

Trend Study 24-12-08

Study site name: Marshall Basin .

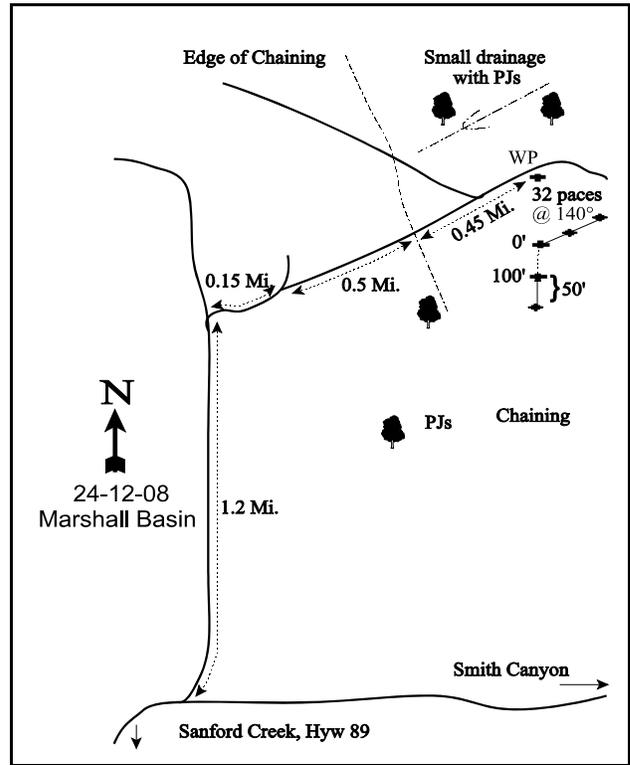
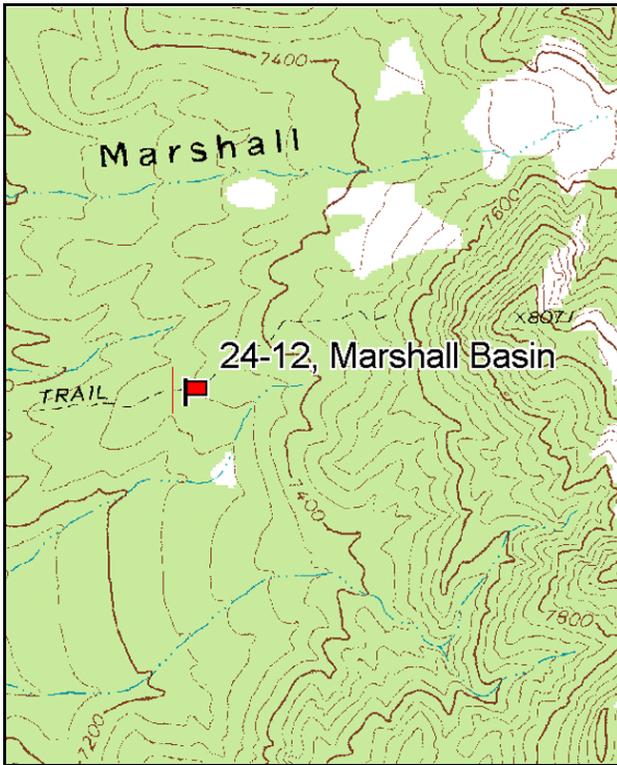
Vegetation type: Chained, Seeded P-J .

Compass bearing: frequency baseline 170 degrees magnetic.

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

LOCATION DESCRIPTION

About 8 miles north of Panguitch on Highway 89 (or 1.7 miles south of the SR20 and Highway 89 junction) turn east onto the Sanford Creek Road. Travel 4 miles east on the main road to a fork. Bear left towards Smith Canyon. Go 1.5 miles to a fork just below the mouth of Smith Canyon, turn left. Continue 1.2 miles to a fork. Stay right and go 0.15 miles to another fork. Stay right and continue 0.5 miles to the edge of a chaining. Continue 0.45 miles east into the chaining to the study area. The witness post is on the right side of road. From the witness post walk 32 paces at 140 degrees magnetic to the 0' stake. The 0' baseline stake is marked by browse tag #9003.



Map Name: Blind Spring Mountain

Diagrammatic Sketch

Township 32S , Range 4 1/2W , Section 34

GPS: NAD 83, UTM 12S 383993 E, 4204402 N

DISCUSSION

Marshall Basin - Trend Study 24-12

Study Information

This site monitors a key wintering area for mule deer on a chained and seeded pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) area in Marshall Basin, located on the western slope of the herd unit [elevation: 7,300 feet (2,225 m), slope: 8%-13%, aspect: southwest]. Approximately 900 acres were chained and seeded in the fall of 1984 as part of a cooperative project involving the Powell Ranger District and the Division of Wildlife Resources. The chained area consists of alluvial benches which gradually slope westward toward the Sevier River. Steep, wooded slopes provide a significant amount of cover above the chaining. Protective cover is also present in the draws which traverse the chained area. Quadrat frequency of deer and elk pellet groups were fairly abundant in 1997 at 20% and 21%, respectively. Wildlife use from deer and elk was estimated to be light in 2003 (1 ddu/acre:3 ddu/ha and 16 edu/acre:40 edu/ha) and 2008 (1 ddu/acre:3 ddu/ha and 7 edu/acre:18 edu/ha). A few old cattle pats were also encountered in 2003 and 2008. Rabbit use was noted to be very high on the site in 2008.

Soil

Soil is deep with an effective rooting depth estimated at nearly 18 inches. Texture is a sandy loam. The soil surface is quite loose and much of it is exposed. Erosion pavement is quite common and was present prior to the chaining. Scattered debris from the chaining and litter buildup from un-grazed grasses help to stabilize the soil on this site but total protective ground cover is marginal. Relative combined vegetation and litter cover was 45%-57% since 1997. Relative combined rock and pavement cover has increased from 21% in 1997 to 36% in 2008. Relative bare ground cover was 19%-28% since 1997. Some erosion was apparent in 2003 and the erosion condition class was determined to be slight in 2003, but stable in 2008.

Browse

The chaining project was initiated to increase browse on deer winter range, but shrubs have been slow to become established on this chaining. The area is presently more valuable to deer during the spring and fall, at which time the area provides quality, succulent herbaceous forage. Shrubs found on the site include very low numbers of mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) and bitterbrush (*Purshia tridentata*) (only 20 plants/acre). The less preferred but more abundant rubber rabbitbrush (*Chrysothamnus nauseosus* ssp. *hololeucus*) is increasing on the site from 220 plants/acre in 1997 to 480 plants/acre by 2008.

Herbaceous Understory

The herbaceous understory provides over 80% of the total vegetation cover on the site. The only abundant species is crested wheatgrass (*Agropyron cristatum*). It provided 86% of the grass cover in 1997, 97% in 2003, and 87% in 2008. Intermediate wheatgrass (*A. intermedium*) was seeded but it is not very abundant indicating that the site is too dry for the species. The site supported a variety of forbs in 1987 but many were weedy increasers. Many forbs have disappeared from the site and only 3 species were encountered in 2003. The number of forbs encountered in 2008 increased to 7, but over half of those were weedy annual species.

1991 TREND ASSESSMENT

Trend for browse is stable. There are no noteworthy browse species of any consequence on the site at this time. Trend for the grasses is stable. The seeded species, crested wheatgrass, still dominates the site. Another seeded grass, intermediate wheatgrass, did not increase, but stayed at almost the same frequencies as noted in 1987. The herbaceous understory has lost many forbs since 1987. The trend for forbs is down. The forbs have gone from 14 species down to 6 in 1991. The seeded alfalfa and small burnet were not found in 1991. However, some of the forbs which have disappeared from the site include weedy early seral species. This was probably a direct result of the extended drought along with increased competition from crested wheatgrass.

browse - stable (0)

grass - stable (0)

forb - down (-2)

1997 TREND ASSESSMENT

Trend for browse is stable. Density differences of browse species may be related to the larger sample area used in 1997, therefore, trend for browse was determined using other parameters. Browse is extremely limited on the site, but many browse species including mountain big sagebrush and antelope bitterbrush were sampled for the first time in 1997. Trend for the grasses is stable. Nested frequency of crested wheatgrass increased significantly, but nested frequency of bottlebrush squirreltail and blue grama declined significantly. In 1987, squirreltail had a nested frequency slightly higher than crested wheatgrass, 88 compared to 103. In 1991, nested frequency of squirreltail was 106 and quadrat frequency was 44%. By 1997, nested frequency declined to only 3 and quadrat frequency to 1%. The trend for forbs is stable, but they are still rare.

winter range condition (DCI) - very poor (23) Mid-level potential scale

browse - stable (0)

grass - stable (0)

forb - stable (0)

2003 TREND ASSESSMENT

Shrubs are still rare on the site with the most preferred species, mountain big sagebrush and bitterbrush, occurring at a density of only 20 plants/acre. No seedlings or young were encountered for either species. The only fairly common shrub is white rubber rabbitbrush which was estimated at only 340 plants/acre. Browse trend is considered stable, but shrubs are still not abundant enough to provide much winter browse forage for deer and elk. The trend for grasses is slightly down, but poor with crested wheatgrass providing virtually all of the herbaceous cover. Sum of nested frequency of perennial grasses declined 29% with a significant decrease in the nested frequency of crested wheatgrass. The nested frequency of the invasive annual, cheatgrass, also decreased significantly, however. The trend for forbs is slightly down as the sum of nested frequency continues to decline. Forbs are still rare.

winter range condition (DCI) - very poor (16) Mid-level potential scale

browse - stable (0)

grass - slightly down (-1)

forb - slightly down (-1)

2008 TREND ASSESSMENT

The trend for browse is stable, but shrubs continue to have a minimal presence on the site. One of the preferred browse species, mountain big sagebrush, density fell to 0 in 2008. Bitterbrush, the other preferred browse species density remained similar to 2003, but rare, at 20 plants/acre. The trend for grasses is slightly up, primarily due to the increase in the sum of nested frequency of the seeded species crested wheatgrass. Other perennial grass species remain rare. The trend for forbs is slightly up with an increase in the sum of nested frequency of perennial forbs. Forbs are still very rare.

winter range condition (DCI) - very poor (18) Mid-level potential scale

browse - stable (0)

grass - slightly up (+1)

forb - slightly up (+1)

HERBACEOUS TRENDS --
Management unit 24 , Study no: 12

T y p e	Species	Nested Frequency					Average Cover %		
		'87	'91	'97	'03	'08	'97	'03	'08
G	Agropyron cristatum	_a 88	_a 124	_c 225	_b 165	_c 209	11.48	7.84	7.42
G	Agropyron intermedium	2	3	8	3	10	.07	.03	.17
G	Bouteloua gracilis	_c 100	_b 55	_a 17	_a 10	_a 7	.21	.19	.31
G	Bromus tectorum (a)	-	-	_b 86	_a 4	_a 7	1.47	.04	.02
G	Festuca ovina	4	-	-	-	6	-	-	.03
G	Oryzopsis hymenoides	3	8	1	-	9	.01	-	.33
G	Poa secunda	5	6	-	-	3	-	-	.00
G	Sitanion hystrix	_b 103	_b 106	_a 3	_a 2	_a 10	.03	.01	.27
Total for Annual Grasses		0	0	86	4	7	1.47	0.04	0.01
Total for Perennial Grasses		305	302	254	180	254	11.80	8.07	8.55
Total for Grasses		305	302	340	184	261	13.28	8.11	8.57
F	Astragalus sp.	_a 1	_b 16	_a -	_a -	_{ab} 7	-	-	.07
F	Chenopodium fremontii (a)	12	3	2	12	9	.01	.11	.05
F	Cryptantha fulvocanescens	_c 24	_{bc} 21	_{ab} 10	_a 2	_a -	.05	.00	-
F	Cruciferae	-	1	-	-	-	-	-	-
F	Cryptantha sp.	-	-	-	-	7	-	-	.16
F	Descurainia pinnata (a)	-	-	-	-	2	-	-	.01
F	Descurainia sp. (a)	-	-	2	-	-	.00	-	-
F	Eriogonum hookeri (a)	_b 51	_a -	_a -	_a -	_a -	-	-	-
F	Erigeron pumilus	1	-	1	-	-	.00	-	-
F	Ipomopsis aggregata	4	-	-	-	-	-	-	-
F	Lappula occidentalis (a)	-	-	_a -	_a -	_b 15	-	-	.20
F	Lactuca serriola	_b 118	_a -	_a -	_a -	_a 1	-	-	.15
F	Lesquerella ludoviciana	3	8	-	-	-	-	-	-
F	Medicago sativa	11	-	-	-	-	-	-	-
F	Nicotiana attenuata (a)	-	-	-	51	-	-	1.76	.00
F	Phlox longifolia	-	-	1	-	-	.00	-	-
F	Salsola iberica (a)	_b 91	_a 12	_a -	_a -	_a -	-	-	-
F	Sanguisorba minor	8	-	-	-	-	-	-	-
F	Sisymbrium altissimum (a)	-	-	_a -	_a -	_b 19	-	-	.23
F	Taraxacum officinale	3	-	-	-	-	-	-	-
F	Tragopogon dubius	1	-	-	-	-	-	-	-
Total for Annual Forbs		154	15	4	63	45	0.01	1.87	0.50
Total for Perennial Forbs		174	46	12	2	15	0.06	0.00	0.38

T y p e	Species	Nested Frequency					Average Cover %		
		'87	'91	'97	'03	'08	'97	'03	'08
	Total for Forbs	328	61	16	65	60	0.07	1.88	0.89

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

BROWSE TRENDS --

Management unit 24 , Study no: 12

T y p e	Species	Strip Frequency			Average Cover %		
		'97	'03	'08	'97	'03	'08
B	<i>Artemisia pygmaea</i>	0	0	0	.18	-	-
B	<i>Artemisia tridentata vaseyana</i>	1	1	0	0.0	.15	-
B	<i>Chrysothamnus nauseosus</i>	0	0	3	-	-	.41
B	<i>Chrysothamnus nauseosus hololeucus</i>	9	13	14	.30	1.92	1.81
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	0	0	1	-	-	.00
B	<i>Gutierrezia sarothrae</i>	4	4	14	.21	.18	.64
B	<i>Juniperus osteosperma</i>	1	0	0	.85	-	-
B	<i>Opuntia sp.</i>	6	2	4	.24	.15	.00
B	<i>Pinus edulis</i>	3	1	0	.15	0.0	-
B	<i>Purshia tridentata</i>	1	1	1	0.0	0.0	0.0
	Total for Browse	25	22	37	1.94	2.40	2.88

CANOPY COVER, LINE INTERCEPT --

Management unit 24 , Study no: 12

Species	Percent Cover	
	'03	'08
<i>Artemisia tridentata vaseyana</i>	.50	-
<i>Chrysothamnus nauseosus</i>	-	.45
<i>Chrysothamnus nauseosus hololeucus</i>	2.93	2.06
<i>Gutierrezia sarothrae</i>	-	.90
<i>Pinus edulis</i>	.10	-

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 24 , Study no: 12

Species	Average leader growth (in)	
	'03	'08
Purshia tridentata	3.0	2.1

BASIC COVER --

Management unit 24 , Study no: 12

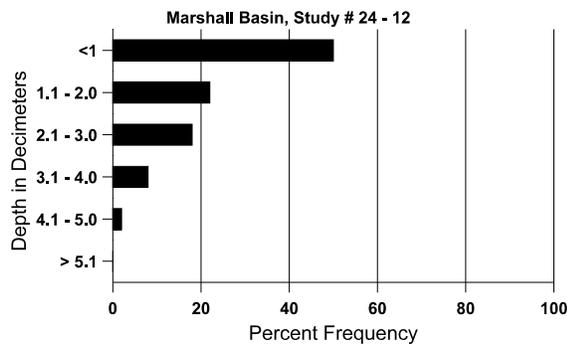
Cover Type	Average Cover %				
	'87	'91	'97	'03	'08
Vegetation	6.75	4.00	16.23	12.96	11.71
Rock	7.25	4.25	2.74	6.09	6.03
Pavement	9.75	28.25	18.25	18.93	32.58
Litter	59.00	51.50	41.13	39.43	36.91
Cryptogams	0	0	.09	0	0
Bare Ground	17.25	12.00	21.42	30.42	20.54

SOIL ANALYSIS DATA --

Management unit 24, Study no: 12, Study Name: Marshall Basin

Effective rooting depth (in)	Temp °F (depth)	pH	sandy loam			%OM	PPM P	PPM K	dS/m
			%sand	%silt	%clay				
17.8	71.3 (13.7)	N/A	57.3	24.1	18.6	2.0	24.6	188.8	0.5

Stoniness Index



PELLET GROUP DATA --
 Management unit 24 , Study no: 12

Type	Quadrat Frequency		
	'97	'03	'08
Rabbit	8	42	96
Elk	20	15	8
Deer	21	9	6
Cattle	-	-	-

Days use per acre (ha)	
'03	'08
-	-
16 (40)	7 (18)
1 (3)	1 (3)
2 (5)	2 (5)

BROWSE CHARACTERISTICS --
 Management unit 24 , Study no: 12

		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>Artemisia tridentata vaseyana</i>												
87	0	-	-	-	-	-	0	0	0	-	0	-/-
91	0	-	-	-	-	-	0	0	0	-	0	-/-
97	20	-	-	20	-	-	0	0	0	-	0	-/-
03	20	-	-	-	20	-	0	0	100	-	0	-/-
08	0	-	-	-	-	-	0	0	0	-	0	34/43
<i>Chrysothamnus nauseosus</i>												
87	0	-	-	-	-	-	0	0	-	-	0	-/-
91	0	-	-	-	-	-	0	0	-	-	0	-/-
97	0	-	-	-	-	-	0	0	-	-	0	-/-
03	0	-	-	-	-	-	0	0	-	-	0	-/-
08	60	200	-	60	-	-	0	0	-	-	0	39/57
<i>Chrysothamnus nauseosus hololeucus</i>												
87	66	-	-	66	-	-	0	0	0	-	0	19/13
91	66	-	-	66	-	-	0	0	0	-	0	28/17
97	220	-	100	100	20	60	0	0	9	9	9	32/45
03	340	-	-	320	20	-	6	0	6	-	0	29/44
08	480	1560	280	180	20	-	0	0	4	4	4	34/50
<i>Chrysothamnus viscidiflorus viscidiflorus</i>												
87	0	-	-	-	-	-	0	0	-	-	0	-/-
91	0	-	-	-	-	-	0	0	-	-	0	-/-
97	0	-	-	-	-	-	0	0	-	-	0	13/20
03	0	-	-	-	-	-	0	0	-	-	0	-/-
08	20	40	-	20	-	-	0	0	-	-	0	16/16

		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)
Gutierrezia sarothrae												
87	465	-	99	366	-	-	0	0	0	-	0	9/10
91	932	-	33	866	33	-	14	4	4	-	11	7/8
97	200	-	-	200	-	-	0	0	0	-	0	9/13
03	160	280	120	40	-	40	0	0	0	-	0	6/5
08	1080	60	-	1060	20	-	0	0	2	-	2	7/9
Juniperus osteosperma												
87	0	-	-	-	-	-	0	0	-	-	0	-/-
91	0	-	-	-	-	-	0	0	-	-	0	-/-
97	20	-	20	-	-	-	0	0	-	-	0	-/-
03	0	-	-	-	-	-	0	0	-	-	0	-/-
08	0	-	-	-	-	-	0	0	-	-	0	-/-
Opuntia sp.												
87	66	-	66	-	-	-	0	0	-	-	0	-/-
91	33	-	-	33	-	-	0	0	-	-	0	3/7
97	120	-	20	100	-	-	0	0	-	-	0	3/13
03	40	-	-	40	-	-	0	0	-	-	0	4/11
08	80	20	-	80	-	-	0	0	-	-	0	4/8
Pinus edulis												
87	33	-	33	-	-	-	0	0	-	-	0	-/-
91	33	-	33	-	-	-	0	0	-	-	0	-/-
97	60	20	60	-	-	-	0	0	-	-	0	-/-
03	20	-	20	-	-	-	0	0	-	-	0	-/-
08	0	-	-	-	-	-	0	0	-	-	0	-/-
Purshia tridentata												
87	0	-	-	-	-	-	0	0	0	-	0	-/-
91	0	-	-	-	-	-	0	0	0	-	0	-/-
97	20	-	20	-	-	-	100	0	0	-	0	18/40
03	20	-	-	-	20	-	0	0	100	100	100	22/60
08	20	-	-	20	-	-	100	0	0	-	0	16/30