

Native Plants for Idaho Roadside Restoration and Revegetation Programs



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Project Advisors: Cathy Ford and Bill Nance*

Rangeland Ecology
and Management
University of Idaho



NIATT

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2006

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Idaho Transportation Department
Highway District cover-photo insets

District 1-blanket flower
District 2-common snowberry
District 3-bluebunch wheatgrass

District 4-snowbrush
District 5-Indian ricegrass
District 6-western yarrow

The preparation of publication was financed in part through funds provided by the Idaho Transportation Department. The opinions, findings, and conclusions expressed in this publication are those of the authors and not necessarily those of the Idaho Transportation Department

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Introduction

This guide profiles a selection of plants native to the state of Idaho. It is intended for the benefit of Idaho Transportation Department (ITD) roadside managers, native plant enthusiasts and travelers throughout the state interested in the use of native plant species along Idaho roadways. The goal is to incorporate more native plant species into future revegetation and restoration programs along Idaho roadsides. The plants described in this guide have the capacity to increase road cut stability, decrease soil erosion, and diminish the presence of weedy species.

When new roads are built, or old roads improved, the roadside and adjacent lands are drastically altered. This physical disturbance of the landscape requires awareness of, and attention to the biological, ecological, and engineering requirements necessary for successful construction of a properly functioning roadway. When road cuts are left bare, these areas contribute to soil loss and play a key role in the establishment of weeds (Tyser and Worley 1992, Hobbs and Humphries 1994). Native vegetation imparts greater soil strength and requires less maintenance than weedy competitors. Incorporating native plants with existing roadside maintenance and road construction strategies promotes sustainability and biodiversity while simultaneously improving roadway stability and roadside aesthetics.

The successful inclusion and establishment of native vegetation into any restoration project requires detailed consideration of site specifics. Each plant species is adapted to specific soil characteristics, including pH, texture, moisture, and nutrient content (Goodwin and Sheley 2003). Water availability and uptake also determine a plant's capacity to germinate, establish, and compete for nutrients and space on road cuts. Accordingly, knowledge about climatic variables, such as temperature and precipitation trends, is important when selecting suitable native plant species for any revegetation program.

Idaho is biologically diverse, with rugged topography and a broad range of climatic regions and unique habitats. This guide highlights native grasses, forbs, and shrubs that exhibit attributes specifically adapted to the soils, terrain, and climate in Idaho. The species descriptions in this guide are intended to facilitate easy recognition of the plants while providing practical information of when, where, and how to cultivate these native plants for restorative use.

Species Selection Criteria

The plants in this guide were chosen primarily because they are native to Idaho, and often native to our neighboring states. In each case, seed and other plant materials can be collected in the wild or purchased from a variety of reputable native plant nurseries throughout the state. None of the species in this guide are listed as threatened or endangered under the Endangered Species Act (ESA) of 1973. Populations of ESA-listed species are often challenged, and grow only in very specific habitats. In order to help protect these challenged species from collection and widespread sale, they are not included in the guide. It is critical to verify the status, origin, and nativity of each seed or cultivar prior to planting, and to use seed/plant propagules collected or cultivated in close proximity to the project area. The species described in this guide have a high likelihood of establishment, and many have considerable longevity. Probability of establishment aside, these plants also maintain characteristics that improve soil stability, and withstand drought, flood, or extreme temperatures without obstructing roadway visibility.

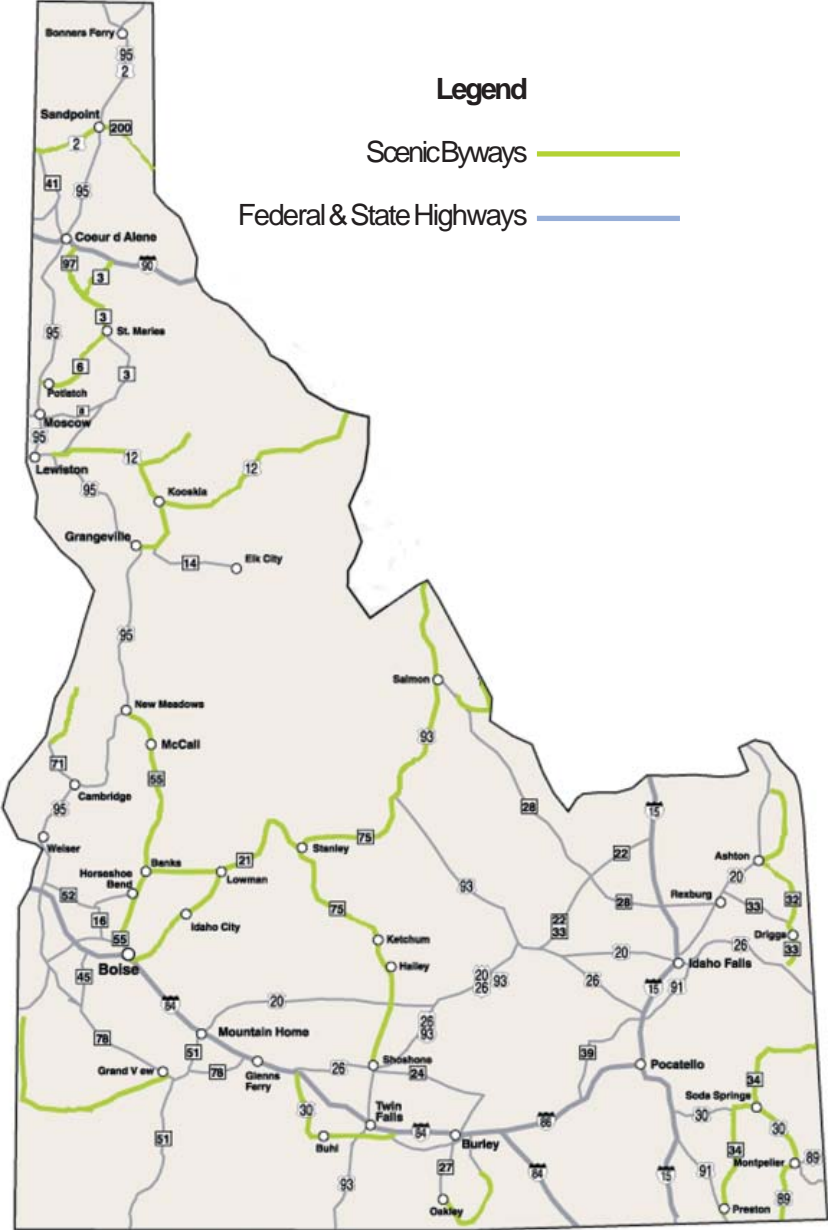
Using the Guide

The plant species in this guide are arranged in sections of grasses, forbs, and shrubs. Each of these growth forms are then arranged alphabetically using the accepted scientific name currently used by the Natural Resources Conservation Service Plants Database. Each description offers tools for identification, along with information about the plant's ecology, natural history, cultural use, and propagation techniques. The guide also specifies appropriate environmental settings for each plant. A quick-reference chart, arranged alphabetically by common name, is located at the back of the guide, listing significant plant attributes such as root form and drought tolerance. A small Idaho Highway District map is included with each species description to depict suitable regions for planting. Detailed maps of Idaho Highways, Highway Districts, precipitation trends, and ecological regions are located in the front of the guide.

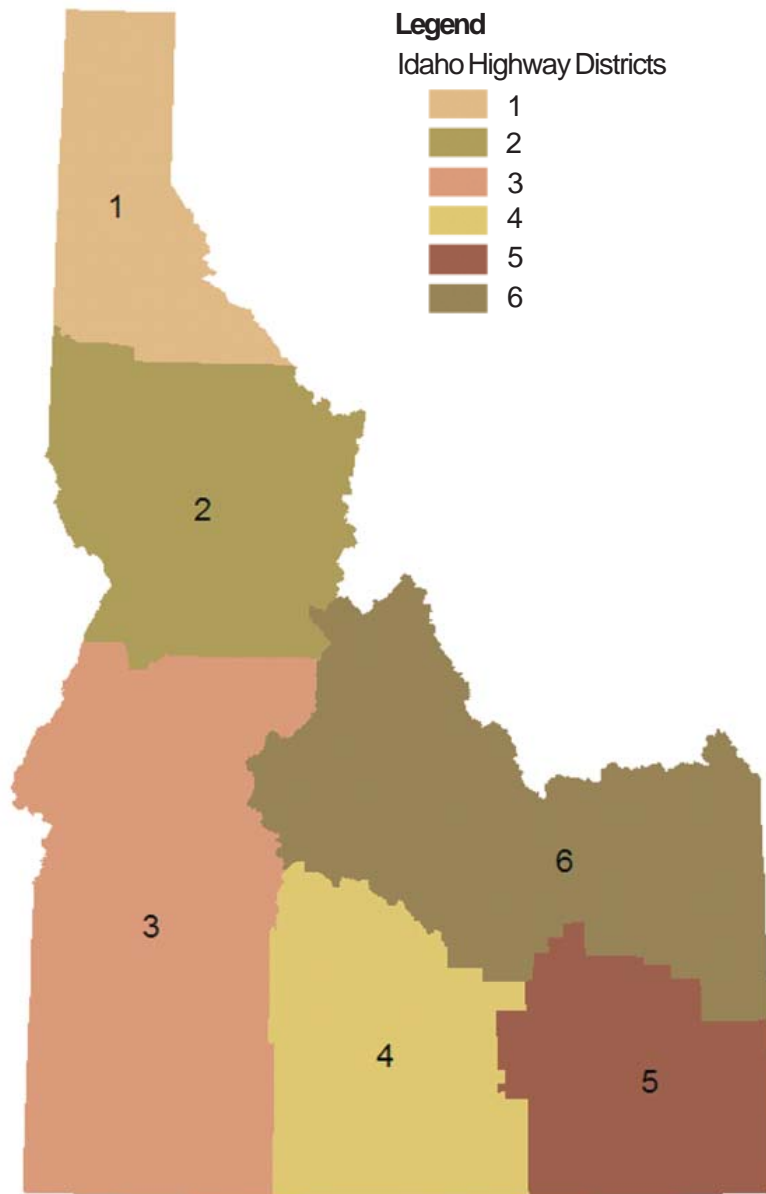
Maps

A map section is included for spatial reference. A road map shows the main arteries of Idaho's highways and byways. A highway district map is included to illustrate the boundaries for jurisdiction and delineate areas suitable for specific species. A map of Idaho's precipitation trend is included because water availability is often one of the most limiting factors for native plant establishment. Additionally a map of Idaho's ecoregions defines areas that have similar climatic and ecological traits such as soils, elevation range, annual precipitation, and area geology. Omernick (1987) coined the term ecoregion, and the concept of combined landscape scale attributes is very useful in the restoration and revegetation arena.

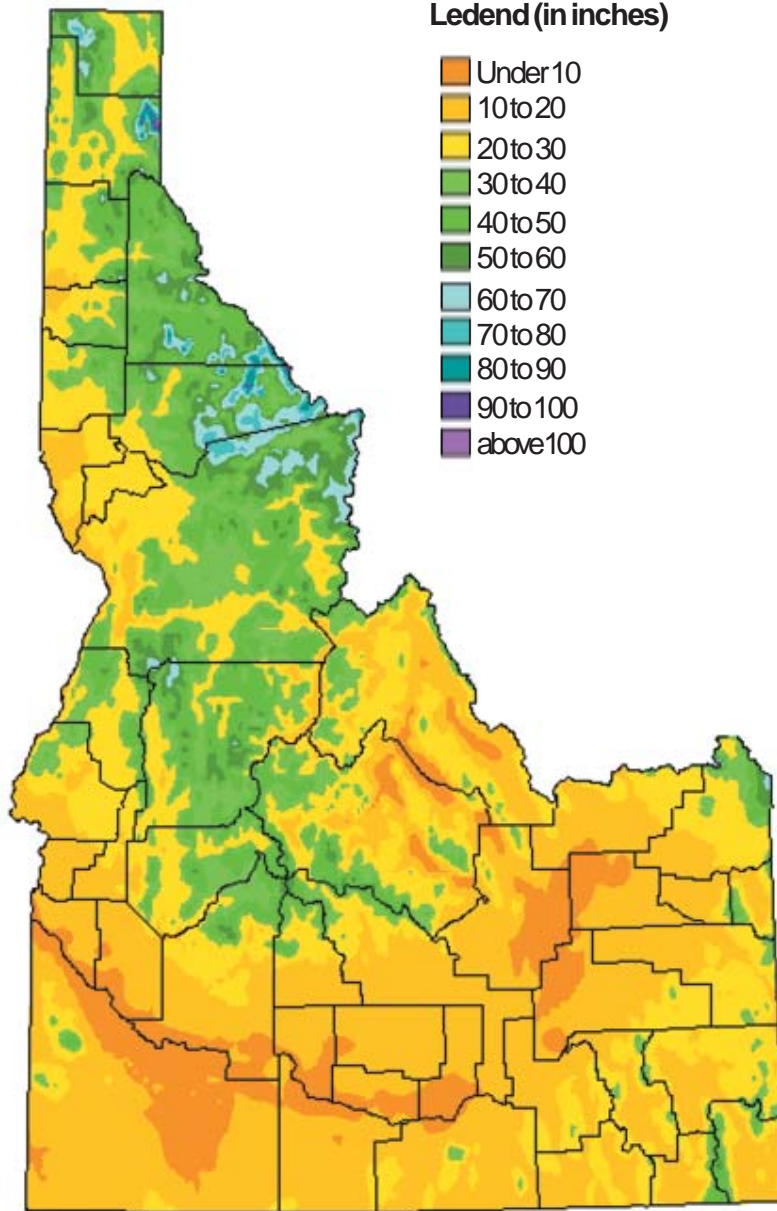
Idaho Road Map



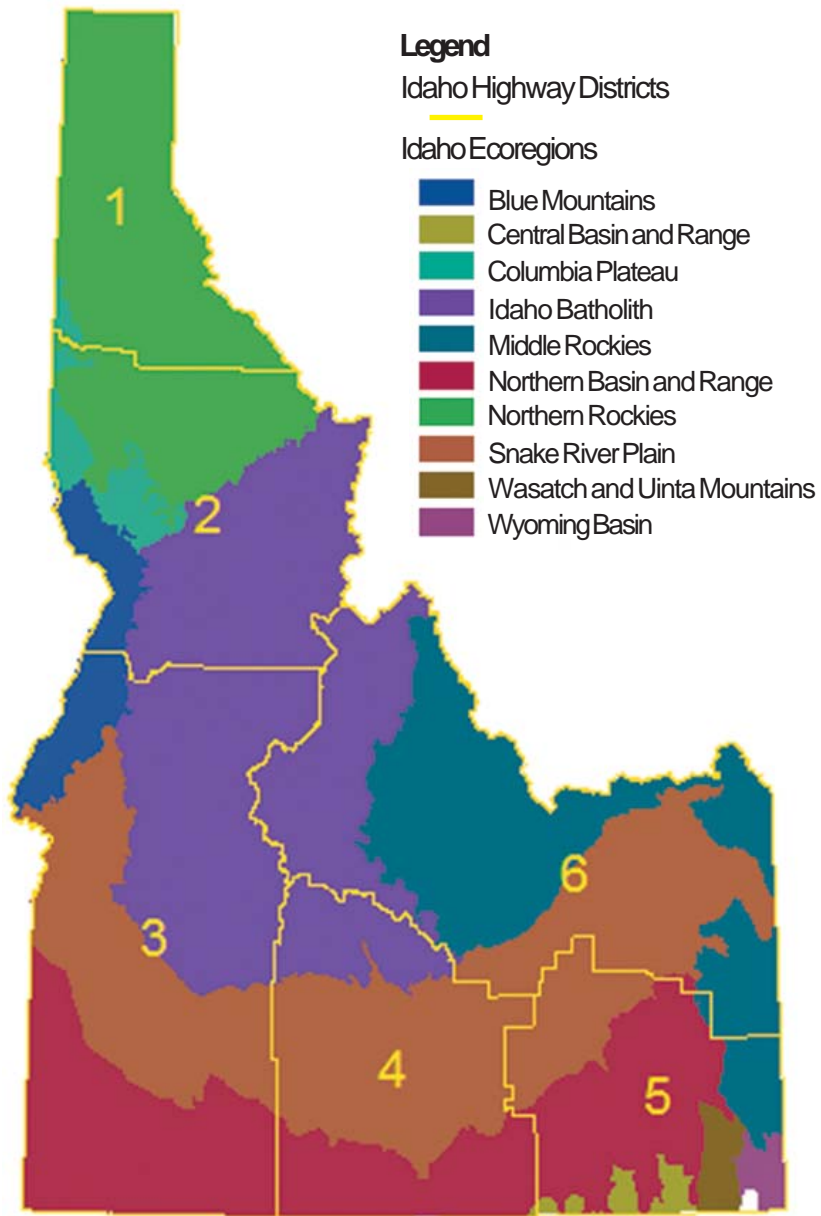
Idaho Transportation Department Highway Districts



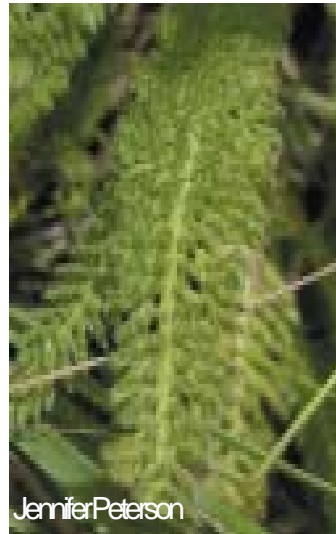
Idaho Annual Precipitation Trend



Idaho Ecoregions with Idaho Highway Districts



Achillea millefolium
Western yarrow, Milfoil



Growth Habit: Erect, aromatic, rhizomatous, perennial forb, growing to 2 feet, with a fibrous taproot.

Botanical Description: Inflorescences are compound corymbs comprised of numerous radiate flowers with small white to cream-colored ray flowers, and tiny white to pink disk flowers. Leaves are fernlike and highly dissected, alternate, and pinnate, up to 6 inches long. Stems are erect up to 40 inches with some side branching.



Western yarrow

The Sunflower Family:

Asteraceae

Bloom Time: May to August

Ecology: Western yarrow has a broad ecological extent, ranging from 200-9,000 feet in elevation and has the ability to colonize multiple habitat types and climatic zones, especially areas of disturbance. While western yarrow has a low palatability rating, it is eaten by domestic and wild grazers early in the season.

Cultural History: Several Native Tribes used western yarrow for pain relief, and some used it for a stimulant or fever reduction. The genus name is derived from Achilles of Greek mythology, as in Achilles' heel. Dried and ground western yarrow flowers and seed can also be used as a seasoning that is similar to pepper.

Seed Collection: Collect globe-like seedhead from mid-August to mid-September into paper bags. The seed is very small, flat and gray.

Seed Treatment: Separate seed from inflorescence by rubbing together and sifting chaff. Small seed lots can be cleaned by hand, while large amounts of seed require specialized equipment such as an air column separator for effective cleaning. Western yarrow requires no pre-planting seed treatment.



Planting: Plant seeds shallow in the soil from March through April. Permanent establishment may take up to two growing seasons.

Precipitation: Grows in areas with 8-20+ inches of annual precipitation.

Soils: Occurs on a variety of weakly developed, well-drained soils.

Uses in Restoration: This species has fibrous roots, is extremely drought tolerant, and grows well in areas of disturbance making it an excellent species for roadside revegetation.

Idaho Highway Districts: Western yarrow is suitable for parts of Idaho Highway Districts 1, 2, 3, 4, 5, and 6.

Artemesia ludoviciana
**Prairie sage, Western mugwort, Wormwood,
White sage**



Growth Habit: Aromatic, rhizomatous, ground-covering, perennial forb/
sub-shrub, growing to 3 ¼ feet, with a coarse fibrous root system and a
prominent taproot.

Botanical Description: Numerous small flower heads are composed of
pale yellow disk flowers. Lower leaves are deeply pinnate with pointed
segments. Upper leaves are lanceolate and entire. Foliage is whitened and
emits distinct sagebrush odor when crushed.



Prairie sage

The Sunflower Family:

Asteraceae

Bloom Time: July to August

Ecology: White sage occurs throughout the western U.S. in a diverse ecological range, from dry open grasslands and shrublands to forested communities, ranging from 3,000-10,000 feet in elevation. Although a late seral species, it establishes quickly following disturbance. White sage provides cover for small mammals and forage for many species of rabbit and deer.

Cultural History: “*Ludoviciana*” is Latin for Louisiana. The smoke from this plant was used by Native Tribes in ceremonies to purify people or animals, spaces, and inanimate objects. This plant was used medicinally by numerous Native Tribes for ailments ranging from headaches and stomachaches.

Seed Collection: Collect seed by hand in early autumn. Strip seed head at maturity, or cut with a sickle into cloth seed bags.

Seed Treatment: Allow seed to dry in cloth bags, separate from seed head by rubbing together and sift to clean. A two week *cold* stratification at 35-40 °F is required to break seed dormancy.

Planting: Sow seed in fall or spring by direct broadcast seeding. Container plants or greenhouse plugs transplant well in spring or fall. Permanent establishment may take up to three years.



Precipitation: Grows in areas with 8-20+ inches of annual precipitation.

Soils: Occurs on dry, rocky soils, with sandy clay textures, and can tolerate slightly acidic to basic soils.

Uses in Restoration: With a minimum rooting depth of 18 inches, white sage is drought tolerant and plays an important role in initial soil cover and slope stabilization. Because it is quick to establish, it thrives in disturbed areas and dry open sites, and forms a rhizomatous mat. It is an excellent component for roadside revegetation programs.

Idaho Highway Districts: White sage is suitable for parts of Idaho Highway Districts 1, 2, 3, 4, 5, and 6.

Balsamorhiza sagitata
Arrowleaf balsamroot



Growth Habit: Erect, unbranched, rhizomatous, aromatic, perennial forb, growing to 3½ feet, with a deep taproot.

Botanical Description: Radiate inflorescences are comprised of yellow, ovate ray flowers toothed at the apex, approximately 1 inch long; disk flowers are yellow and tube shaped. Leaves are basal, approximately 12 inches long, heart-shaped with entire margins and fine silvery hairs on underside. Flower stems are pubescent, growing to 30 inches with few reduced leaves. Seed is a glabrous achene.



Arrowleaf balsamroot

The Sunflower Family:

Asteraceae

Bloom Time: April to July along an altitudinal gradient

Ecology: Arrowleaf balsamroot is distributed across the western United States, in open dry areas with a southern exposure. It has wide ecological amplitude occurring throughout Idaho from sagebrush to forested areas and ranging in elevation from 3,500-8,000 feet. Balsamroot can withstand grazing pressure, but has a low palatability rating and is not readily selected forage.

Cultural History: Arrowleaf balsamroot was integral in Native Tribes diets; leaves and stems were eaten raw, seeds were roasted and ground, and roots were baked. Medicinally, it was employed to alleviate pain from burns, cuts, insect bites, and was used to treat illnesses such as tuberculosis, arthritis, and headaches.

Seed Collection: Collect seed in late summer when flowers are dry, and seeds are dark brown or black.

Seed Treatment: Crush flowerheads to remove seed and sift to clean. Store seed in paper bags at 40 °F and 40% humidity. Extended **cold** and moist stratification are required to break seed dormancy.



Planting: Sow seeds in October to December for direct seeding. The germination period will extend from March to April. Tubelings have a higher establishment rate than direct seeding. Plant tubelings in late fall to over-winter outside and adapt to specific environmental conditions.

Precipitation: Grows in areas with 8-25 inches of annual precipitation, best suited in areas with greater than 10 inches.

Soils: Occurs on well-drained, fine to medium-textured soils.

Uses in Restoration: Arrowleaf balsamroot is extremely drought tolerant, and once established, has a large taproot that provides for increased sub-surface soil stability, making it an excellent species for roadside revegetation.

Idaho Highway Districts: This species is suitable for parts of Idaho Highway Districts 1, 2, 3, 4, 5, and 6.

Delphinium bicolor
Little larkspur



Growth Habit: Weakly erect, low growing, cool season, perennial forb, growing from 4-24 inches, with a fleshy, fibrous root system.

Botanical Description: Flowers are large, irregular, and blue and/white, with 5 petal-like sepals; the upper sepal has a $\frac{1}{4}$ - $\frac{1}{2}$ inch spur. Two pairs of small petals are nested inside the sepals, where the top pair often exhibits prominent white or blue veins, while the lower petals are cupped. Leaves are simple, alternate, and mostly basal; the linear dissections of each leaf give a palmate appearance. Stems are hollow, and glabrous to slightly scabrous, with little branching. The fruit is a three-sided, pod-like follicle containing numerous winged seeds. Sometimes difficult distinguishing from close relative *Delphinium nuticaulis*, which has similar characteristics but its leaves are more deeply lobed and thinner, and grows in the northern latitudes.



Little larkspur

The Buttercup Family:
Ranunculaceae

Bloom Time: May to early July

Ecology: Larkspur is found in moist areas, on varying slopes, from elevations ranging from 3,000-10,000 feet. It is a late seral species and is grazed by wildlife including elk, pronghorn, upland game birds, and small mammals. It is also grazed by domestic livestock, but is considered toxic to cattle, and can also be harmful to horses and sheep.

Cultural History: Some Native American Tribes used a larkspur poultice to ward off lice and other insects. "Delphinium" is a Latin derived word meaning "dolphin" which the flower shape resembles.

Seed Collection: Clip entire seed pod when flower color fades and allow to dry in the pod.

Seed Treatment: Crush pod to remove seed and sift to remove chaff. Larkspur seed requires cold stratification to break seed dormancy and promote germination.

Planting: Direct seeding in fall incorporates natural cold stratification. It is difficult to successfully transplant this species.



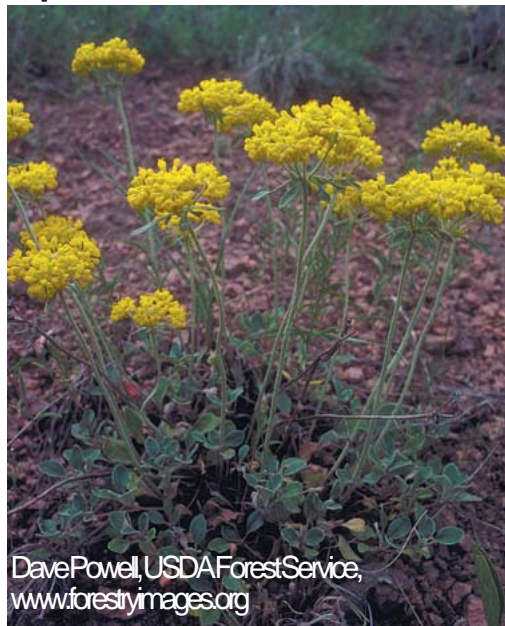
Precipitation: Grows in areas with 8-12 inches of annual precipitation.

Soils: Occurs on well-drained, loamy soils.

Uses in Restoration: Fibrous roots help stabilize upper soil horizons and the species adds both color and biodiversity when incorporated into a restorative seed mix. Little larkspur readily colonizes disturbed areas such as roadsides.

Idaho Highway Districts: This species is suitable for parts of Idaho Highway Districts 3, 4, 5, and 6.

Eriogonum umbellatum
Sulphur flower buckwheat



Growth Habit: Long-lived, low-growing, semi-evergreen, ground-covering forb, growing from 6 -12 inches, with a fibrous taproot.

Botanical Description: Tiny flowers are white to bright yellow arranged in dense clusters (umbels). The flowering stems have a whorl of small leaves below the flowering clusters. Basal leaves form large mats up to 3 feet in diameter. Leaves are green on upper surface and pubescent and grayish on leaf underside.



Sulfer flower buckwheat

The Buckwheat Family:
Polygonaceae

Bloom Time: June to August

Ecology: Sulfer flower buckwheat grows in sagebrush desert, on gravelly ridges, talus slopes, foothills, and mountainous areas throughout the Intermountain West, ranging in elevation from 3,000-8,000 feet. Some birds eat the seeds of this species, and may help with seed dispersal.

Cultural History: Teas and poultices made from this species have a variety of medicinal values including eyewash, intestinal problems, hip and back pain, and discomfort during childbirth.

Seed Collection: Remove whole flowers when rust colored and dry. Seeds fall out of the achene by rubbing flowers together.

Seed Treatment: Soak seeds in a *cold* water bath for 24 hours prior to planting. Alternatively, soak seed in a 1:500 mixture of gibberellic acid and water for 5 hours prior to planting.

Planting: Sow seed directly into soil in the spring, covering seed lightly with soil. Seed can be greenhouse germinated and transplanted as containers or plugs in spring or fall.



Precipitation: Grows in areas with 14-40 inches of annual precipitation.

Soils: Occurs on weakly developed, well-drained soils. Sulphur flower buckwheat also has a high tolerance for salinity.

Uses in Restoration: Because this species is very cold and drought tolerant, it is an excellent addition to roadside seed mixes.

Idaho Highway Districts: Sulphur flower buckwheat is suitable for parts of Idaho Highway Districts 1, 2, 3, 4, 5, and 6.

Eurybia glauca
Gray aster



Growth Habit: Perennial, cool-season, multi-stemmed, highly branched, perennial forb, growing from 15-24 inches with a fibrous root system.

Botanical Description: Composite flowers are violet (occasionally white) borne in corymbs. Leaves are linear to oblong, 1-2 inches in length with entire margins and are pale green in color. Stems are glabrous and highly dissected. Fruit is an achene.



Gray aster

The Sunflower Family:

Asteraceae

Bloom Time: June to July along an altitudinal gradient

Ecology: Gray aster is found in arid and semi-arid habitats, open areas, north-facing slopes, and open woodlands, ranging in elevation from 3,000-10,000 feet. This species is not palatable to domestic or wild grazers.

Seed Collection: Hand collect seeds when achenes are fully mature. Store seed under refrigeration in sealed containers.

Seed Treatment: Gray aster germinates well without pre-planting scarification.

Planting: Direct seeding in the fall incorporates needed temperature stratification.

Precipitation: Grows in areas with 10-20 inches of annual precipitation.



Soils: Commonly found on medium-to coarse-textured dry soils with neutral pH.

Uses in Restoration: With a minimum rooting depth of 10 inches, gray aster works well to stabilize surface soils. This species is also extremely cold tolerant and moderately drought tolerant.

Idaho Highway Districts: Gray aster is suitable for all or parts of districts 1, 2, 3, 4, 5, and 6, especially at higher elevations.

Gaillardia aristata

Gaillardia, Indian blanketflower, Brown-eyed-Susan



Growth Habit: Slender, erect, moderately branched, cool-season, bunched, perennial forb, growing up to 2½ feet, with a taproot.

Botanical Description: Showy flower-heads are about 1-1 ½ inches wide, with ray flowers red at base yellowing towards a broad toothed apex; disk flowers are small and dark in color. Leaves are alternate, entire (occasionally toothed). Stems are branched and leafy toward the base. Both leaves and stems have coarse silvery hairs.



Gaillardia

The Sunflower Family:

Asteraceae

Bloom Time: May to September

Ecology: Native to the United States and found along roadsides. It tolerates heat and dryness, and thrives in sandy plains and deserts ranging in elevation from 5,000-9,000 feet. Gaillardia is considered poor grazing forage, but *Schinia masoni*, a moth, is able to use gaillardia for camouflaged protection from predators. Like many members of the Asteraceae family, gaillardia has composite flower heads comprised of ray and disk flowers.

Cultural History: Gaillardia is one of the notable species found by Lewis and Clark's Corps of Discovery.

Seed Collection: Collect seed by hand from mid-July to late August. The prickly seedhead can be clipped from stems; spread seedheads out to dry in a protected environment.

Seed Treatment: No pre-planting seed treatment is required.

Planting: Sow seed shallowly into soil in the spring. Seed can also be germinated in the greenhouse and transplanted from containers or plugs in spring or fall.



Precipitation: Grows in areas with 16-30 inches of annual precipitation.

Soils: Commonly occurs on coarse-textured, well-drained soils.

Uses in Restoration: Gaillardia is a brilliant, late-season roadside flower with quick-rooting capacity and moderate drought tolerance. When mature, the taproot penetrates to depths greater than 16 inches.

Idaho Highway Districts: Gaillardia is suitable for parts of Idaho Highway Districts 1, 2, 3, 4, 5 and 6, especially the northern districts.

Geranium viscosissimum
Sticky purple geranium, Crane's-bill geranium



Growth Habit: Erect, low-growing, aromatic, perennial forb, growing to 2 feet, with a taproot.

Botanical Description: Flowers have five petals, are white to pinkish-purple, appearing in open clusters on forked stems about 2-3 inches above the leaves. Leaves are typically basal, palmate with toothed tips, pubescent, and range in size from 1-1 ½ inches.



Sticky purple geranium

The Geranium Family:
Geraniaceae

Bloom Time: May to August

Ecology: Sticky purple geranium is one of the most widely distributed flowering plants of western rangelands, found in a variety of habitat types, ranging from low elevation grasslands of 1,000 feet to open forests at 10,000 feet. This species is a food source to small mammals, wild grazers, and bears.

Cultural History: Herbalists have employed many members of the Geranium family to diminish bleeding, and treat ailments such as diarrhea, sore eyes, mouth sores, and chapped lips. This species was traditionally used by Native Tribes to treat colds and sore throats.

Seed Collection: Collect seed by hand in mid-August before the capsules split, placing seed into paper bags. Spread to dry under fine mesh to capture seed as capsules open.

Seed Treatment: Scarify seed with fine-grit sand paper followed by a 24-hour *cold* water soak.



Planting: A greenhouse setting provides greater germination success. Transplant seedlings into pots in spring, and permanently transplant in the fall when roots are established. If direct seeding, sow seed in fall covering lightly with soil; germination will be sporadic and establishment may take up to 3 years.

Precipitation: Grows in areas with 10-20+ inches of annual precipitation.

Soils: Commonly occurs on dry, well-drained soils, but grows in a variety of soil textures.

Uses in Restoration: Sticky purple geranium exhibits rapid root formation and subsequent establishment, adding color and diversity to a restoration project.

Idaho Highway Districts: This species is suitable for parts of Idaho Highway Districts 1, 2, 3, 4, 5, and 6.

Hedysarum boreal
Boreal sweetvetch, Northern sweetvetch,
Western sweetvetch



Growth Habit: Erect, sparsely branched, aromatic, perennial forb growing to 2 feet, with a deep, fibrous taproot.

Botanical Description: Inflorescence is pink to purple arranged in elongated flower clusters called racemes. Flowers are perfect, irregular where the keel is longer than the banner and wing petals. Leaves are compound pinnate with 9-15, 1/3 inch leaflets. Stems bearing flowers are leafless.



Boreal sweetvetch

The Pea Family: Fabaceae

Bloom Time: July to August

Ecology: Boreal sweetvetch typically occurs on grassy slopes, rocky hillsides, and shrublands, ranging in elevation from 4,000-9,500 feet. This plant is palatable to most grazing animals.

Cultural History: Appropriately, the scientific name is derived from the Greek root "*hedys*" meaning sweet, and "*arum*" for smell, as most plants of this genus are fragrant.

Seed Collection: Collect seeds from pods in late August into cloth or paper bags; allow to dry prior to cleaning.

Seed Treatment: Remove seeds from pods by rubbing together, sift to remove chaff. Soak seeds in a cold water bath for 24 hours prior to planting.

Planting: Sow seed directly into soil in the spring, covering seed lightly with soil. Seed can be greenhouse germinated and transplanted from containers or plugs in spring or fall. Inoculation with bacteria increases the nitrogen-fixing capacity of this legume.



Precipitation: Grows in areas with 12-18 inches of annual precipitation.

Soils: Occurs on well-drained, acidic, sandy or loamy soils, and prefers sunlight and moist soil conditions.

Uses in Restoration: Like many species of the pea family, Boreal sweetvetch forms relationships with soil microbes that enhance its ability to fix nitrogen in the soil. The deep taproot establishes quickly and resists disturbances and disease.

Idaho Highway Districts: Boreal sweetvetch is best suited for parts of Idaho Highway Districts 1, 2, and 6.

Ipomopsis aggregata
Scarlet gilia, Skyrocket, Skyrocket gilia



Growth Habit: Erect, unbranched, short-lived, biennial or perennial forb, growing to 3 ½ feet, with a taproot.

Botanical Description: Flowers are scarlet or occasionally whitish with scarlet spots, trumpet shaped and showy ranging from ½-1 ½ inches long and clustered at branch apex. Leaves are mostly basal, but become smaller higher on the stem, approximately 1-4 inches long, pinnate and well dissected.



Scarlet gilia

The Phlox Family: Polemoniaceae

Bloom Time: June to August

Ecology: Scarlet gilia is found in mountainous areas throughout the Intermountain West from foothill elevations of 2,000 feet to mountainous zones up to 8,000 feet. This phlox family member prefers dry meadows, open woodlands, and grows in rocky or cliff areas. Hummingbirds, bees, and butterflies all flock to the vibrant red flowers of this species. Scarlet gilia is susceptible to fungal attack in damp areas.

Cultural History: Native Tribes valued this plant's medicinal value. It was employed for multiple medical ailments. Tea was brewed to treat children's colds and for blood troubles. It was also used to make glue and a blue dye from the roots. Interestingly, when crushed, leaves and flowers have a skunk-like odor.

Seed Collection: Hand collect seeds in fall.

Seed Treatment: Soak seed in a 1:500 mixture of gibberellic acid with water for 5 hours. Rinse with water.

Planting: Sow in fall; rake in lightly. Germination is sporadic and plants generally do not bloom until the second season.



Precipitation: Grows in areas with 8-20 inches of annual precipitation.

Soils: Occurs on fertile, well-drained, sandy-textured soils.

Uses in Restoration: Scarlet gilia is drought tolerant, has minimal requirements for germination and establishment, and is relatively easy to grow. This species is also an easily recognized, colorful plant that occurs naturally along Idaho roadsides, making it an excellent addition to roadside seed mixes.

Idaho Highway Districts: A suitable plant for parts of Idaho Highway Districts 1, 2, 3, 4, 5, and 6.

Linum lewisii
Blue flax, Prairie flax



Growth Habit: Semi-evergreen, perennial forb growing to 2½ feet, with a taproot.

Botanical Description: Showy blue flowers are displayed in loose clusters. Flowers have five petals, five sepals, and five stamens. Leaves are alternate, simple, and smooth.



Blue flax

The Flax Family: Linaceae

Bloom Time: May to July

Ecology: This species is highly adaptable and suitable for elevations ranging from 800-10,000 feet. This plant grows in open, hot, dry sites, as well as in sagebrush, juniper, and mountain brush communities. Blue flax has fair forage value for wildlife and livestock. *Linum perene*, a naturalized European flax biotype, is commonly associated with its native counterpart.

Cultural History: Meriwether Lewis described this plant in 1805. Many flax species are used in textiles because the stems have strong natural fibers, and oil can be pressed from its seed. Although blue flax does not produce fiber or oil, it is extremely hardy and often has two annual blooming flushes.

Seed Collection: Hand collect seed from July to mid August. Tennis rackets work well to beat the seed from the plant into a bucket or seedbag.

Seed Treatment: No pre-planting seed treatment is required.



Planting: Sow seed directly into soil in the spring, covering seed lightly with soil. Seed can also be germinated in the greenhouse and transplanted from containers or plugs.

Precipitation: Grows in areas with 10-24 inches of annual precipitation.

Soils: Commonly occurs in well-drained soils with moderately basic to slightly acidic pH.

Uses in Restoration: This species is extremely drought and cold tolerant. It is useful for increasing roadside soil stability, enhancing plant diversity, and improving roadside aesthetics.

Idaho Highway Districts: Blue flax is suitable for parts of Idaho Highway Districts 1, 2, 3, 4, 5, and 6.

Lupinus sericeus
Silky lupine, Blue bonnet lupine



Growth Habit: Showy, erect, cool-season, perennial forb, growing to 2 feet, with a deep, fibrous taproot.

Botanical Description: Irregularly shaped sweet-pea-like (bilabiate) flowers are ¼-½ inch long, and arranged on stalks in 3-5 inch racemose inflorescence. Flower color ranges from shades of blue to purple, yellow, or white. Leaves are palmately compound and alternate, reducing in size further up the stem. Flat hairs appear on leaves and stems lending to silvery appearance. Typically there are several sparsely-branched stems. Silky pods, approximately 1-inch long produce small brown seed.



Silky lupine

The Pea Family: Fabaceae

Bloom Time: May to August

Ecology: Silky lupine occurs on dry, rocky, and varied slopes ranging in elevation from 1,500-10,000 feet. This plant is very toxic to sheep and moderately toxic to other livestock, and can cause birth defects in cattle. After fire or other repeated disturbance, this plant often re-sprouts from a woody stem just below the soil surface called the caudex. Lupine flowers tend to change color after pollination, which is why a single plant can have multi-colored inflorescence. Additionally, the roots have a nitrogen-fixing capacity, allowing silky lupine to grow in areas deficient in nitrogen.

Cultural History: The common name “silky lupine” originates from its Latin roots; “*sericeus*” meaning “silky.” This species was used by some Native Tribes to treat eye irritations.

Seed Collection: Collect seed into paper bags when pods are tan. Lupine can be challenging to collect due to staggered seed maturity. Spread collected seed pods out to dry and cover with a fine mesh to capture seed as it erupts from pods.

Seed Treatment: Sift seed to remove chaff and store in paper bags. Soak seeds in *hot* water for 1-3 minutes; follow directly with a 24-hour *cold* water soak. After water scarification, seed requires a 30 day *cold*/moist stratification.



Planting: Sow seed in late fall to incorporate natural cold stratification during the winter months. Although it can survive transplanting, it establishes best with direct seeding. Inoculate lupine seed with *Rhizobium* when planting to promote nitrogen-fixing capacity.

Precipitation: Grows in areas with 8-14 inches of annual precipitation; best suited for areas with 10-20 inches of annual precipitation.

Soils: Commonly occurs on a variety of well-drained soils.

Uses in Restoration: A very long-lived, showy perennial, with soil nitrogen-fixing capacity and a substantial taproot, excellent for soil stabilization.

Idaho Highway Districts: Silky lupine is suitable for parts of Idaho Highway Districts 1, 2, 3, 4, 5, and 6.

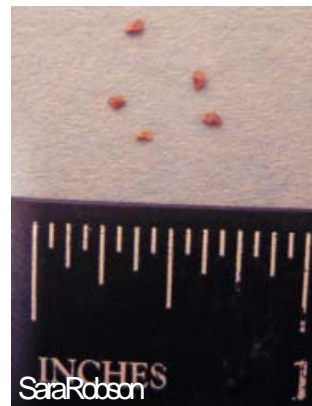
Penstemon venustus

Venus penstemon, Lovely penstemon, Beardtounge



Growth Habit: Medium-lived, erect, perennial growing to 2 ½ feet, with a fibrous taproot.

Botanical Description: Pink to purple flowers are tubular with distinct upper and lower parts of the corolla, and arranged in loose clusters. Leaves are opposite, decussate (pairs are perpendicular to each other above and below), and finely toothed.



Venus penstemon

The Figwort Family:
Scrophulariaceae

Bloom Time: May to August

Ecology: Venus penstemon grows at elevations ranging from 1,000-6,000 feet in elevation. This penstemon species is predominantly found in western parts of Idaho. Venus penstemon may be an indicator of previous disturbance when found on adjacent, more favorable sites.

Cultural History: The term “penstemon” is derived from the Greek words “pente” meaning five and “stemon” meaning stamen, referring to the five stamens.

Seed Collection: Hand harvest by stripping seed capsules when dry, usually in late summer. Clean seed should be dried and stored in a cool dry place.

Seed Treatment: No pre-planting seed treatment is required.

Planting: Shallowly broadcast seed in spring or fall. Early spring seeding will emerge the following season, flowers will establish during the second growing season.



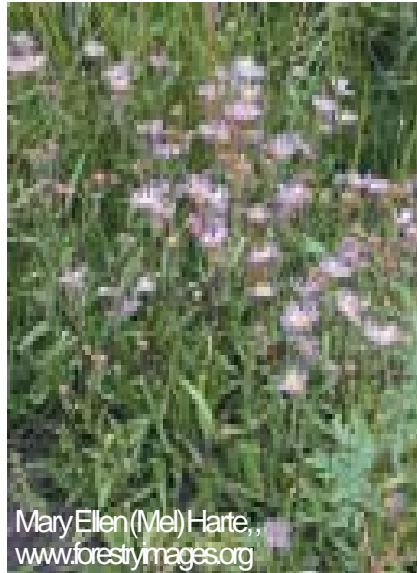
Precipitation: Grows in areas with 20-40 inches of annual precipitation.

Soils: Occurs on a variety of well-drained, disturbed soils.

Uses in Restoration: Venus penstemon is an excellent soil stabilizer, and it is very cold and drought tolerant. This species improves roadside aesthetics and is an excellent component of roadside seedmixes.

Idaho Highway Districts: Venus penstemon is suitable for Idaho Highway Districts 1, 2, 3, and the western half of 4.

Symphotrichum spathulatum
Western mountain aster



Growth Habit: Erect, showy, perennial, growing to 2½ feet with a taproot.

Botanical Description: Blue to purple ray flowers and yellow disk florets compose a large compound inflorescence. Leaves are blade-like and pubescent. Stem is highly branched with a single inflorescence on each terminal branch.



Western mountain aster

The Sunflower Family:

Asteraceae

Bloom Time: July to September

Ecology: Western mountain aster is found in open moist areas, north facing slopes and open woodlands, ranging in elevation from 3,000-10,000 feet.

Cultural History: The Latin word “aster” means “star”. When used in plant names, it often refers to the appearance of the flowerhead which is an arrangement of many ray flowers and disk florets. Together, the multiple flowers comprise a compound inflorescence. Scientific names continually change to reflect new-found genetic relationships in the plant kingdom; *S. spathulatum* is no exception and was once called *Aster occidentalis*.

Seed Collection: Collect seed in September using a rechargeable hand-held vacuum. This method gathers only mature seed, leaving undeveloped seed to ripen. Store seeds in paper bags at room temperature.

Seed Treatment: Separate seed from pappus by rubbing over a fine mesh screen and sifting the chaff. Larger amounts of seed may require using a hammermill and air screen equipment. Store clean seed at 40 °F prior to planting. No pre-planting scarification or temperature stratification is required.



Planting: Sow seed in early spring, germination will occur within 3-4 weeks. Greenhouse germination combined with transplanting in the early spring is an alternative propagation method for western mountain aster.

Precipitation: Grows in areas with 10 to 20 inches of annual precipitation.

Soils: Adapted to deep well-drained soils.

Uses in Restoration: Western mountain aster is an excellent addition to roadside seed mixes. Once established, it is a prolific seed producer and readily reseeds itself.

Idaho Highway Districts: This species is appropriate for parts of Idaho Highway Districts 1, 2, 3, and 4, especially the northern districts.

Thermopsis montana
**Mountain goldenpea, Mountain golden banner,
False lupine**



Growth Habit: Erect, rhizomatous, colony-forming, perennial forb growing to 3 feet, with a deep, fibrous taproot.

Botanical Description: Flowers are yellow, sweet-pea-like (bilabiate), forming an erect and dense raceme. Three smooth leaflets comprise alternate, trifoliate leaves on branched stems. Branches have distinct large stipules. Seed pods are 2-3 inches long with 3-7 seeds per pod.



Mountain goldenpea

The Pea Family: Fabaceae

Bloom Time: May to August

Ecology: Occurs in moist meadows, open forests, and disturbed areas, ranging in elevation from 2,500-7,000 feet. The roots have a nitrogen-fixing capacity, allowing them to thrive in areas with disturbed or degraded soils. Mountain goldenpea is highly competitive, can withstand heavy grazing, and can regenerate after fire.

Cultural History: “Thermopsis” is derived from the Greek origin which translates to “like a lupine.” There is evidence that the quinolizidine alkaloids in this species are potentially hazardous to cattle and horses.

Seed Collection: Collect seed in July and August when dry pods first split. Pods can be collected and stored in paper bags until cleaning.

Seed Treatment: Crush pods in hand to remove seed, and sift to clean. Scarify seed in a 180 °F hot water bath and allow to cool in water for several hours. Inoculate seeds with the appropriate *Rhizobium* to enhance nitrogen-fixing properties.



Planting: Sow seed into tubes in a greenhouse in January, keeping seed amply watered for best germination results. Transplant well-rooted vegetative propagules in spring or fall. If seeding, sow seed in fall for spring emergence; direct seeding has very low germination percentage.

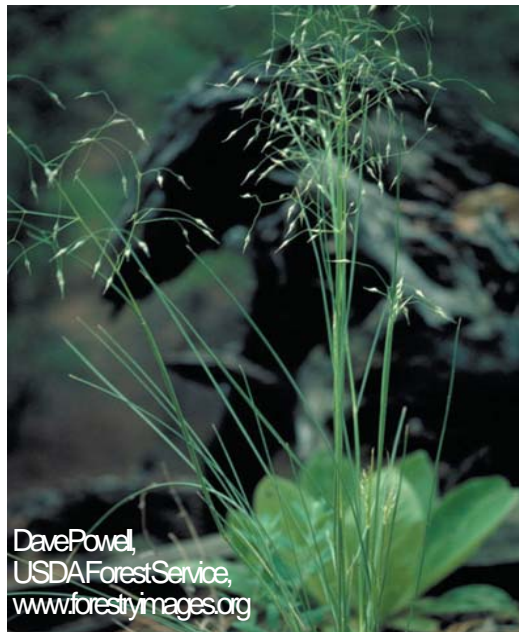
Precipitation: Grows in areas with 10-16 inches of annual precipitation.

Soils: Adapted to well-drained, sandy soils, but grows in a variety of soil textures.

Uses in Restoration: Mountain goldenpea is a nitrogen-fixing species with a strong underground root system, excellent for soil-slope stabilization.

Idaho Highway Districts: Mountain goldenpea is suitable for parts of Idaho Highway Districts 1, 2, 3, 4, 5, and 6, especially the northern districts.

Achnatherum hymenoides
Indian ricegrass, Sand bunchgrass



Growth Habit: A medium lived perennial, cool season grass that forms dense clumps and grows to heights ranging from 4 in. to 2 ft. tall. Will reproduce via seeds and tillers

Botanical Description: Inflorescence is a spreading panicle with single terminal flowers on each hair like branch. Flowers are perfect, producing round, black seeds covered with short, white hairs. Leaves are slender and tightly rolled; growing from clump's base



Indian ricegrass

Family: Poaceae

Tribe: Stipeae

Bloom Time: May (lower elevations) to July (higher elevations)

Ecology: Indian ricegrass occurs at elevations ranging from 2,000 to 10,000 feet. Indian ricegrass an extremely palatable plant for domestic livestock and wildlife year round, but is not considered a hay species.

Cultural History: The seed of Indian ricegrass is very nutritious and was once a staple food of many Native Tribes.

Seed Collection: Collect seed in late June or early July into paper bags. Although the seed is very small, when ripe, it falls readily from plant.

Seed Treatment: Requires a cold stratification or scarification

Planting: Seed Indian ricegrass in very early spring or late fall. Stands can take up to five years to fully establish.

Precipitation: Grows in areas with 7-20 inches of annual precipitation.



Soils: Adapted to sandy, well drained soils, coarse-textured soils, and does not tolerate poorly drained soils. Indian ricegrass is a drought tolerant species.

Uses in Restoration: Very effective soil stabilizer for areas affected by wind erosion and low rainfall.

Idaho Highway Districts: Indian ricegrass is suitable for Idaho Highway Districts 1, 2, 3, 4, 5, and 6.

Carex nebrascensis
Nebraska sedge



Growth Habit: Densely tufted, cool season, rhizomatous, fibrous rooted, perennial sedge growing from 8-36 inches.

Botanical Description: Inflorescence is a narrow terminal spike; terminal spikes are staminate (male), lateral spikes are pistillate (female). Staminate spikes are comprised of several flowers with dark scales, pistillate spikes are comprised of many small florets with dark brown or black scales. The fruit is an achene. Leaf blades are alternate, flat, linear, and channeled near the base. Stems are triangular and erect.



Nebraska sedge

The Sedge Family: Cyperaceae

Bloom Time: May to July

Ecology: Nebraska sedge grows in wet meadows, wetlands, along stream banks, springs, fresh marshes, lake shores, and in ditches, and is highly palatable forage for domestic and wild grazers. It has an altitudinal range from mid-elevations up to 9,000 feet. This species is one of the sedges associated with sagebrush communities. Because Nebraska sedge is a common riparian species, its presence or absence is an indicator of grazing effects on riparian areas.

Cultural History: The stems of this species were eaten by Native Tribes in times of famine.

Seed Collection: Collect seeds in fall by clipping inflorescence into a paper bag.

Seed Treatment: Clean seed by rubbing against fine gauged screen, and sift or fan to remove chaff. Scarify seeds with 100 grit sandpaper. Stratify seeds for 30 days at 37 °F.

Planting: Sow seeds in fall to initiate natural cold stratification. Plant plugs or containerized plants in early spring or early fall.



Precipitation: Grows in areas with 3+ inches of annual precipitation.

Soils: Occurs on moist clay loams, grows in a wide variety of soil textures, and tolerates moderately acidic pH values.

Uses in Restoration: The dense, deep, root structure enhances soil stability and compaction resistance. This species is very useful for roadways along water bodies.

Idaho Highway Districts: Nebraska sedge is appropriate for parts of Idaho Highway Districts 1, 2, 3, 4, 5, and 6.

Deschampsia caespitosa
Tufted hairgrass, Tussock grass



Growth Habit: Native, cool season, erect, long-lived, dense perennial bunch grass growing to 48 in.

Botanical Description: Panicle inflorescence is generally narrow, and often nodding. The whorled branches bear spikelets at or near the tips. Spikelets are comprised of 2 to 3 flowers, each with two basally awned florets. Stems (culms) are hollow, erect and smooth. Leaves are flat, sometimes folded. Blades have tiny angled hairs (magnification required to view) on the margins and the top of the blade, hairs are absent on the lower blade.



Tufted hairgrass

Family: Poaceae

Tribe: Aveneae

Bloom Time: July to September

Ecology: Tufted hairgrass is found from sea level to 14,000 ft, from grassland to open forest communities. Tufted hairgrass also thrives in wetter areas, although it rarely occurs in dense shade. It is considered a component of climax communities, and is a facultative wetland species in Montana.

Cultural History: Tufted hairgrass is important in wetland communities for filtering sediments and pollutants, and providing food and nesting cover for a variety of birds and rodents.

Seed Collection: Seeds are collected from mid-August to mid-September when the seed is tan, mostly hardened, but not yet shattered. The seeds can be collected by shaking the inflorescence into a paper bag.

Seed Treatment: Spread seed on a sheltered tarp to dry for 3 to 5 days, until no moisture is present. Because the seed is so small, cleaning this seed is difficult. Large amounts of seed can be cleaned with mechanical equipment, while small amounts of seed can be sifted by hand, but takes considerable manual labor. Tufted hairgrass seed requires a 10-day cold stratification between 32 °C to 34 °C followed by a warm stratification between 72 °C to 77 °C.



Planting: Direct seeding in the spring or late fall is best. If possible, keep the area moist for 14 days to enhance germination and establishment.

Precipitation: Grows in areas with 20-40 inches of annual precipitation.

Soils: Tufted hairgrass is adapted to a variety of soil types such as sandy loams, silt loams, and clays. In Idaho it is generally found on granitic material.

Uses in Restoration: Tufted hairgrass is adaptable to a variety of environments, and is an excellent competitor, especially on disturbed sites.

Idaho Highway Districts: Tufted hairgrass is appropriate for areas in districts 1, 2, 3, 4, 5, and 6.

Elymus elymoides
Squirreltail, Bottlebrush squirreltail



Growth Habit: A short-lived, cool season, bunchgrass growing up to 20 inches with a fibrous root system.

Botanical Description: Erect spike inflorescence have 2-3 spikelets per node, each having 2-6 florets. Florets have $\frac{1}{4}$ - $\frac{1}{2}$ inch awns which spread as the plant matures, forming a bristly "bottlebrush" appearance. Leaves are flat or slightly rolled inward (involute) and grow 2-8 inches long.



Squirreltail

The Grass Family: Poaceae

The Wheat Tribe: Triticeae

Bloom Time: May to July

Ecology: Squirreltail is common throughout the Intermountain West with an elevation range between 3,500-9,000 feet. This is a dominant grass species in Idaho's shadscale communities. This species is often an increaser in areas of disturbance.

Cultural History: "Elymus" is derived from the Greek word "elymos," meaning "millet." The bushy nature of the inflorescence provides the common names "bottlebrush" and "squirreltail." Scientific names change due to advances in genetic studies; the previously accepted name for *E. elymoides* was *Sitanion hystrix*.

Seed Collection: Collect seed from late July to September prior to seed shatter. Hand harvest is possible, but challenging. If wild harvesting, collect seed into tubs or large paper bags to accommodate the bulky, awned seedheads. Store seed in a cool, dry environment, in plastic bags.

Seed Treatment: Spread seed on a sheltered tarp to dry. Turn seed daily for 3-5 days until completely desiccated. Once dry, thresh and sift to clean. Large amounts of seed are efficiently processed with mechanical cleaning equipment, while small seed can be processed by hand. No pre-planting scarification or temperature stratification is required for germination.



Planting: Sow seed in early spring or late fall. Some weed control may be necessary to promote good establishment.

Precipitation: Grows in areas with 6-18 inches of annual precipitation.

Soils: Occurs on well-drained soils having a variety of textures and can tolerate moderate salinity.

Uses in Restoration: Squirreltail is a priority species for restoring native plant communities in the Great Basin and the Columbia River plateau. This species thrives on disturbed sites and is an excellent component in restoration and revegetation seed mixes. Squirreltail can be very effective for preventing wind erosion due to the extensive root system that reaches depths beyond 40 inches and spreads laterally 16 inches.

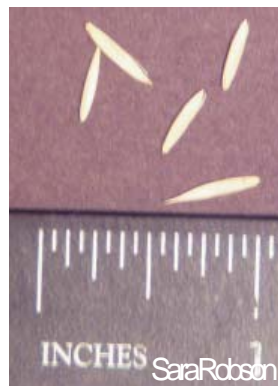
Idaho Highway Districts: Squirreltail is appropriate for parts of Idaho Highway Districts 3, 4, 5, and 6.

Elymus trachycaulus
Slender wheatgrass, Slender wildrye



Growth Habit: Erect, cool-season, short-lived, bunchgrass growing to 2 ½ feet with a fibrous root system.

Botanical Description: Inflorescence is a long spiked raceme, ranging from 2-10 inches, with one spike per node. Overlapping spikelets have 3-7 small florets. Round stems are tinged reddish-purple near base. Leaves are slender and flat with a pointed apex; auricles are very short or absent.



Slender wheatgrass

The Grass Family: Poaceae

The Wheat Tribe: Triticeae

Bloom Time: Late May to early August

Ecology: Slender wheatgrass is found throughout the North American continent with the exception of the southeastern United States. It ranges in elevation from 4,500-12,000 feet. It is considered a pioneer species in many habitats and disturbed areas and has wide ecological amplitude; it is often a component of restorative seed mixes.

Cultural History: “Elymus” is derived from the Greek word “elumos,” which was an ancient grain.

Seed Collection: Collect seed in late July when inflorescence is dry, but not yet shattered, and seed is not fully hard. Clip the inflorescence or strip seed from the spike into paper bags for transport and storage prior to cleaning.

Seed Treatment: Separate seed from inflorescence by rubbing together, sift to remove chaff. Small amounts of seed can be hand processed, while large amounts of seed may require threshing and air screening equipment. No pre-planting seed treatment is required for germination.



Planting: Sow seed in fall in drier areas, if area annual precipitation exceeds 16 inches, sow seed in spring.

Precipitation: Grows in areas with 8-25 inches of annual precipitation.

Soils: Occurs on a variety of dry, well-drained soils, but will grow in moist areas.

Uses in Restoration: Slender wheatgrass germinates and establishes rapidly, exhibiting dense fibrous roots useful for soil erosion control in roadside revegetation and restoration programs. This species will persist long enough for slower growing species to establish.

Idaho Highway Districts: Slender wheatgrass is suitable for parts of Idaho Highway Districts 1, 2, 3, 4, 5, and 6.

Festuca idahoensis
Idaho fescue, Blue bunchgrass



Growth Habit: Densely tufted, cool-season, perennial bunchgrass growing to 3 feet with a fibrous root system.

Botanical Description: Inflorescence is a slim, 3-6 inch panicle with ascending branched spikelets comprised of 5-7 florets. The lemma is robust and straight with a short awn. Fine basal leaves have a bluish tint and grow 5-7 inches long and roll inward (involute).



Idaho fescue

The Grass Family: Poaceae

The Bluegrass Tribe: Poaeae

Bloom Time: May to July

Ecology: Idaho fescue grows throughout North America's rangelands ranging from 1,300-10,000 feet in elevation; it is especially abundant on northern exposures. This species is one of the West's most important grasses because it has excellent forage value. Idaho fescue is a late seral species found in relic landscapes relatively free from disturbance, but is also well suited for seeding on disturbed sites due to its wide ecological amplitude.

Cultural History "*Festuca*" is an ancient word meaning "straw" or "nothing much."

Seed Collection: Collect seed from mid to late-August, prior to seed shatter, when spikelets are light tan. This species is easily hand harvested, by stripping seed or clipping the entire inflorescence into paperbags.

Seed Treatment: Spread seed on tarps to dry. Separate seed from inflorescence by rubbing and sifting. No pre-planting seed treatment is required, but seed exposed to cold stratification has a higher germination rate.



Planting: Sow seed in early spring or late fall. Planting established plugs is an additional technique to achieve rapid soil stabilization.

Precipitation: Grows in areas with 6-30+ inches of annual precipitation, but is more vigorous in areas with 14+ inches.

Soils: Commonly occurs on well-drained loams, but grows in a variety of soil types.

Uses in Restoration: An excellent soil stabilizer on multiple soil types, slopes, and aspects.

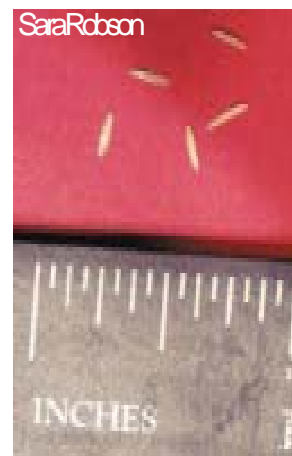
Idaho Highway Districts: Idaho fescue is appropriate for parts of Idaho Highway Districts 1, 2, 3, 4, 5, and 6.

Poa secunda
Sandberg bluegrass



Growth Habit: Erect, densely tufted, long-lived, cool season, bunchgrass growing to 12 inches with a fibrous root system.

Botanical Description: Panicle inflorescence is narrow, loosely branched and grows up to 8 inches long. Spikelets have 2-5 flowers and no basal hairs. Stems (culms) are wiry and erect with 1-3 reddish nodes bearing leaves. Basal leaves are 1-3 inches long. Leaf blades are blue-green, flat, folded, or rolled slightly inward, with a prominent double midrib on the top leaf surface.



Sandberg bluegrass

The Grass Family: Poaceae

The Bluegrass Tribe: Poeae

Bloom Time: April to June

Ecology: Sandberg bluegrass is prominent in the arid and semi-arid regions of the West, ranging from 1,000-12,000 feet in elevation. It is a widely-distributed component of the western United States sagebrush-grassland vegetation community. This species greens up in early spring and is an important forage species because it is highly palatable and has good grazing value for wild and domestic grazers. The Townsend's ground squirrel (*Spermophilus townsendii*) helps with propagation because about half its dietary intake is Sandberg bluegrass seed.

Cultural History: The scientific name change from *Poa sandbergii* to *Poa secunda* was initiated due to the priority of the species description.

Seed Collection: Collect ripe seed in early June when inflorescence is dry, but not yet shattered, and seed is not completely hardened. To harvest, strip the seed from the inflorescence or clip the entire panicle. Collect and store seeds in paper bags.



Seed Treatment: Small amounts of seed can be rubbed free from the inflorescence and sifted clean; large amounts of seed require threshing and air screening equipment. Seed germinates well without pre-planting treatment.

Planting: Sow seed 2 months prior to the wet season depending on area precipitation rate.

Precipitation: Grows in areas with 8-20 inches of annual precipitation.

Soils: Occurs on deep, sandy to silty loams, and is adapted to medium- to fine-textured soils.

Uses in Restoration: Sandberg bluegrass has an extensive and shallow fibrous root system for increased surface-soil stabilization.

Idaho Highway Districts: This species is suitable for parts of Idaho Highway Districts 1, 2, 3, 4, 5, and 6.

Pseudoroegneria spicata
Bluebunch wheatgrass



Growth Habit: Long-lived, cool-season, densely-tufted, perennial bunchgrass growing up to 4 feet, with a fibrous root system.

Botanical Description: Erect spike inflorescence are comprised of 4-8 spikelets (one per node) born on an elongated hair-like stalk. Spikelets often have awns $\frac{1}{4}$ - $\frac{1}{2}$ inches long. Leaves have a bluish hue and are flat or rolled slightly inward (involute) with a prominent mid vein on upper leaf surface.



Bluebunch wheatgrass

The Grass Family: Poaceae

The Wheat Tribe: Triticeae

Bloom Time: May to June

Ecology: Bluebunch wheatgrass is common throughout the Intermountain West, recovers rapidly after low to moderate grazing, and is one of the western rangeland's most important forage species because it is highly palatable to wildlife and livestock. Bluebunch wheatgrass has wide ecological amplitude, ranging in elevation from 300-10,000 feet. Seasonal development varies with different site characteristics.

Cultural History: Some Native American Tribes used bluebunch wheatgrass as a medicinal plant for arthritis and sores. It was also spread on floors of pit houses and stuffed in moccasins for insulation in the cold seasons.

Seed Collection: Collect seed by clipping the entire inflorescence into paper bags for transport and storage prior to cleaning.

Seed Treatment: Separate seeds from inflorescence by rubbing together and sift to remove chaff. An air column separator may be needed to clean large seed lots. Store clean seed in paper bags at 40° F at 40% relative humidity. No pre-planting seed treatment for germination is required.



Planting: Sow seed in late fall, or plant plugs or container stock in the spring or fall. Expect plants to flower in the second growing season.

Precipitation: Grows in areas with 6-35 inches of annual precipitation.

Soils: Occurs on well-drained soils, and grows in a variety of soil textures.

Uses in Restoration: Bluebunch wheatgrass is extremely drought tolerant. Its extensive fibrous root system can reach depths greater than 4 feet, making it an excellent species for roadside soil stabilization.

Idaho Highway Districts: Bluebunch wheatgrass is suitable for parts of Idaho Highway Districts 1, 2, 3, 4, 5, and 6.

Amelanchier alnifolia
Serviceberry, Pacific serviceberry,
Saskatoon serviceberry



Growth Habit: Large, erect, clustered, stoloniferous, cool-season shrub or small tree growing from 3-40 feet in height, with a 6-12 inch diameter trunk and a deep fibrous taproot.

Botanical Description: Simple, alternate, deciduous leaves, 1-2 inches long, oval, with prominent veins extending to leaf margins. As with most members of the Rose family, five sepals unite at the base of the flower to form a tube or cup, to which the petals (also usually five) and stamens are attached. Flowers are white with strap-like petals about 1 inch long. Fruits are ¼-½ inch dark-blue berry-like pomes that ripen from June to July.



Serviceberry

The Rose Family: Rosaceae

Bloom Time: May to June

Ecology: Serviceberry is abundant across the Rocky Mountains in dry forests, open hillsides and rocky slopes of drier regions at elevations ranging from 200-10,000 feet. It is an important shrub in juniper-woodland communities, and is common in ponderosa pine forests. Serviceberry is a valuable browse plant for livestock and wild ungulates. Additionally, numerous birds and small mammals eat the fleshy fruits and find shelter among the branches. This species is able to resprout after fire. It may be difficult to differentiate *Prunus virginiana* (chokecherry) from serviceberry when neither is flowering nor fruiting. The leaves of both are toothed, but serviceberry leaves are toothed only towards the top half of the leaf.

Cultural History: Serviceberry bears small, dark-red to deep-blue berry-like fruits, which are edible, although they have little taste. The berries were an important plant food used by the Native Tribes throughout the northwestern United States and western Canada. Native Peoples made pemmican by pounding dried serviceberries with dried meat. Arrow shafts and tee-pee poles were made from the hard, straight-grained wood.

Seed Collection: Collect seed when fruits are very ripe or dry, during late summer months. Refrigerate seed until cleaning and pre-planting treatment. Notably, wild collected seed is often not viable and/or infested by insects.



Seed Treatment: Seeds should be soaked in a 3:1 water solution with 3% hydrogen peroxide for 20 minutes, followed by a 48-hour water rinse. After pre-treatment, seeds should undergo a 120-day cold/moist stratification.

Planting: Sow seeds in early fall after proper stratification treatments; germination and establishment will be sporadic. Due to extensive warm and cold stratification requirements, planting plugs, cuttings, or potted plants yields higher establishment than direct seeding. Plant vegetative propagules from early spring to late fall.

Precipitation: Grows in areas with 12-30 inches of annual precipitation.

Soils: Occurs on a variety of well-drained soils.

Uses in Restoration: Serviceberry is excellent for moist areas and roadsides along rivers or streams.

Idaho Highway Districts: This species is suitable for parts of Idaho Highway Districts 1, 2, 3, 4, 5, and 6, especially in the northern districts and areas with high precipitation.

Arctostaphylos uva-ursi
Kinnickinnick, Bearberry, Pinemat manzanita,
Mountain cranberry



Growth Habit: Prostrate, creeping, evergreen, growing to 1 ½ feet tall, with a deep fibrous taproot allowing individual plants to form mats up to 6 feet in diameter.

Botanical Description: Umb-shaped flowers are pinkish-white and appear in terminal clusters. The fruit is a bright red drupe about ¼ inch long, containing approximately 5 seeds. The leathery leaves are oval, simple, alternate, and born on a twisted leaf stalk. Leaves turn deep red to purple in the fall. Stems are short, trailing, and have a reddish bark with a velvety texture when young.



Kinnikinnick

The Heath Family: Ericaceae

Bloom Time: May to June

Ecology: Kinnikinnick is widespread in the north and Intermountain West, from low elevations to alpine tundra. It is commonly found on sunny open areas to semi-shaded forests ranging from 2,000-11,000 feet elevations. This species is a shade intolerant, early to late seral species. The foliage is grazed by deer, elk, moose, and sheep, while the berries are eaten by various birds, rodents, and bear.

Cultural History: The scientific name is derived from the Greek and Latin languages. "Uva" and "ursi" are Latin words meaning "grape" and "bear," while "arctos" and "styphyle" are Greek for bear; kinnikinnick fruits are a favorite forage of bears. The berries are edible but can be extremely bitter. Both settlers and many coastal Native Tribes used the dried leaves as a tobacco substitute by combining dried leaves with the dried inner-bark of red osier dogwood. Tannin was also collected from kinnikinnick leaves.

Seed Collection: Collect whole fruits from August to October into plastic bags when fruits are deep red or brown. Refrigerate fruits until cleaning and pre-planting treatment.

Seed Treatment: Separate seeds from fruit by maceration, sift, and rinse. Allow seed to dry and store in a cool, dry place. Pre-planting treatment requires a 30-120 minute soak in sulfuric acid (time varies with seed coat thickness). After removal from acid, cover seeds in lime and soak in water for 48 hours. Following scarification, seeds need extended *warm/moist* and *cold/moist* stratification.



Planting: Due to the extensive pre-planting seed treatment, it is often more cost effective and time efficient to plant purchased plugs or potted plants of kinnikinnick. It transplants well in the early spring or middle fall.

Precipitation: Grows in areas with 8-45 inches of annual precipitation.

Soils: Occurs on a variety of soil types including sandy, acidic, and well-drained to excessively-drained soils.

Uses in Restoration: Kinnikinnick is useful for steep slope stabilization because it will form a dense mat and requires little to no maintenance once established.

Idaho Highway Districts: This species is suitable for parts of Idaho Highway Districts 1, 2, 3, 4, 5, and 6, especially the northern districts and higher elevations.

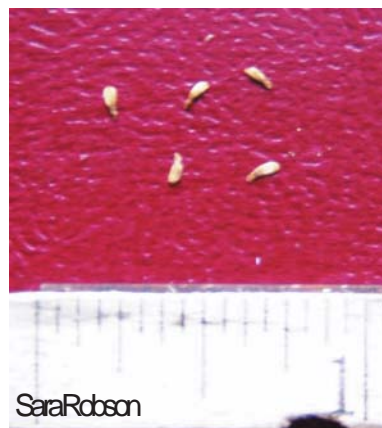
Artemisia cana

Silver sagebrush, Hoary sagebrush



Growth Habit: Aromatic, branching, rhizomatous, evergreen shrub growing from 1-3 feet from a deep taproot with lateral roots.

Botanical Description: Flowers are perfect, yellow, and disk-like, borne on leafy, terminal panicles. Leaves are alternate, simple, linear with entire margins and are 1-2 inches in length, and often 1-2 lobed with lower leaves being tri-lobed. Stems, when young are green and rigid; when mature, stems are brown to gray and glabrous. The trunk bark is grayish and peels into long strips. The fruit is a light brown achene that bears one tiny seed.



Silver sagebrush

The Sunflower Family:

Asteraceae

Bloom Time: July to September

Ecology: Silversage grows throughout the Great Plains and the Intermountain West on rocky open sites, uplands, and floodplains at elevations ranging from 4,000-8,000 feet. This species spans the seral gradient and can be seen growing with early and late seral species. Silver sage is important winter forage for livestock and wild ungulates and provides critical cover for wildlife. This species is also one of the primary components of the sagebrush grasshopper (*Melanoplus bowditchi*) diet.

Cultural History: Native Tribes used a decoction of silver sage to alleviate coughing and remedy hair loss.

Seed Collection: Collect seeds by hand in late fall.

Seed Treatment: Silver sage seeds germinate well without pre-planting scarification or temperature stratification.



Planting: Direct seed in fall on moist sites, or transplant containerized stock in early spring. Transplants do especially well in moist areas.

Precipitation: Grows in areas with a minimum of 8 inches of annual precipitation.

Soils: Commonly occurs on deep, well-drained, coarse-textured soils, but also grows in variety of soil textures.

Uses in Restoration: Silver sage is an excellent species for soil erosion control.

Idaho Highway Districts: Silver sage is suitable for all or part of Idaho Highway Districts 1, 2, 3, 4, 5, and 6.

Artemisia tridentata
Big sagebrush



Growth Habit: Long-lived, aromatic, woody, evergreen, growing between 5-20 feet, with a fibrous taproot.

Botanical Description: Tubular disk flowers are very small and yellow in color, 3-12 flowers are born in narrow panicle like clusters. Silvery green leaves are fragrant, softly pubescent on both sides, alternate, simple, and wedge-shaped with three lobes at the apex. Young stems are thin, silvery gray, and pubescent. Older stems are woody and bark appears shredded.



Big sagebrush

The Sunflower Family: Asteraceae

Bloom Time: July to September

Ecology: Big sagebrush is a dominant shrub found in elevations ranging from 2,500-10,000 feet throughout the North American West. It occurs on open plains, foothills and mountain slopes. There are a number of big sagebrush subspecies. Those common in Idaho are: basin big sagebrush (*A. t. spp. tridentata*), foothills big sage (*A. t. xericensis*), mountain big sagebrush (*A. t. vaseyana*), and Wyoming big sagebrush (*A. t. spp. wyomingensis*). It is often difficult to distinguish among the subspecies without chemical analysis or color wavelength emission, noticeable only with black light. Across North American rangelands, big sagebrush is a nutritious food source on winter game ranges, and provides cover for wild and domestic animals. Increased fire frequency has compromised many natural sagebrush communities through heightened competitive pressure from increased invasive species such as cheatgrass (*Bromus tectorum*).

Cultural History: Native Tribes used big sagebrush leaves and twigs to make medicinal teas and tinctures. The leaves were burned for ceremonial purposes, while bark was woven into textiles

Seed Collection: Collect the entire inflorescence into paper bags from August to October.

Seed Treatment: Remove seeds from inflorescence with tweezers. Although no seed treatment is necessary for germination, the germination rate increases when seed is exposed to sunlight and cold temperatures.



Planting: Sow seed in early fall to incorporate natural exposure to light and seasonal temperatures. Greenhouse propagated plants can be permanently transplanted in early spring or late fall.

Precipitation: Grows in areas with 8-30+ inches of annual precipitation.

Soils: Occurs on well-drained, coarse to fine-textured soils, and grows in soils with neutral to mildly alkaline pH values.

Uses in Restoration: Excellent for soil stabilization, with roots reaching depths greater than 6 feet. The fibrous root system allows the plant to extract moisture throughout the soil profile, improving competitive ability. All subspecies are extremely drought tolerant, and easily propagated under varying conditions and climates.

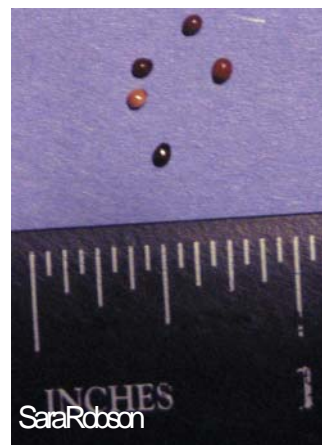
Idaho Highway Districts: This species is suitable for parts of Idaho Highway Districts 3, 4, 5, and 6.

Ceanothus sanguineus
Redstem ceanothus



Growth Habit: A long lived, erect, deciduous, loosely branched, growing from 3-10 feet, with a fibrous taproot.

Botanical Description: Small white flowers are borne in panicle inflorescence. Dark green leaves are ovate to elliptical, alternate, with serrated margins; three prominent veins originate from the leaf base. Leaves are glabrous on the upper surface and finely scabrous on the under surface. Stems are erect, round, greenish, and glabrous.



Redstem ceanothus

The Buckthorn Family:
Rhamnaceae

Bloom Time: May to June

Ecology: Redstem ceanothus grows on moist, partially-shaded slopes, from 2,400-4,000 feet. This species is important winter browse, and year-round shelter for many wildlife species, especially deer and elk; it is also grazed by livestock. Redstem ceanothus also provides cover for bees, birds, and many small mammals. All ceanothus species have nitrogen-fixing potential through a symbiotic relationship with root-dwelling actinomycetes.

Cultural History: This species was used extensively by Native Tribes. The flowers were brewed for tea and used as an ingredient in soap, red dye was made from the roots, and stems were woven into baskets.

Seed Collection: Collect ripe seeds in June and August, using specially spun polyester UV-resistant bags; tie bags onto fruit clusters. The bag catches the seeds as they are ejected from the plant; extremely clean seed is obtained using this method.

Seed Treatment: Clean by rubbing seed over a fine-gauge screen. These seeds are small, and also have a physical and physiological dormancy. Scarify seed in a boiling water bath for 5 to 10 seconds, directly transfer to a *cold* water bath to avoid seed damage or death. Leave seeds in cool water for 24 hours. Follow scarification with a 90-day cold stratification.



Planting: Sow treated seeds in mid to late fall to incorporate natural temperature stratification and enhance germination. Tubelings and potted plants can be planted in early spring; when planting vegetative propagules, deep watering may be necessary for establishment.

Precipitation: Grows in areas with a minimum of 13 inches of annual precipitation.

Soils: Occurs on well-drained, medium-textured soils, rocky outcrops, and areas with shallow soil.

Uses in Restoration: Redstem ceanothus forms a deep root system that serves in soil stabilization. This species is also a nitrogen fixer that aids in nutrient cycling and increased soil fertility.

Idaho Highway Districts: Redstem ceanothus is suitable for parts of Idaho Highway districts, 1, 2, 3, 4, 5, and 6.

Ceanothus velutinus
Snowbrush, Deer brush



Growth Habit: Densely erect, sprawling, evergreen, growing from 2-9 feet with a fibrous taproot that penetrates beyond 18 inches.

Botanical Description: Small, 5-petaled, white flowers appear in large, dense clusters up to 5 inches long. Leaves are simple, 1½-2½ inches long, thick, alternate, ovate to ovate-elliptical with serrated margins, dark-green and shiny above, pale on underside; three prominent veins originate from leaf base. Leaves are notably sticky and have a sweet odor when rubbed or crushed. Stems are smooth and green in color with grayish brown bark.



Snowbrush

The Buckthorn Family:
Rhamnaceae

Bloom Time: May to June

Ecology: Snowbrush occupies open rocky hillsides and favors south-facing slopes ranging in elevation from 3,800-9,000 feet. It commonly establishes in areas where winter snow accumulates. It is also prominent in draws and on open slope faces, exhibiting rapid establishment on burned-over mountain slopes. Snowbrush exhibits browsing tolerance, and is a chief year-round shelter and food source for livestock and wild game. Snowbrush seeds have considerable longevity; germination has occurred after 200 years in the soil profile.

Cultural History: Snowbrush leaves contain saponins which are soap-like substances used to wash the skin. The leaves are also good for treating skin irritations.

Seed Collection: Collect seed in June and August prior to seed shatter. Seed collection can be challenging because it is difficult to extract from the fruits. Harvest stem cuttings in late April to early June; cuttings should be semi-hardened stems, 8-10 inches long, and ¼ inch in diameter.

Seed Treatment: Treat seeds in boiling water for 4-5 minutes, follow by a *warm* water soak for 12 hours prior to planting. The seed can also be scarified using a sulfuric acid soak. After scarification, seeds require *cold* stratification at or below 40°F for up to 90 days. Cuttings are excellent propagules for snowbrush; treat with a rooting hormone to promote root production.



Planting: Sow seeds in a greenhouse and transplant seedlings in the spring. Cuttings should be placed in a hole slightly larger in diameter than the cutting, and about half as deep. Both cuttings and seedlings should be inoculated with nitrogen-fixing organisms.

Precipitation: Grows in areas with a minimum of 11 inches of annual precipitation.

Soils: Occurs on coarse textured, well-drained soils, shallow, rocky areas, with slightly basic and/or non-saline soils.

Uses in Restoration: Snowbrush has a large taproot with an extensive spreading root system reaching depths of 8 feet. Snowbrush can live for 25 years or more. Its longevity and root system contributes greatly to soil stabilization and increases soil nitrogen through root nodules formed by actinomycetes.

Idaho Highway Districts: Snowbrush is suitable for parts of Idaho Highway Districts 1, 2, 3, 4, 5, and 6.

Cornus sericea
Red osier dogwood, Red stem dogwood



Growth Habit: Rapid growing, multi-stemmed, loosely spreading, deciduous shrub/tree, growing from 6-9 feet, with a deep fibrous taproot.

Botanical Description: Flowers are small and white, appearing in flat-topped clusters (cymes) about 2½ inches in diameter. Dark green leaves are opposite, simple, ovate or lance-shaped, 2-4 inches long, with prominent mid vein and 4-7 lateral vein pairs. Leaves turn deep red in the fall. Stems are bright red, occasionally pubescent, often with tiny green spots. The fruit is a white drupe containing a single light-colored seed with 8 yellow stripes.



Red osier dogwood

The Dogwood Family: Cornaceae

Bloom Time: May to July

Ecology: Dogwood grows in wet locations along stream banks, ponds, or lakes. It is also found in mixed open forests, riparian areas, and flood plains ranging in elevation from 1,500-9,000 feet. It is not palatable to large game or domestic livestock, but many bird species eat the berry-like fruits. This shrub also provides valuable cover for small mammals and birds.

Cultural History: Native American Tribes had many uses for dogwood. Bark extract was used for treating coughs and fevers, dyes were prepared from stems, and tea brewed from roots and stems was used to prevent and treat malaria. Some tribes smoked the inner layers of the bark as a tobacco substitute.

Seed Collection: Collect seeds by hand in early fall when fruit turns blue. Collect fruits into plastic bags and store under refrigeration prior to cleaning.

Seed Treatment: Separate seed from fruit by maceration and clean by screening and rinsing. The seed has a physiological dormancy that requires scarification with sulfuric acid for 30 minutes, followed by a 48-hour *cold* water soak, and a 90-day *cold*/moist stratification in peat moss.



Planting: Dogwood does well when planted via cuttings. Soak cuttings in hormonal root inducer, drill a 2 by 18-inch hole and plant in early spring or late fall. If seeding, fall applications are best; germination may be unpredictable and seedling establishment is slow.

Precipitation: Grows in areas with a minimum of 18 inches of annual precipitation.

Soils: Commonly occurs on moist, organic soils, but grows in a wide range of soil types.

Uses in Restoration: A superb soil stabilizer; especially useful for roadsides along streams and rivers. Red osier is adapted to disturbed areas, is quick to establish, and spreads rapidly.

Idaho Highway Districts: Dogwood is appropriate for parts of Idaho Highway Districts 1, 2, 3, 4, 5, and 6.

Ericameria nauseosa
Rubber rabbitbrush, Gray rabbitbrush



Growth Habit: Erect, medium-lived shrub growing from 1-8 feet, with a fibrous taproot.

Botanical Description: Small yellow disk flowers are born in rounded terminal clusters. Leaves are gray to white, alternate, linear, and simple, with 1-3 veins. Stems are erect and yellowish with dense wooly hairs; bark on older stems is fibrous and shredded.



Rubber rabbitbrush

The Sunflower Family: Asteraceae

Bloom Time: mid-June to mid-September

Ecology: Rubber rabbitbrush is a highly variable species that grows on mesic sites throughout the sagebrush steppe. It is adapted to the high plains, valleys, and foothills, and is considered an increaser species following disturbance. It grows best in openings within sagebrush, juniper and ponderosa pine regions ranging from 2,000-9,000 feet in elevation. Rubber rabbitbrush is not highly palatable to wild and domestic grazers, and is considered mildly toxic to livestock. It provides good cover for ground nesting birds, including sage grouse (*Centrocercus urophasianus*). There are six subspecies of rabbitbrush. The prominent subspecies for Idaho are: *E. n. spp. albicaulis*, and *E. n. spp. leiospermus*. The species name "nauseosa" describes the sickening odor emitted from all varieties of the plant. Rubber rabbitbrush is distinguished from green rabbitbrush (*Ericameria teretifolia*) by the leaves; green rabbitbrush has twisting leaves while rubber rabbitbrush leaves are linear.

Cultural History: During World War II, this species was tested as a source for quality rubber production; there is a recent renewed interest in the species as a source for rubber and its overall chemical composition. There is potential for medical applications such as anti-malarial drugs. Cultivation of rubber rabbitbrush began in the late 1800's and today many subspecies are used ornamentally. Some Native American Tribes used the bark as chewing gum.



Seed Collection: Collect seed in fall, separating specific ecotypes by elevation and site.

Seed Treatment: Rubber rabbitbrush seed germinates without pre-planting scarification or temperature stratification.

Planting: Sow seed by hand in early spring, or transplant tubelings or containerized plants in early spring or early fall.

Precipitation: Grows in areas with a minimum of 6 inches of annual precipitation.

Soils: Occurs on a variety of coarse-textured soil types. Specific soil adaptations vary with subspecies.

Uses in Restoration: A good species for erosion control and soil stabilization. The root system establishes quickly, and throughout the growing season, a large volume of leaf litter is produced, which aids in nutrient cycling.

Idaho Highway Districts: Rubber rabbitbrush is suitable for parts of Idaho Highway Districts 1, 2, 3, 4, 5, and 6, especially in the southern districts.

Mahonia repens
Creeping Oregon grape, Creeping barberry



Growth Habit: Prostrate, creeping, stoloniferous, evergreen growing to 12 inches, with a fibrous taproot.

Botanical Description: Flowers are a whorled yellow perianth (corolla with calyx) borne in racemes. The leathery, holly-like leaves are toothed, alternate, and pinnately compound. The evergreen leaves turn deep red in the fall. Stems are woody and inner bark is yellow. Fruits are dusty blue berries encasing one to several seeds.



Creeping Oregon grape

The Barberry Family:

Berberidaceae

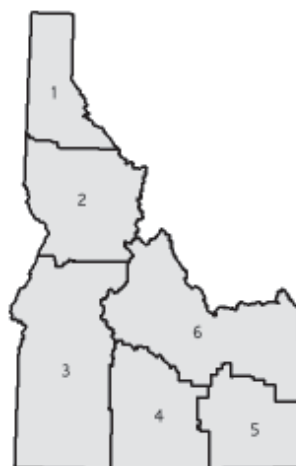
Bloom Time: March through June

Ecology: Oregon grape is found throughout Idaho in a wide range of plant associations, from forests to grasslands to shrublands ranging in elevation from 2,500-11,000 feet. Oregon grape grows in full sun and semi-shade, and occurs on steep slopes in mountains and canyons. The leaves and berries are poor forage for livestock, but are a prime food source for many birds, rodents, and wild ungulates. Oregon grape is host to a serious pathogen to cereal crops and should not be planted in close proximity to these crops.

Cultural History: Native Tribes used the roots and yellow bark to make dyes for clothing and basket fibers. The sour berries were eaten as food. Teas were brewed to treat stomach ailments, heal infections, and treat kidney problems. Contemporary herbalists use it to reduce fever and decrease inflammation. The alkaloid berberine found in the twigs has antibiotic qualities that affect a broad range of bacteria.

Seed Collection: Collect seeds in August when fruits are dark blue; mature seeds are brown. Harvest whole berries, allow to dry, store in plastic bags and refrigerate prior to cleaning.

Seed Treatment: Macerate berries to extract seed. Soak seeds in water for 48 hours, then transfer to fine mesh bags and cover with moistened peat moss for 6-8 weeks. This process is called *warm*/moist stratification. Additionally seeds must also go through a *cold*/moist stratification for approximately 5 months.



Planting: Germination from direct seeding in fall may be sporadic, but this method incorporates a natural cold stratification required by Oregon grape, making it a viable option for roadsides. Due to the extensive seed stratification requirements, greenhouse germination followed by seedling plantings in the early spring is highly recommended.

Precipitation: Grows in areas with a minimum of 15 inches of annual precipitation.

Soils: Commonly occurs on moist, well-drained soils, but also grows in dry, stony, shallow areas.

Uses in Restoration: Oregon grape works well for roadside restoration and revegetation because, once established, it is both drought and heat tolerant. This species also spreads via stolons which form a dense, deep, soil stabilizing mat.

Idaho Highway Districts: Oregon grape is useful for Idaho Highway Districts 1, 2, 3, 4, 5, and 6, especially districts 1 and 2.

Penstemon fruticosus
Shrubby penstemon, Bush penstemon



Growth Habit: Perennial, mat-forming, evergreen sub-shrub growing to 2 feet, with a fibrous taproot.

Botanical Description: Flowers are bilaterally symmetrical comprised of 2 identical halves. Distinct upper and lower parts form the fused tubular corolla. The lower lip is wide with 3 lobes, providing a “landing pad” for insect pollinators, while the upper lip has 2 lobes. Light blue to purple flowers are arranged in loose clusters. Elliptic leaves are opposite, with pairs arranged at right angles to the pair above it (decussate), shiny, and finely toothed. Fruits are capsules bearing narrowly winged seeds.



Shrubby penstemon

The Figwort Family:

Scrophulariaceae

Bloom Time: May to August

Ecology: Shrubby penstemon is found on rocky open or wooded areas ranging in elevation from 4,000-8,000 feet. Penstemon is the largest flowering plant genus endemic to North America, with over 42 species native to Idaho alone.

Cultural History: “Penstemon” is derived from the Greek words “pente” meaning five and “stemon” meaning stamen, referring to the five stamens. The Lewis and Clark expedition collected samples of shrubby penstemon in 1806, near present-day Weippe, Idaho, once known as Quawmash Flats.

Seed Collection: Hand collect when capsules are dry and seed is dark. Multiple collections may be necessary because flowers are indeterminate, causing seeds to mature at different rates. Clean seed by sifting or with a hammer mill and store in a cool dry place in paper bags.

Seed Treatment: Seed requires cold stratification for 2 months at 39 °F, and 1 to 2 months at 50 °F.

Planting: Sow seed in fall to initiate the natural stratification process. Seeds will germinate; however, emergence is sporadic. Vegetative propagules transplant well in early spring or fall.



Precipitation: Grows in areas with 8-18 inches of annual precipitation.

Soils: Occurs on rocky, dry, well-drained soils.

Uses in Restoration: Shrubby penstemon is a great addition to seed mixes for erosion control and aesthetics. This species is also cold and drought tolerant.

Idaho Highway Districts: Shrubby penstemon is a suitable plant for parts of Idaho Highway Districts 1, 2, 3, 4, 5, and 6.

Symphoricarpos albus
**Snowberry, Common snowberry, White coralberry,
Corpse berry**



Jim Kingery

Growth Habit: Small, deciduous, shrub growing to 4 feet with a rhizomatous taproot.

Botanical Description: Small bell shaped flowers are white to pink and can be solitary or in loose clusters of 2-5 flowerheads. Petals are lobed and pubescent. Opposite leaves are simple, oval, and generally longer than wide. Leaves are pubescent on leaf underside; top surface is glabrous and dark green. Stems are slender, usually hollow, with thin reddish bark, often pubescent when young. Fruits are waxy-white, berry-like drupes bearing 2 seeds called nutlets.



Dave Skimer



Sara Robson

Snowberry

The Honeysuckle Family:
Caprifoliaceae

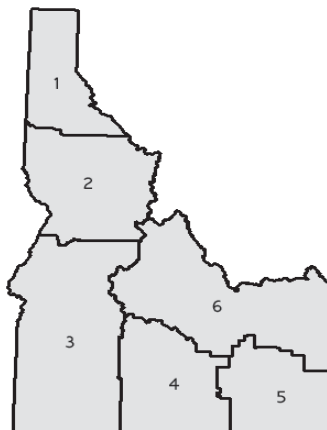
Bloom Time: May to September along an altitudinal gradient; flowers peak in June and July.

Ecology: Snowberry is found from dry to moist areas, rocky slopes, river terraces, and open forests, ranging in elevation between 2,500-6,500 feet, indicating broad ecological amplitude. Snowberry is common in northern bunchgrass communities while its cousin, mountain snowberry (*Symphoricarpos oreophilus*) is more common in sagebrush communities. Snowberry resprouts readily after fire. It is also an important forage and cover species for birds and small mammals; however, it is not preferred by most livestock.

Cultural History: Some Native American Tribes produced stomach tonic from snowberry roots; other plant parts such as leaves and bark were crushed and applied to wounds. The leaves contain a substance called saponin, which when mixed with water creates a soapy substance. Ingesting vast quantities of fruits is not recommended and may cause diarrhea; in fact some indigenous people believe the fruits are toxic and can cause death leading to the alternative name of "corpse berry".

Seed Collection: Collect seed in late fall or early winter by stripping the fruit from the branches. Separate seed from fruit using a rubbing board after fruit has dried.

Seed Treatment: Seeds require up to 3 months of *warm* stratification followed by a *cold* stratification period between 3-12 months depending on specific area conditions.



Planting: Sow seeds in early fall to initiate natural stratification; germination and establishment will be sporadic. Due to extensive warm and cold stratification requirements, planting plugs, poles, or potted plants yields higher establishment than direct seeding. Plant vegetative propagules from early spring to late fall.

Precipitation: Grows in areas with a minimum of 12 inches of annual precipitation.

Soils: Occurs on coarse textured, well-drained soils. This species tolerates moderate salinity, and can withstand low-nutrient conditions.

Uses in Restoration: Because snowberry thrives in a wide range of ecological conditions, this species is very appropriate for many revegetation and restorative programs. The fibrous, shallow root system is great for binding upper soil layers, making snowberry an excellent choice for roads adjacent to riparian areas.

Idaho Highway Districts: Snowberry is suitable for parts of Idaho Highway Districts 1, 2, 3, 4, 5, and 6.

Glossary

- achene** ~ a one sided, indehiscent fruit in which the seed coat is not fused to the ovary wall.
- actinomycetes** ~ a mycelium-forming, rod-shaped, bacterium of the order Actinomycetales.
- alternate** ~ leaves are located singly at each node, not whorled or in pairs.
apex ~ tip, distal end, uppermost point.
- bilabiate** ~ having two lips, as in irregular flowers.
- calyx** ~ the green outer whorl of leaves surrounding the flower in a cup-like structure.
- caudex** ~ a short, woody base of a perennial plant, located just below the soil surface.
- clay** ~ the smallest particulate component of soil, lending to a fine and/or sticky texture.
- corolla** ~ the collective petal structure, fused or separate.
- corymb** ~ an indeterminate, flat-topped inflorescence, where flower stalks rise from different levels on the main stem but reach the same height.
- decussate** ~ leaves arranged in pairs and alternately perpendicular to leaf pairs above and/or below.
- dehisce** ~ split along a lateral seam to discharge contents by splitting.
- disk flower** ~ a tubular flower of an Asteraceae species inflorescence; also called disk floret.
- drupe** ~ a one-seeded indehiscent fruit with a hard seed surrounded by a fleshy fruit, like a cherry.
- ecoregion** ~ an ecological region having broad similarities with respect to climate, topography, soil, and dominant vegetation.
- entire** ~ a continuous margin without indentations.
- floret** ~ a single, small flower as a part of a larger composite flower-head.
- glabrous** ~ a smooth surface, without hairs or projection.
- habitat type** ~ classification of land based on plant association.
- indehiscent** ~ closed at maturity (like a sunflower seed)
- indeterminate** ~ growth is not inhibited by a terminal bud
- inflorescence** ~ the type of development and arrangement of flowers on an axis
- involute** ~ leaf edges are curled or curved inward over the upper leaf surface toward the midrib.
- irregular flowers** ~ inflorescence with an irregular shape; asymmetrical or bilateral.
- lanceolate** ~ narrow leaf tapering at both ends; lance-shaped.
- lemma** ~ the lower bract of a floret that subtends a grass flower.
- loam** ~ a soil consisting of fairly equal portions of clay, silt, and sand.
- maceration** ~ to soften and separate by soaking in water.
- nutrient cycling** ~ mixing of inorganic nutrients through the soil, organisms, air, or water.
- opposite leaves** ~ two leaves directly across from each other borne on the same node.
- palatability** ~ a rating (high, medium, low) given to a plant based on nutritional value and animal preference.
- palmate** ~ a leaf with lobes radiating from a common point.

Glossary

- panicle** ~ inflorescence with a main axis and branches; a pyramidal branched flower cluster.
- pappus** ~ a group of hairs, scales, or bristles borne on the crown of an achene in an Asteraceae flower.
- perfect flowers** ~ the term for flowers with both male and female reproductive structures.
- perianth** ~ the combined flower parts that surround the reproductive structures, generally consisting of the petals and sepals.
- pinnate** ~ a compound leaf structure resembling a feather, where leaflets grow in a row on either side of a mid-rib.
- pome** ~ a fruit with a fleshy outer layer and central core with multiple seeds enclosed in a capsule.
- prostrate** ~ lying flat on the ground; having ground trailing stems that do not root.
- pubescent** ~ covered with fine, short hairs.
- raceme** ~ inflorescence in which flowers are borne on stalks along a rachis, and open upward toward the apex.
- racemose** ~ growing in the form of a raceme
- rachis** ~ vertical axis of a raceme.
- radiate flowers** ~ term to describe Asteraceae flower heads comprised ray flowers and disk flowers spreading from a common center.
- ray flowers** ~ petal like flower component of Asteraceae flowers.
- restoration** ~ the process involved in returning a disturbed area to a functional ecosystem.
- revegetation** ~ incorporating vegetation to a disturbed area which was previously vegetated.
- rhizome** ~ thickened, branching, creeping, lateral stems producing roots from nodes.
- rhizomatous** ~ the term to describe a plant bearing rhizomes.
- sand** ~ largest particulate component of a soil, associated with course-textured soils.
- scabrous** ~ a rough surface with scales, or short hairs.
- scarification** ~ the process of scratching, cutting, or softening the protective seed coat.
- sepal** ~ one of the small modified leaves that comprise the calyx.
- silt** ~ mid-size particulate component of soil that gives soil a silky texture.
- spike** ~ a long, narrow, unbranched cluster of flowers on a central axis.
- spikelet** ~ a secondary spike, usually applied to grass structures.
- stamen** ~ male reproductive structure of a flower.
- stolons** ~ horizontal branch from the plant base that gives rise to new plants from buds or nodes.
- stolon** ~ a horizontal stem that produces roots or plants at the tip.
- stoloniferous** ~ the term to describe a plant bearing stolons.
- stratification** ~ the process of exposing seeds to extreme high or low temperatures.
- talus slope** ~ slope formed by the accumulation of rock debris.
- trifoliate** ~ a leaf compound comprised of three leaflets.
- tubelings** ~ seedling grown in a small tubular greenhouse cone.

Common Name Cross Reference Chart

Page #	Common Name	Seed Treatment	Idaho Highway Districts	Bloom Month	
				Early	Late
12-13	Arrowleafbalsamroot	X	1, 2, 3, 4, 5, and 6	4	7
60-61	Bigsagebrush		3, 4, 5, and 6	7	0
52-53	Bluebunchwheatgrass		1, 2, 3, 4, 5, and 6	5	6
28-29	Blue flax		1, 2, 3, 4, 5, and 6	5	7
24-25	Borealsweetvetch	X	1, 2 and 6	7	8
70-71	CreepingOregongrape	X	1, 2, 3, 4, 5, and 6	3	6
20-21	Gaillardia		1, 2, 3, 4, 5, and 6	5	9
18-19	Grayaster		1, 2, 3, 4, 5, and 6	6	7
48-49	Idahofescue		1, 2, 3, 4, 5, and 6	5	7
38-39	Indian ricegrass		1, 2, 3, 4, 5, and 6	5	6
56-57	Knickknick	X	1, 2, 3, 4, 5, and 6	5	6
14-15	Little larkspur	X	3, 4, 5, and 6	5	7
36-37	Mountain goldenpea	X	1, 2, 3, 4, 5, and 6	5	8
40-41	Nebraska sedge	X	1, 2, 3, 4, 5, and 6	5	7
10-11	Prairie sage	X	1, 2, 3, 4, 5, and 6	7	9
66-67	Redsierdogwood	X	1, 2, 3, 4, 5, and 6	5	7
62-63	Redstem ceanothus	X	1, 2, 3, 4, 5, and 6	5	6
68-69	Rubber rabbitbrush		1, 2, 3, 4, 5, and 6	6	9
50-51	Sandberg's bluegrass		1, 2, 3, 4, 5, and 6	4	6
26-27	Scarlet gilia	X	1, 2, 3, 4, 5, and 6	6	8
54-55	Serviceberry	X	1, 2, 3, 4, 5, and 6	5	6
72-73	Shrubby penstemon	X	1, 2, 3, 4, 5, and 6	5	8
30-31	Silky lupine	X	1, 2, 3, 4, 5, and 6	5	8
58-59	Silversagebrush		1, 2, 3, 4, 5, and 6	7	9
46-47	Slender wheatgrass		1, 2, 3, 4, 5, and 6	5	8
74-75	Snowberry	X	1, 2, 3, 4, 5, and 6	5	9
64-65	Snowbush	X	1, 2, 3, 4, 5, and 6	5	6
44-45	Squirreltail	X	1, 2, 3, 4, 5, and 6	5	6
22-23	Sticky purple geranium	X	1, 2, 3, 4, 5, and 6	5	8
16-17	Subphertflower buckwheat	X	1, 2, 3, 4, 5, and 6	6	8
42-43	Tufted hairgrass		3, 4, 5, and 6	5	7
32-33	Venus penstemon		1, 2, 3, and 4	5	8
34-35	Western mountain aster		1, 2, 3, and 4	7	9
8-9	Western yarrow		1, 2, 3, 4, 5, and 6	5	8

3=March
4=April
5=May
6=June

7=July
8=August
9=September

Common Name Cross Reference Chart

Page #	Season		Drought Tolerant	Roots		Elevation (feet)		Precipitation (inches)	
	Seeding	Planting		T	A	Min.	Max	Min.	Max.
12-13	A/W	A	X	X		3500	8000	8	25
60-61	A	SA	X	X	X	2500	10000	8	30
52-53	A	SA	X	X		300	10000	6	35
28-29	S	S	X	X		800	10000	10	24
24-25	S	SA		X		4000	9500	12	18
70-71	A	S	X	X	X	2500	11000	15	45
20-21		SA	X	X		5000	9000	16	30
18-19	A	SA	X	X		3000	10000	10	20
48-49	S/A	SA	X	X		1300	10000	6	35
38-39	A	S	X	X		2000	10000	7	20
56-57		SA		X	X	2800	11000	8	45
14-15	A	N/A			X	3000	10000	8	12
36-37	A/W	SA		X	X	2500	7000	10	16
40-41	A	S		X		3000	9000	3	30
10-11	A/S	SA	X	X		3000	10000	8	40
66-67	A	SA		X	X	1500	9000	18	60
62-63	A	S		X	X	2400	4000	13	35
68-69	S	SA		X	X	2000	9000	6	20
50-51	S/A	SA		X		1000	12000	8	20
26-27	A	N/A		X		2000	8000	8	20
54-55				X	X	200	10000	12	30
72-73	A	SA	X	X	X	4000	8000	8	18
30-31	A	SA		X	X	1500	10000	10	20
58-59	A	S		X	X	4000	8000	8	40
46-47	A/S	S		X		4500	12000	8	25
74-75	A	SA		X		2500	6500	12	45
64-65		SA		X	X	3800	9000	11	40
44-45	S/A	S		X		3500	9000	6	18
22-23	A	A		X		1000	10000	10	20
16-17	S	SA	X	X		3000	8000	14	40
42-43	S/A	SA		X		1000	12000	20	40
32-33	S/A	S	X	X	X	1000	6000	20	40
34-35	S	S		X		3000	10000	10	16
8-9		S	X	X	X	200	9000	8	60

A = Autumn T = Taproot
 W = Winter F = Fibrous roots
 S = Spring F+T = Fibrous-Taproot

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Reference Materials:

- Allen, L., Bush, D., Sinton, H., and Walker, D. Guidelines for Collection & Use of Native Plants. [PDF] 2002 [cited 2005 April 20, 2005]; Available from: <http://www.anpc.ab.ca/guidelines.pdf>.
- Coffey, T. The History and Folklore of North American Wildflowers. 1994, New York, New York: Houghton Mifflin Company. 345.
- Coombes, A.J., Dictionary of Plant Names: Botanical Names and Their Common Name Equivalents. 2002, Portland, Oregon: Timber Press.
- Daubenmire, R., Floristic Plant Geography of Eastern Washington and Northern Idaho. *Journal of Biogeography*, 1975. 2(1): p. 1-18.
- Ford, C., Idaho, Invasives, and More, in Greener Roadsides: An FHWA Quarterly Newsletter for Roadside Decision-Makers. 2004, Federal Highway Administration: Washington, D.C. p. 7.
- Forman, R., T. T., Alexander, L. E., Roads and Their Major Ecological Effects. *Annual Review of Ecology and Systematics*, 1998. 29: p. 207-231.
- Goodwin, K., and Sheley, Roger, Revegetation Guidelines for Western Montana: Considering Invasive Weeds. 2003, Land Resources and Environmental Sciences at Montana State University for Missoula County Weed District. p. 1-58.
- Hitchcock, C.L., and Cronquist A., *Flora of the Pacific Northwest*. 9th ed. 1994, Seattle and London: University of Washington Press.
- Johnson, C.G., *Common Plants of the Inland Pacific Northwest*. 1988: United States Department of Agriculture, Forest Service, Pacific Northwest Region. 394.
- Johnson, C.G. *Alpine and Subalpine Vegetation of the Wallowa, Seven Devils and Blue Mountains*. 2004: United States Department of Agriculture, Forest Service, Pacific Northwest Region.
- Kingery, J., Cotter, A., and Mosely, K., *Idaho Roadside Revegetation Handbook*. 2003, Department of Rangeland Ecology and Management, University of Idaho. p. 145.
- McCollin, D., Moore, L., and Sparks, T., The flora of a cultural landscape: environmental determinants of change revealed using archival sources. *Biological Conservation*, 2000. 92: p. 249-263.
- Munger, S.H., and Thomas, C. S., *Common to This Country: Botanical Discoveries of Lewis and Clark*. 2003, New York: Artisan, a division of Workmans Publishing, Inc. 128.

Reference Materials:

- Ogle, D, Planning A Seeding. Technical Notes, TN Plant Materials No. 10. United States Department of Agriculture, Soil Conservation Service, Boise, Idaho, 1994: p. 3-33.
- Omernick, J. M. Map Supplement: Ecoregions of the Conterminous United States. *Annals of the Association of American Geographers*, 1987. 77(1):118-125.
- Parish, R., Coupe', R., Lloyd, D., ed. *Plants of Southern Interior British Columbia and the Inland Northwest*. 1996, Lone Pine Publishing: Vancouver, B.C. 463.
- Parkinson, H., *Landscaping with Native Plants of the Intermountain Region*, A. Debolt, Rosentreter, R., and Geerston, V., Editor. 2003, United States Department of the Interior, Bureau of Land Management, Idaho State Office.
- Philips, E.F., *Wild Plant Preservation*. *Ecology*, 1923. 4(1): p. 90.
- Pojar, J., and MacKinnon, A., *Plants of the Pacific Northwest Coast: Washington, Oregon, British Columbia & Alaska*. 1994, Vancouver, British Columbia: Lone Pine Publishing and the Forest Service of British Columbia. 526.
- Reinartz, J. A. *Planting State-Listed Endangered and Threatened Plants*. *Conservation Biology*. 1995. 9(4):771-781.
- Ricker, P.L., *The Protection of our Native Flowers*. *The Scientific Monthly*, 1932. 35(3): p. 273-275.
- Ries, L., Debinski, D. M., Wieland, M. L., *Conservation Value of Roadside Prairie Restoration to Butterfly Communities*. *Conservation Biology*, 2001. 15(2): p. 401-411.
- Ross, R.A., and Chambers, H. L., *Wildflowers of the Western Cascades*. 1995, Portland, Oregon: Timber Press. 140.
- Strickler, D., *Forest Wildflowers: Showy Wildflowers of the Woods, Mountains and Forests of the Northern Rocky Mountain States*. 1988, Columbia Falls, Montana: The Flower Press. 96.
- Strickler, D., *Wayside Wildflowers of the Pacific Northwest: Showy Wildflowers along the Roads and Highways, Trails and Byways of the Pacific Northwest*. 1998, Columbia Falls, Montana: The Flower Press. 272.
- Stubbendieck, J., Hatch S. L., & Landholt L. M., *North American Wildland Plants: A Field Guide*. 6th ed. 2003: Board of Regents of the University of Alaska. 501.

Reference Materials:

- Tinsley, J., Simmons, M., and Windhager, S. Establishing roadside native vegetation in Central Texas: A preliminary Report. 2004 [cited 2005 August 3, 2005]; Available from: <http://www.wildflower.org>.
- Tyser, R.W., and Worley, C. A., Alien Flora in Grasslands Adjacent to Road and Trail Corridors in Glacier National Park, Montana (U.S.A.). *Conservation Biology*, 1992. 6(2): p. 253-263.
- Vizgirdas, R.S., *Useful Plants of Idaho*. 1st ed. 2003, Pocatello, Idaho: Idaho State University. 343.
- Wilkie, D., Shaw, E. Rotberg, F., Morellie, G., and Auzel, P., Roads, Development, and conservation in the Congo Basin. *Conservation Biology*, 2000. 14(6): p. 1614-1622.
- Windhager, S., Restoration: The basics on how to repair your land. *Native Plants*, 2000. 17(3 & 4): p. 11-15.
- Windhager, S. Restoration: Reconnecting Nature and Ourselves. 2001 [cited 2005 August 3, 2005]; Available from: <http://www.wildflower.org>.
- Wright, R. G., MacCracken, J. G., and Hall, J. An Ecological Evaluation of Proposed New Conservation Areas in Idaho Evaluating Proposed Idaho National Parks. *Conservation Biology*. 1994. 8(1):207-216.
- Internet Databases:
- Fire Effects Information Systems: <http://www.fs.fed.us/database/feis/>
- United States Department of Agriculture Native Plants Database: <http://plants.usda.gov/>
- Native Plant Network Propagation Protocol Database: <http://www.nativeplantnetwork.org>
- Environmental Protection Agency:
- <ftp://ftp.epa.gov/wed/ecoregions/id/>
- National Atlas:
- <http://nationalatlas.gov/mld/ecoomrp.html>
- <http://nationalatlas.gov/natlas/Natlasstart.asp>