



CENTRAL HARDWOOD NOTES

Stream Corridor Management

The quality of streams and stream habitat for aquatic life and terrestrial animals in the central hardwood forest can be maintained or enhanced through careful protection, management, and re-establishment of streamside forests. Streams and aquatic animals rely on adjacent forests for:

- Shade
- Organic material to drive aquatic food chains
- Streambank stability from dense root systems
- Filtering erosion sediment from adjacent lands
- Fish cover and production of aquatic invertebrates from submerged tree branches or root wads.

Since streamside forests are the only buffers between streams and the land that drains into them, we need to assess land use in the watershed and the condition of the stream channel. Watershed condition largely determines water quality. High turbidity and excessive suspended sediment are often due to land use practices that fail to protect soils from erosion. Avoiding large scale regeneration cuts, leaving forested buffer strips on contours at regular intervals, careful engineering and placement of logging roads, and maintaining adequate streamside buffer zones can help protect streams from excessive bedloads of eroded silt, sand, and gravel.

Even streams with well-managed watersheds can have problems, however. An unstable stream, or one that is continually declining in quality, must be carefully assessed from a physical standpoint. Whenever possible, rely on the expertise of an aquatic biologist, fisheries biologist, or other trained person with experience in dealing with the physical and biological nature of flowing water.

How to Manage for Optimum Streamside and Aquatic Habitats

1. Use undisturbed stream sections as a model

Compare the section to be managed with natural, undisturbed sections in the same general area to determine relative stability and possible management needs. Streams meander and dissipate energy when water flows downhill. Streams whose meander pattern and gradient are close to that of undisturbed conditions can be managed most successfully. Streams that have been straightened, have large debris jams, have had intensive land use changes, or excessive timber harvest on adjacent streambanks, are often unstable and difficult to manage. Don't attempt major changes in unstable streams without help from professionals experienced in stream management.

2. Plant bare areas

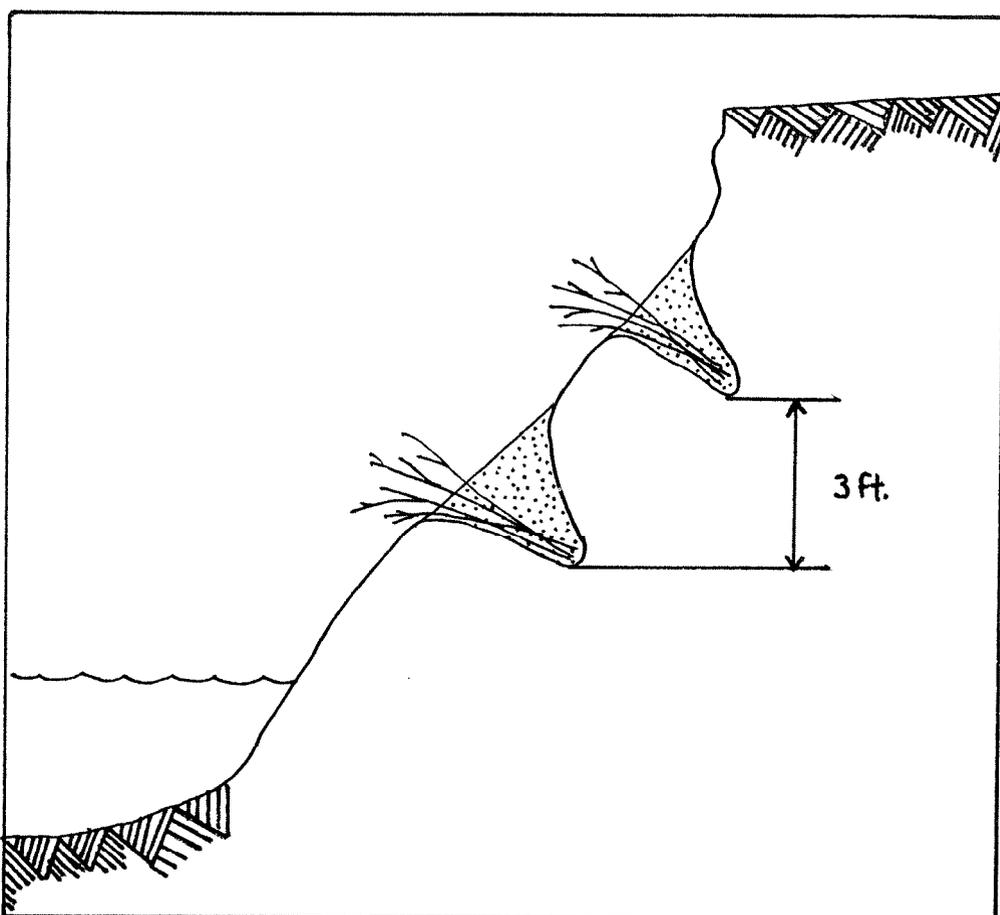
Revegetate bare streambanks that show little or no evidence of serious erosion or slumping. Use one or more of the following techniques:

- a. Cuttings and live staking.-Use black willow and eastern cottonwood cuttings 12 to 18 inches long and 1/2 to 1 inch in diameter or stakes 18 to 36 inches long and 1 to 3 inches in diameter. Push or pound sharpened cuttings or stakes, buds pointing upward, into streambank soils 2 feet apart at least 1 foot above the elevation of the estimated low water level. Three inches of the cutting or stake should remain exposed. On vertical streambanks, stakes and cuttings should be planted with the tops pointing skyward, not flat. Planting is best done in February to April before buds break dormancy.



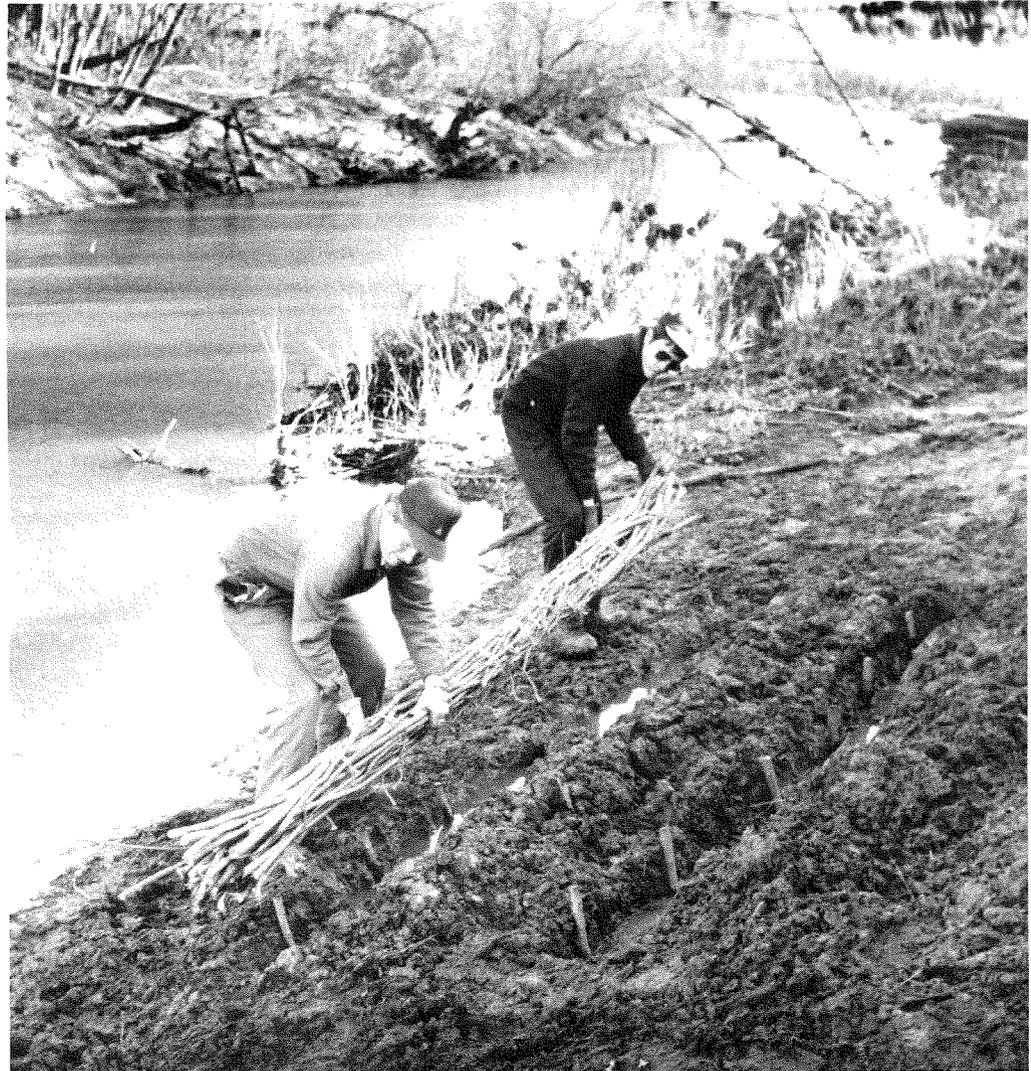
Pound in live stakes during dormancy (Missouri Department of Conservation).

b. Contour brush layering.-Place dormant cuttings $\frac{3}{4}$ to 2 inches in diameter and 24 to 40 inches long in trenches 18 to 30 inches deep, dug at an angle at least 10 degrees vertical of the horizontal plane. Dig trenches 3 feet apart on contour. Branches placed in the trenches should be criss-crossed and be 3 to 6 inches thick when finished. Place fill soil back in the trench and tamp firmly. On streambanks to be reconstructed with heavy equipment, 6-to 8-foot-long tree whips and cuttings can be laid in 3- to 6-inch-thick mats, alternating with 3-foot layers of soil.



Dormant cuttings should be put in trenches 3 feet apart on contour

c. Wattling.-Arrange live black willow whips 1 -1/2 inches in diameter and 4 to 8 feet long in cigar-shaped bundles, branch ends alternating with butt ends. Compress the bundle into an 8- to 10-inch-diameter cylinder and tie. Dig a trench in the streambank and lay the willow bundle in it, with no more than 3 to 6 inches of the circumference exposed. Overlap the ends of successive wattles, stake them with live willow stakes, place the soil back in the trench, and tamp. Wattles can be placed on streambank contours or perpendicular to the stream's flow.



After placing the bundle in the trench, leave a little of it exposed (Missouri Department of Conservation).

d. Live dormant posts.-Cut live black willow posts 3 to 8 inches in diameter and 6 to 8 feet long, score (make a short cut with chain saw, hand saw, or hatchet) the lower half every 12 to 14 inches, and set them in post holes or drive them with a driver to a minimum depth of 3 to 4 feet. Recommended spacing is 2 to 4 feet between centers. About 1 foot of buried portion of the post must be above permanent water level for good root development and survival.



Score willow posts about every foot before setting (Missouri Department of Conservation)



Set or drive willow posts so that a foot of the buried portion remains above permanent water level (Missouri Department of Conservation).

3. Build structures as needed

Correct streambank erosion or slumping problems to improve stream channel stability, reduce sediment loads, and improve water quality for recreation and fish and wildlife habitats. While some lightly eroding streambanks respond to the revegetation efforts described above, often one of the following measures is needed to stabilize the base of a streambank's slope and provide temporary protection while vegetation becomes established. Structures suitable for forested areas include:

a. Tree revetments--bushy trees such as eastern redcedar or pin oaks fastened to the bank with earth anchors and cable to protect the bank at curves and where it is under pressure from high velocity currents.

b. Bank sloping--reduction of the slope of streambanks (2:1 or 3:1 horizontal to vertical) to provide a suitable slope for planting trees and/or for installation of structural bank protection.

c. Riprap-rock of appropriate size properly underlaid with a filter blanket (a layer of smaller size gravel beneath riprap designed to prevent the washout of fine soil or streambank material through the riprap) to protect stream-banks.

d. Jetties---current deflectors of posts, pilings, rock, or other material that project into the stream. Consult with a person experienced in stream management or river engineering to prevent excessive impacts to the opposite bank and downstream areas.

These structures should be used in conjunction with revegetation treatments.

4. Get professional help

If streambanks are eroding severely or the stream is highly unstable, seek advice from stream management professionals.

5. Manage stream corridors

Improve streamside forests that are not regenerating naturally by planting tree species native to the area that are suited to the soils and site (see Note 3.05 Seeding and Planting Hardwoods). Streamside vegetation on both sides of a stream should be of mixed species and sizes with adequate forest floor vegetation and leaf litter and should not be grazed, cropped, or clearcut. Maintain a continuous forest cover at least 100 feet wide measured from the top of the bank.

6. Improve instream habitat if necessary

Evaluate instream habitat conditions with the assistance of an aquatic biologist or a fisheries management biologist. To insure a minimum of usable fish habitat, stream channels should have pools deeper than 3 feet, and 15 percent of the channel area should be comprised of rootwads, submerged timber, or boulders greater than 2 feet in diameter. Instream structures to increase fish cover and fish food production should follow the biologist's recommendations.

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