

Trend Study 17-20-96

Study site name: Lake Creek Road.

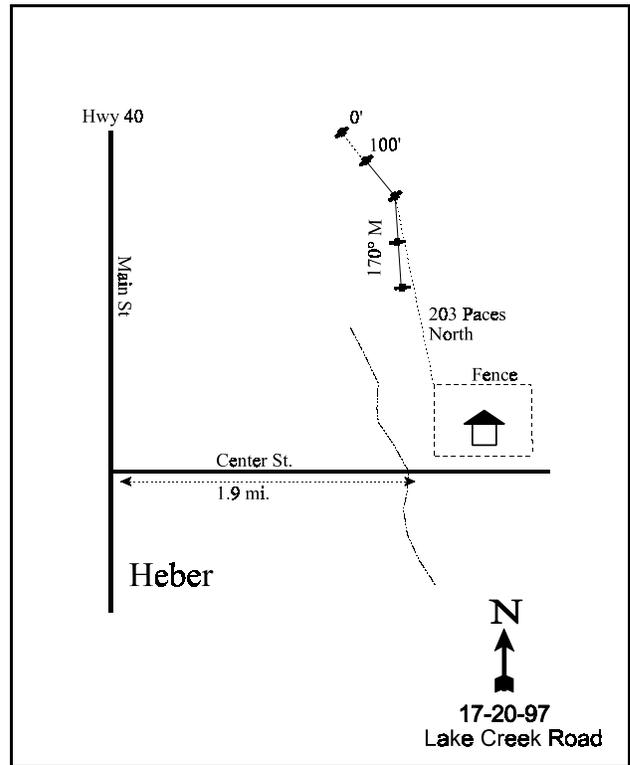
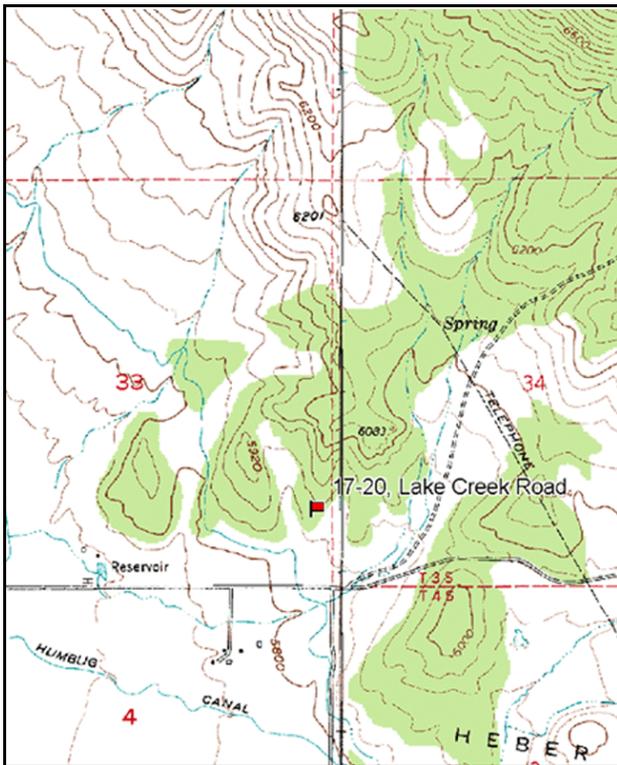
Vegetation type: Big Sagebrush.

Compass bearing: frequency baseline 146 degrees magnetic.

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

LOCATION DESCRIPTION

From Main and Center Street in Heber, proceed east 1.9 miles to a point where the road crosses an irrigation canal. Just east of the canal on the north side of the road is a house enclosed by a chain link fence. From the northwest corner of the fence, walk 203 paces north (approximately 1,000 feet) at 348 degrees true to the 100-foot end of the baseline. The 0-foot end is marked by browse tag # 7023.



Map Name: Heber

Diagrammatic Sketch

Township 3S, Range 5E, Section 33

GPS: NAD 27, UTM 12S 4484407 N 468160 E

## DISCUSSION

### Lake Creek Road - Trend Study No. 17-20

\*\*\*SUSPENDED - This site was suspended in 2002 as it is no longer representative of critical big game winter range. The site has an overstory of juniper and an understory of oak. The site primarily serves as thermal cover for wildlife which feed in the agriculture fields nearby. The narrative and data tables are included from the 1996 report.

This study samples one of several isolated knolls and ridge tops occupied by Utah juniper that lie east of Heber City and north of Lake Creek Road. These areas are extremely critical to wintering deer and exhibit levels of deer and livestock use that can only be classed as extreme. The study lies on a narrow ridge top oriented in a north-south direction. Exposure is south to southeast with the slope varying from nearly level to about 15%. Elevation varies between 5,860 feet and 6,000 feet. Deer use appears high in 1996 and numerous deer carcasses were found in the area.

Vegetatively, the area varies from rather open juniper with a strong but low-growing Gambel oak understory to a nearly closed stand of mature junipers with relatively little understory. Other shrubs such as mountain big sagebrush, true and curleaf mountain mahogany, and antelope bitterbrush occur occasionally throughout the area but always show excessive and heavy utilization. More than 40 years of nearly year-long cattle grazing have greatly depleted the herbaceous understory.

Soil is classified as the "Brad-Rock Outcrop Complex." Where soil exists within this mapping unit, it is very shallow and very cobbly. Textural analysis indicates a sandy loam with a neutral pH. Depth to bedrock seldom exceeds 10 inches and is more often in the neighborhood of 4 to 6 inches. The study area has large expanses of exposed reddish-brown sandstone which has been extensively fractured and thus provides numerous cracks which trap sediment and provide a plant growth medium. Brad soils are highly permeable and not surprisingly, have low available water capacity and restricted root zones. The erosion hazard is high, but overland movement of soil is often interrupted by catchments and cracks in the exposed conditions, any improvement in trend will be very slow. Rock and pavement cover combined have decreased along with bare ground cover. Litter cover is similar to that estimated in 1990 at 38%. Vegetative cover is estimated at 28% in 1996.

This area is characterized by a sparse juniper stand underlain by a very low growing Gambel oak understory composed predominantly of young re-sprouts. Scattered throughout the area are a variety of other browse plants and grasses. This particular site should not be regarded as a representative sample of the total plant community on the juniper ridges. It has more plant diversity and production than most of the surrounding area.

The key browse species is Gambel oak. It seems to be the only species that responds positively to browsing use by sprouting profusely and thus increasing production while availability is unaffected. Oak also seems particularly well suited for growth in the many rock crevices and shallow soil pockets in this area. In 1996, the estimated density of Gambel oak was 5,860 stems/acre. All other browse species are of secondary importance on this site and will likely remain so.

Herbaceous vegetation is represented by a mix of annual and perennial grasses and relatively few forbs. Annual grasses dominate the understory and include cheatgrass, Japanese brome, and rattail fescue. Pale alyssum dominates the forbs with most other species being incidental. Neither grasses or forbs are highly productive. This is a site where Gambel oak will continue to dominate but will remain low-growing because of browsing and soil deficiencies. Species such as antelope bitterbrush and mountain mahogany may persist; but will not become important producers. Increaser shrubs such as pricklypear cactus and broom snakeweed may increase slightly but will eventually be limited by oak and the poor site potential because of poor soil conditions.

### 1984 APPARENT TREND ASSESSMENT

Soil trend appears stable. This is a shallow rocky soil with poor potential. It is unlikely to degrade much further than it already has. Similarly, the potential for soil building and erosion control is equally low. Vegetative trend appears to have deteriorated slightly over the past few years because of declines in abundance and production of mountain big sagebrush and highlining of Utah juniper. However, neither condition can get much worse so trend appears stable. Gambel oak has increased its production to at least partially compensate for the impairment of juniper production and availability. Grasses have increased at least temporarily, but are not a significant competitive factor.

### 1990 TREND ASSESSMENT

The signs of past heavy use of this site are obvious in the highlined juniper and depleted understory. Use since 1984 has been more moderate in terms of deer, although several fawn carcasses were discovered. Use by livestock, controlled by the private landowner, appears to be limited to spring and fairly light on this site. Preferred browse species such as true and curleaf mountain mahogany, big sagebrush, and bitterbrush are rare and heavily hedged. The key species is Gambel oak, which provides the bulk of the available forage. The oak are moderately to heavily hedged, but use does not adversely impact the sprouting oakbrush. Overall the site has experienced little change in the browse component. The junipers have been highlined, and except for the young trees, are unavailable. Juniper density is 92 trees/acre. Grasses, including bluebunch wheatgrass and Indian ricegrass, increased in frequency. The individual grasses are larger in size this time leading to a higher cover estimate. The very shallow soil on the sandstone ridge has adequate protection from erosion.

#### TREND ASSESSMENT

soil - stable (3)

browse - stable (3)

herbaceous understory - stable (3)

### 1996 TREND ASSESSMENT

Soil trend is slightly upward with a decrease in bare ground cover. No erosion was apparent on the site in 1996. The browse trend is stable and still in poor condition. The most preferred browse species are rare and heavily hedged. Gambel oak is the key browse species and exhibits moderate hedging. Decadency has declined since 1990 and vigor is better. The herbaceous understory is sparse and dominated by annual species. Sum of nested frequency for perennial species has stayed nearly the same since 1990. Herbaceous trend is stable and in poor condition.

#### TREND ASSESSMENT

soil - slightly up (4)

browse - stable (3)

herbaceous understory - stable (3)

HERBACEOUS TRENDS --  
Herd unit 17 , Study no: 20

T y p e	Species	Nested Frequency			Quadrat Frequency			Average Cover %
		'84	'90	'96	'84	'90	'96	'96
G	Agropyron spicatum	20	31	18	9	12	8	.31
G	Bromus japonicus (a)	-	-	35	-	-	11	.37
G	Bromus tectorum (a)	-	-	250	-	-	83	2.89
G	Carex spp.	1	4	8	1	1	3	.30
G	Festuca myuros (a)	-	-	79	-	-	31	.69
G	Oryzopsis hymenoides	4	14	-	2	6	-	-
G	Poa bulbosa	-	-	3	-	-	1	.03
G	Poa fendleriana	3	1	8	2	1	4	.02
G	Poa pratensis	<sub>a</sub> 8	<sub>a</sub> 13	<sub>b</sub> 59	5	7	19	.97
G	Poa secunda	<sub>a</sub> 20	<sub>b</sub> 64	<sub>b</sub> 64	10	32	26	.98
G	Sporobolus cryptandrus	<sub>a</sub> 5	<sub>a</sub> 6	<sub>b</sub> 41	3	3	18	1.09
G	Stipa comata	4	7	-	2	4	-	-
Total for Annual Grasses		0	0	364	0	0	125	3.96
Total for Perennial Grasses		65	140	201	34	66	79	3.72
Total for Grasses		65	140	565	34	66	204	7.68
F	Alyssum alyssoides (a)	-	-	138	-	-	54	.37
F	Arabis spp.	-	1	1	-	1	1	.03
F	Artemisia ludoviciana	-	-	1	-	-	1	.00
F	Chenopodium fremontii (a)	-	-	1	-	-	1	.03
F	Collinsia parviflora (a)	-	-	2	-	-	1	.00
F	Erigeron pumilus	-	1	10	-	1	4	.12
F	Galium aparine (a)	-	-	4	-	-	2	.03
F	Hackelia patens	-	6	1	-	3	1	.03
F	Heterotheca villosa	13	27	16	7	14	6	.40
F	Lomatium spp.	-	3	-	-	1	-	-
F	Microsteris gracilis (a)	-	-	4	-	-	1	.00
F	Oxybaphus linearis	1	-	-	1	-	-	-
F	Polygonum douglasii (a)	-	-	5	-	-	2	.01
F	Solidago missouriensis	-	2	1	-	1	1	.03
F	Tragopogon dubius	-	3	4	-	1	2	.01
F	Unknown forb-perennial	-	3	-	-	1	-	-
F	Viguiera multiflora	-	10	2	-	3	1	.03
Total for Annual Forbs		0	0	154	0	0	61	0.45
Total for Perennial Forbs		14	56	36	8	26	17	0.65
Total for Forbs		14	56	190	8	26	78	1.11

Values with different subscript letters are significantly different at alpha = 0.10 (annuals excluded)

BROWSE TRENDS --  
Herd unit 17 , Study no: 20

Type	Species	Strip Frequency	Average Cover %
		'96	'96
B	Amelanchier alnifolia	1	-
B	Artemisia tridentata vaseyana	3	.18
B	Cercocarpus ledifolius	1	-
B	Gutierrezia sarothrae	28	.71
B	Juniperus osteosperma	4	.41
B	Mahonia repens	2	-
B	Opuntia spp.	28	.58
B	Quercus gambelii	61	14.14
Total for Browse		128	16.03

CANOPY COVER  
Herd unit 17 , Study no: 20

Species	Percent Cover
	'96
Juniperus osteosperma	.6

Point-Quarter Tree Data  
Herd unit 17 , Study no: 20

Species	Trees per Acre	Average diameter (in)
	'96	'96
Juniperus osteosperma	135	4.7

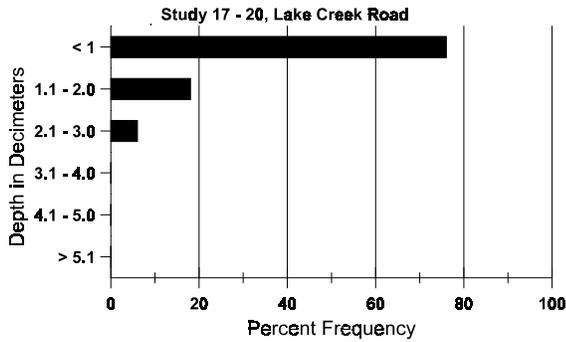
BASIC COVER --  
Herd unit 17 , Study no: 20

Cover Type	Nested Frequency	Average Cover %		
		'84	'90	'96
Vegetation	324	1.00	5.00	28.23
Rock	291	25.25	35.75	31.14
Pavement	22	.25	.25	.07
Litter	366	54.75	38.50	37.81
Cryptogams	150	12.75	9.25	6.61
Bare Ground	118	6.00	11.25	2.54

SOIL ANALYSIS DATA --  
 Herd Unit 17, Study no: 20, Lake Creek Road

Effective rooting depth (in)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
9.4	55.8 (12.0)	6.6	58.2	21.4	20.4	2.1	26.0	156.8	.3

### Stoniness Index



PELLET GROUP FREQUENCY --  
 Herd unit 17 , Study no: 20

Type	Quadrat Frequency '96
Rabbit	13
Elk	10
Deer	46
Cattle	2

BROWSE CHARACTERISTICS --  
 Herd unit 17 , Study no: 20

A G R E	Y	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total	
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Amelanchier alnifolia																		
M	'84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	'96	-	-	-	1	-	-	-	-	-	-	-	-	1	-	-	-	20
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>				<u>%Change</u>						
'84		00%			00%			00%										
'90		00%			00%			00%										
'96		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'84	0	Dec:	-			
												'90	0		-			
												'96	20		-			

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
<i>Artemisia tridentata vaseyana</i>																		
Y	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	96	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	96	1	1	-	-	-	-	-	-	-	2	-	-	-	40	11	18	
X	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'84		00%			00%			00%										
'90		00%			00%			00%										
'96		33%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'84	0	Dec:	-			
												'90	0		-			
												'96	60		-			
<i>Cercocarpus ledifolius</i>																		
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	
	96	-	-	-	-	-	-	-	-	1	1	-	-	-	20	26	45	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'84		00%			00%			00%										
'90		00%			00%			00%										
'96		00%			100%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'84	0	Dec:	-			
												'90	0		-			
												'96	20		-			
<i>Gutierrezia sarothrae</i>																		
Y	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	90	2	-	-	-	-	-	-	-	-	2	-	-	-	66		2	
	96	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	84	16	1	-	-	-	-	-	-	-	17	-	-	-	1133	10	12	
	90	20	-	-	-	-	-	-	-	-	18	-	2	-	1333	9	8	
	96	74	-	-	-	-	-	-	-	-	74	-	-	-	1480	9	14	
D	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	90	4	-	-	-	-	-	-	-	-	3	-	1	-	133		4	
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'84		06%			00%			00%			+26%							
'90		00%			00%			12%			-2%							
'96		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'84	1133	Dec:	0%			
												'90	1532		9%			
												'96	1500		0%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Juniperus osteosperma																		
Y	84	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	90	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	96	1	-	-	-	-	-	-	-	-	1	-	-	-	20		1	
M	84	1	-	-	-	-	-	-	-	-	1	-	-	-	66	59	33	1
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	3	-	-	-	-	-	-	-	-	3	-	-	-	60	-	-	3
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
	'84	00%			00%			00%			-50%							
	'90	00%			00%			00%			+18%							
	'96	00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'84	132	Dec:	-			
												'90	66		-			
												'96	80		-			
Mahonia repens																		
Y	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	90	2	-	-	-	-	-	5	-	-	6	1	-	-	233		7	
	96	2	-	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	84	70	-	-	-	-	-	-	-	-	53	-	17	-	4666	3	5	70
	90	4	-	-	-	-	-	-	-	-	4	-	-	-	266	6	5	4
	96	4	-	-	-	-	-	-	-	-	4	-	-	-	80	2	3	4
D	84	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	90	-	1	-	-	-	-	1	-	-	2	-	-	-	133		2	
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
	'84	00%			00%			24%			-87%							
	'90	08%			00%			00%			-81%							
	'96	00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'84	4799	Dec:	3%			
												'90	632		21%			
												'96	120		0%			

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Opuntia spp.																	
S	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	96	3	-	-	-	-	-	-	-	-	3	-	-	-	60		3
Y	84	8	-	-	-	-	-	-	-	-	8	-	-	-	533		8
	90	14	-	-	-	-	-	-	-	-	14	-	-	-	933		14
	96	7	-	-	-	-	-	-	-	-	7	-	-	-	140		7
M	84	39	-	-	-	-	-	-	-	-	35	-	4	-	2600	8 20	39
	90	21	1	-	-	-	-	1	-	-	20	-	3	-	1533	6 11	23
	96	33	-	-	-	-	-	-	-	-	33	-	-	-	660	5 12	33
D	84	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1
	90	17	1	-	2	-	-	-	-	-	8	1	7	4	1333		20
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
X	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'84		00%			00%			08%			+16%						
'90		04%			00%			25%			-79%						
'96		00%			00%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'84	3199	Dec:	2%			
											'90	3799		35%			
											'96	800		0%			
Quercus gambelii																	
S	84	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3
	90	28	4	-	11	-	-	7	-	-	46	2	2	-	3333		50
	96	29	-	-	-	-	-	-	-	-	29	-	-	-	580		29
Y	84	95	50	5	-	-	-	-	-	-	147	-	3	-	10000		150
	90	52	106	24	-	2	-	2	-	-	164	22	-	-	12400		186
	96	50	34	-	-	-	-	-	-	-	84	-	-	-	1680		84
M	84	6	22	43	-	-	-	-	-	-	56	9	6	-	4733	23 17	71
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0
	96	27	153	18	-	-	-	-	-	-	198	-	-	-	3960	29 34	198
D	84	-	4	21	-	-	-	-	-	-	15	3	7	-	1666		25
	90	6	15	8	1	-	-	1	-	-	16	5	2	8	2066		31
	96	1	4	5	-	1	-	-	-	-	11	-	-	-	220		11
X	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	340		17
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
'84		31%			28%			07%			-12%						
'90		57%			15%			05%			-59%						
'96		66%			08%			00%									
Total Plants/Acre (excluding Dead & Seedlings)											'84	16399	Dec:	10%			
											'90	14466		14%			
											'96	5860		4%			