

# TECHNICAL NOTES

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U.S. DEPARTMENT OF AGRICULTURE    STATE OF COLORADO    NATURAL RESOURCES CONSERVATION SERVICE

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PLANT MATERIALS TECHNICAL NOTE NO. 59 (REVISED)

SEPTEMBER 2011

**To:** All Offices

**From:** Christine Taliga  
Plant Materials Specialist

## **Plant Suitability and Seeding Rates for Conservation Plantings in Colorado**

This revised Technical Note provides guidance for planners, producers and consultants to develop plant suitability and seeding rate recommendations for conservation plantings within Colorado.

The tables included with this Technical Note list general Climate Characteristics, Seeding Dates, Synonymy, Retardance Factors for Grassed Waterways and Seeding Rates and Species Suitability for selected conservation plantings by Major Land Resource Area (MLRA). A revised Colorado MLRA – Average Annual Precipitation map is also included.

### **General**

In order to use this technical note to develop conservation planting recommendations, first identify the MLRA delineation and precipitation potential for your site. Next, go to the Suitability Table and select species based on local site conditions and the Conservation Practice to be applied. Then identify the appropriate seeding rates and dates for the selected species.

Seed mix recommendations developed for Critical Area Planting and erosion control purposes shall be comprised of at least 50 percent adapted sod forming species.

### **Plant Suitability**

In many cases, the selection of adapted cultivars is just as important as the selection of adapted species for the proper functioning of vegetative conservation practices. Some species and cultivars grow over wide geographic areas while others have specific site requirements. Species and cultivars seeded outside their range of adaptation may exhibit poor establishment, decreased forage and seed yields and short-lived stands due to winterkill, drought or excessive soil moisture.

The use of named cultivars that have been evaluated under similar field conditions in similar MLRAs is generally recommended. Good performance can be expected when adapted species and cultivars are planted within prescribed soil, climate and site limitations.

### **Seeding Rates**

Actual seeding rates shall be within 90 to 125 percent of the rates given in this Technical Note.

Nonirrigated seeding rates should be used in areas that will only be irrigated during establishment or if the area will only receive supplemental irrigation.

This Technical Note does not provide specific seeding rate recommendations for row plantings for seed production. Generally, seeding rates for 30 to 40 inch row plantings are 1/4 to 1/3 of the drilled rates for solid stand plantings, or 20 to 40 seeds per linear foot of row.

Seeding rate recommendations provided in this Technical Note are given in pounds Pure Live Seed (PLS) per acre. To determine pounds PLS from a Seed Tag, multiply the Percent Purity X Percent Germination X Total Bulk Pounds. Seed Tag Analysis is required by State and Federal Seed Laws.

**How to calculate PLS quantities for a mixture from seed tag analysis:**

<u>Species</u>	<u>Percent Purity in Mix</u>		<u>Percent Germination</u>		<u>Total Bulk Pounds</u>	<u>Pounds PLS</u>
Western wheatgrass	47.67	X	.90	X	816.5 =	350
Sideoats grama	14.25	X	.86	X	816.5 =	100
Green needlegrass	8.28	X	.74	X	816.5 =	50
Blue grama	7.66	X	.80	X	816.5 =	50

**Or another approach to computing pure live seed:** Calculated by the % germination and % purity as verified by a seed-testing laboratory using the 400-seed germination test.

$$\frac{\% \text{ Purity} \times \% \text{ Germination}}{100} = \text{PLS}$$

From the seed tag below for Indian ricegrass:

$$\frac{66\% \times 97\%}{100} = 64\% \text{ PLS}$$



If, for example, the customer wants Indian ricegrass to make up 25% of the seeding mix, with a recommended drill seeding rate of 4 lbs./acre PLS they will need 1PLS lb. of Indian ricegrass. How many bulk pounds will be required?

$$\frac{\# \text{ of PLS lbs needed}}{\text{percent PLS}} = \text{Bulk lbs.}$$

$$1 / .64 = 1.5 \text{ Bulk Pounds}$$

**How to compute seeding rates for mixtures:**

Decrease the given Solid Stand Seeding Rate for individual species proportional to the percentage of the species in the mixture.

Example - Nonirrigated drilled seeding mixture for Range Seeding

<u>Species</u>	<u>Percent of Mix</u>		<u>Solid Stand Seeding Rate</u>		<u>Mixture Seeding Rate</u>
Sideoats grama	.50	X	4.5	=	2.25 lbs PLS per acre
Blue grama	.30	X	1.5	=	0.45 lbs PLS per acre
Western wheatgrass	.20	X	8.0	=	1.60 lbs PLS per acre

Example - Nonirrigated drilled seeding mixture for Critical Area Planting

<u>Species</u>	<u>Percent of Mix</u>		<u>Solid Stand Seeding Rate</u>		<u>Mixture Seeding Rate</u>
Western wheatgrass	.75	X	16	=	12.00 lbs PLS per acre
Streambank wheatgrass	.25	X	11	=	5.50 lbs PLS per acre

**How to calculate seeds per square foot from pounds of pure live seed:**

Given: 170,000 clean seeds/1 pound of *Eriogonum heracleoides* Nutt.

If that pound were evenly spread out over one acre (43,560 ft.<sup>2</sup>)...

$170,000 \text{ seeds/lb} \div 43,560 \text{ ft.}^2 = 3.9$  or  $\approx \dots 4$  seeds per square foot



Whorled buckwheat (*Eriogonum heracleoides*) seed. Photo by Derek Tilley.

**How do you take the seeds per square foot and calculate the seeding rate expressed as pounds PLS per acre?**

Base your calculation on drilling 20 pure live seeds per foot for non-irrigated sites and 40 pure live seeds per foot for irrigated plantings. Thus, in our example, 20 divided by 3.9 seeds per square foot per PLS pound equals a drilling rate of 5.1 pounds PLS per acre for a non-irrigated planting. The drilling rate for an irrigated planting would be 10.2 pounds PLS per acre.

## Pure Live Seed Conversion Chart

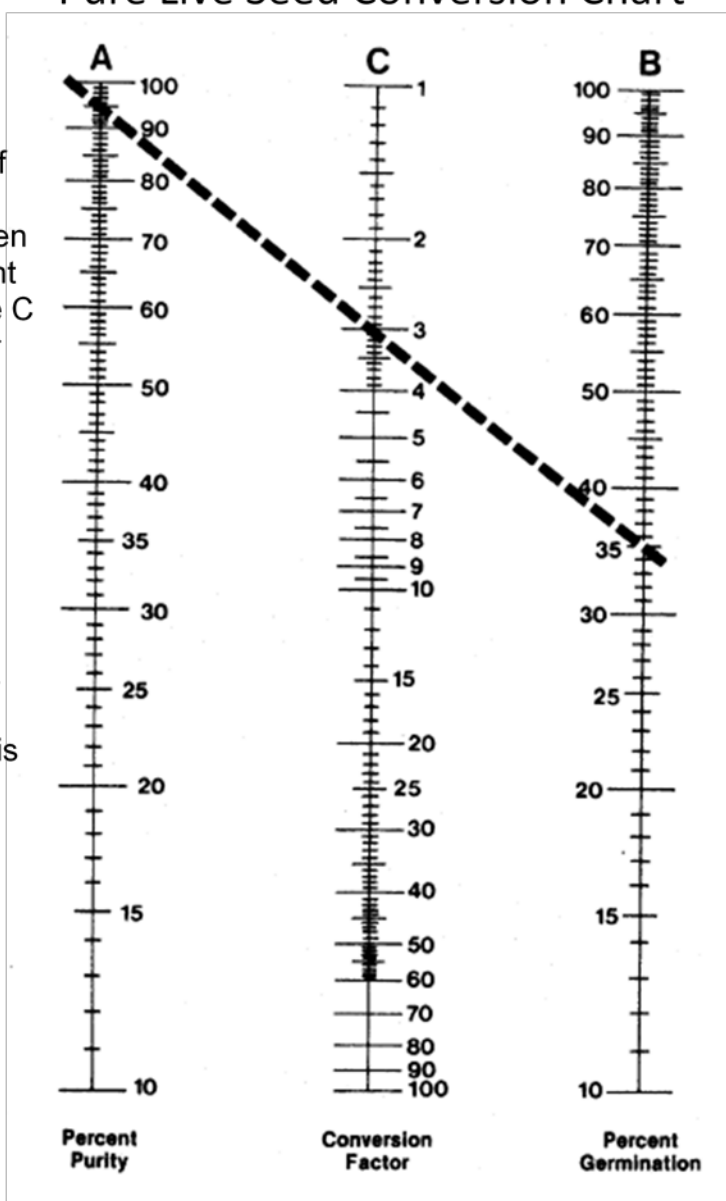
### To use the chart:

Locate the percent purity and percent germination of the seed on lines A and B. Lay a straight edge between these two points. The point of the intersection with line C is the conversion factor for that seed.

### Example:

Purity 95 % line A  
Germination 35% - line B  
Conversion Factor 3.00 – line C

It will take 3 pounds of this seed to equal 1 pound of pure live seed. Multiply this factor by the PLS seeding rate to obtain the seeding rate for this lot of seed.



### References:

1. "Why Pure Live Seed" Manhattan Plant Materials Center 2010
2. "A Field Guide for Collecting Native Seeds in Nevada", University of Nevada Reno Cooperative Extension 2003.

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# Colorado Precipitation and MLRAs

T. Hahn March 28, 2002  
MLRA version 1.4 (January 2002)  
Mean Annual Precipitation from PRISM

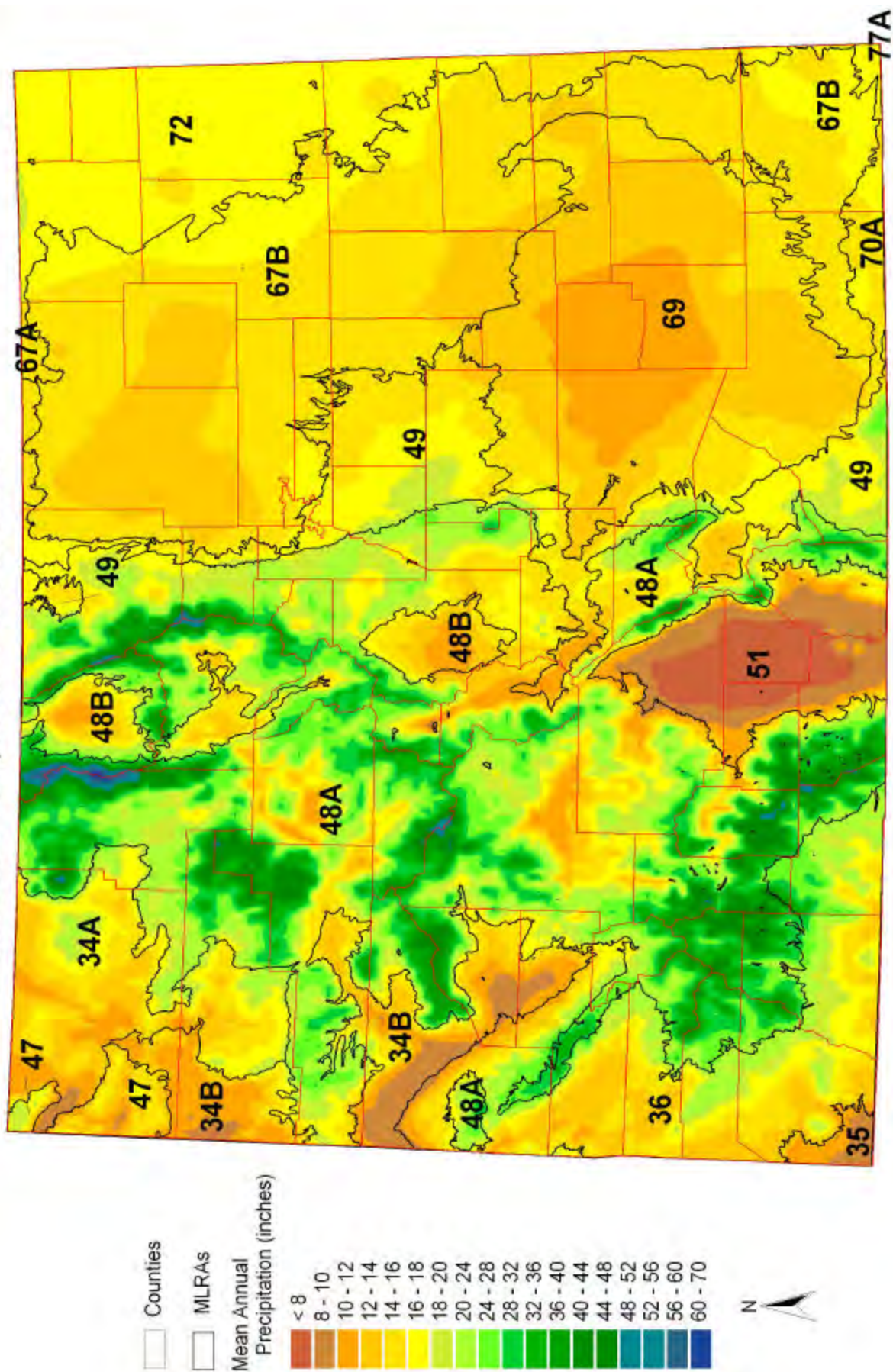


Table 1. Climate and Elevation Characteristics for Major Land Resource Areas (MLRAs) within Colorado

MLRA	Average Annual Precipitation inches		Freeze Free Period 32 degree days		Elevation feet	
	min.	max.	min.	max.	min.	max.
D-34A	8	18	80	120	5,400	8,200
D-34B	8	14	110	190	4,200	8,500
D-35	8	12	120	140	4,800	6,400
D-36	10	20	70	140	4,500	8,000
E-47	10	16	70	110	4,900	8,800
E-48A	10	60	< 70	120	7,000	14,433
E-48B	10	16	< 70	85	7,500	10,000
E-49	10	18	90	160	5,500	7,300
E-51	< 8	10	90	120	7,400	8,800
G-67A	16	18	120	140	5,200	6,200
G-67B north	12	16	120	160	3,900	6,200
G-67B south	14	18	120	180	3,800	6,200
G-69	10	16	140	160	3,600	6,600
H-70A	14	18	160	180	3,400	6,880
H-72	14	18	140	160	3,400	4,600
H-77A	14	18	160	180	3,400	6,560

Table 2. Seeding Dates for Conservation Plantings by Major Land Resource Areas (MLRAs) within Colorado				
MLRA	Cool Season Plants		Warm Season Plants	
	Dormant-Spring	Summer	Dormant-Spring	Summer
D 34A&B, D 35, and D 36	Oct. 25 to Apr. 30	Jul. 15 to Sep. 15	Oct. 15 to Apr. 30	Jun. 15 to Jul. 15
E 47	Oct. 15 to Apr. 30		Oct. 1 to Apr. 30	Jun. 15 to Jul. 15
E 48A&B	Oct. 15 to Apr. 30	Jun. 15 to Jul. 15	Oct. 1 to Apr. 30	Jun. 15 to Jul. 15
E 49	Oct. 15 to May 15	Aug. 1 to Aug. 31 (irrigated sites)	Oct. 15 to May 31	
E 51	Oct. 25 to Apr. 15	Jul. 15 to Aug. 31	Oct. 15 to Apr. 15	Jun. 15 to Jul. 15
G 67B south, H 70A, and H 77A	Nov. 1 to Apr. 30	Aug. 15 to Sep. 15 (irrigated sites)	Nov. 1 to May 15	
G 67A, G 67B north, and H 72	Nov. 1 to Apr. 30	Aug. 15 to Sep. 15 (irrigated sites)	Nov. 1 to May 15	
G-69	Nov. 1 to Apr. 30	Aug. 15 to Sep. 15 (irrigated sites)	Nov. 1 to May 31	



Table 3. Synonymy Cross Reference			
Common Name		Current Genus species	Previous Genus species
subalpine	fir	<i>Abies lasiocarpa</i>	<i>Abies lasiocarpa</i>
Rocky Mountain	maple	<i>Acer glabrum</i>	<i>Acer glabrum</i>
boxelder	boxelder	<i>Acer negundo</i>	<i>Acer negundo</i>
western	yarrow	<i>Achillea millefolium occidentale</i>	<i>Achillea lanulosa</i>
crested	wheatgrass	<i>Agropyron cristatum</i>	<i>Agropyron cristatum</i>
crested	wheatgrass	<i>Agropyron cristatum X desertorum</i>	<i>Agropyron cristatum X desertorum</i>
thickspike	wheatgrass	<i>Elymus lanceolatus ssp. lanceolatus</i>	<i>Agropyron dasystachyum</i>
crested	wheatgrass	<i>Agropyron desertorum</i>	<i>Agropyron desertorum</i>
tall	wheatgrass	<i>Thinopyrum ponticum</i>	<i>Agropyron elongatum</i>
intermediate	wheatgrass	<i>Thinopyrum intermedium</i>	<i>Agropyron intermedium</i>
streambank	wheatgrass	<i>Elymus lanceolatus ssp. psammophilus</i>	<i>Agropyron riparium</i>
Siberian	wheatgrass	<i>Agropyron fragile</i>	<i>Agropyron sibericum</i>
western	wheatgrass	<i>Pascopyrum smithii</i>	<i>Agropyron smithii</i>
beardless	wheatgrass	<i>Pseudorogneria spicata ssp. inermis</i>	<i>Agropyron spicatum inerme</i>
bluebunch	wheatgrass	<i>Pseudorogneria spicata ssp. spicata</i>	<i>Agropyron spicatum spicatum</i>
slender	wheatgrass	<i>Elymus trachycaulus</i>	<i>Agropyron trachycaulum</i>
pubescent	wheatgrass	<i>Thinopyrum intermedium</i>	<i>Agropyron trichophorum</i>
redtop	bentgrass	<i>Agrostis gigantea</i>	<i>Agrostis alba</i>
creeping	bentgrass	<i>Agrostis stolonifera</i>	<i>Agrostis palustris</i>
ticklegass	bentgrass	<i>Agrostis scabra</i>	<i>Agrostis scabra</i>
thinleaf	alder	<i>Alnus incana ssp. tenuifolia</i>	<i>Alnus incana tenuifolia</i>
alpine	foxtail	<i>Alopecurus alpinus</i>	<i>Alopecurus alpinus glaucus</i>
creeping meadow	foxtail	<i>Alopecurus arundinaceus</i>	<i>Alopecurus arundinaceus</i>
meadow	foxtail	<i>Alopecurus pratensis</i>	<i>Alopecurus pratensis</i>
Saskatoon	serviceberry	<i>Amelanchier alnifolia</i>	<i>Amelanchier alnifolia</i>
Utah	serviceberry	<i>Amelanchier utahensis</i>	<i>Amelanchier utahensis</i>
leadplant	leadplant	<i>Amorpha canescens</i>	<i>Amorpha canescens</i>
big	bluestem	<i>Andropogon gerardii</i>	<i>Andropogon gerardii</i>
sand	bluestem	<i>Andropogon hallii</i>	<i>Andropogon gerardii paucipilus</i>
yellow	bluestem	<i>Bothriochloa ischaemum</i>	<i>Andropogon ischaemum</i>
little	bluestem	<i>Schizachyrium scoparium</i>	<i>Andropogon scoparium</i>
Colorado blue	columbine	<i>Aquilegia caerulea</i>	<i>Aquilegia caerulea</i>
fringed	sagebrush	<i>Artemisia frigida</i>	<i>Artemisia frigida</i>
Louisiana	sage	<i>Artemisia ludoviciana</i>	<i>Artemisia ludoviciana</i>
mountain big	sagebrush	<i>Artemisia tridentata ssp. vaseyana</i>	<i>Artemisia tridentata vaseyana</i>
cicer	milkvetch	<i>Astragalus cicer</i>	<i>Astragalus cicer</i>
fourwing	saltbush	<i>Atriplex canescens</i>	<i>Atriplex canescens</i>
bog	birch	<i>Betula nana</i>	<i>Betula glandulosa</i>
water	birch	<i>Betula occidentalis</i>	<i>Betula occidentalis</i>
pine	dropseed	<i>Blepharoneuron tricholepis</i>	<i>Blepharoneuron tricholepis</i>
sideoats	grama	<i>Bouteloua curtipendula</i>	<i>Bouteloua curtipendula</i>
blue	grama	<i>Bouteloua gracilis</i>	<i>Bouteloua gracilis</i>
nodding	brome	<i>Bromus anomalus</i>	<i>Bromus anomalus</i>
meadow	brome	<i>Bromus biebersteinii</i>	<i>Bromus biebersteinii</i>

Table 3. Synonymy Cross Reference			
Common Name		Current Genus species	Previous Genus species
smooth	brome	<i>Bromus inermis</i>	<i>Bromus inermis</i>
mountain	brome	<i>Bromus marginatus</i>	<i>Bromus marginatus</i>
buffalograss	buffalograss	<i>Buchloe dactyloides</i>	<i>Buchloe dactyloides</i>
bluejoint	reedgrass	<i>Calamagrostis canadensis</i>	<i>Calamagrostis canadensis</i>
prairie	sandreed	<i>Calimovilfa longifolia</i>	<i>Calimovilfa longifolia</i>
purple	poppymallow	<i>Callirhoe involucrata</i>	<i>Callirhoe involucrata</i>
marsh	marigold	<i>Caltha leptosepala</i>	<i>Caltha leptosepala</i>
Siberian	peashrub	<i>Caragana arborescens</i>	<i>Caragana arborescens</i>
water	sedge	<i>Carex aquatilis</i>	<i>Carex aquatilis</i>
silvery	sedge	<i>Carex canescens</i>	<i>Carex canescens</i>
douglas	sedge	<i>Carex douglasii</i>	<i>Carex douglasii</i>
threadleaf	sedge	<i>Carex filifolia</i>	<i>Carex filifolia</i>
elk	sedge	<i>Carex geyeri</i>	<i>Carex geyeri</i>
smallwing	sedge	<i>Carex microptera</i>	<i>Carex microptera</i>
Nebraska	sedge	<i>Carex nebrascensis</i>	<i>Carex nebrascensis</i>
clustered field	sedge	<i>Carex praegracilis</i>	<i>Carex praegracilis</i>
beaked	sedge	<i>Carex utriculata</i>	<i>Carex rhynchophysa</i>
slender	sedge	<i>Carex simulata</i>	<i>Carex simulata</i>
awl fruited	sedge	<i>Carex stipata</i>	<i>Carex stipata</i>
fox	sedge	<i>Carex vulpinoidea</i>	<i>Carex vulpinoidea</i>
hackberry	hackberry	<i>Celtis occidentalis</i>	<i>Celtis occidentalis</i>
winterfat	winterfat	<i>Krascheninnikovia lanata</i>	<i>Ceratoides lanata</i>
curtleaf	mountain mahogany	<i>Cercocarpus ledifolius</i>	<i>Cercocarpus ledifolius</i>
true	mountain mahogany	<i>Cercocarpus montanus</i>	<i>Cercocarpus montanus</i>
rubber	rabbitbrush	<i>Ericameria nauseosa</i>	<i>Chrysothamnus nauseosus</i>
douglas	rabbitbrush	<i>Chrysothamnus viscidiflorus</i>	<i>Chrysothamnus viscidiflorus</i>
bladder	senna	<i>Colutea arborescens</i>	<i>Colutea arborescens</i>
redosier	dogwood	<i>Cornus sericea sericea</i>	<i>Cornus stolonifera</i>
black	hawthorn	<i>Crateagus douglasii</i>	<i>Crateagus douglasii</i>
orchardgrass	orchardgrass	<i>Dactylis glomerata</i>	<i>Dactylis glomerata</i>
tufted	hairgrass	<i>Deschampsia caespitosa</i>	<i>Deschampsia caespitosa</i>
inland	saltgrass	<i>Distichlis spicata</i>	<i>Distichlis stricta</i>
common	spikerush	<i>Eliocharis palustris</i>	<i>Eliocharis palustris</i>
altai	wildrye	<i>Leymus angustus</i>	<i>Elymus angustus</i>
Canada	wildrye	<i>Elymus canadensis</i>	<i>Elymus canadensis</i>
basin	wildrye	<i>Leymus cinerius</i>	<i>Elymus cinerius</i>
mammoth	wildrye	<i>Leymus racemosus</i>	<i>Elymus giganteus</i>
Russian	wildrye	<i>Psathyrostachys juncea</i>	<i>Elymus juncea</i>
Snake River	wheatgrass	<i>Elymus wawawaiensis</i>	<i>Elymus lanceolatus wawawai</i>
beardless	wildrye	<i>Leymus triticoides</i>	<i>Elymus trichoides</i>
green	ephedra	<i>Ephedra viridis</i>	<i>Ephedra viridis</i>
sand	lovegrass	<i>Eragrostis trichodes</i>	<i>Eragrostis trichodes</i>
sulphur-flower	buckwheat	<i>Eriogonum umbellatum</i>	<i>Eriogonum umbellatum</i>
Apache plume	Apache plume	<i>Falugia paradoxa</i>	<i>Falugia paradoxa</i>

Table 3. Synonymy Cross Reference			
Common Name		Current Genus species	Previous Genus species
Arizona	fescue	<i>Festuca arizonica</i>	<i>Festuca arizonica</i>
tall	fescue	<i>Lolium arundinaceum</i>	<i>Festuca arundinacea</i>
Idaho	fescue	<i>Festuca idahoensis</i>	<i>Festuca idahoensis</i>
sheep	fescue	<i>Festuca ovina</i>	<i>Festuca ovina</i>
hard	fescue	<i>Festuca trachyphylla</i>	<i>Festuca ovina duriscula</i>
red	fescue	<i>Festuca rubra</i>	<i>Festuca rubra</i>
Thurber's	fescue	<i>Festuca thurberi</i>	<i>Festuca thurberi</i>
green	ash	<i>Fraxinus pensylvanicus</i>	<i>Fraxinus pensylvanicus</i>
common	blanketflower	<i>Gaillardia aristata</i>	<i>Gaillardia aristata</i>
Richard's	geranium	<i>Geranium richardsonii</i>	<i>Geranium richardsonii</i>
largeleaf	avens	<i>Geum macrophyllum perincisum</i>	<i>Geum macrophyllum perincisum</i>
fowl	mannagrass	<i>Glyceria striata</i>	<i>Glyceria striata</i>
Utah	sweetvetch	<i>Hedysarum boreale</i>	<i>Hedysarum boreale</i>
maximilian	sunflower	<i>Helianthus maximiliani</i>	<i>Helianthus maximiliani</i>
Nuttall's	sunflower	<i>Helianthus nutallii</i>	<i>Helianthus nutallii</i>
hairy false	goldenaster	<i>Heterotheca villosa</i>	<i>Heterotheca villosa</i>
galleta	galleta	<i>Pleuraphis jamesii</i>	<i>Hilaria jamesii</i>
Rocky Mountain	iris	<i>Iris missouriensis</i>	<i>Iris missouriensis</i>
baltic	rush	<i>Juncus balticus</i>	<i>Juncus balticus</i>
Colorado	rush	<i>Juncus confusus</i>	<i>Juncus confusus</i>
Drummond's	rush	<i>Juncus drummondii</i>	<i>Juncus drummondii</i>
swordleaf	rush	<i>Juncus ensifolius</i>	<i>Juncus ensifolius</i>
inland	rush	<i>Juncus interior</i>	<i>Juncus interior</i>
longstyle	rush	<i>Juncus longistylis</i>	<i>Juncus longistylis</i>
Merten's	rush	<i>Juncus mertensianus</i>	<i>Juncus mertensianus</i>
knotted	rush	<i>Juncus nodosus</i>	<i>Juncus nodosus</i>
Torrey's	rush	<i>Juncus torreyi</i>	<i>Juncus torreyi</i>
common	juniper	<i>Juniperus communis</i>	<i>Juniperus communis</i>
oneseed	juniper	<i>Juniperus monosperma</i>	<i>Juniperus monosperma</i>
Utah	juniper	<i>Juniperus ostoesperma</i>	<i>Juniperus ostoesperma</i>
Rocky Mountain	juniper	<i>Juniperus scopulorum</i>	<i>Juniperus scopulorum</i>
eastern	redcedar	<i>Juniperus virginiana</i>	<i>Juniperus virginiana</i>
prairie	junegrass	<i>Koeleria macrantha</i>	<i>Koeleria cristata</i>
dotted	gayfeather	<i>Liatris punctata</i>	<i>Liatris punctata</i>
blue	flax	<i>Linum perenne</i>	<i>Linum lewisii</i>
twinberry	honeysuckle	<i>Lonicera involucrata</i>	<i>Lonicera involucrata</i>
birdsfoot	trefoil	<i>Lotus corniculatus</i>	<i>Lotus corniculatus</i>
silvery	lupine	<i>Lupinus argenteus</i>	<i>Lupinus argenteus</i>
alfalfa	alfalfa	<i>Medicago sativa</i>	<i>Medicago sativa</i>
purple	oniongrass	<i>Melica spectabilis</i>	<i>Melica spectabilis</i>
yellow	sweetclover	<i>Melilotus officinalis</i>	<i>Melilotus officinalis</i>
mountain	bluebells	<i>Mertensia ciliata</i>	<i>Mertensia ciliata</i>
wildbergamot	beebalm	<i>Monarda fistulosa</i>	<i>Monarda fistulosa</i>
mountain	muhly	<i>Muhlenbergia montana</i>	<i>Muhlenbergia montana</i>

Table 3. Synonymy Cross Reference			
Common Name		Current Genus species	Previous Genus species
sandhill	muhly	<i>Muhlenbergia pungens</i>	<i>Muhlenbergia pungens</i>
marsh	muhly	<i>Muhlenbergia racemosa</i>	<i>Muhlenbergia racemosa</i>
spike	muhly	<i>Muhlenbergia wrightii</i>	<i>Muhlenbergia wrightii</i>
tufted	evening-primrose	<i>Oenothera caespitosa</i>	<i>Oenothera caespitosa</i>
sainfoin	sainfoin	<i>Onobrychis viciaefolia</i>	<i>Onobrychis viciaefolia</i>
indian	ricegrass	<i>Achnatherum hymenoides</i>	<i>Oryzopsis hymenoides</i>
vinemesquite	vinemesquite	<i>Panicum obtusum</i>	<i>Panicum obtusum</i>
switchgrass	switchgrass	<i>Panicum virgatum</i>	<i>Panicum virgatum</i>
narrow leaf	penstemon	<i>Penstemon angustifolius</i>	<i>Penstemon angustifolius</i>
Rocky Mountain	penstemon	<i>Penstemon strictus</i>	<i>Penstemon strictus</i>
Whipple's	penstemon	<i>Penstemon whippleanus</i>	<i>Penstemon whippleanus</i>
purple	prairieclover	<i>Dalea purpurea</i>	<i>Petalostamen purpureus</i>
reed	canarygrass	<i>Phalaris arundinacea</i>	<i>Phalaris arundinacea</i>
alpine	timothy	<i>Phleum alpinum</i>	<i>Phleum alpinum</i>
timothy	timothy	<i>Phleum pratense</i>	<i>Phleum pratense</i>
common	reed	<i>Phragmites australis</i>	<i>Phragmites australis</i>
engelmann	spruce	<i>Picea engelmannii</i>	<i>Picea engelmannii</i>
Colorado blue	spruce	<i>Picea pungens</i>	<i>Picea pungens</i>
ponderosa	pine	<i>Pinus ponderosa</i>	<i>Pinus ponderosa</i>
alpine	bluegrass	<i>Poa alpina</i>	<i>Poa alpina</i>
big	bluegrass	<i>Poa secunda</i>	<i>Poa ampla</i>
canby	bluegrass	<i>Poa secunda</i>	<i>Poa canbii</i>
Canada	bluegrass	<i>Poa compressa</i>	<i>Poa compressa</i>
muttongrass	muttongrass	<i>Poa fendleriana</i>	<i>Poa fendleriana</i>
fowl	bluegrass	<i>Poa palustris</i>	<i>Poa palustris</i>
Kentucky	bluegrass	<i>Poa pratensis</i>	<i>Poa pratensis</i>
sandberg	bluegrass	<i>Poa secunda</i>	<i>Poa sandbergii</i>
narrowleaf	cottonwood	<i>Populus angustifolia</i>	<i>Populus angustifolia</i>
plains	cottonwood	<i>Populus deltoides monilifera</i>	<i>Populus deltoides occidentalis</i>
freemont	cottonwood	<i>Populus fremontii</i>	<i>Populus fremontii</i>
quaking	aspen	<i>Populus tremuloides</i>	<i>Populus tremuloides</i>
shrubby	cinquefoil	<i>Dasiphora floribunda</i>	<i>Potentilla fruticosa</i>
american	plum	<i>Prunus americana</i>	<i>Prunus americana</i>
bessey	sandcherry	<i>Prunus pumila</i> var. <i>besseyi</i>	<i>Prunus besseyi</i>
chokecherry	chokecherry	<i>Prunus virginiana</i>	<i>Prunus virginiana</i>
hybrid	wheatgrass	<i>Elymus hoffmannii</i>	<i>Pseudorogneria spicata</i> X <i>Elytigna repens</i>
douglas	fir	<i>Pseudotsuga menziesii</i>	<i>Pseudotsuga menziesii</i>
Nuttall's	alkaligrass	<i>Puccinellia nuttalliana</i>	<i>Puccinellia airoides</i>
antelope	bitterbrush	<i>Purshia tridentata</i>	<i>Purshia tridentata</i>
gambel	oak	<i>Quercus gambelii</i>	<i>Quercus gambelii</i>
upright	prairie coneflower	<i>Ratibida columnifera</i>	<i>Ratibida columnifera</i>
skunkbush	sumac	<i>Rhus trilobata</i>	<i>Rhus trilobata</i>
golden	currant	<i>Ribes aureum</i>	<i>Ribes aureum</i>
wax	currant	<i>Ribes cereum</i>	<i>Ribes cereum</i>

Table 3. Synonymy Cross Reference			
Common Name		Current Genus species	Previous Genus species
gooseberry	currant	<i>Ribes montigenum</i>	<i>Ribes montigenum</i>
woods	rose	<i>Rosa woodsii</i>	<i>Rosa woodsii</i>
thimbleberry	thimbleberry	<i>Rubus parviflorus</i>	<i>Rubus parviflorus</i>
arrowhead	arrowhead	<i>Sagittaria latifolia</i>	<i>Sagittaria latifolia</i>
peachleaf	willow	<i>Salix amygdaloides</i>	<i>Salix amygdaloides</i>
bebb	willow	<i>Salix bebbiana</i>	<i>Salix bebbiana</i>
Booth's	willow	<i>Salix boothii</i>	<i>Salix boothii</i>
Drummond's	willow	<i>Salix drummondiana</i>	<i>Salix drummondiana</i>
sandbar	willow	<i>Salix exigua</i>	<i>Salix exigua</i>
Geyer's	willow	<i>Salix geyeriana</i>	<i>Salix geyeriana</i>
planeleaf	willow	<i>Salix planifolia</i>	<i>Salix planifolia</i>
Scouler's	willow	<i>Salix scouleriana</i>	<i>Salix scouleriana</i>
blue	elderberry	<i>Sambucus nigra ssp. cerulea</i>	<i>Sambucus coerulea</i>
small burnet	small burnet	<i>Sanguisorba minor</i>	<i>Sanguisorba minor</i>
hardstem	bulrush	<i>Schoenoplectus acutus</i>	<i>Scirpus acutus</i>
threesquare	bulrush	<i>Schoenoplectus pungens pungens</i>	<i>Scirpus americanus</i>
pale	bulrush	<i>Scirpus pallidus</i>	<i>Scirpus atrovirens pallidus</i>
alkali	bulrush	<i>Schoenoplectus maritimus</i>	<i>Scirpus paludosus</i>
small fruited	bulrush	<i>Scirpus microcarpus</i>	<i>Scirpus microcarpus</i>
softstem	bulrush	<i>Schoenoplectus tabernaemontani</i>	<i>Scirpus validus</i>
silver	buffaloberry	<i>Shepherdia argentea</i>	<i>Shepherdia argentea</i>
russet	buffaloberry	<i>Shepherdia canadensis</i>	<i>Shepherdia canadensis</i>
bottlebrush	squirreltail	<i>Elymus elymoides</i>	<i>Sitanion hystris</i>
yellow	indiagrass	<i>Sorghastrum nutans</i>	<i>Sorghastrum nutans</i>
giant	bur-reed	<i>Sparganium eurycarpum</i>	<i>Sparganium eurycarpum</i>
prairie	cordgrass	<i>Spartina pectinata</i>	<i>Spartina pectinata</i>
scarlet	globemallow	<i>Sphaeralcea coccinea</i>	<i>Sphaeralcea coccinea</i>
alkali	sacaton	<i>Sporobolus airoides</i>	<i>Sporobolus airoides</i>
alkali	muhly	<i>Muhlenbergia asperifolia</i>	<i>Sporobolus asperifolius</i>
needleandthread	needleandthread	<i>Hesperostipa comata</i>	<i>Stipa comata</i>
green	needlegrass	<i>Nassella viridula</i>	<i>Stipa viridula</i>
common	snowberry	<i>Symphoricarpus albus</i>	<i>Symphoricarpus albus</i>
western	snowberry	<i>Symphoricarpus occidentalis</i>	<i>Symphoricarpus occidentalis</i>
mountain	snowberry	<i>Symphoricarpus oreophilus</i>	<i>Symphoricarpus oreophilus</i>
alsike	clover	<i>Trifolium hybridum</i>	<i>Trifolium hybridum</i>
white	clover	<i>Trifolium repens</i>	<i>Trifolium repens</i>
broadleaf	cattail	<i>Typha latifolia</i>	<i>Typha latifolia</i>
american	vetch	<i>Vicia americana</i>	<i>Vicia americana</i>

Genus species (common name)	Notes		Soil pH Range	Soil Textures 1)			Major Land Resource Area																	Retardance Factors by Average Annual Precipitation Zone							
				S	L	C	D 34A	D 34B	D 35	D 36	E 47	E 48A	E 48B	E 49	E 51	G 67A	G 67B N	G 67B S	G 69	H 70A	H 72	H 77A	(inches) * **								
																							8	10	12	14	16	18	20		
<i>Agropyron cristatum</i> (crested wheatgrass)	ICB	2) 6)	6.0-8.5		X	X	X	X	X	X	X	X	X	X	X	X	X	X			X		-	D	C	C	B	B	B		
<i>Agropyron cristatum</i> X <i>desertorum</i> (crested wheatgrass)	ICB	2) 6)	6.0-8.5		X		X	X	X	X	X	X	X	X	X	X	X	X			X		D	D	C	C	B	B	B		
<i>Agrostis gigantea</i> (redtop)	ICS	4) 5)	4.5-8.0		X		X			X	X	X	X	X									-	-	-	-	C	C	C		
<i>Alopecurus arundinaceus</i> (creeping meadow foxtail)	ICS	3) 4) 5)	5.6-8.4		X	X	X			X		X	X										-	-	-	-	-	C	C		
<i>Andropogon gerardii</i> (big bluestem)	NWS	6)	5.6-8.4	X	X							X		X		X	X	X	X	X	X	X	-	-	-	-	C	C	C		
<i>Bouteloua curtipendula</i> (sideoats grama)	NWB	2) 6)	5.3-7.8		X	X			X	X				X	X	X	X	X	X	X	X	X	-	-	D	C	C	C	C		
<i>Bouteloua gracilis</i> (blue grama)	NWB	2) 6)	6.6-8.4	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	D	C	B	B	B		
<i>Bromus inermis</i> (smooth brome)	ICS	6)	5.5-8.0	X	X	X	X			X	X	X	X	X		X	X	X	X	X	X	X	-	-	-	D	C	C	B		
<i>Buchloe dactyloides</i> (buffalograss)	NWS	6)	6.5-8.0		X	X								X		X	X	X	X	X	X	X	-	E	E	E	D	D	D		
<i>Calimovilla longifolia</i> (prairie sandreed)	NWS	6)	5.6-8.4	X	X									X		X	X	X	X	X	X	X	-	-	D	D	D	D	D		
<i>Elymus lanceolatus lanceolatus</i> (thickspike wheatgrass)	NCS	6)	5.5-8.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X			X		-	C	C	C	C	B	B		
<i>Elymus lanceolatus psammophilus</i> (streambank wheatgrass)	NCS	6)	6.6-8.4	X	X	X	X			X		X	X	X	X								-	-	C	C	C	B	B		
<i>Festuca trachyphylla</i> (hard fescue)	ICB	2) 6)	4.5-8.0		X	X	X			X	X	X	X	X									-	-	-	D	C	C	C		
<i>Lolium arundinaceum</i> (tall fescue)	ICB	2) 3) 4) 6)	5.0-9.0		X	X	X			X	X	X		X		X	X	X	X				-	-	-	-	C	B	B		
<i>Pascopyrum smithii</i> (western wheatgrass)	NCS	3) 4) 6)	4.5-9.0		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	-	D	C	C	B		
<i>Phalaris arundinacea</i> (reed canarygrass)	NCS	3) 4) 5)	6.6-9.0		X	X	X			X		X											-	-	-	-	-	B	A		
<i>Phleum pratense</i> (timothy)	ICB	2) 4) 5)	5.0-7.8		X	X	X			X		X											-	-	-	-	-	C	C		
<i>Poa pratensis</i> (Kentucky bluegrass)	ICS	4) 6)	5.0-8.4		X	X	X			X		X											-	-	-	-	-	C	C		
<i>Schizachyrium scoparium</i> (little bluestem)	NWB	2) 6)	5.6-8.4	X	X	X						X		X		X	X	X	X	X	X	X	-	-	D	D	C	C	C		
<i>Sporobolus airoides</i> (alkali sacaton)	NWB	2) 3) 4) 5)	6.6-9.0		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	-	D	D	D	C	C	C		
<i>Thinopyrum intermedium</i> (intermediate wheatgrass)	ICS	6)	5.6-8.5		X	X	X			X	X	X	X	X		X	X	X	X	X	X	X	-	-	-	C	C	C	B		
<i>Thinopyrum intermedium</i> (pubescent wheatgrass)	ICS	6)	5.6-8.4	X	X		X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	-	-	C	C	B	B	B		
<i>Thinopyrum ponticum</i> (tall wheatgrass)	ICB	2) 3) 4) 5)	6.6-10		X	X	X			X		X	X	X	X	X	X	X	X	X	X	X	-	-	-	-	B	B	A		
<i>Trifolium fragiferum</i> (strawberry clover)	IL	2) 3) 4) 5)	6.0-8.4		X					X						X	X	X	X	X		X	-	-	-	D	D	D	D		
<i>Trifolium pratense</i> (red clover)	IL	2) 6)	6.0-7.5	X	X	X				X		X	X	X		X	X	X	X	X		X	-	-	D	D	D	D	D		

**Notes:** I = introduced; N = native; C = cool season; W = warm season; B = bunchgrass; S = sodformer; F = forb; L = legume; 1) Soil textures are general (S = sandy soils, L = loamy soils, C = clayey soils); 2) Mix with adapted sod-formers; 3) Suited for moist, saline lowland sites; 4) Suited for moist lowland sites; 5) Will tolerate prolonged periods (3 to 4 days) of inundation; 6) Will NOT tolerate prolonged periods (3 to 4 days) of inundation.

\* Design velocities shall not exceed those obtained by using the procedures, "n" values, and recommendations in the NRCS Engineering Field Handbook, Part 560, Chapter 7, or Agricultural Research Service Agriculture Handbook 667, Stability Design of Grass-lined Open Channels.

\*\* Use a retardance factor for the next higher precipitation zone if 4 or more inches of supplemental moisture can be furnished above the average native precipitation amount.

Table 5. Graminoid, Forb and Shrub Seeding Rates for Conservation Plantings within Colorado										
Genus species (common name - Cultivar)	Notes		Seeds per pound (1,000s)	Seeds per square foot per pound planted per acre	Solid Stand Seeding Rates 1) pounds PLS (pure live seed) per acre					
					Irrigated		Nonirrigated		Critical, Riparian, Grassed Waterways	
					drill	broadcast	drill	broadcast	drill	broadcast
<i>Achillea millefolium occidentale</i> (western yarrow)	NF	2)	2,790	64.0	drill 0.05 or broadcast 0.1 pounds PLS per acre with grass mixture					
<i>Achnatherum hymenoides</i> (Indian ricegrass - Nezparr, Rimrock)	NCB	2) 4) 5)	235.0	5.4	8.0	16.0	4.0	8.0	8.0	16.0
<i>Achnatherum hymenoides</i> (Indian ricegrass - Paloma)	NCB	2) 4) 5)	140.0	3.2	12.0	24.0	6.0	12.0	12.0	24.0
<i>Agropyron cristatum</i> X <i>desertorum</i> (crested wheatgrass - Hycrest)	ICB	2)	302.0	6.9	6.0	12.0	3.0	6.0	6.0	12.0
<i>Agropyron cristatum</i> (crested wheatgrass - Ephraim)	ICB	2)	302.0	6.9	6.0	12.0	3.0	6.0	6.0	12.0
<i>Agropyron desertorum</i> (crested wheatgrass - Nordan)	ICB	2)	190.0	4.4	10.0	20.0	5.0	10.0	10.0	20.0
<i>Agropyron fragile</i> (Siberian wheatgrass - Vavilov)	ICB	2)	170.0	3.9	11.0	22.0	5.5	11.0	11.0	22.0
<i>Agrostis gigantea</i> (redtop)	ICS		4,900.0	112.5	0.5	1.0	0.3	0.6	0.5	1.0
<i>Agrostis scabra</i> (tickleggrass)	NCB	2)	5,000.0	114.8	0.5	1.0	0.3	0.6	0.5	1.0
<i>Agrostis stolonifera</i> (creeping bentgrass)	ICS		4,540.0	104.2	0.5	1.0	0.3	0.6	0.5	1.0
<i>Alopecurus alpinus</i> (alpine foxtail)	NCS		600.0	13.8	3.0	6.0	1.5	3.0	3.0	6.0
<i>Alopecurus arundinaceus</i> (creeping meadow foxtail - Garrison)	ICS		750.0	17.2	3.0	6.0	1.5	3.0	3.0	6.0
<i>Alopecurus pratensis</i> (meadow foxtail)	ICS		580.0	13.3	3.0	6.0	1.5	3.0	3.0	6.0
<i>Amelanchier alnifolia</i> (Saskatoon serviceberry)	NCSH	2) 4) 7)	82.0	1.9	drill 0.1 or broadcast 0.2 pounds PLS per acre with grass mixture					
<i>Amelanchier utahensis</i> (Utah serviceberry)	NSH	2) 4) 7)	25.8	0.6	drill 0.1 or broadcast 0.2 pounds PLS per acre with grass mixture					
<i>Amorpha canescens</i> (leadplant)	NLSH	2) 6) 7)	165.0	3.8	drill 0.1 or broadcast 0.2 pounds PLS per acre with grass mixture					
<i>Andropogon gerardii</i> (big bluestem)	NWS		160.0	3.7	11.0	22.0	5.5	11.0	11.0	22.0
<i>Andropogon hallii</i> (sand bluestem)	NWS		110.0	2.5	16.0	32.0	8.0	16.0	16.0	32.0
<i>Artemisia frigida</i> (fringed sagebrush)	NCSH	2)	4,500.0	103.3	drill 0.1 or broadcast 0.2 pounds PLS per acre with grass mixture					
<i>Artemisia ludoviciana</i> (Louisiana sage - Summit)	NCSF		2,495.0	57.3	0.7	1.4	0.3	0.7	0.7	1.4
<i>Artemisia tridentata vaseyana</i> (mountain big sagebrush - Hobbie Creek)	NSH	2) 4) 6) 7)	1,726.0	39.6	drill 0.1 or broadcast 0.2 pounds PLS per acre with grass mixture					
<i>Astragalus cicer</i> (cicer milkvetch)	ISL	3) 5) 7)	135.0	3.1	12.0	24.0	6.0	12.0	12.0	24.0
<i>Atriplex canescens</i> (fourwing saltbush - dewinged)	NSH	2) 4) 5)	55.4	1.3	drill 0.5 or broadcast 1.0 pounds PLS per acre with grass mixture					

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					Irrigated		Nonirrigated		Critical, Riparian, Grassed Waterways	
					drill	broadcast	drill	broadcast	drill	broadcast
<i>Blepharoneuron tricholepis</i> (pine dropseed)	NCB	2)	1,100.0	25.3	1.6	3.2	0.8	1.6	1.6	3.2
<i>Bothriochloa ischaemum</i> (yellow bluestem)	IWB		830.0	19.1	2.0	4.0	1.0	2.0	2.0	4.0
<i>Bouteloua curtipendula</i> (sideoats grama)	NWB	5)	191.0	4.4	9.0	18.0	4.5	9.0	9.0	18.0
<i>Bouteloua gracilis</i> (blue grama)	NWB	2)	711.0	16.3	3.0	6.0	1.5	3.0	3.0	6.0
<i>Bromus anomalus</i> (nodding brome)	NCB	2)	168.0	3.9	10.0	20.0	5.0	10.0	10.0	20.0
<i>Bromus biebersteinii</i> (meadow brome - Regar)	ICB	2)	93.0	2.1	17.0	34.0	11.0	22.0	17.0	34.0
<i>Bromus inermis</i> (smooth brome)	ICS		140.0	3.2	13.0	26.0	6.5	13.0	13.0	26.0
<i>Bromus marginatus</i> (mountain brome - Bromar, Garnet)	NCB	2)	78.0	1.8	20.0	40.0	10.0	20.0	20.0	40.0
<i>Buchloe dactyloides</i> (buffalograss - burr)	NWS	4) 5)	56.0	1.3	16.0	32.0	8.0	16.0	16.0	32.0
<i>Buchloe dactyloides</i> (buffalograss - grain)	NWS	4) 5)	275.0	6.3	6.0	12.0	3.0	6.0	6.0	12.0
<i>Calamagrostis canadensis</i> (bluejoint reedgrass)	NCS	4)	3,750.0	86.1					0.5	1.0
<i>Calimovilla longifolia</i> (prairie sandreed)	NWS		274.0	6.3	6.5	13.0	3.5	7.0	6.5	13.0
<i>Callirhoe involucrata</i> (purple poppymallow)	NF	2)	600.0	13.8	drill 0.05 or broadcast 0.1 pounds PLS per acre with grass mixture					
<i>Caltha leptosepala</i> (marsh marigold)	NF	2)	400.0	9.2					4.5	9.0
<i>Caragana arborescens</i> (Siberian peashrub)	ILSh		19.0	0.4	drill 0.2 or broadcast 0.4 pounds PLS per acre with grass mixture					
<i>Carex aquatilis</i> (water sedge)	NB	2)	1,152.0	26.4					1.5	3.0
<i>Carex geyeri</i> (elk sedge)	NS		91.4	2.1			9.0	18.0		
<i>Carex nebrascensis</i> (Nebraska sedge)	NS		912.0	20.9					1.9	3.8
<i>Carex simulata</i> (slender sedge)	NS		971.0	22.3			0.9	1.8	1.8	3.6
<i>Cercocarpus ledifolius</i> (curlleaf mountain mahogany)	NSh	2) 4) 5) 6)	52.2	1.2	drill 0.1 or broadcast 0.2 pounds PLS per acre with grass mixture					
<i>Cercocarpus montanus</i> (true mountain mahogany - Montane)	NSh	2) 4) 5) 6)	45.0	1.0	drill 0.1 or broadcast 0.2 pounds PLS per acre with grass mixture					
<i>Chrysothamnus viscidiflorus</i> (douglas rabbitbrush)	NSh	2)	782.0	18.0	drill 0.1 or broadcast 0.2 pounds PLS per acre with grass mixture					
<i>Colutea arborescens</i> (bladder senna)	ILSh	2) 5)	34.0	0.8	drill 0.1 or broadcast 0.2 pounds PLS per acre with grass mixture					



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					Irrigated		Nonirrigated		Critical, Riparian, Grassed Waterways	
					drill	broadcast	drill	broadcast	drill	broadcast
<i>Cornus sericea sericea</i> (redosier dogwood)	NSh	2) 4)	18.5	0.4	drill 0.25 or broadcast 0.5 pounds PLS per acre with grass mixture					
<i>Dactylis glomerata</i> (orchardgrass)	ICB	2) 4)	540.0	12.4	4.0	8.0	2.0	4.0	4.0	8.0
<i>Dalea purpurea</i> (purple prairieclover)	NWL	2)	275.0	6.3	6.0	12.0	3.0	6.0	6.0	12.0
<i>Dasiphora floribunda</i> (shrubby cinquefoil)	NSh		1,000.0	23.0	drill 0.1 or broadcast 0.2 pounds PLS per acre with grass mixture					
<i>Deschampsia caespitosa</i> (tufted hairgrass)	NCB		1,300.0	29.8	1.5	3.0	1.0	2.0	1.5	3.0
<i>Distichlis spicata</i> (inland saltgrass)	NWS		520.0	11.9	3.0	6.0	1.5	3.0	3.0	6.0
<i>Eliocharis palustris</i> (common spikerush)	NCLS		620.0	14.2					2.8	5.6
<i>Elymus canadensis</i> (Canada wildrye)	NCB	2) 4)	115.0	2.6	10.0	20.0	5.0	10.0	10.0	20.0
<i>Elymus elymoides</i> (bottlebrush squirreltail)	NCB	2)	191.5	4.4	9.0	18.0	4.5	9.0	9.0	18.0
<i>Elymus hoffmannii</i> (hybrid wheatgrass - Newhy)	ICS		110.9	2.5	14.0	28.0	10.0	20.0	14.0	28.0
<i>Elymus lanceolatus lanceolatus</i> (thickspike wheatgrass)	NCS		154.0	3.5	10.0	20.0	5.0	10.0	10.0	20.0
<i>Elymus lanceolatus psammophilus</i> (streambank wheatgrass)	NCS		156.0	3.6	11.0	22.0	5.5	11.0	11.0	22.0
<i>Elymus trachycaulus</i> (slender wheatgrass)	NCB	2)	160.0	3.7	11.0	22.0	5.5	11.0	11.0	22.0
<i>Elymus wawawaiensis</i> (Snake River wheatgrass)	NCB	2)	140.0	3.2	12.0	24.0	6.0	12.0	12.0	24.0
<i>Ephedra viridis</i> (green ephedra)	NSh	2)	25.0	0.6	drill 0.05 or broadcast 0.1 pounds PLS per acre with grass mixture					
<i>Eragrostis trichodes</i> (sand lovegrass)	NWB	2) 4)	1,500.0	34.4	2.0	4.0	1.0	2.0	2.0	4.0
<i>Ericameria nauseosa</i> (rubber rabbitbrush)	NSh	2)	693.0	15.9	drill 0.1 or broadcast 0.2 pounds PLS per acre with grass mixture					
<i>Eriogonum umbellatum</i> (sulphur-flower buckwheat)	NF	2) 6)	210.0	4.8	drill 0.05 or broadcast 0.1 pounds PLS per acre with grass mixture					
<i>Falugia paradoxa</i> (Apacheplume)	NSh	2) 4)	540.0	12.4	drill 0.1 or broadcast 0.2 pounds PLS per acre with grass mixture					
<i>Festuca arizonica</i> (arizona fescue)	NCB	2)	411.0	9.4	4.5	9.0	2.5	4.5	4.5	9.0
<i>Festuca idahoensis</i> (Idaho fescue)	NCB	2)	450.0	10.3	3.5	7.0	2.0	4.0	3.5	7.0
<i>Festuca ovina</i> (sheep fescue - Covar)	NCB	2)	680.0	15.6	3.0	6.0	1.5	3.0	3.0	6.0
<i>Festuca rubra</i> (red fescue)	ICS	4)	615.0	14.1	3.0	6.0	1.5	3.0	3.0	6.0

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					drill	broadcast	drill	broadcast	drill	broadcast
<i>Festuca thurberi</i> (Thurber's fescue)	NCB	2)	995.0	22.8	2.0	4.0	1.0	2.0	2.0	4.0
<i>Festuca trachyphylla</i> (hard fescue - Durar)	ICB	2)	560.0	12.9	3.0	6.0	1.5	3.0	3.0	6.0
<i>Gaillardia aristata</i> (common blanketflower)	NF	2)	199.0	4.6	drill 0.1 or broadcast 0.2 pounds PLS per acre with grass mixture					
<i>Geranium richardsonii</i> (Richard's geranium)	NF	2)	40.0	0.9	drill 0.1 or broadcast 0.2 pounds PLS per acre with grass mixture					
<i>Geum macrophyllum perincisum</i> (largeleaf avens)	NSF		793.0	18.2					2.0	4.0
<i>Glyceria striata</i> (fowl mannagrass)	NS	4)	160.0	3.7					10.0	20.0
<i>Hedysarum boreale</i> (Utah sweetvetch - Timp)	NCL	2) 3) 4) 6)	80.0	1.8	22.0	44.0	11.0	22.0	22.0	44.0
<i>Helianthus maximiliani</i> (Maximilian sunflower)	NWF	2)	150.0	3.4	drill 0.1 or broadcast 0.2 pounds PLS per acre with grass mixture					
<i>Helianthus nuttallii</i> (Nuttall's sunflower)	NCSF		125.0	2.9	drill 0.1 or broadcast 0.2 pounds PLS per acre with grass mixture					
<i>Hesperostipa comata</i> (needleandthread)	NCB	2)	160.0	3.7	11.0	22.0	5.5	11.0	11.0	22.0
<i>Heterotheca villosa</i> (hairy false goldenaster)	NF	2)	640.0	14.7	drill 0.1 or broadcast 0.2 pounds PLS per acre with grass mixture					
<i>Iris missouriensis</i> (Rocky Mountain iris)	NCF		26.4	0.6					66.0	132.0
<i>Juncus balticus</i> (Baltic rush)	NCLS		3,000.0	68.9					0.6	1.2
<i>Juncus longistylis</i> (longstyle rush)	NCS		24,000.0	551.0			0.1	0.1	0.1	0.1
<i>Juncus mertensianus</i> (Merten's rush)	NCS		24,000.0	551.0					0.1	0.1
<i>Juncus nodosus</i> (knotted rush)	NCS		12,000.0	275.5					0.1	0.3
<i>Juncus torreyi</i> (Torry's rush)	NCS		12,000.0	275.5			0.1	0.1	0.1	0.3
<i>Koeleria macrantha</i> (prairie junegrass)	NCB	2)	2,315.0	53.1	1.0	2.0	0.5	1.0	1.0	2.0
<i>Krascheninnikovia lanata</i> (winterfat)	NSh	2) 4)	123.0	2.8	drill 0.5 or broadcast 1.0 pounds PLS per acre with grass mixture					
<i>Leymus angustus</i> (Altai wildrye)	NS		73.0	1.7	20.0	40.0	15.0	30.0	20.0	40.0
<i>Leymus cinerius</i> (basin wildrye)	NCB	2) 4)	130.0	3.0	10.0	20.0	5.0	10.0	10.0	20.0
<i>Leymus racemosus</i> (mammoth wildrye)	ICS		55.0	1.3	15.0	30.0	7.5	15.0	15.0	30.0
<i>Leymus triticoides</i> (beardless wildrye)	NCS	4)	150.0	3.4	12.0	24.0	6.0	12.0	12.0	24.0

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					drill	broadcast	drill	broadcast	drill	broadcast
<i>Liatris punctata</i> (dotted gayfeather)	NWF	2)	63.0	1.4	drill 0.25 or broadcast 0.5 pounds PLS per acre with grass mixture					
<i>Linum perenne</i> (blue flax - Appar)	ICF	2)	285.0	6.5	drill 0.25 or broadcast 0.5 pounds PLS per acre with grass mixture					
<i>Lolium arundinaceum</i> (tall fescue - Alta)	ICB	2)	205.0	4.7	8.0	16.0	4.0	8.0	8.0	16.0
<i>Lolium perenne</i> (perennial ryegrass)	ICB	2)	247.0	5.7	8.0	16.0	4.0	8.0	8.0	16.0
<i>Lonicera involucrata</i> (twinberry honeysuckle)	NSh	2) 4)	327.0	7.5	drill 0.1 or broadcast 0.2 pounds PLS per acre with grass mixture					
<i>Lotus corniculatus</i> (birdsfoot trefoil)	ICL	2) 3)	375.0	8.6	4.0	8.0	2.0	4.0	4.0	8.0
<i>Lupinus argenteus</i> (silvery lupine)	NCF	2) 5) 6)	2.3	0.1	drill 0.2 or broadcast 0.4 pounds PLS per acre with grass mixture					
<i>Medicago sativa</i> (alfalfa)	IL	2)	220.0	5.1	8.0	16.0	4.0	8.0	8.0	16.0
<i>Melica spectabilis</i> (purple oniongrass)	NCS		556.0	12.8	3.0	6.0	1.5	3.0	3.0	6.0
<i>Melilotus officinalis</i> (yellow sweetclover)	ICL	2)	260.0	6.0	7.0	14.0	3.5	7.0	7.0	14.0
<i>Monarda fistulosa</i> (wildbergamot beebalm)	NF	2) 4)	1,272.0	29.2	drill 0.05 or broadcast 0.1 pounds PLS per acre with grass mixture					
<i>Muhlenbergia asperifolia</i> (alkali muhly)	NWS		2,400.0	55.1	0.8	1.6	0.4	0.8	0.8	1.6
<i>Muhlenbergia montana</i> (mountain muhly)	NCB	2)	1,500.0	34.4	1.2	2.4	0.6	1.2	1.2	2.4
<i>Muhlenbergia pungens</i> (sandhill muhly)	NWS		747.0	17.1	2.4	4.8	1.2	2.4	2.4	4.8
<i>Muhlenbergia racemosa</i> (marsh muhly)	NWS		1,608.0	36.9	1.0	2.0	0.5	1.0	1.0	2.0
<i>Muhlenbergia wrightii</i> (spike muhly)	NCB	2) 4)	1,600.0	36.7	1.0	2.0	0.5	1.0	1.0	2.0
<i>Nassella viridula</i> (green needlegrass)	NCB	2) 4) 5)	181.0	4.2	10.0	20.0	5.0	10.0	10.0	20.0
<i>Oenothera caespitosa</i> (tufted evening-primrose)	NCF	2)	1,300.0	29.8	drill 0.05 or broadcast 0.1 pounds PLS per acre with grass mixture					
<i>Onobrychis viciaefolia</i> (sainfoin - Pod)	ICL	2) 3)	18.0	0.4	35.0	70.0	25.0	50.0	35.0	70.0
<i>Onobrychis viciaefolia</i> (sainfoin - Shelled)	ICL	2) 3)	30.0	0.7	25.0	50.0	20.0	40.0	25.0	50.0
<i>Panicum obtusum</i> (vinemesquite)	NWS		145.0	3.3	12.0	24.0	6.0	12.0	12.0	24.0
<i>Panicum virgatum</i> (switchgrass)	NWS	4) 5)	389.0	8.9	4.0	8.0	2.0	4.0	4.0	8.0
<i>Pascopyrum smithii</i> (western wheatgrass)	NCS		110.0	2.5	16.0	32.0	8.0	16.0	16.0	32.0

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					drill	broadcast	drill	broadcast	drill	broadcast
<i>Penstemon angustifolius</i> (narrow leaf penstemon)	NCF	2) 6)	313.0	7.2	6.0	12.0	2.8	6.0	6.0	12.0
<i>Penstemon strictus</i> (rocky mountain penstemon - Bandera)	NCF	2) 6)	286.0	6.6	6.0	12.0	3.0	6.0	6.0	12.0
<i>Penstemon whippleanus</i> (Whipple's penstemon)	NCF	2) 6)	800.0	18.4	2.0	4.0	1.0	2.0	2.0	4.0
<i>Phalaris arundinacea</i> (reed canarygrass)	NCS	5)	530.0	12.2	3.5	7.0	2.0	4.0	3.5	7.0
<i>Phleum alpinum</i> (alpine timothy)	NCS		1,000.0	23.0	2.0	4.0	1.0	2.0	2.0	4.0
<i>Phleum pratense</i> (timothy)	ICB	2)	1,230.0	28.2	2.0	4.0	1.0	2.0	2.0	4.0
<i>Pleuraphis jamesii</i> (galleta grass - caryopsis)	NWS		470.0	10.8	4.0	8.0	2.0	4.0	4.0	8.0
<i>Pleuraphis jamesii</i> (galleta grass - floret)	NWS		160.0	3.7	11.0	22.0	5.5	11.0	11.0	22.0
<i>Poa alpina</i> (alpine bluegrass)	NCS	4)	1,000.0	23.0	2.0	4.0	1.0	2.0	2.0	4.0
<i>Poa compressa</i> (Canada bluegrass)	ICS		2,500.0	57.4	1.0	2.0	0.5	1.0	1.0	2.0
<i>Poa fendleriana</i> (muttongrass)	NCB	2)	2,000.0	45.9	1.0	2.0	0.5	1.0	1.0	2.0
<i>Poa palustris</i> (fowl bluegrass)	NCS	2) 4)	1,900.0	43.6	1.0	2.0	0.5	1.0	1.0	2.0
<i>Poa pratensis</i> (Kentucky bluegrass)	ICS	4)	2,200.0	50.5	1.0	2.0	0.5	1.0	1.0	2.0
<i>Poa secunda</i> (big bluegrass)	NCB	2) 4)	880.0	20.2	2.0	4.0	1.0	2.0	2.0	4.0
<i>Poa secunda</i> (Canby/Sandberg bluegrass)	NCB		925.0	21.2	2.0	4.0	1.0	2.0	2.0	4.0
<i>Prunus pumila besseyi</i> (bessey sandcherry)	NSh	4) 5) 6)	4.0	0.1	drill 0.5 or broadcast 1.0 pounds PLS per acre with grass mixture					
<i>Prunus virginiana</i> (chokecherry)	NSh	4) 5) 6)	4.8	0.1	drill 0.5 or broadcast 1.0 pounds PLS per acre with grass mixture					
<i>Psathyrostachys juncea</i> (Russian wildrye)	ICB	2) 4)	170.0	3.9	10.0	20.0	5.0	10.0	10.0	20.0
<i>Pseudoroegneria spicata inermis</i> (beardless wheatgrass)	NCB	2) 4) 5)	150.0	3.4	12.0	24.0	6.0	12.0	12.0	24.0
<i>Pseudoroegneria spicata spicata</i> (bluebunch wheatgrass)	NCB	2)	140.0	3.2	12.0	24.0	6.0	12.0	12.0	24.0
<i>Puccinellia nuttalliana</i> (Nuttall's alkaligrass)	NCS		2,108.0	48.4					1.0	2.0
<i>Purshia tridentata</i> (antelope bitterbrush)	NSh	2) 4) 6)	15.4	0.4	drill 1.0 or broadcast 2.0 pounds PLS per acre with grass mixture					
<i>Ratibida columnifera</i> (upright prairie coneflower)	NWF	2) 5)	900.0	20.7	drill 0.2 or broadcast 0.4 pounds PLS per acre with grass mixture					

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					drill	broadcast	drill	broadcast	drill	broadcast
<i>Rhus trilobata</i> (skunkbush sumac - cleaned seed)	NSh	2) 4) 5) 7)	20.0	0.5	drill 1.0 or broadcast 2.0 pounds PLS per acre with grass mixture					
<i>Ribes aureum</i> (golden currant)	NSh	2) 4) 7)	233.0	5.3	drill 0.5 or broadcast 1.0 pounds PLS per acre with grass mixture					
<i>Ribes cereum</i> (wax currant)	NSh	2) 4) 7)	251.0	5.8	drill 0.5 or broadcast 1.0 pounds PLS per acre with grass mixture					
<i>Ribes montigenum</i> (gooseberry currant)	NSh	2) 4) 7)	142.0	3.3	drill 0.5 or broadcast 1.0 pounds PLS per acre with grass mixture					
<i>Rosa woodsii</i> (woods rose)	NSh	2) 4) 7)	48.0	1.1	drill 0.5 or broadcast 1.0 pounds PLS per acre with grass mixture					
<i>Rubus parviflorus</i> (thimbleberry)	NSh	2) 7)	204.0	4.7	drill 0.5 or broadcast 1.0 pounds PLS per acre with grass mixture					
<i>Sambucus nigra cerulea</i> (blue elderberry)	NSh	2) 4) 7)	205.0	4.7	drill 0.5 or broadcast 1.0 pounds PLS per acre with grass mixture					
<i>Sanguisorba minor</i> (small burnet)	NCF	2)	42.0	1.0	30.0	60.0	15.0	30.0	30.0	60.0
<i>Schizachyrium scoparium</i> (little bluestem)	NWB	2) 4)	260.0	6.0	7.0	14.0	3.5	7.0	7.0	14.0
<i>Schoenoplectus acutus</i> (hardstem bulrush)	NS		206.4	4.7					8.4	16.9
<i>Schoenoplectus maritimus</i> (alkali bulrush)	NS		430.0	9.9					4.1	8.1
<i>Schoenoplectus pungens pungens</i> (common threesquare)	NS		260.4	6.0					6.7	13.4
<i>Schoenoplectus tabernaemontani</i> (softstem bulrush)	NS		550.0	12.6					3.2	6.3
<i>Scirpus microcarpus</i> (small fruited bulrush)	NS		7,128.0	163.6					0.2	0.5
<i>Scirpus pallidus</i> (pale bulrush)	NS		7,500.0	172.2					0.2	0.5
<i>Shepherdia argentea</i> (silver buffaloberry)	NLSH	2) 4) 7)	41.0	0.9	drill 1.0 or broadcast 2.0 pounds PLS per acre with grass mixture					
<i>Shepherdia canadensis</i> (russet buffaloberry)	NLSH	2) 4) 7)	59.2	1.4	drill 1.0 or broadcast 2.0 pounds PLS per acre with grass mixture					
<i>Sorghastrum nutans</i> (yellow indiagrass)	NWS	4) 5)	170.0	3.9	10.0	20.0	5.0	10.0	10.0	20.0
<i>Sparganium eurycarpum</i> (giant bur-reed)	NS		22.7	0.5					76.8	153.5
<i>Spartina pectinata</i> (prairie cordgrass)	NWS		110.0	2.5	7.0	14.0	5.0	10.0	7.0	14.0
<i>Sphaeralcea coccinea</i> (scarlet globemallow)	NF	2)	500.0	11.5	drill 0.2 or broadcast 0.4 pounds PLS per acre with grass mixture					
<i>Sporobolus airoides</i> (alkali sacaton)	NWB	2)	1,700.0	39.0	1.5	3.0	1.0	2.0	1.5	3.0
<i>Sporobolus cryptandrus</i> (sand dropseed)	NWB	2)	5,298.0	121.6	0.5	1.0	0.3	0.6	0.5	1.0

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					drill	broadcast	drill	broadcast	drill	broadcast
<i>Symphoricarpus albus</i> (common snowberry)	NCS	2) 4) 5) 7)	76.0	1.7	drill 0.5 or broadcast 1.0 pounds PLS per acre with grass mixture					
<i>Symphoricarpus occidentalis</i> (western snowberry)	NCS	2) 4) 7)	74.4	1.7	drill 0.5 or broadcast 1.0 pounds PLS per acre with grass mixture					
<i>Symphoricarpus oreophilus</i> (mountain snowberry)	NCS	2) 4) 6) 7)	54.0	1.2	drill 0.5 or broadcast 1.0 pounds PLS per acre with grass mixture					
<i>Thinopyrum intermedium</i> (intermediate wheatgrass)	ICS		88.0	2.0	15.0	30.0	10.0	20.0	15.0	30.0
<i>Thinopyrum intermedium</i> (pubescent wheatgrass)	ICS		100.0	2.3	14.0	28.0	9.0	18.0	14.0	28.0
<i>Thinopyrum ponticum</i> (tall wheatgrass)	ICB	2) 4) 5)	78.0	1.8	17.0	34.0	11.0	22.0	17.0	34.0
<i>Trifolium fragiferum</i> (strawberry clover)	IL	2) 3)	300.0	6.9	6.0	12.0	3.0	6.0	6.0	12.0
<i>Trifolium hybridum</i> (alsike clover)	IL	2) 3)	700.0	16.1	4.0	8.0	2.0	4.0	4.0	8.0
<i>Trifolium pratense</i> (red clover)	IL	2) 3)	275.0	6.3	6.0	12.0	3.0	6.0	6.0	12.0
<i>Trifolium repens</i> (white clover)	IL	2) 3) 4) 5)	825.0	18.9	4.0	8.0	2.0	4.0	4.0	8.0
<i>Vicia americana</i> (American vetch)	NCL	2)	33.0	0.8	drill 3.0 or broadcast 6.0 pounds PLS per acre with grass mixture					
<b>Notes:</b> I = introduced; N = native; C = cool season; W = warm season; B = bunchgrass; S = sodformer; F = forb; L = legume; Sh = shrub; V = vine; 1) Seeding rates for extremely small (greater than 825,000 seeds/pound) or extremely large (less than 100,000 seeds/pound) have been adjusted based on past establishment data; 2) Mix with adapted sodformers; 3) Inoculate seed with appropriate rhizobium before planting; 4) Stratification recommended; 5) Scarification recommended; 6) Plant unstratified/unscarified seed in late fall; 7) Plant separately or in rows alternating with grasses to decrease competition.										
<b>References:</b> USDA NRCS. 2001. The PLANTS Database, Version 3.1 ( <a href="http://plants.usda.gov">http://plants.usda.gov</a> ). National Plant Data Center, Baton Rouge, LA 70874-4490 USA; Thornburg, Ashley A. 1982. Plant materials for use on surface-mined lands in arid and semiarid regions. USDA SCS-TP-157. 88 pp.; Wasser, C.H. 1982. Ecology and culture of selected species useful in revegetating disturbed lands in the west. USDI FWS. FWS/OBS-82/56. 347 pp.; Hassell, W. and W. R. Beavers. 1996. Seeding rate statistics for native and introduced species. USDI NPS, USDA NRCS. Lakewood, CO. 25 pp.; Colorado Agronomy Technical Note No. 61. Seeding rates. 1981. USDA NRCS. Lakewood, CO.										

Table 6. Perennial Graminoid, Forb and Woody Plant Suitability for Conservation Plantings by Major Land Resource Areas within Colorado															Soils and Landscape Position 1)								Suitability Ratings 3)								Conservation Plantings																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																		
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## Colorado Plant Materials Technical Note No. 59 (revised)

[illegible]

Table 6. Perennial Graminoid, Forb and Woody Plant Suitability for Conservation Plantings by Major Land Resource Areas within Colorado											Soils and Landscape Position 1)												Suitability Ratings 3)										Conservation Plantings																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																												
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Juncus longistylis (longstyle rush)	NCS	4) 5)	20 in	FACW	8	40	80	4,500	10,500	6.0-8.0	X	X	X	X	X	X	X	X	X	X							X		X		2	3	5	3	2	5	3	3	M	H						X	X											
Juncus mertensianus (Merten's rush)	NCS	6)	10 in	OBL	10	30	70	4,000	12,000	6.0-8.0		X				X	X	X	X												2	2	5	3	2	5	1	3	M	H						X												
Juncus nodosus (knotted rush)	NCS	6)	24 in	OBL	14	50	110	3,500	7,500	4.0-7.5	X			X	X			X	X	X	X									3	5	3	3	3	3	3	1	M	M						X													
Juncus torreyi (Torry's rush)	NCS	5)	18 in	FACW	14	50	85	3,400	8,000	4.5-6.5				X	X			X	X	X	X	X	X	X	X	X		X		3	3	3	2	2	3	1	1	L	M						X													
Juniperus communis (common juniper)	NT		10 ft		14	60	70	5,000	11,300	5.5-8.0	X	X	X	X	X	X	X	X	X									X	2	2	1	5	5	2	1	1	L	L		X																		
Juniperus monosperma (oneseed juniper)	NT		20 ft		8	12	120	4,000	7,600	7.0-8.5	X	X	X	X	X			X	X			X	X	X		X			X	3	2	1	5	5	1	1	1	L	L		X																	
Juniperus ostoesperma (Utah juniper)	NT		26 ft		12	20	100	4,300	8,500	6.5-8.2	X	X	X	X	X												X	2	2	1	5	5	2	2	1	L	L		X																			
Juniperus scopulorum (rocky mountain juniper)	NT		25 ft		12	26	70	4,000	11,000	5.0-8.0	X	X	X	X	X	X	X	X	X	X	X	X	X		X			X	2	2	1	5	5	2	2	3	L	L		X																		
Juniperus virginiana (eastern redcedar)	NT		25 ft	FACU	12	68	120	3,600	6,000	5.0-8.0									X	X	X	X	X	X	X			X	2	5	2	5	5	2	2	3	L	L		X																		
Koeleria macrantha (prairie junegrass)	NCB	8)	18 in		16	20	90	3,400	8,000	6.0-8.0	X			X	X	X	X	X	X	X							X	2	2	1	5	5	5	1	5	M	H					X	X		X													
Krascheninnikovia lanata (winterfat - Hatch)	NSh		24 in		8	16	70	3,800	9,500	6.6-8.3	X	X	X	X	X	X	X	X	X	X	X	X	X	X				X	3	3	1	5	5	5	3	3	L	L	X					X														
Leymus angustus (Altai wildrye)	ICB	8) 10)	46 in		14	20	90			5.9-8.5	X	X	X	X	X			X	X	X	X		X		X			X	2	2	1	3	5	5	5	1	L	L					X															
Leymus cinerius (basin wildrye - Magnar, Trailhead)	NCB	4) 5) 8)	48 in	FACU	12	20	70	4,600	10,000	5.6-9.0	X	X	X	X	X	X	X	X	X								X	3	2	3	5	3	5	5	3	H	H	X	X	X		X	X	X	X													
Leymus racemosus (mammoth wildrye - Volga)	ICS		36 in		12	60	90		9,500	6.0-9.0	X			X		X	X								X	X		X	5	5	1	5	5	3	3	1	M	M	X	X																		
Leymus triticoides (beardless wildrye - Shoshone)	NCS	4) 5)	36 in	FAC	14	24	90	4,000	9,500	6.6-9.0				X		X	X	X	X	X	X			X		X	X	X	2	4	3	5	5	5	5	1	M	L		X		X	X	X														
Liatis punctata (dotted gayfeather)	NWF	8)	24 in		16	26	120	3,500	8,000	6.0-7.8							X	X	X	X	X	X	X		X			X	3	2	1	2	5	5	1	1	M	M	X				X															
Linum perenne (blue flax - Appar)	ICF	8)	30 in		10	18	70	5,200	11,000	5.6-8.4	X	X	X	X	X	X	X	X	X	X	X		X				X	5	2	1	5	3	2	2	1	L	M	X																				
Lolium arundinaceum (tall fescue - Alta, Fawn)	ICB	4) 5) 8) 10)	36 in	FACW	16	55	90	4,800	8,700	5.0-9.0	X			X	X	X		X	X	X	X	X					X	4	2	3	3	3	5	4	3	M	M	X		X		X																

Table 6. Perennial Graminoid, Forb and Woody Plant Suitability for Conservation Plantings by Major Land Resource Areas within Colorado											Soils and Landscape Position 1)								Suitability Ratings 3)								Conservation Plantings																												
											Uplands				Lowlands 2)				Seedling Vigor	Rate of Spread	Anerobic Tolerance	CaCO3 Tolerance	Drought Tolerance	Fire Tolerance	Salinity Tolerance	Shade Tolerance	Fertility requirement	Water use	Critical Areas	Cross Wind Trap Strips	Filter Strips	Grassed Waterways	Pasture and Hayland	Range	Riparian Areas	Soil Salinity Mgmt - Nonirr.	Wastewater Trtmt Strips																		
											Slopes > 15%	Slopes < 15%	Saline Alkaline	Non-Saline Alkaline	Soil Textures																							Moist	Dry	Moist	Dry														
															S	L	C	S																								L	C	Moist	Dry	Moist	Dry								
Genus species (common name - Cultivar)	Notes		Mature Height	NWI	Min. Precip inches	Max. Precip inches	Min FFP 32 degree days	Min. Elev	Max Elev	Soil pH Range	Major Land Resource Area																																												
<i>Lolium perenne</i> (perennial ryegrass)	ICB	8) 10)	18 in	FACU	16	65	100	4,000	8,000	5.0-8.0	D 34A	D 34B	D 35	D 36	E 47	E 48A	E 48B	E 49	E 51	G 67A	G 67B north	G 67B south	G 69	H 70A	H 72	H 77A	S	L	C	S	L	C	Moist	Dry	Moist	Dry	5	3	3	3	2	2	3	1	H	H					X		X		
<i>Lonicera involucrata</i> (twinberry honeysuckle)	NSh		10 ft	FAC	14	32	70	7,000	11,500	5.5-8.0	X	X	X	X	X	X	X	X	X												X	X					5	2	2	5	2	3	1	5	M	H					X		X		
<i>Lotus corniculatus</i> (birdsfoot trefoil)	ICL	4) 5) 8) 10)	14 in	FACU	18	65	70		9,000	5.0-7.7	X	X	X	X	X	X	X	X	X	X	X		X		X						X	X	X	X	X	X	X	3	1	3	3	3	2	3	1	M	M	X		X		X	X		
<i>Lupinus argenteus</i> (silvery lupine)	NCF	8)	18 in		10	45	70	4,800	11,500	7.0-8.0	X	X	X	X	X	X	X	X	X	X	X		X								X	X	X				X	5	5	1	3	3	2	1	1	L	L	X				X			
<i>Medicago sativa</i> (alfalfa)	IL	8) 10)	24 in		16	65	90	4,800	8,500	6.0-8.5	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					X	X				X	4	2	1	5	4	5	3	1	H	H	X				X			X	
<i>Melica spectabilis</i> (purple oniongrass)	NCS		24 in	UPL	12	30	70	6,500	11,000	6.0-7.5	X	X	X	X	X	X	X	X													X	X				X	2	2	1	2	5	5	2	3	L	L		X		X	X				
<i>Melilotus officinalis</i> (yellow sweetclover)	ICL	8) 10)	36 in	FACU	12	65	90	4,000	9,000	5.0-8.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X					X	X		X		X	4	3	2	5	5	5	3	1	H	M	X				X				
<i>Mertensia ciliata</i> (mountain bluebells)	NCF	6) 8)	24 in	OBL	12	65	70	5,400	13,000	6.2-7.2						X	X	X	X																2	2	3	2	2	3	1	3	H	H						X					
<i>Monarda fistulosa</i> (wildbergamot beebalm)	NSh		36 in		12	24	90	5,000	9,000	6.5-8.5	X	X	X	X	X	X	X	X	X												X	X	X				3	3	2	3	2	5	1	3	M	M					X				
<i>Muhlenbergia asperifolia</i> (alkali muhly)	NWS	4) 5)	12 in	FACW	12	40	100	3,500	8,000	6.0-8.4	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X					X	X	X		X		2	3	3	5	2	5	5	5	L	H					X	X	X		
<i>Muhlenbergia montana</i> (mountain muhly)	NCB	8)	18 in	UPL	13	30	70	5,500	10,400	6.5-7.5				X		X	X	X	X												X	X				3	3	1	5	5	2	1	1	L	M	X					X				
<i>Muhlenbergia pungens</i> (sandhill muhly)	NWS		18 in		8	20	120	3,500	8,000	5.0-7.0							X	X	X	X	X	X	X	X	X	X	X	X	X		X	X				X	2	5	1	3	5	5	1	1	L	L					X				
<i>Muhlenbergia racemosa</i> (marsh muhly)	NWS	5)	36 in	FACW	10	35	90	3,500	9,000	5.9-8.0	X	X	X	X	X		X		X	X	X	X	X	X	X	X					X	X	X		X		2	3	3	3	2	5	2	5	M	M		X			X	X			
<i>Muhlenbergia wrightii</i> (spike muhly - El Vado)	NCB	5) 8)	24 in	FACU	12	20	90	5,000	9,600	5.8-7.5			X	X			X														X	X				X	3	3	3	5	3	2	1	1	L	M	X		X		X	X	X		
<i>Nassella viridula</i> (green needlegrass - Lodorm)	NCB	8)	24 in		14	24	70	3,500	10,000	6.6-8.4	X			X	X	X	X	X	X	X	X	X	X	X	X	X					X	X				X	4	2	2	5	4	3	1	1	M	L	X				X	X			
<i>Oenothera caespitosa</i> (tufted evening-primrose)	NCF	8)	6 in		7		70	4,100	12,800	6.5-8.0	X	X	X	X	X	X	X	X	X	X	X	X	X	X		X				X	X				X	5	5	1	5	5	3	1	1	L	L	X					X				
<i>Onobrychis viciaefolia</i> (sainfoin - Eski, Remont, Renumex)	ICL	8)	30 in		12	16	90	5,000	8,500	6.0-8.5	X	X	X	X	X	X	X	X	X												X	X				X	5	2	1	5	5	5	2	1	M	L	X				X				
<i>Panicum obtusum</i> (vinemesquite)	NWS	5)	24 in	FACW	8	50	150	3,500	6,000	4.8-7.0												X	X	X		X	X	X		X	X				X	2	5	5	3	2	5	1	3	M	H					X	X	X	X		

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																Uplands				Lowlands 2)				Seedling Vigor	Rate of Spread	Anerobic Tolerance	CaCO3 Tolerance	Drought Tolerance	Fire Tolerance	Salinity Tolerance	Shade Tolerance	Fertility requirement	Water use	Critical Areas	Cross Wind Trap Strips	Filter Strips	Grassed Waterways	Pasture and Hayland	Range	Riparian Areas	Soil Salinity Mgmt - Nonirr.	Wastewater Trtmt Strips																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																							
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Genus species (common name - Cultivar)	Notes		Mature Height	NWI	Min. Precip inches	Max. Precip inches	Min FFP 32 degree days	Min. Elev	Max Elev	Soil pH Range	Major Land Resource Area																Soil Textures								Moist	Dry	Moist	Dry	Seedling Vigor	Rate of Spread	Anerobic Tolerance	CaCO3 Tolerance	Drought Tolerance	Fire Tolerance	Salinity Tolerance	Shade Tolerance	Fertility requirement	Water use	Critical Areas	Cross Wind Trap Strips	Filter Strips	Grassed Waterways	Pasture and Hayland	Range	Riparian Areas	Soil Salinity Mgmt - Nonirr.	Wastewater Trtmt Strips																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
											D 34A	D 34B	D 35	D 36	E 47	E 48A	E 48B	E 49	E 51	G 67A	G 67B north	G 67B south	G 69	H 70A	H 72	H 77A	S	L	C	S	L	C	Moist	Dry																								Moist	Dry																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																						
Poa palustris (fowl bluegrass)	NCS	5) 8)	18 in	FACW	18	50	70	4,000	12,000	4.9-7.5					X	X	X	X	X	X		X																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																											</



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											Slopes > 15%					Slopes < 15%					Saline Alkaline		Non-Saline Alkaline		Seedling Vigor Rate of Spread Anerobic Tolerance CaCO3 Tolerance Drought Tolerance Fire Tolerance Salinity Tolerance Shade Tolerance Fertility requirement Water use Critical Areas Cross Wind Trap Strips Filter Strips Grassed Waterways Pasture and Hayland Range Riparian Areas Soil Salinity Mgmt - Nonirr. Wastewater Trtmt Strips																																		
Genus species (common name - Cultivar)	Notes		Mature Height	NWI	Min. Precip inches	Max. Precip inches	Min FFP 32 degree days	Min. Elev	Max Elev	Soil pH Range	Major Land Resource Area																Soil Textures								Moist	Dry	Moist	Dry																					
											D 34A	D 34B	D 35	D 36	E 47	E 48A	E 48B	E 49	E 51	G 67A	G 67B north	G 67B south	G 69	H 70A	H 72	H 77A	S	L	C	S	L	C																											
Ratibida columnifera (upright prairie coneflower)	NWF	8)	3 ft		16	40	90	3,500	7,000	5.9-7.0										X	X	X	X	X	X	X	X				X	X	X			X	3	2	1	2	3	5	2	1	M	M	X						X						
Rhus trilobata (skunkbush sumac - Bighorn)	NSh		4 ft	NI	8	20	90	3,500	9,000	6.5-8.2	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X				X	X																				X							
Ribes aureum (golden currant)	NSh	5)	5 ft	FACW	12	20	90	3,500	8,000	6.0-8.0	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X				X			X	X	5	5	3	5	3	3	1	3	H	L	X						X	X						
Ribes cereum (wax currant)	NSh		3 ft	NI	13	35	70	4,000	11,400	6.5-7.5	X			X	X	X	X	X	X		X		X								X	X				X	3	3	1	5	5	5	1	1	L	L	X						X						
Ribes montigenum (gooseberry currant)	NSh		2 ft		10	35	70	7,500	11,500	7.0-8.0						X	X	X	X												X	X				X	5	5	1	3	5	3	1	3	M	M	X						X						
Rosa woodsii (woods rose)	NSh		3 ft	FAC	12	40	70	3,500	11,700	5.0-8.0	X	X	X	X	X	X	X	X	X	X	X				X			X				X	X				X	3	5	1	2	3	5	1	3	M	M	X						X					
Rubus parviflorus (thimbleberry)	NSh		4 ft	FAC	20	45	70	7,000	10,000	4.8-7.2						X	X															X	X																			X		X					
Sagittaria latifolia (arrowhead)	NF	6) 8)	18 in	OBL	14	50	95	3,500	6,000	4.7-8.6							X		X	X						X																											X						
Salix amygdaloides (peachleaf willow)	NT	5)	30 ft	FACW	24	60	80	3,500	9,500	6.0-8.0						X	X	X	X	X	X	X	X	X	X	X	X				X	X				X	2	3	3	3	2	5	1	1	M	H							X	X					
Salix bebbiana (Bebb willow)	NT	5)	10 ft	FACW	20	60	80	5,000	9,600	5.5-7.5				X	X	X	X	X													X	X				X	2	2	3	2	1	5	1	1	M	H							X	X					
Salix boothii (Booth's willow)	NSh	6)	10 ft	OBL	55	125	70	5,300	10,500	5.5-8.0						X	X														X	X				X	3	5	3	3	2	3	1	1	L	H							X						
Salix drummondiana (Drummond's willow)	NSh	5)	12 ft	FACW	16	40	70	7,500	11,100	5.2-7.4	X				X	X	X														X	X	X				X	2	2	3	3	2	5	1	3	M	H							X	X	X			
Salix exigua (sandbar willow)	NT	6)	15 ft	OBL	20	30	80	5,000	9,000	6.0-8.5	X			X	X	X	X	X	X	X	X	X	X	X	X	X	X																												X				
Salix geyeriana (Geyer's willow)	NT	5)	15 ft	FACW	19	69	70	5,000	11,800	6.5-7.5						X	X															X	X				X	5	5	3	2	1	5	1	1	L	H							X	X				
Salix planifolia (planeleaf willow)	NT	6)	5 ft	OBL	18	60	70	7,000	13,000	4.5-6.0					X	X	X	X																																			X						
Salix scouleriana (Scouler's willow)	NT	5)	35 ft	FAC	11	40	70	6,500	11,000	6.5-8.0	X	X		X	X	X	X	X													X	X	X				X	X	2	2	3	5	3	5	2	3	L	H							X				
Sambucus nigra cerulea (blue elderberry)	NSh	5)	10 ft	FACU	10	60	80	5,500	8,500	4.9-7.5	X	X	X	X	X		X		X	X	X	X									X	X				X	X	5	3	3	3	5	3	2	1	L	L	X						X	X				
Sanguisorba minor (small burnet - Delar)	NCF	8)	16 in	FACU	12	25	90	4,200	6,000	6.0-8.0	X			X	X																	X	X	X																				X	X				

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Genus species (common name - Cultivar)	Notes		Mature Height	NWI	Min. Precip inches	Max. Precip inches	Min FFP 32 degree days	Min. Elev	Max Elev	Soil pH Range	Major Land Resource Area																Soil Textures						Moist		Moist		Dry																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
											D 34A	D 34B	D 35	D 36	E 47	E 48A	E 48B	E 49	E 51	G 67A	G 67B north	G 67B south	G 69	H 70A	H 72	H 77A													S	L	C	S	L	C																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
<i>Symphoricarpus oreophilus</i> (mountain snowberry)	NCSH		3 ft	FACU	12	40	70	5,500	10,500	5.2-8.2	X	X	X	X	X	X	X	X																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																													