

Trend Study 27-12-08

Study site name: Moons Landing .

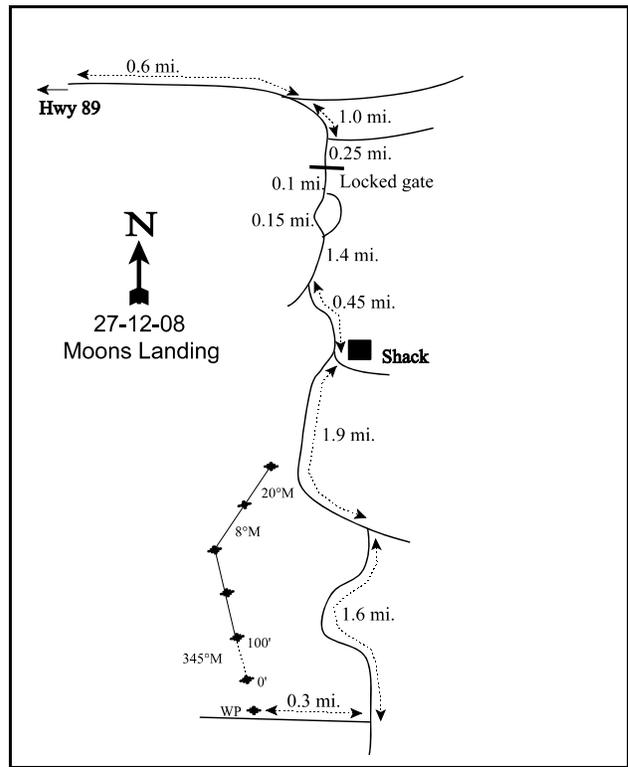
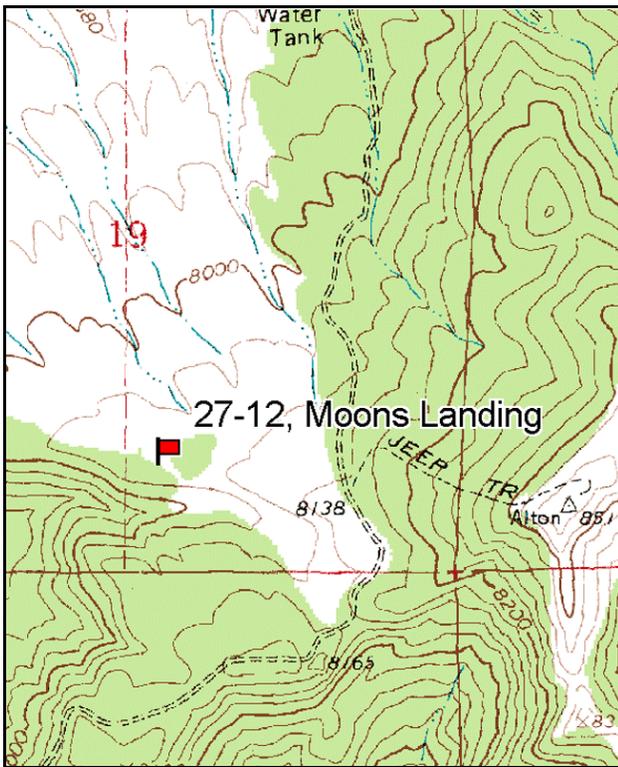
Vegetation type: Mountain Brush .

Compass bearing: frequency baseline 345 degrees magnetic. (Line 4-8°M, line 5-20°M).

Frequency belt placement: line 1 (11ft), line 2 (34ft), line 3 (59ft), line 4 (71ft), line 5 (95ft). Rebar: belt 2 on 6ft, belt 3 on 4ft, belt 4 on 1ft, belt 5 on 2ft.

LOCATION DESCRIPTION

From U. S. 89, go approximately 0.4 miles south of mile marker #111 to a road on the left. Go 0.6 miles to a fork. Stay on Bryce Woodland Road (right) and go 1.0 mile to a fork. Stay right on the two track and go 0.25 to a locked gate (get combination). Go through the gate and go 1.65 miles, staying on the main road, to a fork. Go left 0.45 miles to another fork with a shack on the left. Go right for 1.9 miles to a fork. Turn right and go 1.6 miles to a two track road on the right. Go 0.3 miles on the two track to a witness post on the right (north). The 0-foot stake is 15 feet north of the witness post. The study is marked by green, steel fenceposts approximately 12-18 inches in height.



Map name: Alton

Diagrammatic Sketch

Township 38S, Range 5W, Section 19

GPS: NAD 83, UTM 12S 371047 E, 4149892 N

DISCUSSION

Moons Landing - Trend Study No. 27-12

Study Information

This site was established in 1997 to monitor transitional/summer range on the west side of the Paunsaugunt wildlife management area [elevation: 8,100 feet (2,470 m), slope: 4%-7%, aspect: northwest]. It samples a mountain brush type two miles east of U.S. 89 and about four miles north of Alton. The land is privately owned and part of the Heaton private hunting unit. Pellet group transect data estimated very heavy deer use on the area in 1997, 2003, and 2008 (192 ddu/acre:474 ddu/ha, 96 ddu/acre:238 ddu/ha, and 127 ddu/acre:312 ddu/ha, respectively). Several deer were seen in the area during study establishment in 1997. Elk also use the area but to a much lesser extent. Elk use was estimated to be light in 1997 and 2008 (14 edu/acre:35 edu/ha and 10 edu/acre:25 edu/ha, respectively), with no elk pellets being sampled in 2003. Cattle use was estimated to be moderately heavy in 1997 and 2008 (43 cdu/acre:106 cdu/ha and 31 cdu/acre:77 cdu/ha, respectively) and light in 2003 (15 cdu/acre:36 cdu/ha). Cattle were present on the site during the 1997 and 2003 readings. A deer fawn and a sage grouse were seen on the site in 2003.

Soil

Soil texture is a sandy clay loam with a moderately acidic reaction (pH 5.9). Rocks and pavement are not abundant on the surface or in the profile. Relative combined vegetation and litter cover was high with a range of 78%-91% from 1997 to 2008. Relative bare ground was low at 6% in 1997, and increasing to 19% in 2003 and 15% in 2008. Erosion on the ridge is minimal due to the abundant vegetation and litter cover combined with the gentle terrain. The erosion condition class was rated as stable in 2003 and 2008.

Browse

The site supports a variety of useful browse species including serviceberry (*Amelanchier utahensis*), black sagebrush (*Artemisia nova*), mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), antelope bitterbrush (*Purshia tridentata*), and snowberry (*Symphoricarpos oreophilus*). There are also some gamble oak (*Quercus gambelii*) clones nearby which provide cover and additional forage. The most important shrub on the site is bitterbrush which provided around 40% of the browse cover in 1997, 2003, and 2008. Bitterbrush density was estimated at 1,860 plants/acre in 1997, increasing to 2,160 plants/acre in 2003, and to 2,400 plants/acre in 2008. The population is comprised primarily of mature plants that have had mostly heavy use from 1997 to 2008. These shrubs have been severely hedged to the point where many are partly or totally unavailable due to hedging. Decadence was low in both 1997 and 2003 at 6% and 11%, respectively, but was moderate at 23% in 2008. Most plants still have good leader growth and seed production, and vigor was normal in all three surveys.

Black sagebrush and mountain big sagebrush are both found on the site in moderate numbers. Many of the sagebrush plants on the site are likely hybrids between the two species, but were split according to growth form. Black sagebrush density numbered 980 plants/acre in 1997, 1,540 plants/acre in 2003, and 1,660 plant/acre in 2008. Mountain big sagebrush density was estimated at 560 plants/acre in 1997, 880 plants/acre in 2003, and 900 plants/acre in 2008. Both sagebrush populations showed mostly light use, good vigor, and low decadence in 1997, 2003, and 2008. Snowberry provides about one-quarter of the browse cover on the site. Mature plants are fairly large averaging about two feet in height with an average crown diameter of just over three feet. Snowberry usually receives little use on most areas, but here, some plants displayed moderate to heavy utilization. Serviceberry are rare but heavily hedged.

Stickyleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*), an increaser, is widespread on the site with an estimated density around 2,000 plants/acre. The population appears stable with a majority of the plants being mature in all three sample years. The increaser species, broom snakeweed (*Gutierrezia sarothrae*), was found in limited numbers at the outset of the study, but density had increased to 2,140

plants/acre in 2008. A small number of dwarf rabbitbrush (*Chrysothamnus depressus*) and white rubber rabbitbrush (*Chrysothamnus nauseosus* ssp. *hololeucus*) also persist on the site.

Herbaceous Understory

The herbaceous understory is diverse with a fairly abundant perennial grass component. Letterman needlegrass (*Stipa lettermani*) was the most common grass in all three sample years, though it significantly decreased between the 1997 and 2003 surveys. Other fairly common species include mutton bluegrass (*Poa fendleriana*), Sandberg bluegrass (*Poa secunda*), and needle-and-thread (*Stipa comata*). Needle-and-thread grass nested frequency has changed little over the sample period, mutton bluegrass increased significantly in nested frequency from 1997 to 2003, while Sandberg bluegrass nested frequency significantly declined in both 2003 and 2008. Cattle use has been high on most of the grasses in the open areas. Less abundant grasses include slender wheatgrass (*Agropyron trachycaulum*), thickspike wheatgrass (*Agropyron dasystachyum*), blue grama (*Bouteloua gracilis*), prairie junegrass (*Koeleria cristata*), and bottlebrush squirreltail (*Sitanion hystrix*). Both blue grama and prairie junegrass increased significantly in nested frequency from 2003 to 2008. Forbs are also diverse with 32 species being sampled between the three surveys. Perennial forbs are more abundant than annual varieties with redroot eriogonum (*Eriogonum racemosum*), longleaf phlox (*Phlox longifolia*), and Louisiana sagebrush (*Artemisia ludoviciana*). Total forb cover was about 4% in all sample years.

1997 DESIRABLE COMPONENTS INDEX

winter range condition (DCI) - excellent (93) Mid-level potential scale

2003 TREND ASSESSMENT

Trend for the browse is slightly up. All of the preferred species show increases in density, and maintain normal vigor and low decadence. Bitterbrush continues to demonstrate good leader growth and seed production. Trend for grasses is slightly down as the sum of nested frequency and total cover of perennial grasses has declined since 1997. Trend for forbs is slightly up as the sum of nested frequency of perennial forbs increased since 1997. The increase in forb frequency is somewhat surprising with drought conditions experienced prior to and including the 2003 survey.

winter range condition (DCI) - good (74) Mid-level potential scale

browse - slightly up (+1) grass - slightly down (-1) forb - slightly up (+1)

2008 TREND ASSESSMENT

The trend for browse is slightly up. The density of all of the preferred browse species continued to show an increase since 2003. The primary browse species, antelope bitterbrush, increased in density from 2,160 plants/acre in 2003 to 2,400 plants/acre. Vigor remained normal on most of the bitterbrush population, but decadence increased from 11% in 2003 to 23%. There were slight increases in the density of the other preferred browse species black and mountain sagebrush, serviceberry, snowberry, and woods rose (*Rosa woodsii*). Vigor and decadence remained normal on most of these species populations, though black sagebrush decadence increased from 5% in 2003 to 20%. Gamble oak and dwarf rabbitbrush had a large increases in their densities. Gamble oak increased from 480 plants/acre in 2003 to 1,440 plants/acre. Vigor and decadence remained normal for the oak population. Dwarf rabbitbrush increased from 380 plants/acre in 2003 to 1,720 plants/acre. Vigor remained normal, but decadence increased to 24%. The trend for the grasses is slightly up. Sum of nested frequency and total cover of perennial grasses has increased. The composition of grass species has shifted with a significant increase in the frequency of blue grama and prairie junegrass, and a significant decrease in the frequency of Sandberg bluegrass. Trend for the forbs is slightly up. Sum of nested frequency and total cover of perennial forbs has increased since 2003. Sum of nested frequency and total cover of annual forbs has decreased slightly.

winter range condition (DCI) - good-excellent (79) Mid-level potential scale

browse - slightly up (+1) grass - slightly up (+1) forb - slightly up (+1)

HERBACEOUS TRENDS --
Management unit 27 , Study no: 12

T y p e	Species	Nested Frequency			Average Cover %		
		'97	'03	'08	'97	'03	'08
G	Agropyron dasystachyum	b ₅₀	ab ₄₂	a ₂₅	.77	.24	.24
G	Agropyron trachycaulum	7	7	2	.18	.09	.01
G	Bouteloua gracilis	ab ₃₁	a ₂₅	b ₅₃	.91	.16	1.41
G	Bromus carinatus	2	2	6	.00	.03	.03
G	Carex sp.	19	3	13	.06	.03	.18
G	Koeleria cristata	a ₂₄	a ₂₉	b ₇₀	.24	.30	1.25
G	Poa fendleriana	a ₄₇	b ₁₁₄	b ₁₄₄	1.34	1.34	2.67
G	Poa pratensis	-	3	5	-	.01	.06
G	Poa secunda	c ₁₃₃	b ₈₀	a ₃₅	1.30	1.40	.36
G	Sitanion hystrix	32	20	10	.30	.32	.10
G	Stipa comata	95	133	109	1.57	2.22	1.31
G	Stipa lettermani	b ₃₀₅	b ₁₅₇	a ₂₄₈	11.75	3.38	4.82
Total for Annual Grasses		0	0	0	0	0	0
Total for Perennial Grasses		745	615	720	18.45	9.55	12.50
Total for Grasses		745	615	720	18.45	9.55	12.50
F	Agoseris glauca	a ₃	b ₃₁	a ₄	.00	.29	.03
F	Alyssum alyssoides (a)	-	6	2	-	.09	.00
F	Allium sp.	4	1	2	.01	.00	.00
F	Antennaria rosea	1	3	1	.00	.18	.15
F	Androsace septentrionalis (a)	a ₋	b ₃₃	a ₄	-	.41	.00
F	Arabis sp.	-	2	4	-	.00	.01
F	Artemisia dracunculus	3	5	-	.03	.19	-
F	Artemisia ludoviciana	88	76	94	1.41	.63	1.07
F	Astragalus sp.	-	-	1	-	-	.00
F	Balsamorhiza sagittata	1	2	1	.15	.15	.03
F	Calochortus nuttallii	-	4	-	-	.01	-
F	Cirsium sp.	4	4	2	.03	.06	.06
F	Crepis acuminata	a ₋	b ₉	ab ₃	-	.05	.15
F	Descurainia pinnata (a)	-	-	-	-	.00	-
F	Epilobium brachycarpum (a)	a ₁	b ₂₃	a ₋	.00	.03	-
F	Erigeron eatonii	a ₋	a ₋	b ₁₈	-	.00	.03
F	Erigeron flagellaris	15	7	2	.36	.06	.00
F	Eriogonum racemosum	118	80	94	1.52	1.19	1.39
F	Eriogonum umbellatum	6	17	15	.18	.23	.42

T y p e	Species	Nested Frequency			Average Cover %		
		'97	'03	'08	'97	'03	'08
F	Lappula occidentalis (a)	-	1	-	-	.00	-
F	Lomatium sp.	5	8	-	.01	.01	-
F	Lychnis drummondii	4	2	1	.03	.01	.00
F	Microsteris gracilis (a)	-	4	-	-	.01	-
F	Orthocarpus luteus (a)	-	3	2	-	.03	.03
F	Phlox longifolia	_a 33	_b 80	_c 140	.10	.17	.59
F	Polygonum douglasii (a)	_b 62	_a 4	_b 44	.18	.01	.09
F	Potentilla gracilis	1	2	2	.03	.03	.03
F	Senecio douglasii	-	-	4	-	-	.30
F	Senecio sp.	-	-	-	-	.00	-
F	Stellaria jamesiana	-	2	-	-	.00	-
F	Taraxacum officinale	5	-	12	.06	-	.09
F	Tragopogon dubius	6	9	-	.02	.04	-
Total for Annual Forbs		63	74	52	0.18	0.61	0.13
Total for Perennial Forbs		297	344	400	3.97	3.35	4.41
Total for Forbs		360	418	452	4.16	3.96	4.55

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

BROWSE TRENDS --
Management unit 27 , Study no: 12

T y p e	Species	Strip Frequency			Average Cover %		
		'97	'03	'08	'97	'03	'08
B	<i>Amelanchier utahensis</i>	0	2	2	-	.15	.15
B	<i>Artemisia nova</i>	14	20	23	2.55	2.40	4.71
B	<i>Artemisia tridentata vaseyana</i>	15	25	24	2.17	2.33	3.38
B	<i>Chrysothamnus depressus</i>	12	8	19	.73	1.28	.96
B	<i>Chrysothamnus nauseosus hololeucus</i>	10	3	4	.51	.18	.03
B	<i>Chrysothamnus viscidiflorus viscidiflorus</i>	53	47	43	5.56	4.54	3.10
B	<i>Gutierrezia sarothrae</i>	0	10	22	-	.10	1.04
B	<i>Mahonia repens</i>	4	3	2	.00	.00	.00
B	<i>Purshia tridentata</i>	58	60	64	17.35	15.26	15.72
B	<i>Quercus gambelii</i>	4	4	4	1.16	1.16	.71
B	<i>Ribes sp.</i>	2	2	1	.15	.15	.00
B	<i>Rosa woodsii</i>	0	2	2	.15	.03	.03
B	<i>Symphoricarpos oreophilus</i>	30	32	32	10.24	7.28	9.31
B	<i>Tetradymia canescens</i>	2	4	4	.00	.03	.15
Total for Browse		204	222	246	40.59	34.93	39.32

CANOPY COVER, LINE INTERCEPT --
 Management unit 27 , Study no: 12

Species	Percent Cover		
	'97	'03	'08
<i>Amelanchier utahensis</i>	-	.06	.63
<i>Artemisia nova</i>	-	5.25	7.33
<i>Artemisia tridentata vaseyana</i>	-	2.90	5.18
<i>Chrysothamnus depressus</i>	-	.56	.40
<i>Chrysothamnus nauseosus hololeucus</i>	-	.18	-
<i>Chrysothamnus viscidiflorus viscidiflorus</i>	-	7.71	6.11
<i>Gutierrezia sarothrae</i>	-	.21	1.58
<i>Mahonia repens</i>	-	-	.03
<i>Purshia tridentata</i>	-	17.45	18.76
<i>Quercus gambelii</i>	2.20	2.79	2.51
<i>Ribes</i> sp.	-	.66	-
<i>Symphoricarpos oreophilus</i>	-	8.19	9.14
<i>Tetradymia canescens</i>	-	.16	.05

KEY BROWSE ANNUAL LEADER GROWTH --
 Management unit 27 , Study no: 12

Species	Average leader growth (in)	
	'03	'08
<i>Artemisia tridentata vaseyana</i>	1.3	2.8
<i>Purshia tridentata</i>	2.8	2.0

BASIC COVER --
 Management unit 27 , Study no: 12

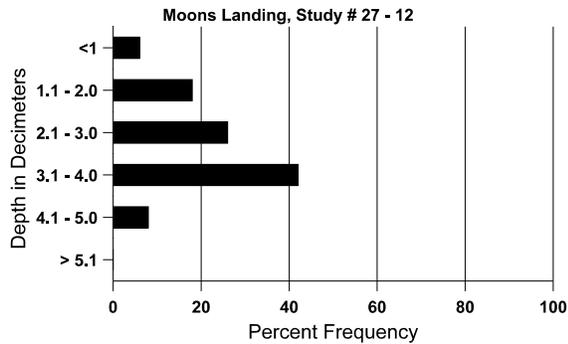
Cover Type	Average Cover %		
	'97	'03	'08
Vegetation	62.22	49.17	54.87
Rock	1.33	2.29	2.25
Pavement	1.18	.93	2.17
Litter	55.81	42.33	42.34
Cryptogams	.49	.03	.36
Bare Ground	7.05	21.55	17.62

SOIL ANALYSIS DATA --

Management unit 27, Study no: 12, Study Name: Moons Landing

Effective rooting depth (in)	Temp °F (depth)	pH	sandy loam			%OM	PPM P	PPM K	dS/m
			%sand	%silt	%clay				
15.4	64.0 (9.5)	5.9	64.0	16.1	19.9	2.7	19.1	134.4	0.4

Stoniness Index



PELLET GROUP DATA --

Management unit 27, Study no: 12

Type	Quadrat Frequency		
	'97	'03	'08
Rabbit	3	11	24
Elk	8	-	13
Deer	45	34	55
Cattle	14	4	10

Days use per acre (ha)	
'03	'08
-	-
-	10 (25)
96 (238)	127 (312)
15 (36)	31 (77)

BROWSE CHARACTERISTICS --

Management unit 27, 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 utahensis												
97	0	-	-	-	-	-	0	0	-	-	0	93/78
03	40	-	20	20	-	-	0	50	-	-	0	4/17
08	80	-	-	80	-	-	25	75	-	-	0	57/47
Artemisia nova												
97	980	420	460	440	80	80	14	4	8	4	6	18/36
03	1540	-	500	960	80	20	1	1	5	-	0	22/26
08	1660	780	320	1000	340	40	18	0	20	2	7	20/30

		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>												
97	560	100	280	240	40	60	14	0	7	4	4	26/38
03	880	40	380	400	100	40	14	5	11	2	5	25/29
08	900	220	400	400	100	20	13	7	11	-	0	24/36
<i>Chrysothamnus depressus</i>												
97	760	-	180	580	-	-	0	0	0	-	0	4/8
03	380	-	-	380	-	-	47	53	0	-	0	6/10
08	1720	-	80	1220	420	-	14	38	24	2	2	3/10
<i>Chrysothamnus nauseosus hololeucus</i>												
97	360	-	20	340	-	-	0	0	0	-	0	12/16
03	60	-	-	60	-	-	0	0	0	-	0	12/17
08	380	-	20	340	20	-	0	0	5	-	0	13/12
<i>Chrysothamnus viscidiflorus viscidiflorus</i>												
97	2080	-	260	1820	-	40	0	0	0	-	0	19/27
03	2220	-	80	2120	20	20	0	0	1	-	0	19/26
08	1840	-	-	1800	40	-	7	0	2	-	2	16/23
<i>Gutierrezia sarothrae</i>												
97	0	-	-	-	-	-	0	0	0	-	0	-/-
03	460	-	-	460	-	-	0	0	0	-	0	6/7
08	2140	-	20	1960	160	20	0	0	7	3	3	7/9
<i>Mahonia repens</i>												
97	200	-	-	200	-	-	0	0	-	-	0	3/6
03	140	-	-	140	-	-	0	0	-	-	0	3/6
08	340	-	-	340	-	-	0	0	-	-	0	3/5
<i>Purshia tridentata</i>												
97	1860	20	260	1480	120	100	25	70	6	1	1	23/70
03	2160	-	80	1840	240	40	16	78	11	2	2	20/46
08	2400	160	80	1760	560	60	13	77	23	5	6	17/45
<i>Quercus gambelii</i>												
97	500	80	360	120	20	-	32	0	4	4	4	98/32
03	480	-	100	380	-	-	8	54	0	-	0	70/29
08	1440	200	480	920	40	280	0	0	3	-	0	42/38
<i>Ribes sp.</i>												
97	40	-	-	40	-	-	50	0	0	-	0	46/61
03	40	-	-	20	20	-	50	50	50	-	0	53/52
08	20	-	-	-	20	-	0	0	100	100	100	48/54

		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)	
Rosa woodsii													
97	0	-	-	-	-	-	0	0	-	-	0	-/-	
03	40	-	20	20	-	-	0	0	-	-	0	16/9	
08	140	-	-	140	-	-	0	0	-	-	0	9/7	
Symphoricarpos oreophilus													
97	880	-	60	820	-	-	59	9	0	-	0	25/57	
03	1280	-	80	1140	60	-	11	9	5	2	2	20/40	
08	1420	-	200	1140	80	20	3	7	6	-	0	17/39	
Tetradymia canescens													
97	80	20	60	20	-	-	0	0	-	-	0	10/13	
03	160	-	60	100	-	-	0	0	-	-	0	15/16	
08	100	-	-	100	-	-	0	0	-	-	0	13/8	