Streamside Landscapes

A plant and care guide for small streams in the Gallatin Watershed.

Keep it wild and bushy out there!

Developed by the Gallatin Watershed Council, in partnership with
Trout Unlimited, Montana State University Landscape Design, and Montana State University Extension – Gallatin County.
Funding provided by the Montana Watershed Coordination Council Watershed Fund.

YOUR STREAMSIDE MATTERS

Riparian areas–the land surrounding a river or stream–are supposed to look wild and bushy, with tall canopy trees and a complex understory, casting their shade for people and wildlife. Native streamside vegetation has adapted to withstand floods and fires, provide nutrient dense forage year-round, and keep streams cold and clean.

Small creeks all across the Gallatin Valley are very much a part of a bigger story about our community's health and productivity. There are over 1,000 miles of streams in the Lower Gallatin Watershed and 40% of their combined length completely lacks native riparian vegetation.

Your streamside matters. Where there are no willows, alders, and cottonwood trees, there are no deep roots to hold streambanks in place or branches to shade out the sun's heat. Healthy streamsides are the best flood insurance money can buy. Unassuming creeks are critical trout spawning habitat, and while riparian areas only make up about 5% of Montana's landscape, almost all critters big and small, four legged or winged, depend on these vital slivers of land for at least part of their life cycle. A buffer of trees and bushes stops litter, sediment, fertilizer, and whatever else from flowing and blowing into the nearest creek. And who doesn't want a peaceful place to disappear and play in the dappled shade of whispering aspen leaves?

This guide is a do-it-yourself road map to get out there, plant some plants, and care for your riparian edge.

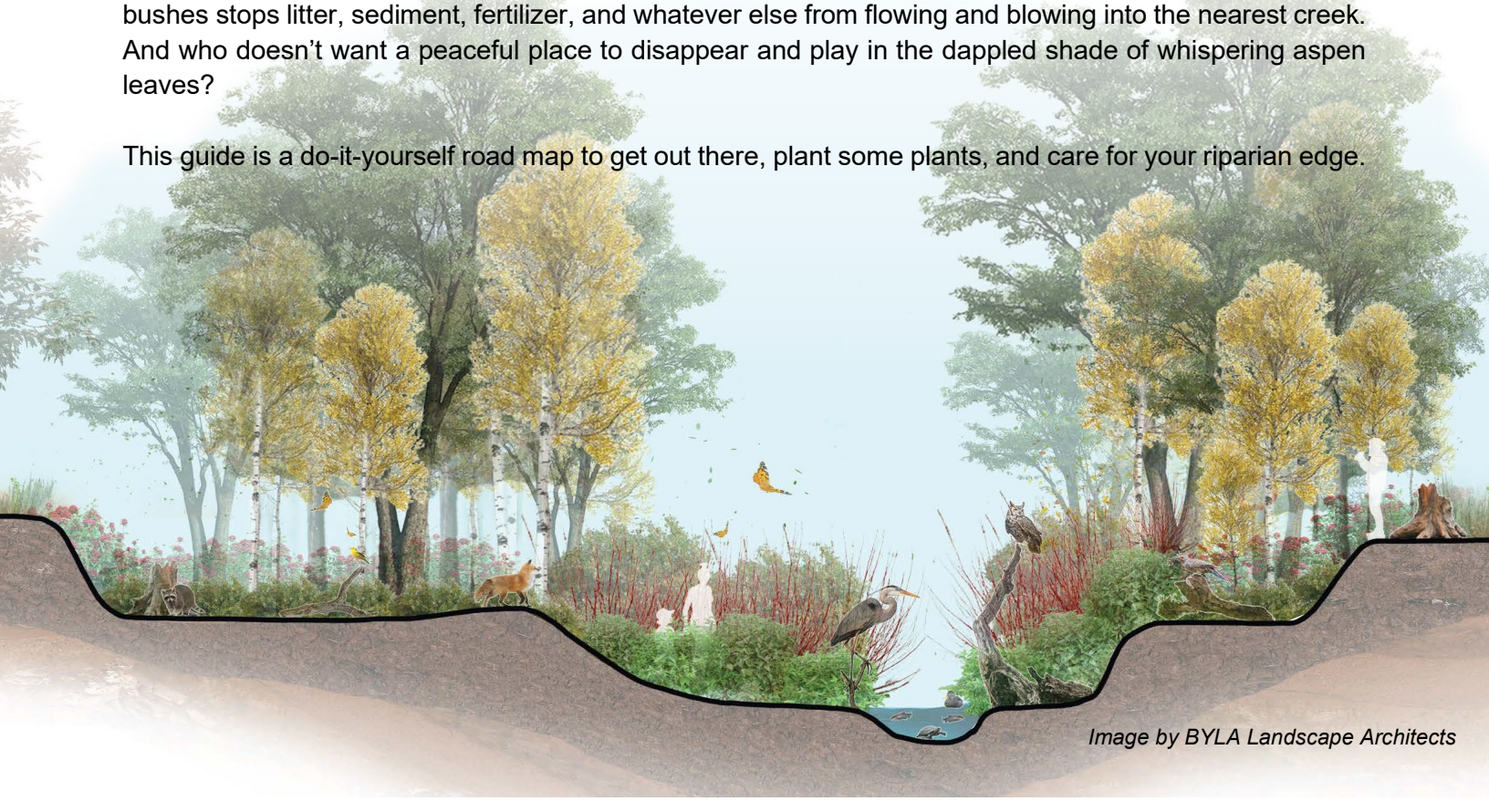

Image by BYLA Landscape Architects

ECOSYSTEM SERVICES

Deep Roots hold soil in place, reach into the groundwater table to capture nutrients before they can enter the stream, and keep riparian vegetation alive into the drier months, cooling the surrounding area and providing a fire break.

Down logs and branches provide important habitat and soil nutrients.

The Watercourse Buffer is the area of land on either side of a stream needed for all these good things to happen. Recommended width: Small streams = 100', Medium Streams = 150', Large rivers = 300'.

Willows and Dogwood along the stream's edge prevent bank erosion.

Diversity in plant heights and species gives a variety of hiding places and food sources, attracting many different animals.

Shade. Riparian areas are often several degrees cooler than surrounding uplands providing refuge for people and critters.

Cottonwood trees give birds of prey a good vantage point to hunt from and a safe place to nest.

Berry-bushes flower in the spring and summer, and offer nutrient dense berries in fall and winter.

Water. Trout need especially cold, clean water to survive.

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HOW TO REPLANT YOUR RIPARIAN EDGE

We are trying to change an ecosystem and shift the plant community from being dominated by aggressive or invasive grasses and weeds, to native trees and shrubs. Site planning and preparation, planting techniques, and long-term care are each important for taking your streamside back.

STEP 1: MAKE A PLAN

Planting zones. Riparian plants like to have their roots wet, but some species more than others. For the purposes of this guide, we created three planting zones: **Zone A** is the wettest, low-lying land closest to the stream; **Zone B** is a transitional zone that is sometimes wet and sometimes dry; and **Zone C** is upland conditions where the depth to groundwater is deepest and the soil is dry most of the year. Soil moisture generally decreases as you move away from the stream, but the width of each planting zone varies, primarily based on topography. Look for benches of land that step up, away from the stream to help distinguish between zones.

Clusters. It can help to arrange plants in groupings, rather than spreading them out evenly across the site. Interspersing larger saplings with seedlings and cuttings creates little native plant communities that compete with grasses and weeds better than loners.

Purchasing Plants: Sometimes, native and specific riparian plants can be hard to find. Check your local nurseries, native plant societies, and Extension Offices to learn more about plant availability. If you can't find a plant or can only find a species in a nursery cultivar, it may be available from a wholesale nursery.

Utilities. Check for utilities overhead and underground. Call 811 for a utility locate before you dig.

Timing. Plant in the spring before bud-break or in the fall after leaf drop. This is when temperatures are not too hot and not too cold, and there is more moisture in the soil.

Seedling, sapling, or cutting? Small bare root saplings, seedlings, and live-stake cuttings have (or quickly grow) root systems that are right for their size, and they adapt to their new homes quickly and without much codling. Balled and burlapped or containerized saplings have relatively small root systems for their size, and growth will stall until their roots have time to catch up. Larger saplings give immediate results, however, they often require more maintenance and water to survive. A tree will take roughly one year to establish for every one inch of trunk diameter.

STEP 2: SITE PREP

Clear aggressive grasses from planting sites. Many streamsides in the Gallatin Valley are dominated by thick grasses that hog sunlight, nutrients, and water, and can leave an impenetrable mat of thatch each year, creating an inhospitable environment for anything else to give it a go. Common culprits are reed canary grass and smooth brome, which have pain-in-the-rear rhizomatous roots. Whether you are planting seedlings or saplings, mow a wide swath around each planting site and remove the top 4" of soil within at least a 2' radius around each plant.

STEP 3: PLANT

HOW TO PLANT A SEEDLING

1. **Keep the seedling moist and protected** until you are ready to plant. Do not allow the seedling's roots to dry out or be exposed to wind and sun. Store the seedlings in a bucket with a slurry of muddy water or wrapped in a damp cloth.

2. **Dig a hole** as deep as the roots are long, and wide enough for the roots not to be cramped. Leave one side of the hole vertical to help keep the seedling straight when backfilling.

3. **Place the seedling** in the hole so the roots can fully extend vertically without bending or "j-hooking," and the root collar is at the soil surface. If you are unable to dig a hole deep enough, trim the roots: the roots below ground should be longer than the seedling is tall.

4. **Backfill** using the soil you dug out. Gently hold the sapling against the vertical wall of the hole as you add soil and pack out air pockets so everything is snug. Plant seedlings so that the soil line is at, or half an inch above, the root collar.

5. **Tamp** the soil down around the sapling with your hands or heel of your boot, creating a slight depression for water to drain towards the plant.

6. **Mulch** a 2' wide circle around the sapling in a 2-4" thick layer. Mulch helps retain moisture, and suppress unwanted weeds and grasses.

7. **Water** immediately after planting. Being transplanted is stressful business.

HOW TO PLANT A SAPLING

1. **Dig a hole** in the shape of a saucer, 2-3x the size of the root ball to allow the roots plenty of room to spread out. Dig just deep enough to where the "root flare" will be above the finished soil surface. Burying a tree too deeply will kill the tree.

2. **Detangle roots** so they are oriented to grow outwards, away from the trunk. If the tree was potted, gently break up or cut roots that are crowded and tightly wound. Roots that grow up or in a circle can kill the tree. If using balled and burlapped, do not disturb the root ball.

3. **Support the roots** from underneath with compacted soil. This helps prevent settling.

4. **Backfill the hole** gently with the same soil you dug out. Do not amend the soil with compost or fertilizer. This helps the tree adapt to its new home more quickly. Do not bury the tree past the "trunk flare."

5. **Do not** bury the tree above the root flare. Burying a tree too deeply will kill the tree.

6. **Shape the soil** around the base of the tree into a slight depression so that water drains towards the tree.

7. **Add mulch** in a 2-4” layer in a wide circle around the tree, but not directly against the trunk. Mulch helps retain moisture and suppresses unwanted weeds and grasses.

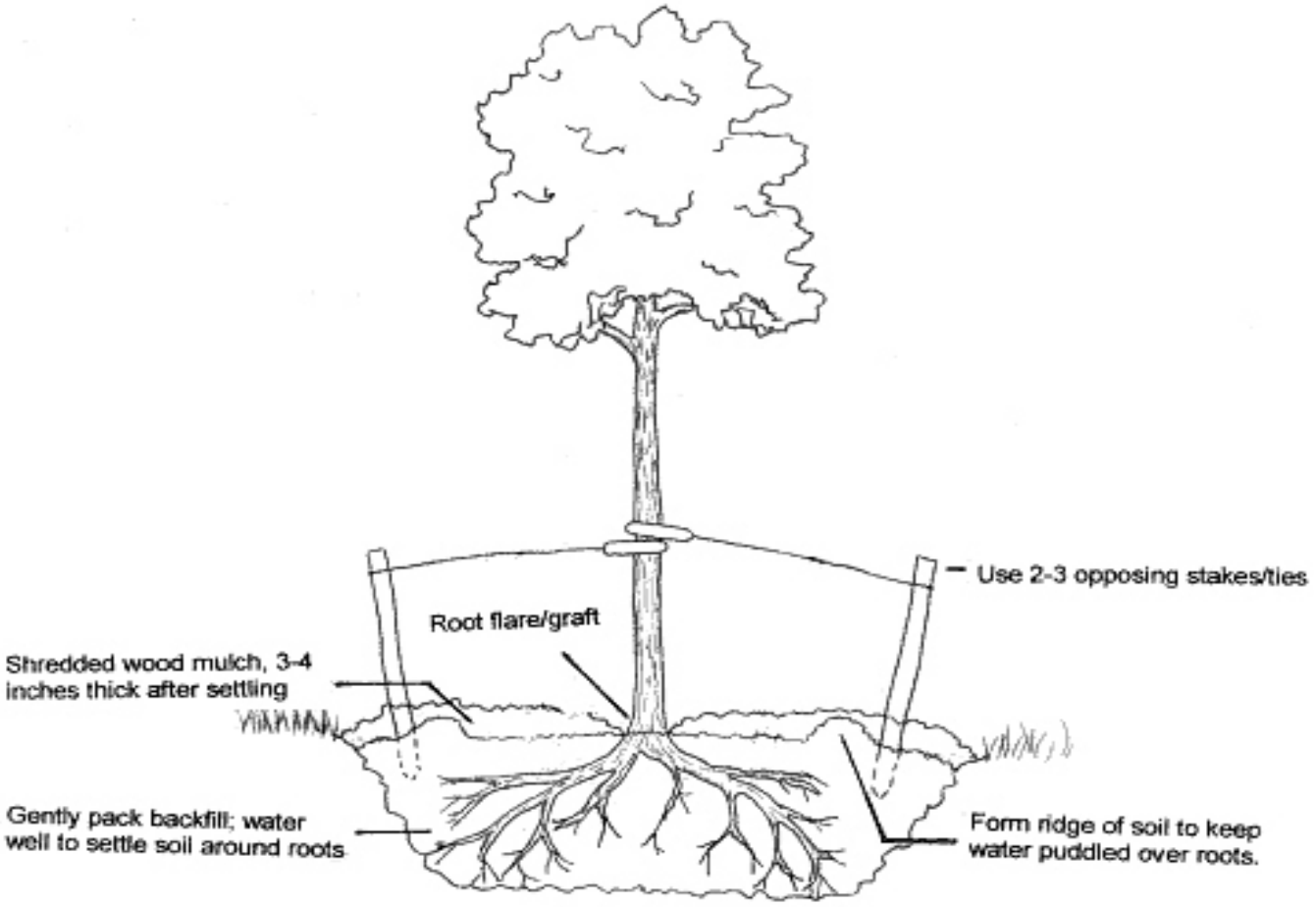
8. **Deeply Water the tree** immediately after planting. Being transplanted is stressful business.

9. **Prune** only dead branches and upright branches competing with the leader. Let the new sapling become established for two years before pruning more substantially.

10. **Use stakes and straps non-abrasive straps or ties** to stabilize the tree only if it is tippy or might get pushed over. It is important that the straps are non-abrasive and are removed after one year. Trees need to learn to hold themselves upright. Drive stakes beyond the disturbed soil.

11. **Trunk wrap** can help shield the young bark from getting sunburned - especially in winter. It is best to apply in the fall and remove in the spring. **Trunk guards** can protect against weed whackers. Damaged bark can slow growth or kill a tree.

12. **Protect** with a 4-foot welded wire fence when planting a tasty tree species in areas with lots of deer. Consider fencing off the whole re-planted area for a couple of years.



HOW TO PLANT CUTTINGS

Some tree and shrub species can reproduce with a branch cut from a mature plant. These are called cuttings, or live stakes. If you have a plant source, this is an inexpensive and effective way to go.

1. **Harvest and plant cuttings** in the spring or fall when vegetation is dormant and lacking leaves. Over winter, deciduous plants store their sugars and nutrients in their stems, supplying cuttings with what they need to grow new roots and leaves in the spring. The best time to plant cuttings is during the spring when there is more moisture in the soil and there will be less browsing pressure from deer and other critters. This also allows the cuttings a whole growing season to develop deep roots that extend into the receding summer water table. You can also harvest and plant in the fall, after willows have dropped their leaves and before the ground has frozen. A rule of thumb is to start after October 15th.

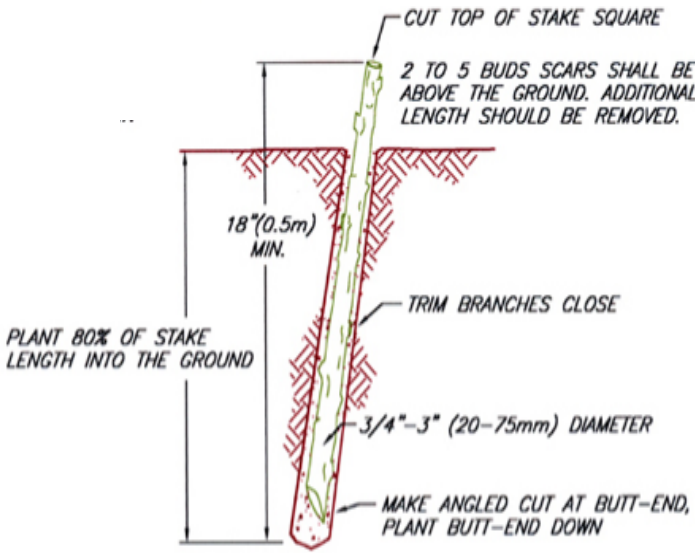
2. **Cut** healthy "green" branches from newer growth. Each cutting should be at least ½" in diameter and long enough to reach the groundwater table at the planting site. Cuttings should be 2' long at a minimum. Smaller cuttings and old or partially dead stems lack the stored nutrients that allow live stakes to become established after planting. Be careful not to take more than 1/3 of the source plant. To prevent damage, use sharp pruning tools and cut at a 45-degree angle.

3. **Soak** the cuttings in water for 7-14 days before planting to increase root formation. Submerge nearly the entire cutting. Do not allow the cuttings to dry out.

4. **Trim** the bottom couple inches of the branches with a fresh 45-degree angle cut just before planting to improve water uptake.

5. **Plant** cuttings so that the bottom of the branch reaches the groundwater table and the top is in the sun, burring at least 2/3rds of the stake. Be sure the branch is facing up! If the soil is soft, you can push the cuttings into the ground. Or, create a pilot hole with a length of rebar and mallet. The diameter of the rebar should be the same width or slightly smaller than the branch. **Trim** the tops of the cuttings with a fresh horizontal cut, leaving 2-5 buds above the soil surface and so that they extend past competing vegetation.

6. **Backfill** and tamp soil around the cutting so there are no air pockets and it will not dry out.



McCullah, 2004. Erosion and Sediment Control Manual

STEP 4: CARE

Natural riparian ecosystems are self-sustaining, but new plant communities require some attention to become established and able to thrive on their own.

Water right away after planting, then once every 2-3 weeks, from late spring until the ground freezes in the fall, for 2-3 years. If the weather is hot and dry or the soil is well drained, plants may need more frequent watering, especially for the first couple of weeks. Water deeply to saturate the root zone, making sure to water beyond the dripline of the tree and not just at the trunk. The rule of thumb is 10 gallons/inch of trunk/week.

Prune only dead branches and upright branches competing with the leader. Leave pruned material on the ground, unless it is diseased. Let new plants become established for two years before pruning more substantially, if at all.

Protect new trees and shrubs temporarily if necessary. In areas with lots of browsing pressure, consider fencing off the whole re-planted area for a couple of years. Remove any stakes and straps one year after planting to let the tree build strength. Remove deer fencing after leaders are above browsing height. Remove trunk protection once bark has grown thicker and can handle some sun, deer rubbing, or a nick from the weed whacker.

Mulch helps retain moisture, suppress unwanted weeds and grasses. To give new plants a fighting chance against fast growing and greedy species, mulch around trees and shrubs twice a year for 2-7 years. Once established, riparian ecosystems shade-out undesirable understory plants and essentially mulch themselves with fallen leaves and branches.

Keep grasses and weeds at bay. Treating weeds and mowing around your new plants for a couple of years helps knock down the competition for sun, water, and nutrients until they are able to reach higher and deeper and fend for themselves.

BEST MANAGEMENT PRACTICES

"A thing is right when it tends to preserve the integrity, stability, and beauty of the biotic community. It is not when it tends otherwise." Aldo Leopold - A Sand County Almanac

Jump, run, splash, roll…with care. Try not to trample and squish vegetation. Stay on established trails (even if it's just a game trail) and pick a designated spot to access the stream. Adopt the "Leave no trace" principles: "Pack it in, pack it out." And let the wildlife be. Keep your pup close. During your visit, look out for nesting birds, bedded-down deer, and curled-up foxes. And heads up, because bigger animals like moose, bears, or mountain lions call this place home too!

Search and destroy noxious weeds. Pull, spray, graze, mow, and outcompete weeds - early and often. Weeds can take over. They grow like crazy, gobbling up sunshine, water, and nutrients and displacing native plant species, crops, and pasture grass. As weeds move in, wildlife moves out due to a decrease in habitat and forage diversity. Different weed species require different eradication techniques. Your local Extension office and Gallatin County Weed District can help you identify weeds and make a plan.

Apply herbicides sparingly and in a targeted manner as part of your noxious weed plan. Always read application instructions to minimize exposure and drift.

Do not apply fertilizer. The fish and wildlife in the Gallatin Watershed have evolved to depend on especially cold, clean water, so even slight changes in water quality can cause problems. Nitrogen and phosphorus are the leading causes of pollution in our local waterways.

Do not apply non-herbicide pesticides. Non-herbicide pesticides harm bugs, bees, and fungi. These guys pollinate plants, build healthy soils, attract birds, and are the tiny heroes of a thriving riparian ecosystem.

Do not mow unless it is part of your weed-management plan. Riparian areas should not look like a lawn. We all love to sink our bare feet into freshly cut green grass. But lawn grasses do not have deep roots to hold soil in place along stream banks and do little to tame the currents of a flood. Bushy streamsides, on the other hand, decrease the energy in breached flows and help prevent damage to you and your neighbor's property. Grass clippings are also high in nitrogen and phosphorus, so they essentially act like pollution when they end up in a stream.

Leave the leaves (and other detritus). Woodpeckers, owls, chickadees, muskrats, trout, lizards, insects, frogs, and turtles…they all rely on leaf litter and dead branches to burrow in, hide under, and munch on. Rotting logs, sticks, fallen leaves, and dead grasses are also natural mulch, suppressing weeds and building rich soil for next year's growth.

Manage Grazing or exclude livestock from riparian areas. Streamside vegetation has evolved with wildlife and floods. Browsing and hoof traffic can actually promote healthy riparian areas by stimulating regrowth, cycling nutrients, and preventing thatch buildup. But too much pressure, and the soil and plant communities degrade, leading to weedy and erosive streamsides. Consider grazing duration, timing, and intensity to promote the regrowth of riparian vegetation. Also consider providing offstream access to water, feed, mineral and shelter to help attract livestock away from the stream.

Cultivate crops outside of the watercourse buffer. A buffer of native riparian plants, with their expansive woody root systems, keeps the stream from eroding away chunks of your field each spring. Roots that reach deep also take up fertilizer that may have leached to groundwater, and the maze of shrubs traps sediment. A hardy vegetated buffer between your field and the creek keeps the water flowing clean.

Build outside the watercourse buffer, from houses and sheds to roads and trails. A stream floods and "migrates", changing its mind from year to year with a new beaver dam, log jam, ice jam, or flood. And they are supposed to. It's all part of a dynamic system adjusting to changes and bringing fresh supplies of sediment and nutrients to downstream ecosystems. Infrastructure within the watercourse buffer is at a high risk of being damaged by erosion and flooding, and in an effort to protect that investment, we tend to rip-rap. Wherever a stream is rip-rapped, it is restricted from moving and flooding naturally, so the current becomes increasingly more destructive downstream. This makes things worse for our neighbors. Buildings and roads also come with the inevitable fence, dog, lawn, trash, exhaust, and noise. A stream needs space to be a stream and do stream things.

Streamside Landscapes

Native riparian plants found along small streams in the Gallatin Watershed

TREES & SHRUBS

Species	Description	Planting Zone	Mature Height	Plant Spacing	Browsing Pressure Low, Med, High	Live Stake
Willows - Sandbar/Coyote, Bebb's, Yellow, Drummond, Geryer's *Salix - exigua, bebbiana, eriocephala, drummondiana, geyeriana*	Willows are a wonder. Growing in dense groups along streambanks, they provid shade and shelter. Your favorite fishing hole is probably beneath the branches of a willow. Willow thickets harbor many insects, such as Caddis and Salmonflies, and are a buffet for trout and songbirds. Finches, warblers, and cedar waxwings can be seen darting in and out to capture snacks. With access to groundwater, their roots grow thickly and quickly, stabilizing stream banks, and stems readily regrow after being browsed: "I get knocked down, but I get up again..."	A	6-13'	1/2'	H	Y
Speckled Alder *Alnus incana*	Large shrub that grows voraciously in wet conditions, forming thickets along streams. Can also grow more singularly as part of an understory. Anchors streambanks and provides cover and forage for moose, deer, rabbits, muskrat, and beaver. Produces seeds, buds, and catkins liked by songbirds. Nitrogen fixing. Thrives with regular disturbance from browsing, flood, and fire.	A, B	12-30'	10'	L	N
Redoiser Dogwood *Cornus sericea*	Grows in thickets along streambanks and wet meadows. Tolerates seasonal flooding, browsing, and most soil conditions. Flat clusters of white spring flowers become clusters of white berries that are popular with pollinators, birds, and wildlife. Unique red stems brighten Montana's winter landscape. Spreads freely underground and their roots are great for stabilizing stream banks. Larval host to the Spring Azure butterfly.	A, B	8-10'		H	Y
Cottonwoods - Lanceleaf, Narrowleaf, Black *Populus - acuminata, angustifolia, trichocarpa*	The dominant overstory tree of Montana’s riparian areas, providing ample shade. Common nesting site and hunting vantage for birds of prey. Fast growing with aggressively spreading root system that stabilizes streambanks. Reproduces from seed and by sprouting from roots and stumps. Flooding and fire disturbance enhances seedling recruitment.	B	25-90'	10-20'	H	Y
Aspen *Populus tremuloides*	Beautiful white bark and small “quaking” leaves that turn vibrant yellow in fall. These trees are often found in groves and will send out roots that can grow entire new trees. A keystone species and one of the most biodiverse forest ecosystems.	B	30'	2-6'	H	Y
Rocky Mountain Maple *Acer glabrum*	Grows as a large shrub or small multi trunked tree and displays bright yellow to dark pink-gold fall foliage. Often found among the understory of Cottonwoods and Aspens. Thrives in moist soil types and is drought tolerant, developing a deep and wide-spreading root system. Small yellow flowers develop into paired winged samaras. Browse for elk and moose.	B	8-25'	5-10'	M	N
Saskatoon Serviceberry / Juneberry *Amelanchier alnifolia*	Small to medium-sized shrub that grows slow and steady in the shade of open woodlands or a sunny field. Early white spring flowers give way to nutrient dense reddish/purple berries that are edible for wildlife and humans alike. Leaves turn yellow, orange, and red in fall.	B	5-12'	4-6’	M	N
Golden Currant *Ribes aureum*	Often found among the understory of Cottonwoods and Aspens. Early spring bloomer proffering fragrant yellow flowers. Berries are popular with wildlife and edible for humans. Leaves turn red in fall.	B	6'	3-6'	M	N
Greene's Mountain Ash *Sorbus scopulina*	Large multi-stemmed shrub that often forms dense thickets. Small white flowers form large flat topped clusters that turn to heavy bunches of red/orange berries. Attracts grouse, cedar waxwings, and grosbeaks.	B, C	5-15'	20'	M	N
Chokecherry *Prunus virginiana*	The chokecherry is the hardy workhorse of our region. Drooping chains of fragrant white flowers develop into fruit clusters. These "cherries" are popular with wildlife and edible but very bitter for humans as long as you avoid the seeds. The fruit can be harvested and made into syrup. It grows well alone and forms dense thickets.	B, C	12-15'	4-6'	M	Y

Snowberry *Symphoricarpos albus*	Small shrub bearing small, bell shaped, pink-white flowers and waxy white berries. Can grow aggressively into thickets, spreading underground to pop up new suckers. Rigorous roots are ideal for erosion control. Propagation benefits from soil disturbances and fire. Attracts pollinators and provides snacks and cover for birds and small mammals. Tolerant of drought and poor soils.	B, C	2-5'	2-6'	M	Y
Silver Buffaloberry *Shepherdia argentea*	Small to medium sized thorny shrub with silvery leaves. Forms thickets ideal for nesting birds. Yellowish flowers attract bees and produce vibrant, nutrient dense red berries used for jellies. Provides an important winter food source for birds, and is preferred by mule deer and sharptail grouse. Tolerant of drought and poor soils. Nitrogen fixer.	B, C	6-10'	4-6'	M	N
Oak Leaf Sumac *Rhus trilobata*	Small shrub with pale-yellow flowers that develop into small orangish-red fruits. During fall, their leaves turn deep shades of orange, red, and maroon. Tends to sucker and form thickets. Develops wide and deep root systems that prevent erosion. Suitable for most soils and tolerates drought and wind. Attracts birds, butterflies, small mammals, and browsing deer and elk. Regrows vigorously after fire.	B, C	3-7'	2-6'	H	N
Woods Rose *Rosa woodsii*	Small thorny shrub is drought tolerant and is adapted to a range of soil moisture conditions and is at home in an understory or on open sunny slopes. Its large, beautiful soft-pink flowers attract pollinators and emanate a light perfume. Flowers turn to rose hips in the fall and are an important nutrient source for wildlife.	B, C	2-5'	2-6'	M	N

GRASSES & FORBS

Species	Planting Zone	Species	Planting Zone	Species	Planting Zone
Field mint *Mentha arvensis*	A	milkweed *Asclepias speciosa*	B	Canada wildrye *Elymus canadensis*	B, C
Sedges - Woolly, Clustered field, Nabraska, Water, Beaked *Carex - pellita, praegracilis, nebrascensis, aquatilis, utriculata*	A	Western Blue Iris *Iris missouriensis*	B	Fowl bluegrass *Poa palustris*	B, C
Rushes - Baltic, Knotted, Torry's *Juncus - balticus, nodosus, torreyi*	A, B	Canada goldenrod *Solidago canadensis*	B	Wheatgrass - Streambank, Slender *Elymus - lanceolatus psammophilus, trachycaulus*	B, C
Bluejoint reedgrass *Calamagrostis canadensis*	A, B	Beebalm *Monarda fistulosa*	B	Yarrow *Achillea millefolium*	B, C
Tufted hairgrass *Deschampsia caespitosa*	A, B	Blanket flower *Gaillardia aristata*	B	pussy toes *Antennaria microphylla*	B, C

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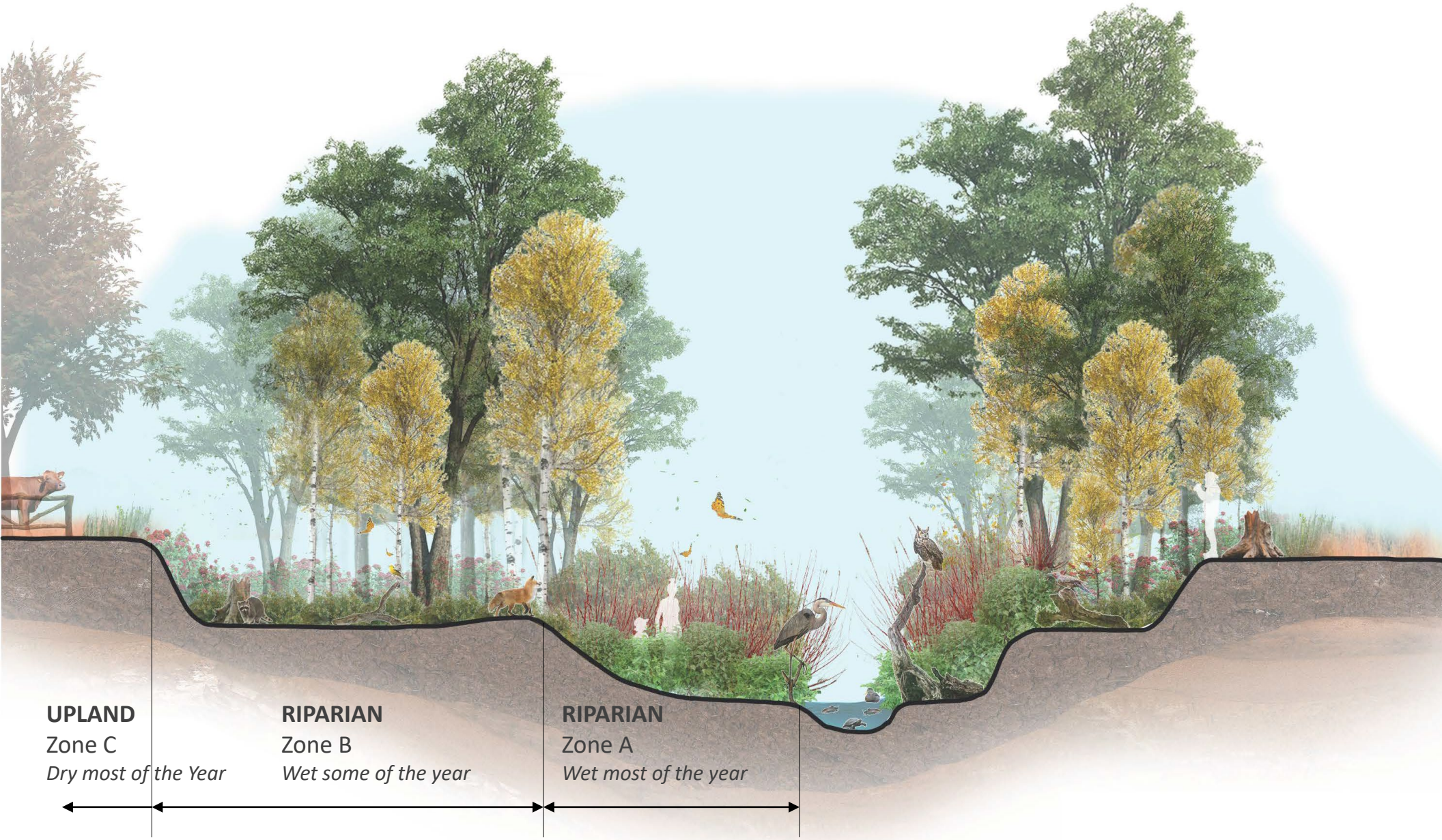

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