Riparian Forest & Buffer

Common Issues

Historically, it was common practice to pull out all vegetation from the banks of rivers and streams. The soil was very fertile next to the river, and converting forest and shrubland to mountain meadow allowed for more agricultural land. After a century, however, it is apparent that the riparian forest was providing protection from erosion, water filtration, habitat for wildlife, and many other benefits. Without riparian vegetation, river health problems, including elevated water temperatures and rapid erosion are becoming more prevalent. The streambank needs new riparian plantings and increased protection to reestablish a healthy forested buffer.

Questions to Consider

- Which areas can be converted to riparian forest?
- Which plant community is appropriate to plant, given the soil, elevation, and conditions of the site?
- What width of riparian forest is appropriate, considering the surrounding land use and landowner objectives?
- How deep is the water table where new riparian trees and shrubs will be planted?
- Is there a water source that can be used to support the establishment of plantings?
- How can grazing be managed to support newly planted vegetation?

Principles of River Health

Riparian Forest is Valuable to a Property

Riparian vegetation helps to solve many problems encountered on a property. The roots create strength and structure in the soil, which prevents erosion. The roots also create turbulence which reduces stream power, thereby reducing the severity of downstream erosion, and the rest of the plant provides roughness on the floodplain which dissipates flood energy. Riparian vegetation shades the river, which lowers its temperature. The plants act as a buffer to capture nutrients and sediment, which improves water quality, and these plants also hold water in the soil, which increases summer flows. In addition to providing critical wildlife habitat for numerous aquatic and terrestrial species, riparian forests also provide quality browse and shade for livestock and help to prevent infestations of invasive species.

Riparian Forest is Important Habitat for Wildlife

Riparian zones make up less than two percent of the American West's land area, but they support the highest density and abundance of plants and animals of any habitat type. In particular, more than 80 percent of wildlife species in Colorado depend on riparian areas for at least part of their life cycle. The combination of river and forest habitats provides food, water, shelter, refuge, breeding and rearing grounds, wintering habitat, and migration corridors for an amazing diversity of birds, mammals, reptiles, fishes, amphibians, and insects.

Different Areas Support Distinct Plant Communities

The specific assemblage of grasses, wildflowers, shrubs, and trees that are appropriate for one area is not necessarily the same as what is appropriate in another area. Plant communities depend on many factors, including elevation, soil, hydrology, river gradient, and climate. It is always important to have riparian vegetation on the banks of the river, but the specific types of plants may vary.

Recommended Practices or Actions

Landowners can undertake a variety of actions to protect and improve riparian forests on the Yampa River and its tributaries. Several recommendations are discussed below, including identifying appropriate plant communities, understanding planting methods for riparian species, selecting strategies for water delivery to support plant establishment, and considering long-term protection of restored areas through conservation easements.

Determine Which Plant Community to Restore

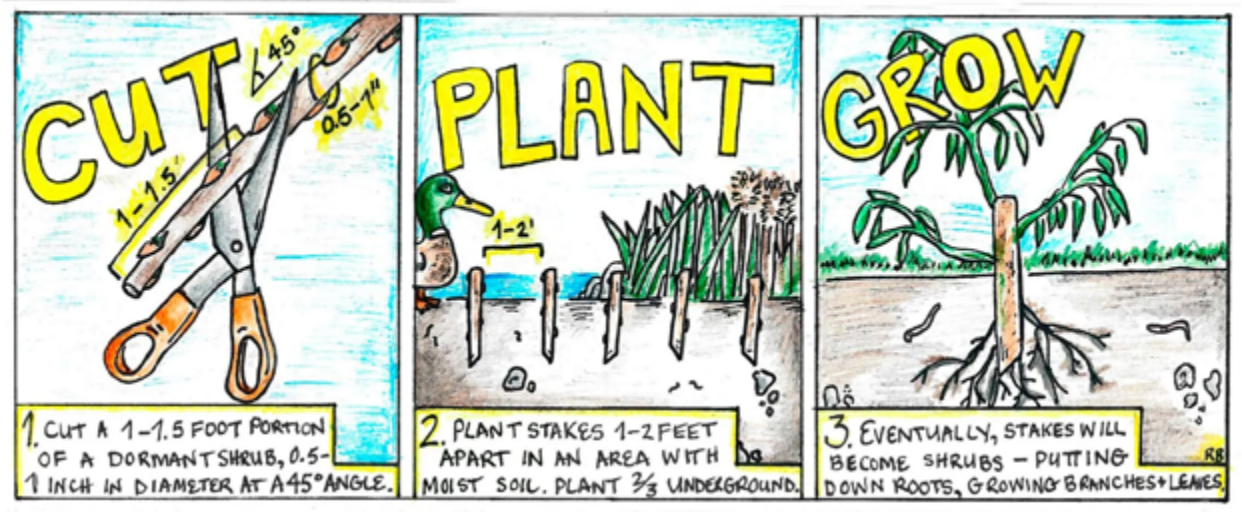
To plan a riparian forest restoration project, one of the first steps is to determine which plants will be best suited for the site, and this is done by developing a reference model. A reference model could be informed by historical photos, or by nearby sites with intact vegetation. The Yampa River Stewardship

Program has developed a Riparian Planting Palette, which accompanies this Handbook (Appendix 1) and describes six plant communities characteristic to the Yampa River watershed. Compare the Planting Palette to a particular property to determine the mix of trees, shrubs, forbs, and grass species that would be appropriate for that property.

Diverse plant communities include (clockwise from top left) Coniferous Riparian Forest, Upper Valley Willow Shrubland, Sandbar Willow Shrubland, and Narrowleaf Cottonwood/Dogwood Woodland
Photos by Roddy Beall, Zenobia Consultants

Understand How to Plant Riparian Species

For successful restoration projects along the Yampa River and its tributaries, it is critical to understand strategies for seeding, planting, or propagation of all the species in the planting palette. Some species, such as grasses, sedges, and herbs, can be planted through a seed mix. Seeds can be purchased from several seed suppliers, and a seed mix can be designed with help from the local CSU Extension, Conservation District, or NRCS. Some species such as willows and cottonwoods can be planted from pole plantings, where a single "pole" of a tree is staked into the soil. Pole plantings (also called stakes) can be a cost-effective strategy because material can be harvested from nearby trees and shrubs, but it is important to use dormant poles and prepare them appropriately.



Simple guide to prepare and plant willow, cottonwood, or dogwood poles | Comic by Nature Conservancy of Canada

Some plants must be planted from rooted stock (a plant with fully-developed roots), and in some circumstances even cottonwoods and dogwoods are more successful from rooted stock. Several nurseries are specializing in developing restoration-quality rooted stock for the Yampa Valley. Restoration-quality seedlings are often grown from seeds collected at the site. Several resources are provided below that describe the process for preparation and planting of poles and rooted material.

Community riparian planting events teach stewardship principles to the next generation
Photos by Ben Beall, Zenobia Consultants

Develop a Strategy for Water Delivery

Riparian plantings need water to establish and thrive. If the plantings are in the right location and at the correct elevation, they should not require supplemental watering because the stream will provide good soil saturation to promote pole planting or seedling establishment. Measure the groundwater depth at the restoration site and determine if plantings can reach the water table.

If the groundwater table is too low, building wood structures can raise the water level to the restoration area. It also may be possible to support beaver to colonize the stream segment, which can raise the water table at the restoration area. If not, it may be necessary to install an irrigation system to support plant establishment. Any strategy for delivering water to plantings on the bank could have water rights implications, and should be carefully considered in coordination with the DWR.

Consider a Conservation Easement

Conservation easements are voluntary agreements between a landowner and a land trust organization that restrict development on a property. Conservation easements limit development to protect certain resources in perpetuity, such as open space, wildlife habitat, agricultural use, scenic vistas, or historic landmarks. If a landowner is interested in creating a permanent agreement that prioritizes and protects the inherent value of the riparian corridor's natural character, that desire can be written into a permanent legal document that is attached to the land despite any changes in ownership. Every property is unique, and every conservation easement is unique, so a landowner must work with a qualified land trust organization, such as Colorado Cattlemen's Agricultural Land Trust, to develop a plan.

Benefits of Implementing Recommended Practices

- Quality browse and shade for healthy livestock
- Habitat for diverse birds, mammals, reptiles, fishes, and amphibians
- Natural water storage for summer flows
- Flood mitigation
- Natural bank stabilization
- Improved water quality
- Reduced soil and land loss

Reference and Resource Materials

The Yampa River Stewardship Program has developed a Riparian Forest Planting Palette specific to the Yampa River watershed. This guide will help guide practitioners in choosing a site-appropriate plant community.

Western Resilience Center's Yampa River Forest Restoration Project has been providing riparian reforestation along the Yampa and its tributaries since 2019 on both public and private land. Private landowners interested in implementing a riparian reforestation project can contact Western Resilience Center for input and potential project partnership. Western Resilience Center supports riparian reforestation projects on private lands each year at no cost to landowners.

NRCS Conservation Practice Standard: Riparian Forest Buffer (Code 391), can be used through the EQIP to access cost sharing. EQIP provides payments to restore and manage riparian corridor habitat.

NRCS Conservation Enhancement Activity E643D: Low-tech process-based restoration to enhance floodplain connectivity (Code E643D), can be used through the EQIP to access cost sharing. EQIP provides payments to restore and manage riparian corridor habitat.

The U.S. Forest Service has developed a thorough resource called Conservation Buffers to help guide the planning and designing of riparian forest buffers.

BLM has written a Riparian Restoration Guide that provides the basic principles and background information needed to carry out a restoration project.

The Watershed Center made a useful guide for Willow Stake Planting.

Wildlands Restoration Volunteers created a Guide For Harvesting, Storing, And Planting Dormant Willow Cuttings to convey basic willow biology and fundamental techniques.

The Tamarisk Coalition published Suggested Methodologies for Cottonwood Pole, Willow Whip Cuttings, and Longstem Plantings, which describes techniques for harvesting, storing, and planting various types of plant materials, including dormant cottonwood pole cuttings, willow whip cuttings, and longstem products.

Colorado Cattlemen's Agricultural Land Trust works with landowners to create Conservation Easements to protect natural resources and preserve the land for farming or ranching.