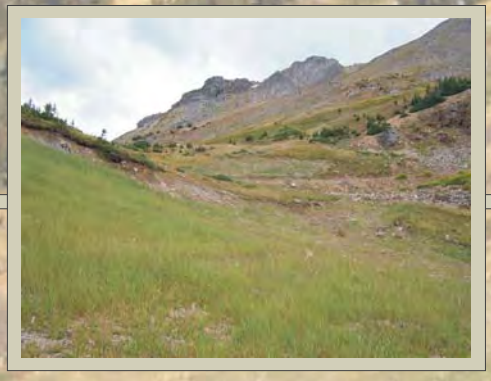
United States Department of Agriculture
Forest Service
Gallatin National Forest

2006
Revegetation Monitoring Report

New World Mining District
Response and Restoration Project



TETRA TECH

2006 REVEGETATION MONITORING REPORT

New World Mining District
Response and Restoration Project

Prepared for:

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INTRODUCTION

Maxim Technologies (Maxim) prepared this 2006 Revegetation Monitoring Report for the United States Department of Agriculture (USDA) Forest Service, Gallatin National Forest. The USDA Forest Service is undertaking non-time-critical removal actions in the New World Mining District (District) to respond to human health and environmental impacts attributed to historic gold, silver, copper, and lead mining activities.

This report describes results of monitoring preformed in 2006 in the McLaren Pit cap area and in Miller Creek as part of the New World Mining District Response and Restoration Project. **Figure 1** shows the project vicinity and **Figure 2** shows the locations monitored. The McLaren Pit cap area and associated borrow area were reclaimed in the fall of 2003 as part of the McLaren Pit Response Action. Reclamation at the McLaren Pit cap area involved incorporating compost and fertilizer in the upper four inches of soil, seeding the sites, and covering the seeded areas with erosion control blanket. The seed mixture contained tufted hairgrass (*Deschampsia cespitosa*) (1.8 kilograms pure live seed kilograms per hectare (kg pls/ha)), alpine bluegrass (*Poa alpina*) (4.5 kg pls/ha), alpine timothy (*Phleum alpina*) (3.5 kg pls/ha), and slender wheatgrass (*Agropyron trachycaulum*) (28.6 kg pls/ha).

At the McLaren Triangle, a surface application of lime (0.18 metric tons per hectare or 1,000 pounds per acre) and compost was added to the soil in 2003 to amend acid conditions that had developed since the triangle area was initially regraded and revegetated in 1993. The triangle was then fertilized, seeded, and covered with erosion control blanket in the same manner as the pit and borrow areas. Revegetation monitoring was conducted at the McLaren Triangle, McLaren Pit cap area and the borrow area in 2005 (Maxim, 2006a).

Three Miller Creek mine waste dump sites (MCSI-99-72, MCSI-96-1, MCSI-96-4) were also monitored in 2006. These sites were regraded, amended with lime, fertilized, seeded, and covered with erosion control blanket in 2004.

METHODS

Maxim conducted revegetation monitoring according to methods described in the 2006/2007 Work Plan (Maxim, 2006b), the Long-Term Revegetation Monitoring Plan (Maxim, 1999a), and the Site-Wide Sampling and Analysis Plan (Maxim, 1999b). The 2006 monitoring effort included both the point-quadrat and the 35 millimeter (mm) slide methods. The goal of revegetation monitoring is to document the condition of revegetation on reclaimed areas in the District, to document erosion problems, and to determine if revegetation cover is meeting the project objective of 20% (Maxim, 2006b). Revegetation monitoring was conducted from the 22nd to 24th of August.

POINT-QUADRAT METHOD

Field measurements used with the point-quadrat method are described in the Long-Term Revegetation Monitoring Plan (Maxim 1999a). Field data sheets were used to record monitoring data and field conditions and site impressions were recorded in a field book.

Sampling methods follow Chambers and Brown (1983) and are similar to cover monitoring methods followed previously for the project (Maxim, 2004). In the McLaren Triangle, McLaren Pit cap area, and borrow area, transects that were established in 2005 were resampled. These transects were established by first setting a baseline through the center of each sampling area. The initial transect was located

randomly along the baseline with subsequent transects systematically spaced every 10 meters (m). Transect origins were set a random distance from the baseline in a perpendicular direction and extended from the origin 30 m along a random azimuth. If possible, transect origins were generally located on alternating sides of the baseline, but this rule was altered based on the size and shape of the revegetation areas along the baseline[1]. Also, if areas were encountered along the 30 m transect that were not seeded (gravel beds and roads, drainage structures, etc.), the transect azimuth was deflected 90 degrees so that only seeded areas were sampled. Quadrats were placed systematically on alternating sides of the transect every 3 m.

Baseline and transects were marked with survey stakes and their locations were recorded with a Global Positioning System (GPS) instrument. Transect azimuth was marked at an origin stake and recorded in the field notes.

Quadrats were constructed using a 50 centimeter square frame with a wire grid of 10 intersections. A brass pin was used to determine 'hits' of vegetation, litter, rock, or bare ground. Vegetation 'hits' were recorded by species. If more than one species was encountered, the tallest was recorded. Litter was defined as dead, dry, vegetative material and included organic portions of erosion control blanket. The current season's growth, whether green or dormant, was recorded as vegetation. Rocks that were larger than 1.25 centimeters (cm) were recorded as rocks; rocks smaller than 1.25 cm were recorded as bare ground as was inorganic material.

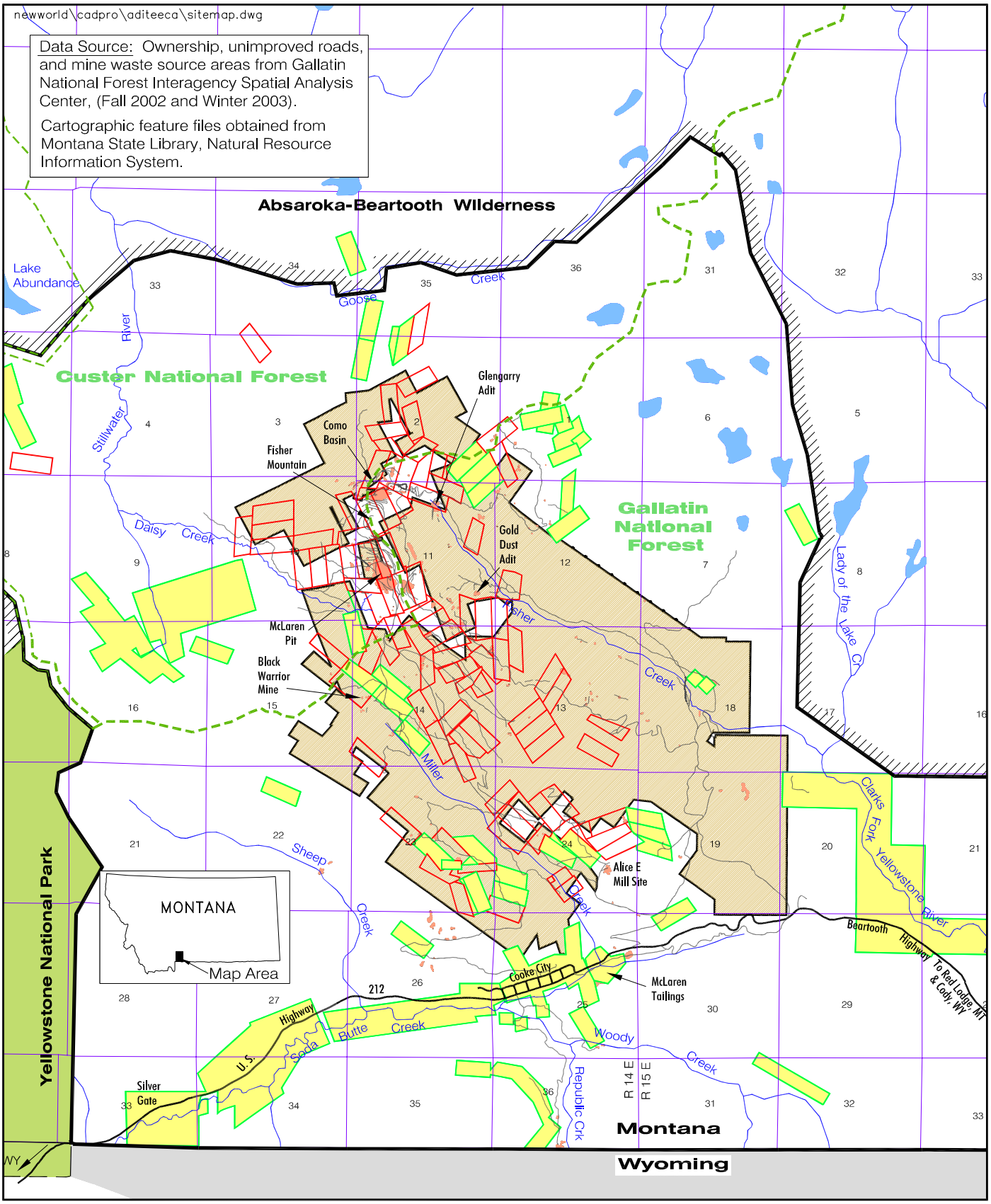
35 MM SLIDE METHOD

A 35 mm slide method was employed to document transect location and provide a reference for cover in herbaceous and shrubby vegetation on reclaimed transects. Individual sample quadrats were photographed in the field and cover was determined from the digital photograph.

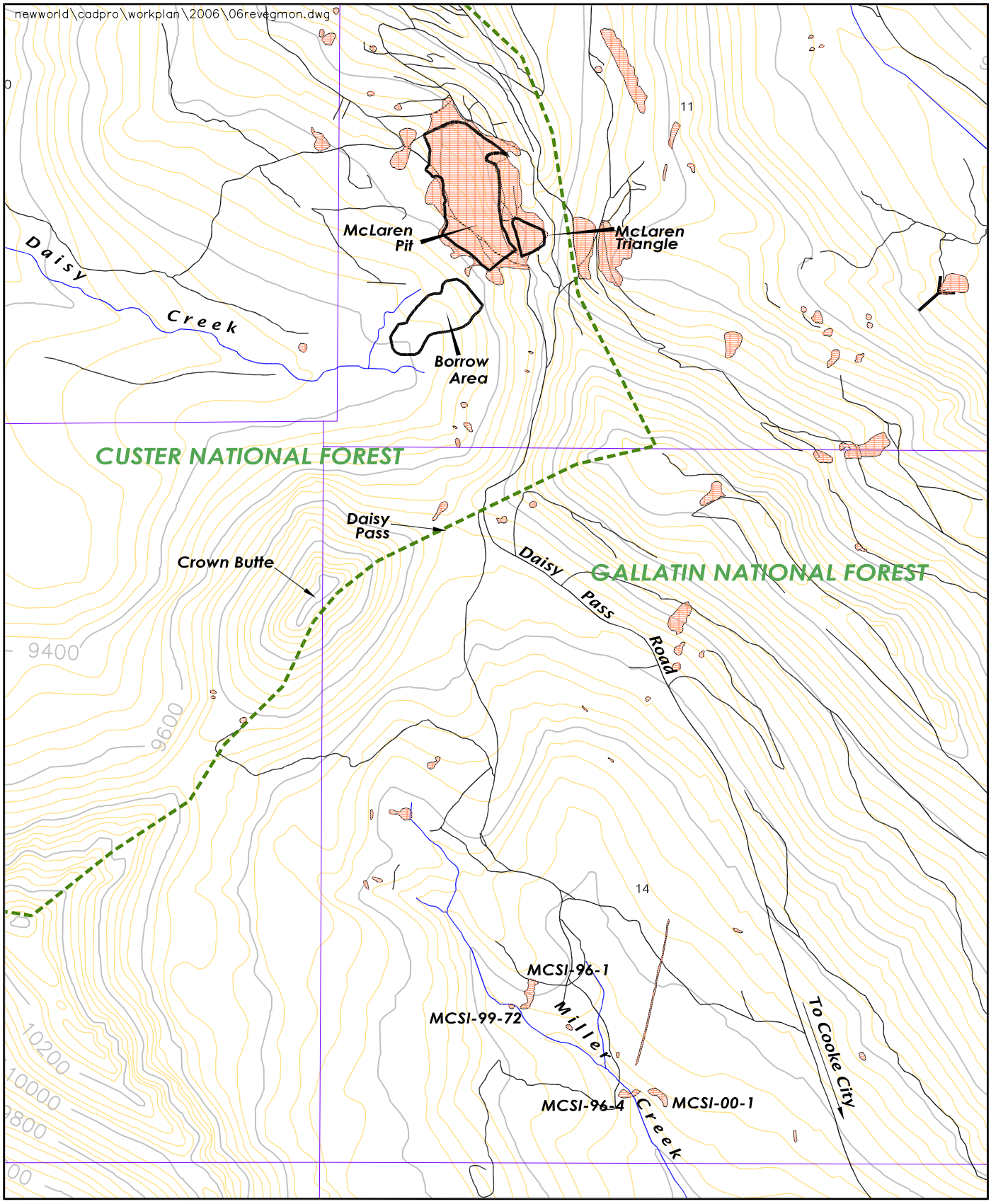
Quadrat photos were taken as a subsample of the sampling locations used in the point-quadrat method. One picture was taken along the transect length to document transect location. Along the transect, three quadrats (Q) with a ten-point intersect wire grid were systematically photographed at the 9 (Q3), 18 (Q6), and 27 (Q9) meter marks. In addition, a fourth photograph was taken at a random quadrat along the transect over a 50 cm square frame without a wire grid. A quality digital camera was employed and positioned over the center of the quadrat, with the facing edge of the quadrat frame lined with the preview screen on the camera. Individual quadrat locations were recorded in a field notebook and on data sheets. Photographs were uploaded to a computer and labeled as to the location, date, transect, and quadrat number.

A 100-square grid was overlaid on each photograph with a computer program and viewed on a computer monitor to determine cover. The number of grids intersected by vegetation, bare ground, rock, or litter was recorded. Counts were made at the bottom, right-hand corner intersection of each grid square. Cover was calculated as a percentage of area covered and compared to cover estimates derived from the point-quadrat method. To ensure unbiased results, the biologist who performed the point-quadrat method did not interpret the slides.

[1] The Miller Creek waste dump sites are less than 30 m in width, therefore, transects were systematically oriented in the Miller Creek area to maximize sample coverage.



Project Vicinity Map
New World Mining District
Response and Restoration Project
Cooke City Area, Montana
FIGURE 1



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Mine Waste Source Area
Forest Boundary
Road

2006 Revegetation Monitoring Areas
New World Mining District
Response and Restoration Project
Cooke City Area, Montana
FIGURE 5

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RESULTS

This section presents data obtained during the 2006 revegetation cover monitoring event. **Table 1** summarizes cover data collected along transects. Appendices contain raw data, field notes, a list of species encountered, and photographs.

MCLAREN PIT CAP AREA

Point-quadrat data from revegetation monitoring in the cap area (**Figure 3**) indicate that percent vegetated cover was 44.35%. Similar to 2005, slender wheatgrass had the highest cover (20.05%), followed by alpine timothy (11.45%), and alpine bluegrass (9.65%). Tufted hairgrass had 2.40% cover. Red fescue (*Festuca rubra*), bentgrass (*Agrostis* spp.), black medic (*Medicago lupulina*), and sawatch knotweed (*Polygonum sawatchense*) were recorded with less than 0.30% cover. Smooth brome (*Bromus inermus*), downy oatgrass (*Trisetum spicatum*), foxtail barley (*Hordeum jubatum*), red clover (*Trifolium pratense*), yellow salsify (*tragopogon dubius*), tower mustard (*Arabis glabra*), and aster (*Asteraceae* spp.) were incidentally observed. Litter comprised the majority of the non-vegetated cover (37.20%) followed by 13.20% bare ground and 5.25% rock.

Results from the 35 mm slide method indicate 39.14% was vegetated cover and 60.86% was non-vegetated cover as compared to 54.75% vegetated cover and 45.25% non-vegetated cover in 2005.

Overall vegetation cover was good in the cap area except near transect MCAP-03. Transect MCAP-03 is located under the highwall on the east side of the cap area and, while vegetation is established, it is not as robust as other portions of the area. In addition, three spotted knapweed (*Centaurea maculosa*) plants were encountered in the area of Transect MPCA-07 (**Figure 3**, 05mpca07) and pulled. Further monitoring is required to ensure spotted knapweed does not continue to invade the site.

MCLAREN TRIANGLE

Maxim monitored revegetation at the McLaren Triangle (**Figure 4**) in 1999, 2000, 2002, 2003, 2005 and 2006. Data from long-term revegetation monitoring indicate that percent cover has decreased since 2005 (**Table 2**). Vegetation percent cover measured with the point-quadrat method at the McLaren Triangle was 44.83%, down 17.34% from 2005 observations. Similar to 2005 results, alpine bluegrass had the highest cover (22.33%), followed by alpine timothy (13.83%) and tufted hairgrass (4.17%). Slender wheatgrass decreased from 4.5% in 2005 to 2.83%. Bentgrass, red fescue, fireweed (*Epilobium angustifolium*) and black medic were also recorded. Payson's sedge (*Carex paysonis*), dandelion (*Teraxacum* spp.), aster, and yarrow (*Achillea millefolium*) were also incidentally observed during the survey. Subalpine fir (*Abies lasiocarpa*) seedlings were present; some seedling mortality was observed.

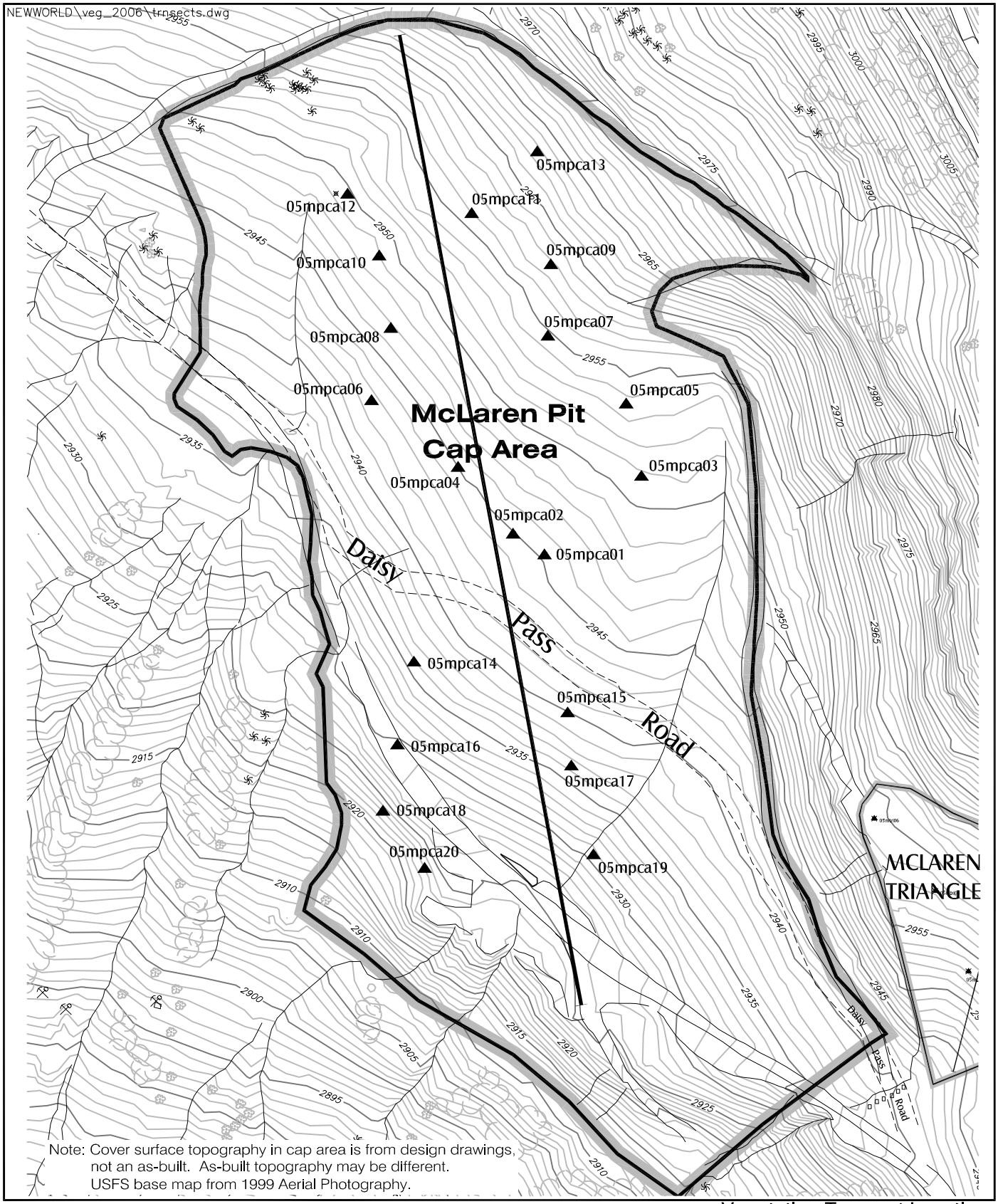
Slide method cover calculations indicated vegetation cover was 35.34% and non-vegetated cover was 64.66%. 2005 slide method results showed 43.00% vegetated cover and 57.00% non-vegetated cover. This is only a 7.66% difference in cover values and is likely more representative of site conditions than field estimates.

Vegetation growth in the McLaren Triangle is not as vigorous as the McLaren Pit cap area but vegetation cover is uniform. No visible signs of erosion are present and weedy species were not encountered.

TABLE 1
2006 COVER MONITORING RESULTS

Species	McLaren Pit Cap Area			McLaren Triangle			Borrow Area			Miller Creek Area		
	Hits[1]	Cover[2] (%)	35 mm Slide Cover (%)	Hits	Cover (%)	35 mm Slide Cover (%)	Hits	Cover (%)	35 mm Slide Cover (%)	Hits	Cover (%)	35 mm Slide Cover (%)
Alpine bluegrass	193	9.65		134	22.33		90	9.00		35	7.00	
Alpine timothy	229	11.45		83	13.83		104	10.40		87	17.40	
Slender wheatgrass	401	20.05		17	2.83		197	19.70		108	21.60	
Tufted hairgrass	48	2.40		25	4.17		36	3.60		-	0.00	
Red fescue	4	0.20		1	0.17		2	0.20		1	0.20	
Blue wildrye	-	0.00		-	0.00		-	0.00		5	1.00	
Smooth brome	-	0.00		-	0.00		3	0.30		-	0.00	
Mountain brome	--	0.00		-	0.00		-	0.00		4	0.80	
Bent grass	4	0.20		6	1.00		-	0.00		-	0.00	
Fireweed	-	0.00		2	0.33		1	0.10		3	0.60	
Small flower epilobium	-	0.00		-	0.00		-	0.00		3	0.60	
Sawatch knotweed	2	0.10		-	0.00		2	0.20		5	1.00	
Black medic	6	0.30		1	0.17		-	0.00		-	0.00	
Hairy microseris	-	0.00		-	0.00		-	0.00		2	0.40	
One flower helianthella	-	0.00		-	0.00		-	0.00		2	0.40	
Sticky arnica	-	0.00		-	0.00		-	0.00		1	0.20	
Bluebell	-	0.00		-	0.00		-	0.00		1	0.20	
Moss	-	0.00		-	0.00		16	1.60		-	0.00	
Subalpine fir	-	0.00		-	0.00		-	0.00		1	0.20	
Vegetated	887	44.35	39.14	269	44.83	35.34	451	45.10	42.34	258	51.60	45.80
Litter	744	37.20	26.34	244	40.67	19.46	355	35.50	21.32	199	39.80	29.20
Rock	105	5.25	5.17	44	7.33	4.86	53	5.30	4.90	2	0.40	1.80
Bare Ground	264	13.20	29.35	43	7.17	40.37	141	14.10	31.43	41	8.20	23.20
Non-Vegetated	1,113	55.65	60.86	331	55.17	64.66	549	54.90	57.66	242	48.4	54.20
Quadrats	200			60			100			50		
Transects	20			6			10			5		

Notes 1 Hits=Number of hits or the total number of species hits per sampling area.
2 Percent Cover or the total number of species hits / the total number of hits per sampling area multiplied by 100.



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05mpca11 Transcect Label and Origin

Approximate Baseline Location

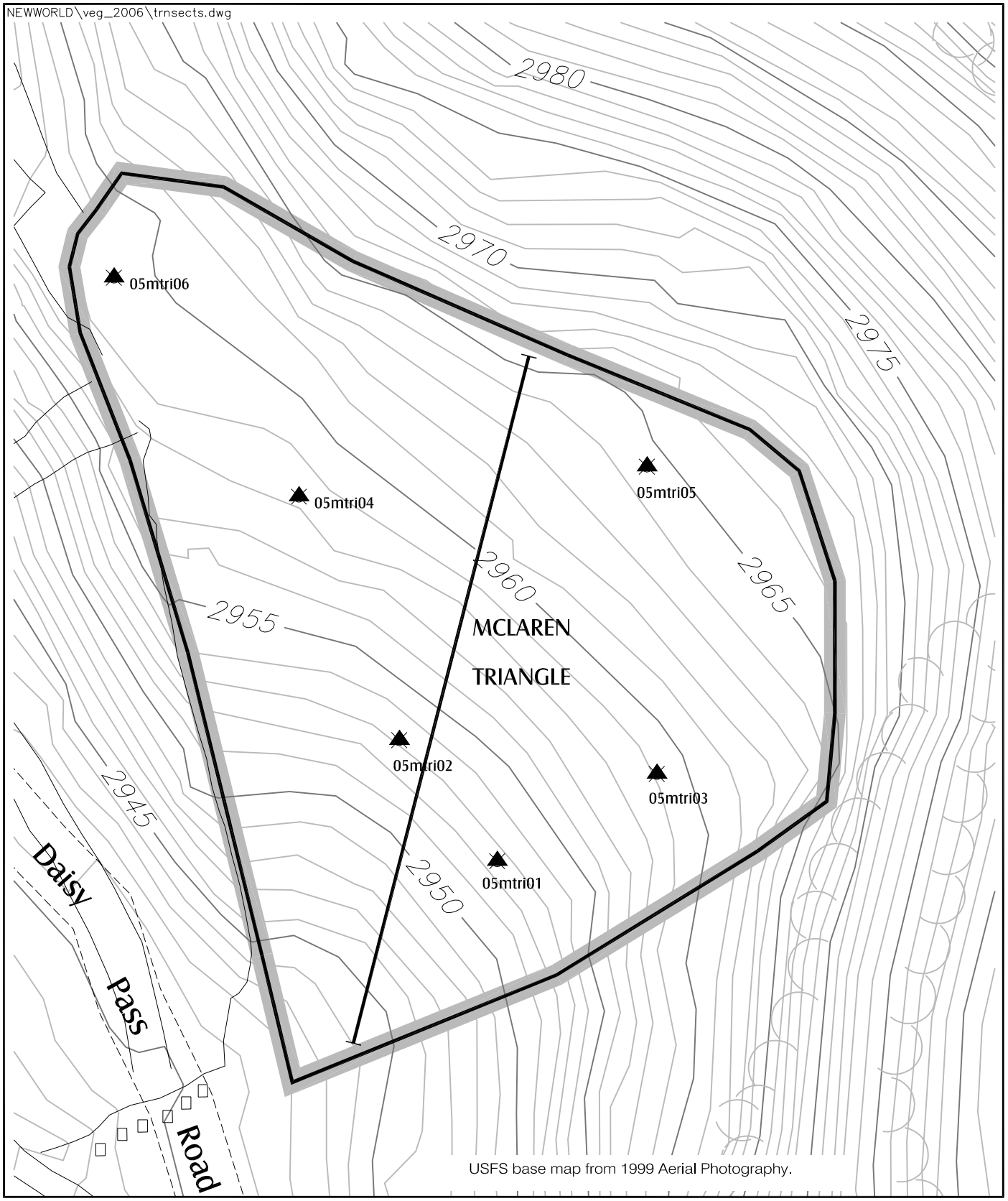
Prospect Pit

Existing Index Contour

Existing Intermediate Contour

McLaren Pit Cap Area Boundary

Vegetation Transect Locations
McLaren Pit Area
2006 Revegetation Monitoring
New World Mining District
Response and Restoration Project
Cooke City, Montana
FIGURE 3



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05mtri01 Transcect Label and Origin

Approximate Baseline Location

Existing Index Contour

Existing Intermediate Contour

McLaren Triangle Area Boundary

Vegetation Transect Locations
McLaren Triangle Area
2006 Revegetation Monitoring
New World Mining District
Response and Restoration Project
Cooke City, Montana
FIGURE 4

TABLE 2
MCLAREN TRIANGLE HISTORIC COVER MONITORING RESULTS

Year	Overall Percent Vegetative Cover
1999	11.30
2000	16.60
2002	15.00
2003	10.70
2005	62.17
2006	44.83

BORROW AREA

Monitoring results in the borrow area (**Figure 5**) were almost identical to 2005 results. Vegetated cover in 2006 was 45.10%, compared to 46.70% in 2005. Slender wheatgrass remained the dominant species with 19.70% cover, follow by alpine timothy (10.40%), and alpine bluegrass (9.00%). Tufted hairgrass increased from 0.40% in 2005 to 3.60% in 2006. Moss cover doubled from 2005 values to 1.60%. Other recorded species included red fescue, smooth brome, fireweed, and sawatch knotweed, all with cover values less than 0.30%. Incidental species included: Columbia brome (*Bromus vulgaris*), fireweed, smooth brome, sticky arnica (*Arnica diversifolia*), tower mustard, sheep sorrel (*Rumex acetosela*), black medic, and lamb's quarter (*chenopodium* spp.).

Standing water was rarely encountered in 2006. Litter dominated non-vegetated cover (35.50%) while bare ground was 14.10% cover and rock was 5.30% cover. Small areas of bare ground were evident along the lower portion of the site, but, overall, vegetation cover is good.

Percent cover calculated using the 35 mm slide method indicated 42.34% was vegetated cover and 57.66% non-vegetated cover. 2005 slide method results had similar vegetated and non-vegetated cover values (43.00% and 57.00%, respectively).

MILLER CREEK

Vegetation is establishing well at the three sites monitored in Miller Creek, and native forbs have begun colonizing the sites. Vegetated percent cover was 51.60% in the five monitoring plots established in the Miller Creek area in 2006. Similar to other reclamation areas, slender wheatgrass was the dominant species with 21.60% cover, followed by alpine timothy (17.40%) and alpine bluegrass (7.00%). The following species had 1% or less cover: blue wildrye (*Elymus glaucus*), red fescue, sawatach knotweed, Columbia brome, fireweed, small flower epilobium (*Epilobium minutum*), hairy microseris (*Microseris nigrescens*), one-flower helianthella, sticky arnica (*Arnica diversifolia*), bluebell (*Mertensia ciliate*), and subalpine fir. Yellow clover (*Melilotus officinalis*) and yarrow were incidentally observed.

Percent cover results from the 35 mm slide method indicated vegetated cover was 45.80% and non-vegetated cover was 54.20%. **Figure 6** presents transect locations in the Miller Creek area.

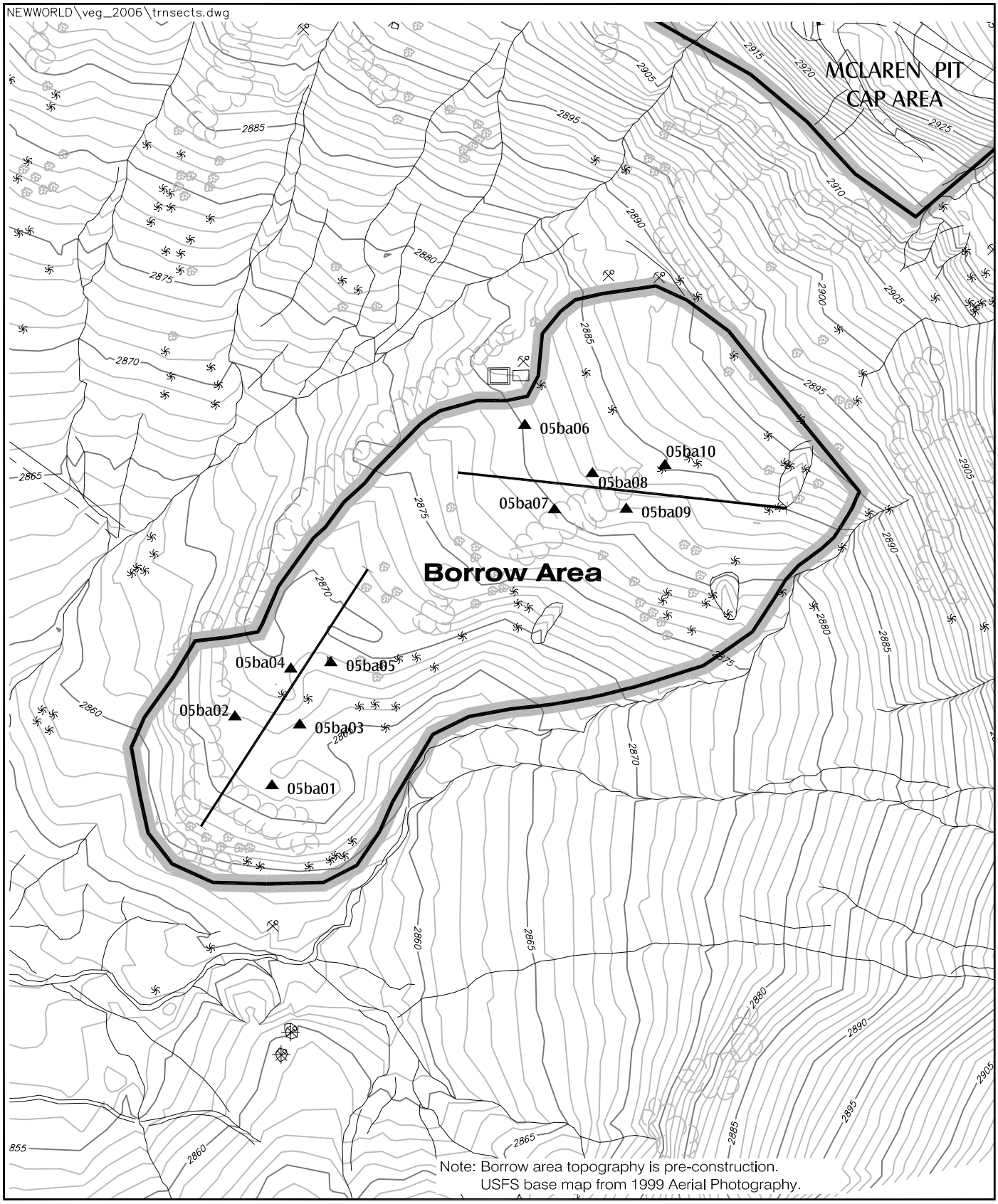
DISCUSSION

The monitoring objective of 20% vegetative cover was met and exceeded at all sites monitored in 2006. Vegetated cover ranged from approximately 44% (McLaren Pit cap area) to 51% (Miller Creek area). Vegetated cover values did decrease slightly from 2005 values in the McLaren Pit cap area and McLaren Triangle, while percent cover in the borrow area remained relatively constant. Slender wheatgrass dominated all sites except the McLaren Triangle, with cover values ranging from 19.70% to 21.60%. Alpine timothy and alpine bluegrass were consistently encountered. Tufted hairgrass increased slightly over 2005 values with cover readings from 2.40% to 4.17%. Litter dominated non-vegetated cover with values ranging from 35.50% (borrow area) to 39.80% (Miller Creek area), rock occurred from 0.40% in Miller Creek sites to 7.33% in the McLaren Triangle, and bare ground ranged from 7.17% (McLaren Triangle) to 13.20% (McLaren Pit cap area). The 35 mm slide method results for vegetated and non-vegetated cover were within 10% of the field observed results in all monitoring areas. Field estimates of litter cover differed from slide estimates. Slide method measurements indicated bare ground cover was greater than litter cover in the McLaren Pit cap area, McLaren Triangle, and borrow area.

Species diversity is increasing as native forbs are beginning to colonize monitoring areas. The area surrounding the Miller Creek sites is dominated by native forbs, resulting in relatively high species diversity on seeded sites despite the short revegetation period. Forb species such as hairy microseris were also noted on revegetated road beds north of Como Basin. The occurrence of spotted knapweed in the McLaren Pit cap area is of great concern. The area should be monitored in early 2007 to identify and eradicate any other existing plants or recruits.

Slender wheatgrass growth in portions of the McLaren Pit cap area and borrow area was very robust, reaching up to 3 feet tall. Herbaceous growth in the McLaren Triangle was not as robust nor was litter as prevalent as some of the more established revegetation. Cover in the borrow area remains patchy due to pockets of standing water and coir blankets used in drainage channels.

Based on 2006 monitoring results and site assessments, no erosion problems were noted and no maintenance, reseeding, or refertilization is necessary at any of the sites.



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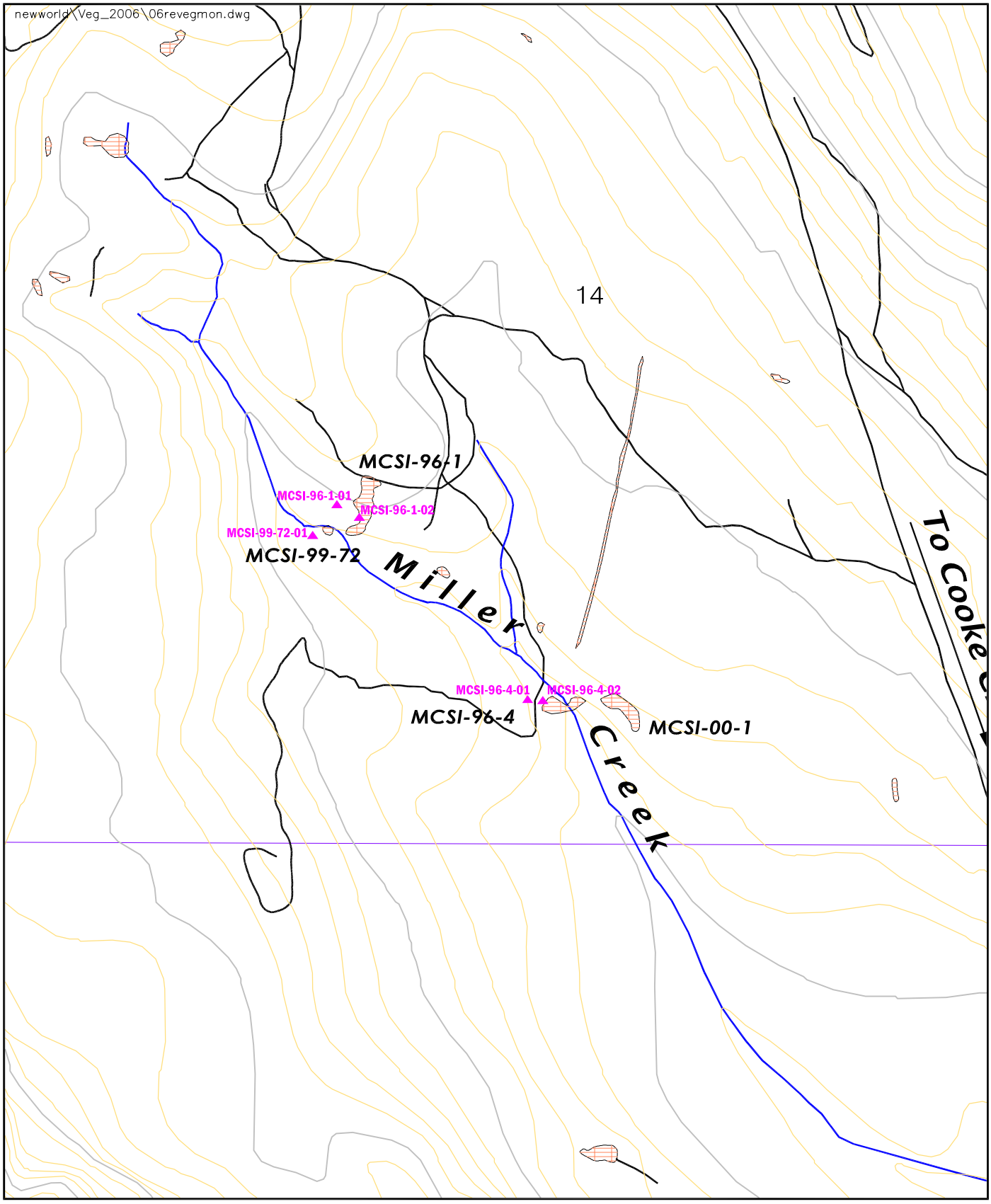
Approximate Baseline Location
Prospect Pit
Existing Index Contour
Existing Intermediate Contour
Borrow Area Boundary

Borrow Area - Vegetation Transect Locations
2006 Revegetation Monitoring
New World Mining District
Response and Restoration Project
Cooke City, Montana
FIGURE 5



Vegetation Transect Locations
Miller Creek
New World Mining District
Response and Restoration Project
Cooke City Area, Montana
FIGURE 6

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APPENDIX A
DATA SUMMARY TABLES

2006 Revegetation Monitoring
New World Mining District Response and Restoration Project

APPENDIX A-I
POINT-QUADRAT METHOD

TABLE A-1 1
2006 TRANSECT DATA SUMMARY
McLaren Pit Cap Area

Species	Total Number of Hits by Transect Number																				Total Hits	Percent Cover
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
Alpine bluegrass	8	10	7	10	6	7	8	9	23	13	12	13	11	9	3	6	15	11	6	6	193	9.65
Alpine Timothy	21	18	12	10	14	5	10	4	24	10	13	7	16	10	4	8	6	9	3	25	229	11.45
Slender wheatgrass	30	7	4	23	-	33	33	26	-	36	20	28	29	-	38	16	-	32	25	21	401	20.05
Tufted hairgrass	2	3	-	2	1	2	4	7	1	3	1	7	-	2	1	3	4	2	2	1	48	2.40
Bentgrass	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	-	-	-	2	4	0.20
Red fescue	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	2	-	-	-	4	0.20
Sawatch knotweed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	-	-	-	2	0.10
Black medic	4	-	-	-	-	-	-	-	-	2	-	-	-	-	-	-	-	-	-	-	6	0.30
Litter	23	31	44	47	46	42	35	41	23	34	44	41	26	25	38	49	33	34	53	35	744	37.20
Rock	3	11	11	2	4	8	3	4	13	1	5	1	7	9	2	8	6	3	3	1	105	5.25
Bare ground	9	20	22	6	29	1	7	9	16	1	5	3	11	45	12	10	32	9	8	9	264	13.20

TABLE A-1 2
2006 TRANSECT DATA SUMMARY
McLaren Triangle

Species	Total Number of Hits by Transect Number						Total Hits	Percent Cover
	1	2	3	4	5	6		
Alpine bluegrass	14	12	36	26	26	20	134	22.33
Alpine Timothy	6	16	19	20	8	14	83	13.83
Slender wheatgrass	8	-	-	9	-	-	17	2.83
Tufted hairgrass	7	3	1	4	10	-	25	4.17
Bentgrass	-	-	-	-	-	6	6	1.00
Red fescue	1	-	-	-	-	-	1	0.17
Fireweed	-	1	1	-	-	-	2	0.33
Black medic	-	-	-	1	-	-	1	0.17
Litter	47	52	31	36	44	34	244	40.67
Rock	8	9	7	3	5	12	44	7.33
Bare ground	9	7	5	1	7	14	43	7.17

TABLE A-1 3
2006 TRANSECT DATA SUMMARY
McLaren Pit Borrow Area

Species	Total Number of Hits by Transect Number										Total Hits	Percent Cover
	1	2	3	4	5	6	7	8	9	10		
Alpine bluegrass	6	6	1	17	3	19	15	9	10	4	90	9.00
Alpine Timothy	19	4	2	18	5	9	3	21	9	14	104	10.40
Slender wheatgrass	3	42	4	12	50	11	12	25	5	33	197	19.70
Tufted hairgrass	2	1	2	8	1	7	7	7	1	-	36	3.60
Fireweed	-	-	-	-	1	-	-	-	-	-	1	0.10
Smooth brome	-	-	1	-	-	1	-	-	-	1	3	0.30
Red fescue	2	-	-	-	-	-	-	-	-	-	2	0.20
Sawatch knotweed	-	-	-	2	-	-	-	-	-	-	2	0.20
Moss	4	4	-	-	-	-	-	1	7	-	16	1.60
Litter	41	33	68	22	25	36	39	27	29	35	355	35.50
Rock	11	2	9	7	9	5	2	1	4	3	53	5.30
Bare ground	12	8	13	14	6	12	22	9	35	10	141	14.10

TABLE A-1 4
2006 TRANSECT DATA SUMMARY
Miller Creek Area

Species	Total Number of Hits by Transect Number					Total Hits	Percent Cover
	96-1-01	96-1-02	96-4-01	96-4-02	99-72-01		
Alpine bluegrass	6	8	10	9	2	35	7.00
Alpine Timothy	10	22	16	8	31	87	17.40
Slender wheatgrass	18	27	27	36	-	108	21.60
Blue wildrye	1	-	-	-	4	5	1.00
Red fescue	-	-	-	-	1	1	0.20
Columbia brome	-	-	4	-	-	4	0.80
Fireweed	1	-	2	-	-	3	0.60
Hairy microseris	2	-	-	-	-	2	0.40
Sticky arnica	1	-	-	-	-	1	0.20
Bluebell	-	-	-	-	1	1	0.20
Sawatch knotweed	-	-	4	1	-	5	1.00
Small flowered epilobium	-	-	2	1	-	3	0.60
One-flower helianthella	-	-	2	-	-	2	0.40
Subalpine fir	-	1	-	-	-	1	0.20
Litter	54	29	29	40	47	199	39.80
Rock	1	-	-	-	1	2	0.40
Bare ground	6	13	4	5	13	41	8.20

APPENDIX A-2
35 MM SLIDE METHOD

TABLE A-2-1
35 MM SLIDE METHOD RESULTS

Transect ID	Number of Hits				Vegetated (%)	Non-vegetated (%)
	Bare Ground	Litter	Rock	Vegetation		
McLaren Triangle						
MTR101R	59	7	6	27	27	73
MTR102R	62	2	2	32	32	68
MTR103R	20	25	2	53	53	47
MTR104R	0	64	0	36	36	64
MTR105R	49	8	12	31	31	69
MTR106R	51	10	7	32	32	68
Total	**241**	**116**	**29**	**211**	**35**	**65**
McLaren Pit Cap Area						
MPCA01R	9	26	5	59	59	41
MPCA02R	54	11	18	17	17	83
MPCA-3R	57	18	3	20	20	80
MPCA04R	14	49	2	35	35	65
MPCA05R	83	3	7	7	7	93
MPCA06R	7	28	2	63	63	37
MPCA07R	32	27	4	37	37	63
MPCA08R	37	33	6	24	24	76
MPCA09R	38	15	15	32	32	68
MPCA10R	0	5	7	88	88	12
MPCA11R	0	53	10	37	37	63
MPCA12R	2	44	1	53	53	47
MPCA13R	38	16	6	40	40	60
MPCA14R	68	7	5	19	19	81
MPCA15R	26	44	4	26	26	74
MPCA16R	4	55	0	40	40	60
MPCA17R	47	29	0	24	24	76
MPCA18R	12	13	1	73	73	27
MPCA19R	32	17	6	44	44	56
MPCA20R	25	32	1	42	42	58
Total	**585**	**525**	**103**	**780**	**39**	**61**
Borrow Area						
BA01R	22	14	18	46	46	54
BA02R	0	0	0	100	100	0
BA03R	29	71	0	0	0	100
BA04R	23	9	4	64	64	36
BA05R	9	64	6	21	21	79
BA06R	40	20	6	34	34	66
BA07R	74	5	6	15	15	85
BA08R	0	5	0	95	95	5
BA09R	75	0	1	24	24	76
BA010R	42	25	8	24	24	76
Total	**314**	**213**	**49**	**423**	**42**	**58**

TABLE A-2-1
35 MM SLIDE METHOD RESULTS

Transect ID	Number of Hits				Vegetated (%)	Non-vegetated (%)
	Bare Ground	Litter	Rock	Vegetation		
Miller Creek						
MCSI-96-1-01R	15	25	1	59	59	41
MCSI-96-1-02R	42	33	3	22	22	78
MCSI-96-4-01R	14	15	2	69	69	31
MCSI-96-4-02R	4	36	0	60	60	40
MCSI-99-72-01R	41	37	3	19	19	81
Total	**116**	**146**	**9**	**229**	**46**	**54**

APPENDIX B
FIELD NOTES AND DATA SHEETS

2006 REVEGETATION MONITORING
New World Mining District Response and Restoration Project

AVAILABLE IN HARD COPY ONLY

APPENDIX C
SCIENTIFIC NAMES OF PLANT SPECIES

2006 REVEGETATION MONITORING
New World Mining District Response and Restoration Project

SCIENTIFIC AND COMMON NAMES OF PLANT SPECIES
2006 REVEGETATION MONITORING
New World Mining District Response and Restoration Project

Common Name	Scientific Name
Alpine bluegrass	*Poa alpina*
Alpine timothy	*Phleum alpina*
Aster	*Asteraceae*
Black hairy microseris	*Microseris nigrescens*
Black medic	*Medicago lupulina*
Bentgrass	*Agrostis* spp.
Bluebells	*Mertensia ciliata*
Columbia brome	*Bromus vulgaris*
Downy oatgrass	*Trisetum spicatum*
Dandelion	*Taraxacum*
Fireweed	*Epilobium angustifolium*
Mustard	*Brassicaceae*
One-flower helianthella	*Helianthella uniflora*
Payson's sedge	*Carex paysonis*
Red fescue	*Festuca rubra*
Sawatch knotweed	*Polygonum sawatchense*
Sheep sorrel	*Rumex acetosela*
Slender wheatgrass	*Agropyron trachycaulum*
Small flowered epilobium	*Epilobium minutum*
Smooth brome	*Bromus inermus*
Sticky arnica	*Arnica diversifolia*
Subalpine fir	*Abies lasiocarpa*
Tufted hairgrass	*Deschampsia cespitosa*
Blue wildrye	*Elymus glaucus*
Yellow clover	*Melilotus officinalis*
Yarrow	*Achillea millefolium*

APPENDIX D
SITE PHOTOGRAPHS

2006 REVEGETATION MONITORING
New World Mining District Response and Restoration Project