

Trend Study 25C-14-08

Study site name: New Home Bench.

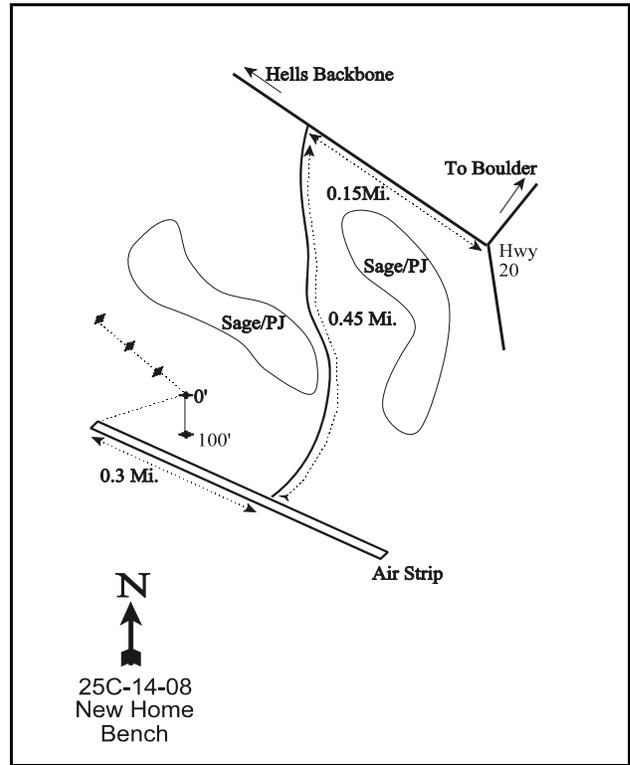
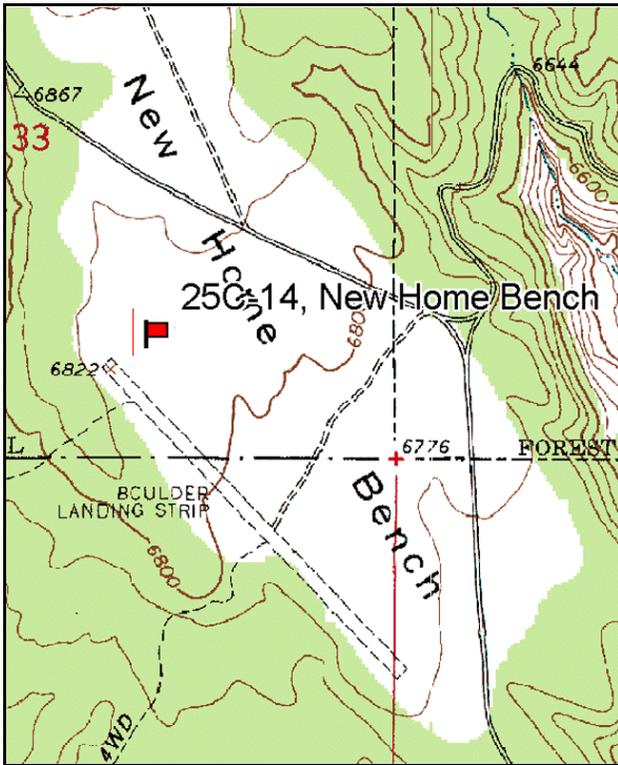
Vegetation type: Wyoming Big Sagebrush.

Compass bearing: frequency baseline 165 degrees magnetic. Lines 2-4 346°M.

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

LOCATION DESCRIPTION

Take SR12 southwest out of Boulder for approximately 3 miles to the top of the bench above Dry Hollow. Turn onto the Hells Backbone-Salt Gulch Road. Travel 0.15 miles northwest to a road turning off to the left. Go 0.45 miles on this road to the Boulder airstrip. Turn right and drive down the airstrip 0.3 miles. The transect starts approximately 85 paces from the end of the airstrip, bearing 86 degrees magnetic. The 0-foot baseline stake is marked by browse tag #7145.



Map Name: Boulder Town

Diagrammatic Sketch

Township 33S, Range 4E, Section 33

GPS: NAD 83, UTM 12S 458949 E, 4193601 N

DISCUSSION

New Home Bench - Trend Study No. 25C-14

Study Information

This study site is located just north of the Boulder airport on the south side of Boulder Mountain [elevation: 6,800 feet (2,073 m), slope: 2%-5%, aspect: northeast]. The sagebrush range type occupies a relatively small area, and is usually found interspersed with pinyon pine (*Pinus edulis*)/juniper (*Juniperus osteosperma*) woodland. These sage flats, such as the one on New Home Bench, are important as deer winter ranges. The small drainage east of the study site drains toward the south. Deer use was estimated to be very heavy in 1998, 2003, and 2008 (66 ddu/acre:163 ddu/ha, 95 ddu/acre:235 ddu/ha, and 150 ddu/acre:366 ddu/ha, respectively). Elk use was estimated to be light in 2003 and 2008 (7 edu/acre:17 edu/ha and 4 edu/acre:9 edu/ha, respectively). Only a couple of cow pats were also encountered in 1998 and 2008, and no sign of cattle grazing was noted in 2003.

Soil

The soil is a sandy loam which is neutral in reaction (pH 6.8). Effective rooting depth is estimated at just over 13 inches with little rock on the surface or within the profile. Soil is loose and susceptible to both wind and water induced erosion. Sparse vegetation, litter, and cryptogam cover provide some soil protection, but bare soil is abundant. The well developed cryptogams on this site are an important factor in soil stabilization. However, cryptogam cover is concentrated only under sagebrush canopies. Relative cryptogam cover has decreased from 10% in 1998 to 4% in 2008. Relative combined vegetation and litter cover has averaged 48% since 1998. Relative bare ground cover is high with an average of 46% since 1998. Erosion is not severe, however, localized soil movement is occurring and soil pedestalling is evident around shrubs. The erosion condition class was considered to be stable in 2003 and 2008.

Browse

The dominant vegetation on the site is an old stand of Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*). Density was estimated at around 4,000 plants/acre in 1998, 2003, and 2008. The stand is overly mature and has had a high proportion of decadent plants since the study site was established. Young recruitment has been good in most years but was poor in 2003 with drought conditions. Use was moderate to heavy in 1987 and 1991 but more moderate in 1998, 2003, and 2008. Drought conditions in 2003 caused 70% of the sagebrush sampled to display poor vigor. Vigor improved slightly in 2008, but sagebrush plants displaying poor vigor was still high at 55%.

There are a few other browse species which provide some additional forage including ephedra (*Ephedra torreyana*) and a few slenderbush eriogonum (*Eriogonum microthecum*). Broom snakeweed (*Gutierrezia sarothrae*), an increaser, occurs in moderately high numbers. A few stickyleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*) also occur on the site. Pinyon and juniper trees are scattered on the flat. Point- quarter data from 1998, 2003, and 2008 estimated a stable population of 26 to 28 pinyon and 27 to 30 juniper trees/acre.

Herbaceous Understory

Density and diversity of herbaceous plants is very low. Blue grama (*Bouteloua gracilis*) is the only common perennial grass species with a quadrat frequency of 59% in 1991, declining to about 35% in 1998 and 2003, and declining further to 25% in 2008. Bottlebrush squirreltail (*Sitanion hystrix*) and needle-and-thread (*Stipa comata*) were moderately abundant in 1987 and 1998. The annual, sixweeks fescue (*Vulpia octoflora*) was abundant in 1998 but this low growing species provides little useful forage. Forbs are depleted and nearly absent. With drought conditions, perennial grasses declined by 52% in sum of nested frequency and average cover showed nearly a 3-fold decline in 2003.

1991 TREND ASSESSMENT

Trend for browse is considered stable. Wyoming big sagebrush, the key browse species, remained stable in density since 1987. However, decadence has gone up from 39% in 1987 to 63%. Seedlings were rare in 1991 but young recruitment was good. The herbaceous understory is poor with blue grama being the only abundant species. Sum of nested frequency of perennial grasses remained similar to 1987. Trend for grasses is stable. Of the limited forbs that had been encountered on the site in 1987, only scarlet globemallow (*Sphaeralcea coccinea*) was still growing on the site in 1991. Trend for forbs is down.

browse - stable (0)

grass - stable (0)

forb - down (-2)

1998 TREND ASSESSMENT

Trend for the key browse species, Wyoming big sagebrush, is slightly up. The increase in density is primarily due to the larger sample used in 1998, but vigor is improved and decadence has declined from 63% in 1991 to 35%. Reproduction is also improved since 1991 with more seedlings counted. Trend for both the grasses and forbs is stable, but depleted. Sum of nested frequency of perennial grasses and forbs remained similar to 1991 estimates. Nested frequency of blue grama declined significantly but the frequency of bottlebrush squirreltail and needle-and-thread grass increased significantly. The annual, sixweeks fescue, increased significantly in nested frequency and is now the most abundant grass on the site. Forbs are severely lacking.

winter range condition (DCI) - fair (42) Low potential scale

browse - up slightly (+1)

grass - stable (0)

forb - stable (0)

2003 TREND ASSESSMENT

Trend for Wyoming big sagebrush is down. Population density is stable for the moment but 91% of the population is decadent. No seedlings were encountered and young plants were rare. Trend for grasses is down. Sum of nested frequency of perennial grasses declined 52% with a significant decline in all species except for blue grama. One good aspect of the grass component is the disappearance of the annual, sixweeks fescue. The trend for forbs is slightly down. Sum of nested frequency of perennial forbs has not changed, but there was an increase in frequency of annual forbs, primarily tansy mustard (*Descurainia pinnata*). Forbs remain rare.

winter range condition (DCI) - poor (15) Low potential scale

browse - down (-2)

grass - down (-2)

forb - slightly down (-1)

2008 TREND ASSESSMENT

Trend for the primary browse species, Wyoming big sagebrush, is stable. Density decreased slightly from 2003, but there was an improvement in vigor and decadence, though both remained high. Decadence in sagebrush decreased to 71% and plants displaying poor vigor decreased to 55%. Recruitment was good with young plants comprising 15% of the population. Trend for grasses is stable. The sum of nested frequency of perennial grasses stayed relatively constant. There was a positive shift in composition, though. The warm season increaser, blue grama, decreased in frequency while Indian ricegrass (*Oryzopsis hymenoides*) and needle-and-thread grass increased in frequency. The trend for forbs is stable with no notable change in frequency or production. Forbs are still extremely rare.

winter range condition (DCI) - poor (21) Low potential scale

browse - stable (0)

grass - stable (0)

forb - stable (0)

HERBACEOUS TRENDS --
 Management unit 25C, Study no: 14

Type	Species	Nested Frequency					Average Cover %		
		'87	'91	'98	'03	'08	'98	'03	'08
G	<i>Bouteloua gracilis</i>	_c 149	_c 144	_b 91	_{ab} 84	_a 52	4.32	2.29	1.17
G	<i>Bromus tectorum</i> (a)	-	-	-	-	2	-	-	.01
G	<i>Oryzopsis hymenoides</i>	_{ab} 1	_b 13	_{ab} 6	_a -	_b 15	.05	-	.13
G	<i>Sitanion hystrix</i>	_a 19	_a 19	_b 59	_a 10	_a 6	1.23	.08	.07
G	<i>Stipa comata</i>	_b 25	_{ab} 13	_c 47	_a 3	_{ab} 21	1.27	.15	.19
G	<i>Vulpia octoflora</i> (a)	-	_a 18	_b 202	_a -	_a 11	8.65	-	.02
Total for Annual Grasses		0	18	202	0	13	8.65	0	0.03
Total for Perennial Grasses		194	189	203	97	94	6.89	2.52	1.57
Total for Grasses		194	207	405	97	107	15.55	2.52	1.60
F	<i>Cryptantha fulvocanescens</i>	2	-	-	-	-	-	-	-
F	<i>Descurainia pinnata</i> (a)	-	-	5	18	16	.01	.11	.07
F	<i>Eriogonum cernuum</i> (a)	-	-	-	3	7	-	.00	.06
F	<i>Eriogonum</i> sp.	-	-	6	-	-	.06	-	-
F	<i>Erigeron pumilus</i>	-	-	2	-	-	.00	-	-
F	<i>Lappula occidentalis</i> (a)	-	-	-	-	3	-	-	.00
F	<i>Machaeranthera canescens</i>	4	-	-	-	-	-	-	-
F	<i>Phlox longifolia</i>	4	-	-	2	-	-	.00	-
F	<i>Senecio multilobatus</i>	-	-	-	1	-	-	.03	-
F	<i>Sisymbrium altissimum</i> (a)	-	-	-	1	-	-	.00	-
F	<i>Sphaeralcea coccinea</i>	_b 9	_{ab} 6	_a -	_a 1	_{ab} 2	-	.03	.01
F	Unknown forb-perennial	3	-	-	-	-	-	-	-
Total for Annual Forbs		0	0	5	22	26	0.00	0.12	0.14
Total for Perennial Forbs		22	6	8	4	2	0.06	0.06	0.01
Total for Forbs		22	6	13	26	28	0.07	0.19	0.15

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

BROWSE TRENDS --

Management unit 25C, Study no: 14

Type	Species	Strip Frequency			Average Cover %		
		'98	'03	'08	'98	'03	'08
B	<i>Artemisia tridentata wyomingensis</i>	85	83	89	18.72	17.33	12.89
B	<i>Ceratoides lanata</i>	0	1	0	-	.00	-
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	0	6	2	-	.00	.00
B	<i>Ephedra torreyana</i>	4	2	2	.00	.15	.03
B	<i>Eriogonum microthecum</i>	2	2	2	.03	.03	.03
B	<i>Gutierrezia sarothrae</i>	31	24	13	.95	.43	.03
B	<i>Juniperus osteosperma</i>	1	3	3	.38	.38	1.25
B	<i>Opuntia sp.</i>	2	0	0	.00	-	-
B	<i>Pinus edulis</i>	0	2	1	-	.85	.85
Total for Browse		125	123	112	20.08	19.18	15.09

CANOPY COVER, LINE INTERCEPT --

Management unit 25C, Study no: 14

Species	Percent Cover	
	'03	'08
<i>Artemisia tridentata wyomingensis</i>	9.48	14.85
<i>Chrysothamnus viscidiflorus viscidiflorus</i>	.03	.06
<i>Gutierrezia sarothrae</i>	.33	.10
<i>Juniperus osteosperma</i>	.45	.55
<i>Pinus edulis</i>	1.06	1.70

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 25C, Study no: 14

Species	Average leader growth (in)	
	'03	'08
<i>Artemisia tridentata wyomingensis</i>	3.7	0.8

POINT-QUARTER TREE DATA --

Management unit 25C, Study no: 14

Species	Trees per Acre		
	'98	'03	'08
<i>Juniperus osteosperma</i>	26	28	30
<i>Pinus edulis</i>	28	28	26

Average diameter (in)		
'98	'03	'08
3.7	3.4	3.6
3.4	3.5	4.3

BASIC COVER --

Management unit 25C, Study no: 14

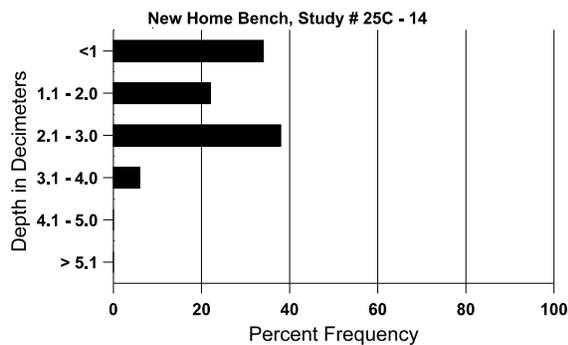
Cover Type	Average Cover %				
	'87	'91	'98	'03	'08
Vegetation	3.00	5.75	31.96	20.92	16.76
Rock	0	0	.22	.24	.10
Pavement	0	.25	2.53	2.38	3.02
Litter	27.50	20.50	29.28	29.80	39.96
Cryptogams	10.00	10.75	12.31	6.17	4.41
Bare Ground	59.50	62.75	51.56	51.27	49.04

SOIL ANALYSIS DATA --

Management unit 25C, Study no: 14, Study Name: New Home Bench

Effective rooting depth (in)	Temp °F (depth)	pH	sandy loam			%OM	PPM P	PPM K	ds/m
			%sand	%silt	%clay				
13.3	63.7 (15.9)	6.8	69.4	12.0	18.6	1.0	12.4	112.0	0.5

Stoniness Index



PELLET GROUP DATA --

Management unit 25C, Study no: 14

Type	Quadrat Frequency		
	'98	'03	'08
Rabbit	38	28	64
Elk	-	3	1
Deer	38	51	49
Cattle	-	-	1

Days use per acre (ha)		
'98	'03	'08
-	-	-
-	7 (17)	5 (12)
66 (163)	95 (235)	148 (366)
2 (5)	-	4 (9)

BROWSE CHARACTERISTICS --
 Management unit 25C, Study no: 14

		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 wyomingensis</i>												
87	2331	333	566	866	899	-	29	41	39	5	10	29/30
91	2364	33	566	299	1499	-	41	38	63	19	35	21/28
98	4120	200	540	2140	1440	1240	39	10	35	6	6	22/32
03	4100	-	20	340	3740	2200	52	8	91	66	70	25/36
08	3940	1680	580	580	2780	2080	29	17	71	47	55	24/36
<i>Ceratoides lanata</i>												
87	0	-	-	-	-	-	0	0	-	-	0	-/-
91	0	-	-	-	-	-	0	0	-	-	0	-/-
98	0	-	-	-	-	-	0	0	-	-	0	-/-
03	20	-	-	20	-	-	0	100	-	-	0	11/5
08	0	-	-	-	-	-	0	0	-	-	0	-/-
<i>Chrysothamnus viscidiflorus viscidiflorus</i>												
87	0	-	-	-	-	-	0	0	0	-	0	-/-
91	0	-	-	-	-	-	0	0	0	-	0	-/-
98	0	-	-	-	-	-	0	0	0	-	0	-/-
03	120	-	40	60	20	-	0	0	17	-	0	11/10
08	40	-	20	20	-	-	0	0	0	-	0	17/15
<i>Ephedra torreyana</i>												
87	33	-	33	-	-	-	100	0	0	-	0	-/-
91	66	-	-	66	-	-	100	0	0	-	0	9/6
98	180	-	40	140	-	-	44	56	0	-	0	11/12
03	60	-	-	40	20	-	0	33	33	-	0	16/17
08	100	-	100	-	-	-	0	100	0	-	100	24/49
<i>Eriogonum microthecum</i>												
87	0	-	-	-	-	-	0	0	-	-	0	-/-
91	0	-	-	-	-	-	0	0	-	-	0	-/-
98	40	-	40	-	-	-	0	0	-	-	0	-/-
03	40	-	-	40	-	-	0	0	-	-	0	9/10
08	40	-	-	40	-	-	0	50	-	-	0	6/6

		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>												
87	0	-	-	-	-	-	0	0	0	-	0	-/-
91	0	-	-	-	-	-	0	0	0	-	0	-/-
98	2720	360	800	1900	20	-	0	0	1	-	0	8/9
03	1180	-	320	780	80	480	0	0	7	2	2	9/11
08	320	60	60	240	20	400	0	0	6	6	6	7/7
<i>Juniperus osteosperma</i>												
87	0	-	-	-	-	-	0	0	-	-	0	-/-
91	66	-	66	-	-	-	100	0	-	-	0	-/-
98	20	60	20	-	-	-	0	0	-	-	0	-/-
03	60	-	40	20	-	-	0	0	-	-	0	-/-
08	60	-	40	20	-	-	0	0	-	-	0	-/-
<i>Opuntia sp.</i>												
87	0	-	-	-	-	-	0	0	-	-	0	-/-
91	133	-	133	-	-	-	0	0	-	-	0	-/-
98	80	-	-	80	-	-	0	0	-	-	0	2/7
03	0	-	-	-	-	-	0	0	-	-	0	-/-
08	0	-	-	-	-	-	0	0	-	-	0	-/-
<i>Pinus edulis</i>												
87	66	33	33	33	-	-	0	0	-	-	0	118/98
91	66	33	-	66	-	-	0	0	-	-	0	152/86
98	0	-	-	-	-	-	0	0	-	-	0	-/-
03	40	-	20	20	-	-	0	0	-	-	0	-/-
08	20	40	-	20	-	-	0	0	-	-	0	-/-