

# Plants for Riparian Buffers



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## What is a Riparian Buffer?

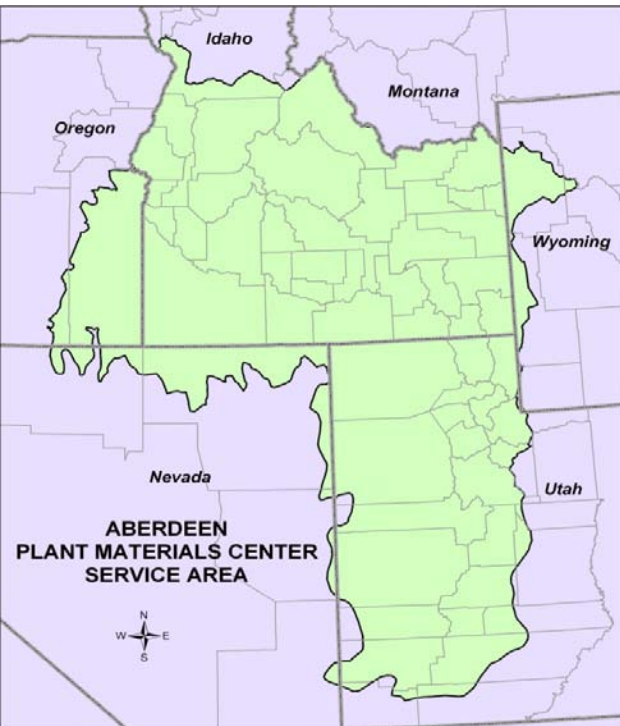
Many farmers, ranchers and land managers have a growing concern over water quality issues. Riparian buffers are one of the most important practices that you can use to help control non-point pollution and improve water quality.

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      |

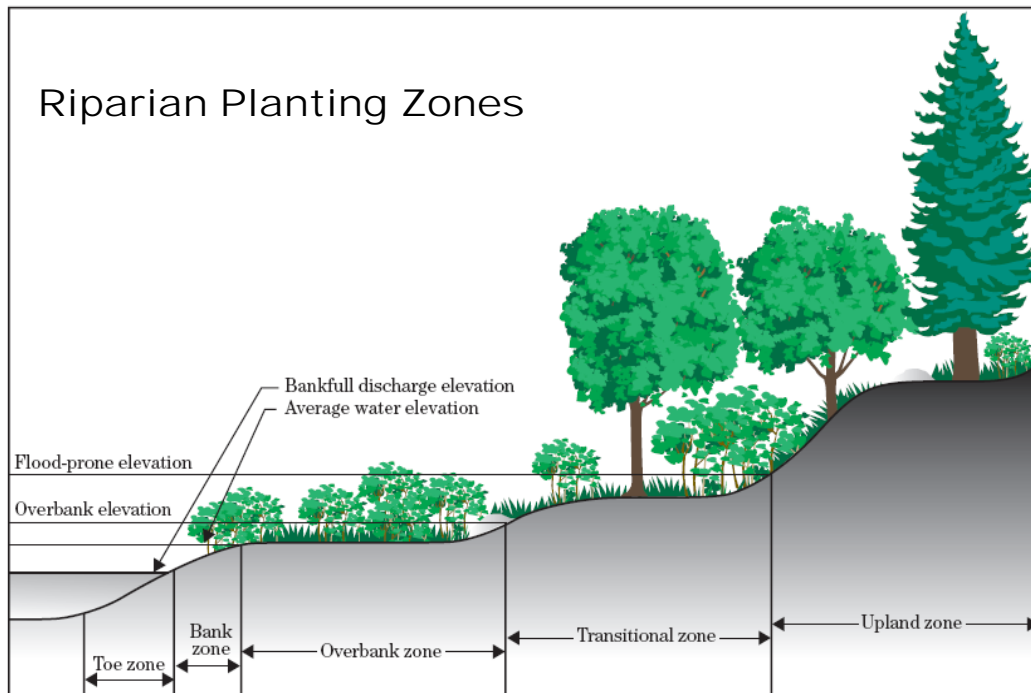
\* The minimum buffer width required in the NRCS Riparian Forest Buffer Standard is 35 feet.

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.



Different vegetation forms occur in the various riparian planting zones as a result of different water and flood conditions. *Note: not all streams will have all riparian planting zones present. Refer to the drawing to help you determine where to plant riparian species in relation to the water line.*

- ❑ 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><br>Box elder  | Med. tree          | Low-Middle      | Moderately spreading       | Poor                                 | Transitional            |
| <i>Alnus rubra</i><br>Red alder   | Med. tree          | Middle-High     | Shallow spreading          | Poor                                 | Overbank - Transitional |
| <i>Alnus sinuata</i><br>Sitka alder   | Sm.–med. tree      | Middle-High     | Shallow spreading          | Poor                                 | Bank-Overbank           |
| <i>Alnus incana</i> ssp. <i>tenuifolia</i><br>Thinleaf alder                              | Sm.–med. tree      | Middle-High     | Shallow spreading          | Poor                                 | Bank-Overbank           |
| <i>Betula occidentalis</i><br>Water birch   | Lg. shrub-sm. tree | Middle-High     | Shallow to deep spreading  | Poor                                 | Bank-Overbank           |
| <i>Cornus sericea</i><br>Redosier dogwood   | Med. shrub         | Middle          | Shallow                    | Moderate (wounding enhances success) | Bank to Transitional    |
| <i>Crataegus douglasii</i><br>Black/Douglas hawthorn                                      | Sm. Tree           | Low-Middle      | Shallow to deep spreading  | Poor                                 | Overbank - Transitional |
| <i>Elaeagnus commutata</i><br>Silverberry   | Med. shrub         | Low-Middle      | Shallow                    | Very good                            | Overbank - Transitional |
| <i>Pentaphylloides floribunda</i><br>Shrubby cinquefoil                                   | Sm. shrub          | Low-Middle      | Shallow to deep spreading  | Poor                                 | Overbank - Transitional |
| <i>Philadelphus lewisii</i><br>Mockorange or Syringa                                      | Sm.-med. shrub     | Low-Middle      | Spreading fibrous          | Poor                                 | Overbank - Transitional |
| <i>Populus angustifolia</i><br>Narrowleaf cottonwood                                      | Lg. tree           | Middle          | Shallow                    | Very good                            | Transitional            |
| <i>Populus fremontii</i><br>Fremont cottonwood  | Lg. tree           | Low-Middle      | Shallow fibrous            | Very good                            | Transitional            |
| <i>Populus tremuloides</i><br>Quaking aspen   | Med. tree          | Middle-High     | Shallow                    | Poor                                 | Transitional            |
| <i>Populus trichocarpa</i><br>Black cottonwood  | Lg. tree           | Low-Middle      | Shallow fibrous            | Very good                            | Transitional            |
| <i>Prunus virginiana</i><br>Chokecherry   | Sm. tree           | Low-Middle      | Rhizomatous                | Good from root cuttings              | Transitional            |
| <i>Rhus trilobata</i><br>Skunkbush sumac  | Med.–lg. shrub     | Low-Middle      | Deep spreading rhizomatous | Poor                                 | Transitional            |
| <i>Ribes aureum</i><br>Golden currant   | Sm.–med. shrub     | Low-Middle      | Spreading                  | Good (in greenhouse)                 | Overbank                |
| <i>Ribes cereum</i><br>Wax currant  | Sm.–med. shrub     | Middle-High     | Spreading                  | Fair                                 | Overbank - Transitional |
| <i>Rosa woodsii</i><br>Wood's rose  | Sm.–med. shrub     | Low-Middle      | Shallow to deep            | Good (in greenhouse)                 | Bank - Transitional     |
| <i>Sambucus coerulea</i><br>Blue elderberry   | Sm. tree           | Middle          | Rhizomatous                | Poor                                 | Transitional            |
| <i>Sambucus racemosa</i><br>Red elderberry  | Med. shrub         | Middle-High     | Spreading                  | Poor                                 | Transitional            |
| <i>Shepherdia argentea</i><br>Silver buffaloberry   | Lg. shrub          | Low-Middle      | Rhizomatous                | Poor                                 | Transitional            |
| <i>Symphoricarpos albus</i><br>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><br>Box elder  | High               | High              | Big game browse, upland bird food                  | High                 | Medium             |
| <i>Alnus rubra</i><br>Red alder   | Medium             | Low               | Big game browse, upland bird food                  | Medium               | Low                |
| <i>Alnus sinuata</i><br>Sitka alder   | Medium             | Low               | Big game browse, upland bird food                  | Medium               | Low                |
| <i>Alnus incana</i> ssp. <i>tenuifolia</i><br>Thinleaf alder                              | Medium             | Low               | Big game browse                                    | Medium               | Low                |
| <i>Betula occidentalis</i><br>Water birch   | Medium             | Low               | Big game browse, small mammal and upland bird food | Medium               | Low                |
| <i>Cornus sericea</i><br>Redosier dogwood   | High               | Medium            | Browse and cover for many species                  | Low                  | Low                |
| <i>Crataegus douglasii</i><br>Black/Douglas hawthorn                                      | Low                | High              | Big game browse                                    | Medium               | Low                |
| <i>Elaeagnus commutata</i><br>Silverberry   | High               | Medium            | Big game browse                                    | High                 | Medium             |
| <i>Pentaphylloides floribunda</i><br>Shrubby cinquefoil                                   | Unknown            | High              | Big game browse                                    | Unknown              | Unknown            |
| <i>Philadelphus lewisii</i><br>Mockorange or Syringa                                      | Unknown            | Unknown           | Big game browse                                    | Unknown              | Unknown            |
| <i>Populus angustifolia</i><br>Narrowleaf cottonwood                                      | Medium             | High              | Big game browse                                    | Medium               | Medium             |
| <i>Populus fremontii</i><br>Fremont cottonwood  | Medium             | Medium            | Big game browse                                    | Medium               | Medium             |
| <i>Populus tremuloides</i><br>Quaking aspen   | Low                | Medium            | Big game browse                                    | Low                  | Medium             |
| <i>Populus trichocarpa</i><br>Black cottonwood  | Medium             | Medium            | Big game browse                                    | Medium               | Unknown            |
| <i>Prunus virginiana</i><br>Chokecherry   | Low                | Low-Medium        | Birds and small mammals eat fruit                  | Low                  | Low-Medium         |
| <i>Rhus trilobata</i><br>Skunkbush sumac  | Medium             | Medium-High       | Birds and small mammals eat fruit                  | High                 | Medium             |
| <i>Ribes aureum</i><br>Golden currant   | Unknown            | Unknown           | Birds and small mammals eat fruit                  | Unknown              | Medium             |
| <i>Ribes cereum</i><br>Wax currant  | Unknown            | Unknown           | Birds and small mammals eat fruit                  | Unknown              | Unknown            |
| <i>Rosa woodsii</i><br>Wood's rose  | Low                | Low-High          | Rosehips eaten by many species                     | Unknown              | Low                |
| <i>Sambucus coerulea</i><br>Blue elderberry   | Medium             | Medium            | Fruit eaten by birds                               | Medium               | Low                |
| <i>Sambucus racemosa</i><br>Red elderberry  | Medium             | Medium            | Birds and small mammals eat fruit                  | Medium               | Low                |
| <i>Shepherdia argentea</i><br>Silver buffaloberry   | Unknown            | Unknown           | Birds and small mammals eat fruit                  | Unknown              | High               |
| <i>Symphoricarpos albus</i><br>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><br>White/Golden willow      | Med.-lg. tree  | Low-Middle      | Shallow to deep | Good                  | Transitional           |
| <i>Salix amygdaloides</i><br>Peachleaf willow | Sm. tree       | Low             | Fibrous         | Very good             | Transitional           |
| <i>Salix bebbiana</i><br>Bebb's willow        | Lg. shrub      | Low-Middle      | Shallow to deep | Good                  | Transitional           |
| <i>Salix boothii</i><br>Booth willow          | Med. shrub     | Middle          | Shallow to deep | Moderate              | Bank-Overbank          |
| <i>Salix drummondiana</i><br>Drummond willow  | Sm.-med. Shrub | Middle-High     | Shallow to deep | Good                  | Bank-Overbank          |
| <i>Salix exigua</i><br>Coyote willow          | Med. shrub     | Low-Middle      | Rhizomatous     | Very good             | Bank-Transitional      |
| <i>Salix geyeriana</i><br>Geyer willow        | Med. shrub     | Middle          | Shallow to deep | Good                  | Bank-Overbank          |
| <i>Salix lasiandra</i><br>Pacific willow      | Sm. tree       | Low-Middle      | Shallow to deep | Good                  | Transitional           |
| <i>Salix lemmonii</i><br>Lemmon willow        | Sm.-med. shrub | Middle-High     | Shallow to deep | Good                  | Bank-Overbank          |
| <i>Salix lutea</i><br>Yellow willow           | Med.-lg. shrub | Low             | Shallow to deep | Good                  | Bank-Overbank          |
| <i>Salix nigra</i><br>Black willow            | Lg. tree       | Low-Middle      | Shallow to deep | Good                  | Transitional           |
| <i>Salix planifolia</i><br>Planeleaf willow   | Sm. shrub      | Middle-High     | Shallow to deep | Moderate              | Bank-Overbank          |
| <i>Salix prolixa</i><br>Mackenzie willow      | Sm. tree       | Low-Middle      | Shallow to deep | Good                  | Overbank               |
| <i>Salix scouleriana</i><br>Scouler willow    | Lg. shrub      | Low-Middle      | Shallow to deep | Treat with hormone    | Upland                 |
| <i>Salix sitchensis</i><br>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><br>White/Golden willow      | High               | Medium            |                 | High                 | Low-Medium         |
| <i>Salix amygdaloides</i><br>Peachleaf willow | High               | Low               |                 | High                 | Medium             |
| <i>Salix bebbiana</i><br>Bebb's willow        | High               | Low-Medium        |                 | High                 | Low                |
| <i>Salix boothii</i><br>Booth willow          | Medium-High        | Low-Medium        |                 | High                 | Low                |
| <i>Salix drummondiana</i><br>Drummond willow  | Medium-High        | Low-Medium        |                 | High                 | Low                |
| <i>Salix exigua</i><br>Coyote willow          | Medium-High        | Low-Medium        |                 | High                 | Low                |
| <i>Salix geyeriana</i><br>Geyer willow        | Medium-High        | Low-Medium        |                 | High                 | Low                |
| <i>Salix lasiandra</i><br>Pacific willow      | Medium-High        | Low-Medium        |                 | High                 | Low                |
| <i>Salix lemmonii</i><br>Lemmon willow        | Medium-High        | Low-Medium        |                 | High                 | Low                |
| <i>Salix lutea</i><br>Yellow willow           | Medium-High        | Low-Medium        |                 | Medium               | Medium             |
| <i>Salix nigra</i><br>Black willow            | Medium-High        | Low-Medium        |                 | Medium               | Low-Medium         |
| <i>Salix planifolia</i><br>Planeleaf willow   | Medium-High        | Low-Medium        |                 | High                 | Low                |
| <i>Salix prolixa</i><br>Mackenzie willow      | Medium-High        | Low-Medium        |                 | High                 | Low                |
| <i>Salix scouleriana</i><br>Scouler willow    | Medium-High        | Low-Medium        |                 | High                 | High               |
| <i>Salix sitchensis</i><br>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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