

INDIAN RIDGE - TREND STUDY NO. 10-1-10

Vegetation Type: Desert Shrub

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: Upland Silt Loam (Fourwing Saltbush-Winterfat), R034XY329UT

Land Ownership: SITLA

Elevation: 6450 ft. (1966 m)

Aspect: North

Slope: 6%

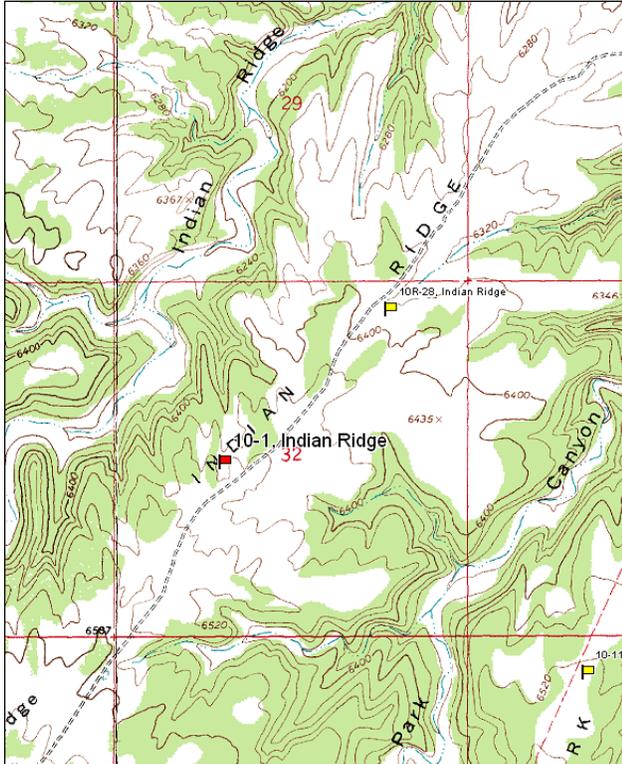
Transect bearing: 357° magnetic

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

Directions:

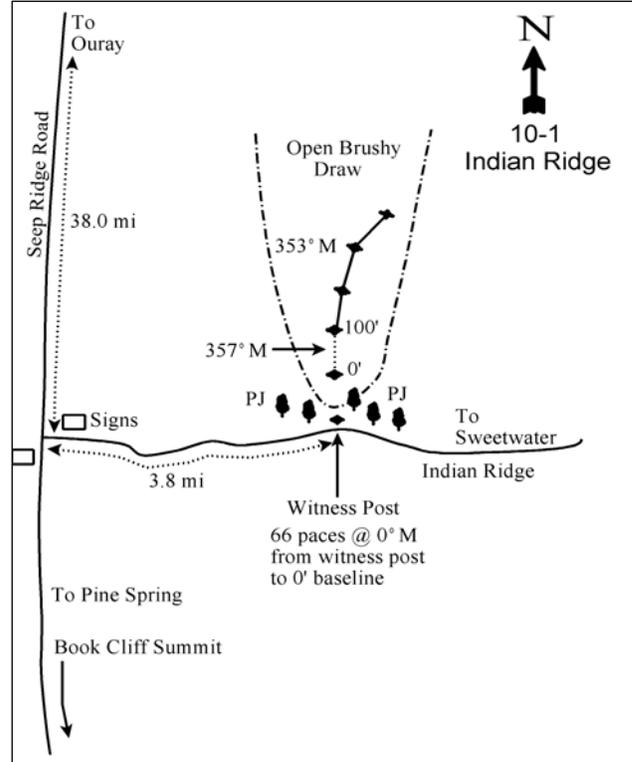
From Ouray, go 38 miles south to the McCook Ridge-Indian Ridge turnoff. Turn left (east) and travel on the Indian Ridge road towards Sweetwater Canyon and McCook Ridge for 3.8 miles. Stop by the head of a small sagebrush-saltbush draw, marked by a 20 inch tall fencepost on the left. Walk down the draw 60 paces to the 0-foot baseline stake. The 0-foot baseline stake is marked by a red browse tag.

Map Name: Cooper Canyon



Township: 13S Range: 23E Section: 32

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 639853 E 4389381 N

INDIAN RIDGE - TREND STUDY NO. 10-1

Site Information

Site Description: The study is located in a shallow draw on the north side of Indian Ridge. The area is principally deer winter range with the vegetation dominated by desert shrub with an understory of cheatgrass (*Bromus tectorum*). Utah juniper (*Juniperus osteosperma*) and pinyon pine (*Pinus edulis*) surround the draw and provide thermal and escape cover. The area is administered by the Utah State Institutional Trust Lands Administration (SITLA). Grazing in the area is managed by the Bureau of Land Management (BLM) as part of the Sunday School Allotment. Pellet group data indicated moderate deer use in 2000, with heavier use in 2005 and 2010. A deer carcass was found on the site in 2005. Estimated elk and cattle use were also moderate in 2000, but were light in 2005 and 2010 (Table - Pellet Group Data).

Browse: The key browse species at this site are fourwing saltbush (*Atriplex canescens*), winterfat (*Ceratoides lanata*) and black sagebrush (*Artemisia nova*). Fourwing saltbush has provided over 50% of the browse cover in each reading ranging from 5% to 8% cover since 1995 (Table - Browse Trends). Recruitment of young plants has been good since 1988. There was a steady increase in decadence from 1995 to 2005, but decadence decreased again in 2010. Drought conditions have likely been a key factor in the increased decadence of fourwing saltbush. Utilization of fourwing saltbush has been mostly light to moderate, but had moderate to heavy use in 2005. Winterfat is a preferred browse species, but is low growing and during severe winters could be covered by snow and largely unavailable. Winterfat density was fairly stable from 1982 to 1995, but has steadily decreased since then. Use of winterfat has been mostly light, with the exception of mostly heavy use in 2005. Utilization is difficult to determine on these shrubs due to abundant annual leader growth. Decadence of winterfat has been low and vigor has been good, but recruitment has been low to moderate in most sample years. A small population of black sagebrush was sampled with the increased sample size used after 1992. Recruitment of young plants has been low with a moderate amount of decadence in the population. Plants displaying poor vigor also increased substantially in 2005. Fringed sagebrush (*Artemisia frigida*), a "sub" shrub, is also moderately abundant on the site (Table - Browse Characteristics). Other browse species encountered on the site include basin big sagebrush (*A. tridentata* ssp. *tridentata*) and broom snakeweed (*Gutierrezia sarothrae*).

Herbaceous Understory: Cheatgrass is by far the most abundant understory species found at this site. Photos from 1982, 1988, and 1995 indicate that cheatgrass steadily increased in abundance. Prior to 1991, data for annual species were not collected so it is unknown exactly how abundant it was. Since 1995, nested frequency and cover of cheatgrass have remained very high. Several perennial grass species have been sampled, with thickspike wheatgrass (*Agropyron dasystachyum*), blue grama (*Bouteloua gracilis*) and sand dropseed (*Sporobolus cryptandrus*) being the most abundant. Forbs are very rare on the site. Perennial species are few with no more than four species being sampled in any year. Scarlet globemallow (*Sphaeralcea coccinea*) is the most commonly occurring perennial forb (Table - Herbaceous Trends).

Soil: Soils are alluvial deposited from limestone parent material with a loam texture and a slightly alkaline soil reaction (pH 7.8). Phosphorus has limited availability for plant growth and development at only 2.4 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Erosion is generally outweighed by soil sedimentation coming from the surrounding woodland slopes. Protective ground cover is adequate to limit erosion due to the abundance of thickspike wheatgrass and cheatgrass (Table - Basic Cover). The soil erosion condition was classified as stable in 2005 and 2010.

Trend Assessments

Browse:

- **1982 to 1988 - slightly up (+1):** The density of fourwing saltbush nearly doubled and the density of winterfat increased by 11%. Decadence is low and vigor is good. Recruitment of young plants

increased for both species and was good for fourwing saltbush at 11% and excellent for winterfat at 41%.

- **1988 to 1995 - stable (0):** Differences in density may be related to the larger sample area used in 1995; therefore, trend was determined using other parameters. There was little change in the decadence or vigor of either fourwing saltbush or winterfat. Recruitment of young saltbush plants increased markedly to 57% of the population, but recruitment of young winterfat plants decreased to 8%. Black sagebrush was sampled for the first time with the larger sample area.
- **1995 to 2000 - slightly down (-1):** All three of the key browse species; fourwing saltbush, winterfat and black sagebrush, decreased in density. Cover of saltbush and black sagebrush remained similar, but winterfat cover decreased from 3% to 2%. Decadence increased slightly in fourwing saltbush and black sagebrush, and recruitment of young plants decreased for all three species. Even with the decrease, recruitment was still good at 19% for fourwing saltbush.
- **2000 to 2005 - slightly down (-1):** The density of fourwing saltbush has increased by 18%, but cover decreased from 8% to 5% and decadence increased from 15% to 30%. Saltbush plants displaying poor vigor increased from 8% to 18%. The density of winterfat decreased by 29% and recruitment of young plants remained poor.
- **2005 to 2010 - slightly down (-1):** The densities of fourwing saltbush and winterfat decreased markedly, but cover remained similar for both species. Black sagebrush density increased substantially, though cover decreased slightly. Decadence of black sagebrush and fourwing saltbush decreased and both species had moderate decadence at 20%.

Grass:

- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for grasses are available from 1982, so no trend was given.
- **1988 to 1995 - down (-2):** The sum of nested frequency of perennial grasses decreased by 23% with a significant decrease in the nested frequency of thickspike wheatgrass and sand dropseed.
- **1995 to 2000 - stable (0):** There was a 16% decrease in the sum of nested frequency of perennial grasses, though cover increased from 4% to 8%. Much of the decrease in frequency was due to a significant decrease in the nested frequency of sand dropseed. Most of the increase in perennial grass cover was due to a significant increase in the nested frequency of thickspike wheatgrass and a subsequent increase in cover from 1% to 6%. Cheatgrass also had a significant decrease in nested frequency and cover decreased from 52% to 22%, but cheatgrass is still very prevalent.
- **2000 to 2005 - stable (0):** The sum of nested frequency of perennial grasses increased to 1995 levels, but cover also decreased to 1995 levels. Cheatgrass increased significantly in nested frequency and cover increased to 49%.
- **2005 to 2010 - stable (0):** The perennial grass sum of nested frequency changed little, with a slight increase in cover. Cheatgrass frequency and cover also remained similar.

Forb:

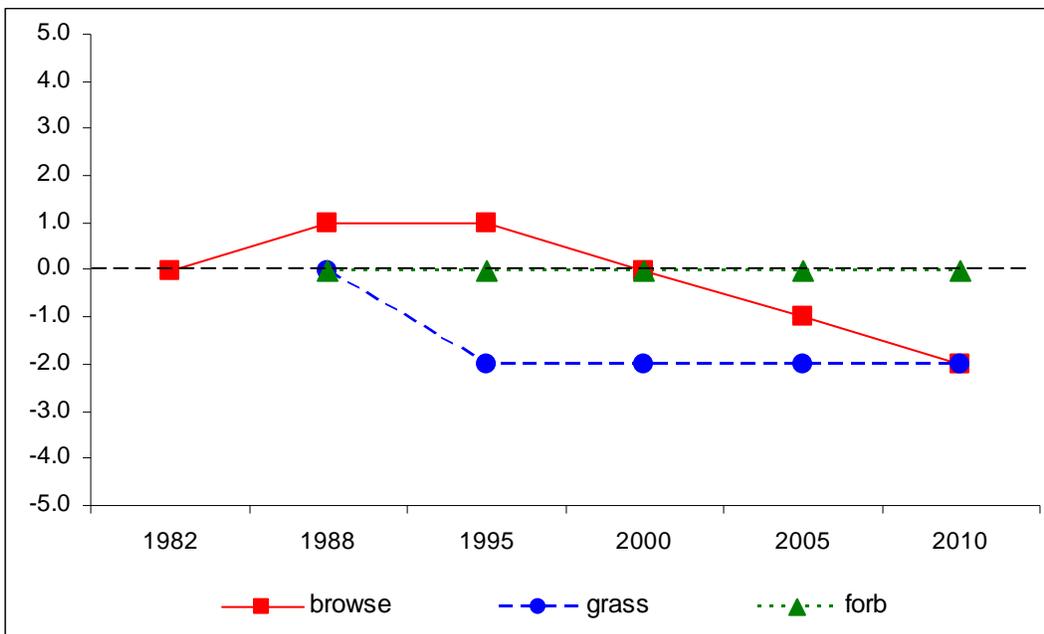
- **1982 to 1988 - no trend (NT):** Only quadrat frequency data for forbs are available from 1982, so no trend was given.
- **1988 to 1995 - stable (0):** Forbs are very rare and provide little forage.
- **1995 to 2000 - stable (0):** Forbs are very rare and provide little forage.
- **2000 to 2005 - stable (0):** Forbs are very rare and provide little forage.
- **2005 to 2010 - stable (0):** Forbs are very rare and provide little forage.

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --
 Management unit 10, study no: 1

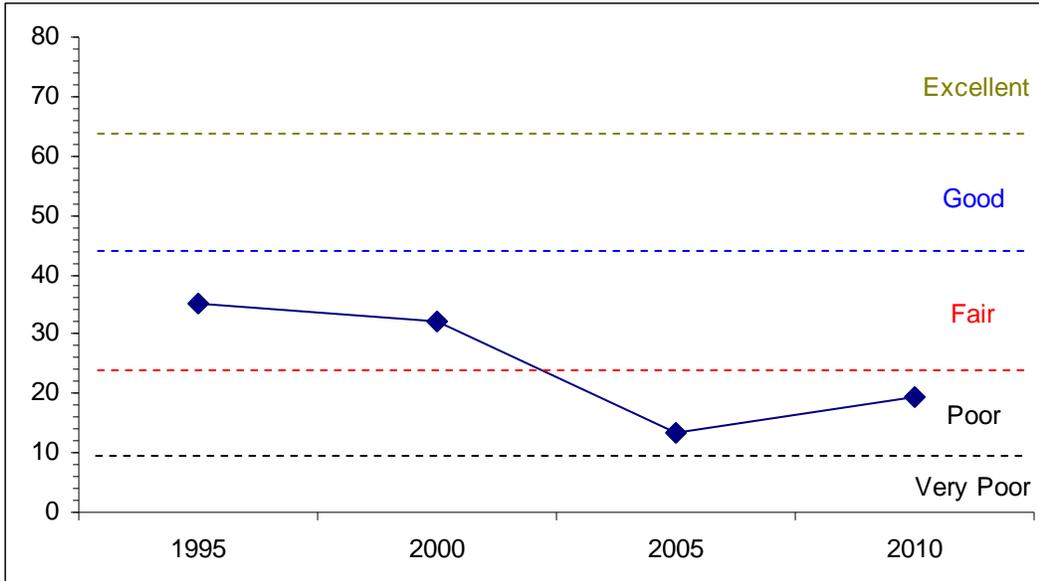
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	17.9	13.6	15.0	7.5	-20.0	1.2	0.0	35.2	Fair
00	15.0	9.8	6.9	16.1	-16.5	0.6	0.0	32.0	Fair
05	12.0	6.5	5.6	7.5	-20.0	1.7	0.0	13.3	Poor
10	12.8	9.7	6.4	9.6	-20.0	0.9	0.0	19.4	Poor

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
 Management unit 10, Study no: 1



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--
 Management unit 10, Study no: 1



HERBACEOUS TRENDS--
 Management unit 10, Study no: 1

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	<i>Agropyron dasystachyum</i>	b75	a38	b77	b83	ab66	1.29	6.28	1.87	1.12
G	<i>Bouteloua gracilis</i>	a8	ab26	ab25	b38	b47	1.01	.76	1.23	2.35
G	<i>Bromus tectorum</i> (a)	-	c379	a302	b344	b329	51.80	22.05	49.03	44.27
G	<i>Oryzopsis hymenoides</i>	a-	ab10	ab4	ab7	b8	.09	.04	.07	.07
G	<i>Poa fendleriana</i>	9	16	14	4	14	.21	.07	.06	.17
G	<i>Sitanion hystrix</i>	a-	b10	ab7	b14	ab3	.10	.19	.18	.01
G	<i>Sporobolus cryptandrus</i>	c161	b94	a37	ab53	ab64	1.04	.66	.35	1.06
G	<i>Stipa comata</i>	-	1	-	-	-	.00	-	-	-
Total for Annual Grasses		0	379	302	344	329	51.80	22.05	49.03	44.27
Total for Perennial Grasses		253	195	164	199	202	3.76	8.03	3.77	4.79
Total for Grasses		253	574	466	543	531	55.57	30.08	52.81	49.07
F	<i>Astragalus</i> sp.	-	1	-	-	-	.00	-	-	-
F	<i>Cryptantha</i> sp.	-	-	-	3	9	-	-	.00	.06
F	<i>Descurainia pinnata</i> (a)	-	ab4	a-	b14	ab4	.01	-	.09	.01
F	<i>Draba</i> sp. (a)	-	3	-	1	-	.00	-	.00	-
F	<i>Lappula occidentalis</i> (a)	-	b57	a5	bc81	c117	.48	.07	.87	1.16
F	<i>Schoenrambe linifolia</i>	-	6	1	6	6	.04	.00	.01	.01
F	<i>Sphaeralcea coccinea</i>	a20	b48	a19	ab30	a24	.58	.23	.82	.35
F	<i>Tragopogon dubius</i>	5	-	5	-	1	-	.07	-	.00
F	<i>Trifolium dubium</i>	6	-	-	-	-	-	-	-	-
F	Unknown forb-perennial	1	-	-	-	-	-	-	-	-
Total for Annual Forbs		0	64	5	96	121	0.50	0.07	0.97	1.17
Total for Perennial Forbs		32	55	25	39	40	0.62	0.31	0.83	0.43

Type	Species	Nestled Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
	Total for Forbs	32	119	30	135	161	1.12	0.37	1.80	1.61

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

BROWSE TRENDS--

Management unit 10, Study no: 1

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Artemisia frigida	75	9	9	7	1.36	.09	.04	.34
B	Artemisia nova	11	9	9	9	2.27	2.53	3.11	2.12
B	Artemisia tridentata tridentata	1	1	1	0	.01	-	-	-
B	Atriplex canescens	56	51	58	47	7.87	7.57	5.21	6.85
B	Ceratoides lanata	86	73	58	35	3.09	1.86	1.23	1.02
B	Gutierrezia sarothrae	10	15	11	18	.12	1.01	.13	.81
B	Pinus edulis	0	1	0	0	-	.00	-	.00
	Total for Browse	239	159	149	116	14.73	13.08	9.72	11.17

CANOPY COVER, LINE INTERCEPT--

Management unit 10, Study no: 1

Species	Percent Cover	
	'05	'10
Artemisia frigida	-	.21
Artemisia nova	3.40	3.54
Atriplex canescens	5.91	9.30
Ceratoides lanata	.28	.36
Gutierrezia sarothrae	.06	1.21

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 10, Study no: 1

Species	Average leader growth (in)	
	'05	'10
Atriplex canescens	4.5	3.3
Ceratoides lanata	4.5	2

BASIC COVER--

Management unit 10, Study no: 1

Cover Type	Average Cover %					
	'82	'88	'95	'00	'05	'10
Vegetation	2.25	8.75	65.86	46.86	58.90	62.64
Rock	1.25	.50	1.08	.32	.76	.01
Pavement	13.50	4.75	3.41	3.73	8.00	5.23
Litter	73.00	79.50	62.46	60.58	25.20	63.46
Cryptogams	0	0	.39	1.19	.06	.01
Bare Ground	10.00	6.50	8.80	12.56	17.90	6.59

SOIL ANALYSIS DATA --

Management unit 10, Study no: 1, Study Name: Indian Ridge

Effective rooting depth (in)	pH	loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
22.8	7.8	36.0	38.0	26.0	1.7	2.4	275.2	0.6

PELLET GROUP DATA--

Management unit 10, Study no: 1

Type	Quadrat Frequency				Days use per acre (ha)		
	'95	'00	'05	'10	'00	'05	'10
Rabbit	6	21	48	20	-	-	-
Elk	2	11	14	8	28 (70)	10 (25)	8 (20)
Deer	9	8	36	26	27 (68)	52 (129)	68 (167)
Cattle	6	3	4	6	23 (56)	9 (23)	12 (30)

BROWSE CHARACTERISTICS--

Management unit 10, Study no: 1

		Age class distribution					Utilization		
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Artemisia frigida									
82	3799	33	67	-	733	0	0	0	9/9
88	266	50	50	-	266	0	0	0	13/5
95	6000	16	84	-	520	0	0	0	14/7
00	420	19	81	-	160	33	5	0	4/5
05	300	40	60	-	-	27	7	0	5/5
10	760	3	97	-	-	0	0	0	5/8
Artemisia nova									
82	0	0	0	0	-	0	0	0	-/-
88	0	0	0	0	-	0	0	0	-/-
95	960	13	69	19	80	31	52	0	9/17
00	820	5	61	34	-	15	0	22	10/23
05	780	5	59	36	-	44	5	28	12/25
10	1080	2	78	20	-	9	7	20	8/22
Artemisia tridentata tridentata									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	40	100	0	-	20	0	0	0	41/69
00	20	0	100	-	-	0	100	0	15/16
05	20	0	100	-	-	0	100	0	30/60
10	0	0	0	-	-	0	0	0	31/74

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
<i>Atriplex canescens</i>									
82	399	0	100	0	-	50	0	0	30/31
88	599	11	89	0	-	0	0	0	49/70
95	2180	57	40	3	320	.91	0	0	38/46
00	1780	19	66	15	-	13	1	8	33/44
05	2100	16	54	30	40	31	50	18	29/35
10	1480	16	64	20	160	61	3	15	31/44
<i>Ceratoides lanata</i>									
82	7132	17	83	0	399	2	0	0	12/9
88	7931	41	58	1	66	24	7	0	15/10
95	6240	8	91	1	100	.32	0	1	13/9
00	3980	5	91	4	120	62	3	3	10/11
05	2820	6	91	4	-	15	78	3	8/8
10	1180	17	80	3	-	7	3	5	9/9
<i>Gutierrezia sarothrae</i>									
82	66	0	100	0	-	0	0	0	7/11
88	0	0	0	0	-	0	0	0	-/-
95	380	16	84	0	20	0	0	0	10/6
00	1440	4	85	11	-	0	0	15	6/8
05	680	38	62	0	60	0	0	0	8/7
10	2880	3	95	1	240	0	0	.69	7/9
<i>Pinus edulis</i>									
82	0	0	0	-	-	0	0	0	-/-
88	0	0	0	-	-	0	0	0	-/-
95	0	0	0	-	-	0	0	0	-/-
00	20	100	0	-	40	0	0	0	-/-
05	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	20	0	0	0	-/-