

EAST CALF CANYON - TREND STUDY NO. 10-17-10

Vegetation Type: Wyoming Big Sagebrush

Range Type: Crucial Deer Winter

NRCS Ecological Site Description: Not Available

Land Ownership: BLM

Elevation: 5500 ft. (1676 m)

Aspect: Southeast

Slope: 3%

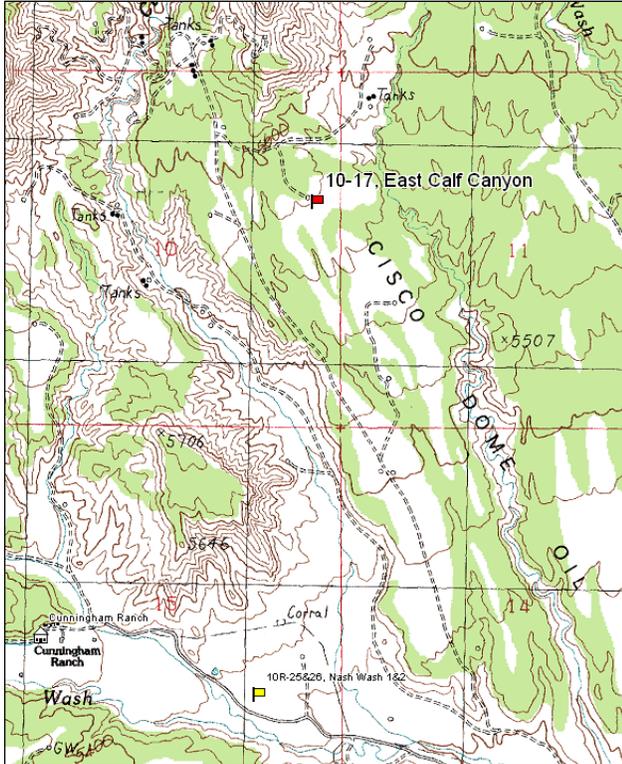
Transect bearing: 165° magnetic

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

Directions:

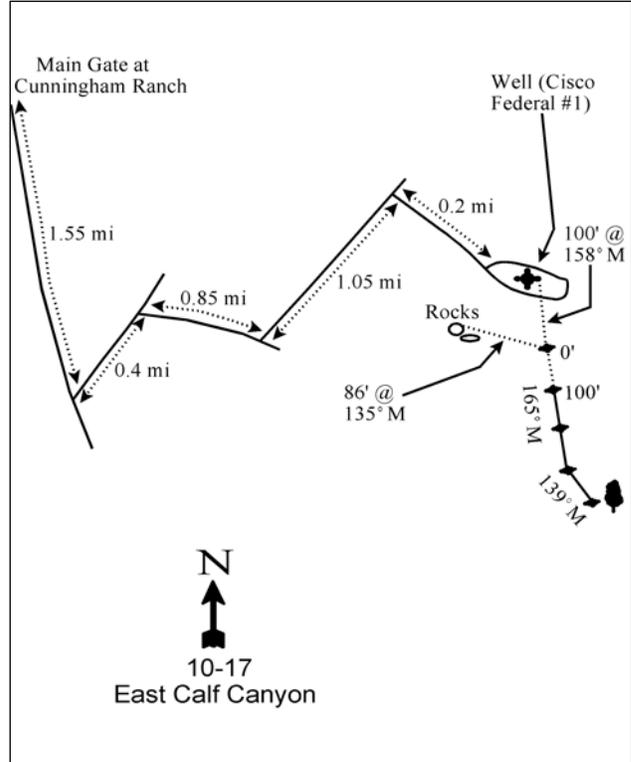
From the main gate at Cunningham Ranch go southeast on the main road for 1.55 miles to a fork and turn left (northeast). Proceed 0.4 miles to a fork. Turn right and proceed 0.85 to a fork. Stay left and go 1.05 miles to another fork. Turn right and go 0.2 miles to a well numbered Cisco Federal #1. The first baseline stake is approximately 100 feet southeast of the road in the sagebrush opening.

Map Name: Sego Canyon



Township: 20S Range: 21E Section: 10

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 623214 E 4326909 N

## EAST CALF CANYON - TREND STUDY NO. 10-17

### Site Information

Site Description: The study is located in a Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) clearing on a mixed pinyon pine (*Pinus edulis*) Utah juniper (*Juniperus osteosperma*) and sagebrush bench at the base of the Book Cliffs, but north of Horse Pasture and Nash Wash. Grazing in the area is managed by the Bureau of Land Management (BLM) as part of the large Cisco allotment. A 330-acre chaining project was completed in the fall of 1987 on the area just east and northeast of the study site, but the study transect was not treated. The chaining and seeding was an interagency project coordinated through State Institutional Trust Lands (SITLA), BLM and Utah Division of Wildlife Resources (UDWR). The chaining was done with a light smooth chain to help protect an understory population of decadent cliffrose (*Cowania mexicana* ssp. *stansburiana*). Besides its importance as big game and livestock winter range, there is active oil and gas exploration with associated developments and network of roads in the area. At the north end of the clearing is an oil pump and storage tanks. Pellet group transect data has estimated fluctuating deer use with moderate use in 2000, light use in 2005 and heavy use in 2010. Estimated elk use has been light since 2000 (Table - Pellet Group Data).

Browse: The overall area supports mostly juniper-pinyon woodland with scattered sagebrush openings. These sagebrush-grass openings provide important forage for deer, sheep and cattle. Wyoming big sagebrush is the key browse species and provides nearly all of the browse cover on the site (Table - Browse Trends). According to earlier BLM studies on the allotment in 1986, sagebrush utilization was heavy to severe. Since the outset of the study in 1986, the sagebrush population has been a mixture of young, mature and decadent plants. The utilization of sagebrush has also been a mixture of light, moderate and heavy use over the course of the study, with the heaviest use occurring in 1986. The two other browse species found on the transect are broom snakeweed (*Gutierrezia sarothrae*) and pricklypear cactus (*Opuntia* sp.) (Table - Browse Characteristics). Utah Juniper surrounds the sagebrush opening, but does not appear to be invading (Table - Point-Quarter Tree Data). Mature trees, especially on the edges and in the opening, have been highlined.

Herbaceous Understory: Both grasses and forbs are limited on the site. The only common perennial grass is bottlebrush squirreltail (*Sitanion hystrix*). Cheatgrass was prevalent in 1995, but decreased significantly in nested frequency in 2000 and has had low frequency and cover since then. There are only a few scattered forbs on the site. The most abundant forbs are longleaf phlox (*Phlox longifolia*) and several milkvetch species (*Astragalus* spp.) that occur in low frequencies (Table - Herbaceous Trends). The disturbed areas along the road and drill pad are a refuge for exotic annual weeds such as Russian thistle (*Salsola iberica*), but they have not yet invaded into the flat.

Soil: Soil on the site is well-drained, loam to clay loam with a neutral soil reactivity (pH 7.2) (Table - Soil Analysis Data). Bare ground cover on the site is high (Table - Basic Cover) with shrub interspaces mostly bare, and small gullies and compacted animal trails showing the effects of some surface erosion. The soil erosion condition was classified as stable in 2005, but was slight in 2010 due to pedestaling, flow patterns and rills.

### Trend Assessments

#### Browse:

- **1986 to 1995 - slightly up (+1):** Differences in density may be related to the larger sample area used in 1995; therefore, trend was determined using other parameters. Decadence of sagebrush decreased from 55% to 18% of the population and recruitment of young plants remained good.
- **1995 to 2000 - stable (0):** There was little change in the density of sagebrush, though cover increased slightly from 18% to 19%. Sagebrush decadence, vigor and recruitment of young plants remained similar.

- **2000 to 2005 - slightly down (-1):** The density of sagebrush decreased by 13% from 5,880 plants/acre to 5,140 plants/acre, and cover decreased to 17%. Decadence of sagebrush increased to 31% and poor vigor increased to 20%, though the recruitment of young plants increased to 32%.
- **2005 to 2010 - up (+2):** Sagebrush density increased by 53% to 7,880 plants/acre, and cover increased to 20%. Much of the increase in density was due to an increase in the recruitment of young sagebrush plants to 44% of the population. Decadence of sagebrush decreased to 17% and poor vigor decreased to 8% of the population.

Grass:

- **1986 to 1995 - slightly up (+1):** There was nearly a two-fold increase in the sum of nested frequency of perennial grasses due to a significant increase in the nested frequency of bottlebrush squirreltail, but perennial grasses remain rare. Annual species were not included in the sample in 1986, but cheatgrass was the dominant species providing 17% cover in 1995.
- **1995 to 2000 - stable (0):** The sum of nested frequency of perennial grasses decreased by 40%, but perennial grasses were already rare. Cheatgrass decreased significantly in nested frequency on the site and provide only 1% cover.
- **2000 to 2005 - stable (0):** Perennial grass sum of nested frequency decreased, but perennial grasses were already rare on the site.
- **2005 to 2010 - stable (0):** There was an increase in the sum of nested frequency of perennial grasses, but they remain rare on the site. Bottlebrush squirreltail cover increased to near 2%, the highest since the outset of the study.

Forb:

- **1986 to 1995 - slightly up (+1):** The sum of nested frequency of perennial forbs increased two-fold, but perennial forbs remain rare on the site.
- **1995 to 2000 - slightly down (-1):** The perennial forb sum of nested frequency decreased to near 1986 levels.
- **2000 to 2005 - stable (0):** There was a slight decrease in the sum of nested frequency of perennial forbs, but cover increased to nearly 2% due to a large increase in the cover of milkvetch.
- **2005 to 2010 - slightly up (+1):** The sum of nested frequency of perennial forbs increased 74%, though cover decreased slightly.

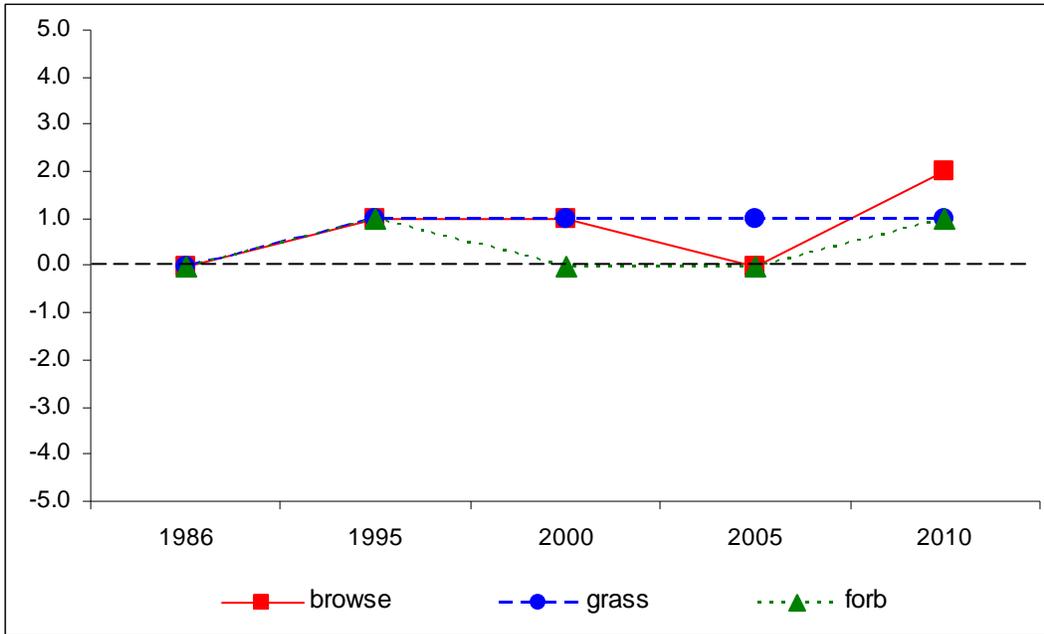
DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --

Management unit 10, study no: 17

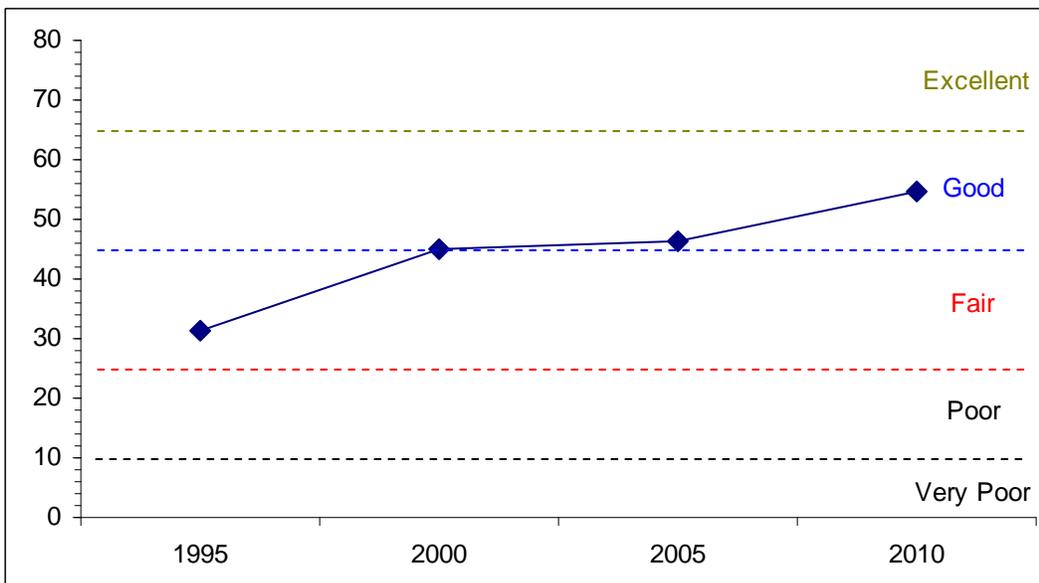
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	22.0	9.6	10.0	1.3	-12.7	1.3	0.0	<b>31.5</b>	Fair
00	24.9	7.7	11.7	0.8	-0.8	0.8	0.0	<b>45.1</b>	Fair-Good
05	21.7	5.7	15.0	1.8	-1.3	3.6	0.0	<b>46.4</b>	Fair-Good
10	24.5	9.9	15.0	3.4	-0.5	2.3	0.0	<b>54.6</b>	Good

## Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--  
Management unit 10, Study no: 17



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--  
Management unit 10, Study no: 17



HERBACEOUS TRENDS--  
Management unit 10, Study no: 17

Type	Species	Nested Frequency					Average Cover %			
		'86	'95	'00	'05	'10	'95	'00	'05	'10
G	<i>Bromus tectorum</i> (a)	-	b359	a95	a116	a126	16.90	1.02	.95	.68
G	<i>Hilaria jamesii</i>	3	-	-	-	-	-	-	-	-
G	<i>Poa fendleriana</i>	-	3	1	-	-	.00	.00	-	-
G	<i>Sitanion hystrix</i>	a31	b95	ab58	a38	ab57	.66	.41	.90	1.72
G	<i>Vulpia octoflora</i> (a)	-	b37	a1	c87	a4	.07	.00	.84	.01
Total for Annual Grasses		0	396	96	203	130	16.97	1.02	1.79	0.68
Total for Perennial Grasses		34	98	59	38	57	0.66	0.41	0.90	1.72
Total for Grasses		34	494	155	241	187	17.63	1.44	2.70	2.41
F	<i>Arabis</i> sp.	-	-	-	-	5	-	-	-	.01
F	<i>Astragalus convallarius</i>	-	-	6	-	5	.00	.19	.00	.59
F	<i>Astragalus</i> sp.	1	8	1	11	-	.36	.00	1.50	-
F	<i>Calochortus nuttallii</i>	a2	a-	a-	a5	b22	-	-	.01	.08
F	<i>Castilleja linariaefolia</i>	-	6	3	2	1	.06	.03	.00	.03
F	<i>Chaenactis stevioides</i>	-	-	-	3	-	-	-	.01	-
F	<i>Chenopodium fremontii</i> (a)	-	a-	a-	a10	b67	-	-	.54	.49
F	<i>Chenopodium leptophyllum</i> (a)	-	3	-	-	-	.00	-	-	-
F	<i>Delphinium</i> sp.	-	-	-	-	2	-	-	-	.03
F	<i>Descurainia pinnata</i> (a)	-	a8	a-	b94	a-	.01	-	.83	-
F	<i>Draba</i> sp. (a)	-	b18	a2	c57	b8	.03	.00	.80	.02
F	<i>Erigeron pumilus</i>	-	-	1	3	1	-	.00	.04	.03
F	<i>Erigeron utahensis</i>	ab1	b8	a-	a-	a-	.06	-	-	-
F	<i>Eriogonum cernuum</i> (a)	-	-	-	6	8	-	-	.02	.16
F	<i>Eriogonum</i> sp.	-	2	-	-	-	.00	-	-	-
F	<i>Gilia hutchiniifolia</i> (a)	-	b17	a-	d199	c66	.04	-	2.35	.16
F	<i>Lappula occidentalis</i> (a)	-	a8	a-	b125	b98	.02	-	1.51	.19
F	<i>Lepidium</i> sp. (a)	-	-	-	2	1	-	-	.03	.00
F	<i>Oenothera</i> sp.	-	-	-	7	-	-	-	.02	-
F	<i>Phlox longifolia</i>	ab39	b60	ab41	a19	ab39	.17	.13	.16	.33
F	<i>Plantago patagonica</i> (a)	-	b18	a-	c43	c65	.03	-	.45	.15
F	<i>Salsola iberica</i> (a)	-	a-	c29	abc17	ab1	-	.06	.03	.00
F	<i>Schoenocrambe linifolia</i>	a-	ab4	ab6	a-	c12	.01	.04	.03	.03
F	<i>Sisymbrium altissimum</i> (a)	-	-	-	6	-	-	-	.03	-
Total for Annual Forbs		0	72	31	559	314	0.15	0.06	6.62	1.18
Total for Perennial Forbs		43	88	58	50	87	0.67	0.40	1.78	1.15
Total for Forbs		43	160	89	609	401	0.82	0.46	8.41	2.34

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

BROWSE TRENDS--

Management unit 10, Study no: 17

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Artemisia nova	-	-	-	-	-	.15	-	-
B	Artemisia tridentata wyomingensis	91	97	87	78	17.57	19.38	17.38	19.57
B	Atriplex canescens	-	-	-	-	-	.38	-	-
B	Gutierrezia sarothrae	60	23	34	32	1.05	.21	1.92	1.72
B	Juniperus osteosperma	0	2	3	3	1.85	.03	1.56	1.14
B	Opuntia sp.	5	9	9	12	.30	.18	.33	.74
Total for Browse		156	131	133	125	20.77	20.33	21.21	23.20

CANOPY COVER, LINE INTERCEPT--

Management unit 10, Study no: 17

Species	Percent Cover		
	'00	'05	'10
Artemisia tridentata wyomingensis	-	22.98	16.13
Gutierrezia sarothrae	-	3.40	.91
Juniperus osteosperma	3.40	3.63	3.98
Opuntia sp.	-	.60	.18

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 10, Study no: 17

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata wyomingensis	1.9	2.1

POINT-QUARTER TREE DATA--

Management unit 10, Study no: 17

Species	Trees per Acre			Average diameter (in)		
	'00	'05	'10	'00	'05	'10
Juniperus osteosperma	43	47	52	2.5	3.8	2.5

BASIC COVER--

Management unit 10, Study no: 17

Cover Type	Average Cover %				
	'86	'95	'00	'05	'10
Vegetation	5.50	37.69	23.30	30.57	26.68
Rock	.25	.27	.69	.45	.47
Pavement	.25	.17	.43	.33	.33
Litter	47.00	38.50	33.78	22.35	30.27
Cryptogams	2.50	7.52	9.76	8.75	6.91
Bare Ground	44.50	29.38	47.86	47.38	45.00

SOIL ANALYSIS DATA --

Management unit 10, Study no: 17, Study Name: East Calf Canyon

Effective rooting depth (in)	pH	loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
15.7	7.2	44.0	29.4	26.6	0.8	6.6	67.2	0.5

PELLET GROUP DATA--

Management unit 10, Study no: 17

Type	Quadrat Frequency				Days use per acre (ha)		
	'95	'00	'05	'10	'00	'05	'10
Sheep	9	-	-	-	-	-	-
Rabbit	16	19	42	13	-	-	-
Elk	-	-	1	19	-	14 (170)	14 (35)
Deer	21	30	50	34	29 (72)	1 (2)	73 (180)

BROWSE CHARACTERISTICS--

Management unit 10, Study no: 17

		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>Artemisia tridentata wyomingensis</i>									
86	<b>3998</b>	12	33	55	1266	2	57	10	12/18
95	<b>5600</b>	20	62	18	700	74	4	4	20/33
00	<b>5880</b>	24	51	25	140	38	22	9	18/30
05	<b>5140</b>	32	37	31	112380	28	27	20	22/32
10	<b>7880</b>	44	38	17	160	29	16	8	17/27
<i>Grayia spinosa</i>									
86	<b>0</b>	0	0	-	-	0	0	0	-/-
95	<b>0</b>	0	0	-	-	0	0	0	-/-
00	<b>0</b>	0	0	-	-	0	0	0	-/-
05	<b>0</b>	0	0	-	-	0	0	0	-/-
10	<b>0</b>	0	0	-	-	0	0	0	19/42
<i>Gutierrezia sarothrae</i>									
86	<b>1931</b>	21	66	14	533	0	0	0	9/7
95	<b>4940</b>	40	60	0	540	.80	0	0	9/9
00	<b>1000</b>	2	90	8	60	0	0	4	5/6
05	<b>1140</b>	11	89	0	1060	0	0	0	14/19
10	<b>2220</b>	19	78	3	20	0	0	3	6/7
<i>Juniperus osteosperma</i>									
86	<b>0</b>	0	0	-	-	0	0	0	-/-
95	<b>0</b>	0	0	-	-	0	0	0	-/-
00	<b>40</b>	50	50	-	20	0	0	0	-/-
05	<b>60</b>	100	0	-	-	0	0	0	-/-
10	<b>60</b>	100	0	-	20	0	0	0	-/-

		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>Opuntia</i> sp.										
86	0	0	0	0	-	0	0	0	-/-	
95	100	0	100	0	-	0	0	0	6/19	
00	240	0	100	0	-	0	0	0	4/19	
05	200	0	90	10	-	0	0	0	7/32	
10	260	0	100	0	-	0	0	0	5/32	
<i>Pinus edulis</i>										
86	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	0	0	0	-	-	0	0	0	-/-	
05	0	0	0	-	-	0	0	0	-/-	
10	0	0	0	-	20	0	0	0	-/-	
<i>Sclerocactus</i> sp.										
86	0	0	0	-	-	0	0	0	-/-	
95	0	0	0	-	-	0	0	0	-/-	
00	0	0	0	-	-	0	0	0	-/-	
05	0	0	0	-	-	0	0	0	3/5	
10	0	0	0	-	-	0	0	0	-/-	