

Planting an Edible Riparian Forest Buffer

Riparian forest buffers are vegetated transitional zones between an upland area and a body of water, such as a stream, river, lake, or wetland (Figure 1). Healthy riparian areas that are covered by an intact forest buffer provide valuable services, including filtering and trapping runoff, recharging groundwater, reducing flooding, stabilizing stream banks against erosion, supporting heightened biodiversity, and producing abundant forage for wildlife, livestock, and people!



Figure 1. A healthy riparian area covered by an intact forest buffer. Photo by AWES.

Land management practices have a direct impact on the health of riparian areas and their ability to provide the ecosystem services mentioned above. In efforts to regain these services, many farmers, ranchers, and other landowners are restoring and enhancing their riparian areas by planting riparian forest buffers.

The species compositions and structural designs of these buffers depend on the conditions of the site and desired services, and thus can vary greatly.

This article focuses on how riparian forest buffers can be designed if desired services involve producing food, such as fruit, nuts, syrup, berries, roots, and tea leaves.

Where do I plant?

A good understanding of how vegetation and moisture conditions vary across your riparian area helps you determine where to plant your edible riparian forest buffer. Riparian areas can be divided into four distinct zones (Figure 2). These zones contain slightly different vegetation communities and moisture regimes throughout the season. Their relative widths vary greatly, and depend upon the size of the water body and steepness of the bank.



Figure 2. Four zones of a riparian area. Illustration by AWES.

Most edible species will not tolerate poorly drained soils, nor can be submerged partially or completely below water for long periods of time. For this reason, edible species

are usually planted in the 'terrace zone', as well as the 'bank zone' if it is relatively flat and easily accessible for maintenance and harvest. Other, flood-tolerant species such as willow (*Salix spp.*), red osier dogwood (*Cornus sericea*), and balsam poplar (*Populus balsamifera*) can be added into the lower zones to provide shelter for the edible species, a first line of defense against flooding, and beneficial insect habitat.

Equipment Considerations

Large equipment (e.g. mechanical tree planters, cultivators, mowers, berry pickers, etc.) may be required for site preparation, planting, maintenance, or harvesting. Care needs to be taken when working in riparian areas with large equipment due to the possibility of compacting wet or saturated soils. If machinery is required, ensure to only use it when soils are dry enough to withstand its weight. Note that seedlings planted in regular rows are easier to maintain and harvest with equipment.

What can I Plant?

When designing an edible riparian forest buffer, consider the layers or 'stories' in a typical forest (Figure 3). Crops can be harvested from up to seven different stories, allowing for multiple, complementary yields within the same area. For example, edible or medicinal roots can be harvested from beneath the soil surface; herbs and food crops at ground level; and berries, nuts, syrup, flowers, and leaves from the middle and upper stories.

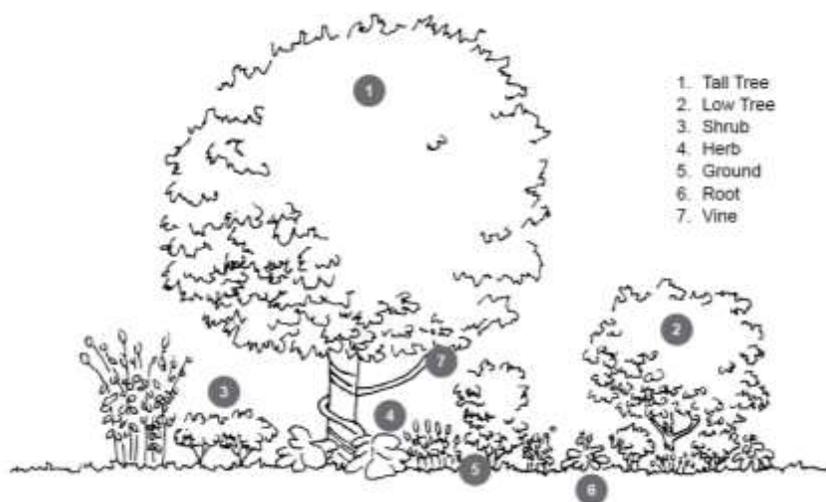


Figure 3. Seven vegetation layers within an edible riparian buffer. Drawing by Fred Meyer. Source: Edible Agroforestry Design Templates by Backyard Abundance.

Whenever possible, select native species for your riparian forest buffer. Native species are hardy, more likely to be adapted to regional stresses, and provide excellent habitat for diverse wildlife including beneficial insects and birds. Non-native species can be added into the buffer to provide certain crops but should be carefully monitored to ensure that they do not spread into surrounding ecosystems. When selecting non-native species, pay attention to their hardiness zones to ensure they have the ability to survive in your region¹. In general, the higher the hardiness zone, the more "babying" the species might need to survive in your region.

Table 1 on the following page provides a list of edible native and non-native edible species that could be considered in a 3-layered riparian forest buffer. The list includes the moisture tolerances and hardiness zones of each species. Though not comprehensive, it will give you an idea of the variety of edible species that could be planted in a riparian forest buffer.

¹ Refer to <http://www.planthardiness.gc.ca> for more information on plant hardiness zones, including maps of Canada's hardiness zones.

Table 1. Native and non-native species for 3 layers of edible riparian forest buffers in Alberta

Vegetation Layer	Scientific Name	Common Name	Moisture Tolerance D dry, A average, M moist, W wet	Minimum Hardiness Zone	Edible Crops	Native/Non-native to Alberta
Upper Canopy - Trees	<i>Acer negundo</i>	Manitoba maple	D, A, M	2b	Syrup	Native (in eastern AB)
	<i>Betula papyrifera</i>	White birch	D, A, M	2a	Syrup	Native
	<i>Juglans cinerea</i>	Butternut	A, M	3a	Nuts	Non-native
	<i>Juglans nigra</i>	Black walnut	A, M	3b	Nuts	Non-native
	<i>Malus ssp.</i>	Apple	A, M	2b+	Fruit	Non-native
	<i>Picea glauca</i>	White spruce	A, M	1a	Tea leaves, gum	Native
	<i>Picea mariana</i>	Black spruce	A, M, W	1a	Tea leaves, gum	Native
	<i>Pinus koraiensis</i>	Korean pine	D, A	2b	Nuts	Non-native
	<i>Prunus ssp.</i>	Plum	A, M	3a+	Fruit	Non-native
	<i>Pyrus ssp.</i>	Pear	A, M	3a+	Fruit	Non-native
	<i>Quercus macrocarpa</i>	Bur oak	D, A	2b	Nuts	Non-native
Mid Story - Shrubs	<i>Amelanchier alnifolia</i>	Saskatoon	A, M	2b	Berry	Native, non-native
	<i>Corylus spp.</i>	Hazelnut	A, M	2a+	Nuts	Native, non-native
	<i>Hippophae rhamnoides</i>	Seabuckthorn	D, A	3a	Berry, Tea leaves	Non-native*
	<i>Lonicera caerulea</i>	Honeyberry/Haskap	A, M	2a	Berry	Non-native
	<i>Prunus pennsylvanica</i>	Pincherry	D, A, M	1a	Berry	Native
	<i>Prunus ssp.</i>	Sour cherry	A, M	3a+	Fruit	Native, non-native
	<i>Prunus virginiana</i>	Chokecherry	D, A, M	2a	Fruit**	Native
	<i>Ribes spp.</i>	Currant/gooseberry	A, M	2a+	Berry	Native, non-native
	<i>Rosa acicularis</i>	Prickly rose	D, A, M	1a	Rose hips, petals	Native
	<i>Rosa woodsii</i>	Woods rose	A, M	1a	Rose hips, petals	Native
	<i>Rubus spp.</i>	Raspberry	A, M	1a+	Berry, Tea leaves	Native, non-native
	<i>Sambucus canadensis</i>	American elderberry	A, M	3b	Berry	Non-native
	<i>Shepherdia argentea</i>	Silver Buffalobery	D, A	2a	Berry, Tea leaves	Native (in southeastern AB)
	<i>Vaccinium spp.</i>	Blueberry	A, M (acidic)	1a	Berry	Non-native
<i>Viburnum opulus</i>	High-bush cranberry	A, M	2a	Berry	Native	
Lower Story - Herbaceous	<i>Mentha arvensis</i>	Wild mint	M	2a	Herb	Native
	<i>Achillea millefolium</i>	Yarrow	D, A	2a	Tea leaves	Native
	<i>Agastache scrophulariaefolia</i>	Giant hyssop	A, M	2b	Herb	Native
	<i>Asparagus officinalis</i>	Asparagus	D, A	3a	Stalk, vegetable	Non-native
	<i>Cucurbita ssp.</i>	Winter squash varieties	A, M	3a	Fruit	Non-native
	<i>Fragaria ssp.</i>	Strawberry	A, M	1a+	Berry	Native, non-native
	<i>Helianthus tuberosus</i>	Jerusalem artichoke	D, A, M	3a	Tuber	Non-native
	<i>Monarda fistulosa</i>	Wild bergamot/ Bee balm	D, A	3a	Tea leaves/Flowers	Native
	<i>Rheum rhabarbarum</i>	Rhubarb	D, A, M	3a	Stalk	Non-native
	<i>Sagittaria latifolia</i>	Duck potato/Arrowhead	W	3a	Tuber	Native
<i>Typha latifolia</i>	Common cattail	W	1a	Shoots, tubers, pollen	Native	
<i>Urtica dioica</i>	Stinging nettle	M	1a	Tea leaves and seeds	Native	

* Seabuckthorn can be extremely invasive, and should not be planted in areas where it has the potential to spread out into surrounding natural ecosystems

** Chokecherry berries should only be eaten when ripe, as unripe seeds contain a toxic substance that can cause harm if eaten in excess.



Conclusion

If given the opportunity to enhance or regenerate a riparian forest buffer, consider planting edible species. This will not only help restore ecosystem functionality, but also provide diverse, long-lasting sources of nourishment. For more information, refer to the Agroforestry and Woodlot Extension Society's *Manual for Riparian Forest Buffer Establishment*, or check out some of the other references listed below.

Useful References

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