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Forest Service
U.S. DEPARTMENT OF AGRICULTURE
Bureau of Land Management
U.S. DEPARTMENT OF THE INTERIOR
DOI–BLM–UT–G020–2021–0046–EIS
August 2025

Skyline Mine Little Eccles Lease by Application and Flat Canyon Lease Modification Application

Environmental Impact Statement

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Skyline Mine Little Eccles Lease by Application and Flat Canyon Lease Modification Application
Environmental Impact Statement
Sanpete, Carbon, and Emery Counties, Utah

Co–Lead Agencies:	**United States Department of Interior Bureau of Land Management and United States Department of Agriculture Forest Service**
Cooperating Agencies:	**United States Environmental Protection Agency; United States Department of the Interior Office of Surface Mining, Reclamation and Enforcement; and Utah Division of Oil, Gas, and Mining**
Responsible Official:	**Kristin Sleeper, Acting Under Secretary of Natural Resources and the Environment, Department of Agriculture** **U.S. Department of Agriculture** **1400 Independence Avenue, S.W. Washington, DC 20250** **Adam G. Suess, Acting Assistant Secretary for Land and Minerals Management** **1849 C Street NW, Washington DC 20240**

Abstract: This Environmental Impact Statement has been prepared by the Bureau of Land Management Price Field Office and United States Department of Agriculture (USDA), Forest Service, Manti–La Sal National Forest(at the direction of the USDA Acting Under Secretary, Natural Resources and Environment), in cooperation with the Office of Surface Mining Reclamation and Enforcement Western Region Office, Environmental Protection Agency, and the Utah Division of Oil, Gas, and Mining to disclose the potential environmental impacts of leasing the Little Eccles Federal Coal Lease Tract (UTU–92226) and modifying the Flat Canyon Federal Coal Lease Tract (UTU–77114) at the Skyline Mine. This underground coal mine is operated by Canyon Fuel Company, LLC. Four alternatives are considered as follows: (1) Alternative 1: No Action, (2) Alternative 2: Modify the Flat Canyon Tract and Lease the Little Eccles Tract, (3) Alternative 3: Only Modify the Flat Canyon Tract, and (4) Alternative 4: Only Lease the Little Eccles Tract. The agencies' preferred alternative is Alternative 2: Modify the Flat Canyon Tract and Lease the Little Eccles Tract. This alternative was chosen because it would strengthen national energy security, support Utah's economy, and best meet Maximum Economic Recovery as defined at 43 Code of Federal Regulations 3484.1(b)(1) and as a result best responds to the National Energy Emergency as declared in Executive Order issued January 20, 2025.

A 45–day public scoping period was held from April 15, 2024, to May 30, 2024. In response to external and internal scoping, and to conform with commitments made in a settlement agreement, issues related to eight resources are analyzed in detail: air quality, greenhouse gas

emissions, geology, hydrology, vegetation and botany, wildlife (terrestrial and aquatic species), and socioeconomics.

For Information Contact: **Erika Tobin, Green River District Mining Engineer**

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Utah State Office
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In Reply Refer To:
DOI–BLM–UT–G020–2021–0046–EIS

Dear Reader:

Enclosed for your review is the Environmental Impact Statement (EIS) for the Skyline Mine Little Eccles Lease by Application and Flat Canyon Lease Modification Application. The EIS was prepared by the United States Department of the Interior (USDOI) Bureau of Land Management (BLM) and United States Department of Agriculture (USDA), Forest Service (FS), at the direction of the USDA Acting Under Secretary, Natural Resources and Environment, in cooperation with the Office of Surface Mining Reclamation and Enforcement (OSMRE)Western Region Office; United States Environmental Protection Agency; and the Utah Division of Oil, Gas, and Mining (UDOGM). This EIS analyzes the potential environmental impacts of leasing the Little Eccles Federal Coal Lease Tract (UTU–92226) and modifying the Flat Canyon Federal Coal Lease Tract (UTU–77114) (proposed action). The Skyline Mine, operated by Canyon Fuel Company, LLC (CFC), is an underground coal mine on the Wasatch Plateau of central Utah that uses longwall mining methods. CFC has operated the Skyline Mine since 1981 under UDOGM Permit C0070005. The Skyline Mine is located approximately 5 miles southwest of Scofield, Utah. The surface portal and related facilities are in Eccles Canyon along State Highway 264. At the Skyline mine, CFC has already mined 119 million tons of coal on seven federal leases totaling approximately 12,000 acres and on two private leases totaling 634 acres. CFC is currently mining the Flat Canyon Federal Coal Lease Tract (UTU–77114).

I, the undersigned, certify that the BLM has considered the factors mandated by NEPA; that the EIS represents the BLM's good–faith effort to prioritize documentation of the most important considerations required by the statute within the congressionally mandated page limits for extraordinarily complex EIS; that this prioritization reflects the BLM's expert judgment; and that any considerations addressed briefly or left unaddressed were, in the BLM's judgment, comparatively unimportant or frivolous.

I have determined that this EIS is of extraordinary complexity due to:

- There are multiple agencies involved in the preparation and analysis in this EIS. The BLM and FS are the co–leads of the EIS, responsible for the sub–surface (BLM) and surface resources (FS) effects analysis.

- There are an additional three cooperating agencies, including OSMRE, which was heavily involved in the development of this EIS so that it can expedite its review of the mining plan, should the leases be approved.

- The EIS was prepared under shifting regulatory frameworks including a change in NEPA regulations, issuance of department level NEPA procedures for both USDOI and USDA, and new direction given in the One Big Beautiful Bill that greatly shortened the timeframe.

- There are also specific requirements as a result of the settlement agreement that added complexity to the analysis.

I, the undersigned, certify that the EIS represents the BLM's good–faith effort to fulfill NEPA's requirements within the Congressional timeline; that such effort is substantially complete; and that, in the BLM's expert opinion, it has thoroughly considered the factors mandated by NEPA; and that, in the BLM's judgment, the analysis contained therein is adequate to inform and reasonably explain the BLM's decision regarding the proposed Federal action.

The EIS is available on the project website at: https://eplanning.blm.gov/eplanning–ui/project/2015277/510.

Thank you for your interest in the Skyline EIS. I appreciate the information you contributed to the process.

Sincerely,

ELIJAH WATERS

Digitally signed by ELIJAH WATERS
Date: 2025.07.31 09:14:15 -06'00'

Elijah Waters, District Manager

United States Department of Agriculture
Forest Service
Intermountain Region
334 25th Street
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Dear Reader:

Enclosed for your review is the Environmental Impact Statement (EIS) for the Skyline Mine Little Eccles Lease by Application and Flat Canyon Lease Modification Application. The EIS was prepared by the United States Department of the Interior (USDOI) Bureau of Land Management (BLM) and United States Department of Agriculture (USDA) Forest Service (FS), at the Direction of the USDA Acting Under Secretary, Natural Resources and Environment, in cooperation with the Office of Surface Mining Reclamation and Enforcement (OSMRE) Western Region Office; United States Environmental Protection Agency; and the Utah Division of Oil, Gas, and Mining (UDOGM). This EIS analyzes the potential environmental impacts of leasing the Little Eccles Federal Coal Lease Tract (UTU–92226) and modifying the Flat Canyon Federal Coal Lease Tract (UTU–77114) (proposed action). The Skyline Mine, operated by Canyon Fuel Company, LLC (CFC), is an underground coal mine on the Wasatch Plateau of central Utah that uses longwall mining methods. CFC has operated the Skyline Mine since 1981 under UDOGM Permit C0070005. The Skyline Mine is located approximately 5 miles southwest of Scofield, Utah. The surface portal and related facilities are in Eccles Canyon along State Highway 264. CFC has already mined 119 million tons of coal on seven federal leases totaling approximately 12,000 acres and on two private leases totaling 634 acres. CFC is currently mining the Flat Canyon Federal Coal Lease Tract (UTU–77114). The EIS is available on the project website at: https://eplanning.blm.gov/eplanning–ui/project/2015277/510.

USDA Certifications. I, the undersigned, affirm that the USDA Forest Service has coordinated with the USDA Acting Under Secretary of Natural Resources and Environment who has certified that the agency has considered the factors mandated by NEPA; that the EIS represents the agency's good–faith effort to prioritize documentation of the substantive issues and most important considerations required by the Act within the Congressionally mandated page limits and deadlines for an extraordinarily complex EIS**;** that this prioritization reflects the agency's expert judgment; and that any issues or considerations addressed briefly or left unaddressed were, in the agency's judgment, comparatively not of a substantive nature.

USDA FS Certification Related to Deadlines. I, the undersigned, certify that the EIS represents the USDA FS's good–faith effort to fulfill NEPA's requirements within the Congressional timeline; that such effort is substantially complete; and that, in the USDA FS's expert opinion, it has thoroughly considered the factors mandated by NEPA; and that, in the USDA FS's judgment, the analysis contained therein is adequate to inform and reasonably explain the USDA FS's decision regarding the proposed Federal action.

Thank you for your interest in the Skyline EIS. We appreciate the information you contributed to the process.

Sincerely,

Digitally signed by BARBARA VAN ALSTINE
Date: 2025.07.31 08:54:11 -06'00'

Barbara Van Alstine

Summary

Introduction

This Environmental Impact Statement (EIS) has been prepared by the United States Department of the Interior (USDOI) Bureau of Land Management (BLM) Price Field Office (PFO) and United States Department of Agriculture (USDA) Forest Service (FS) Manti–La Sal National Forest (at the direction of the USDA Acting Under Secretary, Natural Resources and Environment), in cooperation with the USDOI Office of Surface Mining Reclamation and Enforcement (OSMRE) Western Region Office, United States Environmental Protection Agency, and the Utah Division of Oil, Gas, and Mining (UDOGM) to disclose the potential environmental impacts of leasing the Little Eccles Federal Coal Lease Tract (UTU–92226) (Lease by Application [LBA]) and modifying the Flat Canyon Federal Coal Lease Tract (UTU–77114) (Lease Modification Application [LMA]) at the Skyline Mine (proposed action).

The Skyline Mine, operated by Canyon Fuel Company, LLC (CFC) is an underground coal mine on the Wasatch Plateau of central Utah that uses longwall mining methods. CFC has operated the Skyline Mine since 1981 under UDOGM Permit C0070005. The Skyline Mine is located approximately 5 miles southwest of Scofield, Utah. The surface portal and related facilities are in Eccles Canyon along State Highway 264. CFC has already mined 119 million tons of coal on seven federal leases at the Skyline mine, totaling approximately 12,000 acres and on two private leases totaling 634 acres. CFC is currently mining the Flat Canyon Federal Coal Lease Tract (UTU–77114) and is the applicant for this proposed action.

Purpose and Need for Action

The purpose of the BLM and FS actions is to respond to:

The LBA proposed by CFC for the Little Eccles Federal Coal Lease Tract (UTU–92226) to competitively lease up to 120 acres, containing approximately 858,000 or 1,025,000 tons of recoverable coal, depending on alternative and

The LMA proposed by CFC for the existing Flat Canyon Federal Coal Lease Tract (UTU–77114) to increase the tract acreage by 660 acres, adding approximately 2,095,000 tons of contiguous recoverable coal.

The need for the BLM action is established by the Mineral Leasing Act of 1920, as amended, sections 2 and 3 (30 United States Code [USC] 201 and 203) and its implementing regulations (43 Code of Federal Regulations [CFR] 3432 and 3425), as amended by the Federal Coal Leasing Amendments Act of 1976, and Federal Land Policy and Management Act (FLPMA) of 1976 Section 102 (43 USC 1701), as amended. As stated, "public lands shall be managed in a manner that recognizes the nation's need for domestic sources of minerals (43 USC 1701(a)(12))."

The purpose and need for the FS action is to respond to requests from the BLM for FS consent to issue federal coal leases pursuant to the Mineral Leasing Act, as amended by the Federal Coal Leasing Amendments Act and its implementing regulations (43 CFR 3400.3–1).

Decisions to be Made

Informed by the National Environmental Policy Act (NEPA) analysis, the BLM will decide whether to lease the federal coal resources contained in the federal coal lease tracts and, if so, under what terms, conditions, and stipulations. The surface estate of the lease tracts is administered by the USDA Manti–La Sal National Forest, and the mineral estate (coal) is administered by the BLM PFO. The BLM must have FS consent before issuing a lease for the development of coal resources underlying National Forest System Lands (NFSL). The FS must decide whether to consent to the BLM leasing NFSL for coal resource recovery and upon any conditions (stipulations) for the use and protection of the nonmineral interests in NFSL in accordance with 30 USC 201(a)(3)(A)(iii). In this instance, the USDA Acting Under Secretary, Natural Resources and Environment, will make the decision whether to consent to lease NFSL.

Scoping and Issues

A Notice of Intent to prepare an EIS was published in the Federal Register (Federal Register, 2024) on April 15, 2024, followed by a 45–day public scoping period ending on May 30, 2024. The lead agencies considered the input received during public scoping in the development of this EIS. A scoping report summarizing the pertinent comments within these submissions and the public scoping process is available at https://eplanning.blm.gov/eplanning–ui/project/2015277/510.

Alternatives

Four alternatives are analyzed. No new surface disturbance related to infrastructure on the proposed federal coal lease tracts is planned under any alternative. Under Alternative 1, the BLM would not approve the requested leasing of the Little Eccles Federal Coal Lease Tract (UTU–92226) LBA or modification of the Flat Canyon Federal Coal Lease Tract (UTU–77114) LMA. The FS would not consent to leasing. Under Alternative 2, the BLM would approve the requested modification of the Flat Canyon Federal Coal Least Tract (UTU–77114) LMA and leasing of the Little Eccles Federal Coal Lease Tract (UTU–92226) LBA. The FS would consent to leasing the LBA and LMA in its entirety and may condition its consent with surface resource protection lease stipulations. Under Alternative 3, the BLM would approve the requested modification of the Flat Canyon Federal Coal Lease Tract (UTU–77114) LMA. The FS would consent to leasing the LMA in its entirety and may condition its consent with surface resource protection lease stipulations. Under Alternative 4, the BLM would approve the requested leasing of the Little Eccles Federal Coal Lease Tract (UTU–92226) LBA. The FS would consent to leasing the LBA in its entirety and may condition its consent with surface resource protection lease stipulations. **Table ES–1** compares the coal lease acreages, coal production, and life of mine by alternative.

Table ES 1. Comparison of Coal Production (in tons), Acreage, and Life of Mine by Alternative

	Alternative 1: No Action		Alternative 2: Proposed Action LMA and LBA		Alternative 3: LMA Only		Alternative 4: LBA Only	
	Acres	Tons	Acres	Tons	Acres	Tons	Acres	Tons
LMA	–	–	660	2,094,639	660	2,094,639	–	–
LBA	–	–	120	857,557	–	–	120	1,024,618
Private	2,400	11,748,000	2,400	16,367,310	2,400	15,196,509	2,400	15,007,737
Total	–	11,748,000	780	19,319,506	660	17,291,148	120	16,032,355
Life of Mine	Jan–2032		Aug–2033		Dec–2032		Mar–2033	

The difference in timing and total tons mined between the LMA–only alternative and the LBA–only alternative (implementing the LMA–only alternative would take less time than the LBA–only alternative, although more coal is mined) pertains to the optimization of mine timing. Under the LMA–only alternative, longwall panels can be effectively developed and mined at a faster rate without creating longwall outages. In order to minimize longwall downtime and keep up with mains and panel development under the LBA–only alternative, the longwall mining rate has been slowed in this case, thus showing a longer life of mine whilst recovering less tons overall.

Contents

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Abbreviations

°	degree
%	percent
ASLM	Assistant Secretary for Land and Minerals
BCC	Birds of Conservation Concern
BCI	Biotic Conditions Index
BGEPA	Bald and Golden Eagle Protection Act
BLM	Bureau of Land Management
CAA	Clean Air Act
CFC	Canyon Fuel Company, LLC
CFR	Code of Federal Regulations
CWA	Clean Water Act
dBA	A–weighted decibels
EIS	Environmental Impact Statement
EO	Executive Order
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right–to–Know Act
ESA	Endangered Species Act
F	Fahrenheit
FCLAA	Federal Coal Leasing Amendment Act
FLPMA	Federal Land Policy and Management Act
FS	Forest Service
Gt	Gigatonnes
GHG	Greenhouse Gas
GIS	Geographic Information System
gpm	gallons per minute
HCI	Habitat Condition Index
HCSM	Hydrogeologic Conceptual Site Model
HUC	Hydrologic Unit Code
IMPLAN	IMpact Analysis for PLANning
KVA	kilovolt–amperes
LBA	Lease by Application
LI	Labor Income
LMA	Lease Modification Application
LRMP	Land and Resource Management Plan
MER	Maximum Economic Recovery
mg/L	milligram per liter
MBTA	Migratory Bird Treaty Act
MIS	management indicator species
MLA	Mineral Leasing Act
MLNF	Manti–La Sal National Forest
Mt	Megatonnes
MRP	Mine and Reclamation Plan
MSHA	Mine Safety and Health Administration
NEPA	National Environmental Policy Act
NFMA	National Forest Management Act
NFSL	National Forest System Lands
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places

OHVs	off highway vehicles
ONRR	Office of Natural Resources Revenue
OSMRE	Office of Surface Mining Reclamation and Enforcement
PFO	Price Field Office
PGA	peak ground acceleration
PIF	Partners in Flight
PILT	Payments in Lieu of Taxes
R2P2	Resource Recovery and Protection Plan
RMP	Resource Management Plan
SDPS	Surface Deformation Prediction System
SGCN	Species of Greatest Conservation Need
SHPO	State Historic Preservation Officer
SMCRA	Surface Mining Control and Reclamation Act
UDAQ	Utah Division of Air Quality
UDEQ	Utah Department of Environmental Quality
UDOGM	Utah Division of Oil, Gas, and Mining
UDWQ	Utah Division of Water Quality
UDWAR	Utah Division of Water Resources
UDWIR	Utah Division of Wildlife Resources
UPDES	Utah Pollution Discharge Eliminating System
UNHP	Utah Natural Heritage Program
USC	United States Code
USDA	United States Department of Agriculture
USDOI	United States Department of the Interior
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VQOs	visual quality objectives

Chapter 1 Purpose of and Need for Action

1.1 Introduction

There is a market demand for coal. The coal industry identifies areas of coal leasing interest. The coal industry markets any mined coal for a variety of societal uses. Canyon Fuel Company, LLC (CFC; applicant), owned by Wolverine Fuels, LLC, submitted two coal lease applications to the United States Department of the Interior (USDOI) Bureau of Land Management (BLM) PFO on June 7, 2019; a Lease by Application (LBA) for the leasing of the Little Eccles Federal Coal Lease Tract (UTU–92226) of 160 acres and a Lease Modification Application (LMA) for the existing Flat Canyon Federal Coal Lease Tract (UTU–77114) to add 960 acres (proposed action) (CFC, 2019a). On July 8, 2019, CFC submitted a revised LBA (CFC, 2019b) for the Little Eccles Federal Coal Lease Tract (UTU–92226) reducing the proposed lease area to 120 acres and on July 5, 2021, CFC submitted a revised LMA for the Flat Canyon Federal Coal Lease Tract (UTU–77114) to reduce the proposed LMA area to 640 acres (CFC, 2021). A mine plan (initial mine plan) was submitted with these applications. Upon obtaining further information from geologic exploration, the mine plan was updated (current mine plan). The BLM, upon review of the current mine plan, added 20 acres to the LMA to address Maximum Economic Recovery (MER) (43 CFR 3480) requirements. Current estimates show there are approximately 858,000 tons of recoverable federal coal in the Little Eccles Federal Coal Lease Tract (UTU–92226) (LBA) and approximately 2,095,000 tons of recoverable federal coal within the existing Flat Canyon Federal Coal Lease Tract (UTU–77114) (LMA). These applications are all to lengthen the life of the mine and would not result in an increase in annual production.

This completed Environmental Impact Statement (EIS) has been prepared by the USDOI BLM PFO, and United States Department of Agriculture (USDA) Forest Service (FS) Manti–La Sal National Forest (MLNF), at the direction of the USDA Acting Under Secretary, Natural Resources and Environment, hereafter jointly referred to as "the lead agencies," in cooperation with the USDOI Office of Surface Mining Reclamation and Enforcement (OSMRE) Western Region Office, United States Environmental Protection Agency (EPA), and the Utah Division of Oil, Gas, and Mining (UDOGM). This EIS analyzes the potential environmental impacts of leasing the Little Eccles Federal Coal Lease Tract (UTU–92226) (LBA) and modifying the Flat Canyon Federal Coal Lease Tract (UTU–77114) (LMA).

1.2 Settlement Agreement

On March 7, 2023, a Settlement Agreement in the case *WildEarth Guardians v. Haaland*, 2:16–cv–00168, in the United States District Court for the District of Utah, was made by and between WildEarth Guardians and The Grand Canyon Trust, Debra Haaland, in her official capacity as Secretary of the Interior, the BLM, and the FS; and Intervenor–Defendants, the State of Utah and CFC.

In compliance with Terms and Conditions #3 of the Settlement Agreement, the BLM and FS have completed an EIS that analyzes the effects of climate change attributable to the Little Eccles Federal Coal Lease Tract (UTU–92226) LBA and Flat Canyon Federal Coal Lease Tract (UTU–

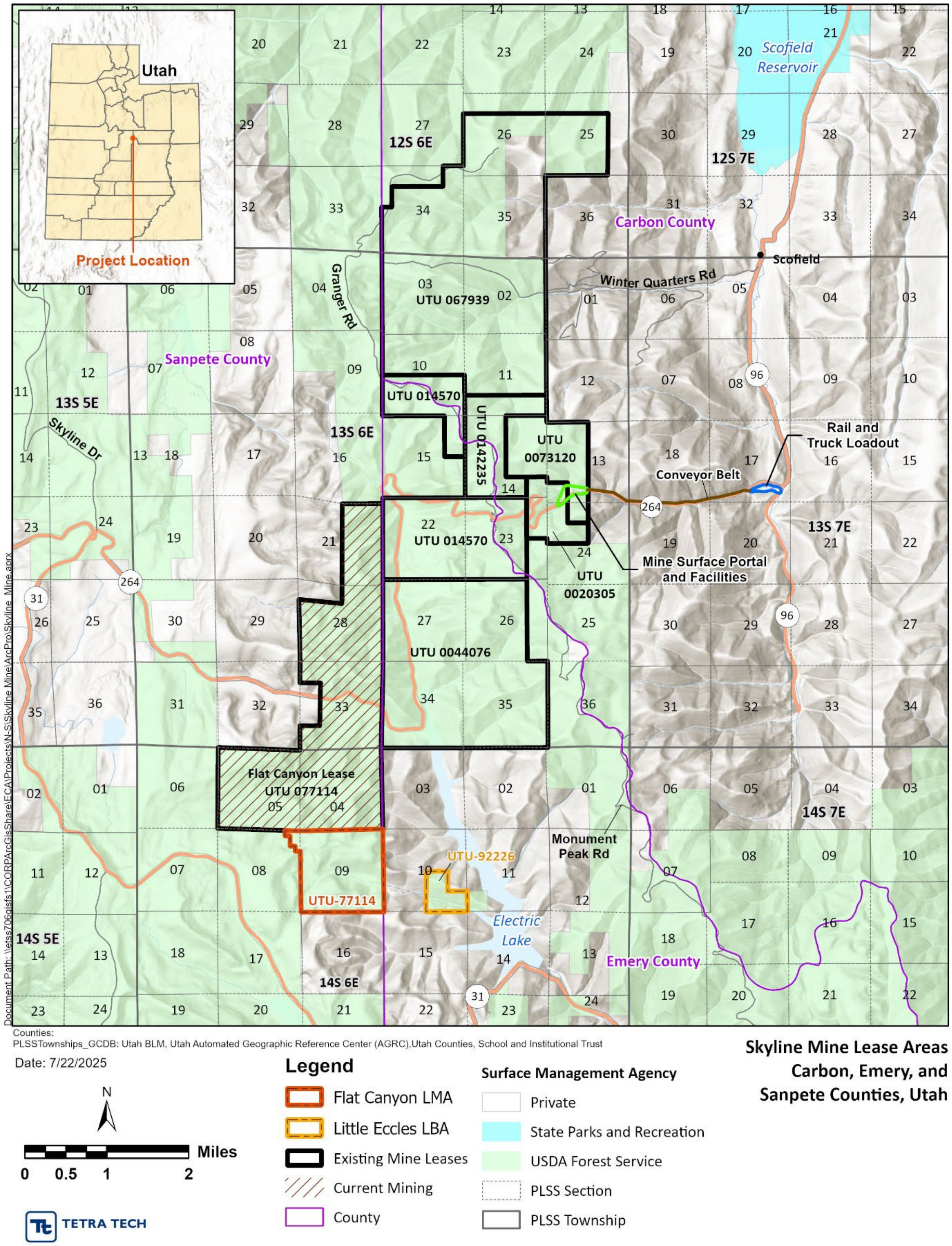
77114) LMA and alternatives to those lease proposals, including consideration of the social cost of greenhouse gas (GHG) emissions resulting from each alternative analyzed and the air quality effects including downstream air quality effects of transporting and combusting leased coal. As part of the baseline environmental information, the BLM and FS are providing an inventory of projected air emissions and monetary estimates of the social cost of GHGs. The inventory and estimates include emissions arising from activities on the lease and downstream emissions resulting from transportation and combustion of the coal proposed for leasing. Emissions are provided for each GHG (carbon dioxide, methane, and nitrous oxide) each year coal production is anticipated to occur from the leases. The estimates of the social cost of GHG emissions uses the figures and methods developed by both the Interagency Working Group on the Social Cost of GHG and EPA as described in the technical support document[1].

1.3 Location and Background

CFC has operated the Skyline Mine since 1981 under UDOGM Permit C0070005. The Skyline Mine is located approximately 5 miles southwest of Scofield, Utah. The surface portal and related facilities are in Eccles Canyon along State Highway 264. CFC has already mined 119 million tons of coal on seven federal leases totaling approximately 12,000 acres and on two private leases totaling 600 acres. CFC is currently mining the Flat Canyon Federal Coal Lease Tract (UTU–77114). The Skyline Mine, existing and proposed leases, and the surrounding area are shown in **Figure 1.3–1**. The proposed LMA is in Township 14 South, Range 6 East, Section 8, NE1/4NE1/4NE1/4, NE1/4NW1/4NE1/4NE1/4, E1/2SE1/4NE1/4NE1/4, and NW1/4SE1/4NE1/4NE1/4 and all of Section 9, Salt Lake Base and Meridian. The proposed LBA is in Township 14 South, Range 6 East, Section 10 W1/2SE1/4 and SE1/4SE1/4, Salt Lake Base and Meridian.

[1] In the Settlement Agreement, Section 3.A.i.a, the BLM agreed to complete an EIS that contains an analysis of "…the direct, indirect, and cumulative effects of climate change…including consideration of the social cost of greenhouse gas [SC-GHG] emissions resulting from each alternative analyzed, to the extent not prohibited by law." Furthermore, the Settlement Agreement, Section 3.B provides that "[t]he estimates of the social cost of greenhouse gas emissions shall use the figures and methods developed by the Interagency Working Group on the Social Cost of Greenhouse Gases [IWG]…" This prior commitment regarding SC-GHG is now in direct tension with Executive Order 14154 *Unleashing American Energy*, which disbanded the IWG, rescinded the IWG's publications, and strongly discourages agencies from using SC-GHG. Given the commitments in the Settlement Agreement, this document includes SC-GHG estimates using IWG's figures despite the inconsistency with the Executive Order.

Figure 1.3–1. Skyline Mine Existing and Proposed Lease Tracts



1.4 Purpose and Need for Action

The purpose of the BLM and FS actions is to respond to:

- The LBA proposed by CFC for the Little Eccles Federal Coal Lease Tract (UTU–92226) to competitively lease up to 120 acres, containing approximately 858,000 or 1,025,00 tons of recoverable coal, depending on alternative, and
- The LMA proposed by CFC for the existing Flat Canyon Federal Coal Lease Tract (UTU–77114) to increase the tract acreage by 660 acres, adding approximately 2,095,000 tons of contiguous recoverable coal.

The need for the BLM action is established by the Mineral Leasing Act of 1920 (MLA), as amended, Sections 2 and 3 (30 United States Code [USC] 201 and 203) and its implementing regulations (43 CFR 3432 and 3425), as amended by the Federal Coal Leasing Amendments Act of 1976 (FCLAA), and Federal Land Policy and Management Act (FLPMA) of 1976 Section 102 (43 USC 1701), as amended. As stated, "public lands shall be managed in a manner that recognizes the nation's need for domestic sources of minerals (43 USC 1701(a) (12))."

The purpose and need for the FS action is to respond to requests from the BLM for FS consent to issue federal coal leases pursuant to the MLA, as amended by the FCLAA (see 43 CFR 3400.3–1).

1.5 Energy and Coal Executive Orders

The White House issued Executive Order (EO) 14154, *Unleashing American Energy*, on January 20, 2025. The White House issued EO 14261, *Reinvigorating America's Beautiful Clean Coal Industry and Amending EO 14241*, on April 8, 2025. The White House issued EO 14156, *Declaring A National Energy Emergency,* on January 20, 2025.

Components of this EO in relation to this EIS include consideration of potentially burdensome requirements for domestic energy resources, revocation of and revisions to certain presidential and regulatory actions, calls for efficient permitting of energy projects, and prioritizing accuracy in environmental analysis. These EOs are directly related to this EIS because they support the domestic coal industry by enhancing coal production and use as a means of securing economic prosperity and national security, lowering electricity costs, and supporting job creation. They further outline a series of policies and actions to remove regulatory barriers, promote coal exports, and assess coal resources on federal lands, while also encouraging the development of coal technologies. In addition, the EO 14241 also directs the National Energy Dominance Council Chair to designate coal as a "mineral" under the terms of EO 14241, effectively giving coal the same benefits and support as other critical minerals.

1.6 Decisions to be Made

Informed by the National Environmental Policy Act (NEPA) analysis, the BLM will decide whether to lease the federal coal resources contained in the federal coal lease tracts and, if so, under what terms, conditions, and stipulations. The surface estate of the federal coal lease tracts is administered by the FS MLNF, and the mineral estate (coal) is administered by the BLM PFO.

The BLM must have FS consent before issuing a lease for the development of coal resources underlying National Forest System Lands (NFSL). The FS must decide whether to consent to the BLM leasing NFSL for coal resource recovery and upon any conditions (stipulations) for the use and protection of the non–mineral interests in NFSL in accordance with 30 USC 201(a)(3)(A)(iii). In this instance, the USDA Acting Under Secretary, Natural Resources and Environment will make the decision whether to consent to lease NFSL.

1.6.1 Roles and Responsibilities

1.6.2 Bureau of Land Management

The BLM PFO is responsible for the issuance, readjustment, modification, termination, cancellation, and/or approval of transfers of federal coal leases pursuant to the MLA, as amended. The BLM is serving as a co–lead agency for this EIS. The BLM has the general responsibility to administer the MLA with respect to coal mining, production, and resource recovery and protection operations on federal coal leases and licenses, and to supervise exploration operations for federal coal resources. The BLM must decide whether to approve the LMA and/or LBA and issue a lease or leases for federal coal resources.

1.6.2.1 Forest Service

The FS MLNF manages the surface resources within their jurisdiction while subsurface minerals are managed by the BLM. The FS, for the USDA Acting Under Secretary, Natural Resources and Environment, is serving as a co–lead agency for this EIS. The FS has authority to consent to BLM issuing leases on NFSL. If consent is given, the FS identifies conditions (stipulations) for use and protection of the non–mineral resources in the lands subject to leasing. The FS complies with the National Forest Management Act of 1976 (NFMA) to plan for multiple uses of public lands and determines if the land is suitable and available for coal leasing and development, see 43 CFR 3420.1–4.

1.6.2.2 Office of Surface Mining Reclamation and Enforcement

The Surface Mining Control and Reclamation Act of 1977 (SMCRA) gives OSMRE the responsibility to administer programs that regulate surface coal mining operations and the surface effects of underground coal mining operations in the United States. OSMRE is serving as a cooperating agency for this EIS. For new mining plans or mining plan modifications, should Federal lands, as that term is defined in 30 USC 1291(4), be involved, OSMRE prepares a mining plan decision document in support of its recommendation to the Assistant Secretary for Land and Minerals Management (ASLM) (30 CFR Chapter VII, Subchapter D, Part 746). The ASLM reviews the mining plan decision document and decides whether to approve the federal mining plan or mining plan modification, approve with conditions, if any, conditions may be needed, pursuant to 30 CFR 746.14, or deny the mining plan.

1.6.2.3 Environmental Protection Agency

The EPA sets forth and enforces environmental regulations concerning air and water quality that coal mining operations must comply with, including monitoring and regulating emissions and discharges that could contaminate natural resources. The EPA is serving as a cooperating agency for this EIS. The EPA works in conjunction with the BLM, FS, and other state agencies to coordinate environmental reviews and ensure compliance with environmental laws during the leasing process. Also, per Section 309 of the Clean Air Act (CAA), EPA evaluates the adequacy of the information presented in the EIS.

1.6.3 Utah Division of Oil, Gas, and Mining

The UDOGM is responsible for regulating the exploration and extraction of oil, gas, and minerals in Utah, including coal mining. The UDOGM is serving as a cooperating agency for this EIS. They administer SMCRA within the State of Utah[2] in consultation with OSMRE, which includes the regular administrative activities of the operations such as mine inspections and ensuring that mining operations comply with state laws and regulations. While BLM manages federal land leases, UDOGM works in coordination with OSMRE, BLM, and the FS to evaluate the environmental and operational aspects of proposed mining projects and continues coordination with federal agencies for mining activities, if approved.

1.6.4 State and Local Agencies

The existing Skyline Mine and potential LBA and LMA are located on federal lands within the State of Utah, specifically in Emery, Sanpete, and Carbon counties. The FS' implementing regulations regarding land use planning, found in the 2012 FS Planning Rule (36 CFR 219 *et seq*.) outline coordination with local agencies: "Coordination is a process that requires Federal agencies to resolve policy conflicts with State and local plans, policies and programs for the purpose of reaching consistency…It recognizes that the responsibilities of State and local governments, to protect the health, safety, and welfare of the people, must be harmonized with the Federal position to ensure effective governance."

1.7 Bureau of Land Management Land Use Plan Conformance

The proposed action and alternatives must comply with the applicable land use plan developed pursuant to FLPMA. Although the Skyline Mine is on FS NFSL, BLM has authority for issuing federal coal leases and administering associated resource use and development. Because of this, mining of the proposed LBA and LMA tracts must also meet the coal mining planning and suitability criteria set forth in the BLM PFO Resource Management Plan (RMP) (BLM, 2008), as amended. **Appendix A** includes the analysis related to the development criteria for the proposed action, while the goals and objectives of the RMP are discussed below.

The RMP has two goals related to coal mining: (1) Provide opportunities for mineral exploration and development under the mineral leasing laws subject to legal requirements to protect other resource values, and (2) Support the need for domestic energy resources by managing and conserving the mineral resources without compromising the long–term health and diversity of public lands. The RMP has one objective related to coal mining: (1) Maintain coal leasing, exploration, and development within the planning area while minimizing impacts to other resource values. Map R–24 under Leasable Minerals (MLE)–2 of the RMP shows areas that are

[2] Pursuant to Section 503 of SMCRA, 30 CFR 944, and Section 523(c) of SMCRA, the Governor of Utah entered into a cooperative agreement with the Secretary of the Interior authorizing DOGM to regulate coal mining operations on federal lands in the State of Utah.

available for further coal leasing consideration. The LMA and LBA tracts occur within this area. As a result, the alternatives conform with the management direction in the RMP. Finally, MLE–3 directs the BLM to use the coal unsuitability determinations as identified in Appendix R–13 of the RMP. As previously discussed, **Appendix A** includes a detailed analysis related to the suitability related to the proposed action.

1.8 Forest Service Land and Resource Management Plan Conformance

The FS MLNF Land and Resource Management Plan (LRMP), as amended (FS, 1986) guides land management direction on the NFSL. Chapter II, Management Situation, page 53 of the LRMP notes that "The Wasatch Plateau Coal Field, as delineated by the Department of [the] Interior in their letter to the Forest, dated January 24, 1983, contains 445,100 acres of medium or high potential coal lands on the Manti Division of the Forest. The Manti Division encompasses a majority of the Wasatch Plateau Coal Field and has vast reserves of high–quality mineable coal."

Per the LRMP Chapter III, page 12, "cleared tracts would be available for leasing subject to the mitigating requirements determined through the multiple–use management and environmental assessments…. Subsidence and the resource monitoring programs, required for approval of mine plans, would provide necessary data to create models for predicting subsidence and the related impacts for evaluating future leases and/or mining operations."

Chapter III, page 36 of the LRMP lists goals and objectives for coal leasing under Minerals Management Leaseables (G02 to G07) as follows:

> d. Coal lands will be determined to be suitable for coal leasing through the application of unsuitability and multiple–use criteria (43 CFR 3461 and 43 CFR 3420). Coal leases may be denied or limited by special stipulations where:
>
> > (1) They are not in compliance with the unsuitability criteria or multiple land use decisions established for the unit.
> >
> > (2) Surface or transportation facilities needed for operations degrade water quantity or quality.
> >
> > (3) Operations would impair the current quality of recreation.
> >
> > (4) National Recreation Trails occur.
> >
> > (5) Operations would result in unacceptable or unmitigable impact on wildlife or fisheries.
> >
> > (6) Operations could result in aggravating land instability.
> >
> > (7) An established need for additional coal cannot be demonstrated.
> >
> > (8) Operations and/or production would result in unacceptable and unmitigable impacts on Human Resource Units. (communities)
> >
> > (9) Operations would result in unacceptable or unstable traffic flows.

e. Extraction of coal shall be by underground mining methods.

1.9 State and Local Plans

The BLM and FS recognize the following state and local plans and policies and the analysis within this EIS considers them accordingly.

Because there are no actions that would create new right–of–way entry or usage, require building permits, or otherwise affect above–ground activities, it is not expected that local land use permits would be required.

1.9.1 State of Utah Resource Management Plan

The State of Utah's RMP states that Utah continues to support the development of its coal resources (State of Utah, 2024).

1.9.2 Carbon County Resource Management Plan

Carbon County's RMP, Land Uses section, page 7, provides that "Natural resources are available to use and produce in Carbon County" (Carbon County, Utah, 2021).

1.9.3 Emery County General Plan

Emery County's General Plan, Section 9.8, page 25, provides that "Emery County recognizes that the development of its abundant mineral resources is desirable and contributes to the economic well–being of the County, State, and the nation." Further, the plan concludes that "it is the policy of Emery County to encourage responsible stewardship of the environment in conjunction with mineral exploration and development" (Emery County, Utah, 2016).

1.9.4 Sanpete County Resource Management Plan

Sanpete County's RMP, Mining section, page 30, has the following policies as it relates to mining (Sanpete County, Utah, 2017):

- The county values mining as part of the local customs and culture.
- The county encourages responsible mineral extraction.
- The county supports the mining industry.
- Support the long–term viability of the coal industry while also diversifying and strengthening other economic drivers.
- Review cases of suspected abuse of the mining laws other than prospecting, mining, and related activities. Initiate appropriate action to resolve abuses.

1.10 Regulatory Framework and Necessary Authorizations

Table 1.10–1 lists the laws, as amended, that establish the primary authorities, responsibilities, and requirements for developing federal coal resources.

Table 1.10–1. Applicable Federal Laws

Law	Requirements
Mineral Leasing Act of 1920 and Federal Coal Leasing Amendments Act of 1976	The MLA and FCLAA provide the legal foundation for the leasing and development of federal coal resources. The BLM issues mineral leases under the MLA. Once a lease is issued, BLM ensures that the MER of coal is achieved during the mining of federal leases (43 CFR 3480) and ensures that waste of federal coal resources is minimized through review and approval of a mine's Resource Recovery and Protection Plan (R2P2) as required under the MLA. The BLM has the general responsibility to administer the MLA, as amended, with respect to coal mining, production, and resource recovery and protection operations on federal coal leases and licenses, and to supervise exploration operations for federal coal. Per the FCLAA the FS has authority to determine whether to consent to the BLM issuance of a federal coal lease on NFSL and may condition consent with special surface resource stipulations. The FS implements its responsibilities for oversight of coal exploration and development following the FS Manual 2820, consistent with 43 CFR 3400.
Mining and Minerals Policy Act of 1970	The Mining and Minerals Policy Act declares that it is the continuing policy of the federal government to foster and encourage the orderly and economic development of domestic mineral resources.
Surface Mining Control and Reclamation Act of 1977 and Utah Surface Coal Mining Reclamation Act of 1979	SMCRA provides the legal framework for the federal government to regulate coal mining by balancing the need for continued domestic coal production with protection of the environment and society while also ensuring the mined land is returned to beneficial use when mining is finished. OSMRE implements its responsibilities for the MLA and SMCRA under regulations at CFR Title 30 – Mineral Resources, Chapter VII – OSMRE, USDOI, Subchapters A–T, Parts 700– 955. Following a leasing decision, and as provided for under SMCRA, OSMRE works with coal producing states to develop their own regulatory programs to regulate coal mining. Once a regulatory program is approved for a state, OSMRE provides oversight. OSMRE has approved the coal regulatory program of the UDOGM, therefore, UDOGM manages its program under the Utah Surface Coal Mining and Reclamation Act of 1979. UDOGM has the authority and responsibility to make decisions to approve surface and underground coal mining permits and regulate coal mining in Utah. The UDOGM would review the Permit Application Package specifying the mining and

Law	Requirements
	reclamation methods to be employed. Once UDOGM finds the Permit Application Package administratively complete, the Permit Application Package would be submitted to OSMRE for review. The UDOGM would continue to work with the applicant to finalize the Permit Application Package. After a 30–day public comment period, UDOGM would issue their findings and recommendations to OSMRE and, if deemed appropriate, issue the permit to the applicant. Once the state's findings and recommendations are received, OSMRE would prepare a mining plan decision document in support of its recommendation to the ASLM, who would decide whether to approve the mining plan modification and if additional conditions are needed.
Federal Land Policy and Management Act of 1976 and National Forest Management Act of 1976	BLM complies with FLPMA and the FS complies with NFMA to plan for multiple uses of public lands and determine if the land is suitable and available for coal leasing and development.
Clean Air Act of 1970 and Clean Water Act of 1972	The CAA and CWA laws trigger some of the new source review, multi–Sector General Permit for storm water discharges, and National Pollutant Discharge Elimination System (NPDES) permits shown in
National Historic Preservation Act of 1966 Endangered Species Act of 1973 Migratory Bird Treaty Act Bald and Golden Eagle Protection Act	The National Historic Preservation Act of 1966 (NHPA), Endangered Species Act of 1973 (ESA), Migratory Bird Treaty Act (MBTA), and Bald and Golden Eagle Protection Act (BGEPA) laws require consultation or coordination as documented in Chapter 4.
One Big Beautiful Bill Act	The One Big Beautiful Bill Act (Public Law 119–21, Section 50201) requires accelerated processing of pending coal lease applications. Within 90 days of the bill's passage (i.e., no later than October 2, 2025), the BLM must publish any required environmental review, establish the fair market value, hold a lease sale, and identify the highest bidder for each currently pending lease application.

The permits and authorizations in **Table 1.10—2** would also be required prior to implementation.

Table 1.10—2. Federal Permits Licenses and Other Entitlements that Must be Obtained in Implementing the Proposal

Permit/Authorization	Issuing Authority	Permit Purpose / Existing Permit Modification
LBA	BLM	Required for new coal leases on federal lands.
LMA	BLM	Required for modifying coal leases on federal

Permit/Authorization	Issuing Authority	Permit Purpose / Existing Permit Modification
		lands.
Consent to Leasing	FS	Consent or not to leasing required for new or modified coal leases.
LBA Competitive Lease Sale	BLM	Required for successful bidder to mine the coal.
LMA Noncompetitive Lease	BLM	Required for lessee to mine the coal.
R2P2	BLM	Once a lease is issued, BLM ensures that the MER of coal is achieved during the mining of federal leases (43 CFR 3480) and ensures that waste of federal coal resources is minimized through review and approval of a mine's Resource Recovery and Protection Plan (R2P2) as required under the MLA.
Mine Operating Permit	UDOGM	A state operating permit cannot be issued for the federal coal until BLM approves the federal coal lease. The permit, when issued, allows coal mining consistent with the Utah regulatory program, approved by OSMRE under SMCRA. Any necessary permit revisions would be determined by UDOGM after review of the mining plan decision document. 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 UDOGM before implementing an operating permit modification.
Federal Mining Plan	ASLM/OSMRE	After BLM approves the federal lease and UDOGM approves the state mine operating permit, the ASLM must decide to approve, disapprove, or conditionally approve the federal mining plan. Review of the proposed plan is coordinated with UDOGM. OSMRE recommends approval, disapproval, or conditional approval of the plan to the USDOI ASLM.
Air Quality: New source review	Utah Department of Air Quality (UDAQ)	Skyline Mine has multiple permitted pieces of equipment through orders with UDAQ (DAQE–ANl 00920003–21). This would be reevaluated and amended, if needed, for the selected alternative.
Multi–Sector General Permit for storm water discharges, National Pollutant Discharge Elimination System	Utah Department of Environmental Quality (UDEQ)	Skyline Mine operates under Utah Pollutant Discharge Elimination System (UPDES) Permit UT0023540. The permit includes limits on discharge quality, monitoring requirements, sampling methods, testing methods, and reporting requirements. This would be reevaluated and amended, if needed, for the selected alternative.

1.11 Scoping and Issues

A Notice of Intent to prepare an EIS was published in the Federal Register (Federal Register, 2024) on April 15, 2024, followed by a 45–day public scoping period ending on May 30, 2024. During this period, the lead agencies solicited comments from other agencies and the public. A legal notice was published in ETV News (ETV News, 2024) on April 24, 2024, and a press release announcing the scoping period and public scoping meetings was posted on the BLM's ePlanning National NEPA Register (ePlanning), BLM's social media, and FS' project websites. Comments were accepted through ePlanning and by mail.

The lead agencies held three public scoping meetings: two in–person meetings on May 7 and 8, 2024, in Huntington, Utah and Mount Pleasant, Utah, respectively, and a virtual scoping meeting on May 14, 2024. During the scoping period, the lead agencies received 15 comment submissions from federal, state, and local agencies, organizations, and individuals. The lead agencies considered the input received during public scoping in the development of this EIS. A scoping report summarizing the pertinent comments within these submissions and the public scoping process is available at: https://eplanning.blm.gov/eplanning–ui/project/2015277/510.

1.12 Issues Analyzed in Detail

Based on internal and external scoping, the following issues are fully analyzed in this EIS. For ease of readership, they are grouped first by physical resources, then biological resources, and lastly sociocultural resources.

On May 29, 2025, the Supreme Court issued a unanimous decision in *Seven County Infrastructure Coalition v. Eagle County, Colorado*, 145 S. Ct. 1497 (2025) (*Seven County*), holding that an agency is entitled to "substantial deference" in determining when an EIS has complied with NEPA "[s]o long as the EIS addresses environmental effects from the project at issue and that NEPA does not require an agency to evaluate the environmental effects of activities separate in time or place from the agency's proposed action.

In addition, the analysis in the EIS was largely drafted before the Supreme Court's *Seven County* decision. As a result, the EIS contains significantly more analysis than is required under NEPA. In light of the national energy emergency, prior litigation over the Skyline Mine, the applicable settlement agreement, and the efficient use of agency resources, BLM and FS decided to leave this extraneous analysis in the EIS rather than taking the time and resources to remove it. However, BLM and FS maintains that under *Seven County*, much of the analysis contained in the EIS, particularly, those that are attenuated in time and geography from the project, are not required to be analyzed under NEPA because those downstream impacts are related to activities for which the agencies have no control.

Physical Resources

- Air Quality: How would emissions from potential coal mining, transportation, and combustion impact air quality and air quality related values in Emery, Carbon, and Sanpete counties and at Class I areas nearest to the Skyline Mine?

- Greenhouse Gas Emissions: How would potential coal mining, transportation, and combustion contribute to GHG emissions and climate change at county, state, national, and global scales?

- Geology: How would the alternatives impact geologic strata (coal) and faults and fractures, subsidence, and seismic events?

- Hydrology:

    - How would the alternatives impact water quality and quantity of streams, springs, ponds, and wetlands as well as Electric Lake, Scofield, and Cleveland reservoirs? How would the alternatives impact well water quantity and quality (including impairment to existing beneficial uses and associated water rights)?

    - How would the alternatives impact the water balance of Electric Lake and Scofield, Huntington, and Cleveland reservoirs?

Biological Resources

- Vegetation and Botany: How would the alternatives impact vegetation communities, including rare plants, and wetlands, riparian areas, seeps, and springs?

- Fish and Wildlife (Aquatic and Terrestrial Species):

    - How would the alternatives impact pollinator species?

    - How would the alternatives impact FS sensitive species American goshawk, flammulated owl, three–toed woodpecker, Colorado River cutthroat trout, spotted bat, or Townsend's western big–eared bat?

    - How would the alternatives impact FS Management Indicator Species (MIS) big game, golden eagle, or macroinvertebrates?

    - How would the alternatives impact migratory birds?

Sociocultural Resources

- Socioeconomics:

    - How would the alternatives impact employment and income including tax revenue, and property taxes in Carbon, Emery, Sanpete counties in Utah?

    - How would the alternatives impact production royalties in Utah?

1.13 Issues Eliminated from Further Analysis

The BLM NEPA guidance states that EISs will discuss effects in proportion to their significance and that EISs will be analytic, concise, and no longer than necessary to comply with NEPA consistent with its page limits and deadlines. With respect to issues that are not significant, a brief discussion to explain why those issues are not significant and therefore do not warrant further analysis is sufficient and is provided below. The following issues were initially considered and analyzed but were eliminated from detailed analysis.

1.13.1 Coal Availability

Coal fueled 46 percent (%) of Utah's total electricity net generation in 2023 and is the leading electricity generation producer in the state, followed by natural gas at 34%; almost all the rest of Utah's generation came from renewable energy. About 65% of the coal mined in Utah is consumed in the state, mostly for electricity generation. About one–fourth of Utah's mined coal is exported to other countries and the remainder is sent to other states, primarily to California and Nevada where the coal is used mostly at industrial facilities and some power plants (EIA, 2025a). Small amounts of coal are sent to Indiana, Oklahoma, Arkansas, Oregon, Tennessee, and Idaho (EIA, 2025b).

Federal coal production has dominated Utah since 2012. Nearly all Utah coal production (6.2 million tons or 88%) in 2023 was from federal leases (Rupke, et al., 2024). The remainder of Utah's 2023 coal production came from private lands (10.3%) and state lands (1.4%). The vast majority of Utah coal, about 81%, went to the electric utility market, mainly within the state (Rupke et al., 2024). Consumption of coal in Utah is now higher than in–state distribution, indicating that coal imports to Utah were considerably higher than in previous years (Rupke, et al., 2024). Utah operators have exported between 1.6 and 4.0 million tons per year for the past 5 years but only shipped about 386,000 tons of coal in 2023, most likely due to the strong in–state demand (Rupke et al., 2024).

Historic production at the Skyline Mine is presented in Chapter 2. All alternatives, including the no action alternative, would result in varying levels of coal production. Coal development is consistent with various laws as described in **Section 1.11**. The FLPMA mandates that the BLM administer the exploration and development of these mineral resources on public lands for the benefit of the citizens of the United States. Potential development of the LMA and LBA would add nearly 3 million tons of recoverable federal coal and nearly 4.6 million tons of private coal to the 40 million tons of coal mined over the last 10 years. Potential development of the LMA and LBA would comprise about 10% of the coal produced over the past 10 years of mining.

1.13.2 Hazardous/Solid Wastes

The action alternatives would extend underground mining activities into the LMA and/or LBA tracts. No above–ground improvements would occur as the facilities associated with existing mining would be utilized. As the action alternatives would not add any above–ground improvements or change operations, but simply extend the life of mine, it is not likely that hazardous materials or solid waste would change. In addition, the existing Skyline Mine operates within regulatory guidelines of the EPA, Utah Division of Water Resources (UDWAR), Mine Safety and Health Administration (MSHA), and UDOGM regulatory guidelines and must follow criteria for hazardous waste disposal. As these are regulated and monitored under other authorities, coal combustion residuals, waste rock, or waste disposal were dismissed as an issue in this EIS.

1.13.3 Cultural Resources

Subsurface mining activities can cause varying degrees of ground surface subsidence which can affect cultural resources. Potential effects to cultural resources from subsidence include vertical and horizontal shifting of a cultural component's context due to considerable shifts in surface and near surface sedimentary deposits. When it occurs, subsidence manifests itself unevenly across a landscape and it is more common on certain topographic features and landforms (e.g., cliff edges, faces, and drainage bottoms) compared to others (e.g., plains, benches, and low sloping hills). Subsidence can considerably affect the spatial context of cultural resources.

Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on historic properties (36 CFR 800.1(a)). A historic property is any prehistoric or historic district, site building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP) because the property is significant at the national, state, or local level in American history, architecture, archaeology, engineering, or culture. The criteria for evaluating a cultural resource's eligibility for listing in the NRHP are defined in 36 CFR 60.4. If a cultural resource is determined to be eligible to the NRHP, it is considered a historic property.

A cultural resource inventory was conducted for this project. Results of this inventory can be found in Potter 2025. No historic properties were identified. Therefore, Cultural Resources was dismissed from further detailed analysis.

1.13.4 Hydrology: Stream Morphology

The action alternatives would result in subsidence, which has the potential to change stream morphology. Changes in stream morphology have not been observed in past operations of the Skyline Mine. Where gradient changes have been observed, they have been short–term (a year or two) and self–healing. Sediment will be locally eroded from the higher gradient reaches and deposited in the adjacent lower gradient reaches of the water course. Stipulation 8 requires monitoring of the stream gradient. Stipulation 18 and design features require repair of subsidence effects. See also the Hydrogeologic Conceptual Site Model (HCSM) (**Appendix B**, Section 2.5, page 15) which describes why the potential for loss of surface water through subsidence fractures is low. Therefore, changes to stream morphology were dismissed as an issue in this EIS.

1.13.5 Livestock Grazing

The action alternatives would extend underground mining activities into the LMA and/or LBA boundary. Two active grazing allotments and water developments fall within the surface boundaries of the LMA and LBA tracts which authorize sheep grazing. The LMA and LBA boundaries are within a Range Emphasis Unit designated by the LRMP. This designation requires appropriate mitigation measures be implemented to assure continued livestock access and use. Potential effects on livestock water developments and forage vegetation would be offset by stipulations 8, 11, 16, and 20 outlined in this document. Stipulations require the lessee to quantify the progressive and final effects of underground mining activities on the topographic surface, underground and surface hydrology, and vegetation. These stipulations further require the lessee to protect, restore, or replace FS owned or permitted improvements, which include livestock water developments; and replace any surface and/or developed groundwater sources that may be lost or adversely affected by mining operations to maintain use by livestock. The lessee is required to replace losses if and when a site–specific development adversely affects long–term production or management. These stipulations would be required for all action alternatives.

Subsidence–related tensile fractures from existing mining activities periodically occur on the surface. They are typically 1 to 4 feet wide and forage vegetation quickly recovers in subsidence areas. Less than 9.6 acres are subject to tensile fracturing. Livestock water developments within the surface boundaries of the LMA and LBA tracts could be adversely impacted by subsidence–related tensile fractures. In the case livestock water developments are adversely affected, the above stipulations will ensure the lessee restores or replaces FS owned or permitted improvements. By inclusion of the above stipulations, livestock grazing would not be adversely affected and was dismissed as an issue in this EIS.

1.13.6 Noise

The action alternatives would extend underground mining activities into the LMA and/or LBA tracts. No aboveground improvements would occur as the facilities associated with existing mining would be utilized, which include a rail load–out, conveyors, coal stockpiles, crushers, waste rock storage, ventilation, and other systems. The coal is mined underground and transported by underground conveyor to the surface portal in Eccles Canyon several miles from the LBA and LMA tracts. Most noise from mining would occur underground. Aboveground processes and equipment that produce noise include heavy machinery (dozers, haul trucks, etc.), ventilation systems, generators, conveyors, and train/truck coal loading processes. These current processes would continue for a certain period under the action alternatives, but no "new" aboveground development-related noise is proposed.

The MSHA has established noise exposure regulations (30 CFR Part 62) to protect workers and the public. The allowable noise level varies with the time of exposure and ranges from 90 A–weighted decibels (dBA) on average over 8 hours to 115 dBA on average for 15 minutes or less. When sound levels exceed these exposure levels the regulations require that engineering controls such as exhaust mufflers, sound enclosures, shields and barriers, or other noise reduction measures be implemented. While these noise exposure limits are primarily enforced on the mine site, they also help protect against noise exposure to the public since noise usually decreases farther away from the noise source.

Offsite, the EPA has identified a 24–hour average exposure level of 70 dBA as the level of environmental noise to prevent any measurable hearing loss over a person's lifetime. Likewise, levels of 55 decibels outdoors and 45 decibels indoors over 24 hours are identified as preventing activity interference and annoyance. The levels are not single event, or "peak" levels. Instead, they represent averages of acoustic energy over periods of time. The 55 dBA threshold is generally recognized as a level below which no public health or safety risks to the general population would be anticipated to occur.

Assuming sound levels of 90 dBA at 50 feet from a noise source, the inverse square law states that noise should decrease by 6 dBA with every doubling of distance. As such, with a noise level of 90 dBA at 50 feet from mining equipment or processes, the ambient noise will drop below EPA's threshold of 70 dBA at 500 feet and 55 dBA at 2,700 feet (approximately a half mile). However, the actual noise levels experienced by the public will depend on the distance to the equipment, vegetation (e.g., trees), meteorological conditions (e.g., wind speed and directions, temperature, humidity), the type of equipment used, etc., so sound levels could vary slightly. A review of areas surrounding mining facilities shows that there are no locations where the public frequents for extended periods of time that are within 2,700 feet of mining facilities. State routes 96, 264, and some minor dirt roads pass within 500 feet of the mining facilities, but the public will likely only be in these areas for a few minutes and not in the area long enough to be exposed to noise above EPA's 24–hour exposure limits.

Noise can also adversely affect wildlife. However, the action alternatives are not proposing any additional noise sources in or near the LMA or LBA tracts but rather an extension of activities at the current mine portal and offloading site in Eccles Canyon.

Noise is being dismissed as an issue in this EIS because workers and the public will not be exposed to noise pollution above EPA's and MSHA's limits for an extended period and there would be no new impacts on wildlife in or near the LMA and LBA tracts beyond those already occurring.

1.13.7 Noxious Weeds

The action alternatives would extend underground mining activities into the LMA and/or LBA tracts. Subsidence–related tensile fractures from existing mining activities periodically occur on the surface. They are typically 1 to 4 feet wide, and vegetation quickly recovers in these areas. Less than 9.6 acres of the LMA and LBA are subject to tensile fracturing. There is potential for the spread of noxious weeds at these tensile fractures. The NFSL within the LMA and LBA boundary are managed for control and prevention of noxious weeds in coordination with local weed control districts to protect, maintain, and improve vegetation community conditions. There are documented occurrences of musk thistle, yellow toadflax, and diffuse knapweed in or near the LMA and LBA. There may be other noxious weed species or populations not previously documented. Effects on noxious weeds would be offset by Stipulation 32 in this document. This stipulation would be required in all action alternatives thus minimizing the establishment and/or spread of noxious weeds. This was dismissed as an issue in this EIS as a result.

1.13.8 Recreation

The action alternatives would extend underground mining activities into the LMA and/or LBA tracts. No above–ground developments would occur as the facilities associated with existing mining would be utilized. There are no designated recreation areas, developed facilities, designated nonmotorized trails, designated motorized trails, or any formal recreation occurring within the LMA and LBA tracts. There are sporadic and informal uses such as fishing in Electric Lake and use of nearby roads and trails for recreational access in the general area. The alternatives would not interfere with these existing, informal recreational activities within the LBA and LMA tracts to the degree that additional detailed analysis is necessary. Recreation was dismissed as an issue in this EIS.

1.13.9 Soils

Soils in the LMA and LBA tracts are largely Horsethief–Lucky Star–Cuberant families complex, 30 to 60 percent slopes; Lucky Star–Skylick families complex, 30 to 60 percent slopes; and Lucky Star–Horsethief–Adel families complex, 30 to 60 percent slopes. These are mountain slope soils comprised of colluvium derived from limestone, sandstone, and shale depending on location and are gravelly or gravelly sandy loams. These soils are rated moderate to highly susceptible for soil degradation to occur during disturbance with steep slopes increasing the potential for water erosion (NRCS, 2025). Subsidence–related tensile fractures from existing mining activities periodically occur on the surface. They are typically 1 to 4 feet wide and most often occur within a few years of mining. These fractures can self–heal or if more pronounced, they are repaired by CFC as part of a subsidence monitoring and mitigation program as outlined in Stipulation 8 in the current lease stipulations and the Skyline Mine's mining and reclamation plan. It is not expected that any of the action alternatives would result in larger subsidence features (see **Section 3.43.4**, Geology). Effects on soils would also be offset by stipulations 8, 10, and 11. Therefore, soils would not be adversely affected and was dismissed as an issue in this EIS.

1.13.10 Transportation

About 65% of the coal mined in Utah is consumed in the state, mostly for electricity generation. About one–fourth of Utah's mined coal is exported to other countries and the rest is sent to other states, primarily to California and Nevada where the coal is used mostly at industrial facilities and some power plants (EIA, 2025a). Small amounts of coal are sent to Indiana, Oklahoma, Arkansas, Oregon, Tennessee, and Idaho (EIA, 2025b).

The annual coal loaded and shipped from the Skyline Mine from 2020 to 2023 averaged 3.3 million tons per year (TPY) and on average 35% of the coal shipped from the Skyline Mine remained in Utah. Historically, the Skyline Mine has shipped coal to multiple facilities throughout the US. The number and location of coal customers for Skyline Mine greatly varies from year to year. From 2020 to 2023, coal was transported via truck to approximately 20 different destinations in Utah, Idaho, Nevada, and Oregon and up to 550 miles away from the mine. During this same period, coal was transported via rail to approximately 25 different destinations including California, Texas, Indiana, Illinois, Arkansas, and Oklahoma and up to 1800 miles away from the mine. One truck can carry 42 tons of coal, and one rail car can carry 116 tons of coal.

Coal transport via truck or rail contributes to existing traffic on highways or rail lines and can pose a risk to wildlife from collisions. In addition, some coal from the Skyline mine is shipped to Japan from the Port of Stockton, California. There may be interactions with marine wildlife as well including potential mortality. A detailed analysis of transportation effects to wildlife would be highly speculative and the analysis area would be difficult to define given that the delivery destinations change over time and are distant from the project. In addition, impacts on wildlife from transportation would not be a direct result of leasing but would be based on transportation of the coal to market, which has no federal action. Lastly, the action alternatives considered would simply extend the life of mine; there would be no increase in annual production so impacts to wildlife from coal transport would remain at the same level they are currently but would just extend overtime. Collisions related to Skyline Mine's coal transport have not been documented in past years of mining and therefore are not likely to be an issue going forward. Transportation was dismissed as an issue in this EIS except as it relates to threatened and endangered fish species (see **Section 3.7**).

1.13.11 Visual Resources

The action alternatives would extend underground mining activities into the LMA and/or LBA tracts. No above–ground developments would occur as the facilities associated with existing mining would be utilized. The FS Landscape Management Handbook provides guidance related to visual classes and visual quality objectives (VQO) for these classes. The LMA and LBA tracts are in two classes: Partial Retention and Modification. The greatest potential for impact on visual resources is surface subsidence. There is some evidence of surface subsidence in previously mined areas. Similar surface subsidence may occur in the new or additional lease areas. If it were to occur, the effects of subsidence are likely to be minimal, similar to past observations, and consistent with the VQOs for these classes. The LMA and LBA tracts are viewable by the casual observer and visitor in the background from key observations points along highways 31 and 264. The LMA and LBA tracts are not discernable from the surrounding viewshed. Any subsidence effects are likely to not be visible and discernable from these key observation points. Visual resources were dismissed as an issue in this EIS.

Chapter 2
Alternatives, Including the Proposed Action

2.1 Introduction

This chapter describes the alternatives analyzed in detail in this EIS. This chapter also discusses alternatives considered but dismissed from detailed analysis.

2.2 Alternatives Development

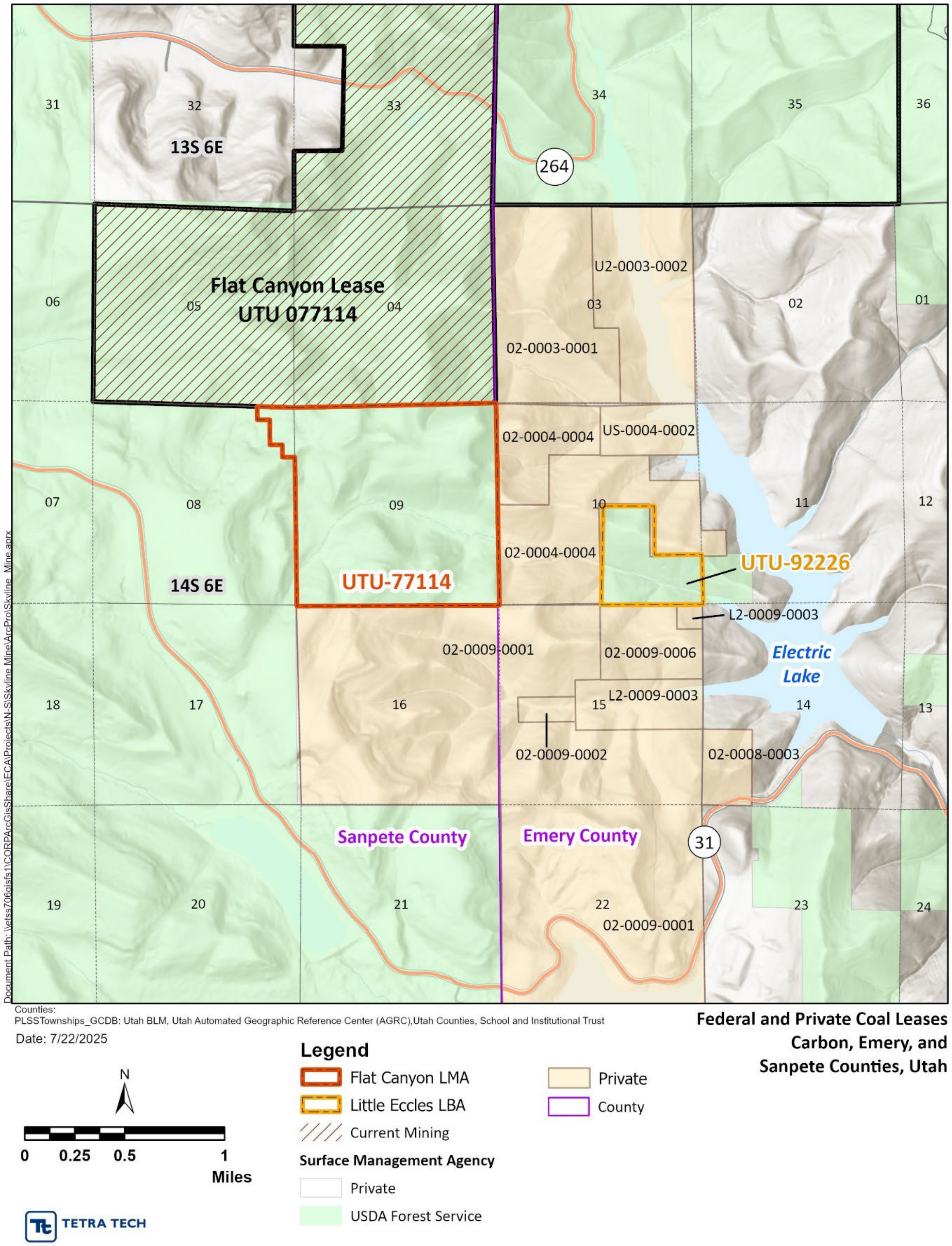
The BLM and FS as well as cooperating agencies (EPA, UDOGM, and OSMRE) held two meetings, on June 27 and July 10, 2024, to discuss resource issues and consider potential alternatives based on possible adverse impacts. The project interdisciplinary team reviewed the Purpose and Need and the alternatives as well as issues brought up internally by the agencies and during public scoping. All comments were considered, and some led the lead agencies to develop Alternatives 3 and 4.

2.3 Private Coal Under All Alternatives

Several privately owned coal leases surround the subject federal coal lease tracts and are available for CFC to lease. **Figure 2.3–1** shows the location and ownership of the private leases. The CFC already has access to the privately owned coal adjacent to the existing Flat Canyon Federal Coal Lease Tract (UTU–77114). It is anticipated that CFC would develop and mine privately owned coal regardless of the alternative selected. What varies between alternatives (see **Table 2.8–1**) is the amount of privately owned coal that is estimated to be recoverable. Estimated recoverable coal across the four alternatives varies due to changed long wall alignments as listed:

- Alternative 1 would enable economic recovery of only 11,748,000 tons of privately owned coal;
- Alternative 2's LMA and LBA would enable economic recovery of 4,619,000 tons of additional privately owned coal for a total of 16,367,000 tons;
- Alternative 3's LMA would enable economic recovery of 3,449,000 tons of additional privately owned coal for a total of 15,197,000 tons; and
- Alternative 4's LBA would enable economic recovery of 3,260,000 tons of additional privately owned coal for a total of 15,008,000 tons.

Figure 2.3–1. Federal and Private Coal Leases



2.4 Alternative 1: No Action

Under Alternative 1, the BLM would not lease, and the FS would not consent to leasing, the federal coal reserves in the Flat Canyon Federal Coal Lease Tract (UTU–77114) LMA and Little Eccles Federal Coal Lease Tract (UTU–92226) LBA, so they would not be mined. Private coal would be mined (see **Section 2.3**), and the life of mine would be January 2032.

2.5 Alternative 2: Modify the Flat Canyon Federal Coal Lease Tract and Lease the Little Eccles Federal Coal Lease Tract

Alternative 2 is the agency preferred alternative because it would strengthen national energy security, support Utah's economy, and best meet MER as defined at 43 CFR 3484.1(b)(1) and as a result best responds to the National Energy Emergency as declared in EO 14156 issued January 20, 2025. Under Alternative 2, the BLM, with FS consent conditioned with stipulations, would offer the requested Flat Canyon Federal Coal Lease Tract (UTU–77114) LMA and approve for competitive leasing the Little Eccles Federal Coal Lease Tract (UTU–92226) LBA. The applications from CFC were received by the BLM on June 10, 2019, with subsequent revisions received on July 10, 2019, and July 12, 2021. The LMA and LBA areas addressed in this EIS are shown in **Figure 1.3–1** and **Figure 2.3–1**.

The Skyline Mine would likely produce 3 to 4 million tons of coal per year, which is consistent with approximate production over the past 10 years.

Inclusion of 858,000 tons from the Little Eccles Federal Coal Lease Tract (UTU–92226) LBA and 2,095,000 tons from modification of the Flat Canyon Federal Coal Lease Tract (UTU–77114) LMA, along with privately owned coal (see **Section 2.3**), would extend the life of mine by 18 months at the current rate of production (similar to the last decade of production Skyline Mine has a permit allowing it to produce up to 8 million tons per year of coal and waste material combined [as established in the minor source air permit Approval Order DAQE–AN0092007–03 issued by the UDEQ, UDAQ]) from the Flat Canyon Federal Coal Lease Tract (UTU–77114).

2.5.1.1 Lease Modification Application

The Flat Canyon Federal Coal Lease Tract LMA (UTU–77114) would include 660 acres: 640 acres as previously outlined in a revised LMA application and an additional 20 acres added by BLM for MER in April 2025 (see **Figure 2.3–1**). There are about 2,095,000 tons of federal recoverable coal in the LMA area.

2.5.1.2 Lease by Application

The Little Eccles Federal Coal Lease Tract LBA (UTU–92226) would include 120 acres (see **Figure 2.3–1**). There are about 858,000 tons of federal recoverable coal in the LBA area.

2.6 Alternative 3: Only Modify the Flat Canyon Federal Coal Lease Tract

Under Alternative 3, the BLM, with FS consent conditioned with stipulations, would only modify the Flat Canyon Federal Coal Lease Tract (UTU–77114) LMA of 660 acres. There are about 2,095,000 tons of federal recoverable coal in the LMA boundary along with privately owned coal (see **Section 2.3**) would extend the life of mine by 11 months.

2.7 Alternative 4: Only Lease the Little Eccles Federal Coal Lease Tract

Under Alternative 4, the BLM, with FS consent conditioned with stipulations, would offer for competitive lease only the Little Eccles Federal Coal Lease Tract (UTU–92226) of 120 acres. There are about 1,025,000 tons of federal recoverable coal in the LBA area, along with privately owned coal (see **Section 2.3**), the life of mine would be extended by 14 months.

2.8 Comparison of Recoverable Coal and Life of Mine by Alternative

Table 2.8–1 provides a comparison of recoverable coal in tons and life of mine by alternative.

Table 2.8–1. Comparison of Recoverable Coal (in tons) and Life of Mine by Alternative

	Alternative 1: No Action	Alternative 2: LMA and LBA	Alternative 3: Only LMA	Alternative 4: Only LBA
LMA	0	2,095,000	2,095,000	0
LBA	0	858,000	0	1,025,000
Private	11,748,000	16,367,000	15,197,000	15,008,000
Total	11,748,000	19,320,000	17,292,000	16,033,000
Life of Mine	January 2032	August 2033	December 2032	March 2033

The difference in timing and total tons mined between the LMA–only alternative and the LBA–only alternative (implementing the LMA–only alternative would take less time than the LBA–only alternative, although more coal is mined) pertains to the optimization of mine timing. Under the LMA–only alternative, longwall panels can be effectively developed and mined at a faster rate without creating longwall outages. In order to minimize longwall downtime and keep up with mains and panel development under the LBA–only alternative, the longwall mining rate has been slowed in this case, thus showing a longer life of mine whilst recovering less tons overall.

2.9 Actions Common to All Action Alternatives

The following subsections describe actions common to all action alternatives. In addition, see **Section 3.1.1**, which describes the conceptual mine plan and mining method analysis assumptions.

2.9.1 Lease Stipulations

Table 2.9–1 lists the stipulations that are attached to the existing Flat Canyon Federal Coal Lease Tract (UTU–77114) and indicates which existing stipulations would be relevant for the LBA, LMA, or both. These stipulations, as modified, would be applied to any resulting lease or lease modification as indicated. The regulatory authorities, as referred to in the following stipulations, include BLM, FS, EPA, UDOGM, OSMRE, and/or UDEQ, unless otherwise specified.

Table 2.9–1. Lease Stipulations

Flat Canyon Federal Coal Lease Tract (UTU–77114)	Little Eccles Federal Coal Lease Tract (UTU–92226)	Stipulation
Yes	Yes	1. In accordance with Section 523(b) of SMCRA, surface mining and reclamation operations conducted on this lease are to conform with the requirements of SMCRA and are subject to compliance with OSMRE, or, as applicable, the Utah program approved under the cooperative agreement in accordance with Section 523(c). The United States Government does not warrant that the entire tract will be susceptible to mining.
Yes	Yes	2. Before undertaking activities that may disturb the surface of previously undisturbed leased lands, the lessee may be required to conduct a cultural resource inventory and a paleontological appraisal of the areas to be disturbed. These studies shall be conducted by qualified professional cultural resource specialists or qualified paleontologists, as appropriate, and a report prepared itemizing the findings. A plan will then be submitted making recommendations for the protection of, or measures to be taken to mitigate impacts for identified cultural or paleontological resources. If cultural resources or paleontological features (fossils) of significant scientific interest are discovered during operations under this lease, operations within 100ft/30m of the discovery shall immediately cease and the appropriate FS authorities shall be notified. Paleontological features of significant scientific interest do not include leaves, ferns, or dinosaur tracks commonly encountered during underground mining operations. The cost of conducting the inventory, preparing reports, and carrying out mitigating measures shall be borne by the lessee.
Yes	Yes	3. If there is reason to believe that threatened or endangered species of plants or animals, or migratory bird species of high federal interest occur in the area, the lessee shall be required to conduct an intensive field inventory of the area to be disturbed and/or impacted. The inventory shall be conducted by a qualified specialist and a report of findings will be prepared. A plan will be prepared making recommendations for the protection of these species or action necessary to mitigate the disturbance. The cost of conducting the inventory, preparing reports, and carrying out mitigating measures shall be borne by the lessee.[1]
Yes	Yes	4. The lessee shall be required to perform a study to secure adequate baseline data to quantify the existing surface resources on and adjacent to the lease area. Existing data may be used if such data are adequate for the intended purposes. The study shall be adequate to locate, quantify, and demonstrate the interrelationship of the geology, topography, surface and groundwater hydrology, vegetation, and wildlife. Baseline data will be established so that future programs of observation can be incorporated at regular intervals for comparison.
Yes	Yes	5. Powerlines used in conjunction with the mining of coal from this lease shall be constructed so as to provide adequate protection for raptors and other large birds. When feasible, powerlines will be located

Flat Canyon Federal Coal Lease Tract (UTU–77114)	Little Eccles Federal Coal Lease Tract (UTU–92226)	Stipulation
		at least 100 yards from public roads.
Yes	Yes	6. The limited area available for mine facilities at the coal outcrop, steep topography, adverse winter weather, and physical limitations on the size and design of the access road, are factors which will determine the ultimate size of the surface area utilized for the Skyline Mine. A site–specific environmental analysis will be prepared for each new mine site development and for major modifications to existing developments to examine alternatives and mitigate conflicts.[1]
Yes	Yes	7. Consideration will be given to site selection to reduce adverse visual impacts. Where alternative sites are available, and each alternative is technically feasible, the alternatives involving the least damage to the scenery and other resources shall be selected. Permanent structures and facilities will be designed, and screening techniques employed, to reduce visual impacts, and where possible achieve a final landscape compatible with the natural surroundings. The creation of unusual, objectionable, or unnatural landforms and vegetative landscape features will be avoided.
Yes	Yes	8. The lessee shall be required to establish a monitoring system to locate, measure, and quantify the progressive and final effects of underground mining activities on the topographic surface, underground and surface hydrology, and vegetation. The monitoring system shall utilize techniques which will provide a continuing record of change over time and an analytical method for location and measurement of a number of points over the lease area. The monitoring shall incorporate and be an extension of the baseline data. A subset of seeps and springs and the drainages identified in the LMA and LBA would be incorporated into CFC's water–monitoring program based on the chosen alternative in the EIS. Extensive tensile fractures identified during topographic surface monitoring would be repaired by the lessee.[1]
Yes	Yes	9. The lessee shall provide for the suppression and control of fugitive dust on haul roads and at coal handling and storage facilities. On MLNF development roads, lessees may perform their share of road maintenance by a commensurate share agreement if a significant degree of traffic is generated that is not related to their activities.
Yes	No	10a. Except at locations specifically approved by the Authorized Officer (AO), with the concurrence of the FS, underground mining operations shall be conducted in such a manner so as to prevent surface subsidence that would: (1) cause the creation of hazardous conditions such as potential escarpment failure and landslides, (2) cause damage to existing surface structures, and (3) damage or alter the flow of perennial streams. The lessee shall provide specific measures for the protection of escarpments and determine corrective measures to ensure that hazardous conditions are not created. Limited subsidence zones consisting of perennial streams in the lease, Boulger Reservoir/Dam, State Route 264, and Flat Canyon Campground are specifically approved for subsidence resulting from a single–seam of full–extraction

Flat Canyon Federal Coal Lease Tract (UTU–77114)	Little Eccles Federal Coal Lease Tract (UTU–92226)	Stipulation
		mining.
No	Yes	10b. Except at locations specifically approved by the AO, with the concurrence of the FS, underground mining operations shall be conducted in such a manner so as to prevent surface subsidence that would: (1) cause the creation of hazardous conditions such as potential escarpment failure and landslides, (2) cause damage to existing surface structures, and (3) damage or alter the flow of perennial streams. The lessee shall provide specific measures for the protection of escarpments and determine corrective measures to ensure that hazardous conditions are not created.
Yes	Yes	11. The limited–subsidence zones, where subsidence from a second overlapping seam of full–extraction mining is not approved, will be determined based on the typical angle–of–draw for past operations in the Skyline Mine Permit Area (23 degrees). The angle–of–draw will be applied to perennial stream buffer zones that include the natural floodplain and alluvium in perennial drainages, bounded by the first major slope break in the associated canyons. For structures, it will be applied to an area delineated by a 50–foot slope break in the associated canyons. For structures, it will be applied to an area delineated by a 50–foot radius or distance from the major structures that could sustain damage. The AO with consultation from the FS can approve full extraction of multiple seams in limited subsidence zones, if the lessee can provide information, based on actual subsidence data from the tract, that impacts can be tolerated or mitigated.[1]
Yes	Yes	12. In order to avoid surface disturbance on steep canyon slopes and to preclude the need for surface access, all surface breakouts for ventilation tunnels shall be constructed from inside the Skyline Mine, except at locations specifically approved by the AO. [1]
Yes	Yes	13. If removal of timber is required for clearing of construction sites, etc., such timber shall be removed in accordance with the regulations of the FS. [1]
Yes	Yes	14. The coal contained within, and authorized for mining under this lease, shall be extracted only by underground mining methods.
Yes	Yes	15. Existing FS owned or permitted surface improvements will need to be protected, restored, or replaced at the lessee's expense to provide for the continuance of current land uses.
Yes	Yes	16. In order to protect big game wintering areas, elk calving and deer fawning areas, sage-grouse strutting areas, and other critical wildlife habitat and/or activities specific surface uses outside the Skyline Mine development area may be curtailed during specific periods of the year. [1]
Yes	Yes	17. Support facilities, structures, equipment, and similar developments will be removed from the lease area within 2 years after the final termination of use of such facilities. This provision shall apply unless the requirement of Terms and Conditions of the lease, Section 10 is applicable. Section 10 applies when all portions of the lease are

Flat Canyon Federal Coal Lease Tract (UTU–77114)	Little Eccles Federal Coal Lease Tract (UTU–92226)	Stipulation
		returned to the lessor. The delivery of premises, removal of equipment, etc. must occur within 180 days. Disturbed areas and those areas previously occupied by such facilities will be stabilized and rehabilitated, drainages reestablished, and the areas returned to an acceptable post mining land use. [1]
Yes	Yes	18. The Lessee will identify and protect evidence of the Public Land Survey System (PLSS) and related Federal property boundaries prior to commencement of any ground–disturbing activity. Contact BLM Cadastral Survey to coordinate data research, evidence examination and evaluation, and locating, referencing, or protecting monuments of the PLSS and related land boundary markers from destruction. In the event of obliteration or disturbance of the Federal boundary evidence, the Lessee shall immediately report the incident, in writing, to the BLM AO. BLM Cadastral Survey will determine how the marker is to be restored. In rehabilitating or replacing the evidence, the Lessee will reimburse the BLM for costs or, if instructed to use the services of a Certified Federal Surveyor, procurement shall be per qualification–based selection. All surveying activities will conform to the Manual of Surveying Instructions and appropriate State laws and regulations. Cadastral survey will review local surveys before being finalized or filed in the appropriate State or county office. The Lessee will pay for all survey, investigation, penalties, and administrative costs.[1]
Yes	Yes	19. The lessee will be responsible to replace any surface and/or developed groundwater sources identified for protection, that may be lost or adversely affected by mining operations, with water from an alternate source in sufficient quantity and quality to maintain existing riparian habitat, fishery habitat, livestock and wildlife use, or other beneficial uses (authorized by 36 CFR 251). [1]
Yes	Yes	20. The licensee/permittee/lessee must comply with all the rules and regulations of the USDA Secretary of Agriculture set forth at 36 CFR II governing the use and management of the NFSL when not inconsistent with the rights granted by the USDOI Secretary of the Interior in the license/permit/lease. The USDA Secretary of Agriculture's rules and regulations must be complied with for (1) all use and occupancy of the NFSL prior to approval of a permit/operation plan by the USDOI Secretary of Interior, (2) uses of all existing improvements, such as FS MLNF development roads, within and outside the area licensed, permitted or leased by the USDOI Secretary of the Interior, and (3) use and occupancy of the NFSL not authorized by a permit/operation plan approved by the USDOI Secretary of the Interior. [1]
Yes	Yes	21. Notwithstanding the approval of an R2P2 by the BLM, lessor reserves the right to seek damages against the lessee in the event (1) the operator/lessee fails to achieve MER [as defined at 43 CFR 3480.0–5(21)] of the recoverable coal reserves. Damages shall be measured on the basis of the royalty that would have been payable on the wasted or unrecovered coal. The parties recognize that under an approved R2P2,

Flat Canyon Federal Coal Lease Tract (UTU–77114)	Little Eccles Federal Coal Lease Tract (UTU–92226)	Stipulation
		conditions may require a modification by the lessee of that plan. In the event a coal bed or portion thereof is not to be mined or is rendered unminable by the operation, the lessee shall submit appropriate justification to obtain approval by the AO to leave such reserves unmined. [1]
Yes	Yes	22. In the event the AO determines that the R2P2 modification will not attain MER resulting from changed conditions, the AO will give proper notice to the operator/lessee as required under applicable regulations. The AO will order a new R2P2 modification if necessary, identifying additional reserves to be mined in order to attain MER. Upon a final administrative or judicial ruling upholding such ordered modification, any reserves left unmined (wasted) under that plan will be subject to damages as described in described in stipulation 21. Subject to the right to appeal hereinafter set forth, payment of the value of the royalty on such unmined recoverable coal reserves shall become due and payable upon determination by the AO that the coal reserves have been rendered unminable or at such time that the lessee has demonstrated an unwillingness to extract the coal. The BLM may enforce this provision either by issuing a written decision requiring payment of the Office of Natural Resources Revenue (ONRR) demand for such royalties, or by issuing a notice of non–compliance. A decision or notice of non–compliance issued by the lessor that payment is due under this stipulation is appealable as allowed by law. [1]
Yes	Yes	23. WASTE CERTIFICATION: The lessee shall provide upon abandonment and/or sealing off a mined area and prior to lease termination/relinquishment, certification to the lessor that, based upon a complete search of all the operator's records for the Skyline Mine and upon their knowledge of past operations, there has been no hazardous substances per (40 CFR 302.4) or used oil as per Utah State Management Rule R–315–15, deposited within the lease, either on the surface or underground, or that all remedial action necessary has been taken to protect human health and the environment with respect to any such substances remaining on the property. The back–up documentation to be provided shall be described by the lessor prior to the first certification and shall include all documentation applicable to the Emergency Planning and Community Right–to–Know Act (EPCRA, Public Law 99–499), Title III of the Superfund Amendments and Reauthorization Act of 1986 or equivalent.
Yes	Yes	24. ABANDONMENT OF EQUIPMENT: The lessee is responsible for compliance with reporting regarding toxic and hazardous material and substances under federal law and all associated amendments and regulations for the handling such materials on the land surface and in underground mine workings. The lessee must remove mine equipment and materials not needed for continued operations, roof support and mine safety from underground workings prior to abandonment of mine sections. Exceptions can be approved by the AO in consultation with the surface management agency. Creation of a situation that would

Flat Canyon Federal Coal Lease Tract (UTU–77114)	Little Eccles Federal Coal Lease Tract (UTU–92226)	Stipulation
		prevent removal of such material and by retreat or abandonment of mine sections without prior authorization would be considered noncompliance with lease terms and conditions and subject to appropriate penalties under the lease.
Yes	Yes	25. UNDERGROUND INSPECTION: All safe and accessible areas shall be inspected prior to being sealed. The lessee shall notify the AO in writing 30 days prior to the sealing of any areas in the mine and state the reason for closure. Prior to seals being put into place, the lessee shall inspect the area and document any equipment/machinery, hazardous substances, and used oil that is to be left underground. The purpose of this inspection will be: (1) to provide documentation for compliance with 42 USC 9620 Section 120(h) and State Management Rule R–315–15, and to assure that certification will be meaningful at the time of lease relinquishment and (2) to document the inspection with a Skyline Mine map showing location of equipment/machinery (model, type of fluid, amount remaining, batteries, etc.) that is proposed to be left underground. In addition, these items will be photographed at the lessee's expense and shall be submitted to the AO as part of the certification. The abandonment of any equipment/machinery shall be on a case–by–case basis and shall not be accomplished unless the AO has granted a written approval.
Yes	Yes	26. All shafts or portals will be filled after mining has ceased or abandoned and all designs will be approved by the AO.
Yes	No	27. Prior to development of the longwall panels that would cause subsidence of the Boulger Reservoir, the lessee shall submit a plan for approval of mining under the reservoir facilities to the AO. This plan shall include, but not be limited to, type of mining, when and how the dam will be taken out of service while undermining and/or subjected to mining induced acceleration of 0.1 gram and greater, and what mitigation measures will be taken to place the dam and reservoir back into full service. This plan shall be submitted to and be approved by the AO, with consultation of the FS, and any requirements by the regulatory authorities. [1]
Yes	No	28. Prior to development of the longwall panels that would cause subsidence of the Flat Canyon Campground, the lessee shall submit a plan for approval to conduct mining under the campground. This plan shall include but not be limited to type of mining, when and how the Flat Canyon Campground will be taken out of service and what mitigation measures will be taken to place the Flat Canyon Campground back into full service. The plan shall be submitted to and be approved by the AO, with the consultation of the FS, in addition to any requirements by the regulatory authorities. [1]
Yes	Yes	29. Lessee shall submit a plan for monitoring the gradient of the perennial streams within the lease and the associated effects to aquatic ecosystems and wetlands. The plans shall also include measures for mitigating detrimental effects discovered during monitoring. The plans

Flat Canyon Federal Coal Lease Tract (UTU–77114)	Little Eccles Federal Coal Lease Tract (UTU–92226)	Stipulation
		shall be submitted to and be approved by the AO, with concurrence of the FS in addition to any requirements by the regulatory authorities, prior to mining.
Yes	Yes	30. The lessee shall immediately notify the AO of any seismic events that trigger a Richter scale reading in excess of 3.0.
Yes	Yes	31. The lessee shall monitor all tensile fractures for noxious weed species. The lessee shall control any noxious weed infestations originating from or associated with tensile fractures, utilizing methods approved by the FS MLNF.[2]
1 – The agencies added minor clarifying text modifications in this stipulation compared to the stipulations on the parent lease. 2 – The agencies created this stipulation specifically for this LMA or LBA.		

2.9.1.1 <u>Regulatory Requirements</u>

Consistent with the assumptions for analysis (see **Section 3.1.1**), the description of the regulatory requirements is written in terms of modification of the CFC's permits. However, the following permits are required no matter who is the successful bidder in the LBA.

1. *Mine and Reclamation Plan*: The Mine and Reclamation Plan (MRP) was initially approved in 1981 by UDOGM and has been updated since that time. The MRP has requirements and commitments to protect the environment and minimize impacts which can be expected to apply to any action alternatives in this EIS, including subsidence impact prevention measures, topsoil stockpile protection, protection of hydrological balance, and protection of fish and wildlife. Updates or amendments to the existing MRP would trigger the need for federal mine plan approval by the ASLM.

2. *Utah Pollutant Discharge Elimination System Permit UT0023540:* The UDEQ, Utah Division of Water Quality (UDWQ) issued a discharge permit (UT0023450) to Skyline Mine, effective May 1, 2015. Skyline Mine is permitted to discharge mine water – water pumped from underground works and runoff from the mines surface facilities – at outfall locations. The permit establishes limits on the discharge from these points into the Eccles Creek, UP Canyon Creek, and Winter Quarters Canyon Creek (all tributaries to the Price River and Colorado River systems (UDEQ, 2020). The permit includes limits on discharge quality, monitoring requirements, sampling methods, testing methods, and reporting requirements as well as the requirements of a storm water pollution prevention plan.

3. Minor Source Air Permit: Requirements outlined in Skyline Mine's APPROVAL ORDER DAQE–AN100920003–21 would reduce impacts from fugitive dust and

other pollutants generated by equipment operated by the Skyline Mine. See DAQE–AN100920003–21 for additional details (UDAQ, 2021).

2.10 Alternatives Considered but Eliminated from Detailed Study

This section discusses alternatives that were considered but eliminated from detailed analysis. Suggested alternatives proposed during public scoping are described briefly below, along with the reasons they were eliminated from detailed analysis.

2.10.1 Proposed Carbon Fee

During scoping it was suggested that the agencies consider an alternative that charges CFC a carbon fee in order to reimburse the BLM for the climate costs associated with the proposed leasing. The comment suggested that under the FLPMA, the BLM has the authority to recover reasonable costs associated with its coal management program and to appropriate and spend such monies. Specifically, it suggested that FLPMA provides the Secretary of the Interior with authority to "require a deposit of any payments intended to reimburse the United States for reasonable costs with respect to applications," including coal lease applications (43 USC 1734(b)). The FLPMA says such payments are "authorized to be appropriated and made available until expended." The comment suggested that the climate costs of the proposed leasing should be tied to a calculation and analysis of the social cost of GHGs, and that any reimbursement should be at least as much as the calculation of the social cost of GHGs in 2030 based on a 2% discount rate.

The agencies' interpretation of the comment is that it wants the BLM to use 43 USC 1734(b) to charge CFC a carbon fee in order to reimburse the BLM for the climate costs associated with the proposed leasing.

The BLM reviewed FLPMA Section 304, 43 USC 1734 – Fees, Charges, and Commissions, 43 CFR 3473.2 – Fees, and 70 Federal Register 58876, and 43 CFR 3000.120 – Fee Schedule for Fixed Fees. The BLM determined that 43 USC § 1734(b) is to collect funds to help in the processing of applications and other documents relating to the public lands. The BLM also determined that the proposed carbon fee does not fall within the definitions of reasonable costs included in 43 USC 1734(b). Likewise, FLMPA Section 304 and the regulations at 43 CFR 3473.2(f) and (g) discuss a processing fee for a competitive coal lease sale and modification of a coal lease as well as a cost recovery process, and the proposed carbon fee does not fit those texts.

Therefore, the agencies dismissed this proposed alternative from detailed analysis because the fee is inconsistent with basic policy objectives for the management of the area.

2.10.2 Alternate Royalty Rate

In response to public comments received, BLM considered an alternative that establishes alternate royalty rates. The commenter urged the BLM to consider a royalty rate of 50% or higher to account for the social cost of GHG and ensure a fair return to the public. At a minimum, the commenter requested the BLM consider a royalty rate of 12.5%. As part of considering this alternative, the commenter requested that BLM impose a stipulation prohibiting CFC from requesting royalty rate reductions in the future.

Fees, rentals, and royalties are established for federal coal in 43 CFR 3473. Application fees vary depending on the request, but annual rental fees are set at no less than $3.00 per acre; and per the One Big Beautiful Bill Act (Public Law 119–21, Section 50202) the royalty rate for coal leases "… shall be not more than 7 percent…" during the period between July 4, 2025, and September 30, 2034. Further, 43 CFR 3473.3–2(e), allows the Secretary of the Interior, "whenever he/she determines it necessary to promote development or finds that the lease cannot be successfully operated under its terms, may waive, suspend or reduce the rental, or reduce the royalty..." Therefore, an alternative requiring anything greater than 7% royalty or preventing royalty rate reductions cannot be considered.

2.10.3 Flat Canyon Alternate Lease Processing

In response to public comments received, BLM considered an alternative that processes the Flat Canyon Federal Coal Lease Tract (UTU–77114) LMA as a LBA to respond to potential competitive interest for the LMA and the commenter stated it could be developed as part of an existing or potential independent operation. This alternative may reconfigure the Flat Canyon Federal Coal Lease Tract (UTU–77114) LMA in order to make the lease competitive and process it as an LBA.

The agencies do not expect other competitive bidders, processing the Flat Canyon Federal Coal Lease Tract (UTU–77114) LMA as an LBA was not further considered because of the following:

- The target coalbed is not exposed at the surface anywhere within the Flat Canyon Federal Coal Lease Tract (UTU–77114).
- A new operation would need to construct shafts approximately 1,700 feet deep to access the coal as well as surface support facilities, including a loadout.
- Surface roads would have to be rebuilt to accommodate coal–hauling trucks.
- An electric power line of at least 46 kilovolt–amperes (KVA) would need to be built.
- Therefore, the economic viability of a new mine being constructed to extract a maximum of 10 million tons of coal is highly improbable.

2.11 Comparison Summary of Effects

Table 2.11–1 provides a comparison summary of effects by alternative.

Table 2.11–1. Comparison Summary of Effects by Alternative

Issue	Alternative 1: No Action	Alternative 2: LMA and LBA	Alternative 3: Only LMA	Alternative 4: Only LBA
Air Quality	Under the No Action alternative, the mine would continue mining private coal, and the life of the mine would not be extended past January 2032 because no Federal coal would be leased. Mining activities, coal transport, and coal combustion would continue to occur at the same rate as current rates. Therefore, annual CAP and HAP emissions would also be expected to occur at the same rates from mining private coal. Since annual CAP and HAP emissions under this alternative would remain the same as current annual emissions and for the original life of the mine, no additional adverse impacts to air quality, cancer and non–cancer risks, or AQRVs would be expected as a result of this alternative.	Under Alternative 2, the life of the mine would be extended by 18 months. Although the amount of total recoverable coal would increase under this alternative when compared to the no action alternative, mining activities, coal transport, coal processing, and coal combustion would continue to occur at the same rate as current rates throughout the extended life of the mine. Therefore, annual CAP and HAP emissions would also continue to occur until August 2033. Although annual emissions under this alternative are not expected to change, the duration of emissions, and therefore adverse impacts to air quality, AQRVs, cancer, and non–cancer risks would be extended by 18 months.	Under Alternative 3, the life of the mine would be extended by 11 months. Although the amount of total recoverable coal would increase under this alternative when compared to the no action alternative, mining activities, coal transport, and coal combustion would be expected to continue to occur at the same rate as current rates. Therefore, annual CAP and HAP emissions would also continue to occur at the same rate as current rates until December 2032. Although annual emissions under this alternative are not expected to change, the duration of emissions, and therefore adverse impacts to air quality, AQRVs, cancer, and non–cancer risks would be extended by 11 months.	Under Alternative 4, the life of the mine would be extended by 14 months. Although the amount of total recoverable coal would increase under this alternative when compared to the no action alternative, mining activities, coal transport, and coal combustion would be expected to continue to occur at the same rate as current rates. Therefore, annual CAP and HAP emissions would also continue to occur at the same rate as current rates until March 2033. Although annual emissions under this alternative are not expected to change, the duration of emissions, and therefore adverse impacts to air quality, AQRVs, cancer, and non–cancer risks would be extended by 14 months.
Greenhouse Gas Emissions	Under the No Action alternative, the mine would continue mining private coal, and the life of the mine would not be extended past January 2032 because no Federal coal would be leased. Mining activities, coal transport, and coal combustion would continue to occur at the same rate as current rates. Therefore, annual GHG emissions would also be expected to occur at the same rates from mining private coal. Since GHG emissions under this alternative would remain the same as current annual emissions, no additional adverse impacts to climate change would be anticipated from this alternative. The social cost of GHGs is presented in section 3.1.10.5.	Under Alternative 2, the mine would continue mining, and the life of the mine would be extended by 18 months (through August 2033). Mining activities, coal transport, and coal combustion would continue to occur at the same rate as current rates. Therefore, annual GHG emissions would also be expected to occur at the same rates. However, the total recoverable coal would increase under this alternative as compared to the No Action Alternative. As a result, total GHG emissions from mining, downstream processing, and combustion of the coal would also increase under this alternative and additional adverse impacts to climate change would occur. The social cost of GHGs is presented in section 3.1.10.5.	Under Alternative 3, the mine would continue mining, and the life of the mine would be extended by 11 months (through December 2032). Mining activities, coal transport, and coal combustion would continue to occur at the same rate as current rates. Therefore, annual GHG emissions would also be expected to occur at the same rates. However, the total recoverable coal would increase under this alternative as compared to the No Action Alternative. As a result, total GHG emissions from mining, downstream processing, and combustion of the coal would also increase under this alternative and additional adverse impacts to climate change would occur. The social cost of GHGs is presented in section 3.1.10.5.	Under Alternative 4, the mine would continue mining, and the life of the mine would be extended by 14 months (through March 2033). Mining activities, coal transport, and coal combustion would continue to occur at the same rate as current rates. Therefore, annual GHG emissions would also be expected to occur at the same rates. However, the total recoverable coal would increase under this alternative as compared to the No Action Alternative. As a result, total GHG emissions from mining, downstream processing, and combustion of the coal would also increase under this alternative and additional adverse impacts to climate change would occur. The social cost of GHGs is presented in section 3.1.10.5.
Geologic Strata	The estimated recoverable reserves of the private leases are approximately 11.7 million tons of Lower O'Connor A Seam coal.	The four coal seams of economic interest have been partially mined but CFC plans to only mine the Lower O'Connor A seam in the proposed LMA and LBA. Approximately 16 million tons would be mined from private lands, for a total of approximately 19.3 million tons mined.	The estimated recoverable coal reserves within the LMA area are approximately 2.1 million tons. Approximately 15.2 million tons would be mined from private lands, with a total of approximately 17.3 million tons mined under this alternative.	The estimated recoverable coal reserves of the LBA are approximately 1.0 million tons of Lower O'Connor A Seam coal. Approximately 15 million tons would be mined from private lands, with a total of approximately 15.9 million tons mined under this alternative.
Faults and Fractures	Any reactivation of faults within the Blackhawk Formation could fill with clay or ground–up rock and limit the reopening or creation of new hydrologic pathways intersecting the surface.	Six faults and fractures with vertical displacements of approximately 5 to 30 feet would be mined through. Any reactivation of faults within the Blackhawk Formation could fill with clay or ground–up rock and limit the reopening or creation of new hydrologic pathways intersecting the surface.	Faults and Fractures: Any reactivation of faults within the Blackhawk Formation would likely be filled with clay or ground–up rock. Reactivated faults would not likely function as new hydrologic pathways intersecting the land surface.	Any reactivation of faults within the Blackhawk Formation could fill with clay or ground–up rock and limit the reopening or creation of new hydrologic pathways intersecting the surface.
Subsidence	Effects of subsidence would be limited to a small portion of the NFSL. It is unlikely that appreciable surface cracking	It is predicted that there would be 1,923 acres of subsidence under this alternative. There would be 6.2 acres susceptible	It is predicted that there would be 1,827 acres of subsidence under this alternative. There would be 9.1 acres susceptible	Effects of subsidence would be limited to the LBA area with similar adverse impacts to that of Alternative 2.

Issue	Alternative 1: No Action	Alternative 2: LMA and LBA	Alternative 3: Only LMA	Alternative 4: Only LBA
	would result from the subsidence predicted.	to tensile fractures within this subsidence area. Therefore, less than 0.5% of the area that could experience subsidence would be subject to tensile fractures. It is unlikely that appreciable surface cracking would result from the subsidence predicted.	to tensile fractures within this subsidence area. Therefore, less than 0.5% of the area that could experience subsidence would be subject to tensile fractures. It is unlikely that appreciable surface cracking would result from the subsidence predicted.	However, as with Alternatives 2 and 3, it is unlikely that appreciable surface cracking would result from the subsidence predicted. It is predicted that there would be 1,509 acres of subsidence under this alternative. There would be 7.5 acres susceptible to tensile fractures within this subsidence area. Therefore, less than 0.5% of the area that could experience subsidence would be subject to tensile fractures. It is unlikely that appreciable surface cracking would result from the subsidence predicted.
Seismic Events:	No unacceptable risks would be created for the Electric Lake or Boulger dams as a consequence of Alternative 1.	Based upon a comprehensive evaluation of mining–induced seismicity of not only the Skyline Mine but other mines in the Wasatch Plateau coal mining region, mining–induced seismicity could generate a seismic event with a magnitude of 3.9 at the Electric Lake dam. However, based upon the results a 2018 study, the LBA and LMA would not create unacceptable risk to the Electric Lake or Boulger dams.	As with Alternative 2, there would be no unacceptable risk to the Electric Lake or Boulger dams.	As with Alternatives 2 and 3, there would be no unacceptable risk to the Electric Lake or Boulger dams
Surface Water – Water Quantity of Streams, Springs, Ponds, and Wetlands	No perceptible or quantifiable adverse impacts to spring or surface–water discharge rates are expected in the areas within or affected by the mining that would occur under Alternative 1. Operational monitoring of selected baseline seeps and springs as identified in Lease Stipulation 8 and the Skyline Mine hydrologic monitoring program with UDOGM would continue. In summary, Alternative 1 is expected to have minimal impacts to water quantity of streams, springs, ponds, and wetlands and stream geomorphology.	No perceptible or quantifiable adverse impacts to spring or surface–water discharge rates are expected in the areas overlying or affected by the LBA or LMA. Operational monitoring of selected baseline seeps and springs as identified in Lease Stipulation 8 and the Skyline Mine hydrologic monitoring program with UDOGM would continue. It is assumed that additional seeps and springs associated with the LMA and LBA would be incorporated into CFC's water–monitoring program based on the chosen alternative in the EIS and associated lease stipulations that would be part of any lease approval. In summary, Alternative 2 is expected to have minimal impacts to water quantity of streams, springs, ponds, and wetlands and stream geomorphology.	Alternative 3 would result in a mine life approximately 8 months shorter, mining of approximately 2 million fewer tons of coal, and mining a slightly smaller area. Mining methods and related activities such as dewatering would be the same as for Alternative 2. The impacts to surface water quantity would be very similar for Alternative 3 as for Alternative 2. Alternative 3 is expected to have minimal impacts to water quantity of streams, springs, ponds, and wetlands.	Compared to Alternative 2, Alternative 4 would result in a mine life approximately 5 months shorter, mining of approximately 3.5 million fewer tons of coal, and mining a slightly smaller area. Mining methods and related activities such as dewatering would be the same as for Alternatives 2 and 3. The impacts to surface water quantity would be very similar for Alternative 4 as for Alternative 2. Alternative 4 is expected to have minimal impacts to water quantity of streams, springs, ponds, and wetlands.
Surface Water – Water Balance and Water Quality of Electric Lake and Scofield, Huntington, and Cleveland Reservoirs	Considering existing ground water quality, the absence of water–quality changes shown by water–quality trend analysis, and historical discharge monitoring results, and assuming continued compliance with permit conditions, surface water quality is not expected to be affected by the permitted discharges from mine dewatering activities. Consequently, no water quality effects on water rights, users, or designated uses are expected.	Considering existing ground water quality, the absence of water–quality changes shown by water–quality trend analysis, and historical discharge monitoring results, and assuming continued compliance with UPDES permit conditions, surface water balance and quality is not expected to be affected by the permitted discharges from mine dewatering activities. Consequently, no water balance or quality effects on water rights, users, or designated uses are expected.	The impacts to surface water balance and quality would be very similar for Alternative 3 as for Alternative 2. Alternative 3 is expected to have minimal impacts to surface water – water balance and water quality of Electric Lake and Scofield, Huntington, and Cleveland Reservoirs.	The impacts to surface water balance and quality would be very similar for Alternative 4 as for Alternative 2. Alternative 4 is expected to have minimal impacts to surface water – water balance and water quality of Electric Lake and Scofield, Huntington, and Cleveland Reservoirs.
Surface Water Quality of Streams, Springs, and Ponds	Impacts to the shallow ground water systems that support springs and seeps and provide baseflow to streams in the area are not anticipated. Thus, detrimental impacts to important water quality parameters such as acidity, total suspended solids, and total dissolved solids in creeks and springs are considered unlikely. This conclusion is supported by the fact that long–term monitoring of surface streams identified no appreciable impacts to surface water quality or flow rates in the Skyline Mine permit or adjacent areas.	Impacts on the shallow ground water systems that support springs and seeps and provide baseflow to streams in the Flat Canyon LMA area are not anticipated. Thus, detrimental impacts to important water quality parameters such as acidity, total suspended solids, and total dissolved solids in creeks and springs in the Flat Canyon LMA area are considered unlikely. This conclusion is supported by the fact that long–term monitoring of surface streams identified no appreciable impacts to surface water quality or flow rates in the Skyline Mine permit or adjacent areas.	The impacts to surface water quantity would be very similar for Alternative 3 as for Alternative 2. Detrimental impacts to important water quality parameters such as acidity, total suspended solids, and total dissolved solids in creeks and springs in the Flat Canyon LMA area are considered unlikely under Alternative 3.	The impacts to surface water quantity would be very similar for Alternative 4 as for Alternative 2. Detrimental impacts to important water quality parameters such as acidity, total suspended solids, and total dissolved solids in creeks and springs in the Flat Canyon LMA area are considered unlikely under Alternative 4.

Issue	Alternative 1: No Action	Alternative 2: LMA and LBA	Alternative 3: Only LMA	Alternative 4: Only LBA
Groundwater Water Quantity and Availability	Quantitative analysis of systematic, long–term monitoring indicated that no monotonic upward or downward trend was observed for any ground water level. While ground water level declines were measured in numerous wells from 2017 through mid–2023, the declines did not occur continuously, and later upward trends resulted in recent water levels that are similar to or in some cases higher than initial levels recorded in 2017–2018. In summary, detrimental impacts to ground water quantity and availability are not anticipated under Alternative 1.	Mining at the Skyline Mine does not appear to have created pathways for the downward migration of water from the surface or near surface to the mine. Mining or mine–related subsidence in the LBA and LMA boundaries also would not divert surface flows or near–surface ground water into deeper formations. While ground water level declines were measured in numerous wells from 2017 through mid–2023, the declines did not occur continuously, and later upward trends resulted in recent water levels that are similar to or in some cases higher than initial levels recorded in 2017–2018. In summary, detrimental impacts to ground water quantity and availability are not anticipated under Alternative 2.	The impacts to groundwater water quantity and availability would be very similar for Alternative 3 as for Alternative 2. Detrimental impacts to ground water quantity and availability are not anticipated under Alternative 3.	The impacts to groundwater water quantity and availability would be very similar for Alternative 4 as for Alternative 2. Detrimental impacts to ground water quantity and availability are not anticipated under Alternative 4.
Groundwater Water Quality	Detrimental impacts to important water quality parameters such as acidity and total dissolved solids in ground water are considered unlikely. This conclusion is supported by the fact that long–term monitoring of water resources identified no appreciable impacts to water quality in the Skyline Mine permit or adjacent areas. In summary, detrimental impacts to ground water quality are not anticipated under Alternative 1.	Springs and seeps in the shallow ground water system may be hydraulically disconnected from the LBA and LMA and the lower Blackhawk Formation and Star Point Sandstone deep ground water system. Consequently, dewatering of the mine and lowering of water levels in the deep ground water system would likely have no impact on overlying ground water quality. Detrimental impacts to important water quality parameters such as acidity and total dissolved solids in ground water are considered unlikely. This conclusion is supported by the fact that long–term monitoring of water resources identified no appreciable impacts to water quality in the Skyline Mine permit or adjacent areas.	The impacts to groundwater water quality would be very similar for Alternative 3 as for Alternative 2. Dewatering of the mine and lowering of water levels in the deep ground water system would likely have no impact on overlying ground water quality.	The impacts to groundwater water quality would be very similar for Alternative 4 as for Alternative 2. Dewatering of the mine and lowering of water levels in the deep ground water system would likely have no impact on overlying ground water quality.
Groundwater – Water Balance and Water Quality of Electric Lake and Scofield, Huntington, and Cleveland Reservoirs	Compared to Alternatives 2, 3, or 4, Alternative 1 would result in a mine life approximately 11 to 18 months shorter, mining of approximately 4.2 to 7.6 million fewer tons of coal, and mining a smaller area. Mining methods and related activities such as dewatering would continue. The impacts to surface water and ground water quantity and quality would be shorter in duration and cover a smaller area than for Alternatives 2, 3, and 4. For Alternative 1, the duration of dewatering discharges would be shorter and the area subject to subsidence would be smaller than for Alternatives 2, 3, and 4. Consequently, any increase in volume of surface water in Electric Lake would be of shorter duration, and any transient effects to stream geomorphology or sedimentation would occur over a smaller area and for a shorter duration.	The reduction of water volume or water balance of water bodies from interception of faults during mining is unlikely under Alternative 2, as the Diagonal Fault is east of the LBA and would not be encountered. Dewatering discharge ultimately flows into Electric Lake and therefore could increase the volume of water in the lake; however, the small volume of dewatering discharge relative to the capacity of Electric Lake, as well as the natural sources of volume changes in Electric Lake, would make it unlikely that any increase in volume would be identifiable or measurable.	For Alternative 3, the duration of dewatering discharges would be shorter and the area subject to subsidence would be smaller than for Alternative 2. Consequently, any increase in the volume of surface water in Electric Lake would be of shorter duration, and any transient effects to stream morphology or sedimentation would occur over a smaller area and for a shorter duration.	For Alternative 4, the duration of dewatering discharges would be shorter and the area subject to subsidence would be smaller than for Alternatives 2 and 3. Consequently, any increase in volume of surface water in Electric Lake would be of shorter duration, and any transient effects to stream morphology or sedimentation would occur over a smaller area and for a shorter duration.
Vegetation Communities and Rare Plants	No rare plant species would be affected. Some individual plants in a six–acre area may be affected by tensile fissuring, but overall community composition would not be appreciably altered.	No rare plant species would be affected. Some individual plants in a less than 10–acre area may be affected by tensile fissuring, but overall community composition would not be appreciably altered.	No rare plant species would be affected. Some individual plants in a nine–acre area may be affected by tensile fissuring, but overall community composition would not be appreciably altered.	No rare plant species would be affected. Some individual plants in a 7.5–acre area may be affected by tensile fissuring, but overall community composition would not be appreciably altered.
Wetlands, Riparian Areas, Seeps, And Springs	Water volume delivered to wetlands, riparian areas, seeps and springs is not expected to change. Shifts in stream morphology may occur due to subsidence, but overall acreages of wetlands and riparian areas are not expected to change appreciably. 1,230 acres would be subject to	Water volume delivered to wetlands, riparian areas, seeps and springs is not expected to change. Shifts in stream morphology may occur due to subsidence, but overall acreages of wetlands and riparian areas are not expected to change appreciably. 1,923 acres would be subject to	Water volume delivered to wetlands, riparian areas, seeps and springs is not expected to change. Shifts in stream morphology may occur due to subsidence, but overall acreages of wetlands and riparian areas are not expected to change appreciably. 1,827 acres would be subject to	Water volume delivered to wetlands, riparian areas, seeps and springs is not expected to change. Shifts in stream morphology may occur due to subsidence, but overall acreages of wetlands and riparian areas are not expected to change appreciably. 1,509 acres would be subject to

Issue	Alternative 1: No Action	Alternative 2: LMA and LBA	Alternative 3: Only LMA	Alternative 4: Only LBA
	potential subsidence.	potential subsidence.	potential subsidence.	potential subsidence.
Federally Threatened and Endangered Fish and Wildlife Species	There would be no effect on the following endangered species: bonytail (*Gila elegans*), Colorado pikeminnow (*Ptychocheilus lucius*), humpback chub (*Gila cypha*), and razorback sucker (*Xyrauchen texanus*). This alternative is not likely to jeopardize continued existence or adversely modify proposed critical habitat for the proposed threatened species monarch butterfly (*Danaus plexippus*) as well as the proposed endangered Suckley's Cuckoo Bumble Bee (Bombus suckleyi).	There would be no effect on the following endangered species: bonytail, Colorado pikeminnow, humpback chub, and razorback sucker. This alternative is not likely to jeopardize continued existence or adversely modify proposed critical habitat for the proposed threatened species monarch butterfly as well as the proposed endangered Suckley's Cuckoo Bumble Bee.	There would be no effect on the following endangered species: bonytail, Colorado pikeminnow, humpback chub, and razorback sucker. This alternative is not likely to jeopardize continued existence or adversely modify proposed critical habitat for the proposed threatened species monarch butterfly as well as the proposed endangered Suckley's Cuckoo Bumble Bee.	There would be no effect on the following endangered species: bonytail, Colorado pikeminnow, humpback chub, and razorback sucker. This alternative is not likely to jeopardize continued existence or adversely modify proposed critical habitat for the proposed threatened species monarch butterfly as well as the proposed endangered Suckley's Cuckoo Bumble Bee.
FS Sensitive Fish and Wildlife Species	There would be no impacts on the following FS sensitive species: western (Boreal) toad (*Anaxyrus boreas* – formerly *Bufo boreas*), Colorado River cutthroat trout (*Oncorhynchus clarkii pleuriticus*), spotted bat (*Euderma maculatum*) and Townsend's western big–eared bat (*Corynorhinus townsendi townsendi*). The alternative may impact individuals but is not likely to cause to trend to federal listing or loss of viability to the following species: American three–toed woodpecker (*Picoides dorsalis*) and American (northern) goshawk (*Astur atricapillus – formerly Accipiter gentilis*).	There would be no impact on the following FS sensitive species: western (Boreal) toad, Colorado River cutthroat trout, spotted bat, and Townsend's western big–eared bat. The alternative may impact individuals but is not likely to cause to trend to federal listing or loss of viability to the following species: American three–toed woodpecker and American (northern) goshawk.	There would be no impact on the following FS sensitive species: western (Boreal) toad, Colorado River cutthroat trout, spotted bat, and Townsend's western big–eared bat. The alternative may impact individuals but is not likely to cause to trend to federal listing or loss of viability to the following species: American three–toed woodpecker and American (northern) goshawk.	There would be no impact on the following FS sensitive species: western (Boreal) toad, Colorado River cutthroat trout, spotted bat, and Townsend's western big–eared bat. The alternative may impact individuals but is not likely to cause to trend to federal listing or loss of viability to the following species: American three–toed woodpecker and American (northern) goshawk.
Migratory Birds	Approximately 6.2 acres of migratory bird habitat could experience subsidence–related tensile fractures. A small number of trees may be become unstable and fall. However, no widespread reduction of foraging resources, cover, or water resources in the analysis area would occur. Nests could be destroyed if a tree falls that contains a nest, although the likelihood of this happening is low given that surface fractures would be 0.3 percent of the 2,408–acre wildlife analysis area.	Approximately 9.6 acres of migratory bird habitat could experience subsidence–related tensile fractures within the predicted subsidence area. A small number of individual plants along the fractures could experience mortality or reduced growth. A small number of trees may be become unstable and fall. However, no widespread reduction of foraging resources, cover, or water resources in the analysis area would occur. Nests could be destroyed if a tree falls that contains a nest, although the likelihood of this happening is low given that surface fractures would be localized and expected to affect a small portion (0.4 percent) of the 2,408–acre wildlife analysis area.	Approximately 9.1 acres of migratory bird habitat could experience subsidence–related tensile fractures. A small number of trees may be become unstable and fall. However, no widespread reduction of foraging resources, cover, or water resources in the analysis area would occur. Nests could be destroyed if a tree falls that contains a nest, although the likelihood of this happening is low given that surface fractures would be localized and expected to affect a small portion (0.4 percent) of the 2,408–acre wildlife analysis area.	Approximately 7.5 acres of migratory bird habitat could experience subsidence–related tensile fractures. A small number of trees may be become unstable and fall. However, no widespread reduction of foraging resources, cover, or water resources in the analysis area would occur. Nests could be destroyed if a tree falls that contains a nest, although the likelihood of this happening is low given that surface fractures would be localized and expected to affect a small portion (0.3 percent) of the 2,408–acre wildlife analysis area.
Big Game Crucial Range	Approximately 6.2 acres of big game crucial summer range could experience subsidence–related tensile fractures. Changes to big game calving/fawning and cover forage ratios would be negligible because any subsidence would be localized, affecting only small portions of the analysis area, 0.3 percent. These areas would not substantially change cover or forage ratios over the larger landscape and would not result in any changes to population trends.	Approximately 9.6 acres of big game crucial summer range could experience subsidence–related tensile fractures within the predicted subsidence area. A small number of individual plants along the fractures could experience mortality or reduced growth but no widespread reduction of foraging resources, cover, or water resources or decrease in habitat quality in the analysis area would occur. No reduction in herd numbers is expected.	Approximately 9.1 acres of big game crucial summer range could experience subsidence–related tensile fractures within the predicted subsidence area. A small number of individual plants along the fractures could experience mortality or reduced growth but no widespread reduction of foraging resources, cover, or water resources or decrease in habitat quality in the analysis area would occur. No reduction in herd numbers is expected.	Approximately 7.5 acres of big game crucial summer range could experience subsidence–related tensile fractures within the predicted subsidence area. A small number of individual plants along the fractures could experience mortality or reduced growth but no widespread reduction of foraging resources, cover, or water resources or decrease in habitat quality in the analysis area would occur. No reduction in herd numbers is expected.
Socioeconomics	Employment would extend to January 2032 under Alternative 1, averaging about 400 employees. Economic output would total more than $1.1 billion over the life of the mine. Alternative 1 would generate approximately $129 million in total tax revenues through 2032, of which $28 million would accrue to the three Counties in the analysis	Employment would extend to January 2033 under Alternative 2, averaging about 410 employees. Economic output would total more than $1.5 billion over the life of the mine. Alternative 2 would generate approximately $183 million in total tax revenues through 2033, of which $41 million would accrue to the three Counties in the analysis	Employment would extend to September 2032 under Alternative 3, averaging about 400 employees. Economic output would total more than $1.3 billion over the life of the mine. Alternative 3 would generate approximately $158 million in total tax revenues through 2032, of which $35 million would accrue to the three Counties in the analysis	Employment would extend to March 2033 under Alternative 4, averaging about 400 employees. Economic output would total more than $1.4 billion over the life of the mine. Alternative 4 would generate approximately $168 million in total tax revenues through 2033, of which $39 million would accrue to the three Counties in the analysis

Issue	Alternative 1: No Action	Alternative 2: LMA and LBA	Alternative 3: Only LMA	Alternative 4: Only LBA
	area. Estimated coal production would be the lowest under this alternative, resulting in lower mineral lease distributions to the State and affected counties. There would be no SC–GHG associated with mining, commuting, transportation, and combustion as the Federal coal would not be leased. GHG emissions associated with mining private coal would remain the same as current annual emissions.	area. Estimated coal production would be the highest under this alternative, resulting in higher mineral lease distributions to the State and affected counties. Using the IWG approach, SC–GHG associated with mining, commuting, transportation, and combustion discounted back to 2025 would be from 0.2 to 1.7 billion dollars (2020 dollars) depending on the discount rate. Using the EPA approach, the SC–GHG associated with mining, commuting, transportation, and combustion discounted back to 2025 would be from 1.6 to 4.4 billion dollars (2023 dollars) depending on the discount rate. GHG emissions associated with mining private coal would be nearly the same as described in Alternative 1, so differences in climate change impacts, including SC–GHG, between alternatives would primarily be from mining the Federal coal.	area. Estimated coal production would be higher than Alternative 1 but lower than Alternative 2, resulting in lower mineral lease distributions than Alternative 2 (but higher than Alternative 1) to the State and affected counties. Using the IWG approach, the SC–GHG associated with mining, commuting, transportation, and combustion discounted back to 2025 would be from 0.1 to 1.0 billion dollars (2020 dollars) depending on the discount rate. Using the EPA approach, the SC–GHG associated with mining, commuting, transportation, and combustion discounted back to 2025 would be from 0.9 to 2.6 billion dollars (2023 dollars) depending on the discount rate. GHG emissions associated with mining private coal would be nearly the same as described in Alternative 1, so differences in climate change impacts, including SC–GHG, between alternatives would primarily be from mining the Federal coal.	area. Estimated coal production would be higher than Alternatives 1 and 3 but lower than Alternative 2, resulting in lower mineral lease distributions than Alternative 2 (but higher than Alternatives 1and 3) to the State and affected counties. Using the IWG approach, the SC–GHG associated with mining, commuting, transportation, and combustion discounted back to 2025 would be from 0.1 to 1.2 billion dollars (2020 dollars) depending on the discount rate. Using the EPA approach, the SC–GHG associated with mining, commuting, transportation, and combustion discounted back to 2025 would be from 1.1 to 3.2 billion dollars (2023 dollars) depending on the discount rate. GHG emissions associated with mining private coal would be nearly the same as described in Alternative 1, so differences in climate change impacts, including SC–GHG, between alternatives would primarily be from mining the Federal coal.

Chapter 3
Affected Environment and Environmental Consequences

3.1 Introduction

On May 29, 2025, the Supreme Court issued a unanimous decision in *Seven County Infrastructure Coalition v. Eagle County, Colorado*, 145 S. Ct. 1497 (2025) (*Seven County*), holding that an agency is entitled to "substantial deference" in determining when an EIS has complied with NEPA "[s]o long as the EIS addresses environmental effects from the project at issue . . . ." and that NEPA does not require an agency to evaluate the environmental effects of activities separate in time or place from the agency's proposed action.

In addition, the analysis in the EIS was largely drafted before the Supreme Court's *Seven County* decision. As a result, the EIS contains significantly more analysis than is required under NEPA. In light of the national energy emergency, prior litigation over the Skyline Mine, the applicable settlement agreement, and the efficient use of agency resources, BLM and FS decided to leave this extraneous analysis in the EIS rather than taking the time and resources to remove it. However, BLM and FS maintains that under *Seven County*, much of the analysis contained in the EIS, particularly, those that are attenuated in time and geography from the project, are not required to be analyzed under NEPA because those downstream impacts are related to activities for which the agencies have no control.

3.1.1 Assumptions for Analysis

The following is a reasonably foreseeable development scenario consisting of underground workings. See also **Appendix C**.

3.1.1.1 Leasing Assumption

The alternatives deal only with leasing actions. The LMA, if offered, would be attached to CFC's existing lease. The LBA would be offered competitively and could be obtained by any company. However, for the purposes of the analysis, the agencies assume that it would be developed in conjunction with the existing Skyline Mine.

3.1.1.2 LBA Conceptual Mine Plan

If CFC is the successful bidder for the Little Eccles Federal Coal Lease Tract (UTU–92226) LBA, underground workings in the Skyline Mine would be extended through the western portion of existing federal and private leases to the LBA. This would involve mining main entries to the south, mining a system of submains to the south, and then mining another set of submains to the west to set up longwall panels that would extend into the LBA. No expansion of the existing surface portal facilities for the Skyline Mine in Eccles Canyon would be required. Access to the coal reserves would be from existing underground workings in the adjacent leases. Water discharge would be from existing UPDES permitted discharge points in Eccles Creek in Eccles Canyon and in Electric Lake [see **Appendix D**]).

There are two coal seams present in the LBA: the Lower O'Connor A seam and the Lower O'Connor B seam. Only the Lower O'Connor A seam is mineable. The LBA could contain about 858,000 tons of recoverable Lower O'Connor A seam coal.

3.1.1.3 LMA Conceptual Mine Plan

The Flat Canyon Federal Coal Lease Tract (UTU–77114) LMA would be noncompetitively offered to CFC upon approval. There are two coal seams present in the LMA: the Lower O'Connor A seam and the Lower O'Connor B seam. Only the Lower O'Connor A seam is mineable. The estimated recoverable reserves within the LMA area are approximately 2,095,000 tons.

3.1.1.4 Anticipated Mining Amounts

Table 3.1–1 shows the Skyline Mine Coal Production over the past 10 years. Based on this information, it is assumed the Skyline Mine would likely produce 3 to 4 million tons of coal per year, which has been their approximate production over the past 10 years.

Table 3.1–1. Skyline Mine Coal Production Over the Past 10 Years

Year (September – August)	Total Tons
2014 – 2015	4,094,000
2015 – 2016	4,691,000
2016 – 2017	4,483,000
2017 – 2018	4,228,000
2018 – 2019	3,224,000
2019 – 2020	3,555,000
2020 – 2021	3,582,000
2021 – 2022	2,869,000
2022 – 2023	3,289,000
2023 – 2024	2,389,000
10–year Average	3,640,000

3.1.1.5 Mining Method

As in the past, CFC would employ longwall extraction with continuous mining machines used for development and potential small room–and–pillar sections. Assumptions used for the analysis regarding the mining operations are:

- Mining of all coal over 6 feet thick.
- Full extraction of one seam in the LBA and LMA. The single seam extraction will be approximately 9 feet.
- Continuous mining machine for gate road development and mains/submains development.
- Room–and–pillar mining for all areas that are not amenable to longwall mining.
- The coal seam average depth is 1,500 feet below the ground surface.

Additional information is contained in **Appendix C**.

3.1.1.6 Coal Consumption

The annual coal loaded and shipped from the Skyline Mine from 2020 to 2023 averaged 3.3 million TPY and on average 35% of the coal shipped from the Skyline Mine remained in Utah. Historically, the Skyline Mine has shipped coal to multiple facilities throughout the US. The number and location of coal customers for Skyline Mine greatly varies from year to year. From 2020 to 2023, coal was transported via truck to approximately 20 different destinations in Utah, Idaho, Nevada, and Oregon and up to 550 miles away from the mine. During this same period, coal was transported via rail to approximately 25 different destinations including California, Texas, Indiana, Illinois, Arkansas, and Oklahoma and up to 1800 miles away from the mine. One truck can carry 42 tons of coal, and one rail car can carry 116 tons of coal.

3.1.2 Past, Present, and Reasonably Foreseeable Projects

The BLM and FS identified numerous projects to consider when assessing incremental impacts which are listed in **Table 3.1–2** and shown in **Figure 3.2–1**. Past and present projects contribute to the Affected Environment and are discussed in these sections for each resource. Reasonably foreseeable projects would contribute to Environmental Consequences and are discussed in these sections by resource.

Table 3.1–2. Past, Present, and Reasonably Foreseeable Projects

Actions	Dates Implemented	Residual Effects
TIMBER		
Shalom Timber Sale	2016–2020	Dead wood salvage on approximately 500 acres.
Mine Timber Sale	2015–2023	Dead wood removal has lowered the amount of dead fuel loading in these areas. Approximately 2,500 acres.
Mine 1 Timber Sale	2015–2021	Dead wood removal has lowered the amount of dead fuel loading in these areas. Approximately 500 acres.
Swen’s Timber Sale	2020–2022	Dead wood removal has lowered the amount of dead fuel loading in these areas. Approximately 200 acres.
Cleveland Timber Sale	2018–2024	Dead wood removal has lowered the amount of dead fuel loading in these areas. Approximately 200 acres.
Boulger Timber Sale	2017–2023	Dead wood removal has lowered the amount of dead fuel loading in these areas. Approximately 900 acres.
Black Timber Sale	2019–present	Dead wood removal has lowered the amount of dead fuel loading in these areas. Approximately 5,000 acres.
Reeder Timber Sale	2020–present	Dead wood removal has lowered the amount of dead fuel loading in these areas. Approximately 2,500 acres.
Staker Timber Sale	2023–present	Dead wood removal has lowered the amount of dead fuel loading in these areas. Approximately 1,400 acres.
Brown Timber Sale	2023–present	Dead wood removal has lowered the amount of dead fuel loading in these areas. Approximately 5,500 acres.
Willow Timber Sale	2018–present	Mixed conifer understory/overstory thinning maximizing species composition and aspen regeneration on

Actions	Dates Implemented	Residual Effects
		approximately 200 acres.
Jane Timber Sale	2021–present	Mixed conifer understory/overstory thinning maximizing species composition and aspen regeneration on approximately 900 acres.
Tarzan Timber Sale	2022–present	Mixed conifer understory/overstory thinning maximizing species composition and aspen regeneration on approximately 400 acres.
Pineapple Timber Sale	2022–present	Mixed conifer understory/overstory thinning maximizing species composition and aspen regeneration on approximately 200 acres.
Duck Timber Sale	2000–2011	Salvage sale on approximately 681 acres.
Lake Timber Sale	2011	Salvage sale on approximately 357 acres.
Miller's Flat Timber Sale	2010	Salvage and harvest on approximately 480 acres.
Flat Canyon Campground Timber Sale	2005–2009	Dead wood removal has lowered the amount of dead fuel loading in these areas as well as reducing the hazard to the public from dead trees falling. Approximately 10 acres.
Six Timber Sale	2016	Dead wood salvage on approximately 266 acres.
Upper Ephraim Timber Sale	2005	Dead wood salvage on approximately 99 acres.
Upper Manti Timber Sale	2005	Dead wood salvage on approximately 179 acres.
Beaver Dams Timber Sale	2010	Dead wood removal has lowered the amount of dead fuel loading in these areas. Approximately 10 acres.
Several private landowners in the surrounding area–initiated timber cutting projects further reducing the dead fuel loading on 1184 recorded acres. However, it could be as high as 1689 acres. Around Electric Lake – inholdings	2001–present	Dead wood removal has lowered the amount of dead fuel loading in these areas. Live fir and aspen removal have potentially increased aspen abundance.
Monument Timber Sale	2021–present	Dead wood removal has lowered the amount of dead fuel loading in these areas. Approximately 600 acres.
Skyline HFRA	Future	Approximately 900 acres on map
FIRE – PRESCRIBED FIRE AND WILDFIRE		
French Creek WFU	2007	Wildland fire use, burning approximately 3,341 acres.
Seeley Fire	2012	Wildland fire burning approximately 47,654 acres. Display in separate polygons on the map.
West Scofield	2009	Prescribed fire burn affecting approximately 8,947 acres.
Forest–wide Restoration and Fuels Reduction Prescribed Fire Project	Future	The forest could increase the acres of prescribed fire to up to 31,250 per year.
Skyline HFRA RX	Future	Approximately 1,500 acres, * pink RX polygons on the map

Actions	Dates Implemented	Residual Effects
WATERSHED RESTORATION		
Gordon Creek Watershed Restoration Project	2024–present	Improve watershed conditions by increasing stream function and riparian habitat, using a variety of methods including beaver dam analogs and post assisted log structures.
Trail Mountain Fire Emergency Watershed Protection Project	2019	Improve watershed conditions by increasing stream function and riparian habitat, using a variety of methods including beaver dam analogs and post assisted log structures.
Twelve Mile Aquatic Restoration Project	2023–present	Improve watershed conditions by increasing stream function and riparian habitat, using a variety of methods including beaver dam analogs and post assisted log structures.
East Mountain Boreal Toad Habitat Restoration Project	2023–present	Improve watershed conditions by increasing stream function and riparian habitat, using a variety of methods including beaver dam analogs and post assisted log structures.
ONGOING USES		
Developed and dispersed recreation	Ongoing	Camping, hunting, fishing, and hiking have historically occurred and would continue to occur throughout the LMA and LBA boundary.
Livestock grazing	Ongoing	Beaver Dams – Boulger S&G allotment is grazed under a term grazing permit which authorizes 1,200 sheep (ewe/lamb pairs) from 7/6 – 10/5 annually. Birch Creek – Bear Canyon S&G allotment is grazed under a term grazing permit which authorizes 1,100 sheep (ewe/lamb pairs) from 7/6 – 9/30 annually.
Road and trail construction and maintenance	Ongoing	Occurs throughout the LMA and LBA boundary.
Public fuelwood cutting	Ongoing	Occurs throughout the LMA and LBA boundary. The percentage of the analysis area affected by fuelwood cutting is minimal.
Invasive species treatments	Ongoing	Occurs throughout the LMA and LBA. There is no ground disturbance associated with this activity.

3.2 Air Quality

3.2.1 Analysis Area

The analysis area for air quality and air quality related values (AQRVs) is defined as Carbon, Emery, and Sanpete counties (the counties where mining activities occur) to accommodate the regional nature of air pollution and to facilitate analysis using the best available air quality monitoring data, which are generally provided at the county level, as well as Class I areas that are nearest to the proposed action. The air quality and AQRVs analysis area is shown in **Figure 3.2–2** and mining activities that occur within the analysis area are discussed in detail in **Section 3.2.3.4**.

Figure 3.2–1. Past, Present, and Reasonably Foreseeable Projects

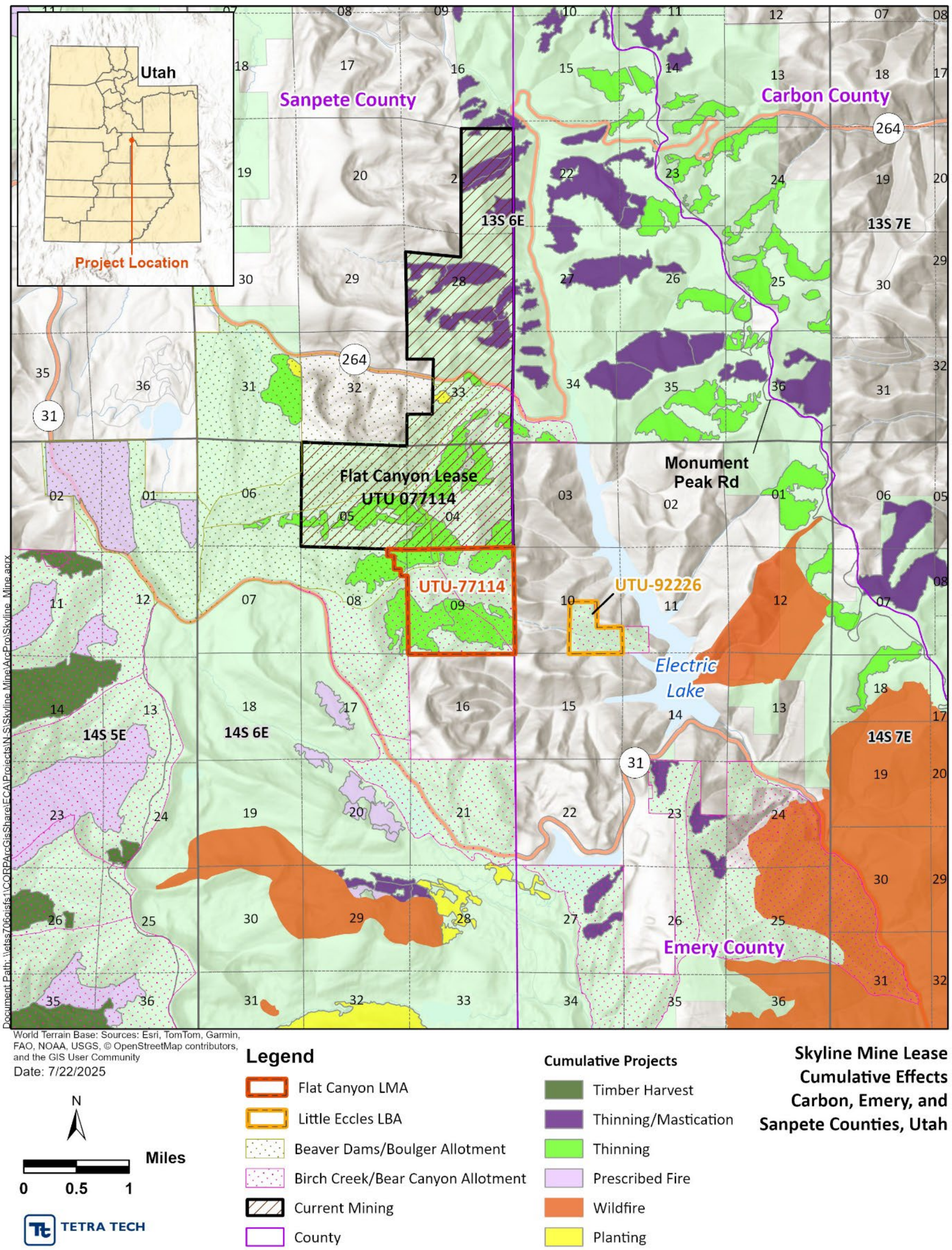
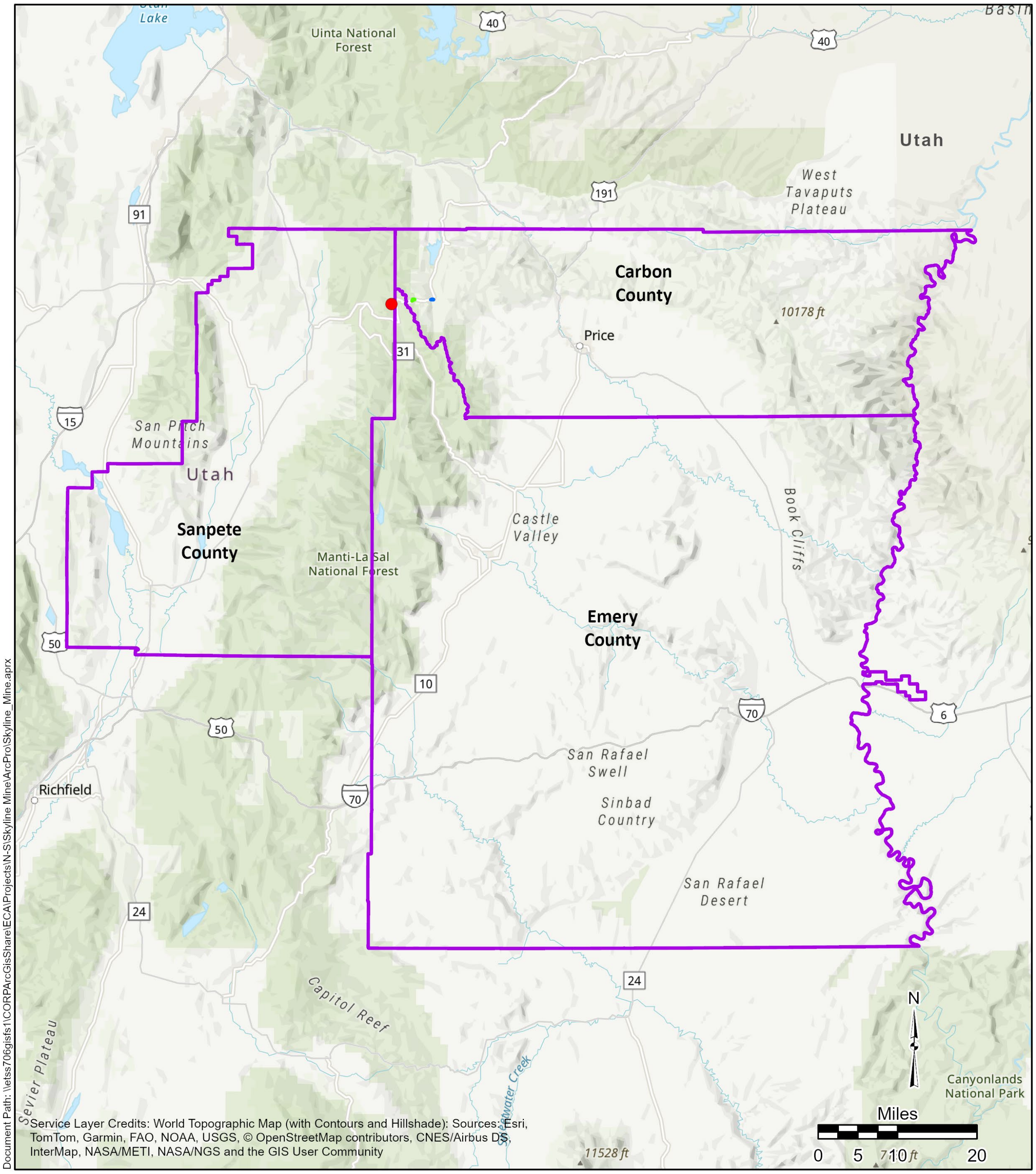


Figure 3.2–2. Air Quality Impact Analysis Area



Date: 7/10/2025

Legend

- Swens Canyon Ventilation Shaft
- Lower Mine Site Surface Operations Area
- Upper Mine Site Surface Operations Area
- Air Quality Analysis Area

TETRA TECH

Air Quality Impact Analysis Area
Project Location
Carbon, Emery, and Sanpete Counties, Utah

3.2.2 Evaluation Criteria

The issues and analysis methodology for air quality as originally specified in the Plan of Study (Tetra Tech, 2021) are shown in **Table 3.2–1** below.

Table 3.2–1. Air Quality Analysis Issues and Evaluation Criteria

Issue	Evaluation Criteria
How would emissions from potential coal mining, transportation, and combustion impact air quality, and air quality related values, in Emery, Carbon, and Sanpete counties and in Class I areas nearest to the mine?	Develop criteria and hazardous air pollutants emissions inventory in tons per year and pounds per hour emitted from mining, transport, and combustion of coal. Perform air dispersion modeling for the Swens Shaft to analyze and determine pollutant concentrations of nitrogen dioxide over a 1–hour averaging period and compare the modeled design value to the Significant Impact Levels and the compare the cumulative impact concentration (modeled design value combined with the monitored design value) to the National Ambient Air Quality Standards, Prevention of Significant Deterioration increments, and Significant Impact Levels.

3.2.3 Affected Environment

3.2.3.1 Criteria Air Pollutants and Air Quality Standards

The CAA requires the EPA to set National Ambient Air Quality Standards (NAAQS)[3] for six air contaminants, known as criteria pollutants (CAPs), which can be harmful to public health and the environment (EPA, 2024a). These criteria pollutants are particulate matter with an aerodynamic diameter of 10 micrometers (µm) or less (PM_{10}), particulate matter with an aerodynamic diameter of 2.5 µm or less ($PM_{2.5}$), nitrogen dioxide (NO_2), carbon monoxide (CO), sulfur dioxide (SO_2), ground–level ozone (O_3), and lead (Pb). O_3 is not emitted directly but is formed secondarily through atmospheric photochemical reactions. Nitrogen oxides (NO_x) and volatile organic compounds (VOCs) are not criteria air pollutants but contribute to the formation of ground–level O_3. Criteria air pollutants and the NAAQS are discussed in detail in Section 3.3.1 of the Air Resource Technical Report, which is included as **Appendix F**.

The EPA's Air Quality Design Values webpage lists the Design Value Reports used for making NAAQS compliance determinations (EPA, 2025). Compliance with the NAAQS is typically demonstrated by monitoring ground–level atmospheric air pollutant concentrations, creating a design value. The monitoring station located nearest to the Skyline Mine and the only air quality monitor within the analysis area is the Price monitoring station**.** The recently monitored values for each criteria air pollutant for the Price monitoring station are summarized in **Table 3.2–2**. The Price monitor shows values that are currently in compliance with the NAAQS for NO_2 and O_3 and it is assumed that counties without reported design values for a particular pollutant have air pollutant concentrations below the NAAQS and good air quality.

Table 3.2–2. Price Monitoring Station Monitored Values and Design Values

Pollutant	Avg. Time	NAAQS	Design Value	% of NAAQS	Meets NAAQS
	1–hr	100 ppb	15.2 ppb	15%	Yes

[3] Title 40 Code of Federal Regulations (CFR) Part 50

Pollutant	Avg. Time	NAAQS	Design Value	% of NAAQS	Meets NAAQS
NO_2	Annual	53 ppb	2.40 ppb	4%	Yes
O_3	8–hr	0.07 ppm	0.062 ppm	89%	Yes

Source: (EPA, 2025)

Under the CAA, the EPA must designate areas as either meeting or not meeting NAAQS (EPA, 2023a). If the air quality in a geographic area meets or is below the NAAQS, it is designated as attainment; areas that do not meet the NAAQS are designated as nonattainment. In some cases, EPA is not able to determine an area's status after evaluating the available information and those areas are designated unclassifiable (EPA, 2023a). It is assumed that unclassified counties without reported design values have air pollutant concentrations below the NAAQS and good air quality since air monitoring is usually needed only when concentrations exceed 80% of the NAAQS (40 CFR 58.14 (c)(1)) or when human populations in a core based statistical area increase to the thresholds outlined in 40 CFR 58.13. Carbon, Emery, and Sanpete Counties are considered to be in attainment/unclassified for all NAAQS pollutants.

Every three years, the EPA, with the help of many organizations, including state, tribal, and local air pollution control agencies, industry, and researchers, compiles a comprehensive summary of air emissions data known as the National Emissions Inventory (NEI) (EPA, 2023c). County level data from the last NEI in 2020 for criteria air pollutants are shown in **Table 3.2–3**. The 2020 NEI is the most recent version as the 2023 NEI has not yet been released to the public.

Table 3.2–3. 2020 NEI Criteria Air Pollutant Emissions in Analysis Area (TPY)

County	PM_{10}	$PM_{2.5}$	NOX_a	CO	SO_2	$VOCs_a$	Pb
Carbon	3,256.61	464.17	1,362.80	5,187.00	76.41	8,817.48	1.49E–03
Emery	3,162.14	429.22	1,290.50	5,023.44	2.63	8,688.17	2.81E–04
Sanpete	5,575.24	870.86	824.87	5,252.44	15.94	8,462.83	4.58E–03
Total	11,993.98	1,764.25	3,478.16	15,462.89	94.97	25,968.49	0.01

Source: (EPA, 2023c)

[a] Not criteria air pollutants but contribute to the formation of ground level O_3.

3.2.3.2 Hazardous Air Pollutants

Hazardous Air Pollutants (HAPs), also known as toxic air pollutants or air toxics, are those pollutants that are known or suspected of causing cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental effects (EPA, 2021a). Under Section 112 of the CAA, known as the National Emission Standards for Hazardous Air Pollutants (NESHAPs), the EPA is required to regulate emissions of HAPs. The original list included 189 pollutants, which EPA has modified through rulemaking and currently includes 188 HAPs. County level data from the last NEI in 2020 for HAPs are shown in **Table 3.2–4.**

Table 3.2–4. 2020 NEI HAP Emissions in Analysis Area (TPY)

County	Total HAPs	Vegetation and Soils	Wildfire	Prescribed Fire	Oil and Gas Production
Carbon	1,198.52	988.66	15.39	–	65.31
Emery	1,868.25	1,761.71	3.52	0.47	8.38

County	Total HAPs	Vegetation and Soils	Wildfire	Prescribed Fire	Oil and Gas Production
Sanpete	1,221.26	936.23	64.38	20.41	1.33
Total	4,288.03	3,686.60	83.29	20.88	75.05

Source: (EPA, 2023c)

The EPA AirToxScreen is used to evaluate impacts from existing HAP emissions (EPA, 2025a). As shown in **Figure 3.3.2** of the Air Resource Technical Report (**Appendix F**), the total cancer risk per million people within the analysis area is between 6 and 25. Cancer risks in the counties are within the acceptable range of risk published by the EPA of less than 100 in one million (EPA, 2025b).

The 2020 AirToxScreen assessment includes cancer risk data only, whereas the 2019 AirToxScreen assessment includes both cancer risk data and noncancer hazards. The 2019 AirToxScreen assessment estimated chronic noncancer hazards for multiple air toxics by summing chronic noncancer hazard quotients for individual air toxics that cause similar adverse health effects. The result is a hazard index (HI). Aggregation in this way produces a target–organ–specific HI, defined as a sum of hazard quotients for individual air toxics that affect the same organ or organ system (EPA, 2024). The HI by organ or organ system within the analysis area are summarized in **Table 3.2–5**, which shows that all HI values are less than 1. A HI value less than or equal to 1 indicates that the exposure is not likely to result in adverse noncancer effects (EPA, 2024). HI by air toxic and source type for each organ or organ system are shown in **Figure 3.3 4** through **Figure 3.3–8** of the Air Resource Technical Report (**Appendix F**).

Table 3.2–5. Hazard Index (HI) by Organ or Organ System within Analysis Area

Respiratory	Neurological	Liver	Kidney	Immunological
0.08–0.1	0.01–0.02	0.005–0.007	0.0002–0.003	0.002–0.009

Source: (EPA, 2025)

3.2.3.3 Air Quality Related Values

Air pollution can impact AQRVs through ambient exposure to elevated atmospheric concentrations, such as O_3 effects to vegetation, impairment of visibility by PM in the atmosphere, and deposition of air pollutants, such as sulfur and nitrogen compounds on the earth's surface through dry and wet deposition. The Prevention of Significant Deterioration (PSD) is a CAA permitting program for new or modified major sources of air pollution located in attainment areas. It is designed to prevent NAAQS violations, preserve and protect air quality in sensitive areas, and protect public health and welfare (EPA, 2023c). Under PSD regulations, the EPA classifies airsheds as Class I, Class II, or Class III. Each of these classes have different applicable thresholds for evaluating air quality and AQRV impacts which, in turn, require different air quality assessment methods. The nearest Class I areas to the project area are Capitol Reef National Park (74 miles), Arches National Park (97 miles), and Canyonlands National Park (100 miles). Current visibility and deposition conditions and trends throughout the state of Utah, including areas nearest to the analysis area, are included in **Section 3.3.4.2** of the Air Resource Technical Report (**Appendix F**).

3.2.3.4 Existing Emissions from Coal Mining, Processing, Transportation, and Combustion Associated with the Skyline Mine

Coal Mining Emissions

Coal at the Skyline Mine is mined underground and transported to the surface. Emissions from underground mining equipment and fugitive dust emissions from underground activities are released into the ambient air via the Swens Canyon Ventilation Shaft Facility (Swens Shaft), which is the primary ventilation mechanism for the mine. Once the coal is brought to the surface it is processed and shipped off site. Surface activities generate emissions of CAPs and HAPs from activities such as earth moving, coal processing, and vehicle travel on unpaved roads as well as wind erosion of stockpiles and other exposed areas. Mobile emission sources located above ground at the Skyline Mine include heavy construction equipment used for material handling and stockpile management, heavy–duty vehicles, light–duty gasoline and diesel–powered trucks/vehicles. Gaseous (for example, NO_x, CO, SO_2, and VOC) and PM emissions are released from tailpipe exhaust from nonroad and on–road mobile sources and from stationary and portable engines.

The Skyline Mine upper and lower mine sites currently operate under minor source permit DAQE–AN100920003–21 (UDAQ, 2021a). However, it should be noted that emissions emitted from above ground and underground mobile equipment at the mine are not included in the minor source permit. The minor source air permit does not set specific emissions limitations but does limit production of coal and waste to a maximum of 8 million TPY and offsite shipments of coal are also limited to 8 million TPY. Additionally, emissions are limited by engine tier ratings.

Historically coal production has been much lower than the maximum allowed as shown in **Table 3.2–6.** The annual coal production from 2014 to 2023 averaged 3.8 million TPY. In the past ten years coal production was lowest in 2022 and highest in 2016.

Table 3.2–6. Skyline Mine Historical Coal Produced

Year	Coal Production (TPY)
2014	4,170,162
2015	4,409,118
2016	4,756,924
2017	4,380,304
2018	3,613,571
2019	3,895,511
2020	3,713,241
2021	3,565,224
2022	2,515,045
2023	2,798,872
Average	3,781,797

Source: (CFC, 2024)

Existing maximum annual and average annual emissions are summarized in **Table 3.2–7**. The table includes emissions from permitted sources, above ground mobile equipment, and underground mobile equipment released through the Swens Shaft.

Table 3.2–7. Existing Emissions from Mining Activities at the Skyline Mine (TPY)

Pollutant	PM_{10}	$PM_{2.5}$	NO_x	CO	SO_2	VOC	HAPs
Permitted Sources (Maximum)	23.08	5.19	15.37	14.10	0.07	1.12	0.23
Permitted Sources (Average)	6.87	1.98	1.59	1.66	0.01	0.16	0.01
Above Ground Mobile	7.68	1.34	10.17	4.85	0.01	1.74	0.02
Underground Mobile	1.54	1.54	30.44	21.01	0.04	2.83	1.85
Total (Average)	16.09	4.85	42.19	27.52	0.05	4.73	1.89

a Basis for average emissions and detailed emission calculations are included in the Air Resource Technical Report (Appendix F).
b Maximum emissions are based on the coal production and shipment limits as well as the maximum equipment ratings established in the minor source air permit DAQE–AN100920003–21 (UDAQ, 2021a). Does not pertain to emissions from underground or underground mobile equipment.

Modeled Impacts from the Swens Shaft

In 2020, a Notice of Intent (NOI) was submitted to the UDAQ for a minor source permit modification at the Skyline Mine to install two emergency engines. As part of the permitting process, the UDAQ conducted an air quality modeling analysis review (UDAQ, 2021b) to estimate the impact of the installation of the emergency engines on the 1–hour NO_2 and 24–hour PM_{10} NAAQS. The UDAQ Modeling Analysis determined that the maximum predicted concentrations from the addition of the emergency engines, including background concentrations, would be less than the 1–hour NO_2 and 24–hour PM_{10} NAAQS. The modeling analysis and results for the minor source air permit modification are discussed in Section 3.3.7.1 of the Air Resource Technical Report (**Appendix F**).

The Swens Shaft is not included as an emissions source in the minor source air permit, therefore emissions from the Swens Shaft were not analyzed as part of the Skyline Mine minor source air permit modification air modeling analysis review (UDAQ, 2021b). Therefore, an Air Quality Dispersion Modeling Analysis was prepared to analyze near–field air quality impacts from the Swens Shaft. Using the most recent version of the American Meteorological Society/EPA Regulatory Model (AERMOD) Version 24142, actual emissions for the worst–case shift scenario under normal operating conditions were evaluated.

As described in the Air Resource Technical Report, only the 1–hour averaging period was analyzed for NO_2 for compliance with the 1–hour NO_2 NAAQS. The dispersion modeling evaluated actual emissions for the worst–case shift scenario under normal operating conditions, which are anticipated to remain the same for all alternatives. **Table 3.2–8** provides the modeling results for the modeled scenario described above in comparison to the NAAQS. The modeled concentration accounts for emissions only from the Swens Shaft and ambient background concentrations are included in the maximum concentration modeling results to account for existing local and regional sources of NO_2. Neither the modeled impact from the Swens Shaft nor the modeled impact combined with the existing ambient background concentrations exceed the NAAQS. The location of the maximum modeled concentration and maximum cumulative concentration (modeled concentration and background concentration) are shown in **Figure 3.3 23** and **Figure 3.3 24** of **Appendix F**, respectively.

Table 3.2–8: Swens Shaft Modeling Results for 1–Hour NO_2 Impacts and Comparison with the NAAQS

Modeled Concentration (µg/m3)a	Background Concentration (µg/m3)	Maximum Concentration (µg/m3)	NAAQS (µg/m3)	Percent of NAAQS
175.06	9.07	184.13	188	97.9%

Note: Modeled concentration is the high–8th–high (98th Percentile) modeled impact averaged over the 5–year meteorological period.

To show that the source will not have a significant or meaningful impact on air quality, permit applicants and permitting authorities may elect to use Significant Impact Levels (SILs) values (air quality concentration values) as a compliance demonstration tool (EPA, 2018). A proposed source can demonstrate they do not cause or contribute to a violation by demonstrating the ambient air quality impacts resulting from the proposed source's emissions would be less than the SIL. There is no PSD increment for 1–hr NO_2 and no SIL for Class I areas. Given that the closest Class I areas are 80 to 100 miles from the Swens Shaft, the modeling results demonstrate that the impacts diminish significantly with distance and would not impact AQRVs for any Class I areas.

Employee Commute Emissions

Based off data provided by CFC (CFC, 2020), it is estimated that Skyline Mine's employees commute an average one–way distance of 40 miles per shift. The mine operates seven days a week with three shifts per day, Monday through Thursday, and two shifts per day, Friday through Sunday. It is estimated that one–half of the employee vehicles are passenger cars and the other one–half are passenger trucks. Estimated annual emissions from employee commuting are shown in **Table 3.2–9**.

Table 3.2–9. Estimated Annual Emissions from Employee Commuting (TPY)

Pollutant	Passenger Car Emissions	Passenger Truck Emissions	Total Emissions
PM_{10}	0.006	0.008	0.014
$PM_{2.5}$	0.005	0.007	0.012
NO_X	0.32	0.55	0.87
CO	7.77	8.08	15.85
SO_2	0.006	0.007	0.013
VOC	0.80	0.69	1.49

Pollutant	Passenger Car Emissions	Passenger Truck Emissions	Total Emissions
HAPs	0.03	0.04	0.07

Offsite Coal Processing and Storage Emissions

Historically some of the Skyline coal has been transferred to the Savage Energy Terminal (SET) and Salina Coal Yard for further processing and/or storage before it is shipped to customers. **Table 3.2–10** shows the percentage of coal transferred to the SET and Salina Coal Yard. The Salina Coal Yard is not evaluated further in this analysis because all mobile equipment and coal storage piles have been removed from the facility and revegetation efforts began in 2023.

Table 3.2–10. Historic Percentage of Skyline Coal Transferred to SET and Salina Coal Yard.

Location	2020	2021	2022	2023	Average
SET	7%	4%	2%	6%	5%
Salina	0.4%	0.1%	–	–	0.1%

Note: Calculated from privileged information provided by CFC.

The SET is permitted as minor sources under permit DAQE–AN117930013–25 (UDAQ, 2025). The minor source permit does not set specific emission limitations but rather set limits on coal storage (tons of coal stockpiled) and off–site coal shipments. Additionally, emissions at the SET are limited by maximum equipment ratings. The total maximum potential emissions at SET and average annual emissions associated with Skyline Mine coal processed and stored at the SET is shown in **Table 3.2–11**. Coal handling emissions sources include roads, unloading, crushing, conveying, coal car loading, and coal storage piles. Pollutants emitted from these sources include only PM_{10} and $PM_{2.5}$. All the NO_X, CO, SO_2, VOC, and HAP emissions at the SET are from crude oil transloading operations (ERM NC, Inc., 2023).

Table 3.2–11. Existing Emissions from Coal Processing and Storage at the SET (TPY)

Pollutant	PM_{10}	$PM_{2.5}$	NO_x	CO	SO_2	VOC	HAPs
Maximum emissions at SET[a]	45.38	5.71	7.07	3.88	0.28	70.23	5.48
Emissions from Skyline coal	1.17	0.15	–	–	–	–	–

a (UDAQ, 2025)

Downstream Impacts from Coal Transport Emissions

About 65% of the coal mined in Utah is consumed in the state, mostly for electricity generation. About one–fourth of Utah's mined coal is exported to other countries and the rest is sent to other states, primarily to California and Nevada where the coal is used mostly at industrial facilities and some power plants (EIA, 2025b). Small amounts of coal are sent to Indiana, Oklahoma, Arkansas, Oregon, Tennessee, and Idaho (EIA, 2025c).

Historically, the majority of the coal is shipped directly from the Skyline Mine to customers, some of the coal is transferred to the SET for further processing and/or storage before it is shipped to customers. Approximately 80% of Skyline coal transported, either directly from the mine or via transfer through the SET, is transported via rail while the other 20% is transported via truck. The number and location of coal customers for Skyline Mine greatly varies from year to year, however, rail and truck transportation routes within the analysis area remain consistent. Common rail and truck transportation routes are shown in **Figure 3.3.34** of **Appendix F**). The existing average annual emissions from rail and truck transportation of coal within the analysis area are summarized in **Table 3.2–12**.

Table 3.2–12. Existing Emissions from Coal Transportation within the Analysis Area (TPY)

Transport Type	PM_{10}	$PM_{2.5}$	NO_x	CO	SO_2	VOC	HAPs
Rail	0.49	0.48	19.50	4.31	0.02	0.79	0.35
Truck	0.09	0.08	4.54	1.97	0.01	0.18	0.02

Downstream Impacts from Coal Combustion Emissions

Coal produced at Skyline Mine is sold to various consumers, both domestically and overseas, and coal combusted is not tied to any one facility.

From 2020 to 2024, 100% of the coal consumed within the analysis area is by the electrical power industry (EIA, 2025a). Between 2020 and 2023, Skyline Mine coal was only sold to two customers within the analysis area, the PacifiCorp Huntington and Hunter power plants. It is assumed that all coal shipped to a customer is consumed within the same year. While the coal consumption at the Huntington and Hunter power plants between 2020 and 2024 peaked in 2021, the highest amount of Skyline coal consumed by the Huntington and Hunter power plants, occurred in 2020; therefore, the peak emissions from combustion of Skyline coal would have occurred in 2020. Skyline coal accounted for 16% and 15% of total coal consumed by the Huntington and Hunter power plants, respectively. The peak (2020) emissions from Skyline coal combusted within the analysis area at the Huntington and Hunter power plants are shown in **Table 3.2–13**. The emissions in **Table 3.2–13** assume that the percent of Skyline coal combusted at the Huntington and Hunter power plants is proportional to the total coal combustion emissions. The 2020 NEI emissions from coal combustion at the Huntington and Hunter Power Plants are shown in **Table 3.3–36** of the Air Resource Technical Report (**Appendix F**).

Table 3.2–13. Existing Emissions from Skyline Coal Combustion within the Analysis Area (TPY)

Plant Name	PM_{10}	$PM_{2.5}$	NO_X	CO	SO_2	VOC	HAPs
Huntington	77.80	52.90	747.48	696.29	256.68	9.56	2.05
Hunter	103.70	57.62	1,371.81	343.36	445.97	16.66	3.84
Total	181.50	110.52	2,119.30	1,039.64	702.65	26.23	5.89

3.2.4 Environmental Consequences

3.2.4.1 Alternative 1: No Action

Under the No Action alternative, no additional impacts to air quality would occur because no new emissions of pollutants would occur outside of those already occurring. The mine would continue mining coal up to a maximum rate of 8 million tons per year and an average rate of 3.6 million tons per year. Maximum and annual average emissions from the mine would be expected to continue throughout the remaining life of the mine, through January 2032. Although no emissions associated with mining the Federal coal leases would occur, emissions from mining private coal would still occur, as the mine would still produce the amount of privately owned coal listed in **Table 2.8–1.** Downstream processing and combustion of coal would also continue to occur until all recoverable coal under this alternative (**Table 2.8–1**) is processed and consumed. Annual emissions would be expected to remain the same as current levels, summarized in **Table 3.2–14**, since mining activities, transportation, and coal combustion would continue to occur at the same rate as current rates described in **Section 3.2.3.4**. Since annual CAP and HAP emissions under this alternative would remain the same as current annual emissions, no additional adverse impacts to air quality, cancer and non–cancer risks, or AQRVs would be expected as a result of this alternative.

Table 3.2–14. Summary of Current Estimated Annual Emissions from Mining Skyline Coal (TPY)

Source	PM_{10}	$PM_{2.5}$	NO_X	CO	SO_2	VOC	HAPs
Permitted Sources	6.87	1.98	1.59	1.66	0.01	0.16	0.01
Above Ground Mobile Sources	7.68	1.34	10.17	4.85	0.01	1.74	0.02
Underground Mobile Sources	1.54	1.54	30.44	21.01	0.04	2.83	1.85
Employee Commute	0.01	0.01	0.87	15.85	0.01	1.49	0.07
Truck Transport	0.09	0.08	4.54	1.97	0.01	0.18	0.02
Rail Transport	0.47	0.45	18.51	4.09	0.01	0.75	0.33
Offsite Processing and Storage	1.17	0.15	–	–	–	–	–
Coal Combustion	181.50	110.52	2,119.30	1,039.64	702.65	26.23	5.89
Total	199.33	116.07	2,185.41	1,089.07	702.74	33.38	8.19

Source: Appendix F Table 3.4.1

3.2.4.2 Alternative 2: Modify the Flat Canyon Tract and Lease the Little Eccles Tract

Under Alternative 2, the mine would continue mining coal up to a maximum rate of 8 million tons per year and an average rate of 3.6 million tons per year, and the life of the mine would be extended by 18 months. Although the amount of total recoverable coal would increase under this alternative (see **Table 2.8–1**), mining activities, coal transport, coal processing, and coal combustion would continue to occur at the same rate as current rates throughout the extended life of the mine. Therefore, annual CAP and HAP emissions would also continue to occur at the same rate as current rates described in **Section 3.2.3.4**, and listed in **Table 3.2–14**,until August 2033. Although annual emissions under this alternative are not expected to change, the duration of emissions, and therefore adverse impacts to air quality, AQRVs, cancer, and non–cancer risks would be extended by 18 months.

3.2.4.3 Alternative 3: Only Modify the Flat Canyon Lease Tract

Under Alternative 3, the mine would continue mining coal up to a maximum rate of 8 million tons per year and an average rate of 3.6 million tons per year, and the life of the mine would be extended by 11 months. Although the amount of total recoverable coal would increase under this alternative (see **Table 2.8–1**), mining activities, coal transport, and coal combustion would be expected to continue to occur at the same rate as current rates. Therefore, annual CAP and HAP emissions would also continue to occur at the same rate as current rates as those described in **Section 3.2.3.4** and listed in **Table 3.2–14**, until December 2032. Although annual emissions under this alternative are not expected to change, the duration of emissions, and therefore adverse impacts to air quality, AQRVs, cancer, and non–cancer risks would be extended by 11 months.

3.2.4.4 Alternative 4: Only Lease the Little Eccles Lease Tract

Under Alternative 4, the mine would continue mining coal up to a maximum rate of 8 million tons per year and an average rate of 3.6 million tons per year, and the life of the mine would be extended by 14 months. Although the amount of total recoverable coal would increase under this alternative (see **Table 2.8–1**), mining activities, coal transport, and coal combustion would continue to occur at the same rate as current rates. Therefore, annual CAP and HAP emissions would also continue to occur at the same rate as current rates as those described in **Section 3.2.3.4**, and listed in **Table 3.2–14**, until March 2033. Although annual emissions under this alternative are not expected to change, the duration of emissions, and therefore adverse impacts to air quality, AQRVs, cancer, and non–cancer risks would be extended by 14 months.

3.3 Greenhouse Gas Emissions

3.3.1 Analysis Area

Greenhouse gases (GHGs) act to trap heat in the atmosphere. Current ongoing global climate change is caused, in part, by the atmospheric buildup of GHGs, which may persist for decades or even centuries. Since the start of the Industrial Revolution, human activities have increased GHG emissions substantially above historical background levels. Since GHGs can have long atmospheric lifetimes, they become well mixed and uniformly distributed over the entirety of the Earth's surface no matter their point of origin. Therefore, the analysis area for GHG emissions is global.

3.3.2 Analysis Issues and Evaluation Criteria

The issues and analysis methodology for air quality as originally specified in the Plan of Study (Tetra Tech, 2021) are shown in **Table 3.3–1** below.

Table 3.3–1. Greenhouse Gas Analysis Issues and Evaluation Criteria.

Issues	Evaluation Criteria
How would potential coal mining, transportation, and combustion contribute to GHG emissions and climate change at county, state, national, and global scales?	Estimated carbon dioxide, methane, nitrous oxide, and carbon dioxide equivalent emissions associated with the alternatives at the local, state, national, and global levels (100–year global warming potential [GWP] factors).

3.3.3 Affected Environment

3.3.3.1 Introduction

Gases that trap heat in the atmosphere are termed GHGs. Current ongoing global climate change may be caused, in part, by the atmospheric buildup of GHGs, which can persist in the atmosphere for decades or even centuries. Since the start of the Industrial Revolution, human activities have increased GHG emissions substantially above historical background levels. The buildup of these gases has contributed to the current changing state of the climate.

Further discussion of climate science and predicted impacts as well as the past, present, and reasonably foreseeable GHG emissions associated with BLM's actions are included in the most recent BLM Specialist Report on Annual GHG Emissions and Climate Trends (BLM, 2024) (hereafter referred to as the Annual GHG Report). This report presents the estimated emissions of GHG attributable to development and consumption of fossil fuels produced from mineral estate managed by the BLM. The Annual GHG Report is incorporated by reference and is available at https://www.blm.gov/content/ghg. Although the decision to be made would also include FS consent, emissions related to any of the alternatives would originate from potential mining of the mineral estate managed by BLM. Therefore, the Annual GHG report is directly applicable to the alternatives analyzed in this EIS.

A discussion of past, current, and projected future GHG impacts are described in Chapters 4, 8, and 9 of the Annual GHG Report. These chapters describe currently observed climate impacts globally, nationally, and in each State, and present a range of projected impact scenarios depending on future GHG emission levels.

The incremental contribution to global GHGs from a single proposed land management action cannot be accurately translated into its potential global or localized climate effects in the area specific to the action. Currently, global climate models are unable to forecast local or regional effects on resources resulting from a specific subset of emissions. However, there are general projections regarding potential impacts on natural resources and plant and animal species that may be attributed to the accumulation of GHG emissions. In this EIS, the BLM uses GHG emissions as a proxy for impacts and provides context with other proxies such as GHG equivalents.

The impact of a given GHG on global warming depends both on its radiative forcing and how long it lasts in the atmosphere. Each GHG varies with respect to its concentration in the atmosphere and the amount of outgoing radiation absorbed by the gas relative to the amount of incoming radiation it allows to pass through (ie., radiative forcing). Different GHGs also have different atmospheric lifetimes. Climate scientists have calculated a factor, known as the global warming potential (GWP), for each GHG that accounts for the length of time a GHG remains in the atmosphere and the strength with which it absorbs energy. The GWP is used as a conversion factor to convert a mixture of different GHG emissions into carbon dioxide equivalents (CO_2e). GWPs are discussed in Section 3.4 of the Annual GHG Report. This report and the Annual GHG report use GWP's from the IPCC Sixth Assessment Report (AR6) (IPCC, 2021), however, emissions data from other sources (e.g. EPA's most recent Inventory of US GHG Emissions and Sinks (EPA, 2024)) may use GWPs from the IPCC Fourth Assessment Report (AR4) (IPCC, 2007) or the IPCC Fifth Assessment Report (AR5) (IPCC, 2014a). External emissions data are being presented here at face value, and it should be noted that the variability in the GWPs used in various reports may introduce small numerical differences when comparing emissions on a relative basis.

Anthropogenic GHGs are commonly emitted air pollutants that include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and fluorinated gases. The most abundant GHG is CO_2, and more than two–thirds of man–made CO_2 emissions in the U.S. come primarily from the transportation and electricity production sectors. Methane from human activities accounts for approximately 10% of total U.S. GHG emissions and results from primarily agriculture and natural gas and petroleum systems. Nitrous oxide emissions from agriculture, fuel combustion, and industrial sources account for approximately 7% of the total U.S. GHG emissions. Fluorinated gases are powerful GHGs that are emitted from a variety of industrial processes and are often used as substitutes for ozone–depleting substances (i.e., chlorofluorocarbons, hydrochlorofluorocarbons, and halons), but they are not typically associated with BLM or FS authorized activities and, as such, will not be discussed further in this report (BLM, 2024).

3.3.3.2 Carbon Dioxide (CO_2)

Of the primary GHGs, CO_2 is the most widely occurring. It is a major component of natural carbon cycling in the terrestrial biosphere including photosynthesis (CO_2 uptake by plants) and respiration (CO_2 release by plants, animals, and microorganisms), decomposition, and ocean releases. CO_2 is emitted from human activities including the combustion of fossil fuels (i.e. oil, natural gas, and coal), solid waste, deforestation and wood products, and as a result of other chemical reactions such as steam reforming for the production of hydrogen and calcination for the production of cement clinker). CO_2 emissions accounted for 79.7% of the total U.S. GHG emissions in 2022 (EPA, 2024, pp. ES-4).

The lifetime of CO_2 in the atmosphere varies between 20 and 1,000 years and is difficult to determine precisely because several processes remove it from the atmosphere. On average, approximately 50% of the CO_2 released into the atmosphere from the burning of fossil fuels remains in the atmosphere, while 25% is absorbed by land, plants, and trees, and the other 25% is absorbed into certain areas of the ocean (NOAA, 2015).

3.3.3.3 Methane (CH_4)

Methane has a relatively short lifetime of 12.4 years but is a potent GHG (IPCC, 2014, p. 87). According to the EPA, CH_4 concentrations in the atmosphere have more than doubled in the last two centuries, largely due to human activities. Methane emissions accounted for 11.1% of U.S. GHG emissions in 2022 (EPA, 2024, pp. ES-4). CH_4 is emitted during the production and transport of coal, natural gas, and oil. CH_4 is also produced biologically under anerobic conditions in ruminant animals, wetlands, landfills, and wastewater treatment facilities. In addition, fertilizer use, agriculture, and changes in land use (e.g., from forest to grazing) are major sources of CH_4 in the atmosphere.

3.3.3.4 Nitrous Oxide (N_2O)

Nitrous oxide has a lifetime of 121 years and is produced by biological processes that occur in soil and water and by a variety of anthropogenic activities in the agricultural, energy, industrial, and waste management fields (IPCC, 2014, p. 87). In 2022, N_2O emissions accounted for 6.1% of the total US GHG emissions (EPA, 2024, pp. ES-4).

3.3.3.5 Regulatory

GHGs are considered air pollutants and are regulated under the CAA (42 U.S.C. 7401 et seq.). The U.S. Supreme Court first ruled that GHGs are air pollutants in 2007 (*Massachusetts v. Environmental Protection Agency*, 549 U.S. 497 (2007)) and instructed the EPA to determine if GHG emissions endanger public health and welfare. In April 2009, the EPA issued its endangerment finding; in May 2010 issued its GHG Tailoring Rule (40 CFR Part 51, 52, 70, et al.); and in January 2011, the EPA began regulating GHGs under its PSD and Title V permitting programs (BLM, 2024).

The EPA set initial emissions thresholds for PSD and Title V permitting applicable to stationary sources that emit greater than 100,000 tons of CO_2e per year (e.g., some power plants, landfills, and other sources) or modifications of major sources with resulting emissions increases greater than 75,000 tons of CO_2e per year. However, in 2014, the U.S. Supreme Court (*Utility Air Regulatory Group v. EPA*, 573 U.S. 302, 134 (2014)) held that the EPA may not treat GHGs as an air pollutant for purposes of determining whether a source is a major source required to obtain a PSD or Title V operating permit under the CAA. (BLM, 2024).

In 2009, the EPA published a rule for the mandatory reporting of GHGs (40 CFR Part 98, Subpart C), which is referred to as the Greenhouse Gas Reporting Program (GHGRP). This rule establishes mandatory GHG reporting requirements for owners and operators of certain facilities that directly emit GHGs as well as for certain indirect emitters, or suppliers. For suppliers, the GHGs reported are the quantity that would be emitted from combustion or use of the products supplied. The rule provides a basis for future EPA policy decisions and regulatory initiatives regarding GHGs. Facilities are generally required to submit annual reports under 40 CFR Part 98 if annual emissions exceed 25,000 metric tons of CO_2e per year.

Federal regulations require that GHG emissions related to coal be quantified and reported under 40 CFR 98. The Mandatory GHG Reporting Rule (40 CFR part 98 subpart FF) requires underground coal mines to report methane emissions. Coal–fired electric power plants are required to continuously monitor carbon dioxide emissions under 40 CFR 98, Subpart D, and submit quarterly emissions reports to EPA under 40 CFR 75.

The MSHA requires methane monitoring in underground mines and sets limits on methane concentrations to protect the life, health, and safety of the miners, but it does not limit methane emission amounts.

The EPA has established emissions control requirements in the New Source Performance Standards (NSPS) at 40 CFR Part 60 that apply to coal, oil, and natural gas production facilities. Subpart Y sets Standards of Performance for Coal Preparation and Processing Plants and Subpart TTTT sets Standards of Performance for GHG Emissions for Electric Generating Units.

While GHG permits may be required for sources that are permitted under the PSD program, the reasonably foreseeable development sources are not anticipated to trigger the need for a PSD permit. Coal–fired electric power plants are required to continuously monitor carbon dioxide emissions under 40 CFR 98, Subpart D, and submit quarterly emissions reports to EPA under 40 CFR 75.

3.3.3.6 Climate Change

Climate change refers to a substantial and persistent change in the mean state of global or regional climate or its variability, usually occurring over decades or longer (U.S. Climate Change Science Program, 2009, p. 17). In 2014, the Intergovernmental Panel on Climate Change (IPCC) produced the *Climate Change 2014 Synthesis Report* (IPCC, 2014a) as part of the IPCC Fifth Assessment Report (AR5). The US Global Change Research Program (USGCRP) published its fourth national climate assessment in 2018 (USGCRP, 2018). Each of these reports' states that anthropogenic (i.e. human–caused) GHG emissions have increased since the preindustrial era, driven largely by economic and population growth, and are now higher than ever previously recorded. This has led to atmospheric concentrations of CO_2, CH_4, and N_2O that are unprecedented in at least the last 800,000 years. These anthropogenic GHG emissions are extremely likely to have been a cause of the observed warming since the mid–20th century (IPCC, 2014a; USGCRP, 2018).

GHGs permit incoming (shortwave) radiation from the sun to enter the earth's atmosphere, but block infrared (longwave) radiation from leaving the earth's atmosphere. As GHG concentrations increase in our atmosphere, through complex interactions on a global scale, they cause a net warming of the atmosphere and exert a greenhouse effect on the Earth's temperature.

The average global temperature increased 1.8°F (1°C) during the period from 1901 to 2016 and 1.2°F (0.65°C) during the period from 1986 to 2015. Nearly the entire planet has already experienced higher surface temperatures due to this greenhouse effect and scientific consensus predicts that the average global temperatures could rise by the end of the century (USGCRP, 2018, pp. 76,80).

These climatic changes can also affect other aspects of the environment including desert distribution, sea level, precipitation, frequency of severe storms, species distribution, species survivability, ocean salinity, availability of fresh water, and disease vectors. These effects can vary from region to region over time; some agricultural regions may become more arid while others become wetter; some mountainous areas may experience greater summer precipitation, yet have their snowpack disappear in the future (IPCC, 2014a).

Climate change is also increasing pest outbreaks, spreading invasive species, accelerating wildfire activity, and changing plant flowering times. Given these complex and changing systems, the causes and effects of climate change are variable and difficult to predict (USGCRP, 2018),

The early 21st century has been the warmest period on record for Utah (**Figure 3.3–1**). Since 1895, temperatures have been increasing 0.2°F to 0.3°F per decade in each of Utah's seven climate divisions. The period from 2000 to 2004 had the largest number of extremely hot days with maximum temperature at or above 100°F in the historical record. In addition to the overall trend of higher temperatures, the state has experienced a marked increase in the number of very warm nights (minimum temperature at or above 75°F) and a decrease in the number of very cold nights (minimum temperature at or below 0°F) since 1990. While 2020 was the driest year on record for Utah and 21st century precipitation has averaged a few percent below the long–term mean across Utah, there is no statistically significant trend in precipitation for the state or in any climate division with natural variability resulting in both wetter and drier periods than observed in the past two decades (**Figure 3.3–2**). As the state has warmed, the percentage of precipitation falling as snow during the winter has decreased, as has the snow depth and snow cover (BLM, 2024).

April 1 snowpack across the state has gradually decreased over the past 40 years with the 2011–2020 average statewide snowpack approximately 20% lower than that observed between 1981–1990. Utah frequently experiences droughts. Because snowmelt from the snowpack provides water for many river basins, abnormally low winter and spring precipitation is often the trigger for drought conditions. In 2012, Utah experienced one of its driest springs since records began in 1895, resulting in severe drought conditions in areas across the entire state. The historical record indicates periodic occurrences of extended wet and dry periods. Dry conditions since 2000 have resulted in near–record–low water levels in the Great Salt Lake (BLM, 2024).

Figure 3.3–1. Utah Temperature Records

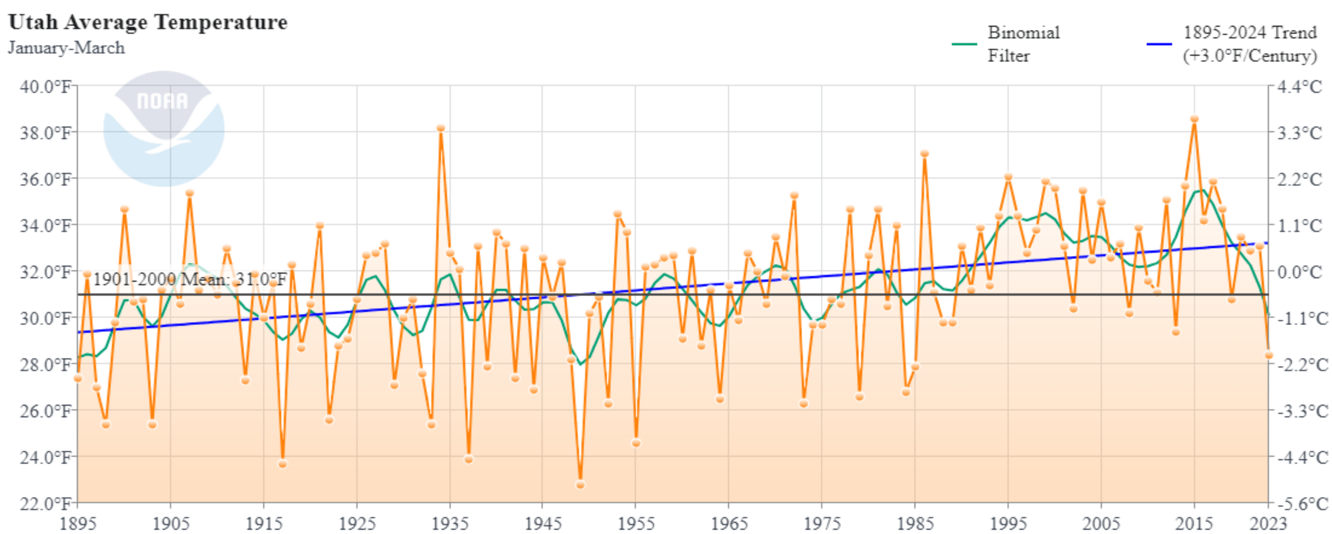
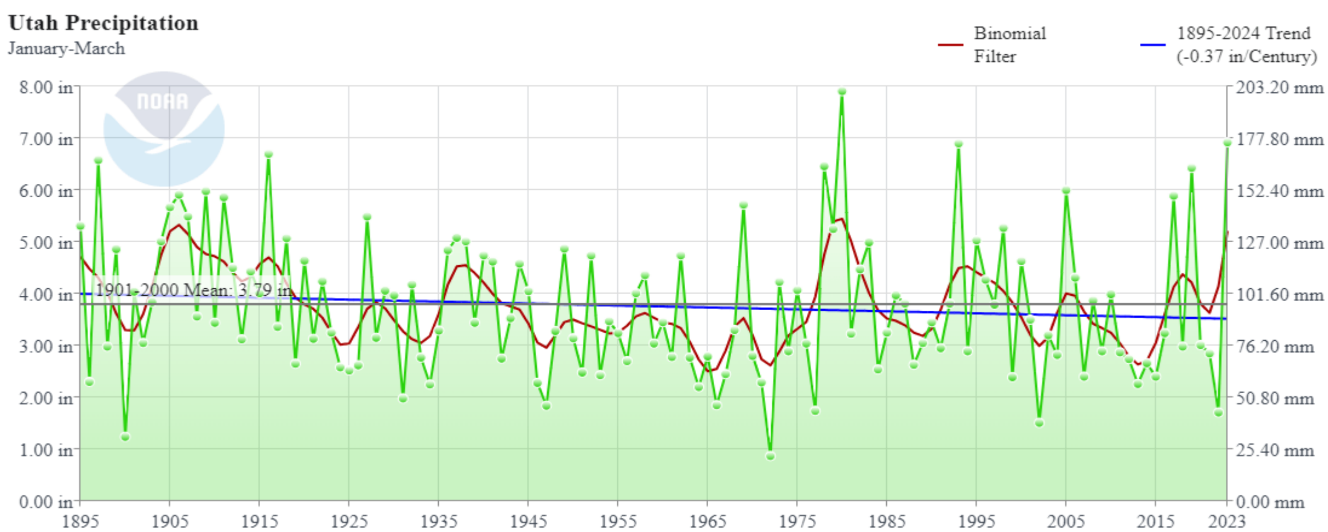


Figure 3.3–2. Utah Precipitation Records



3.3.3.7 Current Global, National, State, and County Level GHG Emissions

According to the latest data from the Emissions Database for Global Atmospheric Research (EDGAR), global GHG emissions in 2023 reached 53.0 Gigatonnes (Gt) CO_2e (without Land Use, land Use Change and Forestry) which represent the highest level recorded and experienced an increase of 1.9% or 994 Mt CO_{2e} compared to the levels in 2022 (EDGAR, 2024). Historical global GHG emissions by sector are summarized in **Table 3.3–2**.

Nationally, the largest percentage of GHG emissions in 2022 were from the transportation sector (28%) and the electrical power sector (25%). Nationally, total gross GHG emissions decreased by 3% from 1990 to 2022, down from a high of 15.2% above 1990 levels in 2007. Nationally gross emissions increased from 2021 to 2022 by 0.2% (14.4 Megatonnes (Mt) CO_2e). Net emissions (including sinks) were 5,489 Mt CO_2e in 2022. Overall, net emissions increased by 1.3% from 2021 to 2022 and decreased by 16.7% from 2005 levels (EPA, 2024, pp. ES-4). Between 2021 and 2022, the increase in total GHG emissions was driven largely by an increase in CO_2 emissions from fossil fuel combustion across most end–use sectors due in part to increased energy use from the continued rebound of economic activity after the height of the COVID–19 pandemic (EPA, 2024, pp. ES-4). Historical National GHG emissions by sector are summarized in **Table 3.3–2**.

In 2022, Utah's GHG emissions accounted for approximately 1.8% of gross US GHG emissions and emissions have increased by 14.3% since 1990. At the state level, the largest percentage of GHG emissions in 2022 was from the electrical power sector (36%), followed by the transportation sector (25%) as shown in **Table 3.3–2**.

Table 3.3–2. Recent Trends in Global, National, State, and County GHG Emissions (in MMT CO_2e)

Sector	1990	2005	2018	2019	2020	2021	2022
Global[a]							
Electric Power	7,686.35	11,077.66	14,348.00	14,222.07	13,723.76	14,798.53	14,837.78
Industry	5,974.38	8,097.42	10,825.38	11,003.20	11,026.77	11,342.14	11,170.65
Transportation	4,706.04	6,630.90	8,409.63	8,420.51	7,217.05	7,767.30	8,081.81
Agriculture	5,395.43	5,617.91	6,257.91	6,290.85	6,395.21	6,423.23	6,463.94
Fuel Exploitation	3,965.93	4,784.58	5,588.57	5,771.55	5,424.88	5,602.75	5,738.87
Buildings	3,725.27	3,642.75	3,786.27	3,727.55	3,668.16	3,722.72	3,731.23
Waste	1,272.83	1,445.67	1,810.87	1,842.61	1,871.72	1,911.58	1,944.19
Gross Total	32,726.23	41,296.88	51,026.63	51,278.35	49,327.54	51,568.25	51,968.47
National[b]							
Electric Power	1,880.18	2,457.45	1,799.18	1,650.75	1,482.17	1,584.45	1,577.49
Industry	1,723.32	1,587.26	1,541.87	1,531.80	1,435.91	1,455.80	1,452.54
Transportation	1,521.42	1,965.92	1,871.61	1,874.55	1,625.28	1,805.47	1,801.52
Agriculture	595.95	634.30	683.53	661.04	640.05	645.88	633.96
Commercial	447.01	418.86	453.48	462.63	436.92	443.66	463.66
Residential	345.60	371.19	376.82	384.21	358.04	369.61	391.30

Sector	1990	2005	2018	2019	2020	2021	2022
US Territories	23.45	59.66	26.26	25.15	23.44	23.93	22.73
Gross Total	6,536.91	7,494.64	6,752.75	6,590.13	6,001.81	6,328.79	6,343.21
Utah[b]							
Electric Power	30.61	36.97	29.22	28.99	27.01	30.55	27.20
Industry	14.22	17.21	14.10	14.06	13.96	14.37	14.42
Transportation	10.69	16.94	18.50	18.26	17.36	18.55	18.72
Agriculture	4.33	5.05	4.77	5.00	4.80	4.80	4.69
Commercial	3.08	3.94	4.50	4.88	4.74	4.80	5.07
Residential	2.81	3.49	4.23	4.79	4.62	4.57	5.06
Gross Total	65.75	83.60	75.33	75.99	72.49	77.64	75.15

Source: [a] (EDGAR, 2024), [b] (EPA, 2023)
Note: AR5 GWPs.

The EPA's Greenhouse Gas Inventory Data Explorer | US EPA is an interactive tool that provides access to data from the EPA's annual *Inventory of U.S. Greenhouse Gas Emissions and Sinks* and the *Inventory of U.S. Greenhouse Gas Emissions and Sinks by State* (EPA, 2024). Detailed GHG emissions are also available for download at https://www.epa.gov/system/files/other–files/2024–09/allstateghgdata90–22_v082924.zip . Tetra Tech evaluated the data and summarized the findings below and in **Section 3.3.3.8**

Table 3.3–3. Recent Trends in Utah GHG Emissions (in MMT CO_2e)

1990	2005	2018	2019	2020	2021	2022
65.75	83.60	75.33	75.99	72.49	77.64	75.15

Source: Greenhouse Gas Inventory Data Explorer | US EPA and https://www.epa.gov/system/files/other–files/2024–09/allstateghgdata90–22_v082924.zip
Note: For AR6, Tetra Tech used CH_4 non–fossil GWP of 27 to and CH_4 fossil GWP of 29.8 to calculate CO_2e emissions.

Emissions at the state and county level are available from EPA's Facility Level Information on GHG Tool (FLIGHT) (EPA, 2024) for facilities that are required to report GHG emissions under EPA's Mandatory GHG Reporting Rule. **Table 3.3** summarizes the downward trend of emissions reported in the state of Utah and in Carbon and Emery counties from 2019 to 2023. There are no facilities in Sanpete County required to report GHG emissions under EPA's Mandatory GHG Reporting Rule. This data shows some variability between years, but a reduction at the state level of approximately 22% in overall emissions since 2019 and 27% and 39% in Carbon and Emery counties, respectively, using AR6 GWPs.

Table 3.3–4. GHG Emissions from Reporting Facilities in the State of Utah (in MMT CO2e)

State/County	2019	2020	2021	2022	2023
Utah (State)	36.33	33.32	37.40	34.22	28.38
Carbon County	0.65	0.50	0.57	0.58	0.48
Emery County	13.44	12.46	15.49	13.23	8.21

Source: (EPA, 2024)

Table 3.3 shows the estimated 2023 GHG emissions for the US and Utah from extraction, processing, transport, and combustion. Nationally, GHG emissions from extraction, processing, transport, and combustion of federal coal accounted for 6% of total fossil fuel production emissions and 55% of fossil fuel production emissions in Utah.

Table 3.3–5. Estimated 2023 Annual Emissions from Fossil Fuel Production (MMT CO_2e)

Area	Extraction	Processing	Transport	Combustion	Total
US Total	618.2966	328.1346	641.0649	5,672.86	7,260.36
US Coal	11.4916	NA	25.2458	1,139.84	1,176.58
US Federal Coal	3.7462	1.1404	6.9986	422.89	434.78
Utah	1.3774	0.7088	1.8118	25.05	28.95
Utah Federal Coal	0.1815	0.1217	0.2438	15.47	16.02

Source: (BLM, 2024)
Note: CO_2e emissions use AR6 GWPs.

3.3.3.8 Emissions from Mining

In 2022, emissions from coal mining in the US accounted for 0.8% of gross US emissions. As shown in **Table 3.3**, emissions from coal mining in the US have decreased by 56.6% from 1990 to 2022 and emissions from underground coal mining and post–mining (underground) have decreased by 61.5% and 53.1%, respectively, from 1990 to 2022.

Table 3.3–6. Recent Trends in US Coal Mining GHG Emissions (MMT CO_2e)

Inventory Sector	1990	2005	2018	2019	2020	2021	2022	Change from 1990*
Coal Mining	120.74	83.02	69.16	62.61	54.84	53.38	52.40	(56.6%)
Underground Coal Mining	87.27	50.34	46.28	41.12	37.11	35.07	33.63	(61.5%)
Post–Mining (Underground)	10.31	8.56	5.95	5.77	4.33	4.76	4.84	(53.1%)

Source: (EPA, 2023)

In 2022, emissions from coal mining in Utah accounted for of gross Utah emissions. As shown in **Table 3.3**, emissions from coal mining in Utah have decreased by 65.5% from 1990 to 2022 and emissions from underground coal mining and post–mining (underground) have decreased by ~81% and 53%, respectively, from 1990 to 2022.

Table 3.3–7. Recent Trends in UT Coal Mining GHG Emissions (MMT CO_2e)

Inventory Sector	1990	2005	2018	2019	2020	2021	2022	Change from 1990*
Coal Mining	2.44	3.28	0.83	0.92	0.92	0.86	0.84	(65.5%)
c	1.77	2.40	0.23	0.33	0.35	0.32	0.33	(81.3%)

Inventory Sector	1990	2005	2018	2019	2020	2021	2022	Change from 1990*
Post–Mining (Underground)	0.38	0.43	0.23	0.25	0.22	0.21	0.18	(53.0%)

Source: (EPA, 2023)

Based on the information provided in the Skyline Mine minor source air permit DAQE–AN100920003–21 (UDAQ, 2021a), Tetra Tech estimated the total maximum potential GHG emissions in metric tons (MT) from permitted emissions sources (fossil fuel combustion from heaters, boilers, and emergency engines) at the upper and lower mine sites using emission factors from EPAs GHG emissions factors hub (EPA, 2025) which are summarized in **Table 3.3** and historic GHG emission estimates are shown in **Table 3.3**.

Table 3.3–8. Skyline Mine Upper and Lower Mine Sites Maximum Potential GHG Emissions (MT CO_2e)

GHG	Emissions
CO_2	13,565.60
CH_4	7.75
N_2O	7.33
Total	13,580.69

Table 3.3–9. Estimated Historic GHG Emissions from Permitted Sources (MT CO_2e)

Year	CO_2	CH_4	N_2O	Total
2020	1,925.65	1.08	0.99	1,927.73
2021	507.05	0.29	0.27	507.61
2022	651.68	0.46	0.58	652.73
2023	416.04	0.28	0.34	416.66
Average	875.11	0.53	0.55	876.18

The GHGs directly emitted from the mining of coal are from diesel and gasoline–powered vehicles, stationary engines, and methane liberated from mined coal are from diesel and gasoline–powered vehicles, stationary engines, and methane liberated from mined coal. Tetra Tech estimated the total maximum potential GHG emissions from above ground mobile sources (see **Table 3.3**) and underground mobile sources (see **Table 3.3**) using emission factors from EPAs GHG emissions factors hub (EPA, 2025).

Table 3.3–1010. Estimated Historic GHG Emissions for Above Ground Mobile Equipment (MT CO_2e)

Year	CO_2	CH_4	N_2O	Total
2019	1,301.81	1.57	2.88	1,306.26
2020	1,895.70	2.29	4.20	1,902.19
2021	1,452.28	1.76	3.22	1,457.25

Year	CO_2	CH_4	N_2O	Total
2022	719.33	0.87	1.59	721.79
2023	789.18	0.95	1.75	791.88
Average	1,231.66	1.49	2.73	1,235.88

Table 3.3–11. Estimated Emissions from Swens Shaft – Underground Mobile Sources (MT/year CO_2e)

CO_2	CH_4	N_2O	Total
3,907.29	10.98	77.56	3,995.84

To meet the requirements under the Mandatory GHG Reporting Rule (40 CFR part 98 subpart FF), Skyline has CH_4 continuous emissions monitoring systems on all of their mine ventilation shafts including the Swens Shaft. As discussed in **Section 3.2.3.4**, the Swens Shaft was originally constructed in 2018, became operational in the first quarter of 2019, and became the primary mine ventilation exhaust shaft when it was retrofitted with a puller fan in the fourth quarter of 2021. Although the mine has other ventilation shafts, it is assumed that the Swens Shaft is the primary emission release point for coal mine methane. Coal mine methane refers to the methane released from coal and the surrounding rock strata from mining activities (About Coal Mine Methane | US EPA). The historical monitored CH_4 emissions from all ventilation shafts are shown in **Table 3.3–12**.

Table 3.3–12. Monitored Methane (CH_4) Emissions from Swens Shaft (MT/year)

Year	CH_4	CO_2e
2018	70.31	1,898.37
2019	176.99	4,778.73
2020	148.17	4,000.59
2021	393.41	10,622.07
2022	194.93	5,263.11
Average	196.76	5,312.57

Source: Skyline Subpart FF Reporting Forms from 2018 to 2022 (CFC, 2019, 2020, 2021, 2022, 2023)
Note: CO_2e emissions were calculated based on GWP of 27 for CH_4

The monitored methane values in **Table 3.3–12** include coal mine methane as well as CH_4 emissions from underground mining equipment that combust fuel. The majority of the monitored CH_4 emissions are from coal mine methane that is released from the coal and surrounding rock strata from mining activities (EPA, 2025). Since there is no way to differentiate coal mine methane from GHGs emitted from underground equipment in the monitoring data, GHG emissions from underground equipment were estimated separately.

3.3.3.9 Emissions from Employee Commuting

The assumptions for employee commuting are the same as those in **Section 3.2.3.4**. Estimated annual historical GHG emissions from employee commuting are shown in **Table 3.3–13** and assumed to be the same from year to year as the number of employees, commute distance, and vehicle type to not drastically change from year to year.

Table 3.3–13. Estimated Annual Historical GHG Emissions from Employee Commuting (MT CO_2e per year)

Pollutant	Car Emissions	Truck Emissions	Total Emissions
CO_2	667.18	885.08	1,552.26
CH_4	0.39	0.73	1.12
N_2O	3.25	5.40	8.65
Total	670.83	891.21	1,562.03

3.3.3.10 Emissions from Coal Transport

GHGs are also produced from transporting coal to the end user once it is mined. As discussed in Section 3.3.9 of Appendix F, manufacturers of locomotives are required to perform emissions testing and submit compliance reports to the EPA, which includes GHGs under EPA's Mandatory GHG Reporting Rule 40 C.F.R. part 1033.

The assumptions for coal transport are the same as the assumptions in **Section 3.2.3.4** and estimated historic GHG emissions from coal transport via rail and truck within the US were calculated using emission factors from EPA's GHG emissions factors hub (EPA, 2025) and are summarized in **Table 3.3** and **Table 3.3** respectively.

Table 3.3–14. Estimated Historic GHG Emissions from Rail Transport of Skyline Coal (MT CO_2e)

Year	CO_2	CH_4	N_2O	Total
2020	45,195.82	105.53	314.20	45,615.55
2021	60,261.19	140.71	418.94	60,820.84
2022	51,706.59	120.73	359.46	52,186.79
2023	44,465.19	103.82	309.12	44,878.14
Average	50,407.20	117.70	350.43	50,875.33

Note: Calculated from privileged information provided by CFC.

Table 3.3–15. Estimated Historic Emissions from Truck Transport of Skyline Coal (MT CO_2e)

Year	CO_2	CH_4	N_2O	CO_2e
2020	6,993.80	1.26	52.48	7,047.55
2021	3,065.00	0.55	23.00	3,088.56
2022	1,253.28	0.23	9.41	1,262.91
2023	1,763.78	0.32	13.24	1,777.34
Average	3,268.97	0.59	24.53	3,294.09

Note: Calculated from privileged information provided by CFC.

3.3.3.11 **Emissions from Coal Combustion**

In 2022, emissions from fossil fuel combustion accounted for 75% of gross GHG emissions in the US while emissions from coal combustion accounted for only 14%. Total emissions from fossil fuel combustion have decreased 1.6% since 1990 and emissions from coal combustion have decreased by ~47%. Fossil fuel and coal combustion data is shown in **Table 3.3**. The electrical power industry and transportation sectors account for the majority of fossil fuel combustion and the majority of coal combustion is from the electrical power industry as shown in **Figure 3.3–3** and

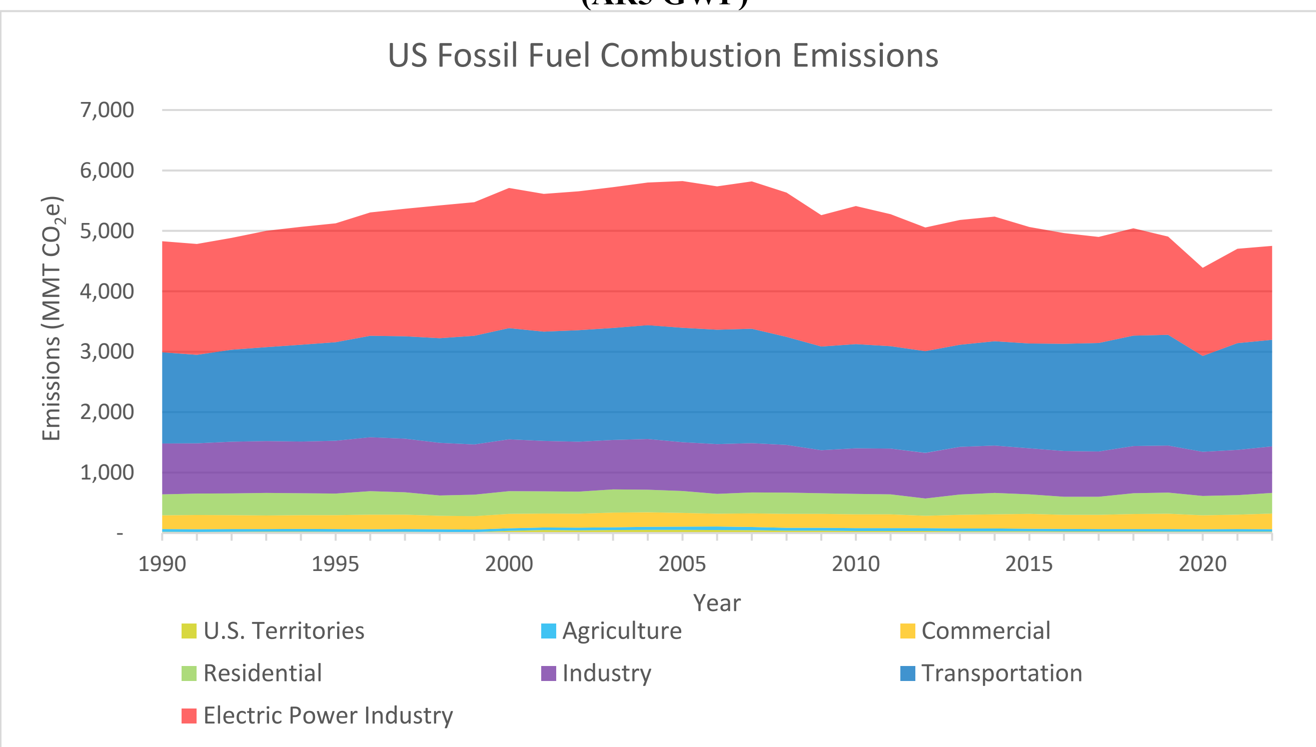
Figure 3.3–4, respectively.

Table 3.3–16. Recent Trends in US Fossil Fuel Combustion GHG Emissions (in MMT CO_2e)

Inventory Sector	1990	2005	2018	2019	2020	2021	2022	Change from 1990*
All Fossil Fuels	4,829.85	5,824.77	5,043.42	4,906.55	4,388.93	4,703.72	4,752.01	(1.6%)
Coal Combustion	1,739.51	2,140.05	1,230.30	1,043.57	849.62	973.03	917.55	(47.3%)

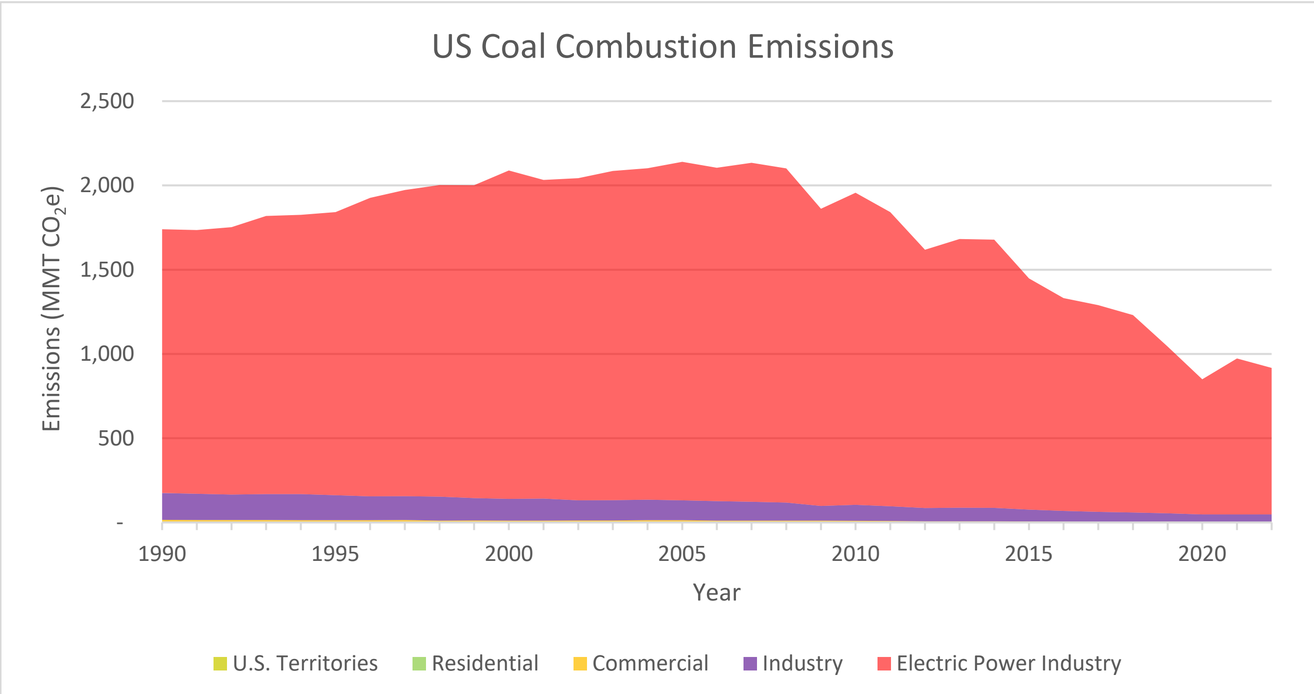
Source: (EPA, 2023)
*Percentages in parenthesis indicate a decrease.

Figure 3.3–3. US Emissions from Fossil Fuel Combustion by Economic Sector from 1990–2022 (AR5 GWP)



Source: (EPA, 2023)

Figure 3.3–4. US Emissions from Coal Combustion by Economic Sector from 1990–2022 (AR5 GWP)



Source: (EPA, 2023)

As shown in **Table 3.3–33**, total gross GHG emissions for Utah in 2022 were 65.75 MMT of CO_2e which accounts for 1.2% of US gross GHG emissions. Total gross emissions in Utah increased by 14.3% from 1990 to 2022. Gross GHG emissions increased in all economic sectors except for the electric power industry which saw an 11.2% decrease from 1990 to 2022.

As stated above, EPA's Mandatory GHG Reporting Rule (40 C.F.R. part 98) requires industrial facilities to report emissions from stationary fuel combustion sources (Subpart C) and electricity generation sources (Subpart D). The reported GHG emissions from the coal fired power plants that the Skyline mine has sold coal to in the past five years (discussed in **Section 3.2.3.4**) are shown in **Table 3.3**. Skyline Mine coal accounts for only a portion of the coal combusted at the power plants in **Table 3.3**. Maximum potential and historic GHG emissions from Skyline coal combustion are presented in **Table 3.3.**

Table 3.3–17. GHG Emissions from Coal Fired Power Plants that combust Skyline Mine's Coal ($MMT\ CO_2e$)

Plant Name	2019	2020	2021	2022	2023
IPSC	6.81	6.33	6.98	5.31	4.43
Huntington	4.90	4.49	6.26	5.71	3.71
Hunter	8.54	7.97	9.24	7.52	4.50
Marion	1.68	1.24	0.96	1.05	0.99
Gibson	11.58	11.39	8.99	9.10	8.27

Plant Name	2019	2020	2021	2022	2023
North Valmy	1.70	1.00	1.64	1.60	1.23

Source: FLIGHT (EPA, 2024)
Note: CO_2e emissions in FLIGHT for 2014–2023 are calculated using AR4 GWPs and were converted using AR6 GWPs.

Table 3.3–17. Estimated Historic and Maximum GHG Emissions from Skyline Coal Combusted

Year	MMT CO_2e
2020	8.15
2021	7.47
2022	5.21
2023	5.82
Average	6.66
Maximum	16.42

Note: Calculated using AR6 GWPs. Maximum based on maximum of 8 million TPY coal mined.

To put the estimated GHG emissions in a relatable context, emissions can be compared to other common activities that generate GHG emissions. The EPA GHG equivalency calculator can be used to express the potential average year GHG emissions on a scale relatable to everyday life (https://www.epa.gov/energy/greenhouse–gas–equivalencies–calculator). For instance, average historic annual GHG emissions from Skyline Coal Combusted are equivalent to the GHG emissions produced from 1,553,480 gasoline powered passenger vehicles driven for one year, 894,418 homes' energy use for one year, 1.8 coal fired power plants operated in a year, or the emissions that could be offset by the carbon sequestration of 6,680,373 acres of forest land.

The EIA provides long–term (2020–2050) world energy and emissions projections in its International Energy Outlook (IEO). The most recent IEO that contains CO_2 emissions data is the IEO2023 (EIA, 2023), released in October 2023, is discussed in Section 5.2 of the Annual GHG Report and are summarized in this section.

The IEO reference case assumes global energy consumption will rise nearly 34% between 2022 and 2050. According to the reference case projections, the use of all fossil fuels increases through 2050, with much of the increased demand coming from Asia. Natural gas consumption is projected to grow between 11% to 57% through 2050 (29% for reference case) (BLM, 2024). From 2022 to 2050, global coal consumption is projected to range from a growth of 19% to a decrease of 13% (EIA, 2023). Coal consumption varies by region, increasing in Africa, India, and the Other Asia-Pacific region and decreasing in China and the United States.

Global energy–related CO_2 emissions are projected to increase by 15% from 2022 to 2050, with a 28% increase from natural gas emissions, and a 4% increase for coal emissions as shown in **Table 3.3**.

Table 3.3–19. Projected Global Energy Related CO_2 Emissions in million metric tons (MMT CO_2e)

Type	2022	2025	2030	2035	2040	2045	2050	2020–2050 % Change
Total	35,669.3	36,052.6	36,725.6	37,724.0	38,496.6	39,685.4	40,953.8	15%
Natural Gas Use	8,087.4	8,223.1	8,501.2	8,815.2	9,293.6	9,832.6	10,381.9	28%

Type	2022	2025	2030	2035	2040	2045	2050	2020–2050 % Change
Coal Use	15,803.8	15,596.6	15,824.1	16,240.0	16,143.2	16,258.1	16,421.9	4%

Source: (EIA, 2023)

3.3.4 Environmental Consequences

3.3.4.1 Alternative 1: No Action

Under the No Action alternative, annual GHG emissions from mining are not anticipated to change. GHG emissions from the mine would be expected to continue throughout the remaining life of the mine, through January 2032. Although no additional GHG emissions associated with mining the Federal coal leases would occur, emissions from mining private coal would still occur, as the mine would still produce the amount of privately owned coal listed in 2.8Error! Reference source not found.. Downstream processing and combustion of coal would also continue to occur. GHG emissions would be expected to remain the same as current levels since mining activities, transportation, and coal combustion would continue to occur at the same rate as current rates described in **Sections 3.3.3.2** through. Since GHG emissions under this alternative would remain the same as current annual emissions, which are summarized in **Table 3.3**, no additional impacts to climate change would be anticipated from this alternative.

Table 3.3–20. Summary of Current Estimated Annual GHG Emissions from Mining Skyline Coal ($MT\ CO_2e$ per year)

Source	CO_2	CH_4	N_2O	Total
Permitted Sources[a]	1,269.55	0.81	0.90	1,271.26
Above Ground Mobile Sources[b]	1,231.66	1.49	2.73	1,235.88
Underground Mobile Sources[c]	3,907.29	10.98	77.56	3,995.84
Coal Mine Methane[d]	–	5,321.57	–	5,321.57
Employee Commute[e]	1,552.26	1.12	8.65	1,562.03
Rail Transport[f]	50,407.20	117.70	350.43	50,875.33
Truck Transport[f]	3,268.97	0.59	24.53	3,294.09
Coal Combustion[g]	6,605,801.04	22,512.69	30,932.82	6,659,246.56
Total	6,667,437.97	27,957.96	31,397.63	6,726,793.56

[a]Natural gas combustion sources based on average historical emissions 2020–2023. Diesel powered emergency engine emissions based on 70 operating hours per year per engine.
[b]Average historical emissions 2019–2023
[c]Emissions based on estimated underground equipment use during typical shift.
[d]Average of historical monitored methane emissions 2018–2022.
[e]Emissions based on 60 trips per shift with average one–way commute distance of 40 miles. Distributed equally between counties within the analysis area.
[f]Average historical transportation emissions 2020–2023.
[g]Based on 2020–2023 average coal shipped.

3.3.4.2 Alternative 2: Modify the Flat Canyon Tract and Lease the Little Eccles Tract

Under Alternative 2, the mine would continue mining coal up to a maximum rate of 8 million tons per year and an average rate of 3.6 million tons per year, and the life of the mine would be extended by 18 months (through August 2033). Mining activities, coal transport, and coal combustion would continue to occur at the same rate as current rates. Therefore, annual GHG emissions would also be expected to occur at the same rates. However, the total recoverable coal would increase under this alternative**.** As a result, total GHG emissions from mining, downstream processing, and combustion of the coal would also increase under this alternative. Estimated GHG emissions arising from potential mining activities, downstream processing, and combustion under this alternative are displayed in **Table 3.3.** The emissions shown in **Table 3.3** were estimated based on the annual average of historical emissions provided in **Table 3.3** and proportioned based on the additional life of mine. For Alternative 2 additional life of mine would be 11 months in 2032 (February through December) and 8 months in 2033 (January through August).

Table 3.3–18. Alternative 2 Estimated GHG Emissions by Source (metric tons)

Source	Year	CO_2	CH_4	N_2O	CO_2e
Permitted Sources	2032	1,165.20	0.03	0.003	1,166.77
Mobile Surface Equipment		1,130.43	0.05	0.009	1,134.30
Mobile Underground Equipment		3,586.15	0.35	0.261	3,667.42
Coal Mine Methane		–	180.59	–	4,875.92
Employee Commuting		1,424.68	0.04	0.029	1,433.65
Rail Transport		46,264.14	3.74	1.178	46,693.79
Truck Transport		3,000.28	0.02	0.082	3,023.34
Coal Combustion		6,062,858.49	714.96	103.994	6,111,911.22
Permitted Sources	2033	845.21	0.02	0.002	846.34
Mobile Surface Equipment		819.98	0.03	0.007	822.79
Mobile Underground Equipment		2,601.29	0.25	0.19	2,660.25
Coal Mine Methane		–	130.99	–	3,667.86
Employee Commuting		1,033.42	0.03	0.02	1,039.93
Rail Transport		33,558.76	2.71	0.85	33,870.42
Truck Transport		2,176.33	0.01	0.06	2,193.05
Coal Combustion		4,397,834.66	518.61	75.43	4,433,416.20
Total	2032	6,119,429.37	899.76	105.56	6,173,906.42
	2033	4,438,869.66	652.66	76.57	4,478,385.85

3.3.4.3 Alternative 3: Only Modify the Flat Canyon Lease Tract

Under Alternative 3, the mine would continue mining coal up to a maximum rate of 8 million tons per year and an average rate of 3.6 million tons per year, and the life of the mine would be extended by 11 months (through December 2032). Although the amount of total recoverable coal would increase under this alternative, mining activities, coal transport, and coal combustion would continue to occur at the same rate as current rates. Estimated GHG emissions arising from potential mining activities, downstream processing, and combustion under this alternative are displayed in **Table 3.3–22**. The emissions were estimated based on the annual average of historical emissions provided in **Sections 3.3.3.8** through **3.3.3.11** and proportioned based on the additional life of mine. For Alternative 3 additional life of mine would be 11 months in 2032 (February through December). GHG emissions for Alternative 3 are shown in **Table 3.3-22**.

Table 3.3–22. Alternative 3 Estimated GHG Emissions by Source (metric tons)

Source	Year	CO_2	CH_4	N_2O	CO_2e
Permitted Sources	2032	1,165.20	0.03	0.003	1,166.77
Mobile Surface Equipment		1,130.43	0.05	0.009	1,134.30
Mobile Underground Equipment		3,586.15	0.35	0.261	3,667.42
Coal Mine Methane		–	180.59	–	4,875.92
Employee Commuting		1,424.68	0.04	0.029	1,433.65
Rail Transport		46,264.14	3.74	1.178	46,693.79
Truck Transport		3,000.28	0.02	0.082	3,023.34
Coal Combustion		6,062,858.49	714.96	103.994	6,111,911.22
Total		6,119,429.37	899.76	105.56	6,173,906.42

3.3.4.4 <u>Alternative 4: Only Lease the Little Eccles Lease Tract</u>

Under Alternative 4, the mine would continue mining coal up to a maximum rate of 8 million tons per year and an average rate of 3.6 million tons per year, and the life of the mine would be extended by 14 months (through March 2033). Although the amount of total recoverable coal would increase under this alternative, mining activities, coal transport, and coal combustion would continue to occur at the same rate as current rates. Estimated GHG emissions arising from potential mining activities, downstream processing, and combustion under this alternative are displayed in **Table 3.3–23** The emissions were estimated based on the annual average of historical emissions provided in **Sections 3.3.3.8** through **3.3.3.11** and proportioned based on the additional life of mine. For Alternative 4 additional life of mine would be 11 months in 2032 (February through December) and 3 months in 2033 (January through March). GHG emissions for Alternative 4 are shown in **Table 3.3**.

Table 3.3–23. Alternative 4 Estimated GHG Emissions by Source (metric tons)

Source	Year	CO_2	CH_4	N_2O	CO_2e
Permitted Sources	2032	1,165.20	0.03	0.003	1,166.77
Mobile Surface Equipment		1,130.43	0.05	0.009	1,134.30
Mobile Underground Equipment		3,586.15	0.35	0.261	3,667.42
Coal Mine Methane		–	180.59	–	4,875.92
Employee Commuting		1,424.68	0.04	0.029	1,433.65
Rail Transport		46,264.14	3.74	1.178	46,693.79
Truck Transport		3,000.28	0.02	0.082	3,023.34
Coal Combustion		6,062,858.49	714.96	103.994	6,111,911.22

Source	Year	CO_2	CH_4	N_2O	CO_2e
Permitted Sources	2033	313.04	0.01	0.001	313.46
Mobile Surface Equipment		303.70	0.01	0.002	304.74
Mobile Underground Equipment		963.44	0.09	0.07	985.28
Coal Mine Methane		–	48.52	–	1,309.95
Employee Commuting		382.75	0.01	0.01	385.16
Rail Transport		12,429.17	1.00	0.32	12,544.60
Truck Transport		806.05	0.01	0.02	812.24
Coal Combustion		1,628,827.65	192.08	27.94	1,642,006.00
Total	2032	6,119,429.37	899.76	105.56	6,173,906.42
	2033	1,644,025.80	241.73	28.36	1,658,661.43

3.3.4.5 Social Cost of Greenhouse Gases

For the narrow purpose of complying with the terms of the Settlement Agreement reached in the matter of *WildEarth Guardians v. Haaland,* 2:16–cv–00168 (D. Utah), BLM and FS have prepared the following estimate of the social cost of GHG for the alternatives. While the Agencies are preparing the estimated social cost of carbon to comply with the Settlement Agreement, such estimates are misleading, strongly discouraged, and not required by law.

The NEPA does not require an agency to quantify project impacts through a specific methodology, such as estimating the "social cost of carbon," "social cost of methane," or "social cost of nitrous oxide." A protocol to estimate what is referenced as the "social cost of greenhouse gases" (SCGHG) associated with GHG emissions was developed by a federal Interagency Working Group on the Social Cost of Greenhouse Gases (IWG).

Executive Order 14154, Unleashing American Energy (Jan. 20, 2025), disbanded the IWG and withdrew any guidance, instruction, recommendation, or document issued by the IWG. Section 6(c) of EO14154 states:

> The calculation of the "social cost of carbon" is marked by logical deficiencies, a poor basis in empirical science, politicization, and the absence of a foundation in legislation. Its abuse arbitrarily slows regulatory decisions and, by rendering the United States economy internationally uncompetitive, encourages a greater human impact on the environment by affording less efficient foreign energy producers a greater share of the global energy and natural resource market. Consequently, within 60 days of the date of this order, the Administrator of the EPA shall issue guidance to address these harmful and detrimental inadequacies, including consideration of eliminating the "social cost of carbon" calculation from any Federal permitting or regulatory decision.

Executive Order 14154 further directs agencies to ensure consistency with the guidance in OMB Circular A–4 of September 17, 2003, when estimating the value of changes in GHG emissions from agency actions.

The Agencies do not normally include any estimates for the SCGHG for multiple reasons. First, this action is not rulemaking. Rulemakings are the administrative actions for which the IWG originally developed the SCGHG protocol. Second, EO 14154 clarifies that the IWG has been disbanded, and its guidance has been withdrawn.

Further, NEPA does not require agencies to conduct a cost–benefit analysis. Including an SCGHG analysis without a complete cost–benefit analysis, which would include the social benefits of the proposed action to society as a whole and other potential positive benefits, would be unbalanced, potentially inaccurate, and not useful to foster informed decision–making. Any increased economic activity—in terms of revenue, employment, labor income (LI), total value added, and output—that is expected to occur as a result of the proposed action is simply an economic impact, not an economic benefit, inasmuch as any such impacts might be viewed by another person as a negative or undesirable impact due to a potential increase in the local population, competition for jobs, and concerns that changes in population will change the quality of the local community. “Economic impact” is distinct from “economic benefit,” as understood in economic theory and methodology, and the socioeconomic impact analysis required under NEPA is distinct from a cost–benefit analysis, which NEPA does not require. In addition, many benefits and costs from agency actions cannot be monetized and, even if monetizable, cannot meaningfully be compared directly to SCGHG calculations for a number of reasons, including differences in scale (local impacts vs global impacts).

Finally, purported estimates of SCGHG would not measure the actual environmental impacts of a proposed action and may not accurately reflect the effects of GHG emissions. Estimates of SCGHG attempt to identify economic damages associated with an increase in carbon dioxide emissions—typically expressed as a one metric ton increase in a single year—and typically includes, but is not limited to, potential changes in net agricultural productivity, human health, and property damages from increased flood risk over hundreds of years. The estimate is developed by aggregating results across models, over time, across regions and impact categories, and across multiple scenarios. The dollar cost figure arrived at based on consideration of SCGHG represents the value of damages avoided if, ultimately, there is no increase in carbon emissions. But SCGHG estimates are often expressed in an extremely wide range of dollar figures, depending on the particular discount rates used for each estimate, and would provide little benefit in informing the Agencies’ decision. For these reasons, the USDOI has also rescinded its memorandum of October 16, 2024, entitled, “Updated Estimates of the Social Cost of Greenhouse Gases,” which had directed Interior bureaus to calculate SCGHG using the methodology contained in the EPA’s Final Rule of March 8, 2024, 89 Fed. Reg. 16,820.

To summarize, the Agencies do not normally evaluate SCGHG for a proposed action such as this because (1) the Agencies are not engaged in a rulemaking for which the now–rescinded SCGHG protocol was originally developed; (2) the IWG has been disbanded and all technical supporting documents and associated guidance have been withdrawn; (3) NEPA does not require agencies to prepare SCGHG estimates or cost–benefit analyses; (4) costs attributed to GHGs are often so variable and uncertain that they are unhelpful for the Agencies’ analysis; and (5) the full social benefits of carbon–based energy production have not been monetized, and quantifying only the costs of GHG emissions, but not the benefits, would yield information that is both potentially inaccurate and not useful. SCGHG estimates using both IWG and EPA estimates are presented in **Table 3.3**. The only reason the agencies are including this analysis here is because of the Settlement Agreement.

These estimates represent the present value (from the perspective of [2020 for IWG estimates and 2023 for EPA estimates]) of future market and nonmarket costs associated with CO_2, CH_4, and N_2O emissions as described in **Sections 3.3.3.8** through **3.3.3.11**. The estimates assume emissions will start in 2032 and end in 2032 or 2033, depending on the alternative, based on the current mining plan.

Table 3.3–19. Alternative 2 IWG SC–GHGs Estimates Associated with Mining, Commuting, Transportation, and Combustion Discounted Back to 2025 (millions, 2020$)

Year	GHG	5% Average Discount Rate	3% Average Discount Rate	2.5% Average Discount Rate	95th Percentile Discount Rate
2032	CO_2	$89.28	$318.70	$474.69	$967.06
	CH_4	$0.64	$1.51	$1.99	$4.02
	N_2O	$0.62	$2.04	$3.01	$5.41
2033	CO_2	$63.43	$228.45	$340.89	$694.45
	CH_4	$0.46	$1.09	$1.45	$2.91
	N_2O	$0.44	$1.47	$2.17	$3.89
Total	CO_2, CH_4, and N_2O	$154.89	$553.26	$824.20	$1,677.75

Table 3.3–2520. Alternative 2 EPA SC–GHGs Estimates Associated with Mining, Commuting, Transportation,
and Combustion Discounted Back to 2025 (millions, 2023$)

Year	GHG	2.5% Discount Rate	2% Discount Rate	1.5% Discount Rate
2032	CO_2	$895.99	$1,464.96	$2,520.65
	CH_4	$1.83	$2.34	$3.17
	N_2O	$4.81	$7.35	$11.73
2033	CO_2	$646.76	$1,059.39	$1,819.68
	CH_4	$1.34	$1.72	$2.33
	N_2O	$3.47	$5.32	$8.51
Total	CO_2, CH_4, and N_2O	$1,554.20	$2,541.08	$4,366.08

Table 3.3–2621. Alternative 3 IWG SC–GHGs Estimates Associated with Mining, Commuting, Transportation,
and Combustion Discounted Back to 2025 (millions, 2020$)

Year	GHG	5% Average Discount Rate	3% Average Discount Rate	2.5% Average Discount Rate	95th Percentile Discount Rate
2032	CO_2	$89.28	$318.70	$474.69	$967.06
	CH_4	$0.64	$1.51	$1.99	$4.02
	N_2O	$0.62	$2.04	$3.01	$5.41
2033	CO_2	$–	$–	$–	$–
	CH_4	$–	$–	$–	$–

Year	GHG	5% Average Discount Rate	3% Average Discount Rate	2.5% Average Discount Rate	95th Percentile Discount Rate
	N_2O	$–	$–	$–	$–
Total	CO_2, CH_4, and N_2O	$90.55	$322.25	$479.69	$976.50

Table 3.3–2722. Alternative 3 EPA SC–GHGs Estimates Associated with Mining, Commuting, Transportation, and Combustion Discounted Back to 2025 (millions, 2023$)

Year	GHG	2.5% Discount Rate	2% Discount Rate	1.5% Discount Rate
2032	CO_2	$895.99	$1,464.96	$2,520.65
	CH_4	$1.83	$2.34	$3.17
	N_2O	$4.81	$7.35	$11.73
2033	CO_2	$–	$–	$–
	CH_4	$–	$–	$–
	N_2O	$–	$–	$–
Total	CO_2, CH_4, and N_2O	$902.63	$1,474.65	$2,535.56

Table 3.3–2823. Alternative 4 IWG SC–GHGs Estimates Associated with Mining, Commuting, Transportation, and Combustion Discounted Back to 2025 (millions, 2020$)

Year	GHG	5% Average Discount Rate	3% Average Discount Rate	2.5% Average Discount Rate	95th Percentile Discount Rate
2032	CO_2	$89.28	$318.70	$474.69	$967.06
	CH_4	$0.64	$1.51	$1.99	$4.02
	N_2O	$0.62	$2.04	$3.01	$5.41
2033	CO_2	$23.49	$84.61	$126.26	$257.20
	CH_4	$0.17	$0.40	$0.54	$1.08
	N_2O	$0.16	$0.54	$0.80	$1.44
Total	CO_2, CH_4, and N_2O	$114.38	$407.81	$607.29	$1,236.22

Table 3.3–2924. Alternative 4 EPA SC–GHGs Estimates Associated with Mining, Commuting, Transportation, and Combustion Discounted Back to 2025 (millions, 2023$)

Year	GHG	2.5% Discount Rate	2% Discount Rate	1.5% Discount Rate
2032	CO_2	$895.99	$1,464.96	$2,520.65
	CH_4	$1.83	$2.34	$3.17
	N_2O	$4.81	$7.35	$11.73
2033	CO_2	$239.54	$392.37	$673.96

Year	GHG	2.5% Discount Rate	2% Discount Rate	1.5% Discount Rate
	CH_4	$0.50	$0.64	$0.86
	N_2O	$1.29	$1.97	$3.15
Total	CO_2, CH_4, and N_2O	$1,143.95	$1,869.63	$3,213.53

3.4 Geology

3.4.1 Analysis Area

The analysis area for geology is shown on **Figure 3.4–1**. The area's boundaries are based on structural features shown on **Figure 3.4–2** as follows: West—Gooseberry Fault Zone; North—Bronco and Eccles canyons, beyond which faulting shifts from a north–south to an east–west orientation; East—Pleasant Valley Fault Zone; South—the nearest township–and–range section lines immediately below the Huntington and Cleveland reservoirs, ensuring any impacts on those water bodies are assessed. Also shown on **Figure 3.4–2** are the historic and current underground mine workings, faults, and the proposed LBA and LMA boundaries. Within the analysis area limits, the investigation captures the full extent of potential impacts on geologic strata, including subsidence and seismic effects, to both natural and man–made features.

3.4.2 Evaluation Criteria

Table 3.4-1. presents the geology/mining engineering analysis issues and evaluation criteria used to assess impacts.

Table 3.4–1. Geology/Mining Engineering Analysis Issues and Evaluation Criteria

Issue	Evaluation Criteria
How would leasing and mining impact geologic strata?	Tons of coal mined beneath both federal and adjacent private lands
How would leasing and mining impact faults and fractures?	Qualitative assessment of potential reactivation or opening and subsequent closing following subsidence based on literature
How would leasing and mining impact subsidence?	Vertical subsidence (feet), slope (%), radius of curvature (degrees), horizontal strain (%), and angle of draw (degrees)
How would leasing and mining impact seismic events?	Maximum credible mining–induced seismic event (by range of magnitude and probability), feet or miles, and potential damage to dams at Boulger, Electric Lake, Cleveland, Huntington, and Scofield reservoirs.

3.4.2.1 Tons of Coal Mined

The Little Eccles Federal Coal Lease Tract (UTU–92226) LBA includes 120 acres of federal coal, and the Flat Canyon Federal Coal Lease Tract (UTU–77114) LMA includes 660 acres of federal coal. There are multiple coal seams present. The Skyline mine will be only mining the Lower O'Connor A seam (**Figure 3.4–3**). Recoverable reserve estimates within the LBA and LMA and on private land by alternative are provided in **Chapter 2** and discussed in **Section 3.4.4**.

3.4.2.2 Faults and Fractures

Faults and fractures within the geology analysis area have been mapped by both the United States Geological Survey (USGS) and CFC. Impacts of faults and fractures were assessed by overlaying the mapped faults and fractures on the proposed mine workings at depth.

Figure 3.4–1. Geology Analysis Area

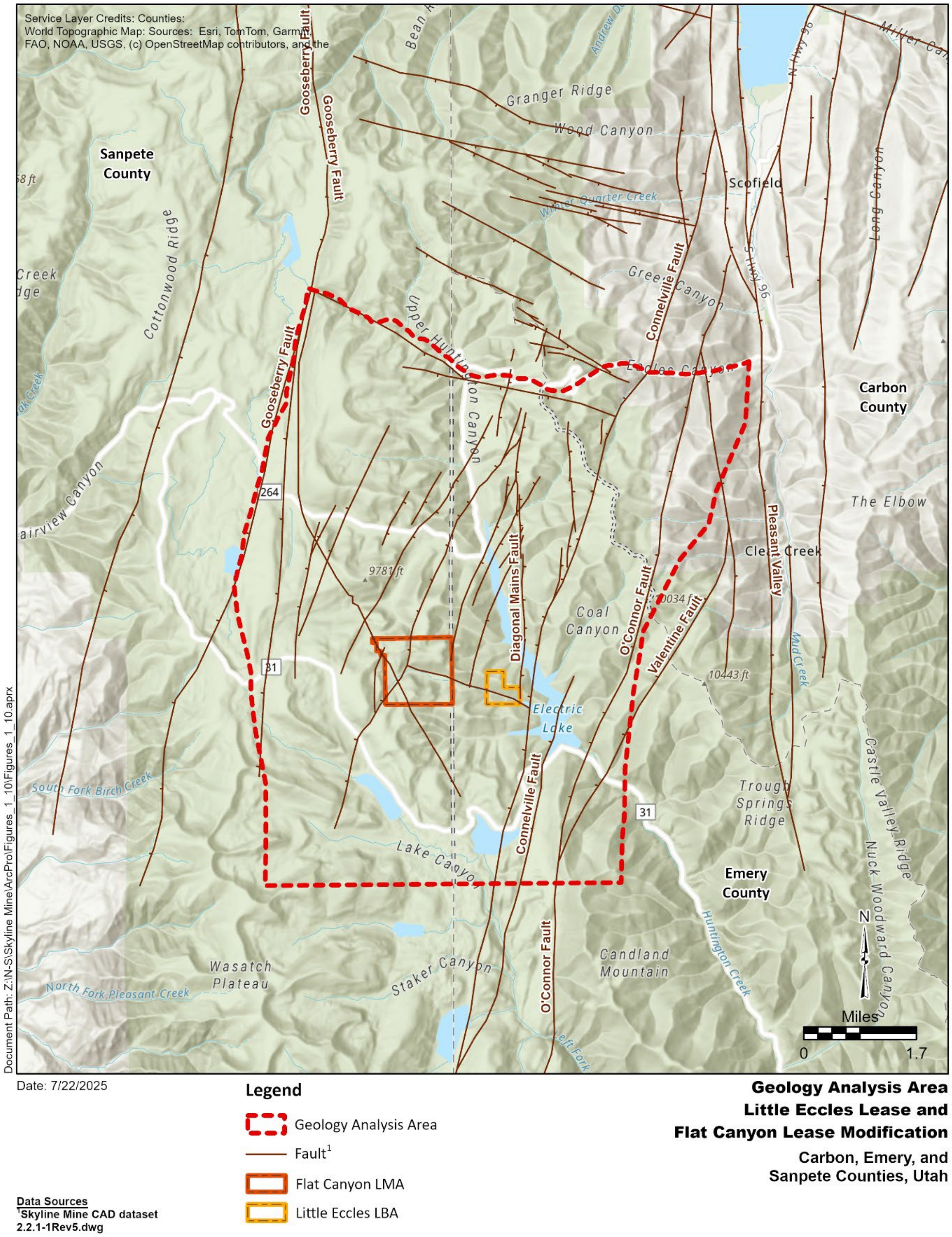
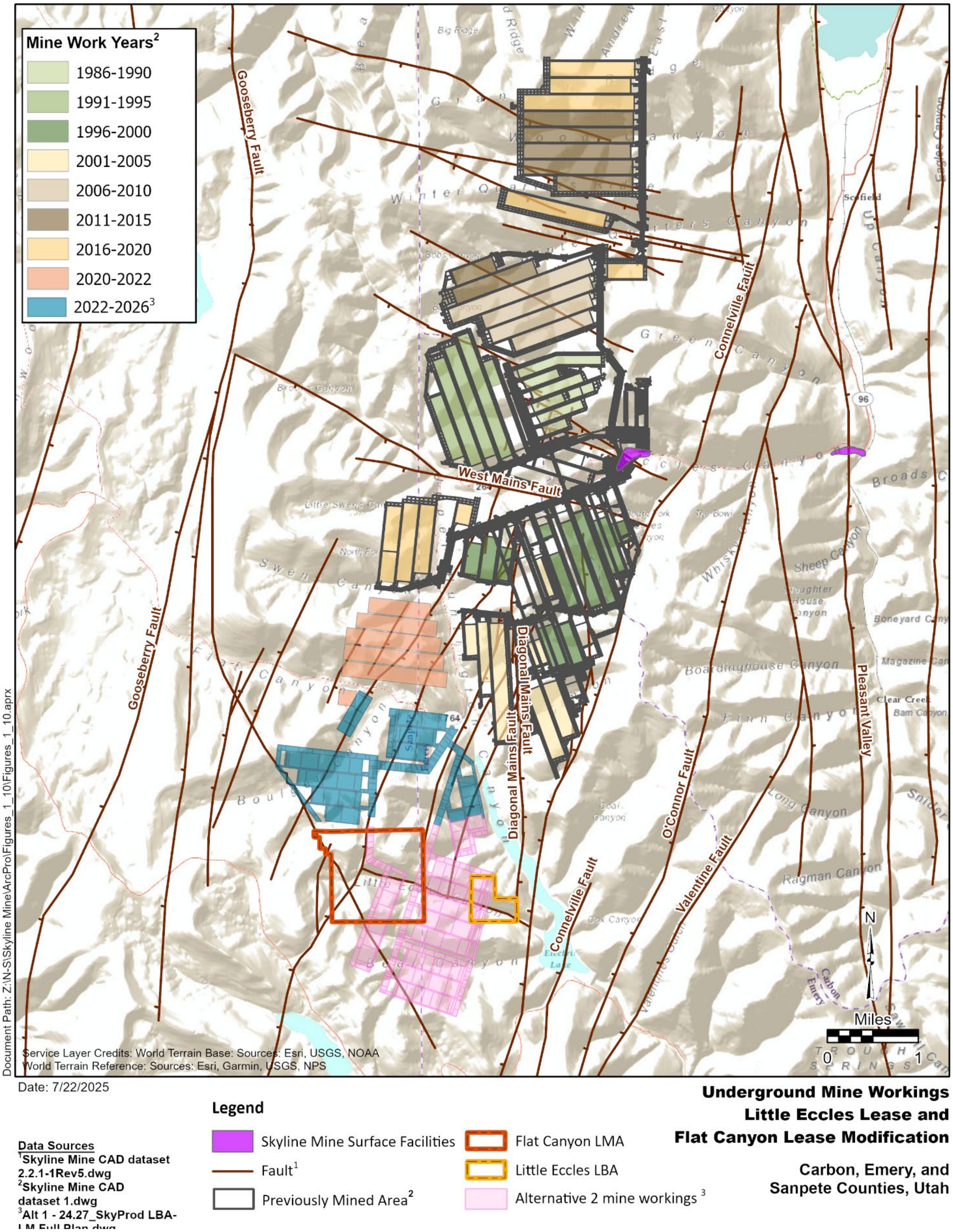


Figure 3.4–2. Historic, Current, and LBA and LMA, and Geologic Faults



3.4.2.3 Impacts Due to Subsidence

Impacts due to subsidence were evaluated by site–specific subsidence modeling performed by Agapito Associates (2021; **Appendix E**). The "Influence Function" module of the Surface Deformation Prediction System (SDPS) was used for the prediction of surface subsidence. The influence function method assignsa mathematical expression (in this case, the bell–shaped Gaussian function) to predict subsidence distribution induced by excavation of a unit area. The influence function method has the ability to superpose the influences from multiple and irregular mine geometries. The influence function was used to calibrate the models to subsidence profiles derived from existing subsidence data provided by CFC. Impacts on geologic resources due to subsidence were assessed by overlaying mapped topography and geologic units on the potential extent of subsidence derived from the SDPS model and described in (Agapito Associates, 2021).

3.4.2.4 Seismic Events

A maximum magnitude and peak ground acceleration (PGA), which is a measure of the maximum ground acceleration experienced during an earthquake at a specific location, from mining–induced seismicity were assessed (RB&G Engineering, 2022) to estimate potential impacts including liquefaction, dynamic instability, internal erosion, subsidence, and landslides, particularly regarding the stability and safety of the Huntington, Cleveland, Electric, and Boulger dams.

3.4.2.5 Dam Hazard Ratings

Table 3.4–2 contains a list of dams and reservoirs that are part of the Utah Dam Safety Inspection program that are within the geology analysis area or within a 2–mile buffer of the LMA and LBA to the south. These dams are managed and meet construction and safety standards per Utah Code Title 73 Chapter 5a.

Table 3.4–2. Reservoirs/Dams within the Geology Analysis Area or within a 2–Mile Buffer of LMA/LBA

Dam #	Name	Hazard Risk	County
UT100144	Huntington	High	Sanpete
UT00100	PacificCorp Electric Lake	High	Emery
UT00695	Boulger Reservoir	Low	Sanpete
UT00071	Cleveland Reservoir	High	Emery

Source: (UDWRi, 2025)

3.4.3 Affected Environment

3.4.3.1 Geologic Setting

The Skyline Mine, LBA, and LMA are located on the Wasatch Plateau at elevations between approximately 8,200 and 9,800 feet above mean sea level. The Wasatch Plateau is an upland into which stream drainages have eroded to produce irregular topography with high relief and relatively steep, narrow valleys.

The geology analysis area is underlain by a thick (tens of thousands of feet) sequence of gently dipping but faulted sedimentary rocks ranging in age from Paleozoic to Tertiary. Of primary interest for study are the upper few thousand feet of rocks, from the Tertiary–age North Horn Formation exposed at the land surface in the highest areas, to the upper part of the Cretaceous–age Mancos Shale, which is exposed in the southernmost part of the geology analysis area and underlies the entire analysis area. Groundwater is present in the rocks above the Mancos Shale. The Mancos Shale forms a low–permeability layer that acts as the base of the groundwater system.

3.4.3.2 Stratigraphy

The stratigraphic units include, as shown in **Figure 3.4–3**, from youngest (shallowest) to oldest (deepest), the following formations:

- The North Horn Formation is exposed on the highest ridge tops in the western part of the area. It consists primarily of shale with lesser amounts of sandstone, limestone, and conglomerate. Isolated channel sandstones are present throughout the formation, and low permeability bentonitic mudstones dominate the lower third of the North Horn Formation (Petersen Hydrologic, 2017). Springs commonly discharge from hillsides near the ridge tops because of the limited vertical permeability of the North Horn Formation overall.

- The Price River Formation crops out along ridges and consists of fluvial sandstone with interbedded shale and conglomerate, resulting in alternating ledges and slopes on outcrops. The discontinuous nature of the sandstones and the adjacent low–permeability material prevents transmission of water over extended distances.

- The Castlegate Sandstone Formation consists of fine– to medium–grained sandstones deposited in a braided stream environment with thin interbeds of siltstone and claystone. The presence of mudstone and the tight cementing of the Castlegate Sandstone Formation limits the potential for groundwater flow.

- The Blackhawk Formation consists of discontinuous beds of sandstone, claystone, mudstone, and shale over basal coal seams. Sandstone paleochannels that are encased in low–permeability rocks are found throughout the Blackhawk Formation. These paleochannels may or may not contain water. The interbedded shales and mudstones impede downward percolation of recharge water into the deeper subsurface. This unit represents most of the land surface in the area and also includes the coal–bearing strata.

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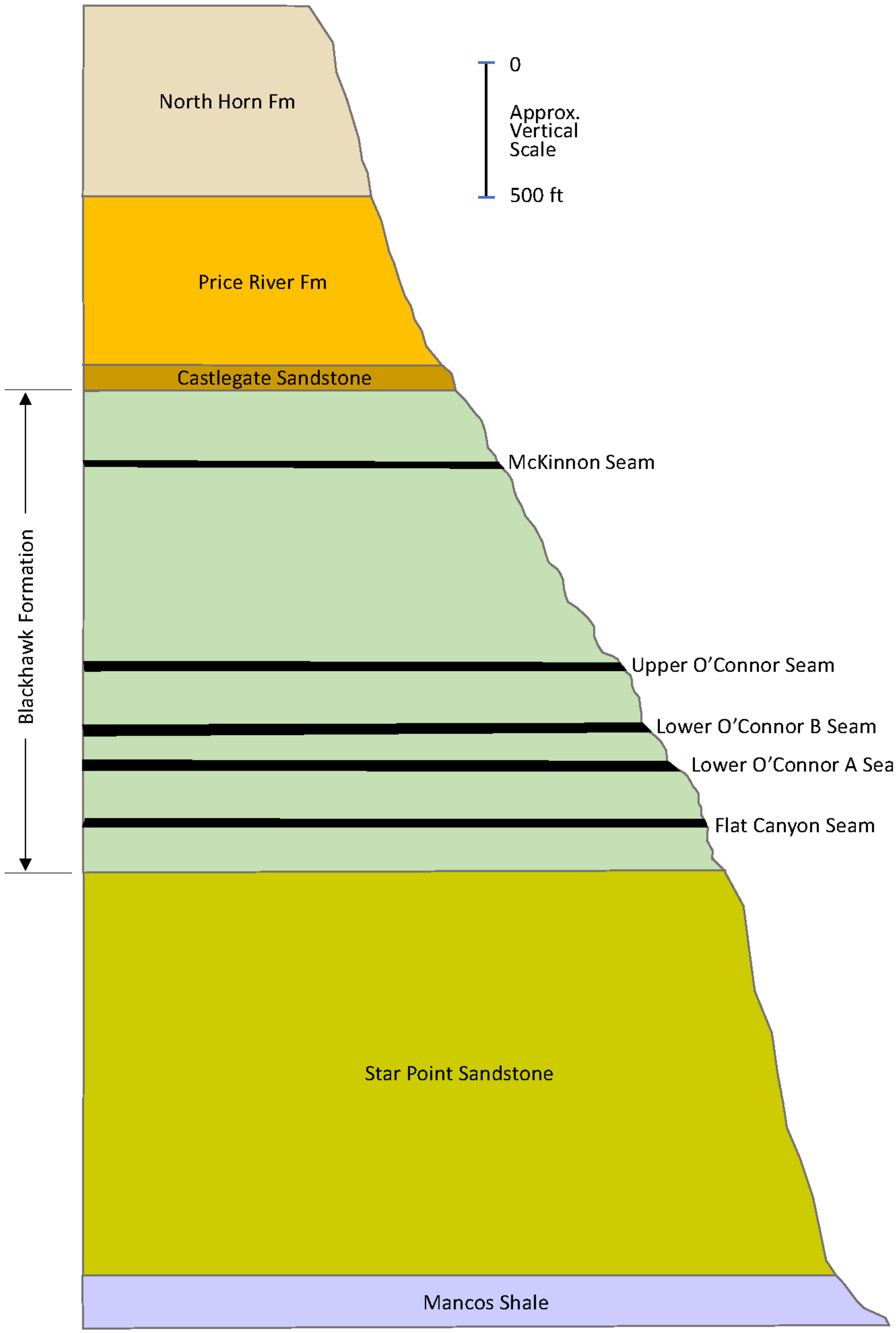
Figure 3.4–3. Stratigraphic Units



- The Star Point Sandstone consists of massive, fine– to medium–grained, water–bearing sandstone that is moderately well consolidated. The top layer Storrs Tongue (not shown on **Figure 3.4–3**) interfingers with the overlying Blackhawk Formation and is one of the sources for the water inflows into the Skyline Mine through tensional fractures. Sandstones in the Blackhawk Formation also contribute to the flow as likely do the Panther Tongue and other parts of the Star Point Sandstone.
- The Mancos Shale is a major unit that underlies the entire region from the Wasatch Front east to the Western Slope in Colorado. It consists of a thick sequence of marine shale and sandstone with several locally thick sandstone–mudstone–coal members. The Mancos Shale hydraulically isolates deeper strata from the Skyline Mine coal mining and reclamation operations.

Geologic units exposed on the Little Eccles Federal Coal Lease Tract (UTU–92226) LBA consist of the Blackhawk Formation of Upper Cretaceous age, which extends down through the coal seams (**Figure 3.4–4**). Geologic units exposed on the Flat Canyon Federal Coal Lease Tract (UTU–77114) LMA consist of Quaternary–age morainal deposits at the base of Boulger Canyon (Agapito Associates, 2021), the Blackhawk Formation in the majority of the tract, and the Castlegate Sandstone and Price River formations of Upper Cretaceous age at the highest elevations (**Figure 3.4–4**). The Star Point Sandstone crops out in the southern and eastern parts of the geology analysis area (**Figure 3.4–4**) and is present in the subsurface west of the outcrop areas and throughout the historical, current, and LBA and LMA boundaries.

3.4.3.3 Structural Geology

The rock units generally dip to the northwest, west, or southwest at 3 to 10 degrees (Petersen Hydrologic, 2017); (UDOGM, 2019). Faults in the area trend mainly north–northeast (**Figure 3.4–4**) and have normal displacement with the strata on the west side of the faults downthrown relative to the strata on the east side. Faults with notable vertical displacement (100 feet or more) include the Pleasant Valley, Connelville, O'Connor, Gooseberry, and East Gooseberry fault zones. The Skyline Mine lies between the Gooseberry Fault on the west and the Connelville Fault on the east (**Figure 3.4–4**). Other generally north–south faults, including the Joes Valley Fault zone (Black et al., 2006) and Diagonal and Valentine faults, typically have displacements up to a few dozen feet. A second set of normal faults trend generally east–southeast; those faults also generally have small vertical displacement. The faulting in the area has resulted in north–south elongated fault–controlled structural blocks.

The faults are important to groundwater flow in the Star Point Sandstone and basal Blackhawk Formation but typically not in the overlying formations. Depending on the amount of vertical displacement across a particular fault and the lithologies of the stratigraphic units juxtaposed against one another across the fault, the faults can act as conduits for groundwater flow laterally, or vertically, or both. Faults can act as barriers that prevent or impede lateral and vertical flow. The Gooseberry Fault has approximately 300 to 400 feet of displacement. The Star Point Sandstone east of the fault contacts shale, mudstone, and sandstone of the Blackhawk Formation west of the fault. The Connelville Fault has approximately 150 to 200 feet of displacement and appears to restrict lateral groundwater flow across the fault. Both the Gooseberry Fault and the Connelville Fault appear to act as groundwater flow barriers. They separate the groundwater system in the Skyline Mine area between the faults from the groundwater systems west of the Gooseberry Fault and east of the Connelville Fault. The East

Gooseberry Fault, which trends northwest–southeast through the southwest corner of the LMA (**Figure 3.4–4**) has approximately 300 to 400 feet of displacement, with the southwest side downthrown relative to the northeast side. The LBA and LMA would be northeast of the East Gooseberry Fault and would extend nearly to the fault.

3.4.3.4 Coal Seams

There are four coal seams of economic interest at the base of the Blackhawk Formation: the Upper O'Connor, the Lower O'Connor B, the Lower O'Connor A, and the Flat Canyon. The Lower O'Connor A is 10.5 to 16 feet thick on the LBA and 13 to 17.5 feet thick on the LMA. The rapid thickness increase on the west side of the LMA is associated with the merging of the Flat Canyon and Lower O'Connor A seams and the East Gooseberry Graben Fault Zone (Agapito Associates, 2021).

The depth to the top of the Lower O'Connor A Seam on the LBA ranges from approximately 800 feet at the southeast corner by Electric Lake to 1,400 feet on the west side of the LBA. The depth in the LMA ranges from approximately 1,500 feet at the east side under Little Eccles Canyon to approximately 3,000 feet under the tops of the ridges in the southwest corner.

3.4.4 Environmental Consequences

3.4.4.1 Alternative 1: No Action

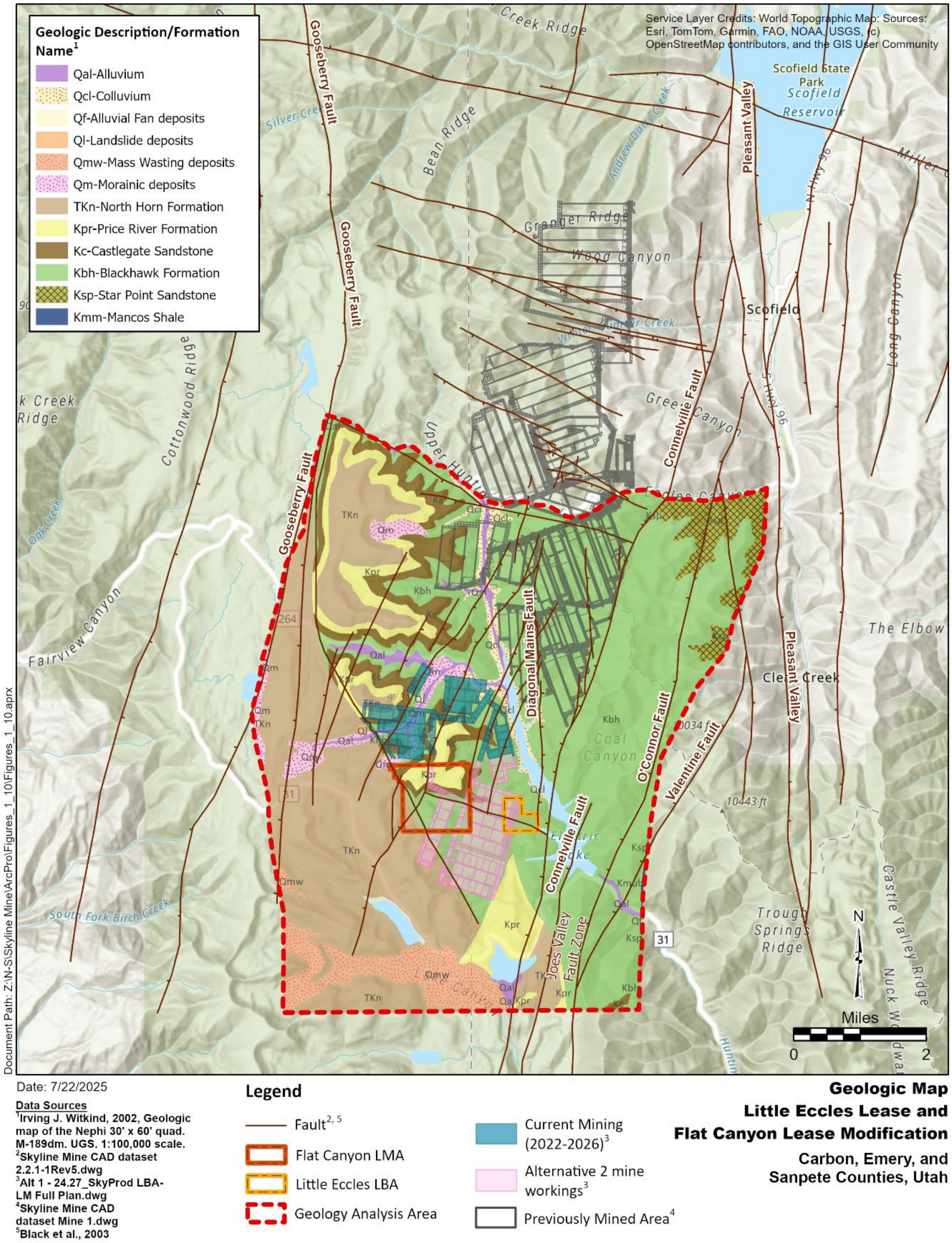
Tons of Coal Mined

The estimated recoverable reserves of the private leases are approximately 11.7 million tons of Lower O'Connor A seam coal. No coal would be mined from the LBA or the LMA.

Faults and Fractures

Several faults and fractures with vertical displacements of approximately 5 to 30 feet would be mined through. The East Gooseberry Fault with 300 to 400 feet of vertical displacement and the Connelville Fault with 150 to 175 feet of vertical displacement are unlikely to be crossed by mining. Mine subsidence can lead to the reactivation or reopening of existing faults. This occurs because the removal of the support beneath the surface creates stress changes, potentially triggering movement along pre–existing faults. Faults with small displacement are essentially non–conductive where they cut more–plastic, fine–grained sedimentary units such as those in the majority of the Blackhawk Formation (SRK Consulting, 2016), whereas sections of faults with larger vertical displacement are filled with ground–up rock and form low–permeability zones (UDOGM, 2019). Hydrogeologic studies have shown that the clay–rich Blackhawk Formation effectively seals faults and fractures above mined areas and those that intersect previously mined areas contribute limited, if any, groundwater flow to the Skyline Mine. Consequently, any reactivated faults within the Blackhawk Formation could fill with clay or ground–up rock. This would limit the reopening or creation of new hydrologic pathways intersecting the surface.

Figure 3.4–4. Geologic Map



Subsidence of the land surface overlying coal mining areas is a commonly observed phenomenon in the Utah coal mining environment. Surface subsidence can occur where the rock strata overlying mined–out areas sags into the voids left by the extraction of the coal. Full–extraction longwall mining results in nearly complete removal of the coal supporting the roof, causing the immediate roof strata to collapse onto the floor of the workings. This failure propagates upward, leading to fracture and flexure of the overlying rocks and surface subsidence. The degree of subsidence varies with the mining layout, depth of overburden, thickness of extraction, and competence of the overlying strata. Details of subsidence mechanisms and factors that affect subsidence are provided in Agapito Associates (2021).

In 2021, four site–specific subsidence models (cases) based on varying model inputs were developed by Agapito Associates for the initial mine plan. Parameters that have a large impact on the subsidence prediction are mining height and overburden depth. Actual overburden is incorporated into the predictive model, so variations in overburden depth are explicitly included. Three cases were run to show the effects of variation in mining height, including average height (12.0 feet, Case 1), maximum height (13.5 feet, Case 2), and minimum height (7.5 feet, Case 3). An additional case, Case 4, was run with the largest subsidence factor from the calibration profiles (60%) as a worst–case scenario.

Subsidence parameters predicted by the SDPS include the following:

- Ground Subsidence—The vertical displacement (feet) of a given point on the surface.
- Horizontal Strain—The percent change in horizontal distance between two points divided by the original horizontal distance between the points.
- Slope—The percent difference in subsidence at two points divided by the horizontal distance between the points.
- Radius of Curvature—Curvature is the difference in slope for two points divided by the horizontal distance between the points, expressed by taking its inverse, the radius of curvature, which is expressed in miles.

Subsidence parameter results for the four different case scenarios are presented in **Table 3.4–3**.

Table 3.4–3. Subsidence Parameter Results from the SDPS Modeling

Case	Mining Height (feet)	Maximum Feet of Subsidence	Horizontal Strain (millistrain) Minimum (compression)	Horizontal Strain (millistrain) Maximum (tension)	Maximum Slope (%)	Radius of Curvature Minimum (miles)
1	12.0	4.92	6.93		1.27	1.01
2	13.5	5.54	8.40		1.43	0.90
3	7.5	3.08	4.68		0.79	1.61
4	Worst case	7.20	10.92		1.86	0.69

The Case 1 model was based on the initial mine plan and was used to assess subsidence because its results present the average mining height and most likely subsidence factor. Results for Case 1 under CFC's initial mine plan were assessed (Agapito Associates, 2021) and specifics about SDPS modeling cases can be found in Agapito Associates (2021). Potential vertical subsidence for Case 1 is shown with existing topography in **Figure 3.4–5** and with geologic units in **Figure 3.4–6**.

The subsidence modeling completed in 2021 for the initial mine plan, which included 8.6 million tons to be mined beneath the 640–acre LMA and 2.2 million tons to be mined beneath the 120–acre LBA, projected approximately 2,745 acres could be subject to most likely (case 1) potential subsidence of up to 4.9 feet (Agapito Associates, 2021). The acreage was determined using an angle of draw of 23 degrees from the proposed underground workings. This remains the maximum modeled extent of potential subsidence. However, since the modeling, the proposed tonnage from the LMA and LBA has been considerably reduced to 2.1 million tons for the LMA (alternatives 2 and 3) and 858,000 tons (Alternative 2) or 1 million tons (Alternative 4) for the LBA, and the extent of proposed underground workings as well as the expected areas of subsidence have also decreased, as shown on **Figure 3.4–7.**

Therefore, all the 2021 modeled cases represent worst case scenarios for subsidence, and given greatly reduced mined tonnage and affected area, it is reasonable to expect a corresponding decrease in potential subsidence effects as compared to the modeled effects. While subsidence can form tension cracks on the surface, particularly in hard strata in the absence of soil, a study on subsidence–induced cracks in Utah reported that tension cracks experienced gradual closure, once tensile stresses were reduced or relaxed (**Appendix B**). The mean closure rate was 0.12 inches per week, with individual crack closure rates from 0.08 to 0.4 inches per week.

The Environmental Assessment for the Flat Canyon Lease (OSMRE, 2016) states that of the total area mined at the Skyline Mine (10,733 acres), less than 0.5% of the area was known to have tensile fractures. This would be less than approximately 6.2 acres over 1,230 acres under Alternative 1 (**Table 3.4–4**). Given this, it is unlikely that appreciable surface cracking would result from the subsidence predicted for the LBA and LMA. Subsidence would be considered an unavoidable adverse impact under this Alternative 1.

Updated potential subsidence areas were predicted for each alternative based on updated expected underground workings and the angle of draw. Thus, potential subsidence acreage and acreage susceptible to tensile fractures differ under each of the four alternatives as shown in **Table 3.4–4**.

Table 3.4–4. Area Potentially Affected by Subsidence and Tensile Fractures for Each Alternative

Alternative	Total Acreage of Subsidence	Acreage Susceptible to Tensile Fractures within Subsidence Area[1]
Alternative 1	1,230 acres	6.2 acres
Alternative 2	1,923 acres	9.6 acres
Alternative 3	1,827 acres	9.1 acres
Alternative 4	1,509 acres	7.5 acres

[1] Estimated based on past monitoring at Skyline Mine, which found that less than 0.5% of the area subject to potential subsidence experienced tensile fractures (OSMRE, 2016).

Figure 3.4–5. Changes in Topographic Elevation Due to Subsidence: Case 1 of Initial Mine Plan

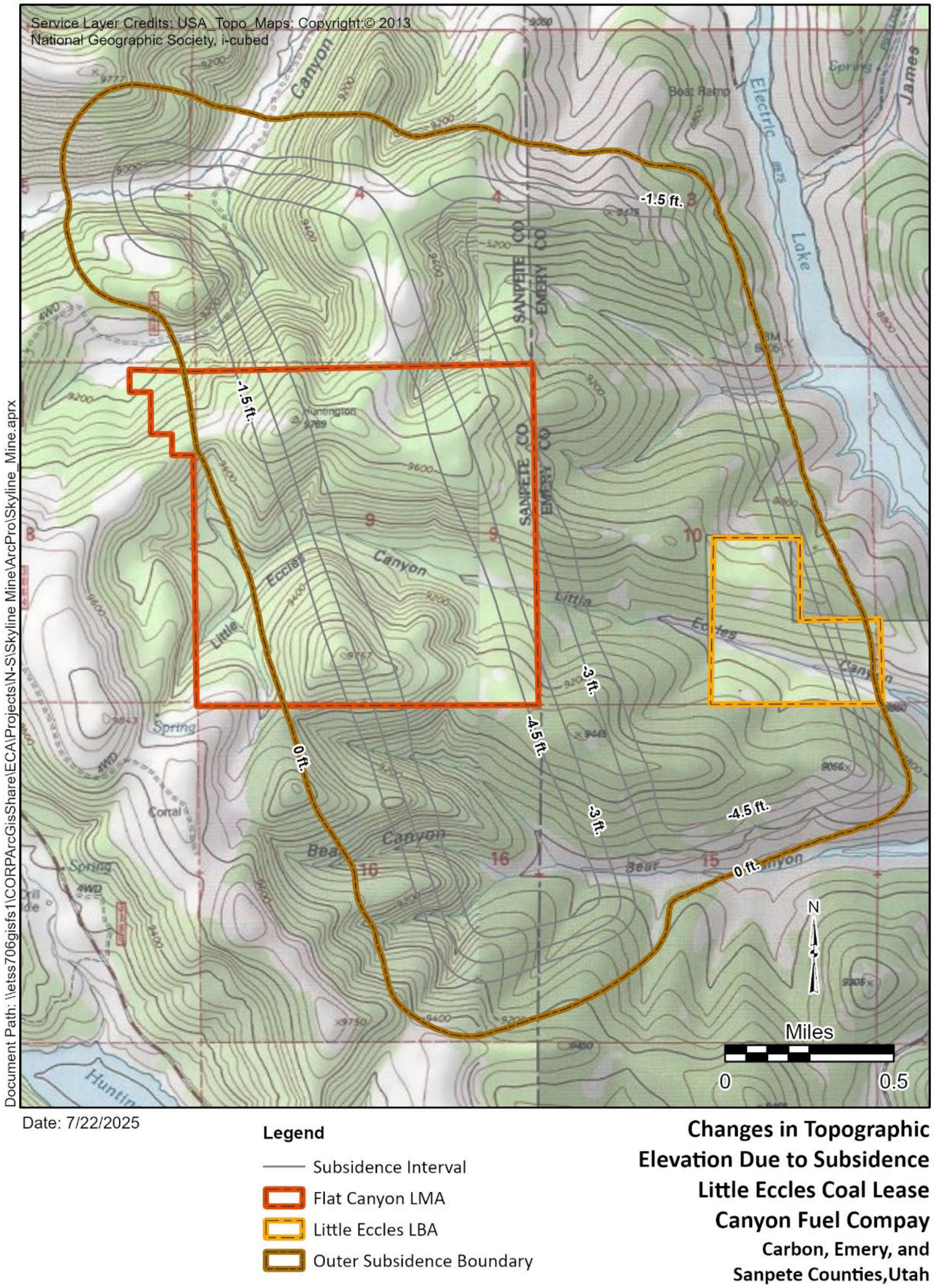


Figure 3.4–6. Geologic Units Subject to Potential Subsidence: Case 1 of Initial Mine Plan

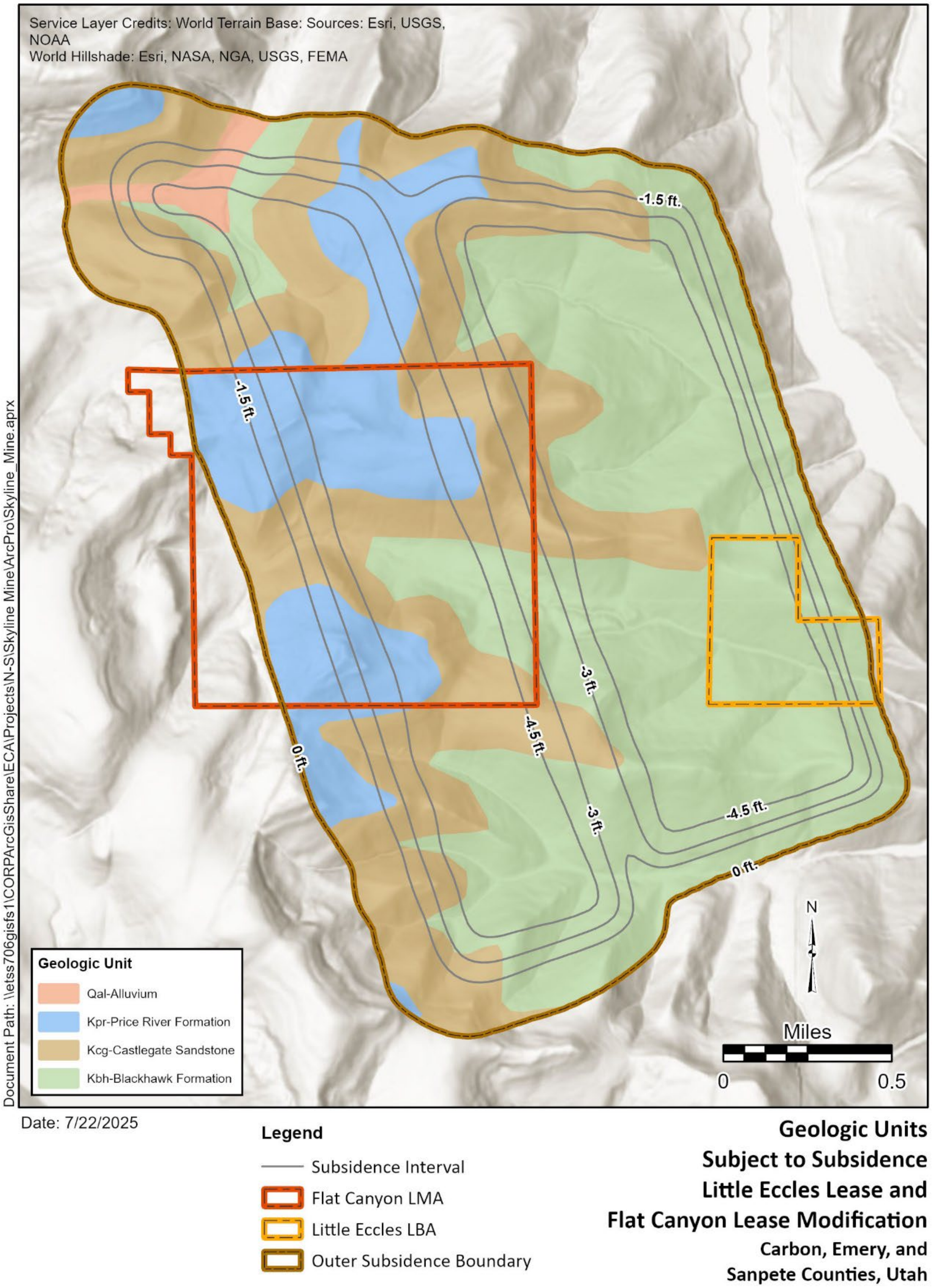
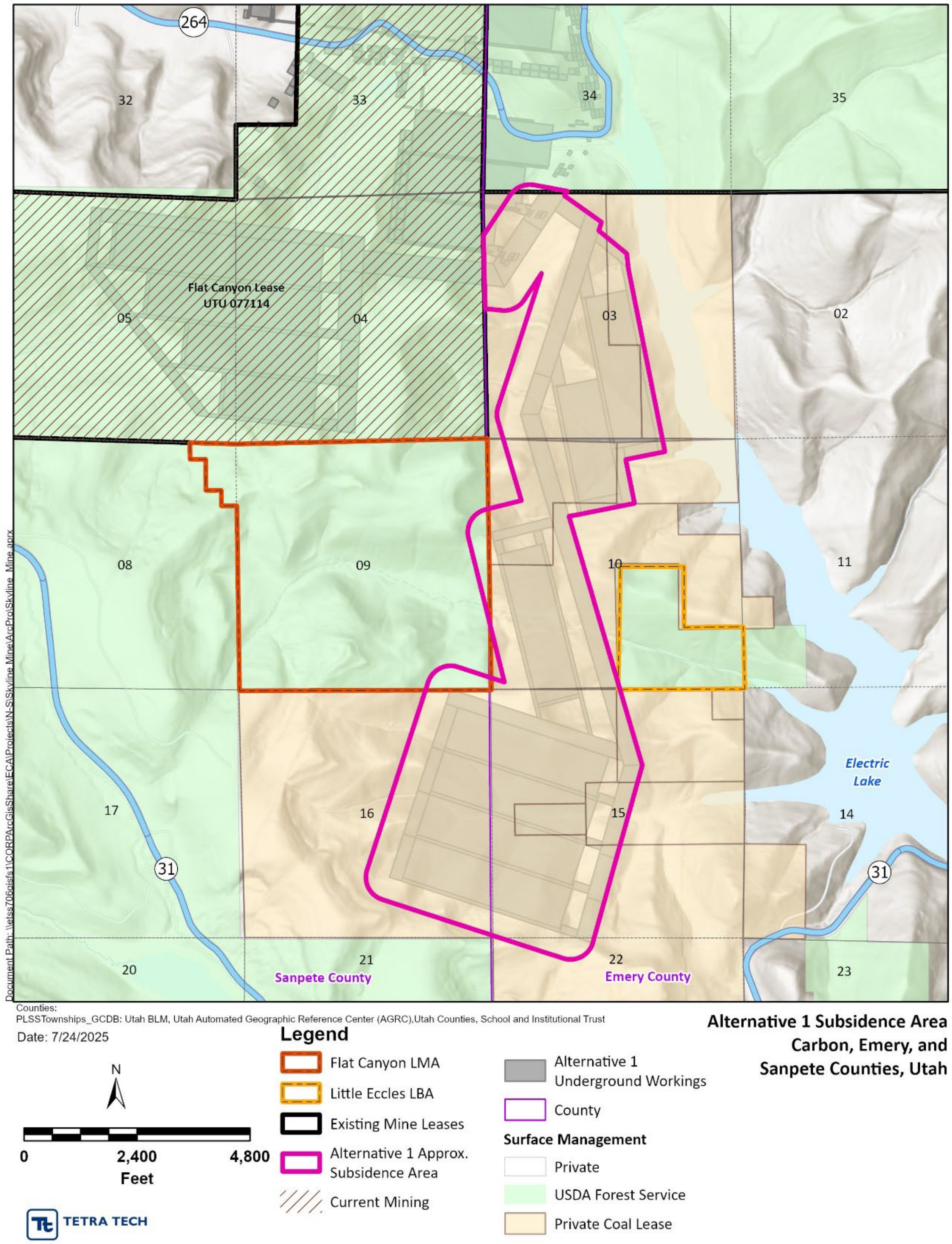


Figure 3.4–7. Mined Area and Expected Limits of Potential Subsidence: Alternative 1



Seismic Events

Four reservoir dams are within the geology analysis area: Huntington (1.10 mile), Cleveland (1.75 mile), Electric (0.80 mile), and Boulger (1.10 mile). These distances are measured from the respective dam to the nearest boundary of the LBA or the LMA. Based upon a comprehensive evaluation of mining–induced seismicity of not only the Skyline Mine but the Willow Creek, Trail Mountain, and West Ridge mines in the Wasatch Plateau coal mining region, mining–induced seismicity could generate a seismic event with a magnitude of 3.9 and PGA of approximately 0.21 g (the standard acceleration due to Earth's gravity, equivalent to g–force) at the Electric Lake dam (RB&G Engineering, 2022). Based on numerous mine–induced seismicity studies for dams in the region and review of available historic information, it is unlikely that an event with a magnitude greater than 3.0 and a PGA at the dam greater than 0.03 g would occur (RB&G Engineering, 2022). Soils within the Electric Lake dam foundation may be subject to liquefaction–induced strength loss if the PGA exceeds approximately 0.18 g at the dam site. Past evaluations have indicated that the Electric Lake dam can withstand a magnitude 7.0 event with a PGA of 0.82 g (RB&G Engineering, 2022).

Based upon the results of a 2018 study, the LBA and LMA would not create unacceptable risk to the Electric Lake or Boulger dams (RB&G Engineering, 2019). Mining–induced seismicity is expected to generate a maximum credible earthquake event of magnitude 3.9. The PGA would not likely exceed 2 g at Boulger dam and 0.1 g at Electric Lake dam. A computed deformation of 0.04 feet was determined for Boulger dam, while zero deformation was determined for Electric Lake dam. Due to the limitations of modeling, the estimate for Boulger dam may be unconservative; however, the study (RB&G Engineering, 2019) considered an upper bound of 0.5 feet of deformation. This results in a factor of safety of 8 against overtopping due to deformation (RB&G Engineering, 2019). A dam's safety factor against overtopping generally refers to the margin of safety against failure due to excessive water flowing over the dam's crest, and a safety factor of at least 1.5 is often considered a minimum acceptable value.

Past and present projects affecting the geology within or surrounding the LBA or LMA include the considerable past mining at Skyline Mine dating back to 1981. All the previously mined areas contribute to the current affected environment which includes subsided lands. Alternative 1 would result in an incremental impact on geology from continued coal mining and related subsidence. No unacceptable risks would be created for the Electric Lake or Boulger dams as a consequence of Alternative 1.

3.4.4.2 Alternative 2: Modify the Flat Canyon Tract and Lease the Little Eccles Tract

Tons of Coal Mined

The four coal seams of economic interest have been partially mined, but CFC plans to only mine the Lower O'Connor A seam in the proposed LMA and LBA. CFC has stated that with their current longwall equipment, the minimum cutting height is 7.5 feet, and the maximum is 13.5 feet. The current mine plan shows they typically do not mine at depths greater than 2,000 feet but consider a maximum potential depth of 2,400 feet feasible (Agapito Associates, 2021). The estimated recoverable reserves within the LMA area are approximately 2.1 million tons. The mineable reserve base in the LBA is approximately 1 million tons. Based on the current mine plan, the LBA could produce about 858,000 tons of recoverable Lower O'Connor A seam coal. Approximately 16.4 million tons would be mined from private lands, with a total of approximately 19.3 million tons mined under Alternative 2. The proposed mining would result in an irreversible and irretrievable commitment of coal resources.

The coal extraction would begin in 2029 and extend through August 2033. The proposed coal mining would meet the 2008 BLM PFO RMP objective for coal mining as it would occur within the BLM's planning area and minimize impacts on other resource values. The alternative would also meet all standards and guidelines for coal mining outlined in the 1986 FS MLNF LRMP as amended, and the requirements of the Utah Coal Regulatory Program at the UDOGM.

Faults and Fractures

Six faults and fractures with vertical displacements of approximately 5 to 30 feet would be mined through. The East Gooseberry Fault with 300 to 400 feet of vertical displacement and the Connelville Fault with 150 to 175 feet of vertical displacement are unlikely to be crossed by mining. Mine subsidence can lead to the reactivation or reopening of existing faults. This occurs because the removal of the support beneath the surface creates stress changes, potentially triggering movement along pre–existing fault lines. Faults with small displacement are essentially non–conductive where they cut more–plastic, fine–grained sedimentary units such as those in the majority of the Blackhawk Formation (SRK, 2016), whereas sections of faults with larger vertical displacement are filled with ground–up rock and form low–permeability zones (UDOGM, 2019). Hydrogeologic studies have shown that the clay–rich Blackhawk Formation effectively seals faults and fractures above mined areas as those that intersect previously mined areas contribute limited, if any, groundwater flow to the Skyline Mine. Consequently, reactivation of faults and fractures or creation of new fractures is unlikely to result in adverse impacts. (Sidel, 2000)

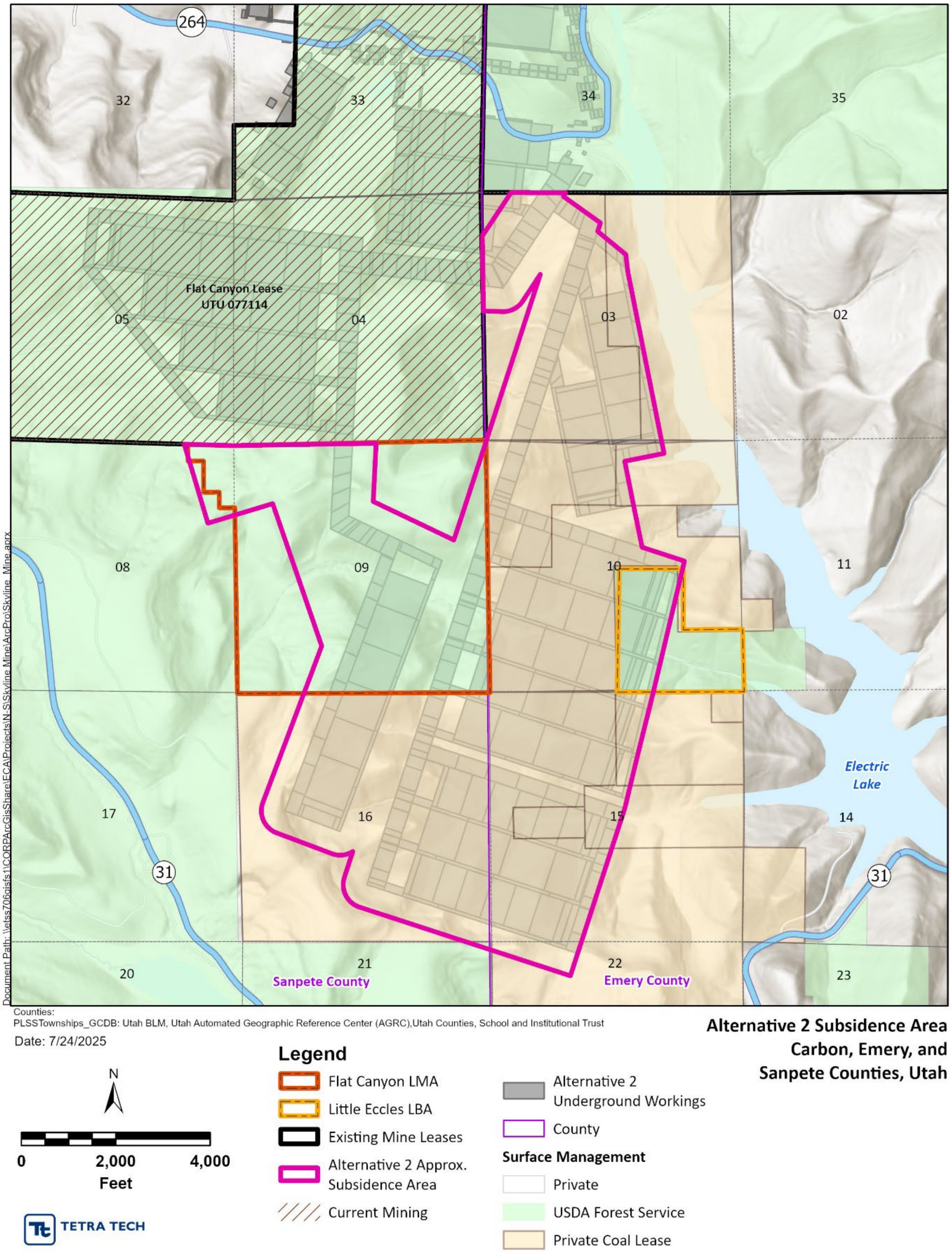
Subsidence

The mined area and expected limits of potential subsidence for Alternative 2, based on the initial mine plan, are shown on **Figure 3.4–8**. The Environmental Assessment for the Flat Canyon Lease (OSMRE, 2016) states that of the total area mined at the Skyline Mine (10,733 acres), less than 0.5% of the area was known to have tensile fractures. This would be less than approximately 9.6 acres over 1,923 acres under Alternative 2. Given this, it is unlikely that appreciable surface cracking would result from the subsidence predicted for the LBA and LMA. Subsidence would be considered an unavoidable adverse impact under this Alternative 2.

Seismic Events

Based upon a comprehensive evaluation of mining–induced seismicity of not only the Skyline Mine but the Willow Creek, Trail Mountain, and West Ridge mines in the Wasatch Plateau coal mining region, mining–induced seismicity could generate a seismic event with a magnitude of 3.9 and PGA of approximately 0.21 g at the Electric Lake dam. Based on numerous mine–induced seismicity studies for dams in the region and review of available historic information, it is unlikely that an event with a magnitude greater than 3.0 and a PGA at the dam greater than 0.03 g would occur (RB&G Engineering, 2022). Soils within the Electric Lake dam foundation may be subject to liquefaction–induced strength loss if the PGA exceeds approximately 0.18 g at the dam site. Past evaluations have indicated that the Electric Lake dam can withstand a magnitude 7.0 event with a PGA of 0.82 g (RB&G Engineering, 2022).

Figure 3.4–8. Mined Area and Expected Limits of Potential Subsidence: Alternative 2



Based upon the results of a 2018 study, the LBA and LMA would not create unacceptable risk to the Electric Lake or Boulger dams (RB&G Engineering, 2019). Mining–induced seismicity is expected to generate a maximum credible earthquake event of magnitude 3.9. The PGA would not likely exceed 2 g at Boulger dam and 0.1 g at Electric Lake dam. A computed deformation of 0.04 feet was determined for Boulger dam, while zero deformation was determined for Electric Lake dam. Due to the limitations of modeling, the estimate for Boulger dam may be unconservative; however, we would consider an upper bound of 0.5 feet of deformation. This results in a factor of safety of 8 against overtopping due to deformation (RB&G Engineering, 2019). A dam's safety factor against overtopping generally refers to the margin of safety against failure due to excessive water flowing over the dam's crest and safety factor of at least 1.5 is often considered a minimum value.

Past and present projects affecting the geology within or surrounding the LBA or LMA include the considerable past mining at Skyline Mine dating to 1981. All the previously mined areas contribute to the current affected environment which includes subsided lands. Alternative 2 would result in an incremental impact on geology from continued coal mining and related subsidence. No unacceptable risks would be created for the Electric Lake or Boulger dams as a consequence of Alternative 2.

3.4.4.3 Alternative 3: Only Modify the Flat Canyon LMA

Tons of Coal Mined

The estimated recoverable coal reserves within the LMA area are approximately 2.1 million tons. Approximately 15.2 million tons would be mined from private lands, with a total of approximately 17.3 million tons mined under Alternative 3. The LMA would result in an irreversible and irretrievable commitment of coal resources.

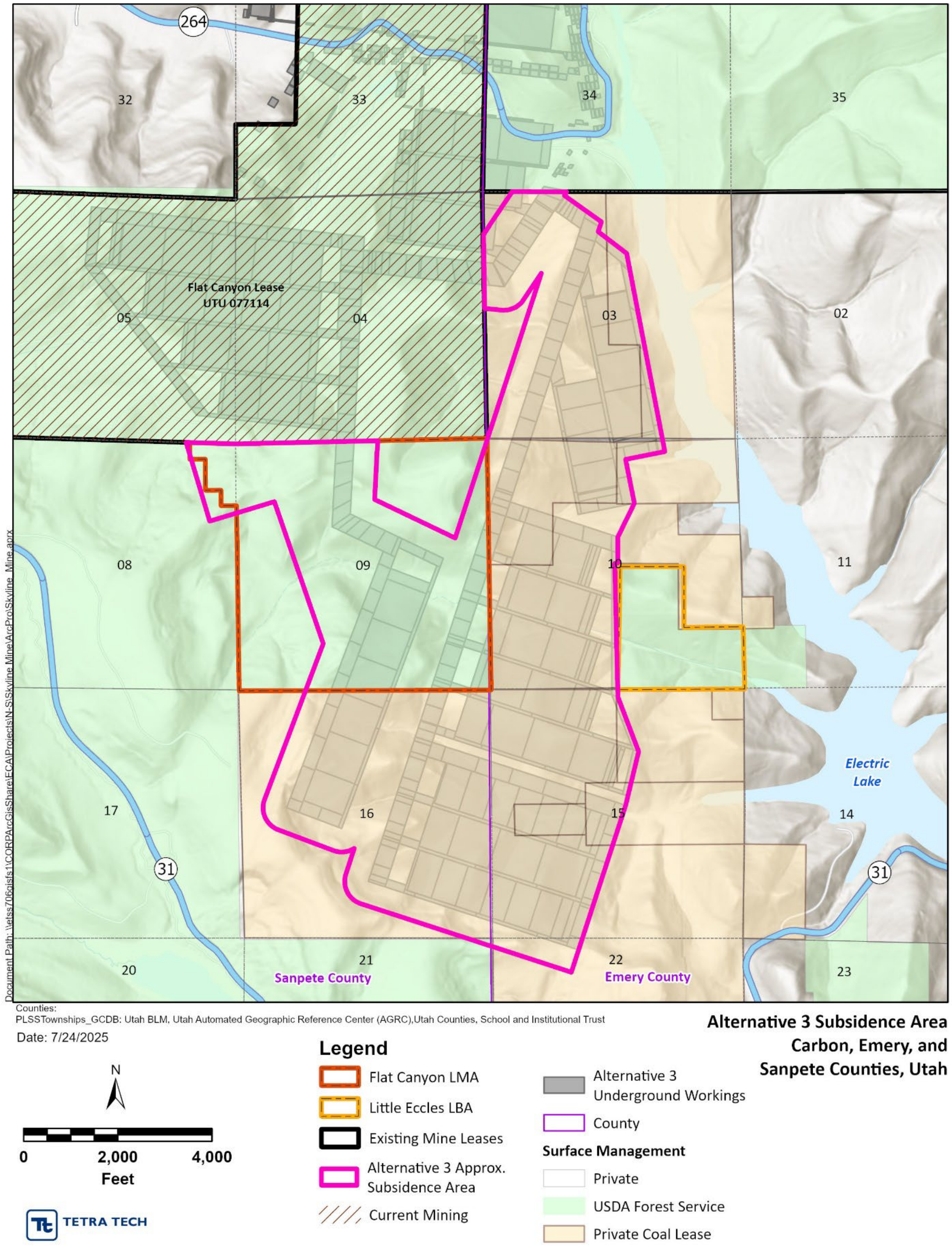
Faults and Fractures

Faults with small displacement are essentially non–conductive where they cut more–plastic, fine–grained sedimentary units such as those in the majority of the Blackhawk Formation (SRK Consulting, 2016), whereas sections of faults with larger vertical displacement are filled with ground–up rock and form low–permeability zones (UDOGM, 2019). Hydrogeologic studies have shown that the clay–rich Blackhawk Formation effectively seals faults and fractures above mined areas as those that intersect previously mined areas contribute limited, if any, groundwater flow to the Skyline Mine. Consequently, reactivation of faults and fractures or creation of new fractures is unlikely to result in adverse impacts.

Subsidence

The mined area and expected limits of potential subsidence for Alternative 3, based on the initial mine plan, are shown on **Figure 3.4–9**. Effects of subsidence would be limited to an area around the proposed workings of the LMA with a similar magnitude of ground subsidence, horizontal strain, slope, and radius of curvature as with that of Alternative 2. Historically, less than 0.5% of mined areas have been subject to surface cracking, which would be less than 9.1 acres over 1,827 acres for Alternative 3 (**Table 3.4–4**). However, as with Alternative 2, it is unlikely that appreciable surface cracking would result from the subsidence predicted. Subsidence would be considered an unavoidable adverse impact under Alternative 3.

Figure 3.4–9. Mined Areas and Expected Limits of Potential Subsidence: Alternative 3



Seismic Events

As with Alternative 2, no unacceptable risks would be created for the Electric Lake or Boulger dams as a consequence of Alternative 3.

Past and present projects affecting the geology within or surrounding the proposed LMA include the considerable past mining at Skyline Mine dating to 1981. All of the previously mined areas contribute to the current affected environment which includes subsided lands. Alternative 3 would result in an incremental impact on geology from continued coal mining and related subsidence. No unacceptable risks would be created for the Electric Lake or Boulger dams as a consequence of Alternative 3.

3.4.4.4 Alternative 4: Only Lease the Little Eccles LBA

Tons of Coal Mined

The estimated recoverable coal reserves of the LBA boundary are approximately 1 million tons of Lower O'Connor A seam coal. Approximately 15 million tons would be mined from private lands, with a total of approximately 16 million tons mined under Alternative 4. The LBA would result in an irreversible and irretrievable commitment of coal resources.

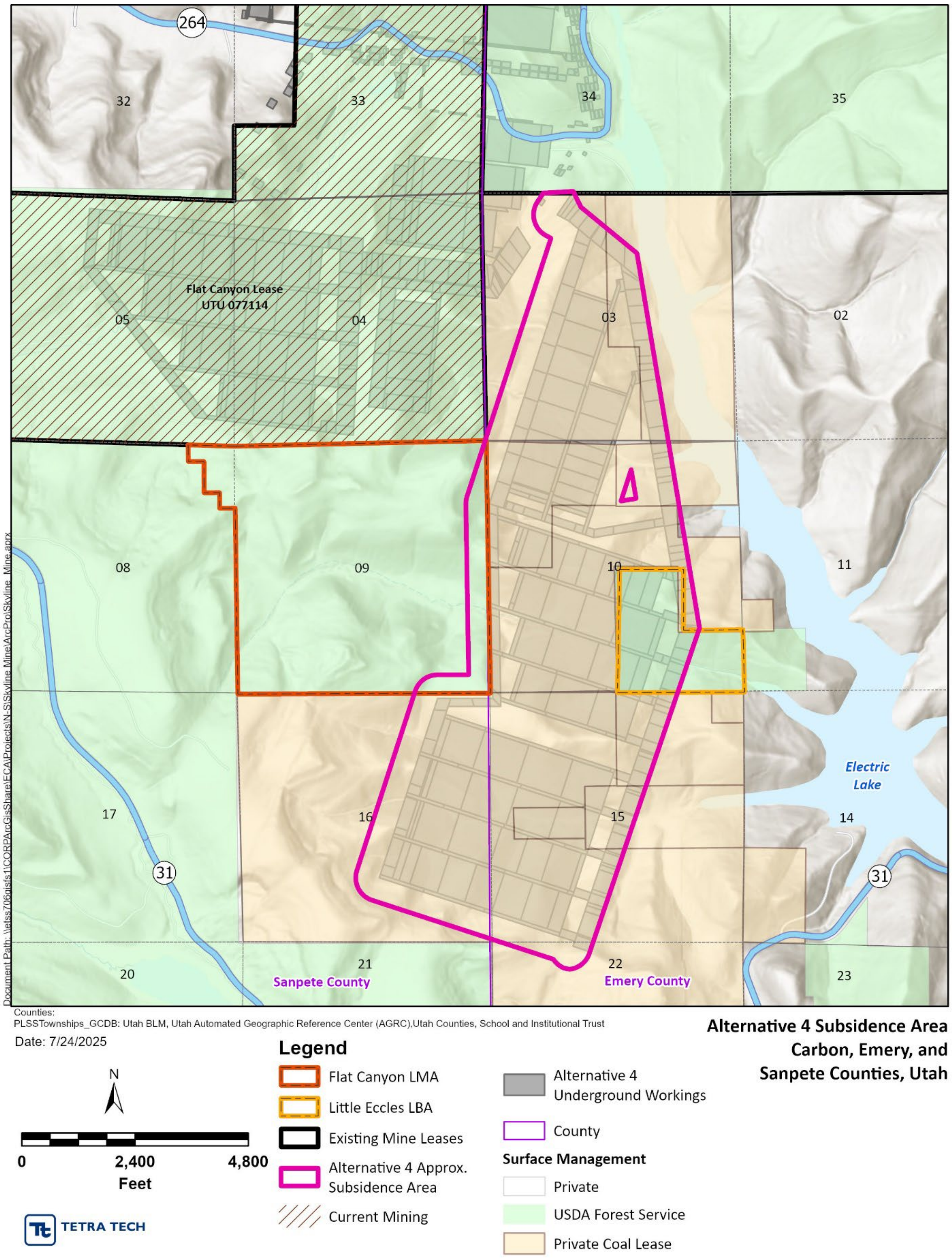
Faults and Fractures

Faults with small displacement are essentially non–conductive where they cut more–plastic, fine–grained sedimentary units such as those in the majority of the Blackhawk Formation (SRK, 2016), whereas sections of faults with larger vertical displacement are filled with ground–up rock and form low–permeability zones (UDOGM, 2019). Hydrogeologic studies have shown that the clay–rich Blackhawk Formation effectively seals faults and fractures above mined areas as those that intersect previously mined areas contribute limited, if any, groundwater flow to the Skyline Mine. Consequently, reactivation of faults and fractures or creation of new fractures is unlikely to result in adverse impacts.

Subsidence

The mined area and expected limits of potential subsidence for Alternative 4, based on the initial mine plan, are shown on **Figure 3.4–10**. Effects of subsidence would be limited to the LBA area with similar magnitude of ground subsidence, horizontal strain, slope, and radius of curvature as with that of Alternative 2. Historically, less than 0.5% of mined areas have been subject to surface cracking, which would be less than 7.5 acres over 1,509 acres (**Table 3.4–4**). However, as with alternatives 2 and 3, it is unlikely that appreciable surface cracking would result from the subsidence predicted. Subsidence would be considered an unavoidable adverse impact under Alternative 4.

Figure 3.4–10. Mined Area and Expected Limits of Potential Subsidence: Alternative 4



Seismic Events

As with alternatives 2 and 3, no unacceptable risks would be created for the Electric Lake or Boulger dams as a consequence of Alternative 4.

Past and present projects affecting the geology within or surrounding the LBA include the considerable past mining at Skyline Mine dating to 1981. All of the previously mined areas contribute to the current affected environment which includes subsided lands. Alternative 4 would result in an incremental impact on geology from continued coal mining and related subsidence. No unacceptable risks would be created for the Electric Lake or Boulger dams as a consequence of Alternative 4.

3.5 Hydrology

3.5.1 Analysis Area

The analysis area for hydrology is based on the watershed boundaries of the upper reaches of the Headwaters Huntington Creek Sub–watershed (Hydrologic Unit Code [HUC] 140600090102), the upper reaches of the Left Fork Huntington Creek Sub–watershed (HUC 140600090101) that incorporate the Huntington and Cleveland reservoirs, and the Mud Creek Sub–watershed (HUC 140600070203) (**Figure 3.5–1**). The southern boundary of the hydrology analysis area ends at the nearest section boundaries below the Huntington and Cleveland reservoirs rather than including the entire Headwaters Huntington Creek Sub–watershed and the Left Fork Huntington Creek Sub–watershed. These latter two sub–watersheds include drainage areas that are not relevant to the LMA or LBA boundaries and are outside of the likely extent of discernible impacts to natural and man–made hydrologic features.

Most of the LBA and LMA and adjacent private coal are within the Headwaters Huntington Creek Sub–watershed (HUC 140600090102) which is a sub–watershed of the greater Huntington Creek Watershed (HUC 1406000901). Electric Lake is within the Headwaters Huntington Creek Sub–Watershed (**Figure 3.5–1**). The upper reaches above the Electric Lake dam are within the current Skyline Mine lease areas. The greater Huntington Creek watershed is a tributary of the larger San Rafael River drainage which in turn drains to the Green River approximately 80 miles south of the hydrology analysis area. A small part of the LMA boundary is in the upper portions of the Left Fork Huntington Creek Sub–watershed which includes the Huntington and Cleveland reservoirs.

3.5The current Skyline Mine operation discharges mine water (see Mine and Well Discharge December 2024 in **Appendix D**) to Eccles Creek immediately east of the NFSL boundary is shown in **Figure 3.5–2**. Eccles Creek drains to Mud Creek and then to the Scofield Reservoir. The current Skyline Mine operation also discharges directly into Electric Lake (**Figure 3.5–2**). These discharges are permitted through the UDWQ by a UPDES permit (UT0023540). The Skyline Mine straddles the drainage divide between the upper Huntington Creek and Mud Creek basins and has workings beneath both basins. The Skyline Mine's only portal is in Eccles Canyon in the Mud Creek basin.

Figure 3.5–1. Hydrology Analysis Area

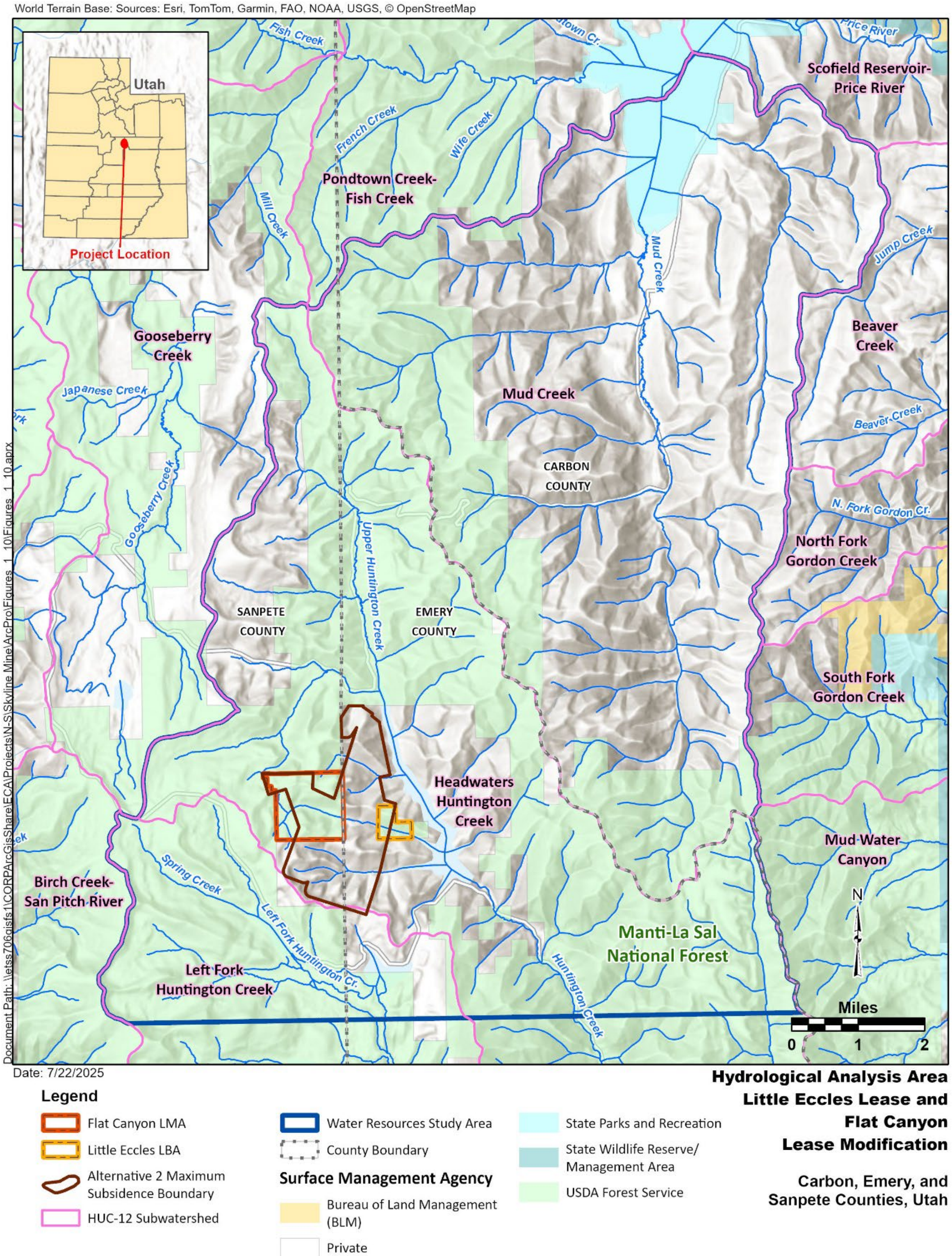
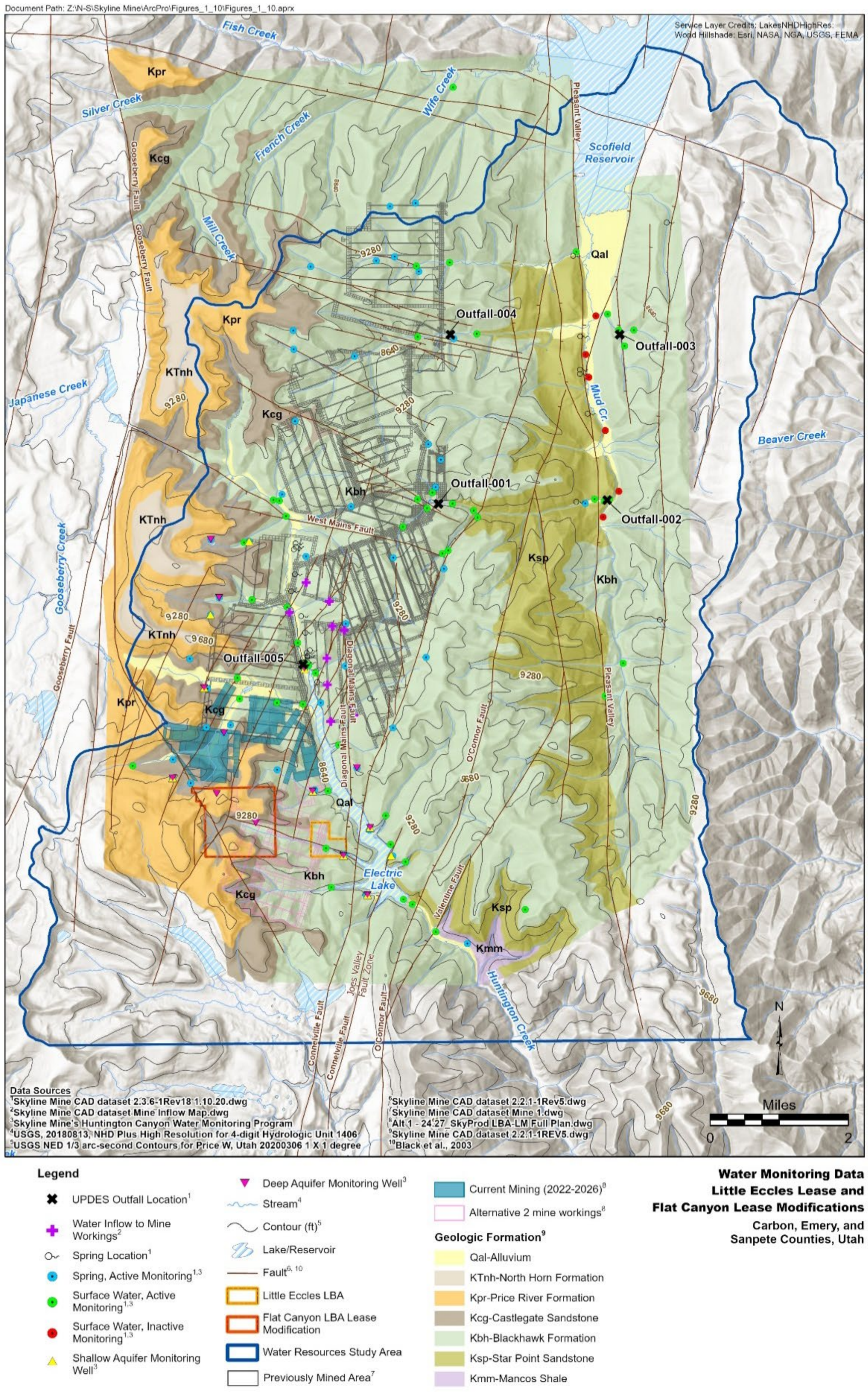


Figure 3.5–2. UPDES–permitted Mine Dewatering Discharge into Electric Lake

During its approximately 44 years of operation, the Skyline Mine has been the subject of numerous hydrologic studies in support of mine permitting activities and mine operations. Studies have included groundwater and surface water investigations; 40+ years of quarterly hydrologic monitoring of springs, streams, and wells; baseline monitoring activities; spring and seep surveys; in–mine hydrogeologic investigations; and numerical modeling of groundwater systems. The surface and underground water resources monitoring locations, including streams, seeps and springs, monitoring wells, and underground mine water flows, are shown in **Figure 3.5–3**.

Figure 3.5–3. Surface and Underground Water Resources Monitoring Locations



3.5.2 Evaluation Criteria

The hydrology analysis issues and evaluation criteria, referenced in **Table 3.5–1**, was used to assess potential environmental consequences of the alternatives.

Table 3.5–1. Issues for Analyzing Impacts on Surface Water and Groundwater Hydrology

Issue	Evaluation Criteria
Surface Water – Water Quantity of Streams, Springs, Ponds, and Wetlands	
How would mine–related changes in hydrologic or geologic conditions impact surface water flows of perennial, intermittent, or ephemeral streams? How would mine–related changes in hydrologic or geologic conditions impact surface water quantity or availability in ponds, stock ponds, seeps and springs? How would mine–related changes in hydrologic or geologic conditions impact surface water flows that affect downstream water rights, uses, or beneficial uses? How would subsidence caused by mining impact stream geomorphology, stream flow, seeps, springs, ponds, and wetlands?	Qualitative evaluation of baseline flows compared to long–term trends in flow to assess potential impacts from on–going mining activities Quantitative evaluation of systematic monitoring to determine long–term changes or trends in flow to assess potential impacts from on–going mining activities Quantitative predictive modeling of subsidence impacts caused by mining to streams and other resources
Surface Water – Water Balance and Water Quality of Electric Lake and Scofield, Huntington, and Cleveland Reservoirs	
How would mine dewatering activities or mine interception of faults (hydrogeologic communication with groundwater) impact water volume, including downstream water rights, users, or designated uses? How would permitted discharges from mine dewatering activities impact water volume and quality, including water rights, users, or designated uses?	Results of groundwater modeling and water budget calculations to assess potential mining impacts to groundwater recharge and mine inflows Quantitative evaluation of systematic monitoring of water quality parameters to determine long–term changes or trends in water chemistry to assess potential impacts from on–going mining activities
Surface Water Quality of Streams, Springs, and Ponds	
How would permitted UPDES discharges from mine dewatering activities impact water quality of surface streams? How would subsidence caused by mining impacts soils including erosion, sedimentation of surface water bodies and compliance with water quality standards? How would miscellaneous mine discharges impact water quality?	Qualitative evaluation of changes in water quality to assess potential impacts from on–going mining activities Quantitative evaluation of systematic monitoring of water quality parameters to determine long–term changes or trends in water chemistry to assess potential impacts from on–going mining activities Quantitative predictive subsidence modeling to evaluate potential soil erosion and sedimentation
Groundwater Water Quantity and Availability	
How would mine dewatering withdrawals or changes in subsurface conditions from mining related subsidence impact potentiometric surface elevation, flow rate, or water availability at permitted wells and water rights or potential future beneficial use	Qualitative evaluation of changes to potentiometric surface in relation to geology and groundwater availability Qualitative evaluation of changes to aquifer storage or well water availability from subsidence

Issue	Evaluation Criteria
locations? How would mining activities or mine dewatering impact groundwater water quantity and availability, including specific yield or storativity of water in the Star Point Sandstone and Blackhawk Formation or other water–bearing aquifers? How would subsidence caused by mining impact aquifer storage or well water availability?	
Groundwater Water Quality	
How would mining activities, dewatering, or dewatering discharges impact well water quality including water's suitability for existing or potential beneficial uses?	Qualitative evaluation of changes in water quality to assess potential impacts from on–going mining activities Quantitative evaluation of systematic monitoring of water quality parameters to determine long–term changes or trends in water chemistry to assess potential impacts from on–going mining activities
Groundwater –Water Balance and Water Quality of Electric Lake and Scofield, Huntington, and Cleveland Reservoirs	
How would mining interception with faults and fractures impact groundwater connection or hydrogeologic communication with Electric Lake or other identified reservoirs? How would mining interception with faults impact water volume or water balance in Electric Lake? How would mining interception with faults and fractures impact mine dewatering needs?	Qualitative evaluation of reported mine inflows from intersected faults relative to potential communication of intersected faults with Electric Lake or other identified reservoirs Quantitative evaluation of systematic monitoring of water quality parameters to determine long–term changes or trends in water chemistry to assess potential impacts from on–going mining activities

3.5.3 <u>Affected Environment</u>

The hydrologic conditions reviewed, including climate, surface water flow and quality, the groundwater system, and subsidence, are summarized below. Details of the hydrologic conditions are provided in the Skyline Mine HCSM Report (**Appendix B**) as well as the subsidence evaluation (Agapito Associates, 2021).

3.5.3.1 <u>Climate and Drought Conditions</u>

Climate data at the Skyline Mine are measured at National Oceanic and Atmospheric Administration weather station 427729, Scofield, Skyline Mine, Utah, which is located at the Skyline Mine surface facilities. The yearly precipitation measured at the Skyline Mine weather station between 1985 and 2020 has ranged from a low of 16.9 inches with a total snowpack of 133 inches in the 2018 water year[4] to a high of 42.3 inches with a total snowpack of 380 inches in the 2011 water year. Monthly average temperatures at the Skyline Mine site have ranged from a low of 3.6 degrees (°) Fahrenheit (F) in February to 82.9 ºF in July. Climatic conditions in the region that includes the LMA and LBA have varied substantially during the period of baseline monitoring (1997 – present). The region was in a period of moderate to severe drought in 2000 that continued to late 2004. Beginning in late 2004, the

[3] Water years begin October 1 and end September 30. Thus, the 2018 water year extends from October 1, 2017, through September 30, 2018.

region transitioned to a period of wetness that peaked in mid–2005. The period from 2006 through 2010 was characterized by generally near–normal climatic conditions with brief alternating periods of wetness and dryness. During 2011, the region experienced a period of severe wetness followed by a period of continuous dryness from 2012 through 2014. Between 2015 and 2017 the region experienced alternating periods of wet and dry years with moderate to extreme drought occurring in 2017 through 2018 and in 2020. Petersen Hydrologic (2017) noted that flows at monitored springs in the area respond rapidly to periods of drought with either reduced or intermittent flow.

3.5.3.2 Stream Water Flow

Perennial streams have been identified in Boulger and Flat canyons in the headwater portions of the upper Huntington Creek watershed, Eccles Creek in the Mud Creek watershed, and Little Eccles Creek in the Left Fork Huntington watershed (**Figure 3.5–1**). Perennial streams also occur in Burnout, James, Swens, and Little Swens canyons. Stream flows are typical of intermountain regions, with relatively large flow volumes from snowmelt occurring in the spring and early summer. As the spring runoff decreases later in the summer, discharges drastically decrease to baseflows supported by shallow groundwater systems (Petersen Hydrologic, 2014; 2017). Perennial drainages are generally fed by ephemeral and intermittent side drainages and canyons (UDOGM, 2019). Many streams in the analysis area which have been monitored over time are gaining, which suggests that perching layers identified beneath the streams effectively prevent streamflow losses to deeper groundwater systems in the subsurface (FS, 2002). Water entering the underground workings of the Skyline Mine has historically been discharged into Eccles Creek, which flows into Mud Creek and eventually to Scofield Reservoir. There is little to no hydraulic connection between the perched perennial streams and the deep groundwater system which may be intersected by mining or between the shallow groundwater system and the deep groundwater system which may be intersected by mining (**Appendix B**).

Surveyed stream sections of Little Eccles Creek and its tributaries showed a majority of the main stem having flowing water except for a reach downstream from its headwaters and a stream reach near the confluence with Electric Lake. The stream–flow survey for Bear Canyon Creek and its tributaries found the main stem and major tributaries contained flowing water to Electric Lake. Because these measurements were made during low flow and during a moderate to severe drought, it is likely the stream reaches are perennial. Additional monitoring would be required over several seasons to determine which reaches are consistently gaining or losing in relation to current climatic conditions.

3.5.3.3 Stream Water Quality

Water quality results from the stream–monitoring program within the current Skyline Mine lease areas (Petersen Hydrologic, 2014; 2017) and wider regional analysis conducted by the USGS (reported by UDOGM, 2019) show that these surface waters are of the calcium–bicarbonate chemical type with average total dissolved solids concentrations ranging from 137 to 198 milligrams per liter (mg/L). Stream chemistry is essentially the same as that for springs; this similarity is expected because the stream water is derived primarily from groundwater discharge from seeps and springs. An evaluation of important water–quality characteristics in stream discharge waters in the LMA indicated no elevated concentrations of any monitored constituents (**Appendix B**). According to the 2024 UDWQ 305b Integrated Report, Electric Lake Tributaries are currently rated in a Category 3 assessment unit, with insufficient data to determine if beneficial uses are currently being supported. Electric Lake is currently rated in Category 2, with no evidence of impairment to existing beneficial uses.

3.5.3.4 Seeps and Springs Water Flow

Spring and seep surveys were originally conducted at the LMA during low–flow conditions in the fall of 1997 and during high–flow conditions in the spring of 1998. Baseline monitoring of selected springs and streams in the LMA and surrounding area spanned both high–flow and low–flow conditions in 1998, 1999, and 2000. Water–monitoring locations are shown on **Figure 3.5–3**. CFC increased monitoring of the stream, seep, and spring flows within the Skyline Mine permit area and adjacent area in 2001 when increased mine inflows from the Star Point Sandstone were encountered in the mine. Results show that baseline monitoring data from springs and streams in the Flat Canyon area collected both before and after encountering the large groundwater inflows did not change, and the large groundwater inflows have not shown any perceptible or quantifiable impacts to overlying spring or surface–water discharge rates (UDOGM, 2019). Monitoring of selected baseline seep and spring monitoring sites as part of the Skyline Mine hydrologic monitoring program has continued to the present.

CFC conducted baseline spring and seep surveys of the LMA and LBA from 2018 through 2020 during low– and high–flow conditions. The survey located 242 seeps and springs in the survey area and established an initial baseline of seep and spring flow and water quality (Petersen Hydrologic, 2021) The survey noted springs producing more than 5 cubic feet of water per second which could potentially contribute to surface–water flows in the major stream drainages (Petersen Hydrologic, 2021). It is assumed, as part of lease stipulations, that a subset of seeps and springs and the drainages identified in the LMA and LBA would be incorporated into CFC's water–monitoring program based on the chosen alternative in the EIS.

3.5.3.5 Seeps and Springs Water Quality

Water quality results from the spring and seep monitoring program within the current Skyline Mine lease areas (Petersen Hydrologic, 2014; 2017) and wider regional analysis conducted by the USFS (reported by UDOGM, 2019) show that shallow groundwater is low in total dissolved solids and is of the calcium–bicarbonate geochemical type. This geochemical type is consistent with the dissolution of carbonate minerals sufficient to buffer impacts from the oxidation of sulfide minerals, so there should be no acid mine drainage or metal leaching.

CFC data show that spring waters from perched aquifers in the Blackhawk Formation typically have total dissolved solid concentrations of approximately 240 mg/L. The highest total dissolved solids measured by the Skyline Mine operator is 668 mg/L at spring S17–2 next to Eccles Creek just above the Skyline Loadout. The average total dissolved solids at this spring is 365 mg/L (UDOGM, 2019). Skyline Mine conducted spring and seep surveys in the LMA and LBA documenting 217 seeps or springs, primarily in Little Eccles Canyon, Bear Canyon, and in areas above Cleveland Reservoir (Petersen Hydrologic, 2021). While water–quality data were not reported, field measurements of specific conductance indicate that these springs are also relatively low in total dissolved solids. The geologic map shows that these springs are mostly associated with perched aquifers in the Blackhawk Formation (Petersen Hydrologic, 2021).

3.5.3.6 Water Rights

Table 3.5–2 identifies water rights above the LMA and LBA boundaries. These are within the subsidence areas and the Skyline Mine panel boundaries.

Table 3.5–2. Summary of Water Rights Above LMA and LBA Boundaries

Water Right Number	Diversion Type	Source	Location	Status	Priority	Uses	Cubic Feet Per Second	Acre Feet	Owner Name
Water Rights on FS above the LMA and LBA Township 14 South, Range 6 East, Sections 3, 4, 5, 8, 9, and 10									
93–399	Point to Point	Huntington Creek	S660 E660 N4 03 14S 6E SL	P	1902	S	0	0	PACIFICORP DBA UTAH POWER LIGHT COMPANY
93–82	Point to Point	Huntington Creek	S660 W660 E4 03 14S 6E SL	P	1902	S	0	0	PACIFICORP DBA UTAH POWER LIGHT COMPANY
93–553	Point to Point	James Canyon Creek	S660 W660 E4 03 14S 6E SL	P	1902	S	0	0	PACIFICORP DBA UTAH POWER LIGHT COMPANY
93–399	Point to Point	Huntington Creek	S660 W1980 E4 03 14S 6E SL	P	1902	S	0	0	PACIFICORP DBA UTAH POWER LIGHT COMPANY
93–1547	Point to Point	Basin Creek	N660 W660 E4 04 14S 6E SL	P	1875	S	0	0	USA FOREST SERVICE
93–19	Point to Point	Boulger Canyon	N660 E660 W4 04 14S	P	1875	S	0	0	USA FOREST SERVICE

Water Right Number	Diversion Type	Source	Location	Status	Priority	Uses	Cubic Feet Per Second	Acre Feet	Owner Name
		Creek	6E SL						
93–95	Point to Point	Flat Canyon Spring	S660 E660 NW 04 14S 6E SL	P	1875	S	0.011	0	USAFOREST SERVICE
93–1534	Point to Point	Sand Dugway Spring	S660 W660 N4 04 14S 6E SL	P	1875	S	0.011	0	USA FOREST SERVICE
93–501	Point to Point	Hard Spring	N660 W660 S4 08 14S 6E SL	P	1875	O, S	0.011	0	USA FOREST SERVICE
93–608	Point to Point	L.E. Spring	S660 W660 E4 08 14S 6E SL	P	1875	O, S	0.011	0	USA FOREST SERVICE
93–16	Point to Point	Bed Spring	S660 E660 W4 08 14S 6E SL	P	1875	O, S	0.011	0	USA FOREST SERVICE
93–1546	Point to Point	Little Eccles Creek	S660 W660 E4 09 14S 6E SL	P	1875	O, S	0	0	USA FOREST SERVICE
93–1546	Point to Point	Little Eccles Creek	S660 E1980 W4 09 14S 6E SL	P	1875	O, S	0	0	USA FOREST SERVICE
93–105	Point to Point	Bear Spring	N660 E660 SW 09 14S 6E SL	P	1875	O, S	0.011	0	USA FOREST SERVICE
93–168	Point to Point	Eccles Spring	S660 W1980 E4 09 14S 6E SL	P	1875	O, S	0.011	0	USA FOREST SERVICE
Water Rights on PVT Surface Township 14 South, Range 6 East Sections 14, 15, and 16									
93–1116	Surface	Huntington Creek	N2000 W600 SE 14	P	19681210	O, P	0	31264	PACIFICORP DBA UTAH POWER

Water Right Number	Diversion Type	Source	Location	Status	Priority	Uses	Cubic Feet Per Second	Acre Feet	Owner Name
			14S 6E SL						LIGHT COMPANY
93–551	Point to Point	Cox Canyon Creek	S660 E660 N4 14 14S 6E SL	P	1902	S	0	0	PACIFICORP DBA UTAH POWER LIGHT COMPANY
93–559	Point to Point	Bear Canyon Creek	S1980 E660 N4 14 14S 6E SL	P	1902	S	0	0	PACIFICORP DBA UTAH POWER LIGHT COMPANY
93–96	Point to Point	Huntington Creek	S660 E660 N4 14 14S 6E SL	P	1902	S	0	0	PACIFICORP DBA UTAH POWER LIGHT COMPANY
a15762	Surface	Huntington Creek	N2000 W600 SE 14 14S 6E SL	A	19900730	I, M, P	0	31264	PACIFICORP DBA UTAH POWER LIGHT COMPANY
93–559	Point to Point	Bear Canyon Creek	N660 E660 W4 14 14S 6E SL	P	1902	S	0	0	PACIFICORP DBA UTAH POWER LIGHT COMPANY
93–7	Point to Point	Bear Canyon	N300 E1240 W4 15 14S 6E SL	P	1902	S	0	0.17	MICHELLE SHEPPARD WOODBURY
93–77	Point to Point	Bear Canyon Creek	N660 E1980 W4 15 14S 6E SL	P	1902	S	0	0	PACIFICORP DBA UTAH POWER LIGHT

Water Right Number	Diversion Type	Source	Location	Status	Priority	Uses	Cubic Feet Per Second	Acre Feet	Owner Name
									COMPANY
93–77	Point to Point	Bear Canyon Creek	N660 W660 E4 15 14S 6E SL	P	1902	S	0	0	PACIFICORP DBA UTAH POWER LIGHT COMPANY
a49634	Underground	Bear Canyon	S176 E575 W4 15 14S 6E SL	U	20221108	D	0	0.169	MICHELLE SHEPPARD WOODBURY
93–832	Point to Point	Bear Canyon Creek	N300 E1240 W4 15 14S 6E SL	P	1902	S	0	0	TIGHT LINE TIMBERS LLC
93–7	Point to Point	Bear Canyon	N660 E1980 W4 15 14S 6E SL	P	1902	S	0	0.17	MICHELLE SHEPPARD WOODBURY
93–76	Point to Point	Bear Canyon Creek	N300 E1240 W4 15 14S 6E SL	P	1902	S	0	0	TIGHT LINE TIMBERS LLC
a46094	Surface	Bear Canyon	S175 E685 W4 15 14S 6E SL	A	20200811	D	0	0.169	MICHELLE SHEPPARD WOODBURY
93–831	Point to Point	Bear Canyon Creek	N660 E1980 W4 16 14S 6E SL	P	1875	S	0	0	TIGHT LINE TIMBERS LLC
93–76	Point to Point	Bear Canyon Creek	S660 E660 NW 16 14S 6E SL	P	1902	S	0	0	TIGHT LINE TIMBERS LLC
93–831	Point to Point	Bear Canyon Creek	S660 E660 NW 16 14S 6E SL	P	1875	S	0	0	TIGHT LINE TIMBERS LLC
93–832	Point to Point	Bear Canyon Creek	S660 E660 NW 16 14S 6E SL	P	1902	S	0	0	TIGHT LINE TIMBERS LLC

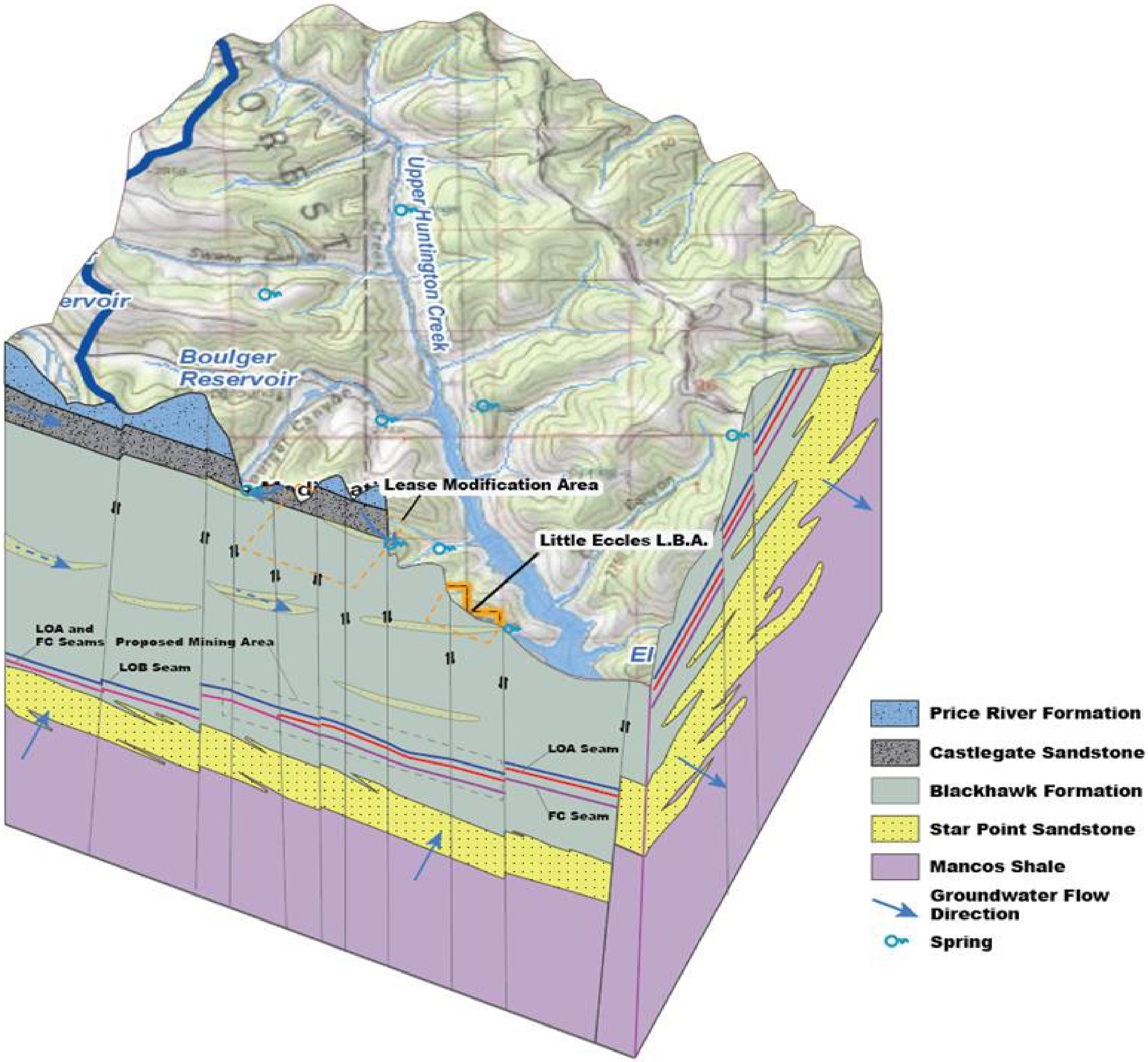
Water Right Number	Diversion Type	Source	Location	Status	Priority	Uses	Cubic Feet Per Second	Acre Feet	Owner Name
93–3526	Point to Point	Tr Bear Canyon Creek	S660 E660 NW 16 14S 6E SL	P	1875	S	0	0	TIGHT LINE TIMBERS LLC
93–3526	Point to Point	Tr Bear Canyon Creek	N660 W660 E4 16 14S 6E SL	P	1875	S	0	0	TIGHT LINE TIMBERS LLC

Uses: S = Stock watering, O = Other wildlife, D = Domestic, P = Power, I = Irrigation, M = Municipal
Status: P = Proposed Determination, A = Approved, U = Unapproved

3.5.3.7 Groundwater

Groundwater is present in a shallow system within the middle and upper Blackhawk and shallower formations and a deep system within the basal Blackhawk Formation and the Star Point Sandstone. **Figure 3.5–4** shows a conceptual diagram of the groundwater flow system in the area. Groundwater is recharged by local precipitation that falls on outcrop areas and infiltrates. Based on numerical modeling of the groundwater system, between 10% and 28% of average annual precipitation is estimated to reach the groundwater system as recharge (SRK Consulting, 2016). The recharge typically percolates downward from the surface until it encounters shale or another low–permeability rock unit. It then moves down dip and is channeled into discontinuous but more permeable sandstones, creating isolated aquifers. Water in the isolated aquifers either continues to move down dip until it is discharged at the surface or encounters an area in which it can resume vertically downward flow. Flow along faults and fractures through the Blackhawk Formation is minimal due to the sealing ability of the clays in the formation, but some recharge does move below the perched systems to reach the deeper regional aquifer of the Star Point Sandstone. Some groundwater in the Star Point Sandstone discharges to streams. UDOGM (2019) notes there is a considerable flow increase in Eccles Creek where the stream passes onto the Star Point Sandstone outcrop and another increase at the O'Connor Fault where the fault conveys groundwater through the fractured Star Point Sandstone to the stream. In comparison, the Connelville Fault does not add considerably to the flow of either the main or south forks of Eccles Creek because potential flow paths through the fractured Blackhawk Formation have been sealed by clays.

Figure 3.5–4. Hydrogeologic Conceptual Site Model Diagram



Groundwater flow in the deep groundwater system is regional and occurs in water–bearing and either unsaturated or saturated coal beds and sandstones of the lower Blackhawk Formation and sandstones of the Star Point Sandstone. The deep groundwater system exhibits little to no response to seasonal changes in precipitation and small, if any, response to longer–term variations, and contains groundwater with relatively old ages. The locations of recharge areas for the deep groundwater system can be inferred from the outcrop areas, flow directions, and water chemistry. Though a range of interpretations remain among subject matter experts regarding the amount of connectivity of the upper and lower Blackhawk Formation hydraulic systems, recharge to the deep groundwater system may also occur as downward flow through the water–bearing rock of the channel sandstones of the Blackhawk Formation that lies between the shallow groundwater system and the deep groundwater system. The flow direction in the deep groundwater system in the hydrology analysis area is generally from southwest to northeast

(UDOGM, 2019), but Skyline Mine dewatering locally captures groundwater flow in the Star Point Sandstone and directs local flow toward the mine workings.

Groundwater discharge into the Skyline Mine occurs most frequently from saturated sandstone lenses in the mine roof and less commonly, but more notably, along fault zones. Inflows from the roof sandstone typically are relatively small, decrease rapidly, and dry up within a few weeks to months. Inflows from fault zones originate from the underlying Star Point Sandstone and flow up into the Skyline Mine through fault fractures in the Blackhawk Formation; some of these inflows have been large to very large and have persisted. UDOGM (2019) reported that discharge into the Skyline Mine from coal seams and channel sandstones averages approximately 10 gallons per minute (gpm). Reported inflows from faults connected to the Star Point Sandstone have ranged from approximately 200 gpm to 6,500 gpm.

A potentiometric surface elevation map for the deep groundwater system was developed from water levels measured in 2023 and is presented as **Figure 4–2** in the Skyline Mine HCSM Report (**Appendix B**). Water–level elevations in wells west of the Connelville Fault indicate generally northward groundwater flow, with the mined area appearing to act as the low point in the potentiometric surface and, by implication, a convergence point for groundwater flow in the Flat Canyon lease area about 2 miles north of the LMA. Water levels in the two Star Point wells east of the Connelville Fault suggest the possibility of generally southward flow in the Star Point east of the Connelville Fault, which implies the fault acting as a barrier or partial barrier to groundwater flow. Additional data would be required to confirm that possibility, and the potentiometric surface elevation in those wells can also be contoured to suggest generally westward flow near those wells. Natural discharge from the regional groundwater system occurs as baseflow into Mud Creek, as baseflow into the reach of Huntington Creek downstream from Electric Lake, and as seeps and springs at faults and along the outcrop of the Mancos Shale within and south of Electric Lake. Groundwater from the deep system also enters the Skyline Mine, with large inflows occurring from the Star Point Sandstone via north– or northeast–oriented faults that are intersected by the Skyline Mine workings. Graphs of groundwater mine discharge volumes from 1999–2024 are summarized in **Figure 5.1** and **Figure 5.2** of the Skyline Mine HCSM Report (**Appendix B**). The Mancos Shale outcrop marks the southern edge of the regional aquifer (UDOGM, 2019).

3.5.3.8 Groundwater Quality

The water quality of springs and seeps, as described above, are considered representative of shallow groundwater in the Blackhawk Formation. Springs and seeps have relatively low total dissolved solids and are of calcium–bicarbonate geochemical type. Groundwater quality, including that of the Star Point Sandstone, meets State of Utah drinking water standards (Groundwater Class II) for the parameters that have been analyzed. Water produced in the underground workings of the Skyline Mine has historically been discharged into Eccles Creek just below the MLNF boundary. Groundwater discharge is subject to the requirements of UPDES permit (UT0023540).

3.5.3.9 Subsidence

Underground mining causes a redistribution of stress, which in turn causes displacements in the affected strata. Subsidence is the result of downward displacement of the rock mass from closure or collapse of underground openings. The magnitude and extent of subsidence are directly related to the type and extent of the mining activity (Agapito Associates, 2021). In full–extraction methods (such as block caving or the longwall mining projected for the LMA and LBA tracts), the overlying strata are meant to cave and subside during active mining (Agapito Associates, 2021). Should subsidence cause cracks to form at the surface in an area of a perennial stream, the potential exists for surface waters to be diverted or to pond, or for surface water and shallow groundwater to infiltrate to deeper groundwater systems. The potential for loss of surface water to deeper groundwater systems through downward migration of water through subsidence fractures in the hydrology analysis area is considered low for two reasons, as discussed by Petersen Hydrologic (2014):

- The hydraulic conductivities of shallow bedrock formations (i.e., the Blackhawk Formation) are low and the more permeable horizons are lenticular and discontinuous. In general, the bedrock underlying the streams is not capable of accepting appreciable quantities of stream leakage, and no loss of streamflow from subsidence has been noted.
- The presence of swelling clays in the bedrock formations in the hydrology analysis area causes the natural healing of tension cracks in fine–grained bedrock lithologies. Surface cracks in stream substrates that occur in more brittle sandstones would likely be filled with sediment transported by the stream.

Site–specific subsidence modeling of projected mining which encompasses the LMA and LBA was conducted to assist in the identification of potential impacts that could occur to both overlying strata and surface features (Agapito Associates, 2021). Historical subsidence data for previous mining in the Skyline Mine were used to calibrate the predictive model for projected mining. See **Section 3.4** for more information regarding potential subsidence.

3.5.4 Environmental Consequences

This section summarizes the potential impacts to surface water hydrology, groundwater hydrology, and stream morphology. A more detailed analysis can be found in the Skyline Mine HCSM Report (**Appendix B**) and subsidence evaluation (Agapito Associates, 2021). Additionally, this section discusses potential impacts to stream morphology, surface water, and wetlands because of subsidence caused by past, present, and reasonably foreseeable projects (**Table 3.1–2**). For surface water, potential impacts on water quality and quantity of streams, springs, ponds, and wetlands as well as Electric Lake, Scofield, Huntington, and Cleveland reservoirs are issues. For groundwater, potential impacts on well water quantity, quality, and availability are issues. For both surface water and groundwater, potential impacts on the water balance of Electric Lake and Scofield, Huntington, and Cleveland reservoirs were identified as issues.

3.5.4.1 Alternative 1: No Action

Surface Water – Water Quantity of Streams, Springs, Ponds, and Wetlands

No perceptible or quantifiable impacts to spring or surface–water discharge rates are expected in the areas within or affected by the mining that would occur under Alternative 1. Operational monitoring of selected baseline seeps and springs as identified in Stipulation 8 and the Skyline Mine hydrologic monitoring program with UDOGM would continue.

Subsidence is not expected to measurably affect streams. Agapito Associates (2021) reported that even with the most likely (Case 1) maximum potential subsidence of 4.9 feet, effects to stream elevations and gradients in the projected mining area would be small and “difficult to discern” on overall plots of elevation and gradient. These results are consistent with analyses of subsidence and its effects on the stream in Burnout Canyon, which indicated that the changes in channel characteristics were subtle, with the only conspicuous changes being an increase in the length of cascades and some increase in pool volumes (FS, 1998; Sidel, 2000). Subsidence had no discernible effect on baseflows or near–channel landslides, and no mitigation was required or implemented.

In summary, Alternative 1 is expected to have minimal impacts to water quantity of streams, springs, ponds, and wetlands and stream geomorphology.

Surface Water – Water Balance and Water Quality of Electric Lake and Scofield, Huntington, and Cleveland Reservoirs

Mine dewatering removes inflows into the underground works from sandstone lenses and faults. In addition, indirect dewatering is accomplished by pumping from well JC–1. Under Alternative 1, the dewatering is expected to continue through the life of mine, and the rate is not anticipated to change significantly because major water–bearing faults are being avoided. Other than possibly some relatively small inflow to the Skyline Mine from faults hydraulically connected to Electric Lake, no surface water enters the mine. Subsidence from mining is not known to have depleted surface–water resources. Water pumped from the Skyline Mine and from well JC–1 is discharged to the surface and ultimately enters Electric Lake via permitted discharges regulated under the UPDES and monitored in accordance with permit conditions. The discharges could cause a slight increase in the volume of Electric Lake. However, the maximum volume of the lake is controlled by the elevation of the principal spillway and ultimately by the elevation of the emergency spillway. Natural sources of changes in Electric Lake volume include direct precipitation to the lake surface, surface runoff into the lake, evaporation from the lake, and infiltration either down through the lakebed or up through the lakebed. Precipitation to the lake surface, surface runoff to the lake, and evaporation from the lake are highly variable over time and location, and lakebed infiltration, either into or out of the lake, has not been quantified. These natural sources of variation in Electric Lake volume would likely mask any change related to Skyline Mine dewatering discharges. A consequence of large flows into the lake could be excessive flow over the dam spillway that might change stream morphology, damage or alter aquatic habitat, and increase erosion or flooding downstream from the dam.

While a range of interpretations remains among subject matter experts on the degree of connection between the shallow and deeper aquifers, and the Skyline Mine and nearby reservoirs (Electric Lake, Scofield, Huntington, and Cleveland), they agree that no reduction in surface water levels is expected in those reservoirs. Consequently, no reduction in surface–water volume is expected. A slight increase in surface–water volume in Electric Lake is possible from the surface discharge of water from Skyline Mine dewatering activities.

Considering existing groundwater quality, the absence of water–quality changes shown by water–quality trend analysis, and historical discharge monitoring results, and assuming continued compliance with UPDES permit conditions, surface water quality is not expected to be affected by the permitted discharges from Skyline Mine dewatering activities. Consequently, no water quality effects on water rights, users, or designated uses are expected.

In summary, under Alternative 1, no impacts to the water volume or water quality of Electric Lake or Scofield, Huntington, and Cleveland reservoirs are expected, and no water quality effects on water rights, users, or designated uses are expected.

Surface Water Quality of Streams, Springs, and Ponds

A portion of stream flow is attributed to the shallow groundwater system by way of springs and seeps. Dewatering of the Skyline Mine and lowering of water levels in the deep groundwater system would likely have no impact on overlying surface water quality. This conclusion is supported by the fact that long–term monitoring of surface streams identified no appreciable impacts on surface–water quality in the Skyline Mine permit area or adjacent area.

Subsidence of the land surface in stream drainages has the potential to create temporary increase of sediment yield in these drainages (Petersen Hydrologic, 2017). This potential impact is primarily the result of subsidence–induced gradient changes of the stream bed. The effects, however, are expected to be temporary because the stream gradually returns to equilibrium with its channel substrate. Thus, detrimental impacts to water quality parameters such as total suspended solids are likely to be minimal.

Impacts to the shallow groundwater systems that support springs and seeps and provide baseflow to streams in the area are not anticipated. Thus, detrimental impacts to important water quality parameters such as acidity, total suspended solids, and total dissolved solids in creeks and springs are considered unlikely. This conclusion is supported by the fact that long–term monitoring of surface streams identified no appreciable impacts to surface water quality or flow rates in the Skyline Mine permit area or adjacent area.

Past and present projects, in combination with reasonably foreseeable projects such as those listed in **Table 3.1–2** affecting the vegetation would likely result in only minimal impacts to stream geomorphology. Additionally, while sediment loads of streams can be impacted by increased sediment yield from disturbed areas, CFC has historically implemented rigorous sediment control programs designed to minimize the sediment yield from disturbed areas (Petersen Hydrologic, 2017). This includes the use of sediment control fences, re–vegetation of previously disturbed areas, and the diversion of surface waters around disturbed areas. Runoff from disturbed areas is collected near its source and diverted into sediment control ponds for retention and settlement of suspended solids before it is discharged to natural drainages, which minimizes the impacts to surface water quality.

Groundwater Quantity and Availability

The Skyline Mine workings function as a groundwater sink causing local depressurization of the aquifer. Groundwater that is encountered in underground workings at the Skyline Mine and groundwater that may be encountered in the hydrology analysis area issues from the deep groundwater system in the lower Blackhawk Formation or the Star Point Sandstone. It is unlikely that groundwater from these zones contributes considerably to surface water flow in the Huntington Canyon watershed. Mining at the Skyline Mine does not appear to have created pathways for the downward migration of water from the surface or near surface to the mine. Mining or mine–related subsidence in the LBA or LMA boundaries also would not divert surface flows or near–surface groundwater into deeper formations.

Groundwater in the lower Blackhawk Formation is poorly connected with the land surface, as indicated by radiocarbon ages, the lack of tritium, and the rapid decline of inflow rates to the Skyline Mine after a water–bearing sandstone in the lower Blackhawk Formation is encountered. This suggests that dewatering of these horizons should not induce renewed recharge to these systems and therefore should not cause any impact to the hydrologic balance in the recharge areas.

Quantitative analysis of systematic, long–term monitoring indicated that no monotonic upward or downward trend was observed for any groundwater level. While groundwater level declines were measured in numerous wells from 2017 through mid–2023, the declines did not occur continuously, and later upward trends resulted in recent water levels that are similar to or in some cases higher than initial levels recorded in 2017–2018. Water–level fluctuations in these wells: 1) may reflect longer–term (over years rather than months) changes in the drought index, 2) do not appear to have a correlation to the vertical stratigraphic separation between the well completion (screened or filter–packed) zone and the mined coal seam, and 3) exhibit weak correlation between advancing mining operations and the timing or degree of water–level declines in the wells, suggesting that mining operations are not demonstrably affecting groundwater levels.

In summary, detrimental impacts to groundwater quantity is not anticipated under Alternative 1.

Groundwater Water Quality

Potential impacts to groundwater quality as a result of Alternative 1 include changes in well water quality from mining activities, dewatering, or dewatering discharges that may alter the water's suitability for existing or potential beneficial uses. Mine dewatering and mining–related subsidence are not anticipated to affect groundwater in the shallow groundwater system or surface water and therefore will not affect shallow groundwater quality. Mine dewatering removes groundwater that has flowed into the Skyline Mine from the deep groundwater system and does not affect the quality of groundwater outside the mine. The Skyline Mine water is discharged to the surface through outfalls permitted by the UPDES. The dewatering discharge does not infiltrate back into the groundwater system. Consequently, detrimental impacts to important water quality parameters such as acidity and total dissolved solids in groundwater are considered unlikely. This conclusion is supported by the fact that long–term monitoring of water resources identified no appreciable impacts to water quality in the Skyline Mine permit area or adjacent area.

In summary, detrimental impacts to groundwater quality are not anticipated under Alternative 1.

Groundwater – Water Balance and Water Quality of Electric Lake and Scofield, Huntington, and Cleveland Reservoirs

As described in **Section 3.4**, the clay–rich Blackhawk Formation effectively seals faults and fractures above mined areas, reopening or reactivation of faults through the Blackhawk Formation intersecting the surface is unlikely, and subsidence is limited to rocks above the mined areas and will not produce fractures hydrologically connected to the springs, seeps, or shallow groundwater. Therefore, the flows and water quality of seeps and springs that contribute flow to streams and reservoirs would not be affected, and no effects on water balance or water quality of the reservoirs would occur via shallow groundwater system sources under Alternative 1.

Faults occasionally serve as conduits for groundwater from the Star Point Sandstone in the deep aquifer, and most pumping from active mining areas is in response to deep aquifer groundwater entering the Skyline Mine along faults on the mine floor. Fractures related to the Diagonal Fault hydraulically connect existing Skyline Mine workings with the underlying Star Point Sandstone are/is and were the apparent source of the large inflows to the mine. The Diagonal Fault is east of the LBA and would not be encountered. Other north–northeast faults were crossed during previous mining and resulted in moderate to large groundwater inflows. However, those faults do not intersect Electric Lake or Scofield, Huntington, or Cleveland reservoirs and therefore are not likely to be hydraulically connected to them. Consequently, reduction of water volume or water balance of those water bodies from interception of faults during mining is unlikely.

Mine dewatering, including removal of large inflows to the Skyline Mine, has been ongoing for decades, and would be handled with routine mining practices and protection measures outlined in the mine permit. Dewatering discharge ultimately flows into Electric Lake and therefore could increase the volume of water in the lake; however, the small volume of dewatering discharge relative to the capacity of Electric Lake, as well as the natural sources of volume changes in Electric Lake, would make it unlikely that any increase in volume would be identifiable or measurable.

Past and present projects affecting the hydrology within or surrounding the LBA and LMA boundaries include the Gordon Creek Watershed, Trail Mountain Fire Emergency Watershed, Twelve Mile Aquatic, and East Mountain Boreal Toad Habitat Restoration projects as identified in **Table 3.1–2**. Alternative 1 would result in an incremental impact on hydrology from continued discharge into Electric Lake and limited impacts on stream geomorphology related to subsidence, in combination with reasonably foreseeable projects such as those listed in **Table 3.1–2**.

Compared to alternatives 2, 3, or 4, Alternative 1 would result in a mine life approximately 11 to 18 months shorter, mining of approximately 4.2 to 7.6 million fewer tons of coal, and mining a smaller area. Mining methods and related activities such as dewatering would continue. The impacts to surface water and groundwater quantity and quality would be shorter in duration and cover a smaller area than for alternatives 2, 3, and 4. For Alternative 1, the duration of dewatering discharges would be shorter and the area subject to subsidence would be smaller than for alternatives 2, 3, and 4. Consequently, any increase in volume of surface water in Electric Lake would be of shorter duration, and any transient effects to stream geomorphology or sedimentation would occur over a smaller area and for a shorter duration.

3.5.4.2 Alternative 2: Modify the Flat Canyon Tract (LMA) and Lease the Little Eccles Tract (LBA)

Surface Water – Water Quantity of Streams, Springs, Ponds, and Wetlands

No perceptible or quantifiable impacts to spring or surface–water discharge rates are expected in the areas overlying or affected by the LBA or LMA. Operational monitoring of selected baseline seeps and springs as identified in Stipulation 8 and the Skyline Mine hydrologic monitoring program with UDOGM would continue. It is assumed that additional seeps and springs associated with the LMA and LBA would be incorporated into CFC’s water–monitoring program based on the chosen alternative in the EIS and associated lease stipulations that would be part of any lease approval.

Subsidence is not expected to measurably affect streams. Agapito Associates (2021) reported that even with the most likely (Case 1) maximum potential subsidence of 4.9 feet, effects to stream elevations and gradients in the projected mining area would be small and "difficult to discern" on overall plots of elevation and gradient. These results are consistent with analyses of subsidence and its effects on the stream in Burnout Canyon, which indicated that the changes in channel characteristics were subtle, with the only conspicuous changes being an increase in the length of cascades and some increase in pool volumes (FS, 1998; Sidel, 2000). Subsidence had no discernible effect on baseflows or near–channel landslides, and no mitigation was required or implemented.

In summary, Alternative 2 is expected to have minimal impacts to water quantity of streams, springs, ponds, and wetlands and stream geomorphology.

Surface Water – Water Balance and Water Quality of Electric Lake and Scofield, Huntington, and Cleveland Reservoirs

Mine dewatering removes inflows into the underground works from sandstone lenses and faults. In addition, indirect dewatering is accomplished by pumping from well JC–1. Under Alternative 2, the dewatering is expected to continue through the life of mine, and the rate is not anticipated to change significantly because major water–bearing faults are being avoided. Other than possibly some relatively small inflow to the Skyline Mine from faults hydraulically connected to Electric Lake, no surface water enters the mine, nor does subsidence from mining induce inflows from surface stream flow depletion. Water pumped from the Skyline Mine and from well JC–1 is discharged to the surface and ultimately enters Electric Lake via permitted discharges regulated under the UPDES and monitored in accordance with permit conditions. The discharges could cause a slight increase in surface water volume in Electric Lake and flow through the lake. Natural sources of changes in Electric Lake surface water volume and flow include direct precipitation to the lake surface, surface drainage into the lake, evaporation from the lake, and infiltration either down through the lake bed or up through the lake bed. Precipitation to the lake surface, surface drainage to the lake, and evaporation from the lake are highly variable over time and location, and lake bed infiltration, either into or out of the lake, has not been quantified. The natural sources of variation in Electric Lake surface water volume and flow would likely mask any change related to Skyline Mine dewatering discharges. Increases in Electric Lake surface water volume could benefit aquatic life. However, excessive flow over the Electric Lake dam spillway could alter stream morphology, damage or alter aquatic habitat, and increase erosion or flooding downstream from the dam.

While a range of interpretations remains among subject matter experts on the degree of connection between the shallow and deeper aquifers, and the Skyline Mine and nearby reservoirs (Electric Lake, Scofield, Huntington, and Cleveland), they agree that no reduction in water levels is expected in those reservoirs. Consequently, no reduction in surface–water volume is expected. A slight increase in surface–water volume in Electric Lake is possible from the surface discharge of water from Skyline Mine dewatering activities, but any such increase would likely not be quantifiable.

Considering existing groundwater quality, the absence of water–quality changes shown by water–quality trend analysis, and historical discharge monitoring results, and assuming continued compliance with UPDES permit conditions, surface water quality is not expected to be affected by the permitted discharges from Skyline Mine dewatering activities. Consequently, no water quality effects on water rights, users, or designated uses are expected.

In summary, under Alternative 2, no impacts to the water balance or water quality of Electric Lake or Scofield, Huntington, and Cleveland reservoirs are expected, and no water quality effects on water rights, users, or designated uses are expected.

Surface Water Quality of Streams, Springs, and Ponds

A portion of stream flow is attributed to the shallow groundwater system by way of springs and seeps. Dewatering of the Skyline Mine and lowering of water levels in the deep groundwater system would likely have no impact on overlying surface water quality. This conclusion is supported by the fact that long–term monitoring of surface streams identified no appreciable impacts to surface–water quality in the Skyline Mine permit area or adjacent area.

Subsidence of the land surface in stream drainages has the potential to create temporary increase of sediment yield in these drainages (Petersen Hydrologic, 2017). This potential impact is primarily the result of subsidence–induced gradient changes of the stream bed. The effects, however, are expected to be temporary because the stream gradually returns to equilibrium with its channel substrate. Thus, detrimental impacts to water quality parameters such as total suspended solids are likely to be minimal.

Impacts to the shallow groundwater systems that support springs and seeps and provide baseflow to streams in the LMA are not anticipated. Thus, detrimental impacts to important water quality parameters such as acidity, total suspended solids, and total dissolved solids in creeks and springs in the LMA are considered unlikely. This conclusion is supported by the fact that long–term monitoring of surface streams identified no appreciable impacts to surface water quality or flow rates in the Skyline Mine permit area or adjacent area.

Past and present projects, in combination with reasonably foreseeable projects such as those listed in **Table 3.1–2** affecting the vegetation would likely result in only minimal impacts to stream geomorphology. Additionally, while sediment loads of streams can be impacted by increased sediment yield from disturbed areas, CFC has historically implemented rigorous sediment control programs designed to minimize the sediment yield from disturbed areas (Petersen Hydrologic, 2017). This includes the use of sediment control fences, re–vegetation of previously disturbed areas, and the diversion of surface waters around disturbed areas. Runoff from disturbed areas is collected near its source and diverted into sediment control ponds for retention and settlement of suspended solids before it is discharged to natural drainages, which minimizes the impacts to surface water quality.

Groundwater Water Quantity and Availability

The Skyline Mine workings function as a groundwater sink causing local depressurization of the aquifer. Groundwater that is encountered in underground workings at the Skyline Mine and groundwater that may be encountered in the hydrology analysis area issues from the deep groundwater system in the lower Blackhawk Formation or the Star Point Sandstone. Neither the lower Blackhawk Formation nor the Star Point Sandstone crop out near the LMA and LBA boundaries. It is unlikely that groundwater from these zones contributes considerably to surface water flow in the Huntington Canyon watershed. Mining at the Skyline Mine does not appear to have created pathways for the downward migration of water from the surface or near surface to the mine. Mining or mine–related subsidence in the LBA or LMA boundaries also would not divert surface flows or near–surface groundwater into deeper formations.

Groundwater in the lower Blackhawk Formation is poorly connected with the land surface, as indicated by radiocarbon ages (use the data), the lack of tritium, and the rapid decline of inflow rates to the Skyline Mine after a water–bearing sandstone in the lower Blackhawk Formation is encountered. This suggests that dewatering of these horizons should not induce renewed recharge to these systems and therefore should not cause any impact to the hydrologic balance in the recharge areas. Because water–bearing sandstones in the lower Blackhawk Formation drain quickly when encountered, it is doubtful that these systems support perceptible or quantifiable discharge to the surface.

Quantitative analysis of systematic, long–term monitoring indicated that no monotonic upward or downward trend was observed for any groundwater level. While groundwater level declines were measured in numerous wells from 2017 through mid–2023, the declines did not occur continuously, and later upward trends resulted in recent water levels that are similar to or in some cases higher than initial levels recorded in 2017–2018. Water–level fluctuations in these wells: 1) may reflect longer–term (over years rather than months) changes in the drought index, 2) do not appear to have a correlation to the vertical stratigraphic separation between the well completion (screened or filter–packed) zone and the mined coal seam, and 3) exhibit weak correlation between advancing mining operations and the timing or degree of water–level declines in the wells, suggesting that mining operations are not demonstrably affecting groundwater levels.

Groundwater Water Quality

Potential impacts to groundwater quality as a result of Alternative 2 include changes in well water quality from mining activities, dewatering, or dewatering discharges that may alter the water's suitability for existing or potential beneficial uses.

While a range of interpretations remain among subject matter experts on the degree of connection between the shallow and deeper aquifers, and the Skyline Mine and nearby reservoirs (Scofield, Huntington, and Cleveland), they agree that no reduction in water levels is expected in those reservoirs. Springs and seeps in the shallow groundwater system may be hydraulically disconnected from the LBA and LMA and the lower Blackhawk Formation and Star Point Sandstone deep groundwater system. Consequently, dewatering of the Skyline Mine and lowering of water levels in the deep groundwater system would likely have no impact on overlying groundwater quality. Skyline Mine dewatering removes groundwater that has flowed into the mine from the deep groundwater system and does not affect the quality of groundwater outside the mine. The Skyline Mine water is discharged to the surface through outfalls permitted by the UPDES. The dewatering discharge does not infiltrate back into the groundwater system. Consequently, detrimental impacts to important water quality parameters such as acidity and total dissolved solids in groundwater are considered unlikely. This conclusion is supported by the fact that long–term monitoring of water resources identified no appreciable impacts to water quality in the Skyline Mine permit area or adjacent area.

In summary, detrimental impacts to groundwater quality are not anticipated under Alternative 2.

Groundwater – Water Balance and Water Quality of Electric Lake and Scofield, Huntington, and Cleveland Reservoirs

As described in **Section 3.4**, the clay–rich Blackhawk Formation effectively seals faults and fractures above mined areas, reopening or reactivation of faults through the Blackhawk Formation intersecting the surface is unlikely, and subsidence is limited to rocks above the mined areas and will not produce fractures hydrologically connected to the springs, seeps, or shallow groundwater. Therefore, the flows and water quality of seeps and springs that contribute flow to streams and reservoirs would not be affected, and no effects on water balance or water quality of the reservoirs would occur via shallow groundwater system sources under Alternative 2.

Faults occasionally serve as conduits for groundwater from the Star Point Sandstone in the deep aquifer, and most pumping from active mining areas is in response to deep aquifer groundwater entering the Skyline Mine along faults on the mine floor. Fractures related to the Diagonal Fault hydraulically connect existing Skyline Mine workings with the underlying Star Point Sandstone are/is and were the apparent source of the large inflows to the mine. The Diagonal Fault is east of the LBA and would not be encountered. Other north–northeast faults were crossed during previous mining and resulted in moderate to large groundwater inflows. However, those faults do not intersect Electric Lake or Scofield, Huntington, or Cleveland reservoirs and therefore are not likely to be hydraulically connected to them. Consequently, reduction of water volume or water balance of those water bodies from interception of faults during mining is unlikely under Alternative 2.

Skyline Mine dewatering, including removal of large inflows to the mine, has been ongoing for decades, and would be handled with routine mining practices and protection measures outlined in the mine permit. Dewatering discharge ultimately flows into Electric Lake and therefore could increase the volume of water in the lake; however, the small volume of dewatering discharge relative to the capacity of Electric Lake, as well as the natural sources of volume changes in Electric Lake, would make it unlikely that any increase in volume would be identifiable or measurable.

Past and present projects affecting the hydrology within or surrounding the LBA and LMA boundaries include the Gordon Creek Watershed, Trail Mountain Fire Emergency Watershed, Twelve Mile Aquatic, and East Mountain Boreal Toad Habitat Restoration projects as identified in **Table 3.1–2**. Alternative 2 would result in an incremental impact on hydrology from continued discharge into Electric Lake and limited impacts on stream geomorphology related to subsidence, in combination with reasonably foreseeable projects such as those listed in **Table 3.1–2**.

3.5.4.3 Alternative 3: Only Modify the Flat Canyon LMA

Compared to Alternative 2, Alternative 3 would result in a Skyline Mine life approximately 8 months shorter, mining of approximately 2 million fewer tons of coal, and mining a slightly smaller area. Mining methods and related activities such as dewatering would be the same as for Alternative 2. The impacts to surface water and groundwater quantity and quality would be very similar for Alternative 3 as for Alternative 2. For Alternative 3, the duration of dewatering discharges would be shorter and the area subject to subsidence would be smaller than for Alternative 2. Consequently, any increase in the volume of surface water in Electric Lake would be of shorter duration, and any transient effects to stream morphology or sedimentation would occur over a smaller area and for a shorter duration.

3.5.4.4 Alternative 4: Only Lease the Little Eccles LBA

Compared to Alternative 2, Alternative 4 would result in a Skyline Mine life approximately 5 months shorter, mining of approximately 3.5 million fewer tons of coal, and mining a slightly smaller area. Mining methods and related activities such as dewatering would be the same as for alternatives 2 and 3. The impacts to surface water and groundwater quantity and quality would be very similar for Alternative 4 as for alternatives 2 and 3. For Alternative 4, the duration of dewatering discharges would be shorter and the area subject to subsidence would be smaller than for alternatives 2 and 3. Consequently, any increase in volume of surface water in Electric Lake would be of shorter duration, and any transient effects to stream morphology or sedimentation would occur over a smaller area and for a shorter duration.

3.6 Vegetation and Botany

3.6.1 Analysis Area

The vegetation and botany analysis area comprises the maximum area potentially subject to subsidence under any alternative, approximately 1,923 acres under Alternative 2, as shown in **Figure 3.6–1**. The vegetation and botany analysis area includes the LMA and LBA tracts and is the area of potential surface disturbance from subsidence resulting from the development of the underground mine as described in **Chapter 2**Chapter 2.

3.6.2 Evaluation Criteria

The vegetation and botany analysis issues and evaluation criteria in **Table 3.6–1**, were used to analyze potential environmental consequences of the alternatives.

Table 3.6–1. Vegetation and Botany Analysis Issues and Evaluation Criteria

Issue	Evaluation Criteria
How would mining related subsidence impact vegetation communities, including rare plants?	Acres of vegetation communities, including rare plant habitat, potentially subject to subsidence
How would mining related subsidence impact wetlands, riparian areas, seeps, and springs?	Acres of wetlands and riparian areas, and number of seeps/springs dried out due to subsidence

3.6.3 Affected Environment

3.6.3.1 Vegetation Communities

Ten vegetation communities are present within the vegetation and botany analysis area as shown in **Figure 3.6–1** and described below (FS, 2017). The vegetation and botany analysis area is primarily (83%) forested.

3.6.3.2 Aspen

This vegetation community is upland forest and woodlands dominated by aspen without a considerable conifer component. The understory structure may be complex with multiple shrub and herbaceous layers, or simple with just an herbaceous layer (FS, 2017; USGS, 2005).

3.6.3.3 Aspen/Conifer

This vegetation community occurs on montane slopes and plateaus in Utah. Occurrences are typically on gentle to steep slopes on any aspect but are often found on clay–rich soils in intermontane valleys. The tree canopy is composed of a mix of deciduous and coniferous species, co–dominated by aspen and conifers, including Douglas–fir, white fir, subalpine fir, blue spruce, Englemann spruce, and ponderosa pine (FS, 2017; USGS, 2005).

3.6.3.4 Spruce–Fir

This vegetation community is a high–elevation system of the Rocky Mountains, dominated by Englemann spruce and subalpine fir. Occurrences are typically found in locations with cold–air drainage or ponding, or where snowpacks linger late into the summer, such as north–facing slopes and high–elevation ravines (FS, 2017; USGS, 2005).

3.6.3.5 Mountain Big Sagebrush

This vegetation community primarily occurs on deep–soiled to stony flats, ridges, nearly flat ridgetops, and mountain slopes. It is composed primarily of big sagebrush. Snowberry may co–dominate some stands (FS, 2017; USGS, 2005).

3.6.3.6 Silver Sagebrush

This vegetation community occurs on bottomlands, stream banks, swales, and snow catchments that are typically vernally wet. Soils are often high in silt or clay and drain slowly. Silver sagebrush is dominant in the shrub canopy with sagebrush species, yellow rabbitbrush, snowberry, or Woods' rose also commonly occurring (FS, 2017; USGS, 2005),

3.6.3.7 Mountain Shrubland

This vegetation community occurs in the mountains, plateaus and foothills in the southern Rocky Mountains and Colorado Plateau. The vegetation is typically dominated or co–dominated by snowberry, serviceberry, big sagebrush, elderberry, or yellow rabbitbrush (FS, 2017; USGS, 2005),

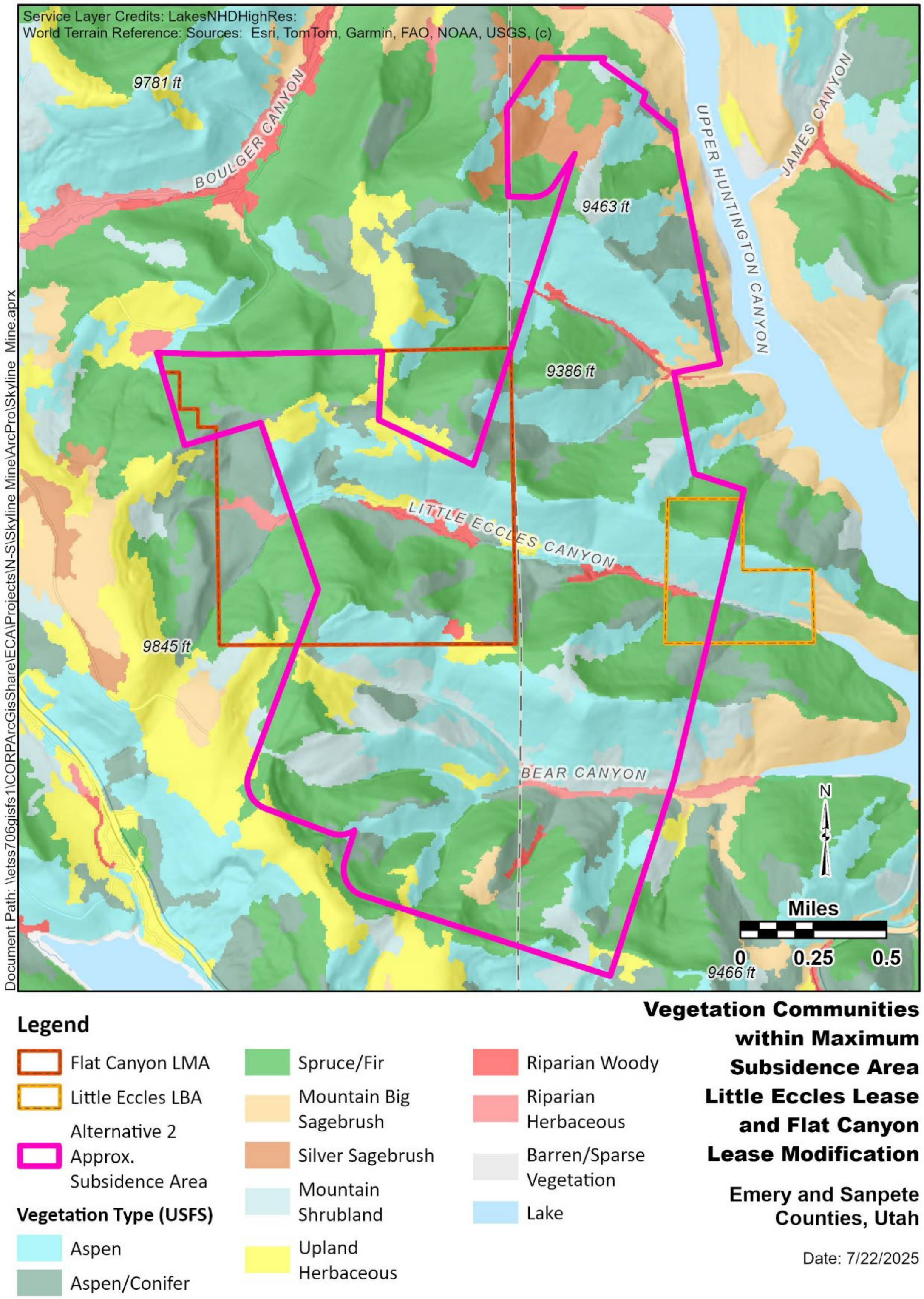
3.6.3.8 Upland Herbaceous

This vegetation community occurs on sites in the subalpine zone where finely textured soils, snow deposition, or wind–swept dry conditions limit tree establishment. In wetter areas, vegetation is typically more forb–rich, often with rushes or sedges. On drier sites, graminoids including bunch grasses typically have higher vegetation cover (FS, 2017; USGS, 2005).

3.6.3.9 Riparian Woody

This vegetation community includes conifer and aspen woodlands that line montane streams. This type is tolerant of periodic flooding and high–water tables. Dominant tree species include subalpine fir, Englemann spruce, Douglas–fir, blue spruce, and aspen. Shrubs that may be present include willows, Woods' rose, mountain gooseberry, and elderberry (FS, 2017; USGS, 2005).

Figure 3.6–1. Vegetation and Botany Analysis Area and Existing Vegetation Communities



3.6.3.10 Riparian Herbaceous

This vegetation community occurs at high elevations throughout the Rocky Mountains and Intermountain regions, occurring as large meadows in montane or subalpine valleys; as narrow strips bordering ponds, lakes, and streams; and along toe slope seeps. This type often occurs as a mosaic of several plant associations, often dominated by graminoids, including sedge (FS, 2017; USGS, 2005).

3.6.3.11 Barren/Sparse Vegetation

This vegetation community commonly occurs at high elevations and includes rocky slopes with thin soils that can only support sparse vegetation or no vegetation.

Past and present projects affecting the vegetation within or surrounding the proposed LMA and LBA tracts include timber, thinning/mastication, thinning, prescribed fire, and planting projects as identified in Table 3.1–2Table 3.1–2. Also included are ongoing uses such as livestock grazing, fuelwood cutting, and invasive species treatments. All of these result in changes in species composition, species density, and the successional stage of the plant communities in and surrounding the vegetation and botany analysis area, contributing to the current vegetation affected environment.

Figure 3.6–2 to **Figure 3.6–6** show representative photographs of some of these vegetation communities and notes regarding mining and other activities.

Figure 3.6–2. Hazardous Fuels Harvest, Thinning, and Mastication Project in Spruce–fir and Aspen/Conifer Vegetation Communities Northeast of Electric Lake

Figure 3.6–3. Typical Tensile Fracture Resulting from Subsidence Affecting Mountain Shrubland Vegetation Community

Source: Pedraza, FS, 2023

Figure 3.6–4. Upland Herbaceous and Aspen/Conifer Vegetation in an Area that has Subsided Approximately 18 Feet since Mining.

Figure 3.6–5. Upland Herbaceous, Mountain Big Sagebrush, and Aspen/Conifer Vegetation Communities in the Southwestern Flat Canyon Lease Tract where CFC is Currently Mining

Figure 3.6–6. Looking East Toward the LMA Tract from Near Highway 31

3.6.3.12 Threatened, Endangered, and Sensitive Plants

According to the official species list ((USFWS, 2025a) obtained for the project through the United States Fish and Wildlife Service (USFWS) Information for Planning and Consultation online tool, no federally listed threatened or endangered plant species occur within the vegetation and botany analysis area.

The FS sensitive species are identified by the Regional Forester when population viability is of concern because of a considerable downward trend in abundance or habitat quality that would reduce the species' distribution (FS Manual 2670.5). None of the 17 FS sensitive plant species identified for the MLNF by the Regional Forester occur within the vegetation and botany analysis area (FS, 2017; Alpine Ecological, 2018a; 2019a; 2019b; 2019c) (2019d; 2019e; 2019f). See Biological Evaluation (**Appendix G**) for further details.

3.6.3.13 Wetlands and Riparian Areas

The National Wetlands Inventory identified several different types of wetlands within the vegetation and botany analysis area as shown in **Figure 3.6–7** and described as follows (USFWS, 2025b).

3.6.3.14 Streams, Seeps and Springs

Peterson Hydrologic (2021) identified the following streams with perennial flow and adjacent riparian habitat:

- Unnamed tributary to Boulger Creek north of the LMA tract
- Little Eccles Creek
- Unnamed tributary to the south of upper Little Eccles Creek
- Bear Creek
- Unnamed tributary to the northwest of upper Bear Creek
- Unnamed tributary to the southwest of upper Bear Creek
- Unnamed tributary to the south of upper Bear Creek

Peterson Hydrologic (2021) identified 242 springs in the Flat Canyon LMA study area. Spring and seep site details, including spring and seep geographic locations, geologic occurrences, and information on development and usage of water, were documented. Discharge rate data for springs and seeps, together with measured field water–quality parameters (temperature, pH, and specific conductance), were also documented.

3.6.4 Environmental Consequences

3.6.4.1 Alternative 1: No Action

Under Alternative 1, approximately 1,230 acres would be subject to potential subsidence (**Table 3.6–2**). Based on subsidence monitoring of the Skyline Mine over 44 years, approximately 6 acres of the area identified as potentially subject to subsidence would be potentially subject to tensile fracturing. No impacts to vegetation communities; federally listed threatened and endangered, or FS sensitive plant species; wetlands and riparian areas; and seeps and springs would occur. Other than the difference in vegetation community acreages potentially affected, impacts would be the same as described for Alternative 2.

Figure 3.6–7. National Wetlands Inventory Wetlands within the Vegetation and Botany Analysis Area

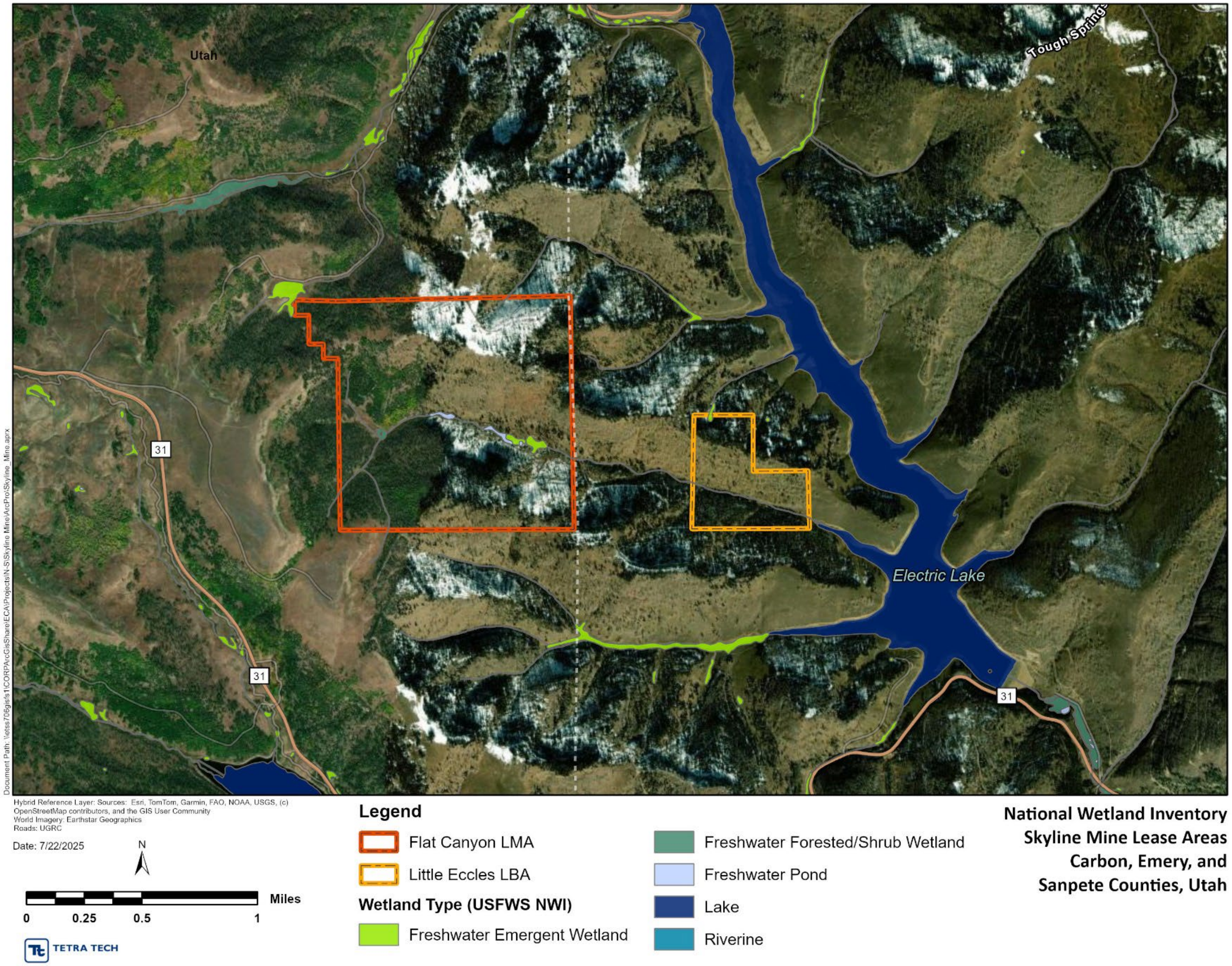


Table 3.6–2. Vegetation Communities Subject to Potential Subsidence Under Alternative 1

Vegetation Community	Acres
Spruce/Fir	376.1
Aspen	467.2
Aspen/Conifer	171.2
Upland Herbaceous	24.5
Riparian Herbaceous	9.1
Riparian Woody	18.0
Mountain Shrubland	88.1
Mountain Big Sagebrush	29.6
Silver Sagebrush	46.3
Total	1,230.2

Source: FS VCMQ Dataset, 2014

3.6.4.2 Alternative 2: Modify the Flat Canyon Tract and Lease the Little Eccles Tract

Subsidence of the land surface overlying coal mining areas is a commonly observed phenomenon in the Utah coal mining environment. Surface subsidence can occur where the rock strata overlying mined–out areas sags into the voids left by the extraction of the coal. Potential vertical subsidence (feet), slope (%), radius of curvature (degrees), horizontal strain (%), and angle of draw (degrees) were predicted by the SDPS (Agapito Associates, 2021). Under Alternative 2, approximately 1,923 acres would be subject to potential subsidence (**Table 3.6–3**).

While subsidence can form tension cracks on the surface, particularly in hard strata in the absence of soil, a study on subsidence–induced cracks in Utah reported that tension cracks experienced gradual closure, once tensile stresses were reduced or relaxed (Agapito Associates, 2021). The mean closure rate was 0.12 inches/week, with individual crack closure rates from 0.08 to 0.4 inches/week. The Environmental Assessment for the Flat Canyon Lease (OSMRE, 2016) states that of the total area mined at the Skyline Mine (10,733 acres), less than 0.5% of the area was known to have tensile fractures. Given this, it is unlikely that appreciable surface cracking would result from the subsidence predicted for the LBA and LMA tracts **Figure 3.6–3** shows a typical tensile fracture in a montane–subalpine grassland with mortality of vegetation limited to a small area along the crack. Based on subsidence monitoring of the Skyline Mine over 44 years, less than 10 acres of the area identified as potentially subject to subsidence would be potentially subject to tensile fracturing.

The study of Burnout Canyon performed above already mined portions of the Skyline Mine indicated there were no effects on water levels due to underground mining (Peterson Hydrologic, 2014; 2017). The Skyline Mine HCSM Report (**Appendix B**) also reports no drying of seeps and springs. The hydrologic model prepared for this project indicates effects to water levels are not anticipated for the numerous seeps and springs within the vegetation and botany analysis area (**Appendix B**). There would be no impact on riparian and wetland vegetation as a result of drying seeps and springs.

In general, the effects of subsidence on vegetation would not lead to any appreciable loss of acreage or change in classifications of upland plant communities. Subsidence typically occurs gradually and with limited surface expression. Effects could include disruption of plant rooting systems and for larger trees greater instability, which could increase susceptibility to windfall. Fracture occurrence is possible but would be focused in bedrock areas with lower soil and vegetative cover. The depth of the proposed mining and montmorillonite clays in the Blackhawk Formation reduce the likelihood of cracking. Along tensile fractures that do occur, there could be limited mortality of individual plants. Stipulation 31 would require the lessee to control any noxious weed infestations originating from or associated with tensile fractures utilizing methods approved by the FS MLNF.

Table 3.6–3. Vegetation Communities Subject to Potential Subsidence Under Alternative 2

Vegetation Community	Acres
Spruce/Fir	650.3
Aspen	672.3
Aspen/Conifer	260.0
Upland Herbaceous	72.4
Riparian Herbaceous	8.9
Riparian Woody	31.4
Mountain Shrubland	152.9
Mountain Big Sagebrush	29.0
Silver Sagebrush	45.8
Total	1,923.1

Source: FS VCMQ Dataset, 2014

3.6.4.3 Threatened, Endangered, and Sensitive Plants

Known populations of federally listed threatened and endangered and FS MLNF sensitive plant species were not identified as occurring prior to baseline surveys and baseline surveys confirmed these species do not occur. There would be no impacts on federally listed threatened and endangered and FS MLNF sensitive plant species. Refer to the Biological Assessment (Tetra Tech, 2025) and Biological Evaluation (**Appendix G**) for more details.

3.6.4.4 Wetlands and Riparian Areas

Within the previously described general vegetation types, some wetlands and riparian areas in Boulger, Little Eccles, and Bear canyons would also be subject to subsidence of from 1 to 4 feet wide. Changes in surface slopes resulting from differential subsidence could result in an increase in the length of cascades and the pool volumes of streams. These changes in channel gradient could locally affect riparian vegetation, potentially resulting in slight expansions in areas where pools form and contractions where the gradient increases.

A detailed study in Burnout Canyon using eight stream monitoring locations and seasonal measurments of flow, channel morphology, substrate size distribution, pool–riffle ratio, and water quality was conducted to assess impacts on surface water flow above previously mined portions of the Skyline Mine.

The study concluded that there is no discernible hydraulic connection between the perched perennial stream, the associated shallow groundwater system, and the deep groundwater system intersected by mining. The study indicated that multiple–seam longwall mining occurring in the Skyline Mine workings beneath Burnout Canyon had not affected stream discharge rates because streams are perched and fed by the shallow groundwater system (Petersen Hydrologic, 2014; 2017).

The Skyline Mine HCSM Report (**Appendix B**) determined no effect on water levels in any of the drainages within the vegetation and botany analysis area, including in Boulger, Little Eccles, and Bear canyons, is expected from underground mining. Therefore, no acreage of wetlands or riparian areas would dry out as a result of subsidence.

3.6.4.5 Seeps and Springs

As previously mentioned, previous study of Burnout Canyon above already mined portions of the Skyline Mine and the hydrologic model prepared for this project indicate no effects to water levels are anticipated for the numerous seeps and springs within the vegetation and botany analysis area (see **Section 3.5** and **Appendix B).** Thus, no discernible impacts to vegetation growing at these seeps and springs would occur. No seeps/springs would dry out due to subsidence.

Potential subsidence under Alternative 2 would result in a potential incremental impact on vegetation, in combination with reasonably foreseeable projects such as planned fuels reduction and prescribed fire projects as well as ongoing livestock grazing and invasive species treatments (**Table 3.1–2**).

3.6.4.6 Alternative 3: Only Modify the Flat Canyon Lease Tract

Under Alternative 3, approximately 1,827 acres would be subject to potential subsidence (**Table 3.6–4**). Based on subsidence monitoring of the Skyline Mine over 44 years, approximately 9 acres of the area identified as potentially subject to subsidence would be potentially subject to tensile fracturing. For the same reasons identified under Alternative 2, no impacts to federally listed threatened and endangered or FS MLNF sensitive plant species would occur. Wetlands and riparian areas; and seeps and springs would not dry out due to subsidence. Changes in channel gradient could locally affect riparian vegetation, potentially resulting in slight expansions in areas where pools form and contractions where the gradient increases. Other than the difference in vegetation community acreages potentially affected, impacts would be the same as described for Alternative 2.

Table 3.6–4. Vegetation Communities Subject to Potential Subsidence Under Alternative 3

Vegetation Community	Acres
Spruce/Fir	602.76
Aspen	637.97
Aspen/Conifer	250.58
Upland Herbaceous	72.41
Riparian Herbaceous	8.90
Riparian Woody	29.78

Mountain Shrubland	149.15
Mountain Big Sagebrush	29.68
Silver Sagebrush	45.91
Total	1,827.14

Source: FS VCMQ Dataset, 2014

Potential subsidence under Alternative 3 would result in a potential incremental impact on vegetation, in combination with reasonably foreseeable projects such as planned fuels reduction and prescribed fire projects as well as ongoing livestock grazing and invasives species treatments (**Table 3.1–2**).

3.6.4.7 Alternative 4: Only Lease the Little Eccles Lease Tract

Under Alternative 4, approximately 1,509 acres would be subject to potential subsidence (**Table 3.6–5**). Based on subsidence monitoring of the Skyline Mine over 44 years, approximately 7.5 acres of the area identified as potentially subject to subsidence would be potentially subject to tensile fracturing. For the same reasons identified under Alternative 2, no impacts to federally listed threatened and endangered or FS MLNF sensitive plant species would occur. Wetlands and riparian areas; and seeps and springs would not dry out due to subsidence. These changes in channel gradient could locally affect riparian vegetation, potentially resulting in slight expansions in areas where pools form and contractions where the gradient increases. Other than the difference in vegetation community acreages potentially affected, impacts would be the same as described for Alternative 2.

Table 3.6–5. Vegetation Communities Subject to Potential Subsidence Under Alternative 4

Vegetation Community	Acres
Spruce/Fir	484.11
Aspen	576.82
Aspen/Conifer	219.26
Upland Herbaceous	27.39
Riparian Herbaceous	9.46
Water	0.01
Riparian Woody	20.74
Mountain Shrubland	110.40
Mountain Big Sagebrush	50.04
Silver Sagebrush	11.10
Total	1,509.32

Source: FS VCMQ Dataset, 2014

Potential subsidence under Alternative 4 would result in a potential incremental impact on vegetation, in combination with reasonably foreseeable projects such as planned fuels reduction and prescribed fire projects as well as ongoing livestock grazing and invasives species treatments (**Table 3.1–2**).

3.7 Wildlife (Terrestrial and Aquatic Species)

3.7.1 Analysis Area

The analysis area for evaluating potential effects to terrestrial and aquatic wildlife is the boundaries of the LMA and LBA tracts plus the combined area that could be affected by subsidence under each alternative as shown on **Figure 3.4–7**, **Figure 3.4–8**, **Figure 3.4–9**, and **Figure 3.4–10**. The wildlife analysis area encompasses 2,408 acres.

3.7.2 Evaluation Criteria

Table 3.7–1 presents the wildlife issues and evaluation criteria used to assess potential consequences to terrestrial and aquatic species and their habitat.

Table 3.7–1. Issues and Evaluation Criteria for Analyzing Impacts to Wildlife Species

Issue	Evaluation Criteria
How would leasing and mining impact habitat for federally threatened and endangered species and species proposed for listing under the ESA?	Amount of water depletions expected. Coal transport routes and destinations in proximity to occupied fish habitat. Acreage of terrestrial habitat types potentially affected by subsidence.
How would mining induced subsidence and water depletions impact habitat for FS sensitive fish and wildlife species?	Acreage and habitat types potentially affected by subsidence. Amount of water depletions expected. Number of breeding sites and other key habitats in subsidence area.
How would mining induced subsidence and water depletions impact habitat for migratory birds?	Acreage and habitat types potentially affected by subsidence and water depletions. Number of breeding sites and other key habitats in subsidence area.
How would mining induced subsidence and water depletions impact habitat for big game crucial range.	Acreage of big game crucial range potentially affected by subsidence and water depletions.

3.7.3 Affected Environment

3.7.3.1 Threatened and Endangered Species

Table 3.7–2 presents the species that are listed as threatened or endangered under the ESA (or have been proposed for listing), and may be present or otherwise have potential to be affected according to the official species list (USFWS, 2025a) obtained for the project through the USFWS Information for Planning and Consultation online tool. A Biological Assessment (Tetra Tech, 2025) was prepared to meet ESA Section 7 requirements and provides additional details on threatened and endangered species.

Table 3.7–2. Threatened and Endangered Species

Species	ESA Status	Range and Habitat	Critical Habitat
Fish			
Bonytail (Gila elegans)	Endangered	Current range in the upper Colorado River basin is warm turbid reaches of the Colorado River, Green River, White River, Yampa River, and the mouth of various larger tributaries to these rivers (USFWS, 2024a). There are no self–	None present in the wildlife analysis area. The closest designated critical habitat is the Green River, 64 air miles to the east.

Species	ESA Status	Range and Habitat	Critical Habitat
		reproducing populations of bonytails in the wild. Species presence remains dependent on stocking.	
Colorado Pikeminnow (Ptychocheilus lucius)	Endangered	Current range in the upper Colorado River basin is the Colorado, Green, and San Juan rivers and their larger tributaries. Migrates long distances to spawn. High spring peak flow is needed to maintain adult habitat and nursery habitat in backwaters (USFWS, 2022).	None present in the wildlife analysis area. The closest designated critical habitat is the Green River, 64 air miles to the east.
Humpback Chub (Gila cypha)	Threatened	Current range in the upper Colorado River basin is the Black Rocks, Westwater Canyon, and Cataract Canyon sections of the Colorado River, and Desolation/Gray Canyon section of the Green River. Inhabits swift, turbulent waters through rocky canyon sections of large rivers. Requires warm water for spawning (USFWS, 2018a).	None is present in the wildlife analysis area. The closest designated critical habitat is the Green River, 64 air miles to the east.
Razorback Sucker (Xyrauchen texanus)	Endangered	Current range in the upper Colorado River basin is the Green and Yampa rivers, Colorado River, San Juan River, and Lake Powell. Found in low–velocity waters, such as backwaters, floodplains, flatwater river reaches, and reservoirs (USFWS, 2018b).	None is present in the wildlife analysis area. The closest designated critical habitat is the Green River, 64 air miles to the east.
Insects			
Monarch Butterfly (Danaus plexippus)	Proposed Threatened	Broadly distributed across the United States and southern Canada. Found in open habitats, such as grasslands, pastures/fields, roadsides, wetlands, streamsides, and suburban areas. Breeding habitat is tied to where milkweed (*Asclepias* spp.) occurs because larvae feed only on the leaves of these plants. Adults require an abundance and diversity of nectar plants, particularly during migration. Wintering grounds are in coastal California and central Mexico (Xerces, 2018).	None is present in the wildlife analysis area. Critical habitat has been proposed in California where there are winter congregations.
Suckley's Cuckoo Bumble Bee (Bombus suckleyi)	Proposed Endangered	Historically occurred across the western United States and Canada where it has been documented in grasslands, shrub–steppe, montane to subalpine mesic meadows, conifer forest, agricultural fields, and urban areas (USFWS, 2024b). Parasitizes nests of other bumblebees (such as western bumble bee) that nest underground, typically in abandoned	Not applicable (none has been proposed).

Species	ESA Status	Range and Habitat	Critical Habitat
		rodent burrows. Adults and host species workers require an abundance and diversity of floral resources for nectar and pollen, particularly in spring and fall. Individual bees likely overwinter in mulch, duff, or other decomposing vegetation on the ground surface.	

Colorado River Fish

None of the four Colorado River fish species occur in the wildlife analysis area. However, the species are analyzed due to the potential for underground mining in the proposed LMA and LBA areas to result in water depletions that could affect downstream occupied waters in the Upper Colorado River Basin. Current ecological stressors impacting these four fish include alteration in natural stream flow regimes and water levels, reductions in water temperature from dam releases, habitat modification, competition with and predation by non–native fish, and hybridization (USFWS, 2018a; USFWS, 2018b; USFWS, 2022; USFWS, 2024a). Additional stressors to Colorado pikeminnow include contaminants, which can bioaccumulate because they are piscivores, and dams and other barriers that impede their ability to migrate long distances to spawn.

Numerous hydrologic studies on groundwater and surface water resources and quarterly monitoring of springs, streams, and wells have been conducted over the Skyline Mine's 44 years of operation. This long–term monitoring has shown that there have been no appreciable depletions in surface water and associated shallow groundwater resources in the Skyline Mine permit area or adjacent area from current and past mining (UDOGM, 2019). The Skyline Mine HCSM Report (**Appendix B**) provides baseline hydrologic and hydrogeologic data and describes in more detail the known hydrologic processes related to the wildlife analysis area. Also see hydrology section (**Section 3.5**) of this EIS. In the wildlife analysis area, hydraulic connection between perennial streams and groundwater in the perched, shallow zone and groundwater in the deep zone (where mining occurs) is limited by intervening unsaturated rock (UDOGM, 2019). Long term monitoring data at Skyline Mine shows that many of the streams are gaining, which also indicates that perching layers identified beneath the streams effectively prevent streamflow losses to deeper groundwater systems in the subsurface (FS, 2002). Stream monitoring studies conducted in Burnout Canyon found that the Skyline Mine's longwall mining of multiple coal seams did not affect stream discharge rates in the watershed (FS, 1998; Sidel, 2000). Monitoring in the Flat Canyon area has shown that Skyline Mine dewatering (i.e., pumping out the inflows) has not resulted in perceptible or quantifiable impacts to overlying spring or surface water discharge rates (Petersen Hydrologic, 2017). This is because inflows into the Skyline Mine are from faults in the Star Point Sandstone in the deep zone, and not from the perched shallow groundwater system.

The Skylin Mine HCSM Report (**Appendix B**) summarizes studies investigating impacts of past mining on Electric Lake and concludes that mining is likely not reducing water levels in Electric Lake. In addition, water inflow that is pumped from the Skyline Mine is discharged to Electric Lake, resulting in a net increase in water entering the lake.

None of the past and present projects listed in **Table 3.1–2** (and shown on **Figure 3.2–1**) are affecting the four fish species because these projects do not overlap with occupied range (which is 64 air miles to the east at the closest) and none are resulting in water depletions.

Monarch Butterfly

Threats to monarch butterfly include loss and degradation of breeding, migratory, and overwintering habitat due to past conversion of grasslands/shrublands to agriculture and widespread use of herbicides, logging/thinning at overwintering sites in Mexico, urban development, senescence, incompatible management at California overwintering sites, and drought. Additional threats are exposure to insecticides and climate impacts (USFWS, 2024c).

There are no known monarch occurrences in the wildlife analysis area based on queries of the FS pollinators database, the Western Monarch Milkweed Mapper database (WMMM, 2025), and the Utah Natural Heritage Program (UNHP) database (UDWIR, 2025). The closest known occurrence is 10 miles to the west (off–forest) in the Sanpete Valley, which was recorded in 2019 at an elevation of 5,825 feet (according to the FS database). Breeding habitat (i.e., milkweed stands) is found in lower elevation areas outside the FS MLNF boundary and is not present in the wildlife analysis area. Meadows, shrublands, and riparian areas in the wildlife analysis area support a diversity of flowering plants and are potential nectar resources for adult monarchs. However, the high elevation of the wildlife analysis area reduces the likelihood of use due to the distance from both breeding habitat and the lower river valleys and agricultural areas where migration typically occurs. **Section 3.6** describes the current vegetation communities in the wildlife analysis area.

Suckley's Cuckoo Bumble Bee

The main threats to Suckley's cuckoo bumble bee are host species declines, pathogens, pesticides, habitat fragmentation, and climate impacts (increased temperatures and drought) (USFWS, 2024b). Drought can have a considerable effect on floral resources, and competition with nonnative/managed bees can have a compounding effect during drought periods. Managed/commercial bee hives can also be a threat due to the risk of pathogens.

There are no records of Suckley's cuckoo bumble bee occurring in the wildlife analysis area. The UNHP database has a record of occurrence between 0.5 and 2 miles from the wildlife analysis area, which was recorded in 1958 (UDWIR, 2025). The nearest occurrence record in the FS pollinators database is 10 miles to the west (off–forest) where both Suckley's and western bumble bees were recorded in 1972 at an elevation of 8,850 feet. All nearby records are more than 50 years old. Suckley's cuckoo bumble bee has not been observed in the contiguous United States since 2016 (USFWS, 2024b).

This species historically occurred in a variety of open habitat types and adjacent wooded areas. As open and wooded areas are present throughout the wildlife analysis area, it is suitable habitat for Suckley's cuckoo bumble bee. Meadows, shrublands, and riparian areas in the wildlife analysis area support a diversity of flowering plants and are potential nectar foraging resources. **Section 3.6** describes the current vegetation communities in the wildlife analysis area. There are no commercial/managed bee hives in the wildlife analysis area.

Past and present projects affecting monarch and bumble bee habitat in the wildlife analysis area include timber, thinning/mastication, thinning, prescribed fire, and planting projects as identified in **Table 3.1–2**. Also included are ongoing uses such as livestock grazing, fuelwood cutting, and invasive species treatments. These activities change the species composition, density, and successional stage of the plant communities in and surrounding the wildlife analysis area, contributing to the current affected environment for monarch butterfly and Suckley's cuckoo bumble bee (and its host species). Activities that create more open habitat conditions increase the growth of flowering forbs and shrubs that are potential foraging resources for both monarch butterflies and bumble bees. The Seeley wildfire burned through portions of the wildlife analysis area in 2012 and was a high intensity fire. The vegetation has recovered and is now dominated by aspen stands.

3.7.3.2 Forest Service Sensitive Fish and Wildlife

The FS sensitive species are identified by the Regional Forester when population viability is of concern because of a considerable downward trend in abundance or habitat quality that would reduce the species' distribution (FS Manual 2670.5). The FS MLNF sensitive fish and wildlife species (FS, 2016) that are known to be present or may be present in the wildlife analysis area based on their range and habitat requirements are listed in **Table 3.7–3**. The Biological Evaluation (**Appendix G**) provides further details on FS MLNF sensitive species.

Table 3.7–3. FS MLNF Sensitive Fish and Wildlife Species in the Wildlife Analysis Area

Species	Habitat Requirements	Occurrence in Wildlife Analysis Area
Fish		
Colorado River Cutthroat Trout (Oncorhynchus clarkii pleuriticus)	Inhabits high gradient coldwater streams and rivers and accessible high–mountain lakes. Often found in pools. Uses cover from large wood, overhanging or submerged vegetation, roots, undercut banks, and boulders (Young, 2008).	No Occurrence. This species is not present in the streams in the wildlife analysis area. FS records show that the closest population is in Left Fork Huntington Creek, 1.1 miles to the south of the wildlife analysis area. It is a conservation population (i.e., non–hybridized, 90 percent genetically pure). A small portion of the wildlife analysis area is within the Left Fork Huntington Creek watershed.
Amphibians		
Boreal Toad (Anaxyrus boreas boreas– formerly Bufo boreas)	Breeds in perennial water bodies. Outside of breeding season it can be found in a variety of upland habitat types above 5,150 feet, including riparian, sagebrush, pinyon–juniper, mountain shrub, mixed conifer, and aspen–conifer forest (Hogrefe, Bailey, Thompson, & Nadolski, 2005). Migrates up to 5 kilometers (3.1 miles) across upland habitat between breeding sites (Thompson, 2004).	There is a historic occurrence record (from 1950) within 0.5 mile of the LMA and LBA tracts and subsidence area (UDWIR, 2025). Suitable breeding habitat (springs and perennial streams) and upland habitat is present. Suitable breeding habitat on the MLNF has been extensively surveyed by the Utah Division of Wildlife Resources (UDWIR). Only one breeding site is currently known on the MLNF, which according to FS geospatial data is on East Mountain, approximately 13.5 miles southeast of the wildlife analysis area. For this reason, the species is unlikely to occur in

Species	Habitat Requirements	Occurrence in Wildlife Analysis Area
		the wildlife analysis area.
Birds		
American Goshawk (Astur atricapillus) [formerly Northern Goshawk Accipiter gentilis)]	Found in mature and older forests with large trees, dense canopy cover, and open understories. The majority of nesting in Utah occurs in mixed conifer–aspen forests (frequently with lodgepole pine and Engelmann spruce present) (Graham, et al., 1999).	Known to occur in the wildlife analysis area. FS monitoring records show there is one known nesting territory within the wildlife analysis area. The Little Eccles territory was occupied (birds present) every year from 2020 to 2023 but was not occupied in 2024.
American Three–toed Woodpecker (Picoides dorsalis)	Restricted to high elevation conifer forests above 8,000 feet, especially spruce–fir. Forages on beetles and therefore are attracted to areas with numerous dead trees, such as from beetle infestations or fire. Populations irrupt locally in response to tree die–offs (Parrish, Howe, & Norvell, 2002).	No known occurrences in the wildlife analysis area. Habitat is present where spruce–fir and dead trees occur. Three years of acoustic surveys were conducted for this species in the wildlife analysis area, but it was not detected (Alpine Ecological, 2018b) (Alpine Ecological, 2018c) (Alpine Ecological, 2019g) (Alpine Ecological, 2019h) (Alpine Ecological, 2020a) (Alpine Ecological, 2020b).
Flammulated Owl (Psiloscops flammeolus)	Primarily found in open, mature ponderosa pine but also occurs in other dry montane conifer (e.g., Douglas fir) and aspen forests (Linkhart & McCallum, 2020).	No known occurrences in the wildlife analysis area and habitat suitability is generally low due to the lack of ponderosa pine. However, individuals could be found in the aspen stands.
Mammals		
Spotted Bat (Euderma maculatum)	Forages in a variety of open habitats from lowland riparian, desert shrub, to edges of montane coniferous forest. Non–colonial. Roosts in cracks and crevices of cliffs, often near water. Feeds primarily on flying insects, especially moths (Oliver, 2000). May forage considerable distances from roost sites (Poche, 1981).	No known occurrences in the wildlife analysis area. Foraging habitat is present. No roosting habitat is present.
Townsend's Western Big–eared Bat (Corynorhinus townsendi townsendi)	Occurs in desert shrub, pinyon–juniper, mountain brush, ponderosa pine, and mixed forests. Colonial rooster in caves or mines (including nursery colonies and winter hibernacula). May roost in buildings. Feeds primarily on moths which are gleaned from vegetation or captured in flight near foliage of trees and shrubs (Oliver, 2000).	No known occurrences in the wildlife analysis area. Foraging habitat is present. No roosting sites (including nursery colonies and winter hibernacula) are known to occur in the wildlife analysis area.

3.7.3.3 Forest Service Management Indicator Species

Under the 1982 Planning Rule, the NFMA states "Fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non–native vertebrate species in the planning area" (36 CFR 219.19). A viable population is defined as, "[a population] which has the estimated numbers and distribution of reproductive individuals to ensure its continued existence is well distributed in the planning area". To ensure that viable populations will be maintained, habitat must be provided to support, at least, a minimum number of reproductive individuals and that habitat must be well distributed so that those individuals can interact with others in the planning area.

A requirement under the NFMA was the development of FS MIS. The NFMA states "In order to estimate the effects of each alternative on fish and wildlife populations, certain vertebrate and/or invertebrate species present in the area shall be identified and selected as MIS and the reasons for their selection will be stated. These species shall be selected because their population changes are believed to indicate the effects of management activities" (36 CFR 219.19 (1)). "Population trends of the MIS will be monitored and relationships to habitat changes determined" (36 CFR 219.19 (6)). The FS MIS that occur in the wildlife analysis area are listed in **Table 3.7–4**. The wildlife resources report (FS, 2025) provides additional details on FS MIS.

Table 3.7–4. Forest Service Management Indicator Species

Species	Habitat Requirements	Occurrence in Wildlife Analysis Area
Golden Eagle (Aquila chrysaetos)	Breeds in open and semi–open habitats from near sea level to 12,000 feet. It occurs primarily in mountainous canyon land, rim–rock terrain of open desert, and grasslands and nests predominantly in cliffs in eastern Utah.	There are no golden eagle nesting territories within the wildlife analysis area. Individuals may forage in the wildlife analysis area, most likely during the summer and fall. They have been observed flying over the wildlife analysis area.
American Goshawk (Northern Goshawk)	See Table 3.7–3.	Breeding territory present. Addressed under FS sensitive fish and wildlife species section above. Also see Table 3.7–3.
Mule Deer (Odocoileus hemionus)	Mule deer use a wide array of habitat types and exhibit seasonal movement (elevational migration) in response to snow cover.	The LMA and LBA is within higher elevation summer range for mule deer. Mule deer have been observed in the wildlife analysis area.
Rocky Mountain Elk (Cervus canadensis)	Elk occupy the higher elevation aspen and mixed conifer habitats from spring through early fall, and move to lower elevation mixed shrub, pinyon/juniper, and sagebrush habitats for winter.	The LMA and LBA is within higher elevation summer range for elk. Elk have been observed in the wildlife analysis area.
Macroinvertebrates	Macroinvertebrates (aquatic insects) are ecological indicator species in aquatic habitats. Habitat requirements for aquatic macroinvertebrates vary with species; habitat requirements for any one species are	Found throughout the Huntington drainage and Little Eccles Creek within the wildlife analysis area.

Species	Habitat Requirements	Occurrence in Wildlife Analysis Area
	very specific. Many macroinvertebrates are the larval form of flying insects such as mayflies, stoneflies, and caddisflies.	

Big Game

The wildlife analysis area is within crucial summer range for mule deer (UDWIR, 2024) and elk (UDWIR, 2023), providing foraging habitat and hiding/thermal cover as well as fawning/calving habitat. The mule deer population objective for the Central Mountains, Manti/San Rafael management unit is 28,000. The mule deer population has been slightly below management objective in four of the five years from 2019 to 2023, and slightly above objective in one of the years (UDWIR, 2024). The elk population objective for the Central Mountains, Manti management unit is 12,000. The elk population is currently at objective but was slightly below objective from 2019 to 2022. There are many factors involved in mule deer population dynamics including degraded habitat, predation, hunting permits, highway mortality, off highway vehicles (OHVs), and habitat fragmentation. The deer population on the MLNF, for the most part, is dependent on the number and type of tags issued by the UDWIR each year, and on weather cycles and patterns. Several past, present, and future habitat restoration projects have and will take place on the MLNF. No high use migration corridors are present. The area around Huntington Canyon receives low to medium use by mule deer as a migration corridor (UDWIR, 2025). Baseline surveys documented mule deer fawns and elk calves in the wildlife analysis area in all three years that surveys were conducted (Alpine Ecological 2018b; 2018c; 2019g; 2019h; 2020a; 2020b).

For mule deer, the FS MLNF LRMP (FS, 1986) considered a minimum viable population for the MLNF to be 19,820. The current winter population estimate for herd units dominated by MLNF is 44,500 deer with 23,900 on the Manti Division (UDWIR, 2024).

Golden Eagle

Golden eagles may use the analysis area in late summer and early fall and would most likely forage around the open ridge tops and meadows. Baseline surveys documented golden eagles flying over the analysis area in all three years that surveys were conducted (Alpine Ecological 2018b; 2018c; 2019g; 2019h; 2020a; 2020b).

The nearest suitable nesting habitat for golden eagles resides along the cliffs within Huntington Canyon. In addition, there is a known golden eagle territory approximately 2.4 miles southeast of the LBA tract. This territory has not been occupied for several years. Golden eagle territories were delineated on the MLNF in 2019 using known nests and alternate nests. Based on three years of territory monitoring, the average territory occupancy over the past three years was 73%. Territory occupancy and productivity are both tied to trends in rabbit populations, their primary prey.

Macroinvertebrates

The FS MLNF LRMP (FS, 1986) on page E–9 states that "the composition of the [macroinvertebrate] community is an indication of the quality of the aquatic habitat and reflects the condition of the entire drainage." The FS has established monitoring locations that are mostly near the MLNF boundary and are designed to reflect the overall water quality and aquatic habitat quality of the stream system and watershed above the monitoring point. The sampling locations are not designed to monitor the effects of a single land or activity and are not suitable for project–level monitoring or evaluation. Monitoring techniques from the FS MLNF LRMP include the Biotic Conditions Index (BCI), a macroinvertebrate community index, and the Habitat Condition Index (HCI), which were measured every five years. The BCI data indicated highly variable communities across the MLNF, probably in response to droughts, floods, and landslides in addition to land management activities. There were no statistically significant trends in the data and no apparent upward trend in the number of streams that did not meet the FS MLNF LRMP standard, nor was there an apparent downward trend in the number of streams that surpassed the standard. Over the entire record, only 5% of the samples did not meet the FS MLNF LRMP BCI standard. The FS MLNF LRMP was updated in 2006 to update the protocols used to collect macroinvertebrate data and to change the method used to analyze the data, which is currently done in cooperation with the UDWQ. The BCI, HCI, and community indices are no longer used.

3.7.3.4 Migratory Birds

A variety of migratory birds associated with spruce–fir forest, aspen forest, montane sagebrush, mountain shrublands, meadows, and riparian areas occur in the wildlife analysis area. The analysis in this section is focused on priority migratory bird species, which include Birds of Conservation Concern (BCC) identified by USFWS (USFWS, 2021), Partners in Flight (PIF) Watch List species (Rosenberg, et al., 2016), and Species of Greatest Conservation Need (SGCN) as identified in the Utah Wildlife Action Plan (UDWIR, 2015). Priority bird species that use coniferous forest as primary or secondary habitat may be present and are listed in Table 3.7–5. The BCC are those in the Southern Rockies/Colorado Plateau Bird Conservation Region (BCR 16) that could occur in the wildlife analysis area based on their geographic range and habitat requirements. Flammulated owl is also a FS sensitive species (discussed in **Section 3.7.3.2**). Baseline surveys have documented Clark's nutcracker (*Nucifraga columbiana*) occurring within the wildlife analysis area in each of the three years that surveys were conducted (Alpine Ecological 2018b; 2018c; 2019g; 2019h; 2020a; 2020b). While the remaining species in Table 3.7–5 have not been documented in the wildlife analysis area, they may be present based on their habitat requirements. The wildlife resources report (FS, 2025) provides additional details on migratory birds.

A variety of forest raptor species may be present. In addition to American goshawk (a FS sensitive species, discussed in **Section 3.7.3.2**), baseline surveys have documented red–tailed hawk (*Buteo jamaicensis*) (several nests) and great horned owl (*Bubo virginianus*) in the wildlife analysis area, and golden eagle and osprey (*Pandion haliaetus*) soaring or flying over the wildlife analysis area (Alpine Ecological 2018b; 2018c; 2019g; 2019h; 2020a; 2020b). Other known raptor occurrences within 2 miles of the wildlife analysis area include American kestrel (*Falco sparverius*) and Swainson's hawk (*Buteo swainsoni*) (UDWIR, 2025).

Table 3.7–5. Migratory Bird Priority Species

Species	Priority List(s)
Broad–tailed Hummingbird (Selasphorus platycercus)	BCC
Cassin's Finch (Haemorhous casinii)	BCC, PIF

Species	Priority List(s)
Clark's Nutcracker (Nucifraga columbiana)	BCC
Evening Grosbeak (Coccothraustes vespertinus)	BCC
Flammulated Owl	BCC, PIF, SGCN (Also, FS sensitive, addressed above)
Long–eared Owl (Asio otus)	BCC
Olive–sided Flycatcher (Contopus cooperi)	BCC, PIF, SGCN

Past and present projects that may be affecting FS sensitive species, FS MIS, and migratory birds are listed in **Table 3.1–2** (and shown on **Figure 3.2–1)** and include exploratory drilling for coal, livestock (sheep) grazing, and vegetation management. The Shalom Hazardous Fuels Project from 2016–2020 thinned and salvaged dead wood. The Seeley wildfire burned through portions of the wildlife analysis area in 2012 and was a high intensity fire. The vegetation has recovered and is now dominated by aspen stands. Recreational use occurs and may disturb wildlife that are present in the area, including motorized and non–motorized road and trail use, camping, hunting, fishing, and snowmobiling. Traffic, noise, and human activities associated with the Skyline Mine that occur above ground are focused at the surface portal and facilities (3.5 miles to the northeast of the wildlife analysis area), ventilation system, conveyor belt, State Highway 264, and rail and truck load out as shown on **Figure 1.3–1**.

3.7.4 Environmental Consequences

No new above–ground facilities are proposed under any of the alternatives. Therefore, there would be no new anthropogenic noise or development on the surface that would contribute to incremental disturbance effects from the past, present, and reasonable foreseeable projects listed in **Table 3.1–2**. The potential impacts on fish and wildlife would stem from subsidence following mining in the LMA and LBA tracts, which could alter groundwater, surface water, topographic features, and vegetation. Effects on fish and wildlife habitat are described generally below, followed by species–specific analysis for each alternative. Effects that are expected under Alternative 1, Alternative 3, and Alternative 4 are considered relative to the effects expected from the Proposed Action (Alternative 2).

Effects to Aquatic Habitat

The Skyline Mine HCSM Report (**Appendix B**) investigates whether mine dewatering or subsidence–induced fractures resulting from the proposed mining activities would affect surface water and associated groundwater resources. The Skyline Mine HCSM Report (**Appendix B**) concludes that the potential for loss of surface water and shallow groundwater to deeper groundwater systems via downward migration of water through subsidence fractures in the wildlife analysis area is low. This is due to the presence of shallow bedrock formations (Blackhawk Formation) between the surface and the coal seam to be mined, which is not capable of accepting appreciable quantities of stream leakage. In addition, the presence of swelling clays in the bedrock formations in the wildlife analysis area result in natural healing of tension cracks in fine–grained bedrock lithologies. Surface cracks in stream substrates that occur in more brittle sandstones would likely be filled with sediment transported by the stream. No reduction in stream volume or drying of seeps/springs or wetlands is expected. See **Section 3.5** for more details.

Mining–related subsidence could result in minor geomorphologic changes to streams. Streams studied in previously mined areas of Burnout Canyon at the Skyline Mine showed increases in cascade lengths, increases in pool lengths, numbers, and volumes, an increase in the median particle diameter of bed sediment in pools, and some constriction in channel geometry (Sidel, 2000; FS, 1998). These types of effects can be both positive and negative in relation to aquatic habitat. For example, whereas prolonged increases in fine sediment composition of pool bottoms are detrimental to fish habitat, increases in median particle diameter in pool bed sediment, such as observed in this study, can improve fish habitat. The impacts described by these studies appeared to be short–lived, with the stream channel recovering to near pre–mining conditions within a year after mining occurred beneath the stream. The Skyline Mine HCSM Report (**Appendix B**) concluded that similar effects can be expected for this project given that geologic and hydrologic conditions in the proposed mining area are similar to Burnout Canyon. Even using the maximum potential vertical subsidence of 7 feet expected in the proposed mining area, the subsidence report concludes that effects to stream elevations and gradients in the projected mining area would be small and “difficult to discern” on overall plots of elevation and gradient (Agapito Associates, 2021).

Groundwater inflows into the Skyline Mine that are discharged into Eccles Creek and Electric Lake meets State of Utah drinking water standards for the parameters that have been analyzed (**Appendix B**). No change to water quality or water balance in surface waters is expected (see **Section 3.5** for more details).

Hydrologic monitoring of streams and other aquatic resources would continue, and additional monitoring locations would be added per lease stipulations in **Section 2.9.1** and mitigation would occur if needed. No impact on hydrologic resources has previously been measured at Skyline Mine that required mitigation.

None of the past, present, and reasonably foreseeable projects are resulting in water depletions or changes to stream geomorphology (**Table 3.1–2**) and none of the alternatives would contribute to these effects. Therefore, there would be no incremental impacts to aquatic habitat.

<u>Effects to Terrestrial Habitat</u>

Subsidence can result in tension cracks on the surface, which could disrupt root systems of plants and potentially cause larger trees to fall due to greater instability. The cracks are expected to be small (1 to 4 feet wide) and localized, temporarily affecting a small portion of the wildlife analysis area during mining and about one year following until subsidence settling is complete. **Figure 3.6–3** shows a typical tensile fracture at Skyline Mine. Subsidence monitoring for previously mined areas at the Skyline Mine has shown that less than 0.5% of the area subject to potential subsidence is known to have tensile fractures. Based on this history, the percentage of the predicted subsidence area that is expected to experience cracking under each alternative is summarized in **Table 3.4–4** along with total acres that could be affected. Acreages of habitat types that would be subject to potential subsidence under each alternative are presented in **Table 3.6–2** (Alternative 1), **Table 3.6–3** (Alternative 2), **Table 3.6–4** (Alternative 3), and **Table 3.6–5** (Alternative 4). The cracks would gradually close (self–heal) once tensile stresses are reduced or relaxed and typical processes of soil movement occur. See **Section 3.4** for more details. Tension cracks would temporarily affect localized areas and individual plants but would not lead to any widespread loss or degradation of habitat, change in the types of plant communities, or alteration of forest structure in the wildlife analysis area. As explained above for aquatic habitat, subsidence is unlikely to affect surface water and shallow groundwater resources in the wildlife analysis area. Therefore, no reductions in soil moisture conditions that would result in plant mortality or reduced growth is expected under any of the alternatives.

Subsidence monitoring would continue per lease stipulations in **Section 2.9.1**. Larger cracks would be repaired by CFC per the lease stipulations. Skyline Mine has repaired tensile fractures in several subsided areas in previously mined areas.

All alternatives could result in subsidence impacts on vegetation components of terrestrial wildlife habitat. The actions under all alternatives would affect a small amount of habitat (range of 6.2 to 9.6 acres, see **Table 3.4–4**) in localized areas where tensile fractures occur and would not be meaningful relative to the size of the area typically used by wildlife and given that habitat conditions naturally change over time with vegetation succession. Therefore, none of the alternatives would contribute to incremental impacts to terrestrial habitat when considered in combination with past, present, and reasonably foreseeable projects affecting vegetation (**Table 3.1–2**), such as planned fuels reduction, prescribed fire, ongoing livestock grazing, and invasive species treatments.

3.7.4.1 Alternative 1: No Action

Threatened and Endangered Species

Table 3.7–6 summarizes the effects determinations for threatened and endangered species and their critical habitat. The determinations are the same for all alternatives.

Table 3.7–6. Effects Determinations for Threatened or Endangered Species

Species	ESA Status	Effects Determinations for All Four Alternatives	
		Species Determination	Critical Habitat Determination
Bonytail	Endangered	No Effect	No Effect
Colorado Pikeminnow	Endangered	No Effect	No Effect
Humpback Chub	Threatened	No Effect	No Effect
Razorback Sucker	Endangered	No Effect	No Effect
Monarch Butterfly	Proposed Threatened	Not likely to jeopardize the continued existence of the species.	No Effect

Species	ESA Status	Effects Determinations for All Four Alternatives	
		Species Determination	**Critical Habitat Determination**
		Provisional Determination[1]: No Effect	Provisional Determination[1]: No Effect
Suckley's Cuckoo Bumble Bee	Proposed Endangered	Not likely to jeopardize the continued existence of the species. Provisional Determination[1]: Not Likely to Adversely Affect	Not applicable (no critical habitat has been proposed).
1 – A provisional determination was made in the event the species is listed as threatened under the ESA prior to project completion.			

<u>Colorado River Fish</u>

Under Alternative 1, effects to the four Colorado River fish species would be the same as Alternative 2. Because no meaningful water depletions would occur or release of contaminants into occupied rivers, the actions proposed under Alternative 1 would have no effect on bonytail, Colorado pikeminnow, humpback chub, and razorback sucker or their critical habitat.

<u>Monarch Butterfly and Suckley's Cuckoo Bumble Bee</u>

Under Alternative 1, effects to monarch butterfly and Suckley's cuckoo bumble bee would be the same as Alternative 2 except the estimated amount of habitat that could experience subsidence–related tensile fractures would be reduced to 6.2 acres compared to 9.6 acres under Alternative 2 (**Table 3.4–4**). Alternative 1 is not likely to jeopardize the continued existence of monarch butterfly and Suckley's cuckoo bumble bee (**Table 3.7–6**) given that the amount of habitat that would be affected is negligible relative to similar available habitat across the MLNF and considering the species' broad geographic ranges. There would be no effect to monarch proposed critical habitat because none is present in the wildlife analysis area.

Forest Service Sensitive Species

Table 3.7–7 summarizes the effects determinations for FS sensitive species. The determinations are the same for all alternatives.

Table 3.7–7. Effects Determinations for FS Sensitive Species

Species	Species Determinations (All Alternatives)
Colorado River Cutthroat Trout	No Impact

Species	Species Determinations (All Alternatives)
Boreal Toad	No Impact
American Goshawk	May impact individuals but is not likely to cause a trend to federal listing or loss of viability
American Three–toed Woodpecker	May impact individuals but is not likely to cause a trend to federal listing or loss of viability
Flammulated Owl	May impact individuals but is not likely to cause a trend to federal listing or loss of viability
Spotted Bat	No Impact
Townsend's Western Big–eared Bat	No Impact

American Goshawk

The nest tree in the Little Eccles territory is 0.5 mile outside the subsidence area predicted for Alternative 1 and therefore would not be affected. Potential subsidence effects on the post–fledging family area would be reduced by 285 acres compared to Alternative 2, and there would be no effect to the active nest area (**Table 3.7–8)**. The estimated amount of habitat that could experience subsidence–related tensile fractures would be reduced to 6.2 acres compared to 9.6 acres under Alternative 2 (**Table 3.4–4)**. Alternative 1 may impact individual American goshawks but is not likely to result in a loss of viability within the MLNF or cause a trend toward federal listing.

Boreal Toad

There are no boreal toad breeding sites within the wildlife analysis area. There is only one known breeding site anywhere on the MLNF, and it is located approximately 11 miles from the wildlife analysis area. At this time, boreal toads are unlikely to occur in the upland habitats in the wildlife analysis area because the maximum reported distance moved from breeding sites is 3.1 miles (Thompson, 2004). Effects under Alternative 1 would be the same as Alternative 2. Alternative 1 would have no impact on boreal toad or its breeding habitat.

Flammulated Owl and Three–toed Woodpecker

There are 638 acres of habitat (aspen or mixed conifer–aspen forest) for flammulated owls and 376 acres of habitat (spruce–fir) for three–toed woodpeckers in the potential subsidence area (**Table 3.6–2**) for Alternative 1. The effects to flammulated owl and three–toed woodpecker would be the same as Alternative 2, except 568 fewer forested acres would be subject to subsidence. Approximately 6.2 acres within the predicted subsidence area could experience subsidence–related tensile fractures (**Table 3.4–4**) (compared to 9.6 acres under Alternative 2). Alternative 1 may impact individual flammulated owls and three–toed woodpeckers but is not likely to result in a loss of viability within the MLNF or cause a trend toward federal listing.

Colorado River Cutthroat Trout

Conservation populations (i.e., non–hybridized, 90% genetically pure) of Colorado River cutthroat trout are present 1.1 miles to the south of the wildlife analysis area in Left Fork Huntington Creek and would not be affected by subsidence. Effects under Alternative 1 would be the same as Alternative 2. Alternative 1 would have no impact on Colorado River cutthroat trout.

Spotted Bat and Townsend's Western Big–eared Bat

Under Alternative 1, effects to bat foraging habitat would be the same as Alternative 2 except the estimated amount of habitat that could experience subsidence–related tensile fractures would be reduced to 6.2 acres compared to 9.6 acres under Alternative 2 (**Table 3.4–4)**. Alternative 1 would have no impact on spotted bat or Townsend's western big–eared bat because no roost sites would be affected and changes to insect prey populations and water sources would not occur.

Forest Service Management Indicator Species and Migratory Birds

Big Game

Under Alternative 1, effects to big game crucial summer range would be the same as Alternative 2 except the estimated amount of habitat that could experience subsidence–related tensile fractures would be reduced to 6.2 acres compared to 9.6 acres under Alternative 2 (**Table 3.4–4)**. Changes to big game calving/fawning and cover forage ratios would be negligible because any subsidence would be localized, affecting only small portions of the wildlife analysis area, 0.3%. These areas would not substantially change cover or forage ratios over the larger landscape and would not result in any changes to population trends.

Golden Eagle

Approximately 6.2 acres of golden eagle foraging habitat could experience subsidence–related tensile fractures (**Table 3.4–4**) (compared to 9.6 acres under Alternative 2). The area that could be affected by tensile fracturing would be 0.3% of the 2,408–acre wildlife analysis area (compared to 0.4% under Alternative 2). No impacts to known nest sites or cliff habitat would occur because none are present in the predicted subsidence area for Alternative 1. Overall changes to the foraging habitat would be similar to Alternative 2.

Macroinvertebrates

Under Alternative 1, effects to macroinvertebrates would be the same as Alternative 2. There could be minor temporary geomorphologic changes to streams, but effects to stream elevations and gradients would be small and difficult to discern, as explained above under effects to aquatic habitat. Reductions in water quality or quantity are not expected. For these reasons, Alternative 1 would have no effect on macroinvertebrates.

Migratory Birds

Habitat types in the potential subsidence area for Alternative 1 are summarized in **Table 3.6–2**. Most of the Alternative 1 potential subsidence area (82%) is forested. Approximately 6.2 acres of migratory bird habitat could experience subsidence–related tensile fractures (**Table 3.4–4**) (compared to 9.6 acres under Alternative 2). The area that could be affected by tensile fracturing would be 0.3% of the 2,408–acre analysis area (compared to 0.4% under Alternative 2). Overall changes to the habitat and risk of nest trees falling would be similar to Alternative 2.

3.7.4.2 <u>Alternative 2: Modify the Flat Canyon Tract and Lease the Little Eccles Tract</u>

Threatened and Endangered Species

Table 3.7–6 summarizes the effects determinations for threatened and endangered species and their critical habitat. The determinations are the same for all alternatives. A Biological Assessment was prepared to analyze the effects of implementing the Proposed Action (Alternative 2) on these species (Tetra Tech, 2025). The USFWS concurred with the determinations presented in the Biological Assessment (USFWS, 2025c).

<u>Colorado River Fish</u>

Colorado pikeminnow, humpback chub, and razorback sucker do not occur in the wildlife analysis area and therefore would not be directly affected. This analysis considers the potential for water depletions and contaminants (related to combustion and transportation of coal) to affect the fish and their critical habitat elsewhere in the upper Colorado River basin.

<u>Water Depletions</u>

The USFWS recently revised consultation guidance for water depletions in the upper Colorado River basin in terms of evaluating effects to Colorado pikeminnow, humpback chub, and razorback sucker. The USFWS determined that water–related activities resulting in less than 10.0 acre–foot per year of new depletions have no effect on the four federally listed Colorado River fish species or their critical habitat (USFWS, 2024d). As explained above under impacts to aquatic habitat, no quantifiable amount of water depletions would occur under Alternative 2 and therefore the USFWS threshold for de minimis water depletion effects to the fish would not be exceeded. None of the past and present projects listed in **Table 3.1–2** are contributing incremental impacts to water depletions.

The USFWS recently revised consultation guidance for water depletions in the upper Colorado River basin in terms of evaluating effects to Colorado pikeminnow, humpback chub, and razorback sucker. The USFWS determined that water–related activities resulting in less than 10.0 acre–foot per year of new depletions have no effect on the four federally listed Colorado River fish species or their critical habitat (USFWS, 2024d). As explained above under impacts to aquatic habitat, no quantifiable amount of water depletions would occur under Alternative 2 and therefore the USFWS threshold for de minimis water depletion effects to the fish would not be exceeded. None of the past and present projects listed in Table 3.1–2 are contributing incremental impacts to water depletions.

<u>Contaminants</u>

Coal produced from the Skyline Mine is shipped to various locations both domestically and overseas and is not tied to any one facility. From 2020 to 2023, Skyline coal was transported to 36 different locations in 10 different states in the U.S. and to Mexico and to various types of facilities (e.g., cement plants), not only power generation stations. In 2020, 23% of the coal from Skyline Mine was transported to ports in California and exported overseas. Although future destinations of coal produced from mining in the proposed lease area is unknown, based on this past history, combustion of coal produced from the

Skyline Mine would be dispersed across a large geographic area mostly outside the Colorado River basin and is not expected to be concentrated in or near where the four fish occur and therefore would not contribute to mercury and selenium deposition in rivers where the fish occur. In addition, examination of past rail and truck routes shows most of the coal from the Skyline Mine travels on routes heading north, south and west and do not cross or parallel rivers occupied by the four Colorado River fish. Therefore, the risk of coal dust from the railcars or potential rail accidents or spills affecting the listed fish or their critical habitat is discountable. None of the past and present projects listed in **Table 3.1–2** are contributing to incremental contaminant impacts because of the type of activity and they are located far from where the fish occur.

Overall, because no water depletions would occur or release contaminants into occupied rivers, the actions proposed under Alternative 2 would have no effect on bonytail, Colorado pikeminnow, humpback chub, and razorback sucker or their critical habitat.

Monarch Butterfly

There would be no impact to monarch breeding habitat because none is present in the wildlife analysis area. Approximately 9.6 acres of monarch migration habitat could experience localized subsidence–related tensile fractures (**Table 3.4–4**) within the predicted subsidence area for Alternative 2 shown on **Figure 3.4–8**. A small number of individual plants along the fractures could experience mortality or reduced growth but no widespread reduction of nectar resources in the analysis area would occur. Alternative 2 is not likely to jeopardize the continued existence of monarch butterfly given that no breeding habitat would be affected, the migration habitat in the Action Area has a low likelihood of use given the elevation, and the amount of migration habitat that would be affected is negligible relative to similar available habitat across the MLNF and considering the species' broad geographic range across North America. In the event the species is listed as threatened under the ESA prior to project completion, a provisional determination of no effect on monarch butterfly is made due to the very low likelihood of monarchs occurring in the analysis area and the negligible impact on nectar resources from potential tensile fractures. Alternative 2 would have no effect on monarch butterfly proposed critical habitat because none is present in the analysis area.

Suckley's Cuckoo Bumblebee

Approximately 9.6 acres of Suckley's cuckoo bumble bee habitat could experience subsidence–related tensile fractures (**Table 3.4–4**) within the predicted subsidence area for Alternative 2 shown on **Figure 3.4–8**. A small number of individual plants along the fractures could experience mortality or reduced growth but no widespread reduction of nectar and pollen resources in the analysis area would occur. The fractures could damage underground host nests and harm female bees that are overwintering on or just below the ground surface in the affected area. Given that the amount of habitat that would be affected is negligible relative to similar available habitat across the MLNF and considering the species' broad geographic range, Alternative 2 is not likely to jeopardize the continued existence of Suckley's cuckoo bumble bee. In the event the species is listed as endangered under the ESA prior to Project completion, a provisional determination of may affect, not likely to adversely affect individuals is made. Alternative 2 may affect Suckley's cuckoo bumble bee because there is potential for surface cracking to temporarily disturb foraging habitat, overwintering bees, and underground host nests. However, this is not likely to adversely affect the bees because the amount of foraging and nesting habitat and number of nectar/pollen plants that could be affected would be insignificant and the probability of a nest being disturbed is discountable. No critical habitat has been proposed for Suckley's cuckoo bumble bee.

Forest Service Sensitive Species

American Goshawk

Management recommendations (Reynolds, Graham, & Reiser, 1992) are to manage goshawk nesting habitat at three scales: the nest area, post–fledgling area, and foraging habitat. Therefore, impacts are assessed relative to these scales. The nest area is where goshawk activities are centered around the nest from courtship to fledging. The post–fledging family area is a larger area around the nest site that the family uses from fledging until the young are no longer depending on the adults for food. For management purposes, the FS also delineates possible alternative nest areas and replacement nest areas within the post–fledging family area based on local habitat conditions. Foraging habitat is considered to be a larger area (typically about 5,400 acres) surrounding the post–fledging family area.

There is one American goshawk nest territory (referred to as the Little Eccles territory) within the wildlife analysis area. The territory was occupied in 2024. The nest tree is just outside the subsidence area predicted for Alternative 2 by 146 feet. However, 40% of the active nest area surrounding the nest tree is within the predicted subsidence area for Alternative 2 (**Table 3.7–8**). In addition, 62% of the post–fledging family area would potentially be subject to subsidence. All alternative nest areas and 31% of the replacement nest areas are in the predicted subsidence area for Alternative 2. Approximately 9.6 acres within the predicted subsidence area could experience subsidence–related tensile fractures (**Table 3.4–4**) for Alternative 2 shown on **Figure 3.4–8**. A small number of trees and other plants along the fractures may be become unstable and fall. However, the nest tree would not be impacted by subsidence. No widespread reduction of forested habitat in the analysis area or changes to forest structure would occur.

Table 3.7–8. Components of American Goshawk Nesting Territory Potentially Affected by Subsidence

Type of Use (Total Acres)		Acres of Little Eccles Territory Subject to Potential Subsidence (% of Area Affected)		
	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Active Nest Area (31.0 acres)	0 acres (0%)	12.4 acres (40%)	12.4 acres (40%)	0 acres (0%)
Post–fledging Family Area (628.5 acres)	105.3 acres (17%)	390.2 acres (62%)	390.1 acres (62%)	131.0 acres (21%)
Alternative Nest Areas (2 areas, total of 63.7 acres)	8.8 acres (14%)	63.7 acres (100%)	63.7 acres (100%)	21.5 acres (34%)

Replacement Nest Areas (3 areas, total of 93.4 acres)	0 acres (0%)	29.1 acres (31%)	29.1 acres (31%)	0 acres (0%)

Overall, the nest tree in the Little Eccles territory would not be affected, and no wide–spread changes to forest cover, forest structure, or prey populations would occur that would affect goshawk survival or productivity. In addition, there are three other goshawk territories that the FS is aware of in the Huntington Canyon area that are 2 to 2.5 miles from the Little Eccles territory. These territories would not be impacted. Impacts on the overall population on the MLNF are not expected. For these reasons, Alternative 2 may impact individual American goshawks but is not likely to result in a loss of viability within the MLNF or cause a trend toward federal listing.

Boreal Toad

The MLNF has been well–surveyed for boreal toad breeding sites, and currently no breeding occurs in the analysis area. At this time, boreal toads are unlikely to occur in the upland habitats in the analysis area because the maximum reported distance moved from breeding sites is 3.1 miles (Thompson, 2004), and the closest occupied breeding site is 11 miles from the analysis area. As explained under aquatic habitat effects above and based on the hydrology analysis (**Section 3.5**), there would be no water depletions that would affect perennial surface waters or associated shallow groundwater systems and therefore breeding habitat in the analysis area would remain suitable in the event recolonization were to occur in the future. Therefore, Alternative 2 would have no impact on boreal toad or its breeding habitat.

Flammulated Owl and Three–toed Woodpecker

There are 932 acres of habitat (aspen or mixed conifer–aspen forest) for flammulated owls and 650 acres of habitat (spruce–fir) for three–toed woodpeckers in the potential subsidence area (**Table 3.6–3**). Approximately 9.6 acres within the predicted subsidence area could experience subsidence–related tensile fractures (**Table 3.4–4**) for Alternative 2 shown on **Figure 3.4–8**. A small number of trees along the fractures may be become unstable and fall. However, no widespread reduction of forested habitat in the analysis area would occur. Nests could be destroyed if a tree falls that contains a nest cavity, although the likelihood of this happening is low given that surface fractures would be localized and expected to affect a small portion (0.4%) of the 2,408–acre wildlife analysis area, not all of which is forested. Alternative 2 may impact individual flammulated owls and three–toed woodpeckers but is not likely to result in a loss of viability within the MLNF or cause a trend toward federal listing.

Colorado River Cutthroat Trout

Conservation populations (i.e., non–hybridized, 90% genetically pure) of Colorado River cutthroat trout are present 1.1 miles south of the analysis area in Left Fork Huntington Creek. As explained under aquatic habitat effects above and based on the hydrology analysis (**Section 3.5**), there would be no water depletions that would affect perennial surface waters or the associated shallow groundwater system in the analysis area (watershed scale) and no change to water quality. In addition, because the potential subsidence area predicted for Alternative 2 does not intersect with the occupied stream, there would be no geomorphological changes to these stream. For these reasons, Alternative 2 would have no impact on Colorado River cutthroat trout.

Spotted Bat and Townsend's Western Big–eared Bat

There would be no effect on bat roost sites (including nursery sites and winter hibernacula) because none are present in the analysis area. Based on the hydrology analysis (**Section 3.5**), there would be no effect on water sources. Approximately 9.6 acres of bat foraging habitat could experience tensile fractures affecting a small number of individual plants. Given the small scale of change relative to the remaining habitat in the wildlife analysis area and throughout the MLNF, this would have no measurable effect on the moths and other insect populations that these bats feed. For these reasons, Alternative 2 would have no impact on spotted bat or Townsend's western big–eared bat.

Management Indicator Species and Migratory Birds

Big Game

Approximately 9.6 acres of big game crucial summer range could experience subsidence–related tensile fractures within the predicted subsidence area for Alternative 2 shown on **Figure 3.4–8**. A small number of individual plants along the fractures could experience mortality or reduced growth but no widespread reduction of foraging resources, cover, or water resources or decrease in habitat quality in the analysis area would occur. No reduction in herd numbers is expected.

Larger tensile fractures could pose a potential hazard to big game if they inadvertently step in a crack. This is likely not a large risk given mule deer and elk are capable of navigating across varied terrain and the total area affected would be small relative to the large areas (home ranges) used by mule deer and elk in their summer range. The cracks would gradually self–heal or be repaired by CFC if needed per the lease stipulations (**Section 2.9.1**).

Golden Eagle

Approximately 9.6 acres of golden eagle foraging habitat could experience subsidence–related tensile fractures (**Table 3.4–4**). The area that could be affected by tensile fracturing would be 0.4% of the 2,408–acre analysis area. No impacts to known nest sites or cliff habitat would occur because none are present in the predicted subsidence area for Alternative 2. Tensile fractures would be small and heal over time and would not hinder eagle foraging activities. A small number of individual plants along the fractures could experience mortality or reduced growth but no widespread reduction of foraging habitat, or effects to prey populations are expected.

Macroinvertebrates

Under Alternative 2, there could be minor temporary geomorphologic changes to streams, but effects to stream elevations and gradients would be small and difficult to discern, as explained above under effects to aquatic habitat. Reductions in water quality or quantity are not expected. For these reasons, Alternative 2 would have no effect on macroinvertebrates.

Migratory Birds

Habitat types in the potential subsidence area for Alternative 2 are summarized in **Table 3.6–3**. Most of the potential subsidence area (82%) is forested. Approximately 9.6 acres of migratory bird habitat could experience subsidence–related tensile fractures (**Table 3.4–4**) within the predicted subsidence area for Alternative 2 shown on **Figure 3.4–8**. A small number of individual plants along the fractures could experience mortality or reduced growth. A small number of trees may be become unstable and fall. However, no widespread reduction of foraging resources, cover, or water resources in the analysis area would occur. Nests could be destroyed if a tree falls that contains a nest, although the likelihood of this happening is low given that surface fractures would be localized and expected to affect a small portion (0.4%) of the 2,408–acre wildlife analysis area.

3.7.4.3 Alternative 3: Only Modify the Flat Canyon Lease Tract

Threatened and Endangered Species

Colorado River Fish

Compared to Alternative 2, Alternative 3 would entail mining less coal and the predicted subsidence area would be smaller (**Table 3.4–4)**. The mining would occur under the same hydrologic and geologic conditions as Alternative 2, and therefore no quantifiable water depletions are expected. Potential transportation and coal destinations would be the same as that described for Alternative 2, and it is unlikely that coal dust or spillage would affect rivers where the four fish occur. Because no meaningful water depletions would occur or release of contaminants into occupied rivers, the actions proposed under Alternative 3 would have no effect on bonytail, Colorado pikeminnow, humpback chub, and razorback sucker or their critical habitat.

Monarch Butterfly and Suckley's Cuckoo Bumble Bee

Under Alternative 3, effects to monarch butterfly and Suckley's cuckoo bumble bee would be the same as Alternative 2 except the estimated amount of habitat that could experience subsidence–related tensile fractures would be reduced to 9.1 acres compared to 9.6 acres under Alternative 2 (**Table 3.4–4)**. Given that the amount of habitat that would be affected is negligible relative to similar available habitat across the MLNF and considering the species' broad geographic range, Alternative 3 is not likely to jeopardize the continued existence of monarch butterfly and Suckley's cuckoo bumble bee (**Table 3.7–6**). There would be no effect on monarch proposed critical habitat because none is present in the analysis area.

Forest Service Sensitive Species

American Goshawk

The nest tree in the Little Eccles territory is just outside the subsidence area predicted for Alternative 3 by 146 feet and therefore would not be affected. Potential subsidence effects on components of the breeding territory would be the same as Alternative 2 (**Table 3.7–8**) except the estimated amount of habitat that could experience subsidence–related tensile fractures would be reduced to 9.1 acres compared to 9.6 acres under Alternative 2 (**Table 3.6–4)**. Alternative 3 may impact individual American goshawks but is not likely to result in a loss of viability within the MLNF or cause a trend toward federal listing.

Boreal Toad

Effects under Alternative 3 would be the same as Alternative 2. Alternative 3 would have no impact on boreal toad or its breeding habitat.

Flammulated Owl and Three–toed Woodpecker

There are 889 acres of habitat (aspen or mixed conifer–aspen forest) for flammulated owls and 603 acres of habitat (spruce–fir) for three–toed woodpeckers in the potential subsidence area (**Table 3.6–4**) for Alternative 3 The effects to flammulated owl and three–toed woodpecker would be the same as Alternative 2, except 43 fewer forested acres would be subject to subsidence. Approximately 9.1 acres within the predicted subsidence area could experience subsidence–related tensile fractures (**Table 3.4–4**) (compared to 9.6 acres under Alternative 2). Alternative 3 may impact individual flammulated owls and three–toed woodpeckers but is not likely to result in a loss of viability within the MLNF or cause a trend toward federal listing.

Colorado River Cutthroat Trout

Effects under Alternative 3 would be the same as Alternative 2. Alternative 3 would have no impact on Colorado River cutthroat trout.

Spotted Bat and Townsend's Western Big–eared Bat

Under Alternative 3, effects to bat foraging habitat would be the same as Alternative 2 except the estimated amount of habitat that could experience subsidence–related tensile fractures would be reduced to 9.1 acres compared to 9.6 acres under Alternative 2 (**Table 3.4–4)**. Alternative 3 would have no impact on spotted bat or Townsend's western big–eared bat because no roost sites would be affected and changes to insect prey populations and water sources would not occur.

Forest Service Management Indicator Species and Migratory Birds

Big Game

Under Alternative 3, effects to big game crucial summer range would be the same as Alternative 2 except the estimated amount of habitat that could experience subsidence–related tensile fractures would be reduced to 9.1 acres compared to 9.6 acres under Alternative 2 (**Table 3.4–4)**.

Golden Eagle

Approximately 9.1 acres of golden eagle foraging habitat could experience subsidence–related tensile fractures (**Table 3.4–4**) (compared to 9.6 acres under Alternative 2). The area that could be affected by tensile fracturing would be 0.4% of the 2,408–acre analysis area (compared to 0.4% under Alternative 2). No impacts to known nest sites or cliff habitat would occur because none are present in the predicted subsidence area for Alternative 3. Overall changes to foraging habitat would be similar to Alternative 2.

Macroinvertebrates

Under Alternative 3, effects to macroinvertebrates would be the same as Alternative 2. There could be minor temporary geomorphologic changes to streams, but effects to stream elevations and gradients would be small and difficult to discern, as explained above under effects to aquatic habitat. Reductions in water quality or quantity are not expected. For these reasons, Alternative 3 would have no effect on macroinvertebrates.

Migratory Birds

Habitat types in the potential subsidence area for Alternative 3 are summarized in **Table 3.6–4**. Most of the Alternative 3 potential subsidence area (82%) is forested. Approximately 9.1 acres of migratory bird habitat could experience subsidence–related tensile fractures (**Table 3.4–4**) (compared to 9.6 acres under Alternative 2). The percentage of habitat in the wildlife analysis area that could be affected would essentially be the same as Alternative 2.

3.7.4.4 Alternative 4: Only Lease the Little Eccles Lease Tract

Threatened and Endangered Species

Colorado River Fish

Under Alternative 4, the effects to the four Colorado River fish species would be the same as Alternative 2. Because no meaningful water depletions would occur or release of contaminants into occupied rivers, the actions proposed under Alternative 4 would have no effect on bonytail, Colorado pikeminnow, humpback chub, and razorback sucker or their critical habitat.

Monarch Butterfly and Suckley's Cuckoo Bumble Bee

Under Alternative 4, effects to monarch butterfly and Suckley's cuckoo bumble bee would be the same as Alternative 2 except the estimated amount of habitat that could experience subsidence–related tensile fractures would be reduced to 7.5 acres compared to 9.6 acres under Alternative 2 (**Table 3.4–4)**. Given that the amount of habitat that would be affected is negligible relative to similar available habitat across the MLNF and considering the species' broad geographic ranges, Alternative 4 is not likely to jeopardize the continued existence of monarch butterfly and Suckley's cuckoo bumble bee (**Table 3.7–6**). There would be no effect on monarch proposed critical habitat because none is present in the analysis area.

Forest Service Sensitive Species

American Goshawk

The nest tree in the Little Eccles territory is 0.5 miles outside the subsidence area predicted for Alternative 4 and therefore would not be affected. Potential subsidence effects on the post–fledging family area would be reduced by 259 acres compared to Alternative 2, and there would be no effect to the active nest area (**Table 3.7–8**). The estimated amount of habitat that could experience subsidence–related tensile fractures would be reduced to 7.5 acres compared to 9.6 acres under Alternative 2 (**Table 3.4–4)**. Alternative 4 may impact individual American goshawks but is not likely to result in a loss of viability within the MLNF or cause a trend toward federal listing.

Boreal Toad

Effects under Alternative 4 would be the same as Alternative 2. Alternative 4 would have no impact on boreal toad or its breeding habitat.

Flammulated Owl and Three–toed Woodpecker

There are 796 acres of habitat (aspen or mixed conifer–aspen forest) for flammulated owls and 484 acres of habitat (spruce–fir) for three–toed woodpeckers in the potential subsidence area (**Table 3.6–5**) for Alternative 4. The effects to flammulated owl and three–toed woodpecker would be the same as Alternative 2, except 212 fewer forested acres would be subject to subsidence. Approximately 7.5 acres within the predicted subsidence area could experience subsidence–related tensile fractures (**Table 3.4–4**) (compared to 9.6 acres under Alternative 2). Alternative 4 may impact individual flammulated owls and three–toed woodpeckers but is not likely to result in a loss of viability within the MLNF or cause a trend toward federal listing.

Colorado River Cutthroat Trout

Effects under Alternative 4 would be the same as Alternative 2. Alternative 4 would have no impact on Colorado River cutthroat trout.

Spotted Bat and Townsend's Western Big–eared Bat

Under Alternative 4, effects to bat foraging habitat would be the same as Alternative 2 except the estimated amount of habitat that could experience subsidence–related tensile fractures would be reduced to 7.5 acres compared to 9.6 acres under Alternative 2 (**Table 3.4–4**). Alternative 4 would have no impact on spotted bat or Townsend's western big–eared bat because no roost sites would be affected and meaningful changes to insect prey populations and water sources would not occur.

Forest Service Management Indicator Species and Migratory Birds

Big Game

Under Alternative 4, effects to big game crucial summer range would be the same as Alternative 2 except the estimated amount of habitat that could experience subsidence–related tensile fractures would be reduced to 7.5 acres compared to 9.6 acres under Alternative 2 (**Table 3.4–4**).

Golden Eagle

Approximately 7.5 acres of golden eagle foraging habitat could experience subsidence–related tensile fractures (**Table 3.4–4**) (compared to 9.6 acres under Alternative 2). The area that could be affected by tensile fracturing would be 0.3% of the 2,408–acre analysis area (compared to 0.4% under Alternative 2). No impacts to known nest sites or cliff habitat would occur because none are present in the predicted subsidence area for Alternative 4. Overall changes to foraging habitat would be similar to Alternative 2.

Macroinvertebrates

Under Alternative 4, effects to macroinvertebrates would be the same as Alternative 2. There could be minor temporary geomorphologic changes to streams, but effects to stream elevations and gradients would be small and difficult to discern, as explained above under effects to aquatic habitat. Reductions in water quality or quantity are not expected. For these reasons, Alternative 4 would have no effect on macroinvertebrates.

Migratory Birds

Habitat types in the potential subsidence area for Alternative 4 are summarized in **Table 3.6–5**. Most of the Alternative 4 potential subsidence area (85%) is forested. Approximately 7.5 acres of migratory bird habitat could experience subsidence–related tensile fractures (**Table 3.4–4**) (compared to 9.6 acres under Alternative 2). The area that could be affected by tensile fracturing would be 0.3% of the 2,408–acre wildlife analysis area (compared to 0.4% under Alternative 2). Overall changes to the habitat and risk of nest trees falling would be similar to Alternative 2.

3.8 Socioeconomics

3.8.1 Analysis Area

The socioeconomic analysis area is Carbon, Emery, and Sanpete counties within the State of Utah. Most of the mine's current workers and any potential future employees are likely to reside within these three counties as 80% of workers in general go to their job within the same county (BLM, 2025). The data reported includes statistics from these counties which were also selected because they are proximal to the mine and contain populations that the alternatives may impact.

3.8.2 Evaluation Criteria

The evaluation criteria for analyzing impacts on social and economic conditions and the indicators that are used to discuss them are shown in **Table 3.8–1**.

Table 3.8–1. Issues and Indicators for Social and Economic Conditions

Issue	Analysis Method
How would the alternatives impact employment and income including tax revenue and property taxes in Carbon, Emery, Sanpete Counties in Utah?	Number of employees for mining and the processing plant, average salaries, compared to community employment and salary from the most recent United States Census.
How would the alternatives impact production royalties in Utah?	Dollars paid in state taxes, property taxes, production royalties. Dollars collected by BLM and distributed to the state and county.

3.8.3 Affected Environment

3.8.3.1 Socioeconomic Data and Analysis

The socioeconomic analysis area is within a relatively sparsely populated region that includes a considerable amount of federally owned lands, including the MLNF. The MLNF stretches from central Utah to southeastern Utah and into Colorado. The 1,413,111–acre forest is managed for multiple uses such as range, timber, minerals, water, wildlife, and recreation. The nearest town to the socioeconomic analysis area is Scofield, Utah which had a population of 26 at the 2020 United States Census (US

Census Bureau, 2025). Other communities include Fairview, Mount Pleasant, and Huntington. The total population of the three counties within the analysis area in 2023 was 59,623 people.

3.8.3.2 Way of Life and Culture

The area within the immediate vicinity of the mine includes primarily rural to semi–rural lands surrounded by or within the MLNF. The greater study area, as previously detailed, includes Sanpete, Carbon, and Emery counties. The mining industry has deeply influenced the cultural identity and traditions of the communities. The legacy of coal mining can be seen in the local culture, contributing to community solidarity and shared history (Carbon County, Utah, 2017).

Approximately 77% of survey respondents in Carbon and Emery Counties support increasing, or maintaining the current level of, mineral exploration and extraction activities on public lands (Krannich, 2008). Carbon County's RMP (Carbon County, Utah, 2021) states that Utah's growing population requires ever–increasing supplies of affordable industrial minerals for construction, agricultural, and industrial uses to maintain the present quality of life.

There are also a variety of outdoor recreational areas and opportunities throughout the socioeconomic analysis area. Within the area adjacent to current underground mining activities, the MLNF has numerous opportunities for fishing, camping, hunting, and recreational cycling. Mineral resources within the study area have been mined underground which allow the surface recreational resources to be used without substantial disruption.

3.8.3.3 Land Ownership Data

There are 4.8 million acres within the socioeconomic analysis area (**Table 3.8–2)**. Of those, 3.2 million acres (67.4%) are federally owned lands. Emery County has the largest total federal land area (2.2 million acres or 79%) in the socioeconomic analysis area followed by Sanpete County (527,302 acres / 52%).

The BLM manages 54% of the analysis area's total land, which is approximately 2.6 million acres. Emery County contains the largest percentage of BLM landholdings at 72% (approximately 2 million acres). The FS manages 633,716 acres (13%) of the study area's total land base. There are approximately 1 million acres (21.6%) of the study area under private ownership. Tribal lands include 60,030 acres (1.2%) of the total socioeconomic analysis area.

In FY 2023 the federal government paid state and local governments associated with the study area a total of $4,757,953. Of those payments, $4,459,149 (93.7%) were Payments in Lieu of Taxes (PILT) (USDOI, 2024).

3.8.3.4 Population/Demographics Data

In 2022, the total estimated population of the study area was 60,394 people. Study area population increased by 6,918 people during the period of 2000 to 2022 (**Table 3.8–3**). This represents an increase of 11.5% over that period; although it should be noted that population decreased in Emery County by 6.9% during this time. Employment has increased in Carbon and Sanpete counties but has decreased in Emery County. Per capita income has increased by 36% from 2000 to 2022.

Table 3.8–2. Land Ownership Data

Land Ownership, Acres	Carbon County, UT	Emery County, UT	Sanpete County, UT	Combined Counties	Utah
Total Area	946,977	2,855,882	1,023,983	4,826,842	53,239,486
Private Lands	371,453	234,413	436,716	1,042,582	10,398,219
Federal Lands	450,267	2,275,232	527,302	3,252,801	34,911,445
BLM	420,045	2,061,856	134,994	2,616,895	22,764,908
FS	30,222	211,186	392,308	633,716	8,146,520
Other Federal	0	2,190	0	2,190	3,944,528
Tribal Lands	21,441	10,486	28,103	60,030	1,178,936
State, City, County, Other	174	0	0	174	3,377,949
% of Total					
Private Lands	39.2%	8.2%	42.6%	21.6%	19.5%
Federal Lands	47.5%	79.7%	51.5%	67.4%	65.6%
BLM	44.4%	72.2%	13.2%	54.2%	42.8%
FS	3.2%	7.4%	38.3%	13.1%	15.3%
Other Federal	0.0%	0.1%	0.0%	0.0%	7.4%
Tribal Lands	2.3%	0.4%	2.7%	1.2%	2.2%
State, City, County, Other	0.0%	0.0%	0.0%	0.0%	6.3%

Source: (BLM, 2025)

Table 3.8–3. Population, Employment, and Per Capita Income

	Carbon County	Emery County	Sanpete County	Combined Counties	Utah
Population					
Population, 2000	20,491	10,850	22,806	54,147	2,244,502
Population, 2022	20,571	10,099	29,724	60,394	3,380,800
Employment					
Employment, 2000	11,701	5,368	10,361	27,430	1,380,538
Employment, 2022	11,779	5,360	14,726	31,865	2,367,996
Per Capita Income					
Per Capita Income, 2000 (2024 $s)	$39,884	$33,358	$28,350	$33,718	$44,022
Per Capita Income, 2022 (2024 $s)	$48,570	$42,413	$45,048	$45,807	$63,738

Source: (BLM, 2025)

3.8.3.5 Jobs, Wages by Industry, Income, and Poverty Data

The total number of full– and part–time study area jobs in 2022 was 31,865 jobs (**Table 3.8–4)**. Non–services jobs were estimated to represent 24.3% of the total jobs. Government is the largest employment sector within the study area, representing 6,281 jobs. Within the services–related sector, mining sector jobs totaled 1,232 within the study area, which represents 3.8% of all jobs within the study area.

In terms of industry growth, mining industry job numbers were not reported but are estimated by the BLM. From 2001 to 2022, there was estimated to be an increase in the study area of 34 jobs. Throughout the study area, there was an increase in 5,049 jobs over the same time period across all industry sectors.

Table 3.8–4 shows average annual wages by industry for wage and salary jobs within the study area. It is important to note that the data is not broken out by county. The average annual wage for the study area is $47,934 compared to the national average of $74,531. Thus, study area wages are 55% below the national average.

For the mining industry, the average annual wage is $94,384 within the study area. Wages within the mining industry are therefore 97% greater than the average wage within the study area. As shown in **Table 3.8–4**, the average wage for mining jobs is the highest within the study area by a relatively high margin. The nearest comparable wage is the federal government, which is $74,420. Although not shown, it is also noted that 20.5% of the study area has received a bachelor's degree or higher, compared to the national average of 35%.

Table 3.8–4. Employment and Wages by Industry

Employment and Wages in 2023, Aggregated Region	Wage & Salary Employment	% of Total Wage & Salary Employment	Avg. Annual Wages (2024 $s)	Utah Avg. Annual Wages (2024 $s)
Total	21,621		$47,934	$65,770
Private	15,623	72.3%	$47,989	$65,893
Non–Services Related	4,713	21.8%	$61,529	$72,131
Natural Resources and Mining	1,347	6.2%	$84,010	$79,552
Agriculture, forestry, fishing & hunting	342	1.6%	$53,525	$43,343
Mining (incl. fossil fuels)	1,005	4.6%	$94,384	$100,134
Construction	1,509	7.0%	$52,292	$68,433
Manufacturing (Incl. forest products)	1,857	8.6%	$52,727	$74,569
Services Related	10,512	48.6%	$40,708	$64,225
Trade, Transportation, and Utilities	3,793	17.5%	$44,255	$58,065
Information	312	1.4%	$64,480	$115,907
Financial Activities	619	2.9%	$44,941	$92,115
Professional and Business Services	1,120	5.2%	$43,672	$87,359
Education and Health Services	2,413	11.2%	$43,342	$56,744
Leisure and Hospitality	1,651	7.6%	$16,760	$27,298
Other Services	604	2.8%	$51,263	$47,361
Unclassified	0	0.0%	na	$174,277
Government	5,998	27.7%	$47,790	$65,071
Federal Government	287	1.3%	$74,420	$85,245
State Government	1,950	9.0%	$56,935	$78,130
Local Government	3,761	17.4%	$41,017	$51,841

Source: (BLM, 2025)

The United States Census Bureau uses a set of income thresholds that vary by family size and composition to define who is living in poverty. As shown in **Table 3.8–5**, the percentage of people living below the poverty level is 15.1% within the study area, compared to the state average of 8.6%. In addition, the number of low–income people is 38.4% compared to the state average of 23.3%.

Table 3.8–5. Poverty and Low–Income Individuals￼5

Poverty, 2023*	Carbon County	Emery County	Sanpete County	Combined Counties	Utah
Population for whom poverty status is determined	20,116	9,868	26,616	56,600	3,278,204
Families	5,281	2,512	6,732	14,525	801,260
People below poverty	3,377	1,112	4,078	8,567	280,516
Families below poverty	635	170	616	1,421	45,507
Low–income people	8,059	3,058	10,637	21,754	763,145
% of Total					
People below poverty	16.8%	11.3%	15.3%	15.1%	8.6%
Families below poverty	12.0%	6.8%	9.2%	9.8%	5.7%
Low–income people	40.1%	31.0%	40.0%	38.4%	23.3%

Source: (BLM, 2025) (Shaded cells have a "medium reliability" due to data with coefficients of variation between 12 and 40% and should be interpreted with caution.)

Table 3.8–6 shows the economic contributions to the state economy stemming from specific resource uses on BLM lands. These reflect statewide contributions, not contributions to a county or local economy. The metrics reported include the following:

- Jobs: an annual average of the number of full–time, part–time, and seasonal employees. Jobs do not equal full–time equivalents.
- LI: includes employee wages, salaries, and benefits.
- Output: the market value of production of a good or service. Output can also be expressed in terms of total sales value, or in terms of the cost to produce a good or service.

Economic contributions, measured as output or jobs or LI, should not be described as an economic benefit. An economic benefit is a measure of preferences and values, whereas an economic contribution is a measure of economic activity and the ripple effects of spending. Of note, coal represented 34.2% of the total output.

Table 3.8–6. Jobs, Labor Income, and Output by Resource, FY 23, PFO (BLM)

Resource Group	Direct Jobs	Total Jobs	Direct LI	Total LI	Direct Output	Total Output
Oil and Gas	310	953	$14.7 M	$56.6 M	$154.6 M	$274.8 M
Coal	236	555	$20.5 M	$38.9 M	$118.6 M	$186.8 M
Nonenergy Minerals	1	1	$14.3 K	$41.5 K	$127.8 K	$229.6 K
Recreation	414	602	$13.0 M	$22.5 M	$40.2 M	$73.1 M
Grazing	95	154	$865.9 K	$2.9 M	$3.9 M	$10.1 M
Timber	0	0	$4.7 K	$9.3 K	$18.0 K	$33.1 K

5 Many Federal agencies, such as the EPA, define low-income individuals as those who live at or below 200% of the poverty threshold (BLM 2025).

Resource Group	Direct Jobs	Total Jobs	Direct LI	Total LI	Direct Output	Total Output
Total Contributions to the State Economy	**1.1 K**	**2.3 K**	**$49.0 M**	**$120.9 M**	**$317.4 M**	**$545.2 M**

Source: BLM PFO FY 2023 Economic Contributions

Skyline Mine Operations

As discussed in Chapter 1, CFC is proposing an expansion and extension of the lease on their current coal mining operations. The mine is in Carbon, Emery, and Sanpete Counties in Utah. The mine currently employs 410 workers and produced 2,786,080 tons of coal in 2023, amounting to 42.2% of total Utah coal production. The mine is an important contributor to the fiscal health of both counties, having paid $1,223,749 to Carbon County and $614 to Emery County in 2024. There are no surface facilities in Sanpete County so no taxes were paid. The taxes paid are in addition to federal mineral lease payments distributed to the Counties, discussed at the end of this document.

Past and present projects affecting socioeconomics within or surrounding the proposed lease tracts include timber sale projects as identified in **Table 3.1–2.** All of these contribute to the current affected environment.

3.8.4 Environmental Consequences

The information in this section is based on an economic modeling analysis conducted by the BLM. IMpact Analysis for PLANning (IMPLAN) is a regional economic model that provides a mathematical accounting of the flow of money, goods, and services through a region's economy. The model provides estimates of how a specific economic activity translates into jobs and income for the region. It includes the ripple effect (also called the "multiplier effect") of changes in economic sectors that may not be directly impacted by management actions but are linked to industries that are directly impacted. In IMPLAN, these ripple effects are termed indirect impacts (for changes in industries that sell inputs to the industries that are directly impacted) and induced impacts (for changes in household spending as household income increases or decreases due to the changes in production).

Input–output models describe commodity flows from producers to intermediate and final consumers. The total industry purchases are equal to the value of the commodities produced. Industries producing goods and services for final demand purchase goods and services from other producers. These other producers, in turn, purchase goods and services. This buying of goods and services continues until leakages from the region stop the cycle. The resulting sets of multipliers describe the change of output for regional industries caused by a change in final demand in an industry.

IMPLAN not only examines direct contributions but also indirect and induced contributions. *Indirect* employment and LI contributions occur when a sector purchases supplies and services from other industries in order to produce their product. For example, a local restaurant may purchase food supplies from a local wholesaler. *Induced* contributions are the employment and LI generated as a result of spending the new household income generated by direct and indirect employment. For example, employees of the restaurant and food supplies wholesaler spend part of their earnings on other locally provided goods and services (e.g., rent, entertainment, groceries for personal consumption, etc.).

Among other things, IMPLAN computes values for the following:

- *Employment:* A job in IMPLAN = the annual average of monthly jobs in that industry. Thus, 1 job lasting 12 months = 2 jobs lasting 6 months each = 3 jobs lasting 4 months each. A job can be either full–time or part–time.
- *Labor income:* LI includes all forms of employment income, including Employee Compensation (wages and benefits) and Proprietor Income.
- *Value added:* The difference between an industry's or an establishment's total output and the cost of its intermediate inputs. It equals gross output (sales or receipts and other operating income, plus inventory change) minus intermediate inputs (consumption of goods and services purchased from other industries or imported). Value added consists of compensation of employees, taxes on production and imports less subsidies (formerly indirect business taxes and nontax payments), and gross operating surplus.

  An example of value added would be a sculptor chiseling a piece of granite. The cost of the granite is relatively low. The cost of the sculptor's time (especially if an employee) may also be relatively low. The value added, however, could be quite high, assuming that the finished product sells for more than the inputs (granite and wages).
- *Output*: Output represents the value of industry production. In IMPLAN these are annual production estimates for the year of the data set and are in producer prices. For manufacturers this would be sales plus/minus change in inventory. For service sectors output = sales; for retail and wholesale trade, output = gross margin and not gross sales.

In the tables which follow, the impacts likely understate value added and output. This is because the mine's owner is a privately held company, and BLM lacks certain proprietary information which affects both of these outputs. Additionally, IMPLAN calculations assume a relatively constant underlying economic structure in the analysis area. As one moves further out in time, this assumption may lose its validity estimates for more than five years in the future need to be used with caution. Lastly, for all the IMPLAN output tables, induced impacts are roughly proportionate to employees' county of residence, since that is where most of their spending will take place. For example, if 50% of the work force is from Carbon, approximately 50% of the induced impact would occur in that county.

3.8.4.1 Alternative 1: No Action

Employment and Income

Employment would continue to January 2032 under Alternative 1 This alternative would maintain approximately 400 direct employment positions through 2030, slightly decreasing the number of positions until mine closure in 2032. Businesses that currently provide goods and services in support of activities are expected to continue to provide those goods and services during operation under this alternative.

Businesses that currently provide goods and services in support of activities would be expected to continue to provide those goods and services during operation of this alternative. These types of business are captured under the "indirect" row within **Table 3.8–7**. *Induced* contributions are the employment and LI generated as a result of spending the new household income generated by direct and indirect employment. For example, employees of the mine (and business that support the mine) spend part of their earnings on other locally provided goods and services (e.g., rent, entertainment, groceries for personal consumption, etc.).

Direct employment and income from mining and manufacturing would be continued for another 7 years of active mining. **Table 3.8–7** shows that Alternative 1 would result in the continued generation of approximately $200 million in economic output in 2025; however, compared to the other alternatives it begins to decrease immediately in 2026 and decreases further through 2032 as mining activities ramp down.

Based on the information provided by CFC and calculated by the BLM, this would total more than $1.1 billion in economic output over the life of the mine. Compared to the other alternatives, Alternative 1 would generate the least economic output.

Table 3.8–7. Economic Indicators by Impact for Alternative 1

	Impact	Employment	Labor Income	Value Added	Output
2025	1 – Direct	437.00	$52,003,000	$109,261,155	$161,731,000
	2 – Indirect	92.16	$5,482,057	$13,867,125	$26,958,670
	3 – Induced	89.65	$3,021,008	$10,215,124	$16,338,965
	Total	618.81	$60,506,065	$133,343,403	$205,028,635
2026	1 – Direct	412.00	$50,287,421	$101,972,374	$149,335,087
	2 – Indirect	83.80	$5,005,057	$12,647,910	$24,550,967
	3 – Induced	86.71	$2,920,317	$9,885,703	$15,810,223
	Total	582.51	$58,212,795	$124,505,987	$189,696,276
2027	1 – Direct	410.00	$48,865,026	$95,686,109	$138,591,701
	2 – Indirect	76.50	$4,586,599	$11,578,732	$22,443,015
	3 – Induced	84.30	$2,837,634	$9,616,314	$15,377,644
	Total	570.80	$56,289,259	$116,881,155	$176,412,360
2028	1 – Direct	410.00	$47,714,488	$92,789,931	$134,095,865
	2 – Indirect	74.23	$4,467,639	$11,266,780	$21,808,155
	3 – Induced	82.91	$2,790,860	$9,458,509	$15,125,180
	Total	567.15	$54,972,987	$113,515,220	$171,029,200
2029	1 – Direct	385.00	$49,000,137	$92,620,531	$132,593,097

	Impact	Employment	Labor Income	Value Added	Output
	2 – Indirect	72.43	$4,375,127	$11,021,897	$21,306,047
	3 – Induced	85.34	$2,871,213	$9,739,156	$15,572,585
	Total	542.77	$56,246,477	$113,381,584	$169,471,729
2030	1 – Direct	291.00	$36,164,435	$74,700,496	$110,013,915
	2 – Indirect	64.53	$3,911,902	$9,844,495	$19,006,039
	3 – Induced	64.92	$2,188,065	$7,396,131	$11,830,441
	Total	420.45	$42,264,402	$91,941,122	$140,850,395
2031	1 – Direct	75.00	$9,426	$29,187,3121	$55,925,149
	2 – Indirect	49.28	$2,998,064	$7,536,7541	$14,532,985
	3 – Induced	6.43	$233,229	$676,1871	$1,100,257
	Total	130.70	$3,240,719	$37,400,253	$71,558,391
2032	1 – Direct	25.00	$264,916	$1,663,201	$2,944,553
	2 – Indirect	2.37	$145,111	$364,715	$702,331
	3 – Induced	0.73	$25,302	$81,176	$130,568
	Total	28.10	$435,330	$2,109,092	$3,777,452
				Total:	**$1,127,824,438**

Revenue

The IMPLAN model calculated tax revenue to the analysis area from Alternative 1. **Table 3.8–8** shows that the tax revenue contributed to the counties in the analysis area was estimated to be approximately $28 million for the years 2025 through 2032. This represents the smallest amount of tax revenue generated in the analysis area. In terms of total revenue, Alternative 1 would generate approximately $129 million through 2032, which is the least amount of tax revenue contributed compared to the other alternatives. The closest amount in comparison is Alternative 4, which would result in $158 million.

Table 3.8–8. Tax Revenue Results for Alternative 1

Year	Impact	All County	State	Federal	Total
2025	1 – Direct	$3,423,281	$2,815,868	$12,613,280	$18,852,429
	2 – Indirect	$1,068,099	$599,618	$1,548,292	$3,216,008
	3 – Induced	$1,004,299	$484,081	$957,931	$2,446,310
	Total	$5,495,679	$3,899,567	$15,119,503	$24,514,748
2026	1 – Direct	$3,092,052	$2,618,124	$12,027,919	$17,738,095
	2 – Indirect	$975,347	$547,961	$1,413,535	$2,936,843
	3 – Induced	$972,689	$468,043	$926,246	$2,366,977

Year	Impact	All County	State	Federal	Total
	Total	$5,040,087	$3,634,128	$14,367,700	$23,041,915
2027	1 – Direct	$2,803,024	$2,447,254	$11,531,426	$16,781,704
	2 – Indirect	$893,861	$502,571	$1,295,304	$2,691,737
	3 – Induced	$946,920	$454,883	$900,252	$2,302,055
	Total	$4,643,805	$3,404,709	$13,726,982	$21,775,496
2028	1 – Direct	$2,698,915	$2,371,328	$11,230,367	$16,300,609
	2 – Indirect	$870,663	$489,931	$1,261,646	$2,622,239
	3 – Induced	$931,429	$447,392	$885,429	$2,264,250
	Total	$4,501,007	$3,308,650	$13,377,441	$21,187,098
2029	1 – Direct	$2,613,461	$2,359,249	$11,410,328	$16,383,038
	2 – Indirect	$852,535	$480,141	$1,235,446	$2,568,122
	3 – Induced	$959,649	$460,346	$911,105	$2,331,100
	Total	$4,425,646	$3,299,736	$13,556,879	$21,282,260
2030	1 – Direct	$2,304,635	$1,921,727	$8,712,713	$12,939,075
	2 – Indirect	$762,112	$429,589	$1,104,563	$2,296,265
	3 – Induced	$726,971	$350,589	$693,759	$1,771,318
	Total	$3,793,718	$2,701,905	$10,511,035	$17,006,658
2031	1 – Direct	$1,728,817	$830,580	$1,342,197	$3,901,595
	2 – Indirect	$583,913	$329,432	$846,465	$1,759,810
	3 – Induced	$58,573	$36,383	$71,481	$166,437
	Total	$2,371,304	$1,196,395	$2,260,143	$5,827,842
2032	1 – Direct	$83,006	$45,837	$115,091	$243,934
	2 – Indirect	$28,292	$15,964	$40,978	$85,233
	3 – Induced	$7,673	$4,016	$7,927	$19,615
	Total	$118,970	$65,817	$163,995	$348,782
	Total	**$28,077,485**	**$20,350,895**	**$80,895,016**	**$129,323,395**

Social Cost of Greenhouse Gas Emissions

Under Alternative 1, using the IWG approach, there would be no SC–GHG associated with mining, commuting, transportation, and combustion as the Federal coal would not be leased. Although no additional GHG emissions associated with mining the Federal coal leases would occur, emissions from mining private coal would still occur, as the mine would still produce privately owned coal. GHG emissions associated with mining private coal would remain the same as current annual emissions, so no additional impacts to climate change, including SC–GHG, would be anticipated from this alternative. For more detailed information please see **Appendix F**.

3.8.4.2 Alternative 2: Modify the Flat Canyon Tract and Lease the Little Eccles Tract

Employment and Income

Employment would extend to 2033 under Alternative 2. As previously detailed, the wages within the mining industry are 97% greater than the average wage within the study area. CFC has stated that the workforce and equipment currently mining would be used under this alternative. This alternative would maintain approximately 410 direct employment positions through 2030, slightly decreasing the number of positions until mine closure in 2033 (**Table 3.8–9**).

Direct employment and income from mining would be extended for another 8 years of active mining. Alternative 2 would result in the continued generation of approximately $60 million in personal income and benefits per year, slightly decreasing in years 2031 to 2033 as mining activities ramp down. Based on the information provided by CFC and calculated by the BLM, this would total more than $1.5 billion in economic output over the life of the mine.[6] Compared to Alternative 1, No Action Alternative, this represents an increase in $396 million of economic output. Alternative 2 would result in the highest amount of economic output compared to any other alternative.

Table 3.8–9. Economic Indicators by Impact for Alternative 2

	Impact	Employment	Labor Income	Value Added	Output
2025	1 – Direct	437.0	$52,003,000	$109,261,155	$161,731,000
	2 – Indirect	92.2	$5,482,057	$13,867,125	$26,958,670
	3 – Induced	89.6	$3,021,008	$10,215,124	$16,338,965
	Total	618.8	$60,506,065	$133,343,403	$205,028,635
2026	1 – Direct	412.0	$50,287,421	$102,957,301	$151,222,574
	2 – Indirect	85.4	$5,100,452	$12,888,959	$25,018,928
	3 – Induced	86.9	$2,927,654	$9,907,050	$15,844,943
	Total	584.3	$58,315,527	$125,753,310	$192,086,444
2027	1 – Direct	410.0	$48,865,026	$105,475,122	$157,351,104
	2 – Indirect	92.5	$5,545,826	$14,000,148	$27,136,565
	3 – Induced	86.3	$2,911,558	$9,831,206	$15,727,197
	Total	588.8	$57,322,411	$129,306,476	$200,214,866
2028	1 – Direct	410.0	$47,714,488	$102,714,282	$153,114,627
	2 – Indirect	90.6	$5,451,617	$13,748,083	$26,611,137
	3 – Induced	85.0	$2,866,836	$9,679,189	$15,484,181
	Total	585.6	$56,032,941	$126,141,554	$195,209,944
2029	1 – Direct	410.0	$52,181,964	$106,163,340	$155,630,434
	2 – Indirect	89.6	$5,414,670	$13,640,568	$26,368,237
	3 – Induced	92.5	$3,116,100	$10,541,190	$16,859,758
	Total	592.1	$60,712,733	$130,345,099	$198,858,429
2030	1 – Direct	410.0	$50,953,327	$102,683,079	$150,086,843
	2 – Indirect	86.6	$5,251,716	$13,215,992	$25,515,478
	3 – Induced	90.9	$3,062,715	$10,362,285	$16,573,335
	Total	587.5	$59,267,758	$126,261,356	$192,175,656
2031	1 – Direct	387.0	$46,962,563	$97,442,212	$143,700,415
	2 – Indirect	85.3	$5,187,733	$13,040,936	$25,147,420

[6] PDF (confidential) provided by CFC and IMPLAN modeling conducted by BLM in PDFs

	Impact	Employment	Labor Income	Value Added	Output
	3 – Induced	84.9	$2,861,350	$9,674,031	$15,471,762
	Total	557.1	$55,011,645	$120,157,179	$184,319,597
2032	1 – Direct	291.0	$35,097,648	$75,714,604	$112,934,900
	2 – Indirect	69.2	$4,225,784	$10,611,329	$20,439,184
	3 – Induced	64.9	$2,188,651	$7,382,465	$11,811,189
	Total	425.1	$41,512,083	$93,708,398	$145,185,273
2033	1 – Direct	50.0	$2,604,210	$5,707,346	$8,550,977
	2 – Indirect	5.3	$324,835	$815,341	$1,570,474
	3 – Induced	4.8	$163,275	$550,295	$880,489
	Total	60.2	$3,092,321	$7,072,983	$11,001,940
				Total:	**$1,524,080,784**

Revenue

The IMPLAN model calculated tax revenue to the analysis area for Alternative 2. As shown in **Table 3.8–10**, under this alternative, the tax revenue contributed to the analysis area was estimated to be approximately $41 million for the years 2025 through 2033. This is approximately $9.5 million more in tax revenue than that under Alternative 1, the No Action Alternative. In terms of total revenue, Alternative 2 would generate approximately $183 million of tax revenue through 2033, which is approximately $53 million more than Alternative 1, the No Action Alternative. Alternative 2 would result in the highest amount of tax revenue compared to the other alternatives.

Table 3.8–10. Tax Revenue Results for Alternative 2

Year	Impact	All County	State	Federal	Total
2025	1 – Direct	$3,423,281	$2,815,868	$12,613,280	$18,852,429
	2 – Indirect	$1,068,099	$599,618	$1,548,292	$3,216,008
	3 – Induced	$1,004,299	$484,081	$957,931	$2,446,310
	Total	$5,495,679	$3,899,567	$15,119,503	$24,514,748
2026	1 – Direct	$3,150,410	$2,646,153	$12,073,165	$17,869,728
	2 – Indirect	$993,934	$558,405	$1,440,476	$2,992,815
	3 – Induced	$974,544	$469,188	$928,496	$2,372,228
	Total	$5,118,887	$3,673,746	$14,442,138	$23,234,771
2027	1 – Direct	$3,383,031	$2,725,837	$11,981,118	$18,089,986
	2 – Indirect	$1,080,842	$607,707	$1,566,198	$3,254,747
	3 – Induced	$965,581	$466,421	$922,921	$2,354,923
	Total	$5,429,454	$3,799,965	$14,470,238	$23,699,656
2028	1 – Direct	$3,286,940	$2,653,762	$11,686,276	$17,626,978
	2 – Indirect	$1,062,460	$597,864	$1,539,515	$3,199,840
	3 – Induced	$950,579	$459,248	$908,723	$2,318,550
	Total	$5,299,979	$3,710,874	$14,134,515	$23,145,368
2029	1 – Direct	$3,229,235	$2,726,698	$12,497,105	$18,453,038

Year	Impact	All County	State	Federal	Total
	2 – Indirect	$1,055,137	$594,252	$1,528,989	$3,178,378
	3 – Induced	$1,036,672	$499,358	$988,184	$2,524,213
	Total	$5,321,044	$3,820,308	$15,014,278	$24,155,629
2030	1 – Direct	$3,095,099	$2,634,590	$12,157,810	$17,887,499
	2 – Indirect	$1,023,171	$576,760	$1,482,870	$3,082,801
	3 – Induced	$1,019,195	$490,818	$971,292	$2,481,304
	Total	$5,137,465	$3,702,168	$14,611,971	$23,451,604
2031	1 – Direct	$3,018,674	$2,507,970	$11,334,282	$16,860,926
	2 – Indirect	$1,010,405	$570,086	$1,464,687	$3,045,178
	3 – Induced	$951,026	$457,985	$907,331	$2,316,342
	Total	$4,980,105	$3,536,041	$13,706,300	$22,222,446
2032	1 – Direct	$2,427,300	$1,956,610	$8,603,517	$12,987,426
	2 – Indirect	$822,692	$464,606	$1,192,988	$2,480,285
	3 – Induced	$724,527	$350,545	$693,600	$1,768,672
	Total	$3,974,518	$2,771,760	$10,490,105	$17,236,384
2033	1 – Direct	$185,400	$147,723	$642,479	$975,602
	2 – Indirect	$63,145	$35,699	$91,703	$190,547
	3 – Induced	$53,976	$26,147	$51,733	$131,856
	Total	$302,521	$209,568	$785,916	$1,298,005
	Total	**$41,059,651**	**$29,123,998**	**$112,774,963**	**$182,958,612**

Social Cost of Greenhouse Gas Emissions

Under Alternative 2, using the IWG approach, the SC–GHG associated with mining, commuting, transportation, and combustion discounted back to 2025 would be from 0.2 to 1.7 billion dollars (2020 dollars) depending on the discount rate. Using the EPA approach, the SC–GHG associated with mining, commuting, transportation, and combustion discounted back to 2025 would be from 1.6 to 4.4 billion dollars (2023 dollars) depending on the discount rate. GHG emissions associated with mining private coal would be nearly the same as described in Alternative 1, so differences in climate change impacts, including SC–GHG, between alternatives would primarily be from mining the Federal coal. For more detailed information please see **Appendix F**.

3.8.4.3 Alternative 3: Only Modify the Flat Canyon Lease Tract

Employment and Income

Employment would extend to September 2032 under Alternative 3. CFC has stated that the workforce and equipment currently mining the deposits would be used under this alternative. This alternative would maintain approximately 400 direct employment positions through 2030, slightly decreasing the number of positions until mine closure in 2032 (**Table 3.8–11**). Businesses that currently provide goods and services in support of activities are expected to continue to provide those goods and services during operation under this alternative.

Direct employment and income from mining would be extended for another 7 years of active mining. Alternative 3 would result in the continued generation of approximately $200 million in economic output, slightly decreasing in years 2031 to 2032 as mining activities ramp down. Based on the information provided by CFC and calculated by the BLM, this would total more than $1.3 billion in economic output over the life of the mine, which is approximately $200 million less than that under Alternative 2; however, it is approximately $196 million more than Alternative 1, No Action Alternative.

Table 3.8–11. Economic Indicators by Impact for Alternative 3

	Impact	Employment	Labor Income	Value Added	Output
2025	1 – Direct	437.0	$52,003,000	$109,261,155	$161,731,000
	2 – Indirect	92.2	$5,482,057	$13,867,125	$26,958,670
	3 – Induced	89.6	$3,021,008	$10,215,124	$16,338,965
	Total	618.8	$60,506,065	$133,343,403	$205,028,635
2026	1 – Direct	412.0	$50,287,421	$102,957,301	$151,222,574
	2 – Indirect	85.4	$5,100,452	$12,888,959	$25,018,928
	3 – Induced	86.9	$2,927,654	$9,907,050	$15,844,943
	Total	584.3	$58,315,527	$125,753,310	$192,086,444
2027	1 – Direct	410.0	$48,865,026	$104,634,287	$155,739,750
	2 – Indirect	91.1	$5,463,454	$13,792,202	$26,733,503
	3 – Induced	86.2	$2,905,211	$9,812,754	$15,697,181
	Total	587.3	$57,233,690	$128,239,243	$198,170,435
2028	1 – Direct	410.0	$47,714,488	$101,079,495	$149,981,763
	2 – Indirect	87.9	$5,289,522	$13,339,271	$25,819,784
	3 – Induced	84.7	$2,854,321	$9,642,837	$15,425,043
	Total	582.6	$55,858,330	$124,061,603	$191,226,590
2029	1 – Direct	410.0	$52,181,964	$103,992,093	$151,469,513
	2 – Indirect	86.0	$5,196,820	$13,091,739	$25,307,268
	3 – Induced	92.0	$3,099,245	$10,492,275	$16,780,174
	Total	588.1	$60,478,029	$127,576,107	$193,556,956
2030	1 – Direct	386.0	$47,970,694	$94,483,742	$137,107,060
	2 – Indirect	77.9	$4,721,987	$11,882,887	$22,941,617
	3 – Induced	85.1	$2,866,205	$9,705,745	$15,521,886
	Total	549.0	$55,558,885	$116,072,374	$175,570,563
2031	1 – Direct	265.0	$33,306,321	$68,726,430	$101,184,474
	2 – Indirect	59.8	$3,639,732	$9,149,711	$17,643,508
	3 – Induced	60.3	$2,033,011	$6,870,878	$10,990,466
	Total	385.1	$38,979,064	$84,747,019	$129,818,448
2032	1 – Direct	75.0	$7,141,747	$12,813,943	$18,011,793
	2 – Indirect	9.7	$589,679	$1,481,099	$2,852,578
	3 – Induced	12.6	$424,308	$1,441,281	$2,304,224
	Total	97.3	$8,155,733	$15,736,324	$23,168,595
				Total:	**$1,308,626,666**

Revenue

The IMPLAN model calculated tax revenue to the analysis area from Alternative 3. As shown in **Table 3.8–12**, under this alternative, the tax revenue contributed to the analysis area was estimated to be approximately $35 million for the years 2025 through 2032. This is approximately $6 million less in tax revenue than that under Alternative 2. In terms of total tax revenue, Alternative 3 would generate approximately $158 million through 2032, which is approximately $29 million more than Alternative 1; however, this alternative generates $24 million less than Alternative 2.

Table 3.8–12. Tax Revenue Results for Alternative 3

Year	Impact	All County	State	Federal	Total
2025	1 – Direct	$3,423,281	$2,815,868	$12,613,280	$18,852,429
	2 – Indirect	$1,068,099	$599,618	$1,548,292	$3,216,008
	3 – Induced	$1,004,299	$484,081	$957,931	$2,446,310
	Total	$5,495,679	$3,899,567	$15,119,503	$24,514,748
2026	1 – Direct	$3,150,410	$2,646,153	$12,073,165	$17,869,728
	2 – Indirect	$993,934	$558,405	$1,440,476	$2,992,815
	3 – Induced	$974,544	$469,188	$928,496	$2,372,228
	Total	$5,118,887	$3,673,746	$14,442,138	$23,234,771
2027	1 – Direct	$3,333,211	$2,701,908	$11,942,491	$17,977,610
	2 – Indirect	$1,064,788	$598,680	$1,542,936	$3,206,404
	3 – Induced	$963,978	$465,430	$920,975	$2,350,384
	Total	$5,361,977	$3,766,019	$14,406,402	$23,534,397
2028	1 – Direct	$3,190,078	$2,607,238	$11,611,176	$17,408,492
	2 – Indirect	$1,030,832	$580,073	$1,493,738	$3,104,643
	3 – Induced	$947,424	$457,295	$904,886	$2,309,605
	Total	$5,168,334	$3,644,606	$14,009,800	$22,822,740
2029	1 – Direct	$3,100,587	$2,664,907	$12,397,362	$18,162,856
	2 – Indirect	$1,012,649	$570,329	$1,467,471	$3,050,449
	3 – Induced	$1,032,431	$496,728	$983,017	$2,512,175
	Total	$5,145,667	$3,731,965	$14,847,849	$23,725,480
2030	1 – Direct	$2,784,245	$2,418,085	$11,345,591	$16,547,922
	2 – Indirect	$919,910	$518,552	$1,333,292	$2,771,754
	3 – Induced	$955,206	$459,398	$909,155	$2,323,759
	Total	$4,659,361	$3,396,035	$13,588,038	$21,643,434
2031	1 – Direct	$2,118,325	$1,767,847	$8,020,904	$11,907,077
	2 – Indirect	$708,880	$399,949	$1,027,631	$2,136,460
	3 – Induced	$675,263	$325,735	$644,571	$1,645,570
	Total	$3,502,469	$2,493,531	$9,693,107	$15,689,106
2032	1 – Direct	$340,297	$324,352	$1,631,561	$2,296,210
	2 – Indirect	$114,853	$64,846	$166,487	$346,186
	3 – Induced	$142,159	$68,048	$134,688	$344,894

Year	Impact	All County	State	Federal	Total
	Total	$597,308	$457,246	$1,932,736	$2,987,290
	Total	**$35,049,682**	**$25,062,715**	**$98,039,571**	**$158,151,968**

<u>Social Cost of Greenhouse Gas Emissions</u>

Under Alternative 3, using the IWG approach, the SC–GHG associated with mining, commuting, transportation, and combustion discounted back to 2025 would be from 0.1 to 1.0 billion dollars (2020 dollars) depending on the discount rate. Using the EPA approach, the SC–GHG associated with mining, commuting, transportation, and combustion discounted back to 2025 would be from 0.9 to 2.6 billion dollars (2023 dollars) depending on the discount rate. GHG emissions associated with mining private coal would be nearly the same as described in Alternative 1, so differences in climate change impacts, including SC–GHG, between alternatives would primarily be from mining the Federal coal. For more detailed information please see **Appendix F**.

3.8.4.4 Alternative 4: Only Lease the Little Eccles Lease Tract

Employment and Income

Employment would extend to March 2033 under Alternative 4. CFC has stated that the workforce and equipment currently mining the coal would be used under this alternative. This alternative would maintain approximately 400 direct employment positions through 2030, slightly decreasing the number of positions until mine closure in 2032. Businesses that currently provide goods and services in support of activities are expected to continue to provide those goods and services during operation under this alternative.

Direct employment and income from mining would be extended for another 8 years of active mining. As shown in **Table 3.8–13**, Alternative 4 would result in the continued generation of approximately $200 million in economic output; however, compared to Alternative 2 it begins to decrease to $193 million in 2028 and decreases further through 2033 as mining activities ramp down. Based on the information provided by CFC and calculated by the BLM, this would total more than $1.4 billion in economic output over the life of the mine. Compared to Alternative 3, Only Modify the Flat Canyon Lease Tract, this is $118 million more in economic output. However, it is $100 million less than the projected economic output under Alternative 2.

Table 3.8–13. Economic Indicators by Impact for Alternative 4

	Impact	Employment	Labor Income	Value Added	Output
2025	1 – Direct	437.0	$52,003,000	$109,261,155	$161,731,000
	2 – Indirect	92.2	$5,482,057	$13,867,125	$26,958,670
	3 – Induced	89.6	$3,021,008	$10,215,124	$16,338,965
	Total	618.8	$60,506,065	$133,343,403	$205,028,635
2026	1 – Direct	412.0	$50,287,421	$102,957,301	$151,222,574
	2 – Indirect	85.4	$5,100,452	$12,888,959	$25,018,928
	3 – Induced	86.9	$2,927,654	$9,907,050	$15,844,943

	Impact	Employment	Labor Income	Value Added	Output
	Total	584.3	$58,315,527	$125,753,310	$192,086,444
2027	1 – Direct	410.0	$48,865,026	$105,236,802	$156,894,395
	2 – Indirect	92.1	$5,522,479	$13,941,209	$27,022,325
	3 – Induced	86.3	$2,909,759	$9,825,976	$15,718,689
	Total	588.4	$57,297,264	$129,003,988	$199,635,409
2028	1 – Direct	410.0	$47,714,488	$102,197,854	$152,124,959
	2 – Indirect	89.7	$5,400,428	$13,618,993	$26,361,268
	3 – Induced	84.9	$2,862,884	$9,667,710	$15,465,506
	Total	584.6	$55,977,800	$125,484,558	$193,951,733
2029	1 – Direct	410.0	$52,181,964	$103,917,615	$151,326,786
	2 – Indirect	85.9	$5,189,350	$13,072,919	$25,270,888
	3 – Induced	92.0	$3,098,668	$10,490,597	$16,777,446
	Total	587.9	$60,469,981	$127,481,132	$193,375,120
2030	1 – Direct	386.0	$47,970,694	$98,401,133	$144,614,242
	2 – Indirect	84.5	$5,119,753	$12,883,874	$24,874,226
	3 – Induced	86.0	$2,897,030	$9,795,142	$15,667,345
	Total	556.4	$55,987,477	$121,080,149	$185,155,813
2031	1 – Direct	205.0	$24,876,810	$71,428,178	$114,086,610
	2 – Indirect	78.6	$4,783,893	$12,025,804	$23,189,857
	3 – Induced	49.5	$1,678,821	$5,596,599	$8,965,021
	Total	333.1	$31,339,524	$89,050,581	$146,241,488
2032	1 – Direct	125.0	$15,340,621	$50,053,953	$81,864,324
	2 – Indirect	59.2	$3,611,438	$9,068,710	$17,467,430
	3 – Induced	32.1	$1,093,845	$3,624,123	$5,809,146
	Total	216.3	$20,045,904	$62,746,786	$105,140,900
2033	1 – Direct	50.0	$1,562,526	$3,491,115	$5,258,422
	2 – Indirect	3.3	$201,845	$506,655	$975,799
	3 – Induced	2.9	$98,501	$331,731	$530,822
	Total	56.2	$1,862,872	$4,329,501	$6,765,043
				Total:	**$1,427,380,585**

Revenue

The IMPLAN model calculated tax revenue to the analysis area for Alternative 4. **Table 3.8–14** shows that the tax revenue contributed to the analysis area was estimated to be approximately $39 million for the years 2025 through 2033. This is approximately $2 million less in tax revenue than that under Alternative 2. In terms of total revenue, Alternative 4 would generate approximately $168 million through 2033, which is approximately $14 million less than Alternative 2 but more than Alternatives 3 and 1.

Table 3.8–14. Tax Revenue Results for Alternative 4

Year	Impact	All County	State	Federal	Total
2025	1 – Direct	$3,423,281	$2,815,868	$12,613,280	$18,852,429
	2 – Indirect	$1,068,099	$599,618	$1,548,292	$3,216,008
	3 – Induced	$1,004,299	$484,081	$957,931	$2,446,310
	Total	$5,495,679	$3,899,567	$15,119,503	$24,514,748
2026	1 – Direct	$3,150,410	$2,646,153	$12,073,165	$17,869,728
	2 – Indirect	$993,934	$558,405	$1,440,476	$2,992,815
	3 – Induced	$974,544	$469,188	$928,496	$2,372,228
	Total	$5,118,887	$3,673,746	$14,442,138	$23,234,771
2027	1 – Direct	$3,368,910	$2,719,055	$11,970,170	$18,058,135
	2 – Indirect	$1,076,292	$605,148	$1,559,605	$3,241,045
	3 – Induced	$965,127	$466,140	$922,370	$2,353,637
	Total	$5,410,329	$3,790,343	$14,452,144	$23,652,816
2028	1 – Direct	$3,256,341	$2,639,065	$11,662,552	$17,557,959
	2 – Indirect	$1,052,484	$592,251	$1,525,060	$3,169,794
	3 – Induced	$949,583	$458,631	$907,511	$2,315,725
	Total	$5,258,408	$3,689,947	$14,095,124	$23,043,478
2029	1 – Direct	$3,096,174	$2,662,788	$12,393,940	$18,152,902
	2 – Indirect	$1,011,194	$569,510	$1,465,361	$3,046,064
	3 – Induced	$1,032,285	$496,638	$982,840	$2,511,763
	Total	$5,139,653	$3,728,935	$14,842,141	$23,710,729
2030	1 – Direct	$3,016,354	$2,529,569	$11,525,550	$17,071,473
	2 – Indirect	$997,424	$562,253	$1,445,607	$3,005,284
	3 – Induced	$962,952	$464,208	$918,603	$2,345,762
	Total	$4,976,730	$3,556,030	$13,889,760	$22,422,519
2031	1 – Direct	$2,772,886	$1,892,321	$6,914,058	$11,579,265
	2 – Indirect	$931,732	$525,701	$1,350,669	$2,808,101
	3 – Induced	$544,595	$268,307	$530,575	$1,343,477
	Total	$4,249,213	$2,686,329	$8,795,302	$15,730,844
2032	1 – Direct	$2,065,845	$1,337,872	$4,539,590	$7,943,307
	2 – Indirect	$703,096	$397,059	$1,019,552	$2,119,707
	3 – Induced	$351,061	$174,620	$345,207	$870,888
	Total	$3,120,002	$1,909,550	$5,904,350	$10,933,902
2033	1 – Direct	$115,193	$90,532	$388,552	$594,276
	2 – Indirect	$39,240	$22,183	$56,983	$118,405
	3 – Induced	$32,520	$15,772	$31,204	$79,496
	Total	$186,953	$128,486	$476,739	$792,178
	Total	**$38,955,852**	**$27,062,933**	**$102,017,199**	**$168,035,985**

Social Cost of Greenhouse Gas Emissions

Under Alternative 4, using the IWG approach, the SC–GHG associated with mining, commuting, transportation, and combustion discounted back to 2025 would be from 0.1 to 1.2 billion dollars (2020 dollars) depending on the discount rate. Using the EPA approach, the SC–GHG associated with mining, commuting, transportation, and combustion discounted back to 2025 would be from 1.1 to 3.2 billion dollars (2023 dollars) depending on the discount rate. GHG emissions associated with mining private coal would be nearly the same as described in Alternative 1, so differences in climate change impacts, including SC–GHG, between alternatives would primarily be from mining the Federal coal. For more detailed information please see **Appendix F**.

Federal Government Revenues

The federal government's ONRR collects royalties and rents from leases of federal lands for production of coal, oil, gas, potash, and other minerals. Royalties for underground coal are generally 8% of the value of production. Annual rental payments for coal are $3.00 per acre. Other minerals have different royalty and rental rates, as set out in 43 CFR Chapter II, Subchapter C, Minerals Management.

Royalties and rents are collectively referred to as mineral lease revenue. The federal government also collects bonuses on certain leases. Bonus payments are one–time payments (based on competitive bids) to the Federal Government for a leased parcel of federal land.

The federal government returns approximately 50% of the total collected revenues to the state in which the mineral production occurred. In Utah, these payments are then distributed by the state by appropriation or statutory formula (Utah Code 59–21–1). The distribution is complex, with amounts going to a number of governmental entities. However, the county in which production occurs receives 40% of the state distribution. Counties can also receive additional distributions for a variety of purposes, particularly those funded by the State's Permanent Community Impact Board, but these are not directly tied to production origin.

Utah received from the federal government $186.3 million in total mineral lease payments in Fiscal Year (FY) 2024[7]. Of this amount, coal production generated $40.8 million. Of this amount, the Skyline paid approximately $8.9 million in FY2023, of which approximately half was then distributed by State code (described above) to a variety of governmental entities including the three counties in the analysis area.

The primary determinants of future mineral lease payments are annual coal production, and market prices at the time of production. The more production which occurs under the various alternatives, combined with its market value at the time determines the mineral lease revenue available for distribution. Given the volatility of commodity prices, including coal, future estimates are problematic. Generally, however, the alternative which results in the most production will produce the highest level of mineral lease revenues. As described above, Alternative 2 would produce the highest level of mineral lease revenues, with Alternatives 3 and 4 not likely generating as much revenue due to the smaller areas

[7] revenuedata.doi.gov/query-data/?dataType=Revenue&period=Calendar%20Year&calendarYear=2016%2C2017%2C2018%2C2019%2C2020%2C2021&groupBy=county&landType=Federal%20-%20not%20tied%20to%20a%20lease%2CFederal%20Offshore%2CFederal%20Onshore&stateOffshoreName=Utah&usStateName=Utah&breakoutBy=revenueType

that would be mined. Alternative 1 would generate the least amount of mineral lease revenues due to the shorter life of mine and not extending into other areas (without the LBA or LMA).

3.9 Unavoidable Adverse Impacts

Under all alternatives, unavoidable adverse environmental impacts would occur to vegetation, riparian areas, hydrologic function in the area, and wildlife as a result of mining induced subsidence, although the amount of impact would vary as previously disclosed. While subsidence is not expected to cause any appreciable loss of acreage or change in classifications of upland plant communities, individual plants would be adversely impacted by disrupting plant rooting systems, causing instability of large trees, and limited mortality to other plant species (**Section 3.6**). Temporary increases in sediment yield would occur within drainages experiencing subsidence (**Section 3.5**). These impacts to plants and water resources would also impact wildlife species that depend on them for habitat (**Section 3.7**).

Emissions of Criteria Air Pollutants and HAPs would also be unavoidable. However, as described in **Section 3.2**, those emissions are projected to remain within regulatory limits. Additionally, an increase in GHG emissions as described in **Section 3.3** would be unavoidable. Finally, mining related transportation of coal would result in unavoidable adverse impacts on and along the roadways used for coal hauling. These impacts would be consistent with those ongoing currently as a result of existing operations at the Skyline Mine but would be extended in time to coincide with the increase in life of mine.

3.10 Short term uses vs. long term productivity

Under all alternatives, the short–term use of available coal resources would be 11 to 18 months across both tracts, although the amount of impact would vary as previously disclosed. This short–term use would result in the long–term (i.e., permanent) loss of the coal resource. Effects to surface water flow and quality would occur over the life of the mine, however once reclamation is complete these resources would return to near pre–mining condition. Related to groundwater, mining activities are not anticipated to cause changes to overall water flow, therefore no long–term changes to groundwater productivity are expected. Coal mining induced subsidence would not cause long–term impacts to vegetative communities on which wildlife and livestock depend because impacts would occur over a relatively small area. The short–term extraction of coal would result in emissions of GHGs which, based on the residence time of GHGs in the atmosphere, would persist in the atmosphere in the long–term contributing to associated long term climate change related effects.

3.11 Irreversible and irretrievable effects

Under all alternatives, the energy fuels and materials used in the mining process would be irretrievably consumed because they cannot be replaced following their use, although the amount of impact would vary as previously disclosed. Likewise, since coal is a non–renewable resource, the 2.95 million tons of coal reserves mined and used would also be irretrievably consumed. Coal left in place for roof support and safety reasons would be irretrievably lost based on current mining engineering practices and technologies. The effects described above relative to subsidence would be irretrievable. Once subsidence occurs it is not possible to return the landscape to a pre–subsidence condition. No effects to the overall amount and quality of ground water available to surface water systems are anticipated, but changes in the location of ground water emergence at springs could occur due to subsidence. These effects would be irretrievable.

Disturbance to vegetation from mining activities would be irreversible. Many vegetation related disturbances would be ameliorated as quickly as one growing season following subsidence–related disturbance. The effects to surface facilities and mine water discharge would also be irreversible because they would return to approximate pre–mining conditions following the life of mine and reclamation. Finally, once the mine closes and reclamation is complete the surface water flow and quality would in time return to near pre–mining condition.

Chapter 4
Consultation and Coordination

4.1 Introduction

4.1.1 Consultation and Coordination

4.1.1.1 Endangered Species Act

Section 7 of the ESA requires federal agencies to ensure that the actions they authorize, fund, or carry out do not jeopardize the continued existence of listed species or destroy or adversely modify critical habitat. The FS coordinated with the USFWS Utah Ecological Services Field Office to ensure compliance with Section 7 of the ESA. As part of informal consultation, a Biological Assessment was prepared and submitted to the USFWS on June 3, 2025. The USFWS reviewed the Biological Assessment and issued their concurrence on June 18, 2025, documenting a no effect determination for four currently listed species and a not likely to jeopardize determination for two currently proposed species.

4.1.1.2 National Historic Preservation Act

Compliance with Section 106 of the NHPA is documented in (Potter, 2025). No historic properties were identified; therefore no historic properties will be affected through implementation of this undertaking. The Utah State Historic Preservation Officer (SHPO) concurred with this finding on July 18, 2025. Section 106 consultation letters to Tribes were sent on April 19, 2024, and July 16, 2025. Should responses be received from Tribes, the FS will consider comments and continue consultation.

4.1.1.3 Tribal Consultation

The FS sent the tribes an invitation to engage in consultation letters on December 12, 2023, and on April 19, 2024, a consultation letter was sent. FS received two responses as a result of the virtual meeting on February 15, 2024.

4.1.2 List of Preparers and their Qualifications

4.1.2.1 Agency Preparers

Table 4.1–1 lists the agency preparers.

Table 4.1–1. Agency Preparers

Preparer	Title	Responsibility
Brown, Concetta	FS, NEPA Specialist	Quality Assurance/Quality Control (QA/QC)
Chachere, Catherine	BLM, Air Resource Specialist	Air Quality and Greenhouse Gases and Noise
Conrad, Chris	BLM, Branch Chief Mining Operations	Hydrology and Geology and QA/QC
Dalebout, Jared	BLM, Hydrologist	Hydrology
Elgiar, Tyler	BLM, Air Quality Specialist	Air Quality and Greenhouse Gases and Noise
Gaddis, Ben	BLM, Branch Chief Planning and Environmental Coordination	QA/QC
Glenn, Britton	FS, Botanist	Vegetation and Pollinators
Hart, April	BLM, Planning & Environmental Coordinator	QA/QC
Hicks, Brian	OSMRE, Hydrologist	Hydrology and Geology
Hinton, Kendra	UDOGM, Environmental Scientist	Hydrology and Geology
Hocanson, Molly	BLM, Planning & Environmental Specialist	QA/QC
Howard, Stephanie	BLM, Branch Chief NEPA &GIS	QA/QC
Jeffs, Myron	FS, Recreation Program Manager	Recreation
Jensen, Carlton	FS, Rangeland Management Specialist	Livestock Grazing, Vegetation, Invasive Species, and Soils

Preparer	Title	Responsibility
Jewkes, Jeff	FS, Wildlife Biologist	Wildlife
Lafazio, Nicholas	BLM, Field Manager	QA/QC
Luke, Daniel	FS, Forest Engineer	QA/QC
Martinez–Hernandez, Roberta	OSMRE, Natural Resource Specialist	Hydrology and Geology
McNeel, Pleasant	FS, Regional Air Program Manager	Air Quality and Greenhouse Gases
Meccariello, Matt	FS, Ecosystems Staff Officer	QA/QC
Miller, Casey	FS, Assistant Forest Engineer	QA/QC
Pedraza, Tony	FS, Geologist	Hydrology and Geology
Potter, Erin	FS, Forest Archaeologist	Cultural Resources
Salow, Jeff	FS, Geologist	Hydrology and Geology
Snyder, Shannon	EPA, Environmental Scientist	QA/QC
Snyder, Teresa	BLM, Solid Minerals Branch Chief	QA/QC
Stevens, William	BLM, Outdoor Recreation Planner	Socioeconomics
Tobin, Erika	BLM, Mining Engineer	Project Description and Project Management
Van Alstine, Barbara	FS, Forest Supervisor	QA/QC
Vernon, Erik	BLM, Air Quality Specialist	Air Quality and Greenhouse Gases and Noise
Water, Elijah	BLM, District Manager	QA/QC

4.1.2.2 <u>Contracted Preparers</u>

Table 4.1–2 lists the contracted preparers.

Table 4.1–2. List of Contracted Preparers

Preparer	**Title**	**Responsibility**
Coulter, Christina	Tetra Tech, Inc., GIS Specialist	GIS
Flood, Cameo	Tetra Tech, Inc., Senior Environmental Scientist (Retired)	Former Project Manager
Karpinski, Mark	Tetra Tech, Inc., Principal Investigator/Senior Archaeologist	Cultural Resources
Kazmer, Greg	Tetra Tech, Inc., Senior Environmental Planner	Socioeconomics
McClure, Kristin	Tetra Tech, Inc., Environmental Scientist	Project Assistant, Air Quality and Greenhouse Gases, Author of Air Resource Technical Report
Muller, Ed	Tetra Tech, Inc., Senior Hydrogeologist	Hydrology and Geology
Pohs, Keith	Tetra Tech, Inc., Senior Environmental Project Manager	Project Manager
Thompson, Keith	Tetra Tech, Inc., Senior Hydrogeologist	Hydrology and Geology, Lead Author of Hydrologic Conceptual Site Model
Reid, Jill	Tetra Tech, Inc., Senior Biologist	QA/QC
Rieth, Wendy	Tetra Tech, Inc., Senior Wildlife Biologist	Biological Resources
Weidner, Michele	Tetra Tech, Inc., Senior Vegetation Ecologist	QA/QC

4.1.3 Public Involvement

A Notice of Intent (NOI) to prepare an EIS was published in the Federal Register (Federal Register, 2024) on April 15, 2024, followed by a 45–day public scoping period from this date to May 30, 2024. During this period, the lead agencies solicited comments from other agencies and the general public. A legal notice was published via ETV News (ETV News, 2024) on April 24, 2024, and a press release announcing the scoping period and public scoping meetings was posted on the BLM's ePlanning and

FS's project websites. Comments were accepted via ePlanning and via mail. The lead agencies held three public scoping meetings: two in–person meetings on May 7th and 8th, 2024 in Huntington, Utah and Mount Pleasant, Utah, respectively, and a virtual scoping meeting on May 14, 2024. During the scoping period the lead agencies received 15 comment submissions from federal, state, and local agencies, organizations, and individuals. A scoping report summarizing the pertinent comments within these submissions and the public scoping process is available at https://eplanning.blm.gov/eplanning–ui/project/2015277/510. The lead agencies considered the input received during public scoping in the development of this EIS.

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Chapter 6 Glossary

Angle of Draw – In coal mine subsidence, this angle is assumed to bisect the angle between the vertical and the angle of repose of the material and is 20 degrees for flat seams. For dipping seams, the angle of break increases, being 35.8 degrees from the vertical for a 40 degrees dip.
Air Quality Related Values – AQRVs are specific scenic, ecological, or cultural resources that may be adversely affected by air pollutants (e.g., deposition and visibility).
Carbon Dioxide Equivalents (CO_2e) – CO2e are a standardized metric used to compare the climate impacts of various greenhouse gases by converting their emissions into the amount of carbon dioxide that would cause the same amount of global warming over a specific time period, typically 100 years.
Continuous Miner (CM) – A machine that has a rotating drum that contains carbide bits that cuts the coal and gathering arms below the drum that remove the coal that has been cut along a short conveyor to a shuttle car. The shuttle car carries a certain tonnage and can move the mined coal to a location where the coal can be conveyed to the surface facilities of the mine.
Design Value – Three–year average of specific statistical measures of monitored air pollutant concentrations at a given site, calculated according to EPA methodology, used to determine whether an area meets or exceeds the National Ambient Air Quality Standards (NAAQS).
Development Mining – Usually, room and pillar mining method is utilized. The long horizontal excavations are called entries (usually numbered from left to right as you look toward the mining or advance area) and the short or perpendicular excavations are called crosscuts (example C–11). The entries and crosscuts form the rooms. The pillars remain for support. The rooms are excavated in order to get to a location to set up the longwall panels.
District – Mines are broken up into districts which are area of the mine for ease of description.
Faults – Geologic term that indicates movement of rock. Depending on the type of fault one side of the fault moves in relation to the opposite side. For normal faulting the "U" represents the side of the fault that is up and "D" or a filled circle represents the side of the fault that has moved down. Dashed lines represent projections of the fault.
Fracture Zone – Location where large vertical cracks in the rock have been found during mining causing the rock to weaken.
Gateroads – Development area that delineate the longwall panels (example 10Rt). This is also in a room and pillar configuration.
Headgate – These are the entries where the longwall stage loader is located which loads the coal the face conveyor to the conveyor going to out of the longwall panel. This is the beginning of the longwall face.
Interburden – The amount of material from the roof (or back) of the mine entries to the ground surface if dealing with one coal seam and if more than one coal seam it is the distance from the roof (back) of the lower coal seam to the floor of the coal seam above it.
Life of Mine – Life of Mine is a term used in the mining industry to describe the expected length of time that a mine will be active and productive. Life of Mine is defined as the period during which all reserves and resources at the mine are projected to be extracted through planned mining activities.
Longwall – A mining method where the working face extends across the coal seam and the coal is extracted by mechanical means. The advance or retreat (moving toward the main haulage) distance. As the working face advances or retreats the overburden is allowed to cave behind the workers. The geometry is mined in panels of a certain length usually to the extent of the coal or property boundary and the working face is identified as the width of the panel.
Longwall Height – This is determined by the height that the shields can go that are part of the longwall machine. The shields are a hydraulic mechanism that support the roof (back) while the shear cuts the

coal along the working face. The highest shields that have been used in the Wasatch–Bookcliffs coal field is 15 feet in height. The face conveyor removes the coal to the stage loader which is located at the beginning of the longwall working face.

Peak Ground Acceleration (PGA) – The maximum magnitude and PGA is a measure of the maximum ground acceleration experienced during an earthquake at a specific location.

Ribs – Walls of the mine entries or crosscuts.

Roof Support – Usually a series of mechanical devices that pin the rock or rock layers together. They can consist of roof or (rib) bolting systems that are used for differing conditions such as point–anchor, resin, rebar, and cable. Roof trusses, and steel supports (legs going to the sill or floor of the mine and cross members along the roof or back of the mine) can also be utilized. Wood cribs (stacked short wood), and cans (cylindrical metal containing light weight concrete) are usually used in conjunction with the longwall coal extraction. Other material can be used for different rock conditions such as shotcrete, gunite, glues and other polymers for filling voids.

Run of Mine (ROM) – The ROM is the quality of the product when it leaves the portal of the mine. This differs from coal qualities that are gathered based on drill cores. Coal quality characteristics come in many different forms. Quality parameters for a short proximate analysis are for %Ash, % Sulfur, % Moisture, %/Violate Matter, % Fixed Carbon and Btu. Different types of analysis will also change these values. The main different analysis types are As Received, Dry and Moisture Mineral Matter free. These test values do not totally indicate the coal quality based on mining where roof falls, cutting rock will change these values.

Sandstone Channels – The sandstone was formed at the same time as the coal in the Cretaceous swamp. In coal mines the sandstone channels are areas where roof falls can occur due to coal thinning or the interface not being intact, water may be present due to the porosity of the sandstone or along the edges of the channel and depending on what the channel does it can cut the coal thickness down if they get thicker. Channels are difficult to predict because they can come and go at random,

Tailgate – This is the end of the longwall working face.

Tensile – Defined as of, relating to, or involving tension. In the context of subsidence, tensile fractures can occur at the surface as a result of underground mining as the rock above caves and fractures into the open space left by mining.

Tipple – A structure used at a mine to load extracted product for transport, typically into railroad hopper cars at a tipple yard.

Unacceptable Risk – A level of risk that is so high that it cannot be justified under any circumstances because it poses a significant threat to health, safety, or the environment and must be eliminated or reduced immediately.

Appendix A Coal Leasing Suitability

Coal leases may be denied or limited by special stipulations where they are not in compliance with the unsuitability criteria or land use decisions established for the unit. Appendix C of the Manti–La Sal National Forest Plan (1986) evaluated the 20 unsuitability criteria defined in Federal Regulation (43 CFR 3461.1). The criteria were applied to the tract acres identified as containing mineable coal.

The PFO's RMP (RMP; October 2008) also evaluated these criteria. Appendix R–13 of the RMP, Unsuitability for Mining Federal Lands in the Price Management Area, also evaluates these criteria to the high development potential mining lands. As stated within the RMP, Appendix R–13, page 2: "For this planning effort, the unsuitability criteria were applied to the areas with surface mining development potential. As a result, the areas for assessment were considerably reduced. Except for one small 120–acre parcel in the Wasatch Plateau, all the coal is deep in the coal fields of Book Cliffs and Wasatch Plateau, where development is anticipated, with little potential for surface facilities. The Emery coal field along the southwest border of the planning area has some areas with surface mining potential in the flat lands south of the town of Emery known as Walker Flat."

Seven of the unsuitability criteria do not apply because the criteria do not exist within these coal lands. Those criteria are not further evaluated below. Four more criteria were found not to be applicable after exceptions and exemptions were applied. Nine of the criteria were exempted insofar as leasing is concerned but should be applied on a project–by–project basis, since they occur and may affect surface development. These criteria are evaluated below. The alternatives are compatible with applicable criteria, as follows:

<u>Criterion Number 2</u>: Rights–of–Way and Surface Leases

Federal lands that are within rights–of–way or easements or within surface leases for residential, commercial, industrial, or other public purposes, on federally owned surface shall be considered unsuitable unless an exemption is found to be suitable. A lease may be issued, and mining operations approved, in such areas if the surface management agency determines the exemption to apply.

Compatible: According to the RMP, no coal lands under any rights–of–way or easements across the public land area of the Wasatch Plateau coal field (where the action is located) were found to be unsuitable because of the underground mining exemption. The action is expected to meet exemption criteria as it states that certain types of coal development (e.g., underground mining) will not interfere with the purpose of the right–of–way or easement and the areas or uses can be protected through appropriate stipulations that have been previously agreed to and will be applied to the additional area included in the LBA.

<u>Criterion Number 3</u>: Rights–of–Way, Public Facilities, etc.

Federal lands affected by section 522(e) (4) and (5) of the Surface Mining Control and Reclamation Act of 1977 shall be considered unsuitable. This includes land within 100 feet of the outside line of the right–of–way of a public road or within 100 feet of a cemetery, or within 300 feet of any public building, school, church, community, or institutional building or public park or within 300 feet of an occupied dwelling. Exceptions may be issued for lands used as mine access roads or haulage roads that join the right–of–way for a public road, among other criteria.

Compatible: According to the RMP, no coal lands were found unsuitable in the public land area of the Wasatch Plateau coal field because of the underground mining exemption. The action is expected to meet exemption criteria as the existing access roads will not change from the existing mining lease and stipulation criteria.

<u>Criterion Number 5</u>: Class I Visual Quality Areas

Scenic Federal lands designated by visual resource management analysis as Class I (an area of outstanding scenic quality or high visual sensitivity) but not currently on the National Register of Natural Landmarks shall be considered unsuitable. A lease may be issued if the surface management agency determines that surface coal mining operations will not significantly diminish or adversely affect the scenic quality of the designated area.

Compatible: According to the RMP, no WSAs exist in the Wasatch Plateau coal field. The action will not significantly diminish or adversely affect the scenic quality of the designated area as the operations will be entirely underground. It is not expected that subsidence from the action will appreciably affect lands within the study area (see Section 3.4, Geology). Existing operations of the mine occur aboveground and would not change under any of the assessed alternatives.

<u>Criterion Number 6</u>: Scientific Study Area

Federal lands under permits by the surface management agency, and being used for scientific studies involving food or fiber production, natural resources, or technology demonstrations and experiments shall be considered unsuitable for the duration of the study, demonstration or experiment, except where mining could be conducted in such a way as to enhance or not jeopardize the purposes of the study, as determined by the surface management agency, or where the principal scientific user or agency gives written concurrence to all or certain methods of mining.

Compatible: According to the ARMP, no lands under any of the coal fields are being used for these types of studies. The action will not occur within federal lands under permits that are being used for scientific studies involving food or fiber production, natural resources, or technology demonstrations and experiments.

<u>Criterion Number 7</u>: Cultural or Historical Resources

All districts, sites, buildings, structures, and objects of historic, architectural, archeological, or cultural significance on Federal lands which are include in or eligible for inclusion in the National Register of Historic Places (NRHP) as determined by the surface management agency, in consultation with the Advisory Council on Historic Preservation and the Utah SHPO shall be considered unsuitable.

Compatible: A cultural resource inventory of the Area of Potential Effect was conducted (Potter, 2025). No Historic Properties were identified. The Utah SHPO concurred with the findings of eligibility and effect.

<u>Criterion Number 9</u>: Threatened and Endangered Species Sites

Federally designated critical habitat or threatened or endangered plant and animal species and habitat for Federal threatened or endangered species which is determined by the Fish and Wildlife Service and the surface management agency to be of essential value and where the presence of threatened or endangered species has been scientifically documented, shall be considered unsuitable.

Exceptions – A lease may be issued and mining operations approved if, after consultation with the US Fish and Wildlife Service, the Service determines that the proposed activity is not likely to jeopardize the continued existence of the listed species and/or its critical habitat.

Compatible: According to the RMP, areas of public lands in the planning area that the surface management agency and the state have agreed are essential for maintaining high interest fish and wildlife habitat and are in areas with potential coal development are not declared unsuitable because of the underground mining exemption. Please refer to Sections 3.6 and 3.7 of the EIS. In addition, the stipulations that currently exist will also apply to the Proposed Action and any action alternatives. For example, Stipulation 3 states that if there is reason to believe that Threatened or Endangered species of plants or animals, or migratory bird species of high Federal interest occur in the area, the Lessee shall be required to conduct an intensive field inventory of the area to be disturbed and/or impacted. Analysis in this EIS found that the alternatives considered are not likely to jeopardize the continued existence of the listed species and/or their critical habitat.

Criterion Number 10: Threatened and Endangered Species Habitat

Federal lands containing habitat determined to be critical or essential for plant or animal species listed by a state pursuant to state law as endangered or threatened shall be considered unsuitable. Exceptions – A lease may be issued and mine operations approved if, after consultation with the state, the surface management agency determines that the species will not be adversely affected by all or certain stipulated methods of coal mining.

Compatible: Please refer to the response above to Criterion 9. The alternatives are not likely to jeopardize habitat determined to be critical or essential for plant or animal species listed by a state pursuant to state law.

Criterion Number 15: High Interest Species Habitat

Federal lands, which the surface management agency and the state jointly agree are fish and wildlife habitat for resident species of high interest to the state and which are essential for maintaining these priority wildlife species shall be considered unsuitable. Examples of such lands which serve a critical function for the species involved include: (i) Active dancing and strutting grounds for sage grouse, sharp–tailed grouse and prairie chicken; (ii) winter range most critical for deer, antelope, and elk; and (iii) Migration corridors for elk. *Exceptions* – A lease may be issued if, after consultation with the state, the surface management agency determines that all or certain stipulated methods of coal mining will not have a significant long–term impact on the species being protected.

Compatible: Please refer to the response above to Criterion 9. The alternatives are not likely to have a significant long–term impact on resident species of high interest to the state.

Criterion Number 16: Riverine, Coastal and Floodplains

Federal lands in riverine, coastal and special floodplains (100–year recurrence interval) on which the surface management agency determines that mining could not be undertaken without substantial threat of loss of life or property shall be considered unsuitable for all or certain stipulated methods of coal mining.

Compatible: According to the RMP, public lands in the Wasatch Plateau coal fields are not unsuitable for mining because of the underground mining exemption. The alternatives are not likely to result in a substantial threat of loss of life or property due to impacts on riverine, coastal, or special floodplains. The EIS analyzes several potential issues related to surface waters, such as changes to stream geomorphology and surface water flows.

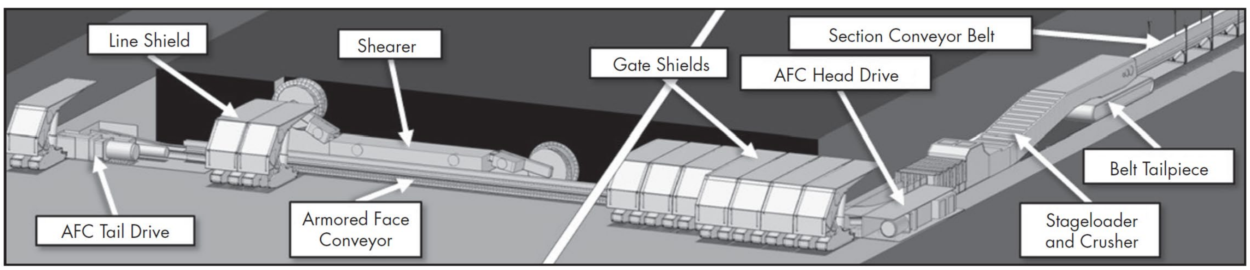
Appendix B Skyline Mine Hydrogeologic Conceptual Site Model

Appendix C Mining Methods

Mining Methods
Based on geologic data the most viable coal seam in the LBA and LMA is the lower O'Connor A seam. The lower O'Connor A seam has an average seam height of 14.3 feet in the LMA and an average seam height of 12.7 feet in the LBA. The typical mining height at the Skyline Mine is 9 feet. The Skyline Mine is currently using one longwall and 2–3 continuous mining machines to produce coal, this is expected to continue throughout the LBA and LMA.

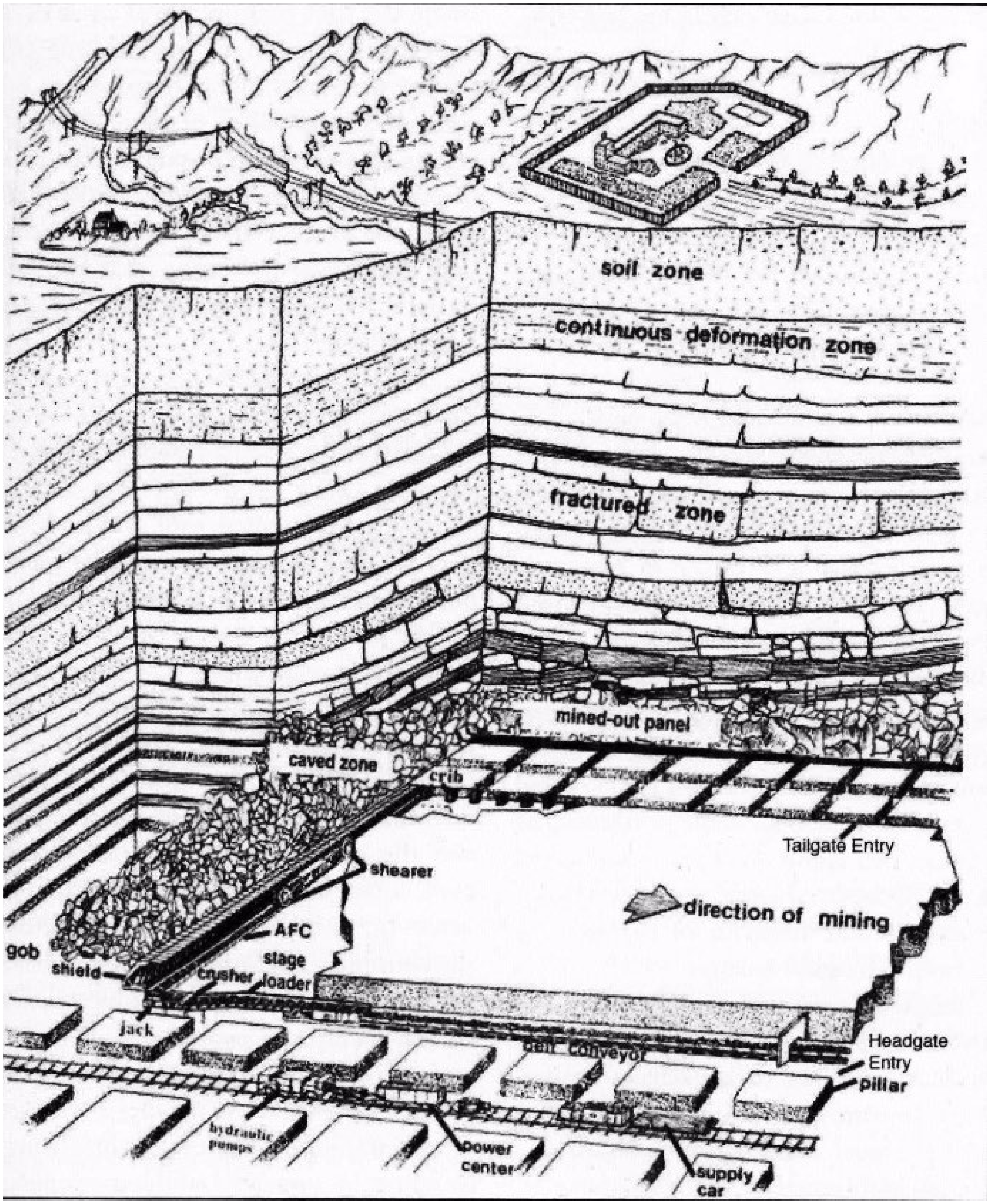
Longwall Mining
Longwall mining is high production method utilizing electrical, mechanical, and hydraulic systems to extract coal underground using a bi–directional shearer to cut along a large "wall" of coal. The armored face conveyor (AFC) is a massive steal structure, containing a chain conveyor, that the shearer rides on to cut the coal. When the coal is cut it falls into the AFC and is transported to the headgate, where the coal is crushed and transferred to a belt conveyor that takes the coal out of the mine. The AFC and the miners are protected by hydraulic shields. As the coal is cut from the face the AFC snakes forward next to the face, as the AFC moves forward the shields follow, as depicted in **Figure C–1**.

Figure C–1 – Major Components of a Modern Longwall



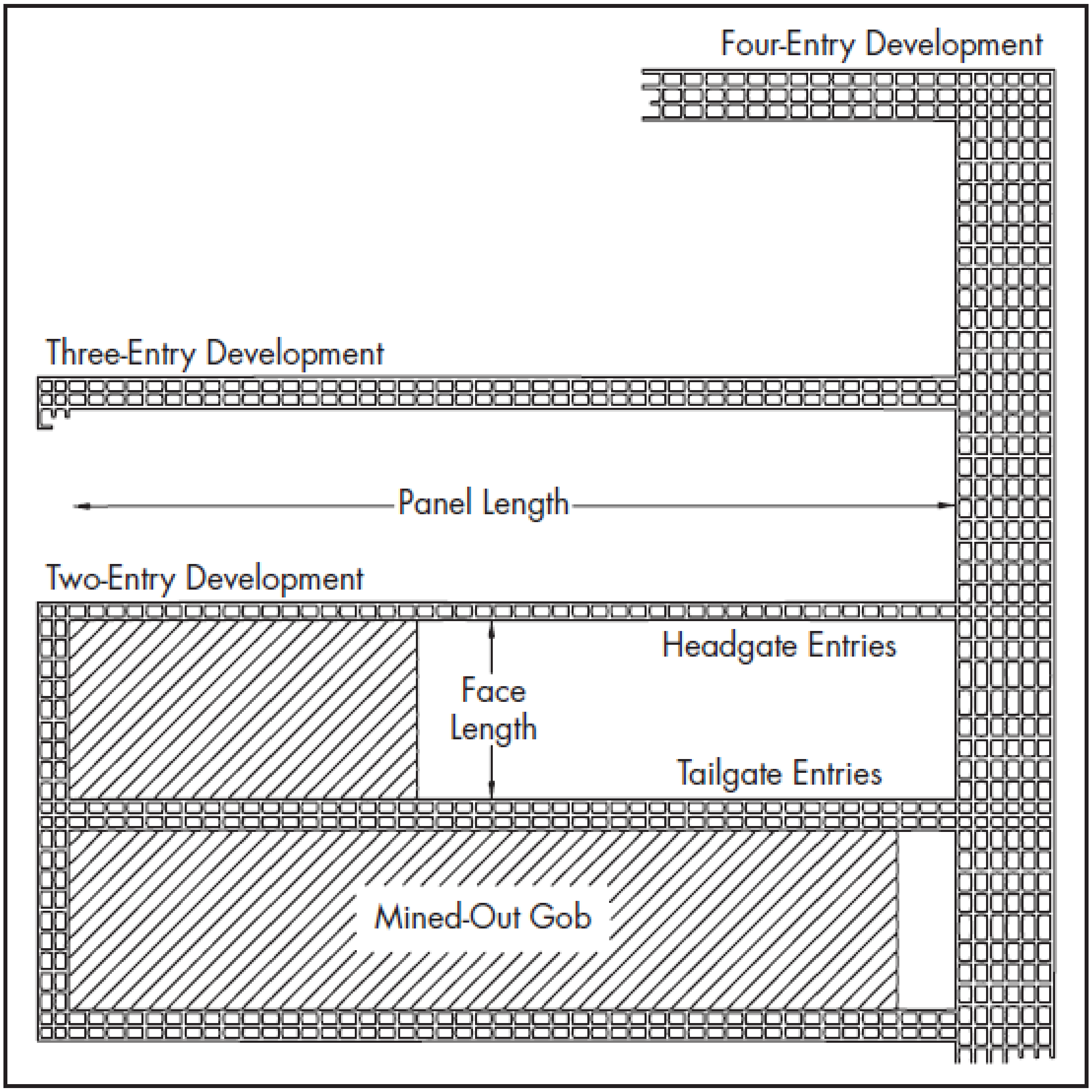
As the longwall progresses forward, leaving a void, the roof in the mined–out area will cave in. Once it has started to cave it will generally continue with each pass of the shearer. These large, caved zones are what causes subsidence to been seen on the surface. The relationship of the longwall and subsidence is seen in **Figure C–2** below.

Figure C–2 – Diagram showing relationship between longwall and subsidence



Longwall panels are developed using room and pillar mining methods for the gateroads, submains, and mains. This entails mining parallel entries (rooms) and leaving blocks (pillars) of coal for roof support. An example longwall panel with mains can be seen in **Figure C–3** below.

Figure C–3 – Example of Longwall panels



Development Mining
Approximately 1–2 continuous mining machines (**Figure C–4**) will be used to develop the longwall panel. This includes development of the gateroads and bleeders, development of the setup rooms (entries mined in a specific pattern to facilitate longwall setup), and development of the recovery rooms (entries mined in a specific pattern to facilitate longwall recovery). The third continuous mining machine will be used to develop the mains and submains.

The Skyline Mine is currently utilizing a 2–Entry petition from Mine Safety and Health Administration (MSHA) to develop the longwall gateroads. This type of development is for deeper cover and bounce prone conditions. The maximum entry width is 20 feet, except longwall set–up which is 30 feet. Continuous mining machines are only operated by remote.

Figure C–4 – Continuous Miner

The continuous mining machine cut the coal with the cutting head, then sucks it through the machine with a chain conveyor to load onto a shuttlecar. The shuttlecar also has a chain conveyor to move the coal loaded from the continous mining machine along the vehicle for a maximum load. The shuttle car is an electric haulage machine (**Figure C–5**) used to transport the coal from the continuous mining machine to the loading point of the belt haulage system. Once the shuttle car gets to the belt feeder, it uses the chain conveyor to off load the coal into feeder breaker (crusher), which is then transported by the belt conveyor to the surface.

Figure C–5 – Shuttle Car

Longwall and Continous Mining Machine section dust is controlled by maintaining minimum air quantities and a directional spray system that has been approved by the MSHA. Each machine has a methane monitor with display.

Coal Handling System
Each section belt conveys the unprocessed mine material, or run–of–mine coal, to the main conveyor belt which transports the coal out of the mine to the tipple yard, which is the structure at the mine used to load extracted materials. Coal is first run through a jaw crusher and screen. Coal is crushed and sized. Crushed coal is fed into the main loader hopper which has an automatic truck sensor to load the truck. When the main loader hopper is full an automatic gate closes and coal is belt conveyed to a surge tube stacker where excess coal is stockpiled. A reclaim belt feeds the loader hopper from this stockpile. See **Figure C–6**.

Figure C–6 – Example of the tipple at a coal mine

Appendix D UPDES Discharge Locations

Appendix E Subsidence Evaluation

Appendix F Air Resource Technical Report

Appendix G Biological Evaluation

ERRATA SHEET

On August 6, 2025, the Bureau of Land Management (BLM) published to e-Planning the Skyline Mine - Little Eccles Lease and Flat Canyon Lease Modification Environmental Impact Statement (EIS). The Environmental Protection Agency posted the EIS to the Federal Register (90 FR 39392) on August 15, 2025.

Through determining the maximum economic recovery of the federal coal tracts, the BLM identified that 6.29 million tons of coal (rather than the 3 million originally estimated) could be economically recovered under Alternative 2 through re-orienting the long wall panels, which enables mining closer to the edges of the mineable coal in the LMA and LBA and which extends the life of mine to April 2034. This also changes the total coal recovered under alternatives 3 and 4, and the additional tonnage changes the life of mine expectancy for Alternatives 3 and 4 (Alternative 4 now has the shortest mine life expectancy of April 2023 and Alternative 3, which previously had the shortest mine life expectancy is now August 2023). Also, an inconsistency was identified in the private coal numbers rounding between Chapters 1 and 2, so those numbers have all been rounded to the nearest thousand to match Chapter 2. Also, the quote from the Federal Land Management and Policy Act was corrected in the purpose and need statement. Finally, in the seismic effects analysis, section 3.4.4, some additional context from a previously cited report was added, and an assumption clarified to support the conclusion of effects expected from the LMA and LBA.

Changing the recoverable tons of coal from 3 million tons to 6.29 million tons, reversing the life of mine expectancy for Alternatives 3 and 4, and adding the seismic context, does not change (1) the location or acreage being considered for leasing or mining, (2) the agency preferred alternative, (3) the impacts analyzed in the EIS, (4) conclusions regarding the analysis of effects on the human environment, or (5) the significance of the impacts. The BLM notes that the Hydrogeologic Conceptual Site Model and Subsidence Reports, upon which the EIS analysis relies, both analyzed recovery of 10.8 million tons of coal, which was subsequently revised downward for the EIS based on exploratory drill hole data, so the 6.29 million tons are within what was analyzed in both documents. Given the limited scope of these corrections, there is no need to supplement the EIS analysis.

Attached are the corrections noted by PDF page number, document page number, and other applicable identifiers such as table number or section number. The new text is in yellow highlight, bolded, italicized and for e-readers it is emphasized.

Contents

Summary

<table>
<tr><th>Document Citation</th><th>Corrected Text</th></tr>
<tr><td>PDF page 9
Page vii</td><td>The LBA proposed by CFC for the Little Eccles Federal Coal Lease Tract (UTU–92226) to competitively lease up to 120 acres, containing approximately 1,290,000 tons of recoverable coal, depending on alternative and The LMA proposed by CFC for the existing Flat Canyon Federal Coal Lease Tract (UTU–77114) to increase the tract acreage by 660 acres, adding approximately 5,000,000 tons of contiguous recoverable coal.
The need for the BLM action is established by the Mineral Leasing Act of 1920, as amended, sections 2 and 3 (30 United States Code [USC] 201 and 203) and its implementing regulations (43 Code of Federal Regulations [CFR] 3432 and 3425), as amended by the Federal Coal Leasing Amendments Act of 1976, and Federal Land Policy and Management Act (FLPMA) of 1976 Section 102 (43 USC 1701), as amended. As stated, "…it is the policy of the United States that— the public lands be managed in a manner that recognizes the Nation's need for domestic sources of minerals…"(43 USC 1701(a) (12))."</td></tr>
<tr><td>PDF page 11
Page ix
Table ES 1</td><td>
<table>
<tr><th></th><th colspan="2">Alternative 1: No Action</th><th colspan="2">Alternative 2: Proposed Action LMA and LBA</th><th colspan="2">Alternative 3: LMA Only</th><th colspan="2">Alternative 4: LBA Only</th></tr>
<tr><td></td><td>Acres</td><td>Tons</td><td>Acres</td><td>Tons</td><td>Acres</td><td>Tons</td><td>Acres</td><td>Tons</td></tr>
<tr><td>LMA</td><td>–</td><td>–</td><td>660</td><td>5,000,000</td><td>660</td><td>5,000,000</td><td>–</td><td>–</td></tr>
<tr><td>LBA</td><td>–</td><td>–</td><td>120</td><td>1,290,000</td><td>–</td><td>–</td><td>120</td><td>1,290,000</td></tr>
<tr><td>Private</td><td>2,400</td><td>11,748,000</td><td>2,400</td><td>16,367,000</td><td>2,400</td><td>15,197,000</td><td>2,400</td><td>5,008,000</td></tr>
<tr><td>Total</td><td>–</td><td>11,748,000</td><td>780</td><td>22,657,000</td><td>660</td><td>20,197,000</td><td>120</td><td>16,298,000</td></tr>
<tr><td>Life of Mine</td><td colspan="2">Jan–2032</td><td colspan="2">Apr–2034</td><td colspan="2">Aug–2033</td><td colspan="2">Apr–2033</td></tr>
</table>
</td></tr>
</table>

Maps

Note: Certain maps in the EIS and its appendices (e.g., Figure 3.4-8) depict potential layouts of underground workings. These layouts vary (for example compare EIS Figure 3.4-8 to Appendix B's Figure 1-2 and Appendix E's Figure A-11c) with the age of the document in response to new data, such as exploratory drill hole information and the addition of the 20 acres to the LMA. None of these maps have been adjusted to show the latest potential layouts of underground workings that resulted from the maximum economic recovery exercise because that exercise is a best estimate of future development and is subject to change based on underground conditions and which company successfully obtains the LBA. Since the figures are non-binding depictions of the best available info at the time of their creation, updating the figures with the latest potential layouts of the underground workings would not provide additional clarity of the impact of the alternatives for the Decision Makers.

Chapter 1

Document Citation	Corrected Text
PDF page 20 Page 1 Section 1.1	Current estimates show there are approximately ***1,290,000*** tons of recoverable federal coal in the Little Eccles Federal Coal Lease Tract (UTU–92226) (LBA) and approximately ***5,000,000*** tons of recoverable federal coal within the existing Flat Canyon Federal Coal Lease Tract (UTU–77114) (LMA).
PDF page 23 Page 4 Section 1.4	The purpose of the BLM and FS actions is to respond to: • The LBA proposed by CFC for the Little Eccles Federal Coal Lease Tract (UTU–92226) to competitively lease up to 120 acres, containing approximately ***1,290,000*** tons of recoverable coal, depending on alternative, and • The LMA proposed by CFC for the existing Flat Canyon Federal Coal Lease Tract (UTU–77114) to increase the tract acreage by 660 acres, adding approximately ***5,000,000*** tons of contiguous recoverable coal. The need for the BLM action is established by the Mineral Leasing Act of 1920, as amended, sections 2 and 3 (30 United States Code [USC] 201 and 203) and its implementing regulations (43 Code of Federal Regulations [CFR] 3432 and 3425), as amended by the Federal Coal Leasing Amendments Act of 1976, and Federal Land Policy and Management Act (FLPMA) of 1976 Section 102 (43 USC 1701), as amended. As stated, "…***it is the policy of the United States that— the public lands be managed in a manner that recognizes the Nation's need for domestic sources of minerals…***"(43 USC 1701(a) (12))."

Document Citation	Corrected Text
PDF page 33 Page 14 Section 1.13.1	Potential development of the LMA and LBA would add nearly ***6.29 million*** tons of recoverable federal coal and nearly 4.6 million tons of private coal to the 40 million tons of coal mined over the last 10 years. Potential development of the LMA and LBA would comprise about ***16%*** of the coal produced over the past 10 years of mining.

Chapter 2

<table>
<tr><th>Document Citation</th><th>Corrected Text</th></tr>
<tr><td>PDF page 42
Page 23
Section 2.5</td><td>Inclusion of 1,290,000 tons from the Little Eccles Federal Coal Lease Tract (UTU–92226) LBA and 5,000,000 tons from modification of the Flat Canyon Federal Coal Lease Tract (UTU–77114) LMA, along with privately owned coal (see Section 2.3), would extend the life of mine by 27 months at the current rate of production (similar to the last decade of production Skyline Mine has a permit allowing it to produce up to 8 million tons per year of coal and waste material combined [as established in the minor source air permit Approval Order DAQE–AN0092007–03 issued by the UDEQ, UDAQ]) from the Flat Canyon Federal Coal Lease Tract (UTU–77114).</td></tr>
<tr><td>PDF page 42
Page 23
Section 2.5.1.1</td><td>There are about 5,000,000 tons of federal recoverable coal in the LMA area.</td></tr>
<tr><td>PDF page 42
Page 23
Section 2.5.1.2</td><td>There are about 1,290,000 tons of federal recoverable coal in the LBA area.</td></tr>
<tr><td>PDF page 42
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Section 2.6</td><td>There are about 5,000,000 tons of federal recoverable coal in the LMA boundary along with privately owned coal (see Section 2.3) would extend the life of mine by 27 months.</td></tr>
<tr><td>PDF page 43
Page 24
Section 2.7</td><td>There are about 1,290,000 tons of federal recoverable coal in the LBA area, along with privately owned coal (see Section 2.3), the life of mine would be extended by 15 months.</td></tr>
<tr><td>PDF page 43
Page 24
Table 2.8-1</td><td>
<table>
<tr><th></th><th>Alternative 1: No Action</th><th>Alternative 2: LMA and LBA</th><th>Alternative 3: Only LMA</th><th>Alternative 4: Only LBA</th></tr>
<tr><td>LMA</td><td>0</td><td>5,000,000</td><td>5,000,000</td><td>0</td></tr>
<tr><td>LBA</td><td>0</td><td>1,290,000</td><td>0</td><td>1,290,000</td></tr>
</table>
</td></tr>
</table>

Document Citation	Corrected Text				
	Private	11,748,000	16,367,000	15,197,000	15,008,000
	Total	11,748,000	***22,657,000***	***20,197,000***	***16,298,000***
	Life of Mine	January 2032	***April 2034***	***August 2033***	***April 2033***

Table 2-11

The following extracts from Table 2-11 are from PDF pages 53 through 57 (document pages 34 through 38). The BLM only extracted the rows containing changes.

Issue	Alternative 1: No Action	Alternative 2: LMA and LBA	Alternative 3: Only LMA	Alternative 4: Only LBA
Air Quality	Under the No Action alternative, the mine would continue mining private coal, and the life of the mine would not be extended past January 2032 because no Federal coal would be leased. Mining activities, coal transport, and coal combustion would continue to occur at the same rate as current rates. Therefore, annual CAP and HAP emissions would also be expected to occur at the same rates from mining private coal. Since annual CAP and HAP emissions under this alternative would remain the same as current annual emissions and for the original life of the mine, no additional adverse impacts to air quality, cancer and non–cancer risks, or AQRVs would be expected as a result of this alternative.	Under Alternative 2, the life of the mine would be extended by ***27*** months. Although the amount of total recoverable coal would increase under this alternative when compared to the no action alternative, mining activities, coal transport, coal processing, and coal combustion would continue to occur at the same rate as current rates throughout the extended life of the mine. Therefore, annual CAP and HAP emissions would also continue to occur until ***April 2034***. Although annual emissions under this alternative are not expected to change, the duration of emissions, and therefore adverse impacts to air quality, AQRVs, cancer, and non–cancer risks would be extended by ***27*** months.	Under Alternative 3, the life of the mine would be extended by ***19*** months. Although the amount of total recoverable coal would increase under this alternative when compared to the no action alternative, mining activities, coal transport, and coal combustion would be expected to continue to occur at the same rate as current rates. Therefore, annual CAP and HAP emissions would also continue to occur at the same rate as current rates until ***August 2033***. Although annual emissions under this alternative are not expected to change, the duration of emissions, and therefore adverse impacts to air quality, AQRVs, cancer, and non–cancer risks would be extended by ***19*** months.	Under Alternative 4, the life of the mine would be extended by ***15*** months. Although the amount of total recoverable coal would increase under this alternative when compared to the no action alternative, mining activities, coal transport, and coal combustion would be expected to continue to occur at the same rate as current rates. Therefore, annual CAP and HAP emissions would also continue to occur at the same rate as current rates until ***April 2033***. Although annual emissions under this alternative are not expected to change, the duration of emissions, and therefore adverse impacts to air quality, AQRVs, cancer, and non–cancer risks would be extended by ***15*** months.
Greenhouse Gas Emissions	Under the No Action alternative, the mine would continue mining private coal, and the life of the mine would not be extended past January 2032 because no Federal coal would be leased. Mining activities, coal transport, and coal combustion would continue to occur at the same rate as current rates. Therefore, annual GHG emissions would also be expected to occur at the same rates from mining private coal. Since GHG emissions under this alternative would remain the same as current annual emissions, no additional adverse impacts to climate change would be anticipated from this alternative. The social cost of GHGs is presented in section 3.1.10.5.	Under Alternative 2, the mine would continue mining, and the life of the mine would be extended by ***27*** months (through ***April 2034***). Mining activities, coal transport, and coal combustion would continue to occur at the same rate as current rates. Therefore, annual GHG emissions would also be expected to occur at the same rates. However, the total recoverable coal would increase under this alternative as compared to the No Action Alternative. As a result, total GHG emissions from mining, downstream processing, and combustion of the coal would also increase under this alternative and additional adverse impacts to climate change would occur. The social cost of GHGs is presented in section 3.1.10.5.	Under Alternative 3, the mine would continue mining, and the life of the mine would be extended by ***19*** months (through ***August 2033***). Mining activities, coal transport, and coal combustion would continue to occur at the same rate as current rates. Therefore, annual GHG emissions would also be expected to occur at the same rates. However, the total recoverable coal would increase under this alternative as compared to the No Action Alternative. As a result, total GHG emissions from mining, downstream processing, and combustion of the coal would also increase under this alternative and additional adverse impacts to climate change would occur. The social cost of GHGs is presented in section 3.1.10.5.	Under Alternative 4, the mine would continue mining, and the life of the mine would be extended by ***15*** months (through ***April 2033***). Mining activities, coal transport, and coal combustion would continue to occur at the same rate as current rates. Therefore, annual GHG emissions would also be expected to occur at the same rates. However, the total recoverable coal would increase under this alternative as compared to the No Action Alternative. As a result, total GHG emissions from mining, downstream processing, and combustion of the coal would also increase under this alternative and additional adverse impacts to climate change would occur. The social cost of GHGs is presented in section 3.1.10.5.
Geologic Strata	The estimated recoverable reserves of the private leases are approximately 11.7 million tons of Lower O'Connor A Seam coal.	The four coal seams of economic interest have been partially mined but CFC plans to only mine the Lower O'Connor A seam in the proposed LMA and LBA. Approximately 16 million tons would be mined from private lands, for a total of approximately ***22.6*** million tons mined.	The estimated recoverable coal reserves within the LMA area are approximately ***5.0*** million tons. Approximately 15.2 million tons would be mined from private lands, with a total of approximately ***20.2*** million tons mined under this alternative.	The estimated recoverable coal reserves of the LBA are approximately ***1.3*** million tons of Lower O'Connor A Seam coal. Approximately 15 million tons would be mined from private lands, with a total of approximately ***16.2*** million tons mined under this alternative.
Surface Water – Water Quantity of Streams, Springs, Ponds, and Wetlands	No perceptible or quantifiable adverse impacts to spring or surface–water discharge rates are expected in the areas within or affected by the mining that would occur under Alternative 1. Operational monitoring of selected baseline seeps and springs as identified in Lease Stipulation 8 and the Skyline Mine hydrologic monitoring program with UDOGM would continue. In summary, Alternative 1 is expected to have minimal impacts to water quantity of streams, springs, ponds, and wetlands and stream geomorphology.	No perceptible or quantifiable adverse impacts to spring or surface–water discharge rates are expected in the areas overlying or affected by the LBA or LMA. Operational monitoring of selected baseline seeps and springs as identified in Lease Stipulation 8 and the Skyline Mine hydrologic monitoring program with UDOGM would continue. It is assumed that additional seeps and springs associated with the LMA and LBA would be incorporated into CFC's water–monitoring program based on the chosen alternative in the EIS and associated lease stipulations that would be part of any lease approval. In summary, Alternative 2 is expected to have minimal impacts to water	Alternative 3 would result in a mine life approximately 8 months shorter, mining of approximately ***1.2*** million fewer tons of coal, and mining a slightly smaller area. Mining methods and related activities such as dewatering would be the same as for Alternative 2. The impacts to surface water quantity would be very similar for Alternative 3 as for Alternative 2. Alternative 3 is expected to have minimal impacts to water quantity of streams, springs, ponds, and wetlands.	Compared to Alternative 2, Alternative 4 would result in a mine life approximately ***12*** months shorter, mining of approximately ***5*** million fewer tons of coal, and mining a slightly smaller area. Mining methods and related activities such as dewatering would be the same as for Alternatives 2 and 3. The impacts to surface water quantity would be very similar for Alternative 4 as for Alternative 2. Alternative 4 is expected to have minimal impacts to water quantity of streams, springs, ponds, and wetlands.

Issue	Alternative 1: No Action	Alternative 2: LMA and LBA	Alternative 3: Only LMA	Alternative 4: Only LBA
		quantity of streams, springs, ponds, and wetlands and stream geomorphology.		
Groundwater – Water Balance and Water Quality of Electric Lake and Scofield, Huntington, and Cleveland Reservoirs	Compared to Alternatives 2, 3, or 4, Alternative 1 would result in a mine life approximately 15 to 27 months shorter, mining of approximately 4.2 to 7.6 million fewer tons of coal and mining a smaller area. Mining methods and related activities such as dewatering would continue. The impacts to surface water and ground water quantity and quality would be shorter in duration and cover a smaller area than for Alternatives 2, 3, and 4. For Alternative 1, the duration of dewatering discharges would be shorter and the area subject to subsidence would be smaller than for Alternatives 2, 3, and 4. Consequently, any increase in volume of surface water in Electric Lake would be of shorter duration, and any transient effects to stream geomorphology or sedimentation would occur over a smaller area and for a shorter duration.	The reduction of water volume or water balance of water bodies from interception of faults during mining is unlikely under Alternative 2, as the Diagonal Fault is east of the LBA and would not be encountered ***and contains a 200-foot mining buffer***. Dewatering discharge ultimately flows into Electric Lake and therefore could increase the volume of water in the lake. ***Additional discharge into Electric Lake would occur throughout the active lifespan of mine, which is the longest under this alternative. The discharge, when combined with*** natural sources of volume changes in Electric Lake, would make it unlikely that any increase in volume would be identifiable or measurable.	For Alternative 3, the duration of dewatering discharges would be shorter and the area subject to subsidence would be smaller than for Alternative 2. ***Dewatering discharge ultimately flows into Electric Lake and therefore could increase the volume of water in the lake. Additional discharge into Electric Lake would occur for 8 fewer months as compared to alternative 2.*** Consequently, any increase in the volume of surface water in Electric Lake would be of shorter duration, and any transient effects to stream morphology or sedimentation would occur over a smaller area and for a shorter duration.	For Alternative 4, the duration of dewatering discharges would be shorter and the area subject to subsidence would be smaller than for Alternatives 2 and 3, ***as the Diagonal Fault is east of the LBA and would not be encountered and contains a 200-foot mining buffer. Dewatering discharge ultimately flows into Electric Lake and therefore could increase the volume of water in the lake. Additional discharge into Electric Lake would occur for 12 fewer months compared to alternative 2.*** Consequently, any increase in volume of surface water in Electric Lake would be of shorter duration, and any transient effects to stream morphology or sedimentation would occur over a smaller area and for a shorter duration.
Socioeconomics	Employment would extend to January 2032 under Alternative 1, averaging about 400 employees. Economic output would total more than $1.1 billion over the life of the mine. Alternative 1 would generate approximately $129 million in total tax revenues through 2032, of which $28 million would accrue to the three Counties in the analysis area. Estimated coal production would be the lowest under this alternative, resulting in lower mineral lease distributions to the State and affected counties. There would be no SC–GHG associated with mining, commuting, transportation, and combustion as the Federal coal would not be leased. GHG emissions associated with mining private coal would remain the same as current annual emissions.	***Under Alternative 2, employment would average about 400 employees per year and would be extended through April 2034. Total economic output through August 2033 would exceed $1.5 billion, and additional economic output would be generated through April 2034. Through August 2033, Alternative 2 would generate more than $183 million in total tax revenues, of which more than $41 million would accrue to the three Counties in the analysis area, and additional tax revenues would be generated through April 2034***. Estimated coal production would be the highest under this alternative, resulting in higher mineral lease distributions to the State and affected counties. Using the IWG approach, SC–GHG associated with mining, commuting, transportation, and combustion discounted back to 2025 would be from ***0.2 to 1.7*** billion dollars (2020 dollars) depending on the discount rate. Using the EPA approach, the SC–GHG associated with mining, commuting, transportation, and combustion discounted back to 2025 would be from ***1.6 to 4.4*** billion dollars (2023 dollars) depending on the discount rate. GHG emissions associated with mining private coal would be nearly the same as described in Alternative 1, so differences in climate change impacts, including SC–GHG, between alternatives would primarily be from mining the Federal coal.	***Under Alternative 3, employment would average about 400 employees per year and would be extended through August 2033. Total economic output through December 2032 would exceed $1.3 billion, and additional economic output would be generated through August 2033. Through December 2032, Alternative 3 would generate more than $158 million in total tax revenues, of which more than $35 million would accrue to the three Counties in the analysis area and additional taxes revenues would be generated through August 2033***. Estimated coal production would be higher than Alternative 1 but lower than Alternative 2, resulting in lower mineral lease distributions than Alternative 2 (but higher than Alternatives 1 ***and 3***) to the State and affected counties. Using the IWG approach, the SC–GHG associated with mining, commuting, transportation, and combustion discounted back to 2025 would be from ***0.1 to 1.0*** billion dollars (2020 dollars) depending on the discount rate. Using the EPA approach, the SC–GHG associated with mining, commuting, transportation, and combustion discounted back to 2025 would be from ***0.9 to 2.6*** billion dollars (2023 dollars) depending on the discount rate. GHG emissions associated with mining private coal would be nearly the same as described in Alternative 1, so differences in climate change impacts, including SC–GHG, between alternatives would primarily be from mining the Federal coal.	***Under Alternative 4, employment would average about 400 employees per year and would be extended through April 2033. Total economic output through March 2033 would exceed $1.4 billion, and additional economic output would be generated through April 2033. Through March 2033, Alternative 4 would generate more than $168 million in total tax revenues, of which more than $39 million would accrue to the three Counties in the analysis area and additional taxes revenues would be generated through April 2033***. Estimated coal production would be higher than Alternatives 1 and 3 but lower than Alternatives 2 ***and 3***, resulting in lower mineral lease distributions than Alternatives 2 ***and 3*** (but higher than Alternative 1) to the State and affected counties. Using the IWG approach, the SC–GHG associated with mining, commuting, transportation, and combustion discounted back to 2025 would be from ***0.1 to 1.2*** billion dollars (2020 dollars) depending on the discount rate. Using the EPA approach, the SC–GHG associated with mining, commuting, transportation, and combustion discounted back to 2025 would be from ***1.1 to 3.2*** billion dollars (2023 dollars) depending on the discount rate. GHG emissions associated with mining private coal would be nearly the same as described in Alternative 1, so differences in climate change impacts, including SC–GHG, between alternatives would primarily be from mining the Federal coal.

Chapter 3

Document Citation	Corrected Text
PDF page 58 Page 39 Section 3.1.1.2	The LBA could contain about ***1,290,000*** tons of recoverable Lower O'Connor A seam coal.
PDF page 59 Page 40 Section 3.1.1.3	The estimated recoverable reserves within the LMA area are approximately ***5,000,000*** tons.

3.2 Air Quality

Document Citation	Corrected Text
PDF Page 73 Page 54 Section 3.2.4.2	Under Alternative 2, the mine would continue mining coal up to a maximum rate of 8 million tons per year and an average rate of 3.6 million tons per year, and the life of the mine would be extended by ***27 months***. Although the amount of total recoverable coal would increase under this alternative (see **Table 2.8–1**), mining activities, coal transport, coal processing, and coal combustion would continue to occur at the same rate as current rates throughout the extended life of the mine. Therefore, annual CAP and HAP emissions would also continue to occur at the same rate as current rates described in **Section 3.2.3.4**, and listed in **Table 3.2–14**, until ***April 2034***. Although annual emissions under this alternative are not expected to change, the duration of emissions, and therefore adverse impacts to air quality, AQRVs, cancer, and non–cancer risks would be extended by ***27 months***.
PDF Page 74 Page 55 Section 3.2.4.3	Under Alternative 3, the mine would continue mining coal up to a maximum rate of 8 million tons per year and an average rate of 3.6 million tons per year, and the life of the mine would be extended by ***19 months***. Although the amount of total recoverable coal would increase under this alternative (see Table 2.8–1), mining activities, coal transport, and coal combustion would be expected to continue to occur at the same rate as current rates. Therefore, annual CAP and HAP emissions would also continue to occur at the same rate as current rates as those described in Section 3.2.3.4 and listed in Table 3.2–14, until ***August 2033***. Although annual emissions under this alternative are not expected to change, the duration of emissions, and therefore adverse impacts to air quality, AQRVs, cancer, and non–cancer risks would be extended by ***19 months***.

Document Citation	Corrected Text
PDF Page 74 Page 55 Section 3.2.4.4	Under Alternative 4, the mine would continue mining coal up to a maximum rate of 8 million tons per year and an average rate of 3.6 million tons per year, and the life of the mine would be extended by ***15 months***. Although the amount of total recoverable coal would increase under this alternative (see Table 2.8–1), mining activities, coal transport, and coal combustion would continue to occur at the same rate as current rates. Therefore, annual CAP and HAP emissions would also continue to occur at the same rate as current rates as those described in Section 3.2.3.4, and listed in Table 3.2–14, until ***April 2033***. Although annual emissions under this alternative are not expected to change, the duration of emissions, and therefore adverse impacts to air quality, AQRVs, cancer, and non–cancer risks would be extended by ***15 months***.

3.3 Greenhouse Gas Emissions

Document Citation	Corrected Text
PDF Page 89 Page 70 Section 3.3.4.1	Although no additional GHG emissions associated with mining the Federal coal leases would occur, emissions from mining private coal would still occur, as the mine would still produce the amount of privately owned coal listed in ***Table 2.8-1***. Downstream processing and combustion of coal would also continue to occur.
PDF page 90 Page 71 Section 3.3.4.2	Under Alternative 2, the mine would continue mining coal up to a maximum rate of 8 million tons per year and an average rate of 3.6 million tons per year, and the life of the mine would be extended by ***27 months*** (through ***April 2034)***. Mining activities, coal transport, and coal combustion would continue to occur at the same rate as current rates. Therefore, annual GHG emissions would also be expected to occur at the same rates. However, the total recoverable coal would increase under this alternative**.** As a result, total GHG emissions from mining, downstream processing, and combustion of the coal would also increase under this alternative. Estimated GHG emissions arising from potential mining activities, downstream processing, and combustion under this alternative are displayed in **Table 3.3.** The emissions shown in **Table 3.3** were estimated based on the annual average of historical emissions provided in **Table 3.3** and proportioned based on the additional life of mine. ***Emissions from coal combustion were estimated based on the additional tonnage of total recoverable coal under this alternative.*** For Alternative 2 additional life of mine would be 11 months in 2032 (February through December), ***12 months*** in 2033 (January through ***December****) and 4 months in 2034 (January through April)*. Table 3.3–1. Alternative 2 Estimated GHG Emissions by Source (metric tons)

Source	Year	CO_2	CH_4	N_2O	CO_2e
Permitted Sources	2032	1,165.20	0.03	0.003	1,166.77
Mobile Surface Equipment		1,130.43	0.05	0.009	1,134.30
Mobile Underground Equipment		3,586.15	0.35	0.261	3,667.42
Coal Mine Methane		–	180.59	–	4,875.92
Employee Commuting		1,424.68	0.04	0.029	1,433.65
Rail Transport		46,264.14	3.74	1.178	46,693.79
Truck Transport		3,000.28	0.02	0.082	3,023.34
Coal Combustion		***10,361,887.04***	***1,221.14***	***178.27***	***10,446,944.54***
Permitted Sources	2033	***1,269.55***	***0.03***	***0.003***	***1,271.26***
Mobile Surface Equipment		***1,231.66***	***0.05***	***0.010***	***1,235.88***
Mobile Underground Equipment		***3,907.29***	***0.38***	***0.28***	***3,995.84***
Coal Mine Methane		***-***	***196.76***	***-***	***5,312.57***
Employee Commuting		***1,552.26***	***0.04***	***0.03***	***1,562.03***
Rail Transport		***50,407.20***	***4.07***	***1.28***	***50,875.33***
Truck Transport		***3,268.97***	***0.02***	***0.09***	***3,294.09***
Coal Combustion		***11,289,817.23***	***1,330.50***	***194.23***	***11,382,491.81***
Permitted Sources	***2034***	***417.39***	***0.01***	***0.001***	***417.95***
Mobile Surface Equipment		***404.93***	***0.02***	***0.003***	***406.32***
Mobile Underground Equipment		***1,284.59***	***0.12***	***0.093***	***1,313.70***
Coal Mine Methane		***-***	***64.69***	***-***	***1,746.60***
Employee Commuting		***510.33***	***0.01***	***0.010***	***513.55***
Rail Transport		***16,572.23***	***1.34***	***0.422***	***16,726.13***
Truck Transport		***1,074.73***	***0.01***	***0.030***	***1,082.99***

Document Citation	Corrected Text

Coal Combustion		***3,711,720.73***	***437.42***	***63.858***	***3,742,189.09***
Total	2032	***10,418,457.92***	***1,405.95***	***179.83***	***10,508,939.73***
	2033	***11,351,454.16***	***1,531.85***	***195.94***	***11,450,038.82***
	2034	***3,731,984.93***	***503.62***	***64.42***	***3,764,519.23***

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Under Alternative 3, the mine would continue mining coal up to a maximum rate of 8 million tons per year and an average rate of 3.6 million tons per year, and the life of the mine would be extended by ***19 months*** (through ***August 2033***). Although the amount of total recoverable coal would increase under this alternative, mining activities, coal transport, and coal combustion would continue to occur at the same rate as current rates. Estimated GHG emissions arising from potential mining activities, downstream processing, and combustion under this alternative are displayed in **Table 3.3–22**. The emissions were estimated based on the annual average of historical emissions provided in **Sections 3.3.3.8** through **3.3.3.11** and proportioned based on the additional life of mine. ***Emissions from coal combustion were estimated based on the additional tonnage of total recoverable coal under this alternative.*** For Alternative 3 additional life of mine would be 11 months in 2032 (February through December)***, and 8 months in 2033 (January through August)***. GHG emissions for Alternative 3 are shown in **Table 3.3-22**.

Table 3.3–22. Alternative 3 Estimated GHG Emissions by Source (metric tons)

Source	Year	CO_2	CH_4	N_2O	CO_2e
Permitted Sources	2032	1,165.20	0.03	0.003	1,166.77
Mobile Surface Equipment		1,130.43	0.05	0.009	1,134.30
Mobile Underground Equipment		3,586.15	0.35	0.261	3,667.42
Coal Mine Methane		–	180.59	–	4,875.92
Employee Commuting		1,424.68	0.04	0.029	1,433.65
Rail Transport		46,264.14	3.74	1.178	46,693.79
Truck Transport		3,000.28	0.02	0.082	3,023.34
Coal Combustion		***11,385,319.85***	***1,341.75***	***195.88***	***11,478,778.39***
Permitted Sources	***2033***	***845.21***	***0.02***	***0.00***	***846.34***

Document Citation	Corrected Text

Mobile Surface Equipment		***819.98***	***0.03***	***0.01***	***822.79***
Mobile Underground Equipment		***2,601.29***	***0.25***	***0.19***	***2,660.25***
Coal Mine Methane		***-***	***130.99***	***-***	***3,536.86***
Employee Commuting		***1,033.42***	***0.03***	***0.02***	***1,039.93***
Rail Transport		***33,558.76***	***2.71***	***0.85***	***33,870.42***
Truck Transport		***2,176.33***	***0.01***	***0.06***	***2,193.05***
Coal Combustion		***8,258,605.15***	***973.27***	***142.08***	***8,326,397.46***
Total	***2032***	***11,441,890.73***	***1,526.56***	***197.44***	***11,540,773.59***
	2033	***8,299,640.14***	***1,107.32***	***143.22***	***8,371,367.11***

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Under Alternative 4, the mine would continue mining coal up to a maximum rate of 8 million tons per year and an average rate of 3.6 million tons per year, and the life of the mine would be extended by ***15 months*** (through ***April 2033***). Although the amount of total recoverable coal would increase under this alternative, mining activities, coal transport, and coal combustion would continue to occur at the same rate as current rates. Estimated GHG emissions arising from potential mining activities, downstream processing, and combustion under this alternative are displayed in **Table 3.3–23** The emissions were estimated based on the annual average of historical emissions provided in **Sections 3.3.3.8** through **3.3.3.11** and proportioned based on the additional life of mine. ***Emissions from coal combustion were estimated based on the additional tonnage of total recoverable coal under this alternative.*** For Alternative 4 additional life of mine would be 11 months in 2032 (February through December) and ***4 months*** in 2033 (January through ***April***). GHG emissions for Alternative 4 are shown in **Table 3.3**.

Table 3.3–23. Alternative 4 Estimated GHG Emissions by Source (metric tons)

Source	Year	CO_2	CH_4	N_2O	CO_2e
Permitted Sources	2032	1,165.20	0.03	0.003	1,166.77
Mobile Surface Equipment		1,130.43	0.05	0.009	1,134.30
Mobile Underground Equipment		3,586.15	0.35	0.261	3,667.42
Coal Mine Methane		–	180.59	–	4,875.92

Document Citation	Corrected Text

Employee Commuting		1,424.68	0.04	0.029	1,433.65
Rail Transport		46,264.14	3.74	1.178	46,693.79
Truck Transport		3,000.28	0.02	0.082	3,023.34
Coal Combustion		***7,788,750.00***	***917.90***	***134.00***	***7,852,685.42***
Permitted Sources	2033	***417.39***	***0.01***	***0.001***	***417.95***
Mobile Surface Equipment		***404.93***	***0.02***	***0.003***	***406.32***
Mobile Underground Equipment		***1,284.59***	***0.12***	***0.09***	***1,313.70***
Coal Mine Methane		***-***	***64.69***	***-***	***1,746.60***
Employee Commuting		***510.33***	***0.01***	***0.01***	***513.55***
Rail Transport		***16,572.23***	***1.34***	***0.42***	***16,726.13***
Truck Transport		***1,074.73***	***0.01***	***0.03***	***1,082.99***
Coal Combustion		***2,790,000.00***	***328.80***	***48.00***	***2,812,902.24***
Total	2032	***7,845,320.88***	***1,102.70***	***135.56***	***7,914,680.61***
	2033	***2,810,264.20***	***395.00***	***48.56***	***2,835,109.47***

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Alternative 2 IWG SC–GHGs Estimates Associated with Mining, Commuting, Transportation, and Combustion Discounted Back to 2025 (millions, 2020$)

Year	GHG	5% Average Discount Rate	3% Average Discount Rate	2.5% Average Discount Rate	95th Percentile Discount Rate
2032	CO_2	***$151.18***	***$539.65***	***$803.78***	***$1,637.51***
	CH_4	***$0.87***	***$2.05***	***$2.71***	***$5.46***
	N_2O	***$1.05***	***$3.44***	***$5.09***	***$9.14***
2033	CO_2	***$161.34***	***$581.05***	***$867.03***	***$1,766.26***
	CH_4	***$0.94***	***$2.23***	***$2.95***	***$5.94***
	N_2O	***$1.12***	***$3.72***	***$5.51***	***$9.88***

Document Citation	Corrected Text
	(continued table below)

2034	***CO2***	***$51.91***	***$188.72***	***$282.15***	***$574.65***
	CH4	***$0.30***	***$0.73***	***$0.97***	***$1.95***
	N2O	***$0.36***	***$1.21***	***$1.80***	***$3.22***
Total	CO_2, CH_4, and N_2O	***$369.09***	***$1,322.79***	***$1,971.97***	***$4,014.00***

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Alternative 2 EPA SC–GHGs Estimates Associated with Mining, Commuting, Transportation, and Combustion Discounted Back to 2025 (millions, 2023$)

Year	GHG	2.5% Discount Rate	2% Discount Rate	1.5% Discount Rate
2032	CO_2	***$1,517.16***	***$2,480.59***	***$4,268.16***
	CH_4	***$2.48***	***$3.18***	***$4.30***
	N_2O	***$8.12***	***$12.41***	***$19.81***
2033	CO_2	***$1,644.96***	***$2,694.45***	***$4,628.18***
	CH_4	***$2.73***	***$3.51***	***$4.76***
	N_2O	***$8.81***	***$13.49***	***$21.59***
2034	***CO2***	***$534.52***	***$882.89***	***$1,517.94***
	CH4	***$0.91***	***$1.17***	***$1.59***
	N2O	***$2.89***	***$4.43***	***$7.10***
Total	CO_2, CH_4, and N_2O	***$3,722.58***	***$6,096.12***	***$10,473.42***

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Alternative 3 IWG SC–GHGs Estimates Associated with Mining, Commuting, Transportation, and Combustion Discounted Back to 2025 (millions, 2020$)

Year	GHG	5% Average Discount Rate	3% Average Discount Rate	2.5% Average Discount Rate	95th Percentile Discount Rate
2032	CO_2	***$166.12***	***$592.95***	***$883.17***	***$1,799.24***
	CH_4	***$0.96***	***$2.25***	***$2.97***	***$6.00***
	N_2O	***$1.15***	***$3.78***	***$5.59***	***$10.04***

Document Citation	Corrected Text
	(continued table below)

Year	GHG				
2033	CO_2	*$118.02*	*$425.04*	*$634.24*	*$1,292.04*
	CH_4	*$0.69*	*$1.63*	*$2.16*	*$4.34*
	N_2O	*$0.82*	*$2.72*	*$4.03*	*$7.22*
Total	CO_2, CH_4, and N_2O	*$287.76*	*$1,028.38*	*$1,532.15*	*$3,118.89*

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Alternative 3 EPA SC–GHGs Estimates Associated with Mining, Commuting, Transportation, and Combustion Discounted Back to 2025 (millions, 2023$)

Year	GHG	2.5% Discount Rate	2% Discount Rate	1.5% Discount Rate
2032	CO_2	*$1,667.01*	*$2,725.59*	*$4,689.73*
	CH_4	*$2.72*	*$3.49*	*$4.73*
	N_2O	*$8.92*	*$13.63*	*$21.77*
2033	CO_2	*$1,203.30*	*$1,971.02*	*$3,385.55*
	CH_4	*$2.00*	*$2.57*	*$3.48*
	N_2O	*$6.45*	*$9.87*	*$15.79*
Total	CO_2, CH_4, and N_2O	*$2,890.41*	*$4,726.17*	*$8,121.05*

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Alternative 4 IWG SC–GHGs Estimates Associated with Mining, Commuting, Transportation, and Combustion Discounted Back to 2025 (millions, 2020$)

Year	GHG	5% Average Discount Rate	3% Average Discount Rate	2.5% Average Discount Rate	95th Percentile Discount Rate
2032	CO_2	*$113.64*	*$405.64*	*$604.18*	*$1,230.87*
	CH_4	*$0.66*	*$1.54*	*$2.04*	*$4.10*
	N_2O	*$0.79*	*$2.59*	*$3.82*	*$6.87*
2033	CO_2	*$39.87*	*$143.59*	*$214.26*	*$436.49*
	CH_4	*$0.23*	*$0.55*	*$0.73*	*$1.47*
	N_2O	*$0.28*	*$0.92*	*$1.36*	*$2.44*

Document Citation	Corrected Text					
	Total	CO_2, CH_4, and N_2O	***$155.47***	***$554.83***	***$826.39***	***$1,682.24***

Document Citation	Corrected Text
PDF pages 95-96 Pages 76-77 Section 3.3.4.5 Table 3.3-24 And Appendix F PDF page 94 Page 83 Table 4.4-10	Alternative 4 EPA SC–GHGs Estimates Associated with Mining, Commuting, Transportation, and Combustion Discounted Back to 2025 (millions, 2023$)

Year	GHG	2.5% Discount Rate	2% Discount Rate	1.5% Discount Rate
2032	CO_2	***$1,140.41***	***$1,864.59***	***$3,208.26***
	CH_4	***$1.86***	***$2.39***	***$3.23***
	N_2O	***$6.10***	***$9.33***	***$14.89***
2033	CO_2	***$406.51***	***$665.87***	***$1,143.74***
	CH_4	***$0.68***	***$0.87***	***$1.18***
	N_2O	***$2.18***	***$3.33***	***$5.33***
Total	CO_2, CH_4, and N_2O	***$1,557.74***	***$2,546.38***	***$4,376.64***

3.4 Geology

Document Citation	Corrected Text
PDF page 107 Page 88 Section 3.4.4.1	The subsidence modeling completed in 2021 for the initial mine plan, which included 8.6 million tons to be mined beneath the 640–acre LMA and 2.2 million tons to be mined beneath the 120–acre LBA, projected approximately 2,745 acres could be subject to most likely (case 1) potential subsidence of up to 4.9 feet (Agapito Associates, 2021). The acreage was determined using an angle of draw of 23 degrees from the proposed underground workings. This remains the maximum modeled extent of potential subsidence. However, since the modeling, the proposed tonnage from the LMA and LBA has been considerably reduced to ***5.0 million tons*** for the LMA (alternatives 2 and 3) and ***1.29 million tons*** (Alternatives 2 ***and 4***) for the LBA, and the extent of proposed underground workings as well as the expected areas of subsidence have also decreased, as shown on Figure 3.4–7.
PDF page 111 Page 92	Based upon the results of a 2018 study ***conducted for the Flat Canyon Lease, where mining within 400 horizontal feet and 1,100 vertical feet of the Boulger Dam and adjacent to Electric Lake was found to not result in an unacceptable seismic risk,*** (RB&G Engineering, 2019), the LBA and LMA would not create

Document Citation	Corrected Text
Section Seismic Events 2nd paragraph and last paragraph	unacceptable risk to the ***Boulger Dam, Electric Lake Dam, Huntington Dam or Cleveland Dam since they are more than 0.8 mile away from the LBA and LMA.*** Mining–induced seismicity is expected to generate a maximum credible earthquake event of magnitude 3.9. The PGA would not likely exceed 2 g at Boulger dam and 0.1 g at Electric Lake dam. A computed deformation of 0.04 feet was determined for Boulger dam, while zero deformation was determined for Electric Lake dam. Due to the limitations of modeling, the estimate for Boulger dam may be unconservative; however, the study (RB&G Engineering, 2019) considered an upper bound of 0.5 feet of deformation. This results in a factor of safety of 8 against overtopping due to deformation (RB&G Engineering, 2019). A dam's safety factor against overtopping generally refers to the margin of safety against failure due to excessive water flowing over the dam's crest, and a safety factor of at least 1.5 is often considered a minimum acceptable value. Past and present projects affecting the geology within or surrounding the LBA or LMA include the considerable past mining at Skyline Mine dating back to 1981. All the previously mined areas contribute to the current affected environment which includes subsided lands. Alternative 1 would result in an incremental impact on geology from continued coal mining and related subsidence. No unacceptable risks would be created for the ***four*** dams as a consequence of Alternative 1.
PDF page 111 Page 92 Section 3.4.4.2	The four coal seams of economic interest have been partially mined, but CFC plans to only mine the Lower O'Connor A seam in the proposed LMA and LBA. CFC has stated that with their current longwall equipment, the minimum cutting height is 7.5 feet, and the maximum is 13.5 feet. The current mine plan shows they typically do not mine at depths greater than 2,000 feet but consider a maximum potential depth of 2,400 feet feasible (Agapito Associates, 2021). The estimated recoverable reserves within the LMA area are approximately ***5.0 million*** tons. The mineable reserve base in the LBA is approximately ***1.29 million*** tons. Based on the current mine plan, the LBA could produce about ***1.29 million tons*** of recoverable Lower O'Connor A seam coal. Approximately 16.4 million tons would be mined from private lands, with a total of approximately ***22.7 million*** tons mined under Alternative 2. The proposed mining would result in an irreversible and irretrievable commitment of coal resources. The coal extraction would begin in 2029 and extend through ***August 2033***. The proposed coal mining would meet the 2008 BLM PFO RMP objective for coal mining as it would occur within the BLM's planning area and minimize impacts on other resource values. The alternative would also meet all standards and guidelines for coal mining outlined in the 1986 FS MLNF LRMP as amended, and the requirements of the Utah Coal Regulatory Program at the UDOGM.
PDF page 114 Page 95	Based upon the results of a 2018 study ***conducted for the Flat Canyon Lease, where mining within 400 horizontal feet and 1,100 vertical feet of the Boulger Dam and adjacent to Electric Lake was found to not***

Document Citation	Corrected Text
Section Seismic Events	***result in an unacceptable seismic risk,*** (RB&G Engineering, 2019), the LBA and LMA would not create unacceptable risk to the ***Boulger Dam, Electric Lake Dam, Huntington Dam or Cleveland Dam since they are more than 0.8 mile away from the LBA and LMA.*** Mining–induced seismicity is expected to generate a maximum credible earthquake event of magnitude 3.9. The PGA would not likely exceed 2 g at Boulger dam and 0.1 g at Electric Lake dam. A computed deformation of 0.04 feet was determined for Boulger dam, while zero deformation was determined for Electric Lake dam. Due to the limitations of modeling, the estimate for Boulger dam may be unconservative; however, we would consider an upper bound of 0.5 feet of deformation. This results in a factor of safety of 8 against overtopping due to deformation (RB&G Engineering, 2019). A dam's safety factor against overtopping generally refers to the margin of safety against failure due to excessive water flowing over the dam's crest and safety factor of at least 1.5 is often considered a minimum value. Past and present projects affecting the geology within or surrounding the LBA or LMA include the considerable past mining at Skyline Mine dating to 1981. All the previously mined areas contribute to the current affected environment which includes subsided lands. Alternative 2 would result in an incremental impact on geology from continued coal mining and related subsidence. No unacceptable risks would be created for the ***four*** dams as a consequence of Alternative 2.
PDF page 114 Page 95 Section 3.4.4.3	The estimated recoverable coal reserves within the LMA area are approximately ***5.0 million*** tons. Approximately 15.2 million tons would be mined from private lands, with a total of approximately ***22.6 million*** tons mined under Alternative 3. The LMA would result in an irreversible and irretrievable commitment of coal resources.
PDF page 116 Page 97 Section Seismic Events 1st paragraph	As with Alternative 2, no unacceptable risks would be created for the ***four*** dams as a consequence of Alternative 3. Past and present projects affecting the geology within or surrounding the proposed LMA include the considerable past mining at Skyline Mine dating to 1981. All of the previously mined areas contribute to the current affected environment which includes subsided lands. Alternative 3 would result in an incremental impact on geology from continued coal mining and related subsidence. No unacceptable risks would be created for the ***four*** dams as a consequence of Alternative 3.
PDF page 116 Page 97 Section 3.4.4.4	The estimated recoverable coal reserves of the LBA boundary are approximately ***1.29 million*** tons of Lower O'Connor A seam coal. Approximately 15 million tons would be mined from private lands, with a total of approximately ***16.3 million*** tons mined under Alternative 4. The LBA would result in an irreversible and irretrievable commitment of coal resources.

Document Citation	Corrected Text
PDF page 116 Page 97 Section Seismic Events	As with alternatives 2 and 3, no unacceptable risks would be created for the ***four*** dams as a consequence of Alternative 4. Past and present projects affecting the geology within or surrounding the LBA include the considerable past mining at Skyline Mine dating to 1981. All of the previously mined areas contribute to the current affected environment which includes subsided lands. Alternative 4 would result in an incremental impact on geology from continued coal mining and related subsidence. No unacceptable risks would be created for the ***four*** dams as a consequence of Alternative 4.

3.5 Hydrology

Document Citation	Corrected Text
PDF page 138 Page 119 Section 3.5.4.1 Last paragraph of the section	Compared to alternatives, 2,3, or 4, Alternative 1 would result in a mine life approximately ***15 to 27 months*** shorter, mining approximately ***10.9 million*** fewer tons of coal and mining a smaller area. Mining methods and related activities such as dewatering would continue. The impacts to surface water and groundwater quantity and quality would be shorter in duration and cover a smaller area than for alternatives 2, 3, and 4. For Alternative 1, the duration of dewatering discharges would be shorter and the area subject to subsidence would be smaller than for alternatives 2, 3, and 4. Consequently, any increase in volume of surface water in Electric Lake from mine dewatering would be of shorter duration, and any transient effects to stream geomorphology or sedimentation would occur over a smaller area and for a shorter duration.
PDF page 142 Page 123 Section 3.5.4.2	Faults occasionally serve as conduits for groundwater from the Star Point Sandstone in the deep aquifer, and most pumping from active mining areas is in response to deep aquifer groundwater entering the Skyline Mine along faults on the mine floor. Fractures related to the Diagonal Fault hydraulically connect existing Skyline Mine workings with the underlying Star Point Sandstone are/is and were the apparent source of the large inflows to the mine. The Diagonal Fault is east of the LBA and would not be encountered ***and contains a 200- foot mining buffer***. Other north–northeast faults were crossed during previous mining and resulted in moderate to large groundwater inflows. However, those faults do not intersect Electric Lake or Scofield, Huntington, or Cleveland reservoirs and therefore are not likely to be hydraulically connected to them. Consequently, reduction of water volume or water balance of those water bodies from interception of faults during mining is unlikely under Alternative 2.

Document Citation	Corrected Text
	Skyline Mine dewatering, including removal of large inflows to the mine, has been ongoing for decades, and would be handled with routine mining practices and protection measures outlined in the mine permit. Dewatering discharge ultimately flows into Electric Lake and therefore could increase the volume of water in the lake. ***Additional discharge into Electric Lake would occur throughout the active lifespan of mine, which is the longest under this alternative. The discharge, when combined with*** natural sources of volume changes in Electric Lake, would make it unlikely that any increase in volume would be identifiable or measurable.
PDF page 142 Page 123 Section 3.5.4.3 First sentence	Compared to Alternative 2, Alternative 3 would result in a Skyline Mine life approximately 8 months shorter, mining approximately ***1.2*** million fewer tons of coal, and mining a slightly smaller area. Mining methods and related activities such as dewatering would be the same as for Alternative 2. The impacts to surface water and groundwater quantity and quality would be very similar for Alternative 3 as for Alternative 2. For Alternative 3, the duration of dewatering discharges would be shorter and the area subject to subsidence would be smaller than for Alternative 2. ***Dewatering discharge ultimately flows into Electric Lake and therefore could increase the volume of water in the lake. Additional discharge into Electric Lake would occur for 8 fewer months as compared to alternative 2.*** Consequently, any increase in the volume of surface water in Electric Lake would be of shorter duration, and any transient effects to stream morphology or sedimentation would occur over a smaller area and for a shorter duration.
PDF page 143 Page 124 Section 3.5.4.4 First sentence	Compared to Alternative 2, Alternative 4 would result in a Skyline Mine life approximately ***12*** months shorter, mining of approximately ***5*** million fewer tons of coal, and mining a slightly smaller area. Mining methods and related activities such as dewatering would be the same as for alternatives 2 and 3. The impacts to surface water and groundwater quantity and quality would be very similar for Alternative 4 as for alternatives 2 and 3. For Alternative 4, the duration of dewatering discharges would be shorter and the area subject to subsidence would be smaller than for alternatives 2 and 3, ***as the Diagonal Fault is east of the LBA and would not be encountered and contains a 200-foot mining buffer. Dewatering discharge ultimately flows into Electric Lake and therefore could increase the volume of water in the lake. Additional discharge into Electric Lake would occur for 12 fewer months compared to alternative 2***. Consequently, any increase in volume of surface water in Electric Lake would be of shorter duration, and any transient effects to stream morphology or sedimentation would occur over a smaller area and for a shorter duration.

3.6 Vegetation and Botany

No changes because the effects are based on subsidence, which did not change. See Appendix E.

3.7 Wildlife (Terrestrial and Aquatic Species)

No changes because the effects are based on subsidence, which did not change. See Appendix E.

3.8 Socioeconomics

Document Citation	Corrected Text
PDF Page 189 Page 170 Section 3.8.4.2 New paragraph before Employment and Income header	***For Alternative 2, the results presented in the tables below were calculated based on CFC's projected mine operations for the original total recoverable Federal coal (3 million tons to be produced through August 2033). The additional 3.29 million tons of recoverable Federal coal is projected to extend the life of the mine through April 2034. The rate of annual production will decline between 2030 and 2034. While annual production is still expected to decline between 2030 and 2034, the rate of decline is anticipated to be less steep than previously analyzed.***
PDF Page 192 Page 173 Section 3.8.4.3 New paragraph before Employment and Income header	***For Alternative 3, the results presented in the tables below were calculated based on CFC's projected mine operations for the original total recoverable Federal coal (2.1 million tons to be produced through December 2032). The additional 2.9 million tons of recoverable Federal coal is projected to extend the life of the mine through August 2033. The rate of annual production will decline between 2030 and 2033. While annual production is still expected to decline between 2030 and 2034, the rate of decline is anticipated to be less steep than previously analyzed.***
PDF Page 195 Page 176 Section 3.8.4.4 New paragraph before Employment and Income header	***For Alternative 4, the results presented in the tables below were calculated based on CFC's projected mine operations for the original total recoverable Federal coal (1 million tons to be produced through March 2033). The additional 0.29 million tons of recoverable Federal coal is projected to extend the life of the mine through April 2033. The rate of annual production will decline between 2030 and 2033. While annual production is still expected to decline between 2030 and 2034, the rate of decline is anticipated to be less steep than previously analyzed.***
PDF Pages 189-192 Pages 170-176	***Note for Alternative 2: The additional 3.29 million tons of recoverable Federal coal is projected to extend the life of the mine through April 2034. The rate of annual production will decline between 2030 and 2034. Production activities are expected to ramp down more slowly than previously assumed, resulting in***

Document Citation	Corrected Text
New footnote to Tables 3.8-9 through 3.8-10	***slightly higher levels of coal production towards the end of the mine life. As a result, the values reported in this table between 2031 and 2034 may slightly understate potential economic activity under this alternative.***
PDF Pages 193-195 Pages 174-173 New footnote to Tables 3.8-11 through 3.8-12	***Note for Alternative 3: The additional 2.9 million tons of recoverable Federal coal is projected to extend the life of the mine through August 2033. The rate of annual production will decline between 2030 and 2033. Production activities are expected to ramp down more slowly than previously assumed, resulting in slightly higher levels of coal production towards the end of the mine life. As a result, the values reported in this table between 2031 and 2033 may slightly understate potential economic activity under this alternative.***
PDF Pages 195-197 Pages 176-178 New footnote to Tables 3.8-13 through 3.8-14	***Note for Alternative 4: The additional 0.29 million tons of recoverable Federal coal is projected to extend the life of the mine through April 2033. The rate of annual production will decline between 2030 and 2033. Production activities are expected to ramp down more slowly than previously assumed, resulting in slightly higher levels of coal production towards the end of the mine life. As a result, the values reported in this table between 2031 and 2033 may slightly understate potential economic activity under this alternative.***
PDF page 192 Page 173 Section 3.8.4.2	Under Alternative 2, using the IWG approach, the SC–GHG associated with mining, commuting, transportation, and combustion discounted back to 2025 would be from ***0.4 to 4.0*** billion dollars (2020 dollars) depending on the discount rate. Using the EPA approach, the SC–GHG associated with mining, commuting, transportation, and combustion discounted back to 2025 would be from ***3.7 to 10.5*** billion dollars (2023 dollars) depending on the discount rate. GHG emissions associated with mining private coal would be nearly the same as described in Alternative 1, so differences in climate change impacts, including SC–GHG, between alternatives would primarily be from mining the Federal coal. For more detailed information please see **Appendix F**.
PDF Page 195 Page 176 Section 3.8.4.3	Under Alternative 3, using the IWG approach, the SC–GHG associated with mining, commuting, transportation, and combustion discounted back to 2025 would be from ***0.3 to 3.1*** billion dollars (2020 dollars) depending on the discount rate. Using the EPA approach, the SC–GHG associated with mining, commuting, transportation, and combustion discounted back to 2025 would be from ***2.9 to 8.1*** billion dollars (2023 dollars) depending on the discount rate. GHG emissions associated with mining private coal would be nearly the same as described in Alternative 1, so differences in climate change impacts, including SC–GHG, between alternatives would primarily be from mining the Federal coal. For more detailed information please see **Appendix F**.

Document Citation	Corrected Text
PDF Page 198 Page 179 Section 3.8.4.4	Under Alternative 4, using the IWG approach, the SC–GHG associated with mining, commuting, transportation, and combustion discounted back to 2025 would be from ***0.2 to 1.7*** billion dollars (2020 dollars) depending on the discount rate. Using the EPA approach, the SC–GHG associated with mining, commuting, transportation, and combustion discounted back to 2025 would be from ***1.6 to 4.4*** billion dollars (2023 dollars) depending on the discount rate. GHG emissions associated with mining private coal would be nearly the same as described in Alternative 1, so differences in climate change impacts, including SC–GHG, between alternatives would primarily be from mining the Federal coal. For more detailed information please see **Appendix F**.

3.9 Unavoidable Adverse Impacts

No changes because the summary cross references other portions of the document.

3.10 Short Term Uses vs. Long Term Productivity

Document Citation	Corrected Text
PDF page 199 Page 180 Section 3.10	Under all alternatives, the short–term use of available coal resources would be ***15*** to ***27*** months across both tracts, although the amount of impact would vary as previously disclosed.

3.11 Irreversible and Irretrievable Effects

Document Citation	Corrected Text
PDF page 199 Page 180 Section 3.11	Likewise, since coal is a non–renewable resource, the ***6.29 million*** tons of coal reserves mined and used would also be irretrievably consumed.

4.0 Consultation and Coordination

No changes.

5.0 References

No changes.

6.0 Glossary

No changes.

Appendix A Coal Leasing Suitability

No changes to this appendix because the entire LMA and LBA boundaries were considered when looking at the Unsuitability Criteria.

Appendix B Skyline Mine Hydrogeologic Conceptual Site Model

No changes to this appendix because it summarizes existing hydrologic and hydrogeologic data and a description of known hydrologic processes. Maps and figures presented in the HSCM and FEIS may slightly differ, however they do represent the most accurate projections of mining placement and analysis boundaries at the time of analysis. Actual mining directions within the LMA and LBA are subject to change.

Appendix C Mining Methods

No changes to this appendix because mining methods exist independent of the LMA and LBA.

Appendix D UPDES Discharge Locations

No changes to this appendix because discharge locations exist independent of the LMA and LBA.

Appendix E Subsidence Evaluation

No changes to this appendix because the entire LMA and LBA boundaries were considered when evaluating subsidence.

Appendix F Air Resource Technical Report

In addition to the following corrections, the SCGHG spreadsheets attached to Appendix F as its Appendix E also received corrections. Those corrected spreadsheets are Attachment 1 of this errata.

Document Citation	Corrected Text
Appendix F (pdf file 5a), Air Quality and Greenhouse Gas Resource Technical Report, page 1 (pdf page 12)	The Little Eccles Tract LBA comprises 120 acres while the Flat Canyon Tract LMA comprises 660 acres. The Bureau of Land Management (BLM) estimates the Flat Canyon Tract LMA contains approximately ***5,000,000 tons*** of recoverable federal coal, and the Little Eccles Tract LBA contains approximately ***1,290,000 tons*** (depending on alternative) of recoverable federal coal.
Appendix F (pdf file 5a), Air Quality and Greenhouse Gas Resource Technical Report, page 4 (pdf page 15) , Table 2.6-1 (page 5 (pdf page 16).	Inclusion of ***1,290,000 tons*** from the Little Eccles Federal Coal Lease Tract (UTU-92226) and ***5,000,000 tons*** from modification of the Flat Canyon Federal Coal Lease Tract (UTU-77114), along with privately owned coal (see section 2.1), would extend the life of mine by ***27 months*** based on the historic rate of production which is discussed in Section 3.3.7. There are about ***5,000,000 tons*** of federal recoverable coal in the LMA area. here are about ***1,290,000 tons*** of federal recoverable coal in the LBA area. There are about ***5,000,000 tons*** of federal recoverable coal in the LMA boundary and along with privately owned coal (see section 2.1) this alternative would extend the life of mine by ***27 months*.**

Document Citation	Corrected Text
	There are about ***1,290,000 tons*** of federal recoverable coal in the LBA area and along with privately owned coal (see section 2.1) the life of mine would be extended by ***15 months***.
Appendix F (pdf file 5a), Air Quality and Greenhouse Gas Resource Technical Report, page 60 (pdf page 71)	Under Alternative 2, the mine would continue mining coal up to a maximum rate of 8 million tons per year and an average rate of 3.6 million tons per year, and the life of the mine would be extended by ***27 months.*** Therefore, maximum and average annual CAP and HAP emissions would also continue to occur at the same rate as current rates described in Sections 3.3.7 through 3.3.11, and listed in **Table 3.4-1**, until ***April 2034.*** Under Alternative 3, the mine would continue mining coal up to a maximum rate of 8 million tons per year and an average rate of 3.6 million tons per year, and the life of the mine would be extended by ***19 months.*** Therefore, maximum and average annual CAP and HAP emissions would also continue to occur at the same rate as current rates as those described in Sections 3.3.7 through 3.3.11, and listed in **Table 3.4-1**, until ***August 2033***.
Appendix F (pdf file 5a), Air Quality and Greenhouse Gas Resource Technical Report, page 61 (pdf page 72)	Under Alternative 4, the mine would continue mining coal up to a maximum rate of 8 million tons per year and an average rate of 3.6 million tons per year, and the life of the mine would be extended by ***15 months***. Therefore, maximum and average annual CAP and HAP emissions would also continue to occur at the same rate as current rates as those described in Sections 3.3.7 through 3.3.11, and listed in **Table 3.4-1**, until ***April 2033.***
PDF pages 88-89 Pages 77-78	Under Alternative 2, the mine would continue mining coal up to a maximum rate of 8 million tons per year and an average rate of 3.6 million tons per year, and the life of the mine would be extended by ***19 months*** (through ***August 2033***). Mining activities, coal transport, and coal combustion would continue to occur at the same rate as current rates. Therefore, annual GHG emissions would also be expected to occur at the same rates. However, the total recoverable coal would increase under this alternative (see **Table 2.6-1).** As a result, total GHG emissions from mining, downstream processing, and combustion of the coal would also increase under this alternative. For the purpose of calculating monetary estimates of the social cost of

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GHGs, as required by the Settlement Agreement discussed in Section 1.0, Tetra Tech has provided an inventory of estimated GHG emissions arising from activities leasing described in **Table 4.4-1** The emissions shown in **Table 4.4-2** were estimated based on the annual average of historical emissions provided in **Table 4.4-1** and proportioned based on the additional life of mine. ***Emissions from coal combustion were estimated based on the additional tonnage of total recoverable coal under this alternative.*** For Alternative 2 additional life of mine in 2032 would be 11 months (February through December), ***12 months in 2033 (January through December), and 4 months in 2034 (January through April).***

Table 4.4-1. Alternative 2 Estimated GHG Emissions by Source (metric tons)

Source	Year	CO_2 [a]	CH_4 [a]	N_2O [a]	CO_2e [b]
Permitted Sources	2032	1,165.20	0.03	0.003	1,166.77
Mobile Surface Equipment		1,130.43	0.05	0.009	1,134.30
Mobile Underground Equipment		3,586.15	0.35	0.261	3,667.42
Coal Mine Methane[c]		-	180.59	-	4,875.92
Employee Commuting		1,424.68	0.04	0.029	1,433.65
Rail Transport		46,264.14	3.74	1.178	46,693.79
Truck Transport		3,000.28	0.02	0.082	3,023.34
Coal Combustion		***10,361,887.04***	***1,221.14***	***178.27***	***10,446,944.54***
Permitted Sources	2033	***1,269.55***	***0.03***	***0.003***	***1,271.26***
Mobile Surface Equipment		***1,231.66***	***0.05***	***0.010***	***1,235.88***
Mobile Underground Equipment		***3,907.29***	***0.38***	***0.28***	***3,995.84***
Coal Mine Methane[c]		-	***196.76***	-	***5,312.57***
Employee Commuting		***1,552.26***	***0.04***	***0.03***	***1,562.03***
Rail Transport		***50,407.20***	***4.07***	***1.28***	***50,875.33***
Truck Transport		***3,268.97***	***0.02***	***0.09***	***3,294.09***

Document Citation	Corrected Text

Coal Combustion		***11,289,817.23***	***1,330.50***	***194.23***	***11,382,491.81***
Permitted Sources	***2034***	***417.39***	***0.01***	***0.001***	***417.95***
Mobile Surface Equipment		***404.93***	***0.02***	***0.003***	***406.32***
Mobile Underground Equipment		***1,284.59***	***0.12***	***0.093***	***1,313.70***
Coal Mine Methanec		***-***	***64.69***	***-***	***1,869.51***
Employee Commuting		***510.33***	***0.01***	***0.010***	***513.55***
Rail Transport		***16,572.23***	***1.34***	***0.422***	***16,726.13***
Truck Transport		***1,074.73***	***0.01***	***0.030***	***1,082.99***
Coal Combustion		***3,711,720.73***	***437.42***	***63.858***	***3,742,189.09***
Total	2032	***10,418,457.92***	***1,405.95***	***179.83***	***10,508,939.73***
	2033	***11,351,454.16***	***1,531.85***	***195.94***	***11,450,038.82***
	2034	***3,731,984.93***	***503.62***	***64.42***	***3,764,519.23***

PDF pages 89-90 Pages 78-79	Under Alternative 3, the mine would continue mining coal up to a maximum rate of 8 million tons per year and an average rate of 3.6 million tons per year, and the life of the mine would be extended by ***19 months*** (through ***August 2033***). Although the amount of total recoverable coal would increase under this alternative (see **Table 2.6-1**), mining activities, coal transport, and coal combustion would continue to occur at the same rate as current rates. For the purpose of calculating monetary estimates of the social cost of GHGs, as required by the Settlement Agreement discussed in Section 1.0, Tetra Tech has provided an inventory of estimated GHG emissions arising from activities on the lease (Section 4.3.5), downstream emissions resulting from employee commuting (Section 4.3.6), and transportation (Section 4.3.7) and combustion (Section 4.3.8) of the coal proposed for leasing. The emissions were estimated based on the annual average of historical emissions provided in Sections 4.3.5 through 4.3.8 and proportioned based on the additional life of mine. ***Emissions from coal combustion were estimated based on the additional tonnage of total recoverable coal under this alternative.*** A detailed description of the assumptions used to calculate the annualized GHG emissions by source are included in **Appendix E**. For Alternative 3 additional life of mine

Document Citation	Corrected Text
	in 2032 would be 11 months (February through December) ***and 8 months in 2033 (January through August).*** GHG emissions for Alternative 3 are shown in **Table 4.4-3**.

Table 4.4-2. Alternative 3 Estimated GHG Emissions by Source (metric tons)

Source	Year	CO_2[a]	CH_4[a]	N_2O[a]	CO_2e[b]
Permitted Sources	2032	1,165.20	0.03	0.003	1,166.77
Mobile Surface Equipment		1,130.43	0.05	0.009	1,134.30
Mobile Underground Equipment		3,586.15	0.35	0.261	3,667.42
Coal Mine Methane[c]		-	180.59	-	4,875.92
Employee Commuting		1,424.68	0.04	0.029	1,433.65
Rail Transport		46,264.14	3.74	1.178	46,693.79
Truck Transport		3,000.28	0.02	0.082	3,023.34
Coal Combustion		***11,385,319.85***	***1,341.75***	***195.88***	***11,478,778.39***
Permitted Sources	***2033***	***845.21***	***0.02***	***0.00***	***846.34***
Mobile Surface Equipment		***819.98***	***0.03***	***0.01***	***822.79***
Mobile Underground Equipment		***2,601.29***	***0.25***	***0.19***	***2,660.25***
Coal Mine Methane		***-***	***130.99***	***-***	***3,536.86***
Employee Commuting		***1,033.42***	***0.03***	***0.02***	***1,039.93***
Rail Transport		***33,558.76***	***2.71***	***0.85***	***33,870.42***
Truck Transport		***2,176.33***	***0.01***	***0.06***	***2,193.05***
Coal Combustion		***8,258,605.15***	***973.27***	***142.08***	***8,326,397.46***
Total	2032	***11,441,890.73***	***1,526.56***	***197.44***	***11,540,773.59***
	2033	***8,299,640.14***	***1,107.32***	***143.22***	***8,371,367.11***

Document Citation	Corrected Text
PDF pages 90-91 Pages 79-80	Under Alternative 4, the mine would continue mining coal up to a maximum rate of 8 million tons per year and an average rate of 3.6 million tons per year, and the life of the mine would be extended by ***15 months (through April 2033).*** Although the amount of total recoverable coal would increase under this alternative (see **Table 2.6-1**), mining activities, coal transport, and coal combustion would continue to occur at the same rate as current rates. For the purpose of calculating monetary estimates of the social cost of GHGs, as required by the Settlement Agreement discussed in Section 1.0, Tetra Tech has provided an inventory of estimated GHG emissions arising from activities on the lease (Section 4.3.5), downstream emissions resulting from employee commuting (Section 4.3.6), and transportation (Section 4.3.7) and combustion (Section 4.3.8) of the coal proposed for leasing. The emissions were estimated based on the annual average of historical emissions provided in Sections 4.3.5 through 4.3.8 and proportioned based on the additional life of mine. ***Emissions from coal combustion were estimated based on the additional tonnage of total recoverable coal under this alternative.*** A detailed description of the assumptions used to calculate the annualized GHG emissions by source are included in **Appendix E**. For Alternative 4 additional life of mine in 2032 would be 11 months (February through December) ***and 4 months in 2033 (January through April).*** GHG emissions for Alternative 4 are shown in **Table 4.4-4**.

Table 4.4-3. Alternative 4 Estimated GHG Emissions by Source (metric tons)

Source	Year	CO_2 [a]	CH_4 [a]	N_2O [a]	CO_2e [b]
Permitted Sources	2032	1,165.20	0.03	0.003	1,166.77
Mobile Surface Equipment		1,130.43	0.05	0.009	1,134.30
Mobile Underground Equipment		3,586.15	0.35	0.261	3,667.42
Coal Mine Methane[c]		-	180.59	-	4,875.92
Employee Commuting		1,424.68	0.04	0.029	1,433.65
Rail Transport		46,264.14	3.74	1.178	46,693.79
Truck Transport		3,000.28	0.02	0.082	3,023.34
Coal Combustion		***7,788,750.00***	***917.90***	***134.00***	***7,852,685.42***

Document Citation	Corrected Text

Permitted Sources	2033	417.39	0.01	0.001	417.95
Mobile Surface Equipment		404.93	0.02	0.003	406.32
Mobile Underground Equipment		1,284.59	0.12	0.09	1,313.70
Coal Mine Methane[c]		-	64.69	-	1,746.60
Employee Commuting		510.33	0.01	0.01	513.55
Rail Transport		16,572.23	1.34	0.42	16,726.13
Truck Transport		1,074.73	0.01	0.03	1,082.99
Coal Combustion		2,790,000.00	328.80	48.00	2,812,902.24
Total	2032	7,845,320.88	1,102.70	135.56	7,914,680.61
	2033	2,810,264.20	395.00	48.56	2,835,109.47

Document Citation	Corrected Text
Appendix F (pdf file 5a), Air Quality and Greenhouse Gas Resource Technical Report, page 81 (pdf page 92) and PDF page 93, Page 75, Section 3.3.4.5	These estimates represent the present value (from the perspective of [2020 for IWG estimates and 2023 for EPA estimates]) of future market and nonmarket costs associated with CO_2, CH_4, and N_2O emissions as described in Subsections 4.3.5 through 4.3.8. The estimates assume emissions will start in 2032 and end in ***2033 or 2034,*** depending on the alternative, based on the current mining plan.

Appendix G Biological Evaluation

Document Citation	Corrected Text
PDF page 7 Page 4 Section 2.2	• The Flat Canyon LMA (UTU-77114) would include 660 acres: 640 acres as previously outlined in a revised LMA application and an additional 20 acres added by BLM for maximum economic recovery in April 2025. There are about ***5.0 million*** tons of federal recoverable coal in the LMA area. • The Little Eccles LBA (UTU-92226) would include 120 acres. There are about ***1,290,000*** tons of federal recoverable coal in the LBA area.

<table>
<tr><th>Document Citation</th><th>Corrected Text</th></tr>
<tr><td></td><td>The Skyline Mine would likely produce 3 to 4 million tons of coal per year, which has been their approximate production over the past 10 years. Inclusion of coal from the Little Eccles Tract (UTU-92226) and the modification of the Flat Canyon Tract (UTU-77114), along with 16.4 million tons of privately owned coal, would result in mining a total of 22.7 million tons of coal. At the current rate of production this would extend the life-of-mine by 27 months compared to the no action alternative.</td></tr>
<tr><td>PDF page 8
Page 5
Section 2.3</td><td>Under Alternative 3, the BLM, with Forest Service consent conditioned with stipulations, would lease only modify the Flat Canyon Federal Coal Lease Tract (UTU-77114) LMA of 660 acres. Mining the 5 million tons of federal recoverable coal in the LMA boundary along with 15.2 million tons of privately owned coal would result in mining a total of 22.7 million tons of coal and would extend the life-of-mine by 19 months compared to the no action alternative.</td></tr>
<tr><td>PDF page 8
Page 5
Section 2.4</td><td>Under Alternative 4, the BLM, with Forest Service consent conditioned with stipulations, would offer for competitive lease only the Little Eccles Federal Coal Lease Tract (UTU-92226) of 120 acres. Mining the 1.29 million tons of federal recoverable coal in the LBA area, along with 15.0 million tons of privately owned coal would result in mining a total of 16.3 million tons of coal and would extend the life-of-mine by 15 months compared to the no action alternative.</td></tr>
<tr><td>PDF page 19
Page 16
Table 4</td><td>
<table>
<tr><th>Alternative</th><th>Total Acreage of Subsidence</th><th>Acreage Susceptible to Tensile Fractures within Subsidence Area[1]</th><th>Life of Mine</th></tr>
<tr><td>Alternative 1 – No Action</td><td>1,230 acres</td><td>6.2 acres</td><td>January 2032</td></tr>
<tr><td>Preferred Alternative - Alternative 2: Modify the Flat Canyon Lease and Lease the Little Eccles Tract</td><td>1,923 acres</td><td>9.6 acres</td><td>April 2034</td></tr>
<tr><td>Alternative 3: Only Modify the Flat Canyon Lease</td><td>1,827 acres</td><td>9.1 acres</td><td>August 2033</td></tr>
</table>
</td></tr>
</table>

Document Citation	Corrected Text			
	Alternative 4: Only Lease the Little Eccles Lease	1,509 acres	7.5 acres	***April 2033***
	[1] Estimated based on past monitoring at Skyline Mine, which found that less than 0.5 percent of the area subject to subsidence experience tensile fractures (OSMRE 2016).			

Errata Attachment 1: Updated SCGHG Calculations Spreadsheet from Appendix F's Appendix E

Skyline Mine Little Eccles EIS

Skyline Mine and Skyline Mine Coal

Emmissions Summary
GHG by Alternative

Summary of Alternatives

Lease	Tons Coal			
	Alterntive 1: No Action	Alternative 2: LMA and LBA	Alternative 3: LMA Only	Alternative 4: LBA Only
LMA	-	**5,000,000**	**5,000,000**	-
LBA	-	**1,290,000**	-	**1,290,000**
Private	11,748,000	16,367,000	15,197,000	15,008,000
Total	11,748,000	**22,657,000**	**20,197,000**	**16,298,000**
Total Additional Coal	-	**10,909,000**	**8,449,000**	**4,550,000**
Total Additional Federal Coal	-	**6,290,000**	**5,000,000**	**1,290,000**
Life of Mine	Jan-32	**Apr-34**	**Aug-33**	**Apr-33**
Additional Months	-	27	19	15
Additional Days	2032	335	335	335
	2033	**365**	**243**	**120**
	2034	**120**	-	-

Source	Annual Estimates (MT/yr)			
	CO_2	CH_4	N_2O	CO_2e
Permitted Sources[a]	1,269.55	0.03	0.003	1,271.26
Above Ground Mobile Sources[b]	1,231.66	0.05	0.010	1,235.88
Underground Mobile Sources[c]	3,907.29	0.38	0.28	3,995.84
Coal Mine Methane[d]	-	196.76	-	5,312.57
Employee Commute[e]	1,552.26	0.04	0.03	1,562.03
Rail Transport[f]	50,407.20	4.07	1.28	50,875.33
Truck Transport[f]	3,268.97	0.02	0.09	3,294.09
Coal Combustion	6,605,801.04	778.99	113.31	6,659,246.56
Total	6,667,437.97	980.34	115.01	6,726,793.56
100-yr GWP Factors[h]	1	28.9	273	

Source	Year	Alternative 2 (MT/yr)				Alternative 3 (MT/yr)				Alternative 4 (MT/yr)			
		CO_2	CH_4	N_2O	CO_2e	CO_2	CH_4	N_2O	CO_2e	CO_2	CH_4	N_2O	CO_2e
Permitted Sources	2032	1,165.20	0.03	0.003	1,166.77	1,165.20	0.03	0.003	1,166.77	1,165.20	0.03	0.003	1,166.77
Above Ground Mobile Sources		1,130.43	0.05	0.009	1,134.30	1,130.43	0.05	0.009	1,134.30	1,130.43	0.05	0.009	1,134.30
Underground Mobile Sources		3,586.15	0.35	0.26	3,667.42	3,586.15	0.35	0.26	3,667.42	3,586.15	0.35	0.26	3,667.42
Coal Mine Methane		-	180.59	-	4,875.92	-	180.59	-	4,875.92	-	180.59	-	4,875.92
Employee Commute		1,424.68	0.04	0.03	1,433.65	1,424.68	0.04	0.03	1,433.65	1,424.68	0.04	0.03	1,433.65
Rail Transport		46,264.14	3.74	1.18	46,693.79	46,264.14	3.74	1.18	46,693.79	46,264.14	3.74	1.18	46,693.79
Truck Transport		3,000.28	0.02	0.08	3,023.34	3,000.28	0.02	0.08	3,023.34	3,000.28	0.02	0.08	3,023.34
Coal Combustion[g]		**10,361,887.04**	**1,221.14**	**178.27**	**10,446,944.54**	**11,385,319.85**	**1,341.75**	**195.88**	**11,478,778.39**	**7,788,750.00**	**917.90**	**134.00**	**7,852,685.42**
Total		**10,418,457.92**	**1,405.95**	**179.83**	**10,508,939.73**	**11,441,890.73**	**1,526.56**	**197.44**	**11,540,773.59**	**7,845,320.88**	**1,102.70**	**135.56**	**7,914,680.61**
Permitted Sources	2033	**1,269.55**	**0.03**	**0.003**	**1,271.26**	**845.21**	**0.02**	**0.00**	**846.34**	**417.39**	**0.01**	**0.001**	**417.95**
Above Ground Mobile Sources		**1,231.66**	**0.05**	**0.010**	**1,235.88**	**819.98**	**0.03**	**0.01**	**822.79**	**404.93**	**0.02**	**0.003**	**406.32**
Underground Mobile Sources		**3,907.29**	**0.38**	**0.28**	**3,995.84**	**2,601.29**	**0.25**	**0.19**	**2,660.25**	**1,284.59**	**0.12**	**0.09**	**1,313.70**
Coal Mine Methane		**-**	**196.76**	**-**	**5,312.57**	**-**	**130.99**	**-**	**3,536.86**	**-**	**64.69**	**-**	**1,746.60**
Employee Commute		**1,552.26**	**0.04**	**0.03**	**1,562.03**	**1,033.42**	**0.03**	**0.02**	**1,039.93**	**510.33**	**0.01**	**0.01**	**513.55**
Rail Transport		**50,407.20**	**4.07**	**1.28**	**50,875.33**	**33,558.76**	**2.71**	**0.85**	**33,870.42**	**16,572.23**	**1.34**	**0.42**	**16,726.13**
Truck Transport		**3,268.97**	**0.02**	**0.09**	**3,294.09**	**2,176.33**	**0.01**	**0.06**	**2,193.05**	**1,074.73**	**0.01**	**0.03**	**1,082.99**
Coal Combustion[g]		**11,289,817.23**	**1,330.50**	**194.23**	**11,382,491.81**	**8,258,605.15**	**973.27**	**142.08**	**8,326,397.46**	**2,790,000.00**	**328.80**	**48.00**	**2,812,902.24**
Total		**11,351,454.16**	**1,531.85**	**195.94**	**11,450,038.82**	**8,299,640.14**	**1,107.32**	**143.22**	**8,371,367.11**	**2,810,264.20**	**395.00**	**48.56**	**2,835,109.47**
Permitted Sources	**2034**	**417.39**	**0.01**	**0.001**	**417.95**								
Above Ground Mobile Sources		**404.93**	**0.02**	**0.003**	**406.32**								
Underground Mobile Sources		**1,284.59**	**0.12**	**0.093**	**1,313.70**								
Coal Mine Methane		**-**	**64.69**	**-**	**1,869.51**								
Employee Commute		**510.33**	**0.01**	**0.010**	**513.55**								
Rail Transport		**16,572.23**	**1.34**	**0.422**	**16,726.13**								
Truck Transport		**1,074.73**	**0.01**	**0.030**	**1,082.99**								
Coal Combustion[g]		**3,711,720.73**	**437.42**	**63.858**	**3,742,189.09**								
Total		**3,731,984.93**	**503.62**	**64.42**	**3,764,519.23**								

[a]Natural gas combustion sources based on average historical emissions 2020-2023. Diesel powered emergency engine emissions based on 70 operating hours per year per engine.

[b]Average historical emissions 2019-2023

[c]Emissions based on estimated underground equipment use during typical shift.

[d]Average of historical monitored methane emissions 2018-2022.

[e]Emissions based on 60 trips per shift with average one way commute distance of 40 miles. Distributed equally between counties within the analysis area.

[f]Average historical transportation emissions 2020-2023.

[g]Based on total additional coal

[h]Climate Change 2021: The Physical Science Basis, Table 7.15 (non-fossil fuel CH4 GWP of 27 used for coal mine methane)

TETRA TECH

August 2025

SOCIAL COST OF CARBON DIOXIDE CALCULATOR

Base Year	2025	(The Base Year is often the current year and can be no later than the first year of emissions.)
Year 1	2032	(First year of emissions)

Year of emissions	**CO_2 emissions (metric tons)[1]**	**Per ton SC-CO_2 Value (2020$/metric ton CO_2)[2,3]**				**Present Value (in Base Year) of Estimated SC-CO_2 by emissions year (2020$)[4]**				**Present Value (in Base Year) of Estimated SC-CO_2 by emissions year (Millions, 2020$)[4]**			
		Average, 5%	**Average, 3%**	**Average 2.5%**	**95th Percentile, 3%**	**Average, 5%**	**Average, 3%**	**Average 2.5%**	**95th Percentile, 3%**	**Average, 5%**	**Average, 3%**	**Average 2.5%**	**95th Percentile, 3%**
2032	*10,418,457.92*	$21	$64	$92	$194	*$152,008,299*	*$542,594,721*	*$808,165,444*	*$1,646,446,128*	*$152.01*	*$542.59*	*$808.17*	*$1,646.45*
2033	*11,351,454.16*	$21	$65	$94	$198	*$162,221,205*	*$584,217,622*	*$871,760,538*	*$1,775,906,514*	*$162.22*	*$584.22*	*$871.76*	*$1,775.91*
2034	*3731984.93*	*$22*	*$66*	*$95*	*$202*	*$52,195,838*	*$189,749,363*	*$283,691,859*	*$577,788,812*	*$52.20*	*$189.75*	*$283.69*	*$577.79*

	Average, 5%	Average, 3%	Average 2.5%	95th Percentile, 3%
Present Value (in Base Year) of Estimated SC-CO_2 for all CO_2 emissions, 2020$)	*$366,425,342*	*$1,316,561,706*	*$1,963,617,840*	*$4,000,141,453*

[1]Annual GHG Estimates from from Air Resource Specialist

[2]*Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide, Interim Estimates under E.O. 13990.* Interagency Working Group on Social Cost of Carbon, United States Government. February 2021.

[3]Social Cost estimates for emissions years beyond 2050 are estimated using an annual growth rate equal to the average annual growth in social cost estimates for the last five years of available estimates from the TSD (2046-2050)

[4]The SCC estimates from the IWG represent the present value of damages from that year's emissions discounted back to the year of emissions. These columns take that value and discount to the base year in order to facilitate the total NPV calculation.

This calculator was developed by Rebecca Moore, Senior Economist, BLM 970-226-9246 rmoore@blm.gov
Last updated 11/18/21

SOCIAL COST OF METHANE CALCULATOR

Base Year	2025	(The Base Year is often the current year and can be no later than the first year of emissions.)
Year 1	2032	(First year of emissions)

Year of emissions	**CH4 emissions (metric tons)**[1]	**Per ton SC-CH_4 Value (2020$/metric ton CH_4)**[2,3] Average, 5%	Average, 3%	Average 2.5%	95th Percentile, 3%	**Present Value (in Base Year) of Estimated SC-CH_4 by emissions year (2020$)**[4] Average, 5%	Average, 3%	Average 2.5%	95th Percentile, 3%	**Present Value (in Base Year) of Estimated SC-CH_4 by emissions year (Millions, 2020$)**[4] Average, 5%	Average, 3%	Average 2.5%	95th Percentile, 3%
2032	*1,405.95*	$1,007	$2,065	$2,635	$5,498	*$1,005,906*	*$2,360,859*	*$3,117,086*	*$6,285,113*	*$1.01*	*$2.36*	*$3.12*	*$6.29*
2033	*1,531.85*	$1,041	$2,121	$2,699	$5,652	*$1,079,438*	*$2,564,320*	*$3,393,728*	*$6,834,458*	*$1.08*	*$2.56*	*$3.39*	*$6.83*
2034	*503.62*	*$1,075*	*$2,176*	*$2,763*	*$5,806*	*$349,144*	*$839,882*	*$1,114,300*	*$2,240,855*	*$0.35*	*$0.84*	*$1.11*	*$2.24*

	Average, 5%	Average, 3%	Average 2.5%	95th Percentile, 3%
Present Value (in Base Year) of Estimated SC-CH_4 for all CH_4 emissions, 2020$)	*$2,434,488*	*$5,765,060*	*$7,625,114*	*$15,360,426*

[1]Annual GHG Estimates from from Air Resource Specialist

[2]*Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide, Interim Estimates under E.O. 13990.* Interagency Working Group on Social Cost of Carbon, United States Government. February 2021.

[3]Social Cost estimates for emissions years beyond 2050 are estimated using an annual growth rate equal to the average annual growth in social cost estimates for the last five years of available estimates from the TSD (2046-2050)

[4]The SCC estimates from the IWG represent the present value of damages from that year's emissions discounted back to the year of emissions. These columns take that value and discount to the base year in order to facilitate the total NPV calculation.

This calculator was developed by Rebecca Moore, Senior Economist, BLM 970-226-9246 rmoore@blm.gov
Last updated 11/18/21

SOCIAL COST OF NITROUS OXIDE CALCULATOR

Base Year	2025	(The Base Year is often the current year and can be no later than the first year of emissions.)
Year 1	2032	(First year of emissions)

Year of emissions	**N2O emissions (metric tons)**[1]	**Per ton SC-N_2O Value (2020\$/metric ton N_2O)**[2,3]				**Present Value (in Base Year) of Estimated SC-N_2O by emissions year (2020\$)**[4]				**Present Value (in Base Year) of Estimated SC-N_2O by emissions year (Millions, 2020\$)**[4]			
		Average, 5%	**Average, 3%**	**Average 2.5%**	**95th Percentile, 3%**	**Average, 5%**	**Average, 3%**	**Average 2.5%**	**95th Percentile, 3%**	**Average, 5%**	**Average, 3%**	**Average 2.5%**	**95th Percentile, 3%**
2032	***179.83***	\$8,295	\$23,760	\$33,921	\$63,051	***\$1,060,074***	***\$3,474,167***	***\$5,131,755***	***\$9,219,347***	***\$1.06***	***\$3.47***	***\$5.13***	***\$9.22***
2033	***195.94***	\$8,542	\$24,252	\$34,532	\$64,410	***\$1,132,857***	***\$3,751,121***	***\$5,553,261***	***\$9,962,608***	***\$1.13***	***\$3.75***	***\$5.55***	***\$9.96***
2034	***64.42***	***\$8,790***	***\$24,744***	***\$35,144***	***\$65,770***	***\$364,997***	***\$1,221,611***	***\$1,812,736***	***\$3,247,079***	***\$0.36***	***\$1.22***	***\$1.81***	***\$3.25***

	Average, 5%	Average, 3%	Average 2.5%	95th Percentile, 3%
Present Value (in Base Year) of Estimated SC-N_2O for all N_2O emissions, 2020\$)	***\$2,557,928***	***\$8,446,900***	***\$12,497,751***	***\$22,429,035***

[1]Annual GHG Estimates from from Air Resource Specialist

[2]*Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide, Interim Estimates under E.O. 13990.* Interagency Working Group on Social Cost of Carbon, United States Government. February 2021.

[3]Social Cost estimates for emissions years beyond 2050 are estimated using an annual growth rate equal to the average annual growth in social cost estimates for the last five years of available estimates from the TSD (2046-2050)

[4]The SCC estimates from the IWG represent the present value of damages from that year's emissions discounted back to the year of emissions. These columns take that value and discount to the base year in order to facilitate the total NPV calculation.

This calculator was developed by Rebecca Moore, Senior Economist, BLM 970-226-9246 rmoore@blm.gov
Last updated 11/18/21

SC-GHG for all years

	Average, 5%	Average, 3%	Average 2.5%	95th Percentile, 3%
CO2	***$366,425,342***	***$1,316,561,706***	***$1,963,617,840***	***$4,000,141,453***
CH4	***$2,434,488***	***$5,765,060***	***$7,625,114***	***$15,360,426***
N2O	***$2,557,928***	***$8,446,900***	***$12,497,751***	***$22,429,035***
Total	***$371,417,759***	***$1,330,773,666***	***$1,983,740,706***	***$4,037,930,914***
Total (million, 2020$)	***$371.42***	***$1,330.77***	***$1,983.74***	***$4,037.93***

Table for NEPA (all gasses, all years, by phase), rounded to nearest $1000

	Average, 5%	Average, 3%	Average 2.5%	95th Percentile, 3%
Total	***$371,418,000***	***$1,330,774,000***	***$1,983,741,000***	***$4,037,931,000***

Users should complete boxes colored in lavender, orange, and green.

Present Value Year	2025
Dollar Year	2023

	Emission Changes (metric tons)			Years used in Annualization
				3 years
	CO2	CH4	N2O	Please confirm this is correct
Year				
2020				
2021				
2022				
2023				
2024				
2025				
2026				
2027				
2028				
2029				
2030				
2031				
2032	10,418,457.9	1,405.9	179.8	✓
2033	11,351,454.2	1,531.9	195.9	✓
2034	3,731,984.9	503.6	64.4	✓
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Totals	25,501,897	3,441	440	

	Undiscounted, Monetized Value of Emission Changes, deflated to 2023 dollars								
	Undiscounted, Monetized Value of CO2 Emissions Changes (millions, 2023$)			Undiscounted, Monetized Value of CH4 Emissions Changes (millions, 2023$)			Undiscounted, Monetized Value of N2O Emissions Changes (millions, 2023$)		
	CO2	CO2	CO2	CH4	CH4	CH4	N2O	N2O	N2O
	Near-Term Ramsey Discount Rate			Near-Term Ramsey Discount Rate			Near-Term Ramsey Discount Rate		
Year	2.5%	2.0%	1.5%	2.5%	2.0%	1.5%	2.5%	2.0%	1.5%
2020									
2021									
2022									
2023									
2024									
2025									
2026									
2027									
2028									
2029									
2030									
2031									
2032	$1,813.27	$2,864.97	$4,762.86	$3.39	$4.21	$5.50	$9.74	$14.38	$22.18
2033	$2,015.17	$3,174.22	$5,242.07	$3.83	$4.74	$6.17	$10.83	$15.95	$24.53
2034	$671.18	$1,060.90	$1,745.07	$1.31	$1.61	$2.09	$3.64	$5.34	$8.18
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Annual Unrounded SC-CO2, SC-CH4, and SC-N2O Values, 2020-2080 (in 2020$)									
Gas	CO2	CO2	CO2	CH4	CH4	CH4	N2O	N2O	N2O
Near-term Ramsey Discount Rate	2.50%	2.00%	1.50%	2.50%	2.00%	1.50%	2.50%	2.00%	1.50%
2020	117	193	337	1,257	1,648	2,305	35,232	54,139	87,284
2021	119	197	341	1,324	1,723	2,391	36,180	55,364	88,869
2022	122	200	346	1,390	1,799	2,478	37,128	56,590	90,454
2023	125	204	351	1,457	1,874	2,564	38,076	57,816	92,040
2024	128	208	356	1,524	1,950	2,650	39,024	59,041	93,625
2025	130	212	360	1,590	2,025	2,737	39,972	60,267	95,210
2026	133	215	365	1,657	2,101	2,823	40,920	61,492	96,796
2027	136	219	370	1,724	2,176	2,910	41,868	62,718	98,381
2028	139	223	375	1,791	2,252	2,996	42,816	63,944	99,966
2029	141	226	380	1,857	2,327	3,083	43,764	65,169	101,552
2030	144	230	384	1,924	2,403	3,169	44,712	66,395	103,137
2031	147	234	389	2,002	2,490	3,270	45,693	67,645	104,727
2032	150	237	394	2,080	2,578	3,371	46,674	68,895	106,316
2033	153	241	398	2,157	2,666	3,471	47,655	70,145	107,906
2034	155	245	403	2,235	2,754	3,572	48,636	71,394	109,495
2035	158	248	408	2,313	2,842	3,673	49,617	72,644	111,085
2036	161	252	412	2,391	2,929	3,774	50,598	73,894	112,674
2037	164	256	417	2,468	3,017	3,875	51,578	75,144	114,264
2038	167	259	422	2,546	3,105	3,975	52,559	76,394	115,853
2039	170	263	426	2,624	3,193	4,076	53,540	77,644	117,443
2040	173	267	431	2,702	3,280	4,177	54,521	78,894	119,032
2041	176	271	436	2,786	3,375	4,285	55,632	80,304	120,809
2042	179	275	441	2,871	3,471	4,394	56,744	81,714	122,586
2043	182	279	446	2,955	3,566	4,502	57,855	83,124	124,362
2044	186	283	451	3,040	3,661	4,610	58,966	84,535	126,139
2045	189	287	456	3,124	3,756	4,718	60,078	85,945	127,916
2046	192	291	462	3,209	3,851	4,827	61,189	87,355	129,693
2047	195	296	467	3,293	3,946	4,935	62,301	88,765	131,469
2048	199	300	472	3,378	4,041	5,043	63,412	90,176	133,246
2049	202	304	477	3,462	4,136	5,151	64,523	91,586	135,023
2050	205	308	482	3,547	4,231	5,260	65,635	92,996	136,799
2051	208	312	487	3,624	4,320	5,363	66,673	94,319	138,479
2052	211	315	491	3,701	4,409	5,466	67,712	95,642	140,158
2053	214	319	496	3,779	4,497	5,569	68,750	96,965	141,838
2054	217	323	500	3,856	4,586	5,672	69,789	98,288	143,517
2055	220	326	505	3,933	4,675	5,774	70,827	99,612	145,196
2056	222	330	510	4,011	4,763	5,877	71,866	100,935	146,876
2057	225	334	514	4,088	4,852	5,980	72,904	102,258	148,555
2058	228	338	519	4,165	4,941	6,083	73,943	103,581	150,235
2059	231	341	523	4,243	5,029	6,186	74,981	104,904	151,914
2060	234	345	528	4,320	5,118	6,289	76,020	106,227	153,594
2061	236	348	532	4,389	5,199	6,385	76,920	107,385	155,085
2062	239	351	535	4,458	5,280	6,480	77,820	108,542	156,576
2063	241	354	539	4,527	5,361	6,576	78,720	109,700	158,066
2064	244	357	543	4,596	5,442	6,671	79,620	110,857	159,557
2065	246	360	547	4,666	5,523	6,767	80,520	112,015	161,048
2066	248	363	550	4,735	5,604	6,862	81,419	113,172	162,539
2067	251	366	554	4,804	5,685	6,958	82,319	114,330	164,030
2068	253	369	558	4,873	5,765	7,053	83,219	115,487	165,521
2069	256	372	562	4,942	5,846	7,149	84,119	116,645	167,012
2070	258	375	565	5,011	5,927	7,244	85,019	117,802	168,503
2071	261	378	569	5,085	6,013	7,344	86,012	119,027	170,013
2072	263	382	573	5,160	6,099	7,444	87,006	120,252	171,523
2073	266	385	576	5,234	6,184	7,545	87,999	121,477	173,033
2074	269	388	580	5,309	6,270	7,645	88,992	122,702	174,543
2075	271	391	583	5,383	6,355	7,745	89,985	123,926	176,053
2076	274	394	587	5,458	6,441	7,845	90,978	125,151	177,563
2077	276	398	591	5,532	6,527	7,946	91,971	126,376	179,073
2078	279	401	594	5,607	6,612	8,046	92,964	127,601	180,582
2079	282	404	598	5,681	6,698	8,146	93,958	128,826	182,092
2080	284	407	601	5,756	6,783	8,246	94,951	130,050	183,602

Source: EPA Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances (https://www.epa.gov/system/files/documents/2023-12/epa_scghg_2023_report_final.pdf)

GDP Deflator (used to convert from 2020$ to currency dollar year)													
Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
GDP index	91.481	93.185	94.771	96.421	97.316	98.241	100.000	102.291	104.008	105.381	110.213	117.973	122.273
2020 Deflator	0.868097665	0.884267562	0.899317714	0.914975185	0.923468177	0.932245851	0.948937664	0.970677826	0.986971086	1	1.045852668	1.119490231	1.16029455

Source: Gross domestic product (implicit price deflator), Index 2017=100, Annual, Not Seasonally Adjusted; Federal Reserve Economic Data. Downloaded 03-13-24 (https://fred.stlouisfed.org/series/A191RD3A086NBEA)

Emission Changes			
	Emissions Changes (metric tons)		
Year	CO2	CH4	N2O
2020			
2021			
2022			
2023			
2024			
2025			
2026			
2027			
2028			
2029			
2030			
2031			
2032	10,418,457.9	1,405.9	179.8
2033	11,351,454.2	1,531.9	195.9
2034	3,731,984.9	503.6	64.4
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Total	25,501,897	3,441	440

Constant discounting			
Number of years (N)	3		
Discount Rate	2.5%	2.0%	1.5%

Present and Annualized Values of CO2 Emission Changes (millions, 2023$)			
GHG	CO2	CO2	CO2
Discount Rate	2.5%	2.0%	1.5%
Present Value in 2025 (2023$)	$3,716.82	$6,091.01	$10,471.14
Annualized Value (3 Years, 2023$)	$1,301.40	$2,112.08	$3,595.61

Present and Annualized Values of CH4 Emission Changes (millions, 2023$)			
GHG	CH4	CH4	CH4
Discount Rate	2.5%	2.0%	1.5%
Present Value in 2025 (2023$)	$7.05	$9.05	$12.26
Annualized Value (3 Years, 2023$)	$2.47	$3.14	$4.21

Present and Annualized Values of N2O Emission Changes (millions, 2023$)			
GHG	N2O	N2O	N2O
Discount Rate	2.5%	2.0%	1.5%
Present Value in 2025 (2023$)	$20.00	$30.59	$48.92
Annualized Value (3 Years, 2023$)	$7.00	$10.61	$16.80

Total Present and Annualized Values of all GHG Emission Changes (CO2, CH4, and N2O) (millions, 2023$)			
GHG	Total	Total	Total
Discount Rate	2.5%	2.0%	1.5%
Present Value in 2025 (2023$)	$3,743.86	$6,130.65	$10,532.32
Annualized Value (3 Years, 2023$)	$1,310.86	$2,125.83	$3,616.62

	Discounted, Monetized Value of Emission Changes, discounted to 2025 (millions, 2023$) - Constant Discounting								
	Discounted, Monetized Value of CO2 Emissions Changes (millions, 2023$)			Discounted, Monetized Value of CH4 Emissions Changes (millions, 2023$)			Discounted, Monetized Value of N2O Emissions Changes (millions, 2023$)		
	Discounted Back to 2025			Discounted Back to 2025			Discounted Back to 2025		
	CO2	CO2	CO2	CH4	CH4	CH4	N2O	N2O	N2O
Year	2.5%	2.0%	1.5%	2.5%	2.0%	1.5%	2.5%	2.0%	1.5%
2020									
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2032	$1,525.44	$2,494.13	$4,291.47	$2.85	$3.66	$4.95	$8.19	$12.51	$19.99
2033	$1,653.94	$2,709.16	$4,653.44	$3.15	$4.04	$5.48	$8.89	$13.61	$21.78
2034	$537.43	$887.71	$1,526.23	$1.05	$1.35	$1.83	$2.91	$4.47	$7.16
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Totals	$3,716.82	$6,091.01	$10,471.14	$7.05	$9.05	$12.26	$20.00	$30.59	$48.92

SOCIAL COST OF CARBON DIOXIDE CALCULATOR

Base Year	2025	(The Base Year is often the current year and can be no later than the first year of emissions.)
Year 1	2032	(First year of emissions)

Year of emissions	**CO_2 emissions (metric tons)**[1]	**Per ton SC-CO_2 Value (2020$/metric ton CO_2)**[2,3]				**Present Value (in Base Year) of Estimated SC-CO_2 by emissions year (2020$)**[4]				**Present Value (in Base Year) of Estimated SC-CO_2 by emissions year (Millions, 2020$)**[4]			
		Average, 5%	**Average, 3%**	**Average 2.5%**	**95th Percentile, 3%**	**Average, 5%**	**Average, 3%**	**Average 2.5%**	**95th Percentile, 3%**	**Average, 5%**	**Average, 3%**	**Average 2.5%**	**95th Percentile, 3%**
2032	11,441,890.73	$21	$64	$92	$194	***$166,940,478***	***$595,895,242***	***$887,553,683***	***$1,808,180,907***	***$166.94***	***$595.90***	***$887.55***	***$1,808.18***
2033	8,299,640.14	$21	$65	$94	$198	***$118,608,384***	***$427,151,972***	***$637,389,594***	***$1,298,457,871***	***$118.61***	***$427.15***	***$637.39***	***$1,298.46***

	Average, 5%	Average, 3%	Average 2.5%	95th Percentile, 3%
Present Value (in Base Year) of Estimated SC-CO_2 for all CO_2 emissions, 2020$)	***$285,548,861***	***$1,023,047,215***	***$1,524,943,277***	***$3,106,638,777***

[1]Annual GHG Estimates from from Air Resource Specialist

[2]*Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide, Interim Estimates under E.O. 13990.* Interagency Working Group on Social Cost of Carbon, United States Government. February 2021.

[3]Social Cost estimates for emissions years beyond 2050 are estimated using an annual growth rate equal to the average annual growth in social cost estimates for the last five years of available estimates from the TSD (2046-2050)

[4]The SCC estimates from the IWG represent the present value of damages from that year's emissions discounted back to the year of emissions. These columns take that value and discount to the base year in order to facilitate the total NPV calculation.

This calculator was developed by Rebecca Moore, Senior Economist, BLM 970-226-9246 rmoore@blm.gov
Last updated 11/18/21

SOCIAL COST OF METHANE CALCULATOR

Base Year	2025	(The Base Year is often the current year and can be no later than the first year of emissions.)
Year 1	2032	(First year of emissions)

Year of emissions	**CH4 emissions (metric tons)**[1]	**Per ton SC-CH_4 Value (2020$/metric ton CH_4)**[2,3]				**Present Value (in Base Year) of Estimated SC-CH_4 by emissions year (2020$)**[4]				**Present Value (in Base Year) of Estimated SC-CH_4 by emissions year (Millions, 2020$)**[4]			
		Average, 5%	**Average, 3%**	**Average 2.5%**	**95th Percentile, 3%**	**Average, 5%**	**Average, 3%**	**Average 2.5%**	**95th Percentile, 3%**	**Average, 5%**	**Average, 3%**	**Average 2.5%**	**95th Percentile, 3%**
2032	1,526.56	$1,007	$2,065	$2,635	$5,498	***$1,092,199***	***$2,563,388***	***$3,384,490***	***$6,824,290***	***$1.09***	***$2.56***	***$3.38***	***$6.82***
2033	1,107.32	$1,041	$2,121	$2,699	$5,652	***$780,289***	***$1,853,659***	***$2,453,210***	***$4,940,397***	***$0.78***	***$1.85***	***$2.45***	***$4.94***

	Average, 5%	Average, 3%	Average 2.5%	95th Percentile, 3%
Present Value (in Base Year) of Estimated SC-CH_4 for all CH_4 emissions, 2020$)	***$1,872,488***	***$4,417,047***	***$5,837,700***	***$11,764,687***

[1]Annual GHG Estimates from from Air Resource Specialist

[2]*Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide, Interim Estimates under E.O. 13990.* Interagency Working Group on Social Cost of Carbon, United States Government. February 2021.

[3]Social Cost estimates for emissions years beyond 2050 are estimated using an annual growth rate equal to the average annual growth in social cost estimates for the last five years of available estimates from the TSD (2046-2050)

[4]The SCC estimates from the IWG represent the present value of damages from that year's emissions discounted back to the year of emissions. These columns take that value and discount to the base year in order to facilitate the total NPV calculation.

This calculator was developed by Rebecca Moore, Senior Economist, BLM 970-226-9246 rmoore@blm.gov
Last updated 11/18/21

SOCIAL COST OF NITROUS OXIDE CALCULATOR

Base Year	2025	(The Base Year is often the current year and can be no later than the first year of emissions.)
Year 1	2032	(First year of emissions)

Year of emissions	**N2O emissions (metric tons)**[1]	**Per ton SC-N_2O Value (2020$/metric ton N_2O)**[2,3]				**Present Value (in Base Year) of Estimated SC-N_2O by emissions year (2020$)**[4]				**Present Value (in Base Year) of Estimated SC-N_2O by emissions year (Millions, 2020$)**[4]			
		Average, 5%	**Average, 3%**	**Average 2.5%**	**95th Percentile, 3%**	**Average, 5%**	**Average, 3%**	**Average 2.5%**	**95th Percentile, 3%**	**Average, 5%**	**Average, 3%**	**Average 2.5%**	**95th Percentile, 3%**
2032	***197.44***	$8,295	$23,760	$33,921	$63,051	***$1,163,867***	***$3,814,325***	***$5,634,208***	***$10,122,020***	***$1.16***	***$3.81***	***$5.63***	***$10.12***
2033	***143.22***	$8,542	$24,252	$34,532	$64,410	***$828,048***	***$2,741,836***	***$4,059,089***	***$7,282,047***	***$0.83***	***$2.74***	***$4.06***	***$7.28***

	Average, 5%	Average, 3%	Average 2.5%	95th Percentile, 3%
Present Value (in Base Year) of Estimated SC-N_2O for all N_2O emissions, 2020$)	***$1,991,915***	***$6,556,162***	***$9,693,297***	***$17,404,068***

[1]Annual GHG Estimates from from Air Resource Specialist

[2]*Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide, Interim Estimates under E.O. 13990.* Interagency Working Group on Social Cost of Carbon, United States Government. February 2021.

[3]Social Cost estimates for emissions years beyond 2050 are estimated using an annual growth rate equal to the average annual growth in social cost estimates for the last five years of available estimates from the TSD (2046-2050)

[4]The SCC estimates from the IWG represent the present value of damages from that year's emissions discounted back to the year of emissions. These columns take that value and discount to the base year in order to facilitate the total NPV calculation.

This calculator was developed by Rebecca Moore, Senior Economist, BLM 970-226-9246 rmoore@blm.gov
Last updated 11/18/21

SC-GHG for all years

	Average, 5%	Average, 3%	Average 2.5%	95th Percentile, 3%
CO2	***$285,548,861***	***$1,023,047,215***	***$1,524,943,277***	***$3,106,638,777***
CH4	***$1,872,488***	***$4,417,047***	***$5,837,700***	***$11,764,687***
N2O	***$1,991,915***	***$6,556,162***	***$9,693,297***	***$17,404,068***
Total	***$289,413,264***	***$1,034,020,424***	***$1,540,474,274***	***$3,135,807,532***
Total (million, 2020$)	***$289.41***	***$1,034.02***	***$1,540.47***	***$3,135.81***

Table for NEPA (all gasses, all years, by phase), rounded to nearest $1000

	Average, 5%	Average, 3%	Average 2.5%	95th Percentile, 3%
Total	***$289,413,000***	***$1,034,020,000***	***$1,540,474,000***	***$3,135,808,000***

Users should complete boxes colored in lavender, orange, and green.

Present Value Year	2025
Dollar Year	2023

	Emission Changes (metric tons)			Years used in Annualization		Undiscounted, Monetized Value of Emission Changes, deflated to 2023 dollars								
						Undiscounted, Monetized Value of CO2 Emissions Changes (millions, 2023$)			Undiscounted, Monetized Value of CH4 Emissions Changes (millions, 2023$)			Undiscounted, Monetized Value of N2O Emissions Changes (millions, 2023$)		
				2 years		CO2	CO2	CO2	CH4	CH4	CH4	N2O	N2O	N2O
	CO2	CH4	N2O	Please confirm		Near-Term Ramsey Discount Rate			Near-Term Ramsey Discount Rate			Near-Term Ramsey Discount Rate		
Year				this is correct	Year	2.5%	2.0%	1.5%	2.5%	2.0%	1.5%	2.5%	2.0%	1.5%
2020					2020									
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2032	11,441,890.7	1,526.6	197.4	✓	2032	$1,991.39	$3,146.40	$5,230.73	$3.68	$4.57	$5.97	$10.69	$15.78	$24.36
2033	8,299,640.1	1,107.3	143.2	✓	2033	$1,473.39	$2,320.84	$3,832.75	$2.77	$3.43	$4.46	$7.92	$11.66	$17.93
2034					2034									
2035					2035									
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2080					2080									
Totals	19,741,531	2,634	341											

Annual Unrounded SC-CO2, SC-CH4, and SC-N2O Values, 2020-2080 (in 2020$)									
Gas	CO2	CO2	CO2	CH4	CH4	CH4	N2O	N2O	N2O
Near-term Ramsey Discount Rate	2.50%	2.00%	1.50%	2.50%	2.00%	1.50%	2.50%	2.00%	1.50%
2020	117	193	337	1,257	1,648	2,305	35,232	54,139	87,284
2021	119	197	341	1,324	1,723	2,391	36,180	55,364	88,869
2022	122	200	346	1,390	1,799	2,478	37,128	56,590	90,454
2023	125	204	351	1,457	1,874	2,564	38,076	57,816	92,040
2024	128	208	356	1,524	1,950	2,650	39,024	59,041	93,625
2025	130	212	360	1,590	2,025	2,737	39,972	60,267	95,210
2026	133	215	365	1,657	2,101	2,823	40,920	61,492	96,796
2027	136	219	370	1,724	2,176	2,910	41,868	62,718	98,381
2028	139	223	375	1,791	2,252	2,996	42,816	63,944	99,966
2029	141	226	380	1,857	2,327	3,083	43,764	65,169	101,552
2030	144	230	384	1,924	2,403	3,169	44,712	66,395	103,137
2031	147	234	389	2,002	2,490	3,270	45,693	67,645	104,727
2032	150	237	394	2,080	2,578	3,371	46,674	68,895	106,316
2033	153	241	398	2,157	2,666	3,471	47,655	70,145	107,906
2034	155	245	403	2,235	2,754	3,572	48,636	71,394	109,495
2035	158	248	408	2,313	2,842	3,673	49,617	72,644	111,085
2036	161	252	412	2,391	2,929	3,774	50,598	73,894	112,674
2037	164	256	417	2,468	3,017	3,875	51,578	75,144	114,264
2038	167	259	422	2,546	3,105	3,975	52,559	76,394	115,853
2039	170	263	426	2,624	3,193	4,076	53,540	77,644	117,443
2040	173	267	431	2,702	3,280	4,177	54,521	78,894	119,032
2041	176	271	436	2,786	3,375	4,285	55,632	80,304	120,809
2042	179	275	441	2,871	3,471	4,394	56,744	81,714	122,586
2043	182	279	446	2,955	3,566	4,502	57,855	83,124	124,362
2044	186	283	451	3,040	3,661	4,610	58,966	84,535	126,139
2045	189	287	456	3,124	3,756	4,718	60,078	85,945	127,916
2046	192	291	462	3,209	3,851	4,827	61,189	87,355	129,693
2047	195	296	467	3,293	3,946	4,935	62,301	88,765	131,469
2048	199	300	472	3,378	4,041	5,043	63,412	90,176	133,246
2049	202	304	477	3,462	4,136	5,151	64,523	91,586	135,023
2050	205	308	482	3,547	4,231	5,260	65,635	92,996	136,799
2051	208	312	487	3,624	4,320	5,363	66,673	94,319	138,479
2052	211	315	491	3,701	4,409	5,466	67,712	95,642	140,158
2053	214	319	496	3,779	4,497	5,569	68,750	96,965	141,838
2054	217	323	500	3,856	4,586	5,672	69,789	98,288	143,517
2055	220	326	505	3,933	4,675	5,774	70,827	99,612	145,196
2056	222	330	510	4,011	4,763	5,877	71,866	100,935	146,876
2057	225	334	514	4,088	4,852	5,980	72,904	102,258	148,555
2058	228	338	519	4,165	4,941	6,083	73,943	103,581	150,235
2059	231	341	523	4,243	5,029	6,186	74,981	104,904	151,914
2060	234	345	528	4,320	5,118	6,289	76,020	106,227	153,594
2061	236	348	532	4,389	5,199	6,385	76,920	107,385	155,085
2062	239	351	535	4,458	5,280	6,480	77,820	108,542	156,576
2063	241	354	539	4,527	5,361	6,576	78,720	109,700	158,066
2064	244	357	543	4,596	5,442	6,671	79,620	110,857	159,557
2065	246	360	547	4,666	5,523	6,767	80,520	112,015	161,048
2066	248	363	550	4,735	5,604	6,862	81,419	113,172	162,539
2067	251	366	554	4,804	5,685	6,958	82,319	114,330	164,030
2068	253	369	558	4,873	5,765	7,053	83,219	115,487	165,521
2069	256	372	562	4,942	5,846	7,149	84,119	116,645	167,012
2070	258	375	565	5,011	5,927	7,244	85,019	117,802	168,503
2071	261	378	569	5,085	6,013	7,344	86,012	119,027	170,013
2072	263	382	573	5,160	6,099	7,444	87,006	120,252	171,523
2073	266	385	576	5,234	6,184	7,545	87,999	121,477	173,033
2074	269	388	580	5,309	6,270	7,645	88,992	122,702	174,543
2075	271	391	583	5,383	6,355	7,745	89,985	123,926	176,053
2076	274	394	587	5,458	6,441	7,845	90,978	125,151	177,563
2077	276	398	591	5,532	6,527	7,946	91,971	126,376	179,073
2078	279	401	594	5,607	6,612	8,046	92,964	127,601	180,582
2079	282	404	598	5,681	6,698	8,146	93,958	128,826	182,092
2080	284	407	601	5,756	6,783	8,246	94,951	130,050	183,602

Source: EPA Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances (https://www.epa.gov/system/files/documents/2023-12/epa_scghg_2023_report_final.pdf)

GDP Deflator (used to convert from 2020$ to currency dollar year)												
Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
GDP index	91.481	93.185	94.771	96.421	97.316	98.241	100.000	102.291	104.008	105.381	110.213	117.973	122.273
2020 Deflator	0.868097665	0.884267562	0.899317714	0.914975185	0.923468177	0.932245851	0.948937664	0.970677826	0.986971086	1	1.045852668	1.119490231	1.16029455

Source: Gross domestic product (implicit price deflator), Index 2017=100, Annual, Not Seasonally Adjusted; Federal Reserve Economic Data. Downloaded 03-13-24 (https://fred.stlouisfed.org/series/A191RD3A086NBEA)

Emission Changes			
	Emissions Changes (metric tons)		
Year	CO2	CH4	N2O
2020			
2021			
2022			
2023			
2024			
2025			
2026			
2027			
2028			
2029			
2030			
2031			
2032	11,441,890.7	1,526.6	197.4
2033	8,299,640.1	1,107.3	143.2
2034			
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2080			
Total	19,741,531	2,634	341

Constant discounting

Number of years (N)	2		
Discount Rate	2.5%	2.0%	1.5%

Present and Annualized Values of CO2 Emission Changes (millions, 2023$)			
GHG	CO2	CO2	CO2
Discount Rate	2.5%	2.0%	1.5%
Present Value in 2025 (2023$)	$2,884.57	$4,719.95	$8,115.40
Annualized Value (2 Years, 2023$)	$1,496.60	$2,431.01	$4,149.23

Present and Annualized Values of CH4 Emission Changes (millions, 2023$)			
GHG	CH4	CH4	CH4
Discount Rate	2.5%	2.0%	1.5%
Present Value in 2025 (2023$)	$5.37	$6.90	$9.34
Annualized Value (2 Years, 2023$)	$2.79	$3.55	$4.77

Present and Annualized Values of N2O Emission Changes (millions, 2023$)			
GHG	N2O	N2O	N2O
Discount Rate	2.5%	2.0%	1.5%
Present Value in 2025 (2023$)	$15.49	$23.69	$37.86
Annualized Value (2 Years, 2023$)	$8.04	$12.20	$19.36

Total Present and Annualized Values of all GHG Emission Changes (CO2, CH4, and N2O) (millions, 2023$)			
GHG	Total	Total	Total
Discount Rate	2.5%	2.0%	1.5%
Present Value in 2025 (2023$)	$2,905.44	$4,750.53	$8,162.60
Annualized Value (2 Years, 2023$)	$1,507.42	$2,446.76	$4,173.36

	Discounted, Monetized Value of Emission Changes, discounted to 2025 (millions, 2023$) - Constant Discounting								
	Discounted, Monetized Value of CO2 Emissions Changes (millions, 2023$)			Discounted, Monetized Value of CH4 Emissions Changes (millions, 2023$)			Discounted, Monetized Value of N2O Emissions Changes (millions, 2023$)		
	Discounted Back to 2025			Discounted Back to 2025			Discounted Back to 2025		
	CO2	CO2	CO2	CH4	CH4	CH4	N2O	N2O	N2O
Year	2.5%	2.0%	1.5%	2.5%	2.0%	1.5%	2.5%	2.0%	1.5%
2020									
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2032	$1,675.29	$2,739.13	$4,713.03	$3.10	$3.98	$5.38	$9.00	$13.74	$21.95
2033	$1,209.28	$1,980.81	$3,402.38	$2.27	$2.92	$3.96	$6.50	$9.95	$15.92
2034									
2035									
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Totals	$2,884.57	$4,719.95	$8,115.40	$5.37	$6.90	$9.34	$15.49	$23.69	$37.86

SOCIAL COST OF CARBON DIOXIDE CALCULATOR

Base Year	2025	(The Base Year is often the current year and can be no later than the first year of emissions.)
Year 1	2032	(First year of emissions)

Year of emissions	**CO_2 emissions (metric tons)[1]**	**Per ton SC-CO_2 Value (2020$/metric ton CO_2)[2,3]**				**Present Value (in Base Year) of Estimated SC-CO_2 by emissions year (2020$)[4]**				**Present Value (in Base Year) of Estimated SC-CO_2 by emissions year (Millions, 2020$)[4]**			
		Average, 5%	**Average, 3%**	**Average 2.5%**	**95th Percentile, 3%**	**Average, 5%**	**Average, 3%**	**Average 2.5%**	**95th Percentile, 3%**	**Average, 5%**	**Average, 3%**	**Average 2.5%**	**95th Percentile, 3%**
2032	***7,845,320.88***	$21	$64	$92	$194	***$114,465,489***	***$408,585,390***	***$608,565,805***	***$1,239,809,027***	***$114.47***	***$408.59***	***$608.57***	***$1,239.81***
2033	***2,810,264.20***	$21	$65	$94	$198	***$40,160,885***	***$144,633,969***	***$215,820,581***	***$439,658,781***	***$40.16***	***$144.63***	***$215.82***	***$439.66***

	Average, 5%	Average, 3%	Average 2.5%	95th Percentile, 3%
Present Value (in Base Year) of Estimated SC-CO_2 for all CO_2 emissions, 2020$)	***$154,626,374***	***$553,219,359***	***$824,386,386***	***$1,679,467,808***

[1]Annual GHG Estimates from from Air Resource Specialist

[2]*Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide, Interim Estimates under E.O. 13990.* Interagency Working Group on Social Cost of Carbon, United States Government. February 2021.

[3]Social Cost estimates for emissions years beyond 2050 are estimated using an annual growth rate equal to the average annual growth in social cost estimates for the last five years of available estimates from the TSD (2046-2050)

[4]The SCC estimates from the IWG represent the present value of damages from that year's emissions discounted back to the year of emissions. These columns take that value and discount to the base year in order to facilitate the total NPV calculation.

This calculator was developed by Rebecca Moore, Senior Economist, BLM 970-226-9246 rmoore@blm.gov
Last updated 11/18/21

SOCIAL COST OF METHANE CALCULATOR

Base Year	2025	(The Base Year is often the current year and can be no later than the first year of emissions.)
Year 1	2032	(First year of emissions)

Year of emissions	CH4 emissions (metric tons)[1]	Per ton SC-CH_4 Value (2020$/metric ton CH_4)[2,3]				Present Value (in Base Year) of Estimated SC-CH_4 by emissions year (2020$)[4]				Present Value (in Base Year) of Estimated SC-CH_4 by emissions year (Millions, 2020$)[4]			
		Average, 5%	Average, 3%	Average 2.5%	95th Percentile, 3%	Average, 5%	Average, 3%	Average 2.5%	95th Percentile, 3%	Average, 5%	Average, 3%	Average 2.5%	95th Percentile, 3%
2032	*1,102.70*	$1,007	$2,065	$2,635	$5,498	*$788,946*	*$1,851,655*	*$2,444,775*	*$4,929,503*	*$0.79*	*$1.85*	*$2.44*	*$4.93*
2033	*395.00*	$1,041	$2,121	$2,699	$5,652	*$278,340*	*$661,227*	*$875,095*	*$1,762,311*	*$0.28*	*$0.66*	*$0.88*	*$1.76*

	Average, 5%	Average, 3%	Average 2.5%	95th Percentile, 3%
Present Value (in Base Year) of Estimated SC-CH_4 for all CH_4 emissions, 2020$)	*$1,067,286*	*$2,512,882*	*$3,319,870*	*$6,691,814*

[1]Annual GHG Estimates from from Air Resource Specialist

[2]*Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide, Interim Estimates under E.O. 13990.* Interagency Working Group on Social Cost of Carbon, United States Government. February 2021.

[3]Social Cost estimates for emissions years beyond 2050 are estimated using an annual growth rate equal to the average annual growth in social cost estimates for the last five years of available estimates from the TSD (2046-2050)

[4]The SCC estimates from the IWG represent the present value of damages from that year's emissions discounted back to the year of emissions. These columns take that value and discount to the base year in order to facilitate the total NPV calculation.

This calculator was developed by Rebecca Moore, Senior Economist, BLM 970-226-9246 rmoore@blm.gov
Last updated 11/18/21

SOCIAL COST OF NITROUS OXIDE CALCULATOR

Base Year	2025	(The Base Year is often the current year and can be no later than the first year of emissions.)
Year 1	2032	(First year of emissions)

Year of emissions	N2O emissions (metric tons)[1]	Per ton SC-N_2O Value (2020\$/metric ton N_2O)[2,3] Average, 5%	Average, 3%	Average 2.5%	95th Percentile, 3%	Present Value (in Base Year) of Estimated SC-N_2O by emissions year (2020\$)[4] Average, 5%	Average, 3%	Average 2.5%	95th Percentile, 3%	Present Value (in Base Year) of Estimated SC-N_2O by emissions year (Millions, 2020\$)[4] Average, 5%	Average, 3%	Average 2.5%	95th Percentile, 3%
2032	***135.56***	$8,295	$23,760	$33,921	$63,051	***$799,116***	***$2,618,934***	***$3,868,474***	***$6,949,828***	***$0.80***	***$2.62***	***$3.87***	***$6.95***
2033	***48.56***	$8,542	$24,252	$34,532	$64,410	***$280,761***	***$929,658***	***$1,376,291***	***$2,469,081***	***$0.28***	***$0.93***	***$1.38***	***$2.47***

	Average, 5%	Average, 3%	Average 2.5%	95th Percentile, 3%
Present Value (in Base Year) of Estimated SC-N_2O for all N_2O emissions, 2020\$)	***$1,079,878***	***$3,548,592***	***$5,244,766***	***$9,418,908***

[1]Annual GHG Estimates from from Air Resource Specialist

[2]*Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide, Interim Estimates under E.O. 13990.* Interagency Working Group on Social Cost of Carbon, United States Government. February 2021.

[3]Social Cost estimates for emissions years beyond 2050 are estimated using an annual growth rate equal to the average annual growth in social cost estimates for the last five years of available estimates from the TSD (2046-2050)

[4]The SCC estimates from the IWG represent the present value of damages from that year's emissions discounted back to the year of emissions. These columns take that value and discount to the base year in order to facilitate the total NPV calculation.

This calculator was developed by Rebecca Moore, Senior Economist, BLM 970-226-9246 rmoore@blm.gov
Last updated 11/18/21

SC-GHG for all years

	Average, 5%	Average, 3%	Average 2.5%	95th Percentile, 3%
CO2	***$154,626,374***	***$553,219,359***	***$824,386,386***	***$1,679,467,808***
CH4	***$1,067,286***	***$2,512,882***	***$3,319,870***	***$6,691,814***
N2O	***$1,079,878***	***$3,548,592***	***$5,244,766***	***$9,418,908***
Total	***$156,773,538***	***$559,280,833***	***$832,951,021***	***$1,695,578,530***
Total (million, 2020$)	***$156.77***	***$559.28***	***$832.95***	***$1,695.58***

Table for NEPA (all gasses, all years, by phase), rounded to nearest $1000

	Average, 5%	Average, 3%	Average 2.5%	95th Percentile, 3%
Total	***$156,774,000***	***$559,281,000***	***$832,951,000***	***$1,695,579,000***

Users should complete boxes colored in lavender, orange, and green.

Present Value Year	2025
Dollar Year	2023

Undiscounted, Monetized Value of Emission Changes, deflated to 2023 dollars

	Emission Changes (metric tons)			Years used in Annualization	Undiscounted, Monetized Value of CO2 Emissions Changes (millions, 2023$)			Undiscounted, Monetized Value of CH4 Emissions Changes (millions, 2023$)			Undiscounted, Monetized Value of N2O Emissions Changes (millions, 2023$)		
				2 years	CO2	CO2	CO2	CH4	CH4	CH4	N2O	N2O	N2O
	CO2	CH4	N2O	Please confirm	Near-Term Ramsey Discount Rate			Near-Term Ramsey Discount Rate			Near-Term Ramsey Discount Rate		
Year				this is correct	2.5%	2.0%	1.5%	2.5%	2.0%	1.5%	2.5%	2.0%	1.5%
2020													
2021													
2022													
2023													
2024													
2025													
2026													
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2028													
2029													
2030													
2031													
2032	7,845,320.9	1,102.7	135.6	✓	$1,365.43	$2,157.38	$3,586.54	$2.66	$3.30	$4.31	$7.34	$10.84	$16.72
2033	2,810,264.2	395.0	48.6	✓	$498.89	$785.84	$1,297.77	$0.99	$1.22	$1.59	$2.69	$3.95	$6.08
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2080													
Totals	10,655,585	1,498	184										

Annual Unrounded SC-CO2, SC-CH4, and SC-N2O Values, 2020-2080 (in 2020$)

Gas	CO2	CO2	CO2	CH4	CH4	CH4	N2O	N2O	N2O
Near-term Ramsey Discount Rate	2.50%	2.00%	1.50%	2.50%	2.00%	1.50%	2.50%	2.00%	1.50%
2020	117	193	337	1,257	1,648	2,305	35,232	54,139	87,284
2021	119	197	341	1,324	1,723	2,391	36,180	55,364	88,869
2022	122	200	346	1,390	1,799	2,478	37,128	56,590	90,454
2023	125	204	351	1,457	1,874	2,564	38,076	57,816	92,040
2024	128	208	356	1,524	1,950	2,650	39,024	59,041	93,625
2025	130	212	360	1,590	2,025	2,737	39,972	60,267	95,210
2026	133	215	365	1,657	2,101	2,823	40,920	61,492	96,796
2027	136	219	370	1,724	2,176	2,910	41,868	62,718	98,381
2028	139	223	375	1,791	2,252	2,996	42,816	63,944	99,966
2029	141	226	380	1,857	2,327	3,083	43,764	65,169	101,552
2030	144	230	384	1,924	2,403	3,169	44,712	66,395	103,137
2031	147	234	389	2,002	2,490	3,270	45,693	67,645	104,727
2032	150	237	394	2,080	2,578	3,371	46,674	68,895	106,316
2033	153	241	398	2,157	2,666	3,471	47,655	70,145	107,906
2034	155	245	403	2,235	2,754	3,572	48,636	71,394	109,495
2035	158	248	408	2,313	2,842	3,673	49,617	72,644	111,085
2036	161	252	412	2,391	2,929	3,774	50,598	73,894	112,674
2037	164	256	417	2,468	3,017	3,875	51,578	75,144	114,264
2038	167	259	422	2,546	3,105	3,975	52,559	76,394	115,853
2039	170	263	426	2,624	3,193	4,076	53,540	77,644	117,443
2040	173	267	431	2,702	3,280	4,177	54,521	78,894	119,032
2041	176	271	436	2,786	3,375	4,285	55,632	80,304	120,809
2042	179	275	441	2,871	3,471	4,394	56,744	81,714	122,586
2043	182	279	446	2,955	3,566	4,502	57,855	83,124	124,362
2044	186	283	451	3,040	3,661	4,610	58,966	84,535	126,139
2045	189	287	456	3,124	3,756	4,718	60,078	85,945	127,916
2046	192	291	462	3,209	3,851	4,827	61,189	87,355	129,693
2047	195	296	467	3,293	3,946	4,935	62,301	88,765	131,469
2048	199	300	472	3,378	4,041	5,043	63,412	90,176	133,246
2049	202	304	477	3,462	4,136	5,151	64,523	91,586	135,023
2050	205	308	482	3,547	4,231	5,260	65,635	92,996	136,799
2051	208	312	487	3,624	4,320	5,363	66,673	94,319	138,479
2052	211	315	491	3,701	4,409	5,466	67,712	95,642	140,158
2053	214	319	496	3,779	4,497	5,569	68,750	96,965	141,838
2054	217	323	500	3,856	4,586	5,672	69,789	98,288	143,517
2055	220	326	505	3,933	4,675	5,774	70,827	99,612	145,196
2056	222	330	510	4,011	4,763	5,877	71,866	100,935	146,876
2057	225	334	514	4,088	4,852	5,980	72,904	102,258	148,555
2058	228	338	519	4,165	4,941	6,083	73,943	103,581	150,235
2059	231	341	523	4,243	5,029	6,186	74,981	104,904	151,914
2060	234	345	528	4,320	5,118	6,289	76,020	106,227	153,594
2061	236	348	532	4,389	5,199	6,385	76,920	107,385	155,085
2062	239	351	535	4,458	5,280	6,480	77,820	108,542	156,576
2063	241	354	539	4,527	5,361	6,576	78,720	109,700	158,066
2064	244	357	543	4,596	5,442	6,671	79,620	110,857	159,557
2065	246	360	547	4,666	5,523	6,767	80,520	112,015	161,048
2066	248	363	550	4,735	5,604	6,862	81,419	113,172	162,539
2067	251	366	554	4,804	5,685	6,958	82,319	114,330	164,030
2068	253	369	558	4,873	5,765	7,053	83,219	115,487	165,521
2069	256	372	562	4,942	5,846	7,149	84,119	116,645	167,012
2070	258	375	565	5,011	5,927	7,244	85,019	117,802	168,503
2071	261	378	569	5,085	6,013	7,344	86,012	119,027	170,013
2072	263	382	573	5,160	6,099	7,444	87,006	120,252	171,523
2073	266	385	576	5,234	6,184	7,545	87,999	121,477	173,033
2074	269	388	580	5,309	6,270	7,645	88,992	122,702	174,543
2075	271	391	583	5,383	6,355	7,745	89,985	123,926	176,053
2076	274	394	587	5,458	6,441	7,845	90,978	125,151	177,563
2077	276	398	591	5,532	6,527	7,946	91,971	126,376	179,073
2078	279	401	594	5,607	6,612	8,046	92,964	127,601	180,582
2079	282	404	598	5,681	6,698	8,146	93,958	128,826	182,092
2080	284	407	601	5,756	6,783	8,246	94,951	130,050	183,602

Source: EPA Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances (https://www.epa.gov/system/files/documents/2023-12/epa_scghg_2023_report_final.pdf)

GDP Deflator (used to convert from 2020$ to currency dollar year)

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
GDP index	91.481	93.185	94.771	96.421	97.316	98.241	100.000	102.291	104.008	105.381	110.213	117.973	122.273
2020 Deflator	0.868097665	0.884267562	0.899317714	0.914975185	0.923468177	0.932245851	0.948937664	0.970677826	0.986971086	1	1.045852668	1.119490231	1.16029455

Source: Gross domestic product (implicit price deflator), Index 2017=100, Annual, Not Seasonally Adjusted; Federal Reserve Economic Data. Downloaded 03-13-24 (https://fred.stlouisfed.org/series/A191RD3A086NBEA)

Emission Changes			
	Emissions Changes (metric tons)		
Year	CO2	CH4	N2O
2020			
2021			
2022			
2023			
2024			
2025			
2026			
2027			
2028			
2029			
2030			
2031			
2032	7,845,320.9	1,102.7	135.6
2033	2,810,264.2	395.0	48.6
2034			
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2080			
Total	10,655,585	1,498	184

Constant discounting			
Number of years (N)	2		
Discount Rate	2.5%	2.0%	1.5%

Present and Annualized Values of CO2 Emission Changes (millions, 2023$)			
GHG	CO2	CO2	CO2
Discount Rate	2.5%	2.0%	1.5%
Present Value in 2025 (2023$)	$1,558.16	$2,548.84	$4,383.61
Annualized Value (2 Years, 2023$)	$808.41	$1,312.78	$2,241.24

Present and Annualized Values of CH4 Emission Changes (millions, 2023$)			
GHG	CH4	CH4	CH4
Discount Rate	2.5%	2.0%	1.5%
Present Value in 2025 (2023$)	$3.05	$3.91	$5.30
Annualized Value (2 Years, 2023$)	$1.58	$2.02	$2.71

Present and Annualized Values of N2O Emission Changes (millions, 2023$)			
GHG	N2O	N2O	N2O
Discount Rate	2.5%	2.0%	1.5%
Present Value in 2025 (2023$)	$8.38	$12.81	$20.46
Annualized Value (2 Years, 2023$)	$4.35	$6.60	$10.46

Total Present and Annualized Values of all GHG Emission Changes (CO2, CH4, and N2O) (millions, 2023$)			
GHG	Total	Total	Total
Discount Rate	2.5%	2.0%	1.5%
Present Value in 2025 (2023$)	$1,569.59	$2,565.56	$4,409.37
Annualized Value (2 Years, 2023$)	$814.34	$1,321.39	$2,254.42

	Discounted, Monetized Value of Emission Changes, discounted to 2025 (millions, 2023$) - Constant Discounting								
	Discounted, Monetized Value of CO2 Emissions Changes (millions, 2023$)			Discounted, Monetized Value of CH4 Emissions Changes (millions, 2023$)			Discounted, Monetized Value of N2O Emissions Changes (millions, 2023$)		
	Discounted Back to 2025			Discounted Back to 2025			Discounted Back to 2025		
	CO2	CO2	CO2	CH4	CH4	CH4	N2O	N2O	N2O
Year	2.5%	2.0%	1.5%	2.5%	2.0%	1.5%	2.5%	2.0%	1.5%
2020									
2021									
2022									
2023									
2024									
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2031									
2032	$1,148.69	$1,878.13	$3,231.56	$2.24	$2.87	$3.89	$6.18	$9.43	$15.07
2033	$409.46	$670.70	$1,152.05	$0.81	$1.04	$1.41	$2.20	$3.37	$5.40
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Totals	$1,558.16	$2,548.84	$4,383.61	$3.05	$3.91	$5.30	$8.38	$12.81	$20.46

Total additional coal (tons)	10909000							% of total additional days
					additional Days in 2032	335	0.408537	
	CO2 (kg/ton)	CH4 (g/ton	N2O (g/ton)		additional Days in 2033	365	0.445122	
Emission Factors[1]	2,325	274	40		additional Days in 2034	120	0.146341	
					total additional days	820		
	CO2	CH4	N2O	CO2e				
Emissions(mt)	25363425	2989.066	436.36	25571625.4				

Alternative 2

	CO2 (mt)	CH4 (mt)	N2O (mt)	CO2e (mt)
Coal combustion (2032)	10361887.04	1221.14	178.27	10446944.54
Coal combustion (2033)	11289817.23	1330.50	194.23	11382491.81
Coal Combustion (2034)	3711720.73	437.42	63.86	3742189.09

References
1 - Emission factors from https://www.epa.gov/system/files/documents/2024-02/ghg-emission-factors-hub-2024.pdf and represent bituminous coal combustion

Total additional coal (tons)	8449000			
	CO2 (kg/ton)	CH4 (g/ton)	N2O (g/ton)	
Emission Factors[1]	2,325	274	40	
	CO2	CH4	N2O	CO2e
Emissions(mt)	19643925	2315.026	337.96	19805175.9

	% of total additional days	
additional Days in 2032	335	0.579585
additional Days in 2033	243	0.420415
additional Days in 2034	-	-
total additional days	578	

Alternative 3

	CO2 (mt)	CH4 (mt)	N2O (mt)	CO2e (mt)
Coal combustion (2032)	11385319.85	1341.75	195.88	11478778.39
Coal combustion (2033)	8258605.15	973.27	142.08	8326397.46
Coal Combustion (2034)	-	-	-	-

References
1 - Emission factors from https://www.epa.gov/system/files/documents/2024-02/ghg-emission-factors-hub-2024.pdf and represent bituminous coal combustion

Total additional coal (tons)	4550000			
	CO2 (kg/ton)	CH4 (g/ton)	N2O (g/ton)	
Emission Factors[1]	2,325	274	40	
	CO2	CH4	N2O	CO2e
Emissions(mt)	10578750	1246.7	182	10665588

	% of total additional days
additional Days in 2032	335	0.736264
additional Days in 2033	120	0.263736
additional Days in 2034	-	-
total additional days	455	

Alternative 4

	CO2 (mt)	CH4 (mt)	N2O (mt)	CO2e (mt)
Coal combustion (2032)	7788750.00	917.90	134.00	7852685.42
Coal combustion (2033)	2790000.00	328.80	48.00	2812902.24
Coal Combustion (2034)	-	-	-	-

References
1 - Emission factors from https://www.epa.gov/system/files/documents/2024-02/ghg-emission-factors-hub-2024.pdf and represent bituminous coal combustion