

Trend Study 10-1-05

Study site name: Indian Ridge.

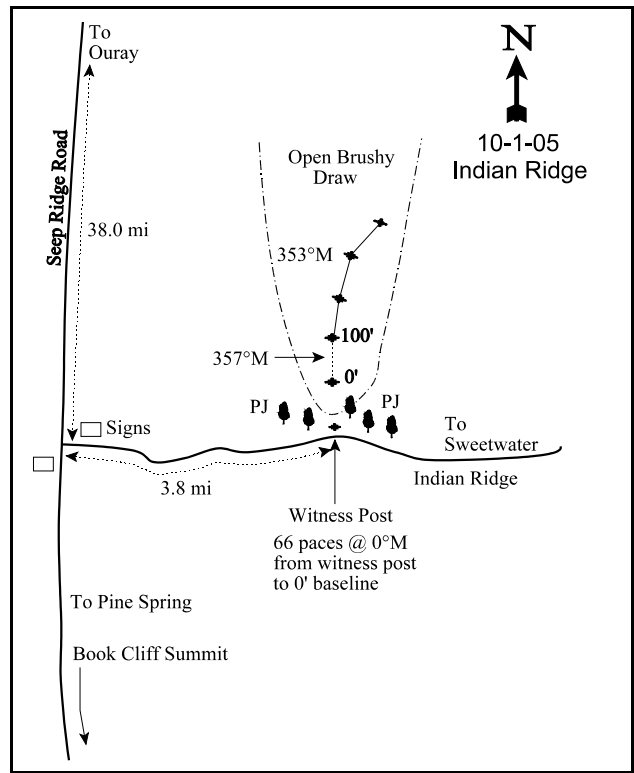
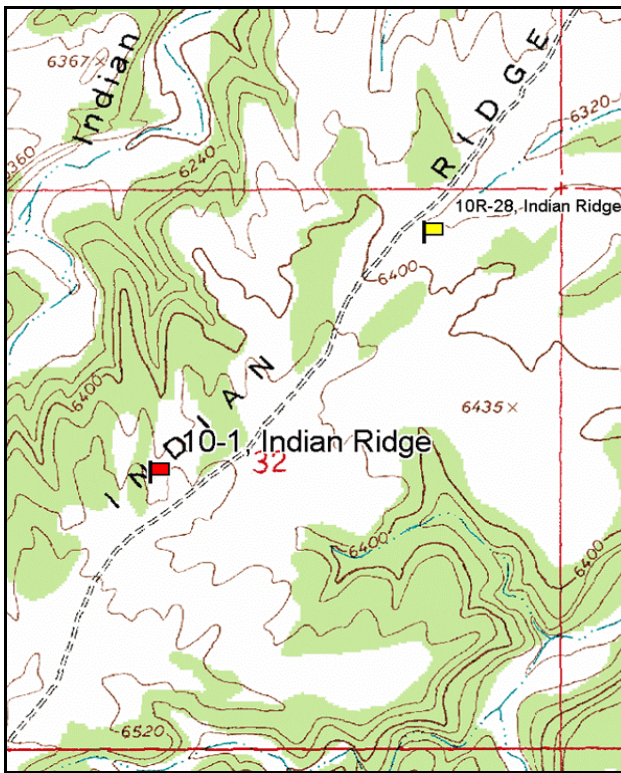
Vegetation type: Desert Shrub.

Compass bearing: frequency baseline 357 degrees magnetic.

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

LOCATION DESCRIPTION

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-saltbrush draw, marked by a 20 inch tall fencepost on the left. Walk down the draw 60 paces to the 0-foot baseline stake. The frequency baseline is marked by red steel fenceposts, 12 to 18 inches in height. The 0-foot baseline stake is marked by a red browse tag.



Map Name: Cooper Canyon.

Diagrammatic Sketch

Township 13S, Range 23E, Section 32

GPS: NAD 27, UTM 12S 4389176 N, 639914 E

DISCUSSION

Indian Ridge Trend Study No. 10-1

This study is located in a shallow draw on the north side of Indian Ridge. The area is principally deer winter range. The site elevation is 6,450 feet with a northern aspect and a slope of 5-6%. The vegetation type is desert shrub dominated by fourwing saltbush, winterfat, and black sagebrush with an understory of cheatgrass. Juniper and pinyon woodlands surround the draws and provide thermal and escape cover. Cattle grazing occurs in the winter and spring from November 1 to April 30 on a rotational deferment grazing system in the BLM Sunday School allotment. Pellet group transect data from 2000 estimated 23 cow days use/acre (57 cdu/ha), 28 elk days use/acre (69 edu/ha), and 27 deer days use/acre (67 ddu/ha). In 2005, cattle and elk use declined to 9 cow days use/acre (23 cdu/ha) and 10 elk days use/acre (25 edu/ha). Deer use was higher at 52 deer days use/acre (129 ddu/ha). Bones from a deer carcass were found on the site in 2005.

Soils are alluvially deposited from limestone parent material and are moderately deep with an estimated effective rooting depth of nearly 23 inches. Soil depth progressively becomes more shallow toward the ridges. Soils have a loam texture and a slightly alkaline soil reaction (7.8 pH). A profile stoniness index estimated from penetrometer readings shows rockiness in the profile to be quite uniform down to 20-25 inches below the surface. There are dense pockets of soil in the shrub interspaces. 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. An erosion class assessment rated erosion as stable in 2005. Phosphorus could be a limiting factor in growth at only 2.4 ppm, which is very low for even wildland soils (Tiedemann and Lopez 2004).

The key browse species at this site are fourwing saltbush, winterfat, and black sagebrush. Fourwing saltbush has provided over 50% of the browse cover in each reading with 5-8% cover. Young age class recruitment was high in 1995 at 57%, good at 19% in 2000 and 16% in 2005. Decadence increased from 3% in 1995 to 15% in 2000 and 30% in 2005. Drought conditions have been a factor in the increased decadence and decreased recruitment of fourwing saltbush. Utilization increased from light to moderate to moderate to heavy in 2005.

Winterfat has had between 1-3% cover since 1995. It 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 (7,133 plants/acre) to 1995 (6,240 plants/acre), but decreased substantially in 2000 to an estimated 3,980 plants/acre. In 2005, it declined another 29% to 2,820 plants/acre. Use was mostly light in 1995, increased to mostly moderate in 2000, and increased again in 2005 to mostly heavy. Utilization is difficult to determine on these shrubs due to abundant annual leader growth. Winterfat displayed excellent leader growth in 2000 and 2005 with leaders averaging nearly 5 inches in length. Decadence has been low and vigor has been good, but recruitment has been low since 1995.

Black sagebrush was picked up with the increased sample size used after 1992, a population of 960 plants/acre was estimated in 1995. This decreased slightly to 820 plants/acre in 2000 and 780 plants/acre in 2005. Recruitment has been low and decadency increased to 36% by 2005. Twenty-eight percent of the population was classified as dying in 2005. Increased decadency and a higher proportion of plants displaying poor vigor can be attributed in part to drought conditions and the high amount of cheatgrass. Fringed sagebrush, a "sub" shrub, was moderately abundant in 1995 (6,000 plants/acre). This decreased dramatically to 420 plants/acre in 2000 and 300 plants/acre in 2005. This decline may be due to drought conditions. This low-growing species has only been lightly utilized, but it can provide good winter forage for big game when snows are not too deep. Other browse species encountered on the site include basin big sagebrush and broom snakeweed.

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 then. In 1995, nested frequency was highest and cover was over 50%. This decreased in 2000 with drought conditions, but increased again in 2005 to 49%. Seven perennial grass species have been sampled, with thickspike wheatgrass, blue grama, and sand dropseed being the most abundant. Sum of nested frequency of perennial grasses decreased from 1988-2000, but increased 21% in 2005. Forb composition is depleted. Perennial species are few with no more than four species being sampled in any year. Scarlet globemallow is the most commonly occurring perennial, but decreased in 2000 due to drought.

1982 APPARENT TREND ASSESSMENT

Soil trend appears stable but is influenced strongly by the surrounding pinyon-juniper type. Concurrent sedimentation and erosion result in a nearly continuous turnover or soil disturbance, which allows an abundant growth of annuals and inhibits, to a degree, perennial establishment. Vegetation trend may be slightly improving. The shrub stand, especially fringed sagebrush and winterfat, appear to be thickening. Management should strive towards encouraging the expansion of fourwing saltbush and other shrubs that can provide needed forage diversity.

1988 TREND ASSESSMENT

The reread of this 1982 range trend study demonstrated that very little change has occurred in this desert shrub type. The density and age structure of the key browse species, winterfat and fourwing saltbush, are basically unchanged. These browse species are very vigorous, with abundant seed heads and new growth. In 1988, 28% of the mature winterfat had a moderate to heavily hedged growth form, but the majority are still lightly used. There was a significant decrease in the number of fringed sagebrush encountered. Trend for the herbaceous understory is up but still in poor condition. Quadrat frequency for western wheatgrass and sand dropseed increased although perennial grasses are lacking on the site. Forb frequency is very low and slightly down since 1982. The soil trend showed slight improvement, but not enough to warrant a change in trend. There was a slight decline in bare ground combined with an increase in litter and basal vegetation cover. Soil trend is considered stable.

TREND ASSESSMENT

soil - stable (0)

browse - stable (0)

herbaceous understory -slightly up (+1)

1995 TREND ASSESSMENT

The soil trend appears stable. Erosion is minimal, mainly due to the dense cover of cheatgrass. Trend for browse has improved since the last reading. Fourwing saltbush densities have increased, while winterfat has slightly decreased due to a decline in number of young plants (3,266 to 500 plants/acre). The majority of the fourwing are young plants which make up 57% of the total population. Due to the large amounts of current annual growth on winterfat and fourwing, utilization was difficult to determine. Use appears light for fourwing and winterfat. The dominant vegetation on the site is cheatgrass which is very vigorous this year due to the unusually wet spring. Cheatgrass has a sum of nested frequency of 379 out of a possible 400 and a quadrat frequency of 97%. The plants are 20 to 30 inches height and cover 52% of the ground surface. Perennial grasses consisting of sand dropseed, mutton bluegrass, and blue grama are present under the cheatgrass canopy while thickspike wheatgrass occurs in small scattered patches. Sum of nested frequency for perennial grasses has declined since 1988 indicating a downward trend. Forbs are uncommon on the site and consist of mostly annuals. Scarlet globemallow is the only common perennial forb. The Desirable Components Index (see methods) rated this site as fair. The high amount of cheatgrass and the potential for fire lowers the score.

TREND ASSESSMENT

soil - stable (0)

browse - up (+2)

herbaceous understory - down (-2)

winter range condition (DC Index) - fair (37) Lower potential scale

2000 TREND ASSESSMENT

Trend for soil appears stable. There is adequate ground cover from grasses and litter to minimize erosion. The ratio of bare ground to protective ground cover (vegetation, litter, and cryptogams) is unchanged since the last reading. Trend for browse is slightly down. The key species, fourwing saltbush, winterfat, and black sagebrush show declines in density and increases in decadence. Also, the proportion of plants classified as dying is high for the key species. Recruitment (proportion of young plants in the population) is low for black sagebrush and winterfat, and moderate for fourwing saltbush. Increased poor vigor, decreases in density, and increases in decadence for browse can be attributed to drought. Dry conditions make it difficult for seedling and young plants to become established and persist. Cheatgrass decreased significantly with the drier conditions, but is still the major component of the understory. Despite the decrease in cheatgrass the trend for the herbaceous understory is slightly down as the weighted sum of nested frequency for perennial grasses and forbs decreased by 17% from 1995. The DCI score remained fair.

TREND ASSESSMENT

soil - stable (0)

browse - slightly down (-1)

herbaceous understory - slightly down (-1)

winter range condition (DC Index) - fair (35) Lower potential scale

2005 TREND ASSESSMENT

The soil trend is slightly down. Relative percent bare ground increased from 10% to 16%, while relative percent litter cover decreased from 48% to 23%. This may be due to lower amounts of cheatgrass during preceding drought years. The ratio of bare ground to protective ground cover (vegetation, litter, and cryptogams) decreased from 1:3.5 in 2000 and 2005 to 1:3.0. The browse trend is slightly down. Fourwing saltbush increased in density by 15%, but decadence increased from 15% to 30%. The number of plants classified as dying increased from 8% to 18%. Utilization increased to moderate to heavy. Winterfat density has decreased 29% since 2000 and 55% since 1995. Black sagebrush density declined only slightly since 2000, but percent decadence has remained at about 35%. The herbaceous understory trend is slightly up. Cheatgrass sum of nested frequency increased significantly since 2000, but is not as high as it was in 1995. Cover of cheatgrass returned to about the same level as it was in 1995. The high amount of cheatgrass is detrimental to perennial species and also young and seedling shrubs. The nested frequency for perennial grasses increased since 2000. Perennial forbs decreased, but they contribute very little to the herbaceous understory. Lower amounts of cheatgrass during recent drought years may have allowed these perennials to increase. The DCI rating declined to poor due to increased decadency and lower recruitment for the key browse species. Cheatgrass cover also increased.

TREND ASSESSMENT

soil - slightly down (-1)

browse - slightly down (-1)

herbaceous understory - slightly up (+1)

winter range condition (DC Index) - poor (16) Lower potential scale

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

Type	Species	Nested Frequency				Average Cover %		
		'88	'95	'00	'05	'95	'00	'05
G	<i>Agropyron dasystachyum</i>	_b 75	_a 38	_b 77	_b 83	1.29	6.28	1.87
G	<i>Bouteloua gracilis</i>	_a 8	_{ab} 26	_{ab} 25	_b 38	1.01	.76	1.23
G	<i>Bromus tectorum</i> (a)	-	_c 379	_a 302	_b 344	51.80	22.05	49.03
G	<i>Oryzopsis hymenoides</i>	-	10	4	7	.09	.04	.07
G	<i>Poa fendleriana</i>	9	16	14	4	.21	.07	.06
G	<i>Sitanion hystrix</i>	_a -	_b 10	_{ab} 7	_b 14	.10	.19	.18
G	<i>Sporobolus cryptandrus</i>	_c 161	_b 94	_a 37	_{ab} 53	1.04	.66	.35
G	<i>Stipa comata</i>	-	1	-	-	.00	-	-
Total for Annual Grasses		0	379	302	344	51.80	22.05	49.03
Total for Perennial Grasses		253	195	164	199	3.76	8.03	3.77
Total for Grasses		253	574	466	543	55.57	30.08	52.81
F	<i>Astragalus</i> sp.	-	1	-	-	.00	-	-
F	<i>Cryptantha</i> sp.	-	-	-	3	-	-	.00
F	<i>Descurainia pinnata</i> (a)	-	_a 4	_a -	_b 14	.01	-	.09
F	<i>Draba</i> sp. (a)	-	3	-	1	.00	-	.00
F	<i>Lappula occidentalis</i> (a)	-	_b 57	_a 5	_b 81	.48	.07	.87
F	<i>Schoenocrambe linifolia</i>	-	6	1	6	.04	.00	.01
F	<i>Sphaeralcea coccinea</i>	_a 20	_b 48	_a 19	_{ab} 30	.58	.23	.82
F	<i>Tragopogon dubius</i>	5	-	5	-	-	.07	-
F	<i>Trifolium dubium</i>	6	-	-	-	-	-	-
F	Unknown forb-perennial	1	-	-	-	-	-	-
Total for Annual Forbs		0	64	5	96	0.50	0.07	0.97
Total for Perennial Forbs		32	55	25	39	0.62	0.31	0.83
Total for Forbs		32	119	30	135	1.12	0.37	1.80

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	'95	'00	'05
B	Artemisia frigida	75	9	9	1.36	.09	.04
B	Artemisia nova	11	9	9	2.27	2.53	3.11
B	Artemisia tridentata tridentata	1	1	1	.01	-	-
B	Atriplex canescens	56	51	58	7.87	7.57	5.21
B	Ceratoides lanata	86	73	58	3.09	1.86	1.23
B	Gutierrezia sarothrae	10	15	11	.12	1.01	.13
B	Pinus edulis	0	1	0	-	.00	-
Total for Browse		239	159	146	14.73	13.08	9.72

CANOPY COVER, LINE INTERCEPT --

Management unit 10 , Study no: 1

Species	Percent Cover
	'05
Artemisia nova	3.40
Atriplex canescens	5.91
Ceratoides lanata	.28
Gutierrezia sarothrae	.06

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 10 , Study no: 1

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

BASIC COVER --

Management unit 10 , Study no: 1

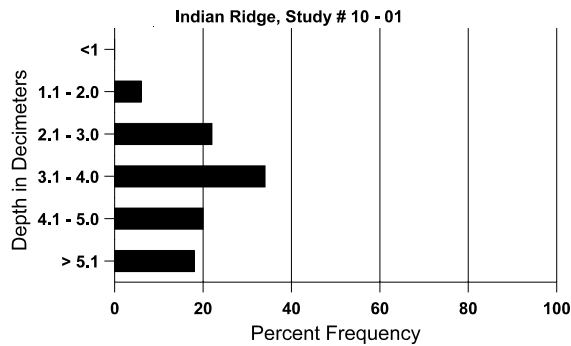
Cover Type	Average Cover %				
	'82	'88	'95	'00	'05
Vegetation	0	8.75	65.86	46.86	58.90
Rock	0	.50	1.08	.32	.76
Pavement	0	4.75	3.41	3.65	8.00
Litter	0	79.50	62.46	60.58	25.20
Cryptogams	0	0	.39	1.19	.06
Bare Ground	10.00	6.50	8.80	12.56	17.90

SOIL ANALYSIS DATA --

Herd Unit 10, Study # 1, Study Name: Indian Ridge

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	ppm P	ppm K	dS/m
22.8	58.4 (18.1)	7.8	36.0	38.0	26.0	1.7	2.4	275.2	0.6

Stoniness Index



PELLET GROUP DATA --

Management unit 10 , Study no: 1

Type	Quadrat Frequency		
	'95	'00	'05
Rabbit	6	21	48
Elk	2	11	14
Deer	9	6	36
Cattle	6	3	4

Days use per acre (ha)	
'00	'05
-	-
28 (70)	10 (25)
27 (68)	52 (129)
23 (56)	9 (23)

BROWSE CHARACTERISTICS --
Management unit 10 , Study no: 1

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
Artemisia frigida												
82	3799	733	1266	2533	-	-	0	0	-	-	0	9/9
88	266	266	133	133	-	-	0	0	-	-	0	13/5
95	6000	520	940	5060	-	-	0	0	-	-	0	14/7
00	420	160	80	340	-	-	33	5	-	-	0	4/5
05	300	-	120	180	-	-	27	7	-	-	0	5/5
Artemisia nova												
82	0	-	-	-	-	-	0	0	0	-	0	-/-
88	0	-	-	-	-	-	0	0	0	-	0	-/-
95	960	80	120	660	180	20	31	52	19	-	0	9/17
00	820	-	40	500	280	20	15	0	34	22	22	10/23
05	780	-	40	460	280	140	44	5	36	28	28	12/25
Artemisia tridentata tridentata												
82	0	-	-	-	-	-	0	0	-	-	0	-/-
88	0	-	-	-	-	-	0	0	-	-	0	-/-
95	40	20	40	-	-	-	0	0	-	-	0	41/69
00	20	-	-	20	-	-	0	100	-	-	0	15/16
05	20	-	-	20	-	-	0	100	-	-	0	30/60
Atriplex canescens												
82	400	-	-	400	-	-	50	0	0	-	0	30/31
88	599	-	66	533	-	-	0	0	0	-	0	49/70
95	2180	320	1240	880	60	20	.91	0	3	-	0	38/46
00	1780	-	340	1180	260	60	13	1	15	8	8	33/44
05	2100	40	340	1140	620	160	31	50	30	18	18	29/35
Ceratoides lanata												
82	7133	400	1200	5933	-	-	2	0	0	-	0	12/9
88	7932	66	3266	4600	66	-	24	7	1	-	0	15/10
95	6240	100	500	5700	40	-	.32	0	1	.32	1	13/9
00	3980	120	200	3620	160	60	62	3	4	3	3	10/11
05	2820	-	160	2560	100	-	15	78	4	3	3	8/8

		Age class distribution (plants per acre)					Utilization					
Year	Plants per Acre (excluding seedlings)	Seedling	Young	Mature	Decadent	Dead	% moderate	% heavy	% decadent	% dying	% poor vigor	Average Height Crown (in)
<i>Gutierrezia sarothrae</i>												
82	66	-	-	66	-	-	0	0	0	-	0	7/11
88	0	-	-	-	-	-	0	0	0	-	0	-/-
95	380	20	60	320	-	-	0	0	0	-	0	10/6
00	1440	-	60	1220	160	40	0	0	11	8	15	6/8
05	680	60	260	420	-	-	0	0	0	-	0	8/7
<i>Pinus edulis</i>												
82	0	-	-	-	-	-	0	0	-	-	0	-/-
88	0	-	-	-	-	-	0	0	-	-	0	-/-
95	0	-	-	-	-	-	0	0	-	-	0	-/-
00	20	40	20	-	-	-	0	0	-	-	0	-/-
05	0	-	-	-	-	-	0	0	-	-	0	-/-