Draft
Environmental Impact Statement
For The
Spring Creek Mine TR1 Major Revision
Big Horn County, Montana

Prepared by:

Montana Department of Environmental Quality
Coal and Opencut Mining Bureau
Helena, Montana

August 2019

Draft Environmental Impact Statement
Spring Creek Mine TR1 Major Revision

PREPARED BY

MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY

COAL AND OPENCUT MINING BUREAU

AUGUST 2019

TABLE OF CONTENTS

Summary **S-1**
1 Purpose and Need **1**
1.1 Introduction 1
1.2 Project Location and History 4
1.3 Purpose, Need, and Benefits 4
1.4 Agency Roles and Responsibilities 6
1.4.1 Montana Department of Environmental Quality 6
1.4.2 SCM TR1 Project 8
1.4.3 Other Agencies Roles 8
1.5 Public Participation 10
1.5.1 Scoping Comments 10
1.5.2 Public Comment Period 11
1.6 Issues 11
1.6.1 Resource Areas with Relevant Issues of Concern 11
1.6.2 Resources Areas Not Carried Forward for Detailed Analysis 12
1.7 Scope of the Analysis 12
1.8 Financial Assurance 12
1.8.1 Performance Bond Amount 12
1.8.2 Timing of Performance Bond Calculation 13
1.8.3 Performance Bond Review 13
1.8.4 Performance Bond Release 13
2 Description of Alternatives **15**
2.1 Development of Alternatives 15
2.2 No Action Alternative 16
2.2.1 Permit Boundary and Disturbed Area Description 16
2.2.2 Water Management and Protection 16
2.2.3 Mine Personnel and Facilities 18
2.2.4 Mining Methods 18
2.2.5 Fish and Wildlife Plans 19
2.2.6 Air Pollution Control 22
2.2.7 Cultural and Historical Resource Protection 25
2.2.8 Approximate Original Contour, Soil Distribution, and Seeding 25
2.2.9 Mine Closure and Reclamation Plan 26
2.2.10 Environmental Monitoring 26
2.3 Proposed Action Alternative 27
2.3.1 Permit Boundary and Disturbed Area Description 27
2.3.2 Mine Personnel and Facilities 29
2.3.3 Water Management and Protection 29
2.3.4 Mining Methods 29
2.3.5 Fish and Wildlife Plan 30

2.3.6 Air Pollution Control 30
2.3.7 Cultural and Historical Resources 30
2.3.8 Approximate Original Contour, Soil Distribution, and Seeding 31
2.3.9 Mine Closure and Reclamation Plan 31
2.3.10 Environmental Monitoring 33
2.3.11 Mitigations for the Proposed Action 33
2.4 Alternatives Not Carried Forward for Detailed Analysis 35
2.4.1 Delay TR1 Project Until SCM Reclaims Majority of Mined Lands 36
2.4.2 Additional Money for Active Reclamation 36
2.4.3 Investments in Clean Energy 37
2.4.4 No Mining on West Side During Lekking and Brood Seasons 37
2.4.5 Reduce Coal Mining Rates and Numbers of Trains 37
2.4.6 Create Regional Coal Train Transportation Plan 37
2.4.7 Additional Aquifer Restoration Plan for Mine Pits 38
2.4.8 Limit New Oil and Gas Wells 38
2.4.9 Mitigation Measures Suggested 38
2.5 Summary Comparison of Alternatives 38
2.6 Agency Preferred Alternative 42
2.6.1 Rationale for the Preferred Alternative 42
3 Affected Environment and Environmental Consequences 44
3.1 Introduction 44
3.2 Resources Areas Considered but Not Studied in Detail 44
3.3 Resource Areas Analyzed in Detail 45
3.4 Air Quality 49
3.4.1 Analysis Area 49
3.4.2 Issues and Analysis Methods 49
3.4.3 Affected Environment 50
3.4.4 Direct and Secondary Impacts 55
3.4.5 Unavoidable, Irreversible and Irretrievable Impacts 58
3.5 Land Use 58
3.5.1 Analysis area 58
3.5.2 Issues and Analysis Methods 58
3.5.3 Affected Environment 59
3.5.4 Direct and Secondary Impacts 63
3.5.5 Unavoidable, Irreversible, and Irretrievable Impacts 64
3.6 Noise 65
3.6.1 Analysis area 65
3.6.2 Issues and Analysis Methods 65
3.6.3 Affected Environment 65
3.6.4 Direct and Secondary Impacts 67
3.6.5 Unavoidable, Irreversible, and Irretrievable Impacts 77
3.7 Socioeconomic Resources 77

3.7.1 Analysis Area ... 77
3.7.2 Issues and Analysis Methods ... 77
3.7.3 Affected Environment ... 77
3.7.4 Direct and Secondary Impacts ... 81
3.7.5 Unavoidable, Irreversible, and Irretrievable Impacts ... 84
3.8 Soils ... 84
3.8.1 Analysis Area ... 84
3.8.2 Issues and Analysis Methods ... 84
3.8.3 Affected Environment ... 85
3.8.4 Unavoidable, Irreversible, and Irretrievable Impacts ... 89
3.9 Transportation ... 89
3.9.1 Analysis Area ... 89
3.9.2 Issues and Analysis Methods ... 89
3.9.3 Affected Environment ... 91
3.9.4 Direct and Secondary Impacts ... 92
3.9.5 Unavoidable, Irreversible, and Irretrievable Impacts ... 94
3.10 Vegetation and Reclamation ... 94
3.10.1 Analysis Area ... 94
3.10.2 Issues and Analysis Methods ... 94
3.10.3 Affected Environment ... 94
3.10.4 Direct and Secondary Impacts ... 97
3.10.5 Unavoidable, Irreversible, and Irretrievable Impacts ... 99
3.11 Water ... 99
3.11.1 Analysis Area ... 99
3.11.2 Affected Environment ... 100
3.11.3 Direct and Secondary Impacts ... 104
3.11.4 Unavoidable, Irreversible, and Irretrievable Impacts ... 109
3.12 Wildlife ... 110
3.12.1 Analysis Area ... 110
3.12.2 Issues and Analysis Methods ... 110
3.12.3 Affected Environment ... 111
3.12.4 Direct and Secondary Impacts ... 125
3.12.5 Unavoidable, Irreversible, and Irretrievable Impacts ... 136
3.13 Cultural Resources ... 137
3.13.1 Analysis Area ... 137
3.13.2 Issues and Analysis Methods ... 137
3.13.3 Affected Environment ... 137
3.13.4 Direct and Secondary Impacts ... 140
3.13.5 Unavoidable, Irreversible, and Irretrievable Impacts ... 141
4 Cumulative, Unavoidable, Irreversible and Irretrievable Impacts ... 142
4.1 Related Future Actions ... 142
4.1.1 SCM AM5 New Haul Road ... 142

4.1.2 Decker Coal Mines 142
4.1.3 Additional Coal Leases 144
4.1.4 Rail Spur 144
4.1.5 Oil and Gas Activities 144
4.1.6 Summary 145
4.2 Air Quality Impacts 145
4.2.1 Cumulative Impacts 145
4.2.2 Unavoidable, Irreversible and Irretrievable Impacts 146
4.3 Land Use and Recreation Impacts 146
4.3.1 Cumulative Impacts 146
4.3.2 Unavoidable, Irreversible and Irretrievable Impacts 146
4.4 Noise Impacts 146
4.4.1 Cumulative Impacts 146
4.4.2 Unavoidable, Irreversible and Irretrievable Impacts 146
4.5 Social and Economic Impacts 147
4.5.1 Cumulative Impacts 147
4.5.2 Unavoidable, Irreversible and Irretrievable Impacts 147
4.6 Soil Impacts 147
4.6.1 Cumulative Impacts 147
4.6.2 Unavoidable, Irreversible and Irretrievable Impacts 147
4.7 Transportation Impacts 148
4.7.1 Cumulative Impacts 148
4.7.2 Unavoidable, Irreversible and Irretrievable Impacts 148
4.8 Vegetation and Reclamation Impacts 148
4.8.1 Cumulative Impacts 148
4.8.2 Unavoidable, Irreversible and Irretrievable Impacts 148
4.9 Water Impacts 149
4.9.1 Cumulative Impacts 149
4.9.2 Unavoidable, Irreversible and Irretrievable Impacts 149
4.10 Wildlife Impacts 150
4.10.1 Cumulative Impacts 150
4.10.2 Unavoidable, Irreversible and Irretrievable Impacts 151
4.11 Regulatory Restrictions for Sage Grouse 151
5 List of Preparers 152
5.1 Preparers and Reviewers 152
6 References 154

LIST OF TABLES

Table S-1 Comparison of Alternative Features S-3
Table S-2 Comparison of Effects by Alternative and Resource S-5
Table 1.2-1 Permit Amendment and Revision History Summary 4
Table 1.4-1 Federal and State Permits, Licenses, and Approvals Required for the Project. 9
Table 1.6-1 Issues Discussed in the EIS and Location of Discussion 11
Table 2.2-1 SCM Habitat Recovery and Replacement Plan (HRRP) and Related Projects 23
Table 2.5-1 Comparison of Alternative Features 39
Table 2.5-2 Comparison of Effects by Alternative and Resource 39
Table 3.2-1 Resource Areas Eliminated from Detailed Analysis 45
Table 3.4-1 National Ambient Air Quality Standards 50
Table 3.4-2 PM10 Emissions Monitoring 2011 through 2018 (annual mean ug/cubic meter) 54
Table 3.4-3 Estimated Emissions of PM_{10} and $PM_{2.5}$ for Proposed Action 56
Table 3.4-4 Estimated Emissions of NOx for Proposed Action 58
Table 3.5-1 Surface and Mineral Ownership Within the Permit Boundary 60
Table 3.5-2 Premining Land Uses in Disturbed Area 60
Table 3.5-3 Surface and Subsurface (Coal and Other Mineral) Ownership within the Approximately 977 Acres 63
Table 3.5-4 Oil and Gas Leases within Approximately 977 Acres 63
Table 3.6-1 Assumptions Used for Equipment Noise 67
Table 3.6-2 Noise Level Predictions No Action Alternative – Worst Case 71
Table 3.6-3 Noise Level Predictions Proposed Action – Worst Case 74
Table 3.7-1 Taxes and Royalty Payments by SCM in 2017 78
Table 3.7-2 Severance Tax Computations 79
Table 3.7-3 Revenue Paid to Montana and Bighorn County in FY 2018 81
Table 3.7-4 Employment During and After Closure by Years 82
Table 3.8-1 Summary of Soil Resources on TR1 Acres 85
Table 3.8-2 Applicable Soil Rules and Regulations Under ARM and MSUMRA 85
Table 3.8-3 Soil and Other Plant Growth Media for Reclamation (in cubic yards) 87
Table 3.10-1 Reclamation Status (No Action and Proposed Action) 97
Table 3.11-1 Wells Potentially Impacted by Increased Drawdown from the Proposed Action . 107
Table 3.12-1 Wildlife Species of Concern at SCM 115
Table 3.13-1 Cultural Resource Sites in TR1 Project Area 139
Table 5.1-1 List of Preparers 152

LIST OF FIGURES

Figure 1.1-1. Location Map 2
Figure 1.1-2. SCM Permit Boundary and Leases 3
Figure 2.2-1. No Action Alternative 17
Figure 2.3-1. Proposed Action Alternative 28
Figure 2.3-2. SCM Postmining Reclamation 32
Figure 2.3-3. TR1 Sage Grouse Habitat Evaluation – Baseline, Year 2020 34
Figure 3.3-1. Air, Noise, and Other Resources Analysis Areas 47
Figure 3.3-2. Socioeconomics, Surface Water, Ground Water, and Wildlife Resources Analysis Areas 48
Figure 3.5-1. Surface Ownership Map 61
Figure 3.5-2. Oil and Gas Ownership Map 62
Figure 3.6-1. No Action Noise Source Locations and Receptors 70
Figure 3.6-2. Proposed Action Noise Source Locations and Receptors 73
Figure 3.9-1. Transportation Analysis Area 90
Figure 3.11-1. Spring Creek and Pearson Creek Drainages 103
Figure 3.11-2. Estimated Ground Water Interception (No Action and Proposed Action) 106
Figure 4.1-1. Cumulative Impact Analysis Areas 143

APPENDICES

Appendix A TR1 Greater Sage Grouse Habitat Assessment

ACRONYMS/ABBREVIATIONS

Acronym	Definition
°F	degrees Fahrenheit
µg/m^3	micrograms per cubic meter
AADT	annual average daily traffic
ACHP	Advisory Council on Historic Preservation
A-D	Anderson-Dietz
APLIC	Avian Power Line Interaction Committee
ARM	Administrative Rules of Montana
BCC	Birds of Conservation Concern
BLM	Bureau of Land Management (U.S. Department of the Interior)
BMP	Best Management Practice
BNSF	Burlington Northern Santa Fe Railroad
BTU	British thermal unit
CAA	Clean Air Act
CBNG	Coal bed natural gas
CCAA	Candidate Conservation Agreement with Assurances
CFR	Code of Federal Regulations
CI ICE	Compression Ignition Internal Combustion Engines
CO	carbon monoxide
CPE	Cloud Peak Energy Resources LLC
CWA	Clean Water Act
dB	decibel
dBA	“A-weighted” decibel
DEQ	Department of Environmental Quality (Montana)
DNRC	Department of Natural Resources and Conservation (Montana)
DOA	Department of Administration (Montana)
DOI	Department of the Interior (United States)
EC	electrical conductivity
EIS	environmental impact statement
EO	Executive Order
EPA	Environmental Protection Agency (United States)
EQC	Environmental Quality Council (Montana)
ESA	Endangered Species Act

FTA	Federal Transit Administration
FWP	Fish, Wildlife and Parks (Montana)
gpm	gallons per minute
HQT	Habitat Quantification Tool
HRRP	Habitat Recovery and Replacement Plan
Hz	hertz
L_{50}	Noise exceeding the 50th percentile
L_{90}	Noise exceeding the 90th percentile
LBM	lease by modification
L_{eq}	A-weighted noise equivalent
LLC	limited liability company
L_{max}	Maximum instantaneous noise level
MAAQS	Montana Ambient Air Quality Standards
MAQP	Montana Air Quality Permit
MBOG	Montana Board of Oil & Gas
MBTA	Migratory Bird Treaty Act
MCA	Montana Code Annotated
MDOA	Montana Department of Administration
MDT	Montana Department of Transportation
MEPA	Montana Environmental Policy Act
mg/l	milligrams per liter
MPDD	Mining Plan Decision Document
MPDES	Montana Pollution Discharge Eliminating System
MRL	Montana Rail Link
MSUMRA	Montana Strip and Underground Mine Reclamation Act
MT	Montana
MTNHP	Montana Natural Heritage Program
NAAQS	National Ambient Air Quality Standards
NHPA	National Historic Preservation Act
NO_2	nitrogen dioxide
NO_x	nitrogen oxide
NPDES	National Pollution Discharge Elimination System
NRHP	National Register of Historic Places
O_3	ozone
OSMRE	Office of Surface Mining Reclamation and Enforcement
Pb	Lead
PE	Professional Engineer

PHC	Probable Hydrologic Consequences
PM	Particulate Matter
$PM_{2.5}$	Particulate matter with diameter of 2.5 microns or less in size
PM_{10}	Particulate matter with diameter of 10 microns or less in size
ppm	parts per million
PPAA	Private Property Assessment Act
SAR	sodium adsorption ratio
SCC	Spring Creek Coal
SCM	Spring Creek Mine
SMCRA	Surface Mining Control and Reclamation Act
SO_2	Sulfur dioxide
SOSI	species of special interest
TDS	Total dissolved solids
TMDL	Total maximum daily load
TR1 Project	TR1 major revision project
TSS	total suspended solids
UP	Union Pacific Railroad
US	United States
USACE	United States Army Corps of Engineers
USC	United States Code
USDA-SCS	United States Department of Agriculture, Soil Conservation Service
USFWS	United States Fish and Wildlife Service
WEST	West Environmental & Statistical Consultants
WMCC	Wolf Mountain Coal Company

SUMMARY

INTRODUCTION

This Draft Environmental Impact Statement (EIS) was prepared by the Montana Department of Environmental Quality (DEQ) for the proposed TR1 major revision (TR1 Project) to the Spring Creek Mine (SCM) Surface Mining Permit C1979012. The SCM is operated by Spring Creek Coal LLC (SCC), a wholly owned subsidiary of Cloud Peak Energy Resources LLC (CPE).

The TR1 Project would add approximately 977 acres of new disturbance to mine approximately 72 million tons of coal. The TR1 Project would extend the life of the mine by about 4 years (from 2027 to 2031).

The permitted disturbance would increase from 6,134 acres to 7,111 acres (977 acres) for the life of the mine, but the approved surface mining permit boundary would remain the same at 9,220 acres. The TR1 Project would include some proposed changes to the currently-approved postmine topography to better resemble the premine topography and provide additional flat benched areas for sage grouse habitat reclamation. No new facilities would be constructed.

The draft EIS describes the purpose and benefits of the Proposed Action, the Proposed Action and Alternatives, the environmental conditions of the affected area, the impacts and mitigation measures, and anticipated compensation.

PURPOSE, NEED, AND BENEFITS

DEQ's purpose is to act in a timely manner upon SCC's major revision application in accordance with the requirements of the Montana Strip and Underground Mine Reclamation Act (MSUMRA) (82-4-201 et seq., Montana Code Annotated [MCA]) and its implementing regulations (Administrative Rules of Montana [ARM] 17.24.301-1309) and to identify any permit conditions or alternatives that may reduce impacts to the human environment.

DEQ's need for the action is set forth in MSUMRA (82-4-201 et seq., MCA) and its implementing regulations (ARM 17.24.301-1309). MSUMRA directs DEQ to confirm whether an applicant has affirmatively demonstrated that the requirements of MSUMRA and the Board's rules will be observed, and if so, DEQ needs to issue the permit or amendment (Section 82-4-227(1); 82-4-252, MCA).

To fulfill the obligations of their customers, SCC needs to access and mine leased coal reserves from Federal Coal Lease MTM-069782, MTM-94378 and State Coal Lease C 1088-05, and access Federal surface from Land Use Lease MTM-74913.

This EIS complies with Montana's Environmental Policy and Protection requirements (75-1-201 MCA), includes discussions of the economic and social impacts and benefits associated with the No Action and Proposed Action Alternatives (Section 3.7.4 and 3.7.5), and addresses the advantages and disadvantages of the proposed project in the short- and long-terms.

The Proposed Action would provide the following short-term and long-term socioeconomic benefits:

- An ongoing fuel source of 72 million tons of coal;
- Continued employment for workers at the mine;
- An ongoing tax base to federal, state, and local governments;
- Ongoing royalty payments to mineral resource owners;
- Continued support to local businesses for a minimum of 4 more years; and
- An ongoing source of income for SCC, CPE, and its shareholders.

PUBLIC INVOLVEMENT

DEQ published a legal notice of the scoping period and public meeting in newspapers on April 8 and April 15, 2018. The EIS scoping period began on April 6, 2018 and ended on May 7, 2018. DEQ held a scoping meeting and open house on April 18, 2018 in Hardin, Montana, where comments were recorded. DEQ accepted written comments throughout the scoping period. DEQ received 24 comment submissions.

DEQ will hold a public meeting during the comment period for the draft EIS and the public will have additional opportunities to submit comments on the draft EIS during this time.

ALTERNATIVES

1. No Action

Under the No Action Alternative, the SCM permit revision application would not be approved by DEQ. SCM would continue to operate the mine and process coal produced within their current disturbance area. At an average production rate of approximately 18 million tons per year, the mine life is expected to continue through approximately 2027.

2. Proposed Action

Under the Proposed Action, SCM would add 977 acres of additional disturbance to expand mining in pits and add approximately 72 million tons of recoverable coal. The mine life would be extended approximately 4 years to 2031 at an annual production rate of 18 million tons. The additional coal reserves are of similar coal quality compared to the leased and permitted coal mining reserves and annual coal production would not change. The number of employees and facilities would not change, but their employment and use would be extended by approximately 4 years.

The overall permit boundary would remain unchanged at 9,220 acres. The total life-of-mine disturbance within the permit boundary would increase by 977 acres from the current 6,134 acres to the proposed 7,111 acres.

A cultural resource mitigation would be completed before the disturbance of one site that is recommended as eligible for the National Register of Historic Places.

SCC would complete the wildlife mitigation required under stipulations from Federal Coal Lease Modification MTM-069782 and Land Use Lease MTM-74913 including the development of a Habitat Recovery and Replacement Plan (HRRP) to mitigated for impacts to sage grouse and other wildlife habitats in the disturbance area. Some of the HRRP tasks are linked with reclamation of the TR1 Project area and will only be completed if the TR1 Project is approved by the DEQ and the Federal Mine Plan revision approved by the OSM. The HRRP tasks are provided in **Table 2.2-1.** SCC would also deposit compensatory mitigation funding in the amount of $107,727 into the Montana Sage Grouse Oversight Team's Stewardship Fund.

Additional voluntary sage grouse mitigation measures would be completed to offset the impacts from the Proposed Action. These mitigation measures would be implemented through the Thunder Basin Grasslands Prairie Ecosystem Association Candidate Conservation Agreement with Assurances.

Table S-1 provides a comparison of the main features of the two alternatives.

Table S-1
Comparison of Alternative Features

Feature	No Action	Proposed Action (with Mitigations)
Surface Mine Permit Boundary	9,220 acres	Same as No Action
Life of Mine Disturbance Area	6,134 acres	7,111 acres (an additional 977 acres) Breakdown for TR1 Project: • 844 acres for expansion of Pits 1, 2 and 6 • 133 acres for constructing temporary overburden stockpile west of Pit 4
Surface Disturbance in Sage Grouse Core Area	1,395 acres	Approximately 642 additional acres in the TR1 would be disturbed for a total of 2,037 acres within SCM Permit Boundary. Mining would result in a loss of 615 functional acres of sage grouse habitat. *(Sage grouse compensatory mitigation of $107,727 would be paid for loss of 615 functional acres.)*
Recoverable Coal	117.8 million tons	189.9 million tons (an additional 72.1 million tons)
Life of Mine	Mining continues to 2027 followed by reclamation	Based on the permitted production rate of 18 million tons per year, mining continues from 2027 through 2031, followed by reclamation.
Mine Closure & Reclamation	Reclamation methods per SCM's approved Reclamation Plan; postmining land used for	Similar to No Action but post mining topography changes to provide additional bench areas more suitable for sage grouse. SCM would commit to implementing and completing the HRRP

Table S-1
Comparison of Alternative Features

Feature	No Action	Proposed Action (with Mitigations)
	livestock grazing, wildlife habitat, and pastureland	and would continue to participate in the Candidate Conservation Agreement with Assurances (CCAA) program. *(SCM would pay sage grouse compensatory mitigation amount of $107,727 for loss of 615 functional acres of sage grouse habitat.)*

SUMMARY OF IMPACTS

The impacts most likely to occur, or that would have the potential to affect some aspect of the human environment in a substantial way, are compared for each alternative in **Table S-2.** A full discussion of all potential impacts is contained in Chapters 3 and 4 in the resource-specific subsections.

Table S-2
Comparison of Effects by Alternative and Resource

Resource/ Issue	No Action	Proposed Action (with Mitigations)
Air Quality	Excellent air quality with limited local sources of pollutants and consistent wind dispersion. SCM to continue to control fugitive dust per SCM's Montana Air Quality Permit (MAQP) #1120-12.	Air quality would continue to be excellent. An estimated annual emission of PM_{10} of 668.53 tons per year over the additional 4 years if mine life. Fugitive dust will continue to be controlled per SCM's MAQP #1120-12
Land Use	SCM would not expand mining to the TR1 area and approved land use would remain unchanged. The 977 acres of grazing land would not be disturbed.	Surface disturbance for the additional 977 acres would be reclaimed to 748 acres of wildlife habitat and 229 acres of Grazing Land.
Noise	SCM would not expand mining to the TR1 area and existing noise levels are estimated to be approximately L_{90} 15 dBA and L_{50} 20 dBA, which are typical for sparsely populated, rural locations, with man-made noise sources intermittently higher. The predicted L_{50} noise levels would exceed ambient noise by more than +10 L_{50} dBA during pre-strip operations at 3 of the 4 nearest leks.	Expanded mining in Pits 1, 2, and 6 would result in short-term noise impacts at 3 sage grouse leks. The L_{50} noise levels are only predicted to exceed the ambient noise by more than +10 L_{50} dBA at the Pasture lek during topsoil salvage in 2029, when the equipment is closest to the lek.
Socioeconomics	SCM would maintain current level of 281 employees for about 5 years (at 13 to 14 million tons per year); would increase to 340 employees with increase to 18 million tons per year. Total annual taxes and royalties paid to Montana to remain at approximately $42 million.	Maintain approximately 281 to 340 employees and income for an additional 4 to 7 years. Total taxes and royalties of $42 to $59.5 million would continue to be paid to Montana over 4 to 7 more years.
Soils	SCM would not expand mining to the TR1 area and there would be no impacts to soils on the 977 acres.	An additional 977 acres would be disturbed with long-term and moderate impacts to soil physical properties, loss of soil structure, soil compaction, and potential soil erosion. Soil productivity would return to previous levels within 10 years after reclamation.
Transportation	SCM would continue to ship coal by rail, with an incidental amount by truck hauling, until all recoverable coal is mined in approximately 2027. An annual average daily traffic (AADT) count on Highway 314 would continue at about 176.	Continue to ship coal for about 4 additional years using the same methods and daily traffic counts.

Table S-2
Comparison of Effects by Alternative and Resource

Resource/ Issue	No Action	Proposed Action (with Mitigations)
Vegetation and Reclamation	SCM would not expand mining to the TR1 area and there would be no impacts to vegetation on the 977 acres.	The TR1 area supports sagebrush, grassland (including cheatgrass), greasewood, and limited stands of juniper in the draws and steeper slopes. Mining disturbances could result in additional weed infestations that would require monitoring and treatment. Much of TR1 reclamation is at the end of mining because of lengthening existing haul roads to recover the additional coal reserves. As a result, the haul road areas would be left unreclaimed for longer periods. (SCM would pay sage grouse compensatory mitigation amount of $107,727 for loss of 615 functional acres of sage grouse habitat.)
Water	Mining would continue in the current permit area but not expand into the TR1 area. Existing impacts include reductions in the surface flow in Pearson Creek and reductions in the flow of the Anderson-Dietz (A-D) aquifer to the Tongue River Reservoir. Impacts to ground water would taper off over the remaining life of mine.	Most of the TR1 expands mining within the South Fork Spring Creek and Pearson Creek Drainage areas as shown in Figure 3.11-1. The TR1 revision will also reduce surface flow within the South Fork Pearson Creek ephemeral stream channel. The Proposed Action is modeled to discharge at approximately 157 gallons per minute to the Tongue River Reservoir from mining the A-D aquifer. As a result, the Proposed Action Alternative is projected to reduce ground water flow by an additional 28 gallons per minute or 45 acre-feet per year. Impacts would continue until TR1 Project Area is reconnected with Pearson Creek and the Tongue River Reservoir.
Wildlife	Wildlife habitat consists of sagebrush-steppe, upland grassland, bottomland, reclaimed grasslands, and agriculture fields. Impacts general to all wildlife species include mortality, disturbance, and habitat loss and would primarily be from road kill, collisions with powerlines and fences, and trapping in pits. These impacts would continue through the life of the mine but would be minimized through reclamation and continued adherence to existing plans that are part of the SCM permit. Additional voluntary conservation measures	SCM has completed or nearly completed 12 of 14 HRRP requirements in advance of the TR1 Project. SCM also voluntarily participates in the CCAA related to TR1 to help minimize impacts to sage grouse and other anthropogenic activities in the area. SCM also submitted the SOSI Plan to provide broad, long-term direction for management of wildlife species of special interest that occur in the SCM wildlife monitoring area. (SCM would pay sage grouse compensatory mitigation amount of $107,727 for loss of 615 functional acres of sage grouse habitat.)

Table S-2
Comparison of Effects by Alternative and Resource

Resource/ Issue	No Action	Proposed Action (with Mitigations)
	(CCAA, SOSI) would also help minimize impacts to wildlife, including sage grouse.	
Cultural Resources	There would be no additional ground disturbance with the potential to disturb cultural sites. Sites in the project area will continue to degrade naturally, which may result in data loss over time.	TR1 would adversely affect one site that has been determined to be eligible for the NRHP. The approved mitigation plan for the one site will be completed prior to disturbance.

1 PURPOSE AND NEED

1.1 INTRODUCTION

This draft environmental impact statement (EIS) was prepared by the Montana Department of Environmental Quality (DEQ) Coal and Opencut Mining Bureau for the proposed TR1 major revision (TR1 Project) to the Spring Creek Mine (SCM) Surface Mining Permit C1979012. The SCM is operated by Spring Creek Coal LLC (SCC), a wholly owned subsidiary of Cloud Peak Energy Resources LLC (CPE). The SCM is in Big Horn County, Montana (**Figure 1.1-1**).

The TR1 Project would add approximately 977 acres of new disturbance necessary to mine approximately 72 million tons of coal reserves from federal and state coal leases within the current permit boundary. The coal would be mined from 571 acres of leased Federal coal and 273 acres of leased State coal which required the modification of Federal Coal Lease MTM-069782 and modification of Land Use Lease MTM-74913 (**Figure 1.1-2**). The TR1 Project would extend the life of the mine by about 4 years (from 2027 to 2031), based on a permitted production rate of 18 million tons per year. SCC submitted the TR1 Project application on March 2, 2012 and the application was deemed complete on December 6, 2013.

The permitted disturbance would increase from 6,134 acres to 7,111 acres (977 acres) for the life of the mine. Of the additional 977 acres, 844 acres would allow for expansion of Pits 1, 2 and 6 and 133 acres would be for constructing a temporary overburden stockpile in an area west of Pit 4. The approved surface mining permit boundary would remain the same at 9,220 acres. The TR1 Project would include some proposed changes to the currently approved postmine topography to better resemble the premine topography and provide additional flat benched areas for greater sage grouse (hereinafter sage grouse) (*Centrocercus urophasianus*) habitat reclamation. No new facilities would be constructed.

The Montana Environmental Policy Act (MEPA) (§ 75-1-201, *et seq*., Montana Code Annotated [MCA]) requires an environmental review of major actions taken by the State of Montana. DEQ determined an EIS was the appropriate level of environmental review for the TR1 Project application because it involves a major action that could significantly affect the environment (§ 75-1-201-(1)(b)(iv), MCA). This draft EIS has been prepared to fulfill MEPA's requirements.

The draft EIS describes (among other things) the Proposed Action (including its purpose and benefits), the governmental units with jurisdiction over the action, the environmental conditions of the affected area, the impacts from the Proposed Action on the quality of the human environment, alternatives to the Proposed Action (including a No Action Alternative), mitigation and any compensation required, tradeoffs among reasonable alternatives (if any), and the agency's Proposed Alternative and the reasons for its preference (ARM 17.4.617(1-9)).

Figure 1.1-1. Location Map

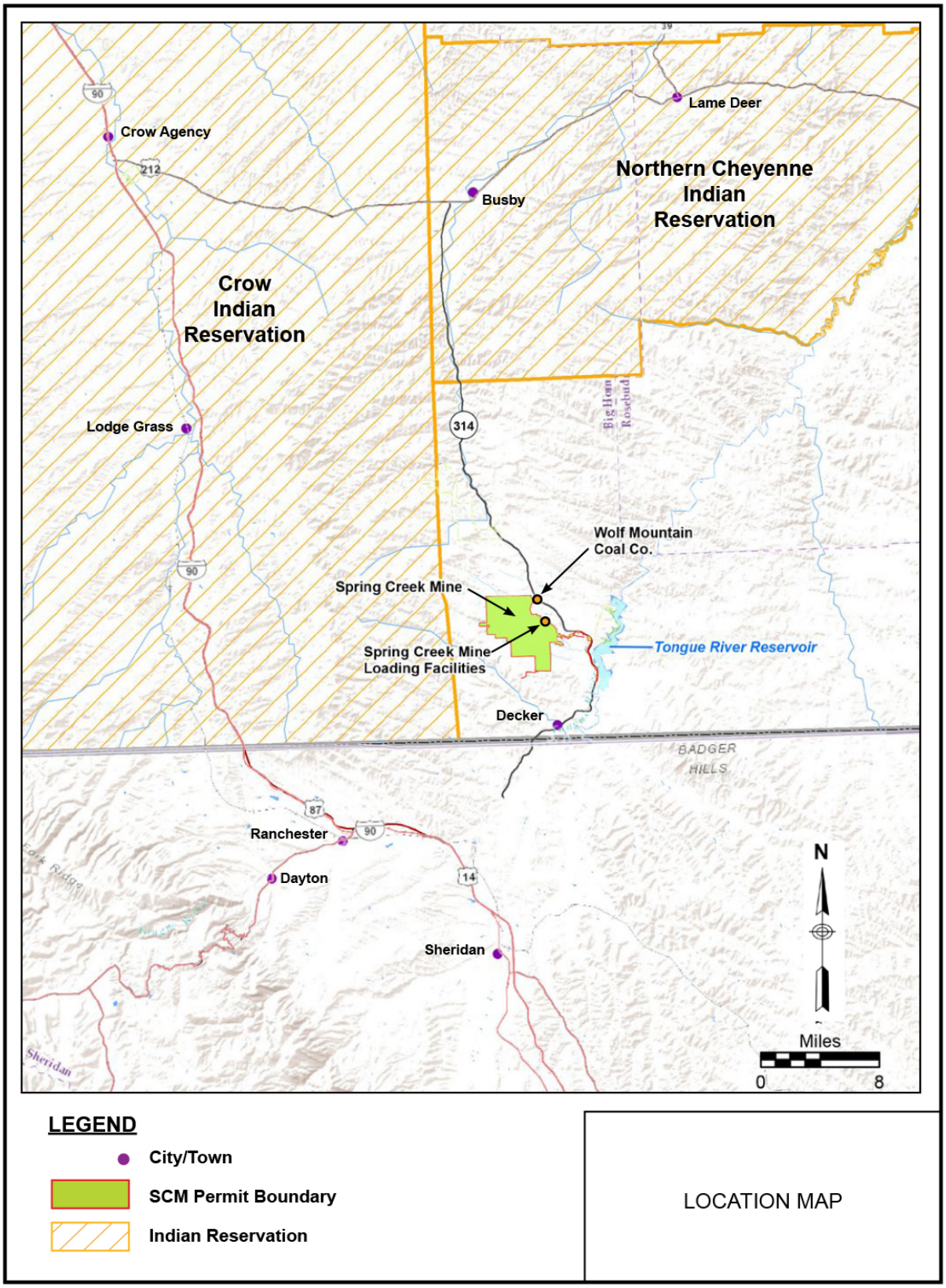
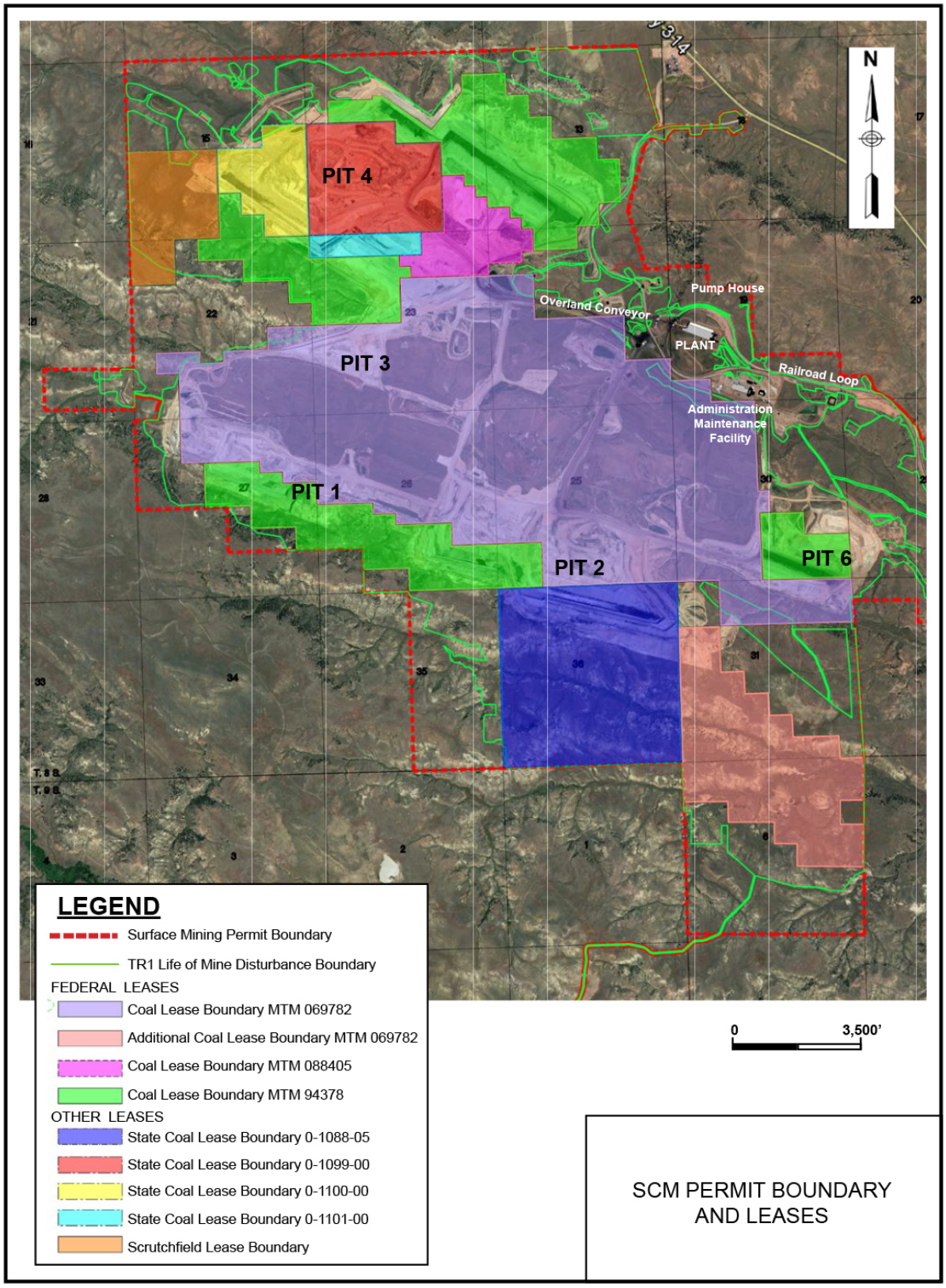


Figure 1.1-2. SCM Permit Boundary and Leases



DEQ's responses to substantive comments on the draft EIS will be included in the final EIS. DEQ will decide which of the alternatives analyzed in detail should be approved in DEQ's written findings. DEQ's written findings will be published no sooner than 15 days after publication of the final EIS.

1.2 Project Location and History

The SCM is in Big Horn County near the Tongue River Reservoir north of Decker, Montana (**Figure 1.1-1**). Construction of the SCM began in April 1979. Coal mine production began in December 1980. The TR1 Project would expand mining in Pits 1, 2, and 6. Mining would be completed by 2031 and all reclamation completed by approximately 2035. The operating permit (#C1979012) has been amended as additional coal reserves were identified, as shown in **Table 1.2-1**.

Table 1.2-1
Permit Amendment and Revision History Summary

Amendment or Revision	Date Approved	Approved Actions
AM1	February 19, 1992	Application 00149 authorizes the addition of 1,487.5 acres to the approved permit area.
AM2	November 14, 2001	Application 00164 adds approximately 2,189 acres to the approved permit area.
AM3	January 29, 2008	Application 00174, South Fork Amendment adds approximately 158 acres to the approved permit area.
AM4	June 23, 2011	Application 00183, Pearson Creek Amendment adds 2,042 acres to the approved permit area.
AM5	Pending	Amendment to add 4,334 acres to the approved permit area for a haul road and associated high voltage distribution line to transport coal from a currently permitted mine in Wyoming to the SCM.
TR1 Major Revision	Pending	A major revision to add 977 acres of additional disturbance within the previously approved permit area for expanded mining in Pits #1, #2, and #6 and construction of a temporary overburden stockpile west of Pit #4. The coal would be mined from 571 acres of leased Federal coal and 273 acres of leased State coal which required the modification of Federal Coal Lease MTM-069782.

1.3 Purpose, Need, and Benefits

DEQ's purpose is to act upon SCC's major revision application in a timely manner in accordance with the requirements of the Montana Strip and Underground Mine Reclamation Act (MSUMRA) (82-4-201 et seq., MCA) and its implementing regulations (Administrative Rules of Montana [ARM] 17.24.301-1309) and to identify any permit conditions or alternatives that may reduce impacts to the human environment. The analysis will identify any potential environmental impacts of SCC's application to revise its operating permit to authorize additional mining and associated disturbance in Pits 1, 2, and 6 to recover an additional 72

million tons of coal and to allow additional disturbance west of Pit 4. Pursuant to MSUMRA, the surface-mine operating permit must be revised before SCM may access additional coal reserves needed to fulfill contractual obligations to its customers.

DEQ's need for the action is set forth in MSUMRA (82-4-201 et seq., MCA) and its implementing regulations (ARM 17.24.301-1309). MSUMRA directs DEQ to confirm whether an applicant has affirmatively demonstrated that the requirements of MSUMRA and the Board's rules will be observed, and if so, DEQ needs to issue the permit or amendment (Sections 82-4-227(1); 82-4-252, MCA).

In addition, DEQ is responsible for ensuring that significant environmental impacts are disclosed in an EIS. Pursuant to 75-1-201(4), MCA, DEQ may not withhold, deny, or impose conditions on the TR1 Project based on Parts 1 through 3 of MEPA. However, in accordance with the ARM 17.4.617(6) and (7), the EIS should include mitigation, stipulations, or other controls committed to and enforceable by the agency or other government agency and a discussion of any compensation related to impacts stemming from the Proposed Action.

To fulfill obligations to their customers, SCC needs to access and mine leased coal reserves from Federal Coal Lease MTM-069782, MTM-94378, and State Coal Lease C 1088-05 and to access Federal surface from Land Use Lease MTM-74913. To achieve this objective, SCC submitted the TR1 Project application to their Surface Mining Permit C1979012 to add 977 acres of additional disturbance to expand mining in Pits 1, 2, and 6 and to provide an area west of Pit 4 to construct a temporary overburden stockpile. The TR1 Project would add 72 million tons of recoverable coal and extend the mine life a minimum of 4 years to approximately 2031 at an annual production rate of 18 million tons.

Pursuant to ARM 17.4.617 (1), an EIS should contain a description of the Proposed Action, including its purpose and benefits. The Proposed Action would provide the following short-term and long-term socioeconomic benefits:

- An ongoing fuel source of 72 million tons of coal;
- Continued employment for workers at the mine;
- An ongoing revenue to federal, state, and local governments;
- Ongoing royalty payments to mineral resource owners;
- Continued support to local businesses for a minimum of 4 more years; and
- An ongoing source of income for SCC, CPE, and shareholders.

This EIS complies with requirements (75-1-201, MCA) and includes discussions of the economic and social impacts and benefits associated with the No Action and Proposed Action Alternatives (Sections 3.7.4 and 3.7.5), and addresses the advantages and disadvantages of the proposed project in the short- and long-terms.

1.4 Agency Roles and Responsibilities

In 1973, the Montana legislature passed the MSUMRA. The State of Montana has assumed "exclusive jurisdiction over the regulation of surface coal mining and reclamation operations" within its borders. DEQ has developed, and the Secretary of the Interior has approved, Montana's permanent regulatory program authorizing DEQ to regulate surface coal mining operations on private, state, and federal lands within the State of Montana. DEQ is responsible for administering MEPA and MSUMRA and its implementing rules. The proposed TR1 Project is being reviewed and evaluated by DEQ under MSUMRA (30 C.F.R. §§ 926.10; 926.30).

1.4.1 Montana Department of Environmental Quality

1.4.1.1 Montana Environmental Policy Act

MEPA requires an EIS when making decisions or planning activities that may have a significant impact on the human environment. DEQ determined an EIS was necessary because the SCM TR1 Project would be a major state action with the potential to have a significant cumulative impact on the greater sage grouse (DEQ 2017) (§ 75-1-201(1)(b)(iv), MCA; ARM 17.4.608). MEPA and its administrative rules define the process to be followed for preparing an EIS (Section 75-1-101 through 203, *et seq*., MCA).

1.4.1.2 Montana Strip and Underground Mine Reclamation Act

MSUMRA has three stages of application review: completeness, acceptability, and decision. A mine revision application (*e.g.*, TR1 Project) is considered administratively complete if it contains information addressing application requirements in Section 82-4-222 (revisions to a permit) and Section 82-4-231 (reclamation plan), MCA, and the rules implementing that section and all other information necessary to initiate the processing and public review. DEQ determined that SCC's application was complete on December 6, 2013.

DEQ then provided deficiency notices to the applicant for any information that was deemed unacceptable or did not appropriately address a rule requirement, and afterward reviewed the materials submitted for deficiencies. The application was considered acceptable after all deficiencies were addressed.

Once the application is determined acceptable and the environmental review is completed, DEQ will issue written findings as part of the decision document. MSUMRA requires the application affirmatively demonstrates full compliance with the 13 items listed in ARM 17.24.405(6), including the 4 presented below:

- The application is complete and accurate, that the applicant has complied with MSUMRA and rules, and that the applicant has demonstrated reclamation can be accomplished;
- The hydrologic consequences and cumulative hydrologic impacts will not result in material damage to the hydrologic balance outside the permit area;

- The applicant has paid all reclamation fees from previous and existing operations nationwide; and
- The operation would not affect the continued existence of endangered or threatened species or result in destruction or adverse modifications of their critical habitats.

Conditions for Issuing a Permit

Prior to approval, SCC must affirmatively demonstrate to DEQ they will comply with MSUMRA and that postmine reclamation will be completed in accordance with the requirements thereof. The final EIS must be published at least 15 days prior to issuing DEQ's written findings granting or denying the permit application per Section 82-4-231(8)(c), MCA. Because additional federal coal is involved, DEQ will submit its written findings and supporting documentation to the Office of Surface Mining Reclamation and Enforcement (OSMRE) for review. OSMRE will complete a National Environmental Policy Act review (42 United States Code [U.S.C.] Section4321 et seq.) and prepare a mining plan decision document (MPDD) recommending approval, disapproval, or conditional approval of the modified federal mining plan. OSMRE often coordinates their review with the MEPA process and documents their decision in a Record of Decision.

Before DEQ can issue a permit, the mine operator must submit a reclamation bond to DEQ in accordance with ARM 17.24.405(7)(a-b).

Conditions for Denial

DEQ may not approve a permit application for new surface coal mining under certain circumstances, which include (without limitation) an inadequate reclamation plan; inadequate protection of water resources outside the permit area; unacceptable impacts on exceptional topographic features, cultural resources, or scientific characteristics; a proposed location on a significant alluvial valley floor; unacceptable impacts on critical biological productivity or ecological fragility; and the threat of a public hazard or designation of the land as unsuitable for mining (Section 82-4-227 and 228, MCA; ARM 17.24.1131–1148). DEQ must also withhold a permit if information contained in OSMRE's Applicant Violator System identifies unabated or uncorrected violations of Surface Mining Control and Reclamation Act of 1977 (SMCRA) or other environmental laws by affiliates or control entities of SCC or CPE (Section 82-4-227, MCA; ARM 17.24.1265). If DEQ denies the permit, SCC can modify and resubmit its permit application to address issues or concerns identified by DEQ.

1.4.1.3 State and Federal Water Quality Statutes

The Montana Water Quality Act, Section 75-5-101 *et seq*., MCA, and ARM 17.30.101 et seq. regulate discharges of pollutants into state surface waters through a Montana Pollutant Discharge Elimination system (MPDES) permit application process and the adoption of water quality standards. Water quality standards, including the Montana nondegradation policy, specify the changes in surface water or ground water quality allowed from a wastewater

discharge. A MPDES permit is also required for discharges of stormwater associated with industrial activities and includes a storm water pollution prevention plan (40 CFR 122.26; ARM 17.30.1102(29)). The federal Clean Water Act (CWA) (33 U.S.C. Sections 1252-1387) also requires applicants for federal permits or licenses for activities that may result in a discharge to waters of the U.S. obtain certification from the state under Section 401 of the CWA and comply with state water quality standards (33 U.S.C. Section 1341). Section 404 permits are issued by the U.S. Army Corps of Engineers (USACE) and require Section 401 certification. DEQ provides Section 401 certification pursuant to state regulations, see ARM 17.30.101 through ARM 17.30.109.

1.4.1.4 State and Federal Air Quality Statutes

Air quality is regulated under federal and state requirements. Under the federal Clean Air Act (CAA) 42 U.S.C. Section 7401), the U.S. Environmental Protection Agency (EPA) sets national standards for air quality and air pollutant concentrations. Under the CAA, states develop and implement procedures including monitoring, permitting, control measures, and enforcement to achieve and maintain these EPA-designated standards. EPA has set primary and/or secondary National Ambient Air Quality Standards (NAAQS) for seven criteria pollutants: carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter, fine particulate matter, and sulfur dioxide. Under the CAA of Montana, DEQ has established Montana Ambient Air Quality Standards (MAAQS). EPA approved Montana's air quality program and has given DEQ authority to regulate air quality in Montana. DEQ requires a permit for the construction, installation, and operation of equipment or facilities that may cause or contribute to air pollution (Section 75-2-102 MCA).

1.4.2 SCM TR1 Project

SCM is operated by SCC which is a wholly owned subsidiary of CPE. SCM obtained an LBM approval from the U.S. Department of the Interior, Bureau of Land Management (BLM) in 2010 for the area that would be mined by the TR1 Project. SCM submitted the original minor revision 168 (MR168) for Permit C1979012 on March 2, 2012, to DEQ to add approximately 1,011 acres to expand mining. The SCM mine expansion area was revised to 977 acres. Through DEQ's acceptability/deficiency reviews, DEQ determined the Proposed Action constituted a major revision to SCM's mine permit and the new project was named "TR1." DEQ concluded its completeness review on December 6, 2013, and the acceptability review was completed with SCC's response to the seventh rounds of comments on June 28, 2017.

1.4.3 Other Agencies Roles

Table 1.4-1 provides a summary of the state and federal permits and licenses, and their purposes. **Table 1.4-1** is not a comprehensive list of all permits, certificates, or approvals needed, but does include the primary federal and state agencies with permitting responsibilities.

Table 1.4-1
Federal and State Permits, Licenses, and Approvals Required for the Project.

Agency	Permit/License	Approval Purpose
U.S. Department of the Interior (assistant Secretary for Lands and Minerals/OSMRE)	Approval of Mining Plan (30 CFR 746)	To allow SCC to mine federal coal leases. Review of the proposed plan is coordinated with DEQ and federal agencies such as BLM. OSMRE recommends approval, disapproval, or conditional approval of the mining plan to the U.S. Department of the Interior (DOI) Assistant Secretary for Lands and Minerals.
U.S. Department of Interior (BLM)	Resource Recovery and Protection Plan (30 CFR 746.13)	To allow SCC to mine federal coal leases. BLM must make a finding and recommendation to OSMRE with respect to SCC's Resource Recovery and Protection Plan and other requirements of SCC's lease. BLM also will submit a recommendation regarding the federal mining plan.
U.S. Fish and Wildlife Service (USFWS)	Endangered Species Act of 1973 (ESA) Section 7 Consultation (16 U.S.C. Section 1536)	To protect Threatened and Endangered species and any designated critical habitat. DEQ will consult with USFWS.
Montana DEQ	MSUMRA (Section 82-4-201, *et seq*., MCA) Surface Mine Operating Permit	To regulate surface coal mining. Proposed activities must comply with state environmental standards and criteria. Approval may include stipulations for final design of facilities and monitoring plans. A sufficient reclamation bond must be posted with DEQ before implementing an operating permit modification. DEQ will coordinate with OSMRE.
	Clean Air Act of Montana (Section 75-2-102, *et seq*., MCA) Air Quality Permit	To control particulate emissions of more than 25 tons per year.
	Montana Water Quality Act (Section 75-5-201 et seq., MCA) MPDES Permit No MT0024619 and storm water MTR000514	To establish effluent limits, treatment standards, and other requirements for point source discharges, which includes storm water discharges to state waters. Coordinate with EPA. The MPDES and storm water permits have no changes associated with TR1.
	Hazardous Waste and Solid Waste Registration (various laws)	To ensure safe storage and transport of hazardous materials to and from the site and proper storage, transport, and disposal of solid wastes.
Montana State Historic Preservation Office	National Historic Preservation Act of 1966 Cultural Resource Clearance (Section 106 Review) (16 U.S.C. Section 470)	To review and comment on federal compliance with the National Historic Preservation Act (NHPA).

1.4.3.1 Montana Sage Grouse Habitat Conservation Program

The Montana Sage Grouse Habitat Conservation Program (Sage Grouse Program) was established in 2015 from collaborative work of the Montana Sage Grouse Habitat Conservation

Advisory Council and other diverse stakeholders. The Sage Grouse Program was created to implement Executive Orders (EO) 12-2015 and 21-2015 across state government, federal land management agencies, and private entities wishing to develop projects in key sage grouse habitats. The Sage Grouse Program is overseen by the Montana Sage Grouse Oversight Team and administratively hosted by the Montana Department of Natural Resources and Conservation (DNRC).

Permit applications submitted in sage grouse core, general, or connectivity habitat, dated on or after January 1, 2016, must include a consultation letter from the Sage Grouse Program. The TR1 Project application was received and deemed complete in 2013 before the EOs' effective dates, thus exempting the application from the EOs and associated consultation. However, under MEPA and MSUMRA, DEQ evaluated potential impacts to sage grouse and related resources to consider alternatives and mitigations to the Proposed Action (Section 82-4-231(10)(j), MCA). For sage grouse, DEQ consulted with the Sage Grouse Program, Montana Fish, Wildlife, and Parks (FWP), BLM, and OSMRE to aid in the development of sage grouse mitigations. The resulting mitigation is described and included in the Proposed Action Alternative (Section 2.3.11).

1.5 Public Participation

MEPA provides for public review and comment at the initiation of a project during scoping and once the environmental analysis is made available in the draft document. The purpose of scoping is to gather input from the public, other governmental agencies, tribal governments, and organizations on the issues of concern and potential alternatives that would meet the purpose and need for a project. DEQ held a scoping meeting and open house on April 18, 2018 at the Common Room in the Hardin High School in Hardin, Montana. The open house portion began at 5:00 PM with DEQ specialists available to answer individual questions. The public meeting began at 6:00 PM and included a court reporter for transcribing oral comments. The full transcript for the scoping meeting is included in the Administrative Record. DEQ also accepted written comments at the meeting, on DEQ’s website, and by regular mail. DEQ published a legal notice of the scoping period and public meeting in the Big Horn County News, Billings Gazette, and Sheridan Press during the weeks of April 8 and April 15, 2018. The SCM TR1 Project EIS scoping period began on April 6, 2018 and ended on May 7, 2018.

1.5.1 Scoping Comments

DEQ received 24 comment submissions. These were from two groups ([1] Northern Plains Resource Council, the Western Organization of Resource Councils, and Powder River Basin Resource Council; and [2] Sierra Club and Montana Environmental Information Center) and 22 individuals. In addition, one individual provided oral testimony during the scoping meeting. The main issues identified from the scoping comments related to air quality; climate change and clean energy; coal train impacts; surface water quantity and quality; vegetation and reclamation; and social and economic conditions. Other issues mentioned included aquatic life

and fisheries; ground water quantity and quality; health and safety concerns; land use and recreation; transportation; visual impacts; and wildlife. In addition, DEQ identified potential cumulative impacts to sage grouse core habitat through its internal scoping process.

1.5.2 Public Comment Period

The public will have additional opportunities to participate in this environmental review process during the draft EIS comment period. DEQ will hold a public meeting during the comment period for the draft EIS. DEQ will review the comments received and respond to all substantive comments in the final EIS.

1.6 Issues

Issues were identified from public scoping comments, from other agencies' comments, and from internal discussions. Relevant issues were identified as ones with potential associated impacts that would adversely affect a resource area; these were retained for detailed analysis in this EIS. Nonrelevant issues were either beyond the scope of the Proposed Action, not supported by scientific evidence, or have no unresolved conflicts to resources (Montana Environmental Quality Council 2013); these nonrelevant issues were not carried forward for detailed analysis. Resource areas anticipated to be affected by the Proposed Action are provided in Section 1.6.1. Resources with no anticipated impacts or which are outside the scope of the analysis are presented in Section 3.2.

1.6.1 Resource Areas with Relevant Issues of Concern

The resource areas with relevant issues of concern associated with the Proposed Action are listed in **Table 1.6-1** and discussed in detail in their respective sections.

Table 1.6-1
Issues Discussed in the EIS and Location of Discussion

Resource Area	Section in Draft EIS Where Discussed
Air quality	Section 3.4
Land use and recreation	Section 3.5
Noise	Section 3.6
Socioeconomics	Section 3.7
Soils	Section 3.8
Transportation (including rail)	Section 3.9
Vegetation and reclamation	Section 3.10
Water (surface and ground water quality and quantity)	Section 3.11
Wildlife	Section 3.12
Cultural Resources	Section 3.13
Cumulative impacts	Section 4.0

1.6.2 Resources Areas Not Carried Forward for Detailed Analysis

Nine resource areas with no substantive impacts anticipated by TR1 or resources areas with potential impacts beyond the scope of the TR1 project are discussed in Section 3.2. The determination and the rationale for eliminating these resource areas from detailed analysis are described.

1.7 Scope of the Analysis

The geographic scope of the SCM TR1 Project EIS covers lands within the boundary of the proposed surface disturbance and lands outside of the surface disturbance boundary where resources may be affected by an alternative being analyzed. This environmental review only discloses potential impacts within the state of Montana as required by MEPA (Section 75-1-201, *et seq*., MCA); the EIS cannot examine potential impacts outside of Montana (Section 75-1-201(2)(a), MCA). A No Action Alternative and a Proposed Action Alternative are analyzed in the EIS. A plan to mitigate impacts to sage grouse was analyzed as part of the Proposed Action.

The temporal scope of the EIS coincides with the life of mine extension. The additional 72 million tons of coal reserves would extend the mine for more than 4 years at the permitted annual production rate of 18 million tons per year.

1.8 Financial Assurance

An adequate performance bond must be in place to ensure that reclamation of the TR1 Project expanded disturbance area will be completed. Before DEQ can issue a permit for the TR1 Project (if the Proposed Action Alternative is selected), SCC would be required to tender the appropriate performance bond. As federal lands are involved, the bond must be payable jointly to DEQ and OSMRE (30 CFR 926.30, Article IX). A complete description of DEQ's performance bonding procedure, including bond release by reclamation phase, is provided in ARM 17.24.1100 and is summarized below.

1.8.1 Performance Bond Amount

The amount of financial assurance SCC would provide is based on DEQ's estimated cost to complete site reclamation work if SCC could not or would not perform the required work. The direct and indirect reclamation costs are estimated using current industry standards and include the estimated cost for DEQ to contract, manage, and direct the reclamation work, plus any contingencies (*e.g*.**,** hiring a third-party contractor, interim and long-term site monitoring, and maintenance) and inflation (ARM 17.24.1102). The principal amount of the reclamation performance bond must be sufficient to cover the estimated cost to DEQ to ensure compliance with state reclamation requirements. The estimated $108.85 million reclamation costs based on mining disturbance were approved by DEQ on September 10, 2018.

1.8.2 Timing of Performance Bond Calculation

The reclamation performance bond would be calculated in accordance with ARM 17.24.1102. A reclamation performance bond cost estimate for the TR1 Project would be provided by SCC. The final reclamation performance bond amount for the TR1 Project would be made by DEQ prior to issuing the written findings and the permit revision, if the permit revision application is approved. The reclamation performance bond would be in the form of a surety bond or a collateral bond (ARM 17.24.1105**).**

1.8.3 Performance Bond Review

Pursuant to ARM 17.24.1104, DEQ would conduct a review of the performance bond whenever the operating permit is reviewed: "The amount of the performance bond must be increased, as required by the department, as the acreage in the permit area increases, methods of mining operation change, standards of reclamation change or when the cost of future reclamation, restoration, or abatement work increases. The department shall notify the permittee of any proposed performance bond increase and provide the permittee an opportunity for an informal conference on the proposal. The department shall review each outstanding performance bond at the time that permit reviews are conducted under ARM 17.24.414 through 17.24.416 and reevaluate those performance bonds in accordance with the standards in ARM 17.24.1102."

1.8.4 Performance Bond Release

DEQ is responsible for approval and release of the reclamation performance bond, although OSMRE would concur with bond release under 30 CFR 926.30, Article IX(B). The criteria and schedule for performance bond release are outlined in MSUMRA's implementing regulations (ARM 17.24.1116). Specifically, "The department (DEQ) may not release any portion of the performance bond until it finds that the permittee (in this case, SCC) has met the requirements of the applicable reclamation phase as defined in this rule. The department (DEQ) may release portions of the performance bond applicable to a permit following completion of reclamation phases on the entire permit area or on incremental areas within the permit area" (ARM 17.24.1116(1)). Performance bond release is completed by reclamation phase. The four phases of reclamation that correspond to performance bond release, collectively known as the "bond liability period," are described in the following subsections.

1.8.4.1 Phase I

Phase I bond release may proceed upon successful completion of backfilling, grading, and drainage control as outlined in the approved reclamation plan and the plugging of all drill holes not approved to be retained as monitoring wells per ARM 17.24.1116(6)(a).

1.8.4.2 Phase II

Phase II reclamation is deemed to have been completed when the requirements of ARM 17.24.1116(6)(b) have been met and soil replacement and tillage of the spoil and soil have been completed in accordance with the approved reclamation plan. At least two growing seasons

(spring and summer for two consecutive years) must elapse after seeding or planting of the affected area. The established vegetation must be consistent with the species composition, cover, production, density, diversity, and effectiveness required by the revegetation criteria. Soils must be protected from accelerated erosion by the established vegetation. Noxious weeds must be controlled. Production of prime farmlands must be returned to the appropriate level.

1.8.4.3 Phase III

Phase III reclamation is deemed complete following the 10-year responsibility period (which commences following the last reclamation treatment as defined in ARM 17.24.725). The established landscape must be stable and consistent with the approved postmining land use. The reclaimed area cannot be contributing suspended solids to streamflow or runoff outside the permit area in excess of the requirements of ARM 17.24.633 or the permit. If an impoundment is to remain in place, DEQ must be satisfied the future management plan for the impoundment is sound and satisfactorily implemented. Finally, the reclaimed area must meet any special conditions provided in Section 82-4-235(4)(a), MCA.

1.8.4.4 Phase IV

Final (Phase IV) bond release is based in part upon successful revegetation. Under MSUMRA, a determination of successful revegetation and final bond release is based upon factors such as the effectiveness of the vegetation for the approved postmining land use, the extent of cover compared to natural vegetation, and other factors enumerated in Section 82-4-233 and Section 82-4-235, MCA. Phase IV reclamation is deemed to be complete in accordance with ARM 17.24.1116(6)(d): (1) reclamation Phases I through III must be complete for all disturbed lands within the designated drainage basin; (2) fish and wildlife habitats and related environmental values have been restored, reclaimed, or protected in accordance with MSUMRA, its implementing rules, and the approved permit; (3) disturbance to the hydrologic balance has been minimized and off-site material damage prevented in accordance with MSUMRA, its implementing rules, and the approved permit; (4) water supplies adversely affected by mining and reclamation operations must be replaced and must function in accordance with MSUMRA, its implementing rules, and the approved permit; (5) the essential hydrologic functions and agricultural productivity on any alluvial valley floors must be reestablished; (6) any SCC alternative land-use plan approved pursuant to ARM 17.24.821 and ARM 17.24.823 must be successfully implemented; and (7) all other reclamation requirements of MSUMRA, its implementing rules, and the approved permit must be met.

Final bond release relieves the operator of liability for corrective actions needed to comply with MSUMRA. ARM 17.24.1116 (2). By allowing final bond release only after all disturbed lands have been reclaimed, fish and wildlife habitats have been fully restored, alternative water supplies are provided, and essential hydrologic functions of alluvial valley floor are restored, DEQ retains jurisdiction of the mine site and the financial security of the surety bond so corrective action can be taken.

2 DESCRIPTION OF ALTERNATIVES

This chapter describes two alternatives evaluated in the EIS; the No Action and the Proposed Action Alternatives. The descriptions include maps, activities common to all alternatives, a comparison of the alternative focusing on the issues of concern, and design elements. This chapter also describes alternatives that were considered but not analyzed in detail.

The Proposed Action Alternative is based on the permit application materials submitted by SCC to DEQ for the TR1 major revision to permit C1979012.

2.1 DEVELOPMENT OF ALTERNATIVES

Alternatives were developed based on requirements for alternatives pursuant to MEPA and its implementing rules. MEPA does not specify the number of alternatives that need to be considered in the EIS; however, any alternative proposed must be reasonable, in that the alternative must be achievable under current technology and the alternative must be economically feasible as determined solely by the economic viability for similar projects having similar conditions and physical locations and without regard to the economic strength of the specific project sponsor (Section 75-1-201(1)(b)(iv)(C)(I), MCA). In accordance with ARM 17.4.603(2)(b), DEQ is "required to consider only alternatives that are realistic, technologically available, and that represent a course of action that bears a logical relationship to the proposal being evaluated." In addition, MEPA requires a meaningful analysis of a No Action Alternative, along with other reasonable alternatives that may or may not be within the jurisdiction of the agency to implement (if any) ARM 17.4.617(5). DEQ must also assess the tradeoffs among the alternatives and identify DEQ's preferred alternative (if any) (ARM 17.4.616(3) (c) and (d); ARM 17.4.617(8) and (9).

Under MEPA, "alternative" means an alternative approach or course of action that would appreciably accomplish the same objectives or results as the Proposed Action; this includes design parameters, mitigation, or controls other than those incorporated into a Proposed Action by an applicant or by an agency prior to preparation of the EIS (ARM 17.4.603(2)).

As part of the MEPA review process, DEQ cannot impose measures on SCC's Operating Permit beyond what is required for compliance with MSUMRA and other state statutes. However, SCC and DEQ can mutually develop measures that, if requested by SCC, would be incorporated into the proposed permit application.

DEQ considered several alternatives that (1) had greater impacts to the human environment than the Proposed Action, (2) did not meet the project's stated purpose, or (3) did not meet the criteria for reasonableness. The alternatives were not carried forward for detailed analysis and are discussed in Section 2.4.

A summary of the alternatives and potential impacts for the No Action and the Proposed Action is provided in **Table 2.5-1** and **Table 2.5-2.** The detailed analysis, description of potential

impacts, and tradeoffs from the alternatives on each resource area are provided in Chapters 3 and 4.

2.2 No Action Alternative

MEPA requires a meaningful No Action analysis for all environmental reviews. **Figure 2.2-1** provides a graphical presentation of the No Action Alternative. The No Action Alternative provides a comparison and baseline of environmental conditions without the Proposed Action. MEPA requires the consideration of the No Action Alternative, even if it would fail to meet the purpose and benefits or would not be able to satisfy environmental permitting standards.

Under the No Action Alternative, the SCM permit revision application would not be approved by DEQ for one or more of the conditions for denial listed in Section 1.4.1.2 of this EIS. SCM would continue to operate the mine and process coal produced within their current disturbance area. At an average production rate of approximately 18 million tons per year, the mine life is expected to continue through approximately 2027. Information in this section is a summary of the currently-approved operating permit, which is available on DEQ's ePermit public portal http://svc.mt.gov/deq/myCOALPublic/180/ePermitAdmin/ApplicationForm.

In 2017, 58 percent of the coal mined from SCM was shipped to US domestic electric generation facilities. About 7 percent was used domestically for industrial purposes. Less than 1 percent was used for residential and institutional heating. Approximately 34 percent was sent to international markets for electric generation (SCM 2018a). SCM expects future sales to be similar to the recent past.

2.2.1 Permit Boundary and Disturbed Area Description

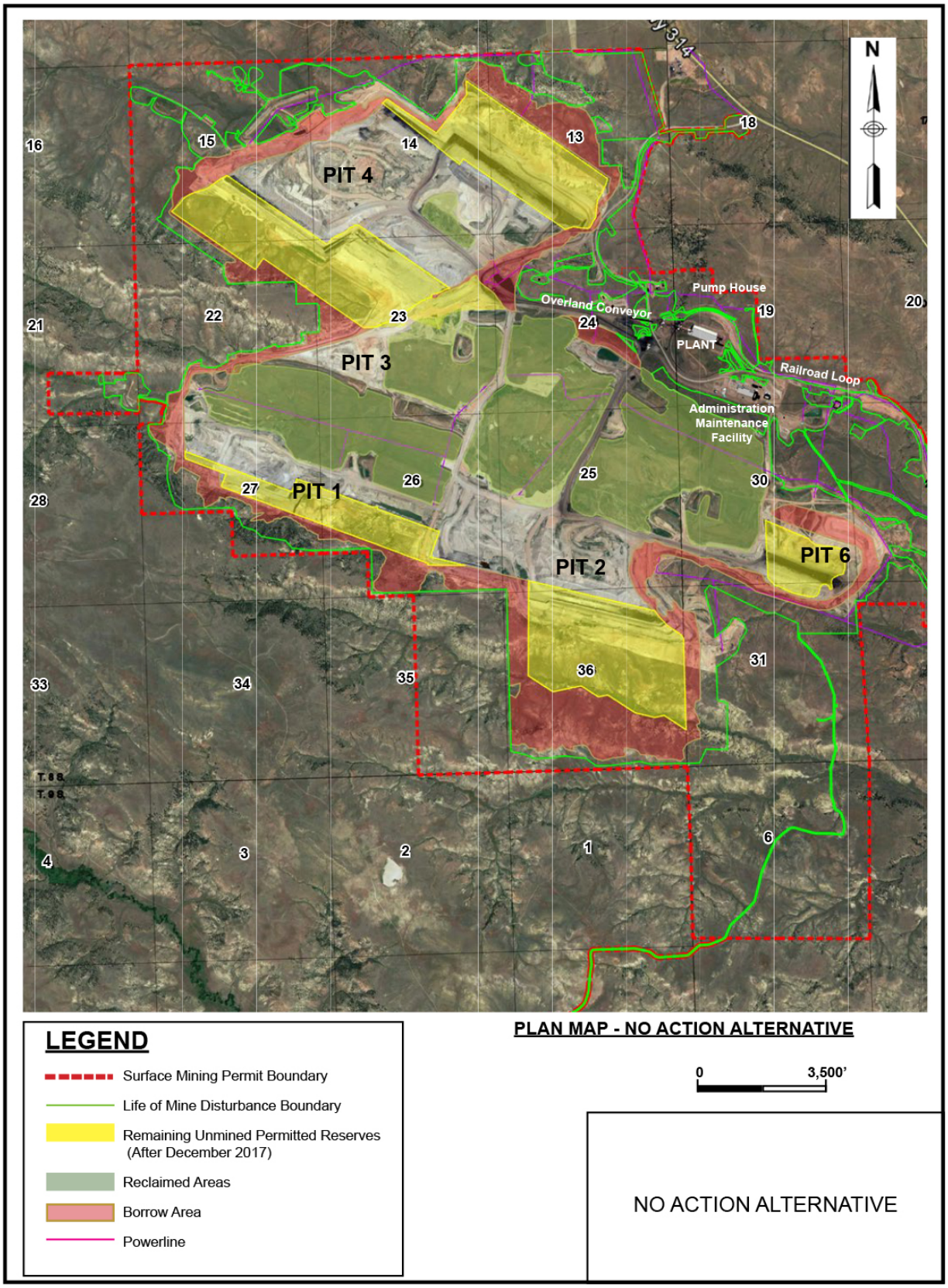
The mine permit boundary encompasses 9,220 acres and 6,134 acres within the permit boundary are approved for disturbance. No changes would occur in the permit boundary or the disturbance area. The current permit boundary for SCM is displayed on **Figure 1.1-2**. No new mining facilities would be constructed.

2.2.2 Water Management and Protection

SCC prepared a plan to protect the hydrologic balance during and after mining and reclamation activities and must conduct mine and reclamation operations in such a way as to minimize any probable impacts to the hydrologic balance and to avoid material damage outside the permit area. Surface water and ground water monitoring and investigation information for the SCM are contained in the Probable Hydrologic Consequences Update (Spring Creek Coal LLC and WWC Engineering 2017).

Mine water needs (for dust control and other purposes) would continue to be supplied by surface water and ground water sources. Surface water quality in and adjacent to the SCM

Figure 2.2-1. No Action Alternative



would continue to be protected by surface water control measures including ponds, traps, diversions and culverts. Water originating in or flowing across disturbed areas would continue to be collected and allowed to settle in sediment control ponds before evaporation, infiltration, or discharge to the natural drainage.

Ground water quantity and quality for pre- and postmining conditions would continue to be monitored and reported as discussed in the Probable Hydrologic Consequences Update (Spring Creek Coal LLC and WWC Engineering 2017). Both surface water and ground water within and adjacent to the SCM would be protected from adverse effects of the mining activities.

SCM would replace the water supply of any impacted nearby landowner, as necessary and in like kind and quality, if such water supply is contaminated, diminished, or interrupted because of their mining operations.

SCM would continue to be required to comply with the CAA, CWA, Resource Conservation and Recovery Act and other applicable laws and standards contained in their permit documents.

2.2.3 Mine Personnel and Facilities

SCM employs 285 people. Employment would continue until approximately 2027. At mine closure, reclamation is expected to initially employ 30 people, tapering off as reclamation is completed and activities focus on monitoring and bond release.

2.2.4 Mining Methods

The following provides information about SCM's current surface coal mining methods and facilities. Mining activities are supported by existing, permitted facilities within the SCM permit boundary and include the main facilities (buildings, coal handling facilities, and ancillary facilities). Other facilities include the train loadout, railroad loop, explosives storage area, scoria pits, landfarm, sediment control ponds and diversions, the access road, haul roads and miscellaneous light use roads.

Overburden is removed by a combination of dragline, cast blast, dozer, and truck/shovel methods. Coal is removed by truck and shovel type systems.

2.2.4.1 Soil Salvage and Overburden Salvage and Removal

Prior to any surface disturbance by mining and after removing larger woody vegetation, suitable topsoil is removed to predetermined depths using scrapers, dozers, or other equipment. Soil is segregated into two lifts. Lift 1 has a stripping depth of approximately 6 inches and contains soils from the A, E, and possibly upper B or C horizons; these soils go into A topsoil stockpiles. Lift 2 salvages the deeper suitable topsoil that goes into B topsoil stockpiles.

Following topsoil salvage, the overburden is drilled and blasted using a mixture of ammonium nitrate and fuel oil explosive. The blasted and fragmented overburden is then moved using combinations of draglines, shovels, trucks, and dozers.

2.2.4.2 Coal Removal

SCM mines coal from a seam averaging 80 feet thick. The coal is blasted using ammonium nitrate and fuel oil explosives and methods similar to what is used for the overburden. The coal is then loaded with shovels and front-end loaders into mining haul trucks. The coal is transported to the primary crusher at the truck dump or to the in-pit crusher for overland conveying. Mining frequently occurs simultaneously at multiple locations across the mine to blend the coal and create a marketable product to meet various customer specifications.

While the permitted mine plan projects an average annual production rate of 18 million tons from the SCM, production rates have been below this rate since 2014.

2.2.4.3 Overburden Replacement

Overburden is placed as backfill in the mined-out pits with a dragline and by cast blasting from the adjacent pit area to be mined, according to the General Backfilling and Grading Section (17.24.501) of SCM's approved permit (SCM 2011a). SCM has estimated up to 35 percent of the overburden volume in some areas can be moved by cast blasting. Overburden can also be transported by truck and placed on backfilled areas to achieve the designed topography (Section 17.24.501 of SCM's permit). Final postmining topography is designed to approximate premining topography given the constraints of the equipment and material characteristics with goals to limit erosion and sedimentation on adjacent undisturbed and reclaimed areas and to reestablish channels, floodplains, valleys, and drainage basins (SCM 2018c).

Overburden at SCM is not acidic or an acid-forming material. It is tested following grading to ensure compatibility with DEQ spoil quality guidelines. There are some overburden materials that are sodium-affected but the sodium is not at levels considered to be toxic to plants, soil organisms, or surface and ground water. There are thin, isolated partial coal stringers in some pre-stripped areas that are mixed with other overburden and placed at least 8 feet deep in the regraded spoil profile. These materials present limited concern or potential as a fire hazard.

2.2.5 Fish and Wildlife Plans

Section 17.24.312 of the mining permit, the Fish and Wildlife Plan (SCM 2017b), and Section 17.24.751, Protection and Enhancement of Fish, Wildlife and Related Environmental Values (SCM 2017b) include measures to protect wildlife. The plans are designed to minimize impacts on wildlife during the life of mine. Through the modification of Federal Coal Lease MTM-069782 and of Land Use Lease MTM-74913, SCM, DEQ, FWP, and BLM developed a required Habitat Recovery and Replacement Plan (HRRP) to mitigate for impacts to sage grouse and other wildlife habitats in the disturbance area. The HRRP tasks are listed in **Table 2.2-1**. Some of the HRRP tasks are linked with reclamation of the TR1 Project area and will only be completed if the TR1 Project is approved by the DEQ and the Federal Mine Plan revision approved by the OSM.

SCM would continue to implement the protection and enhancement measures included in Section 17.24.751 of the mining permit (SCM 2017b) which are summarized below:

- Electrical power lines and transmission facilities would be designed and constructed to minimize collisions and electrocutions of raptors, waterfowl and other wildlife following guidelines in in *Suggested Practices for Raptor Protection on Power Lines: The State of the Art in 1996* (APLIC 2006).
- Haul and access roads would be located and operated to avoid or minimize impacts to important fish and wildlife species, and other species protected by state and federal law.
- Fences, overland conveyers, and other potential structures would be designed and constructed to permit passage of large mammals, except where the DEQ determines such requirements would not be necessary.
- Wildlife would be excluded from ponds that contain hazardous concentrations of toxic-forming materials by fence, cover, or use other appropriate methods.
- Appropriate state and federal fish and wildlife and land management agencies would be consulted to ensure reclamation provides for the habitat needs of various wildlife species in accordance with the approved postmining land use. Pursuant to Section 82-4-231(10)(j) and Section 82-4-232(9), MCA, special attention would be given to inanimate elements such as rock outcrops, boulders, rubble, dead trees, etc., that may have existed on the surface prior to mining, and to plant species with proven nutritional and cover values. Plant groupings and water sources would be distributed to fulfill the requirements for fish and wildlife. Vegetative cover would not be less than required by the approved postmining land use.
- Wetlands, riparian vegetation along rivers and streams and bordering ponds and lakes, and other habitats of unusually high value for fish and wildlife would be restored or avoided, and where practicable, enhanced. Prior to disturbing any delineated wetlands and during the appropriate permitting period, permanent mitigation plans would be developed and submitted to DEQ and OSMRE for review and approval. The approved mitigation plan would then be submitted to the USACE. SCM would use a wetland delineation approach like what was submitted with the Pearson Creek Amendment package.
- Aquatic communities would be protected by avoiding stream channels, or by restoring stream channels as required by Section 17.24.634.

SCM would use the following best practices outlined in the Fish and Wildlife Plan to the extent possible (SCM 2017b):

- Develop a separate Species of Interest Monitoring and Management Plan to serve as an overall guidance document for minimizing impacts to wildlife and wildlife habitats during the life-of-mine.
- Honor raptor nest buffers to the extent practicable except when birds clearly demonstrate tolerance by nesting near ongoing mine operations.

- Honor grouse lek buffers to the extent practicable and schedule disturbance activities near active leks to occur outside the breeding season.
- Complete reclamation contemporaneously to minimize the disturbance footprint of the mine.
- Design and construct all electric power lines and other associated transmission facilities in the permit area in accordance with guidelines in the most current recommendations from the Avian Power Line Interaction Committee (APLIC) or USFWS to minimize collisions and electrocutions of raptors, waterfowl, and other wildlife species.
- Construct temporary ponds and traps to provide resources for wildlife during mining; include escape ramps, as appropriate.
- Use proper stream crossing, culvert designs, erosion control, and sediment control features (i.e., Best Management Practices) to minimize impacts to stream crossings, aquatic species and habitats, and watersheds. Culvert crossings of minor drainages or super-span arch crossings of all major drainages will be engineered and installed to not impede natural flow once completed. These crossings will assure continuity of flow for wildlife uses and appropriators downstream.
- Use proper designs for fences, above-ground conveyors, and above-ground creek crossings to allow big game to pass unimpeded across or under roads and railways, per current Montana Fish, Wildlife and Parks (FWP), BLM, or other agency guidelines for such structures.
- Consolidate infrastructure such as roads, overhead power lines, etc. when feasible to minimize habitat fragmentation and avoid sensitive habitats, when possible.
- Conduct regular training sessions and/or communication with equipment operators, supervisors, and contractors to maintain awareness of the importance of wildlife in the environment at SCM, potential wildlife concerns, and the need for all personnel to be committed to minimizing impacts to wildlife resources to the extent practicable, particularly during the breeding season and harsh winter conditions when species are most vulnerable.
- Continue to provide nesting sites for resident and seasonally present raptors; construct scarps or steep-sloped areas designed to replace existing cliff habitat in the postmining landscape to mitigate losses of potential raptor nesting sites within the affected area.
- Prevent disturbance in the dense sagebrush bench area between Pits 1 and 4.
- Regularly review and analyze wildlife monitoring information and attempt to schedule mining activity around potential nesting/rearing seasons when possible.
- Monitor all environmental variables, including vegetation, soils, wildlife (terrestrial and aquatic, as warranted), water, and air quality/meteorology to proactively mitigate mine related impacts.
- Follow the approved Reclamation Plan in 17.24.313 to establish the desired postmining habitats and land uses, per Administrative Rules of Montana (ARM) 17.24.313(h).

The HRRP tasks associated with SCM's leasing of federal coal reserves for the TR1 Project are listed in **Table 2.2-1**. SCM worked with the DEQ, BLM, and FWP to develop the HRRP tasks, particularly those associated with sage grouse mitigation. SCM voluntarily began implementing many of the HRRP tasks in advance of mining disturbances for the TR1 Project. The HRRP includes commitments to complete 14 tasks and 12 of these tasks have been completed or nearly completed (SCM 2017b).

2.2.6 Air Pollution Control

Fugitive dust is regulated pursuant to ARM 17.8.308 and in accordance with SCM's air quality permit number 1120-12. Operations that emit fugitive particulate matter would be subject to DEQ air quality regulations ARM. 17.8.304 and 17.8.308(2) and (3). Pursuant to ARM 17-8-304(2), fugitive dust emissions would not be allowed to exceed visible opacity of 20 percent or greater, averaged over 6 consecutive minutes. Pursuant to ARM 17.8.308(2), SCM would also be required to take reasonable precautions to control emissions of airborne particulate matter from operations. MSUMRA requires that all surface areas associated with SCM's operations be stabilized and protected to effectively control air pollution (Section 82-4-231(10)(m), MCA). Operators are required to employ fugitive dust control measures in accordance with Section 82-4-231(10)(m), MCA, the operator's air quality permit, and applicable federal and state air quality standards (ARM 17.24.761(1); 17.24.311(1)). Monitoring to evaluate the effectiveness of the fugitive dust control practices must also be conducted (ARM 17.24.761(2)).

Measures used to control fugitive dust according to SCM's Air Pollution Control Plan (SCM 2002) include:

- Enclosed conveyors;
- Enclosed truck dump stilling shed with a dust suppression system;
- Dust suppression at the crusher operation;
- Dust suppression at the collection system and railcar loadout chute;
- Completely enclosed storage barn for the coal storage pile;
- Minimize fall distances of coal and overburden when loading trucks and stockpiles;
- Prevention of overshooting when blasting;
- Use of vegetation to prevent wind erosion;
- Use of chemical dust suppression and water on haul roads along with removal of loose debris from haul roads;
- Reclamation within one growing season;
- Paved access roads; and
- Baghouse filters on the coal quality analytical laboratory coal sample system exhaust.

Table 2.2-1
SCM Habitat Recovery and Replacement Plan (HRRP) and Related Projects

Number	Benefit Term	Project	Mitigation (M)[1] or Compensation[2] (C)	Plan Item Reference	Approvals Required	Implementation Date
1	Long Term	Continue to investigate several methods of sagebrush establishment	M	2(a)	None Required	2009 to 2013 (Completed)
2	Long Term	Enhance existing reclamation with sagebrush interseeding	M	2(a)	Already allowed by Mining Permit 79012 Section 313(h)(ii).	2009 to 2016 (Completed)
3	Long Term	Removing Pastureland Seeding from Reclamation Plan	M	2(a)	Approved by DEQ under MR 08-12-09	August 2008 (Completed)
4	Long Term	Revise Reclamation Plan to balance land use types such as Pastureland	M	2(a)	DEQ with approval of Permit Amendment 183	June 2011 (Completed)
5	Long Term	Get DEQ approval to use sagebrush grassland or other new seed mixes	M	2(a)	Approved by DEQ under MR 08-12-09	August 2008 (Completed)
6	Short Term	Fund $12/acre for Land Owner Incentive Program for land to be disturbed by mining in LBM area	C; expect this will only preserve sage grouse habitat in areas away from the mine.	2(b)	None Required	**Not Completed.** The Land Owner Improvement Program is no longer available.
7	Short Term	Provide FWP with a list of landowners who have expressed an interest in participating in conservation programs	C or M; C if native rangeland is preserved away from the mine, M if native rangeland areas are preserved near the mine.	2(b)	FWP	**Not Completed.** At least one year prior to disturbance.
8	Long Term	Provide Mechanical Manipulation Study Plan to FWP, and BLM areas inside and possibly outside the LBM area	C or M; C if native sagebrush areas are improved in other areas, M if native sagebrush areas are improved near the mine.	2(c)	BLM, FWP, and DEQ	The project started in 2013 and was completed in 2018.
9	Short Term	SCM will consult with agencies to see if there is any benefit to removing existing fencing in Sections 6 & 31	M	2(d)	MFWP & BLM	Spring 2013 (Completed)

Table 2.2-1
SCM Habitat Recovery and Replacement Plan (HRRP) and Related Projects

Number	Benefit Term	Project	Mitigation (M)[1] or Compensation[2] (C)	Plan Item Reference	Approvals Required	Implementation Date
10	Short Term	Any new fencing will be constructed with a wildlife friendly design	M	2(d)	None Required	Summer 2012 (Completed)
11	Short Term	Evaluate during next grazing agreement renewal (annually) in Sections 6 & 31 to ensure sage grouse habitat is protected.	M	2(e)	None Required	Spring 2009 to 2012 (Completed)
12	Long Term	Final habitat recovery will be achieved during Phase IV bond release of current mining and the LBM area	M	3	DEQ	Reclamation Commitments in TR1 Project Permit (Completed)
13	Short Term	Continue to treat water in ponds and stored tires with mosquito larvicide	M	3	None Required	Annually (Completed)
14	Short Term	Additional winter/spring wildlife monitoring plan for 2008	N/A	3	Approved (BLM, FWP, and DEQ)	Spring 2008 (Completed)
Additional Related Actions to Help Sage Grouse						
15	Long Term	Modified Postmining Topography to provide additional bench areas and less dramatic topography for sage grouse	M	See MR 168 Cover Letter Dated 3-2-12	DEQ	**Not Completed.** To be completed if TR1 Project is approved
16	Long Term	CCAA Agreement	C		..	CPE entered into voluntary 30-year plan in 2017 (Completed)

Source: SCM 2017b

1 Mitigation is defined as "rectifying an impact by repairing, rehabilitating, or restoring the affected environment" in MEPA Guide p. 28, Rev 2006.

2 Compensation is defined as, "the replacement or provision of substitute resources or environments to offset an impact on the quality of the human environment" under MEPA.

Long Term = birds may not benefit for 5 + years. Short Term = birds may benefit from the project before 5 years.

2.2.7 Cultural and Historical Resource Protection

Section 17.24.304 of the mining permit includes a measure to avoid or minimize impacts on cultural and historical resources.

- SCM will contact DEQ and the State Historical Preservation Office if any unrecorded cultural resource site is discovered during mining. All appropriate action would be taken to properly record and mitigate any such site.

2.2.8 Approximate Original Contour, Soil Distribution, and Seeding

SCM is required to return the postmine topography to the approximate original contour, which is defined by Section 82-4-203(4), MCA as:

> *"That surface configuration achieved by backfilling and grading of the mined area so that the reclaimed area, including any terracing or access roads, closely resembles the general surface configuration of the land prior to mining and blends into and complements the drainage pattern of the surrounding terrain, with all highwalls, spoil piles, and coal refuse piles eliminated, so that:*
>
> *(a) the reclaimed terrain closely resembles the general surface configuration if it is comparable to the premine terrain. For example, if the area was basically level or gently rolling before mining, it should retain these features after mining, recognizing that rolls and dips need not be restored to their original locations and that level areas may be increased;*
>
> *(b) the reclaimed area blends with and complements the drainage pattern of the surrounding area so that water intercepted within or from the surrounding terrain flows through and from the reclaimed area in an unobstructed and controlled manner;*
>
> *(c) postmining drainage basins may differ in size, location, configuration, orientation, and density of ephemeral drainageways compared to the premining topography if they are hydrologically stable, soil erosion is controlled to the extent appropriate for the postmining land use, and the hydrologic balance is protected; and*
>
> *(d) the reclaimed surface configuration is appropriate for the postmining land use."*

Reclamation activities include (1) grading the spoils to limit erosion, (2) constructing any reclamation enhancement features, (3) sampling the spoils for suitability, (4) ripping the suitable spoils to reduce compaction, (5) distributing the soils to the prescribed depths, and (6) preparing the seedbed, seeding with the approved seed mix, and applying mulch, if needed. Final postmining topography surfaces are configured to limit erosion and sedimentation onto adjacent undisturbed or reclaimed areas and to reestablish channels, floodplains, valleys, and drainage basins.

SCM will use weed-free seed to help control noxious weeds. If mulch is used, weed-free sources will be utilized. Additionally, SCM will utilize several other practices to control weeds such as

cutting or mowing; cultivation or tillage; crop or plant competition; burning; biological control; and chemicals/herbicides. SCM will comply with established practices and criteria outlined by the Montana Department of Agriculture's County Noxious Weed Control Law, and by adhering to the Big Horn County Noxious Weed Management Plan (SCM 2018c).

2.2.9 Mine Closure and Reclamation Plan

Existing disturbed areas for the support facilities, such as roads, office buildings, shops, coal handling facilities, conveyors, powerline, and fences, would be completely reclaimed at the end of mining operations. After mining, all structures, including but not limited to partially buried wire, conduit, waterlines, and other support facilities, will be removed and all areas (including mined areas) graded to approved postmining contours. Following grading operations, areas will be topsoiled and seeded in accordance with procedures outlined in the approved Operations and Reclamation Plans (SCM 2018c).

Mining would cease at SCM in approximately 2027 under the No Action Alternative. Reclamation methods are set forth in SCM's approved Reclamation Plan (SCM 2018c). The approved postmining land uses are livestock grazing, wildlife habitat, and pastureland.

SCM's reclamation plan accounts for all permit provisions during a temporary cessation of operations per MCA Section 17.24.521 (SCM 2001). In the event a permanent cessation of mining occurs, SCM would close or backfill and otherwise permanently reclaim all affected areas of mining per MCA Section 17.24.522 (SCM 2000).

SCM's performance bond has been established to cover the cost of reclamation in the event SCM fails to perform reclamation in a successful manner. The performance bond is evaluated and adjusted annually to improve bond accuracy. The annual evaluation is based on topography and detailed earthwork requirements to achieve an approved postmining topography. The performance bond amount as of September 2018, in the form of several sureties, was $108.85 million (DEQ 2019).

2.2.10 Environmental Monitoring

SCM conducts environmental monitoring and data-gathering activities inside and outside the mine permit boundary. Resource-specific monitoring includes, but is not limited to, ground water, surface water, vegetation, wildlife, soils, and weather. These environmental monitoring activities have minimal surface impacts, other than those from vehicular access to the areas on existing roads and trails. These monitoring activities are part of SCM's permit and must continue until final performance bond release.

Surface disturbances resulting from environmental monitoring, including rutting and tracking from vehicle traffic on roads and off roads during wet weather conditions or other factors, will be repaired and seeded by SCM with an approved seed mix as soon as possible. Road repairs will be completed in compliance with the requirements of ARM Section 17.24.1004 through

1013 and will be completed so the affected areas are returned to their approved post-disturbance land use.

Vegetation monitoring is an ongoing activity consisting of sampling vegetation reference areas for performance bond release and annually monitoring revegetation progress. Ground water monitoring consists of regular periodic monitoring and maintenance of water wells within SCM's currently active ground water monitoring and sampling sites. Surface water monitoring involves regular periodic monitoring and maintenance of SCM's surface water monitoring and sampling sites. Wildlife monitoring has been conducted as prescribed in Sections 17.24.312, 17.24.723, and 17.24.751 of the mining permit to determine changes to the wildlife that reside in or use the SCM area. Wildlife monitoring includes monitoring within the mine permit boundary and within a 2-mile buffer area outside the mine permit boundary. Weather is regularly monitored using a meteorological station and data recorder. Surveying work consists of periodic visits to established survey control points to maintain the network of survey control.

2.3 Proposed Action Alternative

SCM submitted the TR1 major revision to their Surface Mining Permit C1979012 to add 977 acres of additional disturbance to expand mining in Pits 1 and 2 and 6 to provide additional coal and to provide an area west of Pit 4 to construct a temporary overburden stockpile. The TR1 Project includes modification of Federal Coal Lease MTM-069782 and modification of Land Use Lease MTM-74913 which adds approximately 72 million tons of recoverable coal and extends the mine life a minimum of 4 years to approximately 2031 at an annual production rate of 18 million tons. Coal mined from SCM would be sold to a customer mix depending on prevailing market conditions (SCM 2018a).

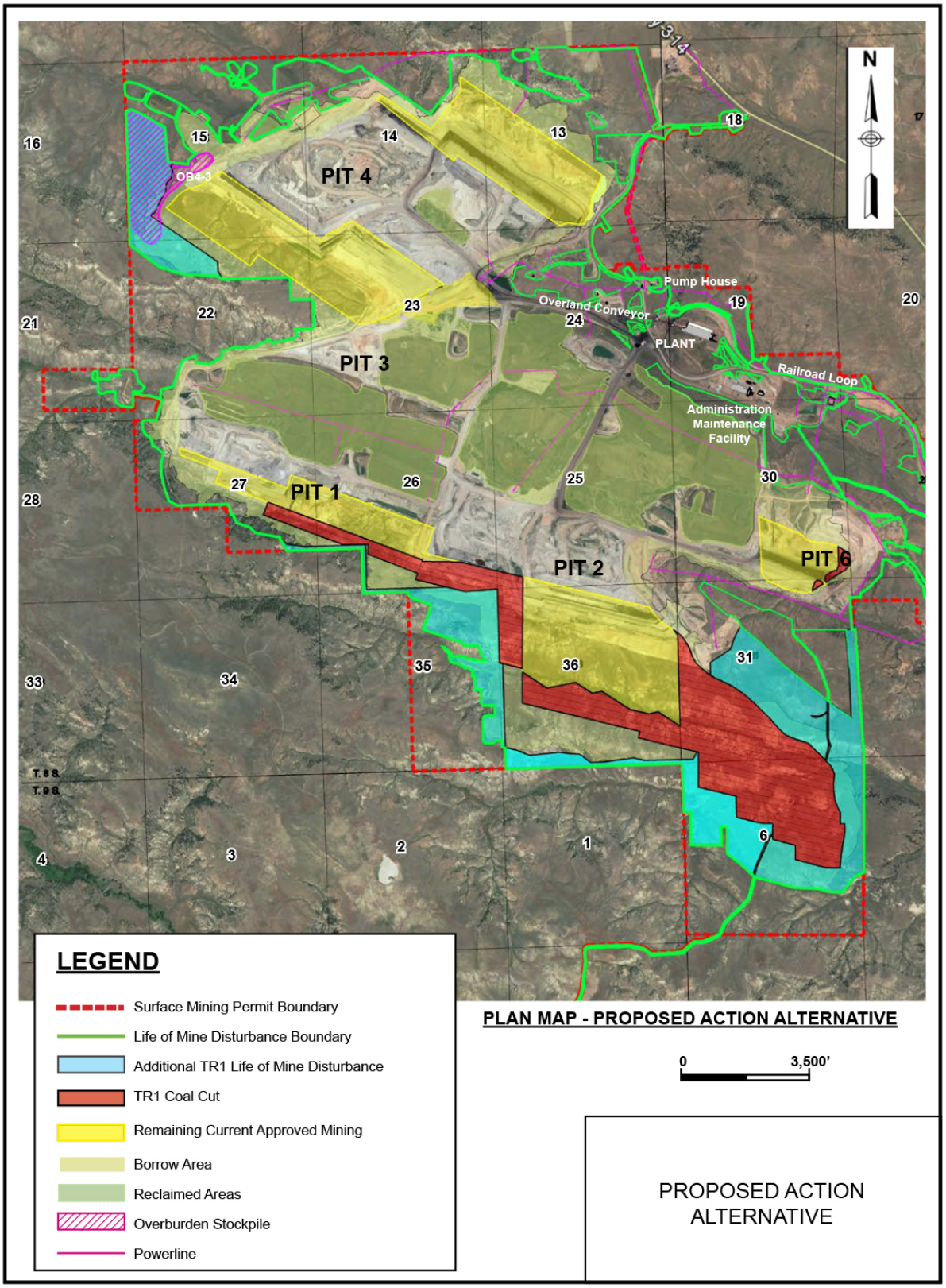
Table 2.5-1 provides the acreages and other specific features for the Proposed Action Alternative compared to the No Action Alternative. **Figure 2.3-1** provides a graphical presentation of the Proposed Action Alternative. Features of the Proposed Action are described below. The additional coal reserves are of similar quality compared to the approved coal mining reserves. As a result, annual coal production would not change.

2.3.1 Permit Boundary and Disturbed Area Description

The overall permit boundary would remain unchanged at 9,220 acres. The total life-of-mine disturbance within the permit boundary would increase by 977 acres from the current 6,134 acres to the proposed 7,111 acres (SCM 2018b). The additional disturbance of 844 acres would allow expansion of Pits 1, 2 and 6 and the additional disturbance of 133 acres in an area west of Pit 4 for the construction of a temporary overburden stockpile.

The TR1 Project would increase the recoverable coal available to SCM by approximately 72 million tons by expanding coal mining blocks in Pits 1, 2, and 6. Modification of Federal Coal Lease MTM-069782 and modification of Land Use Lease MTM-74913 would allow for the additional mining and surface disturbances. Specifically, the additional 72 million tons is

Figure 2.3-1. Proposed Action Alternative



proportioned as follows: 45 million tons from LBM to MTM-069782 (Pit 2 east side), 15 million tons from State Coal Lease C-1088-05 (Pit 2 and Pit 6 west side), and 12 million tons from Federal Coal Lease MTM-94378 (Pit 1 and Pit 2 west side)). Additionally, Land Use Lease MTM-74913 adds 197 acres of BLM surface to be used for coal mining disturbance and pit layback on the west side of Pit 2.

2.3.2 Mine Personnel and Facilities

The Proposed Action would result in no adjustment to the number of mine personnel or facilities needed compared to the No Action Alternative (see Section 2.2.1) but would extend employment at SCM by approximately 4 years due to the longer mine life.

2.3.3 Water Management and Protection

The Proposed Action Alternative would require no adjustment in the annual amount of mine water needed as compared to the No Action Alternative (see Section 2.2.2). Mine water needs would be extended for an additional 4 years due to the longer mine life. SCM would continue to follow the plan to protect the hydrologic balance described in Section 2.2.2. There would be no changes to SCM's MPDES permit for discharging mine water and stormwater associated with mining and the related industrial activities.

2.3.4 Mining Methods

The Proposed Action would result in some minor changes to the mining sequence for Pits 1 and 2 to improve material handling, reclamation scheduling, and improve postmining topography by improving slope diversity and creating more natural looking slopes. The TR1 Project would provide for additional sage grouse habitat compared to the existing premine topography.

Except for the mining sequence, the mining methods used in the Proposed Action would be the same methods used for the No Action Alternative (see Section 2.2).

2.3.4.1 Soil Salvage and Overburden Salvage and Removal

The Proposed Action Alternative adds additional mining blocks to existing pits. As a result, the mining sequence in the existing pits will be extended and the active mining block will progress into additional disturbance areas. The Proposed Action Alternative will continue the same topsoil salvage and overburden movement practices as required under the No Action Alternative.

2.3.4.2 Coal Removal

The additional 72 million tons of recoverable coal from the Proposed Action Alternative would extend the life of the mine approximately 4 years at an average annual production rate of 18 million tons. Production rates have been less than 18 million tons since 2014.

2.3.4.3 Overburden Replacement

Under the Proposed Action, an overburden stockpile would be relocated from the approved location south of the final pit in Section 36 to an area to the north side of Pit 2 (and renamed OB-2-2) in Section 36 due to mining an additional 15 million tons from State Coal Lease C-1088-05. This move would require a sediment pond. The move would be needed because the currently-approved location is on State Coal Lease C-1088-05 coal leased in 1965 (Cloud Peak Energy 2012). Otherwise, the Proposed Action will continue the same overburden replacement practices as required under the No Action Alternative.

2.3.5 Fish and Wildlife Plan

Most of the current fish and wildlife protection and habitat reclamation tasks described in Section 2.2.5 for the No Action Alternative would occur under the Proposed Action. The HRRP tasks associated with the TR1 Project are listed in **Table 2.2-1** along with additional related projects or actions that would benefit sage grouse. SCM began implementing many of the HRRP tasks in advance of any mining disturbances for the TR1 Project and has completed or nearly completed 12 of the required 14 tasks as well as one of the two additional related actions (SCM 2017b).

2.3.6 Air Pollution Control

Under the Proposed Action, controls on fugitive dust and other emissions would be the same as described in the No Action Alternative in Section 2.2.6. The Proposed Action Alternative lengthens the mining cuts in Pit 2 to the south east. As a result, SCC updated the air dispersion model to include mining the additional coal reserves from the Proposed Action and obtained a revised Montana Air Quality Permit # 1120-12 air permit approved on October 16, 2014.

2.3.7 Cultural and Historical Resources

Under the Proposed Action, the additional mining would disturb one site (24BH3392) that has been determined to be eligible for the National Register of Historic Places (NRHP). This site is a Prehistoric occupation site located on private land within SCM mine permit boundary. The site was found and recorded in 2006 (GCM Services 2007). This site was recommended for NRHP eligibility because of meeting Criterion D of the NRHP because of its archaeological content and unique shelter remains, consisting of the recognizable remains of structures made of stacked juniper logs surrounding central features. An approved mitigation plan for the site will be completed prior to any surface disturbance.

In addition to the avoidance measure identified in Section 2.2.7, other cultural and historic preservation measures employed by SCM will be:

- Notification of the BLM if discoveries are made during operations; and
- Update of information for archaeological sites 24BH2530, 24BH2531, 24BH3388, 24BH3396 and 24BH3401.

2.3.8 Approximate Original Contour, Soil Distribution, and Seeding

Under the Proposed Action, grading and reclamation would be conducted using the same process as described under the No Action Alternative described in Section 2.2.8.

2.3.9 Mine Closure and Reclamation Plan

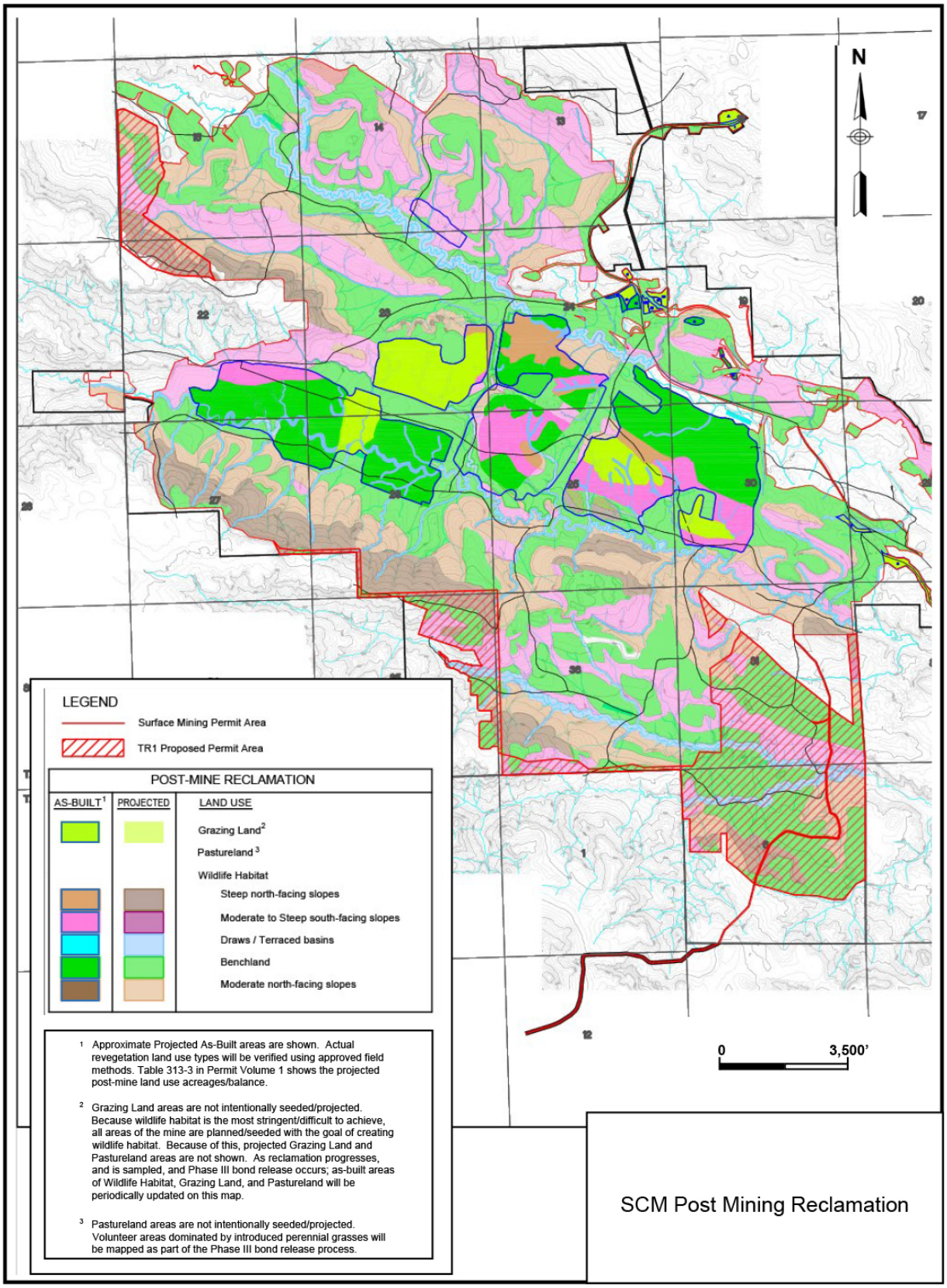
Mining would be extended approximately 4 more years under the Proposed Action with the proposed TR1 alternative, extending mine life through approximately 2031.

SCM would reclaim the TR1 mined areas to a postmine landscape with steep and moderate slopes, draws and drainages, and benchland for establishing a diversity of vegetation communities. The TR1 Project revegetation plan and postmining topography would primarily provide wildlife habitat for mule deer and sage grouse. Sage grouse prefer flat to gentle slopes and the TR1-reclaimed benchland in the Pearson Creek drainage would provide additional sage grouse habitat compared to the No Action (premine) topography (Cloud Peak Energy 2012). **Figure 2.3-2** shows the postmine reclaimed land use and revegetation plan for the TR1 Project Areas and for the entire SCM.

SCM would construct topographic and wildlife habitat features to promote vegetational diversity and provide wildlife habitat similar to premine or undisturbed land. Landscape features would be constructed during the regrading process and could include randomly placed areas with multiple larger shrubs, wetlands, rock piles and ledges, cliffs and steeper slopes, small depressions, and riparian areas.

The same process described in Section 2.2.9 would be used to establish a performance bond and reevaluate it annually. Before the permit revision would be issued by DEQ, SCM must file a performance bond payable to the State of Montana with surety satisfactory to DEQ in an amount to be determined by DEQ (see Section 82-4-223, MCA). A complete description of DEQ's performance bonding procedure, including bond release by reclamation phase, is provided in ARM 17.24.1101 *et seq*.

Figure 2.3-2. SCM Postmining Reclamation



2.3.10 Environmental Monitoring

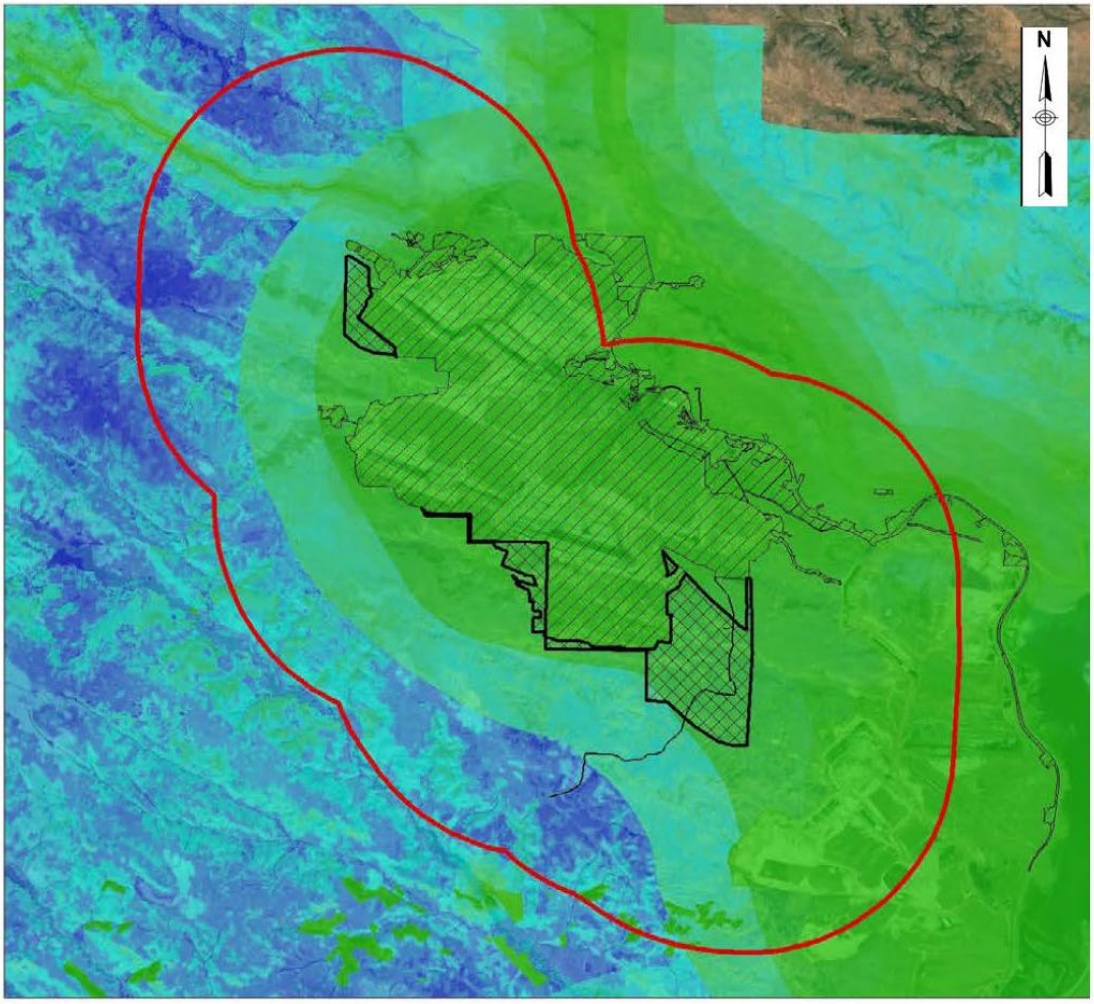
Environmental monitoring under the Proposed Action Alternative would be the same as the No Action Alternative, described in Section 2.2.10.

2.3.11 Mitigations for the Proposed Action

Implementing the Proposed Action would result in impacts to sage grouse habitat. In accordance with ARM 17.4.626(1), DEQ contacted other governmental agencies with special expertise in sage grouse mitigation to request their participation and consultation in the MEPA process. Specifically, DEQ requested the BLM (Miles City field office), FWP (Region 7), and OSMRE to review and concur with DEQ's proposed sage grouse mitigation measures for the TR1 Project. Pursuant to MSUMRA (Section 82-4- 227(2)(a) and 82-4-231(10)(j), MCA), DEQ would incorporate the sage grouse mitigation measures as conditions of approval, should DEQ grant the TR1 Project permit.

DEQ and their third-party consultants prepared a technical memorandum to quantify the amount of sage grouse habitat likely to be affected by direct and secondary impacts associated with the Proposed Action. The existing habitat (No Action Alternative) based on the projected 2020 TR1 sage grouse habitat evaluation area, including a 2-mile buffer, was approximately 28,220 acres and is shown on **Figure 2.3-3**. The Proposed Action TR1 sage grouse habitat was based on a 2034 projection. The technical memorandum "TR1 Greater Sage grouse Habitat Assessment", completed by West Environmental & Statistical Consultants (WEST), is in Appendix A. The TR1 sage grouse habitat evaluation identified additional sage grouse mitigation measures to offset the impacts from the Proposed Action. The habitat evaluation considered previously-implemented recovery and replacement measures stipulated by BLM in the HRRP, and the conservation measures implemented through the Thunder Basin Grasslands Prairie Ecosystem Association CCAA that were related to the TR1 development. The CCAA is a voluntary program to develop a conservation strategy to address loss of habitat for eight species, including sage grouse (USFWS and Cooperating Agencies, 2017).

Figure 2.3-3. TR1 Sage Grouse Habitat Evaluation – Baseline, Year 2020



LEGEND

TR1 TWO MILE BUFFER

TR1 DISTURBANCE AREA

SPRING CREEK MINE DISTURBANCE BOUNDARY

HABITAT FUNCTION

HIGH : 0.89

LOW : 0

NOTES:
1) Two-mile buffer based on Wildlife Analysis Area.

2) Habitat function determination described in Appendix A.

TR1 SAGE GROUSE HABITAT EVALUATION - BASELINE (YEAR 2020 PROJECTED)

SOURCE: West enviornmental & Statistical Consultants 2019

2.3.11.1 TR1 Sage Grouse Habitat Evaluation

A landscape-scale functional acreage approach, similar to Montana's Habitat Quantification Tool (HQT), was used to quantify and compare baseline (No Action) and future (Proposed Action) sage grouse habitats to determine the need for additional sage grouse habitat enhancement measures to mitigate impacts from the TR1 Project. The functional acreage comparison evaluated expected impacts to sage grouse habitat associated with the Proposed Action. One functional acre lost would equate to one mitigation debit. The total compensatory mitigation obligation (debits minus credits) factors in the potential benefits (credits) to sage grouse habitat from SCM's commitments in the HRRP and participation in the CCAA program.

The average baseline (No Action) habitat functional acre score of 0.1733 was compared to the average future (Proposed Action) functional acre score of 0.1515. The Proposed Action would decrease sage grouse habitat function in the 28,220 acres and would result in a loss of 615 functional acres (see Table 3 in Appendix A).

Applying (1) 10 percent multiplier to ensure no net loss; (2) 20 percent multiplier to account for credits lost due to unforeseen events; and (3) 10 percent Steward Fund multiplier, the total compensatory mitigation obligations to sage grouse habitat from the Proposed Action equals 861 debits.

The Montana Sage Grouse Habitat Conservation Program (MSGHCP) policy document (Montana Mitigation Stakeholder Team 2018b) was used to quantify the gains and losses of sage grouse habitat caused by the Proposed Action when compared to the No Action Alternative. A $13.00 per debit value, with an annual depreciation of 3%, was used to calculate total debit costs for the TR1 project beginning in 2020 through completion in 2044, 10 years after TR1 has been reclaimed. A total of 13,019 net debits to sage grouse habitat would accumulate during the 24-year period of the Proposed Action and would result in a total compensatory mitigation cost of $107,727 (see Table 5 in Appendix A). SCC would deposit the mitigation funds into the Montana Sage Grouse Oversight Team's Stewardship Fund.

2.3.11.2 Sage Grouse Compensatory Mitigation and Condition of Approval

If OSM approves the federal Mine Plan revision, SCC would be required to pay $107,727 in compensatory mitigation into the Montana Sage Grouse Oversight Team's Stewardship Fund.

2.4 Alternatives Not Carried Forward for Detailed Analysis

Several alternatives were either suggested in the public comments or identified as a result of DEQ's alternative screening. These alternatives were considered, but for the reasons described below, were not carried forward for detailed analysis.

To be considered for detailed analysis, a reasonable alternative must fulfill the purpose and need of the Proposed Action and meet criteria described in ARM 17.4.603:

- Evaluates different parameters, mitigation measures, or control measures that accomplish the same objectives as those in the Proposed Action by the applicant;
- Does not include an alternative facility or an alternative to the proposed project itself;
- Is technically feasible (achievable by using current technology);
- Is economically feasible (based on similar projects having similar conditions and physical locations, regardless of the economic strength of the specific project sponsor); and
- Is environmentally beneficial (environmental impacts must be reduced compared to the Proposed Action).

2.4.1 Delay TR1 Project Until SCM Reclaims Majority of Mined Lands

Comments were submitted during the public scoping period asking DEQ to require SCC to mine existing pits (i.e. Pit 4) prior to initiating mining within the TR1 Project Area. This alternative was not analyzed in detail because it would be inconsistent with the project's stated purpose. This alternative would leave the coal reserves in TR1 Project Area until all other coal is mined out, limiting the ability of SCC to blend coal of different qualities to meet coal quality criteria for various coal customers. SCC must maintain the ability to blend coal from more than one pit to meet the specific coal quality required by various customers. This blending scenario has been approved since the SCM was first permitted in 1979.

DEQ, BLM, and OSMRE all require contemporaneous reclamation whenever it is possible. MSUMRA requires operators to commence reclamation as soon as possible in accordance with the permit's plan of operation (Section 82-4-234, MCA). Reclamation and revegetation must occur as rapidly, completely, and effectively as the most modern technology and the most advanced state of the art will allow (Section 82-4-231(1), MCA). Contemporaneous reclamation is also the fastest way for the reclamation bond to be released to SCC. The requirements that must be met are detailed in ARM 17.24.1116. SCM has remained in compliance with its approved reclamation plan and has achieved Phase III reclamation bond release on 417 acres within the 5,171 acres of surface disturbance as of December 2017. SCM had reclaimed a cumulative total of 1,334 acres, or 25.8 percent of the disturbed area, as of 2017 (SCM 2018c). The proposed revision would add mining blocks and pit length to existing pits which is not expected to substantially delay contemporaneous reclamation.

2.4.2 Additional Money for Active Reclamation

Comments were received asking DEQ to require SCC to add money to their reclamation budget to increase the amount of reclamation completed annually. This alternative was not carried forward because it assumes that SCC is lagging behind in its reclamation commitment and that additional reclamation is needed at this time.

Review of the 2018 annual report indicates that SCC is in compliance with the approved reclamation schedule. There is also limited area for additional reclamation without affecting the approved mine plan. Removal of a coal seam that is approximately 80 feet thick also requires

that borrow material from areas of thick overburden be used to ensure backfilled areas approximate the approved postmine topography. Additionally, as mining has progressed at the SCM, areas available for reclamation have increased and SCC has increased the amount of reclamation completed.

2.4.3 Investments in Clean Energy

DEQ received public comments requesting that consideration of an alternative to replace coal mining with "investments in clean energy." This alternative was not carried forward for further analysis because it does not meet the purpose of the project (Section 1.3) which is to review and make a decision on SCM's proposed TR1 Project and to comply with MSUMRA and its implementing rules. In addition, MEPA does not allow for consideration of alternative facilities or alternative to the proposed project itself (Section 75-1-220(1), MCA).

2.4.4 No Mining on West Side During Lekking and Brood Seasons

DEQ explored an alternative in which SCM would curtail mining on the west side of the mine to limit noise and other activities during the sage grouse breeding season. Implementation of this alternative would limit mining in a significant area of SCM from March 15 through July 15. This alternative was not carried forward for further analysis because it would not conform with the existing approved mine plan. The alternative would limit the time during which reclamation activities could be conducted, including elimination of the spring seeding period. This alternative also would not allow SCM to move through the sequence of mining operations from topsoil stripping, truck and shovel prestripping, dragline, and coal removal stages without stopping for a particular season. In addition, SCM would be limited in their ability to blend coal of different qualities to meet coal quality criteria for their customers.

2.4.5 Reduce Coal Mining Rates and Numbers of Trains

Under this alternative, SCM would reduce their coal mining production rates, resulting in the need for fewer coal trains. This alternative was not carried forward for further analysis because it is inconsistent with the project's stated purpose and would not add an environmental benefit. The alternative would increase the duration of mining and train traffic. It would also delay reclamation, potentially increasing impacts in the project area.

In addition, SCC is not proposing to increase the number of coal shipments. Production rates would remain the same in both the No Action and the Proposed Action.

2.4.6 Create Regional Coal Train Transportation Plan

Comments were received asking DEQ to consider an alternative requiring SCM to develop or participate in a regional coal train transportation plan to improve scheduling of coal trains to minimize impacts to traffic and to communities traversed by railroads. This alternative was not carried forward for further analysis because it would not meet the stated project purpose. The action before DEQ is to review and decide on SCC's major revision application that is compliant

with MSUMRA and its implementing rules. The impacts from rail transportation of coal are discussed in Section 3.9 (Transportation).

2.4.7 Additional Aquifer Restoration Plan for Mine Pits

Under this alternative, SCM would complete additional aquifer restoration efforts in the mined pits to improve ground water quality and quantity after mining. This alternative is based on a misconception of the ground water aquifer. The basis for this alternative is that ground water is present in underground streams instead of being transmitted through an extensive area of bedrock. This alternative would require SCC to develop "French drains" to connect the upstream portion of the underground stream to the downstream portion. This is technologically infeasible and would not result in the appropriate reclamation of the aquifer.

2.4.8 Limit New Oil and Gas Wells

Public comments request DEQ consider an alternative that would limit the development of new oil and gas wells (especially coal-bed methane wells) within a specified distance from the mine boundary. This alternative does not meet the stated project purpose. The action before DEQ is to review and decide on SCC's major revision application to mine coal that is compliant with MSUMRA and its implementing rules. In addition, this alternative would not appreciably accomplish the same objectives or results as the Proposed Action as defined in ARM 17.4.603(2)(a)(i) and as stated in Section 1.3.

2.4.9 Mitigation Measures Suggested

In addition to the sage grouse compensatory mitigations described in Section 2.3.11 and presented in detail in Appendix A, scoping comments suggested other mitigation measures to add to any action alternative. Some of the mitigation measures are already required and were not studied in detail.

- Shape the top profile of the coal in the loaded train cars and combine with approved topper agents to reduce emissions of fugitive coal dust. This is the method that is currently followed in accordance with ARM 17.8.308.
- Establish methods to mitigate dust. Separate mitigation for dust control was not considered because the mine already actively controls fugitive dust during activities (see Section 2.2.6) in accordance with ARM 17.24.31, ARM 17.8.304 and ARM 17.8.308. SCM currently incorporates BMPs to mitigate dust under their air quality permit. SCM would continue to use existing BMPs and include new practices as they become available.

2.5 Summary Comparison of Alternatives

Table 2.5-1 provides a comparison of the main SCM features under the No Action and the Proposed Action. The impacts most likely to occur, or that potentially affect some aspect of the human environment in a substantial way, are compared for each alternative in **Table 2.5-2.** A full discussion of all potential impacts is contained in Chapters 3 and 4 in the resource-specific subsections.

Table 2.5-1
Comparison of Alternative Features

Feature	No Action	Proposed Action (with Mitigations)
Surface Mine Permit Boundary	9,220 acres	Same as No Action
Life of Mine Disturbance Area	6,134 acres	7,111 acres (an additional 977 acres) Breakdown for TR1 Project: • 844 acres for expansion of Pits 1, 2 and 6 • 133 acres for constructing temporary overburden stockpile west of Pit 4
Surface Disturbance in Sage grouse Core Area	1,395 acres	Approximately 642 additional acres in the TR1 would be disturbed for a total of 2,037 acres within SCM Permit Boundary. Mining would result in a loss of 615 functional acres of sage grouse habitat. *(Sage grouse compensatory mitigation of $107,727 would be paid for loss of 615 functional acres.)*
Recoverable Coal	117.8 million tons	189.9 million tons (an additional 72.1 million tons)
Life of Mine	Mining continues to 2027 followed by reclamation	Mining continues from 2027 through 2031, followed by reclamation
Mine Closure & Reclamation	Reclamation methods per SCM's approved Reclamation Plan; postmining land used for livestock grazing, wildlife habitat, and pastureland	Similar to No Action but post mining topography changes to provide additional bench areas more suitable for sage grouse. SCM will commit to implementing the HRRP and will participate in the CCAA program. *(SCM would pay sage grouse compensatory mitigation amount of $107,727 for loss of 615 functional acres of sage grouse habitat.)*

Table 2.5-2
Comparison of Effects by Alternative and Resource

Resource/ Issue	No Action	Proposed Action (with Mitigations)
Air Quality	Excellent air quality with limited local sources of pollutants and consistent wind dispersion. SCM to continue to control fugitive dust per SCM's Montana Air Quality Permit (MAQP) #1120-12.	Air quality would continue to be excellent. An estimated annual emission of PM_{10} of 668.53 tons per year over the additional 4 years if mine life. Fugitive dust will continue to be controlled per SCM's MAQP #1120-12

Table 2.5-2
Comparison of Effects by Alternative and Resource

Resource/ Issue	No Action	Proposed Action (with Mitigations)
Land Use	SCM would not expand mining to the TR1 area and approved land use would remain unchanged. The 977 acres of grazing land would not be disturbed.	Surface disturbance for the additional 977 acres would be reclaimed to 748 acres of wildlife habitat and 229 acres of Grazing Land.
Noise	SCM would not expand mining to the TR1 area and existing noise levels are estimated to be approximately L_{90} 15 dBA and L_{50} 20 dBA, which are typical for sparsely populated, rural locations, with man-made noise sources intermittently higher. The predicted L_{50} noise levels would exceed ambient noise by more than +10 L_{50} dBA during pre-strip operations at 3 of the nearest leks.	Expanded mining in Pits 1, 2, and 6 would result in short-term noise impacts at 3 sage grouse leks. The L_{50} noise levels are only predicted to exceed the ambient noise by more than +10 L_{50} dBA at the Pasture lek during topsoil salvage in 2029, when the equipment is closest to the lek.
Socioeconomics	SCM would maintain current level of 281 employees for about 5 years (at 13 to 14 million tons per year); would increase to 340 employees with increase to 18 million tons per year. Total annual taxes and royalties paid to Montana to remain at approximately $42 million.	Maintain approximately 281 to 340 employees and income for an additional 4 to 7 years. Total taxes and royalties of $42 to $59.5 million would continue to be paid to Montana over 4 to 7 more years.
Soils	SCM would not expand mining to the TR1 area and there would be no impacts to soils on the 977 acres.	An additional 977 acres would be disturbed with long-term and moderate impacts to soil physical properties, loss of soil structure, soil compaction, and potential soil erosion. Soil productivity would return to previous levels within 10 years after reclamation.
Transportation	SCM would continue to ship coal by rail, with an incidental amount by truck hauling, until all recoverable coal is mined in approximately 2027. An annual average daily traffic (AADT) count on Highway 314 would continue at about 176.	Continue to ship coal for about 4 more years using the same methods and daily traffic counts.
Vegetation and Reclamation	SCM would not expand mining to the TR1 area and there would be no impacts to vegetation on the 977 acres.	The TR1 area supports sagebrush, grassland (including cheatgrass), greasewood, and limited stands of juniper in the draws and steeper slopes. Mining disturbances could result in additional weed infestations that would require monitoring and treatment. Much of reclamation is at the end of mining and additional areas would be left unreclaimed for longer periods. (SCM would pay sage grouse compensatory mitigation

Table 2.5-2
Comparison of Effects by Alternative and Resource

Resource/ Issue	No Action	Proposed Action (with Mitigations)
		amount of $107,727 for loss of 615 functional acres of sage grouse habitat.)
Water	Mining would continue in the current permit area but not expand into the TR1 area. Existing impacts include reductions in the surface flow in Pearson Creek and reductions in the flow of the AD aquifer to the Tongue River Reservoir. Impacts to ground water would taper off over the remaining life of mine.	Most of the TR1 expands mining within the South Fork Spring Creek and Pearson Creek Drainage areas as shown in Figure 3.11-1. The TR1 revision will also reduce surface flow within the South Fork Pearson Creek ephemeral stream channel. The Proposed Action is modeled to discharge at approximately 157 gallons per minute to the Tongue River Reservoir from mining the A-D aquifer. As a result, the Proposed Action Alternative is projected to reduce ground water flow by an additional 28 gallons per minute or 45 acre-feet per year. Impacts would continue until TR1 Project Area is reconnected with Pearson Creek and the Tongue River Reservoir.
Wildlife	Wildlife habitat consists of sagebrush-steppe, upland grassland, bottomland, reclaimed grasslands, and agriculture fields. Impacts general to all wildlife species include mortality, disturbance, and habitat loss and would primarily be from road kill, collisions with powerlines and fences, and trapping in pits. These impacts would continue through the life of the mine but would be minimized through reclamation and continued adherence to existing plans that are part of the SCM permit. Additional voluntary conservation measures (CCAA, SOSI) would also help minimize impacts to wildlife, including sage grouse.	SCM has completed or nearly completed 12 of 14 HRRP requirements in advance of the TR1 Project. SCM also voluntarily participates in the CCAA related to TR1 to help minimize impacts to sage grouse and other anthropogenic activities in the area. SCM also submitted the SOSI Plan to provide broad, long-term direction for management of wildlife species of special interest that occur in the SCM wildlife monitoring area. (SCM would pay sage grouse compensatory mitigation amount of $107,727 for loss of 615 functional acres of sage grouse habitat.)
Cultural Resources	There would be no additional ground disturbance with the potential to disturb cultural sites. Sites in the project area will continue to degrade naturally.	TR1 would adversely affect one site that has been determined to be eligible for the NRHP. The approved mitigation plan for the one site will be completed prior to disturbance.

2.6 AGENCY PREFERRED ALTERNATIVE

The rules and regulations implementing MEPA require agencies to indicate a Preferred Alternative in the draft EIS, if one has been identified. DEQ has identified the Proposed Action Alternative with mitigations as the Preferred Alternative for the reasons discussed below as required by ARM 17.4.617(9).

2.6.1 Rationale for the Preferred Alternative

2.6.1.1 Sage Grouse Mitigation

The sage grouse compensatory mitigation is part of the Preferred Alternative to help minimize project impacts to sage grouse from the TR1 Project. During the required MEPA consultation process, DEQ contacted governmental agencies with special expertise in sage grouse mitigation. DEQ requested the BLM (Miles City Field Office), FWP (Region 7), and OSMRE to review and concur with DEQ's proposed sage grouse mitigation measures for the TR1 Project. DEQ would incorporate the sage grouse mitigation measures as conditions of approval, should DEQ grant the TR1 Project permit.

Through the environmental analysis, DEQ determined that opportunities for effective, on-site sage grouse habitat mitigations were limited. Previous disturbances and the cumulative impacts of TR1 and potential future projects would impact sage grouse habitat in the area. Therefore, a plan to complete compensatory mitigation off-site was pursued. A landscape-scale functional acreage approach was used to quantify and compare baseline (No Action) to the Proposed Action and estimate the compensatory amount for off-site sage grouse habitat mitigation. If approved, SCM would be required to pay a sage grouse compensatory mitigation amount of $107,727 for the loss of 615 functional acres of sage grouse habitat to the Montana Sage Grouse Oversight Team's Stewardship Fund.

The Preferred Alternative would include best practices to reduce noise impacts to wildlife, particularly for the predicted topsoil salvage noise level at the Pasture lek. The best practices are listed in the revised SCM Fish and Wildlife Plan, Section 17.24.312, TR1 Project Application (SCM 2017b) and include:

- Minimize surface disturbance activities to the extent practicable (e.g., soil salvage, road construction, grubbing, logging, exploratory drilling, etc.) during the primary breeding season for most species in the region (i.e., April 1 through July 31);
- Honor sage grouse lek buffers to the extent practicable and schedule disturbance activities near active leks to occur outside the breeding season; and
- Monitor all environmental variables, including vegetation, soils, wildlife (terrestrial and aquatic, as warranted), water and air quality/meteorology, to proactively mitigate mine related impacts.

DEQ has determined all aspects of the Preferred Alternative are reasonable, achievable under current technology, and economically feasible (Section 75-1- 201(1)(b)(iv)(C)(I), MCA). DEQ has

consulted with SCM regarding all aspects of the Preferred Alternative, has given due weight and consideration to SCM's comments to date regarding the Preferred Alternative, and will do so going forward in connection with the formulation of the final EIS (Section 75-1-201(1)(b)(iv)(C)(II), MCA).

3 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This chapter describes the existing conditions of relevant resources that could reasonably be impacted by implementation of the alternatives described in Chapter 2 as they relate to the TR1 application at the SCM. After the affected environment of each resource has been described, the potential direct and secondary impacts and unavoidable, irreversible, and irretrievable impacts of the No Action and Proposed Action are discussed.

3.1 INTRODUCTION

This chapter provides a baseline of current environmental conditions in the area affected from which to analyze and compare the effects of the Proposed Action and alternative(s)(ARM 17.4.617(3)). The impact analysis is developed around the issues identified in scoping (public and internal) and is based on a thorough review of relevant scientific information, an evaluation of proposed and industry practices, a review of regulatory requirements, and a compilation of results from on-site surveys and studies. For the purpose of this analysis, the project area is considered the existing SCM permit boundary and surrounding study areas. Each resource area discussion includes information on the data reviewed, how each data source was collected, and the geographic limits of the analysis area. Data analyses are presented commensurate with the importance of each respective impact (ARM 17.4.617(3)). Analysis areas vary by resource based on the potential for impacts and are defined at the beginning of each resource section.

3.2 RESOURCES AREAS CONSIDERED BUT NOT STUDIED IN DETAIL

The interdisciplinary team reviewed issues and associated resource areas and eliminated several resource areas from detailed analysis because, based on the issues, the resource areas were (1) determined to have no impacts or minimal impacts or (2) the analysis suggested the impacts were out of the scope of this EIS. Also, MEPA requires the impacts analysis be confined to the area within Montana's borders (Section 75-1-201(2)(a), MCA). Some resource impacts extended beyond Montana's borders and were analyzed only to the extent of the Montana border. **Table 3.2-1** provides rationale for resources that were considered but not analyzed in detail.

Table 3.2-1
Resource Areas Eliminated from Detailed Analysis

Resource Area	Determination	Rationale
Climate Change	Outside Scope	Per MEPA statute Section 75.1.201(2)(a), MCA.
Fish	Not present on-site; present downstream, but no impact	There are no perennial or intermittent streams or natural lakes/ponds in the permit area to support fish. Man-made impoundments are present but do not contain fish. Fish downstream in Tongue River and Tongue Reservoir are protected through MPDES requirements for surface water discharge of pollutants.
Health and Safety	Negligible impacts	Related concerns are addressed in air quality, water quality and transportation.
Paleontology	No impact	Dismissed pursuant with Section 22-3-435, MCA 2017.
Recreation	Negligible impacts	SCM manages public access to their mine permit area. Adjacent properties are privately owned and used for ranching.
Endangered Species Act (ESA) Listings	Not present	Black-footed ferrets are the only ESA-listed species in Big Horn County. No sign of black-footed ferrets has ever been documented in surveys conducted at SCM; the analysis area is not in black-footed ferret reintroduction areas and habitat to support a black-footed ferret (USFWS 1989) is not present. No other threatened or endangered wildlife species have been found in baseline or annual wildlife surveys.
Visual Quality	Negligible impacts	Related concerns are addressed in air quality and transportation.
Wastes (hazardous or solid)	Negligible impacts	Wastes generated from mining operations in the Project area would be collected, stored, and managed in other permit areas of the SCM. Hazardous wastes include greases, lubricants, paints, flammable liquids, solvents, and any other material as defined (40 CFR 261.3) and are permitted and managed through the DEQ Hazardous Materials Section.
Wetlands and Waters of the US	Not present	SCM completed wetlands and Waters of the US inventory and no jurisdictional areas were found.

3.3 Resource Areas Analyzed in Detail

Impacts were analyzed in detail for air quality, land use, noise, socioeconomics, soils, transportation, vegetation and reclamation, water, wildlife, and cultural resources.

The impact analysis will identify and estimate if the impacts are direct or secondary impacts. Direct impacts occur at the same time and place as the action that causes the impact. Secondary impacts are a further impact to the human environment that may be stimulated or induced by or otherwise result from a direct impact of the action (ARM 17.4.603(18)).

Where impacts would occur, the impacts analysis will also estimate the duration and intensity of the impact. The duration is quantified as follows:

- Short-term: Short-term impacts are defined as those impacts that would not last longer than the life of the project, including final reclamation.

- Long-term: Long-term impacts are impacts that would remain or occur following project completion.

The intensity of the impacts are measured using the following:

- No impact: There would be no change from current conditions.
- Negligible: An adverse or beneficial effect would occur but would be at the lowest levels of detection.
- Minor: The effect would be noticeable but would be relatively small and would not affect the function or integrity of the resource.
- Moderate: The effect would be easily identifiable and would change the function or integrity of the resource.
- Major: The effect would alter the resource qualities and diminish or improve the overall function and integrity of the resource.

Each resource includes an analysis area shown on **Figure 3.3-1** and **Figure 3.3-2.**

Figure 3.3-1. Air, Noise, and Other Resources Analysis Areas

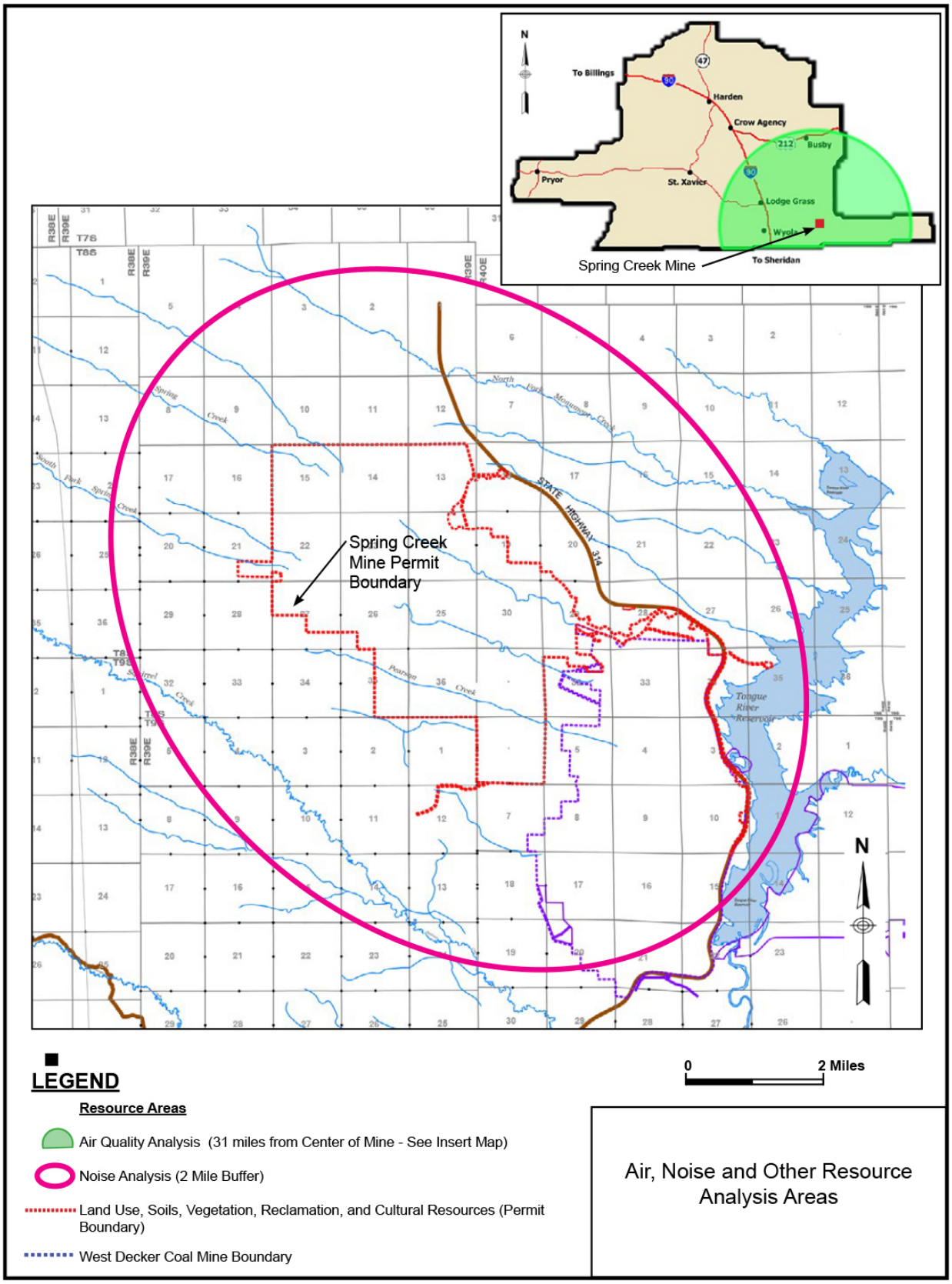
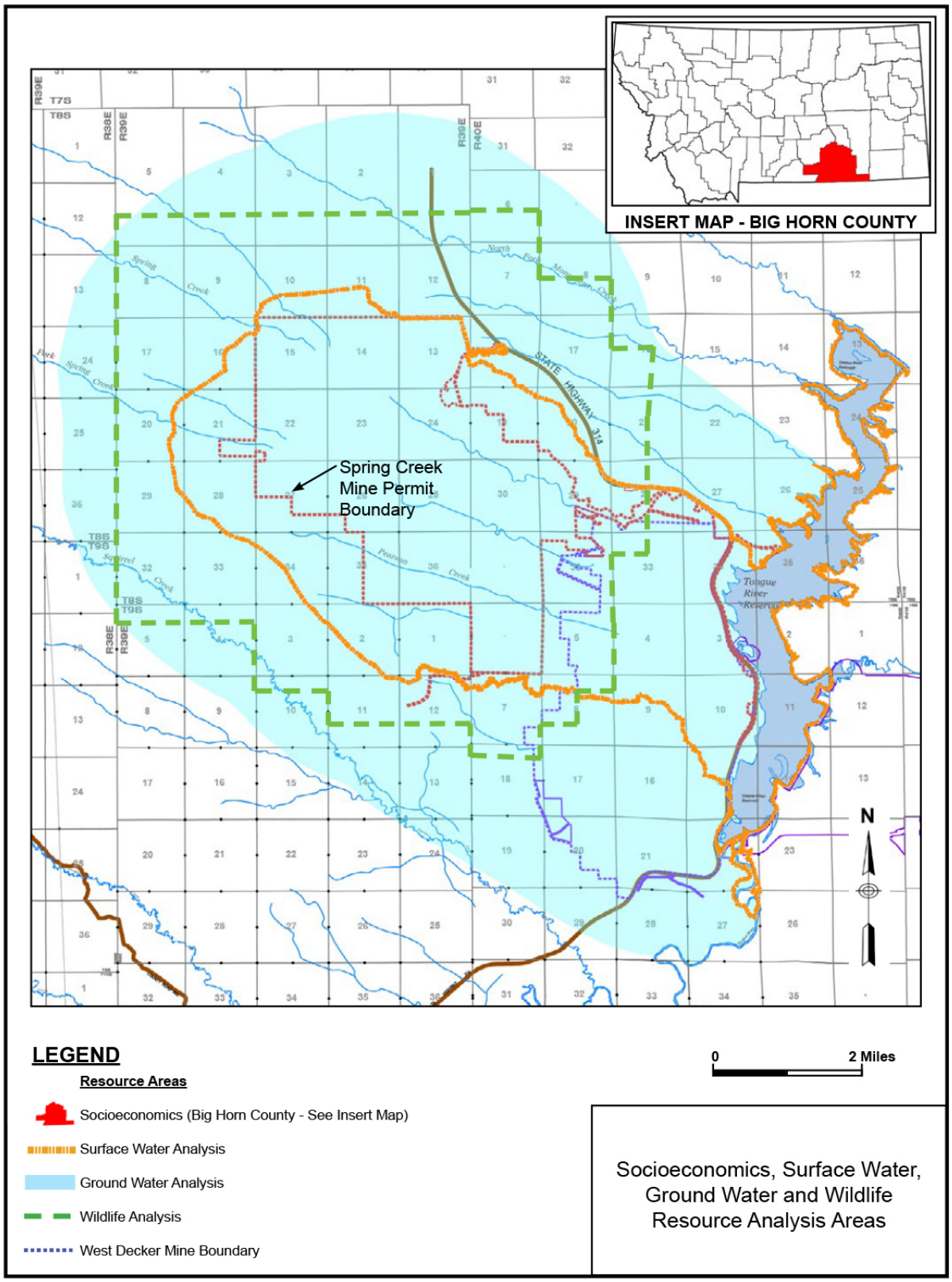


Figure 3.3-2. Socioeconomics, Surface Water, Ground Water, and Wildlife Resources Analysis Areas



3.4 AIR QUALITY

This section discusses air quality resource issues, the analysis area, the affected environment, and direct and secondary impacts associated with the No Action and Proposed Action Alternatives.

3.4.1 Analysis Area

The air analysis area includes the project area plus a 31-mile buffer, but all within the state of Montana as shown in **Figure 3.3-1**. A component and primary indicator for air quality is the amount of particulate matter with an aerodynamic diameter of 10 microns or less in size (PM_{10}) generated by mine construction activities and road traffic. Common sources for particulate matter in the SCM area are carbon black soot, smoke, and fugitive dust from unpaved roads and construction sites (DEQ 2016a). Particulate matter will be transient and primarily deposited within a half mile of the fugitive source locations that generate particulates. Primary gaseous pollutants such as nitrogen dioxide (NO_2) may travel farther from their sources. Atmospheric chemistry may cause the formation of secondary gaseous pollutants from the primary pollutants.

The EPA regulates emissions for on-road and non-road vehicles and engines by regulating fuel and sets emission standards on the amount of pollution a vehicle or engine can emit. This ensures that the vehicles meet federal average fuel economy standards (EPA 2018); therefore, engine emissions related to on-road and off-road vehicles are expected to meet regulations and were not addressed in this evaluation.

3.4.2 Issues and Analysis Methods

Public comments related to air quality and those generated from internal discussions are stated below and followed by a brief description of the method for analyzing the issue and potential impacts.

- How much nitrogen oxide air pollution would occur from blasting and for how long? The increase in nitrogen oxide air pollution was analyzed by estimating emissions using AP-42 Chapter 15 (EPA 1996, EPA 1998, EPA 2006a, EPA 2006b, EPA 2009). The duration of the pollution is a minimum of 4 years, as described in Section 2.3.
- How much will particulate matter emissions increase from coal dust and from diesel-fired coal-mining equipment and for how long? The increase in particulate matter and diesel emissions from coal mining and mining equipment were estimated using AP-42 Chapter 11 (EPA 1998). The duration of the pollution is a minimum of 4 years, as described in Section 2.3.
- How much particulate matter and nitrogen compounds would be emitted from coal dust particles and diesel emissions from railroad engines and trucks? Particulate matter and other vehicle emissions from vehicle travel were estimated using AP-42 Chapter 13 (EPA 2006c).

- How much particulate matter would be generated from blowing dust, dirt, and debris during construction and for how long? Particulate emissions from construction were estimated using AP-42 Chapter 13 (EPA 2006c). The duration of the pollution is a minimum of 4 years, as described in Section 2.3.
- How much would particulate matter increase from wind erosion of disturbed areas during operations and for how long? Particulate emissions from wind erosion was estimated using AP-42 (EPA 2009). The duration of the pollution is a minimum of 4 years, as described in Section 2.3.
- Would the emissions be within permit limits and would ambient air quality standards be met? Emissions and pollutions controls were compared to regulatory and permit requirements.

3.4.3 Affected Environment

This section describes the topography, climate and meteorology, regulatory environment, and existing air quality.

3.4.3.1 Regulatory Environment

The Proposed Action must demonstrate compliance with all applicable state and federal air quality standards. The CAA (42 U.S.C. 1857-18571) requires EPA to set NAAQS for six harmful pollutants to protect public health and the environment: carbon monoxide (CO), lead (Pb), nitrogen dioxide (NO_2), ground-level ozone, (O_3), particulate matter with an aerodynamic diameter of 10 microns or less (PM_{10}), fine PM with an aerodynamic diameter of 2.5 microns or less ($PM_{2.5}$), and sulfur dioxide (SO_2). EPA has delegated authority to administer and enforce the rules under the CAA in the state of Montana. DEQ has established air quality regulations under the ARM, Title 17, Chapter 8, Subchapters 1 through 17. In addition to the NAAQS, Montana has adopted state air quality standards known as MAAQS for the same pollutants (ARM 17.8.201, *et seq*.). The applicable NAAQS and MAAQS are provided in DEQ's air quality standards (DEQ 2016) and EPA Guidelines (EPA 2015).

Table 3.4-1
National Ambient Air Quality Standards

Pollutant [links to historical tables of NAAQS reviews]	Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)	primary	8 hours	9 parts per million (ppm)	Not to be exceeded more than once per year
		1 hour	35 ppm	
Lead (Pb)	primary and secondary	Rolling 3-month average	0.15 micrograms per cubic meter ($\mu g/m^3$)(1)	Not to be exceeded
Nitrogen Dioxide (NO_2)	primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years

Table 3.4-1
National Ambient Air Quality Standards

Pollutant [links to historical tables of NAAQS reviews]		Primary/ Secondary	Averaging Time	Level	Form
		primary and secondary	1 year	53 ppb (2)	Annual Mean
Ozone (O_3)		primary and secondary	8 hours	0.070 ppm (3)	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution (PM)	$PM_{2.5}$	primary	1 year	12.0 µg/m^3	annual mean, averaged over 3 years
		secondary	1 year	15.0 µg/m^3	annual mean, averaged over 3 years
		primary and secondary	24 hours	35 µg/m^3	98th percentile, averaged over 3 years
	PM_{10}	primary and secondary	24 hours	150 µg/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO_2)		primary	1 hour	75 ppb (4)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year

Source: (EPA 2015)

(1) In areas designated nonattainment for the Pb standards prior to the promulgation of the current (2008) standards, and for which implementation plans to attain or maintain the current (2008) standards have not been submitted and approved, the previous standards (1.5 µg/m3 as a calendar quarter average) also remain in effect.

(2) The level of the annual NO_2 standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.

(3) Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O_3 standards additionally remain in effect in some areas. Revocation of the previous (2008) O_3 standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.

(4) The previous SO_2 standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2)any area for which an implementation plan providing for attainment of the current (2010) standard has not been submitted and approved and which is designated nonattainment under the previous SO_2 standards or is not meeting the requirements of a State Implementation Plan call under the previous SO_2 standards (40 CFR 50.4(3)). A State Implementation Plan call is an EPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the required NAAQS.

To determine compliance and assess progress against the NAAQS, the EPA uses a criteria air pollutant-specific statistic referred to as a design value, which describes the air quality status compared to the NAAQS. The design value of each criteria air pollutant at a given location is calculated using ambient monitoring data following the form of the respective NAAQS. The

calculated design values are then used to officially designate the areas as “attainment” (demonstrates compliance with NAAQS), “nonattainment” (exceeds the NAAQS), “maintenance” (in the process of re-designating to attainment by continuing to show compliance with the NAAQS after having initially been in nonattainment), or “unclassifiable” (insufficient data for compliance determination). Once a nonattainment designation occurs, state and local air agencies must develop a federally enforceable State Implementation Plan to outline the control measures and strategies that will be used to attain and maintain compliance with the NAAQS (40 CFR Part 51). States are required to demonstrate that the plans adequately provide for timely attainment and maintenance of the NAAQS. In addition, states are encouraged to investigate alternative strategies and assess the cost and benefit of each in respect to achieving and maintaining attainment.

The New Source Review program of the CAA requires a preconstruction permit that outlines air emission limits and required operating procedures for any new or modified source for which the construction or modification would result in a level of net emissions increase of regulated pollutants that is of concern. The New Source Review program applies to sources in both nonattainment and attainment areas through the Nonattainment New Source Review program and the Prevention of Significant Deterioration program, respectively (EPA 2006c). There are several Prevention of Significant Deterioration classifications which allow differing levels of development. This acceptable growth is estimated using dispersion modeling techniques to quantify effects of current and potential pollutant sources on the surrounding airsheds. Class I areas indicate the highest level of protection while Class II may receive a greater amount of man-made pollution than Class I areas and can accommodate normal and well-managed industrial growth (DEQ 2016). SCM is not a PSD source, since the potential to emit does not meet the minimum amount of 250 tons per year.

Environmental protection performance standards within the Montana Settleable PM standard was designed for much larger particles than those covered under the federal NAAQS for PM_{10} and $PM_{2.5}$. Montana uses measures through permitting and enforcement that serve to provide reasonable precautions against excess PM generation. These include ARM 17.8.308 which includes but is not limited to the following requirements:

- No person shall cause or authorize the production, handling, transportation, or storage of any material unless reasonable precautions to control emissions of airborne particulate matter are taken. Such emissions of airborne particulate matter from any stationary source shall not exhibit an opacity of 20 percent or greater averaged over six consecutive minutes, except for emission of airborne particulate matter originating from any transfer ladle or operation engaged in the transfer of molten metal which was installed or operating prior to November 23, 1968.
- No person shall cause or authorize the use of any street, road, or parking lot without taking reasonable precautions to control emissions of airborne particulate matter.

In addition, when Montana PM, PM_{10}, and $PM_{2.5}$ sources trigger permitting, they must go through a best available control technology analysis and controls that, while reducing PM_{10} and $PM_{2.5}$, would also provide total PM reductions.

Requirements include stabilization of soils from wind erosion which helps to control fugitive particulate emissions from mining activities as outlined in ARM 17.24.702(2).

The New Source Performance Standards are technology-based emission limits that apply to specific categories of new or significantly modified stationary sources (40 CFR Part 60). The applicable New Source Performance Standards at Spring Creek Mine include 40 CFR Part 60, Subpart Y – Standards of Performance for Coal Preparation and Processing Plants and 40 CFR Part 60 Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (CI ICE). 40 CFR Part 60, Subpart Y applies to facilities in coal preparation and processing plants that process more than 181 megagrams (200 tons) of coal per day. The affected facilities include thermal dryers, pneumatic coal-cleaning equipment (air tables), coal processing and conveying equipment (including breakers and crushers), and coal storage systems, transfer and loading systems that commenced construction, reconstruction or modification after October 27, 1974, and on or before April 28, 2008. An owner or operator shall not cause to be discharged into the atmosphere system emissions which exhibit 20 percent opacity or greater due to dust from any coal processing and conveying equipment, coal storage system, or coal transfer and loading. 40 CFR Part 60 Subpart IIII applies to stationary CI ICE that commence construction after July 11, 2005, where the stationary CI ICE are manufactured after April 1, 2006, and are not fire pump engines, and owners and operators of stationary CI ICE that modify or reconstruct their stationary CI ICE after July 11, 2005, are subject to this subpart. An ICE is considered stationary if it remains at the permitted location for more than 12 months (or a shorter period for an engine located at a seasonal source).

Mining the additional coal reserves in the Proposed Action was approved with the modification of 1120-11. The revised MAQP 1120-12 was approved on October 16, 2014 and is subject to air quality regulations therein.

3.4.3.2 Topography

Topographic maps of the SCM area indicate the overall surface water drainage is southeast toward the Tongue River. Valleys and drainages in the area can affect climate and influence wind direction and dispersion of pollutants. Valleys in and adjacent to the SCM have potential to build up higher cumulative concentrations of industrial and transportation-related emissions because of up-valley daytime winds and down-valley nighttime winds. These winds can dominate local wind direction over regional prevailing winds.

3.4.3.3 Climate and Meteorology

Climate in the SCM area is generally characterized as semi-arid, or a region where the potential evapotranspiration exceeds the precipitation, but not by an extreme margin (Peel 2007).

The nearest location for recorded long-term climate data was the Sheridan Field Station, Wyoming (Station ID 488160) for the period of record of 1971 to 2000. The station is approximately 11 miles directly south of the SCM. Average annual maximum and minimum temperatures ranged from 58.9 to 29.8 degrees Fahrenheit (°F), respectively. The highest temperature was seen in July 2002 at 109 °F with highest temperatures occurring in mid to late summer. The lowest temperature was noted in December 1989 at –44 °F with lowest temperatures occurring December through early March.

For the period of record of 1920 to 2006, average annual precipitation and total snowfall were reported to be 15.04 inches and 43.4 inches, respectively. The heaviest precipitation was reported between April and June with heaviest snowfall occurring in January (Western Regional Climate Center 2017).

Wind data tabulated from 2014 indicates that prevailing winds are from the north-northwest with maximum winds greater than 25.5 miles per hour. The nearest recording station outside of the SCM station was Sheridan, Wyoming. The Western Regional Climate Center reported the annual average wind speed for 1996 to 2006 was 7.1 miles per hour (Western Regional Climate Center 2017).

3.4.3.4 Existing Air Quality

Air quality within the analysis area is excellent with limited local sources of pollutants and consistent wind dispersion. All areas within and adjacent to the project area are currently considered in attainment/unclassifiable for all NAAQS/MAAQS pollutants. SCM monitored PM_{10} as an air permit requirement from initial mine development through 2009 and confirmed the ambient air quality throughout the monitoring period was at or near background levels and below the standards for PM_{10} (DEQ 2014). SCM continues to voluntarily monitor PM_{10} at the mine with the air monitoring stations. Annual PM_{10} concentrations in micrograms per cubic centimeter of air (µg/m^3) at two locations for years 2011 through 2018 are shown in **Table 3.4-2**.

Table 3.4-2
PM10 Emissions Monitoring 2011 through 2018 (annual mean µg/cubic meter)

Site	2011	2012	2013	2014	2015	2016	2017	2018
A	22.6	26.2	20.7	26.9	26.6	14.1	24.2	25.1
B	23.3	26.4	19.7	26.9	27.3	13.6	24.2	26.2

The airshed around SCM is classified as Class II Prevention of Significant Deterioration area. The Northern Cheyenne Reservation is a non-federal Class I airshed (DEQ 2018b). The reservation is located approximately 20 miles north of the SCM. Based on prevailing wind from the north-northwest, the reservation is upwind of the SCM.

Montana has 14 official nonattainment areas or areas not meeting the MAAQS (DEQ 2018c). Of those areas, the nearest is Lame Deer, which is located 40 miles north of the SCM and is a federal nonattainment area for PM_{10}. The SCM area is located outside of the nonattainment boundary. Based on prevailing wind from the north-northwest, the SCM is downwind of the nonattainment area. Two other nonattainment areas are more than 90 miles to the northwest in Billings (carbon monoxide) and Laurel (sulfur dioxide). Each area is located upwind of the SCM and neither of the pollutants are associated with particulate matter or NO_x.

3.4.4 Direct and Secondary Impacts

3.4.4.1 No Action Alternative

Fugitive dust is controlled per SCM's MAQP #1120-12 (DEQ 2014) and would continue to be controlled the same way under the No Action Alternative and as per ARM 17.8.308. Measures used to control fugitive dust according to the Air Pollution Control Plan (SCM 2002) and the best available control technology (ARM 17.8.752) requirements in MAQP #1120-12 (DEQ 2014) include:

- Enclosed conveyors;
- Enclosed dump pit with a dust suppression system;
- Dust suppression at the crusher operation;
- Dust suppression and collection system with a chute at the railcar loadout;
- Completely enclosed storage barn for the coal storage pile;
- Minimization of fall distances of coal and overburden when loading trucks and stockpiles;
- Prevention of overshooting when blasting;
- Vegetation to prevent wind erosion;
- Chemical dust suppression and water on haul roads along with removal of loose debris from haul roads;
- Reclamation within one growing season;
- Pavement of access roads; and
- Filters on the coal quality analytical laboratory.

If the No Action Alternative is selected, these process controls would remain unchanged. The mine would continue to operate under the existing permit until operations and reclamation are complete in about 2027. The impacts to air quality from the No Action Alternative would be secondary (downwind and after the mining disturbance), short-term, and minor.

3.4.4.2 Proposed Action Alternative

Several activities associated with the Proposed Action would result in emissions of air pollutants from the SCM. The individual activities are summarized in the sections below. The text sections

describe each activity and the basis for the emissions factors used in the analysis, as well as the multiplier used for the emissions calculations.

PM_{10} would be the most prevalent emission (**Table 3.4-3**). The SCM air permit details emission factors for a permitted production rate of 30 million tons of coal per year (DEQ 2014). The Proposed Action is expected to result in the production of 18 million tons of coal production per year. To estimate emissions, the analysis assumes the same emission factors from the air permit established for 30 million tons production per year (EPA 1996, EPA 1998, EPA 2006a, EPA 2006b, EPA 2009, DEQ 2014) and most were estimated using activity rates estimated using a ratio of the production rates. Based on the ratio of 18 million tons per year to 30 million tons per year, emissions were calculated as 60 percent (18 ÷ 30) of the permit estimates. PM_{10} emissions from wind erosion was based on the disturbed area (wind erosion from disturbed acres), which is the additional 977 acres to be disturbed under the Proposed Action. The estimated annual emissions of PM_{10} is 668.53 tons per year (**Table 3.4-3**). It should be noted that this method generates a calculation of additional emissions is very conservative, because disturbance of 977 acres would occur over 4 years, not 1 and the mining permit requires contemporaneous reclamation and for surface disturbance to be minimized as much as possible.

Emissions of $PM_{2.5}$ were also estimated (**Table 3.4-3**). Emissions factors for $PM_{2.5}$ were not included in the air permit and therefore were calculated as a portion of the PM_{10} based on AP-42 emissions factor guidance (EPA 1996, EPA 1998, EPA 2006a, EPA 2006b, EPA 2009, Midwest Research Institute 2006) depending on the source. The ratio of $PM_{2.5}$ to PM_{10} is between 0.023 and 0.15. The $PM_{2.5}$ emissions associated with these activities were estimated as 54.81 tons per year.

Table 3.4-3
Estimated Emissions of PM_{10} and $PM_{2.5}$ for Proposed Action

Process	PM_{10} Emissions (tons/year)	$PM_{2.5}$ Emissions (tons/year)
Topsoil Removal	3.14	0.44
Topsoil Dumping	0.22	0.03
OB Drilling	2.64	0.15
OB Blasting	12.84	0.74
OB Removal (Truck/Shovel)	19.63	2.94
OB Replacement (Truck/Shovel)	19.63	2.94
OB Removal (Dragline)	180.65	4.09
OB Removal (Cast Blast)	4.62	0.69
OB Replacement (Cast Blast)	4.62	0.69
OB Haul	166.06	16.61
Coal Drilling	0.34	0.02
Coal Blasting	5.93	0.34

Table 3.4-3
Estimated Emissions of PM_{10} and $PM_{2.5}$ for Proposed Action

Process	PM_{10} Emissions (tons/year)	$PM_{2.5}$ Emissions (tons/year)
Coal Removal	0.45	0.07
Coal Haul	94.62	9.46
Coal Dump (Truck Dump)	0.03	0.00
Coal Dump (Conveyor)	0.15	0.02
Wind Erosion (Open Acres)	0.26	0.04
Wind Erosion (Storage Pile at Conveyor)	0.19	0.03
Wind Erosion (Storage Pile at Truck Dump)	0.19	0.03
Haul Road Repair	2.27	0.23
Water Trucks	61.10	6.11
OB Manipulation (Dozers)	67.22	6.72
Lump Coal Production	0.00	0.00
Stoker Coal Loadout	0.00	0.00
KPI-JCI 400 tph Scoria Crusher	0.53	0.08
Metso 400 tph Scoria Screen	0.74	0.11
Scoria Conveyor Transfer Points (10)	0.05	0.01
Fragmented Stone Load-in	0.02	0.00
Storage Pile Load-in and Load-out (2 piles)	1.68	0.25
Scoria Haul Road	1.83	0.18
Access Road	0.45	0.04
Nonroad Engine Sources	14.71	1.47
Train Loading	0.53	0.08
Coal Loadout from Stockpile (Truck Dump)	0.03	0.00
Primary Crusher (Truck Dump)	0.35	0.05
Secondary Crusher (Truck Dump)	0.54	0.08
Coal Loadout from Stockpile (Conveyor)	0.02	0.00
Primary Crusher (Conveyor)	0.02	0.00
Stationary Combustion Sources	0.25	0.02
Total Annual Emissions	668.53	54.81

If the Proposed Action is approved, fugitive dust will continue to be controlled per SCM's MAQP #1120-12, as described in Section 3.3.1 above (DEQ 2014).

Emissions of NO_x were estimated for blasting activities. Because information on the specific type of blasting explosives in use was not available, the highest emission factor in AP-42 Section 15.9 was used as a conservative estimate (EPA 2009). **Table 3.4-4** summarizes estimated NO_x emissions from blasting activities. The estimated annual emissions of NO_x are 0.0036 tons per year, or 7.14 pounds per year.

Table 3.4-4
Estimated Emissions of NOx for Proposed Action

Process	Controlled NOx Factors			Emissions	Emissions
	Value	Units	Blasts/year	Pounds/year	Tons/year
Overburden Blasting	0.07	pounds/blast	30	2.1	0.0011
Coal Blasting	0.07	pounds/blast	72	5.04	0.0025
Total Annual Emissions				**7.14**	**0.0036**

As noted in Section 3.4.1, secondary impacts in the form of transient particulate emissions would primarily be deposited within a half mile of where they are generated and gaseous pollutants such as NO_2 may travel farther. Dust control measures would eliminate secondary impacts from particulate emissions further than one-half mile downwind.

Based on the analysis above, overall impacts on air quality from the Proposed Action are expected to be both direct (on SCM and at the time of mining) and secondary (downwind), short-term, and negligible.

3.4.5 Unavoidable, Irreversible and Irretrievable Impacts

3.4.5.1 Air Quality

Some impacts to air resources are unavoidable and would be associated with emissions and fugitive dust from operating a coal mine, traffic and transportation of coal, and other reasonably foreseeable future actions.

3.5 LAND USE

This section discusses land use resource issues, the analysis area, the affected environment, and direct and secondary impacts associated with the No Action and Proposed Action Alternatives.

3.5.1 Analysis area

The analysis area for land use is the Permit Area (9,220 acres).

3.5.2 Issues and Analysis Methods

Issues identified for analysis include the following:

- What would the postmining land use be? This issue was addressed by reviewing the reclamation plan and postmining land uses.
- Who owns the expansion parcels? A listing of parcels and the ownership is presented in the Affected Environment in Section 3.5.3.

3.5.3 Affected Environment

3.5.3.1 Regulatory Environment

Land use is defined in MSUMRA, Section 82-4-203(29), MCA, as;

> specific uses or management-related activities, rather than the vegetative cover of the land. Land uses may be identified in combination when joint or seasonal uses occur and may include land used for support facilities that are an integral part of the land use. Land use categories include cropland, developed water resources, fish and wildlife habitat, forestry, grazing land, industrial or commercial, pastureland, land occasionally cut for hay, recreation, or residential.

ARM 17.24.762 Postmining Land Use includes regulations on postmining land use, which are as follows:

(1) The postmining land use must satisfy Section 82-4-203(29) and Section 82-4-232(7), MCA. In applying Section 82-4-232 (7), MCA, the following applies:

All disturbed areas must be reclaimed in a timely manner to conditions that are capable of supporting the land uses that they were capable of supporting prior to any mining or to higher or better uses.

(2) Alternative postmining land uses may be proposed and must be determined in accordance with Section 82-4-232(7) and (8), MCA, and ARM 17.24.821 and 17.24.823.

(3) Certain premining facilities may be replaced pursuant to Section 82-4-232(10), MCA.

MSUMRA Section 82-4-232(7), MCA states that all disturbed areas must be reclaimed in a timely manner to conditions that are capable of supporting the land uses that they were capable of supporting prior to any mining or to higher or better uses approved pursuant to subsection (8).

The approximately 977 acres would be disturbed and would require reclamation to the approximate original premine topography and approximate original drainage basins to facilitate postmine land uses. This section describes the land ownership, leases, and primary and other premining land uses in the analysis area.

3.5.3.2 Land Ownership and Leases

The surface ownership of the Project Area is shown in **Table 3.5-1** and on **Figure 3.5-1**. **Figure 3.5-2** shows oil and gas ownership.

Table 3.5-1
Surface and Mineral Ownership Within the Permit Boundary

Type	Acres of Permitted Mineral Ownership	Acres of Permitted Surface Ownership
Federal (Bureau of Land Management)	7,896	904
Tribal (Northern Cheyenne Tribe)	0	17
State (DNRC and MDT)	1,120	674
Private	204	7,625
Totals	**9,220**	**9,220**

Source: SCM 2019.

Primary Premining Land Uses

The primary premining land uses in the analysis area that are defined in MSUMRA Section 82-4-203 (29), MCA are wildlife habitat, grazing land, and pastureland. These land uses are also the dominant land uses on adjacent lands. These land uses are described in the sections below and the premine acres within the disturbed area are shown in **Table 3.5-2**.

Table 3.5-2
Premining Land Uses in Disturbed Area

Premining Land Use	Acres
Wildlife Habitat	3,584
Grazing	1,845
Pasture	703
Ponds	3
Total Disturbed Area at Life of Mine	**6,134**

Source: (SCM 2018c)

Wildlife Habitat

Fish and wildlife habitat are defined in MSUMRA Section 82-4-203(20), MCA, as “land dedicated wholly or partially to the production, protection, or management of species of fish or wildlife.” The primary surface land use is for wildlife habitat. There is no fish habitat in the land use analysis area. Wildlife habitat, especially for sage grouse, is discussed in detail in Section 3.11, Wildlife.

Figure 3.5-1. Surface Ownership Map

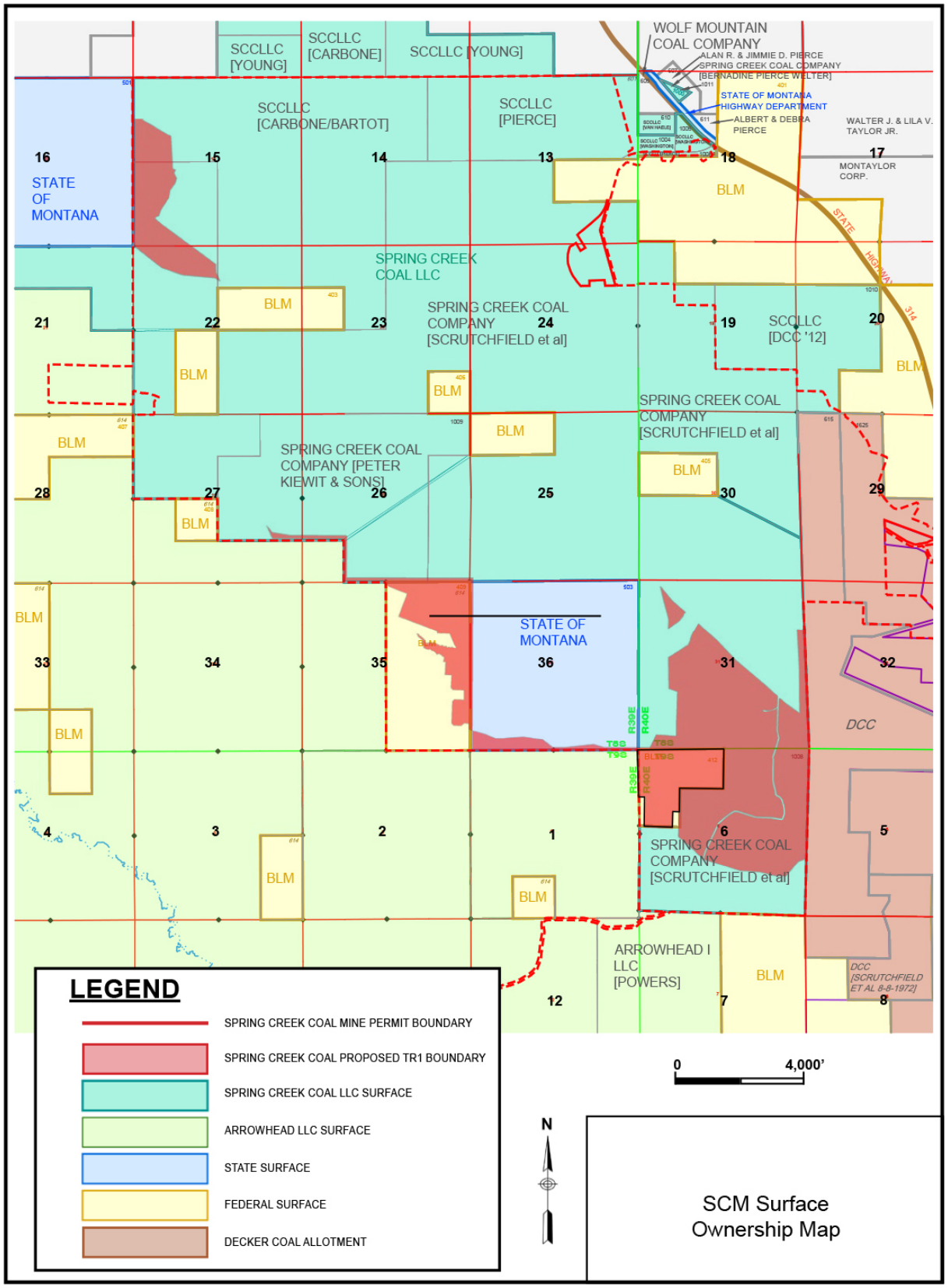
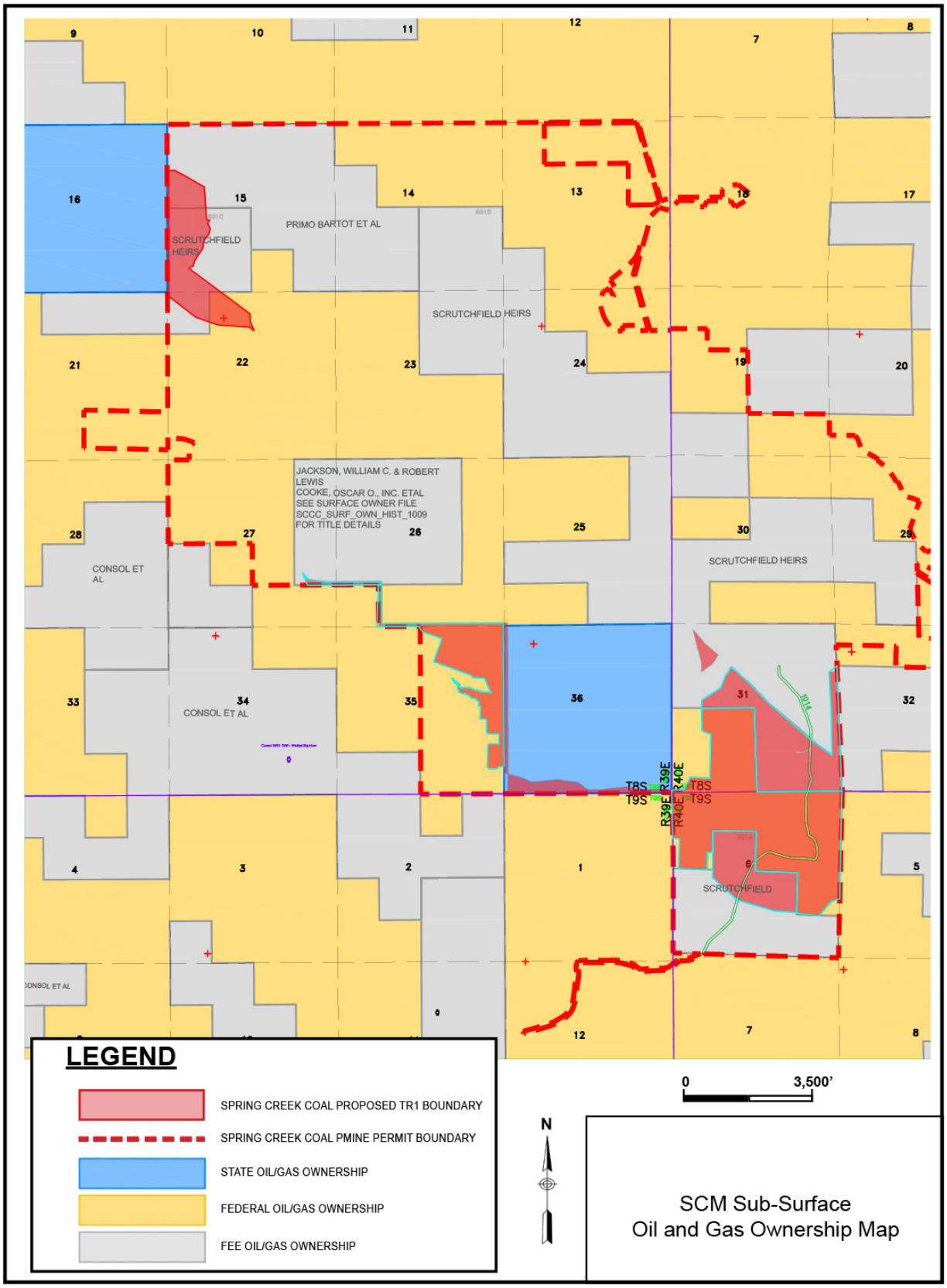


Figure 3.5-2. Oil and Gas Ownership Map



Grazing Land

Grazing land is defined in MSUMRA Section 82-4-203(22), MCA, as "land used for grasslands and forest lands where the indigenous vegetation is actively managed for livestock grazing or browsing or occasional hay production."

There is one grazing lease (GR3387) on a portion of the approximately 977 acres. There is no livestock grazing within the TR1 Project Area, however, grazing occurred premining.

Pastureland

Pastureland is defined in MSUMRA Section 82-4-203(38), MCA, as "land used primarily for the long-term production of adapted, domesticated forage plants to be grazed by livestock or occasionally cut and cured for livestock feed."

3.5.4 Direct and Secondary Impacts

3.5.4.1 No Action Alternative

Under the No Action Alternative, SCM would not expand mining to the TR1 Project Area and there would be no direct or secondary impacts to land use for this area.

3.5.4.2 Proposed Action

Table 3.5-3 shows the surface and subsurface (coal and other minerals) ownership in the TR1 Project.

Table 3.5-3
Surface and Subsurface (Coal and Other Mineral) Ownership within the Approximately 977 Acres

Ownership	Acres Permitted	
	Surface	Subsurface (Coal)
Federal (BLM) Lands	175	936
State of Montana – School Trust Lands	41	41
SCM	761	0
Total	**977**	**977**

The approximately 977 acres of additional surface disturbance to recover the 72 million tons of recoverable coal are all located within SCM's permit boundaries.

Figure 1.1-2 depicts the SCM permit boundaries and coal leases.

Oil and gas leases also occur within the 977 TR1 Project Area, as shown in **Table 3.5-4**.

Table 3.5-4
Oil and Gas Leases within Approximately 977 Acres

Township and Range	Section	Owner	Acres
T8S, R39E	15 and 22	Scrutchfield	109

Table 3.5-4
Oil and Gas Leases within Approximately 977 Acres

T9S, R40E	6	Scrutchfield	98
T8S, R40E	31	Scrutchfield Heirs	179
T8S, R39E	36	State of Montana	43
T8S, R39E	35	Federal	125
T8S, R39E	22	Federal	21
T8S, R40E	6 and 31	Federal	395
T8S, R39E	26 and 27	Jackson, William, and Robert Lewis	7

As mining progresses, approximately 844 acres would be disturbed for the expansion of Pits 1, 2, and 6 to mine coal, while 133 acres would be disturbed for constructing a temporary overburden stockpile in an area west of Pit 4. Disturbance of the approximately 977 acres would curtail other mineral development; cause wildlife habitat disturbance; and reduce livestock grazing during active mining in the permit boundary for an additional 15 years during mining and reclamation. Wildlife (particularly big game) use would be displaced while the proposed acres are being mined and reclaimed. Livestock grazing is currently not conducted inside the permit boundary. Once reclamation is complete after Phase IV bond release (estimated to be about 10 years), livestock grazing could be conducted once the permit boundary is removed.

SCM would reclaim the 977 acres to reestablish wildlife habitat as mining progresses. See Section 3.9, Vegetation and Reclamation, for details on reclamation.

Overall, the direct impacts on land use would be moderate and short-term, continuing through the time needed to obtain bond release.

During operations and reclamation, no impacts on land uses are expected to extend beyond the Project Area, so there would be no secondary impacts occurring at a different location. There would be impacts to sage grouse and other wildlife (Sections 3.6.4 and 3.12.4) from noise and SCM has already committed to follow the best practices listed in the approved SCM Fish and Wildlife Plan, Section 17.24.312. The mined areas would continue to recover following reclamation and the postmining land use would primarily be for wildlife habitat. The reclaimed wildlife habitat land use could support some livestock grazing. As reclamation progresses to the Phase III reclamation level, the established reclamation areas would be monitored, and some areas allowed to be grazed by livestock. Following final Phase IV reclamation, the land use could include other mineral development.

3.5.5 Unavoidable, Irreversible, and Irretrievable Impacts

3.5.5.1 Land Use and Recreation

The reduction in livestock grazing and elimination of wildlife habitat during mining is an unavoidable impact. The removal of coal through mining is irreversible and irretrievable.

3.6 NOISE

This section discusses noise issues, the analysis area, the affected environment, and direct and secondary impacts associated with the No Action and Proposed Action Alternatives.

3.6.1 Analysis area

The noise analysis area for direct and secondary impacts on noise-sensitive receptors includes a 2-mile buffer area around the TR1 Project Area. The 2-mile buffer is adequate to evaluate the project equipment noise as it dissipates from the source.

3.6.2 Issues and Analysis Methods

- How much would the ambient noise level increase at noise-sensitive receptors? Operational and reclamation noise levels were predicted using the Cadna-A Version 2017 software and compared to ambient conditions.

3.6.3 Affected Environment

Noise is generally defined as unwanted sound, and can be intermittent or continuous, steady or impulsive, stationary or transient. Noise levels heard by animals are dependent on several variables, including distance and ground cover between the source and receiver and atmospheric conditions. Perception of noise is affected by intensity, frequency, pitch and duration. Response to noise by wildlife is a function of many variables, including characteristics and duration of the noise, habitat, season, previous noise exposure, and other factors. Different species have different levels of noise tolerance, habituation, and displacement.

3.6.3.1 Regulatory Environment

A review of existing federal, state, and county noise regulations, ordinances, and guidelines was conducted and used to establish significance criteria for assessing project compliance at identified noise-sensitive receptors, including:

- Surface blasting requirements, including limiting blasting to daytime hours, requiring a warning signal and blasting schedule, flyrock restrictions, etc. (ARM 17.24.624)

In 2005, FWP developed the *Management Plan and Conservation Strategy for Sage Grouse in Montana*. The plan describes the desired conditions for sage grouse habitat and identifies risks confronting habitat and sage grouse populations, including noise near leks that can disrupt breeding rituals and cause lek abandonment. This plan limits impacts of fossil fuel generation facilities to 10 A-weighted decibels (dBA) above background noise at the lek (FWP 2005). Per EO 10-2014 the MSGHCP was developed to sustain viable sage grouse populations and conserve habitat while utilizing the plan, and implementing EO 12-2015 that outlines stipulations for development, including noise. However, the TR1 Project is exempt from EO 12-2015 due to pre-existing lease conditions validated prior to EO 10-2014.

MSUMRA, however, requires each application to contain a fish and wildlife plan describing how the project will minimize disturbances and adverse impacts (including noise impacts) on fish,

wildlife, and related environmental values during mining and reclamation operations (ARM 17.24.312(1)(a)). Applicants are required to explain how they will utilize impact control measures, management techniques, and annual monitoring methods to protect or enhance habitats of unusually high value for fish and wildlife (ARM 17.24.312(1)(d)(iii)). DEQ consults with state and federal fish and wildlife authorities (including the Montana Sage Grouse Program) to ensure that reclamation will provide for habitat needs of various wildlife species in accordance with the approved postmining land use (ARM 17.24.751(2)(e)).

3.6.3.2 Noise Terminology

Noise levels are quantified using units of decibels (dB). Humans typically have reduced hearing sensitivity at low frequencies compared with their response at high frequencies. The "A-weighting" of noise levels, or dBA, closely correlates to the frequency response of normal human hearing (250 to 4,000 hertz [Hz]). Noise levels typically decrease by approximately 6 dBA every time the distance between the source and receptor is doubled, depending on the characteristics of the source and the conditions over the path that the noise travels. The reduction in noise levels can be increased if a solid barrier or natural topography blocks the line of sight between the source and receptor.

For environmental noise studies, noise levels are typically described using A-weighted equivalent noise levels (L_{eq}) during a certain time period. The L_{eq} metric is useful because it uses a single number, similar to an average, to describe the constantly fluctuating instantaneous noise levels at a receptor location.

The 90th percentile-exceeded noise level (L_{90}) is typically considered the ambient noise level. The L_{90} is a single number that represents the noise level exceeded during 90 percent of a measurement period. Therefore, it is also an indication of the residual noise level, and among the lowest noise levels during a measurement period. It typically does not include the influence of discrete noises of short duration, such as bird chirps, backup alarms, vehicle pass-bys, or a single blast. If a continuous noise is audible at a measurement location, such as an engine, typically it is that noise that determines the L_{90} of a measurement period even though other noise sources may be briefly audible and occasionally louder than the equipment.

The 50th percentile-exceeded noise level (L_{50}) is a metric that represents the single noise level exceeded during 50 percent of a measurement period. The L_{50} is the median noise level during a period of time. Therefore, if the L_{50} during a 1-hour period is 60 dBA, half of the constantly-fluctuating, instantaneous noise levels are greater than 60 dBA, and half are less than 60 dBA. Noises with a duration of less than 30 minutes during a 1-hour period will have little influence on the L_{50} metric for that hour, no matter how loud the noise. The L_{max} metric denotes the maximum instantaneous sound level recorded during a measurement period.

3.6.3.3 Existing Acoustical Environment

Existing man-made noise sources within 2 miles of the TR1 Project Area include the SCM operations, intermittent vehicles traveling on gravel roads, grazing activities and aircraft flyovers. Distant train, Highway 314 traffic, and other energy development (oil/natural gas) noise sources may also be audible. Natural sound sources include wind, wildlife, birds, insects, grazing animals, and flowing water in the area creeks.

No residences are located within 2 miles of the TR1 Project Area. Noise-sensitive wildlife species occupy the area, including sage grouse, sharp-tailed grouse, and raptors, as identified in Section 3.12. Three active sage grouse leks (Pasture, Alternate Pasture and Playa) are located within 1.5 miles west or southwest of Pits 1 and 2.

The existing ambient sound levels based on current operations are estimated to be approximately L_{90} 15 dBA and L_{50} 20 dBA, which are typical for sparsely populated, rural locations that are predominantly natural (Harris 1998, Patricelli et al. 2013). However, sound levels at noise receptors located adjacent to existing man-made and natural noise sources are intermittently higher.

3.6.4 Direct and Secondary Impacts

The assumptions used for the noise predictions are summarized in **Table 3.6-1**.

Table 3.6-1
Assumptions Used for Equipment Noise

Activity	Associated Equipment and Noise Levels (L_{max} at 50 feet)	Other
Topsoil Salvage or Reclamation	(3) 637 G Scrapers – 89 dBA (1) CAT 16 Road Grader – 85 dBA (1) Small D6 Cat Dozer – 85 dBA	• Elevation: 1-foot below ground surface (bgs) for topsoil storage, 20 feet bgs for reclamation • Location: 500 feet ahead of Coal Block • Operations: 7am-7pm, 7 days/week • Without equipment operating, existing estimated sound levels are: L_{90} 15 dBA and L_{50} 20 dBA
Pre-strip – Dozer	(1) CAT 834B Rubber Tire Dozer – 85 dBA	• Elevation: 1-foot bgs to 20 feet bgs • Location: Within Coal Block • Operations: 24 hours/day, 7 days/week
Pre-strip – Truck & Shovel	(1) 303 CAT 7495 4100 Electric Shovel – 82 dBA (8) Komatsu 830E Haul Trucks – 89 dBA (1) CAT 16 Road Grader – 85 dBA (1) Diesel Powered Light Plants – 81 dBA	• Elevation: 30 feet bgs to 200 feet above top of coal (approx. 182 feet bgs) • Location: Within Coal Block - haul to regrade area in backfill or overburden stockpile • Operations: 24 hours/day, 7 days/week • Haul trucks equipped with thermostatic fan clutches (20-30% of typical speed) and noise blankets

Table 3.6-1
Assumptions Used for Equipment Noise

		• Diesel lights nighttime hours only
Cast Drilling	(1) Ingersol-Rand DMM2 – 98 dBA (1) Atlas Copco DM50E Drills – 98 dBA	• Elevation: 200 feet above top of coal (approx. 100 feet bgs) • Location: Within Coal Block • Operations: 24 hours/day, 7 days/week • Drilling overburden 1 month ahead of Cast
Cast Shot – Blasting	Blast – 118 to 131 dB	• Elevation: 200 feet above top of coal (approx. 182 feet bgs) • Location: Within Coal Block • Operations: Daylight hours, 7 days/week • Shot within 1st month of Cast period (one to several months long) • Blast noise is instantaneous • Blast levels measured by CPE in Pit 4 • Surface blasting follows ARM 17.24.624
Cast Shot – Dozing	(2) CAT D11 Dozers – 85 dBA	• Elevation: 180 to 120 feet above top of coal (approx. 182 to 320 feet bgs) • Location: Within Coal Block • Operations: 24 hours/day, 7 days/week
Overburden Removal	(1) Electric Dragline – 79 dBA (1) Cat D11 Dozer – 85 dBA (1) John Deer 460G Skidder – 85 dBA	• Elevation: 60 feet above top of coal to top of coal seam (approx. 382 bgs) • Location: Within Coal Block • Operations: 24 hours/day, 7 days/week • Skidder moves power cable
Coal Removal	(4) Komatsu 830E Haul Trucks – 89 dBA (1) Hitachi EX1200 Track Hoe – 80 dBA (1) Rubber Tire Dozer – 85 dBA (2) 2300 Shovel – 82 dBA (1) CAT 16 Road Grader – 85 dBA (1) Goodwin HL5 Diesel Water Pump – 81 dBA (2) Diesel Powered Light Plants – 81 dBA	• Elevation: Top of coal seam to bottom of coal seam (382 to 462 feet bgs) • Location: Within Coal Block • Operations: 24 hours/day, 7 days/week • Grader split up between both coal shovels • Dewatering pump - one at each shovel • Haul trucks equipped with thermostatic fan clutches (20-30% of typical speed) and noise blankets • Diesel lights nighttime hours only

Sources: (CPE 2019, FTA 2006, Harris 1998, LSA Associates 2006, Patricelli, Blickley and Hooper 2013, SCM 2017a)

Diesel-powered equipment are dominant long-term noise sources during mining operations (**Table 3.6-1**). Noise levels will vary considerably based on the phase of mining, the type and condition of the equipment, the constantly-varying distances as the equipment moves, and the depth below ground surface (bgs). Therefore, mining noise varies from day to day and hour to

hour, depending on the operations occurring. When the line of sight is blocked by natural terrain or by the depth of mining, a barrier effect occurs, and noise levels are reduced.

Blasting is also used during mining operations, and SCM must meet ARM 17.24.624. Although blasting noise levels are high (**Table 3.6-1**), it occurs for just a few seconds, and does not influence the L_{50} noise level metric over 1-minute, 1-hour or longer periods, and therefore, was not included in the noise analysis.

Operation and reclamation noise levels were predicted using the Cadna-A Version 2017 software that uses algorithms from the International Organization for Standardization Standard 9613-2, *Attenuation of Sound During Propagation Outdoors, Part 2: General Method of Calculation*. This standard specifies the calculations to determine the reduction in noise levels due to the distance between the noise source and the receiver, the effect of the ground on the propagation of sound, and the effectiveness of natural barriers due to grade or man-made barriers. Calculations conservatively assume that atmospheric conditions are favorable for noise propagation, but atmospheric conditions can vary dramatically at large distances between a noise source and a receptor. Therefore, temporary significant positive and negative deviations from the average estimated noise levels can occur (Harris 1998).

No rural residences are located within 2-miles of Pits 1 and 2, but noise-sensitive wildlife species occupy the area, including sage grouse, sharp-tailed grouse, and raptors, as identified in Section 3.12. To evaluate wildlife impacts, noise was assessed at three active sage grouse leks (i.e., Pasture, Alt Pasture and Playa) that are located within 1.5 miles. The predicted noise levels for the No Action and Proposed Action Alternatives are worst case scenarios, since all of the noise sources per phase were grouped at the closest point in a pit to a particular receptor, and all equipment per phase was assumed to be operating simultaneously (**Table 3.6-1**).

The *Management Plan and Conservation Strategy for Sage Grouse in Montana* limits impacts of fossil fuel generation facilities to 10 dBA above background noise at a lek, to avoid disruption of breeding rituals or cause lek abandonment (FWP 2005). Therefore, impacts were assessed for equipment noise levels greater than +10 L_{50} dBA above the estimated existing ambient sound levels at three nearby active sage grouse leks (Section 3.6.3.2) (FWP 2005, Patricelli, Blickley and Hooper 2013).

3.6.4.1 No Action Alternative

Under the No Action Alternative, SCM would not expand into the TR1 Project Area but existing mining activities and equipment would operate in the currently-permitted areas. Noise levels were predicted at three nearby active sage grouse leks for the existing permitted operations in Pits 1 and 2, as shown on **Figure 3.6-1** and in **Table 3.6-2**. For the No Action Alternative, the existing SCM operation L_{50} noise levels are not predicted to exceed the ambient noise by more than +10 L_{50} dBA at three nearby leks (Alt Pasture, Pasture and Playa).

Figure 3.6-1. No Action Noise Source Locations and Receptors

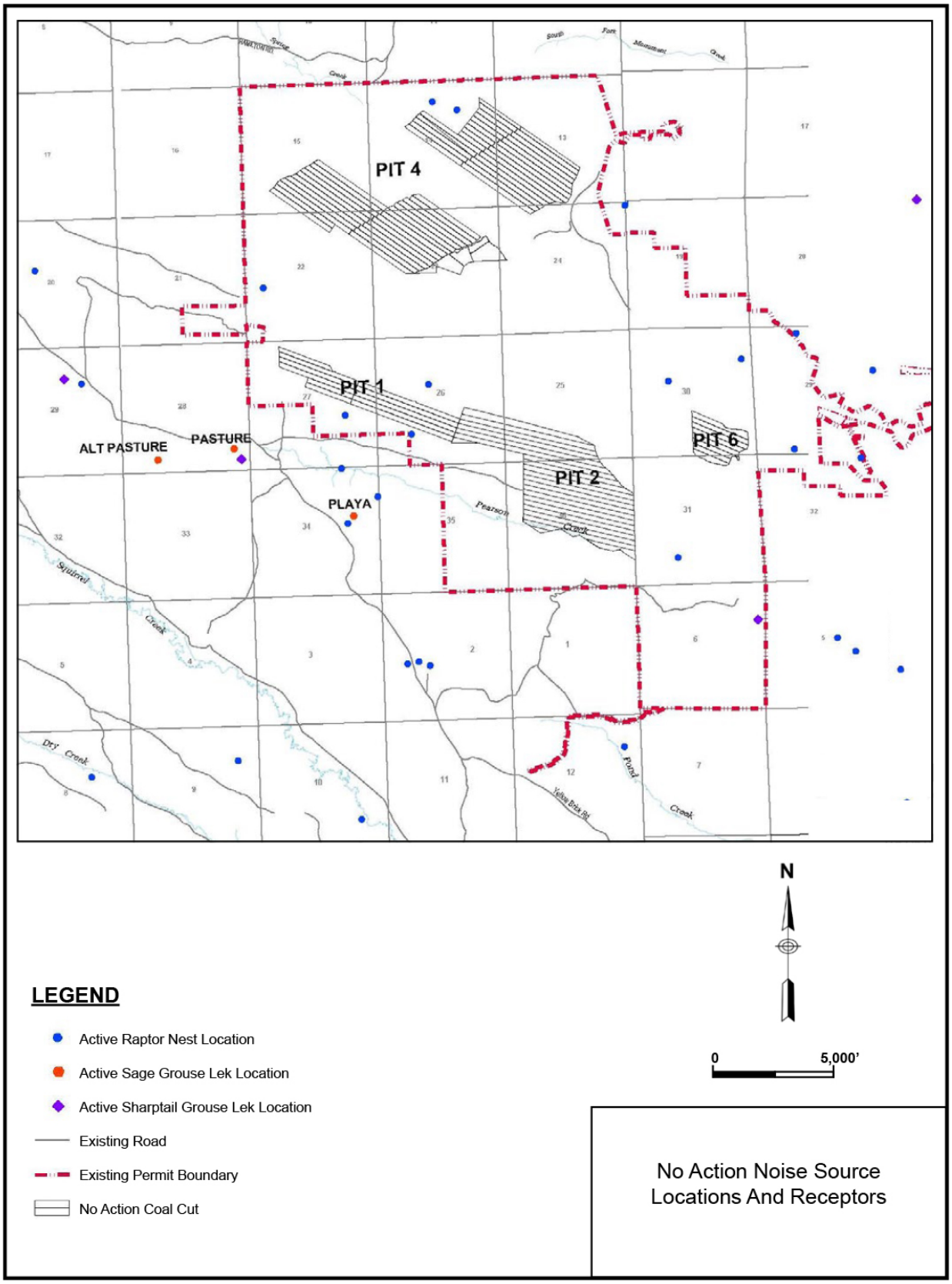


Table 3.6-2
Noise Level Predictions No Action Alternative – Worst Case

Receptor Distance and Direction from Closest Point of Existing Mine Pit (Figure 3.6-1)	Estimated Ambient Noise Level (L_{90} dBA)	Existing SCM Operations (Table 3.6-1)	Projected Dates of Occurrence (months/year)	Predicted Existing Equipment Noise Level (L_{50} dBA)	Existing Equipment L_{50} vs. Ambient L_{90}	Greater than >10 L_{50} dBA?
Alt Pasture Lek						
1.20 miles SW of existing Pit 1	15	Topsoil salvage	1/19	13	-2	N
		Pre-strip – Dozer	3/19	16	1	N
		Pre-strip – Truck & Shovel	3/19	14	-1	N
		Cast Drilling	5/19	15	0	N
		Cast Shot Dozing	5/19	6	-9	N
		Overburden Removal	6/19	6	-9	N
		Coal Removal	6-7/19	4	-11	N
		Pit Reclamation	11/30	3	-12	N
Pasture Lek						
0.73 miles SSW of existing Pit 1	15	Topsoil salvage	1/19	23	8	N
		Pre-strip – Dozer	3/19	24	9	N
		Pre-strip – Truck & Shovel	3/19	22	7	N
		Cast Drilling	5/19	19	4	N
		Cast Shot Dozing	5/19	10	-5	N
		Overburden Removal	5/19	10	-5	N
		Coal Removal	6-7/19	8	-7	N
		Pit Reclamation	11/30	13	-2	N
Playa Lek						
0.81 miles SSW of existing Pit 1	15	Topsoil salvage	2/19	19	4	N
		Pre-strip – Dozer	2-4/21	21	6	N
		Pre-strip – Truck & Shovel	2-4/21	19	4	N
		Cast Drilling	7-9/21	15	0	N

Table 3.6-2
Noise Level Predictions No Action Alternative – Worst Case

Receptor Distance and Direction from Closest Point of Existing Mine Pit (Figure 3.6-1)	Estimated Ambient Noise Level (L_{90} dBA)	Existing SCM Operations (Table 3.6-1)	Projected Dates of Occurrence (months/year)	Predicted Existing Equipment Noise Level (L_{50} dBA)	Existing Equipment L_{50} vs. Ambient L_{90}	Greater than >10 L_{50} dBA?
		Cast Shot Dozing	7-9/21	11	-4	N
		Overburden Removal	8-12/21	11	-4	N
		Coal Removal	9-12/21	9	-6	N
		Pit Reclamation	1/26	9	-6	N

Sources: (CPE 2019, Harris 1998, Patricelli, Blickley and Hooper 2013, SCM 2017a)

Figure 3.6-2. Proposed Action Noise Source Locations and Receptors

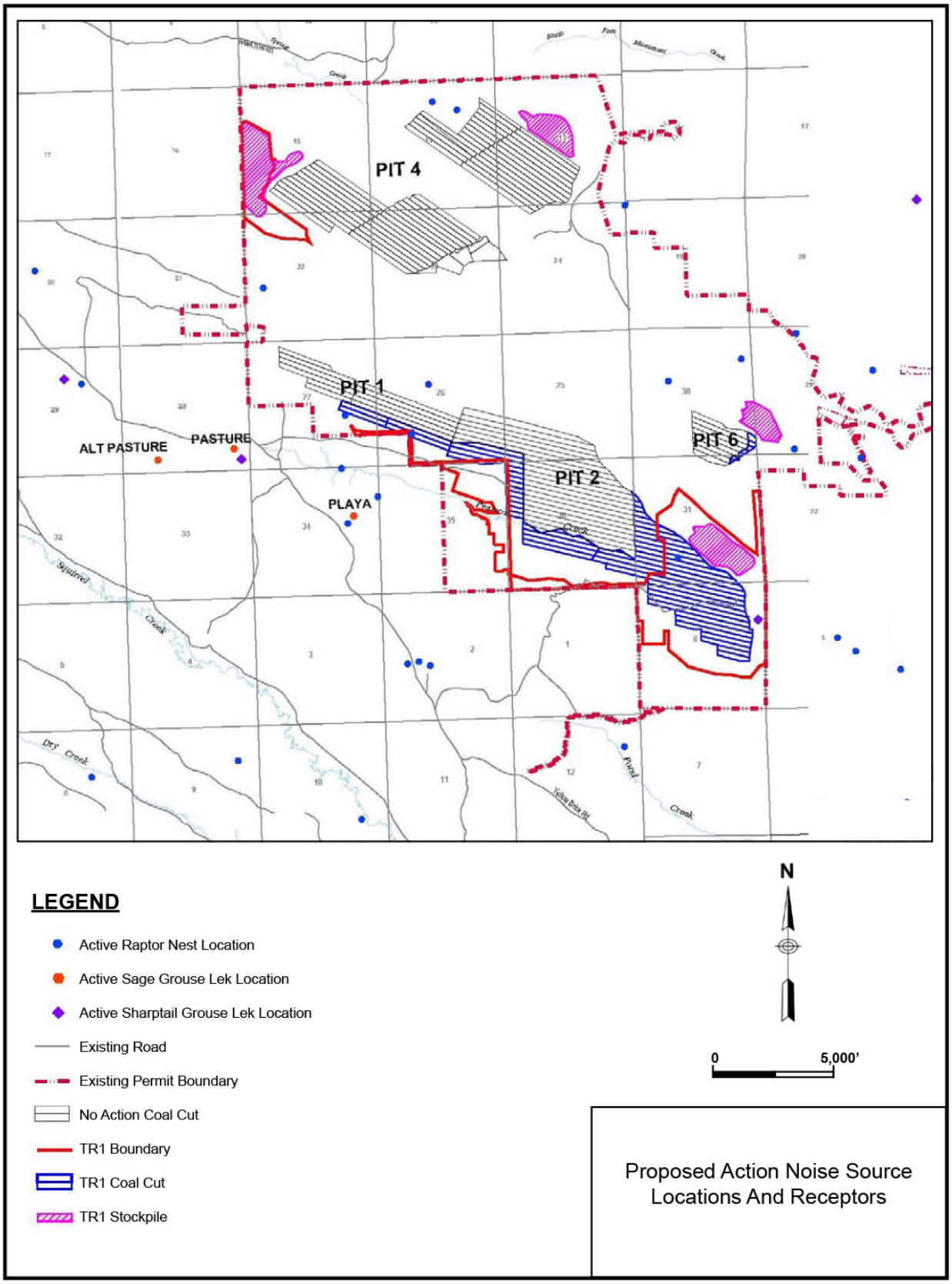


Table 3.6-3
Noise Level Predictions Proposed Action – Worst Case

Receptor Distance and Direction from Closest Point of TR1 Mine Pit Expansion (Figure 3.6-2)	Estimated Existing Ambient Noise Level (L90 dBA)	TR1 Operations (Table 3.5-1)	Projected Dates of Occurrence (months/yr)	Predicted TR1 Equipment Noise Level (L50 dBA)	TR1 Equipment L50 vs. Ambient L90	Greater than +10 L50 dBA?
Alt Pasture Lek						
1.47 miles WSW of Pit 1 expansion	15	Topsoil salvage	1-7/29	24	9	N
		Pre-strip – Dozer	1-7/29	19	4	N
		Pre-strip – Truck & Shovel	5-11/29	17	2	N
		Cast Drilling	5-11/29	8	-7	N
		Cast Shot Dozing	5-11/29	1	-14	N
		Overburden Removal	5-11/29	1	-14	N
		Coal Removal	5-11/29	-1	-16	N
		Pit Reclamation	11/30	14	-1	N
Pasture Lek						
0.88 miles WSW of Pit 1 expansion	15	Topsoil salvage	1-7/29	**30**	**15**	**Y**
		Pre-strip – Dozer	1-7/29	18	3	N
		Pre-strip – Truck & Shovel	5-11/29	16	1	N
		Cast Drilling	5-11/29	10	-5	N
		Cast Shot Dozing	5-11/29	1	-14	N
		Overburden Removal	5-11/29	1	-14	N
		Coal Removal	5-11/29	-1	-16	N
		Pit Reclamation	11/30	20	5	N
Playa Lek						
0.74 miles SSW of Pit 1 expansion	15	Topsoil salvage	12/23	24	9	N
		Pre-strip – Dozer	2-3/24	24	9	N
		Pre-strip – Truck & Shovel	2-3/24	22	7	N

Table 3.6-3
Noise Level Predictions Proposed Action – Worst Case

Receptor Distance and Direction from Closest Point of TR1 Mine Pit Expansion (Figure 3.6-2)	Estimated Existing Ambient Noise Level (L90 dBA)	TR1 Operations (Table 3.5-1)	Projected Dates of Occurrence (months/yr)	Predicted TR1 Equipment Noise Level (L50 dBA)	TR1 Equipment L50 vs. Ambient L90	Greater than +10 L50 dBA?
		Cast Drilling	4-7/24	22	7	N
		Cast Shot Dozing	4-8/24	13	-2	N
		Overburden Removal	4-8/24	13	-2	N
		Coal Removal	9-10/24	11	-4	N
		Pit Reclamation	1/26	14	-1	N

Sources: (Harris 1998, Patricelli, Blickley and Hooper 2013, SCM 2017a, CPE 2019).

3.6.4.2 Proposed Action Alternative

The Proposed Action would expand the SCM surface disturbance in Pits 1, 2 and 6, add additional soil stockpiles, and extend the life of the mine as shown on **Figure 3.6-2**. Noise levels were predicted at three nearby active sage grouse leks for the TR1 operations in Pits 1 and 2 as listed in **Table 3.6-3**.

For the Proposed Action Alternative, the TR1 operation L_{50} noise levels are only predicted to exceed the ambient noise by more than +10 L_{50} dBA at the Pasture lek during topsoil salvage in 2029, when the equipment is closest to the lek. The topsoil salvage operations are scheduled to occur during lekking season (March 1 through July 15) in the year 2029. However, exceedances are not predicted for pre-strip operations or the other mining activities due to a barrier effect (**Table 3.6-2**).

The difference in predicted noise levels between the No Action and Proposed Action Alternatives is +7 dBA during topsoil salvage at the Pasture lek (**Table 3.6-2** and **Table 3.6-3**). The difference is due to changes in distance and changes in terrain between the closest point of the TR1 expanded Pit 1 and the lek (**Figures 3.6-1** and **3.6-2**). Therefore, the predicted equipment noise of the Proposed Action during topsoil salvage would have a direct effect on the acoustical environment, and the noise level is predicted to exceed the +10 L_{50} dBA impact criteria at the Pasture lek (Section 3.6.3.2). SCC is required to follow the best practices listed above to avoid topsoil salvage near active leks during the breeding season. Based on the analysis above, impacts on noise would be expected to be both direct (on the SCM at the time of mining and reclamation) and secondary (audible some distance from the actual disturbance). The direct and secondary noise impacts would be short-term and moderate.

Best Practices

To reduce noise impacts to wildlife, SCM has already committed to follow the best practices listed in the approved SCM Fish and Wildlife Plan, Section 17.24.312, TR1 Project Application (SCM 2017b) including:

- Minimize surface disturbance activities to the extent practicable (e.g., soil salvage, road construction, grubbing, logging, exploratory drilling, etc.) during the primary breeding season for most species in the region (i.e., April 1 through July 31);
- Honor sage grouse lek buffers to the extent practicable and schedule disturbance activities near active leks to occur outside the breeding season (March 1 through July 15; and
- Monitor all environmental variables, including vegetation, soils, wildlife (terrestrial and aquatic, as warranted), water, and air quality/meteorology to proactively mitigate mine-related impacts.

3.6.5 Unavoidable, Irreversible, and Irretrievable Impacts

For the Proposed Action Alternative, topsoil salvage operations are predicted to cause direct and short-term wildlife noise impacts. Noise levels would exceed +10 L_{50} dBA above ambient noise at the Pasture lek (**Table 3.6.3**) located within 1.5 miles of Pits 1 and 2 (**Figure 3.6-2**). The topsoil salvage would be an unavoidable noise impact to sage grouse while occupying the Pasture lek. SCM is required to follow the best practices listed in the SCM Fish and Wildlife Plan (2017b) (Section 3.6.4.2) to reduce some of the noise from the topsoil salvage operations during the sage grouse breeding season, but would not completely eliminate the noise, thereby changing the acoustical environment during the TR1 operations.

3.7 SOCIOECONOMIC RESOURCES

This section discusses socioeconomic resource issues, the analysis area, the affected environment, and direct and secondary impacts associated with the No Action and Proposed Action Alternatives.

3.7.1 Analysis Area

The analysis area for socioeconomic impacts and indicators is Big Horn County, Montana, where the mine operates. Other impacts occur in Sheridan County, Wyoming, because it is the closest residential and commercial area to SCM. However, in accordance with MEPA, impacts beyond the borders of Montana are not analyzed per (Section 75-1-201(2)(a), MCA).

3.7.2 Issues and Analysis Methods

The issues analysis examined the following questions:

- What would be the impacts on employment and income from the Proposed Action and for how long? This issue was analyzed using the level of employment and income for the years these are anticipated to continue.
- What would be the impacts on local, state, and federal tax revenue from the Proposed Action and for how long? Taxes paid by the mine in property taxes, metal mines tax, and royalties were described for each alternative. Taxes paid by employees for state and federal income tax and county property taxes were analyzed.

3.7.3 Affected Environment

This section describes the regulatory environment, federal and state revenue and taxes, and employment and income. In 2017, SCM paid approximately $55.7 million in federal, state, and local taxes and royalties on 12.7 million tons of coal mined. A summary of the taxes and royalties paid by SCM in 2017 are in **Table 3.7-1**.

Table 3.7-1
Taxes and Royalty Payments by SCM in 2017

Tax/Royalty	Amount
Coal Excise Tax (Black Lung Fund)	$4.4 million
Federal Abandoned Mine Reclamation	$3.5 million
Montana Coal Severance	$19.7 million
Montana Coal Gross Proceeds	$6.6 million
Resource Indemnity Trust Tax (RITT)	$0.5 million
Federal Mineral Royalty	$16.8 million
State Mineral Royalty	$3.6 million
Private Mineral Royalty	$0.6 million
Total Tax and Royalty Paid by SCM in 2017	**$55.7 million**

Regulatory Environment

Coal Excise Tax (Black Lung Trust)

Section 4121 of the Internal Revenue Code imposes an excise tax on domestically-produced coal which is deposited in the Black Lung Disability Trust Fund to finance payments of benefits to afflicted miners. The tax imposed for surface mines is the lower of $0.55 per ton or 4.4 percent of the sales price. The Coal Excise Tax paid to Montana by SCM equaled approximately $4.4 million in 2017 based on approximately 12.7 million tons of coal mined (**Table 3.7-1**).

Federal Abandoned Mine Reclamation Fund

SMCRA requires active coal mines to reclaim their land and not cause long-term water-pollution discharges. Pre-1977, coal mines may have abandoned mine lands (AMLs) that pre-date SMCRA. Title IV of SMCRA addresses the reclamation of these AMLs through the establishment of the Abandoned Mine Reclamation Fund (AMRF) created with a federal per-ton tax on every ton of mined coal. These funds are allocated to State and Native American mine land reclamation programs to spend on reclamation projects in their jurisdictions. The fees are 28 cents per ton for surface-mined coal and 12 cents per ton for subsurface mining. SCM paid approximately $3.5 million in 2017 based on 12.7 million tons of coal mined in that year (**Table 3.7-1**).

State of Montana Coal Severance Tax

Montana coal mines pay a severance tax based on the value of coal produced (Section 15-35-103, MCA). The tax rate on coal varies based on the heat content of the coal (**Table 3.7-2**) and the type of mine (open-pit or underground). Each coal producer is exempt from tax on 20,000 tons per year, and mines producing less than 50,000 tons per year are exempt from the tax.

Table 3.7-2
Severance Tax Computation

Heating Quality[1]	Rate for Surface Mines
Under 7,000	10 percent of value of the contract sales price
7,000 and over	15 percent of value of the contract sales price

Source: Section 17-3-240, MCA; 1 Btu per pound of coal

SCM coal averaged 9,283 British Thermal Units (BTU) per pound in 2016 according to Cloud Peak Energy (Cloud Peak Energy 2018a) and paid approximately $19.7 million in coal severance tax (**Table 3.7-1**). For fiscal years 2015 through 2018, the average annual coal severance tax paid by all Montana coal mines averaged just over $60 million (DOR 2018b).

Montana Coal Board grants are funded by the coal severance tax. The Montana Coal Board distributes grants to cities, towns, counties, or school districts; any other local or state governmental units or agencies; or federally-recognized Tribes to help provide government services needed as a direct consequence of an increase or decrease in coal development, or of an increase or decrease in the consumption of coal by a coal-using energy complex (Section 90-6-208, MCA).

Coal severance taxes are also distributed to several state-level funds including the General Fund, Coal Tax Trust Fund, Long Range Building Program Account, Shared Account, Library Services, Conservation Districts, Growth through Agriculture, Park Acquisition Trust, Renewable Res. Debt Service, Cultural and Aesthetic Projects, and Coal and Uranium Program (DOR 2018a). Extending the life of the mine 4 years would continue to generate coal severance tax revenue to Montana as shown in **Table 3.7-1**.

State of Montana Coal Gross Proceeds Tax

The coal gross proceeds tax is implemented in lieu of levied property tax on coal real property in Montana. The coal gross proceeds tax equals 5 percent of the coal's value which is determined by the contract coal price when extracted, or a price imposed by the Montana Department of Revenue (Section 15-23-703, MCA). The local county treasurer collects the tax and distributes it proportionally to the appropriate taxing jurisdictions. No tax is levied on reserve coal property in Montana. In 2017 SCM paid approximately $6.6 million to the State of Montana for the coal gross proceeds (**Table 3.7-1**). For fiscal years 2015 through 2018, the annual gross proceeds taxes collected on all Montana coal property equaled approximately $17 million (DOR 2018b).

Federal Mineral Royalties

Under the Mineral Leasing Act of 1920, as amended, the DOI's Office of Natural Resources Revenue collects royalties on every ton of federal coal mined on federal land. Approximately half (49 percent) of these federal coal royalty revenues are returned to the states (Montana) which in turn use the money for road construction, schools, universities, communities affected

by energy development, and general funds. In 2017, the SCM paid approximately $16.8 million in Federal Mineral Royalties (**Table 3.7-1**).

According to the DOI Natural Resource Revenue data (DOI 2019), the federal government received $33 million in royalties from Montana resource development. All but $2,600 was from coal (the rest from coal bed methane gas). In 2018, federal mineral royalties were $31 million (about $2,800 from coal bed methane). Of the total federal mineral royalties paid, coal mines in Big Horn County paid $19 million in both 2017 and 2018.

The Montana Department of Revenue tracks the amounts of federal mineral royalties distributed to Montana from the federal government (DOR 2018a). In 2017, Montana collected $23 million and it collected $26.9 million in 2018. Twenty-five percent of the revenue received by the State of Montana for federal mineral royalties is distributed to county governments based on mineral production in their county (Section 17-3-240, MCA). The remainder goes into the Montana general fund, 25 percent of which is deposited in a mineral impact account dedicated to local governments and the remaining 75 percent of funds going to state government operations. The Montana Department of Administration (DOA) reported the fiscal year 2017 federal minerals royalty for Big Horn County was $2.159 million (DOA 2017). Big Horn County uses the mineral royalty for county-wide infrastructure improvements, acquisitions, and operation and maintenance needs.

State of Montana Mineral Royalties

Royalties are collected from state trust land coal leases; all of them are currently in Big Horn, Musselshell, and Rosebud counties. In 2017, SCM paid the State of Montana approximately $3.6 million for 4.6 million tons of coal from state leases (DNRC 2017). This payment includes a 12.5% royalty on coal removed and $3 per acre annual rental cost.

Local Requirements

There are no local requirements that apply to the socioeconomic environment as it relates to the alternatives. Spring Creek Coal, LLC has the highest taxable value of property in Big Horn County (DOR 2018b).

A summary of the tax revenue received by the state of Montana and Big Horn County in 2017 from coal mining is shown in **Table 3.7-3**.

Table 3.7-3
Revenue Paid to Montana and Bighorn County in FY 2018

Source	Montana	Big Horn County
Montana – Federal Mineral Royalties	Collected $26.9 million in FY 2018 [b]	Received $1.9 million in FY 2018 [b]
Montana Coal Severance (AML Fees)	Collected $60.0 million in FY 2018[b]	County level distribution not available.
Montana Gross Proceeds	Collected $17.3 million in FY 2018 [b]	Received $3.6 million in FY 2018
Montana Coal Leases	Collect $9.7 million in 2018	County level distribution not available.
Montana Coal Board Grants	Paid out $1.4 million in 2017[1]	Received $336,000 in 2017[a]

Source: (DOR 2018b).

1. Grant recipients were Big Horn County, City of Hardin, City of Hysham, City of Miles City, Harding Public School, Lame Deer Public Schools, Musselshell County, Northern Cheyanne Utilities Commission and Rosebud County (https://commerce.mt.gov/News/PressReleases/montana-department-of-commerce-announces-14-million-in-community-development-funds)

a. To be used for ambulance and county road department equipment. (https://commerce.mt.gov/News/PressReleases/montana-department-of-commerce-announces-14-million-in-community-development-funds)

b. Biennial Report (https://commerce.mt.gov/News/PressReleases/montana-department-of-commerce-announces-14-million-in-community-development-funds)

Employment and Income

SCM currently employs 281 employees. Approximately 94 percent of the workers reside in Wyoming, about 5 percent in Montana, and less than 1 percent in South Dakota. Payroll in 2017 from SCM was estimated at $23.7 million for 247 employees (average of nearly $96K annual income for each employee). There are no large towns in Montana near the mine (Sheridan, Wyoming is the closest), therefore most SCM employees live and spend money outside of Montana. In 2017, only 13 to 15 SCM employees live in Montana, therefore employment and income impacts on Montana and Big Horn County are insignificant under all Alternatives. Mining employed a total of 577 Big Horn County residents in 2017 (Headwaters Economics 2019).

SCM spent approximately $11 million on goods, services, and contributions in Montana, and nearly $53 million in total in 2017 (SCM 2018a).

3.7.4 Direct and Secondary Impacts

Public comments asked DEQ to analyze impacts that are outside the scope of this EIS. These include:

- Plans for employee transition out of coal mining;
- Impacts the SCM would have on coal markets;
- The Youngs Creek Mine and energy markets;

- The financial cost of coal trains;
- The social cost of carbon;
- Economic impacts from climate change on other industries such as timber, agriculture, or recreation and the cost of fire-fighting;
- The employment in or development of “green energy” or “clean energy;” and
- The price of coal.

In addition, there were several comments that used erroneous assumptions, including assumptions that coal train traffic would increase, and that other infrastructure would need to be modified to accommodate coal trains. The Proposed Action would not increase the rate of production and the use of coal trains (number or trips) would not change. Neither of these assumptions would occur, therefore they were not analyzed.

Employment and Income

No Action Alternative

The No Action Alternative would maintain employment at current levels for about 5 years if production is 13 to 14 million tons per year. If production were to increase to the 18 million tons per year, up to 340 employees would be maintained for about 4 more years (SCM 2018a). After the mine closes, employees that still want to work would need to find employment elsewhere, which may be locally, or they may choose to relocate. Approximately 5 percent of SCM employees (13 to 15 people) reside in Montana.

SCM has estimated the number of employees needed for reclamation and closure (**Table 3.7-4)**. Under the No Action Alternative, reclamation and closure would occur about four years earlier compared to the Proposed Action Alternative and could begin in 2021 or 2022 and extend through approximately 2034.

Table 3.7-4
Employment During and After Closure by Year

Years from Closure	0-2	3-4	5-7	8-12
Employees Needed	30	18	14	3

Source: (SCM 2018a).

The needs for goods and services for operations would begin to taper off in 2027 (when the mine closes) until all reclamation is complete in about 12 years, which would reduce the amount spent in Montana by SCM by approximately $11 million, and a total spent of nearly $53 million. Based on the analysis above, impacts on employment and income in Montana are expected to be primarily secondary (after mining), short-term, and minor.

Proposed Action Alternative

The Proposed Action Alternative would have the same socioeconomic impacts as the No Action Alternative, but the employment of up to 340 people would extend about four more years until 2031. Assuming a production rate of 18 million tons per year, approximately 340 people would be employed until approximately 2031. Based on the analysis above, impacts on employment and income in Montana are expected to be direct (to the SCM employees), short-term, and minor.

Tax Revenue

No Action Alternative

Total federal, state and local taxes and royalties paid to Montana is expected to remain at 2017 levels of approximately $42 million on 12.7 million tons of coal for about 4 more years through 2031. This revenue would go to the general fund and the county for school, roads, health care, pensions, and other spending. Based on the analysis above, impacts from continuation of taxes and royalty payments are expected to be short-term and moderate. These impacts would occur for approximately four years less than the Proposed Action Alternative. After mining and reclamation is complete, these impacts would cease, which would be a direct, long-term, and moderate impact on the state as a whole and a direct, long-term and major impact on Big Horn County from the reduction in taxes, royalties, and revenues from state coal leases.

Proposed Action Alternative

The coal mined from four additional years of SCM operations would be used mostly in electricity generation. This coal could potentially find alternative uses if not used for power generation.

While royalties on federal coal go to the federal government (with about 50 percent returned to the state), all the taxes on the coal mine would be paid to Montana. Based on SCM mining for four more years at a rate of 18 million tons of coal per year, the Proposed Action would result in approximately $60 million paid annually to Montana from federal, state and local taxes and royalties. General fund money is used for state government operations (health care, education, pensions, transportation, welfare, and other spending).

Based on the analysis above, the impacts from continuation of taxes and royalty payments, from the Proposed Action would be expected to be short-term and moderate. These impacts would occur for approximately four years longer than under the No Action Alternative. After mining and reclamation is completed, these impacts would cease, which would be a direct, long-term, and moderate impact on the state as a whole and direct, long-term, and major for Big Horn County from the reduction in taxes, royalties, and revenues from state coal leases. Due to the isolated nature of the mine and the majority of workers residing in Wyoming, social impacts in Montana from four extra years of operation would likely be small.

3.7.5 Unavoidable, Irreversible, and Irretrievable Impacts

The Project would have no unavoidable, irreversible, and irretrievable impacts on economic or social activities in Big Horn County, Montana.

3.8 SOILS

Soil resources, soil salvage, soil stockpiling, and reclamation procedures used by SCM for the Proposed Action are described in the following subsection. Regulatory requirements are also identified along with methods and procedures for SCM to protect their soil resources and enhance the potential for successful reclamation of the mined lands. The direct and secondary impacts to soils associated with the No Action and Proposed Action Alternatives are also included.

3.8.1 Analysis Area

The analysis area includes the baseline soil survey areas completed for the entire SCM permitted mine area.

The original SCM baseline soil survey was conducted in 1979 (SCC 1979) and used large scale soil mapping information from the 1977 Big Horn County Soil Survey (U.S. Department of Agriculture, Soil Conservation Service [USDA-SCS] 1977). The baseline soil survey for the South Fork expansion was completed in 1990 (Lupcho 1990). A soil survey for the Carbone area expansion into Pit 4 was completed in 1998 (BKS 1998) and included sampling and analysis of soil properties outlined in the 1998 revised DEQ Soil Suitability Guidelines (DEQ 1998). The soil survey for the Pearson Creek Amendment area was completed in 2007 and 2008 (Bighorn Environmental Sciences 2008). Lastly, in 2012, a baseline soil survey was completed for Areas A and B Expansion areas by Terra Soil and Environmental Solutions, LLC (2012). These SCM soil surveys have been merged together and cover the entire SCM permitted area. In addition, soil sampling and analyses results have been included to characterize the soils and used to develop the plan to salvage the quantity and quality of soil for reclamation.

3.8.2 Issues and Analysis Methods

The soils issues analysis was designed to answer the following question:

- Would full reclamation of the land disturbed by the coal strip mine be successful? Soil properties and quantities of the salvaged soils (Lifts 1 and 2) were evaluated for compliance with DEQ Soil Suitability Guidelines (DEQ 1998).

Soil survey data from 1979 (SCM 1979), 1990 (Lupcho 1990), 1998 (BKS 1998) 2007 and 2008 (Bighorn Environmental Sciences 2008), and 2012 (Terra Soil and Environmental Solutions, LLC 2012) were used to analyze and assess potential impacts to SCM soil resources associated with the Proposed Action. Soils information was used to evaluate current practices SCM employs to characterize the soils, salvage the quantity and quality of soil needed for reclamation, and stockpile and redistribute soil.

Soils have been mapped for the 977 acres of the TR1 Project Area and include 53 different soil types (soil mapping units) that fall into 3 soil taxonomic orders. Soil orders include arid soils (Aridisols), weakly-developed soils (Entisols), and grassland soils (Mollisols) (Bighorn Environmental Sciences 2008). Rock outcrops are present but are not classified as soils. A summary of the soil is provided in **Table 3.8-1**.

Table 3.8-1
Summary of Soil Resources on TR1 Acres

Soil Taxonomic Order	Cumulative TR1 Area (acres)	Number of Map Units in TR1 Area	Maximum Map Unit Size (acres)	Minimum Map Unit Size (acres)
Entisols	566.6	26	65.6	0.3
Aridisols	307.5	21	67.0	0.2
Mollisols	39.2	2	25.8	13.4
Not Classified	64.1	4	36.6	3.8
Totals	977.4	53	67.0	0.2

3.8.3 Affected Environment

The affected environment is the Project Area and the other disturbed areas in the SCM permitted area that have not been reclaimed.

The TR1 Area does not contain any areas designated as prime farmland or unique farmland (USDA 2018). One soil map unit, Chutger clay loam (1 to 4 percent slopes (42B)), has properties that meet the criteria for prime farmland if irrigated. Farming has not occurred in this area and no reasonable sources of irrigation water are currently available.

3.8.3.1 Regulatory Environment

Soil rules and regulations for Montana surface mines are required by MSUMRA (Section 82-4-231 and 232, MCA) and its implementing rules (ARM 17.24.701 and 702). SCM is required to: (1) remove all topsoil and subsoil suitable for reclamation, (2) immediately replace or temporarily store and protect the soil resource during mining, and (3) replace soil following mining to support revegetation. **Table 3.8-2** summarizes the applicable rules and regulations.

Table 3.8-2
Applicable Soil Rules and Regulations Under ARM and MSUMRA

MSUMRA Section 82-4-2, MCA	Summary of Requirement
Subpart 222	Requires a Surface Mining Permit application, including a plan for the mining, reclamation, revegetation, and rehabilitation of land and water to be affected by the operation
Subpart 231	Requires a reclamation plan that includes a plan of grading, backfilling, highwall reduction, topsoiling, and reclamation for the area of land affected by the operation
Subpart 232	Specifies soil removal, storage, replacement, and reconstruction on prime farmlands and non-prime farmlands

Table 3.8-2
Applicable Soil Rules and Regulations Under ARM and MSUMRA

MSUMRA Section 82-4-2, MCA	Summary of Requirement
Subpart 233	Requires planting of vegetation following grading of disturbed area
ARM 17.24	**Summary of Requirement**
Subchapter 3	Requires gathering soil baseline information (ARM 17.24.304 and 306), requirements of the reclamation plan (ARM 17.24.313), special application requirements for prime farmlands (ARM 17.24.324), and special-use requirements for coal-mining operations on or adjacent to areas including alluvial valley floors (ARM 17.24.325)
Subchapter 5	Contains backfilling and grading requirements
Subchapter 6	Lists performance standards for drainage reclamation (ARM 17.24.634) and sediment-control measures (ARM 17.24.638)
Subchapter 7	Requires soil removal (ARM 17.24.701); soil stockpiling and redistribution (ARM 17.24.702); soil-stabilizing practices (ARM 17.24.714); use of soil amendments, management techniques, and land use practices (ARM 17.24.718); establishment of vegetation (ARM 17.24.711); soil/spoil monitoring plan (ARM 17.24.723); postmining land use (ARM 17.24.762); and cropland reclamation (ARM 17.24.764)
Subchapter 8	Requires reclamation and preservation for prime farmland and alluvial valley floors

The DEQ has outlined methods and procedures for protecting soil resources disturbed by coal-mining operations and for enhancing the potential to achieve successful reclamation (*Soil, Overburden, and Regraded Spoil Guidelines,* DEQ 1998). These guidelines are based on the requirements and objectives of MSUMRA and its implementing ARMs and include soil suitability criteria for determining salvage depths and volumes of suitable soil and other plant growth media for use in reclamation.

3.8.3.2 Soil Salvage and Removal

SCM would remove any large vegetation that would interfere with soil removal activities and then would use heavy equipment for the soil salvage operations. Suitable soil would be stripped and segregated into two lifts. Lift 1 would include soils from the A, E, and possibly upper B or C horizons and would be from the approximate upper 6 inches; this material would be placed into “A-soil” stockpiles. Lift 2 would include soils from deeper but still suitable soil horizons and would be placed in “B-soil” stockpiles.

SCM would include additional field characterization prior to soil salvage to accurately determine soil depths. Grid sampling would be completed across the areas and the results used to refine the soil salvage depths. Samples would be collected from the various soil horizons and analyzed for texture, pH, electrical conductivity (EC), sodium adsorption ratio (SAR), saturation percentage, boron (if EC exceeds 4.0), and percent coarse fragments for special soils. Other visible physical parameters (color, percent coarse fragments, etc.) would be determined and

recorded. The soil field characterization results would be used to determine the planned soil salvage depths, which would be submitted to DEQ for approval.

SCM would use salvage stakes on 250-foot centers, or closer, to relay soil salvage depth information to the equipment operators. Additional salvage stakes would be used if topography or special conditions dictate. All available and suitable soils would be salvaged before drilling for blasting, mining, or other surface disturbances.

Salvaged soils could be immediately redistributed if regraded areas would be ready for soil placement. Concurrent direct-haul redistribution of salvaged soil eliminates the need to stockpile the soil. Most salvaged soil would be placed in soil stockpiles and the stockpiles would be seeded to minimize erosion. First-lift soil would be stockpiled separately from the deeper Lift 2 soil. SCM would salvage all Lift 2 soil to balance soil coverage requirements that is suitable for serving as plant growth media.

The volumes for Lift 1 and Lift 2 salvaged soils would be updated after actual volumes have been determined and the information would be provided in the Annual Mining Reports.

Substitute plant growth media, including scoria and other coarse-textured (alluvium) materials, would also be salvaged for special revegetation substrate media to create shrub mosaic areas and reclamation features. Results from SCM revegetation test plots have shown scoria to be a suitable plant growth media for some shrubs (big sagebrush) and warm-season grasses and can help increase species diversity. Scoria would be salvaged from natural deposits for use in reclamation to promote shrubs in certain areas as well as for road and other borrow materials. Suitable alluvial and colluvial materials would also be used as plant growth media for reclaiming channels and floodplains.

The volume of SCM Life of Mine soil and other plant growth media already salvaged, and soil available but not yet salvaged, were compared to the estimated volume of soil and other plant growth media needed for reclamation (SCM 2012 Annual Mining Report). The soil volumes available and needed (balance) are calculated annually and are shown in **Table 3.8-3**. SCM has enough Lift 1 soil stockpiled and available to place an average of 4.6 inches of soil on areas designated for standard reclamation. The volume of Lift 2 soil stockpiled and available would provide approximately 12 inches of soil over those same standard reclamation areas.

Table 3.8-3
Soil and Other Plant Growth Media for Reclamation (in cubic yards)

Material	Lift 1 Salvaged	Lift 2 Salvaged	Not Yet Salvaged	Total Available
Soil	1,514,456	5,201,844	5,749,760	12,466,060
Other Plant Growth Media	57,698	311,540	778,901	1,148,139
Total Available	**1,572,154**	**5,513,384**	**6,528,661**	13,614,199
Total Soil and Plant Growth Media Needed				13,209,270
Balance (extra available)				404,929

Regraded spoil would be covered with Lift 2 soil first and then with Lift 1 soil as soon as practicable to prevent erosion of the spoil. The areas with replaced soil would then be seeded during the first appropriate season.

Soils are intrinsically related to successful reclamation. Reclamation bond is released based on completion of specified reclamation activities grouped under four bond release phases described in Section 1.8 and in ARM 17.24.1116(6)(c).

Direct and Secondary Impacts

Direct soil impacts occur at SCM primarily from soil stripping, soil stockpiling, and soil replacement activities. These impacts are due to disturbance to soil physical properties including the loss of soil structure, compaction, and potential erosion. Secondary soil impacts occur after the soil has been redistributed but before the soil has reestablished biological activity, nutrient cycling, soil structure, or soil productivity which could be expected to take up to 10 years.

3.8.3.3 No Action Alternative

Under the No Action Alternative, the TR1 Project would not be approved and SCM's disturbance area would not be expanded to include the 977 acres. No additional direct or secondary impacts to soils from mining activities would occur on the 977 acres under the No Action Alternative.

In 2017, of the 4,879 acres disturbed at SCM, 1,017 acres (20.8 percent) had been released for Phase II bond (**Table 3.10-1**) (Cloud Peak Energy 2017). The four reclamation bond release phases are defined in Section 1.8.4 and Phase II reclamation is an important reclamation milestone for soils. Soil erosion and other soil aspects (i.e., compaction and fertility) have not restricted existing reclamation success or bond release at SCM. Rather, non-noxious invasive species at reclamation sites have been the main reason some sites have not achieved Phase III bond release (SCM 2017c).

3.8.3.4 Proposed Action Alternative

Under the Proposed Action Alternative, an additional 977 acres would be disturbed for mining coal and related activities. An estimated 134 acres of the 977 acres would be disturbed for constructing the OB4-3 soil stockpile to the west of Pit 4 but would not have any coal mined below. Lift 1 (upper soil) and Lift 2 (subsoil) would be stockpiled for use in reclamation. Disturbed areas would be reclaimed and revegetated with the approved seed mixtures as mining is completed (concurrent reclamation).

Direct impacts to soil disturbed under the Proposed Action Alternative would result from the disturbance to the soil physical properties, loss of soil structure, soil compaction during stripping and stockpiling, and potential erosion from the soil surfaces and stockpiles. Secondary impacts to soils would include the overall loss of soil development and horizons from mixing,

reduction of favorable physical and chemical properties, reduction in biological activity, and changes in nutrient levels. Soil productivity would be expected to return to previous levels within 10 years after reclamation.

Overall, the direct impacts from the Proposed Action Alternative on soil would be long-term and moderate. A direct impact of adding the additional 977 acres of disturbance at the SCM would be the delay in achieving Phase II bond release until about 2034 when the TR1 areas have had soil replaced, seeded, and at least two growing seasons have elapsed. The secondary impacts to soils from the Proposed Action Alternative are expected to be long-term and minor.

3.8.4 Unavoidable, Irreversible, and Irretrievable Impacts

Mining would have unavoidable impacts on soil for the Proposed Action Alternative during the life of the mine through final reclamation. Soil chemical, physical, and nutrient properties would be adversely affected from soil salvage operations, stockpiling, and through reclamation until biological activity and soil nutrient and fertility return to previous levels.

Based on the analysis above, impacts on soil from the Proposed Action are expected to be long-term and minor. However, soils begin redevelopment upon redistribution for reclamation and the establishment of predominantly native vegetation.

3.9 TRANSPORTATION

The transportation resources used for moving coal consist of private haul roads on land leased by SCM, public roads owned and maintained by Montana counties and the state of Montana, and railroads owned and operated by Burlington Northern Santa Fe (BNSF) and Montana Rail Link (MRL) in Montana. All coal is loaded onto BNSF trains and then is transported via both BNSF and MRL in Montana. This section discusses the transportation analysis area, the affected environment, and direct and secondary impacts to transportation associated with the No Action and Proposed Action Alternatives.

3.9.1 Analysis Area

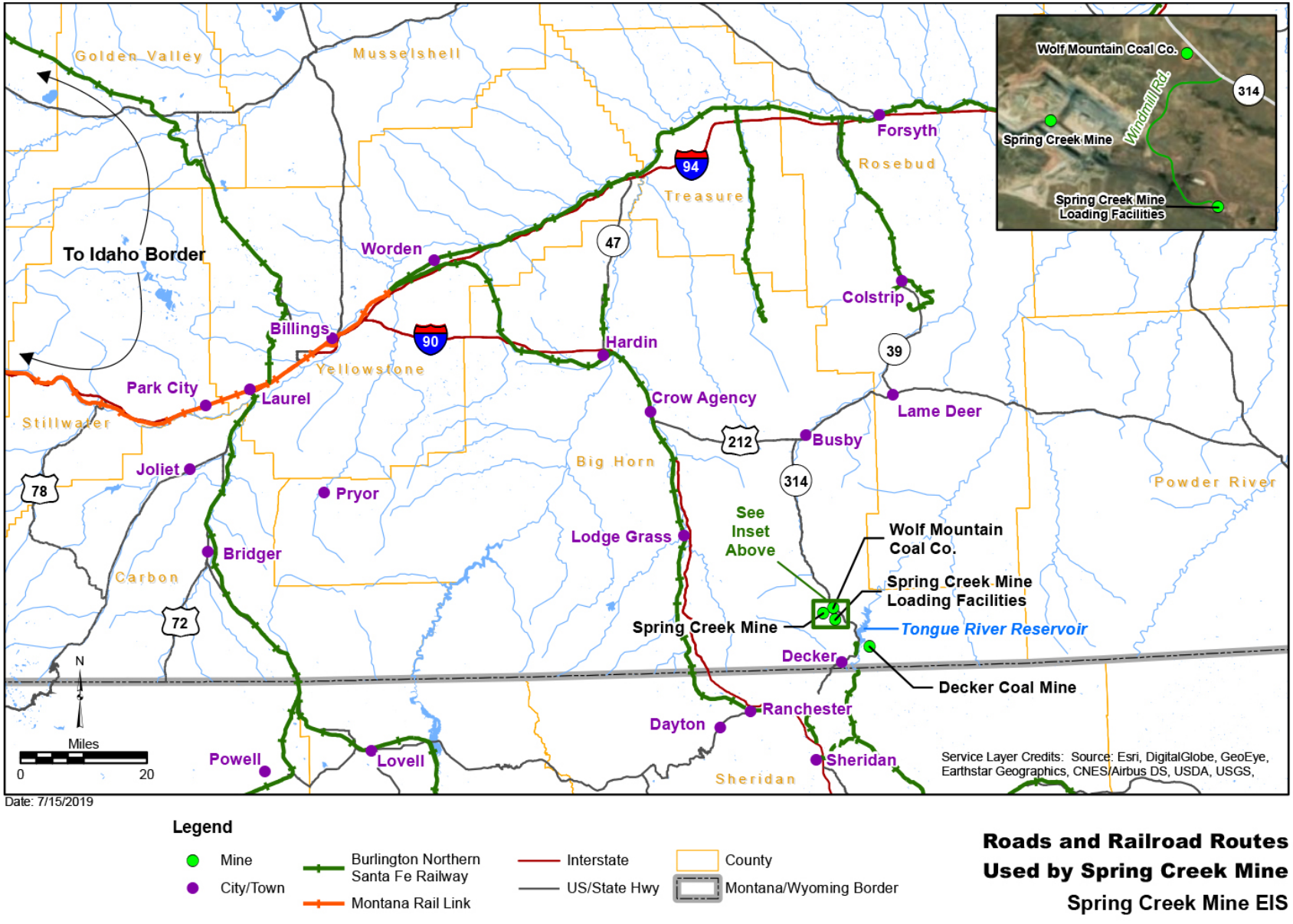
The analysis area includes the permit area (**Figure 3.9-1**) , the mine road between Wolf Mountain Coal Company (WMCC) and SCM, and the railroad rights-of-way owned and operated by BNSF between the SCM and the Wyoming-Montana border generally along Secondary Highway 314. The transportation analysis also included the railroad rights-of-ways in Montana along I-90 as it travels generally northwest until it reaches the Idaho-Montana border.

3.9.2 Issues and Analysis Methods

The issues analysis for transportation has examined the following:

- What would be the impacts on railroad safety and transportation?
- Would coal train traffic increase, for how long, and what impacts would an increase have on communities traversed?

Figure 3.9-1. Transportation Analysis Area



- What impacts would coal transportation have on fugitive coal dust emissions from SCM and would it contribute to ballast fouling and increased derailments?

The proposed plan and the Surface Transportation Board, CPE, and BNSF websites were accessed for information regarding coal dust emissions impacts from railway transportation.

3.9.3 Affected Environment

This section describes existing and future site roads, the railroad loop required to mine coal, railway access, and offsite roads.

3.9.3.1 Regulatory Environment

Federal, State, and Local Requirements

DEQ regulates permitting and operation of surface coal mines on federal lands within Montana under the authority of MSUMRA (Section 82-4-221 et seq., MCA) and its implementing regulations (ARM 17.24.301-1309).

The local regulatory framework is provided under MSUMRA, specifically in Section 82-4-227(7)(d), MCA, and in its implementing regulations, ARM 17.24.1134 and ARM 17.24.1135.

3.9.3.2 Site Roads and Railroad Loop

Existing and future site roads and the railroad loop required to mine coal as currently permitted have been designed using a Transportation Facilities Plan required by ARM 17.24.321. A report was prepared by a qualified professional engineer (PE) as required by ARM 17.24.601 (8) stating that the roads and railroad loop were constructed or reconstructed in accordance with the approved plan.

3.9.3.3 Railway Access

Most of the coal from SCM is transported by rail with a relatively small amount transported by truck to WMCC for local retail coal sales. Using the average production rate of 18 million tons per year (although production rates have been below this rate since 2014) and 15,000 tons of coal per train, an average of approximately 3 to 4 trains are loaded and shipped from SCM per day. Of the total coal mined per year, approximately 80,000 cubic yards (about 54,000 tons) per year are shipped to WMCC.

BNSF requires under the current Coal Loading Rule (October 1, 2011) that

> All shippers loading coal at any Montana or Wyoming mine to take measures to load cars in such a way that ensures coal dust losses in transit are reduced by at least 85% compared to cars where no remedial measures have been taken. The Coal Loading Rule also has a "safe harbor" provision stating that a shipper will be deemed to be in compliance with BNSF's Coal Loading Rule if it loads cars in compliance with BNSF's published Load Profile Template, and either (i) applies an approved in-transit dust suppressant agent to the loaded cars in the specified

> manner, or (ii) uses another method of coal dust suppression that, together with profiling, reduces coal dust losses in transit by the required 85 percent (BNSF and UP 2010).

The effectiveness of surfactants was studied and summarized in a BNSF and Union Pacific (UP) Railroad Company Super Trial document (BNSF and UP 2010). This document states:

> Testing has demonstrated that profiling must be combined with additional measures to meet the 85% reduction requirement. In addition to proper load profiling, in-transit dust suppressant agents can be sprayed over the loaded coal by the shipper or its mine agent at the mine origin to keep the coal in place during transit.

Coal dust suppression follows a three-step process (Cloud Peak Energy 2018b) to maintain coal shipment integrity for coal shipped from SCM. First, a dust suppressant coats coal surfaces before loading. Coal is then loaded in an aerodynamic pattern. Finally, a neutral polymer, called a topper, is applied after loading to create a crust on the top surface of the coal. The spray is not hazardous or toxic and has been effective at keeping dust from leaving the coal cars during transit.

3.9.3.4 Offsite Roads

The employees and vendors utilize Montana Secondary Highway 314 to access the mine. According to information obtained from the Montana Department of Transportation (MDT 2019), the AADT for 2013 through 2018 north of the SCM entrance was 261 vehicles (Traffic Count Site 02-7-2008) and south of the entrance was 581 vehicles (Traffic Count Site 02-8-001) for a difference of 320 vehicles. Also included in this stretch of the Highway 314 is the Tongue River Reservoir State Park access road, Tongue River Road, and the access road to Wolf Mountain Coal Company. The AADT difference from north and south of the SCM entrance includes the traffic related to SCM operations, WMCC operations, Tongue River Reservoir, and some possible local residential use. The traffic counts in and out of the State Park and WMCC are unknown but the annual visitor count for Tongue River Reservoir State Park in 2018 was 72,693 or 199 visitors per day.

3.9.4 Direct and Secondary Impacts

3.9.4.1 No Action Alternative

Under the No Action Alternative, most of the coal would continue to be shipped by rail, with an incidental amount by truck hauling, until all recoverable coal is mined in approximately 2027. The SCM operations would continue to average about 176 daily trips.

The potential for train derailments and truck accidents would continue. Even with fluctuations in the coal market, the railroad would maximize train traffic (BNSF 2018) and the overall number of trains would remain constant independent of the number of coal trains.

BNSF coal dust mitigation measures would continue to be implemented but trains would continue to lose some amount of coal dust and this dust may contribute to ballast fouling and derailments (BNSF and UP 2010).

Based on the analysis above, impacts on transportation from the No Action Alternative are expected to be secondary, long-term, and negligible.

3.9.4.2 Proposed Action Alternative

Under the Proposed Action Alternative, SCM would continue to ship coal for 4 more years.

Railway Access

Assuming coal transported by truck is inconsequential and using an estimated 15,000 tons of coal per train, the Proposed Action would result in 1,200 train trips per year or 3 to 4 train trips per day (one way) for 4 additional years. The estimated life of mine including the extended mining under the Proposed Action would depend on the coal market. It is assumed that BNSF would adjust other coal and non-coal train traffic up or down to account for varying frequency of coal trains from SCM to maximize track use (BNSF 2018). Therefore, the number and frequency for all train traffic would not change (only the duration) and the waiting times for trains would also stay the same.

Site Roads and Railway

No new transportation buildings would be required to support the Proposed Action. However, some new site roads would be constructed as described in the future Transportation Facilities Plan required under ARM 17.24.321. The roads would be constructed or reconstructed in accordance with the plan approved per ARM 17.24.321 and must be submitted to DEQ. Access and haul roads must be designed “according to sound engineering and construction practices” and must, to the extent possible, “not cause damage to fish, wildlife, and related environmental values and must not cause additional contributions of suspended solids to streamflow or to runoff outside the permit area or otherwise degrade the quantity or quality of surface or ground water” (ARM 17.24.601(2), (6)).

The potential for train derailments and truck accidents would continue for about 4 additional years. Even with fluctuations in the coal market, the railroad would maximize train traffic (BNSF 2018) and the overall number of trains would remain constant and independent of the number of coal trains.

SCM coal dust could potentially continue to emit from coal trains and foul railbed ballast for 4 more years under the Proposed Action. However, BNSF requires mitigation measures and SCM has developed appropriate loading procedures.

Based on the analysis above, the impacts on site roads, railroads, and other transportation factors (such as train derailments, truck accidents, and waiting for trains) from implementing

the Proposed Action would be extended for 4 more years and would be short-term and negligible.

3.9.5 Unavoidable, Irreversible, and Irretrievable Impacts

No unavoidable, irreversible, or irretrievable adverse impacts related to transportation are anticipated for any of the alternatives.

3.10 Vegetation and Reclamation

This section presents vegetation and community types in the affected environment and discusses how the proposed disturbances and reclamation procedures are anticipated to impact these communities.

3.10.1 Analysis Area

The analysis area for vegetation and reclamation is the SCM TR1 Project Area (**Figure 3.3-1**).

3.10.2 Issues and Analysis Methods

Several public comments related to vegetation and reclamation were received during scoping (DEQ 2018d) and are provided below. The issues from the comments were used to guide the evaluation and comparisons of effects of the three alternatives.

- How are weed infestations surveyed and monitored? Would expanding the coal mine disturbance cause more weeds?
- What is the status of reclamation at SCM? Has there been a lack of success with final reclamation and bond release?
- How would the TR1 expansion effect reclamation schedules and time frames?
- How does ownership of SCM, which encompasses federal, state, and private lands, impact mining operations and future reclamation?
- What are the existing reclamation issues at SCM and is the mine in compliance with its obligations under federal and state mining laws?

3.10.3 Affected Environment

The affected environment is the TR1 Project Area and the other disturbed areas within the SCM permitted area that have not been reclaimed. The TR1 Project Area does not contain any areas designated as prime farmland or unique farmland (USDA 2018).

Vegetation and community types are described below in Section 3.10.3.2, Existing Conditions. The TR1 Project would result in changes in the acreage of disturbance, sequence, and the timeline for reclamation. Plant species used for reclamation include a variety of seed mixes for alluvial, woodlands, scoria, upland shrub steppe, grassland, and temporary stockpiles. Seed mix variations depend on topographic and soil conditions at a given site. Common species among these seed mixes include western wheatgrass (*Agropyron smithii*), slender wheatgrass (*Elymus trachycaulus*), prairie clover (*Dalea* spp.), yarrow (*Achillea millefolium*), yucca (*Yucca glauca*),

Wyoming Big Sagebrush (*Artemisia tridentata* ssp*. wyomingensis*), silver sagebrush (*Artemisia cana*), black greasewood (*Sarcobatus vermiculatus*), Ponderosa pine, and Rocky Mountain juniper (Cloud Peak Energy 2013).

3.10.3.1 Regulatory Environment

Federal Requirements

Vegetation resources in general are not regulated by federal agencies. Federally-listed threatened and endangered plant species are protected under the ESA, as amended under 16 USC 1531–1543 (Supp. 1996). No federally-listed or proposed special status species were identified (WESTECH Environmental Services, Inc. 2012).

State Requirements

MSUMRA (Section 82-4-233 and Section 82-4-235, MCA) and its implementing rules (Subchapters 3, 5, 6, 7, 8, and 11 of the ARM) include regulations applicable to vegetation, including requirements for baseline investigations, requirements for reclamation and revegetation, protection of federally threatened and endangered species, and conditions for bond release. MSUMRA in particular requires each application to contain a fish and wildlife plan describing how the project will minimize disturbances and adverse impacts (including habitat impacts to aspects of the landscape such as vegetation) on fish, wildlife, and related environmental values during mining and reclamation operations (ARM 17.24.312(1)(a)). Applicants are required to explain how they will utilize impact control measures, management techniques, and annual monitoring methods to protect or enhance habitats of unusually high value for fish and wildlife (ARM 17.24.312(1)(d)(iii)). SCM must ensure reclamation will provide for habitat needs of various wildlife species in accordance with the approved postmining land use, with plant groupings distributed to fulfill fish and wildlife requirements (ARM 17.24.312(1)(e)).

Local Requirements

There are no applicable local regulations for vegetation resources within or near the analysis area.

3.10.3.2 Existing Conditions

Baseline vegetation studies were completed in 1990 and 1991 for the South Fork Expansion (Bighorn Environmental Quality Control); 1998 for the Carbone Expansion (Bighorn Environmental Quality Control); 2007 for the Pearson Creek Area (Bighorn Environmental Sciences); and in 2012 for the Amendment Areas A and B (Westech Environmental Services, Inc.) (Cloud Peak Energy 2017). The Baseline Vegetation Inventory for SCM differentiates the local mining region into six primary community types including grassland, special-use pasture, shrub/grassland, shrub-dominated breaks, conifer-dominated breaks, and ponderosa pine-juniper forest/savannahs. (WESTECH Environmental Services, Inc. 2012).

Much of the Project Area occurs in the Pearson Creek area, which is characterized by stands of Wyoming big sagebrush, bluebunch wheatgrass (*Agropyron spicatum*), western wheatgrass, little bluestem (*Andropogon scoparius*), silver sagebrush, winterfat (*Ceratoides lanata*), and black greasewood. Annual brome grasses are common in some areas of the drainage, as are a limited number of open and closed canopy forested areas. A single area of crested wheatgrass was found in Section 31 and was likely planted in an old prairie dog town.

The most common shrub/grassland community within the Pearson Creek area is the Wyoming big sagebrush/bluebunch wheatgrass community which grows on gentle to moderate slopes and ridges. The second most common plant community is the Wyoming big sagebrush/western wheatgrass communities. Plant communities that occupy the breaks or dissected badlands with moderate to steep slopes are the Wyoming big sagebrush/shadscale saltbush (*Atriplex confertifolia*) community, rubber rabbitbrush (*Chrysothamnus nauseosus*)/bluebunch wheatgrass associations (shrub-dominated), and the Rocky Mountain juniper/Ponderosa pine associations (conifer-dominated). Ponderosa pine and juniper forests are the only forest types occurring within the analysis area. The least common plant community type in the Pearson Creek area is the needle-and-thread (*Stipa comata*)/western wheatgrass grasslands (WESTECH Environmental Services, Inc. 2012).

Weeds were found in limited degrees in all plant communities. Weeds included noxious non-native species, non-noxious non-native species, and native invasive species prone to occur on disturbed sites. Canada thistle (*Cirsium arvense*), which is a Montana noxious weed, is present in existing reclamation areas throughout SCM. Non-native invasive species include cheatgrass (*Bromus tectorum*) and kochia (*Kochia scoparia*). Native disturbance-prone species present includes tansymustard (*Descurainia pinnata*) (Cloud Peak Energy 2017).

Sensitive habitats were evaluated within the SCM TR1 permit boundary. No federally-listed or proposed special status species were identified; however, two species of concern are listed by the Montana Natural Heritage Program (WESTECH Environmental Services, Inc. 2012) including Barr's milkvetch (*Astragalus barrii*) [G3 S3][1] and woolly twinpod (*Physaria didymocarpa var. lanata*) [G5T2 S2S3][2]. No jurisdictional wetlands or waters of the U.S. exist as defined by USACE. Stock ponds and water impoundments with wetland soils, plants, and hydrology are present, but they are not considered jurisdictional because they either lack a continuous ordinary high-water mark or do not have a continuous nexus to other waters of the U.S. (U.S. Army Corps of Engineers 2016).

[1] G3 S3 - Potentially at risk because of limited and/or declining numbers, range and/or habitat, even though it may be abundant in some areas. (http://mtnhp.org/)

[2] G5 - Common, widespread, and abundant (although it may be rare in parts of its range). Not vulnerable in most of its range; T2 – Rank of subspecies is at risk because of very limited and/or potentially declining population numbers, range and/or habitat, making it vulnerable to global extinction or extirpation in the state; S2 S3 - Indicates a range of uncertainty about the status of the species between 2 and 3. (http://mtnhp.org/)

3.10.4 Direct and Secondary Impacts

3.10.4.1 No Action Alternative

Under the No Action Alternative, the Project would not be approved and SCM's disturbance area would not be revised to allow disturbance on the 977 acres. No additional impacts to vegetation and reclamation would be expected from the No Action Alternative, but overall secondary, short-term, and moderate impacts would be expected from the No Action Alternative.

3.10.4.2 Proposed Action Alternative

All disturbed areas must be managed for weeds thus SCM prepares a weed management plan and annual mining reports that include their vegetation monitoring methods and results. Increasing the disturbed area could cause a temporary increase in some additional weeds depending on the weed abundance in the topsoil salvage area. Some reclaimed areas contained minor outbreaks of thistle (*Cirsium spp*)[3], and nearly every reclamation site had some cheatgrass[4] and kochia. The abundance of annuals and noxious weeds in some reclaimed areas could be less numerous compared to the premine areas because of the strict revegetation criteria for bond release. SCM manages weed outbreaks per ARM 17.24.718 through disking and reseeding where applicable, and spraying various herbicides until native perennial grasses, shrubs, or woody species become established. Herbicides used include Roundup®, Plateau®, and Dicamba® + 2,4-D (Cloud Peak Energy 2017).

SCM provides a detailed inventory of noxious and non-noxious weed infestations for each of the reclamation areas within the Surface Mine Permit boundary.

The direct impact from the Proposed Action Alternative would be additional weed infestations that would require monitoring and treatment. Direct impacts would occur throughout mining operations until the areas are successfully reclaimed.

Table 3.10-1 provides a basis for understanding the status of reclamation.

Table 3.10-1
Reclamation Status (No Action and Proposed Action)

Item	No Action (Acres)	Proposed Action (Acres)
Total permit boundary	9,220	9,220
Total life of mine proposed disturbance	6,134	7,111
Current disturbed	4,879	4,879

[3] Canada thistle (*Cirsium arvense*) is a Priority 2B noxious weed in Montana indicating that these weeds are abundant in Montana and widespread in many counties. Management criteria requires eradication or containment in some areas (http://mtnhp.org/).

[4] Cheatgrass is a Priority 3 non-noxious but regulated plant in Montana indicating that it has the potential to cause significant negative impacts in the state. These plants may not be intentionally spread or sold other than as a contaminant in agricultural products (http://mtnhp.org/).

Table 3.10-1
Reclamation Status (No Action and Proposed Action)

Item	No Action (Acres)	Proposed Action (Acres)
Current Phase I bond release	1,284	1,284
Current Phase II bond release	1,017	1,017
Current Phase III bond release	407	407
Total to be reclaimed between 2015 and 2019	1,124	1,124
Total acres to be reclaimed between 2020 and 2024 (estimated)	1,501	1,501
Total acres to reclaimed between 2025 and 2029 (estimated)	1,033	1,521
Total acres to be reclaimed between 2030 and 2034 (estimated)	1,814	2,303

Acres to be reclaimed during periods 2020 to 2024 and 2025 to 2029 are approximately 400 acres more than the 1,124 acres to be reclaimed from 2015 to 2019. SCM provides updated disturbance and reclamation acreage to DEQ in their annual reports and reclamation goals are adjusted as necessary.

The SCM mine plan would continue to expand outward and away from the main mine facilities and would need roads and other disturbances through some previously mined areas. Phase IV bond release can only be achieved after all mining and reclamation operations have ceased in that area or drainage. Thus, the largest blocks of reclamation would occur after 2031 when mining has ceased.

A direct impact from the Proposed Action Alternative would be the longer time until roadway areas are moved to higher reclamation phases. A secondary impact would be the additional time some areas are left disturbed and the longer time until these areas meet their intended postmine land use to provide wildlife habitat.

Conditions and stipulations for reclamation are outlined in MSUMRA, MCA 82-4-235. Specifically, they describe what constitutes each phase of reclamation required for bond release. Currently, 4,875 acres at SCM have been disturbed. The Proposed Action would increase the mine disturbance area by 977 acres but would not increase the Surface Mining Permit area.

The Proposed Action would have no direct impacts on SCM's adherence to MSUMRA and SCM would continue to meet their reclamation schedules and time frames. The Proposed Action would result in a longer period for final establishment of vegetation, even though reclamation would continue throughout the life of the mine.

The majority of the TR1 Area surface acres are privately owned (**Table 3.5-3**). Coal and other resources (oil and gas) are owned by the State and Federal governments and coal is leased by SCM. For the privately-owned property, land use agreements have been executed between the private land owners and SCM for all land in the Permit Boundary. There would be no change in the land use agreements.

There would be no direct or secondary impacts from the Proposed Action on land ownership.

The existing reclamation issues, including weed management, expanded reclamation requirements, delays in final reclamation and schedules, were discussed above. SCM has received four violations since 2006 but only one violation in 2008 was relevant to reclamation and the details of that event were:

- 3/3/2008: The mine seeded two areas totaling 8.7 acres with seed mixes not approved for those areas. The seed mixes used in those areas were in compliance with the not-yet approved application.

SCM's violations are from the DEQ ePermitting Public Portal (http://svc.mt.gov/deq/myCOALPublic/home/index).

Based on the analysis above, impacts on vegetation and reclamation from the Proposed Action are expected to be both direct (on the SCM at time of disturbance) and secondary (off the SCM and at a later time), long-term, and moderate.

3.10.5 Unavoidable, Irreversible, and Irretrievable Impacts

There would be unavoidable and irretrievable adverse impacts to vegetation resources for the Proposed Action Alternative from the physical removal of the vegetation and disturbance of the 977 acres. Impacts to vegetation would remain through mining, but reclamation plans and past vegetation reclamation success at SCM demonstrated the vegetation communities would be reestablished. Sagebrush and other shrub components of designated wildlife postmining land use plantings typically would take longer to grow and fully reestablish compared to the grass and forb species used for the grazing or pasture lands revegetation mixtures.

3.11 Water

3.11.1 Analysis Area

The analysis area for surface water and surface water rights includes the drainage basins of Spring Creek, South Fork of Spring Creek, Pearson Creek and the South Fork of Pearson Creek from just upstream of the proposed SCM permit boundary to and including the Tongue River Reservoir. The analysis area for ground water and ground water rights includes a 3-mile buffer around the proposed SCM permit boundary and includes the West Decker Mine and the intervening area between SCM and West Decker and intervening area between West Decker and the Tongue River Reservoir. These analysis areas were selected so as to be consistent with analysis areas being used to evaluate cumulative hydrologic impacts.

Issues and Analysis Methods

The primary surface and ground water issues were summarized into the following issues:

- What would be the impacts on ground water and surface water quantity and availability to Pearson Creek, Spring Creek, the Tongue River Reservoir, and other receiving and downstream waterways? The impacts to surface water and ground water quantity were

estimated using either published ground water modeling information or published records of surface water flow.

- What would be the impacts to ground and surface water quality, including salinity, EC, and TDS? Impacts to ground and surface water quality were estimated using published records of water quality and published water quality prediction calculations.
- What are impacts to surface and ground water from previous coal mining and coal-bed methane development? Impacts from coal mining and coal bed methane development are analyzed in Section 4 under Cumulative Impact Analysis.

3.11.2 Affected Environment

3.11.2.1 Regulatory Environment

Federal Requirements

Federal surface water quantity and quality regulations applicable to the SCM Project Area include the Clean Water Act of 1972 and National Pollutant Discharge Elimination System (NPDES) program for point sources. The Clean Water Act requires federal agencies to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." (33 U.S.C. Section 1251-101[a]) EPA has delegated authority to the DEQ to administer the Clean Water Act and NPDES program within the State of Montana.

State Requirements

State surface water quantity and quality regulations applicable to the SCM Project Area include:

- Montana Clean Water Act (75-5-101 et seq., MCA)
- MSUMRA (82-4-201 et seq., MCA)
- MPDES (ARM 17.30.1201)
- Montana Nonpoint Source Management Plan (ARM 17.30.1105)
- Tongue River Total Maximum Daily Load (TMDL)
- The Natural Streambed and Land Preservation Act of 1975 (75-7-101 et seq., MCA)

The Montana Water Quality Act provides for protecting, maintaining, and improving the quality of water for beneficial uses and for establishing water quality standards.

MSUMRA requires that surface coal mining and reclamation operations protect surface and ground water quality in compliance with all applicable state and federal water quality laws and regulations and with the effluent limitations for coal mining operations. DEQ is responsible for enforcing compliance with most water quality laws on all lands in the state, excluding tribal lands. MSUMRA also contains reclamation requirements to protect the hydrologic balance and achieve postmine land use performance standards. Hydrologic balance is defined as "the relationship between the quality and quantity of water inflow to, water outflow from, and water storage in a hydrologic unit, such as a drainage basin, aquifer, soil zone, lake, or reservoir,

and encompasses the dynamic relationships among precipitation, runoff, evaporation, and changes in ground water and surface water storage" per Section 82-4-203(25), MCA.

MPDES regulates point source discharges of water to a surface water of the state to limit the quantities of pollutants to be discharged. The limits and/or requirements in the MPDES permit help ensure compliance with Montana's Water Quality Standards and other state and federal regulations written to protect public health and the aquatic environment.

In Montana, non-point source pollution is primarily addressed through voluntary management practices and through Stormwater Permits issued by DEQ. DEQ regulates discharges of stormwater from industrial activity through Multi-Sector General Permit for Stormwater Discharges Associated with Industrial Activity under the MPDES permit system.

Local Requirements

The Natural Streambed and Land Preservation Act (MCA 75-7-1), also known as the 310 Law, is a state law which requires that any work in or near a perennial stream or river on private or public land must first obtain a 310 Permit from the local conservation district (Big Horn County Conservation District). As will be shown in subsequent sections, no perennial streams are involved in the proposed action, so this local requirement is not applicable.

3.11.2.2 Existing Conditions

Ground Water

Ground water occurs in various aquifers throughout the area of analysis including in the overburden, A-D coal and underlying Canyon Coal, interburden, and alluvium. The coal and alluvial aquifers are generally the most important sources of water in the area.

Ground water recharge occurs typically to the west of the SCM in outcrops in the Wolf Mountains. Ground water typically flows to the east and discharges to the Tongue River Reservoir east of SCM.

The primary shallow aquifer within the SCM permit area is the Anderson-Dietz coal seam (SCC and WWC Engineering 2017). Ground water in the A-D coal is typically a sodium sulfate-bicarbonate type with high sodium absorption ratios.

Measured TDS in coal aquifers varies, with a median of about 1,840 milligrams per liter (mg/l) in the A-D coal and a maximum of 13,100 mg/l. The Canyon Coal aquifer contains slightly less dissolved solids with a median of 1,050 mg/l and a maximum of 5,000 mg/l (SCC and WWC 2017, **Table 4.2.3-3**). Spoils, which have replaced the mined A-D coal and have become resaturated, have variable TDS concentrations with a median of 4,540 mg/l and a maximum of 7,440 mg/l. Until rinsing and other geochemical processes reduce TDS in the spoils ground water reconnected through the spoils will deliver higher TDS loads to downstream receiving waterways (namely Tongue River Reservoir).

Historic mining at SCM has interrupted the flow of ground water in the A-D coal by excavating the coal. In some portions of the SCM, spoils have already been used to backfill the excavation and a new spoils aquifer is beginning to form where the mined A-D coal aquifer was previously. Similarly, the West Decker Mine has disturbed the underlying A-D coal aquifers. The A-D coal aquifer (which occurs as separate Anderson and Dietz (1 & 2) coal beds in the vicinity of West Decker Mine) have been removed by mining and replaced with spoil in the West Decker permit areas.

Ground water that appears in the mined A-D coal is typically collected and used for dust control or other process water. The existing West Decker Mine, located southeast of the SCM between Tongue River Reservoir and SCM, has also mined the A-D coal and interrupted the flow of the ground water in that vicinity.

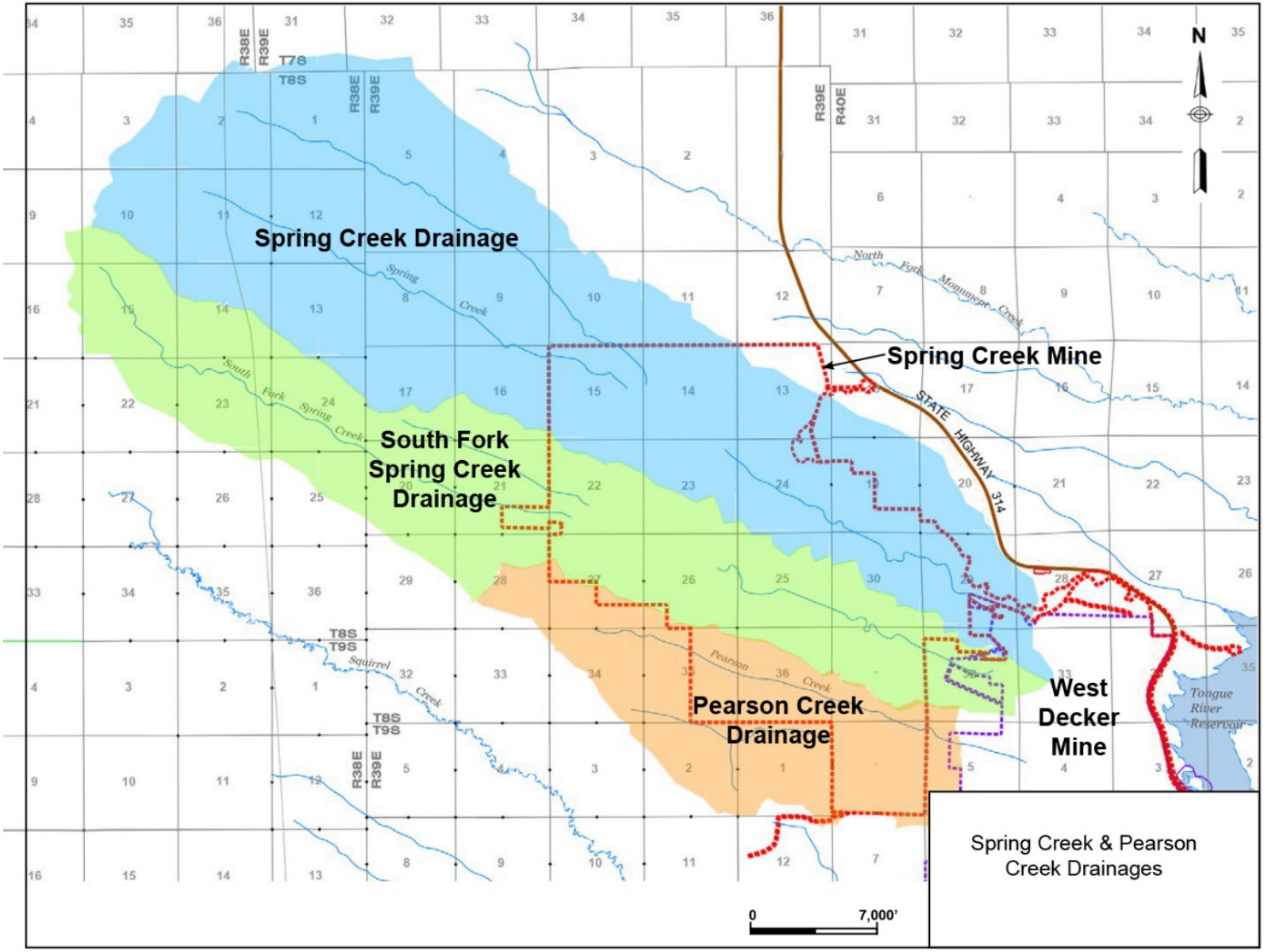
Surface Water

The ephemeral streams within the SCM permit area are Spring Creek, South Fork of Spring Creek, and Pearson Creek (**Figure 3.11-1**). Of these, mining under the existing permit occurs in the Spring Creek, South Fork of Spring Creek, and Pearson Creek drainages. The TR1 expansion would allow SCM to mine additional coal in the Pearson Creek drainage and to expand coal mining into the South Fork of Pearson Creek drainage. Downstream of SCM, existing West Decker Mine has mined across all these streams and currently capture any runoff in their MPDES ponds.

Spring Creek, South Fork of Spring Creek, and Pearson Creek, and South Fork of Pearson Creek meet the hydrological definition for ephemeral streams (ARM 17.30.602[10]) with flow only as a result of rainfall and snowmelt runoff (SCC and WWC 2017, Pg. L-14). Surface water quality is variable within the SCM permit area but is typically characterized as a calcium/magnesium/sodium sulfate type. Surface water has been sampled and tested for various analytes. TDS ranges from lows of about 60 mg/l to a high of 2,120 mg/l upgradient of mining. Mined out and reconstructed drainages exhibit higher TDS (median of approximately 1,560 mg/l; maximum of approximately 3,350 mg/l). Surface water samples frequently had trace metal concentrations (particularly iron and aluminum) higher than applicable water quality criteria. (ibid, **Table 4.1.3-1**).

The West Decker Coal Mine has disturbed lower Pearson Creek as it approaches Tongue River Reservoir and currently captures surface water from Pearson Creek in the Pearson Creek Flood Control Reservoir. At times, the West Decker Coal Mine discharges water from its storm water ponds to the Tongue River Reservoir under the terms of their MPDES permit.

Figure 3.11-1. Spring Creek and Pearson Creek Drainages



Both Pearson Creek and the A-D aquifer historically delivered water to the Tongue River Reservoir, an important recreational water body and water supply reservoir for irrigation, along the Tongue River in Montana. **Figure 3.11-1** shows the location of these drainages and their relationship to SCM, West Decker Mine and Tongue River Reservoir.

Surface water and ground water monitoring networks have been established at the SCM and Decker mines to observe the effects of mining, mitigation measures, and restoration of the hydrologic system (SCC and WWC Engineering 2017). The results of this monitoring program are submitted semi-annually to DEQ.

3.11.3 Direct and Secondary Impacts

3.11.3.1 No Action Alternative

Under the No Action Alternative, SCM would continue to mine and process coal within the current permit area. Existing ground water monitoring consists of regular periodic monitoring and maintenance of water wells within SCM's currently-active ground water monitoring network. Surface water monitoring involves regular periodic monitoring and maintenance of SCM's surface water monitoring and sampling sites. With No Action, these would continue to be monitored until the final bond release.

Surface Water Quantity

During mining surface water runoff patterns are altered significantly. Runoff from upgradient areas in Spring Creek and Pearson Creek for example, no longer flows through and across the mining area but is captured internally within the mining area in pits and stormwater ponds. Runoff that occurs internally from within the mining area is similarly captured. When runoff from larger rainfall or snowmelt events exceeds the holding capacity of internal pits and stormwater ponds, it potentially could flow downgradient toward the West Decker Mine where it is intercepted and captured in pits and ponds there. Stormwater captured in pits or ponds is used by mines for dust control. Natural processes such as evaporation and infiltration into groundwater also result in the elimination of collected stormwater from pits and ponds. This interruption of surface water runoff patterns during mining produces direct impacts on the Tongue River Reservoir and other receiving waterways from the No Action Alternative. These impacts include the reductions in the surface flow from the Spring Creek and South Fork Spring Creek and from Pearson Creek as shown in **Figure 3.11-1**. It is estimated that Spring Creek and South Fork of Spring Creek would have contributed a total of 402 acre-feet per year on average to the Tongue River Reservoir while Pearson Creek would have contributed an estimated 2.2 acre-feet per year (SCC and WWC, 2017, pg. L-73). These direct impacts would continue until mining and reclamation at both SCM and the West Decker Mine is complete and Spring Creek and South Fork Spring Creek and Pearson Creek are reconnected to flow downstream towards the Tongue River Reservoir. Following this reconnection, surface water contribution to the Tongue River Reservoir should return to the premining rates and volumes noted above.

Ground Water Quantity

Water bearing strata are dewatered during mining by excavation and removal of overburden and coal seams. Ground water issuing from the removed strata is collected and intermixed with surface water in pits and ponds within the permit area. As with collected surface water, ground water in pits and ponds is used for dust control, evaporates from the ponds or infiltrates into the underlying groundwater. In extreme cases, intermixed surface and groundwater may be discharged toward the downgradient West Decker Mine where it is similarly captured in pits and ponds. Ground water modeling of the existing permit mining (No Action) indicates the amount of groundwater captured varies considerably over the life of the mine from under 100 gallons per minute (gpm) in the early life of the mine rising to a maximum of approximately 440 gpm during 2015 (Nicklin 2005) and then tapering off to approximately 227 gpm by 2025 (see **Figure 3.11-2**).

Following backfill of mine pits with spoils, groundwater from upgradient recharge areas is expected to flow into the former mine pits and resaturate spoils and create a new aquifer across the mined area. Recovery of the groundwater levels in the newly created aquifer is expected to take place slowly so that within about 50 years, levels mostly meet or exceed pre-mining levels. However, groundwater underlying the Pearson Creek area could still be up to 6 feet lower than premining levels 50 years after mining (Nicklin, 2012).

Following resaturation of the spoil aquifers (both at SCM and at the downgradient West Decker Mine) groundwater flow rates toward discharge areas along the Tongue River Reservoir should return to pre-mining rates.

Some existing wells could be impacted by drawdowns in groundwater produced by the No Action Alternative.

Based on the analysis above, impacts on surface water from the No Action Alternative are expected to be short-term and minor. Impacts on ground water would be long-term and moderate.

3.11.3.2 *Proposed Action Alternative*

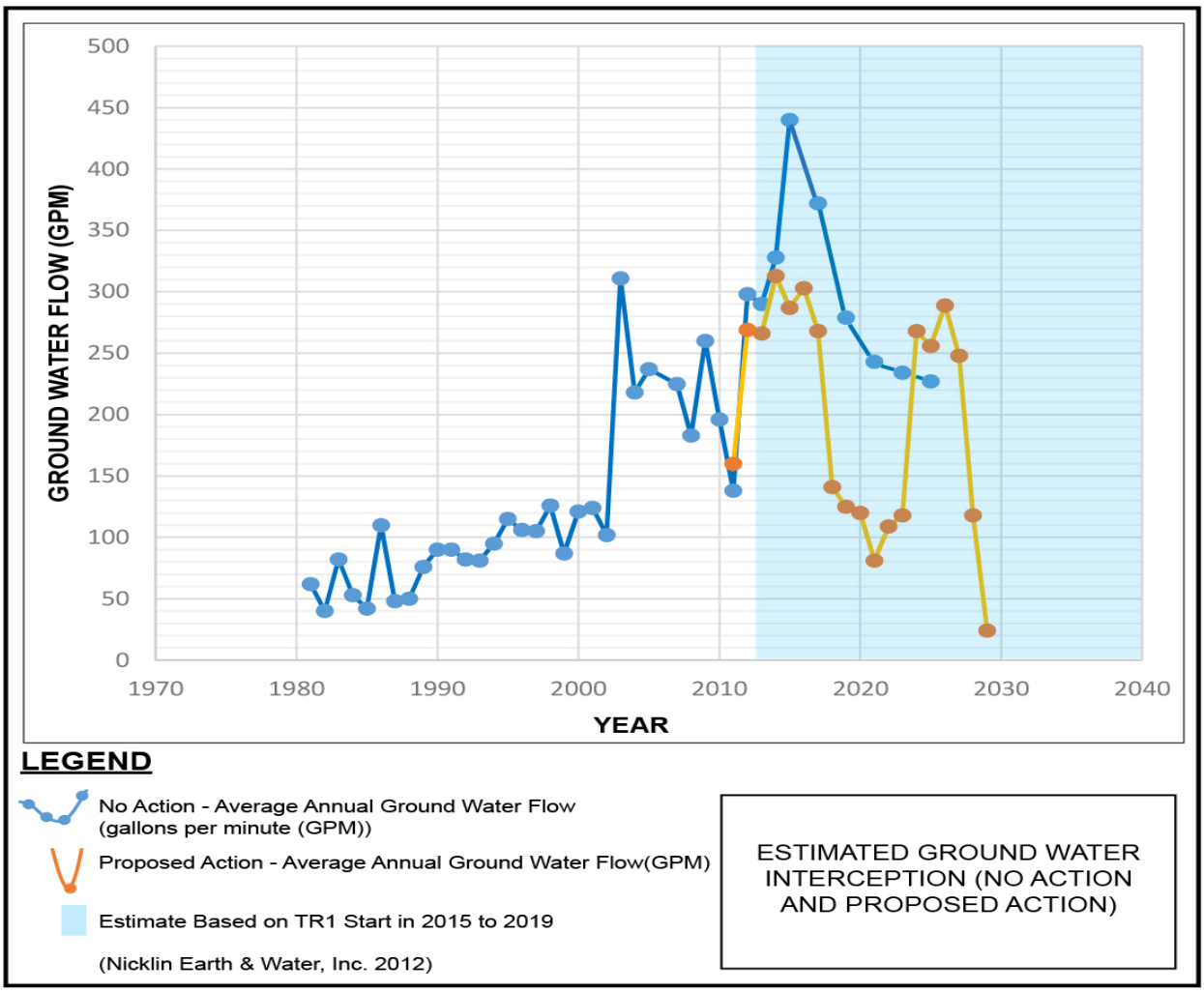
Surface Water Quantity

The Proposed Action affects surface water flow in the Pearson Creek drainage area which ultimately would flow to the Tongue River Reservoir. Currently, Pearson Creek surface water flows do not directly reach the Tongue River Reservoir because they are intercepted both upgradient of the currently-permitted mining in Pearson Creek and downgradient at the West Decker Mine. Surface water would continue to be captured in Pearson Creek at the current locations under the Proposed Action Alternative, but would be captured for approximately four additional years compared to the No Action Alternative. As mining for the TR1 expansion expands into the South Fork of Pearson Creek, it too would be captured within the TR1 disturbance and presumably used for dust control and other uses on the SCM. Consequently,

less surface flow from the South Fork of Pearson Creek would arrive at the West Decker Mine and less may be discharged to the Tongue River Reservoir.

Direct impacts from the Proposed Action would occur in the TR1 area. These impacts could result in less surface water reaching the West Decker Mine and possibly less water being discharged from the West Decker sediment control ponds to the Tongue River Reservoir. The Proposed Action would result in the South Fork of Pearson Creek being mined through and no longer flowing to the Pearson Creek Flood Control Pond at the West Decker Mine. The Proposed Action also captures Pearson Creek flows and prevents them from flowing downstream for a longer period than would occur under the No Action Alternative. Pearson Creek is estimated to contribute 2.2 acre/feet per year on average to the Tongue River Reservoir since monitoring began on this tributary in 2006 (SSC and WWC Engineering 2008). These direct impacts would continue until a future date when the Pearson Creek and South Fork Pearson Creek channels are reconnected through the disturbed area.

Figure 3.11-2. Estimated Ground Water Interception (No Action and Proposed Action)



Ground Water Quantity

The Proposed Action affects ground water contributions to the Tongue River Reservoir by cutting off ground water flow in the A-D coal seam through the mined area. Other aquifers would also be cut off by the Proposed Action but the ground water flow in the other aquifers would be minimal. With the TR1 mining, direct impacts include the interception of ground water as the A-D coal seam is excavated. Secondary impacts would continue to occur after mining and reclamation as the spoils aquifer is resaturated. These secondary impacts would slowly taper off following reclamation. As shown in **Figure 3.11-2**, the peak predicted ground water interception in the remaining life of the SCM with the TR1 Proposed Action is approximately 314 gpm (Nicklin 2012).

The Proposed Action would also affect ground water levels in underlying aquifers. It is predicted (Nicklin 2012, Figure 21) that ground water levels in the TR1 expansion area would decrease over those predicted for the existing permit by as much as 20 feet at the conclusion of mining in 2025 in the spoils that replace the A-D Coal. The change in ground water levels over the existing permit area caused by the TR1 expansion would be relatively small. These changes would persist into the future. Within the TR1 expansion area 50 years after mining ceases, there would still be higher drawdowns by a little less than 7 feet more than drawdowns created by the existing permit. Similarly, drawdowns in the underlying Canyon Coal aquifer would increase by up to 2 feet more than those created by the existing permit in the TR1 expansion area at the conclusion of mining and these increased drawdowns would persist into the future at least 50 years after mining ceases.

Wells may also be impacted by the proposed action. An inventory of private wells and springs (SCC and WWC, 2017) identified about 36 wells and springs within a zone in which drawdowns from the proposed action are greater than those from the no action alternative. Of those, approximately 13 could be impacted by drawdown from the proposed TR1 expansion while the remainder would likely not be impacted. **Table 3.11-1** lists the potentially affected wells.

Table 3.11-1
Wells Potentially Impacted by Increased Drawdown from the Proposed Action

DNRC Water Right No.	GWIC Designation	Owner	Location		
	198207	SCHOOL HOUSE WELL	T 8 S	R 38 E	12
			Township	Range	Section
	266391	JOHN YOUNG* TRAILER	T 8 S	R 39 E	1
	8064	YOUNG, JOHN	T 8 S	R 39 E	2
42B 30003468		HAMILTON TRUST	T 8 S	R 39 E	5
	8069	ROBKE, FRANK	T 8 S	R 39 E	12
42B 46699 00		MONTAYLOR CORPORATION	T 8 S	R 40 E	7
42B 46697 00		MONTAYLOR CORPORATION	T 8 S	R 40 E	9

Table 3.11-1
Wells Potentially Impacted by Increased Drawdown from the Proposed Action

DNRC Water Right No.	GWIC Designation	Owner	Location		
42B 46383 00		MONTAYLOR CORPORATION	T 8 S	R 40 E	20
42B 79364 00		USA (BLM)	T 8 S	R 40 E	28
42B 79365 00		USA (BLM)	T 8 S	R 40 E	28
	8080	KUKUCHKA WM * 6.5 M NE DECKER MT	T 8 S	R 40 E	33
	8457	MINER JIM * 4.2 M SE DECKER MT	T 9 S	R 40 E	4
	8458	HERRINGTON D * 13 MI SE BIG BEND SCHOOL	T 9 S	R 40 E	9

Water Rights

By cutting off both surface water from Pearson Creek and ground water in the A-D coal aquifer, both the No Action and Proposed Action Alternatives potentially impact downstream water rights by reducing the available flow in the Tongue River. Cutting off surface water flow in Pearson Creek reduces the surface flow from Pearson Creek by an average of 2.2 acre-feet per year in both the No Action and Proposed Action Alternatives. Cutting off the flow of the of the A-D aquifer reduces the flow a variable amount (See Figure 3.11-2). The proposed action reduces the flow from the A-D aquifer by a maximum of 313 gpm or the annual equivalent of approximately 500 acre-feet. Although under the No Action Alternative, Pearson Creek and the A-D aquifer are also cut off from the Tongue River, the Proposed Action extends the potential impacts further into the future more years than the No Action Alternative.

Surface Water Quality

The proposed expansion would impact surface water quality by increasing TDS and TSS concentrations. Storm events (short-duration, heavy rainfall) can increase dissolved metals and suspended solids concentrations when rainfall runoff reaches surface water after passing through upgradient mined areas and spoils. Spoils contain broken rock that has been removed from the surface to reach the underlying coal seam. This newly broken rock contains fine sediment that can be carried downstream during runoff. Surface runoff and ground water removed from active mining pits is typically commingled in inactive pits, which can increase TDS concentrations (SCC and WWC Engineering 2017). Discharges of surface water or commingled surface and ground water are subject to the terms of MPDES discharge permits and are prevented from carrying excessive sediment loads to the Tongue River Reservoir. On completion of backfill and reclamation, surface water runoff would no longer be intercepted by impoundments and mining excavation and would return to premining rates.

Ground Water Quality

As mining progresses through the coal seam, inactive pits are backfilled with unconsolidated overburden, known as spoil, pursuant to ARM 17.24.501 and the approved permit (SCM 2011a).

As mining and reclamation progresses, ground water levels begin to rise, eventually contacting the spoil where soluble salts leach from the spoil to the ground water as a result of geochemical equilibrium processes (SCC and WWC Engineering 2017). Dissolution of minerals on the newly exposed and broken surfaces of spoils rock causes an increase in concentrations of major analytes, including calcium, sodium, and sulfate ions. This results in increased TDS concentration in spoil water. The average TDS concentration in the A-D coal aquifer (from 18 wells monitored in 2016) was recorded at approximately 1,913 mg/L. At SCM, the TDS of spoil water ranges from 3,000 to 6,000 mg/L (DEQ 2015). Although no acid-forming or toxic-forming materials have been identified in overburden material at SCM, backfilling mined pits with spoils is the primary cause for changes in ground water quality (SCC and WWC Engineering 2017). The TDS concentrations in spoils are 2.2 and 1.8 times higher than in the undisturbed overburden and A-D coals, respectively. As ground water flows through backfill spoils, TDS concentrations peak during initial saturation and then equilibrate over time. The spoils ground water being monitored at SCM shows TDS concentrations consistent with predicted changes. Elevated TDS concentrations may be attenuated through natural geochemical processes as ground water migrates from the spoil downgradient to undisturbed coal and clinker. Based on an assessment of existing uses and current Montana ground water classification (based on EC), the premine beneficial uses of this water are expected to be feasible at the same viability (SCC and WWC Engineering 2017).

Water bearing units (A-D coal seam, overburden) are dewatered at active mining pits. Hydraulic conductivity and the capacity to store water are changed in the process of removing overburden strata and returning it as spoil to mined-out pits. The relatively homogenous spoil backfill has a more uniform hydraulic conductivity in contrast to undisturbed, bedded lithology where vertical conductivity is usually lower than horizontal conductivity (DEQ 2015). Ground water modeling predicts the majority of the recovery to occur within approximately 50 years postmining, after which ground water levels are predicted to continue to increase to approximately premine conditions. Backfill spoil has been continually monitored and data confirms ground water recovery has been occurring in areas where mining has been completed.

Based on the analysis above, impacts on water from the Proposed Action are expected to be long-term and moderate.

3.11.4 Unavoidable, Irreversible, and Irretrievable Impacts

Ground water levels would be unavoidably lowered during mining due to the physical removal of the coal and from dewatering in the active pits. Ground water levels would eventually return to near premine levels after closure and reclamation, but that would take many years. Ground water and surface water impacts from the Proposed Action would primarily occur during active mining and dewatering of the pits; impacts would diminish with reclamation. Impacts to ground water and surface water are not irreversible. Water quality in the mined-out area would be permanently changed where spoil replaces the A-D Coal and overburden.

3.12 WILDLIFE

This section summarizes applicable federal and state laws protecting wildlife in Montana, describes wildlife species that occur in the analysis area, and analyzes the potential direct and secondary impacts on wildlife from the No Action and Proposed Action Alternatives. Mitigations that would reduce impacts to sage grouse are also provided in this section.

3.12.1 Analysis Area

The analysis area for impacts on wildlife is the annual wildlife monitoring area, which is the SCM permit area plus a surrounding area of up to two miles and encompasses approximately 31,496 acres (**Figure 3.3-2**). The analysis area is larger than the Proposed Action disturbance footprint to ensure impacts that extend outside this boundary (such as noise) are adequately analyzed, and to capture potential impacts to wide-ranging species (e.g., raptors that nest outside the permit area but forage in and near SCM).

3.12.2 Issues and Analysis Methods

The wildlife analysis looked at the following issues:

- What would be the impacts on species of concern and special, exceptional, critical, or unique areas for wildlife (ARM 17.24.304(1)(d)) (core and general sage grouse habitat and leks, sharp-tailed grouse leks, raptor nests, migratory birds, and wintering areas for mule deer and pronghorn)?
- How would threatened and endangered species be affected?
- How would species of concern be affected?

Analysis methods first identified the wildlife species and their habitats in the Project Area based on the 2018 annual wildlife monitoring report for SCM (Great Plains Wildlife Consulting 2019) and the SCM Species of Special Interest Monitoring and Management Plan. Impacts from the No Action and Proposed Action were then evaluated based on species occurrences and habitat locations relative to the proposed activity.

For evaluating potential impacts specifically to sage grouse, DEQ selected a habitat functional acreage approach based on the HQT developed by MSGHCP to quantify gains and/or losses of sage grouse habitat caused by anthropogenic activities (Montana Mitigation Stakeholder Team 2018a and 2018b). This habitat functional acreage approach incorporates species population and habitat variables that are descriptive of seasonal sage grouse habitats. It also incorporates direct and secondary impacts of anthropogenic features. Collectively, these landscape characteristics were used to evaluate changes in sage grouse habitat functions for the SCM. A detailed description of the TR1 Sage Grouse Habitat Assessment approach is provided in Appendix A.

DEQ consulted with the MSGHCP on October 2, 2018, even though the TR1 application was outside the requirements of EOs 12-2015 and 21-2015. DEQ decided to use the habitat

functional acreage approach because it would accurately reflect current habitat conditions (Baseline; No Action) as well as potential changes and impacts associated with the Proposed Action Alternative. The sage grouse habitat functional score in the TR1 area (977 acres) and in the surrounding area within two miles of TR1 (28,220 acres) was quantified. The functional acreage assessment used the average habitat function scores for the different SCM alternatives to estimate the direct and secondary impacts associated with TR1. This approach was deemed to produce an accurate estimate because it also incorporated existing SCM mitigation and conservation activities associated with the HRRP, CCAA, and SOSI into the habitat assessment.

3.12.3 Affected Environment

3.12.3.1 Regulatory Environment

Federal Requirements

The ESA, Migratory Bird Treaty Act (MBTA), and Bald and Golden Eagle Protection Act prohibit an individual "subject to the jurisdiction of the United States" from taking certain wildlife species and their parts (16 U.S.C.S Section 1538(a)(1)). The USFWS administers these federal laws. The ESA prohibits take of species listed as threatened or endangered, where take means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect". Take also can include habitat modifications that result in impairment of essential breeding, feeding, or sheltering behavior. The Bald and Golden Eagle Protection Act of 1940 (16 U.S.C. Section 668–668c) prohibits taking bald eagles (*Haliaeetus leucocephalus*), golden eagles (*Aquila chrysaetos*), and their eggs, parts, or nests without a permit issued by USFWS. Migratory birds (including raptors) are protected under the MBTA (65 Pub. L. No. 186, Section 2, 40 Stat. 755 (1918)). Under the MBTA, it is illegal to take any migratory bird, its eggs, its parts, or any bird nest except as permitted (such as waterfowl hunting licenses, falconry licenses, or bird banding permits) by USFWS.

State Requirements

Under MSUMRA and its implementing rules (ARM 17.24.301 through 17.24.1826), Subchapter 17 of the ARM includes regulations on topsoiling, revegetation, and protection of wildlife and air resources. ARM 17.24.751(1) prohibits mining operations that may jeopardize continued existence of federally listed Threatened or Endangered species, result in adverse modification of critical habitat, or result in unlawful take of bald or golden eagles including their nests or eggs. ARM 17.24.751(2)(a–g) requires avoidance and minimization measures as well as BMPs for siting and construction of electric power lines, roads, and fencing that minimize adverse impacts on wildlife habitat. MSUMRA in particular requires each application to contain a fish and wildlife plan describing how the project will minimize disturbances and adverse impacts (including habitat impacts to aspects of the landscape, such as vegetation) on fish, wildlife, and related environmental values during mining and reclamation operations (ARM 17.24.312(1)(a)). Applicants are required to explain how they will utilize impact control measures, management techniques, and annual monitoring methods to protect or enhance habitats of unusually high

value for fish and wildlife (ARM 17.24.312(1)(d)(iii)). SCM must ensure that reclamation will provide for habitat needs of various wildlife species in accordance with the approved postmining land use, with plant groupings distributed to fulfill fish and wildlife requirements (ARM 17.24.312(1)(e)).

FWP manages fish and wildlife in Montana under the state FWP Commission (Section 87-1-301, MCA). FWP, in conjunction with the Montana Natural Heritage Program (MTNHP), designates Montana Species of Concern. This designation is not a statutory classification, but rather is used to prioritize management and conservation of species that are at risk in Montana due to declining populations, threats to habitat, or restricted geographic range. The Montana Species of Concern list was also adopted as the list of Species of Greatest Conservation Need in the Montana State Wildlife Action Plan.

The state of Montana has issued three EOs on sage grouse management; including EO 10-2014, EO 12-2015, and EO 21-2015. EO 12-2015 amended EO-2014 and provides for implementation of the Montana Sage Grouse Conservation Strategy, consistent with the provisions of S.B. 261, 2015 Leg., 64th Sess. (Mont. 2015). EO 21-2015 directs all Montana state agencies to comply with EO 12-2015 and apply an updated Sage Grouse Core Areas and General Habitat in Montana map.

SCM has developed general management and monitoring plans for wildlife species of interest that are part of their Surface Mining Permit. The TR1 Project would be included in these plans, including the Fish and Wildlife Plan (Section 17.24.312); Monitoring Plan (Section 17.24.723); Protection and Enhancement of Fish, Wildlife, and Related Environmental Values (Section 17.24.751); and Reclamation Plan (Section 17.24.313). At DEQ's request, SCM also prepared a Species of Special Interest Monitoring and Management Plan (SOSI Plan) to provide broad, long-term direction for management of wildlife species of special interest that occur in the TR1 Area. All these plans ensure the Proposed Action would comply with applicable state and federal regulations protecting wildlife. The plans provide long-term direction for monitoring species of interest; requirements for avoiding, minimizing and compensating for potential impacts to these species due to mine operations; and maintaining, enhancing, and/or reclaiming species habitats. Specific measures for minimizing disturbance and adverse impacts to migratory birds, raptor nests, and threatened and endangered species are included in the Fish and Wildlife Plan (SCM 2017b). The Fish and Wildlife Plan also outlines best management practices that are applied during mining activities to minimize wildlife impacts, including buffers on grouse leks and raptor nests; scheduling mining activity and designing powerlines, stream crossings, ponds, fences, and facilities to minimize impacts to wildlife; monitoring of wildlife and other natural resources; and employee training.

The SCM reclamation plan (Section 17.24.313) includes restoring wildlife habitat as the primary postmine land use. In addition, the reclamation plan includes the opportunistic construction of wildlife enhancement features, which would increase the diversity of topography and

vegetation such that habitat in reclaimed areas would be more like premine conditions and conditions in adjacent undisturbed areas. These enhancements include shrub mosaics, wetlands, rock piles/ledges, cliffs, steep slopes/escarpments, moisture catchment basins, riparian areas, small depressions, and woody debris. Larger reclamation features, such as traps and sediment ponds, larger depressions, or larger upland playas, would be addressed with DEQ approval prior to final reclamation. Reclamation is completed contemporaneously to minimize disturbance footprint at the mine.

Wildlife monitoring has been conducted annually at SCM since 1982. Annual reports are submitted to DEQ, which discuss species occurrences, potential mine-related impacts to those species, agency coordination, and specific measures taken to avoid, minimize, or compensate for mine-related impacts within that year. The data are also used to determine the success of reclamation. A complete list of wildlife species observed in the SCM monitoring areas is included in the Surface Mining Permit and the annual monitoring reports. SCM has also developed internal guidance documents, including the SOSI Plan for all wildlife, and the HRRP specifically for the sage grouse. The HRRP was required as part of the federal coal lease permitting process for the Proposed Action. The HRRP requires that sage grouse habitat impacts be mitigated.

SCM is a member of the Thunder Basin Grassland Prairie Ecosystem Association (Association), a local organization representing ranchers and energy producers in northeast Wyoming and southeastern Montana. In cooperation with the USFWS, the Association developed a Conservation Strategy covering eight vertebrate species in sagebrush steppe and short grass prairie ecosystems, including sage grouse, sage sparrow, Brewer's sparrow, sage thrasher, black-tailed prairie dogs, mountain plover, burrowing owl, and ferruginous hawk. The USFWS finalized the Conservation Strategy in 2017 under the authority of Section 10 of the ESA (USFWS 2017). By voluntarily engaging in conservation efforts under the framework of the approved Conservation Strategy, and SCM receives regulatory assurances or a high degree of certainty that if a species covered in the Conservation Strategy is listed under the ESA in the future, the member's activities could continue under a specific take permit that would be issued by USFWS. The Conservation Strategy is being implemented through a conservation agreement. The Conservation Strategy includes a variety of conservation measures both on and off the SCM property. SCM's Certification of Inclusion and Certificate of Participation detail the specific conservation measures selected for SCM to eliminate or minimize threats to sage grouse and other covered species, or to enhance, restore, or maintain habitat to provide a net conservation benefit for one of more of the covered species.

3.12.3.2 Existing Conditions

The majority of the wildlife habitat in the direct/secondary impacts analysis area consists of sagebrush-steppe, upland grassland, bottomland, reclaimed grasslands, and agriculture (pastures, hay fields, and tilled fields). Grasslands are present in playas, prairie dog colonies,

agricultural areas, reseeded disturbed sites, and where a small (less than 20 acres) historical sagebrush area burned decades ago (exact date unknown but prior to at least 1994). The burned area is west of the SCM permit area but within the analysis area. Agricultural fields are present in the north-central portion of the direct/secondary impacts analysis area. Ponderosa pine forests are present on rough breaks and north-facing slopes. Rocky Mountain juniper has colonized drainages and are also encroaching on sagebrush flats. Mining activities have disturbed much of the permit area though portions are under reclamation. Three major named drainages and several smaller drainages flow through the analysis area, all of which have ephemeral flow and drain into the Tongue River Reservoir. Vegetation in these drainages is dominated by juniper trees, but mesic shrubs are also present in drainages that hold more moisture. Water sources, including stock tanks, guzzlers, stock reservoirs, and mine reservoirs are present. Fourteen impoundments within 1 mile of the SCM permit area are monitored annually for aquatic wildlife, though six were dry in 2018 (Great Plains Wildlife Consulting 2019). Sandstone outcrops and clay cliff faces are scattered throughout the analysis area.

The majority of the surface disturbance from the TR1 expansion would occur in the Pearson Creek drainage, which is characterized by sagebrush, grassland (including cheatgrass), greasewood, and limited stands of juniper in the draws and steeper slopes. There are no jurisdictional wetlands in the TR1 expansion area. Limited surface water is present and there is little subsurface water in the drainages to support mesic vegetation. Vegetation types within the TR1 expansion area are described in detail under Section 3.10 of this draft EIS.

Wildlife habitat would experience direct impacts (on the SCM and at the time of mining) and secondary impacts (off the SCM and at a later time) from both the No Action and Proposed Action Alternatives.

Land ownership in the direct/secondary impacts analysis area and cumulative impacts analysis areas is a mix of private, state, and federal surface ownership. Current disturbances in the analysis areas include the SCM and West Decker Mine (cumulative area only), an extensive network of roads and fences, powerlines, pipeline corridors, and old disturbance and infrastructure from coal bed natural gas development.

Species of Concern

Table 3.12-1 lists the Montana Species of Concern in Big Horn County, Montana, for which there is suitable habitat in the analysis areas. **Table 3.12-1** also lists each species' habitat associations based on the Montana Field Guide (MTNHP/FWP 2018) and occurrence history in the analysis areas based on baseline and annual wildlife surveys at SCM. Due to the lack of perennial streams, no fish Montana Species of Concern are present. The sage grouse is discussed in greater detail in the text below because it has specific regulatory requirements and its habitat and space use requirements change seasonally, which is important for understanding potential impacts to the species. All wildlife baseline information provided below is derived

from the 2018 annual wildlife report (Great Plains Wildlife Consulting 2019) unless otherwise cited.

Table 3.12-1
Wildlife Species of Concern at SCM

Species	Habitat	Historic Occurrence in Analysis Area (1984-2013)	Recent Occurrence and Year Observed (2014-2018)	
			Direct/ Secondary Analysis Area	Cumulative Impacts Analysis Area
Amphibians & Reptiles				
Great Plains toad *Anaxyrus cognatus*	Wetlands, floodplain pools	Infrequently	Never	Never
Greater short-horned lizard *Phrynosoma hernandesi*	Rocky outcrops, sparsely vegetated flats with sandy/gravelly soils	Rarely	2016	Never
Plains spadefoot *Spea bombifrons*	Wetlands, floodplain pools	Infrequently	Never	Never
Snapping turtle *Chelydra serpentina*	Prairie rivers and streams	Rarely	Never	2014/2015, 2017
Spiny softshell *Apalone spinifera*	Prairie rivers and larger streams	Never	Never	Never
Birds				
Black-billed cuckoo *Coccyzus erythropthalmus*	Wooded draws (cottonwood, ash, and elm), thickets and deciduous woodlands	Never	Never	Never
Bobolink *Dolichonyx oryzivorus*	Tall grass and mixed grass prairie	Never	Never	Never
Brewer's sparrow *Spizella breweri*	Sagebrush and shrub-steppe	Regularly	Every year from 2014 to 2018	Every year from 2014 to 2018
Burrowing owl *Athene cunicularia*	Open grasslands where abandoned mammal burrows are available	Regularly	2014/2015 and 2016	Never
Cassin's finch *Haemorhous cassinii*	Forests, especially ponderosa pine	Never	Never	Never
Chestnut-collared longspur *Calcarius ornatus*	Short to medium grasslands	Never	Never	Never
Clark's nutcracker *Nucifraga columbiana*	Conifer forests, including ponderosa pine	Rarely	Never	Never
Golden eagle *Aquila chrysaetos*	Hunt over grasslands, shrublands, and open woodlands; nest on cliffs and large trees	Regularly	Every year from 2014 to 2018	Every year from 2014 to 2018
Great blue heron *Ardea herodias*	Wetlands, and edges of rivers and lakes	Regularly	Every year from 2014 to 2018	2018
Greater sage grouse *Centrocercus urophasianus*	Sagebrush, riparian meadows	Occasionally	2014/2015 and 2016	2018

Table 3.12-1
Wildlife Species of Concern at SCM

Species	Habitat	Historic Occurrence in Analysis Area (1984-2013)	Recent Occurrence and Year Observed (2014-2018)	
			Direct/ Secondary Analysis Area	Cumulative Impacts Analysis Area
Green-tailed towhee *Pipilo chlorurus*	Diverse shrub communities, especially on ecotone of sagebrush and mixed montane shrub	Once	Never	Never
Lewis's woodpecker *Melanerpes lewis*	Open forest and woodland, especially ponderosa pine and riparian	Infrequently	Never	Never
Loggerhead shrike *Lanius ludovicianus*	Grasslands, shrublands, pastures/fields, and other open habitats with short vegetation	Regularly	Every year from 2014/2015 to 2018	2016 and 2017
Long-billed curlew *Numenius americanus*	Mixed grass prairie and moist meadows	Rarely	2016 2017 2018	Never
Peregrine falcon *Falco peregrinus*	Nests on tall cliffs in open areas near water and abundant prey	Rarely	2017 (flyover)	2018
Pinyon jay *Gymnorhinus cyanocephalus*	Ponderosa pine and limber pine-juniper woodlands	Occasionally	2014/2015	2014/2015 and 2017
Sage thrasher *Oreoscoptes montanus*	Sagebrush shrublands	Rarely	Never	Never
Veery *Catharus fuscescens*	Deciduous riparian, especially where willow is present	Never	Never	Never
Yellow-billed cuckoo *Coccyzus americanus*	Deciduous riparian woodland (not known to breed in Montana)	Never	Never	Never
Mammals				
Black-tailed prairie dog *Cynomys ludovicianus*	Flat, open grasslands and shrub-steppe with low, sparse vegetation.	Regularly	Every year from 2014 to 2018	Every year from 2014 to 2018
Fringed myotis *Myotis thysanodes*	Ponderosa pine and cottonwood riparian; caves, mines, buildings (roosting)	Occasionally	2014/2015 and 2016	Never (not specifically monitored)
Hoary bat *Lasiurus cinereus*	Forested areas, riparian corridors	Regularly	2014/2015 and 2016	Never (not specifically monitored)
Little brown myotis *Myotis lucifugus*	Generalist, found in a variety of habitats and	Regularly	2014/2015 and 2016	Never

Table 3.12-1
Wildlife Species of Concern at SCM

Species	Habitat	Historic Occurrence in Analysis Area (1984-2013)	Recent Occurrence and Year Observed (2014-2018)	
			Direct/ Secondary Analysis Area	Cumulative Impacts Analysis Area
	elevations; buildings, cave/mines (roosting)			(not specifically monitored)
Merriam's shrew *Sorex merriami*	Sagebrush-steppe	Never	Never	Never
Spotted bat *Euderma maculatum*	Open juniper, sagebrush, ponderosa pine savannah; cliffs/canyons near water (roosting)	Occasionally	2014/2015 and 2016	Never (not specifically monitored)
Townsend's big-eared bat *Corynorhinus townsendii*	Caves/mines (roosting); forest, woodlands, and cottonwood bottomland	Unknown	Never	Never (not specifically monitored)

3.12.3.3 Sage Grouse

Sage grouse have been experiencing long-term range-wide population declines (Connelly et al. 2004). Trends in males attending leks across the range have decreased 0.83% per year between 1965 and 2015 (WAFWA 2015). Trends in males attending sage grouse leks in Montana experienced a negative trend of 2.75% per year between 1965 and 2015 (WAFWA 2015). The decline in sage grouse populations range-wide and in Montana has been largely attributed to degradation and loss of sagebrush habitats (Swenson et al. 1987, Knick et al. 2003, Connelly et al. 2004). Sage grouse are a sagebrush obligate species (Braun et al. 1977), entirely dependent on healthy continuous sagebrush habitats for successful reproduction and survival (Schroeder et al. 1999, Connelly et al. 2004). Fragmentation and degradation of these sagebrush habitats inhibit sage grouse productivity and survival, which have long-term impacts on affected sage grouse populations.

FWP worked with conservation and science partners to develop the Management Plan and Conservation Strategy for Sage Grouse in Montana – Final (plan) (FWP 2005). The goal of this plan is to "provide for the long-term conservation and enhancement of sagebrush steppe/mixed grass prairie complex within Montana in a manner that supports sage grouse and a healthy diversity and abundance of wildlife species and human resources." The plan describes the desired conditions for sage grouse habitat, and identifies risks confronting habitat and sage grouse populations. The MSGHCP was developed to sustain viable sage grouse populations and conserve habitat while utilizing the plan and implementing EO 12-2015.

The MSGHCP manages sage grouse populations within three different habitat types throughout Montana, Core Areas, General Habitats, and Connectivity Areas. Connectivity Areas provide important linkages among populations between Core Areas or priority populations in adjacent states and across international borders; however, there is currently only one such area. Core Areas were delineated by FWP in cooperation with federal and non-governmental partners to encompass the areas with the greatest number of displaying males and associated habitat and are considered areas of highest conservation priority (DNRC 2014; EO 12-2015). Occupied habitat outside of Core Areas or Connectivity Areas is considered General Habitat.

The EO 12-2015 outlines stipulations for development within each habitat type. Stipulations within Core Areas are more conservative than stipulations within General Habitats but are designed to maintain existing levels of suitable sage grouse habitat by regulating uses and activities to ensure sage grouse abundance and distribution in Montana. The TR1 Project is exempt from these conditions because it was received and deemed complete in 2013 before the EO effective date.

Sage grouse populations require large tracts of intact habitat necessary for seasonal requirements. The habitat characteristics used during these seasonal periods vary and can be dependent on what habitats are available to the population (see Connelly et al. 2011). Sage grouse in eastern Montana are nonmigratory as adequate breeding, nesting, brood-rearing, and wintering habitats overlap reducing the need for large seasonal movements (FWP 2005). The FWP identifies four seasonal habitats that are important to population viability: breeding, nesting, brood-rearing, and winter habitats. Breeding habitats include the lek locations where breeding occurs. The majority of nest locations across the species range occur proximate to lek locations (Connelly et al. 2011) and in Montana the majority of nests occurred within 3.2 kilometers (km) of a lek (Wallestad and Pyrah 1974, Foster et al. 2014). While brood-rearing and winter habitats likely occur within 3.2 km of a lek, there have been instances where broods have traveled 5 km to brood rearing habitats (Wallestad 1971) and varying distances during the winter based on sagebrush cover needs (Connelly et al. 2011). Regardless of season, maintaining large tracts of intact habitat that provides functional value during the annual cycle of sage grouse is critical to maintaining sage grouse population viability.

Sage grouse generally select nest sites that have higher percent sagebrush cover and higher shrub height than random locations (see Connelly et al. 2011). Selection patterns during the brood-rearing and late summer period shift as sage grouse seek out wetter areas where succulent forbs and insects are abundant (Wallestad 1975). Habitat selection during the winter is dependent on topography and levels of snowfall but is usually concentrated in areas with greater amount of sagebrush percent canopy cover (e.g., >20%; Eng and Schladweiler 1972). During all seasonal periods, sage grouse avoid using habitats close to anthropogenic features on the landscape (see Naugle et al. 2011), habitats with high density of conifers (Doherty et al. 2010), habitats that have <5% sagebrush cover, and habitats such as badlands or canyons (EO 12-2015).

Historically, there have been nine sage grouse leks in the direct/secondary impacts analysis area (Great Plains Wildlife Consulting 2019). No sage grouse or their sign were recorded at these leks in 2018, and none have been recorded in 4 of the past 11 years (2008 to 2018). As of 2018, the status of the leks are:

- 3 confirmed active leks (Pasture, Alternate Pasture, Playa);
- 5 confirmed inactive leks (Windmill, Corral, Fenceline Playa, Fenceline Playa II, West Bench); The Fenceline Playa lek was impacted by flooding from water discharged from CBNG well sites; the operator is currently reclaiming the area.
- 1 confirmed extirpated lek (Upper Divide, which was mined through in the 1980s); and
- 1 unconfirmed lek (Alternate Fenceline Playa), where birds have occasionally been observed but there is not enough information confirm the lek.

There are two leks (Ankney North and Ankney South) in the cumulative impacts analysis area, both of which have a confirmed active status as of 2018 (Great Plains Wildlife Consulting 2019). No birds were observed at the leks in 2018. Birds have been recorded at Ankney North in 12 of the 20 total survey years but have been absent the past seven years. No more than five males have been observed at Ankney North after 2007. Birds have been present at Ankney South in 5 of the 11 monitoring years (maximum of 6 males counted).

Sage grouse numbers in the direct/secondary impacts analysis area were highest in the late 1970s and 1980s, with the highest average peak male counts being 27 males per lek in 1978, and began declining in the mid-1990s (Great Plains Wildlife Consulting 2019). Lek counts have been low in most years from 2009 through 2018. Peak counts have been below the current long-term average of 3.7 males/year (using counts of males at leks) in 30 of the past 39 years, and average peak male counts exceeded 5 birds per lek in only 8 of 39 years. The decrease in lek attendance at SCM in the mid-1990s was consistent with a larger region-wide decrease in sage grouse numbers during that same time (Connelly and Braun 1997). The declines may be related to a persistent drought in the region, which reduces the number of succulent forbs and insects needed by young sage grouse for forage. Numbers of sage grouse at SCM tend to increase when winters are mild and precipitation conditions improve (Great Plains Wildlife Consulting 2019).

Historical monitoring (1994-2013) at SCM has recorded sage grouse occasionally in other portions of the direct/secondary impacts analysis area (i.e., non-lek sites) (Great Plains Wildlife Consulting 2019). In the past 4 years, sage grouse have been observed in the analysis area in 2014/2015 and 2016 but not in 2017 or 2018. However, they have been repeatedly confirmed in adjacent lands, particularly at one of the recently installed guzzlers. No grouse broods have ever been observed during annual targeted surveys along drainage routes and no broods have been observed from 2000 to 2017. In 2017 a brood was observed nearby but outside the analysis area. Sage grouse have never been encountered during winter surveys over the past 21 years (1995-2018).

Two sage grouse Core Areas intersect the monitoring area (direct/secondary plus cumulative impacts analysis area): PRB-1 (south) and PRB-2 (north). The remaining portion of the monitoring area is General Habitat. There are no Connectivity Areas in the monitoring area. The five confirmed, active leks in the combined direct/secondary impacts analysis area and cumulative analysis area are located in Core Areas.

3.12.3.4 Big Game

In accordance with the SCM Monitoring Plan, big game species are monitored through annual winter surveys. Mule deer (*Odocoileus hemionus*) general and winter range is present in the analysis areas. Annual winter big game surveys have documented mule deer throughout the analysis areas, but they are most common in ponderosa pine, rough breaks, and sagebrush-steppe habitat. They have also been observed in reclaimed grasslands and bottomlands. No areas of concentrated winter use have been identified. In the 2018 winter survey in the direct/secondary impacts analysis area, 101 mule deer were observed in 24 herds. From 2012 through 2018, the minimum population density estimate was 1.5 mule deer/square mile. Historically (from 1995 to 2011), winter mule deer densities have varied each year, ranging from 0.8 to 9.6 mule deer/square mile. Densities have been lower in the past 5 years compared to the historic average of 5.2 deer/square mile. In the cumulative impacts analysis area, an additional 102 mule deer were observed in 22 herds (average of 2.0 mule deer/square mile) in 2018. Increases and declines in the mule deer population at SCM mirror regional trends in FWP Region 7 (FWP 2018), which indicate population declines in harsh winters followed by a rebound within a few years.

Pronghorn (*Antilocapra americana*) general and winter range is present in the analysis areas. Pronghorn are most common in upland grasslands, sagebrush-steppe, and reclaimed grasslands. Most have been observed in the northeast portion of the direct/secondary impacts analysis area, where terrain is less steep. In the 2018 winter survey, 127 pronghorns were observed in five herds (average of 2.6 pronghorn/square mile). In the past 7 years, average annual densities ranged from 0.2 to 9.9 pronghorn/square mile. Historically (from 1995 to 2011) pronghorn densities have ranged from 0.6 to 6.5 pronghorn/square mile (average of 2.9 pronghorn/square mile). In the cumulative impacts analysis area, an additional 159 pronghorn were observed in 4 herds in 2018. Pronghorn in southeastern Montana have been affected by harsh winters but have been on an increasing trend since 2012 (FWP 2016).

Elk (*Cervus canadensis*) and white-tailed deer (*Odocoileus virginianus*) occur rarely in the analysis areas. Elk have been recorded only once in the last 23 years of winter big game surveys. White-tailed deer have been observed in 4 survey years. Most recently 3 deer were observed near the Tongue River Reservoir in 2018, but they are uncommon in the immediate vicinity of the SCM.

There are 22,618 acres of big game high value winter range and 39,765 acres of moderate value winter range in the cumulative impacts analysis area. No big game migration corridors are present in the analysis areas.

3.12.3.5 Raptors

Raptors are monitored through annual raptor nest surveys. Raptor species are known to nest in the direct/secondary and/or cumulative impacts analysis areas, include red-tailed hawk (*Buteo jamaicensis*), osprey (*Pandion haliaetus*), golden eagle, bald eagle, prairie falcon (*Falco mexicanus*), Cooper's hawk (*Accipiter cooperii*), burrowing owl (*Athene cunicularia*), great horned owl (*Bubo virginianus*), northern harrier (*Circus cyaneus*), and turkey vulture (*Cathartes aura*). In addition, although no specific nest sites have been identified, American kestrels (*Falco sparverius*) are regularly observed in the breeding season and they likely nest in the direct/indirect impacts analysis area; and one nest has been observed in the cumulative impacts analysis area. As of 2018, there are 32 intact raptor nests in the direct/secondary impacts analysis area. Ten of these are within the SCM permit area, and one is in the TR1 Project Area. Within the cumulative impacts analysis area, there are an additional 41 intact nests. Some raptor pairs maintain multiple nests in their territory. Some nests have been used by more than one species in different years. Raptor abundance and nest success in a given year is tied in part to local prey abundance as well as weather.

Red-tailed hawks are the most common nesting raptor in the analysis areas, with 15 territories known in the analysis area. Annual surveys have documented from one to eight successful breeding pairs each year. In 2018, six red-tailed hawk pairs nested, and 3 of the 6 successfully fledged young. Currently there are 10 intact nests in the direct/secondary impacts analysis area. In the last 5 years, eight new nests have been constructed, three of which were near active mining within the SCM permit area. There are 12 additional nests in the cumulative impacts analysis area, where 1 to 9 pairs have been active in the past 5 years (9 were active in 2018).

Ospreys have nested in the direct/secondary impacts analysis area most years since 1993. There are currently five intact osprey nests, four of which are in the SCM permit area. In 2018, all five nests were used, and three of the five successfully fledged young. All osprey nests are on artificial nesting platforms, which have been placed by SCM as mitigation for mining disturbance or loss of nest sites and to provide alternate nesting sites when pairs attempt nesting in undesirable locations. For example, ospreys have built nests on power poles and abandoned mining equipment. Five additional nests are present in the cumulative impacts analysis area, four of which have been active each of the past five years.

Golden eagles nest in the analysis areas in most years. Four golden eagle territories have been documented in the analysis area. Two of these currently have intact nests. One (GE3) has no nests remaining (all destroyed by natural causes) and one nest (GE2) has become dilapidated from years of not being used (last occupied in 1994). In 2014, one pair constructed a new nest (GE1b) in view of existing mine activities, including topsoil stripping, blasting, and overburden

removal. The nest has successfully fledged young in three of the past five years. The other nest (GE4) has not been active in the past two years, but was active in the previous 8 years, with young fledging in only two of those years. No golden eagle territories were active in 2017 or 2018. One of the intact nests (GE1b) is on the edge of the SCM permit area, the others are outside the permit area. There are five additional territories in the cumulative impacts analysis area. No more than two have been active in the last five years and both have fledged young in most years.

Bald eagles (*Haliaeetus leucocephalus*) occur regularly in the direct/secondary impacts analysis area in winter. No nests, roost sites, or winter concentration areas are within the SCM permit area. In recent years, 0 to 16 wintering eagles have been observed in the cumulative impacts analysis area in annual winter surveys. Most were perched in mature cottonwood trees along the Tongue River Reservoir, Squirrel Creek, and Youngs Creek. Two bald eagle nests are present in the cumulative impacts analysis area along the western edge of the Tongue River Reservoir. At least one of the nests has been active each of the last 5 years, and known to fledge young in each of the past 3 years (2016-2018). All bald eagle nests are at least 1.5 mile from the SCM permit area.

There are two prairie falcon territories in the direct/secondary impacts analysis area one of which was active and fledged young in 2018 The other territory was active 11 of 24 years (from 1995 to 2018), and was last active in 2017. This territory has two alternate nest sites (eyries), one of which is in the northern portion of the permit area, which will likely be mined in the future under the currently-approved SCM permit. This alternate nest site has been inactive since 2007. Other potential nest sites are limited in the analysis area because there are few other rock features of sufficient size, height, or slope to be suitable for prairie falcons. Four artificial nest cavities are present in the analysis area, which were previously created as mitigation for the SCM and by other landowners. None of these have ever been used by prairie falcons or any other raptor. Within the cumulative impacts analysis area, there are an additional eight eyries across five different territories. Two territories have been active in the past five years, but neither fledged young.

Cooper’s hawk nested for the first time in the direct/secondary impacts analysis area in 2017. The nest is near the mine access road but is not within the SCM permit area. The pair fledged at least one young in both 2017 and 2018.

Burrowing owl nests have been documented in the analysis area sporadically since 1996. Currently there are four intact burrowing owls nest sites in prairie dog colonies in the direct/secondary impacts analysis area. The last year any of these nests were active was in 2011. None of the nest sites are in the SCM permit area. Two additional nest sites have been observed in the cumulative impacts analysis area, neither of which has been active in the past five years.

Great horned owls do not construct their own nest. They use nests constructed by other raptors; natural cavities in cliffs, large trees, mine highwalls; or manmade structures, such as mine facilities and inactive equipment. There is one intact great horned owl nest, and six other nests that have been used by both great horned owl and other species (red-tailed hawk and prairie falcon). Two of these nests are within the SCM permit area. Four great horned owl pairs have nested in at least one of the past 5 years; fledged young have been confirmed in only one recent year. One pair nested in 2018 but failed to fledge young, possibly due to severe spring snow storms. There are 12 additional territories in the cumulative impacts analysis area, with two or three being active in most recent years.

There is one turkey vulture nest site in the direct/secondary impacts analysis area (in the TR1 Project Area), but the nest site has not been active since 1994. No other turkey vultures nest sites are known in the analysis areas though the species is commonly observed flying through.

Other species have been observed rarely in the analysis areas in the breeding season but not associated with a specific nest, including ferruginous hawk (*Buteo regalis*), short-eared owl (*Asio flammeus*), and peregrine falcon (*Falco peregrinus*). Peregrine falcons have been observed flying over the analysis areas in 2005, 2017 and 2018. Rough-legged hawks (*Buteo lagopus*) are often present in winter (including in 2018) but do not breed in the analysis areas.

3.12.3.6 Other Migratory Birds and Game Birds

From 1984 to 2017, general wildlife baseline and annual monitoring surveys, and annual avian point count surveys have documented 141 species of birds in the direct/secondary and cumulative impacts analysis areas. These are mostly passerine species and other small birds, but also include raptors, upland game, shorebirds and waterfowl. In 2017, the greatest species diversity was in cottonwood-riparian (26 species) and ponderosa pine (24 species) followed by bottomland (11 species). Six to eight species were documented in sagebrush-steppe, reclaimed grassland, and reclaimed sagebrush. The most abundant birds are primarily common species associated with sagebrush, such as the western meadowlark (*Sturnella neglecta*), Brewer's sparrow, and lark bunting (*Calamospiza melanocorys*). Common species in cottonwood-riparian habitat include yellow warbler (*Setophaga petechia*), American goldfinch (*Spinus tristis*), and yellow-breasted chat (*Icteria virens*). Diversity and abundance of waterfowl and shorebirds is low in all seasons because aquatic habitat is limited to man-made reservoirs and widely scattered ephemeral/intermittent streams. The most common aquatic birds have been mallard (*Anas platyrhynchos*), Canada goose (*Branta canadensis*), and killdeer (*Charadrius vociferus*). Overall species diversity and abundance of birds has been similar across monitoring years.

Sharp-tailed grouse are monitored through annual lek counts and brood surveys. Historically there were 15 sharp-tailed grouse (*Tympanuchus phasianellus*) leks in the direct/secondary impacts analysis area. Two have been lost to mining and one has been inactive the past 10 years. Six leks were active in 2017 when a total of 47 male grouse were observed. One new lek was also documented but the lek is considered potential/unconfirmed at this time. Three leks

(ST-3b, ST-3a, and Pearson Ck S) are within the proposed disturbance area for the TR1 Project, of which two were active in 2017. Three additional leks are present in the cumulative impacts analysis area. Sharp-tailed grouse populations have fluctuated over the monitoring period, with highest numbers observed in the 1980s. The current population count is about half that observed in the 1980s.

The USFWS Birds of Conservation Concern (BCC) (USFWS 2008) identifies nongame migratory birds that without additional conservation actions are likely to become candidates for listing under the ESA. Impacts analysis focuses on these species because they are considered most vulnerable. Many are also Montana Species of Concern, addressed in the previous section of this EIS. Species on the BCC list for the region (Bird Conservation Region 17 - Badlands and Prairies) have been documented in the analysis areas, including:

- Species that occur regularly: golden eagle, prairie falcon, upland sandpiper (*Bartramia longicauda*), burrowing owl, loggerhead shrike, and Brewer's sparrow;
- Species that occur occasionally: bald eagle, pinyon jay, and grasshopper sparrow (*Ammodramus savannarum*); and
- Species that occur infrequently, rarely, or have a single occurrence record: ferruginous hawk (*Buteo regalis*) (flyovers, no nest), peregrine falcon (flyovers, no nest), short-eared owl (*Asio flammeus*) (flyovers, no nest), long-billed curlew, marbled godwit (*Limosa fedoa*), Lewis's woodpecker, red-headed woodpecker (*Melanerpes erythrocephalus*), and sage thrasher.

3.12.3.7 Other Species

Baseline and annual wildlife monitoring surveys have documented 40 species of mammals in the direct/secondary and cumulative impacts analysis areas. Based on baseline trapping data, small mammal populations in the analysis areas are dominated by common species, such as the deer mouse (*Peromyscus maniculatus*). Chipmunks, ground squirrels, pocket gophers, black-tailed prairie dogs, and porcupines are also common. Lagomorphs are primarily cottontail species, which are monitored annually at SCM to track population trends relative to raptor species that prey on them. The lagomorph population at SCM is cyclic, and experiences periodic highs and lows that match trends elsewhere in this region of Montana. Currently, lagomorph abundance is at a low, with abundance in 2018 at less than half what counts were at the last high in 2010. Coyotes (*Canis latrans*) are the most common carnivore. Badger (*Taxidea taxus*), black bear (*Ursus americanus*), bobcat (*Lynx rufus*), and mountain lion (*Puma concolor*) occur rarely. In 2018, fresh black bear scat was documented along South Fork Spring Creek and a bear was confirmed using a guzzler in the cumulative impacts analysis area.

Eight species of bats have been documented in the direct/secondary impacts analysis area based on baseline surveys, annual monitoring (up to 2012), and automated/electronic monitoring (2012 to 2016). No information is available on bats in the cumulative impacts analysis area, but species diversity and abundance are likely similar. No specific bat roosts are

known to occur in the TR1 Project Area or either of the larger analysis areas, though potential roosting habitat is present in woodlands, cliff faces, and rock outcrops. Bats likely forage throughout all habitat types in the analysis areas, and most frequently at ponds/reservoirs and riparian areas.

Baseline and annual wildlife monitoring surveys have documented 15 species of amphibians and reptiles in the direct/secondary and cumulative impacts analysis areas. Amphibian habitat is limited to ponds/reservoirs and larger streams that hold pooled water in the spring. The boreal chorus frog (*Pseudacris maculata*) is often the only amphibian recorded during annual monitoring. Several species of snakes and lizards have been observed but in general are relatively rare.

3.12.4 Direct and Secondary Impacts

3.12.4.1 No Action Alternative

Under the No Action Alternative, SCM would not expand into the TR1 area. Impacts to wildlife resources in the analysis area would continue to occur from ongoing mining activities that are approved under the existing SCM permit. These impacts would continue through the life of the mine as currently permitted (through the year 2022). Impacts to wildlife would be minimized through reclamation and by continued adherence to the Fish and Wildlife Plan; Monitoring Plan; and the Protection and Enhancement of Fish, Wildlife, and Related Environmental Values Plan that are part of the SCM permit. An additional voluntary conservation measure implemented by SCM to help minimize impacts to wildlife, including sage grouse, is with the Thunder Basin Grasslands Prairie Ecosystem Association CCAA. Also, at the request of DEQ, SCM submitted a SOSI Plan to provide broad, long-term direction for management of wildlife species of special interest that occur within the SCM wildlife monitoring area.

Direct impacts general to all wildlife species under the No Action Alternative include mortality, disturbance, and habitat loss. Wildlife mortality could occur from road kill, collisions with powerlines and fences, and trapping in pits. Disturbance from noise, light, and human presence during drilling, blasting, coal extraction, hauling, and other operational activities would occur up to 24 hours per day. These disturbances would continue to displace wildlife from the area, though the degree of the effect would vary by species because some species are more mobile or are more tolerant of disturbance. Noise effects would vary spatially depending on surrounding topography and other factors (see noise analysis in Section 3.5 of this EIS for more detail). In accordance with the wildlife plans in the permit, regular monitoring would continue and would ensure that wildlife issues are identified as they occur, and specific mitigation measures would be designed as needed in consultation with state and federal agencies.

Temporary loss of up to 6,022 acres of habitat would occur from ongoing approved surface disturbing activities in the permit area, including vegetation clearing, topsoil stripping and storage, overburden stripping and stockpiling, coal recovery, roads, powerlines, pipelines, fencing, parking areas and other facilities. Removal of habitat temporarily reduces the number

of wildlife that the analysis area can support, displaces wildlife to other areas, and increases competition in the remaining habitat. Continuation of contemporaneous reclamation would reduce the impacts of habitat loss in the short term by minimizing the disturbance footprint of the mine. Final reclamation would reduce the impact in the long term by restoring habitat similar to or enhanced from premine conditions. Over 3,570 acres have been or will be reclaimed to wildlife habitat; only 267 acres have been reclaimed to grazing land as of December 2017. Voluntary conservation measures implemented under the regional Conservation Strategy would also offset habitat loss.

Impacts to wildlife are expected to be mostly direct impacts. Secondary impacts could occur from changes to vegetation communities that adversely affect wildlife habitat quality (forage and cover) later in time, such as habitat fragmentation, introduction or spread of weeds, and dust causing reductions in plant productivity. These could occur in the Project Area and spread into adjacent intact habitat. In addition, the mining activities could change wildlife species diversity by promoting wildlife species that are tolerant of disturbance.

Overall, the No Action Alternative would result in localized, short-term, and moderate adverse impacts to wildlife individuals and habitats in the analysis area. Long-term adverse impacts to wildlife are not expected because SCM would adhere to required and voluntary wildlife conservation measures (described above) and reclamation would occur as described in **Section 2.2.9**.

Threatened and Endangered Species

The No Action Alternative would have no effect on black-footed ferret or other threatened or endangered species or their critical habitats because none occur in the SCM permit area. No disturbance would occur in potential black-footed ferret habitat (i.e., prairie dog colonies that are 80 acres or larger). The current Fish and Wildlife Plan would continue to apply, which requires that SCM contact USFWS at least 1 year prior to disturbing any prairie dog colonies within the permit area to determine whether black-footed ferret surveys would be required. The Fish and Wildlife Plan also provides direction on actions to be taken in the unlikely event a threatened or endangered species is encountered, including contacting USFWS and DEQ.

Species of Concern

Under the No Action Alternative, species of concern would continue to be affected by noise and mining disturbance and by the temporary disturbance of 6,022 acres of habitat over the life of the mine. Contemporaneous reclamation would reduce the impact of habitat loss in the short term. Voluntary measures in the Conservation Strategy and final mine reclamation would reduce the impact in the long term.

Removal of sagebrush and grasslands would result in loss of foraging and security habitat for Brewer’s sparrow, burrowing owl, and loggerhead shrike, and removal of woodlands would result in habitat loss for pinyon jay. The longest-term impact would be to species dependent on

sagebrush and ponderosa pine, because trees and sagebrush shrubs take longer to establish in reclamation compared to grasslands. Great blue herons use water sources near mine activities and do not appear to be affected by disturbance. Temporary ponds have been constructed that provide a resource for wildlife. Maintenance of sediment ponds during mining would be addressed under ARM 17.24.639. Approximately 3 acres of ponds existed premining (see **Table 3.5-2**) and would be restored during reclamation phases once mining is complete; these would be incorporated into the reclamation plan as Wildlife Habitat Enhancement Features per 17.24.301(143). Other large reclamation features, such as traps and sediment ponds converted to permanent ponds, larger depressions or larger upland playa will be addressed under ARM 17.24.504, 642, and 751(2)(f) and (g), as required, with DEQ approval prior to final reclamation. Location of postmining man-made stock ponds (considered non-jurisdictional waters of the U.S.) would be designated and permitted with the DEQ. For these reasons, no measurable impacts to great blue heron are expected because there would be no permanent change to the amount of aquatic habitat.

Bat species of concern (including hoary bat, little brown myotis, fringed myotis, and spotted bat) would continue to be affected by noise and light disturbance from ongoing operations at SCM. This could alter their nocturnal foraging behavior and displace them from the mine area. Given that the mine has been operating for more than three decades, it is likely these bat populations have adjusted to the adverse effects from the disturbance. Surface disturbance of 6,022 acres would result in the temporary loss of bat foraging habitat and trees and cliffs that could be used by individual bats for roosting. No known hibernation, maternal, or other large roost sites would be affected. Reclamation would restore foraging habitat, and installation of bat houses (part of the voluntary Conservation Strategy) in the region would help offset the loss of trees and cliffs.

No black-tailed prairie dog colonies would be directly disturbed by continued mining operations, but surface disturbance would result in the temporary loss of potential habitat for new colonies. Noise and human presence are not likely to have a measurable impact on prairie dogs because they tend to habituate to disturbance.

Sage grouse

Under the No Action Alternative, SCM would not expand into the TR1 Area but existing mining in Pits 1 and 2 and other related mining activities (roads, transportation, and reclamation) would result in noise and disturbance impacts at the four nearby active sage grouse leks. SCM has entered into the voluntary 30-year CCAA to implement landscape-scale conservation measures to benefit the sage grouse population affected by the SCM, Decker Mines, and other anthropogenic-related activities (USFWS 2017). The conservation measures are currently being implemented by SCM in the CCAA area and include SCM's commitment to conifer removal to enhance sagebrush-steppe habitats; cheatgrass treatment; additional sagebrush and forb reclamation efforts; road closures and reclamation; protection of sagebrush habitats known to

support targeted species; use of conservation easements to protect certain habitats of special value; and protection of green areas that could serve as important foraging habitat for sage grouse broods and other species (USFWS 2017).

Noise and other disturbance would occur from the No Action Alternative and direct impacts to sage grouse at nearby leks would be expected. Conservation measures voluntarily implemented by SCM and other wildlife plans would continue to apply and would help avoid and minimize other direct impacts.

The average sage grouse habitat function score for the current (baseline; No Action) conditions for the sage grouse assessment area (28,220 acres) was 0.1733 resulting in a total functional score of 4,891 acres in the 28,220-acre area included in this evaluation. The sage grouse habitat score of 4,891 was used to compare to sage grouse habitat scores for the Proposed Action Alternative. The difference between the No Action and Proposed Action sage grouse habitat scores was used to calculate a compensatory mitigation obligation.

Big Game

Currently-approved activities at SCM would result in total disturbance of 4,071 acres of high value big game winter range and 2,013 acres of moderate value big game winter range over the life of the mine, which together would impact 19 percent of the analysis area. No areas of concentrated big game use or migration corridors would be affected because none are present in the analysis area. Required and voluntary reclamation measures both on and off the permit area, would reduce the impact from temporary loss of big game winter habitat. In addition, contemporaneous reclamation has and would continue to minimize the impact, as is evident in the use of reclaimed areas at SCM by both pronghorn and mule deer. Final reclamation would further reduce long-term impacts of habitat loss and would include wildlife enhancement features that are beneficial to big game, including those that target shrub communities for browse and create topography or breaks for cover.

In terms of disturbance from noise and human activity, mule deer and pronghorn continue to occupy areas adjacent to the mine and are likely habituated to the mining activity that has occurred here for over three decades. Based on past annual wildlife monitoring, one to two mortalities from vehicle collisions per year would continue to occur. Measures outlined in the Fish and Wildlife Plan (SCM 2017b) would ensure fences, above-ground conveyors, roads, and other facilities would not impede movement of big game or result in entanglement.

Raptors

Under the No Action Alternative, raptor collisions and electrocutions from existing powerlines would be a continued risk through the life of mine. Powerlines at SCM have been constructed according to Avian Powerline Interaction Committee (APLIC guidelines), which reduces the risk but does not eliminate it completely. An electrocution of a red-tailed hawk was suspected in

2017, and the mortality was found under an APLIC-compliant pole. However, poles following APLIC-standards are considered safer for raptors than non-compliant poles and electrocutions have not been a common occurrence in the past. Therefore, electrocutions are expected to be a minor impact through the life of mine.

The No Action Alternative would result in temporary impacts to a total of 6,022 acres of raptor habitat, which includes foraging habitat, winter habitat for some species such as rough-legged hawks, and nesting habitat in the form of cliffs and trees. The removal of trees would have an adverse impact because raptors in the analysis area nest most frequently in trees (ponderosa pine and juniper) and snags. Riparian trees used as bald eagle winter roost sites would not be affected. Habitat loss may induce a secondary impact by altering the abundance and diversity of prey populations. The impact in a given year would be smaller than the overall total because SCM generally disturbs only up to about 300 acres each year. Contemporaneous and final reclamation would reduce these impacts in the short term and long term. When possible, final reclamation would include enhanced features for raptors, such as construction of scarps and steep slopes to replace lost cliff habitat. Trees would be seeded and transplanted in reclamation areas, but the removal of trees would be a long-term impact since they take time to establish.

Surface disturbance that would occur under the current SCM permit would result in the direct loss of four intact raptor nests, including one prairie falcon eyrie (PF1b), two red-tailed hawk nests (RTH2b, RTH15a), and one golden eagle nest (GE2). Impacts to nesting pairs would be avoided by removing or relocating inactive non-eagle nests prior to surface disturbance activities, which would be done in coordination with USFWS, FWP, and DEQ. This would also apply to any new nests built in proposed disturbance areas in the future. Mitigation would reduce impacts to the breeding population and would be designed in coordination with USFWS and DEQ, including maintenance and installation of nest platforms as needed. Impacts to breeding pairs would also be minimized by using barricade measures prior to the breeding season to prevent nesting in areas to be disturbed. Many of the raptor pairs have multiple nests present in their territory that could be used as alternative nests in the event a nest is lost to mining. This is particularly true for the red-tailed hawks, which are the most common raptor in the analysis area. The loss of a prairie falcon eyrie is less likely to be successfully mitigated, given they have not used any of the artificial rock cavities that were constructed in the analysis area. However, the PF1b eyrie has not been active in since 2007, although in 2017 a pair used an alternative eyrie in this territory that was outside the Surface Mining Permit. The golden eagle nest has also not been active in over 20 years, and only remnant sticks remain. Therefore, loss of the nest site would have minimal impact on golden eagles breeding in the analysis area. Ospreys occasionally nest on power poles and mining equipment and need to be relocated, but they have responded favorably to nest platform mitigation (all existing osprey nests are currently on artificial platforms). Nest relocation or loss would have minimal impacts to osprey.

Under the No Action Alternative, noise and other mining disturbance would continue at their current levels, potentially affecting 33 raptor nests. Nest protection measures included in the SCM permit's wildlife plans, would reduce nest disturbance impacts. Agency coordination would occur annually for active nests that would not be directly impacted but are proximal to mining activity, and mitigation at these nests would be considered as needed on a case-by-case basis. In general, raptors breeding at SCM appear to be tolerant of mining activity, having constructed new nests adjacent to existing disturbance or on mining equipment and power poles, and successfully fledged young there. Given raptor tolerance of existing disturbance and the use of mitigation measures, continued noise and mining disturbance would have a minor impact on nesting raptors.

Other Migratory Birds and Game Birds

Under the No Action Alternative, mining activities would continue to impact passerines, waterfowl and shorebirds, and game birds through noise and other disturbance, direct mortality, and habitat loss. Impacts are most likely to occur in the breeding season when the greatest number of birds are present in the analysis area. Noise and mining activities would continue and would disturb and displace birds from the affected area. Noise interferes with breeding behavior if it masks the ability of birds to hear each other and find mates and can also affect bird survival by decreasing their ability to detect predators.

Vehicle collisions may occur but are expected to be infrequent and therefore not a major impact. Avian protection measures outlined in in the SCM permit's wildlife plans would reduce other direct impacts. For example, impacts to nests would avoided by conducting preconstruction surveys prior to ground clearing activity and implementing nest buffers as needed. No sharp-tailed grouse leks would be lost to surface disturbance approved under the current SCM permit.

Migratory birds and game birds would be impacted by the temporary impact of 6,022 acres of habitat, which would decrease the overall abundance and diversity of birds in the analysis area. Shrubland and grassland species would incur the least impact because these habitat types occur commonly in the area surrounding the proposed disturbance. In addition, 267 acres of the mine disturbance have been reclaimed to grazing land and provides some value to birds. Reductions in sagebrush shrub density are expected to be long term and would result in decreased abundance of birds that require sagebrush habitat. The greatest impact would result from removing less common habitats that have high species diversity, particularly ponderosa pine. Removal of mature trees would also be a long-term impact because of the time it takes to restore trees in reclaimed areas. No cottonwood-riparian habitat would be directly affected. Temporary ponds would be maintained during mining to provide a water source to game birds and other wildlife and would include escape ramps to reduce the risk of drowning. Impacts to habitat used by waterfowl and other aquatic species would not occur.

Other Species

Mining activities under the No Action Alternative would result in habitat loss and direct mortality from collisions with vehicles or mining equipment. These would continue to have short term impacts on the small mammals in the analysis area. Reclamation would include creating or restoring micro habitat features, such as wetlands and rock piles, which would attract small mammals and accelerate recolonization. The impact of habitat loss would be short term because small mammal abundance is expected to be similar in reclaimed and native habitats within several years of reclamation being completed (Clayton, et al. 2006).

There would be minimal impacts to large carnivores, which are generally rare in the analysis area. Carnivores are also highly mobile with large home ranges and can avoid and navigate around disturbed areas. In response to habitat loss, these species would likely shift their activities to adjacent areas. Contemporaneous and final reclamation would further reduce this impact by restoring habitat in the short term and long term. Species such as coyotes are tolerant of disturbance.

Amphibians and reptiles may be lost to collisions with vehicles or other mining equipment, particularly snakes when they are crossing roads or basking, or frogs when they are making overland movements during wet periods. Habitat loss would be the primary impact to reptiles. No amphibian habitat (ponds/reservoirs) would be lost to mining although mining disturbance, particularly in drainages, could impede migratory or other overland movements between breeding ponds. Impacts to streams would be minimized through BMPs as outlined in the SCM permit (see also Section 3.10 of this EIS). Temporary ponds would be maintained during mining and stock ponds would remain following mine closure and continue to provide habitat.

3.12.4.2 Proposed Action Alternative

The Proposed Action Alternative would expand the SCM surface disturbance in the southern and northwestern portion of the permit area and extend the life of the mine. The general duration and intensity of direct and secondary impacts to wildlife from the Proposed Action are similar to those from the No Action Alternative, including direct mortality, disturbance, and habitat loss, except the impacts would be extended for approximately four more years. The Proposed Action would not increase or decrease annual wildlife mortality rates to a measurable degree compared to the No Action Alternative because the risk of road kill, collisions with powerlines and fences, and trapping in pits would not change. Levels and timing of noise, light, and human presence would also be similar to the No Action Alternative but would continue to disturb and displace wildlife for an additional four years. Noise effects would vary spatially depending on surrounding topography and other factors (see noise analysis in Section 3.5 of this EIS for more detail) and would occur at levels comparable to the No Action Alternative.

A specific habitat functional acreage approach was used to assess impacts to sage grouse from the Proposed Action (Appendix A). The addition of TR1 (as described in the Proposed Action)

would result in reduced sage grouse habitat functions in the 28,220-acre wildlife analysis area (TR1 plus a 2-mile buffer).

The primary difference for other wildlife species impacts relative to the No Action Alternative would be the increased surface disturbance under the Proposed Action and that the surface disturbances would continue for an additional four years beyond the currently end of mine life. The Proposed Action would result in an additional 977 acres of disturbance and a total life of mine disturbance of 7,011 acres. Habitat types impacted by the Proposed Action would be similar to those impacted under the No Action Alternative (see Section 3.9 of this EIS for more detail on vegetation impacts).

Impacts to wildlife would be reduced in duration and intensity by adherence to the Fish and Wildlife Plan; Monitoring Plan; and the Protection and Enhancement of Fish, Wildlife, and Related Environmental Values Plan that are part of the SCM permit. Additional required and voluntary impact avoidance, minimization, and compensation measures are detailed in the SOSI Plan for TR1. Per these plans, regular monitoring would continue to ensure site-specific impacts would be identified and addressed in coordination with USFWS, FWP, and DEQ. Overall impacts would be similar to the No Action Alternative in that temporary and localized adverse impacts to individuals would occur but adverse impacts to population viability in the wildlife analysis area would not.

Species of Concern

Compared to the No Action Alternative, similar habitat types would be affected by the Proposed Action, therefore the same Montana Species of Concern would be affected. Noise and other disturbance levels would be similar to the No Action Alternative but would last an additional four years. The Proposed Action would result in an additional 977 acres of habitat loss for Brewer's sparrow, burrowing owl, loggerhead shrike, pinyon jay, hoary bat, little brown myotis, fringed myotis, and spotted bat. This would further reduce the numbers of these species the analysis area could support. Contemporaneous and final reclamation would reduce the impact of this habitat loss. Required and voluntary conservation measures that are focused on sage grouse, including the HRRP and regional Conservation Strategy, would benefit other Montana Species of Concern that inhabit sagebrush. The beneficial impact would last 10 to 30 years, depending on the project, and would help offset the mining-related impacts at SCM.

In contrast with the No Action Alternative, the Proposed Action would remove two small black-tailed prairie dog colonies located in proposed mining disturbance areas. The colonies are near each other and together encompass 19 noncontiguous acres. Black-tailed prairie dogs are common in the analysis area, particularly to the south where some of the larger colonies have been mapped. Given that the impacted colonies are small, and there are numerous black-tailed prairie dog colonies in the surrounding area that could recolonize the area postmining, loss of the two colonies in the TR1 area is unlikely to cause population declines in the analysis area. Loss of prairie dog colonies could also affect other species, such as burrowing owl, that depend

on the burrows, and other raptors that consume prairie dogs as prey. Although up to five pairs of burrowing owls have been known to breed in the analysis area in the larger prairie dog colonies, they have never been observed at the two colonies that would be lost. In addition, only one of these burrowing owl nests has been active in the past five years. Therefore, minimal impacts to burrowing owls would occur from removal of the two black-tailed prairie dog colonies.

Sage Grouse

As described above, a sage grouse habitat functional acreage approach was used to calculate average habitat function scores and estimate the direct and secondary impacts associated with the Proposed Action (**Appendix A**). The addition of TR1 mining to the landscape reduced sage grouse habitat functions within the 28,220-acre wildlife analysis area (TR1 plus a 2-mile buffer) to an average score of 0.1515 with a resulting total score of 4,275 functional acres. The reduction in habitat function from the Proposed Action would result in an estimated loss of 615 functional acres.

Applying a 10-percent multiplier to ensure “no net loss”, a 20-percent multiplier for “credits lost due to unforeseen events”, and a 10-percent multiplier for the Steward Fund, the 615 functional acres of habitat loss would equal a total loss of 861 functional acres of sage grouse habitat for a compensatory obligation. Implementing the Proposed Action would occur over several years and concurrent reclamation would also factor in. Table 5 in Appendix A shows the annual debits from disturbance and the credits from reclamation over the life of TR1 project (2020 to 2044). The total compensatory amount for loss of sage grouse habitat from the Proposed Action was $107,727. The cost of $13.00 per debit would decrease over time based on the MSGOT policy guidance which recommends applying a Present-Value discount of 3 percent to the $13.00 price if SCM pays the compensatory obligation at the beginning of the project.

Big Game

The Proposed Action would disturb an additional 9 acres of high value big game winter range and an additional 968 acres of moderate value big game winter range, which would impact an additional three percent of the analysis area. No migration routes would be affected. Over the life of the mine, the Proposed Action would disturb a total of 4,080 acres of high value habitat and 2,982 acres of moderate value big game habitat. As would be the case under the No Action Alternative, contemporaneous and final reclamation, as well as sagebrush enhancement and offsite mitigation required under the HRRP, would reduce the impact of the additional habitat loss on big game species.

Noise and other disturbance would occur over an additional four years, though big game are likely habituated to the disturbance. No increase in vehicle collisions with big game or other mortality is expected. Conservation measures required in the Fish and Wildlife Plan (SCM

2017b) and other wildlife plans would continue to apply and would avoid and minimize other direct impacts.

Raptors

Raptor mortality from collisions or electrocutions is unlikely to increase as a result of the Proposed Action because there would be no additional powerlines or increased traffic. Noise and mining disturbance effects would shift spatially as mining progresses but would not increase above the levels that would occur under the No Action Alternative. In addition, there are few intact raptor nests in proximity to the areas that would be disturbed under the Proposed Action. Therefore, noise and disturbance resulting from the Proposed Action would have minimal impacts on raptors.

The same raptor nests that would be lost under the No Action Alternative would also be lost under the Proposed Action, with the addition of one nest site. A turkey vulture nest site that is on a cliff within the proposed TR1 disturbance area would be removed during mining activity. However, this nest site has not been active since 1994. Although turkey vultures have been observed flying through the analysis area every year, there are no other intact turkey vulture nest sites in the analysis area.

The Proposed Action would result in loss of an additional 977 acres of foraging habitat as well as potential nest sites for raptors, such as cliffs and trees. Raptor conservation measures outlined in the Fish and Wildlife Plan, and contemporaneous and final reclamation, which would include raptor-specific enhancements, would reduce the impact of the additional habitat loss on raptors. Contemporaneous reclamation would be beneficial to raptors because prey populations are likely to return to reclaimed areas within a few years (Clayton, et al. 2006), which would offset the reductions in prey that would occur in the 977 acres. Two osprey pairs, and one red-tailed hawk pair have nested and fledged young in a reclaimed area at SCM, demonstrating that reclaimed areas can be used by raptors.

Other Migratory Birds and Game Birds

Noise, mining disturbance, and direct mortality impacts on other migratory birds and game birds would be comparable to impacts expected under the No Action Alternative. Avian protection measures required in the SCM permit's wildlife plans would continue to be implemented under the TR1 Project to reduce these impacts.

The temporary impact of an additional 977 acres of habitat would reduce the abundance and diversity of birds that the analysis area can support. The Proposed Action would impact similar habitat types and avian species as the No Action Alternative. Mesic areas along the ephemeral Pearson Creek would be lost but no cottonwood-riparian habitat or water bodies would be affected, therefore no shorebirds or waterfowl would be impacted.

Two active sharp-tailed grouse leks (ST3-b and Pearson Creek S) in the TR1 area would be lost as a result of the Proposed Action. Sharp-tailed grouse do not show the same fidelity to a

specific lek site as compared to sage grouse, and grouse using these leks could shift spring displays to another location in the analysis area. Reclamation efforts are likely to mitigate impacts to this species since the grassland habitat favored by the sharp-tailed grouse are the quickest to establish in postmining reclamation. However, the species also requires brushy areas for cover, and the loss of shrubland, trees, and mesic areas along Pearson Creek would reduce the value of the analysis area until these habitat features are restored.

Other Species

Impacts to other species, such as small mammals, carnivores, and reptiles, would be similar to impacts incurred under the No Action Alternative. No ponds or reservoirs would be affected by the Proposed Action; therefore, there would be no loss in amphibian breeding habitat. Stock ponds would remain in place following mine closure and continue to provide habitat. The loss of mesic areas in the Pearson Creek drainage may impede the ability of amphibians to disperse and move through portions of the analysis area.

Based on the analysis above, impacts to wildlife (including species of concern, big game, and migratory birds) from the Proposed Action would be both direct (on the SCM at the time of mining) and secondary (at a later date and away from the SCM). The impacts to wildlife are expected to be primarily short-term and minor.

3.12.4.3 Sage Grouse Mitigations

Mitigations for sage grouse were derived using a sage grouse habitat functional approach to calculate the average habitat function score for the baseline (No Action Alternative) and compare it to the average habitat function score for the TR1 Project (Proposed Action). Implementing the Proposed Action would result in a reduction in sage grouse habitat function score which was used to estimate the compensatory mitigation obligation associated with the Proposed Action. The complete description of the sage grouse habitat functional approach used for the TR1 EIS is in Appendix A.

The addition of TR1 mining to the landscape reduced sage grouse habitat functions within the 28,220-acre wildlife analysis area (TR1 plus a 2-mile buffer) to an average score of 0.1515 with a resulting total score of 4,275 functional acres. The reduction in habitat function from the Proposed Action would result in an estimated loss of 615 functional acres. Applying a 10-percent multiplier to ensure “no net loss”, a 20-percent multiplier for “credits lost due to unforeseen events”, and a 10-percent multiplier for the Steward Fund, the 615 functional acres of habitat loss would equal a total loss of 861 functional acres of sage grouse habitat for a compensatory obligation. Implementing the Proposed Action would occur over several years and concurrent reclamation would also factor in. Table 5 in Appendix A shows the annual debits from disturbance and the credits from reclamation over the life of TR1 project (2020 to 2044). The total compensatory amount for loss of sage grouse habitat from the Proposed Action was $107,727. The cost of $13.00 per debit would decrease over time based on the MSGOT policy

guidance which recommends applying a Present-Value discount of 3 percent to the $13.00 price if SCM pays the compensatory obligation at the beginning of the project.

Best Practices

To reduce noise impacts to sage grouse and other wildlife, SCM has already committed to follow the best practices listed in the approved SCM Fish and Wildlife Plan, Section 17.24.312, TR1 Project Application (SCM 2017b) including:

- Minimize surface disturbance activities to the extent practicable (e.g., soil salvage, road construction, grubbing, logging, exploratory drilling, etc.) during the primary breeding season for most species in the region (i.e., April 1 through July 31);
- Honor sage grouse lek buffers to the extent practicable and schedule disturbance activities near active leks to occur outside the breeding season (March 1 through July 15; and
- Monitor all environmental variables, including vegetation, soils, wildlife (terrestrial and aquatic, as warranted), water, and air quality/meteorology to proactively mitigate mine-related impacts.

3.12.5 Unavoidable, Irreversible, and Irretrievable Impacts

Topsoil salvage during the sage grouse breeding season would be an unavoidable noise impact to sage grouse while occupying the Pasture lek. SCM could minimize potential impacts to sage grouse by following the best practices listed above to reduce some noise, but would not completely eliminate the noise during the TR1 operations. Irretrievable impacts to sage grouse would be habitat loss and habitat fragmentation during the life of the TR1 Project. Impacts to sage grouse habitat and possibly to individuals would continue until the landscape and habitat is reclaimed. The sage grouse population may experience accelerated long-term declines or be eliminated from within the local area. When the Project Area has been fully reclaimed to be suitable sage grouse habitat, it may be possible for sage grouse to recolonize the habitat; however, is unlikely due to the strong site fidelity that sage grouse exhibit.

The TR1 Project has the potential to cause irretrievable impacts to sage grouse that occupy Core Area habitats within four miles of TR1. The addition of TR1 to the affected Core Area will increase habitat fragmentation which would exceed the 5 percent disturbance threshold reducing the effectiveness of the Core Area strategy outlined in EO 12-2015 at protecting sage grouse populations in Montana. As a result of the Proposed Action, sage grouse declines within the affected Core Areas may be exacerbated due to the increased level of disturbances that exceed the threshold.

3.13 CULTURAL RESOURCES

According to MSUMRA, "cultural resources" are any historic, archaeologic, or other cultural site. Significant sites, at a minimum, include all sites eligible for or listed on the NRHP. Cultural resources are a wide range of prehistoric and historic Native American campsites, properties of religious and cultural significance, and historic buildings, structures, and objects. Generally, any site of human activity older than 50 years is considered a potential cultural resource.

3.13.1 Analysis Area

The analysis area includes the SCM permitted mine area and some additional buffer areas included in the multiple cultural resource inventories completed since 1992.

3.13.2 Issues and Analysis Methods

- Would the project fulfill the requirements of MEPA and MSUMRA and associated federal requirements? A qualitative assessment comparing the project to the state and federal requirements was conducted.

3.13.3 Affected Environment

3.13.3.1 Regulatory Environment

Federal Requirements

Section 106 of the NHPA of 1966 as amended and its implementing regulations under 36 CFR 800 require all federal agencies to consider effects of federal actions on cultural resources eligible for or listed in the NRHP. Both listed and potentially-eligible properties (collectively referred to as cultural resources) are considered during Section 106 review, as are cultural resources that have not yet been evaluated for the NRHP. Section 106 mandates that consultation occur among the State Historic Preservation Officer, the Advisory Council on Historic Preservation (ACHP), Native American tribes traditionally associated with the affected land, and other “interested parties” to consider effects on cultural resources from the proposed project.

Section 106 Consultation

The TR1 Project Area includes a federal coal lease which requires compliance with Section 106 of the NHPA and its implementing regulations under 36 CFR 800. The OSMRE is the lead federal agency responsible for compliance and consultation under the NHPA which requires consulting with ACHP and interested parties including Native American tribes who claim cultural affiliation with the SCM area (Blackfeet Nation Tribe, Chippewa Cree Tribe, the Crow Nation, Fort Peck Assiniboine & Sioux Tribes, Little Shell Chippewa Tribe, the Nakoda and Aaniiih Nations, and Confederated Salish & Kootenai Tribes of the Flathead Reservation). As part of Section 106 consultation, OSMRE would disclose potential effects on historic properties on lands with federal minerals.

Federal agencies determine whether cultural resources found to be eligible for listing in the NRHP (i.e., a historic property) would be adversely affected by mining and associated operations.

State Requirements

Montana State Antiquities Act, MCA 22-3-421 to MCA 22-3-442

The Montana State Antiquities Act and rules (ARM 10.121.901 through 10.121.916) require avoiding or mitigating impacts on historic and prehistoric sites (i.e. buildings, structures, paleontological sites, and archaeological sites) on State-owned lands. The state rules consider compliance with the federal historic preservation review to be sufficient for meeting the state requirements.

3.13.3.2 Existing Conditions

A Class III cultural resource inventory for 843 acres in the southern part of theTR1 Project Area was completed as part of the Pearson Creek Amendment in 2006 (GCM Services, Inc. 2007). A portion of the northern 134-acre overburden stockpile area near Pit 4 was examined in 1998 as part of the Carbone Mine Expansion study (GCM Services, Inc. 1998). The remaining part of the 134-acre overburden stockpile area was inventoried in 2012 (GCM Services, Inc. 2013). Numerous other cultural resource inventories have been completed for the SCM and have included Loendorf et al., (1972), Haberman (1973), Fox (1977), Carmichael, et al. (1979), and GCM Services, Inc. (1990, 1998, 2005, 2006, and 2012). An inventory associated with coal bed methane development was also completed in 2005 (Strait, Bales, and Peterson 2005) and recorded some of the same sites as the SCM cultural resource inventories.

The SCM area is a dissected upland area on the west side of the Tongue River Valley, known as the Tongue River Breaks. The general terrain in the Pearson Creek area is characterized by narrow, steep-sided ravines separated by high, flat topped ridges with exposed outcrops, which contains pockets of a siliceous rock called porcellanite, a primary source of prehistoric stone tool material and was integral to the cultural history of the region (GCM Services, Inc. 2007). Steep, flat-topped ridges separate Pearson Creek from other ephemeral tributaries to the north and south.

Porcellanite was used extensively by the prehistoric inhabitants because it is hard and resists weathering. Water and gravitational erosion moved the materials from the ridge tops and outcrops to the areas below. The material is more concentrated along the faces of the ridges near their crests. Some eroded benches at lower elevations also have a fair amount of porcellanite. The lowest occurrence of porcellanite is along drainage channels (GCM Services, Inc. 2007).

The TR1 Project Area contains 27 cultural sites (24 prehistoric and 3 historic). Site 24BH2003 is a historic homestead dated to circa 1920s – 1930s, which is located mostly outside of proposed disturbance area. There are no standing structures associated with 24BH2003. There are also

two historic dumps (24BH3080 and 24BH3390). The historic sites do not have potential to yield additional important information, nor were they associated with significant historical persons or events. Consequently, these sites are not recommended eligible for listing in the NRHP.

The prehistoric sites included a quarry and lithic scatter, rock shelter, stone ring, campsites, cairn, and numerous lithic scatters. Some diagnostic prehistoric artifacts were observed and collected including two Late Prehistoric Period projectile points. The prehistoric sites in the Project Area are primarily located on highly eroded settings with little or no soil. The cultural components are shallow or on the surface and these sites have little potential to yield additional information important to understanding prehistory.

Site 24BH3392 was recommended to be NRHP eligible under Criterion D because of its archaeological content and unique shelter remains, consisting of structures made of stacked juniper logs surrounding central hearth features (GCM Services, Inc. 2007).

Table 3.13-1 lists 27 identified cultural resource sites within the Project Area. Other information in the table includes the Smithsonian number, site type, land owner, legal description (to the section level), and the NRHP recommendation.

Table 3.13-1
Cultural Resource Sites in TR1 Project Area

No.	Smithsonian Site No.	Site Type	Landowner	Legal Description	NRHP Recommend
1	24BH1059	Quarry & lithic scatter	Private	Sec. 14, T8S, R39E	Not eligible
2	24BH1068	Lithic scatter	Private	Sec. 26, T8S, R39E	Yes, avoidance
3	24BH1583	Lithic scatter	State	Sec. 36, T8S, R39E	Not eligible
4	24BH1584	Rock shelter	State	Sec. 36, T8S, R39E	Not eligible
5	24BH2003	Homestead	Private	Sec. 6, T9S, R40E	Not eligible
6	24BH2318	Stone ring	Private	Sec. 15, T8S, R39E	Not eligible
7	24BH2319	Lithic scatter	Private	Sec. 15, T8S, R39E	Not eligible
8	24BH2530	Lithic scatter	Private & BLM	Sec. 35, T8S, R39E	Not eligible
9	24BH2531	Lithic scatter	Private & BLM	Sec. 35, T8S, R39E	Not eligible
10	24BH3079	Lithic scatter	Private	Sec. 6, T9S, R40E	Not eligible
11	24BH3080	Historic dump	Private	Sec. 6, T9S, R40E	Not eligible
12	24BH3081	Lithic scatter	Private	Sec. 6, T9S, R40E	Not eligible
13	24BH3210	Lithic scatter	BLM	Sec. 6, T9S, R40E	Not eligible
14	24BH3211	Lithic scatter	BLM	Sec. 6, T9S, R40E	Not eligible
15	24BH3212	Lithic scatter	BLM	Sec. 6, T9S, R40E	Not eligible
16	24BH3213	Lithic scatter	BLM	Sec. 6, T9S, R40E	Not eligible
17	24BH3384	Lithic scatter	State	Sec. 36, T8S, R39E	Not eligible
18	24BH3390	Historic dump	Private	Sec. 6, T9S, R40E	Not eligible

Table 3.13-1
Cultural Resource Sites in TR1 Project Area

No.	Smithsonian Site No.	Site Type	Landowner	Legal Description	NRHP Recommend
19	24BH3391	Lithic scatter	Private	Sec. 31, T8S, R40E	Not eligible
20	24BH3392	Lithic scatter & campsite	Private	Sec. 31, T8S, R40E	Eligible, D
21	24BH3396	Lithic scatter	BLM	Sec. 35, T8S, R39E	Not eligible
22	24BH3399	Lithic scatter & campsite	Private	Sec. 6, T9S, R40E	Not eligible
23	24BH3401	Stone ring & lithics	BLM	Sec. 35, T8S, R39E	Not eligible
24	24BH3404	Lithic scatter	Private	Sec. 31, T8S, R40E	Not eligible
25	24BH3410	Cairn & lithic scatter	Private	Sec. 31, T8S, R40E	Not eligible
26	24BH3411	Lithic scatter	Private	Sec. 31, T8S, R40E	Not eligible
27	24BH3699	Rock cairn	Private	Sec. 15, T8S, R39E	Not eligible

3.13.4 Direct and Secondary Impacts

Potential direct impacts to cultural resources could result from disturbance of physical elements, such as lithic scatters and rock art sites. Secondary impacts typically result from changes to the appearance of an area that has cultural significance. Literature searches and surveys have shown there are 27 cultural resource sites within the TR1 Project Area. GCM Services, Inc. (2007) recommended one site, 24BH3392, for inclusion in the NRHP. The other 26 sites have no significant resources that warrant eligibility (GCM Services, Inc. 2007).

Site 24BH3392 has significant archaeological content and unique feature types including dateable organic materials (charcoal, bone and juniper) and a variety of tools indicating prolonged occupation and various activities (not just lithic reduction). Thermal features are present in defined activity areas (e.g., the structures). Lithic materials are present, not just porcellanite. This site has potentially significant archaeological research potential (GCM Services, Inc. 2007).

3.13.4.1 No Action Alternative

Under the No Action Alternative, there would be no additional ground disturbance. The No Action Alternative would result in no additional direct or secondary impacts to the NRHP eligible site 24BH3392.

3.13.4.2 Proposed Action Alternative

Site 24BH3392 has clear archaeological research value under Criterion D (GCM Services, Inc. 2007). The site should be avoided by all mining-related activity until additional investigations are completed to determine and document the site's potential to yield further information to the understanding of local prehistory. A mitigation plan was approved in 2012. The mitigation work would be completed prior to disturbance.

3.13.5 Unavoidable, Irreversible, and Irretrievable Impacts

Site 24BH3392 would have unavoidable impacts from the Proposed Action because avoidance and minimization of impacts is not feasible. Excavation as prescribed under the approved mitigation plan would be an accepted method to resolve the adverse impacts by recovering information important to the interpretation of history and prehistory.

4 CUMULATIVE, UNAVOIDABLE, IRREVERSIBLE AND IRRETRIEVABLE IMPACTS

4.1 RELATED FUTURE ACTIONS

At the time of this EIS publication, the following projects and actions would be considered related future actions to collectively include for impacts assessment. The assessment areas for cumulative impacts are shown on **Figure 4.1-1**.

4.1.1 SCM AM5 New Haul Road

SCM submitted an amendment application (referred to as AM5) to construct a haul road and associated high voltage distribution line within a transportation corridor from the SCM permit boundary south to the Montana–Wyoming border. This project is currently in the final EIS completion stage. AM5 would require approximately 4,334 acres, but construction of the haul road would only disturb approximately 970 acres. The AM5 haul road would connect SCM with the Youngs Creek Mine in Wyoming and allow SCM to extend the life of the mine to 2030 with reclamation completed by 2034. The AM5 haul road would primarily be used to transport coal from the currently-permitted Youngs Creek Mine in Wyoming to the processing facility at SCM where the coal would be processed and then transported off-site under the existing SCM permit. The AM5 area is not an expansion of the area to be mined.

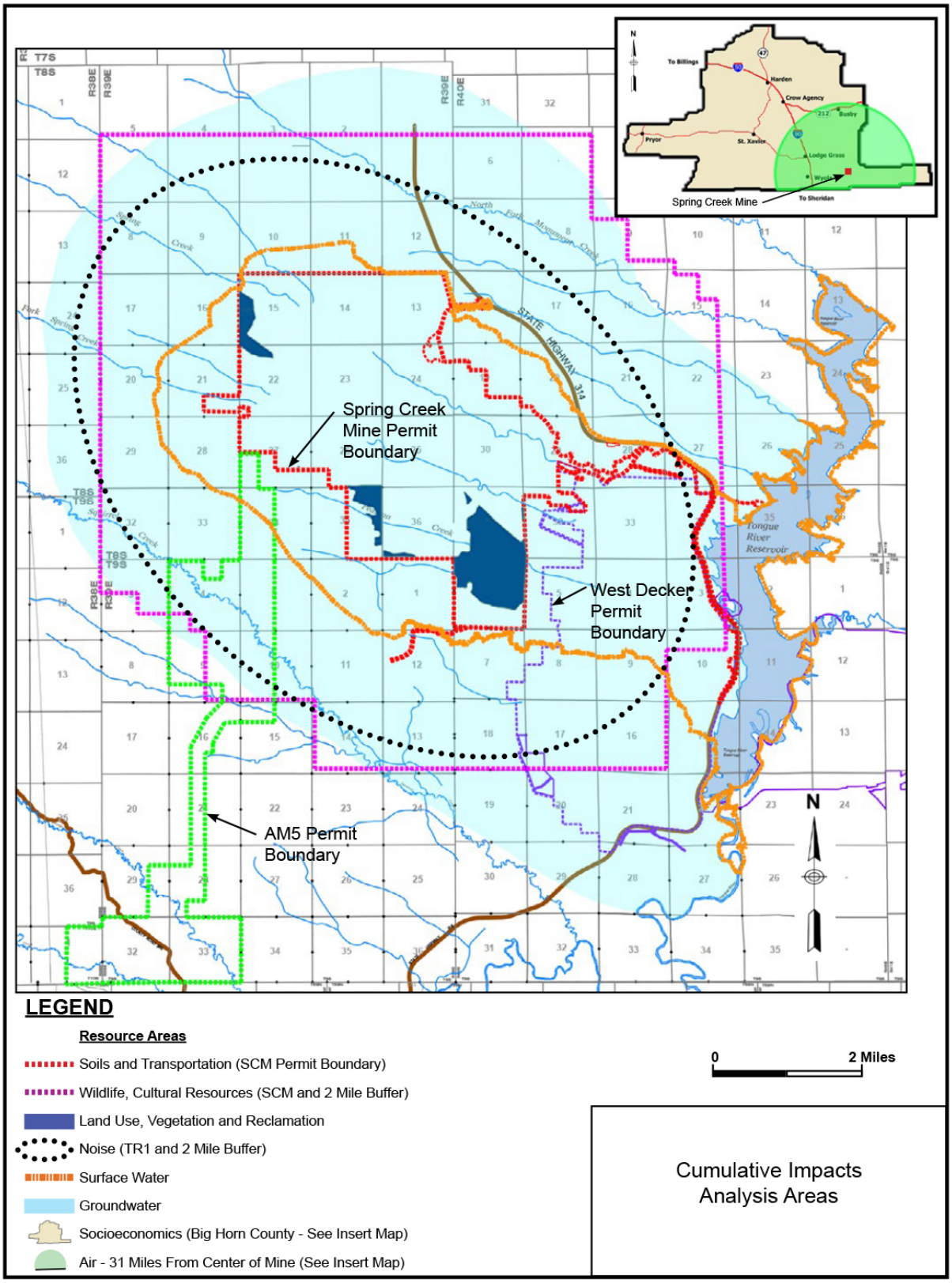
The AM5 project includes the following components: the road alignment, a high voltage distribution line, soil stockpiles, sediment and settling ponds, other sediment control features, culverts, fences, and appropriate safety features.

4.1.2 Decker Coal Mines

The East Decker and West Decker coal mines are surface coal mines owned by Lighthouse Resources Inc. and operated by the Decker Coal Company, LLC. The boundary of the West Decker Mine is approximately 1.5 miles southeast of the TR1 major revision area. The Decker Coal Mines began operating in the 1970s and have a current permitted area of approximately 11,718 acres. Since inception, the Decker Mines have produced approximately 300 million metric tons of coal and have 868 million metric tons of mineable coal remaining plus additional reserves of 138 million metric tons (Decker Coal Company 2019). The annual coal production rate is approximately 3.0 million tons.

The Decker Mines currently have two coal lease applications in process: NDM 101099 to mine 17.7 million tons of coal under 310.47 acres; and NDM 108494 to mine 203.4 million tons of coal under 2,375.32 acres.

Figure 4.1-1. Cumulative Impact Analysis Areas



4.1.3 Additional Coal Leases

SCM has submitted applications for four actions with the BLM; two for coal leases and two for land lease revisions. The two coal lease applications included (1) a new application for a coal lease to mine 170.2 million tons of coal under approximately 1,262.57 acres (MTM-105485), and (2) a lease modification (MTM-110693) for 150 acres that contains approximately 7.9 million tons of mineable coal. The two land use applications included (1) an amendment to land use permit MTM-96659 that adds 175 acres but removes 320 acres, and (2) a lease modification application MTM-74913 that would add 255 acres to the existing 222.12 acres (total 477.12 acres) for areas for coal mine layback, highwall crest establishment, topsoil and overburden stockpiles, and transportation and utility corridors. SCM is currently providing data to BLM for LBA 105485.

Big Metal Coal Co. LLC, a wholly-owned subsidiary of CPE, and the Crow Tribe of Indians signed an exploration agreement and option to lease up to 1.4 billion tons of coal from three project areas in the southeast corner of the Crow Indian Reservation west of SCM. On June 7, 2018, Big Metal Coal provided the Crow Tribe notice it was exercising its lease option on the Upper Youngs Creek project area and extending its coal lease options for the Squirrel Creek and Tanner Creek project areas. After Big Metal Coal and the Crow Tribe sign the Upper Youngs Creek coal lease, the coal lease will require approval from the DOI and will require related regulatory actions before the lease is effective. The Big Metal Project is not under concurrent consideration by any state agency through preimpact statement studies, separate impact statement evaluation, or permit processing procedures, and as such, does not constitute a related future action for which cumulative impacts must be addressed in connection with TR1 (ARM 17.4.603(7)).

4.1.4 Rail Spur

A request for a railroad spur for direct market shipping of coal reserves was mentioned as part of a Section 404 wetland permit application (USACE 2017). Although the rail spur would originate in Wyoming, it extends into Montana where it would tie into the main railroad line just south of Tongue River Reservoir before heading south back into Wyoming.

4.1.5 Oil and Gas Activities

There are no conventional oil and gas facilities associated with the TR1 major revision area. According to Montana Board of Oil & Gas (MBOG) online records, there are five coal-bed natural gas (CBNG) wells in the TR1 major revision area (MBOG 2018). One well is in Section 6, T9S, R40E and four wells are in Section 31, T8S, R40E. Total depths from the surface of the CBNG wells range from 1,810 to 1,133 feet.

According to SCM, all five CBNG wells were closed in 2011 with the wells plugged and the areas around the wells were cleaned up (SCM verbal communication with Tetra Tech and DEQ, October 18, 2018).

4.1.6 Summary

The Decker Coal Mines and SCM have a combined 3,947 acres of coal leases in process to mine an additional 391 million tons of coal. This does not include the Big Metal Coal project. The AM5 haul road project would disturb approximately 970 acres within the 4,334 acres permitted boundary. Approximately 2,600 acres, or 75 percent of the total acres under consideration, are located within two sage grouse Core Areas and approximately 550 acres fall within sage grouse General Habitat. When the related future actions are added to the proposed 977 acres of disturbance for the TR1 major revision, the total acreage of disturbance is approximately 4,917 acres.

4.2 AIR QUALITY IMPACTS

4.2.1 Cumulative Impacts

The area around the SCM has ongoing air quality impacts from the mining and reclamation activities at the Decker Mines, coal trucking operations at the Wolf Mountain Coal facility, and coal train transportation from both SCM and the Decker Mines.

SCM's DEQ air permit no 1120-12 (DEQ 2014) allows for up to 30 million tons of coal production per year. Emissions to the local area are estimated in the air permit at 1,397 tons of particulate matter equal to or less than 10 micrometers in diameter (PM_{10}). The air permit does not include an emissions estimate for particulate matter equal to or less than 2.5 micrometers in diameter ($PM_{2.5}$). The air permit allows for emissions higher than those estimated in the analysis in Section 3.5.2. Air emissions from the TR1 major revision (Proposed Action Alternative) would not be directly additive to SCM's current air emissions (No Action Alternative) because the TR1 major revision extends the period of mining at SCM but the annual coal production rate would remain at or below the average annual production rate of 18 million tons.

The DEQ air permit included only the Wolf Mountain Coal facility for the assessment of cumulative impacts. The Wolf Mountain Coal facility is located immediately north of and adjacent to the SCM (DEQ 2014). The Wolf Mountain Coal facility was not constructed at the time of the air modeling for the permit but was permitted for 11.22 tons of PM10 emissions and 1.27 tons of PM2.5 emissions.

The total cumulative impacts to air from the SCM and Wolf Mountain Coal facility would be 679.77 tons per year for PM_{10}, 56.08 tons per year for $PM_{2.5}$, and 0.0036 tons per year for NOx. The cumulative impacts would be similar for all alternatives (the No Action and Proposed Action) because air quality would remain essentially unchanged and would not be indirectly affected by ore hauling or other mine-related road development, traffic, or reclamation activities.

4.2.2 Unavoidable, Irreversible and Irretrievable Impacts

Some impacts to air resources are unavoidable and would be associated with emissions and fugitive dust from operating a coal mine, traffic and transportation of coal, and other reasonably foreseeable future actions. Irreversible and irretrievable commitment of resources is not applicable to air resources.

4.3 LAND USE AND RECREATION IMPACTS

4.3.1 Cumulative Impacts

The existing coal mine leases and associated land use leases for the SCM, the Decker Mines, and for the additional coal leases listed in Section 4.1.3 would limit public access to federal and state lands included in the mine permit areas. Coal mine operations can disrupt other mineral development and reduce the quantity and quality of wildlife habitat, livestock grazing land, and pastureland.

4.3.2 Unavoidable, Irreversible and Irretrievable Impacts

Following final reclamation, some areas of the TR1 major revision would be available to mineral development, livestock grazing, and for wildlife and recreation. The impacts on future land use of the coal mined lands would be long term.

4.4 NOISE IMPACTS

4.4.1 Cumulative Impacts

The analysis area for cumulative impacts on noise-sensitive receptors includes the SCM permitted area, the TR1 major revision, and other planned or Proposed Actions within two miles that would influence the acoustical environment. Potential cumulative impacts on noise include conflicts with noise-sensitive receptors, such as sage grouse and other noise-sensitive wildlife. These impacts would be intensified where other existing sources have already affected noise levels, such as SCM operations and traffic on local roads and grazing activities

Ambient noise levels are expected to increase if proposed future actions are approved, including Decker Coal Lease Modification (NDM 101099) and the AM5 9-mile haul road that extends from Pit 1 south between the Pasture and Playa sage grouse leks (**Figure 3.6-2**). DEQ is currently completing the final EIS for the AM5 project, and construction and reclamation noise impacts greater than +10 L_{50} dBA were predicted at the same leks analyzed for this TR1 major revision EIS (i.e., Alt Pasture, Pasture and Playa).

4.4.2 Unavoidable, Irreversible and Irretrievable Impacts

For the Proposed Action, topsoil salvage operations are predicted to cause short-term wildlife noise impacts. Noise levels would exceed +10 L_{50} dBA above ambient noise at the Pasture lek (**Table 3.6-3**) located within 1.5 miles of Pits 1 and 2 (**Figure 3.6-2**). Topsoil salvage activities would be predicted to result in an unavoidable and irretrievable noise impacts to nearby sage

grouse while occupying the lek. Best practices would be incorporated into the Proposed Action (Section 3.6.4.2) to reduce some of the noise of the TR1 major revision pre-strip operations.

4.5 Social and Economic Impacts

4.5.1 Cumulative Impacts

The TR1 major revision would extend the mine life by at least 4 years to 2031, which would extend the employment of approximately 340 people (assuming a production rate of 18 million tons per year) by 4 years. The money paid by SCM for federal, state, and local taxes and royalties on the coal mined would continue for at least 4 more years over the No Action Alternative. Cumulative impacts from TR1 major revision and other reasonably foreseeable future projects for Big Horn County would have social and economic benefits.

4.5.2 Unavoidable, Irreversible and Irretrievable Impacts

The TR1 major revision would have an unavoidable, irreversible, and irretrievable commitment of 72 million tons of mineable coal resources in Big Horn County, Montana.

4.6 Soil Impacts

4.6.1 Cumulative Impacts

Cumulative impacts to soil resources would include impacts from the TR1 major revision together with impacts to soils from coal mining and reclamation activities at the Decker Mines, planned coal mining and reclamation activities for the SCM and Decker Mines (associated with existing coal leases), and construction and operation of the proposed AM5 haul road. Primary soil impacts from these past, present, and reasonably foreseeable future actions would be increased soil erosion and reduced soil productivity compared to undisturbed sites. Soil erosion has a short-term minor adverse impact on this resource and would begin to return to natural conditions in a few years after vegetation is reestablished. SCM has been successful in reclaiming mined areas with vegetation. Reduction of soil productivity is a minor but long-term adverse impact that typically takes much longer to return to natural conditions.

Soil salvage, topsoil stockpiling, and soil distribution activities would continue at the SCM and the Decker Mines. Construction of the AM5 haul road and its use would also result in impacts to soils. There would be increased cumulative impacts to soils with continued and potentially higher rates of coal mining and coal transportation in the southern Big Horn County area. Soil impacts should remain local with few offsite impacts from increased sedimentation because soils are handled using best management practices and in compliance with MSUMRA rules and regulations.

4.6.2 Unavoidable, Irreversible and Irretrievable Impacts

Soils would have unavoidable and irretrievable impacts during the life of the TR1 major revision mining through final reclamation. Most impacts to soils are not irreversible, but the soil properties and processes would take prolonged periods (decades) to reestablish to pre-

disturbance conditions once the soil has been redistributed, seeded, and reclaimed. Soil chemical, physical, and nutrient properties would be adversely impacted from soil salvage operations and from stockpiling. Soil stockpiles would be graded and seeded with temporary vegetation to stabilize the soil and reduce erosion from the piles.

4.7 TRANSPORTATION IMPACTS

4.7.1 Cumulative Impacts

Decker Mine and SCM both ship coal via a dead-end BNSF spur (**Figure 3.9-1**). The Decker Mines produced approximately 4.2 million tons of coal in 2017 and 3.2 million tons in 2016. The SCM produced 12.7 million tons of coal in 2017 and 10.2 million tons in 2016 (BNSF 2018).

The analysis area for cumulative impacts for transportation would be the same as described in Section 3.9.1. Cumulative impacts to transportation would be related to coal shipped from the SCM, the Decker Mines, and the coal hauled to the SCM from the Youngs Creek Mine via the AM5 haul road. If the AM5 haul road from Youngs Creek Mine to SCM is approved and used, cumulative impacts to transportation would be increased for the extended life of the mine. The additional 4 years of shipping coal off-site from the SCM for the TR1 major revision would have a minor adverse impact.

4.7.2 Unavoidable, Irreversible and Irretrievable Impacts

No unavoidable, irreversible, or irretrievable adverse impacts related to transportation are anticipated for any of the alternatives.

4.8 VEGETATION AND RECLAMATION IMPACTS

4.8.1 Cumulative Impacts

The cumulative impacts of the TR1 major revision and the other reasonably foreseeable future actions would be additional weed infestations from additional areas to reclaim, a greater area where native plants would be removed, and an extending time until final reclamation would occur. Additional labor and materials (herbicides, fuel, native seed, erosion control products) would be required for the SCM, Decker Mines, the AM5 haul road, and any future coal mining to maintain compliance with reclamation of the disturbed areas. Essentially, greater areas disturbed for coal mining and related transportation would require longer periods of impacts to vegetation. The cumulative impacts to vegetation and reclamation would be expected to continue through final reclamation.

4.8.2 Unavoidable, Irreversible and Irretrievable Impacts

There would be unavoidable and irretrievable adverse impacts to vegetation resources for the Proposed Action from the physical removal of the vegetation and disturbance of the 977 acres. Impacts to vegetation would remain through mining, but reclamation plans and past vegetation reclamation success at SCM suggest the vegetation communities would reestablished. The designated wildlife postmining land use with the sagebrush and other shrub components would

take longer to regenerate compared to grazing or pasture lands because of the additional time required for reestablishing shrub species.

4.9 WATER IMPACTS

4.9.1 Cumulative Impacts

The primary cumulative impacts for ground water from the Proposed Action and other coal mining at the Decker Mines would be from the removal of the coal and overburden aquifers and replacing them with backfilled spoil materials. Continued coal mining in the SCM and Decker Mine areas, together with future coal mining, will result in an increased cumulative amount of backfilled coal seams in the area draining to the Tongue River Reservoir. The extent of water level drawdown in the coal and shallow aquifers in the SCM and Decker Mines area would be expected to increase (greater depth to ground water) because of the mining and dewatering in the active mine pits. Where concurrent ground water drawdown from the SCM and Decker Mines overlap, additional water level declines would be expected.

Another cumulative impact to ground water quality and quantity has been from CBNG development and ongoing mining operations at the Spring Creek and Decker mines. Because CBNG production requires substantial pumping to reduce pressure head and release the natural gas, widespread water level decline has occurred in coal aquifers in the Decker area (DEQ 2015). The premine potentiometric surface had up to 150 feet of hydrostatic head above the top of the A-D coal seam (SCC and WWC Engineering 2017).

Potential cumulative impacts for surface water would occur for the TR1 major revision disturbance area and the Decker Mines within the local drainage basins adjacent to the Tongue River Reservoir. Mining related surface water impacts would continue through the life of mine operations in these drainages below the mines but would reduce with successful reclamation. Cumulative mining impacts to surface water resources would not be expected to be measurable in the Tongue River Reservoir because of the incorporation of sedimentation basins and stormwater best management practices by the SCM and Decker Mines.

4.9.2 Unavoidable, Irreversible and Irretrievable Impacts

Ground water levels would be unavoidably lowered during mining due to the physical removal of the coal and from dewatering in the active pits. Ground water levels would eventually return to near premine levels after closure and reclamation, but that would take many years. Ground water and surface water impacts from the TR1 major revision would primarily occur during active mining and dewatering of the pits; impacts would diminish with reclamation. Impacts to ground water quality are irreversible.

4.10 Wildlife Impacts

4.10.1 Cumulative Impacts

The analysis area for cumulative impacts on wildlife is the expanded area surveyed from 2014 through 2017 during annual wildlife monitoring for SCM, which encompasses 63,458 acres (Great Plains Wildlife Consulting 2019).

The primary cumulative impacts to wildlife would be temporary habitat loss and habitat fragmentation from the SCM, Decker Mines, the proposed AM5 haul road (if a permit is granted), and potential future coal mining in the area. Cumulative impacts would also result from mining and other land use changes and development in Squirrel Creek, Youngs Creek, and Little Youngs Creek, which support cottonwood gallery forests. The 977 acres of habitat temporarily lost under the Proposed Action would be additive to the habitat impacted by current and future coal mining and the other surface disturbing activities like construction of the AM5 haul road. Impacts to wildlife would be reduced after mining has finished and reclamation completed at the mines. Contemporaneous reclamation and specific wildlife conservation measures at SCM would further reduce the impacts from the TR1 major revision.

There would be no cumulative impact to threatened and endangered species because none would be impacted by the Proposed Action.

Species of concern, migratory birds, and game birds associated with grasslands, sagebrush, and areas with trees would be impacted. The cumulative impacts to the landscape would reduce sage grouse habitat functions within the 28,220-acre wildlife analysis area (TR1 plus a 2-mile buffer). The proposed AM5 haul road, Decker Mines, and oil and gas development would also adversely impact sage grouse habitat. SCM agreed to a total compensatory mitigation obligation for the unavoidable adverse impacts to sage grouse habitat associated with their Proposed Action. The compensatory obligation was based on an estimated loss of 615 functional acres and a total compensatory amount of $107,727 which would be paid to the MSGHCP Stewardship Fund.

The SCM and Decker Mines area contains high and moderate value big game winter range. The TR1 major revision area (977 acres) has 9 acres of high value and 968 acres of moderate value habitat. Contemporaneous reclamation at SCM would reduce the impact of temporary habitat loss. Habitat conservation measures implemented under the HRRP and the regional Conservation Strategy would also help offset impacts to wildlife. The Proposed Action would not result in an increase in road killed big game. Big game in the SCM and Decker Mines area have likely habituated to the long term, ongoing mine disturbance throughout the area.

Mining activity in the analysis area could result in adverse impacts to raptor populations because of the cumulative number of nests lost. The TR1 Project Area contains one historic turkey vulture nest but this would not be a major loss in the analysis area. All mines in the cumulative impacts analysis area have raptor conservation measures required under their

permit, including monitoring, habitat reclamation, APLIC-compliant power lines, and nest mitigation to help minimize long term adverse impacts to raptor populations.

4.10.2 Unavoidable, Irreversible and Irretrievable Impacts

Unavoidable impacts to wildlife and greater sage grouse would be temporary habitat loss and habitat fragmentation during the life of the TR1 Project and other surface disturbance projects in the cumulative impacts analysis area. Impacts to wildlife would continue until the topography and habitat are reclaimed. When the TR1 Project Area has been fully reclaimed, it would be possible for wildlife, including sage grouse, to recolonize the habitat.

4.11 Regulatory Restrictions for Sage Grouse

The TR1 Project Area includes lands within sage grouse core, general, or connectivity habitat. The TR1 Project is exempt from EO-10-2014 because it was received and deemed complete in 2013 before the EO effective date. However, under MEPA and MSUMRA, DEQ evaluated potential impacts to sage grouse and related resources to consider alternatives and mitigations to the Proposed Action. The TR1 Project was determined to result in a reduction of sage grouse habitat functions estimated at a loss of 615 functional acres. The total compensatory amount was determined based on MSGOT policy and was estimated at $107,727 for the loss of the 615 functional acres, plus the policy multipliers, for a total of 861 functional acres.

The analysis for compliance with the Private Property Assessment Act (PPAA) is a two-step process. An initial analysis must be performed to determine whether the Proposed Action is covered under the PPAA. If the TR1 Project is covered, an analysis must then be performed to determine whether the Proposed Action has takings implications.

The approval of the TR1 Project is subject to the PPAA where the state agency either (1) denies the amendment application, or (2) approves the amendment application with a condition that has not been agreed to by SCM at the time of the publication of this draft EIS. DEQ understands SCM has requested approval of the TR1 Project but has not as of this date agreed to all conditions DEQ would require in connection with its approval of the TR1 major revision application. Should SCM consent to all DEQ-required conditions prior to the date of publication of the final EIS, then the TR1 Project would not be subject to the PPAA.

The discussion of regulatory restrictions is limited to the conditions or mitigations that would be required of SCM if the Proposed Action is selected as the Preferred Alternative. DEQ will perform a final regulatory restrictions analysis when a Preferred Alternative is selected in the final EIS.

5 LIST OF PREPARERS

5.1 PREPARERS AND REVIEWERS

Table 5.1-1 lists the professionals, their roles, and qualifications who assisted in preparing this draft EIS document.

Table 5.1-1
List of Preparers

Name	EIS Responsibility	Education, Highest Degree; Years of experience
DEQ Specialists		
Jennifer Lane	MEPA Project Coordinator	B.A., Environmental and Social Justice; 5 years
Jeff Blend, Ph.D.	Socioeconomics	Ph.D., Agricultural Economics, Resource Economics, 20 years
Julian Calabrese	Soils and Reclamation	B.S., Land Resource Environmental Science Minor, Soils; 18 years
Ric Casteel	Mine Plan and Engineering	MLA., Landscape Architecture B.S. Engineering; 30 years
Sarah Christopherson	Staff Attorney	J.D. Law Master's Environmental Law and Policy; 3 years
Ed Coleman	Approving Official	B.S., Forestry; 20 years
Emily Hinz	Surface Water	Ph.D., Geophysics; 8 years
Kevin Krogstad	Geology and Ground Water	B.S., Earth Sciences; 25 years
Mark Lucas	Staff Attorney	J.D. Law M.S., Environmental Law; 19 years
Alex Mackey	Land Use, Vegetation, Reclamation	B.S., Forestry; 11 years
Ben Schmitt	Wildlife, Sage Grouse	M.S., Fisheries and Wildlife; 8 years
Bob Smith	Permit Coordinator	B.S., Occupational Safety & Environmental Health; 16 years
Jon Staldine	Surface Water, MPDES	M.S., Natural Resources; 7 years
James Strait	Cultural Resources	M.A., Archaeology; 24 years
Chris Yde	Wildlife	M.S., Fish and Wildlife Management; 39 years, Retired
Tetra Tech Team Specialists (includes Big Sky Acoustics and WEST)		
J. Edward Surbrugg, Ph.D.	Project Manager, Soils	Ph.D., Soil Science; 35 years
Larry Cawlfield	Water Resources	M.S., Civil Engineering; 34 years
Ruthanne Coffey	Water Resources	M.S., Hydrogeology; 5 years
Mike Egan, PG	Geology	B.S., Geology; 30 years

Table 5.1-1
List of Preparers

Name	EIS Responsibility	Education, Highest Degree; Years of experience
Cameo Flood	Land Use and Socioeconomics	B.S., Forestry; 25 years
Lynn Peterson	Cultural Resources	M.S., Anthropology; 30 years
Wendy Rieth	Wildlife Resources (other than greater sage grouse)	M.S., Wildlife Biology; 13 years
Kathie Roos, P.E.	Transportation and Safety Resource Specialist	B.S., Chemical Engineering; 23 years
Nicholas S. Sovner	Vegetation, Reclamation	B.S., Rangeland Resources & Wildland Soils; 14 years
Rob Tisdale, Ph.D.	Air Quality	Ph.D., Chemistry; 22 years
Sean Connolly, Big Sky Acoustics	Noise	M.S., Mechanical Engineering; 24 years
Kristin Connolly, Big Sky Acoustics	Noise	B.A., Molecular, Cellular, and Developmental Biology; 27 years
Chad LeBeau, WEST	Wildlife Resources, greater sage grouse	M.S., Ecosystem Science & Management; 10 years

6 REFERENCES

Administrative Rules of Montana. 2018a. Rule 17, Chapter 8, Subchapter 2, "Ambient Air Quality." Accessed September 24. http://deq.mt.gov/Portals/112/DEQAdmin/DIR/Documents/legal/CH08-02.pdf

Administrative Rules of Montana. 2018b. Rule 17, Chapter 8, Subchapter 8, "Prevention of Significant Deterioration of Air Quality." Accessed September 24. http://deq.mt.gov/Portals/112/DEQAdmin/DIR/Documents/legal/CH08-08.pdf

Administrative Rules of Montana. 2018c. Rule 17, Chapter 24 Subchapter 311, "Air Pollution Control Plan." Accessed September 24. http://mtrules.org/gateway/ruleno.asp?RN=17%2E24%2E311

Administrative Rules of Montana. 2018d. Rule 17, Chapter 24 Subchapter 761, "Air Resources Protection." Accessed September 24. http://mtrules.org/gateway/ruleno.asp?RN=17%2E24%2E761

APLIC. 2006. *Suggested Practices for Avian Protection on Power Lines: The State of the Art in 2006.* [Online]
Available at: http://www.aplic.org/uploads/files/2643/SuggestedPractices2006(LR-2).pdf

Bighorn Environmental Sciences. 2008. Baseline Soil Survey: Pearson Creek Expansion Area, Spring Creek Coal Mine. Prepared for Spring Creek Mine. November.

BKS Environmental Associates, Inc. 1998. Baseline Soil Assessment of the Carbone Permit Extension Area. Prepared for Spring Creek Coal Company. August.

BLM. 2010. Finding of No Significant Impact and Decision Record for Environmental Assessment for Spring Creek Coal Lease Modification MTM-069782 and Amendment to Land Use Lease MTM-74913 EA# MT-DOI-BLM-MT-020-2010-29. US Bureau of Land ManagementAvailable at: https://leg.mt.gov/content/publications/mepa/2012/deq0703_2012004.pdf.

BNSF and Union Pacific (UP). 2010. Field evaluation of coal dust suppressants in the Powder River Basin. Super Trial. Recommended Loading Measures to Mitigate Coal Dust.

BNSF. 2018. BNSF tells federal regulators it's ready to handle more traffic. [Online] March 26, 2018 at: Trains.com. Burlington Northern Santa Fe.

Braun, C.E., T.E. Britt, and R.O. Wallestad. 1977. Guidelines for maintenance of sage grouse habitats. Wildlife Society Bulletin 5:99-106.

Carmichael, G.A., A. Ekland, and J. Kinney. 1979. 1978 Archaeological Investigations in the Spring Creek Mine Area, Big Horn County, Montana. Report submitted to Northern Energy Corporation, Portland, Oregon.

Clayton, K.M., J. Berry, P. Farmer, B. Waage, and C. Yde. 2006. Small Mammal Re-occupancy of Reclaimed Habitat: A Potential Indicator of Reclamation Success. In: Billings Land Reclamation Symposium, June.

Cloud Peak Energy. 2012. MR168 Major Revision Submittal, Decker, MT: Cloud Peak Energy.

Cloud Peak Energy. 2016. Letter to Mr Chris Yde, DEQ from Gabe Johnson, SCM. Response to 7-30-13 MR168 Deficiency Comments and Jamor Revision Determination.

Cloud Peak Energy. 2016..SCM Reclamation Plan. Section 17.24.313. Revised September 12.

Cloud Peak Energy. 2017. Spring Creek Coal LLC 2017 Annual Mining Report, Decker, MT: Spring Creek Coal LLC.

Cloud Peak Energy. 2018a. Spring Creek Minin information. Available at https://cloudpeakenergy.com/operations/spring-creek-mine/.

Cloud Peak Energy. 2018b. Major Revision Submittal Application. Response to 7-30-13 MR 168 Deficiency Comments and Major Revision Determination. October 31.

Cloud Peak Energy. 2019. Email communication and attached spreadsheets with Gabriel Johnson, regarding Revised Mine Info for Noise Modeling.

Connelly, J.W., E.T. Rinkes, and C.E. Braun. 2011. Characteristics of greater sage-grouse habitats. Pgs 69-83 *in* S.T. Knick and J. W. Connelly, editors. Greater sage-grouse: Ecology and Conservation of a Landscape Species and its Habitats. Studies in Avian Biology Series. Vol. 38. Univ. of California Press, Berkeley, CA.

Connelly, J.W., S.T. Knick, M.A. Schroeder, and S.J. Stiver. 2004. Conservation assessment of greater sage-grouse and sagebrush habitats. Western Association of Fish and Wildlife Agencies, Cheyenne, WY.

Decker Coal Company. 2019. 2018 West Decker (Permit C1987001) and East Decker (Permit C1983007) Annual Reports. March 1.

DEQ. 1998. Soil, Overburden and Regraded Spoil Guidelines. Helena, MT. Updated August. Department of Environmental Quality. Available at: https://deq.mt.gov/Portals/112/Land/CoalUranium/Documents/Guidelines%20&%20Forms/Guidelines/Soil,%20Overburden%20and%20Regraded%20Spoil%20Guidelines.pdf

DEQ. 2014. Montana Air Quality Permit #1120-012, Spring Creek Coal LLC. October 16. http://deq.mt.gov/Portals/112/Air/AirQuality/Documents/ARMpermits/1120-12.pdf

DEQ. 2015. Decker Area Groundwater Cumulative Hydrologic Impact Assessment (CHIA) Spring Creek Mine, East and West Decker Mines, Bighorn County, Montana, Helena, Montana: Montana Department of Environmental Quality.

DEQ. 2016a. Air Quality Monitoring Network Plan, Air Quality Bureau, State of Montana. May.

DEQ. 2017. John North TR1 and Sage Grouse Memo.

DEQ. 2018a. Draft Environmental Impact Statement for the Proposed Addition of a Haul Road to the Spring Creek Mine. June.

DEQ. 2018b. Citizens' Guide to Air Quality in Montana. Accessed September 21. http://deq.mt.gov/Air/airmonitoring/citguide/understanding

DEQ. 2018c. Air Quality Nonattainment Information. Accessed September 21. http://deq.mt.gov/Air/2017Air/Standards/airnonattainment

DEQ. 2018d. Scoping Report for Spring Creek Mine (TR1) Environmental Impact Statement, Big Horn County, Montana. Prepared by: Tetra Tech, Inc. July 3.

DEQ. 2018e. Final Environmental Impact Statement for the Proposed Addition of a Haul Road to the Spring Creek Mine.

DEQ. 2019. Personal communication with Darryl Mauder DEQ.

DNRC. 2017. Fiscal Year 2017 Minerals Management Bureau. Available at: http://dnrc.mt.gov/divisions/trust/docs/minerals-management/oil-and-gas/reports/fy2017_mmb_annual_report.pdf [Accessed 20 November 2018].

DOA. 2017. Montana Big Horn County Annual Financial Report. Montana Department of Administration. Available at: http://www.bighorncountymt.gov/wp-content/uploads/2018/03/Fy-17-AFR-Final.pdf. [Accessed 22 August 2018].

Doherty, K.E., D.E. Naugle, and B.L. Walker. 2010. Greater Sage-Grouse nesting habitat: The importance of managing at multiple scales. Journal of Wildlife Management. 74(4): 1544-1553.

DOI. 2019. Natural Resources Revenue Data. Dispursements FY 03-18. Department of the Interior. Available at https://revenuedata.doi.gov/downloads/FY%2003-18%20Federal%20Revenues.xlsx.

DOR. 2018a. Department of Revenue Monthly Collections Report. Fiscal Year 2018 Collections Through FYE. Available online https://mtrevenue.gov/wp-content/uploads/2018/07/2018-FYE-Revenue-Monitoring-Report.pdf

DOR. 2018b. *Montana Department of Revenue, Biennial Report July 1, 2016 - June 30, 2018.* Available at: https://mtrevenue.gov/wp-content/uploads/2019/01/2016-2018-Biennial-Report.pdf [Accessed 9 July 2019].

Eng, R.L. and P. Schladweiler. 1972. Sage Grouse winter movements and habitat use in central Montana. Journal of Wildlife Management. 36(1): 141-146.

EPA. 1996. AP-42: Compilation of Air Emissions Factors, Chapter 3, Section 3, "Gasoline and Diesel Industrial Engines." U.S. Environmental Protection Agency. October.

EPA. 1998. AP-42: Compilation of Air Emissions Factors, Chapter 11, Section 9, "Western Surface Coal Mining." October.

EPA. 2006a. AP-42: Compilation of Air Emissions Factors, Chapter 13, Section 2.2, "Unpaved Roads." November.

EPA. 2006b. AP-42: Compilation of Air Emissions Factors, Chapter 13, Section 2.4, "Aggregate Handling and Storage Piles." November.

EPA. 2006c. Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NSR): Debottlenecking, Aggregation, and Project Netting. Proposed Rule 71 FR 54235. September 14.

EPA. 2009. AP-42: Compilation of Air Emissions Factors, Chapter 15, Section 9, "Blasting Caps, Demolition Charges, and Detonators." July.

EPA. 2015. National Ambient Air Quality Standards Table. July 3. Accessed online at https://www.epa.gov/criteria-air-pollutants/naaqs-table.

EPA. 2018. *Emission Standards Reference Guide for On-road and Nonroad Vehicle and Engines..* Available at: https://www.epa.gov/emission- standards-reference-guide/basic-information-about-emission-standards- reference-guide-road.

EQC. 2013. A Guide to the Montana Environmental Policy Act. Montana Environmental Quality Council Available at: https://www.leg.mt.gov/content/Publications/Environmental/2017-mepa-handbook-reprint.pdf [Accessed 8 November 2018].

Federal Transit Administration (FTA). 2006. Transit Noise and Vibration Impact Assessment. FTA-VA-90-1003-06.

Foster, M.A., J.T. Ensign, W.N. Davis, and D.C. Tribby. 2014. Greater Sage-Grouse in the Southeast Montana Sage Grouse Core Area. Montana Fish Wildlife and Parks (FWP) in partnership with the USDI Bureau of Land Management (BLM).

Fox, R.A. 1977. Archaeology of the Spring Creek Mine Area: Survey and Testing Phases. Report submitted to VTN Consulting Engineers, Denver, Colorado.

FWP. 2005. Management Plan and Conservation Strategies for Sage Grouse in Montana. Final. Montana Department of Fish, Wildlife and Parks. [Online] Available at: http://fwp..mt.gov/fwpDoc.html?id=31187.

FWP. 2016. *News Releases: Hunting Region 7 Pronghorn Check Station Results,* Helena, Montana: Montana Fish, Wildlife, and Parks.

FWP. 2018. 2018 Big Game Hunting Forecast. [Online] Available at: http://fwp.mt.gov/news/newsReleases/hunting/nr_2785.html.

GCM Services, Inc. 1990. 1990 Archaeology Investigation in the Spring Creek Coal Mine Area. December.

GCM Services, Inc. 1998. A Class III Cultural Resource Inventory of the Spring Creek Coal Company's Proposed Carbone Expansion Area, Big Horn County, Montana. April.

GCM Services, Inc. 2007. A Class III Cultural Resource Inventory of the Spring Creek Coal Company's Pearson Creek Permit Amendment Area, Big Horn County, Montana. June.

GCM Services, Inc. 2012. A Class III Cultural Resource Report of the Spring Creek Mine Potential Permit Boundary, Big Horn County, Montana. Prepared for Cloud Peak Energy, Spring Creek Mine, Decker, Montana.

GCM Services, Inc. 2013. Class III Cultural Resource Inventory of the LBM Tracts at the Spring Creek Mine, Big Horn County, Montana. May 10.

Great Plains Wildlife Consulting. 2018. Spring Creek Mine 2017 Wildlife Monitoring, Banner, WY: Great Plains Wildlife Consulting, Inc.

Haberman, T. 1973. 1972 Archaeological Survey in the Decker/Birney Area of Big Horn County, Southeastern Montana. Resources Development Internship Program, Western Interstate Commission for Higher Education, BLM Montana and Wyoming.

Harris, C., ed. 1998. Handbook of Acoustical Measurements and Noise Control. Acoustical Society of America, New York.

Knick, S.T., S.S. Dobkin, J.T. Rotenberry, M.A. Schroeder, W.M Vander Haegen, and C. Van Riper III. 2003. Teetering on the edge or too late? Conservation and research issues for avifauna of sagebrush habitats. Condor 105:611-634.

Loendorf, L.L, Barnett, M.V., and Larson, T.K. 1972. The Decker-Birney Archaeological Survey, Big Horn County, Montana. Univ. of North Dakota. BLM Planning Document.

LSA Associates, Inc. (LSA). 2006. Noise Impact Analysis. Sanger-Centerville Project.

Lupcho, Paul J. 1990. South Fork Expansion of the Soil Survey, Environmental Baseline, Prepared for Spring Creek Coal Mine. July.

MDT. 2019. Montana Department of Transportation Traffic Data Tab, Available at: https://www.mdt.mt.gov/publications/map-gallery.shtml. [Accessed 7/22/19].

Midwest Research Institute (MRI). 2006. Background Document for Revisions to Fin Fraction Ratios Used for AP-42 Fugitive Dust Emission Factors. November 1.

Montana Mitigation Stakeholder Team. 2018a. Montana Mitigation System Habitat Quantification Tool Technical Manual for Greater Sage-Grouse (HQT Manual). Version 1.0 – October 2018. https://sagegrouse.mt.gov/Team#meetingArchive.

Montana Mitigation Stakeholder Team. 2018b. Montana Mitigation System Policy Guidance Document for Greater Sage-Grouse. Version 1.0 – October 2018. https://sagegrouse.mt.gov/Team#meetingArchive.

Montana Natural Heritage Program and FWP. 2018. Montana Field Guide. Available at: http://fieldguide.mt.gov.

MSGOT. 2018. MSGOT Teleconference Meeting Agenda with Appendix B: Greater Sage-grouse Mitigation Plan for the Spring Creek Mine's Proposed AM5 Haul Road Project. April 26, 2018. North American Datum (NAD). 1983. Nad83 Geodetic Datum. Montana Sage Grouse Oversight Team.

Naugle, D.E., K.E. Doherty, B.L. Walker, M.J. Holloran, and H.E. Copeland. 2011. Energy development and greater sage-grouse. Pgs. 489-503 ***in*** S.T. Knick and J.W. Connelly, editors. Greater sage-grouse: Ecology and Conservation of a Landscape Species and its Habitats. Studies in Avian Biology 38. Univ. of California Press, Berkeley, CA.

Nicklin Earth & Water, Inc. 2012. Spring Creek Coal Mine Groundwater Model, 2012 Update. Bozeman, MT.

Nicklin. 2005. Spring Creek Coal Mine Groundwater Model. Earth and Water, Inc. Bozeman, MT.

Patricelli, G.L., J.L. Blickley, and S.L. Hooper. 2013. "Recommended management strategies to limit anthropogenic noise impacts on greater sage-grouse in Wyoming".

Peel, M.C., B.L. Finlayson, and T.A McMahon. 2007. "Updated world map of the Köppen-Geiger climate classification." Hydrology and Earth System Sciences, v. 11. Pp 1633-1644. October 11.

SCC and WWC Engineering. 2017. Appendix L. Probable Hydrologic Consequences Update, Decker MT and Sheridan WY.

SCC and WWE Engineering. 2008. Appendix L. Probable Hydrologic Consequences Update, Decker MT and Sheridan WY.

SCC. 1979. Spring Creek Permit Application. Submitted to the Montana Department of Environmental Quality.

Schroeder, M.A., J.R. Young, and C.E. Braun. 1999. Sage grouse (*Centrocercus urophasianus*). In Birds of North America, Inc., Philadelphia, PA.

SCM. 2000. *Mine and Reclamation Plan Section 17.24.522.* Available at: http://svc.mt.gov/deq/myCOALPublic/180/ePermitAttachment/Download/41543 [Accessed 26 October 2018].

SCM. 2001. *Mine and Reclamation Plan 521 Temporary Cessation.* Available at: http://svc.mt.gov/deq/myCOALPublic/180/ePermitAttachment/Download/41542 [Accessed 26 October 2018].

SCM. 2002. Spring Creek Mine Operating Plan Section 17.24.311 Air Pollution Control Plan. [Online] Available at: http://svc.mt.gov/deq/myCOALPublic/180/ePermitAttachment/Download/41411 [Accessed 29 August 2018].

SCM. 2011a. Section 17.24.501 General Backfilling and Grading. Available at: http://svc.mt.gov/deq/myCOALPublic/180/ePermitAttachment/Download/41440 [Accessed 22 August 2018].

SCM. 2011b. Section 17.24.726 Vegetation Measurements. Available at: http://svc.mt.gov/deq/myCOALPublic/180/ePermitAttachment/Download/41453 [Accessed 22 August 2018].

SCM. 2011c. Reclamation Plan Section 17.24.313. Available at: http://svc.mt.gov/deq/myCOALPublic/180/ePermitAttachment/Download/41658

SCM. 2011d. Enhancement of Fish, Wildlife and Related Environmental Values. November 5. Available at: http://svc.mt.gov/deq/myCOALPublic/180/ePermitAttachment/Download/41414

SCM. 2017a. Plate 15a, Dragline Cross Sections. In: SCM TR1 Revision Application. File date-August 8.

SCM. 2017b. Fish and Wildlife Plan (Revised). In: Section 17.24.312 of SCM TR1 Revision Application. November 17. http://svc.mt.gov/deq/myCOALPublic/180/ePermitAttachment/Download/41414

SCM. 2017c. 2017 Annual Mining Report. Spring Creek Coal Company LLC.

SCM. 2018a. SCM TR1 EIS socioeconon data request email communication between Gabe Johnson, Cameo Flood, Jen Lane, and Jeffrey Blend. Montana.

SCM. 2018b. TR1 EIS Numbers Summary 6-28-18. Decker, MT: Spring Creek Mine.

SCM. 2018c. *SCM Permit Reclamation Plan, MR 238 to Operating Permit C1979012. Section 17.24.313.* Available at: http://svc.mt.gov/deq/myCOALPublic/180/ePermitReclamation/ReclamationPlan [Accessed 26 October 2018].

SCM. 2019. Mine Site Information. Proposed Mineral / Surface Acreage and Reserved Tonnage. Spring Creek Mine – C1979012 – MR 238. Available online http://svc.mt.gov/deq/myCOALPublic/180/ePermitAdmin/MineSiteInformation. Accessed July 20, 2019.

SCS. 1977. Soil Survey of Big Horn County Area, Montana. In cooperation with US Department of Interior, Bureau of Indian Affairs and Montana Agricultural Experiment Station. U.S. Department of Agriculture, Soil Conservation Service. December.

Stephens, B. 2018. BNSF Tells Federal Regulators It's Ready to Handle More Traffic. Trains Industry Newsletter. March 26. Accessed September 15 2018.

Strait, J.D., Bales J. R., and Peterson L.A. 2005. Fidelity: Cultural Resource Investigations of the Pond Creek Development Area in Big Horn County, Montana.

Swenson, J.E., C.A. Simmons, and C.D. Eustace. 1987. Decrease of Sage Grouse Centrocercus Urophasianus After Ploughing of Sagebrush Steppe. Biological Conservation 41(2): 125-132.

Terra Soil Environmental Solutions, LLC. 2012. Baseline Soil Survey Spring Creek Areas A and B Expansion Area, Spring Creek Coal Mine.

USACE. 2016. Letter to Spring Creek Coal LLC. No jurisdictional wetlands, stock ponds and water impoundments are not Waters of the U.S. US Army Corps of Engineers.

USACE. 2017. Public Notice: 30-day notice for Application No. NWO-2009-00654 covering Youngs Creek Mining Company, LLC. Joint Notice of Permit Pending: Wyoming Department of Environmental Quality and Montana Department of Environmental Quality. Issued January 12, 2017. Cheyenne, Wyoming.

USDA. 2018. Web Soil Survey. September 20. Accessed September 20, 2018. https://websoilsurvey.nrcs.usda.gov/app/.

USFWS. 1989. Black-Footed Ferret Survey Guidelines. April.

USFWS. 2008. Birds of Conservation Concern. Division of Migratory Bird Management, Arlington, VA. December.

USFWS. 2017. Final Environmental Assessment Thunder Basin Grasslands Prairie Ecosystem Association Conservation Strategy. USFWS, Wyoming Ecological Services Field Office, Cheyenne, Wyoming and Cooperating Agencies: USDA, Medicine Bow - Routt National Forests; and Thunder Basin National Grassland, US DOI and Wyoming BLM. February.

Wallestad, R. O. and D. Pyrah. 1974. Movements and nesting of sage grouse hens in central Montana. The Journal of Wildlife Management. 38(4): 630-633.

Wallestad, R.O. 1971. Summer movements and habitat use by Sage Grouse broods in central Montana. Journal of Wildlife Management. 35(1): 129-136.

Wallestad, R.O. 1975. Life history and habitat requirements of Sage Grouse in central Montana. Montana Department of Fish and Game, Helena. 65 pp.

Westech Environmental Services, Inc. 2012. Baseline Vegetation Inventory. Prepared for SCM.

Western Association of Fish and Wildlife Agencies (WAFWA). 2015. Greater sage-grouse population trends: An analysis of lek count databases 1965 – 2015. Western Association of Fish and Wildlife Agencies, Cheyenne, WY.

Western Regional Climate Center. 2017. National Climate Reports. [Accessed Online]: Available at: https://www.ncdc.noaa.gov/sotc/national/201707.

APPENDIX A
TR1 GREATER SAGE GROUSE HABITAT ASSESSMENT

ENVIRONMENTAL & STATISTICAL CONSULTANTS

200 South 2nd Street, Laramie, Wyoming 82070

Phone: 307-634-1756 ◆ www.west-inc.com

TECHNICAL MEMORANDUM

Date: March 26, 2019

To: Edward Surbrugg, Tetra Tech

From: Chad LeBeau; WEST, Inc.

Subject: TR1 Greater Sage-Grouse Habitat Assessment

introduction

In 2010, the greater sage-grouse (*Centrocercus urophasianus)*; hereafter sage-grouse) were identified as a candidate for listing under the federal Endangered Species Act (ESA). As a result, the State of Montana established Executive Orders 12-2015 and 21-2015 to implement the Montana Sage-Grouse Conservation Strategy. The Executive Orders recognize existing land uses and activities established prior to the Executive Orders (e.g., January 1, 2016). The Spring Creek Mine (SCM) applied for the proposed Major Revision TR1 project (TR1) on March 2, 2012, exempting it from stipulations identified within the Executive Orders and consultation through the regulatory framework. However, Montana Department of Environmental Quality (DEQ) identified potential significant impacts to sage-grouse as defined in the Montana Environmental Policy Act (MEPA) as a result of the proposed development of TR1.

This technical memo quantifies the amount of sage-grouse habitat likely to be affected by direct and secondary impacts associated with SCM's proposed TR1 and identifies mitigation approaches to offset those potential impacts. This habitat evaluation includes and integrates the implemented recovery and replacement measures of the Habitat Recovery and Replacement Plan (HRRP) stipulated by the Bureau of Land Management (BLM) for the development of the TR1 as described below. In addition, this evaluation considers the conservation measures implemented through the Thunder Basin Grasslands Prairie Ecosystem Association Candidate Conservation Agreement with Assurances (CCAA) as the measures related to the TR1 development. A functional acre approach was used to quantify the potential impacts associated with TR1 while integrating the HRRP stipulations and conservation measures employed through the CCAA.

Background

The SCM is in Big Horn County, Montana and has been in operation since 1979. Currently, the approved permit boundary of the mine encompasses 9,220 acres. In 2012, SCM submitted the TR1 Major Revision application to DEQ to add 977 acres of additional disturbance within the

existing permit boundary. TR1 would extend the life of the mine from 2022 to 2027 and increase the disturbance area from 6,085 to 7,062 acres.

TR1 occurs within the range of sage-grouse and the proposed TR1 mining activities are expected to impact sage-grouse habitat. There are three separate mitigation or conservation plans associated with development of the TR1 lease. The HRRP stipulations are directly tied to the coal lease and development of the TR1. The CCAA is part of a larger conservation strategy associated with impacts to sage-grouse from SCM and other anthropogenic activities in the area. At the request of DEQ, SCM also submitted a Species of Special Interest Monitoring and Management Plan (SOSI Plan) to provide broad, long-term direction for management of wildlife species of special interest that occur within the SCM wildlife monitoring area.

Habitat Recovery and Replacement Plan

In 2008, SCM applied to the BLM for a coal lease modification (MTM-069782) and an application to amend Land Use Lease MTM-74913. In 2010, the BLM completed an Environmental Assessment (EA) that analyzed the environmental impacts of modifying the existing leases to include a tract of Federal coal reserves within SCM's permit boundary and issued a Finding of No Significant Impact (FONSI; BLM 2010). As part of the environmental review, a HRRP was developed between SCM and the BLM, in consultation with Montana Fish, Wildlife, and Parks (FWP) and DEQ, to mitigate the loss of sage-grouse and other wildlife habitats within the disturbance areas. The HRRP stipulations for mitigation were incorporated into the coal lease and Land Use Lease amendment making the HRRP a requirement of the TR1 lease (BLM 2010).

According to SCM, the mitigation plan outlined in the HRRP has been implemented to the extent possible within the SCM permit area and surrounding lands owned by the mine (Table 1). Monetary compensation into the Landowner Incentive Program (LIP) is one mitigation measure that has not been fulfilled.

Table 1. Spring Creek Mine Habitat Recovery and Replacement Plan (HRRP) commitment list for amending land use lease MTM-74913 & LBM MTM-0698782 from EA# MT-DOI-BLMMT-020-2010-29.

Project	Implementation Date	Status
Continue to investigate several methods of sagebrush establishment	2009 to 2013	Completed
Enhance existing reclamation with sagebrush interseeding	2009 to 2016	Completed
Removing Pastureland Seeding from Reclamation Plan	August 2008	Completed
Revise Reclamation Plan to balance land use types such as Pastureland	June 2011	Completed
Get MDEQ approval to use sagebrush grassland or other new seed mixes	August 2008	Completed
Fund $12/acre for LIP program for land to be disturbed by mining in LBM area.	At the time funds are needed	LIP program status unknown
Provide FWP with a list of landowners who have expressed an interest in participating in conservation programs	SCM provided list to BLM	LIP program no longer exists

Table 1. Spring Creek Mine Habitat Recovery and Replacement Plan (HRRP) commitment list for amending land use lease MTM-74913 & LBM MTM-0698782 from EA# MT-DOI-BLMMT-020-2010-29.

Project	Implementation Date	Status
Provide Mechanical Manipulation Study Plan to FWP, & BLM areas inside and possibly outside the LBM area.	Spring 2013	Ongoing and will be completed 2019
SCM will consult with agencies to see if there is any benefit to removing existing fencing in Sections 6 & 31	Spring 2013	Completed
Any new fencing will be constructed with a wildlife friendly design	Summer 2012	Completed
Evaluate during next grazing agreement renewal (annually) in Sections 6 & 31 to ensure sage-grouse habitat is protected.	Spring 2009 to 2012	Completed
Final habitat recovery will be achieved during Phase IV bond release of current mining and the LBM area	Reclamation Commitments in TR1 Major Permit Revision	Completed
Continue to treat water in ponds and stored tires with mosquito larvicide	Annually	Ongoing
Additional winter/spring wildlife monitoring plan for 2008	Spring 2008	Completed

Candidate Conservation Agreement with Assurances

In addition to the HRRP, SCM and its parent company, Cloud Peak Energy Resources LLC(CPE), entered into a voluntary 30-year conservation plan called the Thunder Basin National Grassland CCAA in 2017 to implement a landscape-scale conservation strategy intended to achieve durable conservation benefit for the sage-grouse population affected by the SCM, Decker Mines, and other anthropogenic-related activities (U.S. Fish and Wildlife Service [USFWS] 2017). The conservation strategy was developed as a collaborative effort among the USFWS, BLM, and U.S. Forest Service, along with multiple other state, federal, and non-governmental partners in the region to provide regulatory relief from potential take violations under the ESA in exchange for implementing the voluntary actions (Montana Sage Grouse Oversight Team [MSGOT] 2018). These conservation measures are being implemented by SCM in the CCAA area and are outlined in the Final EA (USFWS 2017) and the Certificate of Inclusion and Certificate of Participation (CI/CP 2016).

Examples of voluntary conservation measures to which SCM is currently committed include focused conifer removal to enhance sagebrush-steppe habitats; cheatgrass treatment; additional sagebrush and forb reclamation efforts; road closures and reclamation; protection of sagebrush habitats known to support targeted species; use of conservation easements to protect certain habitats of special value; and protection of green areas that could serve as important foraging habitat for sage-grouse broods and other species (CI/CP 2016).

Species of Special Interest Monitoring and Management Plan

In addition to the HRRP and CCAA, DEQ requested that SCM develop a general management plan as part of the MSUMRA permitting process. SCM developed the SOSI Plan with feedback from DEQ and the USFWS. The SOSI Plan ensures all entities involved in the leasing, permitting,

and mining of coal comply with applicable federal and state statutes, regulations, and other directives regarding species of interest. The SOSI Plan reiterates and expands upon information found in the TR1 application. The intent of the SOSI Plan is to provide broad, long-term direction for:

1. Monitoring populations of species of special interest within the SCM wildlife monitoring area;
2. Avoiding, minimizing, or compensating for potential impacts to these species due to mine operations; and
3. Maintaining, enhancing, and/or reclaiming habitats upon which such species depend (SOSI 2017).

Methods

There are different methods used for quantifying the extent of direct and secondary impacts to sage-grouse habitat from anthropogenic activities. For example, a physical acre approach was used for the SCM AM5 EIS to quantify impacts to sage-grouse habitat (DEQ 2018). However, the physical acre approach does not incorporate secondary impacts associated with a proposed development, nor does it place the proposed development in context with the surrounding landscape.

Following the issuance of Executive Orders 12-2015 and 21-2015, the Montana Sage Grouse Habitat Conservation Program (MSGHCP) developed a Habitat Quantification Tool (HQT) to quantify the gains and/or losses of sage-grouse habitat caused by anthropogenic activities (MMP 2018). This method incorporates species population and habitat variables that are descriptive of seasonal sage-grouse habitats. It also incorporates direct and secondary impacts of anthropogenic features. Collectively, these landscape characteristics can be used to evaluate changes in habitat function.

Pursuant to MEPA, DEQ consulted with the MSGHCP on October 2, 2018. The MSGHCP recognized that TR1 was outside the requirements of Executive Orders 12-2015 and 21-2015 and that applicant consultation was not required (personal communication J. Lane 2018). However, DEQ determined using a functional habitat quantification methodology similar to the HQT for the TR1 EIS impacts analysis would more accurately reflect changes in habitat function within TR1 and surrounding landscape where the various conservation plans have been implemented than the physical acre approach. Therefore, a functional acre assessment was used to estimate the direct and secondary impacts associated with TR1 and to evaluate the impacts relative to the surrounding landscape, which incorporated the mitigation and conservation activities associated with the HRRP, CCAA, and SOSI.

Baseline habitat conditions were first evaluated for the TR1 area using a two-mile buffer to include both direct and secondary impacts associated with mine activity; the extent of secondary impacts associated with mining activities is assumed to be two miles (HQT 2018). Changes in habitat function were evaluated for the area that included areas with implemented HRRP stipulations and areas in the CCAA.

Habitat function was assessed within 7.5 m x 7.5 m grid cells. Numerous variables were calculated at each grid cell to evaluate habitat function and categorized into population and habitat variables and anthropogenic variables (Table 2). These variables were selected based on best available science and followed Montana's HQT definitions (see HQT 2018). The distance to lek variable was calculated to confirmed active leks identified during SCM wildlife monitoring (GPWC 2018). In addition, juniper percent cover was calculated as the density within a 1.0 km radius because sage-grouse likely avoid areas with higher densities of junipers (Wyoming HQT 2015). All other variables were calculated in the same manner as presented in Montana's HQT (HQT 2018).

Population and habitat variables at each grid cell were given functional scores (ranging from 0–1) based on their perceived habitat function (Table 2). The functional scores for each population and habitat variable were averaged to give each cell a total habitat functional score (ranging 0–1, with higher scores indicating higher-quality habitat). Similarly, anthropogenic variables were given functional scores (ranging from 0–1) and combined using multiplication to give each cell a total anthropogenic score (ranging 0–1, with higher scores indicating higher-quality habitat). The total habitat score and total anthropogenic score at each cell were multiplied to quantify the baseline functional habitat prior to the addition of the TR1 disturbance to the landscape (Table 2, HQT 2018). This procedure produced a score of 0 to 1 for each grid cell. These scores were then averaged to produce the baseline functional habitat score. The baseline functional habitat score was then multiplied by the number of acres within TR1 and the two-mile buffer to produce a quantifiable functional acre score.

The habitat function associated with the development of TR1 was evaluated after the baseline habitat functional score calculation. The modification of habitat associated with TR1 adjusts the baseline functional habitat score to represent habitat conditions post development of TR1. Post-development assumes mining activity would occur in TR1 and habitat directly associated with TR1 would be removed as mining progresses. According to the TR1 application, reclamation of TR1 is expected to begin between 2020 and 2024 and continue through the end of Phase IV (i.e., Final Reclamation) bond release. Final bond release (Phase IV bond release) occurs when conditions specified in MSUMRA and its implementing rules have been met, as specified by ARM 17.24.1116(d). However, the habitat disturbed by TR1 is expected to be restored to the extent that it would support sage-grouse when Phase III bond release is achieved (*see* ARM 17.24.1116(c)). The scoring calculation also assumes reclamation activities will not support sage-grouse until the reclaimed areas have matured and are eligible for Phase III bond release. The conditions required for Phase III bond release are listed in ARM 17.24.1116(c) and include a minimum responsibility period of 10 growing seasons after seeding, as specified by ARM 17.24.725(2). The difference between the baseline functional habitat score and the post-development functional habitat score provides an estimate of the functional acres lost due to the proposed TR1 mining and reclamation activities.

One functional acre lost is equivalent to one mitigation debit. Montana Mitigation System Policy Document for Greater Sage-Grouse (MMP 2018) applies different multipliers to the mitigation debits to calculate total compensatory mitigation obligation. Compensatory mitigation is defined as actions that provide compensation for unavoidable adverse impacts to species or their habitats

and when taken in advance of the impact through activities that preserve, enhance, restore, and/or establish habitat (MMP 2018). There are different options to fulfill compensatory mitigation obligations through the MMP, including permittee-responsible actions, which include conservation easements or land restoration. Another option is financial contributions to the MSGHCP Stewardship Fund (MMP 2018).

The multipliers identified in the MMP were used to calculate the compensatory mitigation obligation of the development of TR1 (MMP 2018). A 10% multiplier was used to ensure there is no net loss to habitat and a 20% multiplier was used to account for credits lost due to unforeseen events. The cumulative 30% multiplier (i.e., 1.3) was applied to the mitigation debits to calculate the total compensatory obligation. An additional 10% multiplier can be applied if compensatory mitigation is achieved through payments to Montana's Stewardship Fund (MMP 2018).

Table 2. General description of population, habitat, and anthropogenic variables used to assess changes in functional habitat associated with TR1. All variables except distance to active leks and percent juniper cover were adapted from the Montana HQT (HQT 2018).

Population and Habitat Variables	
Variable	**Description**
Distance to Lek	Distance to active leks (GPWC 2018)
Breeding density	Relative breeding densities, using leks as a focal point
Distance to upland	Distance from mesic habitats to suitable upland habitat
Unsuitable lands	Lands that do not provide GRSG habitat
Sagebrush abundance	Proportion of sagebrush habitat within a 1.0-km radius
Sagebrush percent cover	Percent sagebrush cover
Sagebrush height classes	Sagebrush Height (cm)
Juniper percent cover	Percent juniper cover within a 1.0-km radius, adapted from Wyoming HQT (2015).
Anthropogenic Variables	
Variable	**Description**
Oil and gas well density	Number of well pads within 1.0-km
Distance to tall structure	Distance to tall structures such as communication and weather towers
Distance to transmission	Distance to above-ground linear features such as transmission lines and associated structures
Wind facilities	Percent disturbance due to wind energy infrastructure
Distance to Moderate Roads and Railways	Distance to nearest moderate road or railway
Distance to Pipelines	Distance to nearest pipeline, fiber optic cable, or other buried utility
Agriculture, mine, and other large-scale land conversion activities[1]	Direct footprint and density (%) of land conversion due to agriculture, mining within a 3.2-km radius.
Distance to major roads	Distance to nearest major road
Compressor stations and other noises	Distance to nearest noise producing disturbance
All other disturbances	Disturbance not included above.

Table 2. General description of population, habitat, and anthropogenic variables used to assess changes in functional habitat associated with TR1. All variables except distance to active leks and percent juniper cover were adapted from the Montana HQT (HQT 2018).

[1]The currently permitted disturbance at Spring Creek Mine was included in this category as existing disturbance because the currently permitted disturbance would occur with or without the approval of TR1. The aim of this assessment was to evaluate the effects of TR1.

Results

The total number of acres within the TR1 area and the two-mile buffer was 28,220 acres. The average baseline habitat function score for this area was 0.1733, resulting in a score of 4,891 functional acres (Table 3, Figure 1). The addition of TR1 mining to the landscape reduced habitat function within TR1 and the two-mile buffer to an average score of 0.1515, resulting in a score of 4,275 functional acres (Table 3; Figure 2). The reduction in habitat function for the TR1 evaluation area resulted in a loss of 615 functional acres (e.g., debits).

Table 3. Summary of Functional Acres

Project	Period	Acres within Two Miles of TR1	Average Habitat Function Score	Functional Acres
TR1	Pre-development (Baseline, 2019 projected)	28,220	0.1733	4,891
	Post-development (Phase IV, 2034 projected)		0.1515	4,275
			Difference	615

Application of the 10% multiplier to ensure no net loss and the 20% multiplier to account for credits lost due to unforeseen events (i.e., 30% multiplier) to the 615 mitigation debits results in a total of 800 debits in compensatory obligation. If the additional 10% Steward Fund multiplier is applied, the total debits associated with TR1 would equal 861 debits (Table 4). Following the MMP, a total of 13,019 net debits (debits minus credits) would result from the TR1 development and reclamation activities (Table 5).

Table 4. Calculation of Total Compensatory Mitigation Obligation.

Project	Functional Acres	No Net Loss Multiplier	Unforeseen Events Multiplier	Contribution to the Stewardship Fund Multiplier	Total Compensatory Mitigation Obligation
TR1	615	10%	20%	-	800
	615	10%	20%	10%	861

Note: cost per debit decreases over time because the MSGOT policy guidance was followed. MSGOT applies a present value discount of 3% to the price of a credit applied to offset debits in future years when developers make a financial contribution to the Stewardship Account or purchase credits in the current year.

Table 5. Scheduled Debits, Credits, and Net Debits and Cost per Debit for TR1 Activities (assumes $13.00 per debit following the Montana Mitigation System Policy Document for Greater Sage-Grouse)

Activity	Year	Debits from Disturbance	Credits from Reclamation	Net Debits (Debits – Credits)	Cost per Debit ($)	Total Debit Cost ($)
First Area Reclaimed	2020	138	0	138	13.00	11,193
	2021	208	0	208	12.61	10,857
	2022	287	0	287	12.22	10,521
	2023	342	0	342	11.83	10,186
	2024	404	0	404	11.44	9,850
Second Area Reclaimed	2025	480	0	480	11.05	9,514
	2026	554	0	554	10.66	9,178
	2027	620	0	620	10.27	8,842
	2028	690	0	690	9.88	8,507
	2029	730	0	730	9.49	8,171
Third Area Reclaimed & 100% Disturbed	2030	764	13	752	9.10	7,835
	2031	764	13	752	8.71	7,499
	2032	797	20	777	8.32	7,164
	2033	797	22	775	7.93	6,828
	2034	861	77	784	7.54	6,492
Waiting for 10-Year Maturity	2035	861	91	770	7.15	5,479
	2036	861	104	757	6.76	4,540
	2037	861	177	684	6.37	3,675
	2038	861	212	649	5.98	2,883
	2039	861	471	390	5.59	2,166
	2040	861	471	390	5.20	1,612
	2041	861	471	390	4.81	1,118
	2042	861	485	376	4.42	685
	2043	861	540	321	4.03	312
	2044	861	861	0	3.64	-
				13,019		**107,727**

Discussion

If approved, the development of TR1 mining is expected to reduce sage-grouse habitat function within TR1 and the two-mile buffer of TR1. A portion of the analysis area overlaps the CCAA conservation area and areas where HRRP and SOSI stipulations have been implemented. It is possible that TR1 mining would reduce the effectiveness of these conservation measures in this area.

Recommendation

Future conservation actions associated with the HRRP and CCAA should be implemented beyond the two-mile buffer area of direct and secondary impacts associated with TR1 to maximize their effectiveness at offsetting and minimizing TR1 related impacts. The HRRP, CCAA, and SOSI plans define multiple required and voluntary habitat protection, restoration, and enhancement efforts; timely postmining habitat reclamation efforts; and targeted conservation measures to implement in suitable habitats both on and off the SCM property. However, based on the functional acre approach, an estimated 861 debits are associated with the development of TR1. Protecting sage-grouse habitats equal to either 800 or 861 credits from further habitat degradation for the duration of the TR1 impacts and Phase IV reclamation would offset the impacts and be consistent with the MMP assuming the credits are calculated using the habitat functional assessment developed for TR1 (MMP 2018).

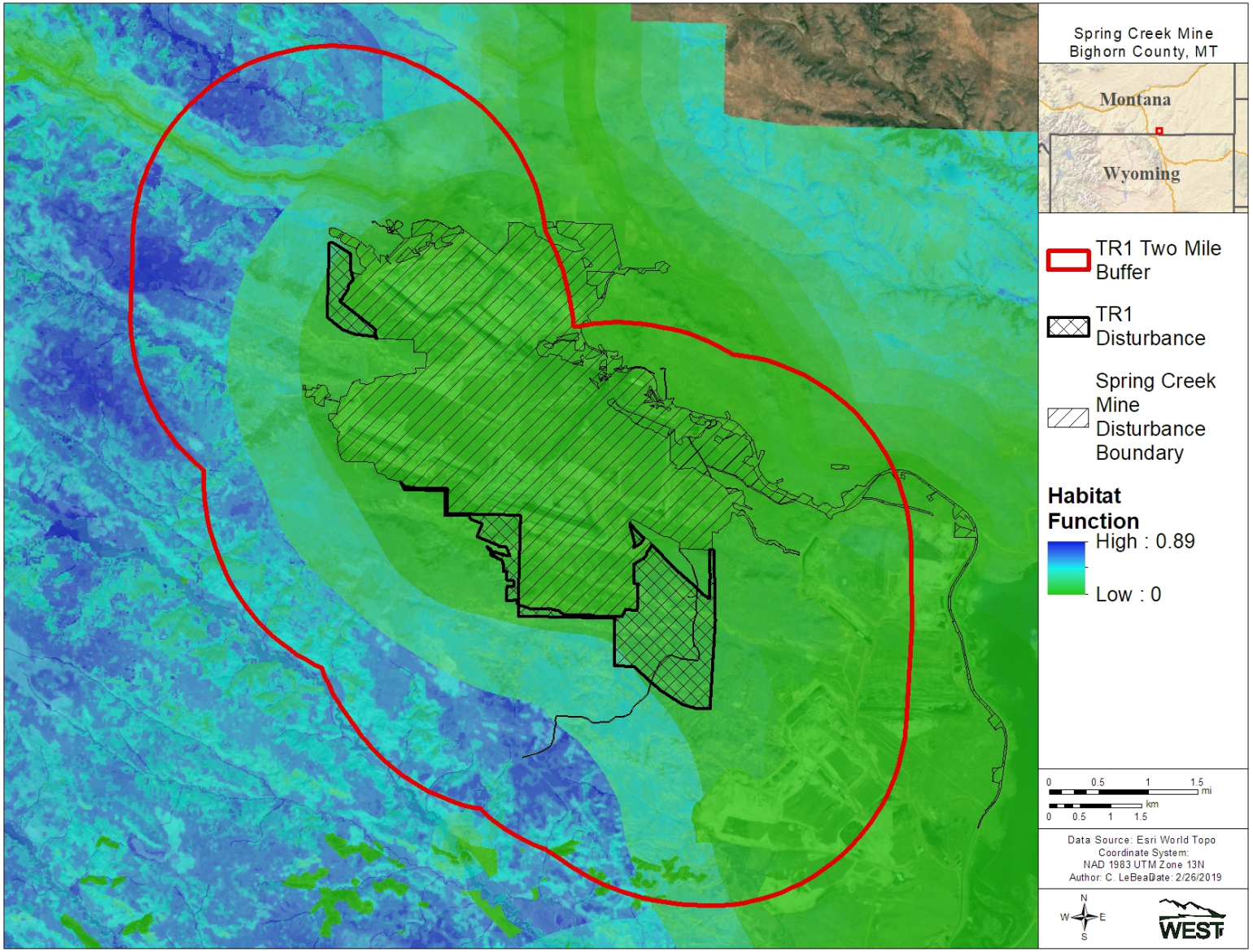


Figure 1. Baseline habitat function scores within the TR1 disturbance area and CCAA (Year 2019 projected)

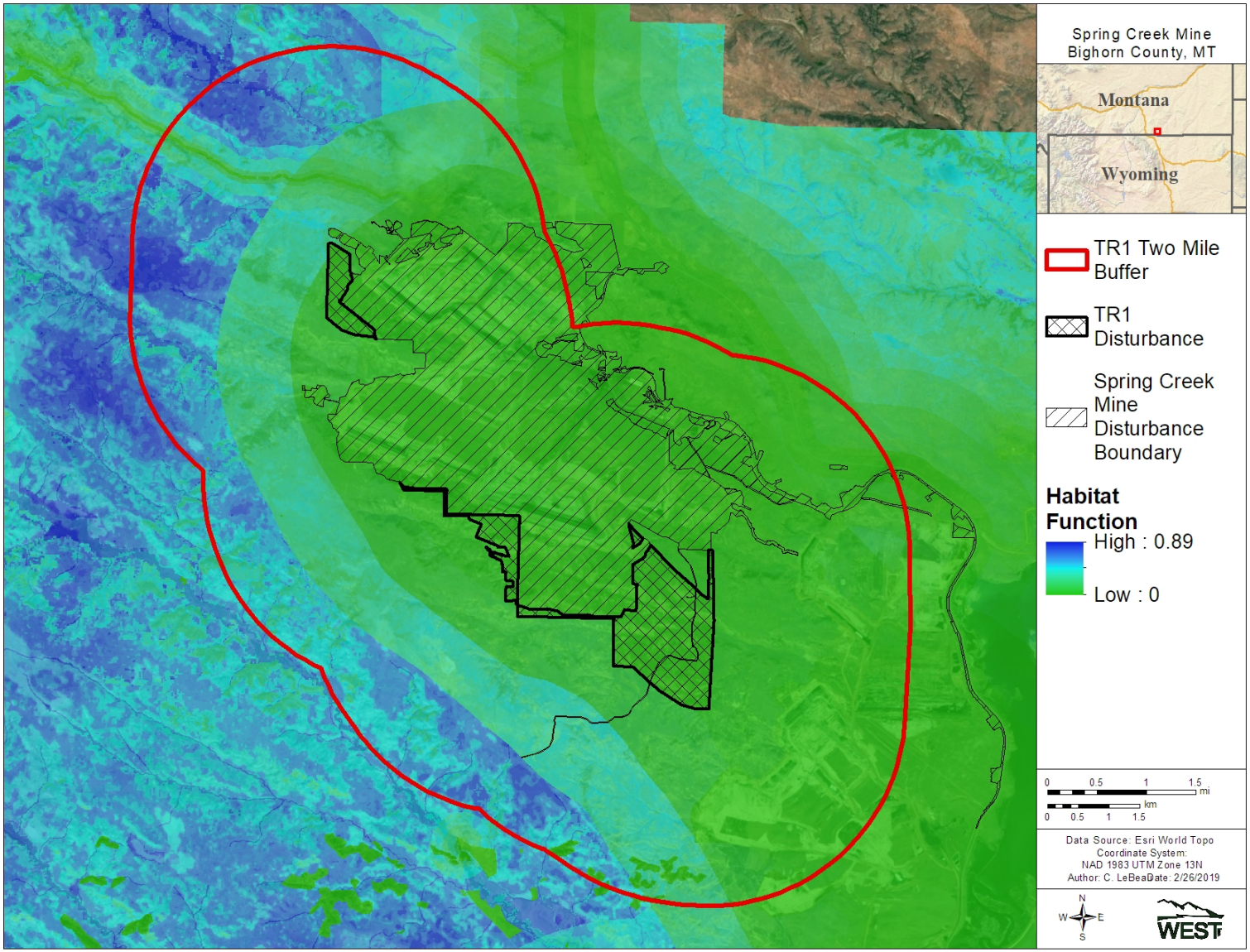


Figure 2. Post-development habitat function scores within the TR1 disturbance and the CCAA (Year 2034 projected)

Literature Cited

Bureau of Land Management (BLM). 2010. Environmental Assessment for Spring Creek Coal Lease Modification MTM-069782 and Amendment to Land Use Lease MTM-74913 EA# MT-DOI-BLM-MT-020-2010-29. US Department of the Interior, BLM, Miles City Field Office. April 20110.

Certificate of Inclusion and Participation (CI/CP). 2016. Application for Spring Creek Coal LLC and Youngs Creek Mining Company, LLC. October 23.

ESRI. 2019. World Imagery and Aerial Photos. ArcGIS Resource Center. Environmental Systems Research Institute (ESRI), producers of ArcGIS software. Redlands, California. Information online: http://www.arcgis.com/home/webmap/viewer.html?useExisting=1

Great Plains Wildlife Consulting, Inc. (GPWC) 2018. Spring Creek Mine 2017 Wildlife Monitoring. Prepared for Cloud Peak Energy Resources LLC, Decker, Montana. Prepared by Great Plains Wildlife Consulting, Inc., Banner, Wyoming. March 2018

Montana Department of Environmental Quality (DEQ). 2018. Draft Environmental Impact Statement for the Proposed Addition of a Haul Road to the Spring Creek Mine. Spring Creek Mine, Cloud Peak Energy, Big Horn County, Montana. June 2018.

Montana Mitigation Stakeholder Team (HQT). 2018. Montana Mitigation System Habitat Quantification Tool Technical Manual for Greater Sage-Grouse (HQT Manual). Version 1.0 – October 2018. https://sagegrouse.mt.gov/Team#meetingArchive

Montana Mitigation Stakeholder Team (MMP). 2018. Montana Mitigation System Policy Guidance Document for Greater Sage-Grouse. Version 1.0 – October 2018. https://sagegrouse.mt.gov/Team#meetingArchive

Montana Sage Grouse Oversight Team (MSGOT). 2018. MSGOT Teleconference Meeting Agenda with Appendix B: Greater Sage-grouse Mitigation Plan for the Spring Creek Mine's Proposed AM5 Haul Road Project. April 26, 2018. North American Datum (NAD). 1983. Nad83 Geodetic Datum.

Office of Surface Mining Reclamation and Enforcement (OSMRE). 2016. Environmental Assessment, Spring Creek Mine, Big Horn County, Montana, Mining Plan Modification for Federal Coal Lease MTM-944378. September 2016.

Spring Creek Coal LLC. 2017. Species of Special Interest (SOSI) Monitoring and Management Plan. Submitted to: U.S. Fish and Wildlife Service Region 6, Montana Fish, Wildlife & Parks, and Montana Department of Environmental Quality. June 14.

US Fish and Wildlife Service (USFWS). 2017. Final Environmental Assessment Thunder Basin Grasslands Prairie Ecosystem Association Conservation Strategy. USFWS, Wyoming Ecological Services Field Office, Cheyenne, Wyoming and Cooperating Agencies: US Department of Agriculture, Medicine Bow - Routt National Forests and Thunder Basin National Grassland, US Department of the Interior and Wyoming Bureau of Land Management. February 2017.

Wyoming HQT. Greater sage-grouse habitat quantification tool: a multi-scaled approach for assessing impacts and benefits to greater sage-grouse habitat. 2015. Scientific Methods Document, Version 3. http://www.wyomingconservationexchange.org/wp-content/uploads/2014/08/WY_Sage_Grouse_HQT_May01_2015.pdf