PRESCRIBING SEED MIXTURES BY SOIL TYPE

AND OTHER CONSIDERATIONS

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NRCS Natural Resources Conservation Service

WHAT TO CONSIDER?

- SEEDING OBJECTIVE(S)
- POST-ESTABLISHMENT USE
- CLIMATE
- LOCATION

- SITE PREP/SEEDING METHOD
- SEED AVAILABILITY/COST
- SOILS

SEEDING OBJECTIVE(S)

- SOIL EROSION CONTROL
- FORAGE
- DIVERSITY
- ECOLOGICAL FUNCTION
- WILDLIFE HABITAT

ALL OF THE ABOVE!

POST-ESTABLISHMENT USE

- RECREATION
- WILDLIFE
- LIVESTOCK GRAZING – SPECIES AND CLASS, SEASON OF USE
- TWO-TRACK ROAD
- FUTURE DISTURBANCE

CLIMATE/LOCATION

- TEMPERATURE
- PRECIPITATION
- LATITUDE/LONGITUDE
- ELEVATION
- ASPECT

SITE PREP/SEEDING METHOD

- SEEDBED CONDITIONS
- SEEDING EQUIPMENT
- TIME OF SEEDING

SEED AVAILABILITY

- CERTIFIED
- PROVEN CULTIVARS
- LOCAL ECOTYPES
- “SOURCE IDENTIFIED”
- GERM/PURITY TESTED IN PAST 12 MONTHS
- LEFTOVERS FROM LAST YEAR

SOILS

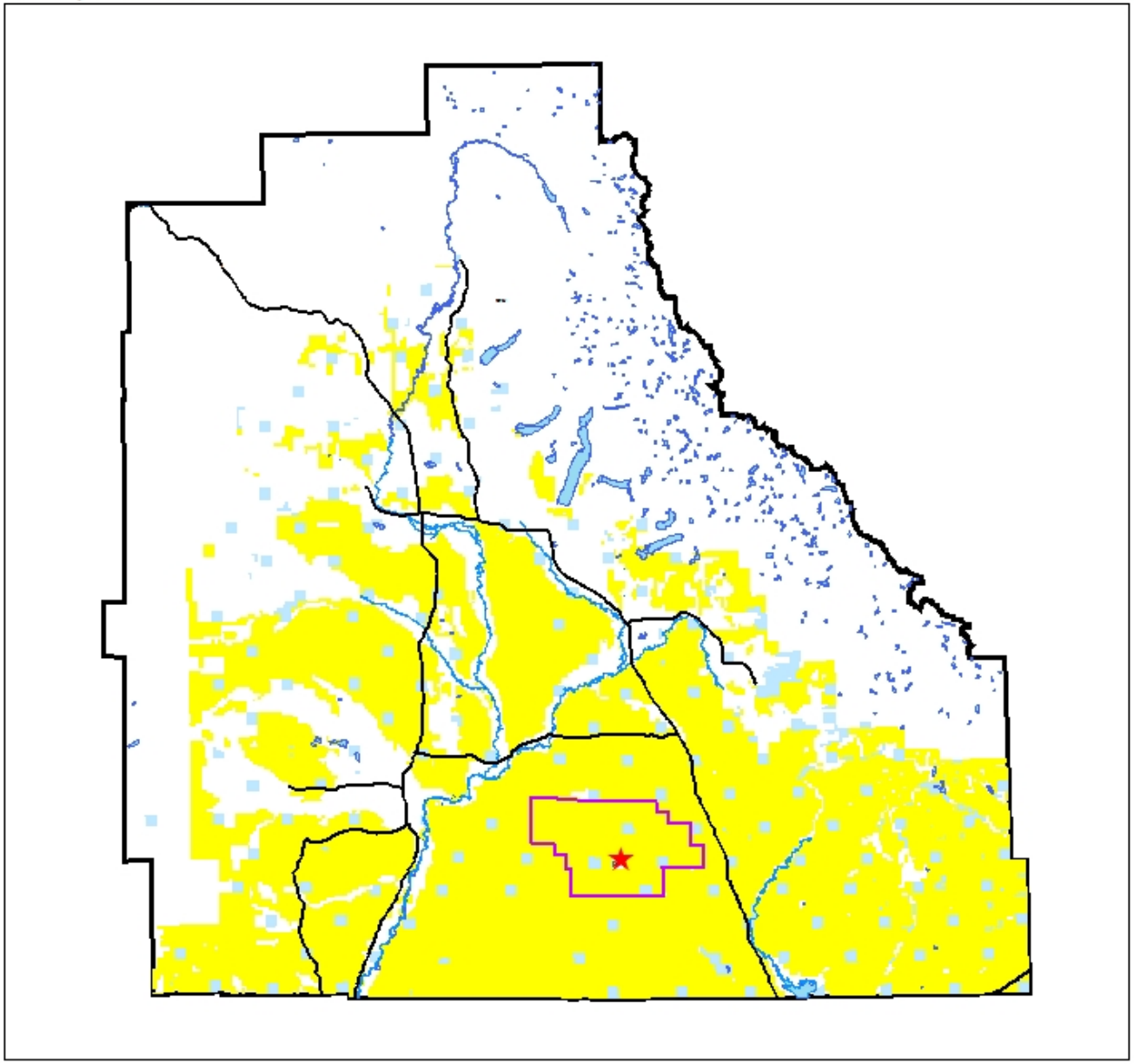
- TEXTURE – Sandy, Clayey, Loamy
- SLOPE – Erosion Control, Seeding Method
- DEPTH – Very Shallow, Shallow, Moderately Deep, Deep
- CHEMISTRY – CEC, pH, $CaCO_3$%, Gypsum, EC, SAR

ABC O&G Company - Location Map

County, ST: Sublette, WY
Approximate Acres: 5 acres
Assisted by: Karen J. Clause, RMS

Location: NENE Sec32 T29N R108W

Precip/Ecological Zone: 7-9" GR
Growing Season: 60-90 days
Date: March 13, 2007



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SCENARIO:

- OBJECTIVE: Permanently Reclaim/Restore Disturbed Well Pad Area, Control Erosion, Reestablish Ecological Processes, Provide Wildlife Habitat

- POST-ESTABLISMENT USE: Spring Grazing by Cattle; Yearlong & Winter Antelope

- CLIMATE: 10” Precip/60-90 Day Growing Season?

- LOCATION: 7100 Ft Elev, aspect neutral, Jonah Field (map)
- SITE PREP/SEEDING METHOD: Deep Ripping; Recontour; Replace Topsoil; Disk to Incorporate; Roll to Firm, Weed-Free Seedbed; Fall Dormant Seeding with Truax No-Till Drill

ABC O&G Company - Reclamation Seeding Plan

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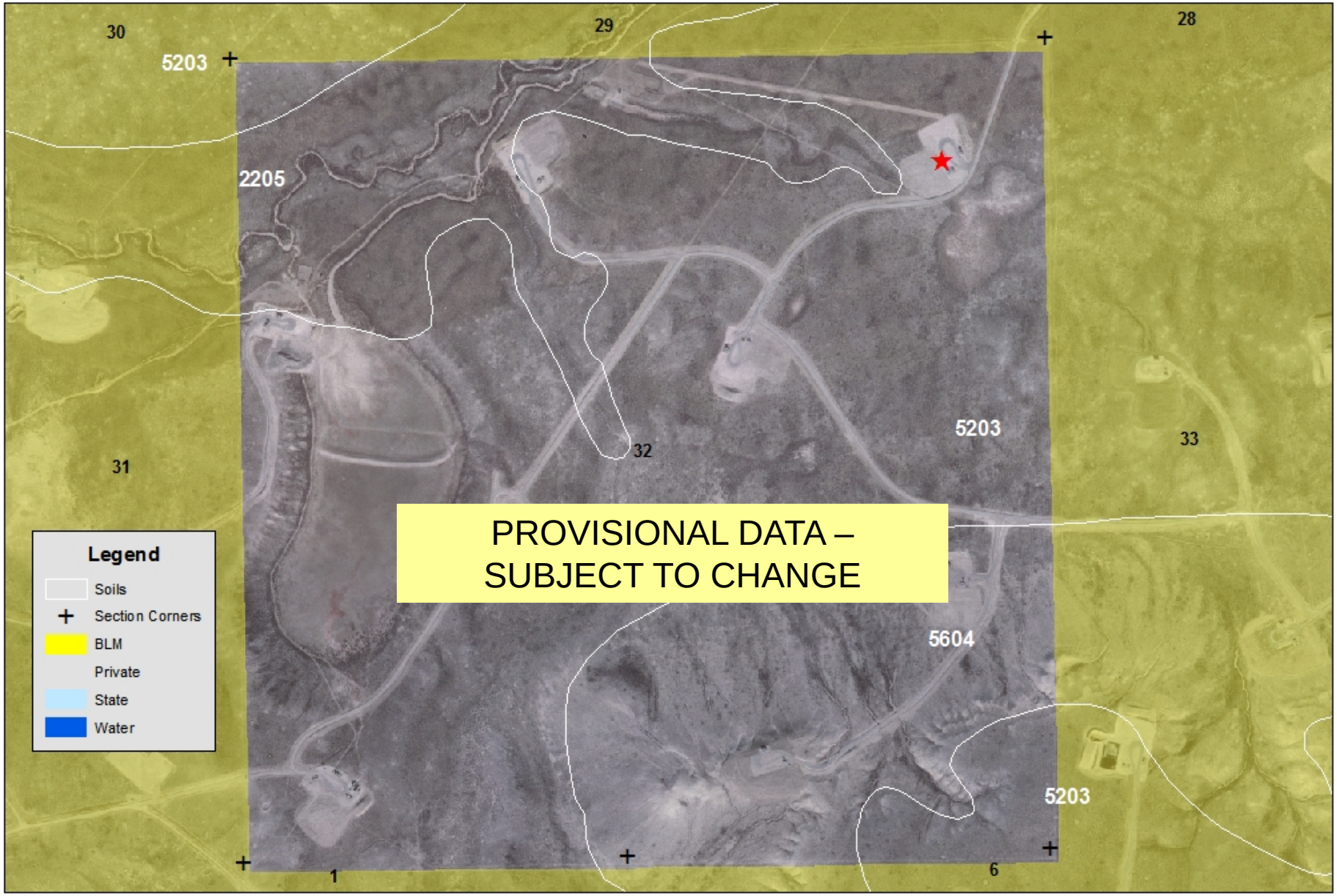

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Component Legend

Sublette County Area, Wyoming

[This report shows only the major soils in each map unit]

Map unit symbol and name	Pct. of map unit	Component name	Component kind	Pct. Slope		
				Low	RV	High
5203: Cushool-Zagpeed-Luhon-Rock River complex, 0 to 4 percent slopes						
	25	Cushool	Taxadjunct	0	2	5
	20	Zagpeed	Taxadjunct	0	2	5
	15	Luhon	Taxadjunct	0	2	14
	15	Rock River	Taxadjunct	0	1	5

PROVISIONAL DATA – SUBJECT TO CHANGE

NON-TECHNICAL SOIL DESCRIPTION

Soil Component Name Cushool 25 % of the mapunit

Slope range (%): 0 to 5
Depth class: Moderately deep
Drainage class Well drained
Land capability: nonirrigated= 6s irrigated= Not rated
Ecological Site: Loamy (Ly) 10-14W, Foothills and Basins W
Restrictive layers (in): 26 - 39 Bedrock (paralithic)

Permeability: Moderately slow
Available water capacity class: Low
Total available water in top five feet (in.): 4.0
Flooding frequency: None
Depth to seasonal high water table (in): NA -

Horizon Information

	Depth (in)	Textures	pH range	Sodium	Salinity (mmhos/cm)
A	0 - 1	loam	7.6 - 8	NA -	NA -
Bt	1 - 6	loam	7.8 - 8	NA -	NA -
Btk	6 - 17	clay loam	8.4 - 8.8	NA -	4 - 8
Bk	17 - 37	loam	8.6 - 8.8	NA -	8 - 16
Cr	37 - 37	bedrock	-	NA -	NA -

PROVISIONAL DATA –
SUBJECT TO CHANGE

PRE-DISTURBANCE SOILS

- TEXTURE – Sandy Loam, Loam
- SLOPE – 0-5%
- DEPTH – Mod. Deep (20-40”)
- SURFACE CHEMISTRY
  - CEC: 13-21 meq/100g
  - pH: 7.6-8.0 (Slight to Mod Alkalinity)
  - $CaCO_3$: 0-2% (Non-calcic)
  - EC: 0-2 mmhos/cm (Non-saline)
  - SAR: 0-2 (Non-sodic)

POST-DISTURBANCE SOILS

- MIXED SUBSOIL (B & C HORIZONS)
- 65% OF ORIGINAL “TOPSOIL” DEPTH (A & B HORIZONS) – USE WITHIN 1 YEAR TO MAINTAIN BIOLOGICAL FUNCTION
- SOIL CHEMISTRY – TESTING RECOMMENDED (EC, pH)!

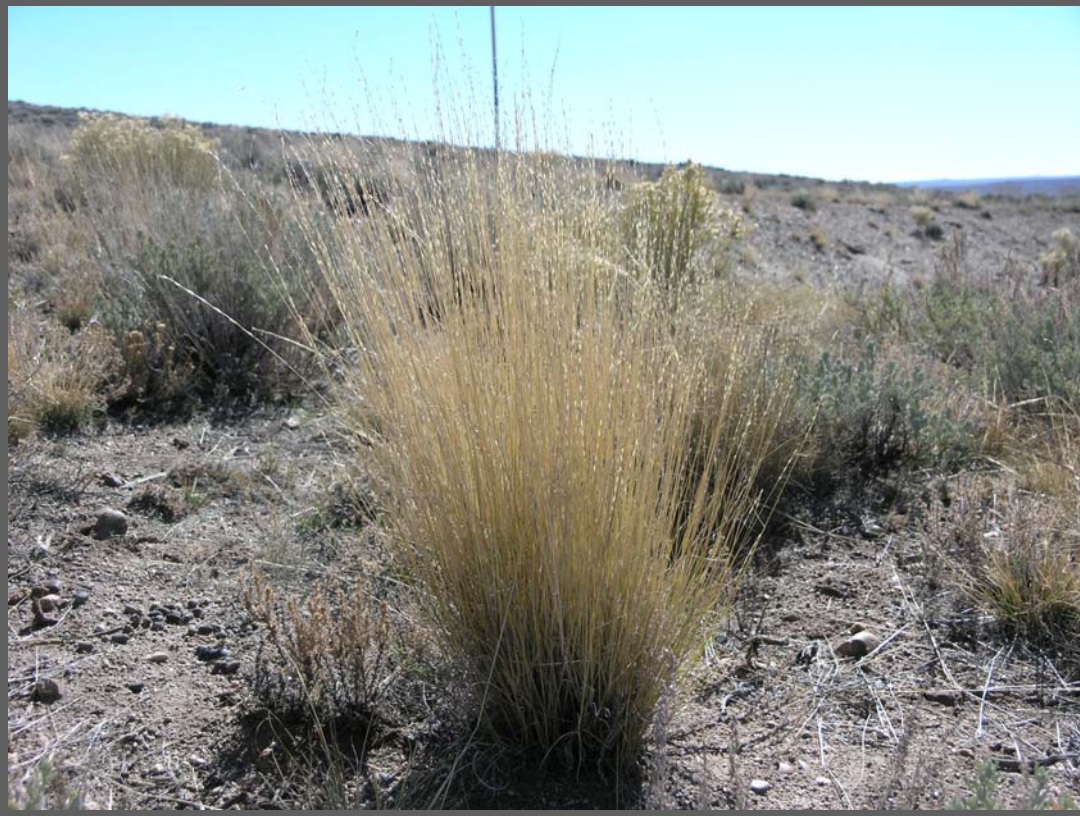
7-9GR ESD – 55-75% GRASSES

COMMON NAME/GROUP NAME	SCIENTIFIC NAME	SYMBOL	Annual Production (Normal Year) Total: 500		
			Group	lbs./acre	% Comp.
GRASSES AND GRASS-LIKES					
GRASSES/GRASSLIKES					
thickspike wheatgrass	Elymus lanceolatus ssp. lanceolatus	ELLAL	1	50 - 150	10 - 30
Indian ricegrass	Achnatherum hymenoides	ACHY	2	50 - 100	10 - 20
needleandthread	Hesperostipa comata	HECO26	3	50 - 100	10 - 20
~~Griffiths wheatgrass or~~	~~Elymus albicans~~	~~ELAL7~~	~~4~~	~~5 - 50~~	~~1 - 10~~
Bluebunch wheatgrass	Pseudoroegneria spicata	PSSP6			
bottlebrush squirreltail	Elymus elymoides	ELEL5	5	5 - 50	1 - 10
MISC. GRASSES/GRASSLIKES			**7**	**25 - 75**	**5 - 15**
Canby bluegrass	Poa canbyi (syn. P. secunda)	POCA (POSE)	7	0 - 25	0 - 5
~~needleleaf sedge~~	~~Carex duriuscula~~	~~CADU6~~	~~7~~	~~0 - 25~~	~~0 - 5~~
~~plains reedgrass~~	~~Calamagrostis montanensis~~	~~CAMO~~	~~7~~	~~0 - 25~~	~~0 - 5~~
Sandberg bluegrass	Poa secunda	POSE	7	0 - 25	0 - 5
~~threadleaf sedge~~	~~Carex filifolia~~	~~CAFI~~	~~7~~	~~0 - 25~~	~~0 - 5~~
other perennial grasses (native)		2GP	7	0 - 25	0 - 5

Slender & streambank wheatgrass

BLUEBUNCH WHEATGRASS

- Coarse to medium soil textures
- Very shallow to deep soils
- Slight salinity, high $CaCO_3$ tolerance
- ‘Secar’ documented @ 8” precipitation
- Spring graze 1 in 3 years @ < 40% utilization



INDIAN RICEGRASS

- Wide range of soil textures and depths
- Slight salinity, high $CaCO_3$ tolerance
- ‘Nezpar’ documented @ 6” precipitation
- Years 3 & 4 critical to stand survival!

THICKSPIKE/STREAMBANK WHEATGRASS

‘Critana’ Thickspike

- **Coarse to medium soil textures**

‘Sodar’ Streambank

- **Medium to heavy soil textures**

- **Moderate salinity & $CaCO_3$ tolerance**
- **5” precipitation**
- **Rhizomatous – tolerates disturbance well**

SLENDER WHEATGRASS

- Medium to heavy soil textures
- Moderate salinity & $CaCO_3$ tolerance
- 10” precipitation
- ‘Pryor’ more drought/saline tolerant
- Short-lived, quick cover

NEEDLEANDTHREAD

- Coarse soil textures
- Low salinity tolerance
- 5” precipitation
- Recommend “source identified” seed w/i 500 miles
- High seed dormancy

BOTTLEBRUSH SQUIRRELTAIL

- Wide range of soil textures
- Moderately salinity, high $CaCO_3$ tolerance
- 5” precipitation
- Broad genetic variation—choose seed source carefully
- A good choice for “assisted succession”

7-9GR ESD – 5-15% FORBS

FORBS			**8**	**25 - 75**	**5 - 15**
asters	Eucephalus spp.	EUCEP2	8	0 - 25	0 - 5
~~biscuitroot~~	~~Lomatium spp.~~	~~LOMAT~~	~~8~~	~~0 - 25~~	~~0 - 5~~
buckwheats	Eriogonum spp.	ERIOG	8	0 - 25	0 - 5
~~clovers~~	~~Trifolium spp.~~	~~TRIFO~~	~~8~~	~~0 - 25~~	~~0 - 5~~
~~deathcamas~~	~~Zigadenus spp.~~	~~ZICAD~~	~~8~~	~~0 - 25~~	~~0 - 5~~
~~fleabane~~	~~Erigeron spp.~~	~~ERIGE2~~	~~8~~	~~0 - 25~~	~~0 - 5~~
~~goldenweed~~	~~Stenotus acaulis~~	~~STAC~~	~~8~~	~~0 - 25~~	~~0 - 5~~
~~hawksbeard~~	~~Crepis acuminata~~	~~CRAC2~~	~~8~~	~~0 - 25~~	~~0 - 5~~
~~hollyleaf clover~~	~~Trifolium gymnocarpon~~	~~TRGY~~	~~8~~	~~0 - 25~~	~~0 - 5~~
~~Hoods phlox~~	~~Phlox hoodii~~	~~PHHO~~	~~8~~	~~0 - 25~~	~~0 - 5~~
~~larkspur~~	~~Delphinium spp.~~	~~DELPH~~	~~8~~	~~0 - 25~~	~~0 - 5~~
~~longleaf phlox~~	~~Phlox longifolia ssp. longifolia~~	~~PHLOL2~~	~~8~~	~~0 - 25~~	~~0 - 5~~
milkvetches	Astragalus spp.	ASTRA	8	0 - 25	0 - 5
~~paintbrushes~~	~~Castilleja spp.~~	~~CAST~~	~~8~~	~~0 - 25~~	~~0 - 5~~
penstemons	Penstemon spp.	PENST	8	0 - 25	0 - 5
~~pussytoes~~	~~Antennaria rosea~~	~~ANRO2~~	~~8~~	~~0 - 25~~	~~0 - 5~~
scarlet globemallow	Sphaeralcea coccinea	SPCO	8	0 - 25	0 - 5
~~toadflax, pale bastard~~	~~Comandra umbellata~~	~~COUMP~~	~~8~~	~~0 - 25~~	~~0 - 5~~
western yarrow	Achillea millefolium	ACMI2	8	0 - 25	0 - 5
other perennial forbs (native)		2FP	8	0 - 25	0 - 5

SULFUR BUCKWHEAT

- Coarse to medium soil textures
- High salinity & $CaCO_3$ tolerance
- 7-9” precipitation zone
- Important food source for grouse and deer

SCARLET GLOBEMALLOW

- Coarse to medium soil textures
- Low salinity, high $CaCO_3$ tolerance
- 6” precipitation
- Important forage for wildlife
- Volunteers on disturbed sites

PALMER PENSTEMON

- Coarse to medium soil textures
- slight salinity, low $CaCO_3$ conditions
- 6” precipitation
- ‘Cedar’ noted for forage value

7-9GR ESD – 5-30% SHRUBS

TREES/SHRUBS					
Wyoming big sagebrush	Artemisia tridentata ssp. wyomingensis	ARTRW8	9	25 - 75	5 - 15
MISC. SHRUBS			**10**	**25 - 75**	**5 - 15**
~~bud sagewort~~	~~Picrothamnus desertorum~~	~~PIDE4~~	~~10~~	~~0 - 25~~	~~0 - 5~~
~~granite prickly phlox (sage gilia)~~	~~Leptodactylon pungens~~	~~LEPU~~	~~10~~	~~0 - 25~~	~~0 - 5~~
green rabbitbrush	Chrysothamnus viscidiflorus	CHVI8	10	0 - 25	0 - 5
shadscale	Atriplex confertifolia	ATCO	10	0 - 25	0 - 5
spiny hopsage	Grayia spinosa	GRSP	10	0 - 25	0 - 5
winterfat	Krascheninnikovia lanata	KRLA2	10	0 - 25	0 - 5

WYOMING BIG SAGE

- Wide range of soil textures and depths
- Low salinity, high $CaCO_3$ tolerance
- 7-9” precip zone
- Seeding at 1 seed/sqft provides ~400 plants/ac
- Possibly the most important shrub on western rangelands!

FOURWING SALTBUSH

- Wide range of textures, but prefers deep, well-drained soils
- High salinity and $CaCO_3$, moderate sodicity tolerance
- 8” precipitation
- ‘Wytana’ a natural cross between fourwing and Gardner’s saltbush
- Excellent wildlife/livestock value

WINTERFAT

- Wide range of soil textures
- Medium salinity, high $CaCO_3$ tolerance
- <6” precipitation
- ‘Open Range’ a composite including Rawlins accession
- Seed viability rapidly decreases after 1-2 yrs
- Superior winter forage for livestock/wildlife

SEED MIX @ 2X NORMAL RATE FOR CRITICAL AREA

SPECIES	CULTIVAR	% COMP	LBS/AC PLS FOR FULL STAND	SEEDS/ SQFT	LBS/AC PLS FOR MIX
Bluebunch wheatgrass	Secar	10%	14.0	4.5	1.4
Streambank wheatgrass	Sodar	10 %	12.0	4.2	1.2
Indian ricegrass	Rimrock	15%	12.0	9.7	1.8
Bottlebrush squirreltail	Common	10%	10.0	4.4	1.0
Slender Wheatgrass	Pryor	10%	12.0	3.9	1.2
Sulfur Buckwheat	Common	5%	6.0	1.9	.30
Palmer penstemon	Common	5%	3.0	2.0	.15
Scarlet globemallow	Common	5%	4.0	2.3	.20
WY big sage	Common	10%	2.0	11.0	.20
Fourwing saltbush	Snake River Plains	10%	10.0 (dewinged)	1.1	1.0
Winterfat	Open Range	10%	16.0	7.7	1.6
TOTAL:		100%		52.7	10.1

POST-SEEDING MANAGEMENT

- WEED CONTROL
- 2 YEARS DEFERRED GRAZING, FOLLOWED BY A PRESCRIBED GRAZING PLAN

TECHNICAL RESOURCES

- SOIL SURVEY DATA…EVENTUALLY!
  - DOES NOT PRECLUDE SITE INVESTIGATION
- ECOLOGICAL SITE DESCRIPTIONS
  - http://www.nrcs.usda.gov/technical/efotg/
- USDA PLANTS DATABASE
  - http://plants.usda.gov
- USDA, NRCS PLANT MATERIALS CENTER TECHNICAL NOTES
  - http://www.plant-materials.nrcs.usda.gov/centers/
- USDA, ARS PUBLICATIONS
  - http://extension.usu.edu/files/publications/publication/pub_7717229.pdf