

COTTONWOOD CANYON - TREND STUDY NO. 11A-4-10

Vegetation Type: Desert Shrub

Range Type: Crucial Deer Winter, Crucial Elk Winter

NRCS Ecological Site Description: Not Available

Land Ownership: UDWR

Elevation: 6520 ft. (1988 m)

Aspect: East

Slope: 2%

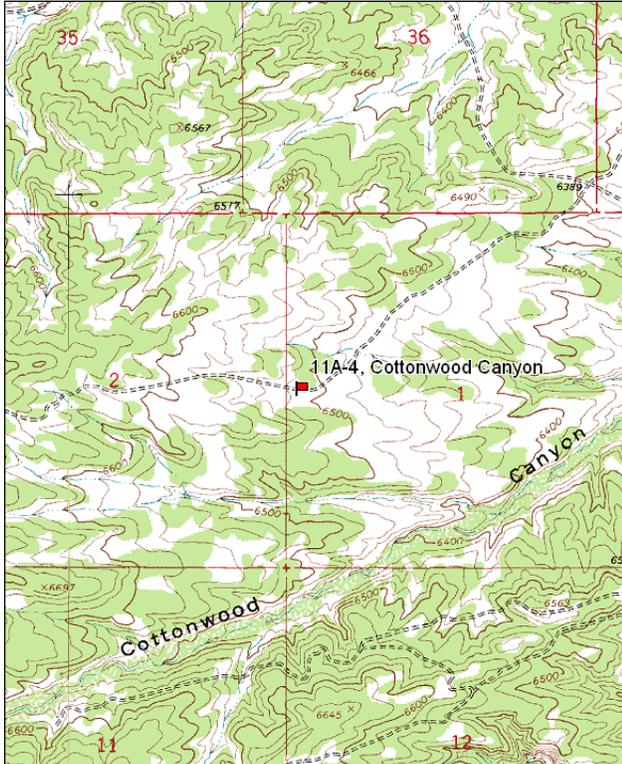
Transect bearing: 0'-100': 151° magnetic, 100'-400': 65° magnetic

Belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft). Belt 4 no rebar.

Directions:

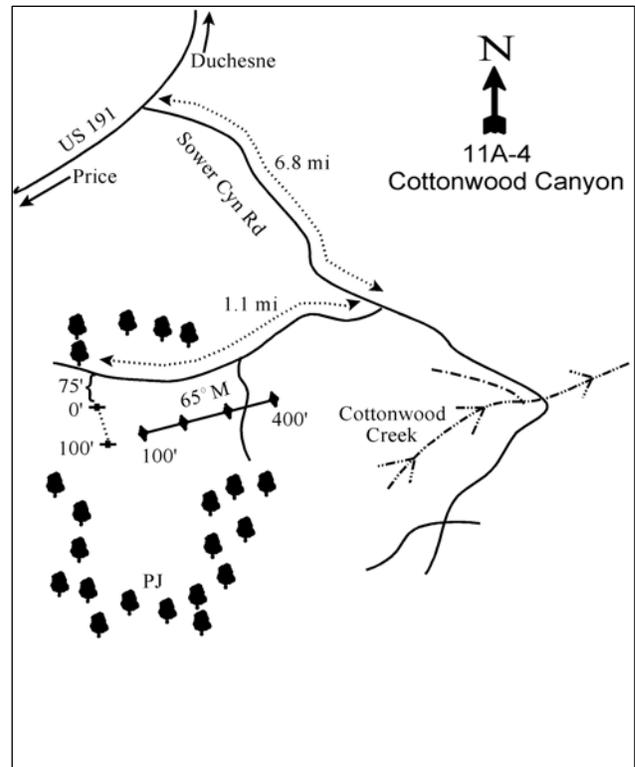
From Duchesne, go up Indian Canyon (U.S. 191) approximately 2.5 miles to the Cottonwood-Sowers Canyon Road. Turn left and to the southeast on the main road 6.4 miles to a jeep trail on top of the ridge just before Cottonwood Creek. Turn right on the jeep trail and drive 1 mile west to a fork. Continue approximately 0.1 miles up the right fork to the study site. The 0-foot baseline stake is 15 paces south of the road and is marked with browse tag #9037. The baseline is interrupted between the first and second lines.

Map Name: Duchesne SW



Township: 5S Range: 5W Section: 2

Diagrammatic Sketch:



GPS: NAD 83, UTM 12T 550716 E 4436264 N

COTTONWOOD CANYON - TREND STUDY NO. 11A-4

Site Information

Site Description: The study samples winter range on the long slope down from Anthro Mountain and the Badland Cliffs to the Duchesne River. The study is in a mixed desert shrub and grass community surrounded by pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) woodlands. It is located on the Utah Division of Wildlife Resources (DWR) Cottonwood Wildlife Management Area (WMA), which is surrounded by Bureau of Land Management (BLM) and Ute tribal lands. The pellet group data has estimated moderate use by elk and light use by deer since 2000 (Table - Pellet Group Data). Antelope also utilize the site, but sign has been relatively infrequent.

Browse: Shadscale (*Atriplex confertifolia*) was historically the dominant browse in cover, but winterfat (*Ceratoides lanata*) increased substantially in cover (Table - Browse Trends) and density in 2005 and is now a co-dominant species. Fringed sagebrush (*Artemisia frigida*) was found in high density at the outset of the study, but density decreased steadily from 1995 to 2005 and fringed sagebrush is now much less prevalent on the site. Shadscale is a mostly mature population of lightly used plants, though utilization was high in 2000. Decadence and vigor of shadscale have been mostly good, but decadence and poor vigor were high in 2000. Recruitment of young shadscale has been poor except in 1986 and 2010. The winterfat population consists of a mixture of mature and young plants that have shown mostly moderate use through the years. Decadence and poor vigor have been low in winterfat except in 2000 when both were high. Recruitment of young winterfat plants was low in 1995 and 2000, but has been excellent since 2005. Most of the fluctuations in the density of winterfat are due to fluctuations in the recruitment of young plants. Other browse species present in low densities include bud sagebrush (*Artemisia spinescens*), black sagebrush (*A. nova*) Wyoming big sagebrush (*A. tridentata* ssp. *wyomingensis*), fourwing saltbush (*Atriplex canescens*), narrowleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *stenophyllus*), broom snakeweed (*Gutierrezia sarothrae*) and prickly pear cactus (*Opuntia* sp.).

Herbaceous Understory: Perennial grasses are abundant, but are not particularly diverse on the site. Needle-and-thread (*Stipa comata*) has slowly gained dominance on the site with a decline in thickspike wheatgrass (*Agropyron dasystachyum*) and blue grama (*Bouteloua gracilis*), though both species also remain abundant. The sum of nested frequency of perennial grasses has decreased gradually over the years, but perennial grasses remain abundant. Perennial forbs are rare and the forb component has, at times, been dominated by annual species. Scarlet globemallow (*Sphaeralcea coccinea*) was fairly abundant in 2005, but has been less prevalent in all other sample years.

Soil: The soil is a moderately deep clay loam texture with slightly alkaline soil reactivity (pH 7.5) (Table - Soil Analysis Data). Bare ground cover has been mostly moderate, but was high in 2005 corresponding to a low in litter cover. Pavement cover is moderately high and provides some protective ground cover (Table - Basic Cover). Soil erosion is not a significant problem due to the high grass frequency, although some soil loss is evident in the interspaces, resulting in pedestaling around shrubs. Erosion is more severe in the surrounding pinyon-juniper woodlands. The soil erosion condition was classified as stable in 2005 and 2010.

Trend Assessments

Browse:

- **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. Decadence of shadscale decreased from 40% to 10%. Winterfat and fringed sagebrush decreased in decadence to 0%. However, there was also a large decrease in the recruitment of young plants in shadscale and winterfat.
- **1995 to 2000 - down (-2):** There was a decrease in the densities of shadscale, winterfat and fringed sagebrush, and cover of shadscale and winterfat decreased. Decadence and poor vigor of shadscale and winterfat increased substantially.

- **2000 to 2005 - up (+2):** The density of winterfat increased six-fold from 1,080 plants/acre to 6,480 plants/acre, and cover increased from less than 1% to 4%. Decadence and poor vigor of winterfat and shadscale decreased substantially. Fringed sagebrush density decreased substantially and fringed sagebrush was no longer prevalent on the site.
- **2005 to 2010 - slightly up (+1):** The density of winterfat continued to increase by 72% to 11,120 plants/acre, though cover remained similar. However, the density of shadscale decreased by 21% from 1,420 plants/acre to 1,120 plants/acre and cover decreased from 5% to 2%. Both species populations remained healthy with low decadence and good vigor.

Grass:

- **1988 to 1995 - stable (0):** There was little change in the sum of nested frequency of perennial grasses. There was a significant decrease in the nested frequency of blue grama and a significant increase in the nested frequency of thickspike wheatgrass.
- **1995 to 2000 - stable (0):** The perennial grass sum of nested frequency remained similar, though cover increased from 18% to 21%. The nested frequency of blue grama decreased significantly.
- **2000 to 2005 - slightly down (-1):** The sum of nested frequency of perennial grasses decreased by 19% and cover decreased slightly to 19%. Thickspike wheatgrass had a significant decrease in nested frequency and needle-and-thread increased significantly in nested frequency.
- **2005 to 2010 - slightly down (-1):** There was a 13% decrease in the perennial grass sum of nested frequency, though cover increased to 23%. There was a significant decrease in the nested frequency of thickspike wheatgrass.

Forb:

- **1988 to 1995 - stable (0):** Perennial forbs were rare.
- **1995 to 2000 - stable (0):** Perennial forbs were rare.
- **2000 to 2005 - slightly up (+1):** Cover of perennial forbs increased to 2% with a large increase in the cover of scarlet globemallow, but perennial forbs remain rare on the site.
- **2005 to 2010 - slightly down (-1):** Scarlet globemallow cover decreased and perennial forb cover decreased to less than 1%.

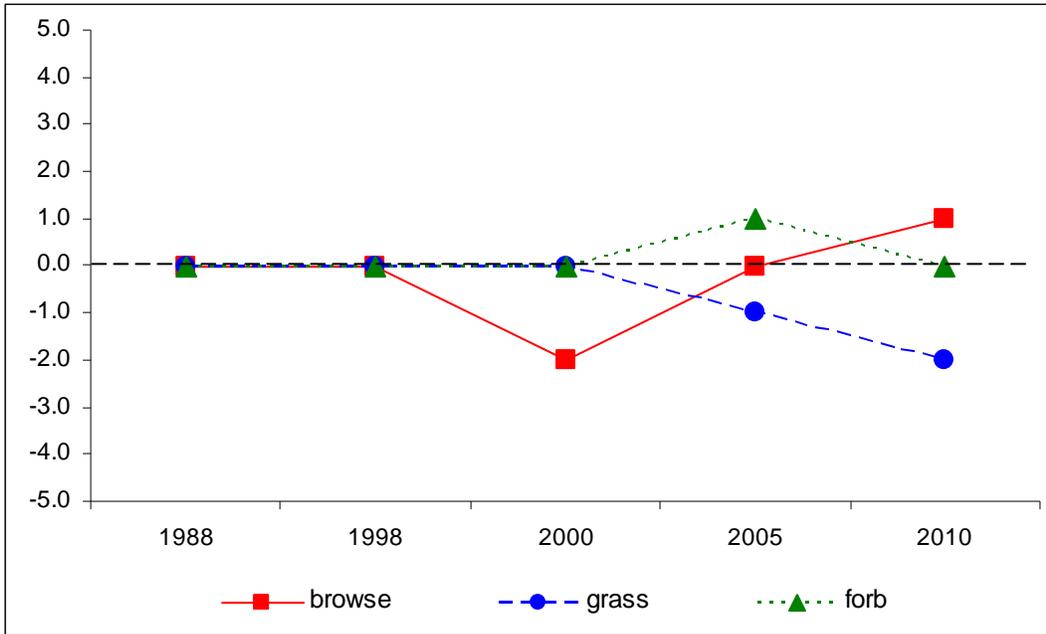
DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --

Management unit 11A, study no: 4

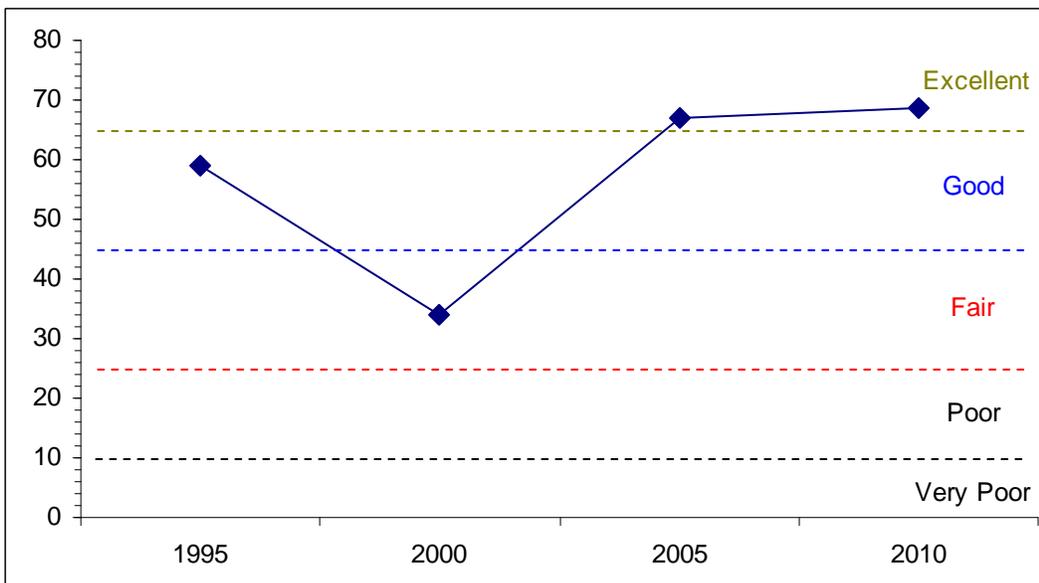
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	8.1	13.1	6.9	30.0	0.0	0.9	0.0	59.1	Good
00	3.8	0.0	0.0	30.0	0.0	0.2	0.0	34.0	Fair
05	9.6	13.4	9.3	30.0	0.0	4.6	0.0	66.9	Good-Excellent
10	7.3	14.5	15.0	30.0	0.0	1.9	0.0	68.7	Excellent

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 11A, Study no: 4



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--
Management unit 11A, Study no: 4



HERBACEOUS TRENDS--

Management unit 11A, Study no: 4

Type	Species	Nested Frequency					Average Cover %			
		'88	'95	'00	'05	'10	'95	'00	'05	'10
G	<i>Agropyron dasystachyum</i>	b179	c255	c279	b164	a116	6.46	5.86	4.64	2.65
G	<i>Agropyron spicatum</i>	-	4	-	-	-	.04	-	-	-
G	<i>Bouteloua gracilis</i>	d298	c190	b152	a82	a74	4.76	4.83	2.42	1.70
G	<i>Bromus tectorum</i> (a)	-	1	-	-	-	.00	-	-	-
G	<i>Oryzopsis hymenoides</i>	a12	b44	ab21	ab18	ab19	1.10	.51	.47	.61
G	<i>Sitanion hystrix</i>	ab15	ab15	b36	ab14	a7	.09	.84	.34	.04
G	<i>Sporobolus cryptandrus</i>	-	-	-	5	-	-	-	.21	-
G	<i>Stipa comata</i>	a190	a167	a172	b251	b248	5.62	9.39	11.31	17.50
Total for Annual Grasses		0	1	0	0	0	0.00	0	0	0
Total for Perennial Grasses		694	675	660	534	464	18.08	21.44	19.42	22.51
Total for Grasses		694	676	660	534	464	18.09	21.44	19.42	22.51
F	<i>Astragalus purshii</i>	-	6	-	-	-	.01	-	-	-
F	<i>Chenopodium fremontii</i> (a)	-	c77	a-	b16	ab2	.55	-	.03	.00
F	<i>Chenopodium leptophyllum</i> (a)	-	c66	a-	b19	a-	.23	-	.19	-
F	<i>Cryptantha</i> sp.	5	4	-	-	-	.01	-	-	-
F	<i>Descurainia pinnata</i> (a)	-	b38	a-	a3	a-	.39	-	.01	-
F	<i>Halogeton glomeratus</i> (a)	-	-	-	4	9	-	-	.01	.21
F	<i>Lappula occidentalis</i> (a)	-	c32	a-	d111	b14	.32	-	.84	.05
F	<i>Machaeranthera grindelioides</i>	-	3	-	-	-	.00	-	-	-
F	<i>Navarretia intertexta</i> (a)	-	d135	a-	c61	b7	1.06	-	.19	.02
F	<i>Orthocarpus luteus</i> (a)	3	-	-	-	-	-	-	-	-
F	<i>Phlox austromontana</i>	3	-	5	-	-	-	.03	-	-
F	<i>Schoenrambe linifolia</i>	a1	c48	ab5	ab6	b21	.31	.01	.09	.33
F	<i>Sphaeralcea coccinea</i>	ab9	ab15	a8	c30	bc25	.09	.04	2.17	.64
F	<i>Taraxacum officinale</i>	-	2	-	-	-	.00	-	-	-
F	<i>Townsendia incana</i>	-	4	4	2	-	.01	.01	.03	-
F	<i>Tragopogon dubius</i>	2	-	-	-	-	-	-	-	-
Total for Annual Forbs		3	348	0	214	32	2.56	0	1.29	0.28
Total for Perennial Forbs		20	82	22	38	46	0.45	0.10	2.28	0.97
Total for Forbs		23	430	22	252	78	3.02	0.10	3.58	1.26

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

BROWSE TRENDS--

Management unit 11A, Study no: 4

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Artemisia frigida	93	87	30	24	1.34	1.63	.49	.26
B	Artemisia nova	5	3	3	3	-	.15	.03	.03
B	Artemisia spinescens	15	1	1	1	.19	.18	.15	.00
B	Artemisia tridentata wyomingensis	1	1	0	0	-	-	-	-
B	Atriplex confertifolia	62	49	45	35	4.85	1.62	4.58	2.11
B	Ceratoides lanata	29	27	61	76	1.56	.30	3.60	3.88
B	Chrysothamnus viscidiflorus stenophyllus	1	2	0	0	-	-	-	-
B	Gutierrezia sarothrae	4	2	1	0	.15	-	.03	-
B	Opuntia sp.	1	0	1	1	-	-	-	-
B	Pediocactus simpsonii	2	0	0	0	-	-	-	-
Total for Browse		213	172	142	140	8.10	3.89	8.89	6.29

CANOPY COVER, LINE INTERCEPT--

Management unit 11A, Study no: 4

Species	Percent Cover	
	'05	'10
Artemisia frigida	1.04	.51
Artemisia nova	.40	.23
Atriplex confertifolia	8.86	4.08
Ceratoides lanata	4.11	3.65
Gutierrezia sarothrae	.10	-

BASIC COVER--

Management unit 11A, Study no: 4

Cover Type	Average Cover %				
	'88	'95	'00	'05	'10
Vegetation	23.50	31.20	28.95	30.33	32.48
Rock	0	.91	.08	.07	.00
Pavement	24.75	7.81	8.63	8.12	5.99
Litter	30.50	28.26	29.41	13.60	46.78
Cryptogams	.25	4.27	1.81	.33	.36
Bare Ground	21.00	20.09	39.95	57.65	28.85

SOIL ANALYSIS DATA --

Management unit 11A, Study no: 4, Study Name: Cottonwood Canyon

Effective rooting depth (in)	pH	clay loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
27.3	7.5	36.9	34.8	28.3	1.9	8.7	233.6	0.7

PELLET GROUP DATA--

Management unit 11A, Study no: 4

Type	Quadrat Frequency			
	'95	'00	'05	'10
Rabbit	26	36	48	25
Elk	15	28	39	27
Deer	13	7	14	12
Cattle	2	-	-	-

Days use per acre (ha)		
'00	'05	'10
-	-	-
59 (146)	35 (86)	42 (104)
15 (37)	1 (2)	5 (13)
-	-	-

BROWSE CHARACTERISTICS--

Management unit 11A, Study no: 4

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
Artemisia frigida									
88	11931	39	53	8	466	0	0	10	6/4
95	14260	68	32	0	2920	2	0	0	15/9
00	8680	17	62	21	20	21	.46	42	2/4
05	960	0	100	0	1020	4	8	0	16/14
10	800	38	60	3	20	5	3	3	6/7
Artemisia nova									
88	265	75	0	25	-	0	0	25	-/-
95	160	0	100	0	-	63	0	0	13/18
00	160	0	0	100	-	13	63	100	6/21
05	100	0	40	60	960	0	0	60	10/18
10	120	33	17	50	-	67	0	50	6/16
Artemisia spinescens									
88	2331	14	60	26	-	0	0	14	5/6
95	440	5	95	0	-	27	73	0	6/12
00	20	0	100	0	-	0	0	0	4/13
05	20	0	0	100	20	0	0	100	6/14
10	20	0	100	0	-	0	0	0	-/-
Artemisia tridentata wyomingensis									
88	0	0	0	0	-	0	0	0	-/-
95	20	0	100	0	-	100	0	0	17/26
00	40	0	50	50	-	0	100	100	21/40
05	0	0	0	0	-	0	0	0	-/-
10	0	0	0	0	-	0	0	0	17/33
Atriplex canescens									
88	0	0	0	-	-	0	0	0	-/-
95	0	0	0	-	-	0	0	0	18/31
00	0	0	0	-	-	0	0	0	-/-
05	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	9/15

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization		% poor vigor	Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy		
<i>Atriplex confertifolia</i>									
88	4198	21	40	40	333	10	0	2	13/18
95	2100	2	89	10	60	10	2	5	13/23
00	1740	0	30	70	-	31	48	53	8/17
05	1420	4	86	10	300	0	0	7	15/32
10	1120	20	77	4	40	2	0	7	11/23
<i>Ceratoides lanata</i>									
88	4264	56	28	16	133	13	3	5	6/6
95	1420	4	96	0	-	38	1	0	12/11
00	1080	4	33	63	-	30	52	63	3/5
05	6480	40	59	0	4960	20	2	0	11/13
10	11120	35	65	0	80	.35	0	9	8/10
<i>Chrysothamnus viscidiflorus stenophyllus</i>									
88	1998	70	30	-	-	0	0	0	7/4
95	20	0	100	-	-	0	0	0	10/12
00	40	0	100	-	-	0	0	0	2/4
05	0	0	0	-	-	0	0	0	9/23
10	0	0	0	-	-	0	0	0	7/12
<i>Gutierrezia sarothrae</i>									
88	265	25	0	75	-	0	0	25	-/-
95	120	0	100	0	40	0	0	0	10/12
00	60	0	33	67	-	0	0	0	4/6
05	20	0	100	0	-	0	0	0	9/11
10	0	0	0	0	-	0	0	0	7/11
<i>Opuntia sp.</i>									
88	66	0	100	0	-	0	0	0	4/12
95	20	0	0	100	-	0	0	100	6/14
00	0	0	0	0	-	0	0	0	3/10
05	20	100	0	0	-	0	0	0	4/12
10	20	0	100	0	-	0	0	0	5/19
<i>Pediocactus simpsonii</i>									
88	0	0	0	-	-	0	0	0	-/-
95	60	0	100	-	-	0	0	0	1/2
00	0	0	0	-	-	0	0	0	-/-
05	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-
<i>Sarcobatus vermiculatus</i>									
88	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	28/37
10	0	0	0	-	-	0	0	0	25/27