

Project-Berthoud Pass

Date: 8/4/2014

Plot/Transect #	Original Seed Mix	1	2	3 1	3 2	4	5 1	5 2	6
Background/Off ROW		Background							
General Location		Old Stone Bridge First Terrace	Old Stone Bridge Across the Highway	Old Stone Bridges	Old Stone Bridges above Falls	MP 246 North Side of Road US 40	MP 247 Lower Hoop Creek	MP 247 East Side of Stream	MP 245.5 Floral Park
Top Canopy/Other Layers/ID from Transects									
Dominant Species #1	BRMA4	POCO	FEBRB	ANPA4	ROWO	POCO	POCO	FEBRB	TAOF
Dominant Species #2	ELLA3	FEBRB	POCO	HEFU3	FRVI	FEBRB	PHAL2	PHAL2	PHAL2
Dominant Species #3	ELTR7	PASM	ACMI2	FRVI	CIEA	TAOF	FEBRB	POPR	CAMI
Dominant Species #4	FEBRB	ACMI2	PHAL2	POCO	ELTR7	SAMO	TRHY	PEST2	FEBRB
Dominant Species #5	PASM	ELTR7	SYAS	BRMA4	CHFR3	PEST2			SYLA3
Dominant Species	PHAL2	CHANC		CAR02	CAREX	TRHY			BRMA4
Dominant Species	POCO				PIEN	PICO			SALIX
Dominant Species	LUAR3				HEFU3	BRMA4			ACMI2
Dominant Species	PEST2				ACMI2	PHAL2			AGGL
Dominant Species	HEMU				CAR09				FRVI
Dominant Species					ORPA				
Vegetative Stage of Dominant Sp		Flowering, seedlings and seeds	Flowering, seedlings and seeds	Flowering, seedlings and seeds	Flowering, seedlings and seeds	Flowering, seedlings and seeds	Flowering, seedlings and seeds	Flowering, seedlings and seeds	Flowering, seedlings and seeds
Total pounds seed/acre	55	55							
Total PLS/ acre	data not available	55							
Seeded Acres (native)	8	8							
Mulch Acres	2 tons/acre	2 tons/acre							
Mulch Tackifier	9000 lbs	9000 lbs							
Mulch Application (tons/acre)	2.00	30 lbs/acre							
Percent Seed Mix Species Hits/total plant hits	Mean = 29%	40%	20%	20%	10%	50%	30%	30%	30%

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Grazing (1-5)		1	2	3	4	3	4	4	3
Overall Health Value (1-5)		4	4	5	4	3	4	4	4
Noxious Weeds Observed		no weeds	LEVU	no weeds	no weeds	LIVU2	no weeds	CIAR4	CIAR4
Seed Mix Observed									
Observed Species		BRMA4	FEBRB	BRMA4	ELTR7	BRMA4	BRMA4	BRMA4	BRMA4
Observed Species		ELLA3	HEMU	LUAR3	BRMA4	ELLA3	FEBRB	FEBRB	FEBRB
Observed Species		ELTR7	LUAR3	PEST2		ELTR7	LUAR3	HEMU	HEMU
Observed Species		FEBRB	PEST2	POCO		FEBRB	PEST2	LUAR3	LUAR3
Observed Species		LUAR3	PHAL2			HEMU	PHAL2	PEST2	PEST2
Observed Species		PASM	POCO			LUAR3	POCO	PHAL2	PHAL2
Observed Species		PEST2				PASM	POTR	POCO	POCO
Observed Species		PHAL2				PEST2		POPR	
Observed Species		POCO				PHAL2			
Observed Species						POCO			
Native Plant Abundance (1-5)		3	4	5	5	3.5	3	4	5
Introduced Species:									
Non-Native Species		MEOF	TAOF	BRIN2	TAOF	TAOF	DAGL	DAGL	DAGL
Non-Native Species		TAOF	TRDU	TRPR		TRDU	TRDU	TAOF	TAOF
Non-Native Species		TRDU	TRHY			TRHY	TRHY	TRDU	TRHY
Non-Native Species			TRRE3					TRHY	
Native Species									
Native Species		ACMI2	ACMI2	ACMI2	ACMI2	AMCI2	ANRO	ACMI2	ACMI2
Native Species		ANPA4	ANRO	ANMA	ANPA4	BRMA4	CIEA	AGGL	AGGL
Native Species		ARCH3	EQAR	ANPA4	ARUV	FEBRB	EPCI	ANCO	ANPA
Native Species		CHANC	ERFO3	ANRO	BRCI2	HEVI4	FEBRB	ASTER	ANRO
Native Species		ELTR7	FEBRB	ARCO9	BRMA4	PEST2	PHAL2	BREU	ARCO9
Native Species		EPCI	FERU	BRMA4	CAREX	PHAL2	PIEN	CIEA	BRMA4
Native Species		FEBRB	MOSS	CAR02	CAR02	PICO	POCO	MECI3	CAMI
Native Species		HEVI4	PANE7	CHANC	CHANC	POCO	POTR	PIPU	CARH4
Native Species		LUAR3	PEVI3	EPCI3	CHFR3	SAMO		POPA	CASU
Native Species		MABI	PHAL2	EQAR	CIEA			POPR	DECE
Native Species		PASM	PICO	FRVI	ELTR7			POTR	DRABA
Native Species		POCO	POCO	GEBA	FRVI			ROWO	EPCI

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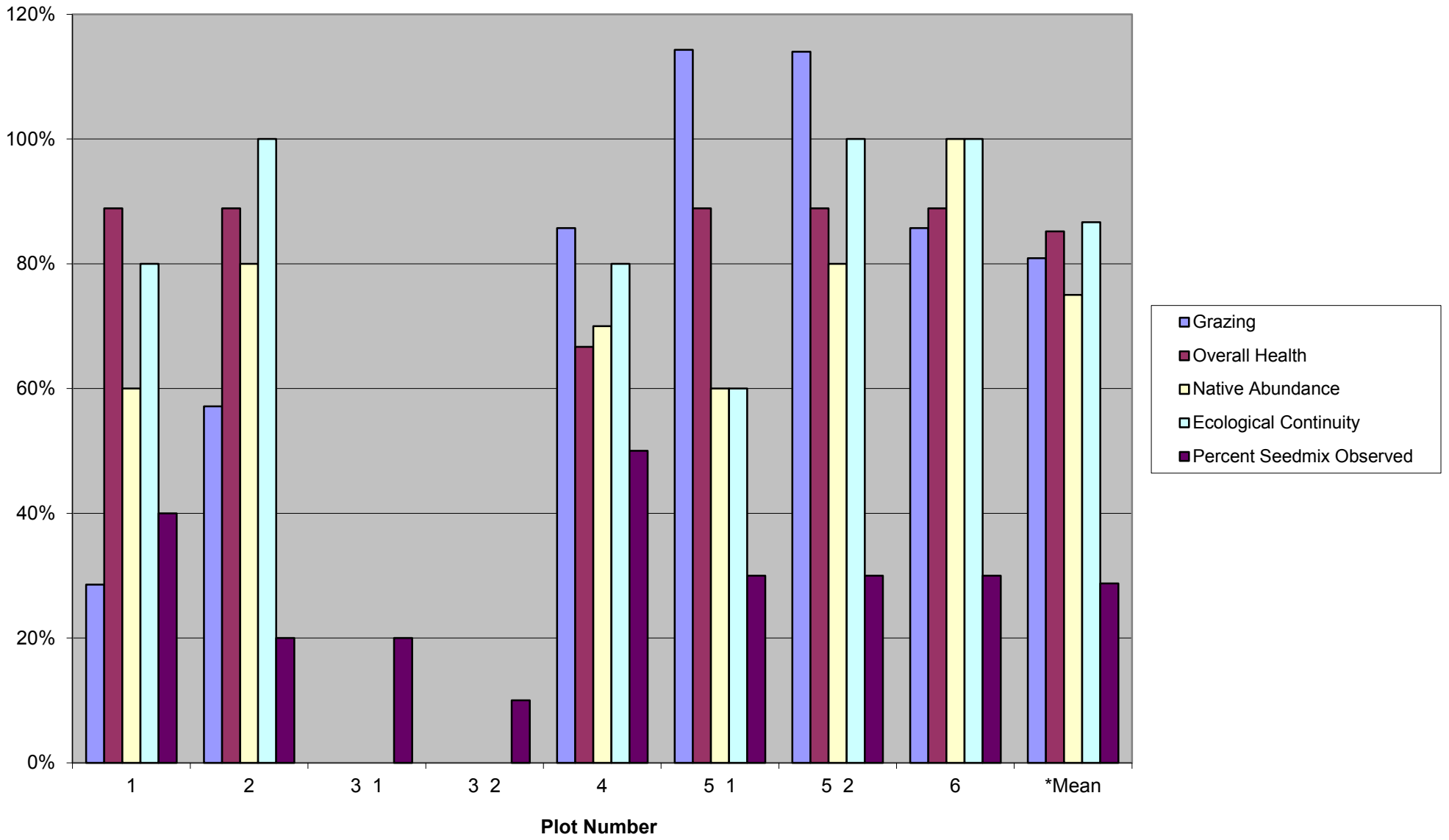
Native Species		RIIN2	POTR	HEFU3	HEFU3				FEBRB
Native Species		RUID	SADR	LUAR3	JUCO6				FRVI
Native Species		SADR	SALIX1	MUAS	ORPA				GEBA
Native Species		SAMO	SALIX2	ORPA	PICO				HATR
Native Species			SALIX3	OXSP	PIEN				JUARL
Native Species			SAMO	PEST2	PIPU				JUCO6
Native Species			SYAS	PLDI3	PODI				LOINI
Native Species				POCO	POPA				MECI3
Native Species				POPU6	POPU6				OXSP
Native Species				SADR	RIIN2				PEWH
Native Species				SIDRD	ROWO				PHAL2
Native Species					SIMO				PICO
Native Species					SOSI3				PIEN
Native Species					SYLA3				PIPU
Native Species									PODI
Native Species									POPR
Native Species									POPU6
Native Species									POTR
Native Species									PSME
Native Species									RUMEX
Native Species									SALIX
Native Species									SAMO
Native Species									SIDRD
Native Species									SOSI3
Native Species									SYLA3
Ecological Continuity Value (1-5)		4	5	5	5	4	3	5	5
Diversity		very good; good choice of seed mix	very good; excellent recruitment	very good	very good; Native habitat	Good	Good	very good; POTR Recruitment	exceptionally diverse
Topography		Terraced	wet area but not wetland	On slope	Steep slope	south facing slopes	Steep slopes; no topsoils	steep slope to south	parallel to road; LUSH VEG
		SW facing	SE facing	SE facing slope	SE facing	S facing	N facing	N facing	S facing

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Hydrology		stays wet with some areas well drained	well drained	very wet next to falls	well drained soils; steep slope	Well drained	Well drained	well drained, rocky	very wet, low area
	finished 2004								
Pecent Vegetation Cover									
Percent canopy (foliar) Cover		80%	80%	100%	100%	90%	60%	80%	100%
Percent Bare Ground		20%	10%	0%	0%	10%	20%	0%	0%
Percent Basal/Soil Surface Cover		20%	10%	40%	0%	40%	0%	0%	30%
Amendments							none		
Fertilizer (yes/no)	slurry	yes							
Biological nutrient organic based fertilizer (lbs/acre)	2000	2000 lbs/acre							
Humate (lbs/acre)	1000	1000 lbs/acre							
Compost (cys/acre)	slurry	not available							
Spray on organic amendments (lbs/acre)	slurry	not available							
Potassium (lbs/acre)	60	50 lbs/acre							
Soil Chemistry									
Soil pH		8.2/7.7	6.7/7.6	6.4/7.1		6.8/7.0	7	6.8/6.7	5.9
Soil EC		0.9/0.1	0.2/.1	0.4/0.3		0.1/0.2	0.2	0.1/0.5	
Surface Depth		3	2	4		6	4	4	5
Surface Color		2.5Y 4/3	2.5Y 4/3	10YR 3/3		10YR 4/3	10YR 5/3	2.5Y 5/4	10YR 3/3
Subsurface Color		2.5Y 5/4	2.5Y 5/3			2.5Y 4/4		10YR 4/4	10YR 3/3

*prioritized per lbs/ac Roadside Mix

Relative Health Evaluations



Summary Scores for Berthoud Pass

Plot	Reference	Canopy Cover	Bare Ground	Basal Cover	Grazing	Overall Health	Native Abundance	Ecological Continuity
1		80%	20%	20%	1	4	3	4
2		80%	10%	10%	2	4	4	5
3 1	Reference	100%	0%	40%	3	5	5	5
3 2	Reference	100%	0%	0%	4	4	5	5
4		90%	10%	40%	3	3	3.5	4
5 1		60%	20%	0%	4	4	3	3
5 2		80%	0%	0%	4	4	4	5
6		100%	0%	30%	3	4	5	5
*Mean		82%	10%	17%	2.8	3.8	3.8	4.3

*Excluding reference locations

1-low

5-high

Relative Health Evaluations

Plot	Grazing	Overall Health	Native Abundance	Ecological Continuity	Percent Seedmix Observed
1	29%	89%	60%	80%	40%
2	57%	89%	80%	100%	20%
3 1					20%
3 2					10%
4	86%	67%	70%	80%	50%
5 1	114%	89%	60%	60%	30%
5 2	114%	89%	80%	100%	30%
6	86%	89%	100%	100%	30%
*Mean	81%	85%	75%	87%	29%

Berthoud TerraLogic for CDOT
USDA Codes for Plants

Seed Mix Species			
Latin Name	Code	Common Name	Notes
Seed Mix Species			
<i>Bromus marginatus</i>	BRMA4	mountain brome	very ciliate on lvs, glumes, lemmas
<i>Elymus lanceolatus ssp riparium 'Sodar'</i>	ELLA3	thickspike wheatgrass	bluish & resembles THIN6
<i>Elymus trachycaulus ssp trachycaulus 'Revenue'</i>	ELTR7	slender wheatgrass	glumes as long as entire spikelet
<i>Festuca ovina (F brachyphylla ssp brachyphylla)</i>	FEFRB	alpine fescue	>1 floret; awned 2mm; hairy lemma; stalk can sometimes look 1 sided
<i>Pascopyrum smithii</i>	PASM	western wheatgrass	bluish & resembles THIN; short glumes
<i>Phleum alpina</i>	PHAL2	alpine timothy	heads < 4 cm; bulbed culms where attach to stem
<i>Poa compressa</i>	POCO	Canada bluegrass	flattened bunchy spikelets; dense panicle
<i>Lupinus argenteus</i>	LUAR3	silvery lupine	whorled leaves; purple-blue raceme; fine silver hairs
<i>Penstemon strictus v 'Bandera'</i>	PEST2	Rocky Mtn penstemon	anther hairs > anther sacs
<i>Viguiera multiflora</i>	HEMU	showy goldeneye	syn: Heliomeris multiflora; opposite, lanceolate, entire leaves
Plants Installed			
<i>Juniperus communis</i>	JUCO6	common juniper	only prostrate juniper
<i>Ribes cereum</i>	RICE	wax currant	pink tubular flwrs; serrated 3 lobed clustered lvs; black twigs
<i>Ribes montigenum</i>	RIMO2	alpine prickly currant	nodal spines & internodal prickles; hypanthium glandular; berries red
<i>Rosa woodsii</i>	ROWO	Woods rose	prickly & thorns; woody base
Weeds			
<i>Cirsium arvense</i>	CIAR4	Canada thistle	many heads; involucre of curved red spines
<i>Leucanthemum vulgare</i>	LEVU	oxeye daisy	white daisy; pointed, serrated, lanceolate leaves
<i>Linaria vulgaris</i>	LIVU2	butter and eggs; toadflax	alternate linear lvs; yellow with dark yellow hood over keel
Introduced			

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<i>Bromus inermis</i>	BRIN2	smooth brome	W, M; sandpapery; I-introduced
<i>Dactylis glomerata</i>	DAGL	orchard grass	chimney brush; ligule uneven light grn ragged; introduced
<i>Melilotus officinale</i>	MEOF	sweet clover	yellow, tall, thin clover
<i>Poa pratensis</i>	POPR	Kentucky bluegrass	rhizomes; wetter area
<i>Taraxacum officinale</i>	TAOF	dandelion	
<i>Thlaspi arvense</i>	THAR5	field pennycress	annual stinkweed; white flwrs; petioled basal lvs wilt early
<i>Tragopogon dubius</i>	TRDU	yellow salsify	green sepals > petals; alternate gray-grn entire lvs
<i>Trifolium hybridum</i>	TRHY	Alsike clover	no drought; flw smaller; introduced
<i>Trifolium pratense</i>	TRPR3	red clover	alien; scapose; papery involucre; leaves subtending 1 flower
<i>Trifolium repens</i>	TRRE3	white clover	alien; tall > 1 dm; no leaf-bracts; scapose; white mark on lvs
Graminoids			
<i>Bromus ciliatus</i>	BRCI2	fringed brome	hangs down; hairy, ciliate side of spikes
<i>Carex</i>	CAREX	sedge	edges; wetlands
<i>Carex microptera</i>	CAMI	smallwing sedge	brown scales
<i>Deschampsia cespitosa</i>	DECE	tufted hair grass	wet; ONE awn, tuft of long hairs at base of lemma; open panicle
<i>Juncus arcticus ssp littoralis</i>	JUARL	mountain rush	star flwrs; clusters mid-stem
<i>Koeleria macrantha</i>	KOMA	prairie June grass	2 florets/spike/shiny, glume long; boat tips; tufted; awnless
<i>Muhlenbergia asperifolia</i>	MUAS	scratchgrass	rhizomatous, 1 floret
<i>Poa cusickii</i>	POCU3	Cusick's bluegrass	new shoots filiform; culm leaves flat, 2 mm; cobwebby tuft of hairs base of lemma; 2+ floret /spike; glumes short
<i>Poa palustris</i>	POPA2	fowl bluegrass	<2mm florets; 2-6 pedicled spikes; ciliate lemma; glumes equal
Forbs			
<i>Achillea millefolium</i>	ACMI2	common yarrow	rounded umbel head
<i>Agoseris glauca</i>	AGGL	agoseris; false dandelion	yellow & all ray flwrs; lvs not wavy; long entire with pale midrib
<i>Anaphalis margaritacea</i>	ANMA	western pearly everlasting	aster dull white flwrs
<i>Antennaria corymbosa</i>	ANCO	falt-top pussytoes	black dots on dull white involucre
<i>Antennaria parvifolia</i>	ANPA4	small-leaf pussytoes	tall, white, many heads, mat

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<i>Antennaria rosea</i>	ANRO	rosy pussytoes	very pink; not just a little
<i>Arnica chamissonis</i>	ARCH3	Chamisso arnica	yellow flwrs, opposite lvs; coarse hairy
<i>Arnica cordifolia</i>	ARCO9	heartleaf arnica	shady; lg yellow single flwr; op lvs, unevenly toothed, serrated
<i>Brickellia eupatorioides</i>	BREU	false boneset	no rays; off-white flowers; lvs sparse
<i>Campanula rotundifolia</i>	CARO2	bluebell bellflower	6-10 in tall; blue bells, 1-4; thin stalked, tiny lvs on stem
<i>Castilleja rhexifolia</i>	CARH4	rosey paintbrush	rosy color; bracts entire, very shallowly lobed
<i>Castilleja sulphurea</i>	CASU12	sulphur Indian paintbrush	yellow to white paintbrush
<i>Chamerion angustifolium</i>	CHANC	fireweed	thin, entire, lanceolate, alternate, raised vein leaf
<i>Chenopodium fremontii</i>	CHFR3	Fremont's goosefoor	simple below, branching above; seeds 1mm; triangular lvs
<i>Cirsium eatonii</i>	CIEA	Eaton's thistle	off-white heads
<i>Draba species</i>	DRABA	draba	tiny 4 petaled yellow flwrs
<i>Epilobium ciliatum</i>	EPCI	fringed willowherb	long ridged siliques; branched; perennial
<i>Equisetum arvense</i>	EQAR	scouring rush, horsetail	wet; whorled long needle-like lvs
<i>Erigeron formosissimus</i>	ERFO3	beautiful fleabane	
<i>Fragaria virginiana</i>	FRVI	Virginia strawberry	tip of serrate lvs < two on either side
<i>Gastrolychnis drummondii</i>	SIDRD	Drummond's champion	erect, slender, hairy, magenta veined sepal tube; tiny op lvs
<i>Gentianopsis barbellata</i>	GEBA	perennial fringed gentian	blue flwrs; fringed corolla
<i>Harbouria trachypleura</i>	HATR	whiskbroom parsley	fine, linear lvs; yellow carrot flwr
<i>Heterotheca fulcrata</i>	HEFU3	rockscree false golddeaster	soft appressed hairs, no glandular; scruffy, almost wavy lvs
<i>Heterotheca villosa</i>	HEVI4	hairy false goldenaster	hairy, sticky though soft
<i>Machaeranthera bigelovii</i>	MABI	Bigelow's tansyaster	recurved leaf-like involucre; purple ray flwrs; very glandular
<i>Mertensia ciliata</i>	MECI3	tall, fringed bluebells	wet; bigger taller plant
<i>Oreochrysum parryi</i>	ORPA	Parry's goldenrod	pappus capillary bristles; involucre broad herbaceous tip;
<i>Oxytropis splendens</i>	OXSP	showy locoweed	pink-purple beaked pea flwrs; hairy pinnate lvs
<i>Packera neomexicana</i>	PANE7	New Mexico groundsel	cauline lvs sub-entire or dentate, oblanceolate, pubescent; stems clustered
<i>Penstemon virens</i>	PEVI3	Front Range beardtongue	dry; ground cover; shorter; entire, almost basal, alternate lvs

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<i>Penstemon whippleanus</i>	PEWH	Whipple's penstemon	wine or white colored flwrs; lvs broadly lanceolate
<i>Platanthera dilatata</i>	PLDI3	white bog orchid	white flwrs; monocot; alternate lvs; round stem
<i>Potentilla diversifolia</i>	PODI2	varileaf cinquefoil	leaflets glaucous toothed -lobed, upper 1/2; >2dm; digitate
<i>Potentilla pulcherrima</i>	POPU6	beautiful	kidney-bean, copper seeds
<i>Rumex sp.</i>	RUMEX	dock	
<i>Solidago simplex</i>	SOSI3	Mt Albert's goldenrod	not 1-sided; rounded globe head; elliptic, top half shallow lobed
<i>Symphotrichum laeve</i>	SYLA3	smooth blue aster	white-blue; glabrous except short lines of hairs on flwr; lvs glaucous entire or toothed
Shrubs & Trees			
<i>Arctostaphylos uva-ursi</i>	ARUV	kinnikinnick	groundcover with shiny, penny-size oblong leaves
<i>Juniperus communis</i>	JUCO6	common juniper	ground cover;
<i>Lonicera involucrata</i>	LOINI	twinberry honeysuckle	opposite entire shiny lvs; twin flwrs; red maple bracts
<i>Picea engelmannii</i>	PIEN	Engelmann spruce	tips of cone toothed, notched, pointed; not as sharp to touch as blue spruce
<i>Pinus contorta</i>	PICO	lodgepole pine	needle bundles 2; 4-8cm needles; 3-7 cm cones
<i>Pinus ponderosa</i>	PIPO	Ponderosa pine	3 lvs 4-9 in; cone w/ sharp pointed
<i>Populus tremuloides</i>	POTR	quaking aspen	round, heart shaped leaves
<i>Pseudotsuga menziesii</i>	PSME	Douglas fir	needles flat, 'furry'; cones with 3 pronged bracts
<i>Ribes inerme</i>	RIIN2	whitestem gooseberry	prickles; green-white flwr; can be droopy cluster
<i>Salix sp</i>	SALIX 1	willow	
<i>Salix sp</i>	SALIX 2	willow	
<i>Salix sp</i>	SALIX 3	willow	
<i>Salix monticola</i>	SAMO2	park willow	wet; lvs serrate, elliptic, sub-acute, yellowish-green; tall, bushy
<i>Salix drummondiana</i>	SADR	Drummond's	leaves alternate
<i>Thermopsis divaricarpa</i>	THDI	golden banner	bright yellow pea flowers
<i>Trifolium pratense</i>	TRPR3	red clover	alien; scapose; papery involucre; leaves subtending 1 flower

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<i>Trifolium repens</i>	TRRE3	white clover	alien; tall > 1 dm; no leaf-bracts; scapose; white mark on lvs
Shrubs & Trees			
<i>Arctostaphylos uva-ursi</i>	ARUV	kinnikinnick	groundcover with shiny, penny-size oblong leaves
<i>Jamesia americana</i>	JAAM	5 petal cliffbrush	white to pink flwrs, opposite, serrated leathery lvs
<i>Lonicera involucrata</i>	LOIN1	twinberry honeysuckle	opposite entire shiny lvs; twin flwrs; red maple bracts
<i>Picea pungens</i>	PIPU	blue spruce	stiff; hurts; new blue
<i>Pinus ponderosa</i>	PIPO	Ponderosa pine	3 lvs 4-9 in; cone w/ sharp pointed
<i>Pseudotsuga menziesii</i>	PSME	Douglas fir	needles flat, 'furry'; cones with 3 pronged bracts
<i>Ribes inerme</i>	RIIN2	whitestem gooseberry	prickles; green-white flwr; can be droopy cluster
<i>Rubus idaeus</i>	RUID	wild raspberry	prickles regular; pinnate serrate lvs; pitted seeds
<i>Salix monticola</i>	SAMO2	park willow	wet; lvs serrate, elliptic, sub-acute, yellowish-green; tall, bushy
<i>Salix drummondiana</i>	SADR	Drummond's	wet; pruinose current year; twigs not red; leaves alternate
<i>Sambucus racemosa</i>	SARA2	red elderberry	balled white racemose; large pinnate lvs