

Range Creek Upland Monitoring Report

Summary of Data Collected in 2011 and 2013

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Purpose

Monitoring transects were established in summer 2011 to collect baseline vegetation/ground cover data in the upland areas of Range Creek Canyon. The need for these data became apparent in spring 2011, as plans were developed to reintroduce livestock grazing to the canyon and to implement vegetation treatments to reduce wildfire potential. We planned to collect data every year for the first 3-5 years that livestock grazed the canyon, and every 5 years thereafter.

In summer 2012, approximately 850 acres of the canyon burned in the Lighthouse Fire. The fire burned large portions of the Calf Canyon and Cherry Meadow pastures that were primarily dominated by thick stands of basin big sagebrush (*Artemisia tridentata* ssp. *tridentata*) with an understory of cheatgrass (*Bromus tectorum*). The entire area of the fire was sprayed with Plateau® herbicide mixed with methylated seed oil adjuvant at a rate of 6 oz/acre to suppress cheatgrass germination. It was seeded by drill, ATV harrow, and hand using slightly different seed mixes on BLM and SITLA lands (see Appendix C for seed mixes). We revisited the canyon in summer 2013 to collect data on our existing monitoring transects that burned and were drill seeded, and established an additional 4 transects to capture the results of the other 2 seeding methods.

Methods

Thirteen 100-m transects were established throughout the canyon in areas with homogenous vegetation, or in areas that burned in the Lighthouse Fire. A landscape photo was taken at the starting point of each transect. A 1-m² quadrat was then placed along the transect every 10 meters. Percent cover values for vegetation by species, litter, rock, pavement, cryptobiotic crust, and bare ground were recorded in each quadrat, along with mean perennial grass height. Presence and species of wildlife pellets were noted. Additionally, photo points were established in 2 wet meadow locations. At least 2 monitoring points were placed in each of the five pastures in the canyon. Nine points were located on SITLA land that is leased to the University of Utah, 5 were located on BLM land, and 1 was located on private land. In the area that burned in the Lighthouse Fire, 4 transects were drill seeded, 2 were seeded using an ATV harrow, and 2 were seeded by hand.

Results

2011

Six transects (2, 3, 4, 5, 6, and 11) were located in areas dominated by basin big sagebrush. Mean sagebrush cover along these transects was 28% (range = 18 - 39). The understory was dominated by grasses. Four transects (3, 4, 6, and 11) were dominated by cheatgrass, with a mean cover value of 24% (range = 16 - 29). One transect (2) was dominated by perennial grasses, with a mean cover value of 28%. Common perennial grasses in these areas include Kentucky bluegrass (*Poa pratensis*), crested wheatgrass (*Agropyron cristatum*), slender wheatgrass (*Elymus trachycaulus*), sand dropseed (*Sporobolus cryptandrus*), and needle and thread (*Hesperostipa comata*). Mean perennial grass height was 14 inches (range = 9 - 19). Mean forb cover was 6%. Common forbs in these areas include white sagebrush (*Artemisia ludoviciana*), common dandelion (*Taraxacum officinale*), prickly lettuce (*Lactuca serriola*), Fremont's goosefoot (*Chenopodium fremontii*), and cryptantha (*Cryptantha* sp.). Ground cover was dominated by litter, with a mean cover value of 62% (range = 48 - 72). Mean bare ground cover was 5% (range = 0 - 12).

Two transects (7 and 8) were located in pastures dominated by perennial grasses, mostly tall wheatgrass (*Thinopyrum ponticum*). Mean perennial grass cover along these transects was 57% (range = 47 - 68). Mean perennial grass height was 27 inches (range = 27 - 27). Mean forb cover was 11% (range = 9 - 14), and consisted

of perennial species such as alfalfa (*Medicago sativa*) and field bindweed (*Convolvulus arvensis*). Ground cover was dominated by litter, with a mean cover value of 35% (range = 23 - 48). Mean bare ground cover was 6% (range = 5 - 7).

One transect (9) was located in an area that burned in 2007 and was dominated by grasses. Mean basin big sagebrush cover was 13%. Western wheatgrass (*Pascopyrum smithii*) was the dominant perennial grass species, with a mean cover value of 19% and a mean height of 18 inches. Cheatgrass was the most abundant species with a mean cover value of 35%. Mean forb cover was 1% and consisted of mostly annual species. Mean litter cover was 50%, and mean bare ground cover was 5%.

Wildlife species present, based on pellets noted along all transects in 2011, include elk, mule deer, moose, and rabbit.

2013

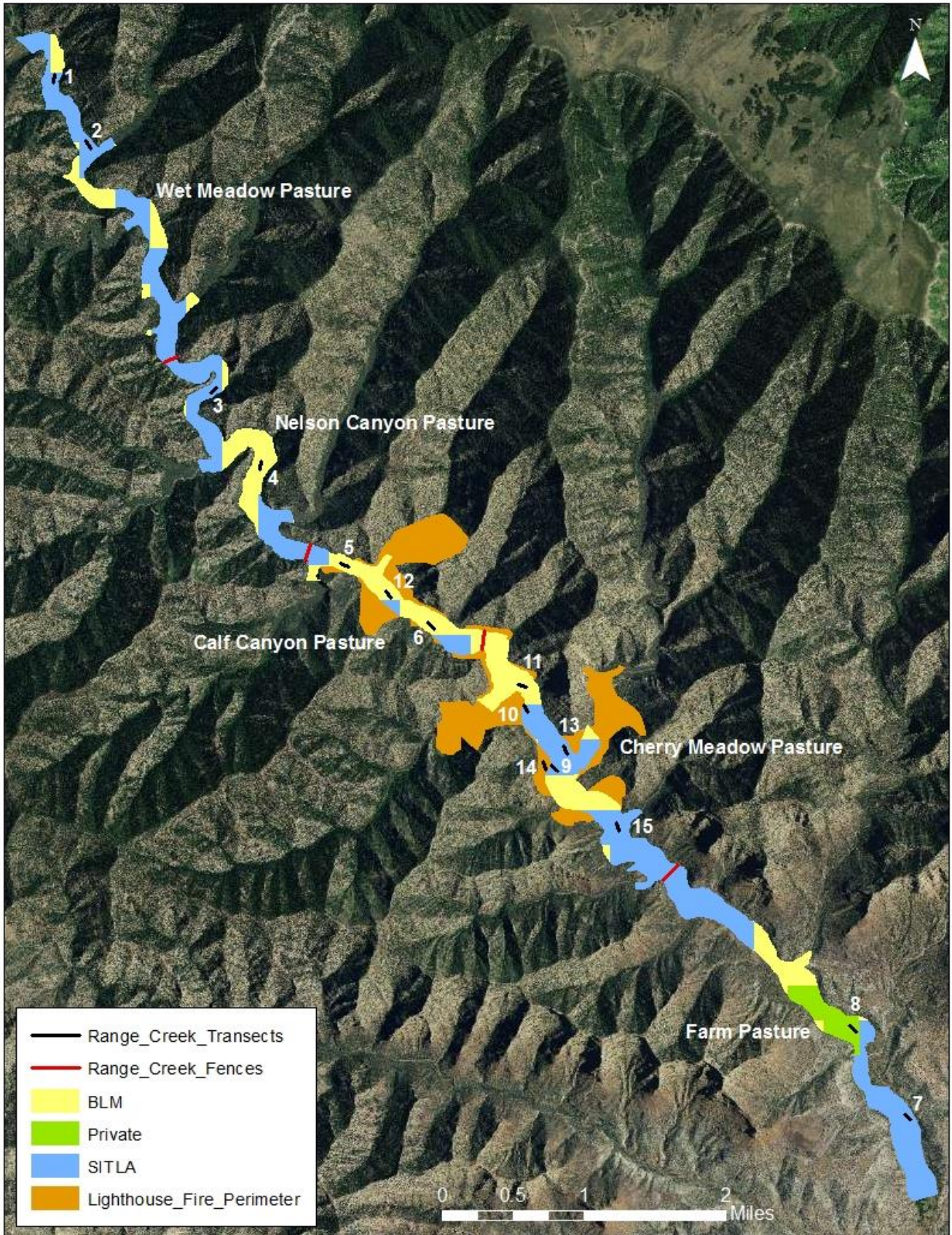
Four of the transects established in 2011 burned in the Lighthouse Fire and were drill seeded. Three of these transects (5, 6, and 11) were dominated by basin big sagebrush before the fire, and mean sagebrush cover was reduced from 31% (range = 23 - 39) to 0%. Mean perennial grass cover was less than 5% in 2011 and less than 1% in 2013. Mean cheatgrass cover decreased from 19% (range = 6 - 27) to 0%. Mean perennial forb cover decreased from 3% (range = 0 - 7) to less than 1% (range = 0 - 1). Ground cover consisted mostly of pavement after the fire, and bare ground averaged 56%.

The fourth existing transect (9) that burned in 2012 also burned in 2007, and was dominated by grasses before the Lighthouse Fire. Mean basin big sagebrush cover decreased from 13% to 0%. Western wheatgrass was the dominant perennial grass species, and its mean cover value was 19% in 2011 and 6% in 2013. Mean cheatgrass cover decreased from 35% to less than 1%. Mean forb cover remained at 1%, but consisted mostly of alfalfa in 2013 as opposed to annual species in 2011. Mean litter cover was 25% and mean bare ground cover was 68% in 2013.

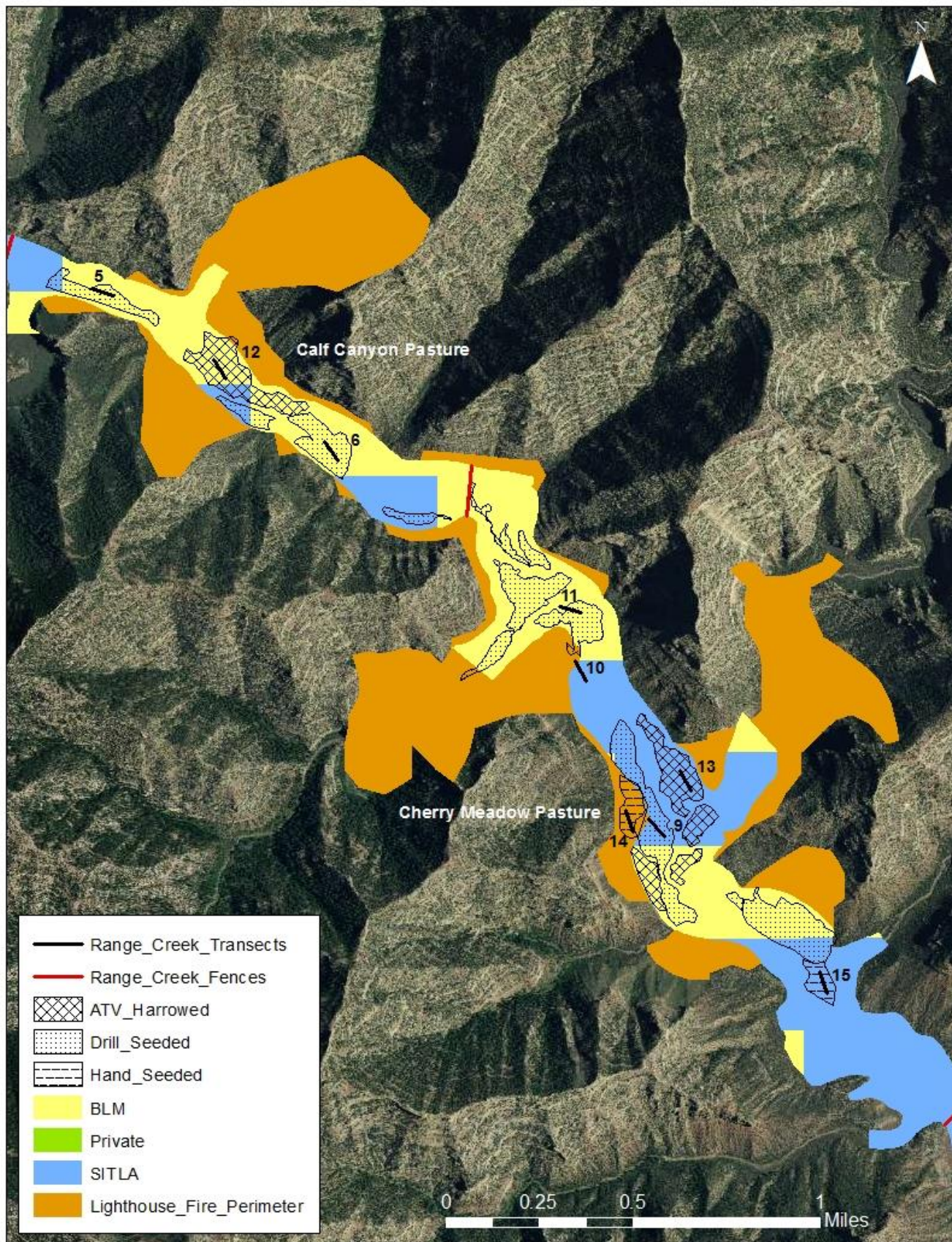
Four additional transects were established in 2013 to monitor the results of the ATV harrow and hand seedings. Two of these transects (12 and 15) appear to be in areas that were dominated by thick sagebrush, and were left barren after the fire in 2012. The other two transects (13 and 14) seemed to be burned in 2007 as well as 2012, and had more of an established vegetative cover. These areas had a mean shrub cover of 3% (range = 1 - 6) and a mean grass cover of 7% (range = 7 - 8). The understory along one of these transects consisted of mostly perennial grasses with a mean cover value of 7%, while the other had 2% perennial grass cover, 5% cheatgrass cover, and 7% perennial forb cover. Mean litter cover was 62% (range = 49 - 76), and mean bare ground cover was 15% (range = 15 - 15).

Wildlife species present, based on pellets noted along all transects sampled in 2013, include elk, mule deer, and rabbit.

APPENDIX A - RANGE CREEK UPLAND MONITORING SITES



APPENDIX B – LIGHTHOUSE FIRE TREATMENTS AND MONITORING SITES



APPENDIX C – LIGHTHOUSE FIRE SEED MIXES

BLM

Common Name	Scientific Name	Variety
SHRUB		
Antelope bitterbrush	<i>Purshia tridentata</i>	
Basin big sagebrush	<i>Artemisia tridentata</i> ssp. <i>tridentata</i>	
Fourwing saltbush	<i>Atriplex canescens</i>	
Winterfat	<i>Krascheninnikovia lanata</i>	
GRASS		
Basin wildrye	<i>Leymus cinereus</i>	Magnar
Bluebunch wheatgrass	<i>Pseudoroegneria spicata</i>	Anatone
Indian ricegrass	<i>Achnatherum hymenoides</i>	Rimrock
Indian ricegrass	<i>Achnatherum hymenoides</i>	Paloma
Needle and thread	<i>Hesperostipa comata</i>	
Sandberg bluegrass	<i>Poa secunda</i>	Upper CO
Thickspike wheatgrass	<i>Elymus lanceolatus</i>	Critana
Western wheatgrass	<i>Pascopyrum smithii</i>	Arriba
FORB		
Blue flax	<i>Linum perenne</i>	Maple Grove
Western yarrow	<i>Achillea millefolium</i>	

SITLA

Common Name	Scientific Name	Variety
SHRUB		
Antelope bitterbrush	<i>Purshia tridentata</i>	
Basin big sagebrush	<i>Artemisia tridentata</i> ssp. <i>tridentata</i>	
Forage kochia	<i>Bassia prostrata</i>	
Fourwing saltbush	<i>Atriplex canescens</i>	
GRASS		
Basin wildrye	<i>Leymus cinereus</i>	
Crested wheatgrass	<i>Agropyrum cristatum</i>	Hycrest
Crested wheatgrass	<i>Agropyrum cristatum</i>	Nordan
Indian ricegrass	<i>Achnatherum hymenoides</i>	Rimrock
Western wheatgrass	<i>Pascopyrum smithii</i>	
FORB		
Alfalfa	<i>Medicago sativa</i>	
Blue flax	<i>Linum perenne</i>	
Sainfoin	<i>Onobrychis viciifolia</i>	
Scarlet globemallow	<i>Sphaeralcea coccinea</i>	
Small burnet	<i>Sanguisorba minor</i>	
Western yarrow	<i>Achillea millefolium</i>	

APPENDIX D - RANGE CREEK SPECIES LISTS

2011

Symbol	Scientific Name	National Common Name	Symbol	Scientific Name	National Common Name
SHRUB			FORB		
ACNE2	<i>Acer negundo</i>	boxelder	AGGL	<i>Agoseris glauca</i>	pale agoseris
ARTRT	<i>Artemisia tridentata</i> ssp. <i>tridentata</i>	basin big sagebrush	ALAL3	<i>Alyssum alyssoides</i>	pale madwort
ATCA2	<i>Atriplex canescens</i>	fourwing saltbush	ARABI2	<i>Arabis</i> sp.	rockcross
CHVI8	<i>Chrysothamnus viscidiflorus</i>	yellow rabbitbrush	ARDR4	<i>Artemisia dracunculus</i>	tarragon
ERNA10	<i>Ericameria nauseosa</i>	rubber rabbitbrush	ARLU	<i>Artemisia ludoviciana</i>	white sagebrush
JUOS	<i>Juniperus osteosperma</i>	Utah juniper	ASTER	<i>Aster</i> sp.	aster
OPUNT	<i>Opuntia</i> sp.	pricklypear	ASTRA	<i>Astragalus</i> sp.	milkvetch
RHTR	<i>Rhus trilobata</i>	skunkbush sumac	CETE5	<i>Ceratocephala testiculata</i>	curvseed butterwort
ROWO	<i>Rosa woodsii</i>	Woods' rose	CHFR3	<i>Chenopodium fremontii</i>	Fremont's goosefoot
SALIX	<i>Salix</i> sp.	willow	CHTE2	<i>Chorispora tenella</i>	crossflower
GRASS			CIIN	<i>Cichorium intybus</i>	chicory
AGCR	<i>Agropyron cristatum</i>	crested wheatgrass	CIRSI	<i>Cirsium</i> sp.	thistle
BOGR2	<i>Bouteloua gracilis</i>	blue grama	COAR4	<i>Convolvulus arvensis</i>	field bindweed
BRTE	<i>Bromus tectorum</i>	cheatgrass	COPA3	<i>Collinsia parviflora</i>	maiden blue eyed Mary
ELEL5	<i>Elymus elymoides</i>	squirreltail	CRYPT	<i>Cryptantha</i> sp.	cryptantha
ELTR7	<i>Elymus trachycaulus</i>	slender wheatgrass	CYOF	<i>Cynoglossum officinale</i>	gypsyflower
HECO26	<i>Hesperostipa comata</i>	needle and thread	DEPI	<i>Descurainia pinnata</i>	western tansymustard
LECI4	<i>Leymus cinereus</i>	basin wildrye	DRABA	<i>Draba</i> sp.	draba
PASM	<i>Pascopyrum smithii</i>	western wheatgrass	EPILO	<i>Epilobium</i> sp.	willowherb
POFE	<i>Poa fendleriana</i>	muttongrass	EQUIS	<i>Equisetum</i> sp.	horsetail
POPR	<i>Poa pratensis</i>	Kentucky bluegrass	ERIGE2	<i>Erigeron</i> sp.	fleabane
PSJU3	<i>Psathyrostachys juncea</i>	Russian wildrye	GARA2	<i>Gayophytum ramosissimum</i>	pinyon groundsmoke
SPCR	<i>Sporobolus cryptandrus</i>	sand dropseed	GILIA	<i>Gilia</i> sp.	gilia
THIN6	<i>Thinopyrum intermedium</i>	intermediate wheatgrass	LAOC3	<i>Lappula occidentalis</i>	flatspine stickseed
THPO7	<i>Thinopyrum ponticum</i>	tall wheatgrass	LASE	<i>Lactuca serriola</i>	prickly lettuce
			MACHA	<i>Machaeranthera</i> sp.	tansyaster
			MEOF	<i>Melilotus officinalis</i>	sweetclover
			MESA	<i>Medicago sativa</i>	alfalfa
			OEPA	<i>Oenothera pallida</i>	pale evening primrose
			PAMU11	<i>Packera multilobata</i>	lobeleaf groundsel
			PHHEF	<i>Physalis hederifolia</i> var. <i>fendleri</i>	Fendler's groundcherry
			RUCR	<i>Rumex crispus</i>	curly dock
			SCLI	<i>Schoenocrambe linifolia</i>	flaxleaf plainsmustard
			SIAL2	<i>Sisymbrium altissimum</i>	tall tumbledustard
			SPGR2	<i>Sphaeralcea grossulariifolia</i>	gooseberryleaf globemallow
			TAOF	<i>Taraxacum officinale</i>	common dandelion
			TRDU	<i>Tragopogon dubius</i>	yellow salsify
			VETH	<i>Verbascum thapsus</i>	common mullein
			VIAM	<i>Vicia americana</i>	American vetch

2013

Symbol	Scientific Name	National Common Name	Symbol	Scientific Name	National Common Name
SHRUB			FORB		
ARTRT	<i>Artemisia tridentata</i> ssp. <i>tridentata</i>	basin big sagebrush	ARLU	<i>Artemisia ludoviciana</i>	white sagebrush
ATCA2	<i>Atriplex canescens</i>	fourwing saltbush	EUPHO	<i>Euphorbia</i> sp.	spurge
BAPR5	<i>Bassia prostrata</i>	forage kochia	FRAL5	<i>Frasera albomarginata</i>	desert frasera
GRASS			GRSQ	<i>Grindelia squarrosa</i>	curlycup gumweed
ACHY	<i>Achnatherum hymenoides</i>	Indian ricegrass	LAOC3	<i>Lappula occidentalis</i>	flatspine stickseed
AGCR	<i>Agropyron cristatum</i>	crested wheatgrass	LASE	<i>Lactuca serriola</i>	prickly lettuce
BRTE	<i>Bromus tectorum</i>	cheatgrass	MESA	<i>Medicago sativa</i>	alfalfa
HECO26	<i>Hesperostipa comata</i>	needle and thread	PENST	<i>Penstemon</i> sp.	beardtongue
LECI4	<i>Leymus cinereus</i>	basin wildrye	SPCO	<i>Sphaeralcea coccinea</i>	scarlet globemallow
PASM	<i>Pascopyrum smithii</i>	western wheatgrass			
SPCR	<i>Sporobolus cryptandrus</i>	sand dropseed			
THIN6	<i>Thinopyrum intermedium</i>	intermediate wheatgrass			

APPENDIX E - RANGE CREEK BASIC COVER SUMMARIES 2011

VEGETATION TYPE: ARTRT

	Shrub % Cover	ARTRT % Cover	Grass % Cover	Perennial Grass % Cover	Perennial Grass Mean Ht (in)	Annual Grass % Cover	Forb % Cover	Perennial Forb % Cover	Annual Forb % Cover	Litter % Cover	Rock % Cover	Pavement % Cover	Cryptogam % Cover	Bare Ground % Cover
Transect 2	21.8	18.4	30.3	27.9	14.0	2.4	7.7	6.4	1.3	65.0	2.9	0.3	0.3	3.4
Transect 3	29.0	24.0	29.2	13.2	19.0	16.0	8.4	2.6	5.8	62.5	0.5	0.1	0.3	1.8
Transect 4	35.2	34.0	35.0	6.0	13.2	29.0	7.7	2.3	5.4	67.0	1.0	0.3	0.1	0.0
Transect 5	42.0	39.0	9.9	4.3	12.2	5.6	7.7	6.6	1.1	47.5	9.2	3.5	3.7	12.2
Transect 6	23.0	23.0	26.6	0.1	9.0	26.5	1.9	1.3	0.6	57.5	6.0	0.3	6.7	5.8
Transect 11	31.8	31.2	23.5	0.0	N/A	23.5	0.7	0.2	0.5	72.0	0.2	0.1	2.2	4.5
Mean	30.5	28.3	25.8	8.6	13.5	17.2	5.7	3.2	2.5	61.9	3.3	0.8	2.2	4.6

VEGETATION TYPE: PERENNIAL GRASS

	Shrub % Cover	Grass % Cover	Perennial Grass % Cover	Perennial Grass Mean Ht (in)	Annual Grass % Cover	Forb % Cover	Perennial Forb % Cover	Annual Forb % Cover	Litter % Cover	Rock % Cover	Pavement % Cover	Cryptogam % Cover	Bare Ground % Cover
Transect 7	0.0	68.2	68.1	26.5	0.1	14.0	14.0	0.0	22.5	0.0	0.0	0.0	5.2
Transect 8	0.0	46.7	46.5	27.2	0.2	8.6	8.6	0.0	48.0	0.0	0.1	0.0	7.4
Mean	0.0	57.5	57.3	26.9	0.2	11.3	11.3	0.0	35.3	0.0	0.1	0.0	6.3

VEGETATION TYPE: ARTRT/PERENNIAL GRASS (BURN)

	Shrub % Cover	Grass % Cover	Perennial Grass % Cover	Perennial Grass Mean Ht (in)	Annual Grass % Cover	Forb % Cover	Perennial Forb % Cover	Annual Forb % Cover	Litter % Cover	Rock % Cover	Pavement % Cover	Cryptogam % Cover	Bare Ground % Cover
Transect 9	13.2	54.1	19.0	18.1	35.1	1.1	0.1	1.0	50.0	0.3	0.3	0.0	4.6

	BLM
	State
	Private

2013

VEGETATION TYPE: BURN/SEEDING

	Shrub % Cover	ARTRT % Cover	Grass % Cover	Perennial Grass % Cover	Perennial Grass Mean Ht (in)	Annual Grass % Cover	Forb % Cover	Perennial Forb % Cover	Annual Forb % Cover	Litter % Cover	Rock % Cover	Pavement % Cover	Cryptogam % Cover	Bare Ground % Cover	Seeding Type
Transect 5	0.0	0.0	0.4	0.4	2.3	0.0	0.1	0.1	0.0	9.8	7.9	17.5	6.7	57.6	Drill
Transect 6	0.0	0.0	0.1	0.1	5.0	0.0	0.0	0.0	0.0	2.9	0.4	37.0	0.0	59.6	Drill
Transect 9	0.0	0.0	6.7	6.3	6.5	0.4	1.2	1.2	0.0	25.3	0.0	0.3	0.0	67.5	Drill
Transect 11	0.0	0.0	0.0	0.0	N/A	0.0	0.0	0.0	0.0	4.8	1.0	44.2	0.3	49.7	Drill
Transect 12	0.0	0.0	0.0	0.0	N/A	0.0	0.0	0.0	0.0	5.4	3.0	64.6	0.0	27.0	ATV Harrow
Transect 13	1.3	0.0	7.8	7.3	8.5	0.5	0.6	0.6	0.0	76.0	0.0	0.0	0.0	15.3	ATV Harrow
Transect 14	5.5	0.0	7.1	2.1	9.5	5.0	6.8	6.5	0.3	48.5	9.2	12.5	0.0	14.6	Hand
Transect 15	4.5	4.5	0.0	0.0	N/A	0.0	0.0	0.0	0.0	15.8	8.4	52.8	2.0	19.3	Hand
Mean	1.4	0.6	2.8	2.0	6.4	0.7	1.1	1.1	0.0	23.6	3.7	28.6	1.1	38.8	

	BLM
	State

APPENDIX F – RANGE CREEK PHOTOS

WET MEADOW PASTURE



NELSON CANYON PASTURE



CALF CANYON PASTURE







Range Creek
Transect # 6
7/12/11



Range Creek
#6
7/16/13

CHERRY MEADOW PASTURE











FARM PASTURE

