New World Mining District Response and Restoration Project: Road Characterization for Project Planning and Reclamation

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Introduction

The New World Mining District is highly accessible by roads. Figure1 illustrates this and their complex relationship to the landscapes of the District. Management implications of this high road density are dependent in part on their location, use, and impacts to other resources (in other words their "geography".) Therefore we have, over the last two years, characterized the geography of roads in the area to aid in restoration activities, as well as for protection of other resources in the area and management decision support.

Many of these roads have historical significance as well, and their characteristics are related to the various periods of historical mining in the area. Public recreational use is heavy on some roads, both winter and summer. There are numerous un-maintained roads that may contribute to stream sedimentation and may be sources of dissolved pollutants from acid-producing rocks. There is multiple, complex ownership that may influence management options. The New World Response and Restoration Project itself has some constraints and objectives that may influence road management and potential road reclamation. Resolving these and other future issues is assisted by an accurate, attributed road characterization system. It is extremely helpful to aid in area-wide analysis, candidate selection and prioritization for reclamation, and in tracking multiple-year changes and progress.

The purpose of this report is to illustrate some characteristics of the road system, and portray results of analysis relating to resources affected by it. Though this is a GIS-based analysis, members of the project team have completed extensive field work to verify its accuracy and consistency. This spatial data can be used in the future to provide consistent, well documented, and accurate analysis for planning and tracking of this multi-year project. Our objectives are to present consistent road analysis data, demonstrate analytical uses relating to important issues, and provide a stable, accurate platform for preserving, displaying, and analyzing future road-related data as they are captured.

Methods and Definitions

Initial spatial data were created by digitizing all study area roads visible on 1:15,840 color aerial photography (magnified to 1:3,000), identified on Crown Butte Mining Inc. maps, or observed in the field. Roads were digitized as arcs on a geo-referenced orthophoto background with an average accuracy of +- 10 meters (based on GPS reference.) Eighty-five percent of these have been field-verified as of October of 2000.

Each New World road is actually a "route" which is an ARC/INFO term for a grouping of arcs on the landscape to fit what is reasonably thought of as a "road." Routes have well-defined endings and are normally continuous.

Naming conventions, road names, extent, and location of routes were chosen to be generally consistent with Forest Service travel routes defined at a scale of 1:24,000. Since New World project needs include a more detailed coverage, routes were added and some were modified from the Forest Service data. Some historical roads are intermittently visible on the ground or on aerial photos. These are modeled as discontinuous routes.

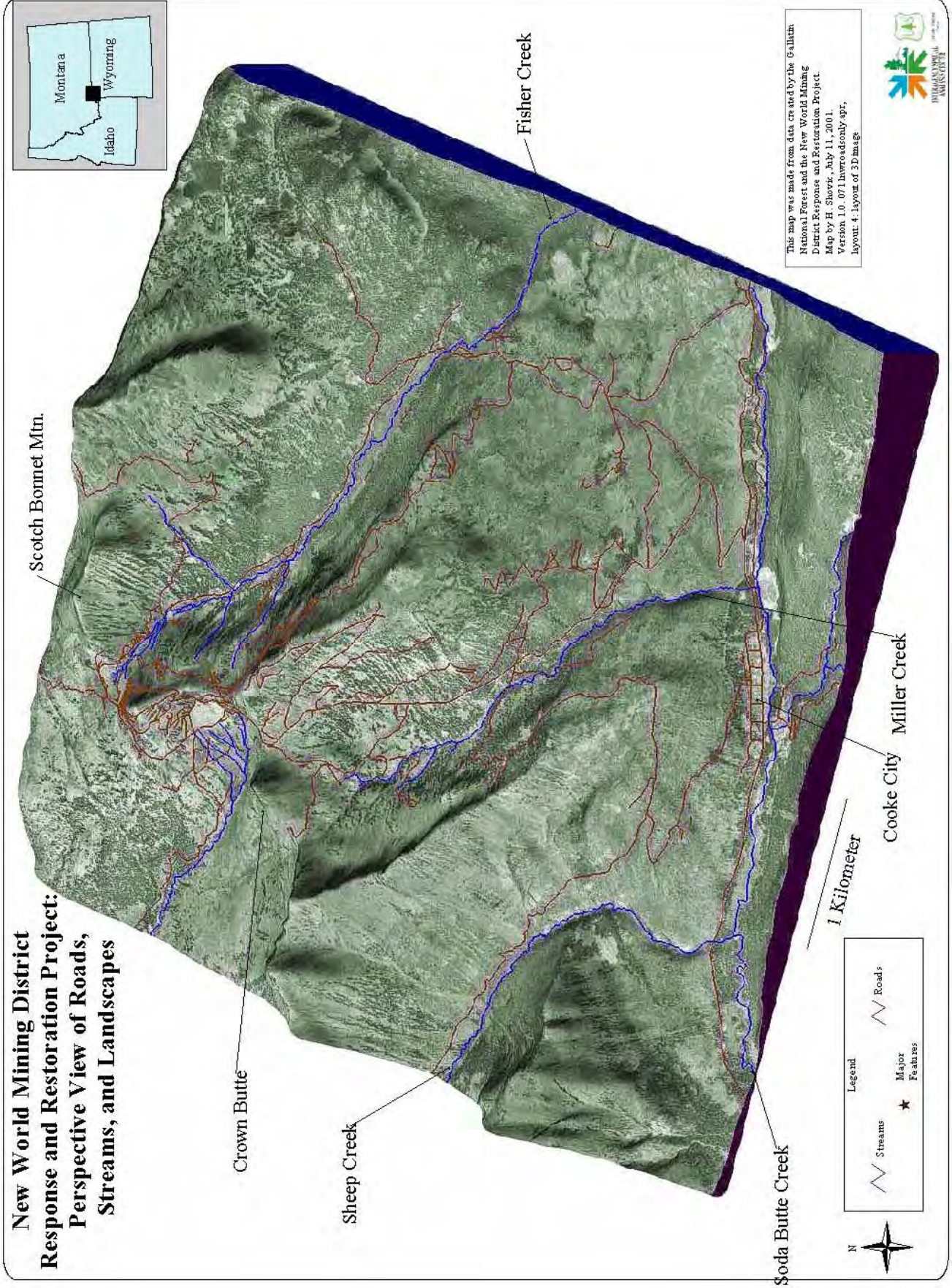

Figure 1. New World Mining Response and Restoration Project: Perspective View of Roads, Streams, and Landscapes

Development of data and primary analysis were facilitated by the use of "dynamic segmentation." This is an ARC/INFO modeling process where multiple sets of attributes are related to portions of linear features. These attributes can be stored, displayed, queried, and analyzed without affecting the underlying linear data.

Characteristics of roads that may not relate to the entire route (such as grade or ownership) are defined under the dynamic segmentation model as "events" related to routes. They are based on the linear distance that characteristic occurs along the route. The use of routes and events makes it easy to change characteristics in a database table rather than re-doing the base arc coverage. Characteristics of roads that always apply to the entire road or are calculated for the entire road are stored as attributes in another table relating to the route as a whole.

Primary analysis includes Appendix One, Two, and Three. These include measures useful for reclamation and project planning. Appendix One describes all fields used in the two tabular summaries. Appendix Two contains information used in the analysis and tables described below. Appendix Three contains additional route information useful in characterizing New World roads. Secondary analysis includes this document, which provides managers with a way of prioritizing roads for reclamation potential based on acid-sediment production, ownership and present use.

The road attributes used in the analysis below, the data in Appendices One, Two, and Three, and event data described above are in a set of tables in two ACCESS ™ databases. All tables in this report were made from queries of those in this database. The NAME field contains the name of the road. Detailed data are contained in recent US Forest Service Road Logs (the ROAD LOG COMPLETE field.) See Appendix Two for identification of which roads have logs as of October 2000.) The FIELD CHECK field contains the date of field checks. The NOTES field contains additional descriptive information.

Other spatial data used in this project includes an ownership coverage, a geology coverage, and an elevation grid, described below.

Important Properties of Roads in the New World Mining District area

Road quality and present use, watershed, acid-material production potential, ownership, present reclamation status, and average grade are all properties important to an evaluation of future reclamation potential. These factors can be used in combination to help determine priorities for further study.

Each road was assigned a "Road Class" to facilitate understanding of its present use and its physical properties. The classes are: 1 = historical, unused, minor, wheel tracks, exploration roads; 2 = intermediate, used, constructed, but not a system road; or 3 = major travelways, USFS system roads, highways. All reclaimed roads are in the Class 1 category. "Open" roads are class 2 and 3 only. Most roads have been driven or walked by Forest Service personnel for field verification.

Eight watersheds are partially or completely contained in the local area. These are the Clark's Fork, the Stillwater, Daisy, Fisher, Miller, Sheep, Soda Butte, and the West Rosebud. These

watersheds are used as sampling units for water quality studies, and drain to a number of important streams both in Montana and Wyoming. Data were digitized at an approximate scale of 1:12,000.

Water quality in the area is significantly related to production of acidic solutions from sulfide-bearing rocks. Though most of the study area has some level of acid-producing potential, it is concentrated in locations where these rocks are exposed by relatively recent disturbance. Potential to impact streams increases where roads channel sediment generated from these kinds of rocks. Acid-producing areas are displayed on a geology coverage developed by the Crown Butte Mining Company in the early 1990's.. This map is at a scale of 1:12,000 and was created using water and rock chemistry data, field observations, aerial photography interpretation, and existing published geologic maps. The source map is titled " New World Project Known and Possible Acid Generating Areas And Outcrop Plan Map Meagher and Pilgrim Limestones, Scotch Bonnet Diorite and Precambrian Granitic Rocks." Roads that intersect these areas may increase movement of acidic solutions and sulfide-bearing rocks toward streams though ditch runoff or cut and fill erosion. Length of each route segment in acid-producing rock was derived by spatial intersection of the geology coverage and associated database, and the roads coverage. These data are expressed as "events" attached to road routes.

District property refers to land in Forest Service ownership plus lands in patented claims to which the Forest Service owns surface rights as defined n the New World Consent Decree of 1998. Non-district property is that where no Forest Service surface rights are present. These lands are generally patented claims not part of the New World Consent agreements. In general, reclamation and other land-disturbing activities are authorized only on District property. Management options on non-District property are limited.

Delineation of District and non-District property is based on a coverage created for the New World Response and Restoration Project. This was digitized at a scale of 1:12,000, and all critical property boundaries have been verified by GPS and land-line survey to an accuracy of +- 8 meters. Length of each route segment not on District property was derived by spatial intersection of this coverage and its associated database with the roads coverage. These data are expressed as "events" attached to road routes.

Present reclamation status refers to the degree to which roads have been reclaimed. Many roads and exploration trails were reclaimed by Crown Butte Mines Inc. in the early 90's. These were regraded to contour, amended with lime to reduce acid production, sown with native seed, and fertilized. There are no records available as to application rates, but most of the regraded slopes are revegetating slowly and have minimal erosion. These data are expressed as "events" attached to road routes.

Average road grade refers to the slope (%) along the centerline of the road. This influences sediment production potential and ease of reclamation. This was derived by calculating elevations at an average interval of 90 m along each route, calculating the slope for each segment, and averaging by route. The associated elevation coverage has a resolution of 30 meters. These data are expressed as "events" attached to road routes. Grades greater than 30% are shown as ">30%".

Results

There are 181 total routes in the New World Mining Area (Figure 2). Road properties are listed by route in Appendices Two and Three. These data were used to calculate the following area-wide measures. Total road length in the area is 107,747 meters (353,412 feet or 67 miles with an approximate study area of 20 sq. mi.) This is a road density of 2 km/ha (3.4 miles/sq. mi.) Open roads (Class 2 and 3 roads) make up 74.1 percent of the total, with a total length of 79,864 meters and a road density of 1.5 km/ha (2.5 miles/sq. mi.), displayed in Figure 2. A 1:9,000 scale map is available from the author for detailed review. Some routes are unclassed (723 m) pending further field review.

The study area (the New World Mining District) contains the whole or parts of eight watersheds (Figure 2.) The road coverage (with attached Road Class) was intersected with the watershed coverage to produce Table 1. Almost ½ the entire road length is contained in two watersheds (Fisher and Miller.) Another third is in the Soda Butte watershed, which drains into Yellowstone National Park. These watersheds are under intense scrutiny on issues of water quality relating to mining impacts, including road-related sedimentation.

Table 1. Road Length by Road Class and Watershed

Watershed	Un-classed	Class 1 Roads (m)	Class 2 Roads (m)	Class 3 Roads (m)	Un-classed (%)	Class 1 Roads (%)	Class 2 Roads (%)	Class 3 Roads (%)	% of Total Roads
Clark's Fork	-	-	-	354	0.0%	0.0%	0.0%	0.3%	0.3%
Daisy	-	5,459	2,084	5,133	0.0%	5.1%	1.9%	4.8%	11.8%
Fisher	93	10,164	3,820	14,654	0.1%	9.4%	3.5%	13.6%	26.7%
Miller	587	9,155	7,371	8,975	0.5%	8.5%	6.8%	8.3%	24.2%
Sheep	-	-	-	2,996	0.0%	0.0%	0.0%	2.8%	2.8%
Soda Butte	43	2,386	3,628	30,172	0.0%	2.2%	3.4%	28.0%	33.6%
Stillwater	-	-	-	558	0.0%	0.0%	0.0%	0.5%	0.5%
West Rosebud	-	-	-	115	0.0%	0.0%	0.0%	0.1%	0.1%
Total	723	27,160	16,903	62,961	0.7%	25.2%	15.7%	58.4%	100.0%
Total Road Length (m)									107,747

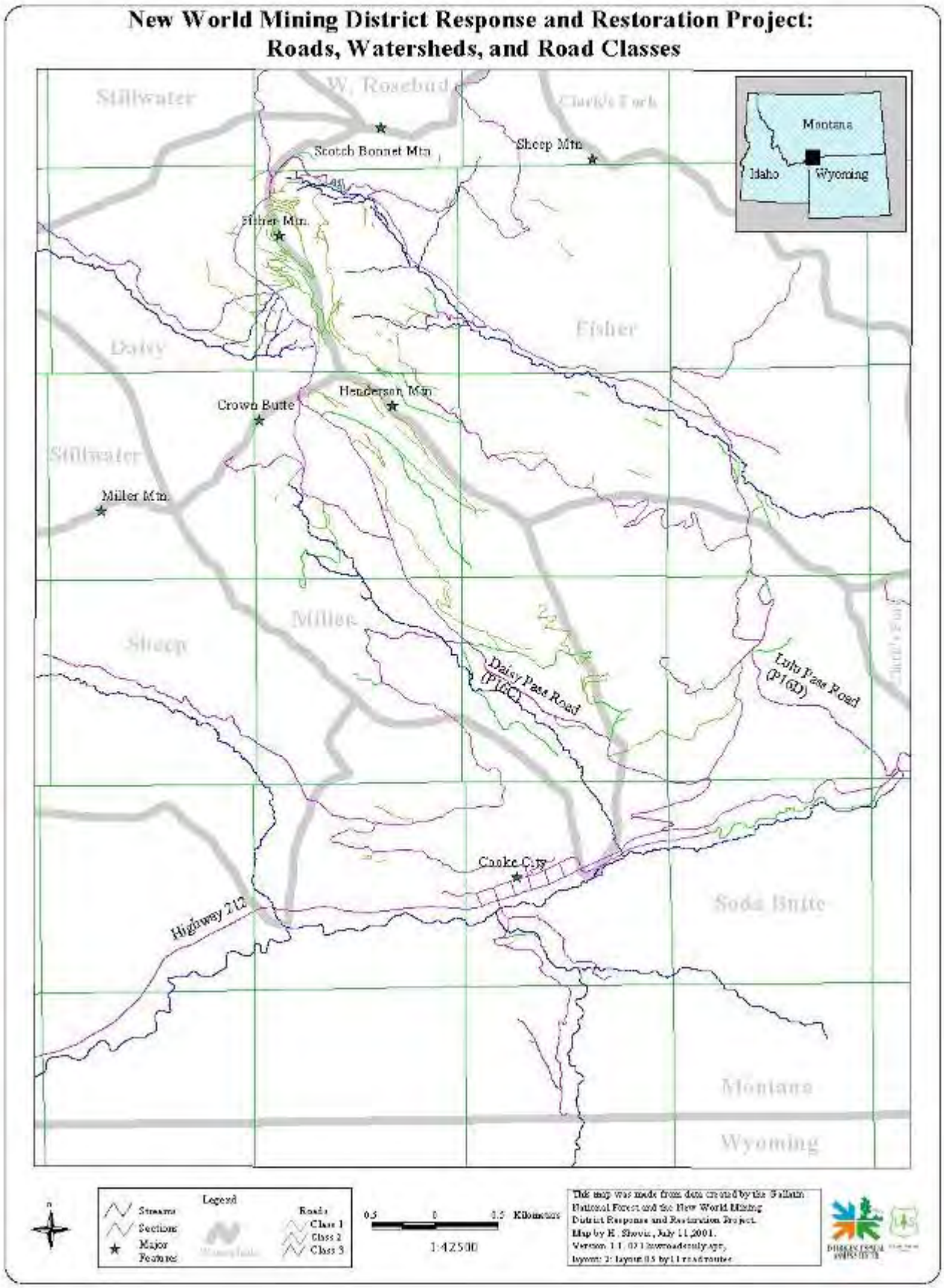

Figure 2. New World Mining Response and Restoration Project: Overview of Roads, Watersheds, and Road Classes

Over ½ of the total length is in Road Class 3 (major travelways) (Table 2), with most of the remainder in Class 1 (intermittent, unused historical routes.) In all classes, about 86 percent is on District property (Figure 3), allowing a range of management options. The remaining 14 percent are on non-District property where management options are limited due to lack of surface conservation rights. However, of that 14 percent, about 11 percent are class 3 roads with county or Forest Service right-of-ways where some kinds of sedimentation control may be possible.

Table 2. Road Route Length by Road Class and Ownership.

ROAD CLASS	District (m)	Non-District (m)	Total Length (m)	District (%)	Non-District (%)	Total (%)
Un-classed	452.9	270.3	723.1	0.4	0.3	0.7
1	26,045.7	1,114.8	27,160.5	24.2	1.0	25.2
2	15,624.2	1,278.5	16,902.7	14.5	1.2	15.7
3	50,745.3	12,216.3	62,961.5	47.1	11.3	58.4
Total (m)	92,868.1	14,879.8	107,747.8	86.2	13.8	100.0

Average road grades range from 0 to > 30 percent (Appendix Two.) Even major Class 3 roads (e.g. P16C, the Daisy Pass road) have grades > 9 percent. Higher grades increase runoff velocity and transport of sediment, and make maintenance more difficult.

Decision Support For Road Reclamation

Most Forest Service efforts to date in the New World project have focused on planning for adit and minedump reclamation and upgrading roads for future work. However, portions of the road network may act as significant sediment sources as well as non-point chemical pollution sources, and can contribute to heavy metal loading and acidity with respect to streams.

The following factors influence this pollution potential. Some roads pass through exposed and fractured acid-producing rocks (Figure 3.) Standards of construction may be very low, since most roads in the District were initially constructed during mining periods, maintenance levels are variable, and the climate is harsh. Road grades over 30 percent are present, and even Class 3 roads can have average grades up to 9 percent (Appendix Two). Many roads are in close proximity to live streams. Figure 1 gives an overview of these patterns of high road grades and interaction with stream networks. This, in conjunction with the high-snow/ high runoff climate in the area, creates a potential for significant sedimentation.

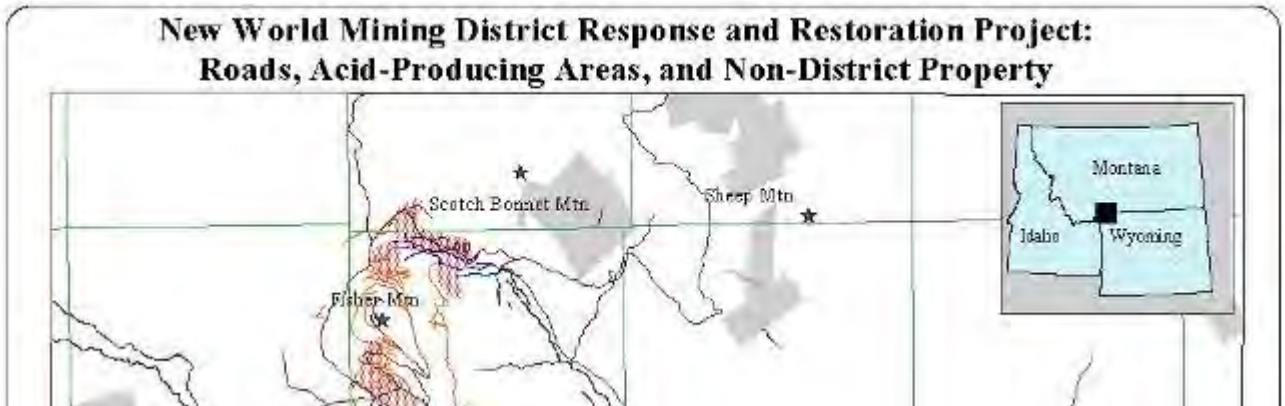

Figure 3. New World Mining Response and Restoration Project: Overview of Roads, Acid-Producing Areas, and Non-District Property..

The above concerns were recognized to some extent during active exploration by Crown Butte Inc. About 17,000 meters of road were reclaimed by the company in the early 90's (Figure 3 , Table 3.), with about 53 percent in known acid-generating rocks. Their methods consisted of restoring side slopes to original contours using fill and borrow material from cuts, amelioration of acidity where indicated, and seeding with native plant materials. These roads, though still rather barren show signs of increasing stability and some re-vegetation. Most of these roads were used or constructed for drill exploration, but some were also reclaimed to reduce surface erosion, notably in the Maclaren Pit area.

Table 3. Road Route Length by Lithology and Reclamation Status

LITHOLOGY	Total Route Length (m)	Not Reclaimed (m)	Reclaimed (m)
possible acid-generating area	1,740.2	1,585.2	155.0
known acid-generating area	2,988.4	1,418.2	1,570.2
Meagher and Pilgrim Limestones	3,669.4	3,575.8	93.6
other rocks	81,705.3	66,597.8	15,107.5
Precambrian granitic rocks	16,281.4	16,214.0	67.3
Scotch Bonnet Diorite	1,363.2	1,280.0	83.2
Totals		90,671.1	17,076.8

Table 3 illustrates total length of reclaimed road routes in acid-generating materials. Though 53 percent (1,570 m) of road length in known acid-generating materials has been reclaimed, only nine percent (155 m) has been reclaimed in possible acid-generating areas. There is a potential for reducing pollution-generating potential of these materials by reclaiming exposed cuts, fills, and road surfaces in acid-producing materials. This should reduce stream sedimentation and potential non-point pollution.

Though any of the remaining 90,000 meters of open roads are still potential "bad actors" in terms of sediment contribution and pollution potential, there are a few critical factors that may help us focus our efforts. A systematic, data-based method of prioritizing and focusing our efforts would be beneficial. Any such method should account for management and administrative priorities and constraints, potential for acid-sediment production, and reclamation status. Constraints on reclaiming these roads include restricted management options on non-District property and the identification of which roads have acid-producing subgrades or cutslope material.

The decision making process involved in programming roads for reclamation includes not only the pollution-potential, but also management priorities. Some roads may have uses or management plans that conflict with reclamation efforts. Some may be on non-District property. Therefore best candidates for reclamation may be those having significant length in acid materials, a high proportion of District ownership, and not reclaimed to date. The proportion of acid-producing materials should not be correlated directly with this rating. Their mere presence on a route is probably sufficient, as not all acid-producing areas may be mapped

to date and the materials may have been significantly spread during road construction and post-construction sedimentation.

Administrative and use parameters also may influence feasibility. Class 1 roads have the least potential conflicts with other uses. Class 2 roads proposed for reclamation should have review for potential recreational or administrative conflicts. Class 3 routes are good candidates because they often can be stabilized with administrative funds, and have well-constructed templates.

A final criterion is reclamation status. Effective reclamation reduces the sedimentation and chemical pollution potential of a route. Observations indicate the Crown Butte Inc. efforts have largely been successful in meeting these goals, so any route in the "reclaimed" category is likely to have a low rating for pollution regardless of bedrock lithology.

We have integrated these management concerns by using a simple model of the road system. Table 4 is a list of roads having a part of their length in acid-producing lithologies (either potential or known.), sorted by increasing proportion of non-District property and present reclamation status. There are 36 total routes in these materials. Based on the management criteria described above, there are 11 routes having significant potential for reclamation. These have both acid-producing materials, are entirely on District property, and are not reclaimed. Of these 11, eight are either Class 1 or 3 which have the lowest potential for use-related conflicts. These are P16D, 3219, 38, 125, 41, 132, 127, and 143. It makes sense to further evaluate these eight for reclamation potential before doing a field investigation of the entire road network of 181 routes. We should examine the remainder as time allows.

Other routes that may be of interest are 471 and 472, which have almost their entire length in acid-producing materials, though they are on non-District property, and P16C. The latter has some non-District length, but has about 460 meters of acid-producing material, and because of its county right-of-way, has some potential for relatively simple improvement in its drainage and erosion potential. Reclamation of routes 471 and 472 may be appropriate for analysis by personnel from the State of Montana.

Table 4. Listing of Road Routes having Acid-producing Materials, sorted by Reclamation Status and Proportion of Non-District Length in Increasing Order

Identifier	Name	ROAD CLASS	Length in Acid-producing Materials	Length of Route (m)	% Total Length in Acid Materials	% of Total Length Reclaimed	% Non-District Length
P16D	Lulu Pass	3	783.9	8,856.7	8.9		
3219	Lake Abundance	3	14.9	2,555.2	0.6		
32	Fisher Mountain 32	2	608.8	768.2	79.3		
38	Fisher Mountain 38	1	126.6	479.1	26.4		
2223	Fisher Creek switchbacks	2	356.1	424.3	83.9		

125	Sheep Mountain 125	1	289.9	317.0	91.5		
41	Fisher Mountain 41	1	67.9	84.1	80.7		
131	Scotch Bonnet Mountain 131	2	155.0	238.2	65.1		
132	Scotch Bonnet Mountain 132	1	4.8	53.4	9.1		
127	Sheep Mountain 127	1	43.2	43.2	100.0		
143	Sheep Mountain 143	1	29.8	29.8	100.0		
P16C	Daisy Pass	3	465.0	8,518.8	5.5		2.9
90	Miller Creek 90	2	42.5	529.7	8.0		32.9
472	Miller Creek 472	1	50.3	50.3	100.0		100.0
471	Miller Creek 471		42.3	43.8	96.6		100.0
53	Fisher Mountain 53	1	182.8	1,702.8	10.7	100.0	
12	Fisher Mountain 12	1	87.2	804.7	10.8	100.0	
18	Fisher Mountain 18	1	119.4	789.6	15.1	100.0	
36	Fisher Mountain 36	1	131.3	301.7	43.5	100.0	
28	Fisher Mountain 28	1	141.1	261.9	53.9	100.0	
130	Scotch Bonnet Mountain 131	1	77.5	77.5	100.0	100.0	
22	Fisher Mountain 22	1	186.1	230.8	80.6	100.0	
239	Fisher Mountain 239	1	78.7	221.2	35.6	100.0	
40	Fisher Mountain 40	1	181.2	181.2	100.0	100.0	
25	Fisher Mountain 25	1	14.2	158.0	9.0	100.0	
112	Fisher Mountain 112	1	59.0	125.5	47.0	100.0	
24	Fisher Mountain 24	1	119.9	119.9	100.0	100.0	
21	Fisher Mountain 21	1	65.7	116.4	56.4	100.0	
23	Fisher Mountain 23	1	71.0	114.8	61.8	100.0	
27	Fisher Mountain 27	1	14.7	103.6	14.2	100.0	
33	Fisher Mountain 33	1	4.5	94.6	4.7	100.0	
37	Fisher Mountain 37	1	6.3	60.5	10.4	100.0	
26	Fisher Mountain 26	1	1.3	51.3	2.5	100.0	

449	Fisher Mountain 449	1	41.6	41.6	100.0	100.0	
30	Fisher Mountain 30	1	33.8	33.8	100.0	100.0	
29	Fisher Mountain 29	1	30.6	30.6	100.0	100.0	

The above analysis helps focus our efforts. It can help us justify and emphasize the benefits of road reclamation on a project planning basis. Further analysis could include evaluation of average grade (from Appendix Two) and proximity to live or intermittent streams (using the Streams coverage.) However, project level analysis is needed to establish final designs.

Publication

An important part of this project is the preservation of a stable set of base layers and tables for analysis and documentation. We maintain and make available the following databases for roads and road-related analysis. We have a set of maps illustrating various aspects of road characteristics available on request.

NW_RDS: Route and arc data are in this ARC/INFO ™ coverage. This coverage was updated in May of 2001, and is linked to the attribute database by the field “IDENTIFIER” in the ROADS route feature. All roads are routes. No arcs are un-routed.

ROADSEXPORT.MDB: An ACCESS ™ database with road attributes, including the tables from which Appendix Two and Three were created. This can be linked to NW_RDS. Another database with all analysis data and queries for event analysis is available from the author.

ROADSMETADATA.HTM: metadata for NW_RDS

ROAD LOGS: Field copies of physical road logs for 32 percent of all roads (76 percent of the Class 2 and 3 roads) are contained in recent US Forest Service Road Logs. These were used in developing attributes for the NW_RDS coverage. They are maintained on the Gallatin National Forest by the New World Project Engineer.

NWATERSHEDS: watersheds or partial watersheds in the New World District study area.

PAT_CLAIMS: New World District patented claim coverage.

CLAIMS.MDB: An ACCESS ™ database with attributes regarding ownership, conservation easements, and District property flags, created from the New World Consent Decree. This can be linked to PAT_CLAIMS.

ACIDOUTCROPS: An ARCINFO 7.0 Coverage with bedrock lithology, including acid-producing areas.

All projections are: UTM zone 12, NAD27, meters.

We have other coverages for the New World project. These include streams, minedumps, hillshades of various types, section lines, cultural features, water quality sampling sights, geo-referenced historical maps, digital topographic maps, contour lines, detailed topography of the Maclaren and Como areas, various perspective views of the area, and a variety of maps showing various aspects of the project.

Appendix One. Definition of Fields for Attributes of New World Mining District Roads

Report: New World Mining District Road Characteristics

IDENTIFIER: This is a unique identifier taken from existing USFS data where present.

NAME: This is a unique name defined by a geographic locator and the IDENTIFIER.

ROAD CLASS: This is a classification based on a review of each road by project personnel. 1 = historical, unused, minor, wheel tracks; 2 = intermediate, used, constructed, but not a system road; 3 = major travelways, USFS System roads, highways

ROUTE LENGTH (M): This length is the total route length (meters) from the Spatial Data.

AVERAGE SLOPE OF ROUTE (%): This is a measure of the average grade slope of each route. This was derived by calculating elevations at an average interval of 90 m along each route, calculating the slope for each segment, and summing by route. These data are expressed as "events" relating to the road routes. Grades greater than 30% are shown as ">30%".

% NON-DISTRICT LENGTH: This is based on the total length by route not in District ownership. This was derived by spatial intersection of the New World Claims coverage and associated database, and the roads coverage. Non-district claims were defined as those having no government surface rights as defined in the New World Consent decree. These data are expressed as "events" relating to the road routes.

% OF TOTAL LENGTH RECLAIMED: This is based on the total length by route designated reclaimed (recontoured and seeded) in the roads attribute database. These data are expressed as "events" relating to the road routes.

% OF TOTAL LENGTH IN ACID MATERIALS: This is based on the total length by route crossing acidic (potential or actual) materials. This was derived by spatial intersection of the New World geology coverage and the roads coverage. These data are expressed as "events" relating to the road routes. The geology coverage currently has polygons for potential or actual acid-producing materials, as well as limestone, granite, and, and other rocks.

Report: New World Mining District Other Road Attributes

IDENTIFIER: This is a unique identifier taken from existing USFS data where present.

NAME: This is a unique name defined by a geographic locator and the IDENTIFIER.

ROAD LENGTH (FEET): This field (feet) is calculated from the Field ROUTE LENGTH (M).

FIELD CHECK: This field indicates when formal field checks were completed for road logs or verification of road characteristics.

ROAD LOG COMPLETE: This flag indicates the completion of formal road logs by the New World project engineer.

RECLAIMED: This field is a flag for reclamation. Present reclamation status refers to the degree to which roads have been reclaimed. Many roads and exploration trails were reclaimed by Crown Butte Mines Inc. in the early 90's. These were regraded to contour, amended with lime to reduce acid production, sown with native seed, and fertilized. There are no records available as to application rates, but most of the regraded slopes are revegetating slowly and have minimal erosion. These data are expressed as "events" attached to road routes.

NOTES: This field contains notes about the route.

Appendix Two. New World Mining District Road Characteristics

New World Mining District Road Characteristics

Identifier	Name	Road Class	Route Length (meters)	Average Slope of Route	% Non-District Length	% of Total Length Reclaimed	% Total Length in Acid Materials
10	Fisher Mountain 10	1	91.0	16.0		100.0	
100	Republic Creek 100	2	296.8	5.1	29.1		
101	Fisher Creek 101	2	203.6	1.5			
102	Fisher Creek 102	1	36.8	> 30			
103	Fisher Creek 103	1	37.4	5.0			
104	Fisher Creek 104	1	146.1	17.3			
105	Fisher Creek 105	1	168.2	1.0			
106	Fisher Creek 106	1	304.2	2.1			
108	Fisher Creek 108	1	138.2	2.4			
109	Fisher Creek 109	2	700.6	8.8			
11	Fisher Mountain 11	1	98.6	0.0		100.0	
110	Miller Creek 110	1	53.7	17.0			
111	Daisy Creek 111	1	35.8	8.0			
112	Fisher Mountain 112	1	125.5	11.9		100.0	47.0
113	Fisher Mountain 113	1	135.4	1.0		100.0	
114	Fisher Mountain 114	1	116.7	19.0		100.0	
115	Fisher Mountain 115	1	23.5	0.0		100.0	
116	Fisher Mountain 116	1	42.1	> 30		100.0	
1169	Colter Camp	3	220.1	0.0			
117	Fisher Creek 117	1	46.9	4.0			
1170	Soda Butte Camp	2	1,910.3	5.4			
1172	Irma Mine	3	2,227.5	8.1	15.0		
1172A	Irma Mine Spur	3	681.7	7.6	92.1		
1172B	1172 spur	2	74.3	25.0	100.0		
1172C	1172 Republic Creek	1	85.3	0.0	86.7		
118	Fisher Creek 118	1	130.1	3.0			
119	Fisher Creek 119	1	123.4	2.5			
12	Fisher Mountain 12	1	804.7	12.5		100.0	10.8

Identifier	Name	Road Class	Route Length (meters)	Average Slope of Route	% Non-District Length	% of Total Length Reclaimed	% Total Length in Acid Materials
120	Fisher Creek 120	1	67.3	6.0		100.0	
121	Fisher Creek 121		42.4	11.0			
122	Fisher Creek 122		50.7	10.0			
125	Sheep Mountain 125	1	317.0	> 30			91.5
127	Sheep Mountain 127	1	43.2	12.0			100.0
13	Fisher Mountain 13	1	77.1	9.0		100.0	
130	Scotch Bonnet Mountain 130	1	77.5	4.0		100.0	100.0
131	Scotch Bonnet Mountain 131	2	238.2	12.0			65.1
132	Scotch Bonnet Mountain 132	1	53.4	8.0			9.1
133	Scotch Bonnet Mountain 133	1	113.7	2.7		100.0	
134	Scotch Bonnet Mountain 134	1	170.6	4.8		100.0	
137	Sheep Mountain 137	1	89.5	18.0			
138	Sheep Mountain 138	1	254.1	7.6	37.2	100.0	
139	Sheep Mountain 139	1	179.3	9.1	5.2		
14	Fisher Mountain 14	1	109.6	10.8		100.0	
141	Alice E Spur 141	1	34.1	30.0			
142	Daisy Pass Spur 142	1	478.2	20.3		100.0	
143	Sheep Mountain 127	1	29.8	22.0			100.0
144	Alice E Spur 144	1	186.2	7.3	37.2		
145	Fisher Creek 145	2	97.6	16.0	100.0		
146	Alice E Spur 146	1	147.3	24.8	100.0		
147	Fisher Creek 123	1	58.0	7.0			
148	Miller Creek 94	1	77.6	7.0			
149	Miller Creek 447		65.9	17.0			
15	Fisher Mountain 15	1	215.2	13.0		100.0	
150	Alice E Spur 150		28.8	0.0			
151	Daisy Pass Spur 151	1	148.1	10.8			
16	Fisher Mountain 16	2	68.0	14.0			
17	Fisher Saddle 17	2	1,482.0	11.1			
18	Fisher Mountain 18	1	789.6	9.8		100.0	15.1
19	Fisher Mountain 19	1	103.7	9.6		100.0	

Identifier	Name	Road Class	Route Length (meters)	Average Slope of Route	% Non-District Length	% of Total Length Reclaimed	% Total Length in Acid Materials
2	Daisy Creek 2	1	333.9	5.8			
20	Fisher Mountain 20	1	133.0	7.9		100.0	
21	Fisher Mountain 21	1	116.4	7.7		100.0	56.4
212	US 212 (FAP12)	3	7,718.6	3.7	52.1		
22	Fisher Mountain 22	1	230.8	8.1		100.0	80.6
2222	High Repository	2	356.1	> 30			
2223	Fisher Creek switchbacks	2	424.3	> 30			83.9
23	Fisher Mountain 23	1	114.8	1.7		100.0	61.8
239	Fisher Mountain 239	1	221.2	5.4		100.0	35.6
24	Fisher Mountain 24	1	119.9	17.4		100.0	100.0
240	Henderson Mountain 240	1	109.4	8.1			
241	Henderson Mountain 241	1	118.3	4.4	100.0		
242	Miller Creek 242	1	43.1	2.0	100.0		
25	Fisher Mountain 25	1	158.0	9.9		100.0	9.0
26	Fisher Mountain 26	1	51.3	19.0		100.0	2.5
27	Fisher Mountain 27	1	103.6	1.0		100.0	14.2
28	Fisher Mountain 28	1	261.9	4.1		100.0	53.9
29	Fisher Mountain 29	1	30.6	13.0		100.0	100.0
3	Daisy Creek 3	1	133.8	5.1			
30	Fisher Mountain 30	1	33.8	12.0		100.0	100.0
32	Fisher Mountain 32	2	768.2	14.0			79.3
3215	Henderson View	3	763.8	5.8			
3216	Tony's Top	3	842.1	6.2			
3217	Tony's Top cutoff 3217	2	138.5	12.2			
3218	Goose Lake trail road	2	269.0	5.5			
3219	Lake Abundance	3	2,555.2	10.9			0.6
3220	Cooke-Soda Connection	3	1,104.2	5.3	56.4		
3221	Woody Creek	3	1,175.1	6.6	15.1		
3222	Clarks Fork Road	3	354.0	2.5	100.0		
3223	Chimney Rock	3	4,218.4	8.5			
3224	Sheep Mountain 3224	3	3,486.8	8.8	0.4		

Identifier	Name	Road Class	Route Length (meters)	Average Slope of Route	% Non-District Length	% of Total Length Reclaimed	% Total Length in Acid Materials
3225	Bull of the Woods Pass	3	848.5	11.1	42.8		
3226	Crown Butte	3	1,655.2	11.1	46.3		
3227	County Connnect	3	1,166.3	8.7	2.3		
3227A	County Connect Spur A	3	1,003.1	6.5	70.9		
3228	Miller Creek 3228	3	6,125.5	10.8	21.7		
3228A	Miller Creek Spur A	3	3,337.0	6.1	8.6		
3228B	Miller Creek Spur B	3	265.5	9.0	100.0		
3229	Scotch Bonnet	3	993.9	6.9			
3230	Goose Lake	3	2,263.6	7.3			
33	Fisher Mountain 33	1	94.6	13.4		100.0	4.7
34	Fisher Mountain 34	1	32.4	> 30		100.0	
35	Fisher Mountain 35	1	29.0	> 30		100.0	
36	Fisher Mountain 36	1	301.7	12.1		100.0	43.5
37	Fisher Mountain 37	1	60.5	2.0		100.0	10.4
38	Fisher Mountain 38	1	479.1	12.5			26.4
4	Daisy Creek 4	1	518.8	6.4		100.0	
40	Fisher Mountain 40	1	181.2	14.2		100.0	100.0
41	Fisher Mountain 41	1	84.1	1.0			80.7
43	Fisher Mountain 43	1	126.7	16.4		100.0	
438	Fisher Creek 438	2	255.8	4.8			
439	Fisher Creek 439	1	82.2	28.0		100.0	
44	Henderson Mountain 44	1	65.0	8.0		100.0	
442	Miller Creek 442	1	134.0	16.9			
445	Miller Creek 445	1	684.3	8.7		100.0	
446	Fisher Mountain 446	1	33.5	21.0		100.0	
447	Miller Creek 447	1	414.9	12.6	57.7	100.0	
449	Fisher Mountain 449	1	41.6	3.0		100.0	100.0
45	Fisher Mountain 45	1	173.3	15.7		100.0	
46	Fisher Mountain 46	1	112.5	10.2		100.0	
47	Fisher Mountain 47	1	115.6	14.8		100.0	
471	Miller Creek 471		43.8	22.0	100.0		96.6

Identifier	Name	Road Class	Route Length (meters)	Average Slope of Route	% Non-District Length	% of Total Length Reclaimed	% Total Length in Acid Materials
472	Miller Creek 472	1	50.3	14.0	100.0		100.0
48	Henderson Mountain 48	1	255.5	15.8		100.0	
49	Fisher Mountain 49	1	45.4	11.0		100.0	
5	Daisy Creek 5	1	32.6	3.0		100.0	
52	Fisher Creek 52	1	502.3	26.4			
53	Fisher Mountain 53	1	1,702.8	8.9		100.0	10.7
54	Fisher Mountain 54	1	709.8	12.0		100.0	
55	Henderson Mountain 55	2	466.3	10.8			
56	Henderson Mountain 56	1	119.2	17.8			
57	Henderson Mountain 57	1	635.8	21.3		100.0	
58	Henderson Mountain 58	1	70.9	25.3		100.0	
59	Henderson Mountain 59	1	149.1	11.6		100.0	
6	Daisy Creek 6	1	166.9	10.5		100.0	
60	Fisher Creek 60	1	146.7	14.3			
62	Fisher Creek 62	1	39.7	10.0			
63	Fisher Creek 63	2	252.0	5.1			
64	Fisher Creek 64	2	155.5	7.5			
65	Fisher Creek 65	2	57.6	12.0			
66	Henderson Mountain 66	1	1,561.3	7.6		100.0	
67	Miller Creek 67	2	1,594.3	8.2			
68	Miller Creek 68	2	1,168.4	9.5			
69	Miller Creek 69	1	1,892.1	12.2		100.0	
7	Daisy Creek 7	1	461.7	3.8			
70	Miller Creek 70	1	384.2	7.9		100.0	
71	Miller Creek 71	1	129.1	27.6			
72	Miller Creek 72		178.6	15.6			
73	Miller Creek 73	1	369.0	11.4			
7311	Upper Lady of the Lake	3	524.3	1.7	24.8		
75	Crown Butte 75	1	287.4	10.9	5.2		
76	Crown Butte 76	2	176.3	14.6	89.8		
77	Crown Butte 77	1	34.5	9.0	100.0		

Identifier	*Name*	*Road Class*	*Route Length (meters)*	*Average Slope of Route*	*% Non-District Length*	*% of Total Length Reclaimed*	*% Total Length in Acid Materials*
78	Miller Creek 78	2	1,290.6	10.5	28.3		
781	Miller Creek Spur 781	1	32.0	9.0	100.0		
79	Miller Creek 79	1	388.5	6.4	48.3		
8	Fisher Mountain 8	1	54.9	17.0			
81	Henderson Mountain 81	2	818.3	16.7			
82	Henderson Mountain 82	1	80.0	15.0			
83	Fisher Creek 83	1	465.9	13.3			
85	Miller Creek 85	1	319.6	10.1		100.0	
86	Miller Creek 86	1	452.7	10.4		100.0	
87	Miller Creek 87	1	938.9	13.8			
88	Miller Creek 88	1	98.4	> 30			
89	Miller Creek 89	2	1,413.6	9.4	6.5		
9	Fisher Mountain 9	1	43.7	> 30			
90	Miller Creek 90	2	529.7	8.4	32.9		8.0
900	Fisher Connect 900		313.1	4.7	72.3		
901	Private 901	1	1,254.8	4.3			
91	Miller Creek 91	2	85.6	3.0			
92	Miller Creek 92	2	76.2	2.0			
93	Fisher Creek 93	2	58.6	13.0	100.0		
94	Miller Creek 94	2	1,200.6	11.2			
95	Miller Creek 95	1	351.6	12.9			
96	Miller Creek 96	2	276.0	10.3	62.1		
97	Miller Creek 97	1	109.9	5.9			
98	Miller Creek 98	1	94.3	17.0			
99	Miller Creek 99	1	86.6	1.0			
Cooke City	Cooke City	1	1,888.3	5.5	100.0		
P168	Republic Creek Road	3	167.2	2.7	33.8		
P16C	Daisy Pass	3	8,206.8	9.3	3.0		5.7
P16D	Lulu Pass	3	8,856.7	6.9			8.9

Appendix Three. New World Mining District Other Road Attribute

New World Mining District Other Road Attributes

Identifier	Name	Road Length (feet)	Field Check	Road Log Complete	Reclaimed	Notes
10	Fisher Mountain 10	294.7			yes	
100	Republic Creek 100	961.5			no	
101	Fisher Creek 101	659.6	2000		no	historical road, used for dispersed camping
102	Fisher Creek 102	119.1	2000		no	cutof road, revegetated now, not
103	Fisher Creek 103	121.2	2000		no	cutoff, not constructed, wheel tracks
104	Fisher Creek 104	473.3	2000		no	This appears to be an access road to a minedump area.; undriveable
105	Fisher Creek 105	544.9	1999		no	This appears to be an historical exploration road. It has a hand-made rock butrress.
106	Fisher Creek 106	985.7			no	historical road
108	Fisher Creek 108	447.8			no	This road appears to be related to a mine town site.
109	Fisher Creek 109	2269.8	2000		no	This road appears to be related to a mine town site, historical exploration and a tramway access, as well as dispersed
11	Fisher Mountain 11	319.3			yes	exploration road
110	Miller Creek 110	174.1			no	This is an historical pioneer road or a
111	Daisy Creek 111	116.0	2000	yes	no	multiple wheel tracks in meadow on Abundance Lake road
112	Fisher Mountain 112	406.7			yes	
113	Fisher Mountain 113	438.5	2000		yes	Spur complex
114	Fisher Mountain 114	378.2			yes	
115	Fisher Mountain 115	76.3			yes	spur
116	Fisher Mountain 116	136.5	2000		yes	exploration road
1169	Colter Camp	713.3			no	

Identifier	Name	Road Length (feet)	Field Check	Road Log Complete	Reclaimed	Notes
117	Fisher Creek 117	151.9			no	This road appears to be a historical trench, partially revegetated
1170	Soda Butte Camp	6189.3			no	
1172	Irma Mine	7217.1	1999,2000	yes	no	Republic Creek Road, driveable
1172A	Irma Mine Spur	2208.7	1999	yes	no	Republic Creek Road, driveable with high clearance
1172B	1172 spur	240.7	2000	yes	no	Irma mine spur
1172C	1172 Republic Creek	276.3	2000		no	on private land
118	Fisher Creek 118	421.5			no	These roads appear to be old pioneer cuts, with some vegetation
119	Fisher Creek 119	400.0			no	These roads appear to be old pioneer cuts, with some vegetation
12	Fisher Mountain 12	2607.1	1999		yes	
120	Fisher Creek 120	218.2			yes	
121	Fisher Creek 121	137.3			no	
122	Fisher Creek 122	164.1			no	
125	Sheep Mountain 125	1027.0			no	historical road to Como Basin
127	Sheep Mountain 127	139.8			no	historical
13	Fisher Mountain 13	249.8			yes	exploration road
130	Scotch Bonnet Mountain 130	251.1	1999, 2000		no	recontoured, revegetated road to Spaulding tunnels
131	Scotch Bonnet Mountain 131	771.6	2000		yes	to Spaulding tunnels, driveable
132	Scotch Bonnet Mountain 132	173.1	2000		no	This appears to be a historical road of the Glengarry Pit, hard to see on the ground
133	Scotch Bonnet Mountain 133	368.5	2000		yes	exploration road, low cuts, hard to see on ground
134	Scotch Bonnet Mountain 134	552.6	1999		yes	restored and successfully reveg, but barren where in restored minedump Shovic
137	Sheep Mountain 137	289.9	2000		no	Exploration road, wheel tracks

Identifier	Name	Road Length (feet)	Field Check	Road Log Complete	Reclaimed	Notes
138	Sheep Mountain 138	823.3	2000		yes	Reclaimed exploration road
139	Sheep Mountain 139	581.0			no	historical
14	Fisher Mountain 14	355.2	1999		yes	
141	Alice E Spur 141	110.6			no	
142	Daisy Pass Spur 142	1549.3			yes	Recontoured by CBMI
143	Sheep Mountain 127	96.7			no	These roads all appear un-reclaimed;
144	Alice E Spur 144	603.3			no	
145	Fisher Creek 145	316.3			no	route to a private dwelling
146	Alice E Spur 146	477.2			no	
147	Fisher Creek 123	188.0			no	historical
148	Miller Creek 94	251.5			no	This road may be related to logging
149	Miller Creek 447	213.4	1999		no	Restored, recontoured drill pad road, Restored, Adolph 082599
15	Fisher Mountain 15	697.2	1999		yes	
150	Alice E Spur 150	93.2			no	
151	Daisy Pass Spur 151	479.8			no	
16	Fisher Mountain 16	220.4			no	ATV tracks
17	Fisher Saddle 17	4801.7	2000	yes	no	driveable
18	Fisher Mountain 18	2558.2	1999		yes	Restored, field checked by Shovic 082599
19	Fisher Mountain 19	336.1			yes	reclaimed roads not on CBMI coverage
2	Daisy Creek 2	1081.7			no	This is historical road, not reclaimed.
20	Fisher Mountain 20	431.0			yes	reclaimed roads not on CBMI coverage
21	Fisher Mountain 21	377.2			yes	
212	US 212 (FAP12)	25008.3			no	Highway 212
22	Fisher Mountain 22	747.8			yes	

Identifier	Name	Road Length (feet)	Field Check	Road Log Complete	Reclaimed	Notes
2222	High Repository	1153.9	2000		no	temporary road for repository and Rommel tailings dump, reconstructed from old logging road;put in 2000. Low cuts, no
2223	Fisher Creek switchbacks	1374.9	2000		no	this is network of eroded and rutted roads cutting switchbacks on P16D, the Lulu Pass Road
23	Fisher Mountain 23	372.1			yes	appear to also have been rehabed
239	Fisher Mountain 239	716.7	1999		yes	restored by CBMI, Restored, field checked by Shovic 082599
24	Fisher Mountain 24	388.4			yes	
240	Henderson Mountain 240	354.3	2000		no	revegetated wheel tracks
241	Henderson Mountain 241	383.1	2000		no	caterpiller track, historical
242	Miller Creek 242	139.6	2000		no	revegetated, but not recontoured, leads into Miller Creek
25	Fisher Mountain 25	512.1	1999		yes	restored
26	Fisher Mountain 26	166.2	1999		yes	older road, apparently part of Glengarry pit., restored
27	Fisher Mountain 27	335.6	1999		yes	restored
28	Fisher Mountain 28	848.5			yes	
29	Fisher Mountain 29	99.0			yes	
3	Daisy Creek 3	433.4			no	This appears to be a historical pioneer road.
30	Fisher Mountain 30	109.6			yes	
32	Fisher Mountain 32	2488.8		yes	no	driveable to blockade at base
3215	Henderson View	2474.7	2000	yes	no	driveable, goes to Gold Dust Adit and Dump
3216	Tony's Top	2728.3	1999		no	secondary road, not constructed in lower section; used for firewood, goes by an historical site
3217	Tony's Top cutoff 3217	448.7	2000		no	steep (25%) cutoff from 3216
3218	Goose Lake trail road	871.5	2000		no	this leads to the Goose Lake Trailhead

Identifier	Name	Road Length (feet)	Field Check	Road Log Complete	Reclaimed	Notes
3219	Lake Abundance	8278.9	1999, 2000	yes	no	bumpy, eroded, poorly drained
3220	Cooke-Soda Connection	3577.6			no	
3221	Woody Creek	3807.4	1999, 2000	yes	no	Woody Creek Road; Bridge over Woody Creek is unsafe; road is slow and bumpy; high clearance needed
3222	Clarks Fork Road	1146.9			no	
3223	Chimney Rock	13667.5	2000	yes	no	driveable, needs some drainage in lower sections; high clearance
3224	Sheep Mountain 3224	11297.3	2000	yes	no	driveable; high clearance needed in places, road log goes to steep spot 3/4 of distance to top
3225	Bull of the Woods Pass	2749.3	2000	yes	no	driveable for 500 feet to washout. Possibly accessible by 4WD
3226	Crown Butte	5362.7	1998	yes	no	drainage has failed, washouts; driveable with high clearance four wheel drive
3227	County Connnect	3778.8	2000	yes	no	
3227A	County Connect Spur A	3250.0	2000		no	driveable, leads to private dwellings, county road to private land
3228	Miller Creek 3228	19846.6	1998 first 1 mile, 2000	yes	no	driveable with high clearance and four wheel drive; low erosion in first portion
3228A	Miller Creek Spur A	10812.0			no	goes to Sheep Creek, blocked at junction with 3228
3228B	Miller Creek Spur B	860.1	2000		no	part of Cooke City
3229	Scotch Bonnet	3220.3	1997,2000	yes	no	goes to wilderness boundary,driveable, for 1.4 miles
3230	Goose Lake	7334.0	2000	yes	no	very bumpy, needs high clearance and four wheel drive
33	Fisher Mountain 33	306.4			yes	
34	Fisher Mountain 34	105.0			yes	This may not be a reclaimed road. It is too steep.
35	Fisher Mountain 35	93.8			yes	

Identifier	Name	Road Length (feet)	Field Check	Road Log Complete	Reclaimed	Notes
36	Fisher Mountain 36	977.6			yes	
37	Fisher Mountain 37	196.0			yes	
38	Fisher Mountain 38	1552.1	2000		no	
4	Daisy Creek 4	1681.0			yes	exploration spur
40	Fisher Mountain 40	587.2			yes	
41	Fisher Mountain 41	272.6			no	exploration Road in Maclaren minedump
43	Fisher Mountain 43	410.6			yes	exploration road
438	Fisher Creek 438	828.9	1998,2000	yes	no	driveable to Alice E. dump, used for
439	Fisher Creek 439	266.3	2000		yes	part of 438, but undriveable
44	Henderson Mountain 44	210.7			yes	exploration road
442	Miller Creek 442	434.2			no	
445	Miller Creek 445	2217.3	1999		yes	Restored, recontoured.drill pad road, Restored, Adolph, 082599
446	Fisher Mountain 446	108.5	1999		yes	Restored, recontoured, Restored, Shovic 082599
447	Miller Creek 447	1344.4			yes	
449	Fisher Mountain 449	134.8	1999		yes	Restored, recontoured drill pad road, Restored Shovic 082599
45	Fisher Mountain 45	561.3			yes	
46	Fisher Mountain 46	364.5			yes	
47	Fisher Mountain 47	374.5			yes	
471	Miller Creek 471	141.8			no	
472	Miller Creek 472	162.9			no	
48	Henderson Mountain 48	827.9			yes	
49	Fisher Mountain 49	147.1			yes	exploration spur
5	Daisy Creek 5	105.5			yes	exploration spur
52	Fisher Creek 52	1627.4			no	historical exploration road segments

Identifier	Name	Road Length (feet)	Field Check	Road Log Complete	Reclaimed	Notes
53	Fisher Mountain 53	5517.2			yes	
54	Fisher Mountain 54	2299.9	2000		yes	narrow (4 foot) bench, mostly reclaimed, poss. Potential for ATV
55	Henderson Mountain 55	1510.8	2000	yes	no	low erosion, driveable with high clearance, route to upper Homestake mine from end of
56	Henderson Mountain 56	386.1	2000		no	low erosion, driveable with high clearance
57	Henderson Mountain 57	2059.9	2000		yes	historical, probably exploration road
58	Henderson Mountain 58	229.8	2000		yes	historical, probably exploration road
59	Henderson Mountain 59	483.0	2000		yes	exploration road
6	Daisy Creek 6	540.8			yes	exploration road
60	Fisher Creek 60	475.4	1999		no	
62	Fisher Creek 62	128.7			no	cutoff on route 3215
63	Fisher Creek 63	816.4	2000	yes	no	driveable, appears to be used, goes to an old weatherstation site
64	Fisher Creek 64	503.8	2000	yes	no	driveable, dispersed camping
65	Fisher Creek 65	186.6			no	cutoff from Main Fisher Creek road to 3215
66	Henderson Mountain 66	5058.8			yes	Reclaimed 1998, per Alan Kirk 5-1-99, verified 2000
67	Miller Creek 67	5165.5	2000	yes	no	driveable with high clearance
68	Miller Creek 68	3785.6	2000		no	not driveable, revegetated, but not recontoured, blowdown common
69	Miller Creek 69	6130.4	2000		yes	reclaimed, but some erosion in steep draws
7	Daisy Creek 7	1495.8			no	
70	Miller Creek 70	1244.7			yes	
71	Miller Creek 71	418.3			no	Historical exploration roads, not reclaimed.
72	Miller Creek 72	578.8			no	
73	Miller Creek 73	1195.6	2000		no	Historical exploration road, revegetated, not driveable

Identifier	Name	Road Length (feet)	Field Check	Road Log Complete	Reclaimed	Notes
7311	Upper Lady of the Lake	1698.9	1999, 2000	yes	no	leads to Chicago Mill and trail, high clearance driveable
75	Crown Butte 75	931.2	1998		no	This is an historical pioneer road, now largely segments, routed through a stream in places, largely undriveable
76	Crown Butte 76	571.2	1998, 2000	yes	no	
77	Crown Butte 77	111.8			no	cutoff on 3226
78	Miller Creek 78	4181.4	2000		no	leads to a minedump on Miller Mountain. Low erosion, high clearance driveable to
781	Miller Creek Spur 781	103.6			no	
79	Miller Creek 79	1258.9			no	historical road, partially vegetated, cutbank enters Miller Creek
8	Fisher Mountain 8	177.8			no	historical cat track
81	Henderson Mountain 81	2651.2	2000		no	appears driveable with four wheel drive very narrow
82	Henderson Mountain 82	259.2	2000		no	This road accesses a historical exploratory adit and minedump.
83	Fisher Creek 83	1509.5	2000		no	historical wheel tracks, partially revegetated
85	Miller Creek 85	1035.6			yes	Reclaimed 1998, per Alan Kirk 5-1-99
86	Miller Creek 86	1466.8			yes	Reclaimed 1998, per Alan Kirk 5-1-99
87	Miller Creek 87	3042.0			no	
88	Miller Creek 88	318.8			no	very faint in places location may be suspect
89	Miller Creek 89	4580.1	2000		no	This is an historical access road, probably not related to the mine., blowdown common
9	Fisher Mountain 9	141.5			no	cat track
90	Miller Creek 90	1716.1	1999	yes	no	driveable high clearance, to mine on private land to road
900	Fisher Connect 900	1014.3	2000		no	
901	Private 901	4065.5	2000		no	private road

Identifier	Name	Road Length (feet)	Field Check	Road Log Complete	Reclaimed	Notes
91	Miller Creek 91	277.5	2000		no	historical spur road goes to mill site
92	Miller Creek 92	246.7	2000	yes	no	historical spur road, wet in places
93	Fisher Creek 93	189.9			no	route to a private dwelling
94	Miller Creek 94	3890.0			no	constructed in places, may be used
95	Miller Creek 95	1139.2			no	
96	Miller Creek 96	894.1	2000		no	This is an historical road to an adit and exporation pit, driveable, goes to a TV tower, needs a road log
97	Miller Creek 97	356.0			no	historical spur road to dump
98	Miller Creek 98	305.5			no	historical spur road to a dump
99	Miller Creek 99	280.5			no	historical road segment
Cooke City	Cooke City	6118.2			no	roads in the town of Cooke City
P168	Republic Creek Road	541.6	1999		no	Republic Creek Road from Cooke City to intersection with 100
P16C	Daisy Pass	27941.8	1999		no	This is a major arterial road.
P16D	Lulu Pass	28695.8	1999		no	this is a major arterial road