

BOX CANYON SAGE GROUSE - TREND STUDY NO. 16C-42-09

Vegetation Type: Mountain Big Sagebrush

Range Type: Crucial Deer Winter, Substantial Elk Winter, Crucial Sage Grouse

NRCS Ecological Site Description: Not Available

Land Ownership: USFS

Elevation: 8,400 ft (2,560 m)

Aspect: North

Slope: 5%

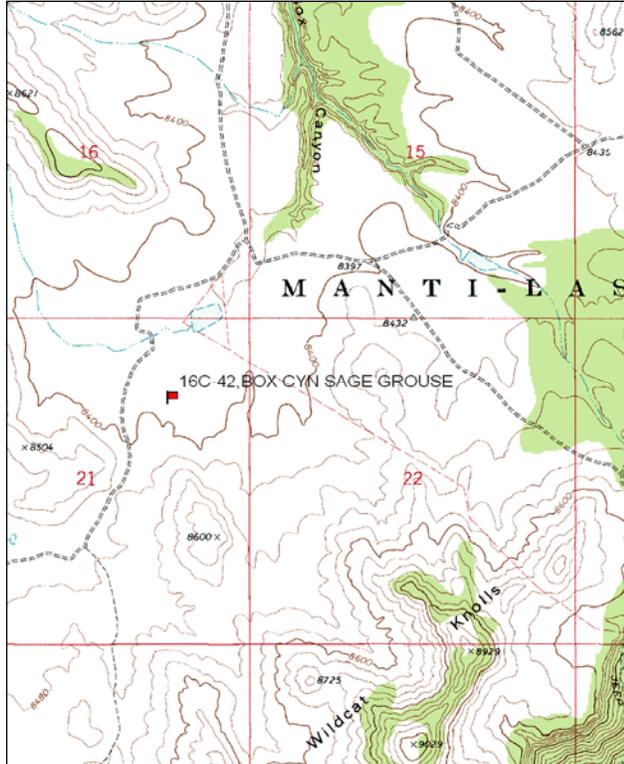
Transect bearing: 185 degrees magnetic

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

Directions:

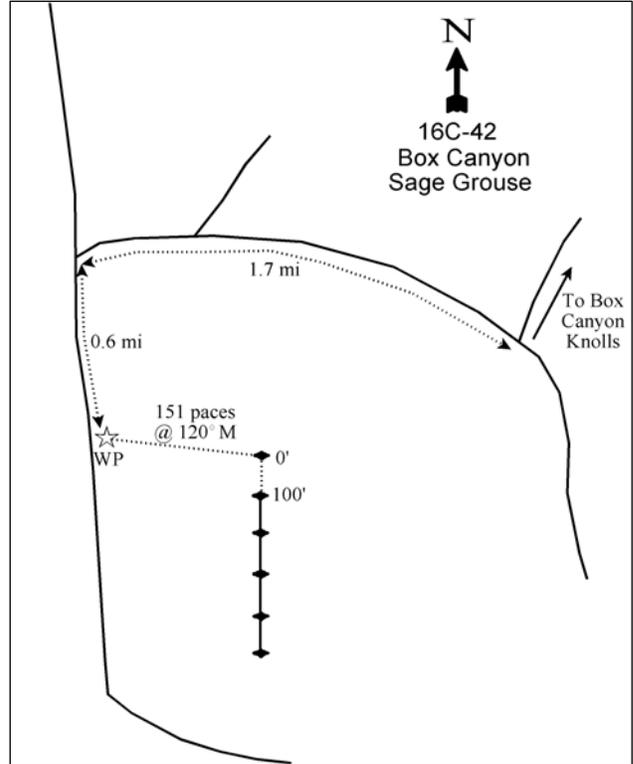
From Center Street in the town of Emery, continue south on Highway 10 for 1.2 miles. Turn right onto a dirt road and go 0.6 miles. Turn left and travel up Link Canyon 7 miles (4WD road) to the top. Stay left at the fork. Continue west for 1.7 miles to another fork. Turn left and head south for 0.6 miles to a witness post on the left hand side of the road. The 0-foot post is 151 paces from the witness post at 120°M and is marked with a blue browse tag, #49.

Map Name: Emery West



Township: 21S, Range: 5E, Section: 21

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 468949 E 4314470 N

BOX CANYON SAGE GROUSE - TREND STUDY NO. 16C-42

Site Information

Site Description: The study was established to monitor sage grouse nesting and brooding habitat. There is an active lek just south of this site. The study samples a mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) community that sits in a large basin northwest of the Wildcat Knolls. This area is managed by the Forest Service as part of the Emery allotment. The area was treated in Phase I of the Wildcat Knolls Habitat Improvement project ([WRI Project# 1161](#)) in 2008. There were 400 acres of the area that were Dixie harrowed and seeded to enhance sage grouse habitat by increasing forbs throughout the project area, reduce the amount of crested wheat grass (*Agropyron cristatum*) and smooth brome (*Bromus inermis*) monocultures which does not provide species diversity for sage grouse, and to create a diverse age class within sagebrush stands. The Dixie harrow was used in stands of sagebrush that were greater than 20% canopy cover. The seeding and harrowing occurred at the same time. Pellet group data has estimated mostly light use by deer, elk, and cattle since 2004, and sage grouse pellets have been prevalent on the site (Table - Pellet Group Data).

Browse: Mountain big sagebrush is the key browse species on this site. Mountain big sagebrush had a mostly mature stand consisting of fairly large plants at the outset of the study in 2004, but the density and size of mature sagebrush plants was reduced in 2009, after the treatment. The sagebrush population has displayed moderate decadence and moderate poor vigor over the sample years. Utilization of sagebrush was mostly light since 2004 (Table - Browse Characteristics). Other preferred browse that is less abundant includes black sagebrush (*Artemisia nova*) and dwarf rabbitbrush (*Chrysothamnus depressus*).

Herbaceous Understory: The herbaceous understory is dominated by perennial grasses creating a fairly dense ground cover between the sagebrush that has averaged 23% since 2004. Smooth brome is the dominant grass providing over half of the grass cover since 2004. Mutton bluegrass (*Poa fendleriana*), sedge (*Carex* sp.), crested wheatgrass, and Letterman needlegrass (*Stipa lettermani*) are also common. Forbs are very diverse and are moderately abundant on the site. Forb cover increased substantially in 2009 following the treatment, but there was little change in the sum of nested frequency. Several species that are important to sage grouse are located on this site such as common dandelion (*Taraxacum officinale*), hawksbeard (*Crepis acuminata*), penstemon (*Penstemon* spp.), lupine (*Lupinus argenteus*), and milkvetch (*Astragalus* spp.) (Beck and Mitchell 1997) (Table - Herbaceous Trends).

Soil: The soil texture is a sandy clay loam with a neutral pH (Table - Soil Analysis Data). The ground is covered with a high percent of litter and vegetation cover with little bare ground cover exposed (Table - Basic Cover). The soil erosion condition was classified as stable in 2004 and 2009.

Trend Assessments

Browse:

- **2004 to 2009 - stable (0):** There was a treatment that helped to rejuvenate the mountain big sagebrush stand by increasing the age class structure in the population. The treatment reduced mountain big sagebrush canopy cover from 16% to 9%. The treatment also reduced the density of mature sagebrush plants, but the total density of sagebrush increased 15% due to a large increase in the recruitment of young sagebrush plants.

Grass:

- **2004 to 2009 - stable (0):** There was little change in the sum of nested frequency or cover of perennial grasses. There was a slight change in composition with a significant decrease in the nested frequency of sedge and a significant increase in mutton bluegrass.

Type	Species	Nested Frequency		Average Cover %	
		'04	'09	'04	'09
G	<i>Stipa pinetorum</i>	-	3	-	.15
Total for Annual Grasses		0	0	0	0
Total for Perennial Grasses		792	794	21.32	24.53
Total for Grasses		792	794	21.32	24.53
F	<i>Androsace septentrionalis</i> (a)	4	-	.04	-
F	<i>Antennaria rosea</i>	58	55	.74	1.91
F	<i>Arabis</i> sp.	6	1	.02	.00
F	<i>Astragalus convallarius</i>	25	34	.20	.36
F	<i>Astragalus</i> sp.	_a 7	_b 26	.07	.43
F	<i>Castilleja linariaefolia</i>	_a 4	_b 23	.04	.19
F	<i>Chaenactis douglasii</i>	6	12	.06	.19
F	<i>Chenopodium</i> sp. (a)	7	11	.01	.02
F	<i>Collinsia parviflora</i> (a)	-	1	-	.03
F	<i>Comandra pallida</i>	6	5	.04	.07
F	<i>Crepis acuminata</i>	4	1	.03	.00
F	<i>Erigeron eatonii</i>	_a 17	_b 46	.07	.76
F	<i>Erigeron pumilus</i>	10	-	.04	-
F	<i>Eriogonum racemosum</i>	61	43	.52	.86
F	<i>Eriogonum umbellatum</i>	14	19	.16	.36
F	<i>Gayophytum ramosissimum</i> (a)	-	1	-	.00
F	<i>Hedysarum boreale</i>	3	1	.06	.03
F	<i>Lupinus argenteus</i>	_a 12	_b 31	.37	1.85
F	<i>Lychnis drummondii</i>	_b 21	_a 1	.14	.00
F	<i>Machaeranthera canescens</i>	2	7	.03	.18
F	<i>Machaeranthera grindelioides</i>	-	6	-	.01
F	<i>Oenothera pallida</i>	11	-	.02	-
F	<i>Orthocarpus luteus</i> (a)	_b 16	_a -	.12	-
F	<i>Penstemon comarrhenus</i>	12	11	.11	.31
F	<i>Penstemon watsonii</i>	_b 12	_a 3	.25	.03
F	<i>Polygonum douglasii</i> (a)	33	17	.06	.03
F	<i>Potentilla</i> sp.	48	39	.81	.24
F	<i>Senecio multilobatus</i>	5	9	.04	.06
F	<i>Sisymbrium altissimum</i> (a)	-	-	-	.00
F	<i>Taraxacum officinale</i>	_b 17	_a -	.10	-
Total for Annual Forbs		60	30	0.24	0.10
Total for Perennial Forbs		361	373	3.97	7.89
Total for Forbs		421	403	4.21	7.99

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

BROWSE TRENDS--

Management unit 16C, Study no: 42

Type	Species	Strip Frequency		Average Cover %	
		'04	'09	'04	'09
B	Artemisia nova	5	1	1.06	.21
B	Artemisia tridentata vaseyana	80	65	15.85	6.41
B	Chrysothamnus depressus	0	0	-	.03
B	Chrysothamnus nauseosus	7	1	.21	.00
B	Chrysothamnus viscidiflorus viscidiflorus	24	31	.81	1.71
B	Symphoricarpos oreophilus	2	0	.03	.03
B	Tetradymia canescens	1	2	.03	.03
Total for Browse		119	100	18.00	8.42

CANOPY COVER, LINE INTERCEPT--

Management unit 16C, Study no: 42

Species	Percent Cover	
	'04	'09
Artemisia nova	.65	.38
Artemisia tridentata vaseyana	15.98	9.31
Chrysothamnus nauseosus	.35	-
Chrysothamnus viscidiflorus viscidiflorus	.18	.68

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 16C, Study no: 42

Species	Average leader growth (in)	
	'04	'09
Artemisia tridentata vaseyana	1.9	1.1

BASIC COVER--

Management unit 16C, Study no: 42

Cover Type	Average Cover %	
	'04	'09
Vegetation	45.07	44.34
Pavement	.01	0
Litter	55.27	47.02
Cryptogams	.23	.21
Bare Ground	22.39	23.51

SOIL ANALYSIS DATA --

Management unit 16C, Study no: 42, Study Name: Box Canyon Sage Grouse

Effective rooting depth (in)	pH	sandy clay loam			%0M	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
14.5	6.8	55.4	18.8	25.8	3.1	21	304	1

PELLET GROUP DATA--

Management unit 16C, Study no: 42

Type	Quadrat Frequency		Days use per acre (ha)	
	'04	'09	'04	'09
Rabbit	6	21	-	-
Grouse	4	6	-	139 pellets/acre
Elk	11	10	29 (73)	13 (31)
Deer	8	2	5 (12)	2 (5)
Cattle	8	17	28 (70)	14 (34)

BROWSE CHARACTERISTICS--

Management unit 16C, Study no: 42

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Artemisia nova</i>									
04	420	24	48	29	780	0	0	14	15/20
09	40	0	100	0	-	0	100	100	6/10
<i>Artemisia tridentata vaseyana</i>									
04	3580	9	68	23	3680	9	.55	15	30/40
09	4140	40	41	19	500	24	9	16	20/26
<i>Atriplex confertifolia</i>									
04	0	0	0	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
<i>Chrysothamnus nauseosus</i>									
04	220	9	91	-	-	0	0	0	16/18
09	20	0	100	-	-	0	0	0	19/17
<i>Chrysothamnus viscidiflorus viscidiflorus</i>									
04	1180	5	95	0	180	5	0	0	9/14
09	1520	5	88	7	40	0	0	43	9/12
<i>Symphoricarpos oreophilus</i>									
04	40	100	0	-	-	0	0	0	5/6
09	0	0	0	-	-	0	0	0	17/28
<i>Tetradymia canescens</i>									
04	20	100	0	0	-	0	0	0	7/7
09	60	33	33	33	-	0	33	33	5/6