

TECHNICAL NOTE

**USDA - Natural Resources Conservation Service
Boise, Idaho – Salt Lake City, Utah**

TN PLANT MATERIALS NO. 32

**August 2012
REVISION**

NATIVE SHRUBS AND TREES FOR RIPARIAN AREAS IN THE INTERMOUNTAIN WEST

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A healthy riparian community. Photo by Derek Tilley

This technical note describes establishment management of woody riparian trees and shrubs for riparian area stabilization and enhancement. It provides species descriptions for several woody riparian species commonly used in the Intermountain West.

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Plant Selection Tables

The following tables contain plant attributes which will assist you in selecting the appropriate species for your specific conservation application. Once you select the appropriate species continue to the Plant Data Sheet where you will find more in depth information about your selected species. Within each species Data Sheet there is a section which discusses available selections that may be commercially available. Use tested named selections when possible or obtain plants grown from local sources.

Table 1. Riparian trees and shrubs suitable for use in the Intermountain 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

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.

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

Table 1 (cont.). Riparian trees and shrubs suitable for use in the Intermountain 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

Table 2. Riparian willows suitable for use in the Intermountain region					
Species	Size/Form	Elevation range	Root type	Rooting from cuttings	Riparian Planting Zone
<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 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

Table 2 (cont.). Riparian willows suitable for use in the Intermountain region					
Species	Flooding tolerance	Drought tolerance	Wildlife value*	Deposition tolerance	Salinity tolerance
<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 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.

Plant Data Sheets

This section contains information on the description, uses, establishment and management of many of the commonly used riparian woody species used in the Intermountain Western region of the United States. This information is compiled from NRCS Plant Guides (USDA-NRCS, 2011) and numerous other sources. Species distribution maps for Idaho and Utah are also included to provide county level information on the species' range.

Boxelder

Acer negundo



Boxelder. J.S. Peterson @ USDA-NRCS PLANTS Database.

Alternate Names

Canadian maple

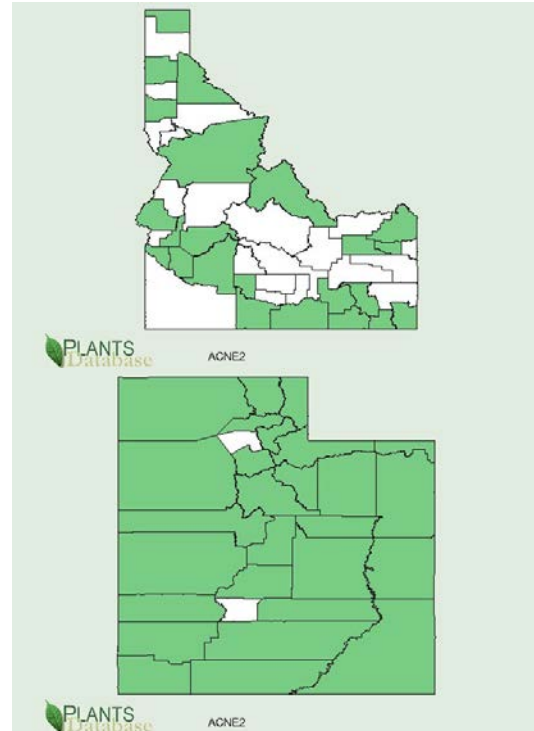
Description

Maple Family (Aceraceae): Boxelder is a native tree growing to 60 feet tall, with a broad rounded crown and a shallow, fibrous root system. The bark is light gray-brown with shallow fissures, becoming deeply furrowed; The leaves are opposite, 5 to 8 inches long, pinnately compound with 3 to 5 leaflets. Each leaflet is 2 to 4 inches long and 1 to 2 inches wide. The species is essentially dioecious, but bisexual flowers occur on a few trees. The fruit is a winged samara, 1 to 1.5 inches long, clustered on long stalks.

Boxelder is unusual among American maples in having compound leaves. Seedlings and young saplings of Boxelder are similar in appearance to poison ivy and are often mistaken for it by beginning naturalists. Boxelder can be distinguished from poison ivy by its opposite leaves.

Distribution

Boxelder is the most widely distributed of all American maples. Its native range extends from the east coast of the U.S. to California and from Alberta to southern Mexico and Guatemala.



Idaho and Utah county level distribution maps for boxelder.

Habitat

Boxelder occupies lowland sites along streams, rivers and ponds.

Uses

Food: Boxelder produces sap high in sugar content used to produce syrup sometimes called "mountain molasses." Native Americans used the cambium for food, boiled down the sap for syrup and candy, and made a tea from the inner bark to induce vomiting.

Conservation: The trees are useful for quick growth in riparian plantings, but they are short-lived, sometimes weedy or invasive and disease-prone.

Boxelder was once widely planted in windbreaks or shelterbelts in the Great Plains to reduce wind erosion and dust storms, but these shelterbelts have largely been removed. Its fibrous root system and prolific seeding habit make it valuable for erosion control in some parts of the world.

Wildlife: The seeds are important winter food for birds and small mammals, deer browse young plants.

Adaptation

Boxelder is adapted to river bottoms and disturbed sites on heavy, seasonally flooded wet soils. It is one of the most common bottomland trees throughout its range, usually following the pioneer species of cottonwood and willow in colonizing alluvial bottoms.

Establishment

Field propagation of dormant hardwood cuttings is rarely successful. Bareroot or containerized stock should be planted in the transition zone.

For nursery establishment, the best seed germination follows stratification for 60 to 90 days at 33° F. Softwood stem cuttings can also be used. These should be collected until mid-September. Treat softwood cuttings with 8,000 ppm indolebutyric acid (IBA) prior to planting. Plants will be ready for transplanting in 1 to 2 years.

The trees are fast growing, producing up to 1-inch diameter annual growth for the first 15 to 20 years. Early growth is best in full sun but plants are tolerant of partial shade. Young trees commonly produce stump and root sprouts.

Management

Boxelder is tolerant to stressful sites and requires little special care, but it is relatively short-lived and the branches of older trees are susceptible to ice and wind damage. Boxelder is highly sensitive to 2,4-D and also is susceptible to fire and mechanical damage because of its thin bark.

The boxelder bug is a common associate of boxelder throughout most of its range. The nymphs feed mainly on female trees in leaves, fruits, and soft seeds. The trees are not greatly damaged but the insects sometimes invade human habitation in large numbers with the onset of cold weather.

Availability

Boxelder is available at most nurseries within its range.

Red Alder *Alnus rubra*

Alternate Names

Pacific Coast alder, Oregon alder, western alder



Red alder. Wikipedia.

Description

Birch family (Betulaceae). Red alder is a deciduous tree native to the Pacific Northwest region. The trees are medium-sized, reaching 100 feet tall. These fast-growing trees often grow several feet each year until 20 years of age. The trees can live to 100 years of age with trunks reaching 14 to 18 inches in diameter. A shrub form occurs when the trees grow in open exposed areas. The thin bark is generally smooth, ashy gray to grayish-brown, and is commonly covered with white lichens as it ages. The inner bark is reddish brown.

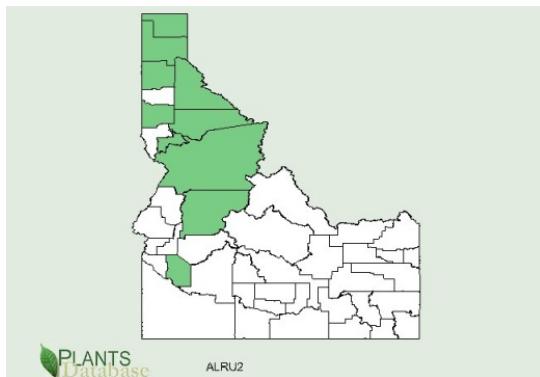
Leaves are alternately arranged, dark green, and broadly ovate. The leaves are 2 to 6 inches long with a pointed tip. Leaf edges are serrated or softly lobed and slightly rolled under, giving a dark-green edging effect from the underside of the leaf. The undersides of the leaves are rusty colored and covered with fine soft hairs.

The trees are monoecious, bearing both female flowers and male catkins. The tassel-like catkins grow in cluster of two to four. The catkins are greenish-yellow and 4 to 6 inches long. The flowers appear in spring either before or with the leaves. The flowers develop into small-scaled cones (fruits) that are 0.75 to 1 inch long and 0.4 to 0.6 inches across. Each cone contains from 50 to 100 seeds. The abundant seeds are wind dispersed from May to winter months.

Distribution

Red alder occurs along streams and lakes from Alaska to California and east to Montana. Red

alder has spread to upland areas since European contact because of increased disturbance, such as logging, which opens sites for colonization.



Idaho county distribution map of red alder.

Habitat

Red alder occurs in slightly wet to moist soils in riparian forests along streams, in swamps and in marshy areas in low elevations. Stands are eventually succeeded by Douglas fir, western hemlock, and Sitka spruce. Red alder trees are often associated with mixed evergreen forests and redwood forests in coastal areas.

Uses

Ethnobotanic: Native American tribes used red alder bark, roots, leaves, twigs, cones, and sap for building, weaving and medicinal purposes.

Wildlife: Deer and elk eat the leaves, twigs, and buds. Red alder seeds attract many bird and small mammal species including redpolls, goldfinches, and mice. Most of the seed remain on the tree well into the fall and winter months, providing valuable resources for seed-eating birds, insects and mammals when other foods are scarce. Beaver eat the bark and build dams and lodges with the stems. Red alder trees provide valuable nesting for birds and thermal cover for deer and other wildlife.

Livestock: Horses, cattle, sheep and goats browse on the leaves, twigs and buds of young alder trees.

Conservation: Red alder is an excellent species for re-establishing forestlands. These trees are used in forested riparian buffers to reduce stream bank erosion, protect water quality, and enhance aquatic environments. Plantings of red alder are effective in controlling erosion on steep slopes in disturbed areas. These fast-growing trees help prevent soil erosion because of their dense

canopy cover and thick litter layer that forms within the first 3 to 5 years. The leaf litter is high in nitrogen content.

Adaptation

Red alder trees invade clearings or burned-over areas and form temporary forests. Over time, red alders build the soil with their copious litter, and enriched it with nitrogen compounds formed by symbiotic bacteria that live in little nodules on their roots.

Young trees survive disturbance by resprouting from the stumps. Red alder trees tolerate flooding and can grow in areas with brackish water.

Establishment

This species is normally established using nursery grown planting stock. Bareroot or containerized stock should be planted in moist, well-drained, deep sandy loams and full sun in the overbank and transition zones. Quick growing red alders can be planted with slower growing trees such as oak to provide quick screening.

Nursery produced red alder trees are generally propagated from seed. Mature seeds can be collected beginning in May. Spring sown seeds should germinate successfully as long as they are not covered as the seeds require sunlight to germinate and germinate best in full sun. Sow the seeds in containers or seed trays containing a slow release fertilizer. Firm the medium and place the seeds thinly and evenly on top. When large enough to handle, the seedlings can be placed into individual pots.

The seeds do not require pretreatment, however germination can be improved by cold stratification for 1 to 3 months.

Softwood cuttings from young trees (<7 years old) have been successful. Plant 2.5 to 5 in long and 0.1/8 to 3/16 in diameter cuttings treated with 3,000 ppm indole-3-butyric acid (IBA) into perlite/vermiculite at 77° F for rooting.

Availability

Red alder is readily available through native plant nurseries.

Sitka Alder

Alnus viridis ssp. *sinuata*



Sitka alder. Sousesan McDougal @ USDA-NRCS PLANTS Database.

Alternate Names

Green alder, mountain alder, wavy-leaf alder, slide alder

Description

Birch family (Betulaceae). Sitka alder is a small to large shrub ranging 3 to 20 feet in height. It is tall, upright and multi-stemmed with a rounded crown. The leaves are alternate, oval shaped from 3 to 6 inches long and 1 to 4 inches wide. The leaf margin is finely double-serrate.

The plants are monoecious with separate male and female catkins on the same plant. Male catkins are slender, 3.0 to 5.5 inches long, and drooping. The female flowers produce cone-like structures (strobili). Mature cones are 0.5 to 0.8 inches long and 0.25 to 0.5 inches thick, ovate to ovoid-ellipsoid in shape. Unlike other alders, the catkins of Sitka alder open with the formation of the leaves as opposed to beforehand. Flowering occurs in late spring.



Sitka alder leaves. Sitka alder. Sousesan McDougal @ USDA-NRCS PLANTS Database.

The branches are slender, glabrous, light brown to reddish brown or grey, and somewhat zigzagged in appearance. The older bark is thin and smooth grey to blue-grey in color. Twigs are reddish to yellow brown, at first pubescent later becoming smooth with conspicuous lenticels (pores in the bark). The winter buds are sessile on new growth, and covered with 3 to 6 brownish-red to dark purple overlapping scales

Distribution

In North America, Sitka alder occurs from southern and western Alaska and the Yukon southward to northern California and eastward to southwestern Alberta, western Montana, northwestern Wyoming, and Idaho.



Idaho distribution of sitka alder.

Habitat

Sitka alder is a thicket forming, pioneer, early-seral, and mid-seral species of moist mountain woods, stream banks, bogs, lakeshores, moist talus slopes, the edges of moist meadows, and the north face of rocky outcrops or other shady aspects.

Uses

Erosion control and reclamation: Sitka alder is a valuable shrub for slope and stream bank stabilization and general erosion control on disturbed, nutrient poor sites.

Forestry: As host to symbiotic nitrogen fixing bacteria in its roots, Sitka alder is particularly important for improving forest site productivity and is sometimes used as a companion or nurse shrub in conifer.

Wildlife: The palatability of Sitka alder is considered poor and forage value low for most big game animals and livestock, but others report that it is one of the most palatable of the native

alders, being rated fair to good as browse for sheep in some areas. Selective browsing of this species by moose occurs in Idaho and Montana during summer months as leaves remain green. It is also considered high-quality moose browse in British Columbia. Elk will browse the tender young shoots, while whitetail and mule deer feed on leaves and twigs. Alder twigs and leaves are consumed by muskrats, rabbits, snowshoe hares, and squirrels, while the seeds, buds, or catkins are an important source of food in winter for numerous song and game birds.

Ethnobotanic: Native Americans used Sitka alder for dye, food, and medicinal purposes.

Adaptation

Sitka alder grows on soils that vary from infertile mineral to rich humus covered substrates, highly acidic to neutral pH (3.3 to 7.5), and coarse to medium texture (rocky, gravelly, loamy sands, sandy loams, silts, loams). Sitka alder also does well in moist clay loam soils that are nutritionally poor. The species is usually found in full sun, but has intermediate shade tolerance and can persist under a forest canopy.

Because of nitrogen fixation sitka alder can strongly influence the soil characteristics of the site it occupies. Its abundant, nitrogen-rich leaf litter is also an important source of organic matter for soil building and nutrient cycling. The species also produces an acidifying effect on the soil.

Establishment

This species is normally established using nursery grown planting stock. Sitka alder can be established in the field using seedlings. Roots should be inoculated with *Frankia* bacteria by the producer and if possible, with an appropriate ectomycorrhizal fungus prior to or at outplanting. Container stock is most frequently used, but bare-root material in the range of 18 to 24 inches tall may be used as well. Sitka alder should be planted in the transition and overbank zones.

Sitka alder can be established by direct seeding revegetation and reclamation sites, but ideal seeding rates are unknown. Physiological dormancy can be present in seed lots; therefore, it is advisable for dry untreated seed to be planted in the fall on moist mineral seedbeds for best results. Seed sown to 0.1 to 0.2 inches deep is covered with a thin layer of soil, mulch, or

peat. Results from Sitka alder seeding can be mixed and poor germination rates have been reported.

If used in a spring seeding, a cold moist stratification prior to planting is recommended. However, the ideal length of time for chilling varies among reports. Dry seed of Sitka alder can germinate at higher rates or more uniformly if it undergoes cold moist stratification for 1 to 3 months at 34 to 38° F. Others report improved results with cold stratification periods for Sitka alder of 14 days to 9 weeks.

Management

Sitka alder is susceptible to pathogens including leaf spot, Septoria spot, branch and trunk cankers, heart rot, and powdery mildew.

Alders in general can be host to a number of insect pests including aphids, scales, borers, sawflies, and leaf miners. Other common pests of Sitka alder are the alder leaf beetle (*Altica ambiens*), poplar-willow borer (*Cryptorhynchus lapathi*), and western tent caterpillar (*Malacosoma californicum*).

Availability

Skamania Germplasm was developed by the NRCS Plant Materials Center in Corvallis, OR in 2002. The selection originated from a natural stand growing near the north shore of the Columbia River, in the vicinity of Beacon Rock in Skamania County, WA. Suggested area of use is western Washington and western Oregon below an elevation of 457 m (1500 ft).

Thinleaf Alder

Alnus incana ssp. tenuifolia

Alternate Names

Grey alder, mountain alder, river alder

Description

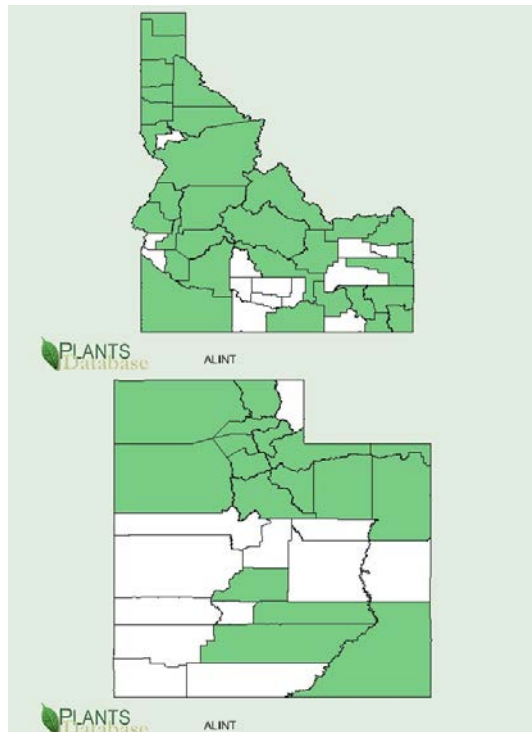
Birch family (Betulaceae). Thin-leaf alder is a native, deciduous shrub or tree reaching heights of up to 40 feet. The leaves are ovate, double serrated, and pointed at the tip. Male catkins are produced in the autumn in-groups of three or four. The female catkins are borne separately on the same plant in late winter or early spring. The fruit are small, brown, scale-like cones produced in early autumn. The bark is thin, smooth, and green-gray, grayish-brown, or reddish-brown.



Thinleaf alder. Kenaiwetlands.org

Distribution

Thin-leaf alder is distributed throughout Europe and much of North America.



Idaho and Utah county level distribution maps for Thinleaf alder.

Uses

Ethnobotanic: Native Americans reportedly pounded the wood of thin leaf alder into a powder to produce a red dye.

Wildlife: Cottontail rabbits, muskrats, moose, elk, deer, and snowshoe hares eat the leaves and twigs. Numerous bird species forage on alder seeds, buds, and catkins. Beaver eat the bark and build dams with the stems.

Windbreak: Thin-leaf alder is used in windbreaks for livestock protection and soil erosion control.

Adaptation

Thinleaf alder tolerates a wide range of soil conditions and pH levels. This species grows best in moist heavy soils in semi shaded areas. It has good flood tolerance and typically grows near rivers and moist stream borders on poorly developed soil. Thin-leaf alder is frequently found growing in the understory of coniferous forests in mesic areas.

Establishment

This species is normally established using nursery grown planting stock in the upper end of the overbank zone and into the transition zone.

Thinleaf alder seed requires a stratification treatment. Seed for nursery production should be sown in fall for natural stratification, or artificially stratified for 6 months. Sow the seeds in containers or seed trays containing a slow release fertilizer. Firm the medium and place the seeds thinly and evenly on top. When large enough to handle, the seedlings can be placed into individual pots.

Small seedlings can also be collected from under mature trees and transferred into containers for eventual reestablishment.

Asexual propagation is rare. Best results have been obtained from treating summer softwood cuttings with 8,000 ppm IBA. Field propagation by dormant hardwood cuttings is difficult

Management

Thin-leaf alder often occurs in dense thickets, which reportedly results from underground rhizomes or suckers. If plants are damaged by fire, sprouting can occur from the stump, root collar, or from the root crown. After top-

removal of plants by beavers, they have been observed to sprout heavily from the cut.

Availability

Thinleaf alders are somewhat available through native plant nurseries within its range.

Water Birch *Betula occidentalis*



Water birch. Wikipedia.

Alternate Names

Rocky Mountain birch, mountain birch, red birch, black birch, spring birch

Description

General: Birch family (Betulaceae). Water birch is a small native tree or shrub attaining heights of 30 ft. The leaves are 1 to 2 inches long, ovate, and coarsely toothed. The bark is thin, dark reddish-brown to black, with mark horizontal slits, and does not peel like other birches.

Distribution

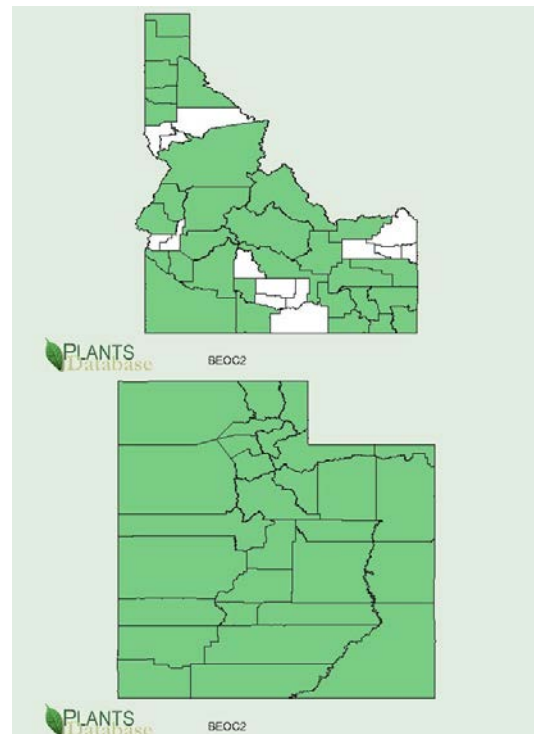
Water birch is found in all western states and territories from the Pacific to the Great Plains.

Habitat

Water birch occurs in dense thickets in riparian communities and near seeps and springs.

Uses

Economic: The wood is very dense and heavy and is used for firewood and fence posts.



Idaho and Utah county distribution maps for water birch.

Wildlife: Goats, sheep, deer, and elk browse water birch. Beaver harvest the stems of water birch for dams and lodges. The broad-tailed hummingbird and red-napped sapsucker feed on sap oozing from holes in the bark made by sapsuckers.

Agroforestry: Water birch is used in forest riparian buffers to reduce stream bank erosion, protect aquatic environments, enhance wildlife, and increase biodiversity.

Adaptation

Water birch is very shade tolerant. It is mostly found in wet to moist nutrient-rich soils, along streams, in mountain canyons, usually in coniferous forest. Water birch occurs most commonly on medium textured soils at low to middle elevations.

Establishment

Field propagation by dormant hardwood cuttings is rarely successful. Nursery produced water birch should be planted into the overbank zone using containerized stock.

Seeds may be collected from local trees for establishing nursery stock. Sow ripe seed in containers or seed trays containing a slow-release fertilizer. Seed should be lightly covered with medium. Once the seedlings are large enough to handle they should be placed into individual pots. When the seedlings are 18 to 30 inches tall (1 to 2 years old), they can be removed from individual pots and transplanted to field locations. The best time for transplanting is in the spring as the buds begin to turn green.

Availability

Water birch is readily available from commercial sources.

Redosier Dogwood

Cornus sericea

Alternative Names

American dogwood, red willow, redstem dogwood,



Redosier dogwood. Central Washington Native Plants.

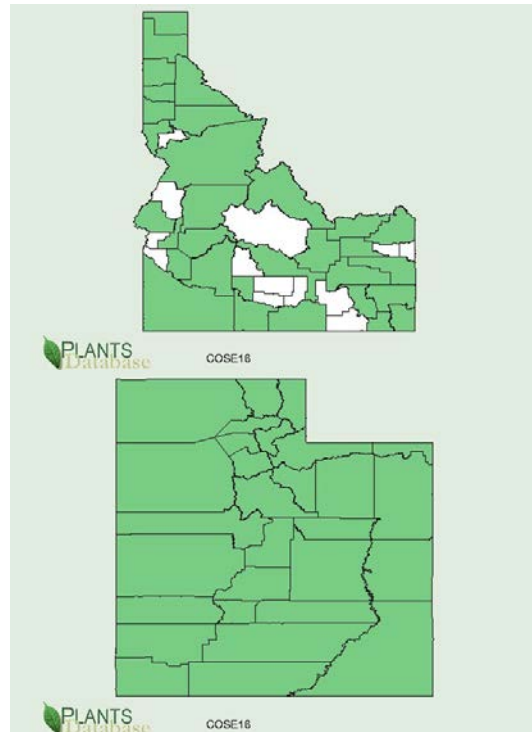
Description

Dogwood Family (Cornaceae). Redosier dogwood is a woody deciduous shrub generally 4 to 20 feet tall. The bark and twigs are reddish to purple and fairly smooth from autumn to late spring; after the leaves have fallen, the deep burgundy branches add color to the winter landscape. The bark, twigs, and leaves are bright green in spring through summer. The simple, opposite leaves are 2 to 4 inches long, dark green above and hairy and lighter-colored below, with smooth margins, rounded bases, pointed tips, and falsely parallel veins. Flowering occurs from May to August. The inflorescence is a cyme, with 0.08 to 0.12 inch white to cream-colored

flowers. The white berries are smooth on the faces, furrowed on the sides.

Distribution

Redosier dogwood has a wide distribution from California north to Alaska and throughout the country to the eastern states and south to Mexico. It generally grows at elevations below 8,200 ft.



Idaho and Utah county distribution maps for redosier dogwood.

Habitat

Redosier dogwood occurs along streams, rivers and other moist sites from low to relatively high elevations.

Uses

Ethnobotanic: Redosier dogwood was widely used by Native Americans for medicinal purposes. The berries are used for food, and the stems and bark are used for basket weaving.

Wildlife: The fleshy berries of dogwood are valuable food for wildlife. The fruit ripens in late summer, and besides being available through the fall, some of the berries may persist on the plants into the winter months. Wildlife browse the twigs, foliage, and fruit. Numerous birds are known to eat the fruit. The shrubs provide excellent nesting habitat for songbirds.

Adaptation

Redosier dogwood grows in soils that are saturated for at least a portion of the growing season. It is common on the edges of lakes, ponds, within wetlands, and along streams. It is not as tolerant of long-term root saturation as are some other shrubs. Dogwood prefers wetland margins where soils are nitrogen-rich, saturated, and shallowly inundated in the spring, and dry by late summer.

Establishment

This species is normally established using nursery planting stock, but can also be established with cuttings. Dogwoods will only root on damaged portions of bark, so lightly scaring the bark up and down the stem is recommended.

Nursery stock of redosier dogwood is established easily from seed. The best germination is obtained if the seeds are gathered as soon as the fruit starts to color or ripen, from August to October. If the seeds are allowed to dry out, it is best to remove seeds from the fruit and soak in water.

Best results are obtained from fall sowing of freshly harvested seeds. Fruit collected too late to sow in the fall should be stored, pre-chilled until the next season, and sown outdoors the following fall. To effectively condition the seed for germination, store for two months in moist sand at 41° F for 90 days. After pre-chilling, the seed is exposed to fluctuating cold and warm temperatures for 10 days. Seeds sown in nursery beds should be covered with 0.25 to 0.5 inches of soil. Fall-sown beds should be mulched during the winter.

Management

Redosier dogwood is often coppiced in late fall after the leaves turn brown and fall off the stem. Cut all stems to approximately 2 to 3 inches from the base before growth begins in spring. Apply fertilizer around the shrub to promote new growth, and then apply mulch around the base. Coppicing stimulates the growth of new, vigorous stems.

Availability

Cultivars: Several horticultural varieties are available: 'Silver' and 'Gold', 'Cardinal' and 'Isanti' were developed by the University of Minnesota. 'Bailey' was developed by Bailey Nurseries in Portland, OR. Other available

varieties have been developed and marketed in the eastern US such as 'Allamans', 'Lutea', and 'Ruby'. The origin of 'Flaviromea' is unknown, but it is widely marketed. Two selections developed by the NRCS Plant Materials Center at Pullman Washington, Wallowa Selection and Harrington Origin are not available in the marketplace. For restoration purposes ask origin of purchased materials to obtain most local materials.

Black Hawthorn

Crataegus douglasii



Black hawthorn. Clint Shock. Malheur Experiment Station. OSU.

Alternate Names

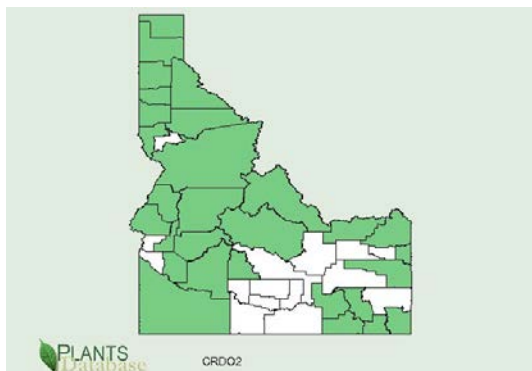
Douglas hawthorn

Description

Rose family (Rosaceae). Black hawthorn is a large shrub or small tree that grows to 35 feet tall, with straight, strong but few thorns ranging from 0.5 to 1 inch long. Stems are usually clustered from the base or from a point just above the ground surface. Leaves are smooth, long, broad, dark green, shiny, and serrated at the tip. Flowers are globe-shaped and in small clusters produced in the spring. Its fruits are dark reddish-purple to black.

Distribution

Black hawthorn is widespread in the Northwest, from southeastern Alaska south through British Columbia to northern California and east to the rocky mountains of Montana to Colorado.



Idaho county level distribution map of black hawthorn.

Habitat

Black hawthorn is found in drier riparian locations. It often grows in association with aspen, cottonwood, serviceberry and chokecherry.

Uses

Erosion Control: Because it tolerates a wide variety of sites, black hawthorn can be planted to stabilize banks, for windbreaks and shelterbelts, and for erosion control along ditches and highways.

Wildlife: Black hawthorn provides food and cover for game birds such as the blue and rough grouse. Deer, small mammals and other wildlife species feed on the leaves and twigs of young seedlings or trees. Livestock readily eat the leaves.

Adaptation

Black hawthorn generally occurs on deep, moist, fine-textured soils, at lower elevations ranging from 2,200 to 5,400 ft. Although it will succeed in partial shade and different soil types, it grows best in full sunlight with sufficient moisture levels. It is predominantly an understory species and is seldom found in pure stands. It is fire tolerant and will re-sprout and produce suckers following fire disturbance

Establishment

This species is normally established using nursery grown planting stock. Containerized trees should be planted in the overbank and transition zone in the fall or spring. Balled and burlapped trees should be planted in early spring.

Black hawthorn is propagated by seed. Seed requires acid scarification for 0.5 to 3 hours, followed by 84 to 112 days of cold treatment for adequate germination. Seeds can be planted

early in the fall, in drill rows 8 to 12 inches apart and covered with 1/4 inch of soil. Seedlings should not be kept in the nursery longer than a year.

Management

Because it develops a long taproot, black hawthorn should not be kept in seedbeds more than one year. Pruning should be completed in the winter or early spring in order to maintain a clear shoot leader on young trees and/or remove the weakest branches to allow more light to pass through. Suckers or stems arising from the roots should be removed when they become noticeable. Limited livestock browsing can help maintain and protect black hawthorn thickets as important source of food and cover for wildlife.

Although pests and diseases seldom affect it, it is susceptible to fire blight, cedar-hawthorn rust, cedar-quince rust, leaf blight, fruit rot, and leaf spot.

Availability

Black hawthorn is available locally at native plant nurseries within the species range.

Shrubby Cinquefoil *Dasiphora fruticosa* ssp. *floribunda*



Shrubby cinquefoil. Max Licher. Intermountain Herbarium.

Description

Rose family (Rosaceae). Shrubby cinquefoil is a small shrub generally reaching 1 to 3 feet tall

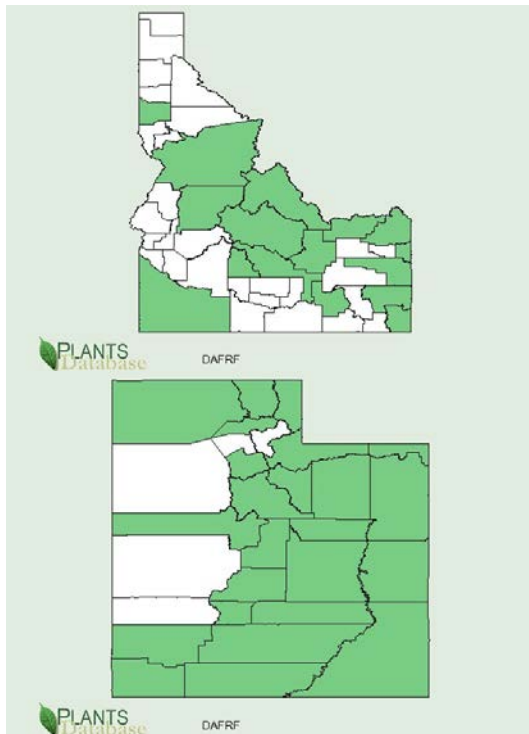
with brownish shredding bark. The leaves are leathery and pinnate with 3 to 7 leaflets. The flowers are yellow in loose axillary cymes.

Habitat

Shrubby cinquefoil occurs in meadows, sagebrush aspen and spruce-fir plant communities. The plants are often found along streams, semi-wet meadows or floodplains.

Distribution

Shrubby cinquefoil is found throughout most of North America with the exception of the southeastern region.



Idaho and Utah county level distribution maps of shrubby cinquefoil.

Adaptation

Shrubby cinquefoil occurs in areas which are generally moist early in the season and dryer later. Open valleys from mid to high elevations. Soils vary from clay loams to sandy loams. The soils are typically well developed, and neutral to slightly acidic.

Establishment

For riparian plantings, use bareroot or containerized stock in the overbank and transition zones.

Seed generally germinates well without pretreatment; however some recommend a 60 day cold stratification period.

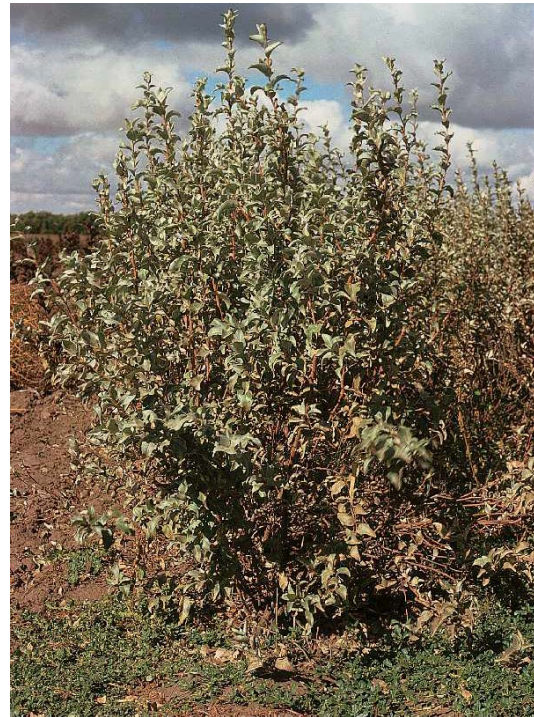
Asexual propagation is by softwood cuttings treated with 1,000 ppm IBA. Cuttings are placed in peat/perlite or sand media under greenhouse misters. Field propagation by dormant unrooted hardwood cuttings is rarely successful.

Availability

These plant materials are readily available from commercial sources

Silverberry

Elaeagnus commutata



Silverberry. D.E. Herman @ USDA-NRCS PLANTS Database.

Alternate Names

Silverberry, wolf-willow

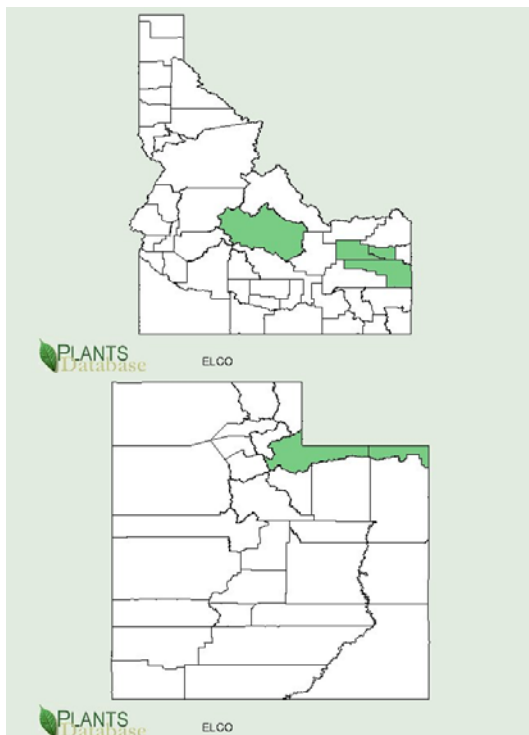
Description

Oleaster family (Elaeagnaceae). Silverberry is a long-lived shrub, growing 3 to 13 feet tall. It is strongly rhizomatous, and stoloniferous, sometimes forming thickets or loose colonies. The branches are thornless, reddish brown, sparsely to densely covered with silvery scales. The leaves are deciduous, simple, alternate, 1 to 4 inches long, ovate or lanceolate, wedge-shaped

at base, with both surfaces covered by minute, silver scales, sometimes with scattered brown scales beneath. Flowers are bisexual or unisexual in lateral clusters of 1 to 3 on current year twigs. The petals are absent; the sepals form a 4-lobed tube from the top of the developing fruit, yellowish inside, silvery outside, 0.5 to 0.6 inches long. The fruit is a silvery berry approximately 0.5 inches long. Silverberry should not be confused with its introduced relative, Russian olive.

Distribution

American silverberry is distributed across northern North America, from Alaska, Yukon Territory, and the Northwest Territories through Canada, except for the easternmost provinces (New Brunswick, Nova Scotia, Newfoundland), and in the United States from Washington to Minnesota and southward to northeastern Utah and Colorado.



Idaho and Utah county level distribution maps of American silverberry.

Habitat

American silverberry commonly occurs in riparian communities along watercourses. It also grows in open grasslands and a variety of open forests and thickets. Because of its relative shade intolerance, it is often found in open

vegetation, particularly where soil disturbance has occurred.

Uses

Wildlife/Livestock: American silverberry is an important wildlife food for moose, elk, deer, pronghorn antelope, upland game birds, small nongame birds, small mammals, and waterfowl. Its palatability is rated poor for cattle and horses and fair for sheep. American silverberry provides protection and nesting cover for these same animals, particularly in grasslands and other mostly open habitats.

Ethnobotany: The fleshy fruit of American silverberry is cooked in moose fat and eaten by some Alaskan natives. The pits of the fruits are used as necklace beads in the Fort Yukon region of Alaska.

Conservation: The vigorous rhizomatous sprouting habit of American silverberry helps it spread quickly in disturbed sites, and it has been used for soil stabilization of mine spoils in British Columbia and Alberta. Pre-inoculation with mycorrhiza may result in more rapid revegetation.

Adaptation

Although it grows best in loamy soils, American silverberry is commonly found in dry, sandy or gravelly soils, including those highly susceptible to erosion. The species occurs over a wide range of elevations from 300 to 8,000 feet in areas receiving 16 to 40 inches of annual precipitation.

The tough leaves, with their dense and close cover of scales, probably are at least partially responsible for the drought resistance of silverberry. Plants also are wind resistant and tolerate temperatures down to about -40° F.

American silverberry fixes nitrogen, some of which is available to plants of other species growing nearby.

Establishment

This species is normally established using nursery grown planting stock. Cuttings are slow and difficult to root, usually requiring at least 12 months for good establishment. Containerized and bareroot materials are recommended in the overbank and transition zones.

Seeds are produced in good crops every 1 to 2 years. They remain viable 1 to 2 years or more

and germination may require a natural stratification period of nearly two years. Birds are the primary seed dispersers. American silverberry also reproduces and spreads by rhizomes.

Management

American silverberry is an increaser species on overgrazed cattle rangelands. Frequent sheep browsing or mowing, however, reduce silverberry cover. Many passerine bird species are attracted to mixed-grass prairie with interspersed silverberry cover and reduction of silverberry results in reduced or altered composition of bird communities.

In native grasslands, American silverberry is often controlled with herbicides or fire. It is top-killed by most fires and is probably completely killed by severe fires. In the Canada Great Plains, American silverberry is seriously harmed by spring and fall burns. Plants sprout from rhizomes after fire, and although numbers of plants may increase after fire, cover usually decreases and recovery is slow.

American silverberry is significantly affected by rust in Canada and is also a host for pycnia and aecia of *Puccinia coronata* (crown rust) and *Puccinia caricis-shepherdiae*.

Availability

These plant materials are readily available from commercial sources.

Syringa (Mockorange)

Philadelphus lewisii

Alternate Names

Gordon's mockorange, Indian arrowwood, wild mockorange

Description

Hydrangea family (Hydrangeaceae). Lewis' mockorange, the state flower of Idaho, was named for Captain Meriwether Lewis, who collected the plant in 1806. Mockorange is a native, deciduous, erect to spreading shrub that grows to 3 to 10 feet tall. Showy white flowers occur in clusters of three to fifteen. Leaves are opposite, simple, ovate to elliptic-ovate, with entire to remotely dentate margins. Flowers are white, 1 to 1.5 inches across, with four petals. The fruit is a small dark brown capsule. Seeds are small, averaging 5,300,000 per pound.



Lewis' mockorange. WSU.edu.

Distribution

Lewis' mockorange occurs in Washington, Oregon, Idaho, Montana, California, Alberta and British Columbia.



Idaho county level distribution map of syringa.

Habitat

Lewis' mockorange occurs on rocky hillsides, talus slopes and canyons in sagebrush, ponderosa pine and Douglas fir plant communities.

Uses

Wildlife: This species furnishes excellent cover and habitat for wildlife, providing good browse for deer and elk. It is not grazed extensively by livestock but does receive some use in some areas. Palatability increases following resprouting following fire. Quail, squirrel and deer also use mockorange for food.

Conservation: Mockorange can be a valuable plant for revegetating disturbances on steep,

rocky, unstable slopes. It can also be planted in drier areas of degraded riparian zones.

Ethnobotany: Native Americans used stems for making arrows, bows, combs, tobacco pipes, cradles and netting shuttles.

Adaptation

Mockorange prefers soil textures ranging from coarse to medium. The species is adapted to soil pH from 5.6 to 7.8, and precipitation from 14 to 70 inches annually.

Establishment

Conservation plantings are usually done using potted plants produced from seed. However hardwood cuttings can be successful. Plant in the overbank and transition zones in coarse to medium textured soils.

Seed should be cold stratified in coarse moist sand for 8 weeks. Seed can also be sown in the fall to naturally stratify. Seedlings may be subject to kill by spring frost.

Leafy softwood cuttings of current season's growth can be rooted in coarse grade perlite with bottom heat and mist. Cuttings should be treated with fungicide if needed and then treated with .1% IBA powder on the freshly cut ends before sticking. Rooting media should be kept at approximately 75 - 77° F. Room temperature should be 5 to 10 degrees cooler. Mist interval used was about 15-20 seconds every 20 minutes. Rooting occurs in approximately 18 to 30 days when plants can be transferred to a hardening table with mist. Time required to grow usable plants in containers (10 cubic inch) is approximately 90 days.

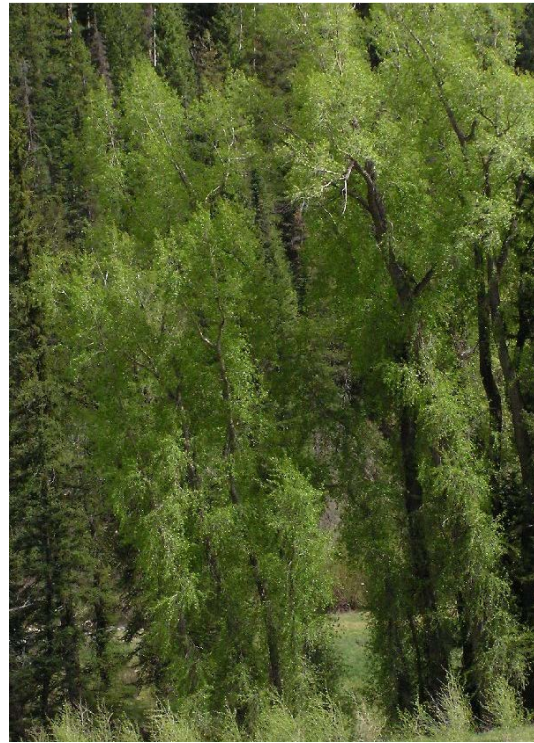
Management

Mockorange is moderately tolerant of browsing but heavy grazing by wild ungulates and livestock has a negative impact.

Availability

The NRCS Plant Materials Center in Pullman, Washington released two mockorange selections in 2002 as selected class releases. St. Maries Germplasm (St. Maries, Idaho) and Colfax Germplasm (Colfax, Washington). Several cultivars from Canada are apparently meant for landscape uses: 'Waterton' which was selected from the Waterton Lakes area of Alberta and 'Blizzard' which was selected at the Morden Research Station, Manitoba.

Narrowleaf Cottonwood *Populus angustifolia*



Narrowleaf cottonwood. A. Schneider @ USDA-NRCS PLANTS Database.

Alternate Names

Bitter cottonwood, willow cottonwood, willow-leaf cottonwood, mountain cottonwood, Rydberg cottonwood, smooth-bark cottonwood

Description

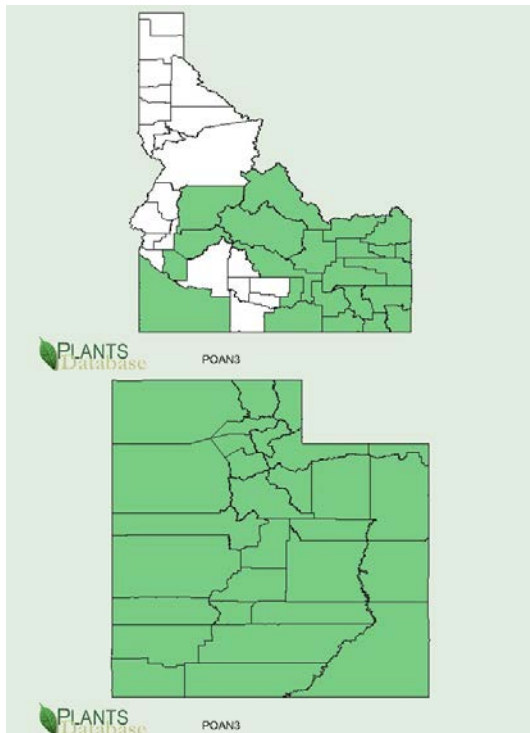
Willow Family (Salicaceae). Narrowleaf cottonwood is a native tree up to 50 to 65 feet tall, single-stemmed with slender, upright branches forming a narrowly spreading crown. The bark is yellowish green to grayish brown, smooth on upper portions and furrowed into broad, flat ridges on older lower portions. Leaves are deciduous, simple, alternate, lanceolate to ovate-lanceolate, rounded at base, 2 to 4 inches long, 0.5 to 1 inches wide, hairless or nearly so, the margins glandular-toothed, dark green above and slightly paler beneath. Flowers male (staminate) and female (pistillate), are on separate trees (the species dioecious).

Natural hybrids are frequent between narrow-leaf cottonwood and other species: balsam poplar (*P.*

balsamifera) = *P. x brayshawii* Boivin (Brayshaw's poplar); eastern cottonwood (*P. deltoides*) = *P. x acuminata* Rydb. (lanceleaf poplar); Fremont cottonwood (*P. fremontii*) = *P. x hinckleyana* Correll.

Distribution

Narrowleaf cottonwood occurs primarily in mountainous areas from southern Alberta and Saskatchewan south to Oregon and California (east of the Sierra Nevada), Arizona, New Mexico, and Trans-Pecos Texas and in northern Mexico (northeastern Sonora).



Idaho and Utah county level distribution maps of narrowleaf cottonwood.

Habitat

Narrowleaf cottonwood is commonly found on narrow, periodically flooded benches adjacent to streams and smaller rivers. Common associates are Douglas-fir, blue spruce, ponderosa pine, junipers, big tooth and rocky mountain maples, birch, alder, other cottonwoods and aspen. In relatively undisturbed sites, the understory often includes red-osier dogwood, chokecherry, serviceberry, willows, and currants.

Uses

Wildlife: Narrowleaf cottonwood provides habitat, cover, and food for a diversity of wildlife. Squirrels, bear, deer, elk, moose and

many bird species frequent cottonwood stands. Twigs and leaves are browsed by rabbits, deer, and moose and buds and catkins are eaten by quail and grouse. Beaver use cottonwood to build and maintain lodges and dams and use the bark for immediate food or storage in winter caches.

Conservation: The aggressively spreading root system of narrowleaf cottonwood makes it useful for soil stabilization in erosion control and streambank reclamation projects. This same feature, however, may be a liability in urban areas where the roots may clog drains and sewers.

Ethnobotanic: Native Americans used young cottonwood shoots to make baskets.

Adaptation

Narrowleaf cottonwood grows along streams in dry mountains, desert shrublands, and prairie grasslands and in coniferous forests with willows and alders, at elevations of 3,000 to 8,000 feet.

Narrowleaf cottonwood is a pioneer that colonizes sandbars and other fresh alluvium in areas of full sun. Such sites tend to become dominated by a dense, closed canopy of cottonwood. Continual disturbances such as flood and fire allow such communities to persist.

Establishment

This species is normally established using cuttings, pole, and nursery planting stock. Plant into permanent positions either in late summer or the following spring. Hardwood cuttings or container stock should be planted in the transition zone.

Natural seedlings establish only if the seed lands on unoccupied, wet, sandy soil in full sun. Flood disturbance along waterways enhances seedling recruitment, and periodic fires may serve the same purpose – removing competing over-story vegetation, allowing more light penetration, and exposing mineral soil. Narrowleaf cottonwood is a fast-growing but short-lived species in natural conditions.

Because of its short period of viability, seed needs to be sown within a few days of ripening in the spring. However it may be kept viable by drying and storing cold in an airtight container to retain viability.

Narrowleaf cottonwood reproduces vegetatively by sprouting from roots and stumps. Cuttings of twigs 8 to 18 inches long and 0.25 to 1.0 inch diameter of the current season's growth, taken during the dormant season, can be placed in a sheltered outdoor bed or directly into permanent positions. Larger cuttings and poles are recommended for on-site establishment. Initial growth of un-rooted cuttings may not be as rapid as that of rooted cuttings. Cuttings grown in a mist-propagator also root easily and survive potting.

Management

Beaver activities may inhibit cottonwood regeneration; seedlings and saplings are stripped of bark for food and larger trees are cut for building material. Poorly oxygenated water in stagnant ponds causes a decline in health. Severe grazing by livestock, and associated trampling of seedlings, reduces cottonwood regeneration potential.

Narrowleaf cottonwood will produce stump sprouts and root suckers after light to moderate intensity fires. Seedlings, saplings, and young trees are damaged or killed by fire, but they develop more fire-resistant bark after 15 to 20 years of age. Older trees may be killed by even relatively cool fires, which wound trees and open the way to heartwood decay.

Availability

These plant materials are readily available from commercial sources

Black Cottonwood *Populus balsamifera ssp.* *trichocarpa*

Alternate Names

Common black cottonwood, balsam cottonwood, western balsam poplar, California poplar

Description

Willow Family (Salicaceae). Black cottonwood is a large native tree reaching 160 feet tall, usually with a straight, branch-free trunk for more than half its length. It forms a broad, open crown in open sites. The bark is gray to gray-brown on mature trees, deeply furrowed into flat ridges on older portions. The leaves are deciduous, simple, alternate, ovate-lanceolate to deltoid. The leaves are finely toothed, dark green

above and slightly paler beneath. Flowers male (staminate) and female (pistillate), on separate trees (dioecious) and borne in drooping catkins. The fruit is a capsule 0.15 inches long, splitting to release the seeds; seeds approximately 0.1 inches long, each with a tuft of long, white, silky hairs ("cotton"), easily blown by the wind. Black cottonwood is the largest American poplar and the largest hardwood tree in western North America.



Black cottonwood. MT.gov.

Distribution

Black cottonwood occurs throughout northern North America.

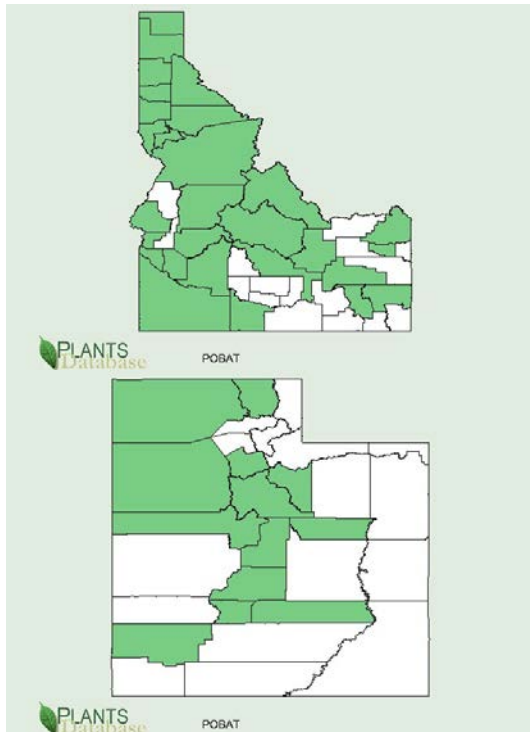
Habitat

Black cottonwood grows on alluvial sites, riparian habitats, and moist woods on mountain slopes, at elevations of 0 to 5,000 feet. It often forms extensive stands on bottomlands of major streams and rivers at low elevations along the Pacific Coast, west of the Cascade Range. In eastern Washington and other dry areas, it is restricted to protected valleys and canyon bottoms, along streambanks, and edges of ponds and meadows.

Adaptation

Black cottonwood grows on a variety of soils from moist silts, gravels, and sands to rich humus, loams, and occasionally clays. It is a pioneer species that grows best in full sunlight and commonly establishes on recently disturbed

alluvium. Seeds are numerous and widely dispersed because of their cottony tufts, enabling the species to colonize burn sites, if conditions for establishment are met. Seral communities dominated by cottonwood are maintained by periodic flooding or other types of soil disturbance. Black cottonwood has low drought tolerance; it is flood-tolerant but cannot tolerate brackish water or stagnant pools.



Idaho and Utah county level distribution maps for black cottonwood.

Uses

Wildlife: Black cottonwood provides food and cover for a variety of wildlife species, including deer, elk, moose and beaver. Large birds use the crowns for nesting sites and various animals rely on the trunk cavities, which commonly result from heart rot in most stands nearing maturity. The rotten trunks of black cottonwood provide an important wildlife habitat.

Ethnobotanic: Disinfectant properties of resin from buds were discovered by Native Americans, who used the resin to treat sore throats, coughs, lung pain, and rheumatism. It is still used in some modern natural health ointments. Soap was produced from the inner bark.

Conservation: Black cottonwood is a very fast-growing and potentially large tree, easy to establish, and useful for shade and ornament. Black cottonwood also has been planted as windbreaks and shelterbelts and it is commonly used for screening along motorways in Europe. The aggressive root systems of black cottonwood are effective soil stabilizers and make the species useful in restoration of riparian areas, where it also provides protection for the aquatic environment. The high nitrate uptake and extensive rooting of these trees make them useful for buffer or "filter" planting along streams in agricultural areas.

Establishment

This species is normally established using cuttings, pole, and nursery planting stock. Hardwood cuttings made from smooth bark sections of stems should be planted in the upper overbank and transition zones. Nursery- or container-grown seedlings and rooted cuttings establish easily and grow rapidly on moist well-drained soils in full sun.

Black cottonwood begins producing seed at about 8 to 10 years; abundant seed is usually produced every year. Seeds under natural conditions are short-lived, usually less than a month. Seed will readily germinate on a variety of favorable sites, particularly where mineral soil has been exposed or new soil deposited. High germination rates and seedling survival depend on continuously moist conditions, such as in fresh alluvium, during the first month.

Collect seed for propagation as capsules begin to open (late May to mid July). Place in paper bags and allow them to finish opening in warm area. Seed needs to be sown within a few days of ripening; otherwise they may be kept viable for up to a year by drying and storing cold in an airtight container. In a cold frame, sow on the surface or lightly cover the seeds.

For asexual propagation, cuttings of twigs 8 to 18 inches long and 0.25 to 1.0 inch diameter of the current season's growth, taken during the dormant season, can be placed in a sheltered outdoor bed or directly into permanent positions. Larger cuttings and poles are recommended for on-site establishment. Plant with at least one bud above the surface. Cuttings grown in a mist-propagator also root easily.

Management

The shallow root system of black cottonwood, especially on wet soils, makes the species susceptible to damage from ice storms, heavy snow, and wind. Unseasonably early or late frosts may damage saplings, but in dormancy, it is one of the most frost-resistant trees in the northwestern USA.

Black cottonwood is susceptible to fire damage because of its thin bark and shallow root system. Seedlings and saplings are usually killed by fire of any intensity, and all trees may be killed by high-intensity fire. Even relatively cool fires may wound older trees and open the way to heartwood decay. Repeated fire at short intervals may permanently exclude black cottonwood. Even so, post-fire regeneration may be effective and rapid in black cottonwood. Thickened bark on lower portions of the trunk after 10 to 20 years affords better fire protection, and moist soil contributes to the survival of underground parts. Trees can quickly sprout from the stump and roots following top-kill or damage by fire.

Availability

Black cottonwood is available from local nurseries.

Fremont Cottonwood

Populus fremontii

Alternate Names

Alamo cottonwood



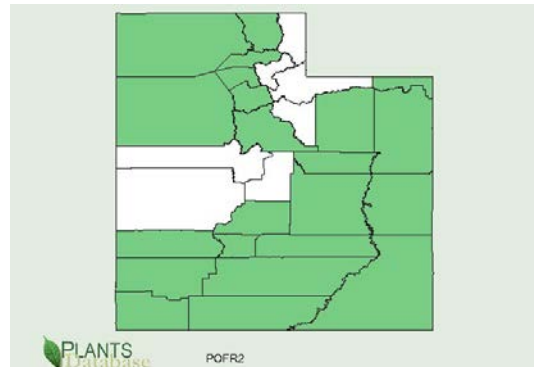
Fremont cottonwood. USU.edu.

Description

Willow Family (Salicaceae). Fremont cottonwood is a native tree growing in riparian areas near streams, rivers and wetlands in the American Southwest. Fremont cottonwood trees range from 40 to 115 feet in height, and trunk diameter ranges from 1 to 5 feet. The bark is smooth in younger trees, becoming deeply furrowed with whitish cracked bark with age. The leaves are cordate (heart-shaped) with white veins and coarse crenate-serrate teeth on the margins. The leaves have petioles 1/2 to equal the blade length, laterally compressed near the blade which causes the leaves to flutter in the wind. These trees are dioecious, with flowers in drooping catkins, which are 1.5 to 5.5 inches long. The seed is attached to a silky hair, which look like patches of cotton hanging from the limbs.

Distribution

Fremont cottonwood is distributed throughout the Southwest, extending from California eastward to Nevada, Colorado, Arizona, Texas, New Mexico, and southward into Mexico.



Utah county level distribution map of Fremont cottonwood.

Habitat

Fremont cottonwood is found on flood plains and washes associated with other riparian species.

Uses

Ethnobotanic: The sweet and starchy sap can be consumed raw or cooked. The bark is bitter, but edible. It can be scraped off and eaten, cooked in strips like soup noodles, or dried and powdered as a flour substitute. The inner bark of cottonwoods and aspens were used for man and horse in hard times. Some Indians preferred it because of its sweetness. The bark and leaves were used for medicinal purposes.

Other Uses: Ecological diversity, bank and sediment stabilization, maintenance of channel morphology, water quality improvement, ground-water recharge, flood abatement, fish and wildlife habitat.

Wildlife: Grouse, quail, and other birds eat cottonwood buds and catkins. Bark, twigs, and leaves are eaten by ungulates and rabbits, while beaver and porcupine relish the bark and wood.

Livestock: Twigs and shoots of Fremont cottonwood are browsed by all domestic grazing animals and deer. The twigs are cropped especially close by sheep, goats, and deer. The browse rating for cottonwood is good to fair for goats; fair to poor for sheep and deer; poor for cattle; and useless for horses.

Adaptation

Cottonwoods dominate the riparian forests of lower terrace deposits and stabilized gravel bars. Cottonwoods are found near water. They require a bare gravel or sand substrate with adequate moisture for germination and development. Cottonwoods grow very rapidly when their roots are in contact with the permanent water table; they can grow as much as 12 to 18 feet in 3 years.

Establishment

This species is normally established using cuttings, pole, and nursery planting stock. Establishment from seed is difficult and seldom used.

Poles planted where the water table fluctuates widely will have lower survival rates than those planted where water table is relatively stable. If groundwater monitoring shows the water level will drop more than 3 feet during the growing season (May-October), another site should be selected.

Competition from exotic weed species is a key factor in mortality and site failure. Hardwood cuttings should be planted in the transition zone.

Management

Cottonwood is susceptible to mistletoe. In certain instances cottonwood can be invasive. Its shallow root system can disrupt sidewalks or pavement.

Availability

Containerized Fremont cottonwood samplings are available from most nurseries in the areas where adapted.

Quaking Aspen *Populus tremuloides*

Alternate Names

Trembling aspen, golden aspen, mountain aspen, trembling poplar, white poplar

Description

Willow Family (Salicaceae): Quaking aspen is a native tree 15 to 80 feet tall, with a rounded crown. The bark is typically smooth, white to gray-white, often thin and peeling, becoming thicker and furrowed with age, especially toward the base. Leaves are simple, oval to round, 1.5 to 2.5 inches long, with small, rounded teeth on the margins. They are dark green and shiny above, pale green below.



Quaking aspen. Derek Tilley, NRCS.

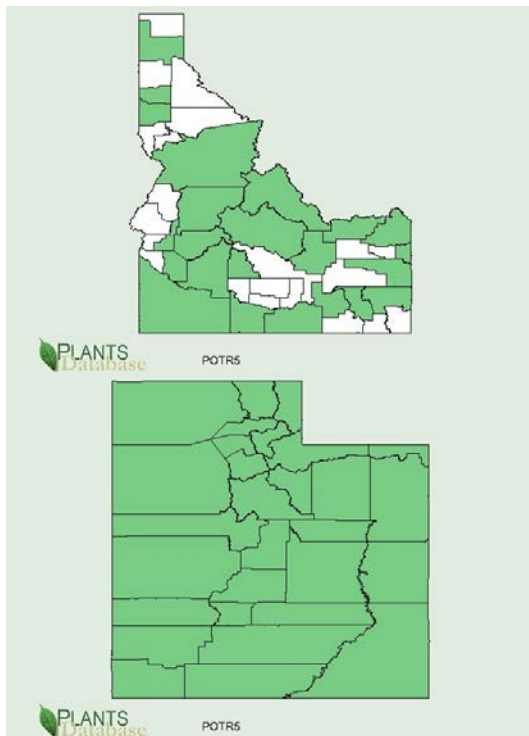
Quaking aspen clones can be very old: many in the Rocky Mountain and Great Basin regions are estimated to be at least 8000 years old, persisting since the last glacial retreat. A male clone in the Wasatch Mountains of Utah occupies 17.2 acres and has more than 47,000 stems – this clone is estimated to be 1 million years old and may be the world's most massive known organism. Clones east of the Rocky Mountains usually cover no more than a few acres

Distribution

Quaking aspen is the most widely distributed tree species in North America. It grows from Alaska across the Northwest Territories to Quebec and Newfoundland, south to West Virginia and Virginia, and in all of the western North America US states (except Oklahoma and Kansas) -- in all Canadian provinces and all but 13 US states (absent from the Southeast). It occurs in both the eastern and western Sierras of Mexico, into the south-central part of the country.

Habitat

Quaking aspen occurs with scrub oak and sagebrush at lower elevations and as a prostrate form above timberline and exists as a dominant species in many communities at mid elevations.



Idaho and Utah county level distribution maps for quaking aspen.

Uses

Conservation: Quaking aspen is valued for its white bark and brilliant fall color, especially when clustered. The species has been widely used in landscaping but is best in sites away from structures that might be damaged by the aggressive roots. The trees provide good visual screening and noise abatement. It does best in mid to higher elevation locations. Avoid areas

and climates with sustained summer temperature above 90 degrees F.

Aspen stands are good firebreaks, often dropping crown fires in conifer stands to the ground when they reach aspens and even sometimes extinguishing the fire because of the small amount of flammable accumulation. They allow more ground water recharge than do conifer forests and they also play a significant role in protecting against soil erosion. They have been used in restoration of riparian habitats.

Wildlife: Quaking aspen shoots, leaves and buds provide food and habitat for livestock and wildlife including black bear, deer, beaver, porcupine, elk, moose, ruffed and blue grouse and many smaller birds and animals.

Ethnobotanic: Native Americans used aspen bark as a food source. Catkins were eaten raw, and the cambium was eaten raw or in a soup.

Adaptation

Quaking aspen occurs in a wide variety of soil types, moisture conditions and habitats and a wide range of elevation, matching its extensive geographic range. It is a shade-intolerant, disturbed site species and is quickly replaced in succession by more tolerant species.

Establishment

For field establishment, Containerized stock should be planted in the transition zone. Root cuttings can also be used in small areas.

Quaking aspen establishes naturally from seed in Alaska, northern Canada, and eastern North America. Seedling establishment is less common in the West but occurs there in moist sites such as seeps, springs, lake margins, and burnt-out riparian zones. Drought stress kills seedlings, as does standing water.

Germination generally begins nearly immediately after moisture is received and can occur across a broad temperature range, with optimal germination at 60 to 77° F. Seeds should be sown on the soil surface or at very shallow depths. Continuous moisture is required.

Quaking aspen can be propagated by seed, following cold stratification. Germination of fresh seed may be 80 to 95%, but viability lasts only 2 to 4 weeks under favorable natural

conditions (low temperature and humidity). Seeds dried for 3 days and stored at cool temperatures may retain good viability for up to a year.

The species roots poorly from woody stem cuttings, but newly initiated (softwood) shoots can usually be induced to root by dipping in IBA or other commercially available rooting powders. A more preferred method uses root sprouts. Lateral roots should be collected in early spring. Plant root cuttings 1 to 2 inches in diameter and 2 to 4 inches long in vermiculite and place in the greenhouse for 6 weeks. Remove the young sucker shoots and root in perlite/vermiculite (2 to 3 weeks, using IBA), misting frequently. The developing plants can then be transplanted to peat/vermiculite mix and grow at 60 to 77° F. Or, the root cuttings may be planted directly into the perlite mix, with the top of the cutting just below the media surface.

Management

The thin, soft bark of quaking aspen makes it susceptible to many diseases and insect infestations as well as mechanical and fire damage. Fires may kill trees or cause basal scars that serve as entry points for wood-rotting fungi, which are common in older stands. The wood decays easily. Fires may also kill surface roots that could reduce sucker regeneration.

The poplar borer beetle can weaken trees by boring galleries in the trunk near the lower portion of the crown. Outbreaks of forest tent caterpillar can last 4 to 5 years and result in serious defoliation. Cold weather in the spring shortly after the eggs hatch and above-average fall temperatures can cause a rapid decline in caterpillar populations by killing eggs and larvae.

Overgrazing by livestock or big-game animals disturbs roots and leads to soil compaction which limits sucker formation. Heavy grazing of young sucker stands by cattle for three years in a row may destroy the stand.

Availability

Quaking aspen is readily available from commercial sources.

Chokecherry *Prunus virginiana*

Alternate Names

common chokecherry, black chokecherry, red chokecherry, wild cherry, wild blackcherry, bird cherry, cabinet cherry, chuckleyplum, sloe tree, bitter-berry, caupulin

Description

Rose Family (Rosaceae). Chokecherry is a native, perennial, deciduous, thicket-forming large erect shrub or small tree. It rarely reaches a height of over 30 feet. The crown is irregular from 10 to 20 feet wide when mature. Reproduction can either be by seed or rhizomes. Leaves are alternate, simple, dark green and glossy above and paler beneath. They are oval to broadly elliptic in shape, 1 to 4 inches long, and 3/4 to 2 inches wide. The margins are toothed with closely-spaced sharp teeth pointing outward forming a serrated edge.



Chokecherry. S. Hagwood @ USDA-NRCS PLANTS Database.

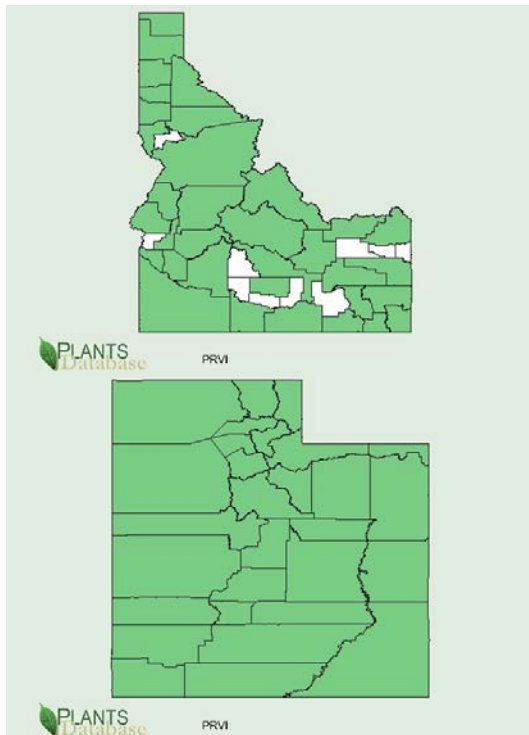
The flowers are aromatic and arranged in cylindrical racemes 3 to 6 inches long. The racemes always grow on the current year's leafy twig growth. Flowers are 1/4 to 3/8 inch in diameter with 5 white petals. The flowers start appearing before the leaves are fully developed. Flowers may appear from April to July and fruits form a couple of months later. The berries are 1/4 to 3/8 inch in diameter. Small ripe cherries range in color from dark red or purple to almost

black. There are from 3,000 to 5,000 seeds per pound.

The roots are a network of rhizomes. Deep root systems grow at irregular intervals along the length of the rhizomes. Rhizomes can extend beyond the drip zone, up to 35 feet away from the base of the tree. Rhizomes grow up to 3/4 inch in diameter.

Distribution

Chokecherry is found in all but eight states or territories.



Idaho and Utah county level distribution maps for chokecherry.

Habitat

Chokecherry occurs in a variety of plant communities from arid bottomlands to riparian areas to montane forests. Chokecherry can be found in association with sagebrush, pinyon-juniper, serviceberry and aspen-fir communities.

Uses

Conservation: Chokecherry is used extensively in shelterbelt, windbreak, wildlife habitat and erosion control plantings. Chokecherry does well in riparian area planting. It provides thermal cover over the water and works well in stabilizing streambanks. It has been used on disturbed sites such as mined land reclamation, highway right-of-ways and construction sites. It

is a good erosion control plant because it can form thickets and spread by rhizomes.

Wildlife: Chokecherry is important to many wildlife animals. Birds, rabbits, hares, rodents and bears all seek out and eat its fruit. It provides food, cover and nesting habitat for a variety of birds. Birds will also take advantage of its growth form for cover and nesting habitat. It is used extensively by deer as a browse source in the winter. The early spring flowers provide an important source of nectar for butterflies, honeybees and ants.

Food: The common name, chokecherry, came from the bitter taste of the fruit. The fruit was a staple for numerous Native American tribes across the North American continent, especially to tribes who lived on the plains and prairies. Chokecherries were routinely cooked before they were eaten or dried thoroughly. Drying chokecherries improves their taste by sweetening them, or at the very least, getting rid of the naturally occurring bitter taste.

Ethnobotany: Chokecherry covered a large geographic range in North America, so a majority of tribes used it to treat a variety of health problems. It was valued especially for its astringent properties and beneficial effect upon the respiratory system.

Adaptation

Chokecherry is found in a large geographic area and it grows abundantly in many habitat types and plant associations. It may be found in thin stands, as dense thickets or individually in open forest clearings. It prefers direct sunlight and is not an understory species of boreal forests.

Chokecherry occurs naturally in a wide range of soil types and textures. Soil textures range from silt to sandy loam, it does not do well on heavy clay soils. Soil pH can vary from 5.2 (mildly acid) to 8.4 (moderately alkaline) without any adverse effect upon growth. Precipitation ranges from 13 to 65 inches annually. Sites range from low to mostly mid-elevation, although it also occurs up to 10,000 feet in Idaho, Nevada and Utah. It is widely adaptable to temperature extremes. Chokecherry is intolerant of shade, poor drainage, frequent flooding and soils with a large amount of clay.

Establishment

Rhizomes, root crowns or containerized materials should be planted in the transition and lower portions of the upland zone.

Nursery grown seedlings establish satisfactorily if planted free of competition in areas having 15 or more inches of annual precipitation. If seeds are planted in the spring they should be pre-chilled for 3 months, then placed about 1/2 inch deep. Saplings are not tolerant of weedy competition for 2 to 3 years after planting. Use of weed barrier mat, a strict cultivation regime, or proper herbicide treatment is necessary if a successful planting is to occur.

Chokecherry has seed dormancy. About half of the seed which is not stratified germinates within a couple of months. Delayed germination may occur up to 4 months. An after-ripening period in the presence of oxygen and moisture is needed for a majority of seed to germinate. Good germination can only be expected after a cool, moist stratification regime lasting 90 to 160 days at 36 to 41° F. Sow 25 seeds per foot of drill row. One year-old bareroot stock should be planted on deep, well-drained soils in sunny locations.

Chokecherry can also be propagated by rhizome cuttings, suckers, crown division, semi-hardwood cuttings and grafting. If the rhizomatous roots are damaged due to a mechanical injury suckers will be produced. This is often how thickets are formed. Fires initially cause major damage to a stand of chokecherry; however, regrowth is enhanced for several years following a burn. It sprouts vigorously from surviving root crowns and suckers arise from the rhizomes.

Management

On range and pastures chokecherry is often considered a potential hazard to livestock because of poisonous substances in the plant. As a consequence either mechanical and/or herbicide treatments combined with good grassland management is needed to prevent animal loss. When used in windbreaks or as a wildlife resource chokecherry is beneficial. Control of weedy vegetation, and treatment for potential diseases, is necessary if it is expected to grow for an extended period of years.

Chokecherry is susceptible to X-disease, black knot, stem decay, shothole, Valsa canker, and

honey fungus *Plowrightia stansburiana*. Common insect pests are the prairie tent caterpillar, eastern tent caterpillar and aphids. In the northeastern United States, chokecherry is a primary host of the eastern tent caterpillar. Browsing by deer on young immature trees causes considerable damage in some areas.

Availability

Planting materials can be obtained from commercial nurseries. Several cultivars have been released by government agencies and private nurseries for use in landscaping and/or fruit production. Colorow Germplasm was developed by the Upper Colorado Environmental Plant Center in 2009. 'Colorow' Germplasm was selected and developed from a collection made in Rio Blanco County, Colorado; it has performed well in trials near Pinedale, Wyoming and Craig and Meeker, Colorado for over 30 years. 'Colorow' is not yet available on the commercial market.

Skunkbush Sumac

Rhus trilobata

Alternate Names

Squawbush



Skunkbush sumac. D.E. Herman @ USDA-NRCS PLANTS Database.

Description

Sumac family (Anacardiaceae). Skunkbush sumac is an upright arching native shrub, 2 to 12 feet tall, forming rounded, mound-like, or upright thickets. The roots are deep and extensively branched, with woody, shallow, and spreading rhizomes, sometimes connecting shrubs more than 30 feet apart. The leaves are deciduous, alternate, compound with 3 leaflets, variable in size, shape, lobing, and margin. The summer foliage is green, becoming orange or

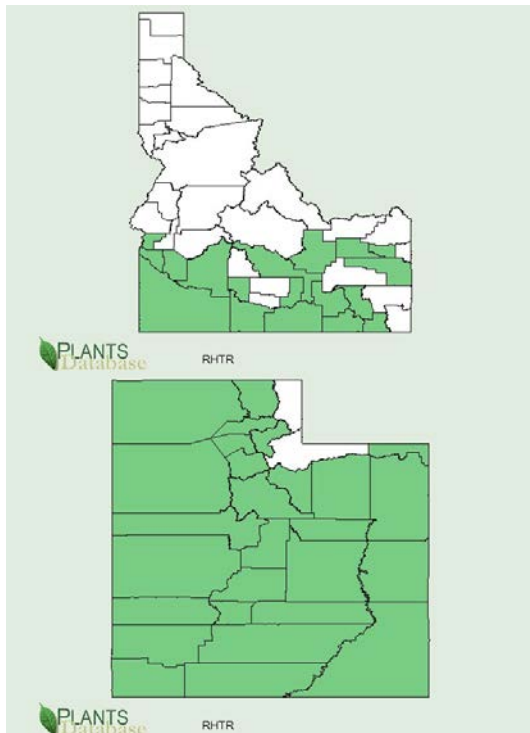
reddish in the fall. Flowers are yellowish to whitish, in small, dense clusters on short lateral shoots, opening before the leaves, bisexual and unisexual, both types borne on the same plant. The fruit is a 0.25 inch diameter red berry.



Skunkbush sumac leaf. Patrick Alexander @ USDA-NRCS PLANTS Database.

Distribution

Skunkbush sumac is broadly distributed throughout western North America, from Saskatchewan and Alberta south to Texas and California and into Mexico; not in Washington or British Columbia.



Idaho and Utah county level distribution maps of skunkbush sumac.

Uses

Ethnobotanic: Skunkbush sumac fruits were used by Native Americans in foods, beverages, and medicines. Pliable young stems were woven with grass stems into durable baskets that would hold water. The leaves are said to have been smoked by the Comanche.

Wildlife & Livestock: Livestock in some locations use skunkbush sumac, but it is not a preferred species. It has been planted in some areas as a deterrent to grazing animals. It provides some browse for deer and elk when more preferred forage is unavailable. Skunkbush sumac fruits, which persist through fall and winter, provide a food source for birds and small mammals when other foods are scarce or unavailable. Skunkbush sumac also may form dense thickets that provide good thermal, hiding and nesting cover for small birds and mammals.

Conservation: Skunkbush sumac is useful for windbreaks and shelterbelts. It is very drought tolerant and has strong root development for erosion control. Skunkbush sumac has been successfully transplanted onto phosphate mine spoils in Idaho. 'Bighorn,' a cultivar from Wyoming, has been widely planted on pinyon-juniper sites, and the species has been successfully transplanted in aspen-maple, pinyon-juniper, and mountain-brush zones.

Adaptation

Skunkbush sumac grows in prairies, shrub lands and oak woodlands at elevations of 3,000 to 10,000 ft and in a variety of sites including dry rocky slopes, stream sides, seasonal drainages, canyon bottoms, sand dunes and sandhills, pastures, roadsides, and waste places in sun or partial shade and over a wide range of soils from nearly bare rock to sand and heavy clay. It is intolerant of flooding and high water tables. It is a prominent species in many early seral communities, especially following fire, but it also is an indicator of climax in various shrub and grassland communities.

Establishment

This species is normally established using nursery grown planting stock. Plant in the transition zone for riparian plantings.

Skunkbush can be propagated from root and softwood cuttings. Propagation is most effectively done well before freezing weather. Best seed germination is from fall and winter

planting. The presence of seeded grasses has reduced the survival of skunkbush at some sites, and although the plants are generally drought-tolerant, water-stressed seedlings may be stunted for several years and sometimes fail to recover.

Management

Skunkbush sumac sprouts vigorously from woody rhizomes or from adventitious buds at the root crown after top-kill by fire. Crown width and overall coverage often increase in response to fire. Skunkbush also may have the ability to delay sprouting for up to a year following fire. Skunkbush is generally reported to be tolerant of heavy grazing.

Availability

Skunkbush sumac is readily available from commercial sources. ‘Bighorn’ skunkbush sumac was developed by the NRCS Plant Materials Center in Los Lunas, New Mexico in 1979. ‘Bighorn’ originated from a collection obtained near Basin, Wyoming which is in the Middle Rockies EPA-ecoregion. ‘Bighorn’ was provided to Sante Fe Greenhouses in the past; as of 2012 Sante Fe Greenhouses market an unnamed skunkbush sumac which may be ‘Bighorn’. ‘Autumn Amber’ was developed by the NRCS Plant Materials Center in Los Lunas, NM in 1983. ‘Autumn Amber’ originated from seed a collection obtained near Littlefield, TX which is in the High Plains EPA eco-region. ‘Autumn Amber’ is not known to be commercially available.

Golden Currant

Ribes aureum

Alternate Names

Buffalo currant, fragrant golden currant, golden flowering currant, clove currant, spicebush

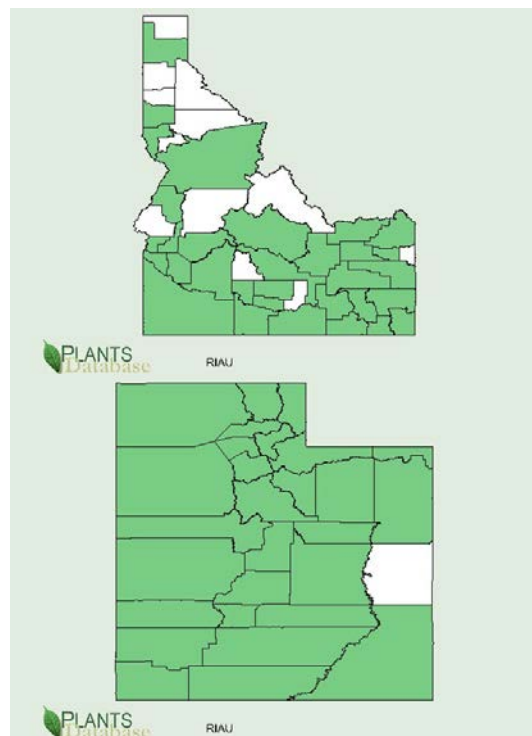
Description

Currant family (Grossulariaceae). Golden currant is a rhizomatous native shrub 3 to 10 feet tall, spineless, with numerous, erect-arching branches forming an irregular crown. The leaves are deciduous, light green and glossy, alternate or clustered, with 3 to 5 rounded lobes. The flowers are born in short racemes of 5 to 10. They are long-tubed (from fused sepals) and trumpet-shaped, with 5 yellow sepal lobes spreading at the top, with 5, short, reddish petals inserted at the top of the tube. The fruit is a 0.5 inch diameter berry ripening from green to

yellow to red and finally black to dark purple, with numerous seeds.



Golden currant. Calflora nursery



Idaho and Utah county level distribution maps of golden currant.

Distribution

Golden currant is widespread in the western U.S. and southeastern Canada, with populations in Ontario and perhaps Quebec, as far south as

Texas. The species is naturalized in Europe from garden escapes.

Habitat

Golden currant occurs in riparian and palustrine habitats in or near sagebrush, pinyon-juniper, ponderosa pine and Douglas fir communities.

Uses

Wildlife: Fruit of golden currant is a food source for birds, rodents and numerous wildlife species.

Ethnobotanic: The sweet and flavorful fruits are full of seeds but are popular for making jam, jelly, pie, and even ice cream. Some Native American tribes used currants for making pemmican.

Conservation: Golden currant is used for beautification and diversification of riparian and natural area plantings. Golden currant can be used to revegetate roadsides and disturbed areas, such as mine spoils and rangeland. It is rated mostly good in initial establishment, growth rate, persistence, germination, seed production, ease of planting, and natural spread. It tolerates shearing and may be used on dry, exposed sites in a range of soil types, and it is a good soil stabilizer.

Adaptation

Golden currant is generally an early to mid-seral species in the west. Golden currant is somewhat shade tolerant and may grow in open, scattered, and dense pine stands, but it is usually suppressed by a denser canopy. Golden currant is also fairly saline tolerant.

Establishment

This species is normally established using nursery grown planting stock. Hardwood cuttings should be planted in June or September. Containerized or bareroot materials can be planted when leafless in spring or fall. Golden currant should be planted in the transition and lower upland zones.

Currants generally begin fruiting after 3 years of establishment. Seeds may remain viable in the soil and duff for many years. Germination is enhanced by scarification, but relatively good germination of golden currant seeds is obtained by stratification at or near freezing temperatures for 60 days without scarification.

Golden currant transplants well and forms suckers. Plants can also be grown from cuttings.

It reproduces vegetatively by rhizomes and from sprouting after cutting or fire.

Management

Golden currant is an alternate host for white pine blister rust (*Cronartium ribicola*); this and other currants have been targets of various eradication efforts where white pine is of commercial interest.

Fire top-kills golden currant, but it can survive low- to moderate-severity fire by sprouting from rhizomes. Such fires also scarify soil-stored seed and enhance germination. Severe fire probably kills golden currant and may destroy soil-stored seeds.

Availability

These plant materials are readily available from commercial sources. One cultivar, 'Crandall' has been referred to as "the North Country's answer to Forsythia." Other horticultural selections have been made for hardiness, flower color and density, and fruit taste and size.

Wax Currant

Ribes cereum



Wax currant. Al Schneider @ USDA-NRCS PLANTS Database.

Alternate Names

Squaw currant

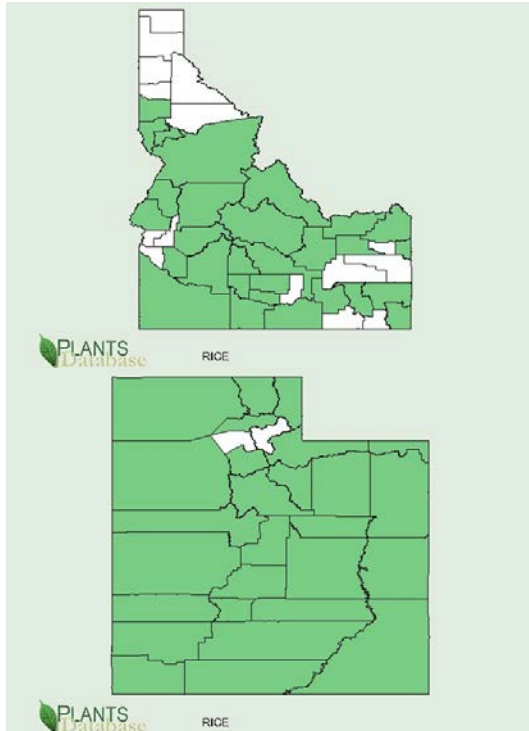
Description

Wax currant is a small shrub ranging from 2 to 6 feet tall. The branches bear stalked glands and non spines. The leaves are round to oval with 3 to 7 shallow lobes. The flowers are small, tubular

and pinkish. The fruit is a red berry, approximately 0.5 inches in diameter.

Distribution

Wax currant occurs throughout western North America.



Idaho and Utah distribution maps of wax currant.

Habitat

Wax currant grows in mountain brush, sagebrush, pinyon-juniper, riparian, and coniferous forest plant communities from 4,500 to 8,000 feet.

Uses

Wildlife: Many species of birds and mammals feed on the berries and seed of wax currant.

Adaptation

This species is adapted to well drained soils of all textures.

Establishment

This species is normally established using nursery grown planting stock. Bareroot and container materials should be planted in the transition and upland zones.

Availability

This species is available commercially.

Wood's Rose *Rosa woodsii*



Wood's rose. FS.fed

Alternate Names

Common wild rose, wild rose, mountain rose

Description

Rose family (Rosaceae). Wood's rose is a native shrub or sub-shrub growing 1 to 10 feet tall. The plants are rhizomatous, with shallow, frequently branching fibrous roots, sometimes forming nearly impenetrable thickets. The stems are reddish-brown to gray, with straight or slightly curved prickles. Leaves are deciduous, alternate, odd-pinnately compound with 5 to 7 leaflets. The flowers have 5 pink to lilac-pink petals 0.5 to 1 inch long. The fruit is a fleshy, red hip, derived from the base of the sepals and petals.

Distribution

Wood's rose is widely distributed over western North America, from Ontario and Manitoba, Wisconsin, Minnesota, and Iowa, south to Texas and northern Mexico, west to California and Alaska through every western state and province.

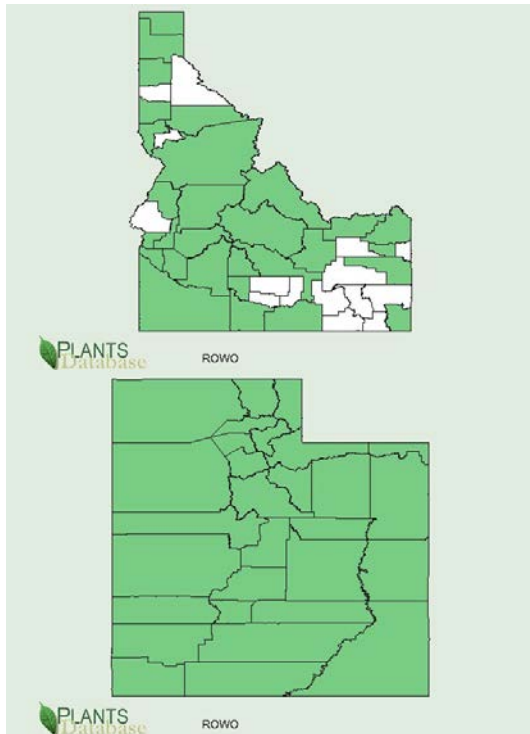
Habitat

Wood's rose occurs on bluffs, dry grassy slopes, prairie sand hills, and in clearings in boreal and subalpine forests or sometimes as an understory species in stands dominated by cottonwood, ponderosa pine, and Douglas fir. Moderate shade-tolerance allows it to persist as an understory species in mid-seral to climax communities; at elevations of 2,500 to 11,000 feet.

Uses

Wildlife: Fruit of Woods' rose are a good source of energy and protein and are eaten by many animals, including squirrels, deer, coyotes, and

bears. Many birds including ruff grouse and mammals are sustained by the persistent dry hips when the ground is covered with snow. The plants are browsed by livestock and big game from spring through fall, but the young spring leaves are especially palatable. Porcupine and beaver also browse the leaves. Thickets formed by Woods' rose provide nesting and escape cover for many birds and small mammals.



Idaho and Utah county level distribution maps of Wood's rose.

Conservation: The rhizomatous root system makes Woods' rose effective in erosion control, and the species has been used to revegetate disturbed sites along road cuts, streambanks, and seeps.

Ethnobotanic: Native Americans used the roots, stems, leaves, flowers, and fruits of Woods' rose for foods and therapeutic materials. The hips are a source of vitamin C and are dried for use in flavoring teas, jellies, fruitcakes, and puddings. The inner bark and roots were boiled to treat diarrhea and stomach ailments and a tea was made from the bark to treat muscles.

Adaptation

Woods' rose is commonly one of the dominant species on riparian and wetland sites, but it is adapted to a broad range of moisture conditions.

It is common in various regions as a pioneer species on disturbed sites, especially along roadsides and south facing banks.

Establishment

This species is normally established using nursery grown planting stock. Riparian plantings can be done with transplants, hardwood cuttings, and direct seeding. Plant in the overbank zone.

Woods' rose produces flowers and fruits at about 2 to 5 years of age. Good crops are usually produced every 2 years. Birds and mammals eat the fruits and disperse the seeds in droppings. The seeds remain viable for 2 to 5 years, and after warm or cold stratification, they germinate within 30 to 40 days. Woods' rose also reproduces through rhizomes, root crown sprouts, and layering.

Management

Fire of low- to moderate-severity will top-kill Woods' rose, but sprouts from root crowns and rhizomes enable it to persist or increase. The shallow root crowns are injured by severe fire and populations consequently may decrease in vitality and abundance. Reproduction from seed is rarely observed after fire, and seedling growth rate in a burned area may be slow.

Availability

These plant materials are readily available from commercial sources

Peachleaf Willow *Salix amygdaloides*

Alternative Names

Wright willow, almond willow

Description

Willow Family (Salicaceae). Peachleaf willow is a small to medium sized tree with one to several trunks up to 40 feet tall. The twigs are gray to light yellow, shiny, and flexible. The leaves look like peach leaves; they are yellowish green above, pale to white-glaucous beneath, glabrous, lance-shaped, 1 to 3 inches long and finely serrate. The petioles are glandless. Peachleaf willow flowers in May and fruits in June.

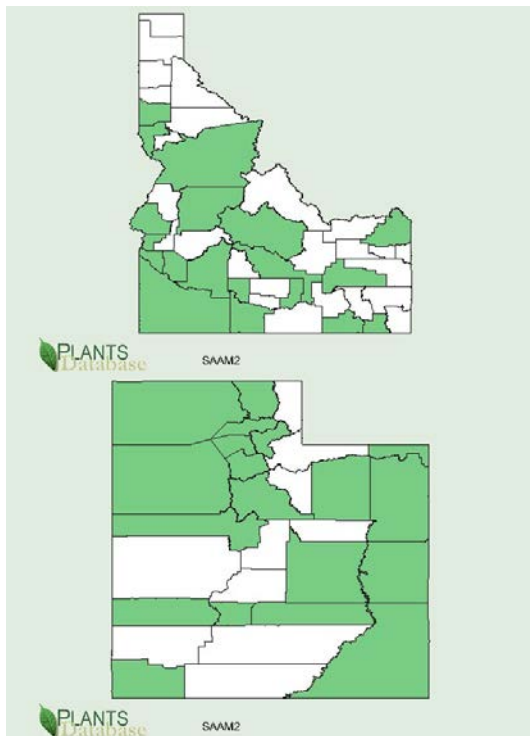
Distribution

This species occurs from Quebec, west across southern Canada to British Columbia, south to

Oregon, Utah, and Arizona, east to Texas, and northeast to Kentucky and Vermont.



Peachleaf willow. S. Hagwood @ USDA-NRCS PLANTS Database.



Idaho and Utah county level distribution maps of peachleaf willow.

Habitat

Peachleaf willow grows in riparian areas on the banks of streams and ponds, roadside gullies, and sloughs.

Uses

Ethnobotanic: Willows were used for making dye, furniture, mats, baskets, drums, stirrups, tipi pegs and pins, fox and fish traps, hunting lodge poles, and meat-drying racks. Willows were and still are used for baskets throughout their range.

Conservation: Peachleaf willow is an over story dominant species in many riparian ecosystems throughout the American west and Midwest. The trees are used for bank stabilization and riparian buffers.

Wildlife: Peachleaf willow is utilized by large ungulates, small mammals and birds. The trees also provide cover and temperature regulation for aquatic habitat.

Establishment

This species is normally established using dormant hardwood cuttings.

Willows are difficult to propagate in quantity by seed. Peachleaf willows root freely from cuttings, and it is one of the easiest willows to establish using this method. Use dormant cuttings of younger, smooth bark stems in the overbank and transition zones.

Availability

Containerized peachleaf willow saplings are available from nurseries in the areas where it grows.

Bebb Willow

Salix bebbiana

Alternative Names

diamond willow, beak willow, long-beaked willow, livid willow, smooth gray willow

Description

Willow family (Salicaceae). Bebb willow is a large native shrub 10 feet tall to a small bushy tree up to 25 feet tall. Leaves are elliptical to oblanceolate; 1 to 3 inches long, and are hairy when young smooth and strongly veined later in the season. The bark is thin, reddish, olive-green, or gray tinged with red and slightly divided by shallow fissures. The roots are

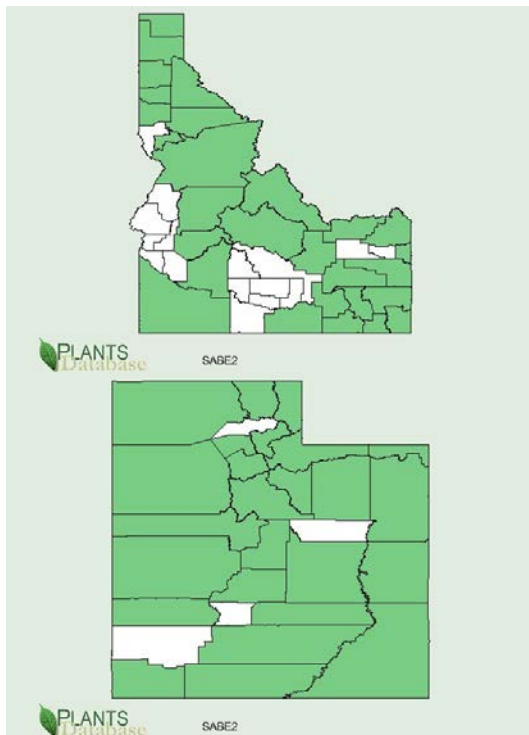
shallow and dense. The term “diamond willow” applies to species when the stems are carved resulting in a pattern of diamond-shaped cavities with a sharp contrast between the white or cream sapwood and the reddish-brown heartwood.



Bebb willow. Forestryimages.org.

Distribution

Bebb willow range from Alaska south to British Columbia to east Newfoundland and in northeast United States and upper mid-western United States



Idaho and Utah county level distribution maps of Bebb willow.

Habitat

Bebb willow is found in riparian areas and occasionally along irrigation ditches from 4,000 to 8,500 ft.

Uses

Ethnobotanic: A decoction of the branches was taken by women for several months after childbirth to increase blood flow. A poultice of bark and sap was applied as a wad to bleeding wounds. A poultice of the damp inner bark was applied to the skin over a broken bone.

Economic: The diamond shaped wood is carved into canes, lampposts, furniture, and candleholders. The wood has also been used to make furniture, baskets, baseball bats, charcoal, and gunpowder.

Wildlife: snowshoe hares, deer, elk, and moose browse Bebb willow. The buds, shoots, and catkins are eaten by birds, beaver and small mammals.

Agroforestry: Bebb willow is used in riparian forest buffers to reduce stream bank erosion, protect aquatic environments, enhance wildlife, and increase biodiversity.

Adaptation

Bebb willow is adapted to a wide variety of soil textures. It prefers moist sites and is drought tolerant. This species tolerates moderate alkaline soil conditions. It is frequently found in swamps, lakes, borders of streams, open woods and forests. Bebb willow is a fast growing but short-lived species that occurs most commonly under shade of trees where the sites are poor.

Establishment

This species is normally established using cuttings. Hardwood cuttings can be collected and prepared for insertion, normally from November through March. Bebb willow should be planted in the overbank zone at lower elevations and in the transition and upland zones at higher altitudes.

Seeds must be sown as soon as they are ripe in the spring. Seeds are viable for only a few days and the maximum storage period is four to six weeks with germination rates dropping off fast after ten days at room temperature. Willow seeds have no dormancy and germinate within twelve to twenty-four hours after falling on

moist ground. Seedbeds must be kept moist until seedlings are well established.

Pests and Potential Problems

The depressions on these willows are caused by one or more fungi, which attack willows at the junction of a branch with the main trunk.

Availability

Bebb willow is available through native plant nurseries within its area of distribution.

Booth Willow

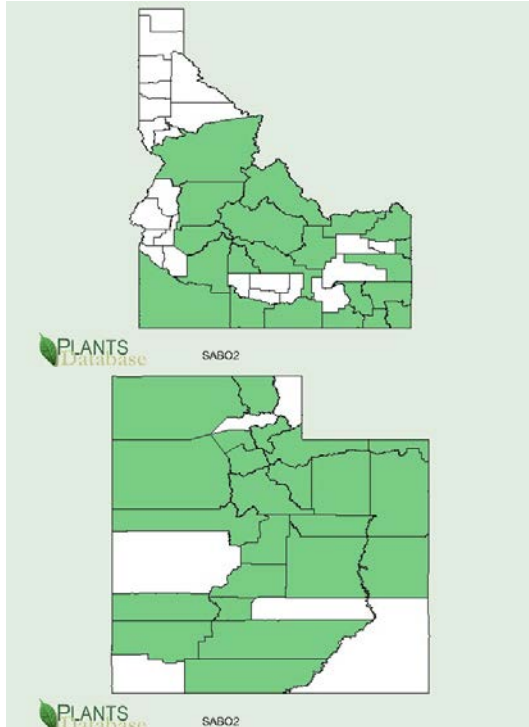
Salix boothii

Description

Booth willow is a small shrub-type willow, 6 to 15 feet tall that grows in dense thickets. The leaves are 1 to 3 inches long and approximately 1 inch wide, lance shaped to almost linear. In winter, the twigs appear a very distinctive bright yellow.

Distribution

Booth willow occurs from Colorado to California and north to British Columbia.



Idaho and Utah county level distribution maps of Booth willow.

Habitat

Booth willow can be found growing in riparian and wet meadow communities from 6,000 to 10,000 feet in elevation. It is often found in association with Geyer's and Drummond willow.

Adaptation

This species is commonly found on wet coarse soils, but will also grow in fine-textured soils. Booth willow tolerates moderately alkaline soil conditions. It is not shade tolerant.

Establishment

This species is normally established using cuttings. Booth willow should be planted as hardwood cuttings in the bank and overbank zones.

Availability

This species is available commercially.

Drummond Willow

Salix drummondiana

Alternate Names

beautiful willow, blue willow, handsome willow

Description

General: Drummond willow is a multi-stemmed native shrub. It reaches a mature height of 12 feet. Flowers appear before or with new leaves. Twigs are glabrous or glaucous. Leaves are entire with revolute margins and are dense persistent white-hairy beneath.

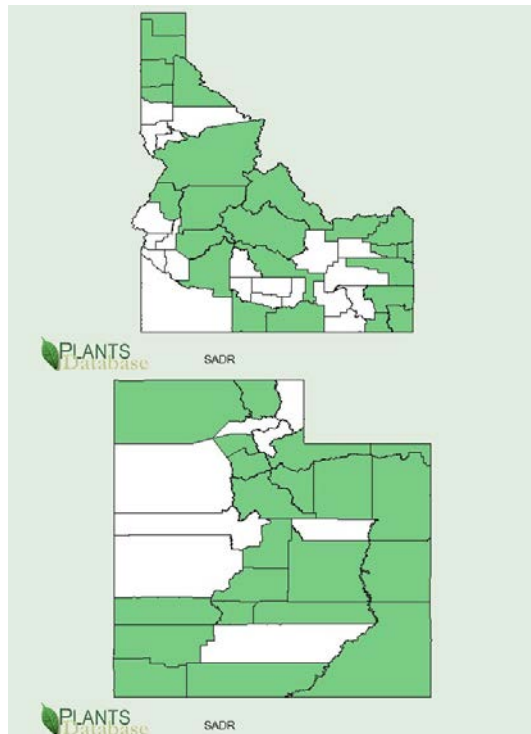


Drummond willow. srgc.org.uk

Distribution

Drummond willow occurs in the Yukon Territory, Alberta, British Columbia, and east of the Cascades mountains in Washington, Montana, Oregon, Idaho, California, Nevada,

Utah, Colorado, Wyoming and New Mexico.



Idaho and Utah county level distribution maps of Drummond willow.

Habitat

Drummond willow commonly dominates or co-dominates shrubby communities along middle elevation mountain streams. It frequently mixes with Booth willow. It occurs on streambanks and in moist meadows, less often on open slopes, from foothills to moderate or high elevations in the mountains

Uses

Drummond willow is used for revegetation of riparian areas, native plant community restoration, and wildlife food, cover, and browse. Drummond willow is palatable to livestock, but its importance in their diets is not reported.

Moose consume large amounts of Drummond willow during the winter, while use by other ungulates is generally light. It is used by elk and deer.

Drummond willow often forms thickets that provide good cover for a variety of wildlife species including moose, and good nesting and foraging habitat for ducks, shore birds, vireos, warblers, and sparrows. Dense overhanging branches provide shade for trout.

Adaptation

Drummond willow is adapted to fine, medium, and coarse-textured soils with a pH of 5.2 to 7.4 and annual precipitation from 16 to 40 inches. It typically grows on moist, well-aerated mineral soils. Textures vary from cobbles and gravels immediately adjacent to waterways to sandy or clay loams in broad valleys. Shade tolerance is intermediate.

Establishment

This species is normally established in riparian plantings using cuttings.

Drummond willow may be propagated for nursery production via seed or cuttings. Seed is used to produce containerized plants. Cuttings may either be planted directly at the site or planted to produce bareroot plants or containerized plants. Drummond willow should be established in the bank and overbank zone in riparian revegetation plantings.

Management

Drummond willow provides important streambank protection by effectively stabilizing soils. Heavy grazing in moist Drummond willow communities can lead to soil compaction, streambank sloughing and damage to willow plants. Cattle or wild ungulate overgrazing of Drummond willow causes it to become decadent or stunted. Plants recover rapidly when browsing is excluded.

Pests and Potential Problems

Poplar/willow borers are potential problems in stands of Drummond willow maintained for cutting production. Borers must be controlled prior to entering the stems. Decadent stems with borer infestation should be pruned from commercial cutting production sites. Consult local/state pesticide recommendations for further control.

Cultivars

The NRCS Pullman, WA Plant Materials Center released a cultivar 'Curlew' Drummond willow in 1993. 'Curlew' originated from a riparian site near the Curlew River in Ferry County, Washington at an elevation of 2,135 feet.

Coyote Willow

Salix exigua



Coyote willow. S. Hagwood @ USDA-NRCS PLANTS Database.

Alternate Names

Sandbar willow, gray willow, narrow-leaved willow, dusky willow, pussywillow

Description

Willow Family (Salicaceae). Coyote willow is a shrub commonly less than 6 feet tall, but sometimes reaching 15 feet tall and spreading clonally by root-sprouting. Coyote willow leaves have a very short petiole, and mature blades are linear, much longer than broad, with an acuminate leaf tip and a serrate or entire leaf edge. The catkins are 2 to 3 inches long appearing with or after the leaves in the spring.

Distribution

Coyote willow is distributed in wetlands, along alluvial bottomlands and stream sides at elevations below 8,100 feet. Coyote willow occurs from California north to Alaska, east across North America, and south to Arizona and Mexico.

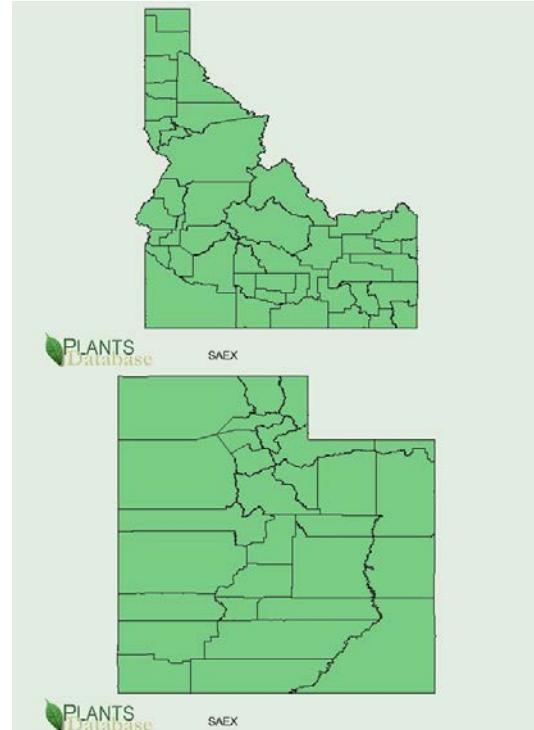
Uses

Ethnobotanic: Coyote willow was used extensively by Native Americans for housing, weaving, and medicine.

Riparian Ecosystem Services and Functions:

Coyote willow is an excellent bank stabilizer. It forms a vast matrix of roots and rhizomes. It also provides roughness to reduce water velocities and absorb flooding.

Wildlife: Rabbits and many ungulates, including deer, moose, and elk, browse willow twigs, foliage and bark. Beaver consume willow branches, while several species of birds eat willow buds and young twigs.



Idaho and Utah county level distribution maps of coyote willow.

Coyote willow is browsed by deer and to some extent by sheep, goats, and cattle, in summer and early fall. Cattle will leave the willow patches when the foliage matures and dries, whereas deer devour the current leafless stem throughout the winter. The browse rating for willow is good to fair for sheep and goats; good to poor for cattle; fair for deer; and fair to useless for horses.

Adaptation

Coyote willow dominates the lower terrace deposits and stabilized gravel bars of riparian zones. It is commonly found near water; it requires bare gravel or sand substrate with adequate moisture for seed germination and development. It grows very rapidly when its roots are in contact with the permanent water table.

Establishment

This species is normally established using cuttings. Coyote willow roots freely from cuttings, and is an easy species to propagate. In

riparian plantings, hardwood cuttings should be planted in the bank and overbank zones.

Management

Unmanaged grazing in coyote willow stands will reduce the stand and can result in streambank erosion and downcutting.

Availability

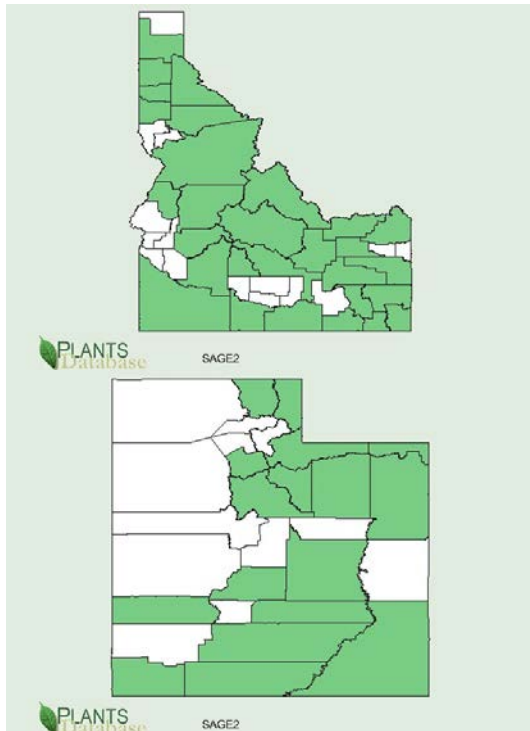
Containerized coyote willow saplings are available from nurseries in areas where adapted. We recommend using plants from the same region, elevation, climate, soil type, moisture or hydrologic regime as you are replanting.

Geyer Willow

Salix geyeriana

Description

Geyer willow is a medium size shrub-type willow growing 10 to 15 feet tall. The leaves are 1 to 2 inches long, elliptical to narrowly lanceolate. They are dark green and hairy above and waxy below. The young stems are very waxy with a white bloom that can be rubbed off. Under the waxy bloom the stems are green, unlike Drummond willow which will be reddish.



Idaho and Utah county level distribution maps of Geyer willow.

Distribution

Geyer willow occurs in all western states.

Habitat

This willow grows along streambanks and rivers and other wet areas from 3,000 to 8,000 feet. It is often found with Booth willow, occupying drier portions of the same riparian area.

Adaptation

Geyer willow grows in deep, fine textured alluvial soils.

Establishment

This species is normally established using cuttings.

Geyer willow should be planted as rooted or unrooted cuttings in the bank and overbank zones.

Availability

This species is available commercially.

Pacific Willow

Salix lucida ssp. *lasiandra*



Pacific willow. S. McDougall @ USDA-NRCS PLANTS Database.

Alternative Names

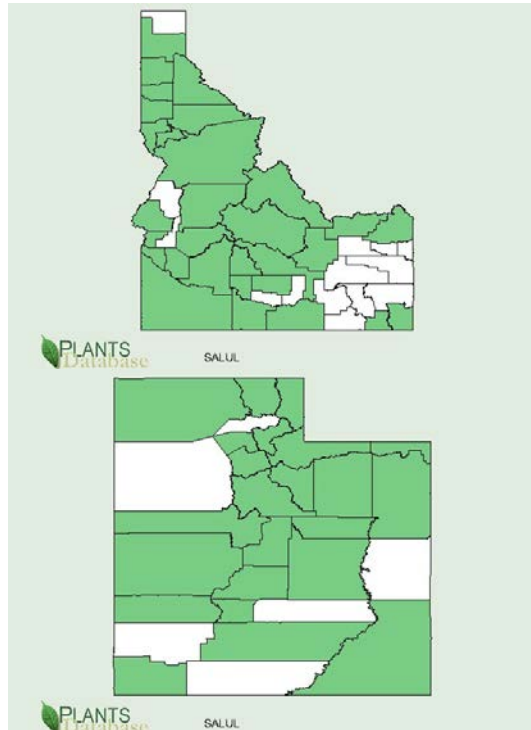
whiplash willow, golden willow, caudate willow, western black willow, waxy willow, western shining willow

Description

Pacific willow is a tall, slender, large shrub to small tree, 15 to 45 ft tall. The leaves are long, thin, shiny, 2 to 4 inches long with finely toothed edges. The fruit are thick catkins that are hairless, light reddish-brown. The bark is furrowed with broad flat scaly plates.

Distribution

Pacific willow is native along stream banks from British Columbia south to southern California and New Mexico.



Idaho and Utah county level distribution maps of Pacific willow.

Uses

Ethnobotanic: The inner bark was dried, ground into a powder, and then added to flour for making bread. The stems and bark were used in basket making. Native Americans used the stems for bow making and the bark for fabric making and tea.

Medicinal: Willows produce salicin, which is closely related to acetylsalicylic acid, commonly known as aspirin. Various preparations from willows are used to treat stomachache, sore throats, colds, diarrhea, and dandruff. The inner bark is haemostatic and has been applied externally to bleeding cuts.

Landscaping & Wildlife: Pacific willow is an excellent species for use in landscaping. It provides food and cover for many wildlife species. Deer and elk browse the young shoots of the plant. It is also a preferred food of moose.

Agroforestry: Pacific willow is commonly used in windbreaks. They are planted and managed to protect livestock, enhance production, and control soil erosion. Windbreaks can help communities with harsh winter conditions better handle the impact of winter storms and reduce home heating costs during the winter months.

Adaptation

Pacific willow is a fast growing but short-lived tree. This species prefers damp heavy soils, but will succeed in most soils. This species is often found in riverbanks, floodplains, lakeshores, and wet meadows often standing in quiet river backwaters. It grows best in a sunny position scattered at low elevations along major rivers.

Establishment

This species is normally established using cuttings. For riparian plantings, hardwood cuttings should be placed in the overbank and transition zones.

Availability

Pacific willow is available from plant nurseries within its range.

Lemmon Willow *Salix lemmonii*

Description

Willow family (Salicaceae). Lemmon willow is a multi-stemmed native deciduous shrub. It reaches a mature height of 10 to 16 feet. Flowers appear before or with new leaves. Leaves are alternate, pinnate-veined, entire or inconspicuously toothed, green shiny above and pale glaucous below. Stipules are minute and inconspicuous. Current season twigs are glabrous or sparsely pubescent, becoming strongly glaucous.

Distribution

Lemmon willow occurs in foothills to mid-mountains from Hood River County, Oregon along the east side of the Cascades to the Sierras in California east to Owyhee County, Idaho and Nevada.



Idaho county level distribution map of Lemmon willow.

Habitat

Lemmon willow occurs in riparian habitats which are usually bordered by coniferous forests of lodgepole pine or Douglas fir. It also occurs in zones of mountain big sagebrush. It grows near low gradient streams and rivers on floodplains. It is an early seral species.

Uses

Reclamation: Lemmon willow is used for streambank stabilization and riparian enhancement.

Wildlife: Lemmon willow provides food for wildlife including deer, elk and moose. The thickets also create cover and nesting habitat for birds and other animals.

Ethnobotany: Native Americans used willows for basket making. Willows are also a well-known source of salicin, which is chemically related to aspirin. Willows were also been used by Native Americans for bows, arrows, scoops, fish traps, and other items.

Adaptation

Lemmon willow is found on well-drained gravelly or sandy soils. In Oregon, it is found on deep, fine-textured alluvium over subsurface soils of various textures ranging from silt to silty clay loam soil. Soil pH ranges from 5.2 to 7.4 and annual precipitation requirement is from 20 to 40 inches. Shade tolerance is intermediate.

Establishment

This species is normally established using cuttings. Lemmon willow should be established in the overbank and lower transition zones in riparian revegetation plantings. On-site wild hardwood cutting collections may not root as well as nursery grown stock. Growing conditions at nurseries are maintained at a more

optimum level, therefore nursery grown cuttings have better carbohydrate storage levels and less potential problems with disease and insects.

Management

Lemmon willow provides important streambank protection by effectively stabilizing soils. Heavy grazing in Lemmon's willow communities can lead to lowered vigor, uneven stem age distribution and dead clumps. Plants recover rapidly when browsing is excluded.

Poplar/willow borers are potential problems in stands of Lemmon willow maintained for cutting production. Borers must be controlled prior to entering the stems. Decadent stems with borer infestation should be pruned from commercial cutting production sites. Consult local/state pesticide recommendations for additional information.

Willow plantings, especially during establishment, can be damaged by rodents including beaver, muskrat, mice, voles, etc. either cutting off or girdling stems. Cuttings or plants should be protected from rodent damage, especially in grassy areas where vole/mice populations are active.

Availability

'Palouse' Lemmon willow was released as a cultivar by the NRCS Pullman, Washington Plant Materials Center in 1993. 'Palouse' was developed from a native stand growing along the Deschutes River, in Jefferson County, Oregon, at an elevation of 2500 feet.

Yellow Willow

Salix lutea



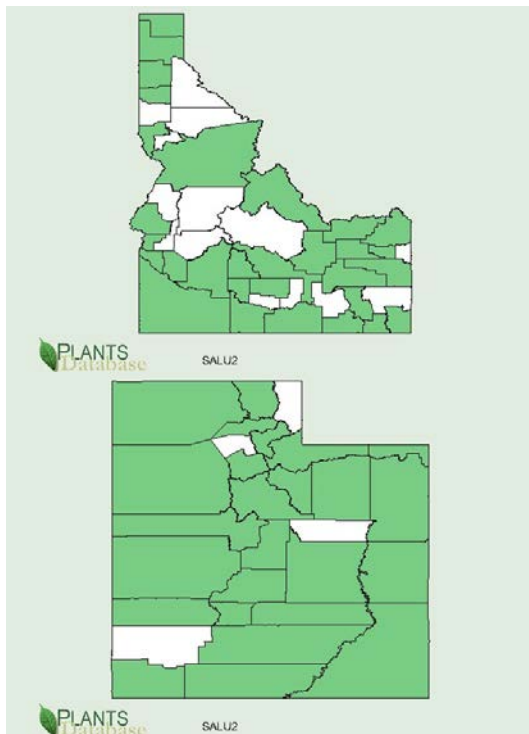
Yellow willow. Wikipedia.

Description

Yellow willow is a medium sized, shrub-type willow with a rounded shape, occasionally growing into a multi-stemmed tree. Mature specimens reach over 20 feet in height. The leaves are oval to lanceolate, 1.5 to 3 inches long and 0.5 to 1 inches wide. The leaves are green above and pale waxy beneath. In winter, the twigs are yellowish white to gray and lack hairs. Newer growth has a blue-gray color.

Distribution

Yellow willow is found in most of North America with the exception of the northwest and southeastern portions.



Idaho and Utah county level distribution maps of yellow willow.

Habitat

Yellow willow occurs along waterways in the foothills and lowlands. It is often found occurring near stands of coyote willow and Pacific willow.

Establishment

This species is normally established using cuttings. Yellow willow readily propagates from rooted hardwood cuttings. Cuttings should be planted in the bank or overbank zones for riparian projects.

Availability

This species is commercially available.

Planeleaf Willow

Salix planifolia

Alternate Names

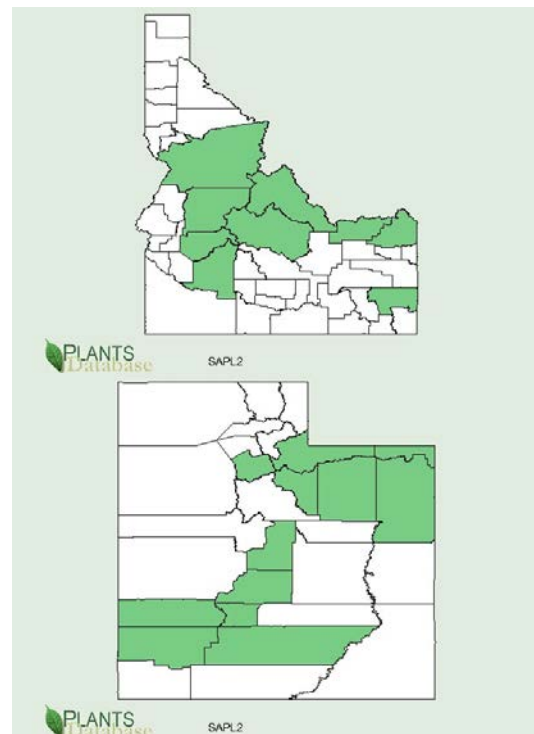
diamondleaf willow

Description

Willow Family (Salicaceae). Planeleaf willow is a medium shrub-type willow ranging 6 to 13 ft tall. New stems are glabrous while older stems are dark red or brown and glabrous to waxy. The leaves are glabrous, dark green (occasionally red-tinged) shiny above and glabrous beneath. It is sometimes referred to as “parallel-veined willow” because the lateral veins in the leaves are partially parallel to the midrib.

Distribution

Planeleaf willow is a circumboreal species. In North America it occurs as far south as California and Arizona in the west and the New England states in the east.



Idaho and Utah county level distribution maps of planeleaf willow.

Habitat

This willow is found in riparian habitats associated with Geyer, yellow and coyote willow.

Adaptation

Planeleaf willow is found at mid-elevations in moist stream sides and bottomlands of the mountain big sagebrush/grass zone. It prefers deep silts, clays, sand or gravel.

Establishment

This species is normally established using cuttings. Field propagation with dormant unrooted hardwood cuttings is moderately successful. Plant in the bank and overbank zones.

Availability

This species is commercially available.

MacKenzie Willow

Salix prolixa

Alternate Names

diamond willow, yellow willow

Description

General: Mackenzie willow is a coarse multi-stemmed shrub that grows from 6 to 30 feet tall. Catkins usually appear with new leaves. Twigs of the current season are glabrous or very sparsely puberulent. Mature leaves are green above, pale and glaucous beneath. Margins are finely toothed except near the apex or sometimes inconspicuously toothed or entire. Stipules are present but are eventually deciduous.

Distribution:

Mackenzie willow occurs in western Wyoming, western Montana, and north to the Yukon Territory, west across central Idaho (north of the Snake River plains) and central Oregon to the east base of the Cascade Mountains in Oregon and Washington and in the valleys of southern British Columbia to southern Vancouver Island.

Habitat:

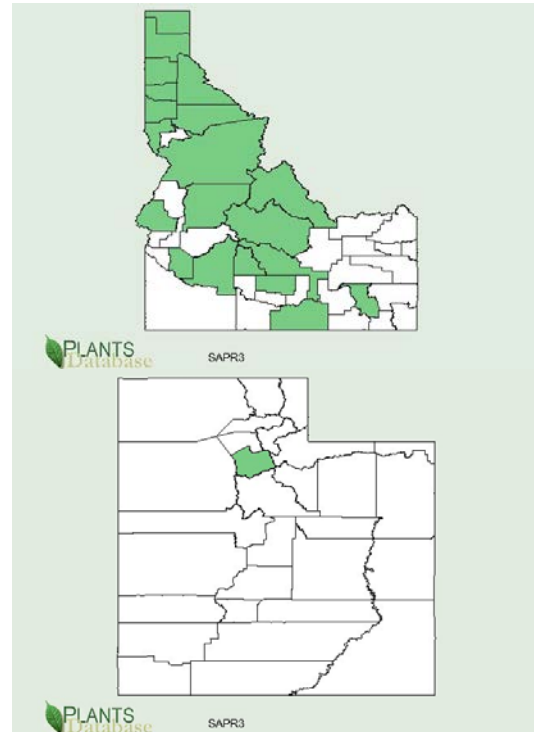
MacKenzie willow occurs on rocky stream and river edges to moist alluvial terraces from low to moderate elevations. It is most productive on fine-textured soils with moderate to high levels of available water. It is a pioneer or early seral species on newly exposed soils, sometimes replacing coyote willow. Stands also occur on

well-developed soils, indicating Mackenzie willow is relatively long-lived.

Uses

Reclamation: Mackenzie willow is used for revegetation of riparian areas, native plant community restoration and wildlife food, cover and browse.

Livestock/Wildlife: MacKenzie willow is browsed by livestock and wildlife.



Idaho and Utah county level distribution maps of MacKenzie willow.

Adaptation

Mackenzie willow is adapted to a wide variety of soil textures from coarse-textured, gravelly areas to silt loams.

Establishment

This species is normally established in riparian plantings using cuttings. Mackenzie willow should be established in the overbank zone in riparian revegetation plantings.

Mackenzie willow may be propagated via seed or cuttings. Seed is used to produce containerized plants.

Mackenzie willow is easily propagated with hardwood cuttings without use of rooting

hormone. It can also be propagated with seed but seed must be collected as soon as the fruits ripen. Mature seed loses germination ability rapidly, so planting soon after collection is necessary. Moistened seed may be stored for up to a month if refrigerated in sealed containers. Seeds of willow are not known to exhibit dormancy.

Management

Grazing is particularly detrimental to the establishment of willows. Plants recover rapidly when browsing is excluded.

Poplar/willow borers are potential problems in stands of Mackenzie willow maintained for cutting production. Borers must be controlled prior to entering the stems. Decadent stems with borer infestation should be pruned from commercial cutting production sites.

Cultivars

'Rivar' Mackenzie willow was released as a cultivar in 1993 by the NRCS Pullman, WA Plant Materials Center for use in riparian revegetation projects in Eastern Washington, Eastern Oregon and North Idaho. 'Rivar' was developed from plants collected along the Tucannon River, near Starbuck, Washington at an elevation of 800 feet.

Scouler's Willow
Salix scouleriana



Scouler's willow. S. McDougall @ USDA-NRCS PLANTS Database.

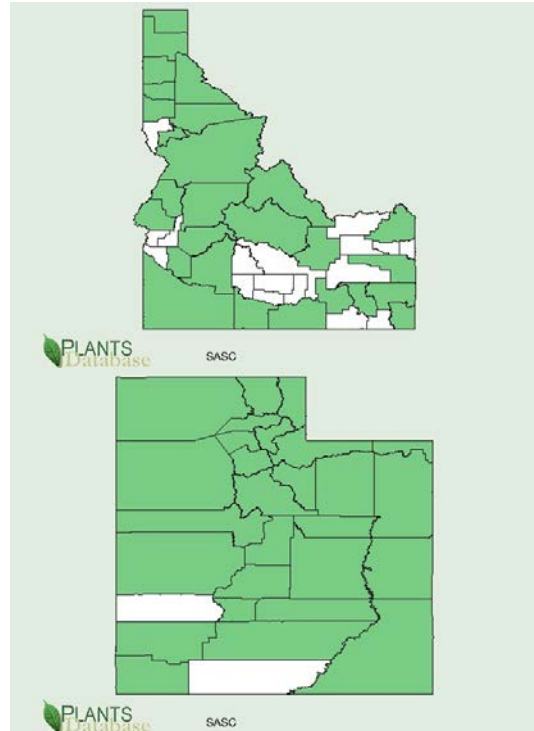
Description

Scouler's willow is a shrub or small tree from 9 to 22 feet tall. The leaves are 1 to 4 inches long and 2 to 3 times longer than wide, and spoon

shaped being widest above the middle. The leaves are shiny green on top and covered with dense white hairs below. The bark is smooth, green-gray to yellow-brown.

Distribution

Scouler's willow is found in all western states from South Dakota and Colorado westward.



Idaho and Utah county level distribution maps of Scouler's willow.

Habitat

Scouler's willow occurs along streams and rivers at moderate elevations.

Establishment

This species is normally established using cuttings. Establish Scouler's willow in the bank and upland zones.

Availability

This species is available commercially.

Sitka Willow
Salix sitchensis

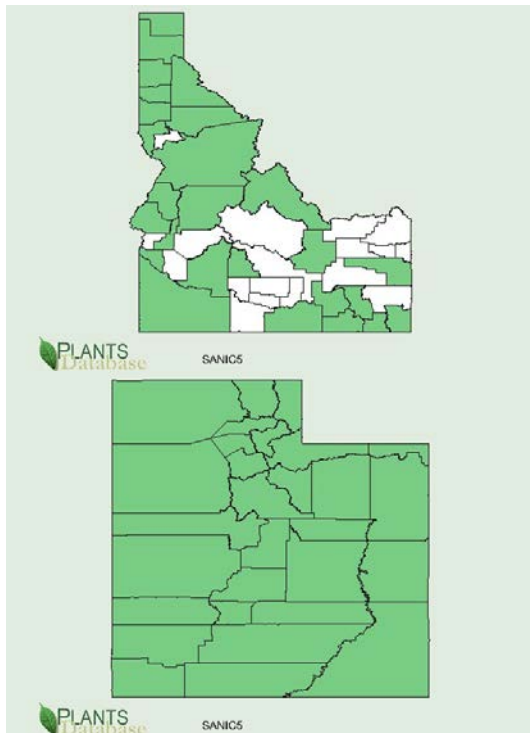
Alternative Names

satin willow, silky willow

to dark brown, irregularly furrowed and ridged. The pinnately compound leaves are deciduous, opposite, about 6 to 14 inches long, odd-pinnate with 5 to 9 serrate leaflets, each 1 to 6 inches long, often with a long stalk, often asymmetrical at the base. The inflorescence is flat-topped, 6 to 8 inches across, broader than high. The flowers are small, white to cream, with a pleasant, yet slightly rancid odor. The fruit is a blue to purple-black berry which develops a white-waxy surface at maturity.

Distribution

Blue elderberry occurs from west Texas north to Montana, western Alberta, and southern British Columbia, and all other western states, south into northwest Mexico.



Idaho and Utah county level distribution maps of blue elderberry.

Habitat:

Blue elderberry is common along streambanks, river banks, and open places in riparian areas lower than 10,000 ft.

Uses

Ethnobotanic: Only the blue or purple berries of elderberry are edible. Edible berries and flower are used for medicine, dyes for basketry, arrow shafts, flute, whistles, clapper sticks, and folk medicine. The active alkaloids in elderberry

plants are hydrocyanic acid and sambucine. Both alkaloids will cause nausea so care should be observed with this plant. Elderberries are high in vitamin C.

Livestock: Blue elderberry is a useful range plant for domestic livestock, but is not equally palatable during all seasons. It usually receives limited browsing in the spring and to a much greater extent in the late summer and fall. The leaves are eagerly devoured after the first heavy frost in the fall. Because many branches are beyond the reach of the animals, utilization is less destructive.

Wildlife: Game birds, squirrels and other rodents, and several kinds of browsers also feed on the fruit or foliage of elderberry. Bears eat the elderberry fruits while deer, elk, and moose browse on the stems and foliage. Elderberries are important sources of summer food for many songbirds.

The valley elderberry longhorn beetle (VELB) (*Desmocerus californicus dimorphus*) was listed as threatened under The Endangered Species Act on August 8, 1980. The elderberry beetle is endemic to moist valley oak riparian woodlands along the margins of rivers and streams in the lower Sacramento and upper San Joaquin Valley of California where elderberry grows. The primary threat to the VELB is loss of habitat, insecticide and herbicide use, and lack of elderberry shrubs/trees as a food plant for the beetle.

Conservation: Blue elderberry is planted because of its forage and cover value, productivity, adaptability, and ease of establishment. It is a useful ground cover for stabilizing streambanks and eroding sites. It provides food, cover, perching, and nesting sites for many species of birds and food and cover for other wildlife, and it is important as browse for deer and elk. In the spring, the leaves may be strongly scented and less palatable, but they sweeten and become more palatable by fall.

Adaptation

Blue elderberry grows on moist, well-drained sunny sites, usually occurring in early seral communities or in openings in moist forest habitats (slopes, canyons, cliff bases, streamsides, streambanks) and moist areas within drier, more open habitats (sagebrush, mountain brush, pinyon-juniper, ponderosa pine, often

along fence rows and roads); at elevations up to 10,000 feet. Blue elderberry is a dominant understory species in some riparian areas. It can persist past seral stages as scattered individuals in open forests, chaparral, or riparian zones.

Establishment

This species is normally established using nursery grown planting stock. Bareroot or containerized materials are recommended for riparian plantings. Plant in the transition and upland zones.

Blue elderberry grows well from seed.

Elderberry fruits are collected when ripe and spread in thin layers to dry. To separate seeds from fruits either run fruit through a macerator with water. One can also crush and dry the fruit without separating fruits and seeds, or small amounts of fruit can be cleaned in a blender.

Seeds can be sown in the fall soon after collection, or stratified and sown in the spring. In either case, germination is often not complete until the second spring. Seeds are sown 1/4 inch deep in drills and covered with about 3/8 inch of sawdust mulch. In the greenhouse, seeds are warm stratified for two months in a mixture of peat, vermiculite, and sand at 21° to 30°C; (70 to 85°F). Seeds are then placed close to the soil surface in flats in the greenhouse. If planted in the fall, irrigation may not be necessary in moist sites. In drier sites or with spring planting, irrigation will be required for seedling establishment.

Cuttings of elderberry tend to have lower survival success than establishment from seed. Use hardwood cuttings from previous season's growth. Take "heel cuttings" from older wood, so inner pith is not exposed. Cuttings should be at least 10 inches, and have at least two nodes. Cuttings should be placed in perlite and peat. Plants should be kept moist. Cuttings have a fragile root system, with high mortality occurring when transplanted. Care should be taken to be very gentle with delicate roots when transplanting.

Management

Competition from exotic weeds is a key factor in plant mortality. On small sites, hand weeding around trees and shrubs is the most effective means of weed control.

Clear-cutting or seed tree cutting with high soil disturbance sometimes favors the development

of blue elderberry in a seral community. It recovers well from heavy grazing in the Great Basin.

Blue elderberry usually is not present in the understory of closed-canopy forests. Post-fire regeneration occurs from seed banks between 1 to 4 inches deep in the soil. The seeds deposited are from off-site dispersal or from plants of an earlier community. Fire scarifies the hard seed coat of buried seeds and stimulates their germination, which usually occurs the first growing season after the fire. Subsequent burns may eliminate blue elderberry since it spreads slowly by seed. Fire kills above-ground parts but the root crown may sprout. A severe fire can kill the root and stem buds from which sprouting occurs.

Availability

Blanchard Origin was developed by the NRCS Pullman, WA PMC in 1995. Blanchard Origin was developed from material collected in Blanchard, Idaho; in Bonner County. Average annual precipitation is 30 inches. Elevation: 2560 feet. Material was historically provided to the Washington Conservation District Nursery, but it is not currently offered for sale.

Red Elderberry *Sambucus racemosa*



Red elderberry. L. Koepke @ USDA-NRCS PLANTS Database.

Alternate Names

scarlet elder, stinking elderberry, stinking elder, red-berried elder, bunchberry elder, and red elder

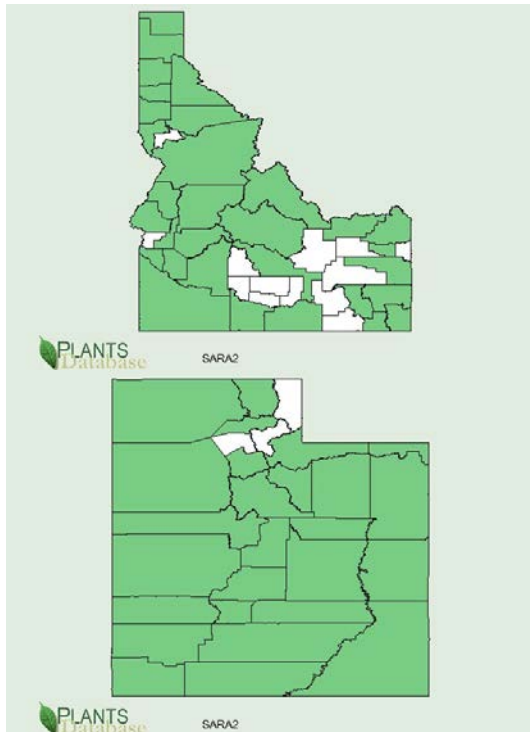
Description

Honeysuckle family (Caprifoliaceae). Red elderberry is a large deciduous shrub or small

tree of the Honeysuckle family that grows 10-20 ft tall. Older specimens have large, multiple trunks with coarse bark. Red elderberry begins growth early in spring and produces abundant, creamy white flowers in large clusters between April and July. Large bunches of small, bright red, fleshy berries appear in summer bearing 2 to 5 seeds per fruit. Opposite leaves are divided into 5 to 7 pointed, oval to oblong or lance shaped 2 to 4 inch long leaflets with finely toothed margins. The foliage has a strong, distinctive odor. Twigs are pithy, dark red or purple to reddish-brown in color, and covered with numerous small bumps (raised pores). There are about 200,000 – 300,000 clean seeds per pound.

Distribution

Red elderberry is an early to mid seral species in the west and a component of climax deciduous forests in the eastern U. S. This species is circumpolar in northern temperate zones extending south in cooler areas along the California coast and at higher elevations in the Rocky and Appalachian Mountains.



Idaho and Utah county level distribution maps of red elderberry.

Habitat

Red elderberry inhabits streambanks, ravines, swamps, moist forest clearings and higher

ground near wetlands from sea level to 9,500 ft in elevation.

Adaptation

Red elderberry is shade tolerant but prefers a sunny exposure. Red elderberry is found on a wide variety of soils but favors deeper, loamy sands and silts and nutrient rich sites with good drainage, ample moisture and a pH of 5.0 to 8.0.

Establishment

This species is normally established using nursery grown planting stock. Container and bare root nursery stock may be planted using standard practices. Fall planting is recommended over winter and spring if material is available at this time. Red elderberry should be established in better drained portions of the overbank and transition zones.

Red elderberry may be propagated vegetatively by dormant hardwood cuttings taken in late fall or winter, by softwood cuttings taken in the spring or summer, and by root or rhizome cuttings. Stem cuttings require at least 2 nodes (joints) with the basal cut just below the lower node. Stem cuttings may benefit from the use of a rooting hormone solution like IBA or IBA-talc. Layering is another means of propagation. Sturdy, unrooted dormant cuttings taken in late fall or winter can be planted directly on moist streambanks as “live stakes”.

Due to seed coat and embryo dormancy, dry or fresh seed requires 30 to 60 days warm, moist (68 to 86° F) stratification followed by at least 90-150 days cold stratification [cold, moist chilling], or 5 to 15 min sulfuric acid plus 2 months cold, moist chilling at 33 to 37° F for good germination. Others suggest that after pulp removal, fresh seed can be sown immediately in late summer to provide both warm (fall) and cold (winter) periods for conditioning.

Management

Nursery plantings of red elderberry can be as dense as 700 plants per acre in soil at least 24 in. deep. Consider supplemental irrigation during establishment year or years with low rainfall. Red elderberry will re-sprout from both roots and the seed bank following fire. Severe pruning will prevent a spindly growth habit in ornamental applications

Viral cankers can girdle and kill the stems. Bacterial and fungal leaf spots, powdery mildew and cane borers are usually not serious.

Environmental Concerns: Red elderberry spreads slowly either by seed or by root sprouting. In moist forests of the Pacific Northwest this species can inhibit tree regeneration following fire, but it is not considered a primary competitor. Although little effect has been discerned in the field, plants may have some allelopathic potential as they inhibited germination and growth of Douglas-fir and other species under experimental conditions.

Availability : Red elderberry is routinely available in containers or bare-root from west coast native plant nurseries. 'Plumosa Aurea' is an ornamental cultivar with cut leaves and yellow foliage.

Silver Buffaloberry

Shepherdia argentea



Silver buffaloberry. A. Schneider © USDA-NRCS PLANTS Database.

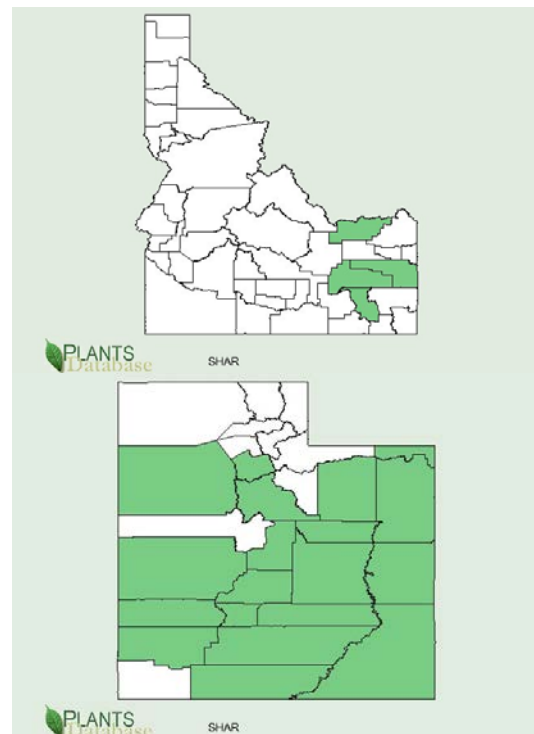
Description

Elaeagnaceae (Oleaster Family). Silver buffaloberry is a deciduous thorny, thicket-forming native shrub to small tree that is drought and winter-hardy. It has opposite branching. Heights reach from 3 to 20 feet. The leaves are 1 to 2 inches long and silvery gray in color on both

top and bottom. The male and female flowers are found on separate plants. This species is insect pollinated, most commonly by honey bees and bumble bees. The fruit is a ¼ inch long one-seeded berry. The berries start to form in late may and ripen by late summer. Most of the fruit are reddish-orange in color. Rarely, yellow fruit are seen. The ripe berries remain on the shrubs and, if not eaten, dry berries may still be present the following spring.

Distribution

Silver buffaloberry occurs throughout western North America.



Idaho and Utah county level distribution maps of silver buffaloberry.

Habitat

Silver buffaloberry occurs along streams and on exposed, moist hillsides where it forms thickets in which several woody species are represented. Silver buffaloberry is capable of fixing nitrogen in root nodules that contain bacteria. This nitrogen may be important to other species and in the establishment and maintenance of shrub communities.

Uses

Wildlife: Silver buffaloberry provides cover and nesting sites for many birds. It is a preferred food source of many songbirds and grouse.

Seeds of this shrub are dispersed in the droppings of birds and ungulates, but sprouting of the seeds seems to occur very rarely in nature. It is also a browse source for big game animals, as well as rodents.

Windbreaks: This species is suitable for the windward rows of multi-row windbreaks and shelterbelts. In a single-row planting, it forms a low, dense barrier.

Recreation and Beautification: The grayish green foliage and bright red fruit in the fall are colorful. The thorns and moderate suckering may make it less desirable for urban plantings.

Adaptation

Silver buffaloberry grows on most well-drained soils. It is tolerant of slight to moderately saline, calcareous soils. It prefers full sunlight, often on northwest to east facing slopes. The shrubs are excellent bank stabilizers, once established.

Establishment

This species is normally established using nursery grown planting stock. Propagation from dormant hardwood cuttings is rarely successful. Root cuttings have yielded fair success.

The harvested fruit should be macerated to remove the pulp from the seeds. The pulp is removed by floating, changing the water several times. Non-stratified seed should be sown about ½ inch deep in mid-September. Cover the seedbed with sand to prevent soil crusting.

For non-dormant plantings, seed should be acid scarified followed by a 90 day cold stratification at 41° F in order to break dormancy. Seedlings can be transplanted after two growing seasons.

Nursery grown seedlings generally establish readily if planted free of competing vegetation, in locations having 13 inches or more of annual precipitation. Occasionally, establishment problems are reported for no obvious reason. Bare root seedlings should be planted in the spring, once the threat of frost is over. The optimum spacing is 4 to 6 feet between plants. Successful establishment has been documented from direct seeding into native grassland. Seed should be sown about ½ inch deep in mid-September. Establish silver buffaloberry in the overbank and lower transition zones.

Management

Control of invading weeds and grasses is important. Shallow cultivation works best. Silver buffaloberry is a suckering plant. However, the suckers do not seem to be strongly competitive. Browsing often sharply reduces the amount of suckers. Cultivation can also be used to stop the spread of shoots or suckers, if that is a concern. Shelterbelts which are regularly cultivated show little sign of suckering. Suckering may be encouraged for wildlife plantings. Control of competing vegetation is still needed to allow for adequate growth of the buffaloberry plants.

Insect problems are not severe. White heart rot disease is a common problem on older plants. If diseased plants are pruned, the life of the planting can be prolonged.

Availability

Seedlings of silver buffaloberry are available from commercial nurseries. 'Sakakawea' was developed by the NRCS Plant Materials Center, Bismarck, North Dakota. This cultivar originated from open-pollinated seed collected in 1954 in Canada. Sakakawea has not been widely tested in the intermountainwest, but performs well at Bridger Montana.

Mill Creek Germplasm was developed by the NRCS Plant Materials Center Bridger, Montana in 2010. This selection originated from seed collected from plants at a site that had soils with low pH and heavy metal contamination in Anaconda, Montana. The testing of this selection has been limited to the immediate area of its origin and the Bridger Plant Materials Center in south-central Montana. It appears best adapted to low- to mid-elevations ranging from 915 to 2,300 meters (3,000 to 7,500 feet).

Snowberry

Symphoricarpos albus

Alternate Names

White coralberry, common snowberry

Description

Honeysuckle family (Caprifoliaceae). Snowberry is a small to medium shrub that grows to 10 feet tall. The leaves are large, opposite, divided into five to seven leaflets, and toothed or irregularly lobed. The fruit are white, berry like drupes. The flowers are small, white to creamy, with a strong unpleasant odor;

numerous in a rounded or pyramidal parasol-like cluster; blooming from mid May to July. The fruits are roundish, dull-white berries about 3/8 inch in diameter, soon becoming blackish, ripening August or September.



Snowberry. J. Peterson @ USDA-NRCS PLANTS Database.

Distribution

Snowberry inhabits slopes and valley bottoms of the foothills of the Coast Ranges, the Sierra Nevada, and the mountains of southern California. It extends northward to British Columbia and eastward to Pennsylvania and the New England states.

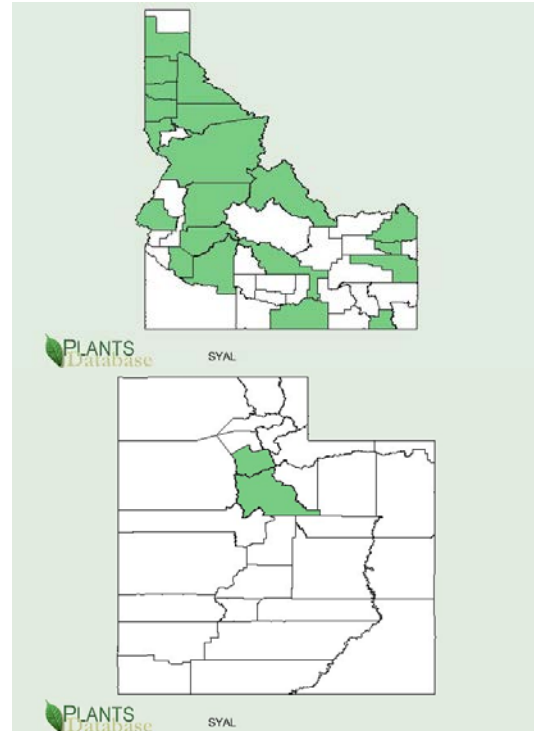
Habitat

Snowberry is found in shaded or moist areas in sagebrush, ponderosa pine, Douglas fir, aspen, lodgepole pine and spruce fir communities.

Uses

Ethnobotanic: Some southern groups made brooms out of the branches and the Gitksan hollowed out the twigs to make pipe-stems. Other tribes used the berries medicinally.

Wildlife: Snowberry is an important browse for many types of livestock and wildlife. It is important for shelter and food for various birds and small mammals.



Idaho and Utah county level distribution maps of snowberry.

Adaptation

Snowberry is found along streambanks, in swampy thickets, moist clearings and open forests at sea level to middle elevations. It tolerates all soil types but grows best in heavy clay soils. Snowberry grows well in sun or shade.

Establishment

This species is normally established using nursery grown planting stock. Plant cuttings or other stock into permanent positions in late spring or early summer. Snowberry should be planted in the overbank, transition and upland zones.

Snowberry seeds are best sown in the fall after maturity. Dormancy of this species is caused by hard seed coat and immature embryo, which can be broken by stratification in sand and peat for 90 days at 77°, plus 180 days at 41°F. When the seedlings are large enough to handle, place them into individual pots and grow them in the greenhouse for their first winter.

Management

Snowberry fruit contains low concentrations of a bitter principle, saponin, which foams in water. It is very poorly absorbed by the body and can be

broken down by thoroughly cooking the fruit.
Saponin is much more toxic to some creatures,
such as fish, if eaten in large quantities

Availability

Snowberry is commonly available through plant nurseries.

APPENDIX 1. RIPARIAN ZONES AND BASIC PLANTING TECHNIQUES

INTRODUCTION

Riparian zones, the ecosystem situated between aquatic and upland environments, are complex and valuable natural resources. These ecosystems have highly diversified plant communities including most life forms including grasses, grass-like plants, forbs, shrubs and trees. The associated root systems of these species stabilize stream bank soils reducing erosion and buffering the ecosystem from other pollutants resulting in enhanced water quality. The above ground stems and branches absorb and deflect flood energy and help ameliorate flood damage. The highly varied riparian canopy provides cover, habitat and food for upland and aquatic wildlife, and leaf litter from riparian shrubs and trees forms the primary food source in aquatic environments.

Riparian areas have numerous plant communities within a narrow band created by the constantly changing conditions encountered in the riparian area. Riparian zones are by definition, an area of repeated disturbance. Stream channel flows scour new banks and cause deposition forming bars and back water ponds. Water levels regularly rise and fall due to snowmelt, storm runoff and periods of drought. Additionally, subsurface water becomes less available with increased distance from the stream. These variations in water availability create bands and pockets of different plant communities that support a wide variety of wildlife.

Riparian areas consist of a series of plant communities or zones which progress in a series of slopes and plateaus as one travels from the stream outward to the upland area (Figure 1).

The toe zone and bank zone comprise the slope coming directly from the stream at average water elevation. The toe zone is typically vegetated with flexible stemmed herbaceous wetland grass-like species such as rushes and sedges. Few woody species can survive the constant saturated conditions encountered in the toe zones. The bank zone frequently encounters erosive water currents, wet-dry periods and freeze-thaw cycles and ice formation. The variable and harsh nature

of this zone makes it difficult for many rigid-stemmed species to survive. Flexible stemmed shrubs such as coyote willow thrive in the bank zone.

The bank zone levels off to the overbank zone, an area that is flooded by high water levels during spring runoffs. The overbank zone is nearly level with the subsurface water table. Plants in this zone are tolerant of inundation but do not require frequent flooding. You commonly find shrubby willows, dogwood, alder and birch in the overbank zone.

Riparian plants mix with upland species in the transition zone. This area is usually not subjected to erosive water currents except during high water events in the spring. Tree species commonly occupy the transition zone. Plant species in the transition zone do not have to be extremely flood or inundation tolerant. The result is a mixture of plant communities.

Not all riparian or wetland areas will contain all of the zones mentioned. Rocky areas and steep slopes often preclude one or more zones. Understanding the zones in a particular riparian area can greatly improve the chances of a successful planting.

Establishment

Successful establishment of riparian and wetland plants depends on several factors. Proper selection of species, plant material procurement and handling, site preparation, and establishment techniques are vital. The success of a project is dependent on proper planning and the complete integration of these factors.

When planning a project, it is important to examine the existing vegetation and its respective locations in relationship to the stream and water table. Planting species in the portion of the riparian area to which they are best adapted increases the chance of successful establishment, and ensures the longevity of the planting. Hoag (2001) provides additional details on water levels in the riparian planting zones.

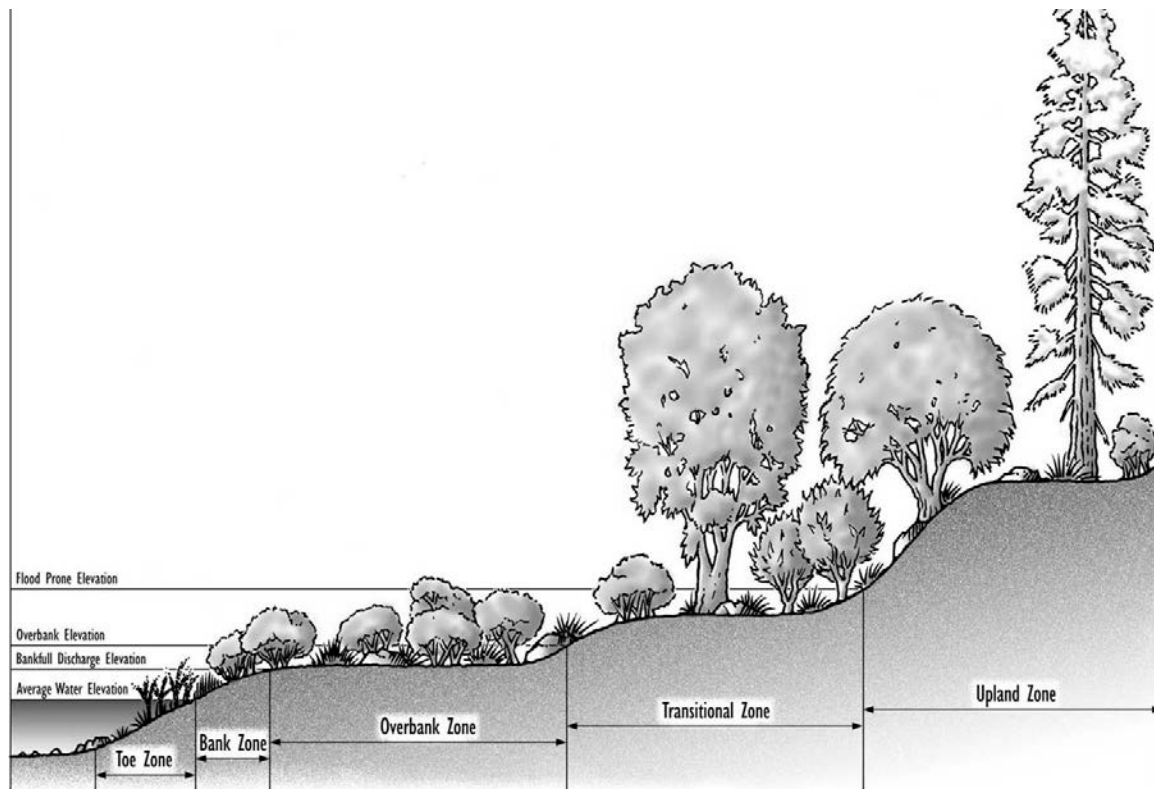


Figure 1. A general depiction of a riparian area from the toe zone to the upland zone. (From Hoag, 2001).

There are numerous types of plant materials available for riparian plantings. Bare root and containerized stock are relatively expensive and take a significant amount of labor to plant, however these materials often result in much higher success rates, and are the only available option for many species.

Unrooted dormant hardwood cuttings are inexpensive and easy to plant. Cuttings can be purchased from nurseries or harvested near the planting site. Hardwood cuttings should be collected when the parent plant is dormant (between leaf fall and spring bud break). Some species establish better from softwood cuttings harvested during the growing season.

Dormant hardwood cuttings made from 2 to 5 year old wood with clean bark typically have the best establishment. Furrowed bark, infected areas and young sucker shoots should be avoided. Branches and leaves should be trimmed during the harvesting process. Under proper conditions with cold temperatures and high relative humidity dormant hardwood cuttings can be stored in climate controlled locations for several months. A dark cooler or root cellar with

temperatures from 34 to 36° F and high humidity (but not free standing water) provides excellent storage conditions.

Cuttings fall into several categories based on their diameter. In general cuttings from 1/2 to 3 inches in diameter are considered poles. Posts are large cuttings from 3 to 6 inches in diameter. Small cuttings or whips less than 3/8 in diameter are often used as bundles or in wattles and brush mattresses. Larger cuttings typically have more stored energy in their tissues and thus have better establishment success. However some species such as coyote willow never achieve large sizes and small diameter cuttings work very well.

Cuttings should be long enough to reach 6 to 8 inches into the permanent water table or into the capillary fringe. The permanent water table is the LOWEST water table of the year. Cuttings planted too high and out of this zone will not have access to water during dry periods and will die. The primary cause of failure in riparian plantings is planting too shallow.

Approximately 2/3 of the cutting should be in the ground. The cutting should be tall enough to rise

above competing plants; however, if the cutting is too tall, it is more susceptible to being ripped out of the ground or damaged by wind and animals, especially during the first growing season.

Many species, willows for example, establish better when subjected to a pre-soaking treatment (Figure 2). Soaking primes the cuttings with water and initiates root growth. Garbage cans, buckets and troughs are good for soaking cuttings. Cuttings can also be tied in bundles and soaked in the stream or in backwaters at the planting site. However beavers may find soaking bundles and strip them of their bark.



Figure 2. Willow cuttings soaking in water prior to planting. Derek Tilley, NRCS.

The duration of the soaking treatment depends on water temperatures and light conditions. Cuttings soaked in warm water and light will quickly initiate growth while cuttings soaked under cold dark conditions will absorb water and develop roots and shoots more slowly. The soaking treatment should take place **BEFORE** roots have emerged. Emerged roots will shear off during planting and will not recover. A cold-dark soaking treatments of about 7 to 14 days is recommended.

Several planting methods are available for establishing riparian woody species. There are

many tools available to plant dormant hardwood cuttings. Back hoe mounted stingers are excellent for driving large poles into riprap (Hoag and Ogle, 2011). For smaller cuttings, auger and rotary hammer drills are very effective. Waterjet stingers are very good at quickly making holes in non-rocky soils (Hoag and others, 2001).

On planting sites where donor plants are available, consider using willow clump plantings (Figure 3). Clumps of willows can be scooped with a back hoe and dropped in place for immediate bank protection and establishment (Hoag, 2010).



Figure 3. Willow clumps being removed from a local stand (above) and established willow clumps in a riparian planting (below). Chris Hoag, NRCS.

Site preparation and planning are very important for successful riparian plantings. One should take the time to find the lowest water table of the year in order to determine a planting strategy. Prior to establishment of riparian woody species weeds need to be sufficiently controlled. Something that is often overlooked in riparian plantings is the establishment of an herbaceous understory. To create a fully functioning riparian ecosystem, consider planting an understory of grasses, grass-like plants, and forbs. This will also impede the encroachment of invasive weeds. See Scianna and others (2011) for more information.

Management

New riparian plantings require active management for optimum establishment (Hoag, 2007). Grazing should be deferred for 2 to 5 years to allow trees and shrubs to grow tall and thick enough to withstand livestock damage.

Following establishment, a riparian grazing management plan should be developed. Weeds should be controlled for proper riparian function and to prevent competition. Wildlife can also be detrimental to new plantings. Beaver, muskrats, deer and elk often strip or browse growth from newly established trees and shrubs. If browsing is a problem, fencing/netting may need to be considered. Less palatable tree and shrub species such as hawthorn, birch, alder and snowberry may be considered in plantings to deter browsing.

All riparian project plans should be developed to meet NRCS Standard and Specification guidelines.

References.

Hoag, J.C. and D.G. Ogle. 2010. Technical Note 42: Willow Clump Plantings. USDA-NRCS Aberdeen Plant Materials Center, Boise, ID. TN-42, Dec. 2010. 11p.

Hoag, J.C. 2007. Technical Note 23: How to plant willows and cottonwoods for riparian restoration. USDA-NRCS Aberdeen Plant Materials Center, Boise, ID. TN-23, Jan. 2007. 8p.

Hoag, J.C., and D.G. Ogle. 2011. Technical Note 6: The Stinger – A tool to plant unrooted hardwood cuttings of willow and cottonwood species for riparian or shoreline erosion control or rehabilitation. USDA-NRCS, Boise, ID. ID-TN6, Oct. 2011. 10p.

Hoag, J.C. and R.W. Sampson. 2008. Technical Note 21 - Planting willow and cottonwood poles under rock riprap. USDA-NRCS, Boise, ID. ID-TN21, Jan. 2008. 5p.

Hoag, J.C., B. Simonson, B. Cornforth, and L. St. John. 2001. Technical Note 39: Waterjet Stinger – A tool to plant dormant unrooted cuttings of willows, cottonwoods, dogwoods, and other species. USDA-NRCS, Boise, ID. ID-TN39, Feb. 2001. 13p.

Hoag, C., D. Tilley, D. Darris, and K. Pendergrass. 2008. Field guide for identification and use of common riparian woody plants of the Intermountain West and Pacific Northwest Regions. USDA-NRCS, Aberdeen, ID. 195p.

Ogle, D.G., Hoag, J.C., and J.D. Sciana. 2000. Technical Note 32: Users guide to description, propagation and establishment of native shrubs and trees for riparian areas in the Intermountain West. USDA-NRCS, Boise, ID and Bozeman, MT. Feb, 2000. 22p.

Scianna, J., L. Holzworth, D. Ogle, and L. St. John. 2011. Technical Note 41: Restoration of plant communities with woody plants. USDA-NRCS, Boise, ID, Bozeman, MT, and Salt Lake City, UT. Oct 2011. 9p.

[USDA NRCS] USDA Natural Resources Conservation Service. 2011. The PLANTS Database. URL: <http://plants.usda.gov> (accessed Nov. 28, 2011). Baton Rouge (LA): National Plant Data Center.

APPENDIX 2 RIPARIAN/WETLAND PLANT NURSERIES & CONTRACTORS

2011

Note: *This list is not intended to be exclusive, nor does it imply an endorsement of those listed*

Nurseries

Balance Restoration Nursery 27995 Chambers Mill Road Lorane, OR 97451 PH: (503) 942-5530	Frosty Hollow Ecological Restoration P.O. Box 53 Langley, WA 98260 PH:(206) 579-2332	Intermountain Aquatics 85 S Main Driggs, ID 83422 PH: (208) 354-3690
Clifty View Nursery Rt. 1, Box 509 Bonners Ferry, ID 83805 PH: (208) 267-7129	Granite Seed 1697 West 2100 North Lehi, UT 84043 PH: (801) 768-4422	Lake Creek Seed 15700 S. Idaho Road Worley, ID 83876 PH: (208) 291-6661
Comstock Seed Co. 917 Hwy 88 Gardnerville, NV 89460 PH: (775) 746-3681	Grassland West Co. P.O. Box 489 Clarkston, WA 99403 PH: (509) 758-9100	Lawyers Nursery 950 Highway West Plains, MT 59859 PH:(406) 826-3881
Cornflower Farms, Inc. P.O. Box 896 Elk Grove, CA 95759 PH: (916) 689-1015	The Green Ranch P.O. Box 2597 Boise, ID 83701 PH: (208) 336-3312	Lincoln Oakes Nursery P.O. Box 1601 Bismarck, ND 58502 PH: (701) 223-8575
Denny Dawes Wildlife Habitat Nursery Rt.1, Box 102-A Princeton, ID 83857 PH: (208) 875-1246	Harold M Miller Landscape Nursery P.O. Box 379 Hubbard, OR 97032 PH: (503) 651-2835	Native Seed Foundation Star Route Moyie Springs, ID 83845 PH: (208) 267-7938
Express Farms HC 79 Box 106C Melba, ID 83641-9504 PH: (208) 896-4229	High Altitude Gardens P.O. Box 4238 Ketchum, ID 83340 PH: (208) 726-3221	Newell Wholesale Nursery P.O. Box 372 Ethel, WA 98542 PH:(360) 985-2460
Ferris Nursery 415 NE 98th Street South Beach, OR 97366 PH:(503) 867-4100	Hillview Water Gardens 1044 East Hillview Salt Lake City, UT 84124 PH: (801) 261-4912	Nishitani Greenhouse P.O. Box 325 West Galveston Caldwell, ID 83606 PH: (208) 459-0567
Forestfarm 990 Tethrow Road Williams, OR 97544 PH:(503)846-6963	Hobbs & Hopkins, Ltd. 1712 SE Ankeny Portland, OR 97214 PH:(800) 345-3295	North Fork Native Plants P.O. Box 1115 Driggs, ID 83422 (877) 444-6996
Fourth Corner Nurseries 3057 E. Bakerview Road Bellingham, WA 98226 PH:(206) 734-0079	Hughes Water Gardens 25289 SW Stafford Road Tualatin, OR 97062 PH: (800) 858-1709	<i>Northplan / Mountain Seed</i> P.O. Box 9107 Moscow, ID 83843 PH: (208) 882-8040
Freshwater Farms 5851 Myrtle Ave. Freshwater, CA 95503 PH: (707) 444-8261	IFA Nurseries, Inc. 463 Eadon Road Toledo, WA 98591 PH:(206) 864-2803	Oasis Environmental, MT PO Box 582 Livingston, MT 59047 PH: (406) 222-7600

Progressive Plants
9180 S. Wasatch Blvd.
Sandy, UT 84093
PH: (801) 942-7333

Purple Sage Farms, Inc.
11741 Bullock Lane
Middleton, ID 83644
PH: (208) 585-6140

Rainier Seeds, Inc.
P.O. Box 187
Davenport, WA 99122-0187
PH: (800) 828-8873

Silver Springs Nursery
HCR 62, Box 86
Moyie Springs, ID 83845
PH: (208) 267-5753

Siskiyou Rare Plant Nursery
2825 Cummings Road

Medford, OR 97501
PH: (503) 772-6846
Sound Native Plants
P.O. Box 10155
Olympia, WA 98502
PH: (206) 866-1046

Watershed Garden Works
2039 - 44th Ave.
Longview, WA 98632
PH:(360) 423-6456

Western Native Seed
P.O. Box 1463
Salida, CO 81201
PH: (719) 363-1071

Westlake Nursery
05720 Canary Road
Westlake, OR 97493
PH:(503) 997-3803

Westscape Nursery
423 N. Tracy,

Bozeman, MT 59715
PH: (406) 388-1116
Wood's Native Plants
5740 Berry Drive
Parkdale, OR 97041
PH: (503) 352-7497

Contractors

Intermountain Habitat, Fairfield,
ID
PH: (208) 764-3516

American Water Resources
219 South River Street, Hailey,
Idaho
PH: (208) 788-2860

TerraGraphics Env. Inc
121 S. Jackson St.
Moscow, ID
PH: (208) 882-7858