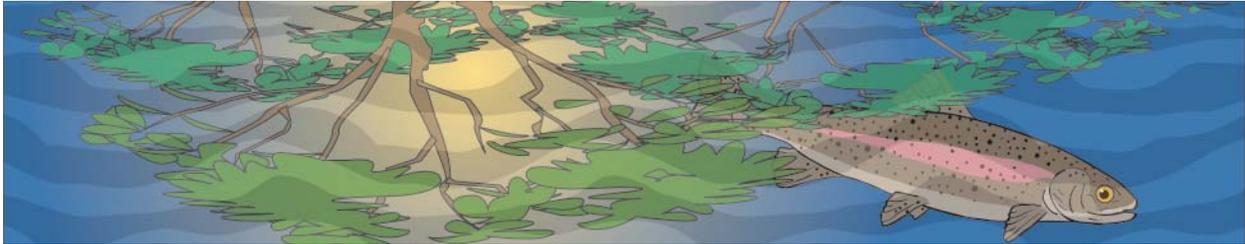




Riparian forest buffers for trout habitat improvement

Maintenance of riparian forest buffers

Phyllis Bongard and Gary Wyatt¹



Introduction

Minnesota is home to more than 450 miles of Department of Natural Resources designated trout streams. As a cold water species, trout are sensitive to warm stream temperatures. Establishing trees in riparian buffers is widely recognized as a significant tool for stabilizing stream temperatures and improving trout habitat. Riparian forest buffers (RFBs) provide other benefits, as well. They filter sediment, nutrients and pesticides, thus preventing movement of these nonpoint pollution sources downstream. Trees in the buffer zone provide woody debris for the stream, an important component of trout habitat. The woody roots also help stabilize stream banks and help with flood control.

Multi-species, multi-use RFBs offer landowners an opportunity to not only improve stream habitat and water quality, but to explore income producing options from the buffer itself. Currently, the most accepted design includes

three zones: an unmanaged woody zone nearest the stream, a second zone of trees and shrubs that can be managed for income, and finally, a warm-season grass zone adjacent to cropland.

Weed control

Until tree seedlings can compete with surrounding vegetation, weed control is the primary maintenance activity in the critical zone around the seedlings. Recommendations in neighboring states include mulching, mowing and shielded herbicide applications as options for weed control in the tree zones. Organic mulch, such as wood chips or shredded hardwood, can be applied to a four to six inch depth around the seedling to suppress weed competition. However, mulching alone may not be adequate if weed control during site preparation was poor. Mulching may also draw voles or mice that may chew on the bark in the winter, which could damage or kill the tree or shrub. A similar caution applies to both the use of weed mats and mowing. While mowing is

¹ Phyllis Bongard is an Extension educator, agriculture production/water quality, for University of Minnesota Extension, Dakota County. Gary Wyatt is an Extension educator, agroforestry, for University of Minnesota Extension.

useful to mark rows and reduce rodent habitat, it will not provide adequate weed control if the preplanting control in previous pastures was poor.

Herbicide applications are the most effective weed control method for the tree zones in the buffer. Glyphosate (Roundup® and others), a non-selective systemic herbicide, can seriously damage tree and shrub seedlings, so applications need to be shielded. Herbicide applications may be needed annually until the tree and shrub seedlings can compete with the surrounding vegetation.

While glyphosate is the most commonly recommended herbicide, applications of sethoxydim may be an option. Sethoxydim (ex. Poast®) is a systemic annual and perennial grass herbicide. In recent studies, a single early summer application was effective in reducing reed canarygrass biomass and seedhead density for that growing season. However, the herbicide effects didn't carry over into the following season, so multiple year applications would likely be required.

In large plantings, preemergence herbicides can also be used for weed control. These herbicides target weed seedlings before they emerge from the soil. Examples of herbicides used in forestry plantings include Goal® (oxyfluorfen), Oust® (sulfometuron methyl) and Surflan® (oryzalin). Always carefully read and follow label directions.

Weed control recommendations for the grass zone are quite different than for the tree zones. During the first year of warm-season grass establishment, the area should be mowed at a height of six inches when the weeds are a foot tall and again in mid- to late-September to help prevent annual weeds from going to seed. Appropriate herbicides may be used, if needed. When possible, early spring burns during the first few years of establishment help reduce competition from non-native cool-season grasses, weeds and woody plants.



Figure 1. Shredded hardwood mulch suppressing weed growth around tree seedling one year after planting at Vermillion River demonstration.

Long-term maintenance

Long-term maintenance activities promote strong plants that can survive environmental stress and optimize nutrient uptake and storage. In Zones I and II, harvesting or cutting back shrubs and pruning trees will stimulate vigorous growth. Pruning for plant health and growth is important in the first 10 years of growth. Pruning is also recommended for high value species managed for sawlog production. After eight to 12 years, thinning or selectively harvesting fast growing trees (ex. willows, cottonwoods, silver maple) will remove captured nutrients and chemicals from the riparian zone and continue to promote growth. A continual annual harvest where a portion of the tree zone (1/8 to 1/12) is taken is an option. Harvesting in the winter also has some advantages. The root systems of the harvested trees will be retained and continue to stabilize the soil while allowing trees to regenerate from stump sprouts in the spring.

To provide coarse woody debris for the stream, avoid disturbing existing large downed logs and stumps. If a snag must be dropped, leave it where it falls whenever possible. To create coarse woody debris, cut two to five bark-on logs greater than 12 inches in diameter per acre. Preferably select hollow butt or other defective

log sections of at least six feet in length. Cut sound logs only if there is not enough defective material available.

After the first five years, the grass zone should be harvested or burned. To improve native grass and forbs plantings, it is recommended to conduct a prescribed burn every three or four years. Naturally, a fire break or buffer needs to be established to protect the desirable woody plantings. This will promote both root and dense upper plant growth and prevent a build-up of dead material on the soil surface.

Replanting or reseeding may be required during the life of the buffer. If three to four consecutive trees or shrubs die in Zones I or II, they should be replaced. Likewise, trees should be replanted after harvest if they are not regenerating on their own. In Zone III, if the grass establishment is poor, the area should be treated with glyphosate and redrilled. If there has been some establishment but it is less than optimal, new seed can be drilled directly into the existing stand. Small areas can be hand seeded and raked.

Buffers should be inspected regularly for eroded areas and repaired immediately. Sediment may also build up, particularly along the field edge of the grass zone. If this occurs, the sediment can be re-spread onto the field and the area replanted, as necessary.

Other maintenance activities might include insect and disease management, particularly if fruit and nut trees are included in the managed woody zone (Zone II). If the buffer is established during a drought, additional watering may be required. Finally, the tree zones (I and II) should be protected from livestock. Careful grazing of the grass zone (only) may be an option, although this has not been thoroughly tested. Grazing may not be allowed if this planting is enrolled in a government program.

Wildlife damage

These plantings must be monitored for all wildlife which could cause damage to the buffer planting. Significant damage from browsing deer, rabbits, voles, gophers and beavers can be minimized with an integrated pest management approach. Late fall mowing is recommended in the buffers to reduce habitat for rodents. Other options include using repellents and controlling populations through hunting or trapping. Beavers, attracted to riparian plantings where they can cause significant damage, are an example of a species that may legally be trapped.

Contact the Minnesota Department of Natural Resources for more information and regulations. To learn more about wildlife and ways to prevent and control damage, a handbook from a consortium of universities is available: *Prevention and Control of Wildlife Handbook*, icwdm.org/handbook/index.asp.

For more information

Other publications in this series:

- Benefits of riparian forest buffers
- Design of riparian forest buffers
- Establishment of riparian forest buffers
- Financial assistance opportunities for riparian forest buffers

Find the full series as well as these additional resources at the University of Minnesota Extension website, extension.umn.edu/buffers.

Center for Agroforestry. 2005. Establishing and managing riparian forest buffers. University of Missouri Center for Agroforestry, Columbia, Mo. AF1009.

Fox, A., Franti, T., & Kucera, M. (2005). Installing your riparian buffer: Tree and grass planting, postplanting care and maintenance. Lincoln, Nebraska: University of Nebraska-Lincoln Extension G1558.

Schultz, R.C., Wray, P.H., Colletti, J.P. et. al. 1997. Stewards of our streams: Buffer Strip Design, Establishment and Maintenance. Ames, Iowa: Iowa State University Extension PM-1626b.

Bedker, P.J., O'Brien, J.G. & Mielke, M.M. 1995. How to Prune Trees. USDA Forest Service. Available at na.fs.fed.us/spfo/pubs/howtos/ht_prune/prun001.htm.

The information given in this publication is for educational purposes only. Reference to commercial products or trade names is made with the understanding that no discrimination is intended and no endorsement by University of Minnesota Extension is implied.

Reviewers: Brian Nerbonne, Minnesota Department of Natural Resources and Ken Brooks, Department of Forest Resources, University of Minnesota.

Illustrations by Robin Freese.

Copyright © 2010, Regents of the University of Minnesota. All rights reserved. University of Minnesota Extension is an equal opportunity educator and employer. This material is available in alternative formats upon request. Contact your University of Minnesota Extension office or the Extension Store at 800-876-8636. University of Minnesota Extension publication M1285.

♻️ Printed on FSC-certified recycled and recyclable paper with at least 30 percent postconsumer material.