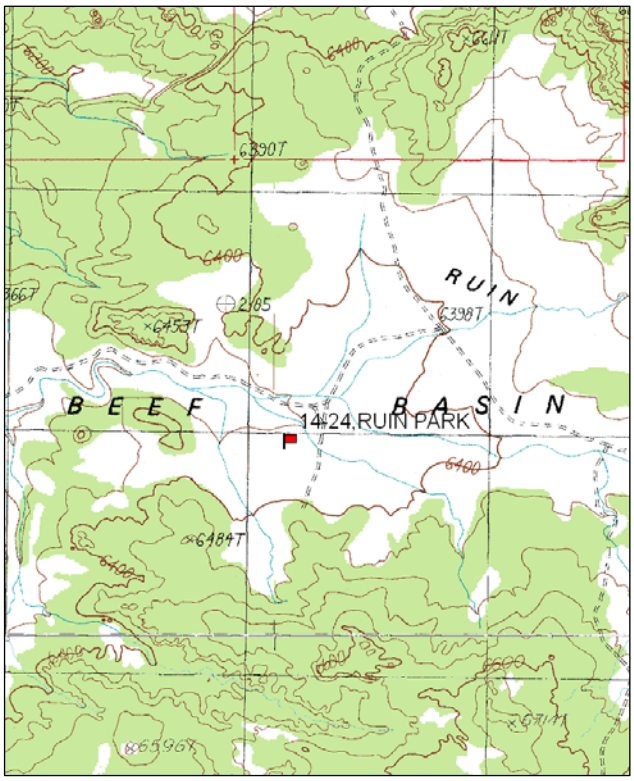
RUIN PARK - TREND STUDY NO. 14-24-09

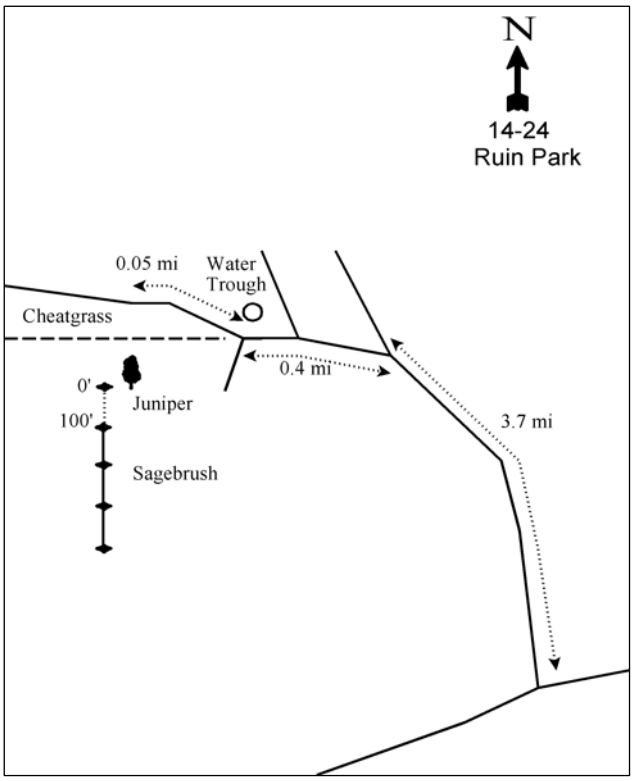
Vegetation Type: Wyoming Big Sagebrush
Range Type: Crucial Deer Yearlong
NRCS Ecological Site Description: Semidesert Sandy Loam (Fourwing Saltbush), R035XY215UT
Land Ownership: BLM
Elevation: 6,400 ft (1,951 m)
Aspect: Flat
Slope: 0%-4%
Transect bearing: 165 degrees magnetic
Belt placement: line 1 (11 & 71ft), line 2 (34ft), line 3 (59ft), line 4 (95ft)

Directions:
At the junction of the Elk Ridge-Salt Creek Mesa-Beef Basin Roads, go north down into the Beef Basin area. Follow the main road for 9.1 miles, passing the FS/BLM boundary, down to an intersection where there is a BLM register box. Bear right and go 3.7 miles on the main road disregarding all forks until you come to a fork at this mileage. Stay left and continue 0.3 miles to a right turnoff to a ruin. Continue left 0.1 miles to a water trough by a fork. Turn right for approximately 0.05 miles before turning south and driving southwest across the cheatgrass flat (no road). Stop at the sagebrush border and look out in the sagebrush flat for a small lone juniper near a shallow gully. The frequency baseline starts by this juniper and runs south towards the P-J covered hills. All stakes are 3 1/2 foot tall green steel fence posts.

Map Name: Cross Canyon



Diagrammatic Sketch:



Township: 32S, Range: 18E, Section: 11

GPS: NAD 83, UTM 12S 595094 E 4207141 N

RUIN PARK - TREND STUDY NO. 14-24

Site Information

Site Description: The study samples an open park in Beef Basin surrounded by rocky, pinyon pine (*Pinus edulis*) and Utah juniper (*Juniperus osteosperma*) covered hills. Numerous Anasazi Indian ruins are found in the hills near the study, therefore the name Ruin Park for the large open flat. A water development for cattle is located just northeast of the study transect. Cattle distribution is controlled mainly by water and there are few fences. Pellet group data from the site has estimated fluctuating deer use on the site with heavy use in 1999, light use in 2004, and moderate use in 2009. Estimated cattle use has been light to lightly moderate since 1999 (Table - Pellet Group Data).

Browse: Browse species are rare on the site. Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*) was the primary browse species at the outset of the study in 1986, but the population was overly mature and decadent. The density of sagebrush steadily decreased from 1986 to 2004, when no live sagebrush plants were sampled. No live sagebrush plants have been sampled since 1999 (Table - Browse Characteristics). The decline of sagebrush on the site is likely due to a combination of heavy use, competition with the annual grass cheatgrass (*Bromus tectorum*), and periods of low precipitation. Small populations of fringed sagebrush (*Artemisia frigida*), winterfat (*Ceratoides lanata*), and white rubber rabbitbrush (*Chrysothamnus nauseosus* ssp. *albicaulis*) have also been sampled on the site.

Herbaceous Understory: Perennial grasses provide important ground cover and soil protection, as well as some of the only forage on the site. The most abundant perennial species are needle-and-thread (*Stipa comata*), blue grama (*Bouteloua gracilis*), and Indian ricegrass (*Oryzopsis hymenoides*). Cheatgrass occurred on the site in 1992 in small numbers, but by 1999 cheatgrass frequency and cover exploded dominated the site. Drought conditions prior to the 2004 reading caused cheatgrass to decline significantly. Although several species of forbs were encountered on the study transect over the sample years, perennial forbs have steadily declined in nested frequency since 1992. Forb species now occur only rarely (Table - Herbaceous Trends).

Soil: The reddish sandy loam soil has a moderately alkaline pH and a fairly deep effective rooting depth. Phosphorus has low availability for plant growth and development at 5.9 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). A buildup of litter and soil, along with some cryptogamic development, is found at the base of sagebrush. The average bare ground cover increased markedly in 2004 and remained high in 2009 (table - Basic Cover). The soil erosion condition was classified as slight in 2009 due to a gully that runs parallel to the baseline, and surface litter and soil movement.

Trend Assessments

Browse:

- **1986 to 1992 - down (-2):** Differences in density may be related to the larger sample area used in 1992; therefore, trend was determined using other parameters. Decadence of the primary browse species, Wyoming big sagebrush, increased from 58% to 76% and plants displaying poor vigor increased from none to 24% of the population. Recruitment of young sagebrush plants decreased from 12% to 5% of the population.
- **1992 to 1999 - down (-2):** Density of Wyoming big sagebrush decreased by 58% from 1,520 plants/acre to 640 plants/acre and cover decreased from 4% to 2%. Decadence of sagebrush increased to 91% and poor vigor increased to 50% of the population. There was no new recruitment of young sagebrush plants. There was also a decrease in the winterfat density and increase in decadence.
- **1999 to 2004 - down (-2):** There were no Wyoming big sagebrush plants sampled on the site in 2004. The density of winterfat decreased 47% from 300 plants/acre to 160 plants/acre.
- **2004 to 2009 - stable (0):** The browse is in very poor condition on this site. No Wyoming big sagebrush plants were sampled in the density strips. There was a slight increase in the density of winterfat.

Grass:

- **1986 to 1992 - stable (0):** There was little change in the sum of nested frequency of perennial grasses. There was a slight change in composition as blue grama increased significantly in nested frequency, and bottlebrush squirreltail (*Sitanion hystrix*) decreased significantly in nested frequency.
- **1992 to 1999 - down (-2):** The sum of nested frequency of perennial grasses decreased by 32% and cover decreased from 28% to 10%. There was a significant increase in the nested frequency of cheatgrass and cover increased from less than 1% to 21%. Blue grama and needle-and-thread decreased significantly in nested frequency.
- **1999 to 2004 - slightly up (+1):** There was a slight increase in the nested frequency of perennial grasses and cover increased to 23%. Cheatgrass decreased significantly in nested frequency and provided no cover in 2004. There was a significant increase in the nested frequency of needle-and-thread.
- **2004 to 2009 - stable (0):** The sum of nested frequency and cover of perennial grasses changed little. There was a significant increase in the nested frequency of cheatgrass, but cover is still less than 1%.

Forb:

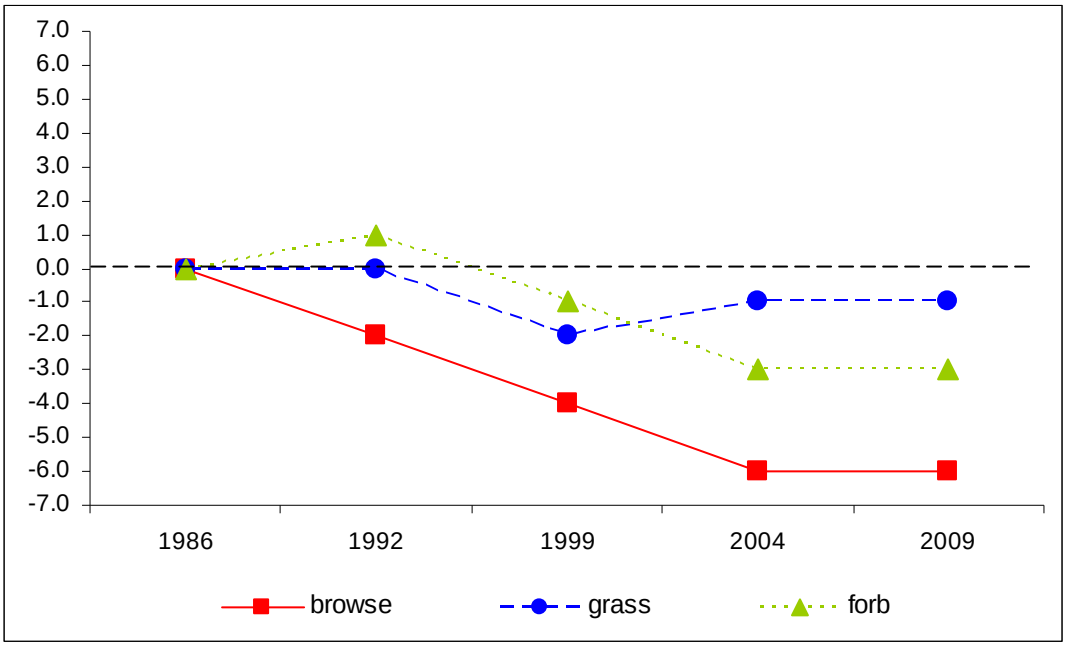
- **1986 to 1992 - slightly up (+1):** There was a slight increase in the sum of nested frequency of perennial forbs due to a significant increase in the nested frequency of hoary aster (*Machaeranthera canescens*).
- **1992 to 1999 - down (-2):** The sum of nested frequency of perennial forbs decreased 59% and cover decreased from 2% to less than 1%. Hoary aster and longleaf phlox (*Phlox longifolia*) decreased significantly in nested frequency.
- **1999 to 2004 - down (-2):** The sum of nested frequency of perennial forbs decreased a further 65% and cover continued to decrease. Annual forbs increased in sum of nested frequency and cover. Forbs are very rare on the site.
- **2004 to 2009 - stable (0):** There was a slight decrease in the sum of nested frequency and cover of perennial forbs, but forbs are so rare this decrease had little change on the community.

DEER DESIRABLE COMPONENTS INDEX - LOW POTENTIAL SCALE --
Management unit 14, study no: 24

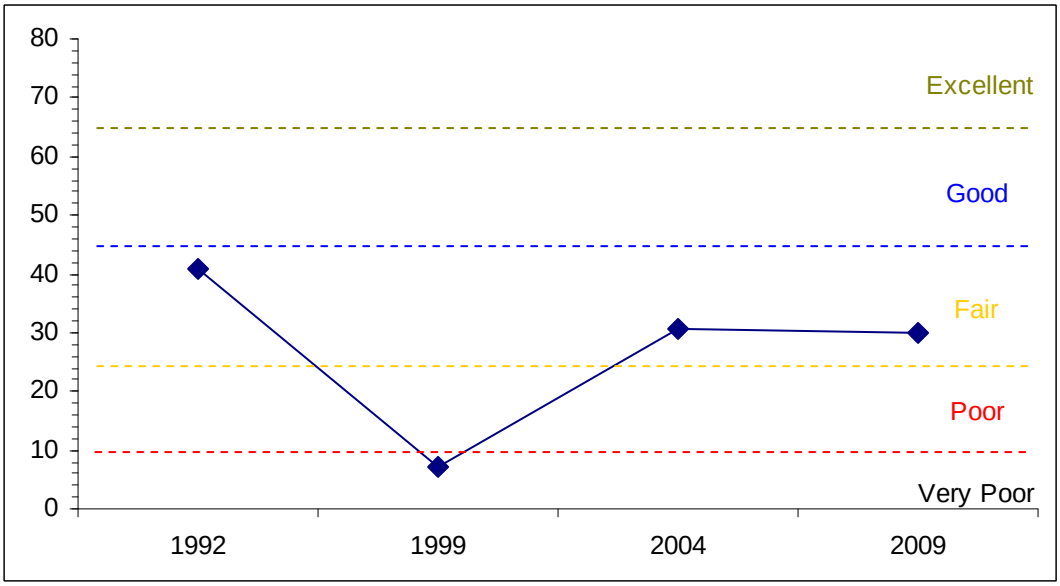
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	**Total Score**	Ranking
92	5.9	0.0	0.0	30.0	0.0	4.9	0.0	**40.7**	Fair
99	2.4	0.0	0.0	19.5	-16.0	1.1	0.0	**7.1**	Very Poor
04	0.2	0.0	0.0	30.0	0.0	0.3	0.0	**30.6**	Fair
09	0.2	0.0	0.0	30.0	-0.5	0.2	0.0	**29.9**	Fair

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 14, Study no: 24



DEER DESIRABLE COMPONENTS INDEX TREND, LOW POTENTIAL SCALE
Management unit 14, Study no: 24



HERBACEOUS TRENDS--
Management unit 14, Study no: 24

Type	Species	Nested Frequency					Average Cover %			
		'86	'92	'99	'04	'09	'92	'99	'04	'09
G	Bouteloua gracilis	$_{a}$95	$_{b}$146	$_{a}$58	$_{a}$62	$_{a}$80	9.26	.80	3.37	4.96
G	Bromus tectorum (a)	-	$_{a}$5	$_{c}$336	$_{a}$1	$_{b}$89	.04	21.28	.00	.62
G	Oryzopsis hymenoides	$_{a}$56	$_{ab}$61	$_{b}$96	$_{a}$47	$_{a}$52	1.40	2.20	1.82	3.45
G	Sitanion hystrix	$_{b}$47	$_{a}$11	$_{a}$3	$_{a}$9	$_{a}$3	.07	.00	.33	.00
G	Sporobolus cryptandrus	10	12	1	-	8	.15	.00	-	.42
G	Stipa comata	$_{c}$278	$_{bc}$262	$_{a}$176	$_{bc}$244	$_{b}$219	16.82	6.71	17.45	13.21
G	Vulpia octoflora (a)	-	9	5	-	1	.02	.01	-	.00
Total for Annual Grasses		0	14	341	1	90	0.05	21.30	0.00	0.62
Total for Perennial Grasses		486	492	334	362	362	27.72	9.74	22.98	22.05
Total for Grasses		486	506	675	363	452	27.78	31.04	22.99	22.68
F	Astragalus mollissimus	7	8	6	-	-	.04	.02	-	-
F	Calochortus nuttallii	-	-	-	-	-	-	-	.00	-
F	Chenopodium leptophyllum(a)	$_{a}$8	$_{b}$68	$_{a}$-	$_{b}$54	$_{a}$-	1.44	-	1.36	-
F	Descurainia pinnata (a)	-	-	-	7	1	-	-	.04	.00
F	Erigeron pumilus	4	7	2	-	-	.06	.00	-	-
F	Eriogonum sp.	-	2	-	-	-	.03	-	-	-
F	Euphorbia fendleri	11	3	10	8	3	.06	.24	.07	.03
F	Helianthus annuus (a)	-	2	-	-	-	.00	-	-	-
F	Lappula occidentalis (a)	-	-	6	11	-	-	.06	.10	-
F	Machaeranthera canescens	$_{a}$4	$_{b}$40	$_{a}$7	$_{a}$-	$_{a}$-	1.79	.02	-	-
F	Microsteris gracilis (a)	-	-	1	-	-	-	.00	-	-
F	Navarretia intertexta (a)	-	-	-	1	6	-	-	.00	.07
F	Penstemon sp.	-	1	-	-	-	.03	-	-	-
F	Phlox hoodii	3	20	14	-	4	.17	.28	-	.06
F	Phlox longifolia	$_{c}$32	$_{bc}$23	$_{a}$2	$_{ab}$6	$_{a}$-	.10	.00	.06	-
F	Plantago patagonica (a)	-	$_{a}$-	$_{b}$28	$_{a}$6	$_{a}$-	-	.06	.01	-
F	Ranunculus testiculatus (a)	-	-	3	-	-	-	.00	-	-
F	Salsola iberica (a)	-	3	-	5	-	.15	-	.01	-
F	Senecio multilobatus	4	-	-	-	-	-	-	-	-
F	Sphaeralcea coccinea	$_{b}$15	$_{a}$2	$_{a}$-	$_{a}$1	$_{a}$-	.16	-	.03	-
F	Tragopogon dubius	-	-	2	-	-	-	.00	-	-
F	Unknown forb-annual (a)	-	2	-	-	-	.01	-	-	-
Total for Annual Forbs		8	75	38	84	7	1.61	0.13	1.53	0.08
Total for Perennial Forbs		80	106	43	15	7	2.45	0.57	0.17	0.09
Total for Forbs		88	181	81	99	14	4.06	0.71	1.71	0.17

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

BROWSE TRENDS--
Management unit 14, Study no: 24

Type	Species	Strip Frequency				Average Cover %			
		'92	'99	'04	'09	'92	'99	'04	'09
B	Artemisia frigida	4	2	2	0	.03	.00	.06	.00
B	Artemisia tridentata wyomingensis	43	23	0	0	4.15	1.77	-	-
B	Ceratoides lanata	13	8	4	5	.51	.18	.15	.15
B	Chrysothamnus nauseosus albicaulis	1	1	0	1	.00	.00	-	.00
B	Chrysothamnus viscidiflorus stenophyllus	25	28	11	12	1.24	1.43	.31	.74
B	Opuntia sp.	1	0	0	0	.00	-	-	-
B	Sclerocactus sp.	0	0	0	1	-	-	-	.00
Total for Browse		87	62	17	19	5.93	3.39	0.51	0.89

CANOPY COVER, LINE INTERCEPT--
Management unit 14, Study no: 24

Species	Percent Cover	
	'04	'09
Ceratoides lanata	.30	.18
Chrysothamnus viscidiflorus stenophyllus	1.79	.88

KEY BROWSE ANNUAL LEADER GROWTH--
Management unit 14, Study no: 24

Species	Average leader growth (in)	
	'04	'09
Ceratoides lanata	1.8	2.2

BASIC COVER--
Management unit 14, Study no: 24

Cover Type	Average Cover %				
	'86	'92	'99	'04	'09
Vegetation	6.50	36.31	36.66	27.64	22.83
Rock	0	.83	0	.01	.01
Pavement	0	0	.30	.26	.19
Litter	41.00	22.78	34.33	24.71	40.30
Cryptogams	2.50	.55	.24	.18	.05
Bare Ground	50.00	33.97	34.17	55.52	54.28

SOIL ANALYSIS DATA --
Management unit 14, Study no: 24, Study Name: Ruin Park

Effective rooting depth (in)	pH	sandy loam			%0M	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
18.1	7.9	60	21.8	16.6	0.6	5.9	80	0.4

PELLET GROUP DATA--
Management unit 14, Study no: 24

Type	Quadrat Frequency			
	'92	'99	'04	'09
Rabbit	17	19	10	39
Elk	1	-	-	2
Deer	57	40	16	11
Cattle	10	12	2	6

Days use per acre (ha)		
'99	'04	'09
-	-	-
-	-	-
70 (173)	13 (31)	24 (60)
26 (64)	11 (27)	17 (41)

BROWSE CHARACTERISTICS--
Management unit 14, Study no: 24

		Age class distribution				Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Artemisia frigida									
86	**0**	0	0	-	-	0	0	0	-/-
92	**140**	0	100	-	-	0	0	0	-/-
99	**60**	33	67	-	-	67	0	0	7/7
04	**40**	0	100	-	-	0	0	0	2/4
09	**0**	0	0	-	-	0	0	0	4/13
Artemisia tridentata wyomingensis									
86	**2198**	12	30	58	-	15	85	0	24/27
92	**1520**	5	18	76	-	43	38	24	-/-
99	**640**	0	9	91	-	9	88	50	21/29
04	**0**	0	0	0	-	0	0	0	-/-
09	**0**	0	0	0	-	0	0	0	5/7
Atriplex canescens									
86	**0**	0	0	-	-	0	0	0	-/-
92	**0**	0	0	-	-	0	0	0	-/-
99	**0**	0	0	-	-	0	0	0	-/-
04	**0**	0	0	-	-	0	0	0	-/-
09	**0**	0	0	-	-	0	0	0	44/50
Ceratoides lanata									
86	**1732**	19	27	54	133	73	23	0	8/9
92	**640**	34	59	6	-	13	6	0	-/-
99	**300**	47	27	27	-	13	40	7	13/13
04	**160**	0	100	0	-	13	0	0	14/16
09	**240**	42	58	0	120	0	0	0	11/13
Chrysothamnus nauseosus albicaulis									
86	**0**	0	0	-	-	0	0	0	-/-
92	**20**	0	100	-	-	0	0	0	-/-
99	**20**	0	100	-	-	0	100	0	14/19
04	**0**	0	0	-	-	0	0	0	-/-
09	**60**	0	100	-	-	0	0	0	16/26

		Age class distribution				Utilization			
Year	Plants per Acre (excluding seedlings)	% Young	% Mature	% Decadent	Seedling (plants/acre)	% moderate	% heavy	% poor vigor	Average Height Crown (in)
Chrysothamnus viscidiflorus stenophyllus									
86	**0**	0	0	0	-	0	0	0	-/-
92	**900**	24	76	0	40	0	0	0	-/-
99	**1000**	6	68	26	-	4	0	8	12/21
04	**460**	0	83	17	-	0	0	13	9/15
09	**440**	0	86	14	-	0	5	5	9/21
Gutierrezia sarothrae									
86	**0**	0	0	-	-	0	0	0	-/-
92	**0**	0	0	-	-	0	0	0	-/-
99	**0**	0	0	-	-	0	0	0	-/-
04	**0**	0	0	-	-	0	0	0	-/-
09	**0**	0	0	-	-	0	0	0	4/9
Opuntia sp.									
86	**0**	0	0	-	-	0	0	0	-/-
92	**40**	100	0	-	-	0	0	0	-/-
99	**0**	0	0	-	-	0	0	0	6/24
04	**0**	0	0	-	-	0	0	0	7/21
09	**0**	0	0	-	-	0	0	0	-/-
Sclerocactus sp.									
86	**0**	0	0	-	-	0	0	0	-/-
92	**0**	0	0	-	-	0	0	0	-/-
99	**0**	0	0	-	-	0	0	0	4/6
04	**0**	0	0	-	-	0	0	0	-/-
09	**20**	100	0	-	-	0	0	0	-/-