

FORSYTH RESERVOIR - TREND STUDY NO. 25A-11-09

Vegetation Type: Black Sagebrush

Range Type: Crucial Deer Winter, Substantial Elk Winter

NRCS Ecological Site Description: Not Available

Land Ownership: USFS

Elevation: 8,400 ft (2,560 m)

Aspect: Southwest

Slope: 12%

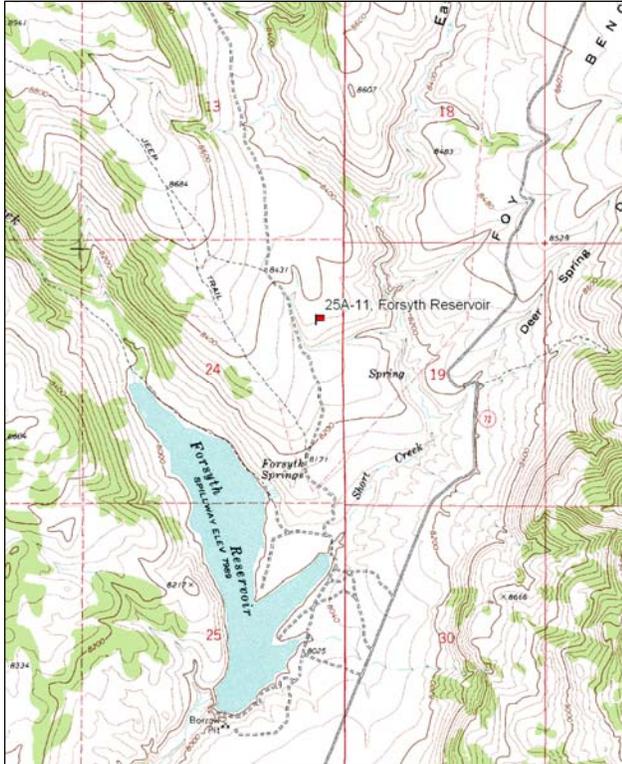
Transect bearing: 165 degrees magnetic

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

Directions:

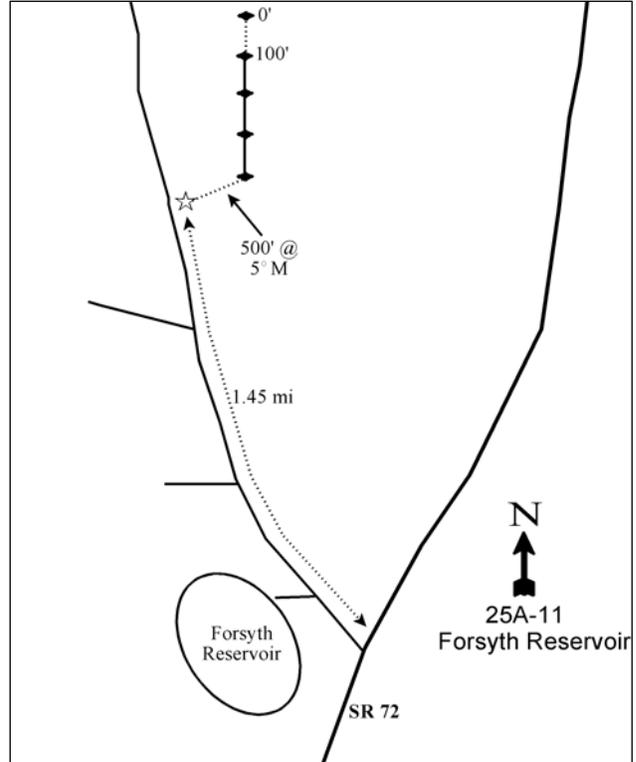
Between Lyman and Loa, turn north towards Fremont to connect with SR 72. Travel up SR 72 until you cross a Forest Service boundary cattleguard (about 5 miles from Fremont). Continue another 2.7 miles to Forsyth Reservoir. Turn at the Forsyth Reservoir sign and drive down 0.3 miles to a fork. Turn right and continue 0.1 miles to where the road crosses Short Creek (which empties into the east cove of Forsyth). From Short Creek, go up 0.1 miles to a fork. Turn right and go 0.25 miles to a cattleguard. Continue 0.15 miles beyond the cattleguard to a fork. Take the right fork and go 0.55 miles to a draw below a ridge to the northeast. There is a steel rebar witness post on the right side of the road. The last baseline stake is located 500 feet away at a bearing of 5°M on top of the ridge. The 0-foot baseline stake is 400 feet due north, and has a red browse tag #7062 attached.

Map Name: Forsyth Reservoir, Utah



Township: 26S, Range: 3E, Section: 24

Diagrammatic Sketch:



GPS: NAD 83, UTM 12S 454121 E 4265787 N

FORSYTH RESERVOIR - TREND STUDY NO. 25A-11

Site Information

Site Description: The study is located on the top of a hill north of Forsyth Reservoir. The area is managed by the Fish Lake National Forest as part of the Tidwell cattle allotment. Historically, the area has received heavy grazing by cattle and sheep, but with an especially high impact within the vicinity of the reservoir. A large area was sprayed with 2,4-D in the spring of 1976 to reduce shrub competition and release the grasses and forbs. A drought after the spraying impaired growth, but five years after the spraying it was noted by Forest Service personnel that there was fair grass production with good vigor. Pellet group data estimated heavy use by elk in 1999, light use in 2004, and moderate use in 2009. Estimated deer and cattle use has been light since 1999 (Table - Pellet Group Data).

Browse: The dominant browse on the site is black sagebrush (*Artemisia nova*) which provides almost all of the browse cover and the majority of vegetation cover on the site (Table - Browse Trends). Black sagebrush has an extremely dense population of small statured, mostly mature plants. Decadence is moderately high in the black sagebrush population, but vigor is mostly good. Recruitment of young sagebrush plants comprised a large proportion of the population from 1985 to 1999, but recruitment has been nominal since 2004. There was a large die-off of black sagebrush between the 1999 and 2004 sample years that is attributed to drought, winter injury, and intraspecific competition in this dense population. Utilization has been mostly light since 2004. There are some scattered mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*) plants on the site, which are more heavily hedged because of their higher preference. Other common shrubs found on the site include fringed sage (*Artemisia frigida*) and stickyleaf low rabbitbrush (*Chrysothamnus viscidiflorus* ssp. *viscidiflorus*). Both of these species have steadily decreased in density since 1999 (Table - Browse Characteristics).

Herbaceous Understory: Grasses on the site are fairly diverse and abundant providing an average of 10% cover since 1999. The dominant grass is the warm season grass blue grama (*Bouteloua gracilis*) with other perennial grasses such as mutton bluegrass (*Poa fendleriana*), bottlebrush squirreltail (*Sitanion hystrix*), and Letterman needlegrass (*Stipa lettermani*) also being fairly abundant. Forbs are less abundant providing only 1% or less cover since 1999 and have steadily decreased in sum of nested frequency since 1985. Perennial forbs are limited to a few low growing, poor forage value species like lobeleaf groundsel (*Senecio multilobatus*), low fleabane (*Erigeron pumilus*), and longleaf phlox (*Phlox longifolia*) (Table - Herbaceous Trends).

Soil: Soil texture is a clay loam with a neutral pH. Phosphorus has limited availability for plant growth and development at 2.6 ppm (Tiedemann and Lopez 2004) (Table - Soil Analysis Data). Rock and pavement cover are high on the surface and the profile contains abundant gravel. Bare ground cover is low ranging from 1% to 6% since 1985 (Table - Basic Cover). The soil erosion condition was classified as stable in 2009.

Trend Assessments

Browse:

- **1985 to 1991 - up (+2):** The density of the primary browse species, black sagebrush, increased by 36%. The population of black sagebrush is extremely dense at 21,131 plants/acre. Recruitment of young sagebrush plants increased from 37% to 50% of the population.
- **1991 to 1999 - stable (0):** Differences in density may be related to the larger sample area used in 1999; therefore, trend was determined using other parameters. Decadence of black sagebrush increased from 13% to 29% and recruitment of young plants decreased to 27%, but both values are still considered good.

- **1999 to 2004 - down (-2):** The density of black sagebrush decreased by 54% to 13,080 plants/acre and cover decreased from 19% to 16%. Decadence of black sagebrush increased to 40% and poor vigor increased from 2% to 19%. Recruitment of young black sagebrush plants was nominal.
- **2004 to 2009 - slightly up (+1):** Black sagebrush density increased by 16% to 15,180 plants/acre, but there was little change in cover. Recruitment of young black sagebrush plants increased slightly, but is still low. Decadence and poor vigor of black sagebrush remained relatively high.

Grass:

- **1985 to 1991 - stable (0):** There was little change in the sum of nested frequency of perennial grasses.
- **1991 to 1999 - stable (0):** Perennial grass sum of nested frequency remained similar.
- **1999 to 2004 - stable (0):** The sum of nested frequency of perennial grasses changed little, but cover nearly doubled from 7% to 13%.
- **2004 to 2009 - stable (0):** Perennial grass sum of nested frequency remained similar, though cover decreased to 10%.

Forb:

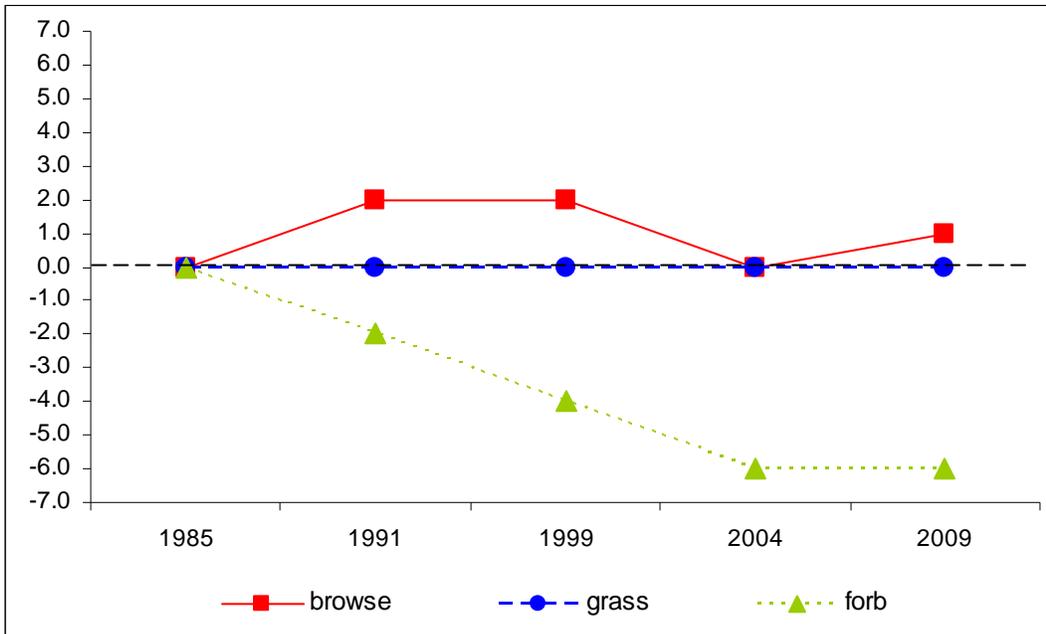
- **1985 to 1991 - down (-2):** Perennial forb sum of nested frequency decreased by 32% with a significant decrease in the nested frequency of longleaf phlox and rockcress (*Arabis demissa*).
- **1991 to 1999 - down (-2):** There was a 35% decrease in the sum of nested frequency of perennial forbs with a significant decrease in the nested frequency of low fleabane and rockcress.
- **1999 to 2004 - down (-2):** The sum of nested frequency of perennial forbs decreased by 44%. Forbs are now rare on the site.
- **2004 to 2009 - stable (0):** There was little change in the sum of nested frequency of perennial forbs, but cover decreased to less than 1%. Forbs remain rare on the site.

DEER DESIRABLE COMPONENTS INDEX - MID-LEVEL POTENTIAL SCALE --
Management unit 25A, study no: 11

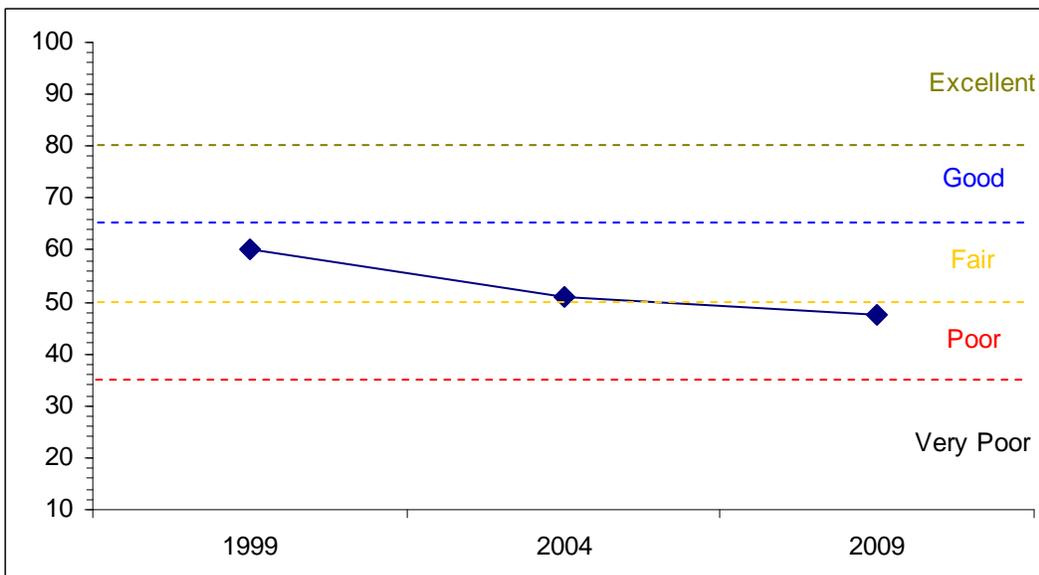
Year	Preferred Browse Cover	Preferred Browse Decadence	Preferred Browse Young	Perennial Grass Cover	Annual Grass Cover	Perennial Forb Cover	Noxious Weeds	Total Score	Ranking
99	24.5	6.4	13.4	13.6	0.0	2.1	0.0	60.1	Fair
04	19.8	3.2	0.1	25.6	0.0	2.1	0.0	50.9	Poor-Fair
09	18.9	4.3	4.0	20.0	0.0	0.5	0.0	47.6	Poor

Trend Summary

CUMULATIVE RANGE TREND ASSESSMENT--
Management unit 25A Study no: 11



DEER DESIRABLE COMPONENTS INDEX TREND, MID-LEVEL POTENTIAL
Management unit 25A, Study no: 11



HERBACEOUS TRENDS--

Management unit 25A, Study no: 11

T y P e	Species	Nested Frequency					Average Cover %		
		'85	'91	'99	'04	'09	'99	'04	'09
G	Agropyron spicatum	-	-	-	1	-	-	.03	-
G	Agropyron trachycaulum	b14	ab4	ab9	a-	a-	.04	-	-
G	Bouteloua gracilis	a140	b184	ab166	b178	b189	2.44	5.97	5.56
G	Carex sp.	a6	a6	b33	b42	b36	.14	.46	.18
G	Poa fendleriana	102	113	120	129	126	2.00	3.46	2.34
G	Sitanion hystrix	b156	b161	a85	a78	a63	.66	1.36	.59
G	Stipa comata	a1	a-	b35	ab11	ab15	.37	.15	.10
G	Stipa lettermani	102	102	85	74	89	1.14	1.37	1.18
Total for Annual Grasses		0	0	0	0	0	0	0	0
Total for Perennial Grasses		521	570	533	513	518	6.82	12.82	9.98
Total for Grasses		521	570	533	513	518	6.82	12.82	9.98
F	Androsace septentrionalis (a)	-	-	3	2	-	.03	.00	-
F	Arabis demissa	c143	b74	a25	a9	a9	.05	.02	.03
F	Astragalus lentiginosus	3	-	-	-	-	-	-	-
F	Astragalus sp.	-	-	-	3	-	-	.00	-
F	Chaenactis douglasii	a2	b14	a3	ab5	a-	.00	.06	-
F	Erigeron pumilus	c137	c110	b66	a20	b58	.19	.07	.18
F	Gayophytum ramosissimum(a)	-	-	-	2	-	-	.01	-
F	Hymenoxys richardsonii	a1	a-	b17	a-	a-	.70	-	-
F	Pedicularis centranthera	-	-	1	4	4	.00	.03	.01
F	Penstemon sp.	-	1	9	-	-	.02	-	-
F	Phlox austromontana	-	-	2	-	-	.01	-	-
F	Phlox longifolia	c60	b33	ab19	a2	a4	.05	.01	.01
F	Polygonum douglasii (a)	-	-	-	2	-	-	.00	-
F	Senecio multilobatus	a-	a3	a10	b42	a3	.02	.86	.00
Total for Annual Forbs		0	0	3	6	0	0.03	0.01	0
Total for Perennial Forbs		346	235	152	85	78	1.07	1.06	0.24
Total for Forbs		346	235	155	91	78	1.11	1.08	0.24

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

BROWSE TRENDS--

Management unit 25A, Study no: 11

Type	Species	Strip Frequency			Average Cover %		
		'99	'04	'09	'99	'04	'09
B	Artemisia frigida	31	25	21	.16	.29	.09
B	Artemisia nova	96	96	96	19.44	15.63	15.02
B	Artemisia tridentata vaseyana	2	2	2	.00	.00	.00
B	Chrysothamnus nauseosus	1	0	1	.00	-	.00
B	Chrysothamnus viscidiflorus viscidiflorus	29	28	23	1.60	1.58	.86
B	Coryphantha vivipara arizonica	2	1	0	.06	.00	-
B	Eriogonum microthecum	9	7	7	.03	.09	.00
B	Gutierrezia sarothrae	4	12	9	.01	.18	.03
B	Leptodactylon pungens	2	2	2	.00	.00	.00
B	Pediocactus simpsonii	2	3	1	.03	.01	.01
B	Pinus edulis	1	1	1	.00	.00	.00
B	Tetradymia canescens	1	1	0	.00	.00	-
Total for Browse		180	178	163	21.35	17.80	16.02

CANOPY COVER, LINE INTERCEPT--

Management unit 25A, Study no: 11

Species	Percent Cover	
	'04	'09
Artemisia frigida	.58	.18
Artemisia nova	14.89	17.23
Artemisia tridentata vaseyana	.65	.96
Chrysothamnus viscidiflorus viscidiflorus	2.01	1.03
Eriogonum microthecum	-	.01
Gutierrezia sarothrae	.30	-
Pinus edulis	.03	.05

KEY BROWSE ANNUAL LEADER GROWTH--

Management unit 25A, Study no: 11

Species	Average leader growth (in)	
	'04	'09
Artemisia nova	1.4	0.5

BASIC COVER--

Management unit 25A, Study no: 11

Cover Type	Average Cover %				
	'85	'91	'99	'04	'09
Vegetation	5.75	10.75	32.02	31.75	28.87
Rock	6.25	2.75	14.71	9.88	8.81
Pavement	49.50	57.00	38.54	47.79	47.76
Litter	32.00	27.75	7.75	20.64	22.36
Cryptogams	4.75	.75	1.71	1.78	.64
Bare Ground	1.75	1.00	3.56	4.67	6.38

SOIL ANALYSIS DATA --

Management unit 25A, Study no: 11, Study Name: Forsyth Reservoir

Effective rooting depth (in)	pH	loam			%OM	PPM P	PPM K	ds/m
		%sand	%silt	%clay				
14.4	7	41.3	35.4	23.3	2.2	2.6	89.6	0.5

PELLET GROUP DATA--

Management unit 25A, Study no: 11

Type	Quadrat Frequency			Days use per acre (ha)		
	'99	'04	'09	'99	'04	'09
Rabbit	6	10	47	-	-	-
Grouse	-	-	-	-	-	139 pellets/acre
Elk	19	16	26	60 (148)	14 (35)	34 (84)
Deer	5	3	1	2 (5)	2 (5)	-
Cattle	2	1	3	7 (17)	4 (11)	10 (25)

BROWSE CHARACTERISTICS--

Management unit 25A, Study no: 11

Year	Plants per Acre (excluding seedlings)	Age class distribution			Seedling (plants/acre)	Utilization			Average Height Crown (in)
		% Young	% Mature	% Decadent		% moderate	% heavy	% poor vigor	
Artemisia frigida									
85	23199	60	40	0	4866	0	0	0	2/4
91	20398	16	76	8	199	30	14	.65	2/3
99	2240	13	88	0	40	8	0	0	4/6
04	1780	6	93	1	-	2	0	0	7/9
09	960	19	81	0	120	0	0	2	5/7
Artemisia nova									
85	15465	37	54	9	9466	19	2	.43	7/10
91	21131	50	37	13	-	15	7	5	6/11
99	28180	27	43	29	120	37	.63	2	7/16
04	13080	0	60	40	240	0	0	19	8/15
09	15180	8	56	36	4540	5	0	16	8/15
Artemisia tridentata vaseyana									
85	0	0	0	-	-	0	0	0	-/-
91	0	0	0	-	-	0	0	0	-/-
99	40	0	100	-	-	50	50	0	11/25
04	40	0	100	-	-	0	0	0	18/34
09	40	0	100	-	80	0	0	0	16/34
Chrysothamnus nauseosus									
85	66	0	100	-	-	0	0	0	2/2
91	0	0	0	-	-	0	0	0	-/-
99	20	0	100	-	-	0	100	0	7/9
04	0	0	0	-	-	0	0	0	31/35
09	20	0	100	-	-	0	0	0	27/28

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>Chrysothamnus viscidiflorus viscidiflorus</i>									
85	11731	24	74	2	799	0	0	.56	7/8
91	11931	17	64	18	133	19	9	4	3/4
99	1900	5	91	4	-	2	1	2	6/11
04	1560	8	85	8	-	0	0	1	6/11
09	1200	20	70	10	20	0	0	8	6/9
<i>Coryphantha vivipara arizonica</i>									
85	0	0	0	-	-	0	0	0	-/-
91	0	0	0	-	-	0	0	0	-/-
99	120	0	100	-	-	0	0	0	1/2
04	20	0	100	-	-	0	0	0	-/-
09	0	0	0	-	-	0	0	0	-/-
<i>Cowania mexicana stansburiana</i>									
85	0	0	0	-	66	0	0	0	-/-
91	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	-/-
<i>Eriogonum microthecum</i>									
85	66	0	100	0	-	0	0	0	5/5
91	199	67	0	33	-	33	0	0	-/-
99	220	18	64	18	-	36	0	18	5/9
04	200	0	100	0	-	0	40	0	6/9
09	180	0	100	0	-	0	0	0	5/7
<i>Gutierrezia sarothrae</i>									
85	0	0	0	-	-	0	0	0	-/-
91	0	0	0	-	-	0	0	0	-/-
99	80	0	100	-	-	0	0	0	6/7
04	340	6	94	-	-	0	0	0	7/8
09	180	22	78	-	-	0	0	0	6/6
<i>Leptodactylon pungens</i>									
85	0	0	0	-	-	0	0	0	-/-
91	0	0	0	-	-	0	0	0	-/-
99	120	0	100	-	-	0	0	0	7/9
04	120	0	100	-	-	0	0	0	5/6
09	40	0	100	-	-	0	0	0	2/5
<i>Pediocactus simpsonii</i>									
85	0	0	0	-	-	0	0	0	-/-
91	0	0	0	-	-	0	0	0	-/-
99	40	50	50	-	-	0	0	0	1/3
04	60	0	100	-	-	0	0	0	1/2
09	20	0	100	-	-	0	0	0	0/2

		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>Pinus edulis</i>										
85	0	0	0	-	66	0	0	0	-/-	
91	0	0	0	-	-	0	0	0	-/-	
99	20	100	0	-	-	0	0	0	-/-	
04	20	100	0	-	-	100	0	0	-/-	
09	20	100	0	-	-	0	0	0	-/-	
<i>Tetradymia canescens</i>										
85	0	0	0	-	-	0	0	0	-/-	
91	0	0	0	-	-	0	0	0	-/-	
99	20	0	100	-	-	0	0	0	7/10	
04	20	0	100	-	-	0	0	0	10/21	
09	0	0	0	-	-	0	0	0	13/31	