WINTERFAT [#52] (*Krasheninnikovia lanata* [Pursh] Guldenstaedt)
An erect or spreading, evergreen sub shrub up to five feet tall. The branches and leaves are covered with a dense coating of stellate and simple hairs that are white when young, but become rust colored with age. It is a member of the Chenopod family. Winterfat is native to the interior western USA, including the Great Basin region. It occurs on lower foothills, plains and valleys, often with dry sub-alkaline soils. It requires from eight to 16 inches of annual rainfall. Winterfat may grow in association with other salt desert shrubs, sagebrush or pinyon pine/juniper. Average number of seeds per pound: 110,000; the seed is harvested in the fall months. Caution: Winterfat seed is very short-lived and moderately fragile. The seed must be stored in cold storage (<38° F.) and <25%R.H.). It is recommended to use seed within six months to one year of harvest.

KOCHIA, FORAGE (*Kochia prostrata* [L.] Schrad.)
An evergreen, low growing non-native shrub up to four feet tall. Forage kochia, also known as prostrate kochia, originated in central Asia and was introduced to the western USA by USDA to improve forage production for domestic livestock and fire control (greenstripping) on arid lands. It is a member of the Chenopod family. Cultivar: 'Immigrant' forage kochia is a public released variety by the USDA NRCS Plant Materials Center, Aberdeen, Idaho and Agricultural Research Service, Logan, Utah. Average number of seeds per pound: 115,000. Caution: forage kochia seed is very short-lived. The seed must be stored in cold storage (<38° F. and <25% R.H.). It is recommended to use seed within one to two years of harvest. The recommended seeding rate in a mixture is ¼ to ½ lb/acre.

HORSEBRUSH

HORSEBRUSH, GRAY [#53] (*Tetradymia canescens* DC)
A low-growing, evergreen shrub up to three feet tall. The leaves and stems are very tomentous, wooly streaks that provide the characteristic gray-green color to this shrub. Gray horsebrush is a member of the Sunflower (Composite) family. It is native to the Great Basin and adjacent areas. It is found on dry plains, hills, and ridges, often well-drained sandy soils, between 1,300 and 10,000 feet in elevation, associated with big sagebrush, pinyon pine/juniper, and ponderosa pine communities. Average number of gray horsebrush seeds per pound: 140,000. Three other horsebrush species are native to sites in the Great Basin region.

RABBITBRUSH

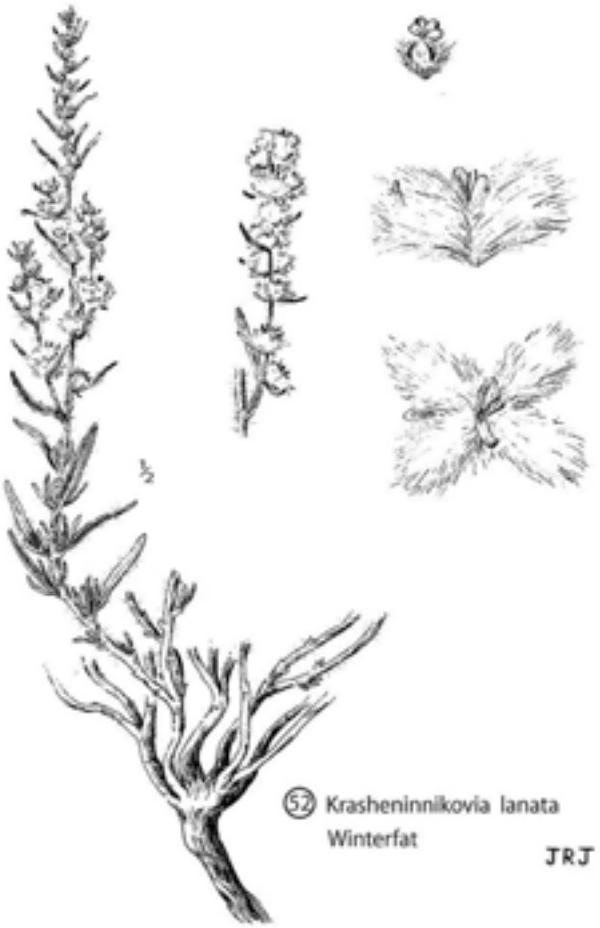
RABBITBRUSH, GREEN or LOW (*Chrysothamnus viscidiflorus* [Hook.] Nutt.)
An evergreen shrub up to three feet tall, with dark green leaves. Green rabbitbrush is a member of the Sunflower (Composite) family. It is native to the interior western USA, including the Great Basin region. There are several distinct subspecies of green rabbitbrush, some are valuable browse plants.
Average number of seeds per pound: 780,000.

RABBITBRUSH, PARRY (*Chrysothamnus parryi* [Gray] Greene)
A low-growing evergreen shrub up to 28 inches tall, with numerous spreading to erect flexible branches. The branches are covered with a felt-like white to green hairs. Parry rabbitbrush is intermediate in height, growth habit, and stem and leaf hairs between rubber rabbitbrush and green rabbitbrush. It is a member of the Sunflower (Composite) family. Parry rabbitbrush is a diverse group with 12 subspecies. It is native to the western USA including the Great Basin region. Parry rabbitbrush grows on dry, open foothills, sagebrush steppe, and lower mountains. It is not as commonly found as the other native rabbitbrush species.

RABBITBRUSH, RUBBER (Gray) [#54] (*Chrysothamnus nauseosus* [Pallas ex Pursh] Britt)
An evergreen shrub up to 7 feet tall, with gray stems and gray-green leaves. Rubber rabbitbrush is a member of the Sunflower (Composite) family. It is native to the interior western USA, including the Great Basin region. It is naturally found in association with big sagebrush, pinyon pine/juniper, and ponderosa pine communities. Rubber rabbitbrush vigorously re-sprouts after fire or other disturbances. It grows on sites with sandy, gravelly, or clay-alkaline soils where the annual rainfall is between eight and 18 inches. There are several distinct subspecies of rubber rabbitbrush. Average number of seeds per pound: 695,000; the ripe seed is harvested in the fall months.

SAGEBRUSH

SAGEBRUSH, BASIN BIG [#55] (*Artemisia tridentata* ssp. *tridentata* Nutt.)
An evergreen shrub up to 14 feet tall, five to eight wide. Basin big sagebrush is erect, spreading, heavily branched, with an uneven top. It is a member of the Sunflower (Composite) family. It is native to the interior western USA, including the Great Basin region. Basin big sagebrush is found on well-drained, moderately deep to deep loam or silt loam soils, up to 9,500 feet in elevation. Basin big sagebrush is the most abundant shrub in western USA aridlands; it may sometimes be interspersed with Wyoming big sagebrush, and may also occur in riparian sites. It is generally fire intolerant. Moisture regime: semi-dry; nine to 18 inches annual rainfall.
Average number of seeds per pound: 2,500,000; the seed is harvested in the late fall months. The drill seeding rate for big sagebrush is 0.1 to 0.2 pounds PLS per acre in a seed mixture. The seed should be planted very shallow (1/16 inch deep). Caution: Basin big sagebrush seed is very short-lived and may be fragile. The seed must be stored in cold storage (<38° F. and <25%R.H.). It is recommended to use seed within one to two years of harvest.



(52) Krasheninnikovia lanata
Winterfat

JRJ

(53) Tetradymia canescens
Gray Horsebrush

Chrysothamnus nauseosus
(54) Rubber Rabbitbrush

(55) Artemisia tridentata
Basin Big Sagebrush

SAGEBRUSH, MOUNTAIN BIG (*Artemisia tridentata* ssp. *vaseyana* [Rydb.] Beetle)
An evergreen shrub up to nine feet tall. Mountain big sagebrush is spreading and even topped. It is a member of the Sunflower (Composite) family. Mountain big sagebrush is native to the interior western USA, including the Great Basin region. It occurs on soils that are deep and well-drained with pH usually about 7.0. It naturally found in association with mountain shrub plant communities from moderate to high elevations, up to 10,000 feet. Mountain big sagebrush often recovers after wildfire from seed in the soil bank or layered roots. Moisture regime: semi-dry, at least 12 inches mean annual precipitation. Average number of seeds per pound: 2,250,000; the seed is usually harvested in the early fall months. The drill seeding rate for big sagebrush is 0.1 to 0.2 pounds PLS per acre in a seed mixture. The seed should be planted very shallow (1/16 inch deep). Cultivar: 'Hobble Creek' is a native cultivar released by the US Forest Service Shrub Lab, Provo, Utah. Caution: mountain big sagebrush seed is very short-lived and may be fragile. The seed must be stored in cold storage (<38° F. and <25%R.H.). It is recommended to use seed within one to two years of harvest.

SAGEBRUSH, WYOMING BIG (*Artemisia tridentata* ssp. *wyomingensis* Beetle & Young)
An evergreen shrub up to three feet tall, usually up to three to four wide at maturity. Wyoming big sagebrush is basally branched rounded in form with an uneven top. It is a member of the Sunflower (Composite) family. Wyoming big sagebrush is native to the interior western USA, including the Great Basin region. It is found on shallow, gravelly, sandy to silt-clay loam soils at elevations from 2,500 to 7,000 feet. Wyoming big sagebrush does not re-sprout after wildfire. Moisture regime: dry, seven to 14 inches annual rainfall. Average number of seeds per pound: 2,500,000; the seed is harvested in the late fall months. Cultivar: 'Gordon Creek' Wyoming big sagebrush, origin Carbon County, Utah, was released by the US Forest Service Shrub Sciences Laboratory, Provo, Utah. Currently there is no seed production of Gordon Creek; source-identified seed collected from wildland sources is available from seed vendors. The drill seeding rate for Wyoming big sagebrush is 0.1 to 0.2 pounds PLS per acre in a seed mixture. The seed should be planted very shallow (1/16 inch deep). Caution: Wyoming big sagebrush seed is very short-lived and may be fragile. The seed must be stored in cold storage (<38° F. and <25%R.H.). It is recommended to use seed within one to two years of harvest.

SAGEBRUSH, BLACK (*Artemisia nova* A. Nels.)
An evergreen, spreading, aromatic shrub up to three feet tall with numerous erect branches arising from a spreading base. Black sagebrush appears darker in color than big sagebrush and low sagebrush. It is native to the interior western USA, including the Great Basin region. Black sagebrush usually occurs on dry, shallow, calcareous, often stony soil, pH between 6.5 and 7.5 at elevations between 4,500 and 8,900 feet. It is a member of the Sunflower (Composite) family. Moisture regime: dry; seven to 14 inches mean annual precipitation. Average number of seeds per pound: 900,000.

SAGEBRUSH, BUD [#56] (*Artemisia spinescens* D.C. Eat.)
A low, pungent, rounded, usually deciduous shrub up to 20 inches tall. Bud sagebrush is profusely branched from the base and has white-tomentose hairs on young twigs and leaves. The pubescence on older branches is grayish and stiff. It is a member of the Sunflower (Composite) family. Bud sagebrush is native to the western USA, including

the Great Basin region. It is well adapted to xeric conditions. It occurs on dry, often saline, limestone, or volcanic derived soils in plains and hills, and in arid deserts. It occurs on soils that are moderately deep with fine to coarse texture, pH is 7.0 to 8.5. Bud sagebrush grows in association with salt desert shrub, black sagebrush and basin big sagebrush communities at 3,000 to 8,000 feet in elevation. Moisture regime: dry to very dry. Bud sagebrush will reproduce from stem layers or seed.
Average number of seeds per pound: 2,000,000. The drill seeding rate for bud sagebrush is 0.1 to 0.2 pounds PLS per acre in a seed mixture. The seed should be planted very shallow (1/16 inch deep). Caution: bud sagebrush seed is very short-lived and may be fragile. The seed must be stored in cold storage (<38° F. and <25 % R.H.). It is recommended to use seed within one to two years of harvest.

SAGEBRUSH, LOW [#57] (*Artemisia arbuscula* Nutt.)
A low, spreading, irregularly branched, evergreen shrub up to 20 inches tall and up to 30 inches wide. The leaves are green to dark green in color. Low sagebrush is a member of the Sunflower (Composite) family. It is native to the interior western USA, including the Great Basin region. It occurs on dry, sterile or infertile, rocky, sometimes volcanic, often alkaline soils between 3,000 and 11,500 feet. Normally, low sagebrush sites are drier and rockier than those on which big sagebrush subspecies occur. Low sagebrush is fire intolerant. Moisture regime: dry to semi-dry.
Average number of seeds per pound: 980,000.

SAGEBRUSH, SILVER [#58] (*Artemisia cana* Pursh)
An erect, freely branched, rounded, evergreen shrub up to six feet tall. Silver sagebrush is erect, rounded or spreading, and freely to thickly branched. It readily re-sprouts from root suckers after fire and other disturbances. It is a member of the Sunflower (Composite) family. Silver sagebrush is native to the western USA, including the Great Basin region. It occurs in valleys, plains, playas, foothills and mountains up to 10,000 feet in elevation. Silver sagebrush is found on soils that are deep, well-drained, loamy to sandy, with pH of 6.5 to 8.5. Bolander's silver sagebrush (*Artemisia cana bolanderi*) occurs on extremely clayey, alkaline, granitic soils. Moisture regime: semi-dry to moist.
Average number of seeds per pound: 2,250,000.

SAGEBRUSH, THREE-TIP (*Artemisia tripartita* Rydb.) (N)
A rounded, evergreen shrub up to seven feet tall. Three-tip sagebrush leaves are typically deeply divided into three linear or narrowly linear-lanceolate lobes. It is a member of the Sunflower (Composite) family. It is native to the interior western USA, including the Great Basin region. Three-tip sagebrush is found on shallow to deep, well-drained, loamy, sandy or gravelly soils. It usually occurs on sites that are moister with cooler summer temperatures than basin big sagebrush sites; and that are drier and warmer than mountain big sagebrush sites. Three-tip sagebrush reproduces by root sprouts, stem layers, or seed. Moisture regime: semi-dry.
Average number of seeds per pound: 2,500,000. Seeding rate for three-tip sagebrush is 0.1 to 0.2 pounds PLS per acre in a seed mixture. The seed should be planted very shallow (1/16 inch deep). Caution: three-tip sagebrush seed is very short-lived and may be fragile. The seed must be stored in cold storage (<38° F. and < 25% R.H.). It is recommended to use seed within one-two years of harvest.

SNAKEWEED

SNAKEWEED, BROOM (*Gutierrezia sarothrae* [Pursh] Britt. & Rusby)
A low-growing shrub, usually evergreen, is up to 28 inches tall. Broom snakeweed, also known as matchbrush, is a member of the Composite family. The root systems are fairly shallow, unusual for shrubs in aridlands. It is native to the interior western USA including the Great Basin region. Broom snakeweed naturally occurs in dry, open areas in the lower foothills, valleys, and plains, and may occur at higher elevations. It is found in plant associations on desert grasslands, sagebrush steppe, pinyon pine-juniper and Ponderosa pine woodlands. Snakeweed grows best on sandy loam soils, but it may also thrive on well-drained loams to clay loams.

MINT

SAGE, PURPLE [#59] (*Salvia dorii ssp. dorii* [Kellogg] Abrams)
An evergreen shrub up to eight feet tall. Purple sage is a member of the Mint family. It is native to the western interior USA, including portions of the Great Basin region. It is naturally found in association with big sagebrush and desert shrub communities, grows best on sandy to silt loam soils where the annual rainfall is between nine and 16 inches.

ELM

HACKBERRY, NETLEAF (*Celtis reticulata* Torr.)
A deciduous shrub or small tree up to 25 feet tall. Netleaf hackberry is native to the western USA, including the Great Basin region. It occurs on open slopes and rocky bluffs, along present or ancient riparian areas and river courses, especially the Snake River and tributaries. Average number of Netleaf hackberry seeds per pound: 4,800.

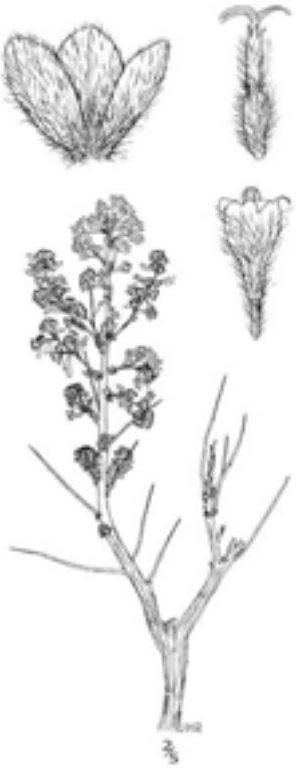
SUMAC

LEMONADE BUSH [#60] (*Rhus trilobata* Nutt.)
A dense deciduous shrub up to 12 feet tall. Lemonade bush, also known as oak-leaf sumac or skunkbush/, is native to the western USA, including portions of the Great Basin. It grows best on rocky, gravelly, well-drained soils. It is moderately tolerant of alkalinity where drainage is good. Lemonade bush requires at least ten inches of annual precipitation for establishment. Average number of seeds per pound: 20,000.

MOCKORANGE [#61] (*Philadelphus lewisii* Pursh) (N)
A deciduous shrub up to 16 feet tall. It is native to the western USA, including portions of the Great Basin region. It often occurs on rocky slopes and foothills where annual precipitation exceeds 14 inches.
Average number of mockorange seeds per pound: 4,500,000.

Note: An (I) after a plant name means the plant is Introduced (I) to western North America and is considered to be a non-native species. An (N) after a plant name means the plant is Native (N) to a specified geographic area in western North America prior to the year 1800. All of the shrubs described above are considered to be native species in western North America, except forage kochia, which is a non-native (introduced) species to North America.

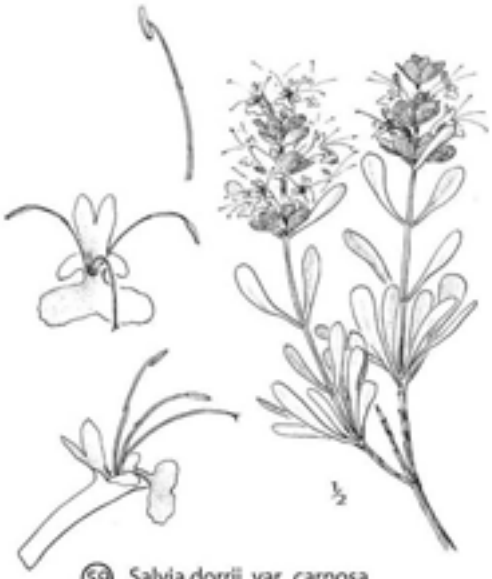
Recommendation: seeding of shrub seed on aridlands (twelve inches or less annual rainfall) is to be completed in winter (dormant) or very early spring depending on presence of sufficient soil moisture conditions to germinate and establish plants



56 Artemisia spinescens
Bud Sagebrush

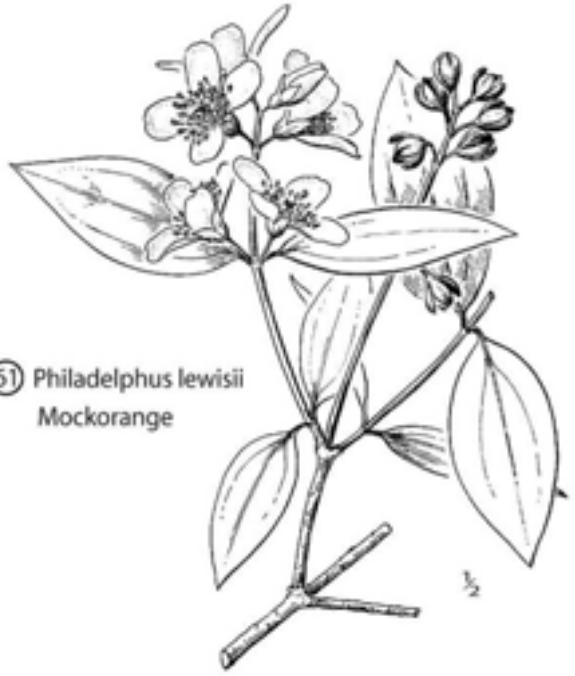
57 Artemisia arbuscula
Low Sagebrush

58 Artemisia cana
Silver Sagebrush



59 Salvia dorrii var. carnosa
Purple Sage

60 Rhus trilobata
Lemonade Bush



61 Philadelphus lewisii
Mockorange

APPENDICES

Table A: Grasses
Great Basin Plant Species showing Nativity, Soils Adapted to, Average Plant Height at Maturity, and Seed Placement Depth in Soil

GRASS SPECIES	SOILS	PLANT HT (Inches)	Seed Depth (Inches)
Alkali Bluegrass (N)	sil, alkali	26	1/8
Big Bluegrass (N)	l, sil	24	1/8
Canada Bluegrass (I)	l	16	1/8
Canby's Bluegrass (N)	l, sil	20	1/8
Cusick's Bluegrass (N)	sil, sl	16	1/8
Muttongrass (N)	l, sil	20	1/8
Nevada Bluegrass (N)	sil, sl	30	1/8
Sandberg's Bluegrass (N)	l, sil	16	1/8
Meadow Brome (I)	l, deep	42	1/4-1/2
Mountain Brome (N)	l, sil, deep	48	1/4-1/2
Smooth Brome (I)	l, sil, deep	48	1/4-1/2
Sand Dropseed (N)	s, sl	30	1/8
Alkali Sacaton (N)	l, sl	36	1/8
Creeping Red Fescue (I)	l, sil, acidic	24	1/4
Hard Fescue (I)	l, sil	18	1/4
Idaho Fescue (N)	cl, sil	32	1/4
Roemer's fescue (N)	cl, sil, (W.OR)	30	1/4
Sheep Fescue (I)	l, sil	14	1/4
Six-weeks Fescue (N)	annual sil	12	1/4
Western Fescue (N)	sil	24	1/4
Galleta Grass (N)	cl, l	18	1/4
Blue Grama (N)	cl, sl	16	1/8-1/4
Sideoats Grama (N)	sil, sl	30	1/4
Tufted Hairgrass (N)	cl, sil, acidic	24	1/8
Prairie Junegrass (N)	sil, sl	24	1/8
Desert Needlegrass (N)	sl	30	1/2
Green Needlegrass (N)	cl, shale-derived	40	1/2
Needle-&-thread Grass (N)	s, sl	30	1/2
Thurber's Needlegrass (N)	sil, sl, shallow, rocky	30	1/2
Annual Oatgrass (N)	cl, sil	24	1/4
California Oatgrass (N)	l, cl, sil	32	1/4-1/2
Intermediate Oatgrass (N)	sl, l	24	1/2
Orchardgrass (I)	l, sil	48	1/4-1/2
Indian Ricegrass (N)	s, sl	28	2-8
Saltgrass, Inland (N)	cl, sil, alkali	16	1/8-1/4
Bottlebrush (N)	sil, sl	24	1/4
Big Squirreltail (N)	sil, sl	28	1/4
Purple Three-awn (N)	sil, sl	16	1/4-1/2
Beardless Bluebunch Wheatgrass (N)	sil	40	1/4-1/2
Bluebunch Wheatgrass (N)	sil	40	1/4-1/2

SPECIES	**SOILS**	**PLANT HT** (Inches)	**Seed Depth** (Inches)
Crested Wheatgrass (I)	l, sil	36	1/4-1/2
Intermediate Wheatgrass (I)	sil	48	1/4-1/2
Pubescent Wheatgrass (I)	sil, sl	42	1/4-1/2
RS Hybrid Wheatgrass (I)	sil	36	1/4-1/2
Siberian Wheatgrass (I)	sl	30	1/4-1/2
Slender Wheatgrass (N)	l, sl, saline	40	1/4-1/2
Snake River Wheatgrass (N)	sl, sil	36	1/4-1/2
Streambank Wheatgrass (N)	l, sil	36	1/4-1/2
Tall Wheatgrass (I)	l, sil	60	1/4-1/2
Thickspike Wheatgrass (N)	s, sil	36	1/4-1/2
Western Wheatgrass (N)	cl, l	36	1/4-1/2
Basin Wildrye (N)	sil, sl	60	1/4-1/2
Beardless Wildrye (I)	sl	40	1/2
Creeping Wildrye (N)	sl, s	40	1/2
Blue Wildrye (N)	l, sil	36	1/4-1/2
Mammoth Wildrye (I)	s	40	1/2
Russian Wildrye (I)	sil, sl	32	1/4-1/2

KEY to Soil abbreviations: s = sands, sl = sandy loam, sil = silt loam, cl = clay loam, l = loam

(N) = Species native to western USA
(I) = Species introduced, origin is from outside western USA

Table A: Forbs **Wildflowers including Herbaceous Legumes**			
SPECIES	**SOILS**	**PLANT HT** (Inches)	**SEED DEPTH** (Inches)
Alfalfa (I)	sl, sil, l	36	1/4-1/2
Pacific Aster (N)	sl, sil, l	36	1/4-1/2
Showy Aster (N)	sl, sil, l	36	1/4-1/2
Arrowroot Balsamroot (N)	sil, sl	48	1/2
Carey's Balsamroot (N)	sil, sl	46	1/2
Hooker's Balsamroot (N)	sil	42	1/2
Rocky Mtn. Beeplant (N)	sil, l	36	1/4
Yellow Beeplant (N)	sil, sl	28	1/4
Biscuit-root & Desert-Parsley (N)	sil, sl	36	1/8-1/4
Cous' Biscuit-root (N)	sil, sl	36	1/8-1/4
Fernleaf lomatium	sil	30	1/8-1/4
Gray's lomatium	sil	30	1/8-1/4
Black-eyed Susan (N)	sil, l	24	1/4
Blanketflower (N)	sil, l	24	1/4
Blazing-star (N)	sl	36	1/4
Small Burnet (I)	sil, sl	28	1/2
Blue Camas (N)	sil, l, cl	24	1/4-1/2
Clovers (N & I)	sil, sl	30	1/4-1/2
Evening Primrose (N)	sl, sil, s	28	1/4
Blue Flax (I)	sl, sil	30	1/4
Lewis' Flax (N)	sil, sl	28	1/4
Desert Yellow Fleabane (N)	sil, sl	12	1/4
Dwarf Yellow Fleabane (N)	sil, sl	10	1/4
Shaggy Fleabane (N)	sil	20	1/4
Sticky Geranium (N)	sil	24	1/8
Prickly Gilia (N)	sil, sl	24	1/4
Scarlet Gilia (N)	sil, sl	36	1/4
Gooseberryleaf Globemallow (N)	sil, sl	28	1/4
Munroe's Globemallow (N)	sil, sl	32	1/4
Scarlet Globemallow (N)	sil	10	1/4
Showy Goldeneye (N)	sil	48	1/4
Tapertip Hawksbeard (N)	sil, sl	28	1/4
Silky Lupine (N)	sl, sil	18	1/4-1/2
Silver Lupine (N)	sl, sil	18	1/4-1/2
Sagebrush Mariposa-lily (N)	sl, sil	18	1/4
Gunnison's Sego-lily (N)	sl, sil	18	1/4
Microseris, Nodding (N)	sil, sl	16	1/4
Basalt Milkvetch (N)	sil, sl	36	1/4-1/2
Cicer Milkvetch (I)	sil, sl	36	1/4-1/2
Freckled Milkvetch (N)	sil, sl, cl	16	1/4
Pulse Milkvetch (N)	sil, sl	24	1/4
Silver Milkvetch (N)	sil, sl	12	1/4

SPECIES	SOILS	PLANT HT (Inches)	SEED DEPTH (Inches)
Woolly Milkvetch (N)	sil, l	20	1/2
Milkweed (N)	sil, sl	36	1/2
Tapertip Onion (N)	sil, l	24	1/4-1/2
Bonneville Peavine (N)	sil	24	1/4-1/2
Dark Blue Penstemon (N)	sil, sl	28	1/4
Eaton's Penstemon (N)	sil, sl	28	1/4
Hot-rock Penstemon (N)	sil	24	1/4
Palmer's Penstemon (N)	sil, l	30	1/4
Rocky Mtn Penstemon (N)	sil, l	36	1/4
Rydberg's Penstemon (N)	sil	32	1/4
Sagebrush Penstemon (N)	sil	36	1/4
Sand Penstemon (N)	sl	24	1/4
Whipple's Penstemon (N)	sil	24	1/4
Hood's Phlox (N)	sil	8	1/8
Longleaf Phlox (N)	sil, sl, shallow	20	1/8
Showy Phlox (N)	sil, sl	16	1/8
Spiny Phlox (N)	sil, sl, cl	6	1/8
Western Prairieclover (N)	sl	30	1/4-1/2
Sainfoin (I)	sl, sil	24	1/4-1/2
Annual Sunflower (N)	sl, sil	60	1/4-1/2
Yellow Sweetclover (I)	sil, sl	48	1/4
Northern Sweetvetch (N)	sil	30	1/4
Big Deervetch (N)	sil, sl	24	1/4-1/2
Birdsfoot Trefoil (I)	sil, cl, l	18	1/4
Meadow Deervetch (N)	sil	20	1/4
Nevada Deervetch (N)	sl, shallow	20	1/4
American Vetch (N)	sil	30	1/4
Hairy Vetch (I)	sil, l	30	1/4
Wyethia, Mule's-ear (N)	sil, cl	36	1/2
Western Yarrow (N)	sil, l	24	1/8-1/4
Soapwell Yucca (N)	sl, sil	48	1/4-1/2

Table A: Shrubs			
SHRUB SPECIES	**SOILS**	**PLANT HT (Feet)**	**SEED DEPTH (Feet)**
Wyo. Big Sagebrush (N)	sl, sil, shallow	3feet	1/16
Basin Big Sagebrush (N)	sl, sil, l	14	1/16
Mtn. Big Sagebrush (N)	sil, cl, l	9	1/16

KEY to Soil abbreviations: s = sands, sl = sandy loam, sil = silt loam, cl = clay loam, l = loam
NOTE: An (I) or (N) after the plant's name means the plant is Introduced,
Non-native (I) to western North America. Or Native (N) to a specified geographic area in western North America.

Table B: Grasses

Approximate Adaptability for Rehabilitation/ Conservation in the Great Basin

EFFECTIVE ANNUAL PRECIPITATION

	5-9 in.	9-12 in.	12-15 in.	15-18 in.	18-25 in.	25-40 in.	40-60 in.	Over 60 in.
GRASSES								
Bottlebrush/squirreltail (N)								
SnakeRiver wheatgrass (N)								
Thurber's needlegrass (N)								
Needle&thread (N)								
Sandberg's bluegrass (N)								
Sand dropseed (N)								
Siberian wheatgrass (I)								
Indian ricegrass (N)								
Thickspike wheatgrass (N)								
Crested wheatgrass (I)								
Big bluegrass (N)								
Six weeks fescue (N)								
Prairie junegrass (N)								
Nevada bluegrass (N)								
Basin wildrye (N)								
Bluebunch wheatgrass (N)								
Russian wildrye (I)								
Canby bluegrass (N)								
Beardless wheatgrass (N)								
Sheep fescue (I)								
Idaho fescue (N)								
Mammoth wildrye (I)								
Streambank wheatgrass (N)								
Tall wheatgrass (I)								
Pubescent wheatgrass (I)								
Intermediate wheatgrass								
Muttongrass (N)								
Hard fescue (I)								
Annual ryegrass (I)								
Perennial ryegrass (I)								
Smooth bromegrass (I)								
Creeping red fescue (I)								
Tall fescue (I)								
Orchardgrass (I)								
Timothy (I)								
Slender wheatgrass (N)								
Mountain brome (N)								
Foxtail millet (I)								
Proso millet (I)								
Blue wildrye (N)								
Bentgrass								
Redtop								
American dunegrass (N)								

Table B: Forbs and Legumes
Approximate Adaptability for Rehabilitation/Conservation in the Great Basin

	EFFECTIVE ANNUAL PRECIPITATION							
	5-9 in.	9-12 in.	12-15 in.	15-18 in.	18-25 in.	25-40 in.	40-60 in.	Over 60 in.
FORBS AND LEGUMES								
Lupines (N)								
Native milkvetch (N)								
Penstemon sp. (N)								
Globemallow (N)								
Sainfoin (I)								
Blue flax (I)								
Ann. Sunflower (N)								
Alfalfa (I)								
Small Burnet (I)								
Sweetclover (I)								
Western yarrow (N)								
Showy goldeneye (N)								
American vetch (N)								
Common vetch (I)								
Hairy vetch (I)								
White clover (I)								
Sub clover (I)								
Alsike clover (I)								
Hungarian vetch (I)								
Field peas (I)								
Strawberry clover(I)								
Rose clover (I)								
Red clover (I)								
Birdsfoot trefoil (I)								
Smartweed (N)								
Geyer sedge (N)								
Elk sedge (N)								
Nebraska sedge (N)								
Alkali bulrush (N)								
Hardstem bulrush (N)								

Table B: Woody Plants
Approximate Adaptability for Rehabilitation/ Conservation in the Great Basin

EFFECTIVE ANNUAL PRECIPITATION

	5-9 in.	9-12 in.	12-15 in.	15-18 in.	18-25 in.	25-40 in.	40-60 in.	Over 60 in.
WOODY PLANTS								
Fourwing-saltbrush (N)								
Shadscale (N)								
Spiny hopsage (N)								
Rubber rabbitbrush (N)								
Snow buckwheat (N)								
Big sagebrush (N)								
Bitterbrush (N)								
Western juniper (N)								
Western clematis (N)								
Netleaf hackberry (N)								
Rocky Mountain juniper (N)								
Green rabbitbrush (N)								
Pinyon pine (N)								
Mountain-mahogany (N)								
Caragana (I)								
Scotch pine (I)								
Ponderosa pine (N)								
Lilac (I)								
Austrian pine (I)								
Serviceberry (N)								
Douglas hawthorn (N)								
Mockorange (N)								
Bitter cherry (N)								
Mallow ninebark (N)								
Oceanspray (N)								
Western chokecherry (N)								
Common snowberry (N)								
Snowbrush ceanothus (N)								
Blue elderberry (N)								
Arborvitae (I)								
Western white pine (N)								
Blue spruce (N)								
Black twinberry (N)								
Evergreen huckleberry (N)								
Mountain ash, Sitka (N)								
Douglas-fir (N)								
Redosier dogwood (N)								
Mountain maple (N)								
Red alder (N)								
Grand fir (N)								
Vine maple (N)								
Incense cedar (N)								
Western red cedar (N)								
Norway Spruce (I)								
Coyote willow (N)								
Quaking aspen (N)								
Black cottonwood (N)								
Fremont cottonwood (N)								

Table B: Woody Plants
Approximate Adaptability for Rehabilitation/ Conservation in the Great Basin

EFFECTIVE ANNUAL PRECIPITATION

	5-9 in.	9-12 in.	12-15 in.	15-18 in.	18-25 in.	25-40 in.	40-60 in.	Over 60 in.
WOODY PLANTS								
Lodgepole pine (N)								
Pacific willow (N)								
Lemmon's willow (N)								
Drummond's willow (N)								
Mackenzie's willow (N)								
Sitka willow (N)								
Hooker willow (N)								
Douglas spirea (N)								
Western hemlock (N)								
Sitka spruce (N)								

Table C: Seed Characteristics for Grasses Used for Rehabilitation and Conservation Seeding

Common Name	Scientific Name	Seeds Per Pound	PLS Seeds/ sq.ft./lb/ac 1/	PLS Seeds/lin. Ft 6 in. spacing 2/	Single Species seeding rate lbs/acre
Grasses					
Bentgrass, redtop (I)	*Agrostis gigantea*	4,990,000	115	58	1
Bentgrass, spike (N)	*Agrostis exarata*	3,900,000	89.5	45	1.5
Bluegrass, big (N)	*Poa secunda ssp. ampla*	917,000	21	11	3
Bluegrass, Canby's (N)	*Poa secunda ssp. canbyi*	930,000	21.3	11	3
Bluegrass, Sandberg's (N)	*Poa secunda ssp. secunda*	950,000	21.8	10.9	3
Bottlebrush, squirreltail (N)	*Sitanion hystrix*	220,000	5.1	2.6	5
Brome, mountain (N)	*Bromus marginatus*	140,000	3.2	1.6	8
Brome, smooth (I)	*Bromus inermis*	125,000	2.9	1.5	8
Dropseed, sand (N)	*Sporobolus cryptandrus*	5,000,000	115	57.5	1
Alkali sacaton (N)	*Sporoblus airoides*	1,750,000	40	20	2
Fescue, creeping red (I)	*Festuca rubra*	615,000	14.1	7.1	N/A
Fescue, hard (I)	*Festuca trachyphylla*	565,000	13	6.5	4
Fescue, Idaho (N)	*Festuca idahoensis*	450,000	10.3	5.1	4
Fescue, sheep (I)	*Festuca ovina*	680,000	15.6	7.8	4
Fescue, tall (I)	*Festuca arundinacea*	225,000	5.2	2.6	N/A
Fescue, western (N)	*Festuca occidentalis*	350,000	8	4	7
Galleta grass (N)	*Hilaria jamesii*	170,000	3.9	1.9	6
Hairgrass, tufted (N)	*Deschampsia caespitosa*	2,500,000	57.8	28.9	2
Junegrass, prairie (N)	*Koeleria macrantha*	2,200,000	50.5	25.2	2
Needlegrass, green (N)	*Stipa virdula*	180,000	4.1	2	6
Needle and Thread (N)	*Stipa comata*	150,000	3.4	1.7	6
Needlegrass, Thurber's (N)	*Stipa thurberiana*	150,000	3.4	1.7	6
Oatgrass, California (N)	*Danthonia californica*	125,000	2.9	1.5	8
Orchardgrass (I)	*Dactylis glomerata*	450,000	10.5	5.2	6
Ricegrass, Indian (N)	*Oryzopsis hymenoides*	205,000	4.7	2.3	5
Ryegrass,annual (I)	*Lolium multiflorum*	190,000	4.4	2.2	6
Ryegrass, perennial (I)	*Lolium perenne*	225,000	5.2	2.6	N/A
Saltgrass, inland (N)	*Distichlis spicata*	520,000	11.9	6	4
Squirreltail, bottlebrush (N)	*Elymus elymoides*	190,000	4.4	2.2	6
Timothy (I)	*Phleum pratense*	1,300,000	30	15	N/A

Table C: Seed Characteristics for Grasses Used for Rehabilitation and Conservation Seeding

Common Name	Scientific Name	Seeds Per Pound	PLS Seeds/ sq.ft./lb/ac 1/	PLS Seeds/lin. Ft 6 in. spacing 2/	Single Species seeding rate lbs/acre
Wheatgrass, beardless (N)	*Pseudoroegneria spicata in*	125,000	3	1.5	6
Wheatgrass, bluebunch (N)	*Pseudoroegneria spicata sp*	140,000	3.2	1.6	6
Wheatgrass, crested (I)	*Agropyron cristatum*	200,000	4.6	2.3	5
Wheatgrass, intermediate (I)	*Elytrigia intermedia*	110,000	2.5	1.2	8
Wheatgrass, pubescent (I)	*Elytrigia intermedia*	95,000	2.2	1.1	8
Wheatgrass, Siberian (I)	*Agropyron fragile ssp. siber*	220,000	5.1	2.5	5
Wheatgrass, slender (N)	*Elymus trachycaulus*	160,000	3.7	1.8	6
Wheatgrass, Snake River (N)	*Elymus waiwaiensis*	170,000	3.9	2	6
Wheatgrass, streambank (N)	*Elymus lanceolatus*	170,000	3.9	2	6
Wheatgrass, tall (I)	*Elytrigia elongatum*	80,000	1.8	0.9	8
Wheatgrass, thickspike (N)	*Elymus lanceolatus*	160,000	3.6	1.8	5
Wheatgrass, western (N)	*Pascopyrum smithii*	120,000	2.8	1.4	7
Wildrye, basin (N)	*Leymus cinereus*	150,000	3.4	1.7	6
Wildrye, blue (N)	*Elymus glaucus*	130,000	3	1.5	8
Wildrye, mammoth (I)	*Leymus giganteus*	75,000	1.7	0.9	8
Wildrye, Russian, (I)	*Psathrostachys juncea*	175,000	4	2	6

N/A Not Applicable for BLM seeding
1/ I lb/ac seeding rate
2/ 1 lb/ac seeding rate with 6 inch drill width - typical rangeland drill row spacing
3/ Seed data for some species contained in this guide are unavailable and not included in this table
Note: Seed mixtures are usually based on the desired percent of each species/ cultivar.
The single species seeding rates for forb and shrub seed are not applicable for BLM seedings.

Table C: Seed Characteristics for Cereals and Legumes Used for Rehabilitation and Conservation Seeding

Common Name	Scientific Name	Seeds Per Pound	PLS Seeds/ sq.ft./lb/ac 1/	PLS Seeds/lin. ft 6 in. spacing 2/	Single Species seeding rate, lbs/acre
Cereals					
Oats (I)	*Avena sativa*	16,000	0.4	0.2	20
Barley (I)	*Hordeum vulgare*	13,600	0.3	0.15	20
Wheat (I)	*Triticum aestivum*	11,400	0.3	0.15	20
Legumes					N/A
Alfalfa (I)	*Medicago sativa*	230,000	5.3	2.6	
Clover, alsike (I)	*Trifolium hybridum*	680,000	15.7	7.9	
Clover, crimson (I)	*Trifolium incarnatum*	179,000	4.1	2.1	
Clover, red (I)	*Trifolium pratense*	275,000	6.5	3.3	
Clover, rose (I)	*Trifolium hirtum*	140,000	3.2	1.6	
Clover, strawberry (I)	*Trifolium fragiferum*	288,000	6.6	3.3	
Clover, subterranean (I)	*Trifolium subterranean*	60,000	1.4	0.7	
Clover, white (I)	*Trifolium repens*	800,000	18.4	9.2	
Flatpea (I)	*Lathyrus sylvestrus*	15,000	0.3	0.15	
Lupine, big-leaf	*Lupinus polyphyllus*	70,000	1.6	0.8	
Lupine, pine (N)	*Lupinus albicaulus*	25,000	0.6	0.3	
Lupine, silky (N)	*Lupinus sericeus*	20,000	0.5	0.25	
Lupine, silver (N)	*Lupinus argenteus*	20,000	0.5	0.25	
Lupine, tailcup (N)	*Lupinus caudatus*	25,000	0.6	0.3	
Milkvetch, basalt (N)	*Astragalus filipes*	100,000	2.3	1.1	
Milkvetch, freckled (N)	*Astragalus lentiginosus*	95,000	2.2	1.1	
Milkvetch, woollypod (N)	*Astragalus purshii*	110,000	2.5	1.2	
Peas, field (I)	*Pisum sativum*	18,000	0.4	0.2	
Prairieclover, western (N)	*Dalea ornata*	440,000	10.1	5	
Sainfoin (I)	*Onobrychis viciaefolia*	28,000	0.6	0.3	
Sweetclover, yellow (I)	*Melilotus officinalis*	230,000	5.3	2.7	
Sweetvetch, northern (N)	*Hedysarum boreale*	90,000	2.1	1	
Deervetch, big (N)	*Lotus crassifolius*	250,000	5.7	2.8	
Trefoil, birdsfoot (I)	*Lotus corniculatus*	450,000	10.3	5.1	
Vetch, American (N)	*Vicia americana*	30,000	0.7	0.4	
Vetch, common (I)	*Vicia sativa*	8,300	0.2	0.1	
Vetch, hairy (I)	*Vicia villosa*	17,000	0.4	0.2	
Vetch, Hungarian (I)	*Vicia pannonica*	11,000	0.3	0.15	
Vetch, winter (I)	*Vicia villosa varia*	11,000	0.3	0.15	

Table C: Seed Characteristics for Forbs Used for Rehabilitation and Conservation Seeding

Common Name	Scientific Name	Seeds Per Pound	PLS Seeds/ sq.ft./lb/ac	PLS Seeds/lin. ft 6 in. spacing	Single Species seeding rate, lbs/acre
Wildflowers/Forbs					N/A
Balsamroot, arrowleaf (N)	*Balsamorhiza sagittata*	55,000	1.3	0.6	
Balsamroot, Hooker's (N)	*Balsamorhiza hookeri*	55,000	1.3	0.6	
Beeplant, Rocky Mtn. (N)	*Cleome serrulata*	65,000	1.5	0.75	
Black-eyed Susan	*Rudbeckia hirta*	1,500,000	34.4	17.2	
Blanketflower (N)	*Gaillardia aristata*	200,000	4.6	2.3	
Blazing-star (N)	*Mentzelia laevicaulis*	300,000	6.9	3.5	
Burnet, small (I)	*Sanguisorba minor*	50,000	1.2	0.6	
Daisy, woolly (N)	*Eriophyllum lanatum*	810,000	18.5	9.2	
Desert-parsley, Gray's (N)	*Lomatium grayi*	45,000	1	0.5	
Desert-parsley, nine-leaf (N)	*Lomatium triternatum*	45,000	1	0.5	
Dusty-maiden (N)	*Chaenactis douglasii*	350,000	8	4	
Evening Primrose, desert (N)	*Oenethera caespitosa*	1,200,000	27.5	13.75	
Flax, blue (I)	*Linum perenne*	295,000	7	3.5	
Flax, Lewis' (N)	*Linum lewisii*	420,000	9.6	4.8	
Fleabane, shaggy (N)	*Erigeron pumilis*	1,800,000	41.3	20.6	
Geranium, sticky (N)	*Geranium viscosissimum*	60,000	1.4	0.7	
Gilia, scarlet (N)	*Gilia aggregata*	950,000	21.8	10.9	
Globemallow, desert (N)	*Sphaeralcea ambigua*	500,000	11.4	5.7	
Globemallow, gooseberryleaf (N)	*Sphaeralcea grossulariifolia*	500,000	11.4	5.7	
Globemallow, scarlet (N)	*Sphaeralcea coccinea*	500,000	11.4	5.7	
Goldeneye, showy (N)	*Viguieria multiflora*	1,050,000	24.1	12	
Lomatium, dissected-leaf (N)	*Lomatium dissectum*	48,000	1.1	0.55	
Penstemon, beardlip (N)	*Penstemon barbatus*	550,000	12.6	6.3	
Penstemon, dark-blue (N)	*Penstemon cyaneus*	180,000	4.1	2	
Penstemon, Eaton's (N)	*Penstemon eatonii*	600,000	13.7	6.8	
Penstemon, Palmer's (N)	*Penstemon palmeri*	600,000	13.8	6.9	
Penstemon, Rocky Mtn. (N)	*Penstemon strictus*	520,000	11.9	5.9	
Prairie-smoke (N)	*Geum triflorum*	690,000	15.8	7.9	
Sego-lily, Nuttall's (N)	*Calochortus nuttallii*	190,000	4.3	2.1	
Sunflower, annual (N)	*Helianthus annuus*	45,000	1	0.5	
Wallflower, western (N)	*Erysimum occidentale*	3,000,000	68.8	34.4	
Wyethia, mule's-ear (N)	*Wyethia amplexicaulis*	25,000	0.6	0.3	
Yarrow, western (N)	*Achillea millefolium* var. *occidenta*	2,700,000	62	31	
Yucca, soapwell (N)	*Yucca glauca*	25,000	0.6	0.3	

1/ @1 lb/ac seeding rate

2/ @ 1lb seeding rate with 6 inch drill width - Typical rangeland drill row spacing

Forb and Shrub seed are used in mixtures with other species, adjust the seeding rate based on the required seeds per area and cost of seed.

The single species seeding rates for forb and shrub seed are not applicable for BLM seedings.

Table C: Seed Characteristics for Shrubs Used for Rehabilitation and Conservation Seeding

Common Name	Scientific Name	Seeds Per Pound	PLS Seeds/ sq.ft./lb/ac	PLS Seeds/lin. ft 6 in. spacing	Single Species seeding rate, lbs/acre
Shrubs				N/A	N/A
Bitterbrush (N)	*Purshia tridentata*	15,000	0.3		
Chokecherry, western (N)	*Prunus virginiana ssp. demissa*	2,000	0.05		
Cliffrose (N)	*Cowania stansburiana*	65,000	1.5		
Fernbush (N)	*Chamaebatiaria millefolium*	1,700,000	39		
Indian-apple (N)	*Peraphyllum ramossissimum*	24,000	0.5		
Mountain-mahogany, curl-leaf N	*Cercocarpus ledifolius*	50,000	1.1		
Mountain-mahogany, little-leaf N	*Cercocarpus intricatus*	50,000	1.1		
Mountain-mahogany, True (N)	*Cercocarpus montanus*	60,000	1.4		
Serviceberry, Utah (N)	*Amelanchier utahensis*	25,000	0.6		
Jointfir, Nevada (N)	*Ephedra nevadensis*	20,000	0.5		
Mormon-tea, Ephedra (N)	*Ephedra viridis*	20,000	0.5		
Greasewood, Black (N)	*Sarcobatus vermiculatus*	285,000	6.5		
Hopsage, spiny (N)	*Grayia spinosa*	165,000	3.8		
Saltbush, Fourwing (N)	*Atriplex canescens*	55,000	1.3		
Saltbush, Gardner's (N)	*Atriplex gardneri*	70,000	1.6		
Shadscale (N)	*Atriplex confertifolia*	65,000	1.5		
Winterfat (N)	*Krasheninnikovia lanata*	110,000	2.5		
Kochia, forage (I)	*Kochia prostrata*	115,000	1.6		
Horsebrush, gray (N)	*Tetradymia canescens*	140,000	3.2		
Rabbitbrush, green (N)	*Chrysothamnus viscidiflorus*	780,000	18		
Rabbitbrush, rubber (N)	*Chrysothamnus nauseosus*	695,000	16		
Big sagebrush, Basin (N)	*Artemisia tridentata* ssp. *tridentata*	2,500,000	57		
Big sagebrush, Mountain (N)	*Artemisia tridentata* ssp. *vaseyan*	2,250,000	51		
Big sagebrush, Wyoming (N)	*Artemisia tridentata* ssp. *wyoming*	2,500,000	57		
Sagebrush, black (N)	*Artemisia nova*	900,000	21		
Sagebrush, bud (N)	*Artemisia spinescens*	2,000,000	45.9		
Sagebrush, low (N)	*Artemisia arbuscula*	980,000	22		
Sagebrush, silver (N)	*Artemisia cana*	2,250,000	51		
Sagebrush, Three-tip (N)	*Artemisia tripartita*	2,500,000	57		
Hackberry, netleaf (N)	*Celtis reticulata*	4,800	0.1		
Lemonade bush (N)	*Rhus trilobata*	20,000	0.5		
Mockorange (N)	*Philadelphus lewisii*	4,500,000	103.3		

The single species seeding rates for forb and shrub seed are not applicable for BLM seedings.

Forb and Shrub seed are used in mixtures with other species, adjust the seeding rate based on the required seeds per area and cost of seed.

Table D: BLM Minimum PLS & Average Seed Costs/LB

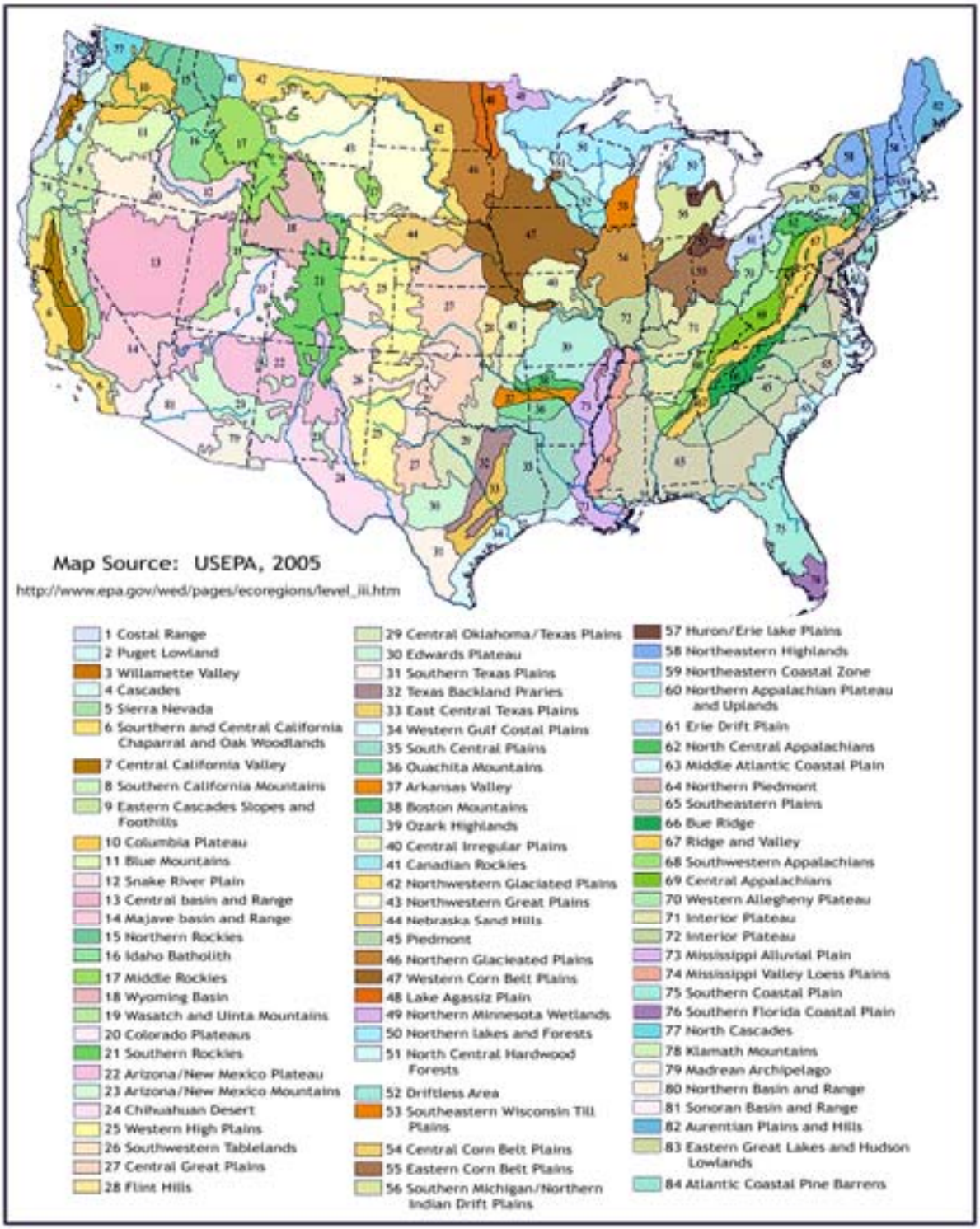
SEED NAME/VAR./SC SYMBOL	NATIVE/INTRO	Seed Source	EST. COST/LB	Min.Pur-Germ-PLS
Crested whtgr, Hycrest/ AGCR	Introduced Grass	Central Asia	$0.52	0.95/ 0.85/ 0.8075
Crested whtgr, Nordan/AGDE	I	Central Asia	$0.77	0.95/ 0.85/ 0.8075
Crested whtgr,Ephraim/ AGCR	I	Central Asia	$0.82	0.95/ 0.85/ 0.8075
Crested whtgr, Fairway/ AGCR	I	Central Asia	1.09	0.95/ 0.85/ 0.8075
Crested whtgr, Douglas/ AGCR	I	Central Asia	1.22	0.95/ 0.85/ 0.8075
Crested whtgr, CDII/ AGCR	I	Central Asia	1.09	0.95/ 0.85/ 0.8075
Siberian whtgr, P27/ AGFRS	I	Central Asia	$0.53	0.95/ 0/85/ 0/8075
Vavilov Siberian whtgr/AGFRS	I	Central Asia	$0.53	0.95/ 0.85/ 0/8075
Int whtgr, Oahe/ ELIN	I	Central Asia	$0.98	0.95/ 0/85/ 0.8075
Pubescent whtgr, Luna/ ELIN	I	Central Asia	1.99	0.95/ 0.85/ 0.8075
Tall whtgr, Alkar/ ELEL	I	Central Asia	1.98	0.95/ 0/85/ 0.8075
Sheep fescue, Covar/ FEOV	I	Mid-East (Turkey)	3.25	0.95/ 0.80/ 0.7600
Russian wildrye, Bozoisky/ PSJU	I	Russia-Kazakhstan	4.24	0.90/ 0.85/ 0.7650
Sodar streambank whtgr, Sodar/ ELLAF	Native Grass	Grant Co. OR	3.99	0.95/ 0.85/ 0.8075
Snake River whtgr, Secar/ ELWA	N	nr. Lewiston ID	$2.51	0.90/ 0.85/ 0.7650
Bluebunch whtgr, Anatone/ PSSP	N	Hells Cnyn ID	7.31	0.90/ 0.85/ 0.7650
Bluebunch whtgr, Goldar/ PSSP	N	Anatone WA	$4.99	0.90/ 0.85/ 0.7650
Bluebunch whtgr, P7/ PSSP	N	Bulk composite	4.92	0.90/ 0.85/ 0.7650
Beardless whtgr, Whitmar/ PSSPI	N	nr. Colton WA	6.22	0.90/ 0.85/ 0.7650
Thickspike wht, Critana/ ELLA	N	Central MT	1.61	0.90/ 0.85/ 0.7650
Thickspike WG, Schwendimar/ ELLA	N	nr. The Dalles, OR	2.55	0.90/ 0.85/ 0.7650
Thickspike wht, Bannock/ ELLA	N	Bulk composite	2.47	0.90/ 0.85/ 0.7650
Western whtgr, Arriba/ PASM	N	northern NM	1.79	0.90/ 0.85/ 0.7650
Western whtgr, Rosana/ PASM	N	MT	1.75	0.90/ 0.85/ 0.7650
Slender whtgr, Pryor/ ELTR	N	Southcent. MT	2.72	0.90/ 0.85/ 0.7650
Slender whtgr, San Luis/ ELTR	N	SanLuis val CO	2.41	0.90/ 0.85/ 0.7650
Basin wildrye, Magnar/ LECI	N	Southern BC	$5.50	0.90/ 0.85/ 0.7650
Basin wildrye, Trailhead/ LECI	N	MT	5.69	0.90/ 0.85/ 0.7650
Sandberg's bluegrass/ POSE	N	Western USA	4.25	0.90/ 0.80/ 0.7200
Sandberg's bluegrass/ POSE	N	Elmore Co. ID	6.41	0.90/ 0.80/ 0.7200
Canby's bluegrass, Canbar/ POCA	N	Blue Mtns, OR	2.92	0.90/ 0.70/ 0.6300
Big bluegrass, Sherman/ POAM	N	Sherman Co, OR	1.49	0.90/ 0.70/ 0.6300
Big squirreltail,SandHollow/ ELCA	N	Gem Co. ID	$23.50	0.90/ 0.75/ 0.6750
Bottlebrush squirreltail/ ELEL	N	Western USA	21.95	0.90/ 0.80/ 0.7200
Indian ricegrass, Nezpar/ ORHY	N	Eastern ID	$3.89	0.95/ 0.80/ 0.7600
Indian ricegrass, Rimrock/ ORHY	Native Grass	Northern MT	$3.39	0.95/ 0.80/ 0.7600

Table D: BLM Minimum PLS & Average Seed Costs/LB

SEED NAME/VAR/SC SYMBOL	NATIVE/INTRO	Seed Source	EST. COST/LB	Min.Pur-Germ-PLS
Needle&thread grass/ STCO	Native Grass-W. USA	S/I	$25.99	0.90/ 0.50/ 0.4500
Thurber's needlegrass/ STTH	N-W. USA	S/I	N/A	0.90/ 0.50/ 0.4500
Alkali sacaton,Salado/ SPAI	N-W. USA	NM		0.95/ 0.70/ 0.6650
Sand dropseed grass/ SPCR	N-W. USA	S/I	4.22	0.95/ 0.85/ 0.8075
Idaho fescue grass/ FEID	N-W. USA	Northwest USA	$12.24	0.95/ 0.90/ 0.8550
Galleta grass/ HIJA	N-SW. USA	S/I	$12.50	0.60/ 0.70/ 0.4200
Blue Grama/ BOGR	N-SW. USA	AZ, CO, NM	$3.15	0.80/0.60/0.4800
Sideoats Grama/ BOCU	N-SW. USA	AZ, CO, NM	$3.75	0.80/0.60/0.4800
Alfalfa, Ladak/ MESA	Introduced Forb	Eurasia	$1.25	0.95/ 0.85/ 0.8075
Alfalfa, Spredor III/ MESA	I	Eurasia	2.34	0.95/ 0.85/ 0.8075
Sainfoin, Eski/ ONVI	I	Eurasia	$1.30	0.95/ 0.85/ 0.8075
Small burnet, Delar/ SAMI	I	Europe	1.21	0.95/ 0.80/ 0.7600
Blue flax, Appar/ LIPE	I	Europe	3.25	0.98/ 0.80/ 0.7840
Lewis flax, Maple grove/ LILE	Native Forb	Central UT	N/A	0.98/ 0.80/ 0.7840
western yarrow/ ACMIL	N	S/I	4.95	0.99/ 0.85/ 0.8415
Globemallow, gooseberryleaf/ SPGR	N	S/I	$48.01	0.90/ 0.75/ 0.6750
Globemallow, Munroe/ SPMU	N	S/I	$48.01	0.90/ 0.75/ 0.6750
Globemallow, scarlet/ SPCO	N	S/I	49.24	0.90/ 0.75/ 0.6750
showy goldeneye/ VIMU	N	S/I	19.95	0.90/ 0.85/ 0.7650
northern sweetvetch/ HEBO	N	S/I	$30.00	0.90/ 0.80/ 0.7200
American vetch/ VIAM	N	S/I	33.31	0.95/ 0.80/ 0.7600
silky lupine/ LUSE	N	S/I	$49.98	0.90/ 0.80/ 0.7200
Palmer's penstemon/ PEPAL	N	S/I	41.99	0.90/ 0.85/ 0.7650
RockyMtn penstemon/ PEST	N	S/I	25.01	0.90/ 0.85/ 0.7650
sagebrush penstemon/ PESP	N	S/I	$42.59	0.90/ 0.85/ 0.7650
Forage kochia/ KOPR	Introduced Shrub	Central Asia	3.98	0.85/ 0.60/ 0.5100
Basin big sagebrush/ ARTRT	Native Shrub	S/I	4.99	0.14/ 0.80/ 0.1120
Mountain big sagebrush/ ARTRV	N	S/I	$6.14	0.25/ 0.80/ 0.2000
Wyoming big sagebrush/ ARTRW	N	S/I	4.79	0.14/ 0.80/ 0.1120
Black sagebrush/ ARNO	N	S/I	12.75	0.14/ 0.80/ 0.1120
Rubber Rabbitbrush/ CHNA	N	S/I	$15.00	0.15/0.75/0.1125
Winterfat/ KRLA	N	S/I	13.25	0.60/ 0.50/ 0/.3000
Fourwing saltbush/ ATCA	N	S/I	8.38	0.90/ 0.35/ 0.3150
Shadscale/ ATCO	N	S/I	6.25	0.90/ 0.35/ 0.3150
Spiny hopsage/ GRSP	N	S/I	24.01	0.90/ 0.35/ 0.3150
Antelope bitterbrush/ PUTR	N	S/I	15.12	0.95/ 0.90/ 0.8550
Cliffrose/ COST	N	S/I	25.01	0.90/ 0.60/ 0.6300
Mountain-mahogany/ CERCO	Native Shrub	S/I	24.01	0.90/ 0.60/ 0.6300

I = introduced plant, non-native to the western USA **N = native plant to th**

Level III Ecoregions of the Conterminous United States



Native Plant Species by Ecoregion, Level III (EPA) (GREAT BASIN STATES)

SPECIES	SC. NAME SYMBOL	CP-10	NR-15	EC-9	BM-11	IB-16	SRP-12	NBR-80	CBR-13	MR-17	WUM-19	MBR-14
Bluegrass, alkali	POJU	X		X			X	X	X			
Bluegrass, big	POAM	X		X	X		X	X				
Bluegrass, Canby's	POCA	X	X		X							
Bluegrass, Cusick's	POCU	X	X	X	X							
Muttongrass	POFE		X		X	X				X	X	
Bluegrass, Nevada	PONE						X	X	X			X
Bluegrass, Sandberg's	POSE	X		X	X	X	X	X	X			X
Brome, Mountain	BRMA	X	X	X	X	X				X	X	
Dropseed, Sand	SPCR	X		X			X	X	X		X	X
Sacaton, alkali	SPAI	X					X	X	X			
Fescue, Idaho	FEID	X	X	X	X	X		X		X		
Fescue, six-weeks	VUOC	X		X	X	X	X	X	X		X	X
Galleta grass	HIJA								X		X	X
Grama, blue	BOGR								X		X	
Grama, sideoats	BOCU								X		X	
Hairgrass, tufted	DECE		X		X	X				X	X	
Junegrass, prairie	KOMA	X	X	X	X	X		X		X	X	
Needlegrass, Thurber's	STTH	X		X			X	X	X			
Needle & thread	STCO	X		X			X	X	X			X
Oatgrass, California	DACA	X	X	X	X	X				X	X	
Ricegrass, Indian	ORHY	X		X	X		X	X	X			
Saltgrass, inland	DIST	X		X			X	X	X		X	X
Bottlebrush-squirreltail	ELEL	X		X		X	X	X	X			X
Three-awn, purple	ARPU	X			X		X	X	X			
Wheatgrass, beardless	PSSPI	X	X	X	X	X						
Wheatgrass, bluebunch	PSSP	X		X	X	X	X	X		X	X	
Wheatgrass, Snake River	ELWA	X			X	X	X					
Wheatgrass, slender	ELTR	X	X	X	X	X				X	X	
Wheatgrass, thickspike	ELLA	X		X	X		X	X				
Wheatgrass, western	PASM		X		X		X	X	X	X	X	

LEGEND: X = Occurs in Ecoregion, CP-10 = COLUMBIA PLATEAU Ecoregion, NR-15 = NORTHERN ROCKY MTNS, EC = EAST SLOPE -CASCADES, BM-11 = BLUE MTNS, IB-16 = IDAHO BATHOLITH, SRP-12 = SNAKE RIVER PLAIN, NBR-80 = NORTHERN BASIN AND RANGE, CBR- 13 = CENTRAL BASIN AND RANGE, MR-17 = MIDDLE ROCKY MTNS, WUM-19 = WASATCH AND UINTA MTNS, MBR-14 = MOHAVE BASIN AND RANGE

Native Plant Species by Ecoregion, Level III (EPA) (GREAT BASIN STATES)

SPECIES		CP-10	NR-15	EC-9	BM-11	IB-16	SRP-12	NBR-80	CBR-13	MR-17	WUM-19	MBR-14
Needlegrass, desert	STSP								X	X		X
Wheatgrass, streambank	ELLAP	X		X	X							
Wildrye, basin	LECI	X		X	X		X	X	X		X	
Wildrye, blue	ELGL	X	X	X	X	X				X	X	
Scratchgrass	MURI						X	X	X			X
Muhly, mat	MUHLE						X	X	X			
Sedge, elk	CAGE	X			X		X	X				
Agoseris, pale	AGOSER	X	X				X	X	X			
Balsamroot, arrowleaf	BASA	X	X	X	X	X	X	X	X	X	X	
Beeplant, Rocky Mtn	CLSE					X			X	X	X	
Beeplant, yellow	CLLU						X	X	X		X	
Blanketflower	GAAR	X			X		X	X	X			
Blue-eyed Mary	COPA	X		X			X	X	X		X	
Buckwheat, cushion	ERIOG	X						X	X			
Chaenactis, Douglas'	CHDO	X		X			X	X	X			
Clover, largehead	TRMA	X		X				X				
Flax, Lewis'	LILE	X		X	X	X		X		X	X	
Fleabane, desert	ERIGE						X	X	X			
Fleabane, threadleaf	ERIGE	X		X			X	X	X			
Globemallow, gooseberryleaf	SPGR	X		X			X	X	X		X	X
Globemallow, Munro's	SPMU							X	X			
Globemallow, scarlet	SPCO	X					X	X				
Goldeneye, showy	VIGUER							X		X	X	
Hawksbeard, tapertip	CRAC	X					X	X	X		X	
Lomatium, Gray's	LOGR						X	X				
Lomatium, dissected-leaf	LODI	X					X	X				
Lomatium, Nevada	LONE							X				
Lomatium, nineleaf	LOTR	X		X			X	X				
Lupine, silver	LUAR	X					X	X				
Lupine, tailcup	LULE							X	X			
Lupine, wooly	LUSE	X		X			X	X				
Microseris, nodding	MICRO						X	X	X			
Milkvetch, basalt	ASFI						X	X			X	
Milkvetch, freckled	ASTRAG	X					X	X				
Milkvetch, woolypod	ASTRAG	X						X	X			

Native Plant Species by Ecoregion, Level III (EPA) (GREAT BASIN STATES)

SPECIES		CP-10	NR-15	EC-9	BM-11	IB-16	SRP-12	NBR-80	CBR-13	MR-17	WUM-19	MBR-14
Onion, Lemmon's	ALLE							X				
Onion, tapertip	ALAC	X		X			X	X				
Penstemon, dark blue	PECY				X		X	X				
Penstemon, sharpleaf	PEAC						X	X	X			
Penstemon, sagebrush	PESP						X	X	X			
Phlox, longleaf	PHLO	X					X	X	X			
Phlox, slender	PHLOX							X				
Phlox, spiny	PHLOX	X					X	X	X			
Princesplume, desert	STPI							X	X		X	
Pussytoes, low	ANTEN	X		X			X	X	X			
Sego-lily	CALOCH	X					X	X	X			
Vetch, American	VIAM							X		X	X	
Wallflower	CHIER	X						X	X			
Yarrow, western	ACMIL	X		X	X	X	X	X	X			

LEGEND: X = Occurs in Ecoregion, CP-10 = COLUMBIA PLATEAU Ecoregion, NR-15 = NORTHERN ROCKY MTNS, EC = EAST SLOPE -CASCADES, BM-11 = BLUE MTNS, IB-16 = IDAHO BATHOLITH, SRP-12 = SNAKE RIVER PLAIN, NBR-80 = NORTHERN BASIN AND RANGE, CBR- 13 = CENTRAL BASIN AND RANGE, MR-17 = MIDDLE ROCKY MTNS, WUM-19 = WASATCH AND UINTA MTNS,

Determining a Seed Mixture for BLM Seeding Projects

To plan and design a seeding project, gather information on seeds, ecological sites, and seeding purpose from this guidebook and other sources such as land use plans (LUP), seeding guides, and websites. An excellent database for plants, called VegSpec (Vegetation Specifications), is located at a USDA website http://plants.usda.gov/.

The VegSpec database may be useful to assist with species selection for a restoration site, determine the appropriate seed mixture, and seeding rates. VegSpec is most easily accessed as a web link on the PLANTS Home Page (the Web address is included above). VegSpec is a web-based decision support system that assists land managers in the planning and design of vegetative establishment practices.

VegSpec utilizes soil, plant, and climate data to select plant species that are (1) site specifically adapted, (2) suitable for the selected practice, and (3) appropriate for the purposes and objectives for which the planting is intended.

The VegSpec application has the ability to determine site specific adaptability of plant species in the United States.

Checklist of Potential Causes for Seeding Problems or Failure

The seed doesn't grow when initially planted.

1. The seed selected was not appropriate to the given environment. This problem may be due to inaccurate seeding specifications or inadequate seed availability. In many native species, a local seed source may be preferable to the seed available from sources farther away in distance and elevation from the seeding project location. The seed from non-local collections or seed production fields may be less well adapted to the restoration site. Seed not adapted to the site may have no or low percent of seed able to germinate.

2. The seed may remain dormant in the soil for varying periods of time. Most seed planted in late fall or early winter will germinate the following spring. Some seed, such as hard-coated ones like Indian ricegrass, may take several years under normal conditions before initiation of seed germination.

3. Poor seed storage conditions prior to seeding. In general, seed stored for more than two weeks must be held in climate-controlled warehouse with temperatures not to exceed 80° F. and 30% R.H. Seeds of some plants, such as big sagebrush, are very short-lived unless held in cold storage at <38° F. and <25% R.H.

4. The seed delivered was not viable, this may be caused by low seed germination or low percent pure live seed (PLS). To overcome this potential problem: arrange for a certified seed sampler to confirm or deny the original seed tag information, supplied by the vendor, by drawing seed samples of the seed lots prior to mixing. Then have the seed samples sent to a certified seed lab for purity, germination or TZ test and noxious weeds seed analysis. Do not accept seed lots with low germination rates or unacceptable PLS. Acceptable germination rates or PLS percent should be determined by the responsible agency or by the Seed Certification standards for the seed type or species. An example of the Certified seed standard minimum set for bluebunch wheatgrass are 85% pure seed, 80% germination, and 68% PLS.

5. The seed delivered was not viable or had reduced vigor, this may also be caused by high seed moisture content (usually >12%). High moisture content in the seed of many plant species, such as big sagebrush and winterfat, can be the cause for reduction in seed vigor and increase of fungal diseases. The high moisture content can be the reason for increased seed or seedling mortality. To prevent the high moisture problem, visually inspect the seed as it arrives at your receiving facility for indications of excessive seed moisture. If the seed appears to be damp or moist, request a seed sample be tested for moisture content (%) at a certified seed lab. At the same lab, have the seed sample tested for purity, germination and noxious weed seeds. Do not accept seed that exceeds the maximum allowable moisture content set for the species.

6. The seed was planted at too great a depth in soil. Be sure that all seed drills and other equipment are set to install the seed in the soil correctly before you start the seeding operation.

7. The seed was damaged during application. Some damage to seed may occur with rough handling, transportation of seed to the field site, or during hydro-seed applications.

8. If mulch is also applied, it may not be capable of sustaining seed germination. Some temporary mulch, especially the ones made of recycled newsprint, can contain inks and metals that are toxic to the newly germinated seedlings.

9. The time of seeding was past the season for that species (natural dormancy). This problem can vary between species. Some species will actually germinate under snow cover during the winter, while others will break seed dormancy and germinate the following spring or summer.

The seed has germinated and later dies off.

1. There is insufficient soil nutrients/moisture to sustain seedling growth.
2. The soil is not capable of sustaining seed germination/development.
3. Diseases, like damping off (a fungal disease), may kill seedlings soon after germination.

Environmental conditions at time of seeding may cause additional stress to prevent seedling establishment.

1. Conditions that may increase seedling mortality include drought, excessive heat or cold spells, wind, flood, early frost, or late frost.
2. Competing vegetation, especially weeds such as cheatgrass (*Bromus tectorum*), will cause seedling mortality in less competitive plant species. Control of competing weeds may be essential to the desired seedling establishment.
3. After seeding it was found that the seeding mix contained some weed seeds – they germinated and took over the site. To overcome this problem: arrange for all seed lots to be tested by a certified seed lab for noxious and other weed seeds prior to mixing. Do not accept seed lots with unacceptable weed seeds on the seed lab analysis.
4. Seed/seedling predation by animals and insects. You may need to provide some manner of protection to emerging seedlings. Seedings of native plants, including big sagebrush, should be protected from grazing for at least three to five years to allow time for the desired shrubs, forbs and grasses to be established.
5. The soil may lack the microorganisms and fungal mycorrhizae necessary for seedling establishment. Inoculation of seed or soil with the beneficial microorganisms may be necessary for plant growth.

Invasive Non-native Plants of Concern in the Great Basin States

The following partial list of non-native (introduced) plants includes those species considered to be moderately to highly invasive in natural ecosystems by the Exotic Pest Plant Councils, U.S. Fish and Wildlife Service, National Invasive Species Council and Executive Order No.13112 concerning Invasive Species. The Nature Conservancy website through Nature Serve maintains a database categorizing invasive plant species.

Some of these non-native plants have been seeded in BLM projects. It is recommended to utilize seed of acceptable non-native or native plants when restoring or rehabilitating natural ecosystems. Certain non-native plants, such as alfalfa, Siberian wheatgrass and tall wheatgrass, are generally considered non-invasive plants when seeded on eroded or burned-over arid lands.

This is a partial list of invasive non-native plants. It does not include those species previously identified as weeds, such as downy brome, medusahead rye, knapweeds, Russian thistle, and field bindweed.

Grasses

Cereal rye (*Secale cereale*) – Highly invasive in rangelands and croplands.

Creeping bentgrass (*Agrostis stolonifera*) – Highly invasive in meadows and wetlands.

Kentucky bluegrass (*Poa pratensis*) - Highly invasive in meadows and wetlands.

Smooth brome (*Bromus inermis*) – Moderate to highly invasive in prairies and shrublands where precipitation is greater than 12 inches annually.

Tall fescue (*Festuca arundinacea*) – Moderate to highly invasive in prairies and shrublands where precipitation is greater than 12 inches annually. It is highly invasive in riparian areas also.

Orchardgrass (*Dactylis glomerata*) – Moderately invasive in meadows and prairies.

Timothy (*Phleum pratense*) – Moderately invasive in meadows and wetlands.

Intermediate wheatgrass (*Elytrigia intermedia*) – Moderately invasive in rangelands where precipitation exceeds 12 inches annually.

Forbs

Batchelor's button or cornflower (*Centaurea cyanus*) – Highly invasive in the USA..

Birdsfoot trefoil (*Lotus corniculatus*) – Highly invasive where precipitation exceeds 16 inches annually.

Crownvetch (*Coronilla* sp.) – Highly invasive in areas where rainfall exceeds 16 inches.

White clover (*Trifolium repens*) – Moderately invasive in meadows and wetlands.

Yellow sweetclover (*Melilotus officinalis*) – Moderately invasive.

Shrubs

Honeysuckle, Amur (*Lonicera maackii*) – Moderately invasive in the United States.

Honeysuckle, Tatarian (*Lonicera tatarica*) – Highly invasive in the United States..

Russian-olive (*Elaeagnus angustifolia*) - Highly invasive in or adjacent to riparian areas and wetlands.

Seed Vendors (Partial List), Updated October 2004			
NAME AND ADDRESS	**PHONE #**	**FAX NUMBER**	**E-MAIL ADDRESS**
Applewood Seed Co. Norm Poppe 5380 Vivian St. Arvada, CO 80002	(303) 431-7333	(303) 467-7886	dwilson@applewoodseed.com
Arkansas Valley Seeds Research Seeds Inc. Thomas C. Hatfield/ Dustin Terrell 4625 Colorado Blvd. Denver, CO 80216	(303) 320-7500 Dustin at: (970) 535-4481	(303) 320-7516	terrell@avseeds.com
Bamert Seed Co. Pat Durbin Route 3, Box 1120 1897 CR 1018 Muleshoe, TX 79347	(806) 272-5506 (800)-262-9892	(806) 272-3114	natives@bamertseeds.com
Big Sky Wholesale Seeds Jay Hould/Arnold POB 852 Shelby, MT 59474	(406) 434-5011	(406) 434-5014	seeds@bigskyseeds.com
Black Canyon Seed Jim Frisbee 1475 W. Central Rd. Emmett, ID 83617	(208) 365-3851	(208) 398-7662	seedman@bigsky.net
Barton Seed Russell Barton 222 E. Union Street Manti UT 84642	(435) 835-9200 Cell: (435) 851-2347	(435)835-9200	
BFI Native Seeds Jerry Benson 1145 S. Jefferson Moses Lake WA 98837	(509) 765-6348 Cell: (509) 750-1789	(509) 764-9978	jbenson@bfinativeseeds.com
ConservaSeed Scott Stewart Redding CA			stewartseed@citlink.net
Cedera Seed, Inc. Delbert F. Winterfield POB 97, 118 St. Hwy. 31 Swan Valley, ID 83449	(208) 483-3683	(435) 483-3684	delbert684@cs.com
Central Utah Seed Bob Clark 826 N. 400 E. Ephraim, UT 84627	(435) 340-0686	(435) 340-0686	

Seed Vendors (Partial List), Updated October 2004			
NAME AND ADDRESS	**PHONE #**	**FAX NUMBER**	**E-MAIL ADDRESS**
Chapman Farms John Chapman 17648 Northside Blvd. Nampa, ID 83687	(208) 466-8289 (208) 880-0905	(208) 466-3958	johnchapman@velocitus.net
Circle S Seeds of Mt., Inc. Stephen P. McDonnell POB 130 Three Forks, MT 59752	(406) 285-3269	(406) 285-3260	circles@imt.net
Comstock Seed Ed Kleiner 917 Hwy 88 Gardnerville, NV 89410	(775) 746-3681 (775) 265-0090	(775) 265-0040	ed@comstockseed.com
Curtis & Curtis Seed Inc. Tye Curtis Star Route Box 8A Clovis NM 88101	(505) 762-4759		
Environmental Seed Producers Jack Bodger POB 2709 Lompoc, CA 92438	(805) 735-8888	(805) 735-8798	esp@espseeds.com
Ford Seed Ken/Kelsey Ford 2918 Woody Dr. Boise, ID 83703	(208) 342-8088	(208) 342-4996	
Fremont Trading Co. S. Lloyd Stevens 450 S. 50 E., Ephraim, UT 84627	(435) 283-4701 (800) 671-5323	(435) 283-6872	maplelf@cut.net
Geertson Seed Farms Phil/ Marilyn Geertson 1665 Burroughs Road Adrian, OR 97901	(541) 339-3768	(541) 339-7990	geertsonseedfarms@starband.net
Gooding Seed Co. Larry Simis POB 57 Gooding, ID 83330	(208) 934-8441	(208) 934-8584	mrrgsc@northrim.net
Granite Seed Don Bermant/ Bill Agnew 1697 W. 2100 North Lehi, UT 84043	(801) 768-4422 (800) 992-5040	(801) 768-3967	donb@graniteseed.com
Grassland West Don Baune/Brad Styner 908 Port Drive Clarkston, WA 99403	(509) 758-9100	(509) 758-6601	styner@hibek.net

Seed Vendors (Partial List), Updated October 2004			
NAME AND ADDRESS	**PHONE #**	**FAX NUMBER**	**E-MAIL ADDRESS**
Harvest Moon Seed Co. Jimmy B. Goble POB 532 Richfield, UT 84701	(435) 979-8549 (435) 896-6129	(435) 896-1762	
Idaho Grimm Growers Alan Degiulio POB 276 Blackfoot, ID 83221	(208) 785-0830	(208) 785-0841	idgrimm@ida.net
Intermountain Seed Co. Eric Christensen Box 62, 370 W. 300 N. Ephraim, UT 84627	(435) 283-4703 (435) 283-4383	(435) 283-4388	
L&H Seeds, Inc. Paul Herrman 4765 West Highway 260 Connell, WA 99326	(509) 234-4433	(509) 234-0202	lhseeds@aol.com
Landmark Seed Co. Mark Musto/ Orlin Reinbold N. 120 Wall St. Ste. 400 POB 200897 Spokane, WA 99201	(800) 268-0180 (509) 835-4967	(509) 835-4969	landmark@landmarkseed.com
Maughan Seed Brad Maughan POB 72 700 West 2100 South Manti, UT 84642-0072	(435) 835-0401 (435) 835-0404	(435) 835-0405	
McClintick Farms, Inc. Rick Mc Clintick POB 129 Orovada, NV 89425	(775) 272-3374 X3284	(775) 272-3294	
David R. Mosman Ranch 3160 Mosman Road Rt. 2 Box43 Craigmont, Idaho 83523	(208) 937-2552	(208) 937-2552	mosman@camasnet.com
Mountain West Seed Co. Jeremy Andreasen 19 N. 100 W. Ephraim, UT 84627	(435) 283-4704 cell phone (435) 340-1381	(435) 283-4704	mtnwseed@cut.net
Native Seed Company (Kyle Wagstaff or Justin Dean - partner) 7361 Pineridge Drive Park City, UT 84098	(435) 640-0557 or Justin at (801) 554-5796	(435) 655-0299	

Seed Vendors (Partial List), Updated October 2004			
NAME AND ADDRESS	**PHONE #**	**FAX NUMBER**	**E-MAIL ADDRESS**
NP Seed Co. James R. / Jason Rhodes 206 E. 300 S. Manti, UT 84642	(435) 835-8301	(435) 835-8301	
Oregon Wholesale Seed Angela Rose POB 885 Silverton, OR 97381	(503) 874-8221	(503) 873-8861	seed@teleport.com
Owyhee Trail Seed Linda Kurtz 737 Enterprise Ave. Nyssa, OR 97913	(541) 372-5523	(541) 372-2166	
Pacific Coast Seed David Gilpin 6144A Industrial Way Livermore, CA 94550	(925) 373-4417	(925) 373-6855	
Pacific Northwest Natives Craig Edminster 1525 Laurel Hts. Dr. NW Albany OR 97321	(541) 928-8239	(541) 924-8855	cwe@proaxis.com
Paul Seed Co. Glen Broadhead P.O. Box 156 Paul, Idaho 83347	(208) 438-5858	(208) 438-5858	elkmastr@pmt.org
Pawnee Buttes Seed, Inc. Don Hijar/Mike Otto 605 25th. St. Greeley, CO 80631	(970) 356-7002	(970) 356-7263	pawneeseed@ctos.com
Plummer Seed Co., Inc. Mark Plummer POB 70 Ephraim, UT 84627	(435) 283-4844	(435) 283-4030	mark@plummerseedco.com or debbie@plummerseedco.com
Rainier Seeds, Inc. Eric Coulter/Mike Ingham POB 1549 Port Orchard, WA 98367	(800) 828-8873 Or Eltopia Warehouse: (509) 297-4545	(509) 725-7015	mingham@rainierseeds.com or sreinbold@rainierseeds.com
James Reneau Seed Co. James Reneau POB 40, 119 S. Main Shamrock, TX 79079	(806) 256-3216	(806) 256-5335	

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Rocky Mountain Seed Co. Jeff Hallows POB 355 Aurora, UT 84620	(435) 529-7318	(435) 529-6457	jhallows@mstar2.net
S&S Seeds, LLC Jake Lamp POB 947 Albany, OR 97321-0354	(541) 928-5868	(541) 928-5581	ssjake@proaxis.com
Seed-Rite, Inc. Keith R. Schafer POB 496 Odessa, WA 99159	(509) 982-2454 (509) 988-0206	(509) 982-2454	
Sharp Bros. Seed Co. Daniel / Gail E. Sharp 2001 S. Sycamore Healy, KS 67850	(620) 398-2231	(620) 398-2220	buffalo@st-tel.net
Jonathan Skinner 5000 NW 1st Avenue New Plymouth ID 83655	(208) 278-3789		jskinner261@msn.com
Southern Utah Seed Edith Morrison Junction Utah	(435) 577-2142		emorrison@piute.state.ut.us
Seedyco Wayne Snavely 7550 Elmore Fruitland ID 83619	(208) 452-4614		
Southwest Seed Inc. Walter Henes/Doug Lard 13260 Road 29 Delores, CO 81323	(970) 565-8722	(970) 565-2576	swseed@fone.net
Stevenson Intermountain Seed Ron Stevenson POB 2 Ephraim, UT 84627	(435) 283-6639	(435) 283-4155	ron@stevensonintermountainseed.com

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Treasure State Seed, Inc. Donald L. Becker POB 698 6 1st. St. SW Fairfield, MT 59436	(406) 467-2557 (800) 572-4769	(406) 467-3377	treasure@3rivers.net
Wagstaff Seed Fred J. Wagstaff 1900 E. Oakhill Lane POB 68 Wallsburg, UT 84082	(435) 654-3439	(435) 654-9403	
Westland Seed Inc. Kenneth M. Sagmiller 1308 Round Butte Rd. Ronan, MT 59864	(406) 676-4100	(406) 676-4101	westland@ronan.net
Wheatland West Seed Orson Boyce POB 513 1780 N. Hwy 69 Brigham City, UT 84302	(435) 734-2371 (800) 676-0191	(435) 723-1903	oboyce@wheatlandseed.com
Willow Creek Allan Stevens 593 E. 900 S. 79-16 Ephraim, UT 84627	(435) 283-4701	(435) 283-6872	
Wind River Seed Clair/Rick Dunne Russ H. 3075 Lane 51 2 Manderson, WY 82432	(307) 568-3361	(307) 568-3364	claire@windriverseed.com

Official State Seed Laboratories, Updated July 2004				
NAME AND ADDRESS	**PHONE**	**FAX**	**EMAIL**	**WEBSITE**
Arizona State Seed Laboratory Kathleen Willey, Manager 2422 W. Holly Phoenix, AZ 85009	(602) 744-4911	(602) 253-2247	kathleenw@sal.ah.state.az.us.com	
Plant and Pest Diagnostics Branch California Dept. of Food & Agriculture Lab Supervisor 3294 Meadowview Rd. Sacramento, CA 95832	(916) 262-1100 Voice Mail: (916) 262-1190	(916) 262-1190	ppeterson@cdfa.ca.gov	WWW.CDFA.GOV
Colorado Seed Laboratory Colorado State University Ethan Waltermire, Manager E-10 Plant Sciences Blvd. Ft. Collins, CO 80523	(970) 491-6406	(970) 491-1173 Attn: Colo. Seed Lab		WWW.COLOSTATE.EDU
Idaho State Seed Laboratory Richard C. Lawson, Manager 2240 Kellogg Lane Boise, Idaho 83712	(208) 332-8630	(208) 334-3482		WWW.AGRI.STATE.ID.US
Montana State Seed Laboratory Harold Armstrong, Manager P.O. Box 173120-3120 Bozeman, MT 59717	(406) 994-2141	(406) 994-3786		WWW.MONTANA.EDU
Nevada State Division of Agriculture Terry Dunfield 350 Capitol Hill Ave. Reno, Nevada 89502	(775) 688-1180	(775) 688-1178		
Oregon State Seed Lab Oregon State University Adriel Garay, Manager Corvallis, Oregon 97331-3801	(541) 737-4464	(541) 737-2126	adriel.garay@orst.edu	WWW.CSS.ORSET.EDU

Official State Seed Laboratories, Updated July 2004				
NAME AND ADDRESS	**PHONE**	**FAX**	**EMAIL**	**WEBSITE**
Utah Department of Agriculture (USDA) Stephen T. Burningham, Lab Supervisor P.O. Box 146500 Salt Lake City, Utah 84114-6500	(801) 538-7100 x7182 Stan Akagi	(801)538-7189		WWW.AG.STATE.UT.US
Washington State Seed Lab Program Manager 21N 1st Ave. #203 Yakima, Washington 98902	(509) 225-2630 Joyce Little or Nancy Hartshorn	(509)454-4395		
Wyoming State Seed Laboratory 749 Road 9 Powell, Wyoming 82435	(307) 754-4750 G. Waibel, mgr.	(307) 754-4932		WWW.PUREHARVEST.COM
North Dakota State Seed Laboratory University Station Fargo, ND 58105	(701) 231-5400	(701) 231-5401	mhafdahl@state-seed.ndsu.nodak.edu	
South Dakota State University Seed Testing Lab, Box 2207A, Agri. Hall 242 Brookings, SD 57007-1096	(605) 688-4589	(605) 688-4013	sdsu_seedlab1@sdstate.edu	
AV Seed Testing 4333 Highway 66 Longmont CO 80504	(970) 535-4680 Richard	(970) 535-4593	ragnew@seedsolutions.com	
Agri-Quality Testing Inc. 1900 Fowler St. Suite G Richland WA 99352	(509) 736-6330	(509) 736-5303	aqt@agriqualitytesting.com	
Agri-Seed Testing Services 1930 Davcor Ct. SE Salem OR 97302	(503) 585-1440 Jeanie or Sharon	(503) 588-0733	agriseedtesting@aol.com	

Official State Seed Laboratories, Updated July 2004				
NAME AND ADDRESS	**PHONE**	**FAX**	**EMAIL**	**WEBSITE**
Mid-West Seed Services 236 32nd Ave. Brookings, SD 57006	(605) 692-7611	(605) 6692-0977	micheller@mwseed.com	WWW.MWSEED.COM

Project Seed Request Form (Send completed form to: Scott Lambert, ID State Office, ID-931, Phone 208.373.3894, Fax # 208.373.3805)

Requestor (Print/Sign):_____ Phone No._____ State:_____

Dist/Field Office:_____ Office Address:_____ Delivery Address: _____

Seed COR (must be COR certified and have completed the Seed Processing Workshop) **Required Delivery Date**:_____

Name:_____ Title:_____ Phone:_____ Mail Code:_____ **PROJECT NAME**: _____

Charge code:_____ **APPROVED BY**: (Print)_____ (Sign)_____

(Every Line above must be filled in or the Seed Warehouse-Boise will consider the order void.)

Species	Bulk pounds[1]	Est. Price/lb	Species	Bulk pounds[1]	Est. Price/lb
Crested Wheatgrass-Hycrest (I)			Needle & Thread Grass (N)		
Crested Wheatgrass-Nordan (I)			Thurber's Needlegrass (N)		
Crested Wheatgrass-Fairway (I)			Galleta Grass-Viva (N)		
Crested Wheatgrass-Ephraim (I)			Green Needlegrass-Lodorm (N)		
Crested Wheatgrass-Douglas (I)			Prairie Junegrass (N)		
Crested Wheatgrass-CDII (I)			Triticale, Grass (I)		
Siberian Wheatgrass -P27 (I)					
Siberian Wheatgrass-Vavilov (I)			Alfalfa, Inoculated-Ladak/Ladak 65 (I)		
Intermediate Wheatgrass-Oahe (I)			Alfalfa, Inoculated (Specify Variety) (I)		
Pubescent Wheatgrass-Luna (I)			Yellow Sweetclover-Madrid (I)		
Tall Wheatgrass-Alkar (I)			Sanfoin-Eski (I)		
Streambank Wheatgrass-Sodar (N)			Sanfoin-Remont (I)		
Thickspike Wheatgrass-Critana (N)			Blue Flax-Appar (I)		
Thickspike Wheatgrass-Bannock (N)			Small Burnett-Delar (I)		
Thickspike Wheatgrass Schwendimar (N)			Western Yarrow (N)		
Slender Wheatgrass-San Luis/Pryor (N)			Globemallow (Specify Variety/Species) (N)		
Western Wheatgrass-Arriba/Rosana (N)			Milkvetch (Specify Variety/Species) (N)		
SnakeRiver Wheatgrass-Secar (N)			Penstemon (Specify Variety/Species) (N)		
Bluebunch Wheatgrass-Anatone (N)			Lupine (Specify Species) (N)		
Bluebunch Wheatgrass-P7					
Bluebunch Wheatgrass-Goldar (N)			Shadscale, Shrub (N)		
Beardless Wheatgrass-Whitmar (N)			Bitterbrush-Antelope (N)		
Basin Wildrye Grass-Magnar (N)			Big Sagebrush-Wyoming (N)		
Basin Wildrye Grass-Trailhead (N)			Big Sagebrush-Basin (N)		
Russian Wildrye Grass-Bozoisky (N)			Big Sagebrush-Mountain (N)		
Smooth Brome Grass-Manchar (I)			Sagebrush-Black (N)		
Mountain Brome Grass-Bromar (N)			Sagebrush-Low (N)		
Idaho Fescue Grass(Specify Variety (N)			Spiny Hopsage, Shrub (N)		
Sheep Fescue Grass-Covar (I)			Rabbitbrush (Specify Variety/Species) (N)		
Orchardgrass-Paiute (I)			Winterfat, Shrub (N)		
Bluegrass, Sandberg's (N)			Cliffrose, Shrub (N)		
Bluegrass, Sandberg's-Mtn. Home (N)			Mountain Mahogany (Specify Species) (N)		
Bluegrass, Canby's-Canbar (N)			Forage Kochia-Immigrant (I)		
Bluegrass, Big-Sherman (N)			Fourwing Saltbush (N)		
Bottlebrush Squirreltail, Grass (N)					
Squirreltail, Big-SandHollow,Grass(N)			Other Species/Variety:		
Indian Ricegrass-Nezpar (N)					
Indian Ricegrass-Rimrock (N)					
Alkali Sacaton, Grass-Salado (N)					
Sand Dropseed (N)					

I = Introduced plant to USA. N = Native plant to USA.

[1] For minimum PLS rating refer to the BLM Regional Warehouse inventory spreadsheet

Complete List of Plant Drawings:

[#1] CANBY'S BLUEGRASS (Poa secunda J. Presl) (Formerly: Poa canbyi)
[#2] SANDBERG'S BLUEGRASS (Poa secunda J. Presl)Nevada Bluegrass
[#3] NEVADA BLUEGRASS (Poa nevadensis)
[#4] MOUNTAIN BROME (Bromus marginatus Nees. ex Steud.)
[#5] DROPSEED, SAND (Sporobolus cryptandrus [Torr.] Gray)
[#6] IDAHO FESCUE (Festuca idahoensis Elmer)
[#7] NEEDLE and THREAD GRASS (Stipa comata Trin. & Rupr.)
[#8] THURBER'S NEEDLEGRASS (Stipa thurberiana Piper)
[#9] ORCHARDGRASS (Dactylis glomerata L.)
[#10] INDIAN RICEGRASS (Oryzopsis hymenoides)
[#11] BOTTLEBRUSH SQUIRRELTAIL (Elymus elymoides [Raf.] Swezey)
[#12] BEARDLESS BLUEBUNCH WHEATGRASS (Pseudoroegneria spicata ssp. iner.mis)
[#13] BLUEBUNCH WHEATGRASS (Pseudoroegneria spicata ssp. spicata)
[#14] CRESTED WHEATGRASS (Agropyron cristatum [L.] Gaertn.)
[#15] INTERMEDIATE WHEATGRASS (Elytrigia intermedia)
[#16] THICKSPIKE WHEATGRASS (Elymus lanceolatus ssp. lanceolatus)
[#17] WESTERN WHEATGRASS (Pascopyrum smithii [Rydb.] A. Love)
[#18] BASIN WILDRYE (Leymus cinereus [Scribn. & Merr.] A. Love)
[#19] MAMMOTH or GIANT WILDRYE (Leymus giganteus [Vahl] Pilger)
[#20] YELLOW WILDRYE (Leymus flavescens [Scribn. & J.G. Smith] Pilger)
[#21] ALFALFA (Medicago sativa L.)
[#22] BALSAMROOT, ARROWLEAF (Balsamorhiza sagittata [Pursh] Nutt.)
[#23] BEEPLANT, YELLOW (Cleome lutea Hook.)
[#24] LOMATIUM, DISSECTED-LEAF (Lomatium dissectum [Nutt.])
[#25] BLANKETFLOWER (Gaillardia aristata Pursh)
[#26] BURNET, SMALL (Sanguisorba minor Scop.)
[#27] CLOVER, LARGEHEAD (Trifolium macrocephalum [Pursh] Poiret)
[#28] CLOVER, SMALLHEAD (Trifolium microcephalum Pursh)
[#29] EVENING-PRIMROSE, DESERT (Oenethera caespitosa Nutt.)
[#30] EVENING-PRIMROSE, HAIR (Oenethera deltoides Torr. & Frem.)
[#31] FLAX, LEWIS' (Linum lewisii Pursh)
[#32] FLEABANE, DWARF YELLOW (Erigeron chrysopsidis Gray)
[#33] GLOBEMALLOW, GOOSEBERRYLEAF (Sphaeralcea grossulariifolia Rydb.)
[#34] GLOBEMALLOW, MUNRO'S (Sphaeralcea munroana [Dougl. Spach)
[#35] HAWKSBEARD, TAPERTIP (Crepis acuminata Nutt.)
[#36] LUPINE, SILKY (Lupinus sericeus Pursh)
[#37] MILKVETCH, BASALT (Astragalus filipes Torr.)
[#38] PENSTEMON, RYDBERG'S (Penstemon rydbergii A. Nels.)
[#39] PENSTEMON, SHOWY or SAGEBRUSH (Penstemon speciosus Dougl.)
[#40] PENSTEMON, SAND-DUNE (Penstemon acuminata Dougl.)
[#41] PHLOX, LONGLEAF (Phlox longifolia Nutt.)
[#42] SAINFOIN (Onobrychis viciaefolia Scop.)
[#43] WALLFLOWER, WESTERN (Erysimum occidentale [Wats.] Robins)
[#44] BITTERBRUSH (Purshia tridentata [Pursh] DC)

[#45] INDIAN-APPLE (Peraphyllum ramossissimum Nutt.)
[#46] MOUNTAIN-MAHOGANY, CURL-LEAF (Cercocarpus ledifolius Nutt.)
[#47] MOUNTAIN-MAHOGANY, TRUE (Cercocarpus montanus Raf.)
[#48] SERVICEBERRY, UTAH (Amelanchier utahensis Koehne)
[#49] BUCKWHEAT, ARROW-LEAF (Eriogonum compositum Dougl. ex Benth.)
[#50] SALTBUSH, FOURWING (Atriplex canescens [Pursh] Nutt.)
[#51] SHADSCALE (Atriplex confertifolia [Torr. & Frem.] S. Wats.)
[#52] WINTERFAT (Krasheninnikovia lanata [Pursh] Guldenstaedt)
[#53] HORSEBRUSH, GRAY (Tetradymia canescens DC)
[#54] RABBITBRUSH, RUBBER (Gray) (Chrysothamnus nauseosus
[#55] SAGEBRUSH, BASIN BIG (Artemisia tridentata ssp. tridentata Nutt.)
[#56] SAGEBRUSH, BUD (Artemisia spinescens D.C. Eat.)
[#57] SAGEBRUSH, LOW (Artemisia arbuscula Nutt.)
[#58] SAGEBRUSH, SILVER (Artemisia cana Pursh)
[#59] SAGE, PURPLE (Salvia dorii ssp. dorii)
[#60] LEMONADE BUSH (Rhus trilobata Nutt.)
[#61] MOCKORANGE (Philadelphus lewisii Pursh)

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