

# Plants for Riparian Buffers



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## What is a Riparian Buffer?

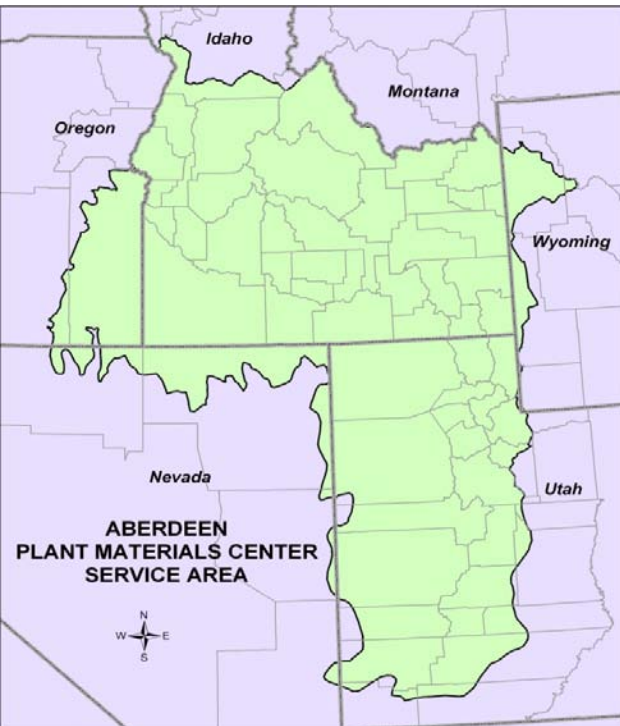
Many farmers, ranchers and land managers have a growing concern over water quality issues. Riparian buffers are one of the most important practices that you can use to help control non-point pollution and improve water quality.

Riparian buffers are the grasses, grass-like, forbs, shrubs, trees or other vegetation growing along streams. These plants control erosion and help filter and keep water clean.

Cropland fields shouldn't be planted right up to a stream's edge where the soil is generally more fragile and subject to erosion.



A healthy riparian buffer between cropland and a river system



Aberdeen Plant Materials Center Service area. The PMC provides plant based solutions to resource concerns throughout the Intermountain and Rocky Mountain regions.

Shrubs, trees and other vegetation protect the stream from pollutants and runoff. They absorb excess nutrients such as nitrogen and phosphorus from farm and livestock operations.

Plants protect the stream banks from erosion by providing a protective barrier against the water. The trunks, branches, stems and leaves intercept the water currents that can weaken and wash away bank material.

In addition to protecting water and soil, riparian buffers provide important habitat for aquatic and upland wildlife and also fish habitat.

The information contained in this brochure will help you select the best shrubs and trees for installing riparian buffers on your farm or ranch. The plants listed are all highly recommended for use in the Intermountain West and Rocky Mountain States.

Included are tips for planning riparian buffers and areas, selecting plants and taking dormant un-rooted hardwood cuttings.

## Benefits and Functions of Riparian Buffers

- ❑ Reduced water pollution
  - Intercepts surface runoff and filters sediment
  - Research has shown that riparian vegetation can remove up to 90% of unused nitrogen from croplands
- ❑ Protection from flood
  - Slows flood water velocities
  - Absorb water flows and energy
- ❑ Erosion control
  - Protects vulnerable soils
  - Roots strengthen and stabilize stream banks
  - Above ground vegetation intercepts wave forces/energy
- ❑ Provides fish and wildlife food and cover habitat
  - Trees and shrubs create cover and nesting habitat
  - Shed leaves and fallen insects provide the primary food source for aquatic ecosystems
  - They serve as habitat-movement corridors for wildlife



Cropland eroding into a stream. This field could have been protected with a properly managed riparian buffer. Photo by Rob Sampson, NRCS.



Native fish benefit from the food and habitat created by riparian buffers. Photo by Pat Clayton, FishEyeGuy Photography. Used with permission.

## Planning and Design

Recommended widths for riparian buffers		
	Minimum*	Optimal
	(feet)	(feet)
Aquatic species	35	150
Big game	35	150
Wildlife diversity	35	150
Non-game birds and mammals	10	150
Raptors	--	300+
Reptiles, amphibians	35	150
Upland game (pheasants)	10	75
Waterfowl	25	75

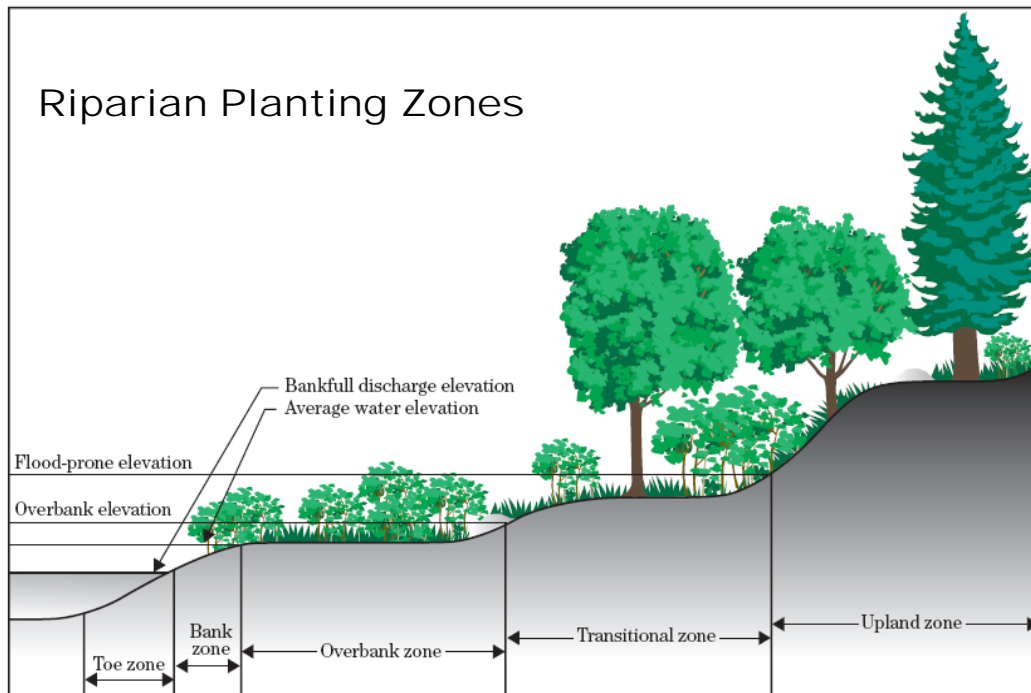
\* The minimum buffer width required in the NRCS Riparian Forest Buffer Standard is 35 feet.

Riparian buffers can be established along streams, lakes, ponds, and wetlands to improve or maintain water quality, and to protect or improve fish and wildlife habitat. Using a diversity of trees, shrubs, grasses, and forbs will provide shade, organic matter, and eventually woody debris to the water body. The type of vegetation, configuration, and maintenance regime you use will vary depending on site conditions, your objectives and economic concerns. Temporary exclusion of livestock and wildlife may be required until the desired vegetation is established. Grazing management is essential to maintain healthy riparian buffers.

In general, wider riparian buffers provide better wildlife cover and fish habitat. Maintenance needs will vary by design. Timing of thinning, pruning, burning, and grazing is particularly critical during migration periods, calving, nesting or spawning. When possible, allow large dead and dying trees to remain for use by cavity nesters and for eventual recruitment to the stream channel.

## Plant Selection

Establishment of riparian plants depends on proper selection of species, plant material procurement and handling, planting location, and establishment techniques. When planning a project, it is important to identify the existing vegetation and its respective locations in relationship to the stream and water table. Attempt to match the potential native species at the project site, and to match as closely as possible the correct species with the proper hydrology.



- ❑ Plants with flexible stems and creeping root systems are usually located from the top of the Toe Zone through the Bank Zone.
- ❑ Most emergent aquatic species (sedges, rushes, etc.) are found in the Toe Zone.
- ❑ Small to medium shrubs are found in the Bank and Overbank Zones and beyond.
- ❑ Large shrubs and trees are usually found in the Transitional and Upland Zones. They should not be planted in other zones because their large stems won't give if high velocity stream flows hit them. The large stems also tend to block debris and ice that can cause bank erosion.
- ❑ Wetland herbaceous species are found throughout the streambank cross section.

Riparian trees and shrubs suitable for use in the Intermountain and Rocky Mountain region					
Species	Size/Form	Elevation range	Root type	Rooting from cuttings	Riparian Planting Zone
<i>Acer negundo</i> Box elder	Med. tree	Low-Middle	Moderately spreading	Poor	Transitional
<i>Alnus rubra</i> Red alder	Med. tree	Middle-High	Shallow spreading	Poor	Overbank - Transitional
<i>Alnus sinuata</i> Sitka alder	Sm.–med. tree	Middle-High	Shallow spreading	Poor	Bank-Overbank
<i>Alnus incana</i> ssp. <i>tenuifolia</i> Thinleaf alder	Sm.–med. tree	Middle-High	Shallow spreading	Poor	Bank-Overbank
<i>Betula occidentalis</i> Water birch	Lg. shrub-sm. tree	Middle-High	Shallow to deep spreading	Poor	Bank-Overbank
<i>Cornus sericea</i> Redosier dogwood	Med. shrub	Middle	Shallow	Moderate (wounding enhances success)	Bank to Transitional
<i>Crataegus douglasii</i> Black/Douglas hawthorn	Sm. Tree	Low-Middle	Shallow to deep spreading	Poor	Overbank - Transitional
<i>Elaeagnus commutata</i> Silverberry	Med. shrub	Low-Middle	Shallow	Very good	Overbank - Transitional
<i>Pentaphylloides floribunda</i> Shrubby cinquefoil	Sm. shrub	Low-Middle	Shallow to deep spreading	Poor	Overbank - Transitional
<i>Philadelphus lewisii</i> Mockorange or Syringa	Sm.-med. shrub	Low-Middle	Spreading fibrous	Poor	Overbank - Transitional
<i>Populus angustifolia</i> Narrowleaf cottonwood	Lg. tree	Middle	Shallow	Very good	Transitional
<i>Populus fremontii</i> Fremont cottonwood	Lg. tree	Low-Middle	Shallow fibrous	Very good	Transitional
<i>Populus tremuloides</i> Quaking aspen	Med. tree	Middle-High	Shallow	Poor	Transitional
<i>Populus trichocarpa</i> Black cottonwood	Lg. tree	Low-Middle	Shallow fibrous	Very good	Transitional
<i>Prunus virginiana</i> Chokecherry	Sm. tree	Low-Middle	Rhizomatous	Good from root cuttings	Transitional
<i>Rhus trilobata</i> Skunkbush sumac	Med.–lg. shrub	Low-Middle	Deep spreading rhizomatous	Poor	Transitional
<i>Ribes aureum</i> Golden currant	Sm.–med. shrub	Low-Middle	Spreading	Good (in greenhouse)	Overbank
<i>Ribes cereum</i> Wax currant	Sm.–med. shrub	Middle-High	Spreading	Fair	Overbank - Transitional
<i>Rosa woodsii</i> Wood's rose	Sm.–med. shrub	Low-Middle	Shallow to deep	Good (in greenhouse)	Bank - Transitional
<i>Sambucus coerulea</i> Blue elderberry	Sm. tree	Middle	Rhizomatous	Poor	Transitional
<i>Sambucus racemosa</i> Red elderberry	Med. shrub	Middle-High	Spreading	Poor	Transitional
<i>Shepherdia argentea</i> Silver buffaloberry	Lg. shrub	Low-Middle	Rhizomatous	Poor	Transitional
<i>Symphoricarpos albus</i> Common snowberry	Sm. shrub	Low-Middle	Spreading	Very good	Overbank - Transitional

Riparian trees and shrubs suitable for use in the Intermountain and Rocky Mountain region					
Species	Flooding tolerance	Drought tolerance	Wildlife value	Deposition tolerance	Salinity tolerance
<i>Acer negundo</i> Box elder	High	High	Big game browse, upland bird food	High	Medium
<i>Alnus rubra</i> Red alder	Medium	Low	Big game browse, upland bird food	Medium	Low
<i>Alnus sinuata</i> Sitka alder	Medium	Low	Big game browse, upland bird food	Medium	Low
<i>Alnus incana</i> ssp. <i>tenuifolia</i> Thinleaf alder	Medium	Low	Big game browse	Medium	Low
<i>Betula occidentalis</i> Water birch	Medium	Low	Big game browse, small mammal and upland bird food	Medium	Low
<i>Cornus sericea</i> Redosier dogwood	High	Medium	Browse and cover for many species	Low	Low
<i>Crataegus douglasii</i> Black/Douglas hawthorn	Low	High	Big game browse	Medium	Low
<i>Elaeagnus commutata</i> Silverberry	High	Medium	Big game browse	High	Medium
<i>Pentaphylloides floribunda</i> Shrubby cinquefoil	Unknown	High	Big game browse	Unknown	Unknown
<i>Philadelphus lewisii</i> Mockorange or Syringa	Unknown	Unknown	Big game browse	Unknown	Unknown
<i>Populus angustifolia</i> Narrowleaf cottonwood	Medium	High	Big game browse	Medium	Medium
<i>Populus fremontii</i> Fremont cottonwood	Medium	Medium	Big game browse	Medium	Medium
<i>Populus tremuloides</i> Quaking aspen	Low	Medium	Big game browse	Low	Medium
<i>Populus trichocarpa</i> Black cottonwood	Medium	Medium	Big game browse	Medium	Unknown
<i>Prunus virginiana</i> Chokecherry	Low	Low-Medium	Birds and small mammals eat fruit	Low	Low-Medium
<i>Rhus trilobata</i> Skunkbush sumac	Medium	Medium-High	Birds and small mammals eat fruit	High	Medium
<i>Ribes aureum</i> Golden currant	Unknown	Unknown	Birds and small mammals eat fruit	Unknown	Medium
<i>Ribes cereum</i> Wax currant	Unknown	Unknown	Birds and small mammals eat fruit	Unknown	Unknown
<i>Rosa woodsii</i> Wood's rose	Low	Low-High	Rosehips eaten by many species	Unknown	Low
<i>Sambucus coerulea</i> Blue elderberry	Medium	Medium	Fruit eaten by birds	Medium	Low
<i>Sambucus racemosa</i> Red elderberry	Medium	Medium	Birds and small mammals eat fruit	Medium	Low
<i>Shepherdia argentea</i> Silver buffaloberry	Unknown	Unknown	Birds and small mammals eat fruit	Unknown	High
<i>Symphoricarpos albus</i> Common snowberry	Medium	Medium	Birds and small mammals eat fruit	Medium	Low

# Riparian willows suitable for use in the Intermountain and Rocky Mountain region

Species	Size/Form	Elevation range	Root type	Rooting from cuttings	Riparian Planting Zone
<i>Salix alba</i> White/Golden willow	Med.-lg. tree	Low-Middle	Shallow to deep	Good	Transitional
<i>Salix amygdaloides</i> Peachleaf willow	Sm. tree	Low	Fibrous	Very good	Transitional
<i>Salix bebbiana</i> Bebb's willow	Lg. shrub	Low-Middle	Shallow to deep	Good	Transitional
<i>Salix boothii</i> Booth willow	Med. shrub	Middle	Shallow to deep	Moderate	Bank-Overbank
<i>Salix drummondiana</i> Drummond willow	Sm.-med. Shrub	Middle-High	Shallow to deep	Good	Bank-Overbank
<i>Salix exigua</i> Coyote willow	Med. shrub	Low-Middle	Rhizomatous	Very good	Bank-Transitional
<i>Salix geyeriana</i> Geyer willow	Med. shrub	Middle	Shallow to deep	Good	Bank-Overbank
<i>Salix lasiandra</i> Pacific willow	Sm. tree	Low-Middle	Shallow to deep	Good	Transitional
<i>Salix lemmonii</i> Lemmon willow	Sm.-med. shrub	Middle-High	Shallow to deep	Good	Bank-Overbank
<i>Salix lutea</i> Yellow willow	Med.-lg. shrub	Low	Shallow to deep	Good	Bank-Overbank
<i>Salix nigra</i> Black willow	Lg. tree	Low-Middle	Shallow to deep	Good	Transitional
<i>Salix planifolia</i> Planeleaf willow	Sm. shrub	Middle-High	Shallow to deep	Moderate	Bank-Overbank
<i>Salix prolixa</i> Mackenzie willow	Sm. tree	Low-Middle	Shallow to deep	Good	Overbank
<i>Salix scouleriana</i> Scouler willow	Lg. shrub	Low-Middle	Shallow to deep	Treat with hormone	Upland
<i>Salix sitchensis</i> Sitka willow	Sm.-med. shrub	Low-Middle	Shallow to deep	Moderate	Overbank

**An Idaho riparian buffer with several forms and sizes of vegetation including tall trees, shrubs and herbaceous wetland sedges.**



# Riparian trees and shrubs suitable for use in the Intermountain and Rocky Mountain region

Species	Flooding tolerance	Drought tolerance	Wildlife value*	Deposition tolerance	Salinity tolerance
<i>Salix alba</i> White/Golden willow	High	Medium		High	Low-Medium
<i>Salix amygdaloides</i> Peachleaf willow	High	Low		High	Medium
<i>Salix bebbiana</i> Bebb's willow	High	Low-Medium		High	Low
<i>Salix boothii</i> Booth willow	Medium-High	Low-Medium		High	Low
<i>Salix drummondiana</i> Drummond willow	Medium-High	Low-Medium		High	Low
<i>Salix exigua</i> Coyote willow	Medium-High	Low-Medium		High	Low
<i>Salix geyeriana</i> Geyer willow	Medium-High	Low-Medium		High	Low
<i>Salix lasiandra</i> Pacific willow	Medium-High	Low-Medium		High	Low
<i>Salix lemmonii</i> Lemmon willow	Medium-High	Low-Medium		High	Low
<i>Salix lutea</i> Yellow willow	Medium-High	Low-Medium		Medium	Medium
<i>Salix nigra</i> Black willow	Medium-High	Low-Medium		Medium	Low-Medium
<i>Salix planifolia</i> Planeleaf willow	Medium-High	Low-Medium		High	Low
<i>Salix prolixa</i> Mackenzie willow	Medium-High	Low-Medium		High	Low
<i>Salix scouleriana</i> Scouler willow	Medium-High	Low-Medium		High	High
<i>Salix sitchensis</i> Sitka willow	Medium-High	Low-Medium		High	Low

\*All willows listed are good browse and provide excellent cover for many species.

## Elevation range:

Low            2,000 – 4,500 ft  
 Middle        4,500 – 7,000 ft  
 High           7,000 – 10,000 ft

## Flooding Tolerance:

Low            Tolerates 1 to 5 days or less  
 Medium        Tolerates 6 to 10 days  
 High            Tolerates 10 to 30+ days

**Deposition Tolerance:** Regrowth following shallow coverage by soil.

**Drought Tolerance:** Resistance to drought relative to native sites.

**Salinity Tolerance:** Resistance to salinity relative to native vegetation on similar sites.

## Dormant Unrooted Cuttings

- ❑ Make cuttings after leaves fall and before buds burst in the spring.
- ❑ The best rooting success is from cuttings made of 2 to 10 year old limbs
- ❑ Cutting diameter should be as large as possible, depending on the species. Best diameters are ¾ to 3 inches.
- ❑ Cuttings should be long enough to reach 8 to 12 inches into the lowest water table level of the year.
- ❑ Remove the terminal (top) current years growth of the cutting to provide more energy to the establishing roots.
- ❑ Remove all side branches to ensure stored energy is used in root development.
- ❑ Soaking cuttings for 7 to 14 days allows root development to begin prior to planting. Planting should take place before roots have emerged from the bark.
- ❑ Hormones are generally unnecessary for large volume plantings of willows.
- ❑ Hormones may be valuable for other species and for older willow cuttings with thick rough bark.
- ❑ Leave at least one node above the surface at planting. Make sure the cutting is tall enough to be over competing vegetation.



Dormant willow cuttings soaking in a water filled garbage can . Soaking cuttings for 7 to 14 days helps prime the cutting with water and initiate root growth for better establishment.

## Technical and cost share help is available

The Natural Resources Conservation Service can help you plan, establish, and manage riparian buffers. Contact your local USDA Service Center.

USDA offers several programs that can help you install riparian buffers and other types of conservation plantings. These programs include the continuous Conservation Reserve Program (CRP), the Environmental Quality Incentives Program (EQIP), the Wildlife Habitat Incentives Program (WHIP), and the Wetland Reserve Program (WRP).

**For more information on the Aberdeen PMC**, contact the PMC in Aberdeen, Idaho at (208) 397-4133, or the Plant Materials Specialist in Boise at (208) 685-6987.

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