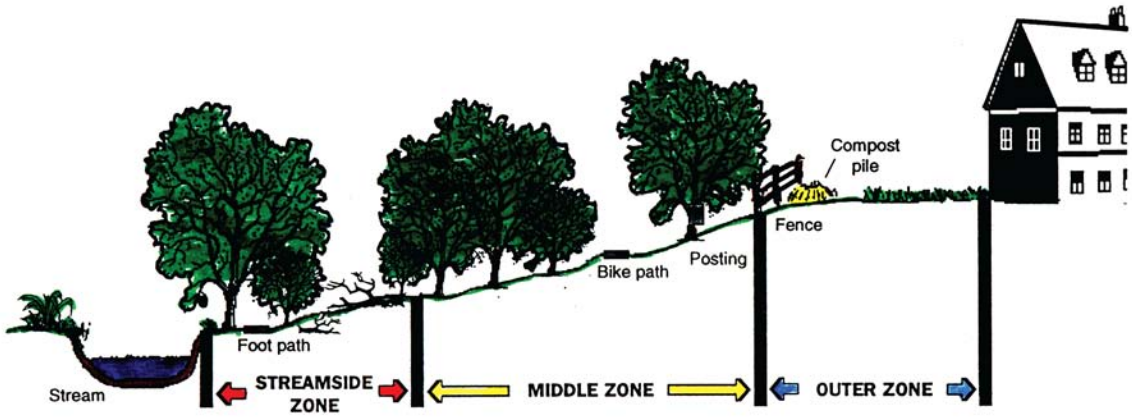
- ☐ Remove any trash or other illegally dumped material
- ☐ Remove invasive plants such as multiflora rose (may include mowing, cutting, or spraying with aquatic-use herbicide)
- ☐ Improve soil drainage if needed (e.g., amend with compost, mix soils to a depth of 6 to 18 inches).

General Planting Guidance

- ☐ Use three-zone buffer design (Welsch, 1991) with the following zones: streamside, middle, and outer. Each zone should have different vegetative targets, widths, and allowable uses that are progressively more restrictive as you move towards the stream (Figure 32).
- ☐ Focus on providing a forested strip immediately adjacent to the stream if land use limits reforestation of the entire site (Figure 33)
- ☐ Select a mix of stock so trees do not all die at the same time. Use larger trees next to the stream and seedlings elsewhere. Bare root stock may be easier for volunteers to plant and require less water.
- ☐ Random spacing is preferred but can make survival counts difficult
- ☐ If mowing between trees is necessary, provide enough space for mowers to avoid damaging trees.

Maintenance

- ☐ Design for little or no maintenance (watering may not be feasible)
- ☐ Use mulch to retain moisture. Do not mulch deeper than 3 inches or build up mulch around trunks.
- ☐ Use tree shelters to protect seedlings from deer
- ☐ Continually monitor for and remove invasive species (mowing in between trees may be necessary).



CHARACTERISTICS	STREAMSIDE ZONE	MIDDLE ZONE	OUTER ZONE
FUNCTION	Protect the physical integrity of the stream ecosystem	Provide distance between upland development and streamside zone	Prevent encroachment and filter backyard runoff
WIDTH	Min. 25 feet, plus wetlands and critical habitats	50 to 100 feet, depending on stream order, slope, and 100 year floodplain	25 foot minimum setback to structures
VEGETATIVE TARGET	Undisturbed mature forest. Reforest if grass	Managed forest, some clearing allowable	Forest encouraged, but usually turfgrass
ALLOWABLE USES	***Very Restricted*** e.g., flood control, utility right of ways, footpaths, etc.	***Restricted*** e.g., some recreational uses, some stormwater BMPs, bike paths, tree removal by permit	***Unrestricted*** e.g., residential uses including lawn, garden, compost, yard wastes, most stormwater BMPs

Figure1. The three-zone stream buffer system (Source: Schueler, 1995, p. 111)

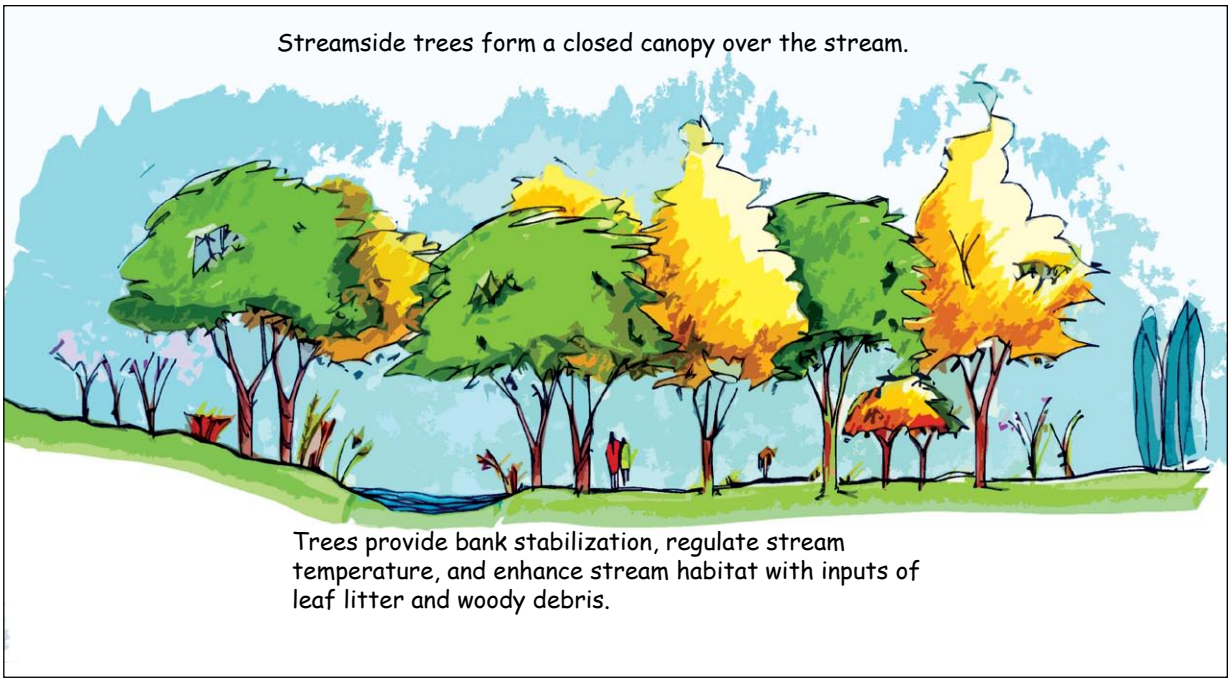


Figure 2. Planting trees along streams and shorelines

Potential for Stormwater Treatment

If stormwater runoff crosses the stream buffer in a pipe, potential for stormwater treatment is low. Runoff from adjacent land uses may be directed to the buffer as sheetflow for stormwater treatment. Linear stormwater treatment practices such as filter strips and bioretention may work best here, although depending on space available, stormwater wetlands could also be used. Guidance for incorporating trees into these practices is provided in Part 2 of this manual series.

Further Resources

Alliance for the Chesapeake Bay (ACB). 2002. *Pennsylvania Stream ReLeaf Forest Buffer Toolkit*. Pennsylvania Department of Environmental Protection, Bureau of Watershed Conservation. www.dep.state.pa.us/dep/deputate/watermgt/wc/subjects/StreamReLeaf

Native Plants by Region for Riparian Forest Buffers: www.rce.rutgers.edu/njriparianforestbuffers/nativeALL.htm

Palone, R. and A. Todd. 1998. *Chesapeake Bay Riparian Handbook: A Guide for Establishing and Maintaining Riparian Forest Buffers*. USDA Forest Service, Northeastern Area State and Private Forestry. www.chesapeakebay.net/pubs/subcommittee/nsc/forest/handbook.htm

Schueler, T. 1995. *Site Planning for Urban Stream Protection*. Center for Watershed Protection and the Metropolitan Washington Council of Governments.

Standard for Riparian Forest Buffer from the New Jersey BMP Manual: www.state.nj.us/dep/watershedmgt/DOCS/BMP_DOCS/chapter5_reparian_buffer.PDF

Welsch, D. 1991. *Riparian Forest Buffers – Function and Design for Protection and Enhancement of Water Resources*. 28 pp. USDA Forest Service NA-PR-07-91. Radnor, PA. www.na.fs.fed.us/spfo/pubs/n_resources/buffer/cover.htm

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