

From: Ingrid Campbell
To: Vicky Miller
CC: OGMCOAL
Date: 6/19/2012 8:39 AM
Subject: Soldier Canyon Reclamation
Attachments: 20120509162941.pdf

Hi Vicky-

I thought I had sent this email out a month and a half ago. Apparently it was stuck in my draft folder, so my apologies. I reviewed the soldier canyon reclamation plan, and the only thing that really jumped out at me that needed to be revised were the seed mixes listed in appendix 3-E. I have attached our version, which is a bunch of strike outs followed by revised mixes. I have no problem with the revised mixes unless you would like to change those depending on seed availability. The intermediate seed mix needs to be revised as we discussed for the topsoil piles. I would suggest adding species such as crested wheatgrass and keeping western wheatgrass and thickspike wheatgrass since they seemed to be doing well on the other piles. Also, I don't think we should use yellow sweet clover or alfalfa. Lastly, I think we should add some shrub species for cover such as mountain big sagebrush. These are only suggestions, so please submit a proposed interim seed mix and a proposal to reseed the topsoil pile. I think it would also be wise to include some wood mulch after seeding. Let me know if you have any questions or would like to revise additional sections of the MRP.

Thanks!

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Intermediate (Temporary) Seed Mixture - All Areas

	Rate
<u>Variety</u>	<u>(lbs/ac)</u>
Intermediate wheatgrass (<u>Agropyron intermedium</u>)	Oahe 2.0
Slendar wheatgrass (<u>Agropyron trachycaulum</u>)	Primar 3.0
Thickspike wheatgrass (<u>Agropyron dasystachyum</u>)	Critana 4.0
Western wheatgrass (<u>Agropyron smithii</u>)	Rosana 3.0
Yellow sweet clover (<u>Melilotus officinalis</u>)	Common 1.0
Alfalfa (<u>Medicago sativa</u>)	Ranger 1.0
	TOTAL 14.0

Permanent Seed Mixture - Central Mine Facilities Area

	Rate
<u>Variety</u>	<u>(lbs/ac)</u>
Mountain big sagebrush (<u>Artemisia tridentata var. vaseyana</u>)	Hobble Crk 0.2
Bluebunch wheatgrass (<u>Agropyron spicatum</u>)	Secar 2.5
Thickspike wheatgrass (<u>Agropyron dasystachyum</u>)	Critana 2.0
Great Basin wildrye (<u>Elymus cinereus</u>)	Common 3.0
Indiana ricegrass (<u>Oryzopsis hymenoides</u>)	Paloma 2.5
Western wheatgrass (<u>Agropyron smithii</u>)	Rosana 3.0
Alfalfa (<u>Medicago sativa</u>)	Ladak 0.5
Lewis-flax (<u>linum lewisii</u>)	Common 1.0
Yellow sweetclover (<u>Melilotus officinalis</u>)	Common 0.5
Antelope bitterbrush (<u>Parshia tridentata</u>)	Common 1.0
Rubber rabbitbrush (<u>Chrysothamnus nauseosus var. albicaulis</u>)	Common 1.0
Saskatoon serviceberry (<u>Amelanchier alnifolia</u>)	Common 1.0
Winterfat (<u>Ceratoides lanata</u>)	Common 2.0
Blueleaf aster (<u>Aster glaucodes</u>)	Common 0.5
Rocky Mountain penstemon (<u>Penstemon strictus</u>)	Common 0.5
	TOTAL 21.2

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Permanent Seed Mixture - Sewage Lagoons Area

	<u>Variety</u>	<u>Rate</u> <u>(lbs/ac)</u>
Great Basin wildrye (<u>Elymus cinereus</u>)	Common	3.0
Indian ricegrass (<u>Oryzopsis hymenoides</u>)	Paloma	2.5
Thickspike wheatgrass (<u>Agropyron dasystachyum</u>)	Critana	3.0
Western wheatgrass (<u>Agropyron smithii</u>)	Rosana	2.0
Slender wheatgrass (<u>Agropyron trachycaulum</u>)	Primar	3.0
Alfalfa (<u>Medicago sativa</u>)	Ranger	0.5
Lewis flax (<u>Linum lewisii</u>)	Common	1.0
Northern sweetvetch (<u>Hedysarum boreale</u>)	Common	0.5
Yellow sweetclover (<u>Melilotus officinalis</u>)	Common	0.5
Birchleaf mountain - mahogany (<u>Cercocarpus montanus</u>)	Common	1.0
Saskatoon serviceberry (<u>Amelanchier alnifolia</u>)	Common	1.0
Utah juniper (<u>Juniperus osteosperma</u>)	Common	0.5
	TOTAL	18.5

Permanent Seed Mixture - Topsoil/Storage Area

		<u>*Rate</u> <u>(lbs/ac)</u>
Black Sagebrush (<u>Artemisia nova</u>)		0.5
Squawbush (<u>Rhus trilobata</u>)		2.0
Yarrow (<u>Achillea millifolium</u>)		0.1
Pacific Aster (<u>Aster chilensis</u>)		0.2
Northern Sweetvetch (<u>Hedysarum boreale</u>)		1.5
Lewis Flax (<u>Linum lewisii</u>)		1.0
Yellow Sweetclover (<u>Melilotus officinalis</u>)		0.5
Blue Grama (<u>Bouteloua gracilis</u>)		0.4
Western Wheatgrass (<u>Elymus smithii</u>)		3.0
Bluebunch Wheatgrass (<u>Elymus spicatus</u>)		3.0
Slendar Wheatgrass (<u>Elymus Trachycaulus</u>)		2.0
Indian Ricegrass (<u>Stipa hymenoides</u>)		2.0
Wyoming Big Sagebrush (<u>Artemisia tridentata var. wyomingensis</u>)		0.25
Mountain Big Sagebrush (<u>Artemisia tridentata var. vaseyana</u>)		0.25
Rubber Rabbitbrush (<u>Chrysothamnus causeosus var. hololeucus</u>)		0.5
Winterfat (<u>Eurotia lanata</u>)		1.0
	TOTAL	18.20

Permanent Seed Mixture - Refuse Disposal Area

	<u>Variety</u>	<u>Rate</u> <u>(lbs/ac)</u>
Great Basin Wildrye (<u>Elymus cinerus</u>)	Common	3.0
Indian Ricegrass (<u>Oryzopsis hymenoides</u>)	Paloma	2.5
Thickspike Wheatgrass (<u>Agropyron dasystachyum</u>)	Critana	3.0
Western Wheatgrass (<u>Agropyron smithii</u>)	Rosana	2.0

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Permanent Seed Mixture - Refuse Disposal Area

	Rate
<u>Variety</u>	<u>(lbs/ac)</u>
Slender wheatgrass (<u>Agropyron trachycaulum</u>)	3.0
Alfalfa (<u>Medicago sativa</u>)	0.5
Lewis flax (<u>Linum lewisii</u>)	1.0
Northern sweetvetch (<u>Hedysarum boreale</u>)	0.5
Yellow sweetclover (<u>Melilotus officinalis</u>)	0.5
Birchleaf mountain-mahogany (<u>Cercocarpus montanus</u>)	1.0
Saskatoon serviceberry (<u>Amelanchier alnifolia</u>)	1.0
Utah Juniper (<u>Juniperus osteosperma</u>)	0.5
TOTAL	18.5

Permanent Seed Mixture - Riparian Area (with Cutting and Seedling Planting Specifications)

	Rate
<u>Variety</u>	<u>(lbs/ac)</u>
Great Basin wildrye (<u>Elymus cinereus</u>) ^{N-G}	3.0
Kentucky bluegrass (<u>Poa pratensis</u>)	0.3
Mountain brome (<u>Bromis marginatus</u>) ^{N-G}	3.0
Slender wheatgrass (<u>Agropyron trachycaulum</u>) ^{N-G}	2.5
Streambank wheatgrass (<u>Agropyron riparium</u>) ^{N-G}	3.0
Western wheatgrass (<u>Agropyron smithii</u>) ^{N-G}	3.0
Lewis flax (<u>Linum lewisii</u>) ^{N-G}	1.0
Alfalfa (<u>Medicago sativa</u>)	1.0
Antelope bitterbrush (<u>Purshia tridentata</u>) ^{N-VF}	1.0
Woods rose (<u>Rosa woodsii</u>) ^{N-VF}	2.0
Yellow sweetclover (<u>Melilotus officinalis</u>)	1.0
Sweet anise (<u>Osmorhiza occidentalis</u>) ^{N-F}	1.0
TOTAL	21.8
<u>Seedling Species</u>	
Narrow leaf cottonwood (<u>Populus augustifolia</u>)	NA 15
<u>Cutting Species</u>	
Endemic willow (<u>Salix spp</u>)	NA 125
Narrowleaf Cottonwood (<u>Populus augustifolia</u>)	NA 50
TOTAL	190

*Rates based on drill seeding pure live seed (PLS). The rate would be doubled if the seeding method employed is surface broadcasted.

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DECIDUOUS STREAM BANK FINAL SEED MIX

	Rate <u>(lbs/ac)</u>	<u>#pls/ft²</u>
Great Basin Wildrye (<i>Elymus cinereus</i>)	3.0	10
Kentucky Bluegrass (<i>Poa pratensis</i>)	0.3	10
Mountain Brome (<i>Bromus marginatus</i>)	6.0	8
Slender Wheatgrass (<i>Elymustrachycaulus</i>)	6.0	18
Streambank Wheatgrass (<i>Elymus lanceolatus</i>)	3.0	12
Western Wheatgrass (<i>Agropyron smithii</i>)	3.0	8
Yarrow (<i>Achillea millefolium</i>)	0.2	19
Sweet Anise (<i>Osmorhiza occidentalis</i>)	2.0	6
Mountain Lupine (<i>Lupinus alpestris</i>)	4.0	1
Antelope Bitterbrush (<i>Purshia tridentata</i>)	1.0	0.5
Woods Rose (<i>Rosa woodssi</i>)	4.0	4
Mountain Snowberry (<i>Symphoricarpos oreophilus</i>)	4.0	5
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Total	36.5	101.5

Bare-root Stock - 50 of each species per acre

Narrowleaf Cottonwood (*Populus angustifolia*)
 Willow spp. (*Salix* spp) species endemic to area
 Red Osier Dogwood (*Cornus stolonifera*)

SEWAGE LAGOON & TOPSOIL STORAGE AREA FINAL SEED MIX

	Rate <u>(lbs/ac)</u>	<u>#pls/ft²</u>
Great Basin Wildrye (<i>Elymus cinereus</i>)	3.0	10
Indian Ricegrass (<i>Oryzopsis hymenoides</i>)	3.0	11
Thickspike Wheatgrass (<i>Elymus lanceolatus</i>)	4.0	14
Western Wheatgrass (<i>Agropyron smithii</i>)	4.0	10
Blue Grama (<i>Bouteloua gracilis</i>)	1.0	17
Northern Sweetvetch (<i>Hedysarus boreale</i>)	2.0	1
Annual Sunflower (<i>Helianthus annuus</i>)	1.0	2
Scarlett Globemallow (<i>Sphaeralcea coccinea</i>)	0.3	3
Utah Juniper (<i>Juniperus osteosperma</i>)	1.0	1
Wy. Big Sagebrush (<i>Artemisia tridentata wyomingensis</i>)	0.3	18
Black Sagebrush (<i>Artemisia nova</i>)	0.5	10
Shadscale (<i>Artiplex confertifolia</i>)	1.2	2
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Total	21.3	99

CENTRAL MINE FACILITIES AREA FINAL SEED MIX

	Rate (lbs/ac)	#pls/ft ²
Great Basin Wildrye (<i>Elymus cinereus</i>)	3.0	10
Indian Ricegrass (<i>Oryzopsis hymenoides</i>)	3.0	11
Slender Wheatgrass (<i>Elymustrachycaulus</i>)	3.0	9
Western Wheatgrass (<i>Agropyron smithii</i>)	3.0	8
Bluebunch Wheatgrass (<i>Agropyron spicatum</i>)	2.5	7
Northern Sweetvetch (<i>Hedysarus boreale</i>)	2.0	1
Prairie Sage (<i>Artemisia ludoviciana</i>)	0.25	14
Rocky Mountain Penstemon (<i>penstemon stictus</i>)	2.0	14
Blueleaf Aster (<i>Aster glaucodes</i>)	0.5	6
Mountain Big Sagebrush (<i>Artemisia tridentata</i> var. <i>vaseyana</i>)	0.3	18
Utah Serviceberry (<i>Amelanchier utahensis</i>)	4.0	4
Winterfat (<i>Eurotia lanata</i>)	4.0	12
Antelope Bitterbrush (<i>Purshia tridentata</i>)	6.0	3
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Total	33.55	117