

Maintaining a Healthy Riparian Buffer Along Streams and Rivers

Protecting Land, Water, Fish & Wildlife with Streamside Vegetation

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Riparian areas are the “green zones” of water-loving vegetation found along streams, rivers, and lakes. Riparian – “of, on, or relating to the banks of a natural course of water” (Latin *riparius*, from *ripa*, bank.)

Vegetation – The Roots of the Solution

Streams and riparian areas are held together by a diversity of vegetation with strong, deep root systems. This vegetation reduces the velocity of a stream, by slowing water down through friction. A 5 cm. deep rootmat resists erosion up to 20,000 times better than bare soil streambanks (Adams, Fitch, 1995). The more vigorous and dense the plants are, the better streambank protection they provide.

The best vegetation for stabilizing soils and protecting streambanks are woody species (trees and shrubs). The many branches and extensive root systems of woody species are especially effective in the development of overhanging banks, which provide cover and shade for fish and other aquatic organisms. When the deep, binding roots of shrubs and trees are absent, shallow-rooted grasses cannot withstand substantial erosion forces.

Larger Streams and Rivers



For larger and higher gradient streams and rivers, woody species such as shrubs and trees are needed to stabilize streambanks.



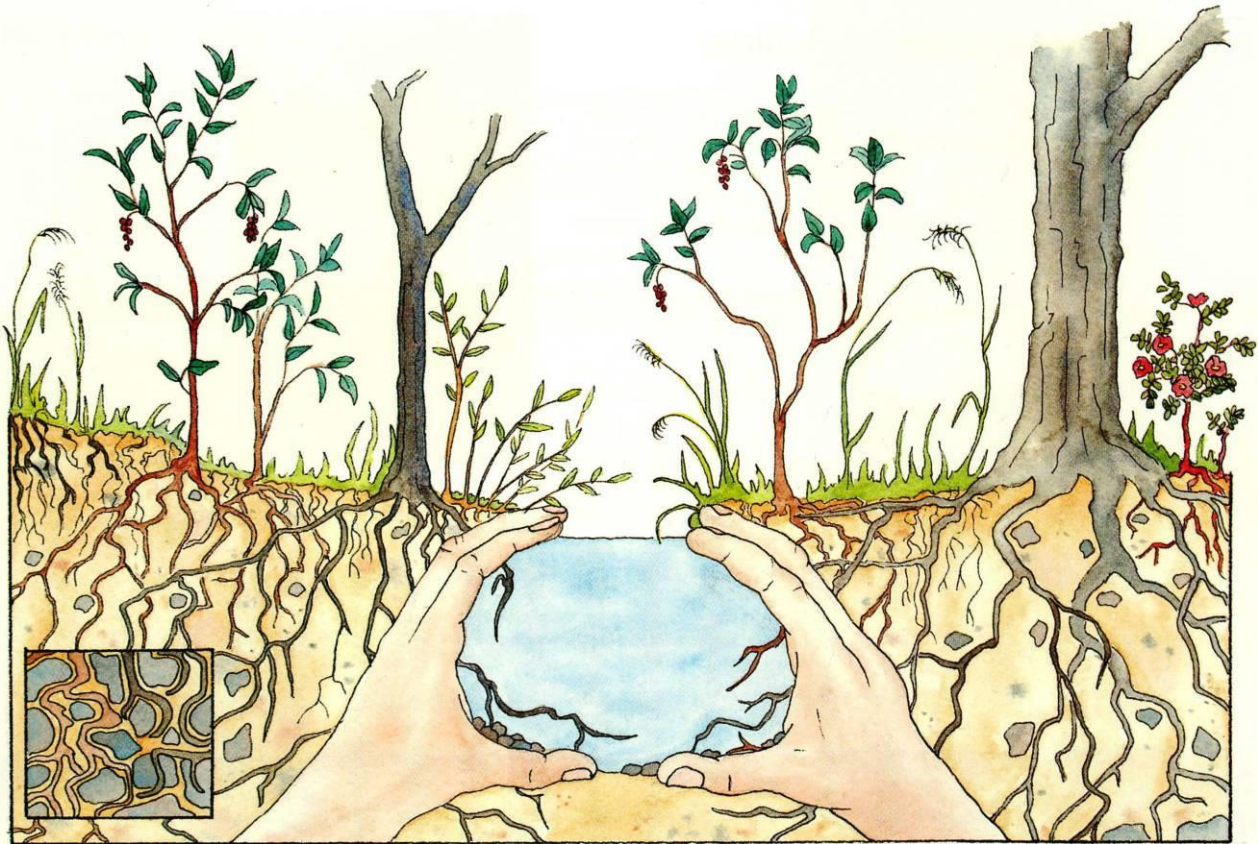
Small Streams



On small, narrow, low gradient, sinuous streams, sod-forming, deep-rooted herbaceous species such as grasses and sedges can protect streambanks.



Stream Channel Shape and Size



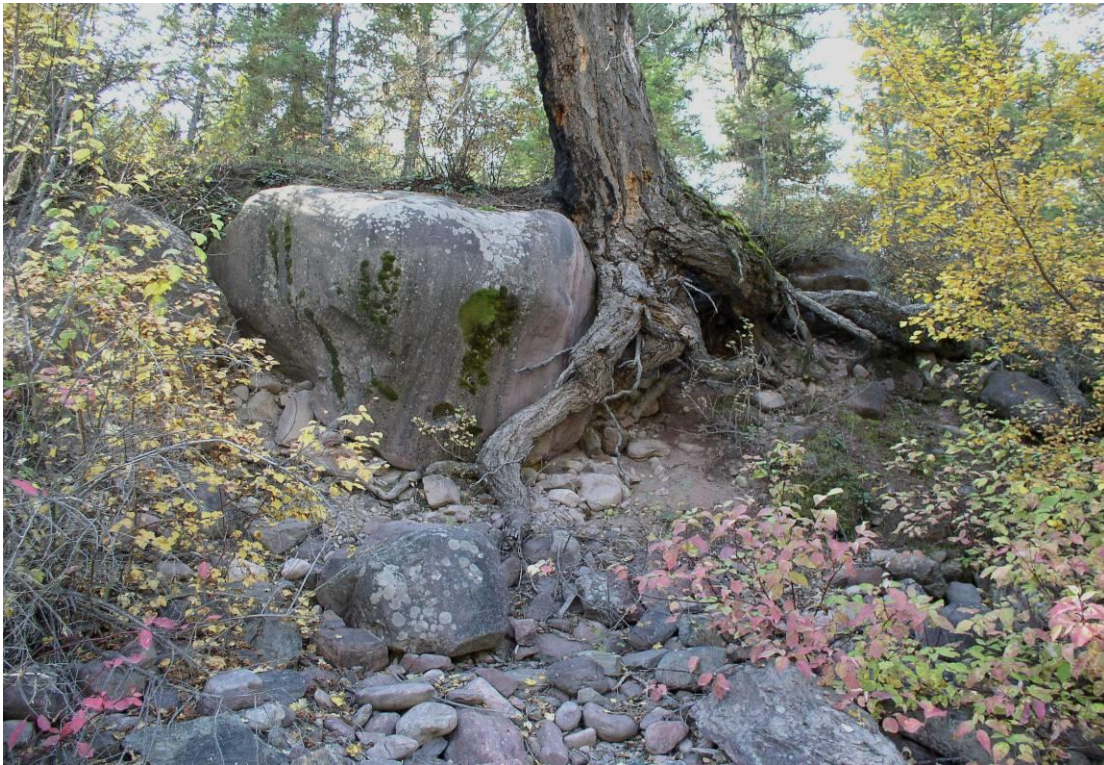
Well-vegetated streams tend to be narrow and deep due to the binding nature of plants and their root systems.



Where vegetation has been removed by heavy grazing, logging or floodplain development, the cohesive nature of streambanks breaks down and the stream becomes wide and shallow.

Diverse, healthy vegetation has a major influence on stream channel shape and size.

Plant Species - Size Accordingly



Roots of trees are large and few, but have tremendous holding-power for the bank's larger materials.



Shrubs and grasses have numerous, fibrous roots that can hold smaller particles, binding the soils of the streambank or riverbank together.

Healthy Riparian and Streamside Vegetation Provides the Following Important Functions:



- Protect soils and streambanks from erosion – As the roots of vegetation along streambanks increase, erosion decreases.
- Slow the speed of flowing water – During flooding, water flow rates are reduced by streambank vegetation.
- Store and release water over a longer period of time – By reducing the flow rate, streambank vegetation allows more water to be added to groundwater and bank storage.
- Protect water quality - Vegetation traps sediment and nutrients which becomes incorporated into the banks rather than washing downstream. Water temperatures and evaporation are reduced due to the shading effect of overhanging banks and vegetation. Vegetation buffers a stream from pollutants.
- Enhance plant productivity - Water tables in well-vegetated riparian areas are higher which allow plants to keep the roots wet. Plant production is high.

- Provide fish and wildlife habitat – Healthy riparian areas provide water, shading, shelter, cover, food and nesting sites for fish and wildlife.
- Provide large woody debris needed for fish habitat.



Large trees and logs that fall into the stream are most likely to remain in a channel. These woody “anchors” reduce stream velocities, control sediment, help create pools, spawning areas, and habitat for bugs that are important food for fish.



Negative Effects of Removing Riparian and Streamside Vegetation:



- Increases bank erosion and failure
- Widens channels; decreases water depth
- Decreases fish and wildlife habitat
- Disrupts streamside plant communities
- Increases invasion of non-native plants and weeds
- Lowers water table
- Makes streambanks more susceptible to compaction
- Increases water and soil temperature which increases evaporation
- Speeds runoff of rainfall and snowmelt
- Reduces trapping of sediment and other pollutants
- Reduces livestock forage
- Increases bank damage due to icing
- Decreases real estate values
- **Against state law (310 Law, SMZ Law)***

Negative Impacts of Repeated Cutting or Mowing:

- Reduced plant vigor – Root growth stops when the above-ground portion of the riparian vegetation is repeatedly removed. Regrowth of the above-ground portion of the plant takes precedence over providing energy for root growth. Continuous removal causes roots to die back, reducing plant vigor. The plants become weak, smaller in size, and are more susceptible to bank erosion.
- Elimination of existing woody vegetation - Repeated cutting or mowing eventually kills woody species. Trees and shrubs unlike grasses, sedges, and forbs build on last year's growth, and are not able to continually come back from the roots. The growing points of woody species are located on the tips of the branches, unlike many grasses and forbs that have growing points at or below the soil surface.
- Prevents any establishment of new woody vegetation. With repeated cutting or mowing, only herbaceous species can survive.



Negative Impacts of Replacement of Riparian Species with Lawn:

- Increased potential for bank erosion - Lawn grass species, such as Kentucky bluegrass, are shallow-rooted and provide very limited soil and bank holding capability. The streambank is no longer able to withstand spring runoff and erosion occurs.

****Permit Alert****

310 Law: Natural Streambed and Land Preservation Act

The 310 Law is a state law which requires that any person planning to work in or near a year-round (perennial) stream or river on private or public land must first obtain a 310 Permit from the local conservation district. Missoula Conservation District administers the 310 Law within Missoula County.

The purpose of the 310 Law is to insure that projects on perennial streams will be carried out in ways that are not damaging to the stream or to adjoining landowners.

Unless specifically authorized by the Conservation District, removal of streambank vegetation within the **immediate banks** of the stream is prohibited. Streambank vegetation must be protected except where removal is necessary for completion of a permitted project, and then removal must be kept to a minimum.

***Immediate banks** are defined as the area above the mean high water mark and adjacent to the stream which supports stream stability and function.*

There is no fee for a 310 Permit. For stream activities within Missoula County contact the Missoula Conservation District by calling (406) 829-3395; e-mailing: mslacd@montana.com; Fax: (406) 829-3455 or stop by the office at 3550 Mullan Road, Suite 106 to pick up an application. Applications can also be found on the Internet at www.dnrc.state.mt.us/cardd/jointapplinfo.html.

SMZ Law: Montana Streamside Management Zone Law

The SMZ Law establishes a Streamside Management Zone (SMZ) along each side of a stream, lake, and other bodies of water (OBW). The SMZ law applies only to drainages that meet the Streamside Management Zone Law Administrative Rules of Montana definition of a stream, lake, or OBW, and only to forest practices that meet the definition of a timber sale (The SMZ Law does not apply to cutting wood for personal use or other land management activities that do not qualify as timber sales.).

A streamside management zone, or “SMZ” is a buffer strip that serves as a natural filter which helps to keep sediment out of the stream, protects and shades stream channels and banks, and provides large woody debris to the stream channel. Timber harvesting in the SMZ may cause erosion, water quality problems. With this in mind, the 1991 Montana legislature passed the Streamside Management Zone Law.

For more information contact: Montana Department of State Lands, 2705 Spurgin Road, Missoula, Montana 59801; (406) 542-4300.

Credits:

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Technical Review:

Missoula Conservation District
USDA, Natural Resource and Conservation Service
Montana Fish, Wildlife and Parks
Montana Department of Natural Resources and Conservation

References:

Caring for the Green Zone, Riparian Areas and Grazing Management, August 1995, Barry Adams, Lorne Fitch, Pub. No. I-581 ISBN: 0-7732-1435-6, 36 pp.

Livestock Grazing On Western Riparian Areas, July 1990, U.S. Government Printing Office: 1990-775-443/21,661 Region No. 8, 45 pp.

Montana Stream Management Guide for Landowners, Managers and Stream Users, 1998 Revised Edition, April 1998, MT Assoc. of Conservation Dist. And MT Dept. of Envir. Quality, 34 pp.

Special report: Grass: The stockman's crop, How to harvest more of it, Harland Dietz, Soil Conservation Service, 1988, 1989 Sunshine United, Inc., 16 pp.

Stream and Riparian Area Management, A Home Study Course for Managers, Gene Surber and Bob Ehrhart, MSU Extension Service, 1998, 78 pp.

Water Quality BMPs *Best Management Practices* For Montana Forests, Robert Logan, MSU Extension Service EB 158, 2001, 58 pp.