

CURTIS RIDGE - TREND STUDY NO. 2R-15-11

Vegetation Type: Mountain Big Sagebrush

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: [Mountain Loam \(Mountain Big Sagebrush\), R047XA446UT](#)

Land Ownership: DWR

Elevation: 6,720 ft (2,048 m)

Aspect: Southeast

Slope: 5%

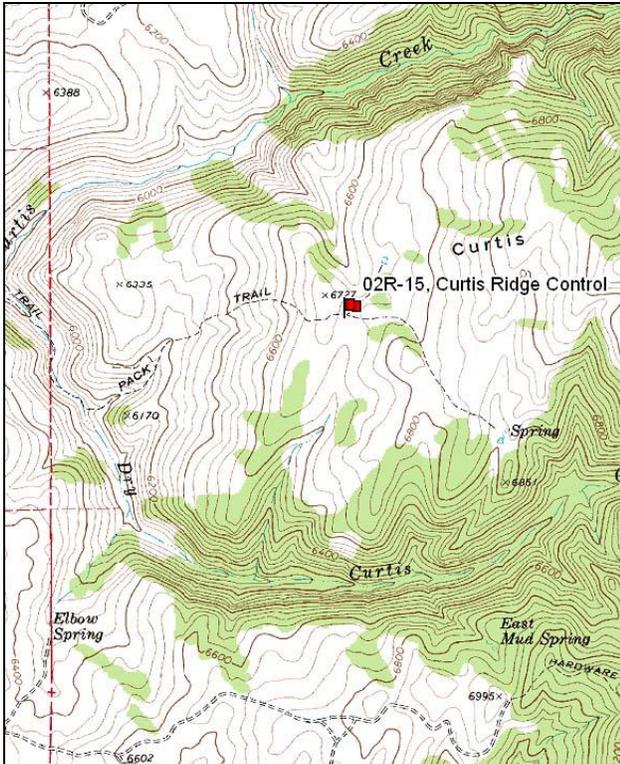
Transect bearing: 140° magnetic

Belt placement: line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95 ft)

Directions:

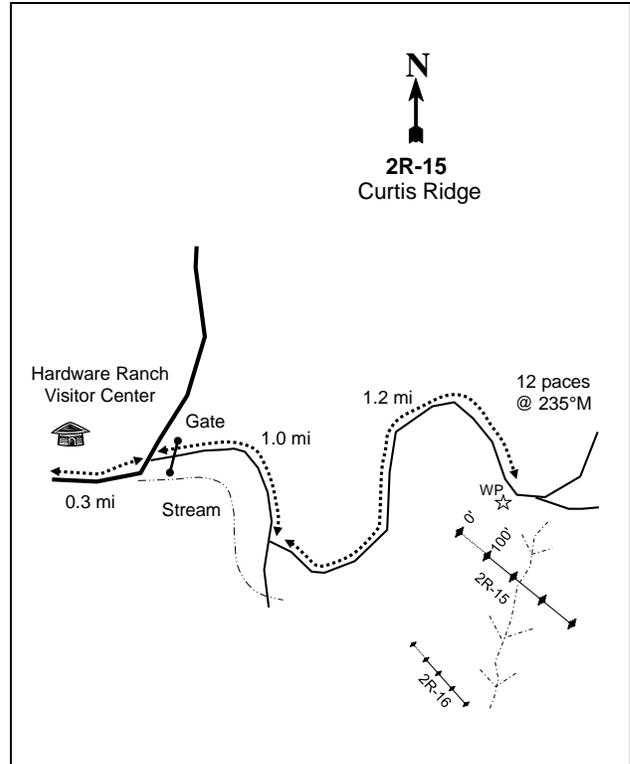
From the Hardware Ranch Visitors' Center, drive 0.3 miles to a fork in the road and a gate. Take a right through a gate (this road follows a stream a short distance). Proceed 1.0 miles to a fork. Take a left and drive 1.2 miles to a witness post on the right. From the witness post, walk 12 paces at 235 degrees magnetic to the 0-foot stake with browse tag #144. Transect baseline is at a bearing of 140 degrees magnetic.

Map Name: Hardware Ranch



Township: 10N Range: 4E Section: Unsurveyed

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 456274 E 4605931 N

CURTIS RIDGE - TREND STUDY NO. 2R-15

Site Information

Site Description: This study was established as a control to an intensive grazing project conducted on Hardware Ranch to improve browse composition. Hardware Ranch is administered by the Utah Division of Wildlife Resources (UDWR). The study is located on Curtis Ridge two miles east of the Hardware Ranch visitor's center. The vegetation is comprised of a mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and low sagebrush (*Artemisia arbuscula*) community, with several belts also sampling a dry meadow. The study was established prior to the intensive grazing treatment that was scheduled to take place later in the summer of 2006, and an electric fence was built around the study area before the grazing treatment. Deer, elk, and cattle sign were sampled in low abundance in 2006 and 2011 (Table - Pellet Group Data).

Browse: The preferred browse species found on the site are low sagebrush, mountain big sagebrush, and antelope bitterbrush (*Purshia tridentata*). The low sagebrush population is dense, and is centered within the mature demographic. Low sagebrush decadence and poor vigor are low. Utilization of low sagebrush has been mostly light over the sample years. The recruitment of young low sagebrush has been good since the outset of the study. The mountain big sagebrush population is moderately dense, and is centered within the mature demographic. Decadence of mountain big sagebrush has been moderately high, but poor vigor has been low over the sample years. The mountain big sagebrush has had light to moderate use over the sample years. The recruitment of young mountain big sagebrush has been fairly good. Saskatoon serviceberry (*Amelanchier alnifolia*) and antelope bitterbrush were also sampled in low densities. Utilization of bitterbrush has been moderate to heavy over the sample years (Table - Browse Characteristics). Rocky Mountain juniper (*Juniperus scopulorum*), parsnipflower buckwheat (*Eriogonum heracleoides*), Woods rose (*Rosa woodsii*), mountain snowberry (*Symphoricarpos oreophilus*) are also found on the site (Table - Browse Characteristics).

Herbaceous Understory: The herbaceous understory is diverse. The perennial grass species Letterman needlegrass (*Stipa lettermani*) was the dominant grass in 2006 and 2011. Other common perennial grasses include alpine fescue (*Festuca ovina*), prairie junegrass (*Koeleria cristata*), bulbous bluegrass (*Poa bulbosa*), and Sandberg bluegrass (*P. secunda*), slender wheatgrass (*Agropyron trachycaulum*), and thickspike wheatgrass (*A. dasystachyum*). Common perennial forb species include aster (*Aster sp.*), western yarrow (*Achillea millefolium*), pale agoseris (*Agoseris glauca*), lambstongue groundsel (*Senecio integerrimus*), and Douglas knotweed (*Polygonum douglasii*). The annual species cluster tarweed (*Madia glomerata*) was the most common of the annual species (Table - Herbaceous Trends).

Soil: The study is part of the Curtis Creek-Goring association, and is likely part of the Goring component. These soils occur on seales. The parent material consists of colluviums and residuum derived from sandstone, quartzite, and small amounts of limestone (Soil Survey Staff 2011). The soil texture is a clay loam with a neutral soil reaction (pH 6.7) (Table - Soil Analysis Data). Some bare ground is associated with game and livestock trails, and is found in the interspaces of the Mountain big sagebrush population. Generally, bare ground is modest to near absent within the more grassy areas. Protective ground cover is provided by a fair amount of vegetation and litter (Table - Basic Cover). The soil erosion condition has been classified as stable since 2006.

Trend Assessments

Browse:

- **2006 to 2011 - stable (0):** The density for low sagebrush remained similar, decreasing from 9,080 plants/acre to 8,840 plants/acre. Decadence within the low sagebrush population had a minor increase from 6% to 8%. The low sagebrush population maintained poor vigor at 5%. Recruitment of low sagebrush to the population decreased slightly from 16% to 15%. The density for mountain big sagebrush decreased 37% from 1,640 plants/acre to 1,040 plants/acre, but canopy cover remained

similar. Decadence within the mountain big sagebrush population increased from 22% to 25%. Poor vigor decreased from 7% to 4% of the population.

Grass:

- **2006 to 2011 - slightly up (+1):** The sum of nested frequency for perennial grasses, excluding bulbous bluegrass, increased 11%, though cover decreased from 14% to 10%. Letterman needlegrass increased little in nested frequency, but decreased in cover from 6% to 5%. Thickspike wheatgrass, slender wheatgrass, and carex (*Carex sp.*) increased significantly in nested frequency. The weedy species bulbous bluegrass also increased significantly in nested frequency, but remained a minor component. Alpine fescue and prairie junegrass decreased significantly in nested frequency, and both species decreased in cover from 2% to 1%.

Forb:

- **2006 to 2011 - stable (0):** The sum of nested frequency for perennial forbs remained similar. The perennial species western yarrow and aster contributed to the majority of forb cover. Western yarrow maintained cover near 7%, while the aster species decreased in cover from 10% to 7%. The perennial species Douglas chaenactis (*Chaenactis douglasii*) increased significantly in nested frequency. Pale agoseris, tapertip onion (*Allium acuminatum*), and sulfur eriogonum (*Eriogonum umbellatum*) decreased significantly in nested frequency. All had covers that contributed modestly. The annual species annual stickseed (*Lappula occidentalis*), yellow owlclover (*Orthocarpus luteus*), and Douglas knotweed increased significantly in nested frequency.

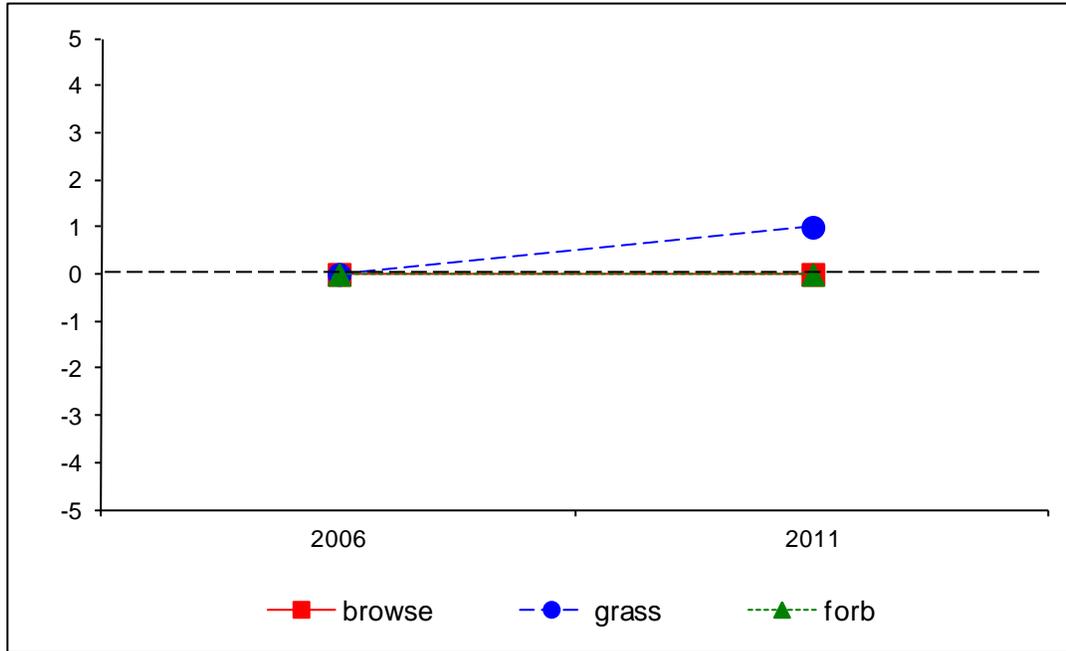
DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --
Management unit 2R, study no: 15

Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover (-POBU)	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
06	30.0	11.1	5.8	27.2	0.0	10.0	0.0	84.0	Excellent
11	29.2	11.3	6.4	20.0	0.0	10.0	0.0	76.9	Good

Trend Summary

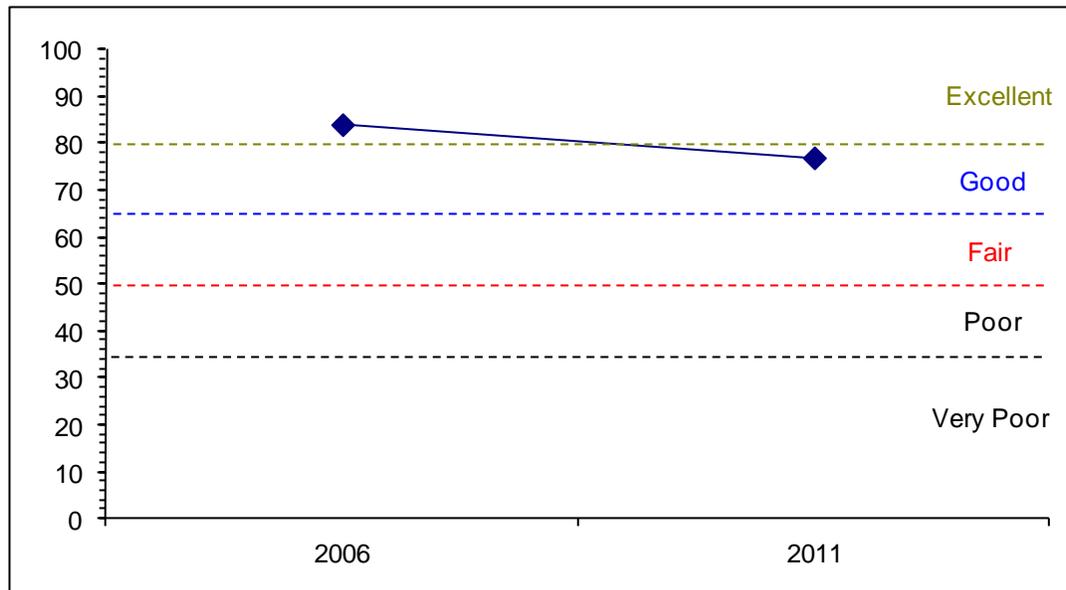
CUMULATIVE RANGE TREND ASSESSMENT--

Management unit 2R Study no: 15



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL--

Management unit 2R, Study no: 15



HERBACEOUS TRENDS--

Management unit 02R, Study no: 15

Type	Species	Nested Frequency		Average Cover %	
		'06	'11	'06	'11
G	<i>Agropyron dasystachyum</i>	a18	b46	.11	.40
G	<i>Agropyron spicatum</i>	5	4	.00	.03
G	<i>Agropyron trachycaulum</i>	a15	b60	.77	.58
G	<i>Bromus tectorum</i> (a)	-	2	-	.01
G	<i>Carex</i> sp.	a17	b27	.27	.38
G	<i>Festuca ovina</i>	b54	a28	2.05	.93
G	<i>Juncus</i> sp.	-	2	-	.00
G	<i>Koeleria cristata</i>	b101	a56	1.57	.65
G	<i>Melica bulbosa</i>	34	50	.68	.45
G	<i>Poa bulbosa</i>	a43	b103	1.48	3.25
G	<i>Poa fendleriana</i>	12	1	.21	.00
G	<i>Poa pratensis</i>	26	22	.44	.27
G	<i>Poa secunda</i>	59	59	1.12	.82
G	<i>Sitanion hystrix</i>	20	43	.31	.37
G	<i>Stipa lettermani</i>	169	193	6.00	5.07
Total for Annual Grasses		0	2	0	0.00
Total for Perennial Grasses		573	694	15.06	13.24
Total for Grasses		573	696	15.06	13.25
F	<i>Achillea millefolium</i>	250	268	7.04	7.41
F	<i>Agoseris glauca</i>	b129	a65	1.35	.32
F	<i>Allium acuminatum</i>	b76	a25	.39	.06
F	<i>Antennaria rosea</i>	-	1	-	.00
F	<i>Aster</i> sp.	230	236	9.47	7.26
F	<i>Calochortus nuttallii</i>	1	-	.00	-
F	<i>Chaenactis douglasii</i>	a-	b16	-	.15
F	<i>Collinsia parviflora</i> (a)	33	33	.16	.14
F	<i>Collomia linearis</i> (a)	13	13	.05	.02
F	<i>Comandra pallida</i>	2	8	.03	.01
F	<i>Crepis acuminata</i>	1	5	.03	.01
F	<i>Descurainia pinnata</i> (a)	-	5	-	.01
F	<i>Draba</i> sp. (a)	-	2	-	.00
F	<i>Epilobium brachycarpum</i> (a)	41	25	.18	.10
F	<i>Eriogonum umbellatum</i>	b8	a-	.36	-
F	<i>Geranium richardsonii</i>	15	7	.79	.48
F	<i>Holosteum umbellatum</i> (a)	6	3	.01	.00
F	<i>Lappula occidentalis</i> (a)	a2	b35	.03	.16
F	<i>Lomatium</i> sp.	1	-	.03	-
F	<i>Lupinus argenteus</i>	2	1	.38	.15
F	<i>Madia glomerata</i> (a)	37	52	.11	1.22
F	<i>Mertensia</i> sp.	1	-	.03	-
F	<i>Microsteris gracilis</i> (a)	21	14	.03	.02
F	<i>Navarretia intertexta</i> (a)	-	5	-	.00
F	<i>Orthocarpus luteus</i> (a)	a31	b111	.14	1.95

Type	Species	Nested Frequency		Average Cover %	
		'06	'11	'06	'11
F	<i>Orthocarpus purpureo-albus</i> (a)	1	-	.00	-
F	<i>Polygonum douglasii</i> (a)	_a 131	_b 246	1.27	2.44
F	<i>Potentilla gracilis</i>	2	-	.03	.03
F	<i>Senecio integerrimus</i>	85	95	1.03	.67
F	<i>Stellaria longipes</i>	5	13	.30	.56
F	<i>Taraxacum officinale</i>	23	32	.26	.16
F	<i>Tragopogon dubius</i> (a)	2	-	.03	-
F	<i>Veronica biloba</i> (a)	-	11	-	.18
F	<i>Viola</i> sp.	5	1	.06	.00
F	<i>Zigadenus paniculatus</i>	7	8	.06	.01
Total for Annual Forbs		318	555	2.05	6.29
Total for Perennial Forbs		843	781	21.70	17.33
Total for Forbs		1161	1336	23.76	23.62

Values with different subscript letters are significantly different at alpha = 0.10

BROWSE TRENDS--

Management unit 02R, Study no: 15

Type	Species	Strip Frequency		Average Cover %	
		'06	'11	'06	'11
B	<i>Amelanchier alnifolia</i>	1	1		
B	<i>Artemisia arbuscula</i>	68	67	16.84	16.07
B	<i>Artemisia tridentata vaseyana</i>	34	28	8.76	5.38
B	<i>Eriogonum heracleoides</i>	0	13	-	1.02
B	<i>Juniperus scopulorum</i>	1	1	1.16	.68
B	<i>Purshia tridentata</i>	13	12	3.49	1.49
B	<i>Rosa woodsii</i>	2	2	.15	.15
B	<i>Symphoricarpos oreophilus</i>	6	8	.30	.18
Total for Browse		125	132	30.70	24.98

CANOPY COVER, LINE INTERCEPT--

Management unit 02R, Study no: 15

Species	Percent Cover	
	'06	'11
<i>Amelanchier alnifolia</i>	.38	-
<i>Artemisia arbuscula</i>	22.10	21.00
<i>Artemisia tridentata vaseyana</i>	9.81	8.35
<i>Chrysothamnus viscidiflorus viscidiflorus</i>	.01	-
<i>Eriogonum heracleoides</i>	-	.26
<i>Juniperus scopulorum</i>	3.68	3.20
<i>Purshia tridentata</i>	3.08	2.36
<i>Rosa woodsii</i>	.28	.08
<i>Symphoricarpos oreophilus</i>	1.21	.71

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 02R, Study no: 15

Species	Average leader growth (in)	
	'06	'11
Artemisia arbuscula	1.3	0.9
Artemisia tridentata vaseyana	1.7	2.3
Purshia tridentata	1.8	4.3

BASIC COVER--

Management unit 02R, Study no: 15

Cover Type	Average Cover %	
	'06	'11
Vegetation	61.28	54.91
Rock	1.12	.84
Pavement	.60	.27
Litter	37.91	43.56
Cryptogams	.52	.63
Bare Ground	20.86	12.98

PELLET GROUP DATA--

Management unit 02R, Study no: 15

Type	Quadrat Frequency		Days use per acre (ha)	
	'06	'11	'06	'11
Rabbit	-	1	-	-
Elk	1	11	8	7 (17)
Deer	5	5	3	1 (3)
Cattle	6	1	17	4 (9)

BROWSE CHARACTERISTICS--

Management unit 02R, Study no: 15

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
Amelanchier alnifolia										
06	40	50	50	-	-	0	0	0	33/35	
11	20	0	100	-	-	0	0	0	38/37	
Artemisia arbuscula										
06	9080	16	78	6	960	8	0	5	12/20	
11	8840	15	77	8	1180	25	2	5	10/23	
Artemisia tridentata vaseyana										
06	1640	7	71	22	180	7	0	7	30/44	
11	1040	10	65	25	380	31	6	4	26/39	
Eriogonum heracleoides										
06	0	0	0	-	-	0	0	0	7/10	
11	1320	6	94	-	-	0	0	0	7/8	

		Age class distribution			Utilization				
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
<i>Juniperus scopulorum</i>									
06	20	100	0	-	20	0	0	0	-/-
11	20	100	0	-	-	0	0	0	-/-
<i>Purshia tridentata</i>									
06	380	0	74	26	120	16	42	11	24/52
11	300	0	87	13	-	53	7	0	26/49
<i>Rosa woodsii</i>									
06	40	50	50	-	-	0	0	0	27/19
11	60	0	100	-	-	0	0	0	20/10
<i>Symphoricarpos oreophilus</i>									
06	280	7	86	7	100	0	0	7	19/30
11	220	9	91	0	-	0	0	0	21/30