OHIO STREAM MANAGEMENT GUIDE

Restoring Streambanks with Vegetation

Guide No. 07

Woody vegetation planted along streams can be extremely useful in controlling soil erosion, providing wildlife habitat and improving water quality. Dormant woody stakes and posts can be used to stabilize eroding banks and bare-root or transplanted trees can be used on top of the bank in the riparian/ flood plain area. Properly selected and planted vegetation can withstand flooding and high velocity water and often can be used instead of costly structural practices.

SPECIES SELECTION

The best tree species and planting methods will depend greatly upon amount of bank erosion, stream size and planting location. Among the most successful woody vegetation for dormant cuttings are: black willow (Salix nigra), white willow (Salix alba), sandbar willow (~Salix interio~ and eastern cottonwood (Populus deltoides). Other bottomland species used for dormant cuttings include: green ash (Fraxinus pennsylvanica), eastern sycamore (Plantanus occidentalis), and box elder (Acer negundo); while these species live longer, they are more difficult to establish and are slower growing. Root hormone treatment at planting is suggested to improve their survival. Trees and shrubs available from commercial nurseries generally as barefoot stock and suitable for streamside planting include Bankers willow (Salix cottet/) and Streamco willow (Salix purpurea)' red-osier dogwood (Comus stolonifera), bristly locust (Robinia fertilis).

Commonly used sources for cuttings are native species (like some of those listed above) taken from a nearby site similar to the proposed planting site. Suitable trees and shrubs should be marked when the leaves are on (for best identification) for cutting and planting later.

STREAMBANK PLANTING

Post, stake and whip-sized dormant cuttings can be use for streambank erosion control. Use the larger sized cuttings for the worst bank erosion problems. To prevent moisture loss and possible washing away due to high water flow, dormant cuttings must be anchored deep in the soil from the toe of the eroding bank to the highest point where moisture is available. (See figure 1) Start the first row one foot above the low water elevation then stagger successive rows of stakes or posts. Most sites require a minimum of three rows of stakes or posts starting just upstream of the eroded site. Whips can be planted in between or above rows of stakes and posts. For all dormant or seedling plantings, ample sunlight and root moisture are necessary for successful growth. Planting in shaded or low light areas results in poor survival rates.

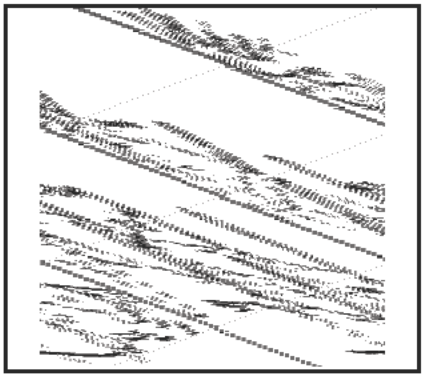

Figure 1. Stake spacing and angles.

Cuttings should be made after leaf drop when trees become dormant (December) and before the buds swell and leaf out, (late March). February to early March is a good time for planting dormant cuttings in Ohio. When storing or transporting cuttings or plants, keep them cool and moist. Planting should take place within 24 hours of cutting.

Stakes are used on small to medium sized streams with steep or eroding banks. Stakes may also be planted in between and above rows of posts.

1. Use straight branches or main stems. Cut one to three inch diameter stems into 18 to 36 inch lengths with shears, a hand or chain saw and remove all lateral stems. (Note: try to cut the branches and stems cleanly; ripped or jagged cuts may damage the plant.)

2. Make a horizontal cut on the top end which will remain exposed after planting and a 45 degree angle cut on the butt end to be planted. This will mark the correct side to plant into the ground.

3. Use a tree planting dibble bar, pry bar or drive the stake with a mallet until approximately three to six inches remain exposed or until meeting solid resistance. Do not force and split the stake or scrape the bark off.

4. Space stakes two to four feet apart in staggered rows parallel to the water elevation.

Posts are used on medium to large streams to stabilize the bank and toe of very steep or severely eroding slopes.

1. Cut three to six inch diameter trees into straight eight to twelve foot lengths with a chain saw and remove all lateral branches. Like stakes, cut the top end horizontal and cut the bottom end at an angle to ease planting. (See figure 2)

2. Set posts in pre-dug holes or drive with post driver so that half of the post is buried. Posts must be set deep enough to maintain contact with moist soil from the water table but

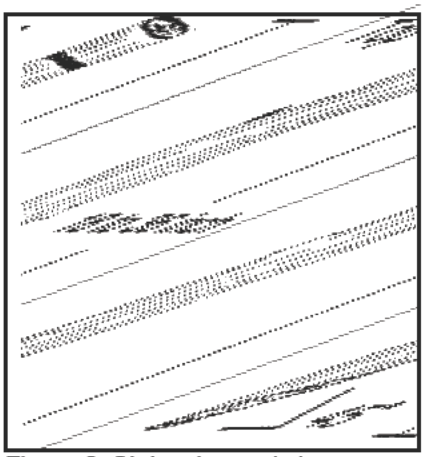

Figure 2. Stake size and shape.

not completely submerged in water year-round. Obtaining proper hole depth may require use of manual or tractor-operated augers or preferably an excavator operated ram.
For the row nearest water, the bottom of the post should be a least one foot below the deepest part of the stream bed.

3. Soil should be tamped into any holes around the post. This will provide good soil-post contact, prevent washing out and conserve plant moisture for better growth.

4. The damaged top few inches of each post should be cut off after planting if posts were driven. This will minimize insect and disease damage and conserve plant moisture.

5. Space posts four to eight feet apart in staggered rows parallel to the water elevation. The distance apart depends on the severity of erosion and site access conditions. (See figure 3)

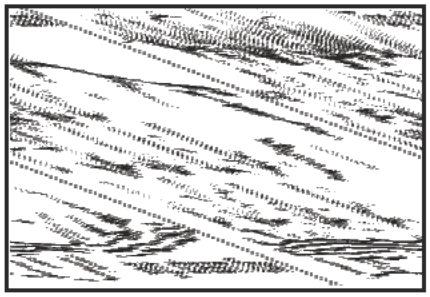

Figure 3. Post spacing on stream bank.

A combination of posts, stakes and other practices may be needed to control bank stability depending upon the site conditions. Some sites may need regrading to a 1:2 slope for planting access.

BERM PLANTING

Planting the tops of banks or berms with trees, shrubs, and grasses provides additional erosion control, buffering from agricultural and urban activities and helps filter polluted runoff before it enters the stream. Berms may extend from the top of each bank a minimum distance of two and one half times the channel width or 50 feet. For areas with severe bank erosion or in environmentally sensitive areas such as scenic rivers, 120 feet is recommended. Trees can be planted bare-root or transplanted from other sites. Plant spacings depend upon size and type of stock and soil conditions. Trees and shrubs which provide food as well as cover for wildlife should be considered for planting.

MAINTENANCE

Vegetative plantings should be inspected frequently for disease, insect infestation, wildlife damage (i.e., beavers, deer, rabbits) and high water damage. Willow sawflies, for example, may strip leaves of dormant planted willows in mid-June and late August. If sawflies are detected, immediate insecticide control is recommended. Inspections are particularly vital during the project's initial year and following periods of severe rain and/or flooding. If stakes and posts are dislodged or removed, replanting is necessary until the bank stabilizes.

Protect young trees and shrubs from livestock and drift applications of herbicides. Fencing and posting signs can help prevent these problems.

SUMMARY

Planting woody vegetation in stream corridors effectively protects soil, water, terrestrial and aquatic wildlife and recreational resources. These plantings are often used in conjunction with other conservation practices in order to effectively manage and restore stream corridors. Use of woody vegetation may not always solve slope stability problems but can often compliment other structural practices like rock rip rap or excavation. Furthermore, plantings can protect slopes from erosion until native vegetation reestablishes itself and the stream channel stabilizes.

Additional specifications can be found in the SCS Woodland Conservation Technical Note OH#13 (1992) and Technical Guide Engineering Standard No. 580 (1992).

This Guide is one of a series of Ohio Stream Management Guides covering a variety of watershed and stream management issues and methods of addressing stream related problems. The overview Guides listed below, are intended to give the reader an understanding of the functions and values of streams. For more information about stream management programs, issues and methodologies, see Guide 05 Index of Titles or call the ODNR Soil and Water Resources at 614/265-6740. All Guides are available from the Ohio Department of Natural Resources. Single copies are available free of charge and may be reproduced. Please contact:

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The guides are also available on-line as web pages and PDF files so you may print high quality originals at your location. You will find the guides on-line at:

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