

PRIMARY USE: Reduce pollution into streams.

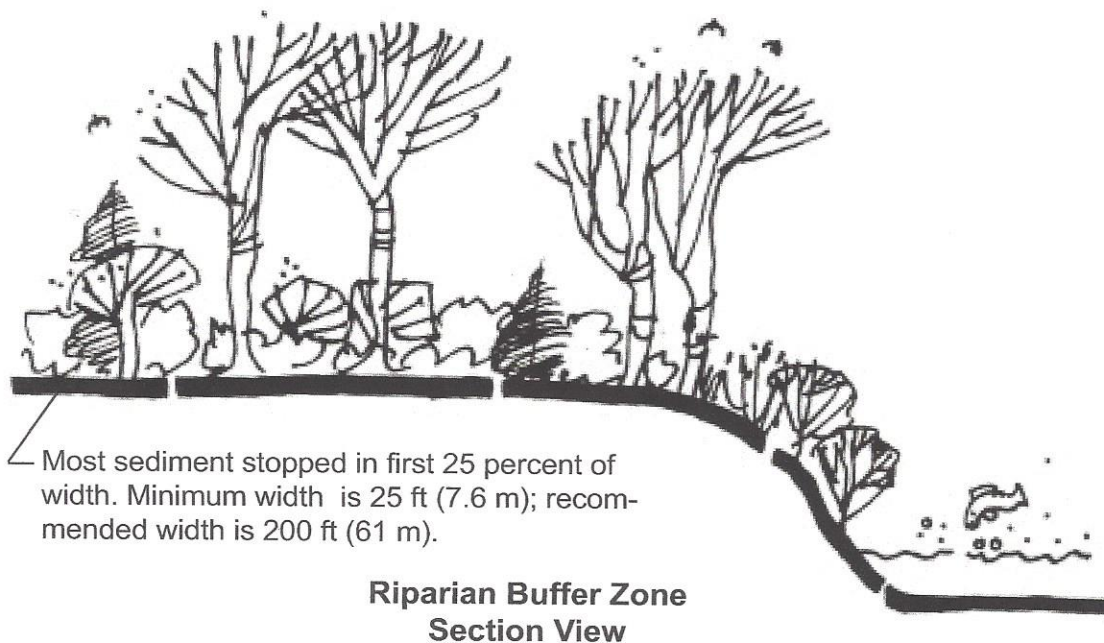
ADDITIONAL USES: Reduce erosion; wildlife habitat; aesthetics; provide shade to control water temperature.

RIPARIAN BUFFER ZONE

What is it? A riparian forest buffer is an area of trees, usually accompanied by shrubs and other vegetation, along a stream, river, or shoreline that is managed to maintain the integrity of the waterway, to reduce pollution, and to provide food, habitat, and thermal protection for fish and wildlife.

Purpose

Riparian forest buffers slow and filter nutrients and sediments out of stormwater before they reach the waterway. Forest buffers also stabilize streambanks and floodplains, reducing erosion. The cool stream temperatures maintained by riparian trees are essential for the survival of many fish and other aquatic species. Leaves and fallen logs and branches provide food and habitat for many organisms that are critical to the aquatic food chain. Riparian forest buffers can also attract birds and wildlife, providing important habitat and migration corridors for many species.



Limitations

Runoff into the buffer zone should not be channeled. Livestock should be prevented from entering the zone.

Materials

Existing natural vegetation is usually preferred. Planted stock may be used.

Installation

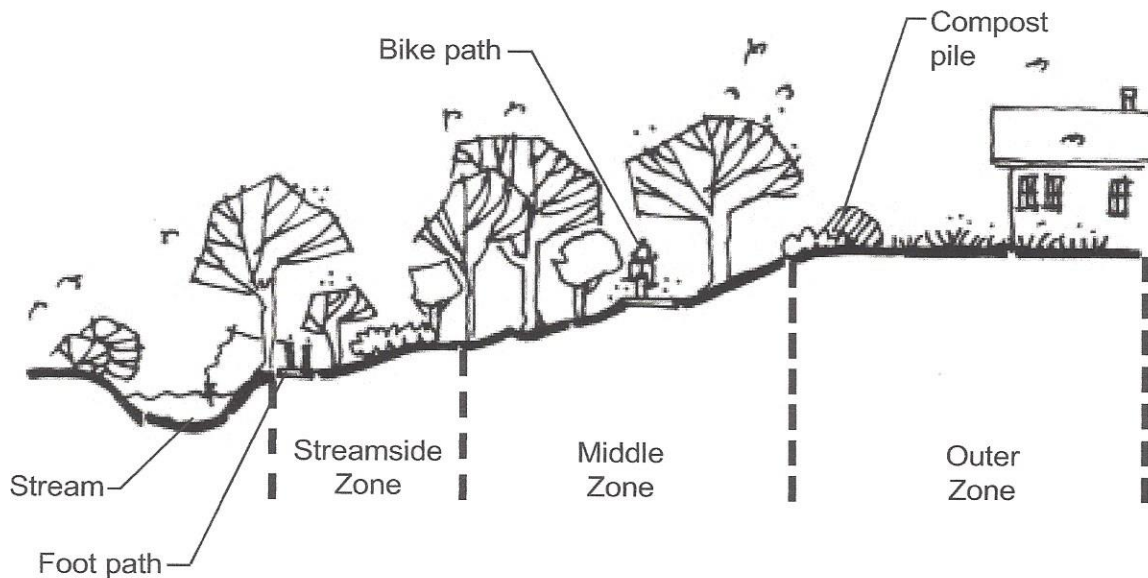
Buffer zone width is variable, depending upon location, erosion potential and slope. It should be wide enough so that no transported sediment is visible in the first (streamside) 25 percent of the zone.

Source: NRCS Planning & Design Manual, NRCS.

RIPARIAN BUFFER ZONE

Additional Considerations and Drawings:

An effective urban riparian forest buffer can be viewed as three zones. The diagram below provides an example of the three zones, each of which performs a different function and has a different recommended width, vegetative cover, and use. The buffer width called for by various riparian forest buffer specifications ranges from 20-200 ft (6-60 m), but a minimum buffer of 100 ft (30 m) on both sides of the stream is recommended for sufficient protection of the stream. This usually amounts to a buffer that is 3 to 5 mature trees wide on each side of the stream.



**Three Zone Urban Stream Buffer System
Section View**

RIPARIAN BUFFER ZONE

Additional Considerations:

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	Minimum of 25 ft (8 m) plus wetlands and critical habitat	50 – 100 ft (15 to 30 m) depending on stream order, slope and 100 year floodplain	25 ft (8 m) 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, footpaths, etc.	Restricted e.g. some recreational uses, some stormwater BMP's, bike paths	Unrestricted e.g. residential uses, including lawn, garden, compost, yard wastes, most stormwater BMP's

Relative effectiveness of different vegetation types for providing specific benefits.

Benefit	Vegetation Type		
	Grass	Shrub	Tree
Stabilize bank erosion	Low	High	High
Filter sediment	High	Low	Low
Filter nutrients, pesticides, microbes			
• Sediment bound	High	Low	Low
• Soluble	Medium	Low	Medium
Aquatic habitat	Low	Medium	High
Wildlife habitat			
• Range/pasture/prairie wildlife	High	Medium	Low
• Forest wildlife	Low	Medium	High
Economic products	Medium	Low	Medium
Visual diversity	Low	Medium	High
Flood protection	Low	Medium	High

Source: NRCS Planning & Design Manual, NRCS.

RIPARIAN BUFFER ZONE

Additional Considerations:

Buffer width depends on both the character and the needs of the site.

Stabilize eroding banks - On smaller streams and lakes, good erosion control may require only the width of the bank to be covered with shrubs and trees. Extending buffer vegetation beyond the bank is necessary where more active bank erosion is occurring.

Filter sediment and sediment-attached contaminants from runoff - For slopes less than 15%, most sediment settling occurs within a 25-30 ft (8-9.25 m) wide buffer of grass. Greater width may be required for shrub and tree vegetation, on steeper slopes, or where sediment loads are particularly high.

Filter soluble nutrients and pesticides from runoff - Width up to 100 ft (30 m) or more may be necessary on steeper slopes and less-permeable soils to obtain sufficient capacity for infiltration of runoff, and vegetation and microbial uptake of nutrients and pesticides.

Provide shade, shelter, and food for aquatic organisms - Warm water fisheries may require only very narrow buffers, except where shade and temperature control is needed to discourage algae blooms. Width up to 100 ft (30 m) in trees may be needed for adequate shade and water temperature control for cold water fisheries in warmer climates.

Wildlife habitat - Width required is highly dependent upon desired species. For example, Nebraska NRCS Standards call for a minimum of 45 ft (14 m) of grass to promote upland game birds. Generally, larger animals have greater minimum width requirements, particularly interior forest species. Narrower width may be acceptable where a travel corridor is desired for connecting larger areas of habitat.