

WEST HORSE PASTURE - TREND STUDY NO. 10-16-10

Vegetation Type: Wyoming Big Sagebrush

Range Type: Crucial Deer Winter

NRCS Ecological Site Description: Not Available

Land Ownership: BLM

Elevation: 5300 ft. (1615 m)

Aspect: Southeast

Slope: 0-3%

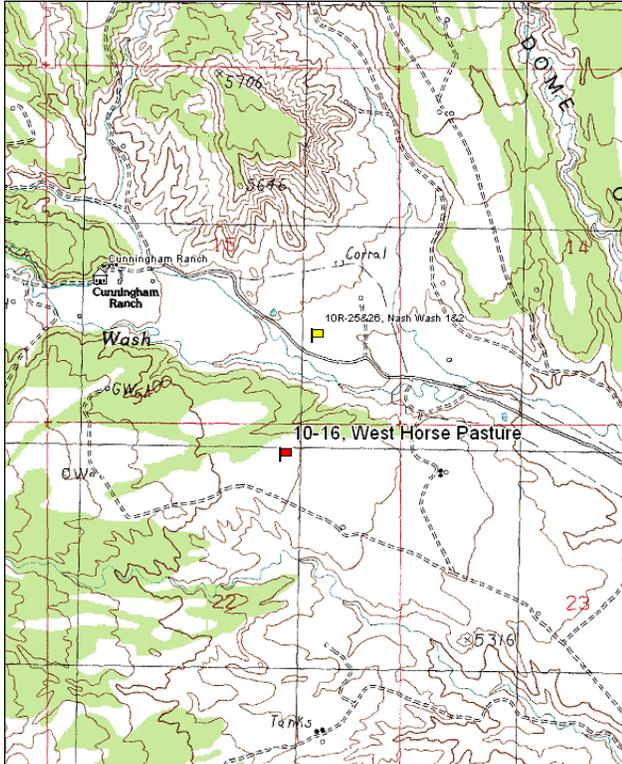
Transect bearing: 135° magnetic

Belt placement: line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (28ft).

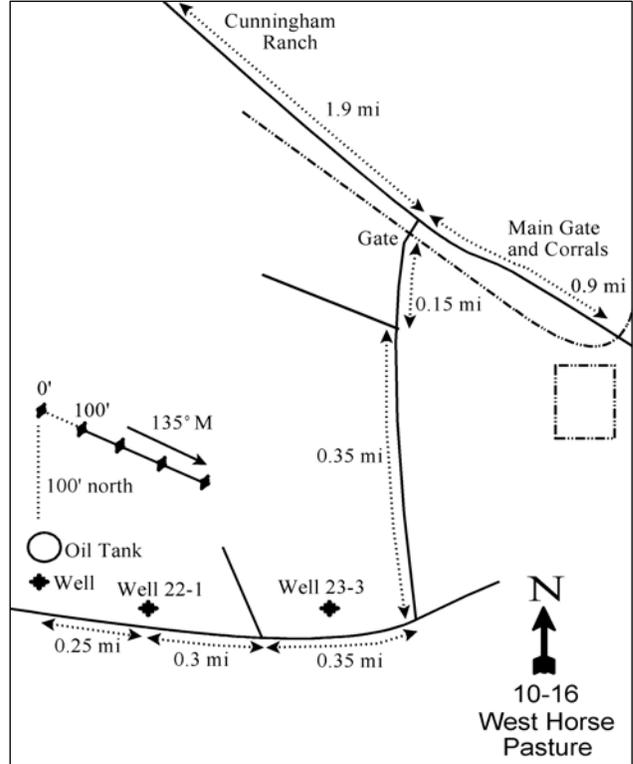
Directions:

From the main gate at Cunningham Ranch travel south 1.9 miles to a fork and turn right. Go through a gate (100 yards) and proceed 0.15 miles to a fork at the top of a hill. Stay left and go 0.35 miles to a "T" intersection. Turn right and go 0.35 miles past a well [NP Energy #23-3] to a fork. Stay left and travel northwest 0.3 miles to another well [NP Energy #22-1]. Continue northwest for 0.25 miles to another well and oil-tank. The 0-foot stake is 100 feet north from oil-tank marked by a rebar tagged with browse tag #7807.

Map Name: Sego Canyon



Diagrammatic Sketch:



Township: 20S Range: 21E Section: 22

GPS: NAD 83, UTM 12S 622851 E 4324139 N

WEST HORSE PASTURE - TREND STUDY NO. 10-16

Site Information

Site Description: The study is located south of Nash Wash in a large, open, Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) flat surrounded by Utah juniper (*Juniperus osteosperma*) trees and eroded steep cliffs to the north and west. Not only is the area a crucial deer winter concentration area, it also supports many other uses including cattle and sheep grazing, oil and gas exploration, and production, mining and associated human activity. The study transect had to be moved slightly in 2010 due to an oil pad that was placed directly over the old transect. A fire also burned the upper section of the transect some time between 2005 and 2010. Grazing in the area is managed by the Bureau of Land Management (BLM) as part of the large Cisco allotment. Other pellet group transects located in the Horse Pasture area showed an average use of 58 deer days use/acre (143 ddu/ha) between 1981 and 1986 (Jense et al. 1986). From 1986 through 1990, use averaged 39 deer days use/acre (95 ddu/ha) (Jense et al. 1991). Pellet group data estimated moderate deer use in 2000 and 2005, increasing to very heavy use in 2010. In 1986, four antler sheds were found. Cover for deer is provided by a nearby dense stand of mature Utah Juniper. Antler rubs on trees were noted in 2005. Estimated elk use has been light since 2000, and estimated cattle use was only sampled in 2005 at light levels (Table - Pellet Group Data).

Browse: The key browse species on the site is Wyoming big sagebrush, but the species has been decreasing in cover since 2000 (Table - Browse Trends) and density since 1995. The fire between 2005 and 2010 caused a large decline in sagebrush. The sagebrush population is a mixture of mature and decadent plants with little recruitment of young plants. Utilization of sagebrush has been a mixture of moderate to heavy hedging over the sample years. The high amounts of cheatgrass on this site may be preventing the establishment of seedling and young plants. Broom snakeweed (*Gutierrezia sarothrae*) is the only other common browse species, but it has fluctuated in density with fluctuation in precipitation (Table - Browse Characteristics). There are also some scattered spiny hopsage (*Grayia spinosa*), and young pinyon pine (*Pinus edulis*) and juniper trees throughout the flat.

Herbaceous Understory: As reported in 1986, the grass composition has been dominated by cheatgrass (*Bromus tectorum*), with perennial grasses being relatively scarce. This puts this site at risk for fire, which would destroy the sagebrush population. Perennial grasses have not been very abundant. Galleta (*Hilaria jamesii*) and bottlebrush squirreltail (*Sitanion hystrix*) have been the most abundant perennial grasses. Perennial forbs are also not very abundant on the site. Scarlet globemallow (*Sphaeralcea coccinea*) and timber poisonvetch (*Astragalus convallarius*) are the most abundant perennial forbs.

Soil: The soil texture is a sandy clay loam with a slightly alkaline soil reaction (pH 7.4). Both phosphorus and potassium may have limited availability for plant growth and development at 3.8 ppm and 57.6 ppm, respectively (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Vegetation and litter cover is primarily provided by the annual species cheatgrass and has been variable over the sample years. Because of this, bare ground cover has been high at times. Cryptogams are mossy-like and are present under almost the entire area under the shrub crowns, but have been decreasing since 2000 (Table - Basic Cover). Soil loss in the past is evident by a high degree of soil movement from interspaces and subsequent pedestaling around the base of the shrubs. Litter build-up is also evident on mounds beneath shrub crowns. The soil erosion condition was classified as stable in 2005 and 2010.

Trend Assessments

Browse:

- **1986 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. There was a substantial decrease in decadence of sagebrush from 55% to 27%, but is still considered moderately high. Recruitment of young sagebrush plants remained low.

- **1995 to 2000 - slightly down (-1):** Density of sagebrush decreased by 19% from 4,300 plants/acre to 3,500 plants/acre, though cover increased from 12% to 15%. Decadence, vigor and recruitment of sagebrush remained similar.
- **2000 to 2005 - down (-2):** The density of sagebrush decreased 10% to 3,140 plants/acre, but cover decreased to 8%. Decadence increased to 71% and poor vigor increased from 19% to 51%. Recruitment of young plants remained very low.
- **2005 to 2010 - down (-2):** Due to the relocation of the transect, direct comparison between the study years is not possible. There was a large decrease in the density of sagebrush following the fire on the site and cover was low at 4%. Decadence and poor vigor decreased, but recruitment of young plants remained very low.

Grass:

- **1986 to 1995 - up (+2):** There was a five-fold increase in the sum of nested frequency of perennial grasses, but perennial grasses remain relatively rare.
- **1995 to 2000 - up (+2):** The sum of nested frequency of perennial grasses increased by 27% and cover increased from 2% to 6%. Cheatgrass decreased significantly in nested frequency and cover decreased from 12% to 1%.
- **2000 to 2005 - down (-2):** The perennial grass sum of nested frequency decreased 47% and cover decreased to 2%. Perennial grasses are rare on the site. The nested frequency of cheatgrass increased significantly and cover increased to 51%.
- **2005 to 2010 - slightly down (-1):** Due to the relocation of the transect, direct comparison between the study years is not possible. The sum of nested frequency of perennial grasses decreased with a significant decrease in the nested frequency of galleta. Cheatgrass decreased in nested frequency, but remained the dominant species on the site providing 20% cover.

Forb:

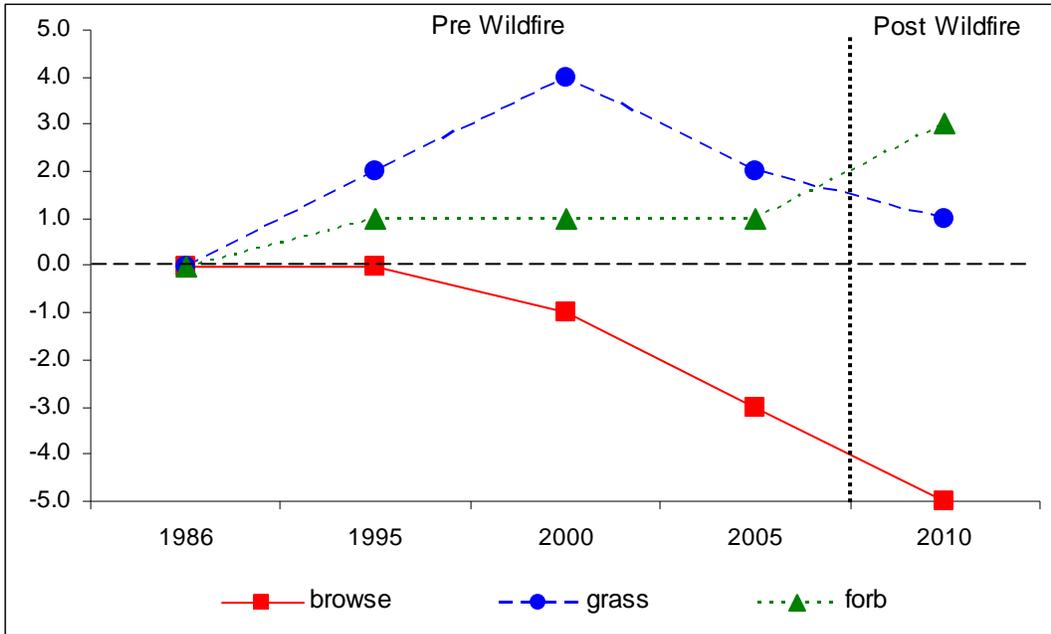
- **1986 to 1995 - slightly up (+1):** There was a three-fold increase in the sum of nested frequency of perennial forbs, but they remained rare on the site.
- **1995 to 2000 - stable (0):** The sum of nested frequency of perennial forbs decreased by 15%, but cover increased from less than 1% to 2% due to a large increase in the cover of scarlet globemallow.
- **2000 to 2005 - stable (0):** There was little change in the sum of nested frequency or cover of perennial forbs.
- **2005 to 2010 - up (+2):** Due to the relocation of the transect, direct comparison between the study years is not possible. The perennial forb sum of nested frequency and cover increased were substantially higher on the site due to a large increase in the nested frequency of scarlet globemallow.

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --
Management unit 10, study no: 16

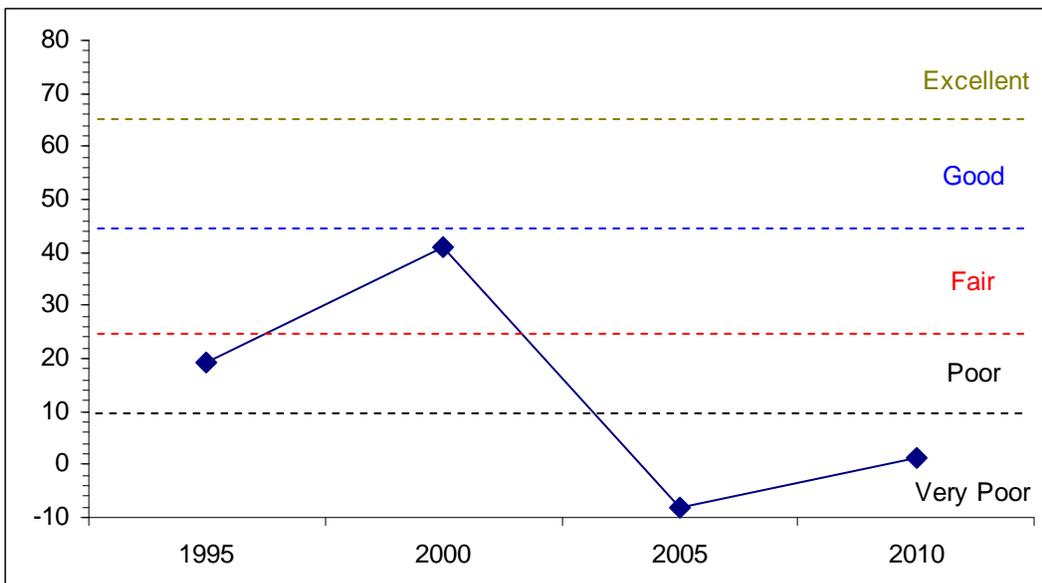
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
95	15.4	6.9	1.0	3.7	-9.1	1.2	0.0	19.1	Poor
00	18.9	7.2	0.5	11.6	-1.1	3.8	0.0	41.0	Fair
05	10.0	-6.3	0.5	4.3	-20.0	3.5	0.0	-8.0	Very Poor
10	4.4	0.0	0.0	3.9	-14.9	7.9	0.0	1.4	Very Poor

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
 Management unit 10, Study no: 16



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE--
 Management unit 10, Study no: 16



HERBACEOUS TRENDS--

Management unit 10, Study no: 16

Type	Species	Nested Frequency					Average Cover %			
		'86	'95	'00	'05	'10	'95	'00	'05	'10
G	<i>Bromus tectorum</i> (a)	-	c374	a196	c379	b336	12.08	1.44	51.08	19.82
G	<i>Hilaria jamesii</i>	a2	b50	b51	b44	a16	1.25	3.73	.91	.87
G	<i>Oryzopsis hymenoides</i>	1	3	5	6	3	.15	.44	.82	.19
G	<i>Sitanion hystrix</i>	a3	b42	b63	a14	a9	.44	1.58	.40	.48
G	<i>Sporobolus cryptandrus</i>	b12	a-	ab2	a-	ab6	-	.03	-	.25
G	<i>Stipa comata</i>	-	-	-	-	1	-	-	-	.15
G	<i>Vulpia octoflora</i> (a)	-	a10	a-	b67	a6	.01	-	.75	.01
Total for Annual Grasses		0	384	196	446	342	12.10	1.44	51.83	19.83
Total for Perennial Grasses		18	95	121	64	35	1.83	5.78	2.14	1.96
Total for Grasses		18	479	317	510	377	13.94	7.22	53.97	21.79
F	<i>Astragalus convallarius</i>	5	12	7	9	12	.17	.21	.48	.09
F	<i>Astragalus moencopensis</i>	1	-	-	-	-	-	-	-	-
F	<i>Astragalus</i> sp.	a3	b28	a3	a5	a-	.05	.00	.01	.01
F	<i>Calochortus nuttallii</i>	a-	a3	a1	b20	a2	.00	.00	.08	.01
F	<i>Castilleja linariaefolia</i>	-	6	3	-	3	.16	.00	-	.15
F	<i>Delphinium nuttallianum</i>	-	-	-	2	-	-	-	.00	-
F	<i>Descurainia pinnata</i> (a)	-	ab11	a-	b16	a4	.02	-	.13	.06
F	<i>Draba</i> sp. (a)	-	1	-	1	-	.00	-	.00	-
F	<i>Erigeron pumilus</i>	1	-	5	-	-	-	.04	-	-
F	<i>Erodium cicutarium</i> (a)	-	-	-	-	2	-	-	-	.00
F	<i>Gilia hutchinifolia</i> (a)	-	a8	a-	b34	ab25	.02	-	.20	.26
F	<i>Holosteum umbellatum</i> (a)	-	b21	a-	a-	a-	.06	-	-	-
F	<i>Lactuca serriola</i>	-	-	-	-	8	-	-	-	.01
F	<i>Lappula occidentalis</i> (a)	-	b31	a-	b61	c99	.05	-	.34	.42
F	<i>Lepidium</i> sp. (a)	-	c51	a-	b27	b12	.11	-	.59	.57
F	<i>Leucelene ericoides</i>	-	1	3	3	5	.00	.03	.03	.45
F	<i>Oenothera</i> sp.	-	5	-	-	9	.01	-	-	.06
F	<i>Phlox longifolia</i>	a-	b19	b21	a-	a1	.04	.04	-	.00
F	<i>Plantago patagonica</i> (a)	-	c129	a2	d183	b11	.30	.00	3.93	.05
F	<i>Salsola iberica</i> (a)	-	a-	a-	a-	b20	-	-	-	.55
F	<i>Schoenocrambe linifolia</i>	-	-	1	-	-	-	.00	-	-
F	<i>Sphaeralcea coccinea</i>	a20	a28	a43	a38	b101	.16	1.57	1.12	3.14
F	<i>Townsendia</i> sp.	-	-	-	3	-	-	-	.00	-
F	Unknown forb-perennial	3	-	-	-	-	-	-	-	-
Total for Annual Forbs		0	252	2	322	173	0.58	0.00	5.20	1.92
Total for Perennial Forbs		33	102	87	80	141	0.61	1.92	1.74	3.94
Total for Forbs		33	354	89	402	314	1.19	1.93	6.94	5.86

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

BROWSE TRENDS--

Management unit 10, Study no: 16

Type	Species	Strip Frequency				Average Cover %			
		'95	'00	'05	'10	'95	'00	'05	'10
B	Artemisia tridentata wyomingensis	84	80	77	34	12.32	15.15	8.03	3.55
B	Atriplex canescens	0	1	0	0	-	-	-	-
B	Chrysothamnus nauseosus	0	0	0	0	-	-	-	.01
B	Echinocactus sp.	0	0	0	1	-	-	-	-
B	Grayia spinosa	0	0	0	1	-	-	-	.15
B	Gutierrezia sarothrae	97	34	71	41	7.67	.23	3.80	2.74
B	Juniperus osteosperma	0	0	0	1	-	-	-	-
B	Opuntia sp.	9	10	11	7	.00	.09	.58	.21
Total for Browse		190	125	159	85	20.01	15.48	12.43	6.67

CANOPY COVER, LINE INTERCEPT--

Management unit 10, Study no: 16

Species	Percent Cover	
	'05	'10
Artemisia tridentata wyomingensis	7.71	4.44
Gutierrezia sarothrae	4.00	3.04
Opuntia sp.	.45	.18

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 10, Study no: 16

Species	Average leader growth (in)	
	'05	'10
Artemisia tridentata wyomingensis	1.2	2.3

BASIC COVER--

Management unit 10, Study no: 16

Cover Type	Average Cover %				
	'86	'95	'00	'05	'10
Vegetation	24.50	36.40	27.21	68.36	28.62
Rock	0	.07	.01	.04	.03
Pavement	0	0	.12	.01	.00
Litter	48.00	45.56	33.00	18.70	32.25
Cryptogams	0	1.89	2.98	.63	.18
Bare Ground	27.50	29.78	51.00	20.34	32.46

SOIL ANALYSIS DATA --

Management unit 10, Study no: 16, Study Name: West Horse Pasture

Effective rooting depth (in)	pH	sandy clay loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
15.4	7.4	50.0	24.0	26.0	0.7	3.8	57.6	0.5

PELLET GROUP DATA--

Management unit 10, Study no: 16

Type	Quadrat Frequency			
	'95	'00	'05	'10
Rabbit	49	30	16	6
Elk	-	3	1	4
Deer	44	66	24	28
Cattle	-	-	-	-

Days use per acre (ha)		
'00	'05	'10
-	-	-
5 (12)	9 (22)	3 (7)
58 (143)	38 (94)	141 (349)
-	2 (4)	-

BROWSE CHARACTERISTICS--

Management unit 10, Study no: 16

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>Artemisia tridentata wyomingensis</i>									
86	2798	2	43	55	-	5	93	21	12/14
95	4300	2	71	27	-	43	50	16	17/30
00	3500	1	74	26	-	58	23	19	16/26
05	3140	1	27	71	180	25	67	51	19/28
10	1380	7	52	41	300	59	9	22	14/25
<i>Atriplex canescens</i>									
86	0	0	0	-	-	0	0	0	-/-
95	0	0	0	-	-	0	0	0	-/-
00	20	0	100	-	-	100	0	0	-/-
05	0	0	0	-	-	0	0	0	-/-
10	0	0	0	-	-	0	0	0	-/-
<i>Chrysothamnus nauseosus</i>									
86	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	-/-
10	0	0	0	-	40	0	0	0	-/-
<i>Echinocactus sp.</i>									
86	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	-/-
10	20	0	100	-	-	0	0	0	7/17
<i>Grayia spinosa</i>									
86	265	0	25	75	-	0	100	25	13/17
95	0	0	0	0	-	0	0	0	10/20
00	0	0	0	0	-	0	0	0	-/-
05	0	0	0	0	-	0	0	0	20/27
10	20	0	100	0	-	0	100	0	17/29

		Age class distribution					Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)	
<i>Gutierrezia sarothrae</i>										
86	7531	53	42	5	733	0	0	0	10/7	
95	15140	35	65	0	580	0	0	.13	12/13	
00	1020	2	80	18	40	0	0	12	10/11	
05	4460	1	97	2	180	0	0	0	13/13	
10	1740	3	86	10	-	0	0	1	10/15	
<i>Juniperus osteosperma</i>										
86	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	-/-	
10	20	100	0	-	-	0	0	0	-/-	
<i>Opuntia sp.</i>										
86	0	0	0	0	-	0	0	0	-/-	
95	200	0	100	0	-	0	0	0	6/18	
00	240	0	75	25	20	8	0	17	5/17	
05	360	0	100	0	-	0	0	0	6/23	
10	160	0	75	25	-	0	0	13	5/17	