

## **APPENDIX F**

### **Agency-Recommended Seed Mixes**

# **Rockies Express**

Seed mixtures that may be used to revegetate the right-of-way are based on consultations with the NRCS Greeley Field Office, NRCS Colorado State Office, NRCS Minden Field Office, NRCS Red Cloud Field Office, NRCS Nebraska State Office, NRCS Kansas State Office, and NRCS Missouri State Office. REX will choose a seed mixture prior to construction that has been tested to ensure compliance with Federal and state seed requirements and has been certified for germination and pure live seed content (PLS). If the supply of a specific seed is limited or unavailable at the time of ordering, REX will consider alternative species.

## COLORADO

### Colorado<sup>a</sup> Mixture #1 – Native Grass Mixture<sup>b</sup>

Species/Variety	Full Seeding Rate (lbs/acre of PLS)	Percent of Mixture
Sideoats grama/Niner	2.7	30
Western wheatgrass/Arriba	3.2	20
Blue grama/Hachita	0.6	20
Switchgrass/Blackwell	0.8	20
Green needlegrass/Lodorm	2.0	10
<b>Total</b>	<b>9.3</b>	<b>100</b>

<sup>a</sup>Includes Weld, Sedgwick, and Logan counties.

<sup>b</sup>Critical Area seeding specifications for reclamation purposes on loamy soils.

Source: NRCS 2006a.

### Colorado<sup>a</sup> Mixture #2 – General Conservation Reserve Program (CRP) Native Seeding Mixture<sup>b,c</sup>

Species	Height	Location	Percent of Mixture Range <sup>d</sup>
Pubescent wheatgrass	mid	—	0 to 40
Intermediate wheatgrass	mid	—	0 to 40
Western wheatgrass	mid	—	0 to 40
Tall wheatgrass	tall	—	0 to 10
Green needlegrass	mid	—	0 to 30
Orchardgrass (Paiute)	mid	—	0 to 10
Meadow bromegrass	mid	—	0 to 10
Cicer milkvetch	—	west slope	0 to 5
Small burnet	—	west slope	0 to 10
Alfalfa	—	—	0 to 10
Purple prairieclover	—	—	0 to 10
Other adapted perennial grasses	—	—	0 to 10
Other adapted perennial forbs	—	—	0 to 10

<sup>a</sup>Includes Weld, Sedgwick, and Logan counties.

<sup>b</sup>Based upon consultation with CRP-contracted landowners and their cooperating NRCS district, explicit seed mixtures will be chosen based on contract specifications. This seed mixture is a representative seed mixture for CRP lands throughout Colorado and may not be the chosen mixture for some CRP-contracted lands.

<sup>c</sup>Mixture suited for all soil types except loamy or loamy sand soils.

<sup>d</sup>10-point or 40-point mix depending upon the number of species selected from this list.

Source: NRCS 2006b.

## WYOMING

Wyoming?? Native and CRP

## NEBRASKA

### Kearney County, Nebraska Mixture #1 – General Seeding Mixture

Species/Variety	Full Seeding Rate (lbs/acre of PLS)
Indiangrass/Holt, Oto, or NE54	0.6
Little bluestem/Cimmaron, Blaze, or Camper	0.7
Sand lovegrass/Bend or NE27	0.2
Big bluestem/Kaw or Pawnee	0.4
Sweet clover (optional)	0.2

Source: NRCS 2006c.

### Webster County, Nebraska Mixture #2 - General Seeding Mixture

Species/Variety	Full Seeding Rate (lbs/acre of PLS)
Big bluestem/Pawnee, Champ, or Kaw	1.0
Indiangrass/Holt, Oto, NE 54, or Cheyenne	0.6
Little bluestem/Cimmaron, Camper, or Pastura	0.7
Sideoats grama/Butte or El Reno	1.0
Switchgrass/Blackwell, Trailblazer, NE 28, or Pathfinder	0.4
Western wheatgrass/Flintlock, Barton, Arriba	1.0
Alfalfa	0.3
Sweet clover	0.2

Source: NRCS 2006d.

### Kimball, Perkins, Lincoln, and Frontier counties, Nebraska Mixture #3 USDA-NRCS West Area – Upland Sites<sup>a</sup>

Species	Full Seeding Rate (lbs/acre of PLS)	Full Seeding Rate (lbs/sq. ft of PLS)	Site-Specific Recommendations
Blue grama	1.20	22.68	This mixture assumes the seed mixture will be drilled. If the mixture is broadcast or hydroseeded double the PLS/sq. ft. (120 PLS/sq. ft.)
Green needlegrass	1.80	7.56	
Little bluestem	0.80	14.40	
Western wheatgrass	1.20	9.00	
Sideoats grama	0.60	7.92	
<b>Total:</b>	<b>5.60</b>	<b>61.56</b>	
Native forbs (if added) <sup>b</sup>	—	≥6	

<sup>a</sup>All sites characterized as dominantly silty, clayey, shallow, limy upland, or thin loess.

<sup>b</sup>If forbs are added, native forbs adapted to the sites will be selected. See Critical Area Design Procedures (342 DP) General guide for selecting species for specific critical area uses and the pure live seed calculations document for adapted native forbs by MLRA. This seed mix is based on Nebraska NRCS Critical Area Planting Requirements (342 DP) and Range Planting Specification (550S).

Source: NRCS 2006e.

**Kimball, Perkins, Lincoln, and Frontier counties, Nebraska Mixture #4  
USDA-NRCS West Area – Sandy Sites<sup>a</sup>**

<b>Species</b>	<b>Full Seeding Rate (lbs/acre of PLS)</b>	<b>Full Seeding Rate (lbs/sq. ft of PLS)</b>	<b>Site-Specific Recommendations</b>
Sand bluestem	3.90	14.82	Sandy sites are subject to high rates of soil erosion by wind and water. Ensure site is well protected with mulch on the soil surface. This mixture assumes the seed mixture will be drilled. If the mixture is broadcast or hydroseeded double the PLS/sq. ft. (120 PLS/sq. ft.)
Little bluestem	1.80	10.80	
Prairie sandreed	0.30	5.67	
Sand lovegrass	0.60	18.00	
Blue grama	0.60	11.34	
<b>Total:</b>	<b>7.20</b>	<b>60.63</b>	
Native forbs (if added) <sup>b</sup>	—	≥6	

<sup>a</sup>All sites characterized as dominantly sandy lowlands, sandy, shallow sandy, shallow gravel, sands, and choppy sands.

<sup>b</sup>If forbs are added, native forbs adapted to the sites will be selected. See Critical Area Design Procedures (342 DP) General guide for selecting species for specific critical area uses and the pure live seed calculations document for adapted native forbs by MLRA. This seed mix is based on Nebraska NRCS Critical Area Planting Requirements (342 DP) and Range Planting Specification (550S).

Source: NRCS 2006e.

**Kimball, Perkins, Lincoln, and Frontier counties, Nebraska Mixture #5  
USDA-NRCS West Area – Lowland Sites<sup>a</sup>**

<b>Species</b>	<b>Full Seeding Rate (lbs/acre of PLS)</b>	<b>Full Seeding Rate (lbs/sq. ft of PLS)</b>	<b>Site-Specific Recommendations</b>
Big bluestem	4.80	18.00	Sandy sites are subject to high rates of soil erosion by wind and water. Ensure site is well protected with mulch on the soil surface. This mixture assumes the seed mixture will be drilled. If the mixture is broadcast or hydroseeded double the PLS/sq. ft. (120 PLS/sq. ft.)
Little bluestem	2.10	12.60	
Sideoats grama	1.50	6.60	
Switchgrass	1.20	10.68	
Indiangrass	1.50	6.00	
Western wheatgrass	2.7	6.75	
<b>Total:</b>	<b>13.80</b>	<b>60.63</b>	
Native forbs (if added) <sup>b</sup>	—	≥6	

<sup>a</sup>All sites characterized as dominantly silty overflow, clayey overflow, silty lowland, or subirrigated.

<sup>b</sup>If forbs are added, native forbs adapted to the sites will be selected. See Critical Area Design Procedures (342 DP) General guide for selecting species for specific critical area uses and the pure live seed calculations document for adapted native forbs by MLRA. This seed mix is based on Nebraska NRCS Critical Area Planting Requirements (342 DP) and Range Planting Specification (550S).

Source: NRCS 2006e.

**Frontier, Dawson, Gosper, Phelps, Kearney, Franklin, Webster, Nuckolls,  
Thayer, Jefferson, and Gaga counties, Nebraska Mixture #6  
USDA-NRCS Central Area – Upland Sites<sup>a</sup>**

Species	Full Seeding Rate (lbs/acre of PLS)	Full Seeding Rate (lbs/sq. ft of PLS)	Site-Specific Recommendations
Big bluestem	3.90	14.82	This mixture assumes the seed mixture will be drilled. If the mixture is broadcast or hydroseeded double the PLS/sq. ft. (120 PLS/sq. ft.)
Indiangrass	2.10	8.40	
Little bluestem	2.40	14.40	
Sideoats grama	1.80	7.92	
Switchgrass	1.20	10.68	
Western wheatgrass	1.80	4.50	
<b>Total:</b>	<b>13.20</b>	<b>60.72</b>	
Native forbs (if added)	—	≥6	

<sup>a</sup>All sites characterized as dominantly silty, clayey, limy upland, dense clay, shallow, or thin loess.

<sup>b</sup>If forbs are added, native forbs adapted to the sites will be selected. See Critical Area Design Procedures (342 DP) General guide for selecting species for specific critical area uses and the pure live seed calculations document for adapted native forbs by MLRA. This seed mix is based on Nebraska NRCS Critical Area Planting Requirements (342 DP) and Range Planting Specification (550S).

Source: NRCS 2006e.

**Frontier, Dawson, Gosper, Phelps, Kearney, Franklin, Webster, Nuckolls, Thayer,  
Jefferson, and Gaga counties, Nebraska Mixture #7  
USDA-NRCS Central Area – Sandy Sites<sup>a</sup>**

Species	Full Seeding Rate (lbs/acre of PLS)	Full Seeding Rate (lbs/sq. ft of PLS)	Site-Specific Recommendations
Sand bluestem	4.50	11.70	Sandy sites are subject to high rates of soil erosion by wind and water. Ensure site is well protected with mulch on the soil surface. This mixture assumes the seed mixture will be drilled. If the mixture is broadcast or hydroseeded double the PLS/sq. ft. (120 PLS/Sq. Ft.)
Indiangrass	1.50	6.00	
Little bluestem	1.80	10.80	
Switchgrass	0.90	8.01	
Prairie sandreed	0.90	5.67	
Sand lovegrass	0.60	18.00	
<b>Total:</b>	<b>10.20</b>	<b>60.18</b>	
Native forbs (if added)	—	≥6	

<sup>a</sup>All sites characterized as dominantly sandy lowland, sandy, sands, shallow sandy, shallow gravel, and choppy sands.

<sup>b</sup>If forbs are added, native forbs adapted to the sites will be selected. See Critical Area Design Procedures (342 DP) General guide for selecting species for specific critical area uses and the pure live seed calculations document for adapted native forbs by MLRA. This seed mix is based on Nebraska NRCS Critical Area Planting Requirements (342 DP) and Range Planting Specification (550S).

Source: NRCS 2006e.

Frontier, Dawson, Gosper, Phelps, Kearney, Franklin, Webster, Nuckolls, Thayer, Jefferson, and Gaga counties, Nebraska  
Mixture #8  
USDA-NRCS Central Area – Lowland Sites<sup>a</sup>

Species	Full Seeding Rate (lbs/acre of PLS)	Full Seeding Rate (lbs/sq. ft of PLS)	Site-Specific Recommendations
Big bluestem	6.00	21.84	This mixture assumes the seed mixture will be drilled. If the mixture is broadcast or hydroseeded double the PLS/sq. ft. (120 PLS/sq. ft.)
Indiangrass	2.70	10.80	
Switchgrass	1.50	13.35	
Little bluestem	1.50	9.00	
Sideoats grama	0.90	3.96	
Western wheatgrass	0.90	2.25	
<b>Total:</b>	<b>13.50</b>	<b>61.20</b>	
Native forbs (if added)	—	≥6	

<sup>a</sup>All sites characterized as dominantly silty overflow, clayey overflow, subirrigated, or silty lowland.

<sup>b</sup>If forbs are added, native forbs adapted to the sites will be selected. See Critical Area Design Procedures (342 DP) General guide for selecting species for specific critical area uses and the pure live seed calculations document for adapted native forbs by MLRA. This seed mix is based on Nebraska NRCS Critical Area Planting Requirements (342 DP) and Range Planting Specification (550S).

Source: NRCS 2006e.

## KANSAS

Kansas<sup>a</sup> Mixture #1 – Critical Area Planting –  
Dune and Blowout Seeding Mixture

Species <sup>b</sup>	Full Seeding Rate (lbs/acre of PLS)	Percent of Mixture Range
Big bluestem	12	0 to 10
Blue grama	3	0 to 10
Indiangrass	12	0 to 10
Little bluestem	8	10 to 20
Prairie sandreed	8	20 to 30
Sand bluestem	12	10 to 30
Sand lovegrass	2	10 to 20
Sideoats grama	12	0 to 10
Switchgrass	6	10 to 30

<sup>a</sup>Includes Marshall, Nemaha, Brown, and Doniphan counties.

<sup>b</sup>Adapted native forbs and or legumes may be added in addition to the full grass seeding mixture at a rate not to exceed 1 pound PLS per acre (see Kansas Mixture #4).

Source: NRCS 2006f; 2005.

**Kansas<sup>a</sup> Mixture #2 – Critical Area Planting –  
Earthen Dam Seeding Mixture**

Species <sup>b</sup>	Maximum Percent of Mixture			
	Full Seeding Rate (lbs/acre of PLS)	Borrow Area Waste Area Dam Fill	Stilling Basin Outlet, Shoreline, Upstream Berm	Spillway
<i>Native</i>				
Big bluestem	12	10	10	–
Blue grama	3	20	–	20
Buffalograss	10	30	30	30
Indiangrass	12	10	10	–
Little bluestem	8	20	10	20
Prairie cordgrass	13	–	Sprigs	–
Sideoats grama	12	100	10	30
Switchgrass (Kanlow)	6	–	40	–
Switchgrass	6	100	10	–
Virginia wildrye	25	–	40	–
Western wheatgrass	20	100	30	100
<i>Introduced</i>				
Bermudagrass	5	100	–	100
Common reed	–	–	–	–
Creeping foxtail	4	–	10	–
Intermediate wheatgrass	18	–	–	–
Pubescent wheatgrass	18	100	–	100
Reed canarygrass	4	–	20	–
Smooth brome <sup>c</sup>	16	100	–	100
Tall fescue <sup>c</sup>	12	100	–	10

<sup>a</sup>Includes Marshall, Nemaha, Brown, and Doniphan counties.

<sup>b</sup>Adapted native forbs and or legumes may be added in addition to the full grass seeding mixture at a rate not to exceed 1 pound PLS per acre(see Kansas Mixture #4).

<sup>c</sup>Brome and fescue are limited to 20 percent if seeded in conjunction with native species.

Source: NRCS 2006f; 2005.

**Kansas<sup>a</sup> Mixture #3 – Critical Area Planting – Grassed Waterway, Ephemeral/Classic Gully, and Other Critical Treatment Areas  
Seeding Mixture**

<b>Species<sup>b</sup></b>	<b>Full Seeding Rate (lbs/acre of PLS)</b>	<b>Maximum Percent of Mixture</b>
<i>Native</i>		
Big bluestem	12	100
Blue grama	3	10
Buffalograss	8	10
Indiangrass	12	100
Little bluestem	8	20
Prairie cordgrass	13	May be sprigged
Sideoats grama	12	100
Switchgrass	6	100
Virginia wildrye	25	100
Western wheatgrass	20	100
<i>Introduced</i>		
Bermudagrass	5	100
Intermediate wheatgrass	18	100
Pubescent wheatgrass	18	100
Reed canarygrass	4	100
Smooth brome <sup>c</sup>	16	100
Tall fescue <sup>c</sup>	12	100
Tall wheatgrass	20	100

<sup>a</sup>Includes Marshall, Nemaha, Brown, and Doniphan counties.

<sup>b</sup>Adapted native forbs and or legumes may be added in addition to the full grass seeding mixture at a rate not to exceed 1 pound PLS per acre(see Kansas Mixture #4).

<sup>c</sup>Brome and fescue are limited to 20 percent if seeded in conjunction with native species.

Source: NRCS 2006f, 2005.

**Kansas<sup>a</sup> Mixture #4 – Critical Area Planting –  
Listing of Native, Introduced Forbs and Legumes**

Species <sup>b</sup>	Legume	Growth Habit
<i>Native</i>		
Black sampson		Perennial
Blackeyed susan		Perennial
Butterfly milkweed		Perennial
Clasping coneflower		Annual
Dotted gayfeather		Perennial
Englemann's daisy		Perennial
False sunflower		Perennial
Grayhead prairieconeflower		Perennial
Illinois bundleflower	x	Perennial
Indian blanket		Annual
Lance-leaf coreopsis		Perennial
Leadplant	x	Perennial
Maximilian sunflower		Perennial
Missouri primrose		Perennial
New England aster		Perennial
Pale Echinacea		Perennial
Pitcher sage		Perennial
Plains coreopsis		Annual
Prairie aster		Perennial
Purple prairieconeflower	x	Perennial
Roundhead lespedeza	x	Perennial
Shellleaf beardtongue		Perennial
Showy partridge pea	x	Annual
Thickspike gayfeather		Perennial
Upright coneflower		Perennial
White prairieclover	x	Perennial
<i>Introduced</i>		
Alfalfa	x	Perennial
Birdsfoot trefoil	x	Perennial
Red clover	x	Perennial

<sup>a</sup>Includes Marshall, Nemaha, Brown, and Doniphan counties.

<sup>b</sup>Forb/legume species and varieties must be adapted to the site. Adapted native forbs and/or legumes may be added in addition to the full grass seeding mixture at a rate not to exceed 1 pond per acre.

Source: NRCS 2006f; 2005.

# MISSOURI

## Missouri<sup>a</sup> Mixture #1 – Critical Area Planting – Wetland and Stream Crossings<sup>b</sup>

Species	Full Seeding Rate (lbs/acre of PLS)
Switchgrass	5.6
Redtop	1.5
Virginia wildrye	7.2

<sup>a</sup>Includes Buchanan, Clinton, Caldwell, Carroll, Chariton, Randolph, and Audrain counties.

<sup>b</sup>Mixture may be used on all sites where there is additional moisture available due to local hydrology and landscape position.

Source: NRCS 2006g.

## Missouri<sup>a</sup> Mixture #2 – Critical Area Planting – Upland Woodland Sites<sup>b</sup>

Species	Full Seeding Rate (lbs/acre of PLS)
Little bluestem	9.6
Sideoats grama	6.7
Alfalfa	4.5
Native forb mixture (various species) <sup>c</sup>	1.0

<sup>a</sup>Includes Buchanan, Clinton, Caldwell, Carroll, Chariton, Randolph, and Audrain counties.

<sup>b</sup>Upland woodlands and other wooded areas should be seeded to a mix that is well suited to disturbed areas that have had tree cover removed or other disturbances. This mixture includes introduced legumes, native warm-season grasses, and forbs that will establish well in these sites. As this mix is slow to establish, the proper use of mulch is needed to protect the seedlings from desiccation until established. This is the mixture that should be used on any property specifically designated for wildlife habitat unless specified otherwise by state or Federal agencies.

<sup>c</sup>Native forb mixture will include ten forb species native to Missouri equally represented in the mixture.

Source: NRCS 2006g.

## Missouri<sup>a</sup> Mixture #3 – Critical Area Planting – Cool-Season Grass and Legume Pastures<sup>b</sup>

Species	Full Seeding Rate (lbs/acre of PLS)
Tall fescue (MaxQ variety)	16.0
Orchardgrass	5.0
Red clover	3.6

<sup>a</sup>Includes Buchanan, Clinton, Caldwell, Carroll, Chariton, Randolph, and Audrain counties.

<sup>b</sup>This mixture may be used where a land manager does not know the current plant composition for a pasture or hayland crossed by the pipeline route. This mixture will establish fast and will provide forage for hay or grazing after one growing season. This mixture is designed to duplicate the normal forage planted for pasture in the local area but lacks the endophyte problems of older varieties of tall fescue.

Source: NRCS 2006g.

References:

- NRCS. 2006a. Written correspondence from T. T. L. Wesley, Acting District Conservationist, Greeley Field Office, NRCS to A. Grow, ENSR on March 1, 2006.
- NRCS, 2006b. Written correspondence from E. Backhaus, Resource Conservationist, NRCS Colorado State Office to A. Grow, ENSR on February 3, 2006.
- NRCS. 2006c. Written correspondence from D. Beins, Soil Conservation Technician, Minden Field Office, NRCS to A. Grow, ENSR on January 18, 2006.
- NRCS. 2006d. Written correspondence from A. Schweitzer, Resource Conservationist, Red Cloud Field Office, NRCS to A. Grow, ENSR on January 24, 2006.
- NRCS. 2006e. Written correspondence from M. Faulkner, Rangeland management Specialist, NRCS, Lincoln, Nebraska to A. Grow, ENSR on March 6, 2006.
- NRCS. 2006f. Written correspondence from A. Boerger, Resource Conservationist, NRCS Kansas State Office, Manhattan, Kansas to A. Grow, ENSR on January 20, 2006.
- NRCS. 2006g. Written correspondence from R. Hansen, State Conservationist, NRCS Missouri State Office, Columbia, Missouri to A. Grow, ENSR on February 3, 2006.
- NRCS. 2005. Natural Resource Conservation Service Construction Specifications, Critical Area Planting (S-342-1). June 2005.

# **Overthrust**

## ROCK SPRINGS FIELD OFFICE SEED MIXES FOR TYPICAL UPLAND AND LOWLAND SITES

Note: These mixes are intended as an initial recommendation for the plan of development and will be adjusted as needed on a project-specific basis. They are only intended for areas within the Rock Springs Field Office. Introduced or non-native species are not to be used in seed mixes.

<u>Geographic Area</u>	<u>Soil Type 7-9" and 10-14" Ppt Zone</u>			
	<u>Sandy</u>	<u>Clay</u>	<u>Lowlands</u>	<u>Mtn shrub</u>
<u>N. BAXTER-HIAWATHA</u>		<u>A</u>		
<u>BLUE FOREST</u>		<u>A</u>		
<u>NITCHIE GULCH- PINE CANYON</u>	<u>B</u>	<u>A</u>		<u>C</u>
<u>ROCK SPRINGS-S. BAXTER- TABLE ROCK</u>		<u>A</u>		
<u>ASPEN MTN-HICKEY MTN- PINE MTN--LOWER ELEV</u>	<u>B</u>	<u>A</u>		<u>C</u>
<u>WIND RIVER FRONT-PINE MTN LITTLE MTN--HIGHER ELEVATIONS</u>				<u>D</u>

Seed mixes should be chosen based on precipitation zone, soil type and species present on-site prior to disturbance.

Big sagebrush and other specified shrubs which have high wildlife value will be planted in **big game winter range areas**.

Sagebrush debris bladed off the soil surface during project construction activities may be spread across the ROW in these areas to provide a seed source.

Planting will be done in the fall. Site preparation will consist of leaving a rough surface, which provides microsites where moisture catchment and wind protection will be maximized. Seeding will be accomplished either by seed drill (no more than 1/2" deep), or broadcast seeding. **Shrubs should be planted in separate, alternating rows with grasses and forbs.** Successful plantings of **antelope bitterbrush** have been obtained by seeding with shadscale and lightly raking into soil on suitable sites.

Seeds from a local source have the highest chance of success because of their adaptability and insect and disease resistance. If the project is planned more than one season in advance of construction, we recommend that seeds be collected from the site and used in reclamation. Otherwise, seeds must be bought from the closest source to the project area. Seeds used in reclamation must be CERTIFIED WEED-FREE. Seed tags and other verification must be sent to the authorizing BLM party for inspection.

**Planting a mixture of species expedites the natural sequence of plant succession.** Variation in size and type of cover is required by big game, small mammals and birds. **Inclusion of broadleaf herbs with shrubs and grasses improves the forage production, herbage quality, biodiversity, and soil stability of treated sites.**

SEED MIX A--Loamy Clay

Grasses--USE ALL

Thickspike wheatgrass	6 LBS/ACRE
Indian ricegrass	2
Sandberg bluegrass or bluebunch wheatgrass	6
Bottlebrush squirreltail	2

Shrubs--USE TWO (IN WINTER RANGE--USE BIG SAGEBRUSH)

Basin or Wyoming big sagebrush	1 LBS/ACRE
shadscale (esp important on winter range)	1
winterfat	2
Gardners saltbush	2

Forbs--USE TWO

scarlet globemallow	1/2 LBS/ACRE EACH
lupine	
blue flax	1/4 LBS/ACRE
Rocky Mountain penstemon	

**Globemallow** is a native pioneer species; very drought tolerant; very successful in sagebrush areas; relished by antelope, deer and small mammals; maintains summer succulence for wildlife in arid areas; and produces large amounts of seed. Generally available.

**Lupines** are nitrogen fixers (soil builders); have the superior ability to establish and persist on harsh sites; and are important for deer and antelope (seed pods). Variety of species available.

**Blue flax** is a drought tolerant, very vigorous, highly competitive forb which is successful on well drained soils. Initiates growth in early spring, foliage highly palatable to livestock and wildlife; seeds eaten by birds and rodents. Available.

**Rocky Mountain penstemon** is an easily established rhizomatous forb with good stabilization value. The forage is palatable to antelope and deer.

SEED MIX B--Sandy

Grasses--USE ALL

Needle and thread grass	6 LBS/ACRE
Thickspike wheatgrass	6
Indian ricegrass	3
Bottlebrush squirreltail	2
Bluebunch wheatgrass	2

Shrubs--USE TWO

shadscale	1 LBS/ACRE
spiny hopsage	

Forbs--USE TWO

Northern sweetvetch	1/2 LBS/ACRE EACH
Rocky Mountain beeplant	
Louisiana (Prairie) sagebrush ( <i>Artemisia ludoviciana</i> var <i>ludoviciana</i> )	

**Northern sweetvetch** is a nitrogen-fixing soil builder, drought tolerant, and highly palatable to big game and livestock. Good seed producer, well adapted. Several varieties available.

**Rocky Mountain beeplant** is a good pioneering species and short-term stabilizer, produces copious seeds, is attractive to small mammals, upland game birds and insects. Available.

**Louisiana (prairie) sagebrush** establishes quickly, does very well on coarse soils in sagebrush, rabbitbrush and juniper communities. Drought and cold tolerant. Used by sheep and mule deer. Serves as an excellent nurse crop. It is a very good non-leguminous nitrogen-fixer. Available.

SEED MIX C--Saline (alluvial bottoms and clay flats)

Grasses--USE ALL

Thickspike wheatgrass	6 LBS/ACRE
Western wheatgrass	6
Bottlebrush squirreltail	4
Indian ricegrass	2-3
Basin wildrye	2
Sandberg's bluegrass	2

Shrubs--USE TWO (IN WINTER RANGE USE WINTERFAT)

Black greasewood	2 LBS/ACRE EACH
Gardner's saltbush	2
winterfat	3
shadscale	2

Forbs--USE ONE

scarlet globemallow	1/2 LBS/ACRE EACH
blue flax	1/4

SEED MIX D--Mountain shrub (15-19"PPT ZONE)

Grasses--USE ALL

Bluebunch wheatgrass	6 LBS/ACRE
Letterman needlegrass	6
Mountain brome	6
Canby bluegrass OR	4 LBS/ACRE EACH
Sandberg bluegrass OR	
prairie junegrass OR	
mutton bluegrass	

Shrubs--USE TWO (REPLACE SPECIES REMOVED)

Mountain Big Sagebrush	1 LBS/ACRE
Mountain mahogany	3
Bitterbrush	3

Forbs--USE TWO

Arrowleaf balsamroot	1 LBS/ACRE
Silky or mountain lupine	
Rocky Mountain penstemon	

**Arrowleaf balsamroot** is a drought tolerant, long-lived perennial. Its foliage provides important early spring forage, and is sought after by elk, deer and antelope. Seed should be covered to prevent loss to rodents.

**Lupines** are nitrogen fixers (soil builders); have the superior ability to establish and persist on harsh sites; and are important for deer and antelope (seed pods).

**EXTREMELY HARSH SITES: Western yarrow, Basin wildrye, Indian ricegrass, Mountain brome, Louisiana sagebrush, sulfur buckwheat (especially rocky sites).** These species compete very well against invaders, grow under adverse conditions, and improve the soil conditions, but are rather site-specific. Therefore seed should be obtained as close to the site as possible. **Yarrow** is an especially aggressive species, so should be used sparingly, and only on extremely difficult sites.

**References:**

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American Wildlife and Plants: A Guide to Wildlife Food Habits. Martin, Zim and Nelson. Dover Publications 1951.

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**STANDARD SEED MIXTURES  
RAWLINS FIELD OFFICE**

**DRY LOAMY/CLAY SITES** - characterized as a sagebrush/wheatgrass community with less that 10 inches precipitation

Species of Seed	Variety	Lbs. PLS*
<b><u>Grasses</u></b>		
Thickspike wheatgrass ( <i>Agropyron dasystachyum</i> )	Critana	3(either)
Western wheatgrass ( <i>Agropyron smithii</i> )	Rosana	3(either)
Indian ricegrass ( <i>Oryzopsis hymenoides</i> )		2
Bottlebrush squirreltail ( <i>Sitanion hystrix</i> )		2
Slender wheatgrass ( <i>Agropyron trachycaulum</i> )	Pyror	4
Little bluegrass ( <i>Poa secunda</i> )		0.5
<b><u>Shrubs</u></b>		
*Big sagebrush ( <i>Artemesia tridentata wyomingensis</i> )		0.5
*Gardner's saltbush ( <i>Atriplex gardneri</i> )		1
*Fourwing saltbush ( <i>Atriplex canescens</i> )		1
*Common winterfat ( <i>Ceratoides lanata</i> )		1
<b><u>Forbs</u></b>		
*Scarlet globemallow ( <i>Sphaeralcea coccinea</i> )		0.5+
*Lewis' flax ( <i>Linum lewsi</i> )	Appar	0.5+
*Rocky Mountain beeplant ( <i>Cleome serrulata</i> )		0.5+

**DRY SANDY SITES** - characterized as a sagebrush/bunchgrass community with less that 10 inches precipitation

Species of Seed	Variety	Lbs. PLS*
<b><u>Grasses</u></b>		
Indian ricegrass ( <i>Oryzopsis hymenoides</i> )		2
Needleandthread ( <i>Stipa comata</i> )		4
Slender wheatgrass ( <i>Agropyron trachycaulum</i> )		4
*Sandhill muhly ( <i>Muhlenbergia pungens</i> )		0.5
<b><u>Shrubs</u></b>		
*Rubber rabbitbrush ( <i>Chrysothamnus nauseosus</i> )		1
*Big sagebrush ( <i>Artemesia tridentata wyomingensis</i> )		0.5
*Spiny hopsage ( <i>Atriplex spinosa</i> )		1
*Fourwing saltbush ( <i>Atriplex canescens</i> )		1
<b><u>Forbs</u></b>		
*Scarlet globemallow ( <i>Sphaeralcea coccinea</i> )		0.5+
*Lewis' flax ( <i>Linum lewsi</i> )	Appar	0.5+
*Rocky Mountain beeplant ( <i>Cleome serrulata</i> )		0.5+

**LOAMY/CLAY-LOAM SITES** - characterized as a sagebrush/wheatgrass community with 10 or greater inches of precipitation

Species of Seed	Variety	Lbs. PLS*
<b><u>Grasses</u></b>		
Western wheatgrass ( <i>Agropyron smithii</i> )	Rosana	2(either)
Thickspike wheatgrass ( <i>Agropyron dasystachyum</i> )	Critana	2(either)
Indian ricegrass ( <i>Oryzopsis hymenoides</i> )		1
Green needlegrass ( <i>Stipa viridula</i> )		3
Prairie Junegrass ( <i>Koeleria cristata</i> )		1
Bottlebrush squirreltail ( <i>Sitanion hystrix</i> )		1
Slender wheatgrass ( <i>Agropyron trachycaulum</i> )		2

Mutton bluegrass (*Poa fendleriana*) 0.5

**Shrubs**

\*Big sagebrush (*Artemisia tridentata wyomingensis*) 0.5  
 \*Fourwing saltbush (*Atriplex canescens*) 1  
 \*Antelope bitterbrush (*Purshia tridentata*) 1  
 \*Snowberry (*Symphoricarpos oreophilus*) 1

**Forbs**

\*Lewis' flax (*Linum lewisii*) Appar 0.5+  
 \*Scarlet globemallow (*Sphaeralcea coccinea*) 0.5+  
 \*American vetch (*Vicia americana*) 0.5+  
 \*Lupine (*Lupinus sericeus*) 0.5+  
 \*Blanketflower (*Gaillardia aristata*) 0.5+

**SANDY SITES** - characterized as a sagebrush/bunchgrass community with 10 or greater inches of precipitation

Species of Seed	Variety	Lbs. PLS*
<b><u>Grasses</u></b>		
Indian ricegrass ( <i>Oryzopsis hymenoides</i> )		2
Green needlegrass ( <i>Stipa viridula</i> )		3
Needleandthread ( <i>Stipa comata</i> )		2
Slender wheatgrass ( <i>Agropyron trachycaulum</i> )		2
Mutton bluegrass ( <i>Poa fendleriana</i> )		0.5
Sand dropseed ( <i>Sporobolus cryptandrus</i> )		0.5
<b><u>Shrubs</u></b>		
*Silver sagebrush ( <i>Artemisia cana</i> )		0.5
*Fourwing saltbush ( <i>Atriplex canescens</i> )		1
*Antelope bitterbrush ( <i>Purshia tridentata</i> )		1

**Forbs**

**WET ALKALINE/SALINE SITES** - characterized as a greasewood community in a lowland location

Species of seed	Variety	Lbs. PLS**
<b><u>Grasses</u></b>		
Western wheatgrass ( <i>Agropyron smithii</i> )	Rosana	3
Slender wheatgrass ( <i>Agropyron trachycaulum</i> )		4
Alkali sacaton ( <i>Sporobolus airoides</i> )		0.5
Inland saltgrass ( <i>Distichlis stricta</i> )		2
Basin wildrye ( <i>Elymus cineris</i> )		2
<b><u>Shrubs</u></b>		
*Fourwing saltbush ( <i>Atriplex canescens</i> )		1

**MOUNTAIN SHRUB SITES** - characterized as shrub community with deep loamy soils and greater than 14 inches of precipitation

Species of Seed	Variety	Lbs. PLS**
<b><u>Grasses</u></b>		
Bluebunch wheatgrass ( <i>Agropyron spicatum</i> )		2
Idaho fescue ( <i>Festuca idahoensis</i> )		2
Green needlegrass ( <i>Stipa viridula</i> )		4
Mutton bluegrass ( <i>Poa fendleriana</i> )		0.5
Mountain brome ( <i>Bromus carinatus</i> )	Bromar	2

\*Oniongrass (*Melica bulbosa*)

2

**Shrubs**

\*Wyoming big sagebrush (*Artemisia tridentata vaseyana*)

0.5

\*Antelope bitterbrush (*Purshia tridentata*)

1

\*Snowberry (*Symphoricarpus oreophilus*)

1

\*Serviceberry (*Amelanchier alnifolia*)

1

\*Chokecherry (*Prunus virginiana*)

1

**Forbs**

**INTRODUCED SPECIES** - Species that are not native, but can adapt to certain habitat types. These species will only be used with BLM approval and when either two attempts at revegetation with native species have been unsuccessful or adjacent vegetation has an established stand of introduced species.

Crested wheatgrass (*Agropyron cristatum*)

Russian wildrye (*Elymus junceus*)

Tall wheatgrass (*Agropyron elongatum*)

Pubescent wheatgrass (*Agropyron trichophorum*)

**Footnotes**

**Total Lbs. PLS** - Seed mixtures should total approximately 8 to 12 lbs. of pure live seed.

\*\* Pure Live Seed, drill seeded For broadcast seeding, double the above rates.

\* These species can be used as alternatives, site specific choices, or species required to fulfill a particular value (e.g., critical wildlife habitat).