

Trend Study 18B-15-07

Study site name: Upper Kessler Canyon .

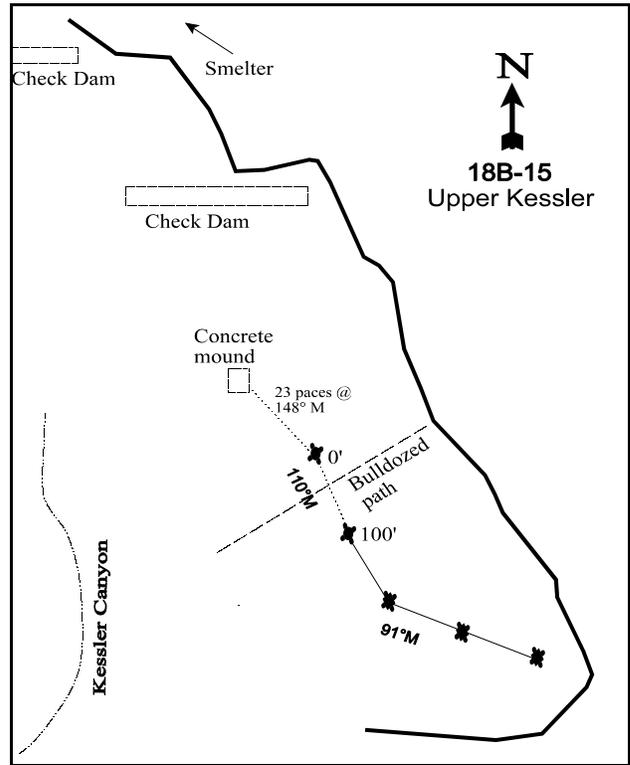
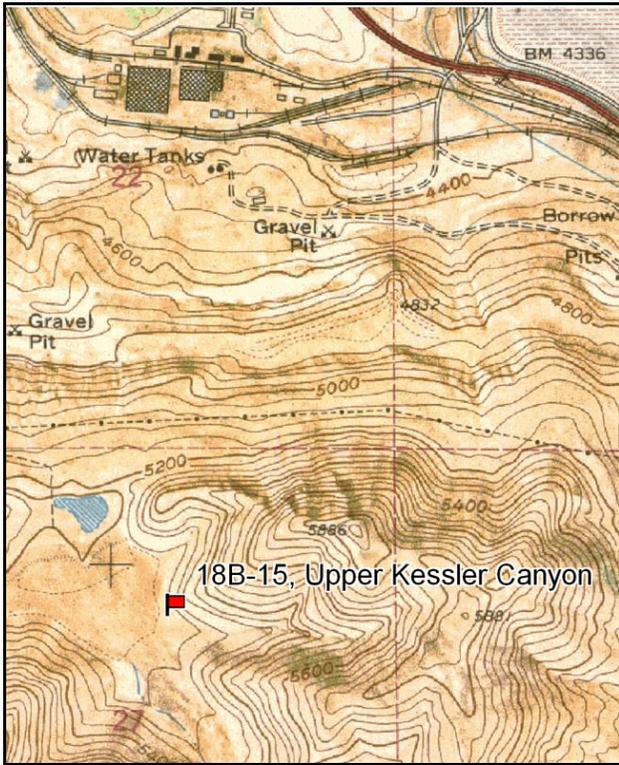
Vegetation type: Perennial Grass .

Compass bearing: frequency baseline 110 degrees magnetic (Lines 3-4 @ 91°M).

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

LOCATION DESCRIPTION

Contact the Kennecott Environmental Office (569-7120) before reading the site. From Highway 201 turn left (south) at 11600 West to North Warehouse, Gate #24 of Kennecott. Travel to security shack and get permission and an escort to proceed up Kessler Canyon. From the check dam in upper Kessler Canyon (Smelter Canyon) continue on into the valley for approximately 0.25 miles to a concrete mound. From the concrete mound, walk 23 paces bearing 148 degrees magnetic to the 0-foot baseline stake. The 0-foot stake is a short fencepost with a white top.



Map Name: Farnsworth Peak

Diagrammatic Sketch

Township 1S, Range 3W, Section 27

GPS: NAD 83, UTM 12T 398277 E 4504336 N

## DISCUSSION

### Upper Kessler Canyon - Trend Study No. 18B-15

#### Study Information

This study is located in the canyon owned by Kennecott, just south of the smelter [elevation: 5,200 feet (1,585 m), slope: 3-5%, aspect: northwest]. Decades of pollution from the smelter, previous to current environmental regulations, denuded the vegetation on the surrounding hills, which cause the soil to erode into the bottom of the canyon (personal communication with Ann Neville, Kennecott biologist resource specialist, 2007). The study is located in an area where sediment has collected during the period of high pollution and heavy erosion. It was disked and seeded mainly with perennial grass species. Wildlife use is mostly from elk, but there is also some deer. Deer pellet group transect data estimates were 9 days use/acre in 2002 and 2 in 2007 (22 ddu/ha in 2002 and 5 in 2007). Elk pellet group estimates were 22 days use/acre in 2002 and 27 in 2007 (54 edu/ha in 2002 and 68 in 2007).

#### Soil

The soil surface is hard-packed sandy clay loam with a relatively large percentage of rock and gravel on the surface and throughout the shallow profile. It is categorized as a stony alluvial land by the NRCS (USDA-NRCS 2007). The soil pH is 6.6. This unusually low pH is likely influenced by past pollution. The original shrub community was removed from the area during the years of heavy pollution and denudation and have not recovered. The shallow soil depth slows the establishment of shrubs, as illustrated by the low success rate of shrub seedlings in this area. There is little erosion occurring because of the protective cover from herbaceous species, litter, and lack of significant slope.

#### Browse

No browse species were sampled within the sample area other than a Russian olive (*Elaeagnus angustifolia*) in 2002. If shrubs are thought to be necessary to improve the value of the reclamation area a winter range, interseeding or planting browse species is necessary.

#### Herbaceous Understory

In a 1978 line-intercept study, the area was devoid of perennial vegetation and dominated by bare soil, rock, and annual species. By 1990, the study area had been disked, terraced, and seeded with perennial species. The dominant species in the canyon bottom in 1990 was the large and very robust bunchgrass tall wheatgrass (*Agropyron elongatum*), which is often used in reclamation. The tall wheatgrass provides good forage for elk in the winter, but is not used by deer in winter. It has been the dominant species and has provided 28-29% cover every year. In 2007, cheatgrass (*Bromus tectorum*), dalmatian toadflax (*Linaria dalmatica*), and western ragweed (*Ambrosia psilostachya*) had increased significantly in nested frequency, despite the competition from elongated wheatgrass. Those three species also increased substantially in cover. Weedy species have established and become a large component of the understory. Dalmatian toadflax is a noxious weed and should be controlled before it displaces more desirable species.

#### 1997 TREND ASSESSMENT

The browse trend is stable because there were no browse species sampled. The grass trend is stable. The sum of the nested frequency of perennial grasses did not change and tall wheatgrass continued to dominate. However, there continued to be little diversity. The forb trend is stable. The sum of the nested frequency of perennial forbs changed little and the forb composition remained weedy. Western ragweed was sampled for the first time. The Desirable Components Index (DCI) score was fair due to high perennial grass cover.

winter range condition (DCI) - fair (37) Low potential scale

browse - stable (0)

grass - stable (0)

forb - stable (0)

2002 TREND ASSESSMENT

The browse trend is stable. No browse species were sampled. The grass trend is stable. The tall wheatgrass continued to dominate the understory and prevent other grass species, including cheatgrass, from spreading. The forb trend is slightly down. The nested frequency of perennial forbs increased, as did that of annual forbs, but the majority of the forbs sampled were weedy. The noxious weed dalmatian toadflax was also sampled for the first time. The increase in the noxious weed and worsening of the species composition are the reason for the downward trend. The DCI score remained fair.

winter range condition (DCI) - fair (33) Low potential scale  
browse - stable (0)                      grass - stable (0)                      forb - slightly down (-1)

2007 TREND ASSESSMENT

The browse trend is stable. No browse species were sampled. The grass trend is slightly down. The nested frequency and cover of perennial grasses changed little, but the nested frequency of cheatgrass increased significantly. The forb trend is slightly down. The sum of the nested frequency of perennial forbs increased, but most of the increases were by weedy species. The nested frequencies of dalmatian toadflax and western ragweed increased significantly. The nested frequency of prickly lettuce (*Lactuca serriola*) and white sweetclover (*Melilotus alba*), both of which are preferred forage for big game, increased. The DCI score remained fair.

winter range condition (DCI) - fair (37) Low potential scale  
browse - stable (0)                      grass - slightly down (-1)                      forb - slightly down (-1)

HERBACEOUS TRENDS --  
 Management unit 18B, Study no: 15

T y p e	Species	Nested Frequency				Average Cover %		
		'90	'97	'02	'07	'97	'02	'07
G	Agropyron elongatum	<sub>a</sub> 286	<sub>b</sub> 306	<sub>b</sub> 307	<sub>ab</sub> 303	27.99	29.17	27.73
G	Bromus japonicus (a)	-	-	-	1	-	-	.00
G	Bromus tectorum (a)	-	<sub>a</sub> 67	<sub>a</sub> 51	<sub>b</sub> 94	.39	.35	.97
G	Poa bulbosa	-	-	<sub>a</sub> 5	<sub>a</sub> 4	-	.04	.06
G	Poa fendleriana	<sub>a</sub> 3	<sub>a</sub> 5	-	<sub>a</sub> 3	.04	-	.00
G	Poa pratensis	<sub>a</sub> 23	<sub>a</sub> 10	-	<sub>a</sub> 8	.09	-	.21
Total for Annual Grasses		0	67	51	95	0.39	0.35	0.98
Total for Perennial Grasses		312	321	312	318	28.13	29.21	28.01
Total for Grasses		312	388	363	413	28.52	29.56	28.99
F	Achillea millefolium	-	-	-	1	-	-	.15
F	Ambrosia psilostachya	-	<sub>a</sub> 70	<sub>a</sub> 62	<sub>b</sub> 96	3.25	1.36	5.09
F	Aster chilensis	<sub>b</sub> 25	<sub>a</sub> 2	-	<sub>a</sub> 6	.00	-	.19
F	Cardaria draba	-	-	-	4	-	-	.06
F	Cirsium sp.	-	<sub>a</sub> 2	3	-	.00	.04	-
F	Compositae	-	-	-	47	-	-	.50
F	Comandra pallida	-	-	1	-	-	.00	-

Type	Species	Nested Frequency				Average Cover %		
		'90	'97	'02	'07	'97	'02	'07
F	<i>Epilobium brachycarpum</i> (a)	-	<sub>a</sub> 34	<sub>b</sub> 76	<sub>c</sub> 161	.28	.85	1.24
F	<i>Equisetum hyemale</i>	-	-	2	-	-	.00	-
F	<i>Eriogonum brevicaulis</i>	-	-	28	-	-	.26	-
F	<i>Grindelia squarrosa</i>	<sub>ab</sub> 27	<sub>a</sub> 4	<sub>ab</sub> 15	<sub>b</sub> 31	.22	.38	1.12
F	<i>Helianthus annuus</i> (a)	-	-	<sub>b</sub> 20	<sub>a</sub> 3	-	.82	.03
F	<i>Lactuca serriola</i>	<sub>a</sub> 2	<sub>a</sub> 14	<sub>a</sub> 9	<sub>b</sub> 48	.06	.02	.46
F	<i>Linaria dalmatica</i>	-	-	<sub>a</sub> 36	<sub>b</sub> 148	-	.63	3.01
F	<i>Melilotus alba</i>	-	-	-	17	-	-	.91
F	<i>Mentzelia</i> sp.	-	-	1	-	-	.38	-
F	<i>Medicago sativa</i>	<sub>a</sub> 11	-	<sub>a</sub> 3	-	-	.06	-
F	<i>Phlox longifolia</i>	-	-	-	3	-	-	.00
F	<i>Solidago</i> sp.	18	-	-	-	-	-	-
F	<i>Tragopogon dubius</i>	-	-	-	2	-	-	.06
F	<i>Verbascum thapsus</i>	-	-	<sub>a</sub> 7	<sub>a</sub> 1	-	.04	.15
Total for Annual Forbs		0	34	96	164	0.28	1.68	1.27
Total for Perennial Forbs		83	92	167	404	3.55	3.19	11.76
Total for Forbs		83	126	263	568	3.84	4.87	13.03

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

BROWSE TRENDS --

Management unit 18B, Study no: 15

Type	Species	Average Cover %		
		'97	'02	'07
B	<i>Elaeagnus angustifolia</i>	-	.15	-
Total for Browse		0	0.15	0

BASIC COVER --

Management unit 18B, Study no: 15

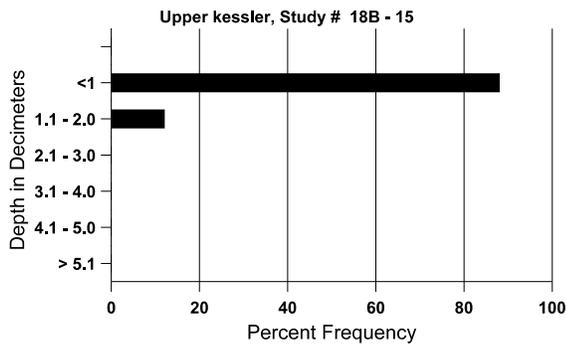
Cover Type	Average Cover %			
	'90	'97	'02	'07
Vegetation	0	33.99	33.88	39.78
Rock	0	23.40	21.96	15.90
Pavement	0	2.83	3.69	2.22
Litter	0	44.82	34.93	45.27
Cryptogams	0	2.83	4.77	5.06
Bare Ground	7.50	8.89	14.36	3.29

SOIL ANALYSIS DATA --

Herd Unit 18B, Study no: 15, Upper Kessler

Effective rooting depth (in)	Temp °F (depth)	pH	Sandy clay loam			%OM	ppm P	ppm K	dS/m
			%sand	%silt	%clay				
5.0	79.0 (5.9)	6.6	52.3	26.2	21.6	1.0	28.4	134.4	.7

### Stoniness Index



PELLET GROUP DATA --

Management unit 18B, Study no: 15

Type	Quadrat Frequency			
	'90	'97	'02	'07
Elk	-	32	4	18
Deer	-	-	2	-

Days use per acre (ha)	
'02	'07
9 (22)	27 (68)
22 (54)	2 (5)