

Trend Study 2-12-06

Study site name: Second Dam Blacksmith Fork .

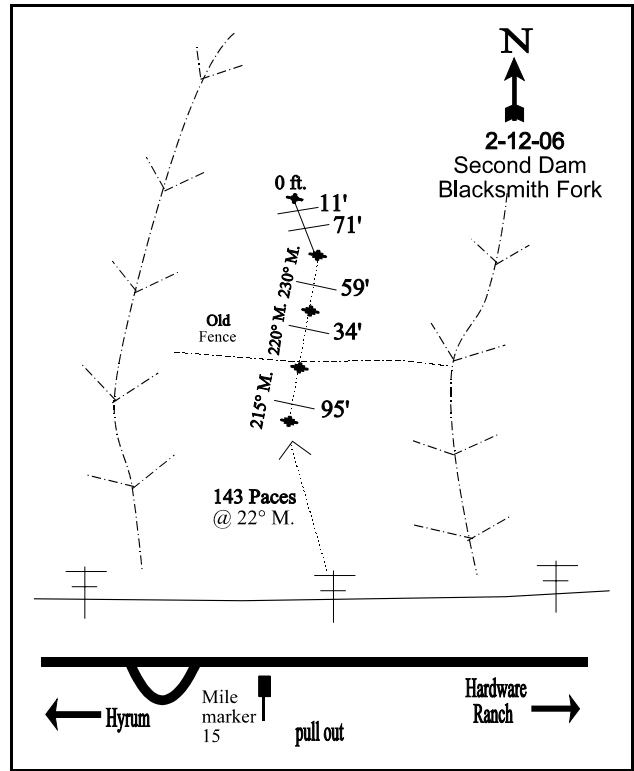
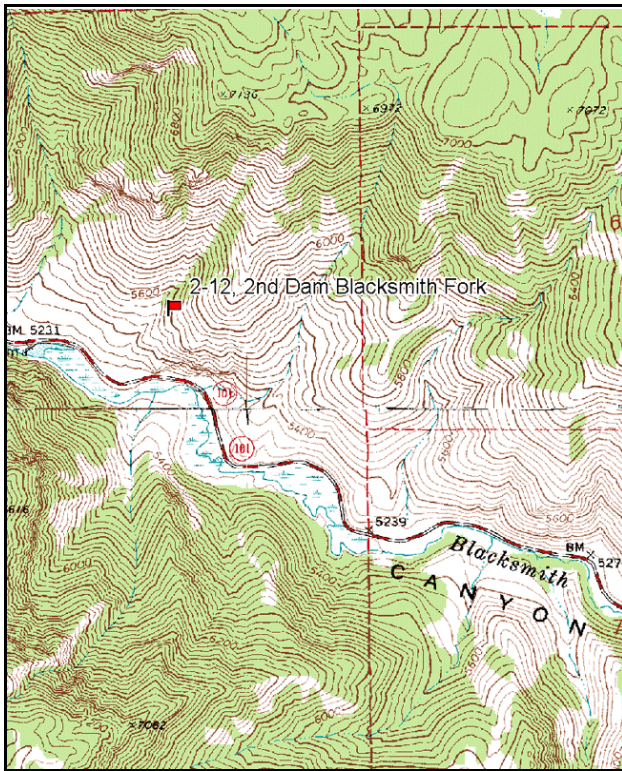
Vegetation type: Big Sagebrush .

Compass bearing: frequency baseline 151 degrees magnetic.

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

LOCATION DESCRIPTION

In Hyrum, proceed east up Blacksmith Fork Canyon (U-101) to mile marker 15. Continue 200 feet to the pull-out before mile marker 15. Look for a power pole north of the east of the pull-out. From the pole, take a azimuth of 22 degrees magnetic and walk 143 paces to the 400-foot baseline stake marked by browse tag #7985. The baseline bearing is 151 degrees magnetic. Note: due to the rocky terrain the 100-foot stake is actually at the 95 foot mark; adjust the tape and belts accordingly. Line 2 runs 230 degrees magnetic. Line three runs 220 degrees magnetic. Line 4 runs 215 degrees magnetic.



Map Name: Logan Peak

Diagrammatic Sketch

Township 10N, Range 2E, Section 1

UTM NAD 27, UTM 12T 4608526 N, 444151 E

DISCUSSION

Second Dam Blacksmith Fork - Trend Study No. 2-12

Study Information

This study samples critical deer winter range north of the second reservoir in Blacksmith Fork Canyon (elevation: 5,600 feet, slope: 35-40%, aspect: south). It is dominated by mountain big sagebrush and bitterbrush community with scattered junipers. Deer utilize the area during all but the most severe winters. Hedging was heavy in the past, although deer and elk pellet groups have occurred at low frequencies since 1996. A pellet group transect read in 2001 estimated 6 elk and 12 deer days use/acre (15 edu/ha & 30 ddu/ha). Pellet group data from 2006 was estimated at 16 elk and 16 deer days use/acre (40 edu/ha and 40 ddu/ha).

Soil

The soil survey goes into very little detail, simply classifying the area in the Rock Land series (USDA-NRCS 2006). This category includes steep mountain slopes with significant areas of exposed bedrock and very shallow soils derived primarily from limestone and quartzite. Soils show little development and tend to erode easily because of the steep slopes if not protected by vegetation cover. The soil is moderately shallow due to underlying limestone and effective rooting depth was estimated just over 8 inches. Rock and pavement cover on the surface is abundant and consists of dark colored limestone, which can elevate daytime ground surface temperatures. The soil reaction is slightly alkaline (7.4 pH). There is little bare ground exposed and erosion does not appear to be a problem. The erosion condition class was classified as stable in 2001 and 2006.

Browse

Browse composition consists of a low density of mountain big sagebrush with an associated sparse population of antelope bitterbrush. Density of mountain big sagebrush was estimated at 933 plants/acre in 1984 and has declined each reading to 160 plants/acre in 2006. Decadence has been high every sampling year, averaging 60% of the population. Plants classified as dying increased from none in 1984 to a high of 63% in 2006. Seedling and young recruitment have been minimal and do not appear to be replacing the dying plants. Utilization has varied each sampling year from heavy in 1984 to light-moderate most other years. Annual leader growth averaged 2.8 inches in 2001 and 2.9 inches in 2006.

Bitterbrush displayed a stable density at nearly 200 plants/acre from 1984 through 1996, but declined to 100 plants/acre in 2001 and 2006. Use was moderate to heavy in 1984, 2001, and 2006, but light to moderate in 1990 and 1996. Decadence has varied each sampling year with a high of 67% of the population in 1984. It has then alternated from 33% in 1990 to 0% in 1996, back to 40% in 2001 and then to 0% in 2006. Reproduction is limited with only a few young observed in 1996 and no seedlings encountered during any of the other 4 readings. Annual leader growth averaged 4 inches in 2001 and 2006.

Other species such as Saskatoon Serviceberry, blueberry elder, Rocky Mountain maple, true mountain mahogany, and Rocky Mountain juniper provide a desirable variety of forage, but are of minor importance because of their limited abundance.

Herbaceous Understory

Bluebunch wheatgrass is the dominant perennial grass and its nested frequency has remained similar since 1984. Cover averaged 6-7% in 1996 and 2001, but nearly doubled in 2006 to 11%. Other perennial grasses include: prairie Junegrass, Kentucky bluegrass, bulbous bluegrass, and Sandberg bluegrass. Japanese brome has continually decreased since 1996, while cheatgrass increased significantly in 2001 and produced 19% cover (up from 4% in 1996). Cheatgrass cover declined in 2006 to 8% and the nested frequency decreased significantly. Unfortunately cheatgrass is still widely distributed across the site with a quadrat frequency of 88% in 2006.

Forbs are diverse, yet contain few valuable perennial species. The majority are annuals or weedy biennials

and perennials. Common species include pale alyssum, arrowleaf balsamroot, rock goldenrod, gray lomatium, and, yellow salsify. Dyer's woad, a state listed noxious weed, was sampled in small numbers in 1990 and 1996, but has not been sampled since. It was observed on the study in 2001 and 2006

1990 TREND ASSESSMENT

Trend for browse is down. Density of mountain big sagebrush decreased from 933 plants/acre in 1984 to 633 plants/acre in 1990. It was only lightly hedged compared to the heavy use in 1984. No young plants were found and there is an excessively high percentage of decadent sagebrush (68%) in the population. Sagebrush canopy cover averaged 6%. The bitterbrush population showed very little change, except a decrease in utilization. Trend for grasses is up. Perennial grass nested frequency increased 49%, due to an increase in Sandberg bluegrass. Trend for forbs is stable. Perennial forbs changed very little from 1984 reading.

browse - down (-2)

grasses - up (+2)

forbs - stable (0)

1996 TREND ASSESSMENT

Mountain big sagebrush still has a high percent decadence, poor vigor, and little reproduction. Antelope bitterbrush displays a stable trend with a decline in percent decadence (33% to 0%) and light to moderate use. Overall browse trend is considered slightly down due to the condition of the sagebrush population and the high density of broom snakeweed. Trend for grasses is stable. Sum of nested frequency of perennial grasses has remained similar to 1996 levels. Annual grass data were collected for the first time in 1996 and were abundant. Trend for forbs is up. Sum of nested frequency of perennial forbs increased, due largely to an increase in nested frequency of yellow salsify. However, the forb composition is still poor with few valuable forage species. The Desirable Components Index rated this study as poor due to low browse cover, high browse decadence, and high annual grass cover.

winter range condition (DC Index) - poor (38) Mid-level potential scale

browse - slightly down (-1)

grasses - stable (0)

forbs - up (+2)

2001 TREND ASSESSMENT

Trend for the key browse species, mountain big sagebrush and bitterbrush, appears to be declining. Bitterbrush displays heavier use compared to 1996. Vigor is normal, but decadence has increased since 1996 to 40%. Plants were flowering and producing seed during the 2001 reading, but no seedlings or young were encountered in the density strips. It appears that some layering is occurring in these large spread out shrubs which average about six feet in crown diameter. Bitterbrush occurs in low numbers and does not produce much forage. Mountain big sagebrush also occurs in low numbers. It displays moderate use, and vigor is poor on 20% of the population. Decadence has remained stable at 53%, but 20% of the sagebrush population appear to be dying and there are currently no young plants to replace them. The density of dead plants is slightly more than living plants. It is obvious that the thick cover of annual grasses and forbs make seedling establishment very difficult. Trend for grasses is slightly down. Sum of nested frequency and cover for perennial grasses remained similar, but annual grass cover increased from 10% to 21%. Trend for forbs is down. Perennial forb nested frequency decreased to values similar to those in 1990. The forb composition is still dominated by annuals and weedy perennials, although dyer's woad nested frequency significantly declined. The Desirable Components Index rated this study as very poor due to low browse cover, high decadence, and an increase in annual grass cover.

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

browse - down (-2)

grasses - slightly down (-1)

forbs - down (-2)

2006 TREND ASSESSMENT

Trend for key browse, mountain big sagebrush and bitterbrush, is down. Mountain big sagebrush density continued to decrease from 300 plants/acre in 2001 to 160 plants/acre in 2006. Decadence increased from

53% to 63% and over half (63%) the population was classified as dying. Seedlings and young recruitment have been rare and are not replacing the dying plants. Bitterbrush is not abundant and have remained similar to the previous reading. Trend for grasses is slightly up. Bluebunch wheatgrass nested frequency has remained similar, but cover nearly doubled. Cheatgrass nested frequency also decreased significantly and cover dropped from 19% to 8%, but quadrat frequency is still high at 88%. Trend for forbs is up. The sum of nested frequency for forbs increased, mostly due to a large increase in gray lomatium. Dyer's woad is a very minor component and was not sampled in any quadrats, but was observed in 2006. The Desirable Components Index rated this study as very poor-poor due to decreasing browse cover, high decadence, but with a slight reduction in annual grass cover.

winter range condition (DC Index) - very poor-poor (35) Mid-level potential scale
browse - down (-2) grasses - slightly up (+1) forbs - up (+2)

HERBACEOUS TRENDS --
Management unit 02 , Study no: 12

T y p e	Species	Nested Frequency					Average Cover %		
		'84	'90	'96	'01	'06	'96	'01	'06
G	Agropyron smithii	-	-	-	-	3	-	-	.15
G	Agropyron spicatum	151	176	154	168	180	6.40	6.50	11.37
G	Bromus brizaeformis (a)	-	-	a11	b49	b77	.03	.35	.56
G	Bromus japonicus (a)	-	-	c280	b95	a45	5.56	1.16	.34
G	Bromus tectorum (a)	-	-	a213	b347	a268	4.00	19.09	7.70
G	Koeleria cristata	18	8	11	9	5	.21	.11	.03
G	Poa bulbosa	-	-	4	8	10	.01	.18	.07
G	Poa fendleriana	-	-	-	-	2	-	-	.03
G	Poa pratensis	a-	ab4	a-	a-	b11	-	-	.11
G	Poa secunda	a66	c162	c158	c164	b121	3.68	2.92	2.30
Total for Annual Grasses		0	0	504	491	390	9.60	20.61	8.61
Total for Perennial Grasses		235	350	327	349	332	10.30	9.72	14.08
Total for Grasses		235	350	831	840	722	19.91	30.33	22.69
F	Achillea millefolium	6	1	-	-	-	-	-	.00
F	Agoseris glauca	a-	a1	a3	a9	b32	.00	.16	.19
F	Allium acuminatum	c60	a3	ab28	b24	ab13	2.14	.09	.08
F	Alyssum alyssoides (a)	-	-	a227	b286	a212	.89	4.43	1.34
F	Astragalus sp.	-	-	-	-	1	-	-	.03
F	Astragalus utahensis	2	4	1	-	-	.03	-	-
F	Balsamorhiza sagittata	17	24	12	11	7	.43	1.60	1.19
F	Castilleja linariaefolia	-	-	-	1	-	-	.03	-
F	Camelina microcarpa (a)	-	-	-	1	6	-	.00	.01
F	Calochortus nuttallii	2	1	3	-	6	.00	-	.01
F	Cirsium undulatum	2	4	5	-	4	.19	.12	.24

Type	Species	Nested Frequency					Average Cover %		
		'84	'90	'96	'01	'06	'96	'01	'06
F	<i>Collomia linearis</i> (a)	ab7	a-	a1	ab6	b12	.00	.01	.04
F	<i>Comandra pallida</i>	b35	a2	ab17	a10	a3	.07	.09	.03
F	<i>Collinsia parviflora</i> (a)	-	-	a7	a5	b28	.01	.01	.09
F	<i>Crepis acuminata</i>	a5	b28	ab17	a8	ab12	.25	.19	.31
F	<i>Delphinium nuttallianum</i>	-	-	-	-	2	-	-	.00
F	<i>Descurainia pinnata</i> (a)	-	-	-	3	-	-	.00	-
F	<i>Draba sp.</i> (a)	-	-	-	3	2	-	.00	.01
F	<i>Epilobium brachycarpum</i> (a)	-	-	b11	a-	c49	.02	-	.51
F	<i>Erodium cicutarium</i> (a)	-	-	a-	a5	b46	-	.06	1.37
F	<i>Eriogonum umbellatum</i>	1	2	2	5	-	.15	.03	-
F	<i>Galium aparine</i> (a)	-	-	a3	a3	b24	.01	.03	.04
F	<i>Hackelia patens</i>	-	-	-	2	3	-	.00	.04
F	<i>Holosteum umbellatum</i> (a)	-	-	a10	c161	b55	.05	.81	.17
F	<i>Isatis tinctoria</i>	a-	b13	b19	a-	a-	.07	-	.00
F	<i>Lappula occidentalis</i> (a)	-	-	-	-	9	-	-	.02
F	<i>Lactuca serriola</i>	a-	ab15	a5	c58	b25	.06	.62	.19
F	<i>Lithospermum arvense</i> (a)	-	-	-	-	1	-	-	.01
F	<i>Linum lewisii</i>	2	1	3	-	-	.03	-	-
F	<i>Lithospermum ruderales</i>	2	-	-	5	5	.03	.06	.18
F	<i>Lomatium grayi</i>	13	27	4	5	59	.01	.01	2.56
F	<i>Melilotus officinalis</i>	-	5	1	-	3	.00	-	.00
F	<i>Microsteris gracilis</i> (a)	-	-	-	-	8	-	-	.02
F	<i>Oenothera sp.</i>	-	-	-	-	1	-	-	.00
F	<i>Penstemon sp.</i>	-	-	3	-	-	.03	-	-
F	<i>Petrorhiza pumila</i>	bc34	c34	a9	ab10	a9	.71	.89	1.31
F	<i>Ranunculus testiculatus</i> (a)	-	-	a13	a31	b76	.02	.07	.42
F	<i>Senecio sp.</i>	1	-	-	-	-	-	-	-
F	<i>Tragopogon dubius</i>	a18	a53	c175	b98	b112	2.85	1.29	3.09
F	<i>Veronica biloba</i> (a)	-	-	a46	a54	b97	.15	.67	.43
Total for Annual Forbs		7	0	318	558	625	1.17	6.14	4.50
Total for Perennial Forbs		200	218	307	246	297	7.10	5.22	9.50
Total for Forbs		207	218	625	804	922	8.28	11.36	14.01

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

BROWSE TRENDS --

Management unit 02 , Study no: 12

Type	Species	Strip Frequency			Average Cover %		
		'96	'01	'06	'96	'01	'06
B	<i>Artemisia tridentata vaseyana</i>	19	13	8	3.20	1.74	.74
B	<i>Chrysothamnus nauseosus hololeucus</i>	2	2	3	.76	1.96	.76
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	5	4	3	.06	.23	.31
B	<i>Eriogonum heracleoides</i>	1	0	0	-	-	-
B	<i>Gutierrezia sarothrae</i>	25	26	16	.65	.66	.39
B	<i>Purshia tridentata</i>	9	5	5	1.99	1.41	2.67
B	<i>Rosa woodsii</i>	0	2	2	-	.15	.15
Total for Browse		61	52	37	6.67	6.17	5.03

CANOPY COVER, LINE INTERCEPT --

Management unit 02 , Study no: 12

Species	Percent Cover '06
<i>Artemisia tridentata vaseyana</i>	.83
<i>Chrysothamnus nauseosus hololeucus</i>	2.16
<i>Chrysothamnus viscidiflorus viscidiflorus</i>	.83
<i>Gutierrezia sarothrae</i>	.90
<i>Purshia tridentata</i>	5.56
<i>Rosa woodsii</i>	.41

KEY BROWSE ANNUAL LEADER GROWTH --

Management unit 02 , Study no: 12

Species	Average leader growth (in)	
	'01	'06
<i>Artemisia tridentata vaseyana</i>	2.8	2.9
<i>Purshia tridentata</i>	3.9	3.8

BASIC COVER --

Management unit 02 , Study no: 12

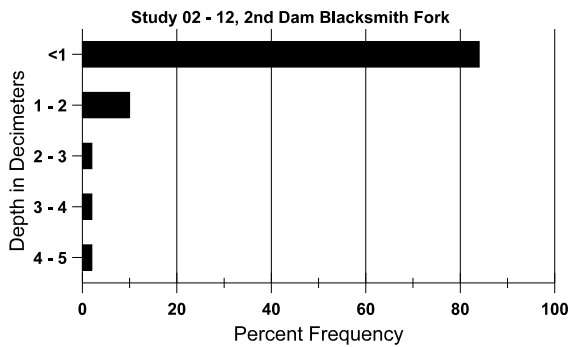
Cover Type	Average Cover %				
	'84	'90	'96	'01	'06
Vegetation	1.25	9.75	33.04	52.43	34.54
Rock	43.00	39.00	31.60	29.89	36.88
Pavement	12.25	8.25	3.85	2.98	6.91
Litter	26.25	25.00	31.88	36.83	30.38
Cryptogams	4.25	1.75	4.36	3.26	1.75
Bare Ground	13.00	16.25	4.64	4.52	9.03

SOIL ANALYSIS DATA --

Herd Unit 02, Study no: 12, 2nd Dam Blacksmith Fork

Effective rooting depth (in)	Temp °F (depth)	PH	Clay loam			%0M	PPM P	PPM K	dS/m
			%sand	%silt	%clay				
8.2	58.8 (8.8)	7.4	36.6	35.1	28.4	3.4	10.0	176.0	0.7

Stoniness Index



PELLET GROUP DATA --

Management unit 02 , Study no: 12

Type	Quadrat Frequency		
	'96	'01	'06
Rabbit	-	-	4
Elk	6	1	5
Deer	8	4	11
Cattle	-	-	1

Days use per acre (ha)	
'01	'06
-	-
6 (15)	16 (40)
12 (30)	16 (40)
-	-

BROWSE CHARACTERISTICS --
Management unit 02 , 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)
Amelanchier alnifolia												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	0	-	-	-	-	-	0	0	-	-	0	54/47
01	0	-	-	-	-	-	0	0	-	-	0	51/52
06	0	-	-	-	-	-	0	0	-	-	0	36/43
Artemisia tridentata vaseyana												
84	933	-	-	333	600	-	18	82	64	-	29	34/30
90	633	-	-	200	433	-	0	0	68	3	5	30/31
96	380	-	20	160	200	500	21	5	53	16	16	30/47
01	300	20	-	140	160	340	80	0	53	20	20	29/40
06	160	20	-	60	100	420	25	25	63	63	63	30/42
Chrysothamnus nauseosus hololeucus												
84	0	-	-	-	-	-	0	0	0	-	0	-/-
90	0	-	-	-	-	-	0	0	0	-	0	-/-
96	40	-	-	40	-	20	0	0	0	-	0	47/72
01	40	-	-	40	-	20	0	0	0	-	0	33/44
06	60	-	-	40	20	-	0	0	33	-	0	27/34
Chrysothamnus viscidiflorus viscidiflorus												
84	132	-	33	66	33	-	0	0	25	-	0	15/10
90	100	-	-	100	-	-	0	0	0	-	0	18/23
96	140	-	20	120	-	-	0	0	0	-	0	18/30
01	100	-	-	100	-	-	0	0	0	-	0	15/25
06	80	-	-	60	20	-	0	0	25	-	0	16/32
Eriogonum heracleoides												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	20	-	-	20	-	-	0	0	-	-	0	3/4
01	0	-	-	-	-	-	0	0	-	-	0	-/-
06	0	-	-	-	-	-	0	0	-	-	0	-/-

		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>												
84	0	-	-	-	-	-	0	0	0	-	0	-/-
90	0	-	-	-	-	-	0	0	0	-	0	-/-
96	1260	60	440	820	-	-	0	0	0	-	0	10/16
01	1080	-	-	1080	-	-	0	0	0	-	0	9/13
06	500	-	-	460	40	20	0	0	8	4	4	11/16
<i>Purshia tridentata</i>												
84	199	-	-	66	133	-	0	100	67	-	0	28/36
90	199	-	-	133	66	-	17	0	33	-	0	24/30
96	180	-	20	160	-	20	44	0	0	-	0	33/76
01	100	-	-	60	40	-	60	20	40	-	0	39/76
06	100	-	-	100	-	-	20	80	0	-	0	38/71
<i>Rosa woodsii</i>												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	0	-	-	-	-	-	0	0	-	-	0	10/6
01	40	-	40	-	-	-	0	0	-	-	0	-/-
06	180	-	20	160	-	-	0	0	-	-	0	16/11
<i>Sambucus racemosa</i>												
84	0	-	-	-	-	-	0	0	-	-	0	-/-
90	0	-	-	-	-	-	0	0	-	-	0	-/-
96	0	-	-	-	-	-	0	0	-	-	0	-/-
01	0	-	-	-	-	-	0	0	-	-	0	-/-
06	0	-	-	-	-	-	0	0	-	-	0	62/95