Service Date:
August 6, 2021

Uinta Basin Railway

Final Environmental Impact Statement

STB Docket No. FD 36284

Volume I: Summary and Chapters 1–9

Project Applicant:
Seven County Infrastructure Coalition

Lead Agency:
Surface Transportation Board
Office of Environmental Analysis

Cooperating Agencies:
Department of the Army, U.S. Army Corps of Engineers
State of Utah Public Lands Policy Coordinating Office
U.S. Department of Agriculture, Forest Service
U.S. Department of the Interior, Bureau of Indian Affairs
U.S. Department of the Interior, Bureau of Land Management

Decision # 50896

SURFACE TRANSPORTATION BOARD
Washington, DC 20423

Office of Environmental Analysis

August 6, 2021

Re: Docket No. FD 36284, Seven County Infrastructure Coalition—Rail Construction and Operation Exemption—in Carbon, Duchesne, Uintah, and Utah Counties, Utah: **Issuance of Final Environmental Impact Statement**

Dear Reader:

I am pleased to announce that the Surface Transportation Board's (Board) Office of Environmental Analysis (OEA) has issued the Final Environmental Impact Statement (EIS) for the proposed Uinta Basin Railway. The Final EIS analyzes the potential environmental impacts of the Seven County Infrastructure Coalition's (Coalition) proposal to construct and operate an approximately 85-mile rail line connecting the Uinta Basin (Basin) to the national rail network. The Final EIS also includes comments received on the Draft EIS and responses to those comments. The Basin is an isolated geographical region, extending from northeastern Utah into northwestern Colorado, that is surrounded by high mountains and plateaus with limited access to transportation infrastructure. According to the Coalition, the proposed rail line would provide shippers in the Basin with a viable alternative to trucking, which is currently the only available transportation option.

The Coalition's proposed rail line would extend from two terminus points in the Basin near Myton and Leland Bench to a connection with an existing Union Pacific Railroad Company rail line near Kyune, Utah. Depending on future market conditions, between approximately 3.68 and 10.52 trains could move on the proposed rail line per day, on average, including both loaded and unloaded trains. The Coalition expects that these trains would primarily transport crude oil produced in the Basin, but could also carry frac sand, other proppant material, steel, machinery, or mineral and agricultural products and commodities into and out of the Basin. The Final EIS analyzes three alternatives for the proposed rail line, as well as the No-Action Alternative. The alternatives are the Indian Canyon Alternative, Wells Draw Alternative, and Whitmore Park Alternative. In its request for Board authority, the Coalition identified the Whitmore Park Alternative as its preferred route for the proposed rail line.

OEA issued the Draft EIS on October 30, 2020. The comment period lasted from the issuance of the Draft EIS on October 30, 2020, to the close of the twice-extended comment period on February 12, 2021. During that time, OEA received 1,934 comment submissions on the Draft EIS. In preparing the Final EIS, OEA considered all comments whether received orally or in writing. The Final EIS includes all of the comments received on the Draft EIS and OEA's responses to substantive comments, as well as any changes to the analysis that resulted from comments. Changes made to the Draft EIS appear in blue in the Final EIS.

Based on the analysis in the Final EIS, OEA concludes that construction and operation of any of the alternatives would result in significant environmental impacts. Major impacts would include temporary and permanent impacts on surface waters and wetlands; impacts on biological resources, including federally listed threatened and endangered species and other protected species; permanent changes to land uses on public and private lands; and noise impacts on residences near the proposed rail line during rail operations. In the Final EIS, OEA identifies the Whitmore Park Alternative as the environmentally preferred alternative because it would avoid or minimize major environmental impacts compared to the Indian Canyon Alternative and the Wells Draw Alternative. The Final EIS also sets forth OEA's final recommended environmental mitigation, as well as the Coalition's voluntary mitigation measures.

Five cooperating agencies assisted OEA in preparing the EIS: the U.S. Department of Agriculture, U.S. Forest Service; the U.S. Department of the Army, U.S. Army Corps of Engineers; the U.S. Department of the Interior, Bureau of Indian Affairs; the U.S. Department of the Interior, Bureau of Land Management; and the Utah Public Lands Policy Coordinating Office, representing all Utah State agencies. OEA also consulted with tribes; other federal, state, and local agencies; and other stakeholders during the preparation of the EIS. Throughout the EIS process, OEA consulted extensively with the Ute Indian Tribe. The Ute Indian Tribe is the only federally recognized tribe that accepted OEA's invitation to engage in government-to-government consultation.

In addition, OEA, in consultation with consulting parties, has executed a Programmatic Agreement to satisfy obligations under Section 106 of the National Historic Preservation Act. The Programmatic Agreement details the procedures and responsible parties for identification and evaluation of historic properties, assessment of potential effects on historic properties, and the resolution of adverse effects on historic properties. To satisfy obligations under Section 7 of the Endangered Species Act, OEA included a Draft Biological Assessment in the Draft EIS and initiated formal consultation with the U.S. Fish and Wildlife Service on March 18, 2021.

WHERE TO FIND THE EIS

The Draft EIS and Final EIS are available for viewing and downloading on the Board's website (www.stb.gov) and on the Board-sponsored project website (www.uintabasinrailwayeis.com). OEA is also making the Final EIS available at the following libraries.

- Duchesne Library, Duchesne, Utah
- Price City Library, Price, Utah
- Roosevelt Library, Roosevelt, Utah
- Uintah Library, Vernal, Utah

WHAT HAPPENS NEXT

The Final EIS sets forth OEA's conclusions regarding the potential environmental impacts of the proposed Uinta Basin Railway and OEA's final recommendations to the Board, including recommended environmental mitigation measures. The Board will then issue a final decision that will take into consideration the transportation merits of the proposed project and the entire environmental record, including the Draft EIS, Final EIS, and all public and agency comments received. In this final decision, the Board will decide whether to approve the proposed rail line, deny it, or approve it with mitigating conditions, including environmental conditions.

OEA appreciates the efforts and interest of all who have participated in this environmental review and worked to make the Final EIS as informative a document as possible.

Sincerely,

Danielle Gosselin
Acting Director
Office of Environmental Analysis

Uinta Basin Railway
Final Environmental Impact Statement

STB Docket No. FD 36284

Prepared by:

Surface Transportation Board, Office of Environmental Analysis

Cooperating Agencies:

Department of the Army, U.S. Army Corps of Engineers
State of Utah Public Lands Policy Coordinating Office
U.S. Department of Agriculture, Forest Service
U.S. Department of the Interior, Bureau of Indian Affairs
U.S. Department of the Interior, Bureau of Land Management

August 2021

Surface Transportation Board, Office of Environmental Analysis. 2021. *Uinta Basin Railway Final Environmental Impact Statement*. August. Washington, DC.

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Acronyms and Abbreviations

μeq/l	micro-equivalents per liter
μg/m^3	micrograms per cubic meter
AADT	annual average daily traffic
AAQS	Ambient Air Quality Standards
AAR	American Association of Railroads
ACEC	Area of Critical Environmental Concern
ACHP	Advisory Council on Historic Preservation
AFY	acre-feet per year
ANC	acid neutralizing capacity
ANF	Ashley National Forest
APE	area of potential effects
AQCR	Air Quality Control Region
AQRV	air quality related value
AQS	air quality standard
AREMA	American Railway Engineering and Maintenance-of-Way Association
ARMPA	Utah Greater Sage-Grouse Approved Resource Management Plan Amendment
ARMS	Utah Air Resource Management Strategy
Ashely Forest Plan	Ashley Forest Land and Resource Management Plan
AUM	Animal Unit Month
BA	Biological Assessment
Basin/the Basin	Uinta Basin
BCC	Birds of Conservation Concern
Berry Petroleum	Berry Petroleum LLC
BIA	U.S. Bureau of Indian Affairs
BLM	U.S. Bureau of Land Management
BMP	best management practice
BNSF	BNSF Railway Company
Board	Surface Transportation Board
bpd	barrels per day
BRWL	Blue-Rich White Light

Btu	British thermal unit
C.F.R.	Code of Federal Regulations
Cadna	Computer-Aided Noise Abatement
CASTNET	Clean Air Status and Trends Network
CDPHE	Colorado Department of Public Health and Environment
CEQ	Council on Environmental Quality
CH_4	methane
cm	centimeters
CMAQ	Community Multi-scale Air Quality
CMP	corrugated metal pipe
CO 13	Colorado State Highway 13
CO 139	Colorado State Highway 139
CO 64	Colorado State Highway 64
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
Coalition	Seven County Infrastructure Coalition
Corps	U.S. Army Corps of Engineers
CPW	Colorado Parks and Wildlife
CSGMA	Carbon Sage-grouse Management Area
CSU	controlled surface use
CWA	Clean Water Act
CWMU	Cooperative Wildlife Management Unit
DAT	deposition analysis threshold
dBa	A-weighted decibel
DDV	delta-deciviews
DHV	design hour volume
DNL	day-night average noise level
DNM	Dinosaur National Monument
DPM	diesel particulate matter
DPR	Deseret Power Railroad
Drexel Hamilton	Drexel Hamilton Infrastructure Partners
DTM	Digital Terrain Model

EI	exposure index factor
EIA	U.S. Energy Information Administration
EIS	Environmental Impact Statement
EMU	ecological management unit
EPA	U.S. Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
ERMA	Extensive Recreation Management Area
ESA	Endangered Species Act
ESRI	Environmental Systems Research Institute
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRS	Federal Information Relay Service
FLPMA	Federal Land Policy and Management Act
Forest Service	U.S. Forest Service
FR	Federal Register
FRA	Federal Railroad Administration
FTA	Federal Transit Administration
FTE	full-time equivalent
GGE	gasoline gallon equivalent
GHG	greenhouse gas
GIS	geographic information system
GPS	global positioning system
GRP	gross regional product
GRSG	greater sage-grouse
gSSURGO	Gridded Soil Survey Geographic
GWP	global warming potential
HAP	hazardous air pollutant
HUC	Hydrologic Unit Code
I-70	Interstate 70
IMPLAN	IMpact analysis for PLANning
IMPROVE	Interagency Monitoring of Protected Visual Environments
IPaC	Information for Planning and Consultation
IRA	Inventoried Roadless Area

ITA	Indian Trust Asset
kg/ha-yr	kilograms per hectare per year
KOP	key observation point
kVa	kilovolt-ampere
L&G	Light and Glare
LAU	Lynx Analysis Unit
LCAS	Lynx Conservation Assessment Strategy
Leq	equivalent sound level
LOS	level of service
LRMP	Land Resource Management Plan
LWCF	Land and Water Conservation Fund
MA-LR	Management Action - Lands and Realty
MA-SSS	Management Action – Special Status Species
mg/l	milligrams per liter
mi^2	square miles
mm	millimeters
Monument Butte FEIS	Monument Butte Oil and Gas Development Project Final Environmental Impact Statement
mph	miles per hour
MST	Mountain Standard Time
MT/yr	metric tons per year
MUTCD	Federal Highway Administration Manual on Uniform Traffic Control Devices for Streets and Highways
MW	megawatts
MWh	megawatt hours
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NAICS	North American Industry Classification System
National Register	National Register of Historic Places
NEPA	National Environmental Policy Act
NFS	National Forest System
NHPA	National Historic Preservation Act
NO	nitric oxide

NO_2	nitrogen dioxide
NOI	Notice of Intent
NO_X	nitrogen oxide
NPDES	National Pollutant Discharge Elimination System
NRA	National Recreation Area
NRCS	Natural Resources Conservation Service
NWI	National Wetland Inventory
O&M	operations and maintenance
OEA	Office of Environmental Analysis
OHV	off-highway vehicle
OHWM	ordinary high-water mark
PA	Programmatic Agreement
PAC	priority areas for conservation
PADD	Petroleum Administration for Defense District
PAH	polycyclic aromatic hydrocarbon
PC&N	public convenience and necessity
PEM	palustrine emergent [wetland]
PFO	palustrine forested [wetland]
PFYC	Potential Fossil Yield Classification
PHMA	Priority Habitat Management Area
PHMSA	Pipeline and Hazardous Materials Safety Administration
PLPCO	State of Utah Public Lands Policy Coordinating Office
PM10	particulate matter 10 microns or less in diameter
PM2.5	particulate matter 2.5 microns or less in diameter
POM	polycyclic organic matter
PPV	peak particle velocity
PSD	Prevention of Significant Deterioration
PSS	palustrine scrub-shrub [wetland]
PYFC	Potential Fossil Yield Classification
R.L Banks Study	Pre-Feasibility Study of a Prospective Railroad Connecting the Uinta Basin to the National Rail Network
RD1	Roosevelt/Duchesne Ranger District
RDF	required design feature

RGCP	Rio Grande Pacific Corporation
RIPRAP	Recovery Implementation Program Recovery Plan
RKOP	rendered key observation point
RMP	Resource Management Plan
RMPA	Utah Greater Sage-Grouse Resource Management Plan Amendment
RMS	root-mean square
ROD	Record of Decision
ROW	right-of-way
RPI	Railway Progress Institute
RTD	Denver Regional Transportation District
RV	recreational vehicle
SEL	sound exposure level
SGMA	Sage-Grouse Management Areas
SHPO	Utah State Historic Preservation Officer
SITLA	Utah School and Institutional Trust Lands Administration
SO_2	sulfur dioxide
SRMA	Special Recreation Management Area
SSS	Special Status Species
State Plan	Utah Conservation Plan for Greater Sage-Grouse
SWPPP	stormwater pollution prevention plan
T&E	Threatened and Endangered
TBtu	trillion British thermal unit
TDS	Total Dissolved Solids
the Project	Uinta Basin Railway Project
THPO	Tribal Historic Preservation Office
TMDL	total maximum daily load
TRRC	Tongue River Railroad Company
U.S.C.	United States Code
UDEQ	Utah Department of Environmental Quality
UDOGM	Utah Division of Oil, Gas, and Mining
UDOT	Utah Department of Transportation
UDWQ	Utah Division of Water Quality
UDWR	Utah Division of Wildlife Resources

UDWRi	Utah Division of Water Rights
UIC	Underground Injection Control
UP	Union Pacific
UPAC	Utah Professional Archaeological Council
URARA	Utah Rock Art Research Association
US 191	U.S. Highway 191
US 40	U.S. Highway 40
US 6	U.S. Highway 6
USDOT	U.S. Department of Transportation
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
Ute Indian Tribe	Ute Indian Tribe of the Uintah and Ouray Reservation
VdB	vibration decibels
VMT	vehicle miles traveled
VOC	volatile organic compound
VPH	vehicles per hour
VQO	Visual Quality Objective
VRI	visual resource inventory
VRM	Visual Resource Management
WHP	Wildfire Hazard Potential
WY 789	Wyoming State Highway 789

Summary

S.1 Introduction

On May 29, 2020, the Seven County Infrastructure Coalition (Coalition) filed a petition with the Surface Transportation Board (Board) pursuant to 49 United States Code (U.S.C.) 10502 requesting authority to construct and operate approximately 85 miles of new rail line in Carbon, Duchesne, Uintah, and Utah Counties, Utah. Also known as the Uinta Basin Railway, the proposed rail line would provide a common-carrier rail connection between the Uinta Basin in northeastern Utah and the existing interstate common-carrier rail network.

The Board's Office of Environmental Analysis (OEA), together with five cooperating agencies, prepared this ~~Draft~~ Environmental Impact Statement (EIS) in accordance with the National Environmental Policy Act (NEPA), Council on Environmental Quality (CEQ) regulations, and the Board's environmental rules.[1] The ~~Draft~~ EIS is intended to provide federal, state, and local agencies; American Indian tribes; and the public with clear and concise information about the potential environmental impacts of the proposed rail line. In preparing the ~~Draft~~ EIS, OEA considered three reasonable alternatives, known as the Indian Canyon Alternative, the Wells Draw Alternative, and the Whitmore Park Alternative (collectively referred to as the Action Alternatives), as well as the No-Action Alternative. As summarized in the following sections, OEA concludes that any of the Action Alternatives would result in significant environmental impacts. Appropriate mitigation would lessen those impacts and this ~~Draft~~ EIS recommends mitigation conditions for the Board to impose if the Board decides to authorize construction and operation of the proposed rail line. Should the Board decide to authorize the Coalition's petition, OEA ~~preliminarily~~ recommends that the Board authorize the Whitmore Park Alternative to avoid and minimize environmental impacts.

OEA issued~~is issuing~~ the Draft EIS for public review and comment. ~~Following the end of the public comment period on **December 14, 2020**,~~ OEA ~~will~~ considered all comments received on the Draft EIS and responded to all substantive comments in the~~a~~ Final EIS. The Final EIS ~~will~~ includes OEA's final environmental recommendations, including final recommended mitigation conditions. The Board will now~~then~~ consider the entire environmental record, the Draft EIS and the Final EIS, all public and agency comments, and OEA's environmental recommendations in making its final decision on the Coalition's petition.

The sections that follow summarize the key elements of the development of the ~~Draft~~ EIS, including the project purpose and need, the Action Alternatives, and OEA's major conclusions regarding the potential environmental impacts of the proposed Uinta Basin Railway.

S.1.1 Purpose and Need

The proposed federal action in this case is the Board's decision to authorize, deny, or authorize with conditions the Coalition's petition. If the Board were to grant~~authorize~~ the petition, the proposed rail line would be operated as a common carrier rail line. As a common carrier, the Coalition would be required to provide rail service to any shipper upon reasonable request. The proposed rail line is not being proposed or sponsored by the federal government. Therefore, the purpose and need of the

[1] While much of the ~~Draft~~ EIS generally refers only to OEA, the document reflects input from all cooperating agencies, as well as other participating agencies that OEA consulted with during the preparation of the ~~Draft~~ EIS.

proposed rail line is informed by both the goals of the Coalition, as the project applicant, and the Board's enabling statute, 49 U.S.C. § 10901. Construction and operation of new rail lines requires prior authorization by the Board under 49 U.S.C. § 10901(c), which directs the Board to grant construction proposals "unless" the Board finds the proposal "inconsistent with the public convenience and necessity (PC&N)." This is a permissive licensing standard that presumes that rail construction projects are in the public interest unless shown otherwise. The Coalition, however, has sought an exemption under § 10502 from the regulatory requirements of § 10901; therefore, the public convenience and necessity standard in § 10901—although instructive—does not directly apply in this case. Under § 10502, the Board here must grant an exemption if it finds that the application of § 10901 (in whole or in part) is not necessary to carry out the Rail Transportation Policy contained in § 10101 and either the rail construction and operation is of limited scope or the application of § 10901 is not needed to protect shippers from the abuse of market power.

The Coalition's petition states that the purpose of the proposed rail line would be to provide common carrier rail service connecting the Basin to the interstate common carrier rail network using a route that would provide shippers with a viable alternative to trucking. Because it is surrounded by high mountains and plateaus, the Basin has limited access to all transportation modes and all freight moving into and out of the Basin is currently~~currented~~ transported by trucks on the area's limited road network. According to the Coalition, the proposed rail line would provide customers in the Basin with multi-modal options for the movement of freight; promote a safe and efficient system of freight transportation; further the development of a sound rail transportation system; and foster sound economic conditions in transportation and effective competition and coordination between differing modes of transportation. While the Board will ultimately determine whether to authorize or deny the petition, the Coalition's stated purposes appear to be consistent with the PC&N.[2]

S.1.2 Proposed Action

The Coalition is an independent political subdivision of the State of Utah established under an inter-local agreement by the Utah counties of Carbon, Daggett, Duchesne, Emery, San Juan, Sevier, and Uintah. The Coalition has entered into or intends to enter into agreements with Drexel Hamilton Infrastructure Partners (Drexel Hamilton), Rio Grande Pacific Corporation (RGPC~~Rio Grande~~) and the Ute Indian Tribe of the Uintah and Ouray Reservation (the Ute Indian Tribe). If the Board were to authorize the proposed construction and operation, the Coalition ~~'s petitions~~ states that Drexel Hamilton would be responsible for financing and commercialization of the proposed rail line and RGPC~~Rio Grande~~ would operate and maintain it. The Coalition expects that the Ute Indian Tribe would become an equity partner in the proposed rail line.[3]

The proposed rail line would consist of a single main track with sidings to let trains pass each other. The track would be constructed of steel rail supported by timber, steel, or concrete ties. The rail right-of-way would be approximately 100 feet wide along most of its length but could be considerably wider in some locations where the rugged topography would require large areas of cut-and-fill. Numerous bridges and culverts would be required to cross major roads, waterways, and

[2] The Board issued a preliminary decision on the transportation merits under the § 10502 exemption criteria in this proceeding on Jan. 5, 2021. *Seven County Infrastructure Coalition – Rail Constr. and Oper. Exemption – In Utah, Carbon, Duchesne, and Uintah Counties, Utah*, FD 36284 (Jan. 5, 2021).

[3] As used in this EIS, references to the Coalition as the project applicant also refer to any private partners that may be involved in the construction and operation of the proposed rail line, including Drexel Hamilton and RGPC.

topographical features and several tunnels would also be constructed under mountain summits. Other permanent project features would include at-grade road crossings, communications towers, signaling and safety equipment, and permanent access roads and road realignments. Construction of the proposed rail line would involve a variety of construction methods and equipment. Bulldozers, front end loaders, and dump trucks would be used to create the appropriate corridor and grade. Cranes may be needed to construct bridges over roads and surface waters. The Coalition anticipates that mining and potentially blasting methods would be used to construct tunnels. Rail would be laid and welded by track welding machine or crews where necessary. During construction, temporary access roads would be necessary for construction equipment to reach construction sites. One or more temporary camps would be installed to house construction workers and land outside of the permanent rail right-of-way would have to be cleared to create temporary laydown and staging areas.

Following construction, the Coalition anticipates that trains on the proposed rail line would primarily transport crude oil produced in the Basin to markets across the United States, but could also carry other bulk commodities and products, including fracturing sand, building products, industrial materials, and agricultural products. Depending on future market conditions, including the global price of crude oil, the Coalition anticipates that between approximately 3.68 or as many as 10.52 trains could operate~~move~~ on the proposed rail line each day, on average, including both loaded and empty trains.

S.1.3 Cooperating Agency Actions

Four federal agencies and one state agency, acting as lead agency for other Utah State agencies, provided input throughout~~on~~ the development of the~~this~~ Draft EIS and Final EIS as cooperating agencies ~~and will continue to participate in the Board's environmental review process throughout the public comment period and issuance of the Final EIS~~. Those agencies and their potential actions are listed below.

- The Department of Agriculture, U.S. Forest Service (Forest Service) intends to consider the Coalition's request for a special use permit allowing the Coalition to cross National Forest System lands if the Board were to authorize an alternative that crosses Ashley National Forest. The Forest Service has given notice that its decision to permit the proposed rail line may include amending the existing *Ashley Forest Land and Resource Management Plan* in the areas of visual quality and scenery management pursuant to the Forest Service's 2012 Planning Rule (36 Code of Federal Regulations [C.F.R.] Part 219).
- The Department of the Army, U.S. Army Corps of Engineers (Corps), through the Regulatory Program, administers and enforces Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act. Under Rivers and Harbors Act Section 10, a permit is required for work or structures in, over, or under navigable waters of the United States. Under Clean Water Act Section 404, a permit is required for the discharge of dredged or fill material into waters of the United States. On September 30, 2020, the Corps issued a public notice announcing that it was evaluating the Coalition's application for a permit under Section 404 of the Clean Water Act.
- The Department of the Interior, Bureau of Indian Affairs (BIA) intends to consider the Coalition's request for a right-of-way across Tribal trust lands within the Ute Indian Tribe's Uintah and Ouray Reservation if the Board authorizes an alternative that crosses Tribal trust lands.

- The Department of the Interior, Bureau of Land Management (BLM) intends to consider the Coalition's request for a right-of-way across BLM-administered lands if the Board authorizes an alternative that crosses BLM-administered lands. The issuance of a right-of-way would be subject to the requirements of the BLM's applicable Resource Management Plans (RMPs), including the Vernal Field Office RMP, Price Field Office RMP, and Pony Express RMP. As proposed, the Indian Canyon Alternative and Wells Draw Alternative would not be in compliance with greater sage-grouse noise thresholds in the Price Field Office RMP and Pony Express RMP, and BLM may need to amend these plans to issue a right-of-way grant. BLM may also need to amend the Vernal Field Office RMP based on where the Wells Draw Alternative crosses BLM Visual Resource Management Class II land and the Lears Canyon Area of Critical Environmental Concern.
- The State of Utah's Public Lands Policy Coordinating Office (PLPCO) is coordinating the participation of state agencies in the Board's environmental review process. The Coalition intends to seek permits or approvals from multiple state agencies to construct and operate the proposed rail line, including rights-of-way across state lands administered by the Utah State Institutional Trust Lands Administration (SITLA).

S.2 Draft EIS and Final EIS Process

OEA is the office at the Board responsible for conducting the environmental review process, independently analyzing environmental data, and making environmental recommendations to the Board. OEA considered~~will consider~~ all comments received on the~~this~~ Draft EIS and responded to substantive comments in this~~the~~ Final EIS, which~~ will~~ includes OEA's final recommended environmental mitigation. Changes made to the Draft EIS appear in blue in the Final EIS. The Board will now consider the entire environmental record, the Draft EIS and Final EIS, all comments received, and OEA's recommendations in making its final decision on the Coalition's petition.

S.2.1 Scoping and Consultation

S.2.1.1 Scoping

To help determine the scope of the EIS, OEA involved the public, government agencies, tribes, and other interested organizations. On June 19, 2019, OEA published a Notice of Intent (NOI) to prepare an EIS and a Draft Scope of Study for the EIS in the Federal Register. Publication of the NOI initiated a 45-day public scoping period that was scheduled to end on August 3, 2019. In response to requests to extend the public scoping period, the Board extended the scoping comment period for an additional 30 days. The scoping comment period ended September 3, 2019.

During the scoping period, OEA held six public scoping meetings in the project area. Approximately 420 people attended the public meetings, including citizens; tribal members; representatives of organizations; elected officials; and officials from federal, state, and local agencies. OEA also met with federal and state cooperating and consulting agencies to discuss the scope of this EIS. OEA considered all input received during the scoping process. On December 13, 2019, OEA published the Final Scope of Study for the EIS in the Federal Register. The Final Scope of Study directed OEA's analysis for ~~this~~the Draft EIS.

S.2.1.2 Draft EIS Public Comment Period

On October 30, 2020, the Board issued the Draft EIS for review and comment. On that date, OEA published a Notice of Availability in the Federal Register, which announced the availability of the Draft EIS, instructions on how to submit comments on the Draft EIS, and the schedule and instructions for participating in online public meetings. The Notice of Availability noted that the comment period would end December 14, 2020. Following the issuance of the Draft EIS, the Board twice extended the public comment period. On December 9, 2020, OEA announced an extension of the public comment period for 60 days until January 28, 2021. On January 28, 2021, OEA announced an additional extension of the comment period for 15 days until February 12, 2021.

OEA conducted six online public meetings during the comment period. These meetings were held online due to OEA's concerns for public safety during the COVID-19 pandemic and COVID-19-related restrictions on large gatherings and travel. Over the course of the six online public meetings, 209 persons registered to attend, and 55 persons registered in advance to make oral comments. Persons who did not register in advance were able to participate in any of the meetings by following the instructions on the project website or by dialing the telephone number that OEA made available on the public website. When time permitted during an online public meeting, the meeting facilitator called upon persons desiring to make an oral comment, but who had not registered in advance to do so.

OEA received 1,934 comment submissions on the Draft EIS, including both written and oral comments. Of those, 1,065 were form letters associated with one of two master form letters, and 184 were form letters with some unique text. Of the total comment submissions, 869 were unique comment submissions.

~~S.2.1.2~~S.2.1.3 Agency Consultation

OEA consulted with appropriate federal, state, and local agencies during the preparation of this ~~Draft~~ EIS. As part of scoping under NEPA and before the NOI was published, OEA sent consultation letters to 27 agencies soliciting their input, comments, ideas, and concerns regarding this ~~Draft~~ EIS. Following the publication of the NOI, OEA held biweekly conference calls with the cooperating agencies and other participating agencies. OEA also held teleconferences and in-person meetings with participating agencies, including the U.S. Environmental Protection Agency and U.S. Fish and Wildlife Service as needed throughout development of this ~~Draft~~ EIS to discuss resource-specific topics. ~~OEA will continue to meet with cooperating and other agencies throughout the course of developing the Final EIS.~~

~~S.2.1.3~~S.2.1.4 Tribal Consultation

OEA consulted with tribal organizations throughout the development of this ~~Draft~~ EIS. Executive Order 13175 requires that federal agencies conduct government-to-government consultations with federally recognized Indian tribes in the development of federal policies, as does Section 106 of the National Historic Preservation Act. On June 19, 2019, OEA sent letters to 12 federally recognized tribes that have current and ancestral connections to the area surrounding the proposed rail line inviting them to enter into government-to-government consultation and Section 106 consultation, as appropriate. The Ute Indian Tribe is the only federally recognized tribe that indicated it wanted to enter into both government-to-government consultation and Section 106 consultation. OEA met with representatives of the Ute Indian Tribe, including the Tribal Business Committee and the tribe's Cultural Rights Protection Department, in-person and by phone throughout the development of this

~~Draft~~ EIS to discuss the Section 106 process, provide updates on the EIS, and learn about issues of concern to the tribe.

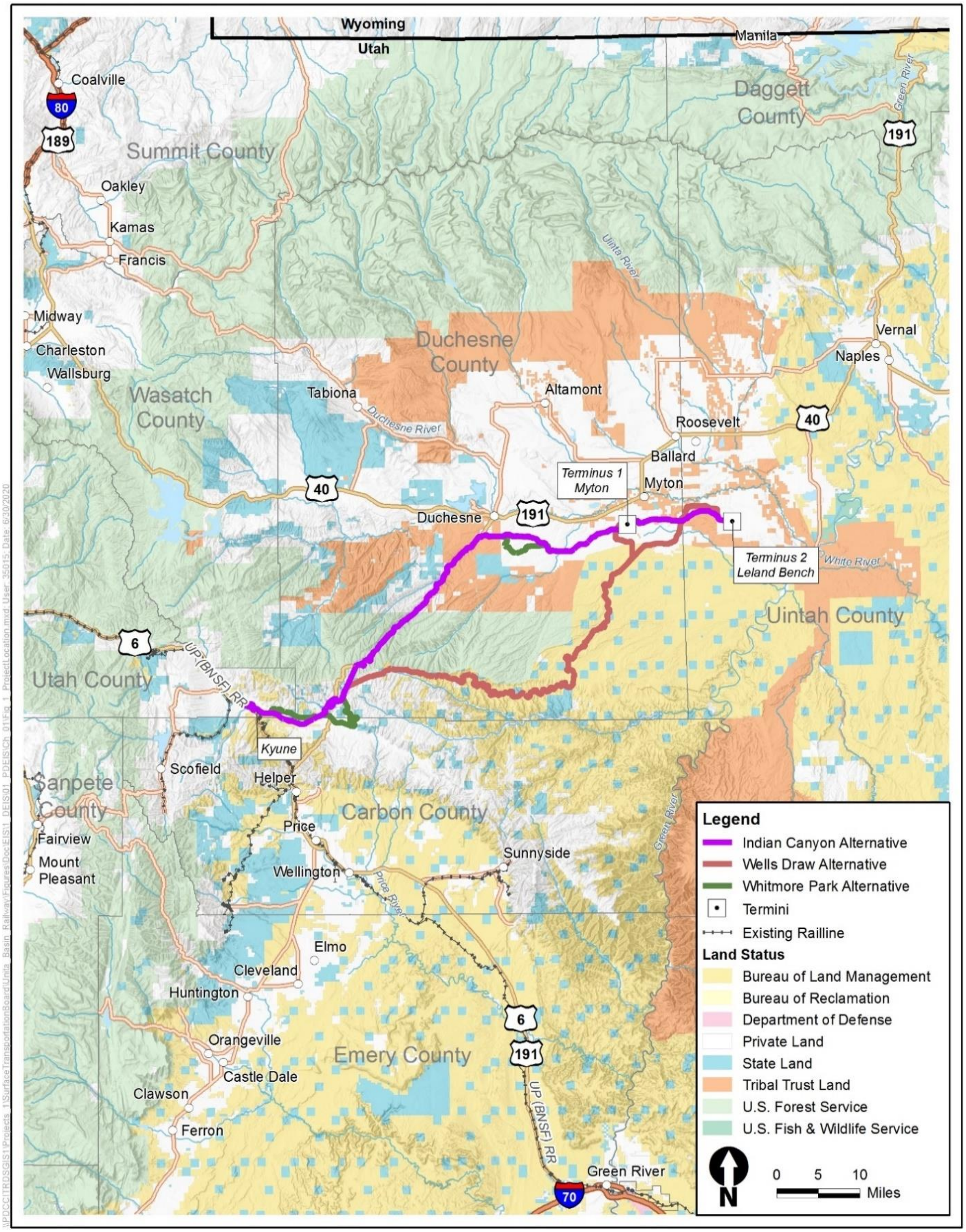
The Hopi Tribe of Arizona did not enter into government-to-government consultation but opted to participate in Section 106 consultation. OEA held monthly conference calls with all Section 106 consulting parties between January 2020 and April 2021 and continued to invite the 12 federally recognized tribes to participate in these meetings throughout the development of this ~~Draft~~ EIS. OEA provided meeting transcripts and meeting materials from all Section 106 conference calls on the Board's website and the project website (www.uintabasinrailwayeis.com).

S.3 Alternatives

NEPA requires that federal agencies consider reasonable alternatives to the proposed action. To be reasonable, an alternative must meet the project purpose and need and must be logistically feasible and practical to implement. The three Action Alternatives examined in this ~~Draft~~ EIS—the Indian Canyon Alternative, the Wells Draw Alternative, and the Whitmore Park Alternative—were developed over the course of several years of analysis by the Utah Department of Transportation (UDOT) and the Coalition, and later OEA. Because the Basin is surrounded by high mountains and plateaus, there are very few feasible routes that would allow freight trains to operate within modern standards of safety and efficiency~~safely and efficiently~~. In 2014 and 2015, UDOT examined the feasibility of constructing a rail line to connect the Basin to the interstate railroad network. In 2019 and 2020, the Coalition reassessed the conceptual routes that UDOT identified and additional potential alignments identified by the Coalition. The Coalition initially proposed that OEA consider three routes as potential alternatives in the EIS, based on UDOT's and the Coalition's studies. Those proposed alternatives were the Indian Canyon Alternative, the Wells Draw Alternative, and an alignment referred to as the Craig Route. After considering the comments that OEA received during the EIS scoping process, the Coalition proposed an additional route as a potential alternative. That route, the Whitmore Park Alternative, although similar to the Indian Canyon Alternative, would avoid some sensitive habitat and some residential areas relative to the Indian Canyon Alternative.

Based on the analyses conducted by UDOT, the Coalition, and OEA, as well as comments submitted during scoping, OEA concluded that, of the conceptual routes that were considered at various times, only three alternatives would be reasonable under NEPA. Those routes are the Indian Canyon Alternative, Wells Draw Alternative, and Whitmore Park Alternative (Figure S-1). OEA eliminated the Craig Route from detailed review in this ~~Draft~~ EIS because that alignment would not meet the Coalition's purposes and because it would have the potential to cause disproportionately significant environmental impacts compared to the Action Alternatives. In addition to the Action Alternatives, OEA also analyzed the No-Action Alternative, which would occur if the Coalition did not construct and operate the proposed rail line.

Figure S-1. Project Alternatives



Each of the Action Alternatives would extend from two terminus points in the Basin near Myton, Utah and Leland Bench, Utah to a proposed connection with the existing Union Pacific (UP) Provo Subdivision near Kyune, Utah. The Indian Canyon Alternative, Wells Draw Alternative, and Whitmore Park Alternative would be approximately 81 miles, 103 miles, and 88 miles in length, respectively.

S.4 Conclusions on Environmental Impacts

OEA has conducted an extensive review of the environmental impacts that could result from construction and operation of the proposed rail line. Based on consultation with federal, state, and local agencies; consultation with tribes; input provided by organizations and the public; and its own independent environmental analysis, OEA has reached the following conclusions about the potential impacts of the Action Alternatives.

S.4.1 Major Impacts

OEA identified the following significant and adverse impacts that could occur as a result of the proposed rail line. Table S-1 provides additional details regarding these major impacts.

- **Water Resources**. Construction and operation of the proposed rail line, if authorized, would result in unavoidable impacts on surface waters and wetlands, including the loss of wetland habitat and permanent changes to surface water hydrology from crossing structures and stream realignments. Across the three Action Alternatives, the Whitmore Park Alternative would permanently affect the smallest total area of surface waters and wetlands, while the Wells Draw Alternative would affect the largest area. The Coalition has proposed voluntary mitigation measures related to water resources and OEA is recommending additional mitigation measures that would reduce but not eliminate impacts (Chapter 4, *Mitigation*). If the mitigation measures are implemented, the Coalition would need to obtain a permit from the Corps under Section 404 of the Clean Water Act before beginning construction of the proposed rail line. The Coalition would need to undertake efforts to avoid or minimize impacts on water resources during the final engineering and design phase, as part of the Section 404 permitting process. For unavoidable impacts on waters under the Corps' jurisdiction, the Coalition would need to develop and implement a plan for compensatory mitigation in consultation with the Corps.
- **Special Status Species**. Any of the Action Alternatives would cross suitable habitat for several plant species that are listed as threatened or endangered under the Endangered Species Act, including Pariette cactus, Uinta Basin hookless cactus, Barneby ridge-cress, and Ute ladies'-tresses. OEA is consulting with the U.S. Fish and Wildlife Service (USFWS) to determine appropriate measures for avoiding, minimizing, or mitigating impacts on those species, but some impacts would be unavoidable. Any of the Action Alternatives would also cross habitat for the greater sage-grouse, a bird species that is managed by BLM and the State of Utah. The Action Alternatives would each pass near one or more greater sage-grouse leks, which are areas where male grouse perform mating displays and where breeding and nesting occur. Depending on the Action Alternative, several of those leks could experience significant increases in noise during construction and during rail operations, which would disturb the birds and potentially cause them to abandon the leks. OEA has determined that the Whitmore Park Alternative would avoid or minimize impacts on greater sage-grouse relative to the other Action Alternatives because it

would be located further away from more leks and associated summer brood rearing habitat. In addition, the Coalition, in consultation with OEA and the State of Utah, is developing voluntary mitigation to address impacts on greater sage-grouse by restoring or creating greater sage-grouse habitat outside of the immediate project area (Chapter 4, *Mitigation*). If that mitigation is implemented, and if the Whitmore Park Alternative is constructed, OEA concludes that impacts on greater sage-grouse would not be significant.

- **Wayside Noise**. Wayside noise refers to train noise adjacent to a rail line that comes from sources other than the locomotive horn, such as engine noise, exhaust noise, and noise from steel train wheels rolling on steel rails. During rail operations, wayside noise would depend on factors such as train speed, train length, and number of locomotives. If the volume of rail traffic were at the highest projected level of 10.52 trains per day, on average, then OEA concludes that up to six residences would experience an increase in noise that would exceed the Board's thresholds for adverse noise impacts, depending on the Action Alternative. Among the Action Alternatives, the Indian Canyon Alternative would result in the most severe noise impacts. OEA is recommending mitigation to address noise impacts, including a requirement for the Coalition to install sound insulation at residences that could experience an adverse noise impact (Chapter 4, *Mitigation*).
- **Land Use and Recreation**. Any of the Action Alternatives could significantly affect land uses on public, private, or tribal lands. The Indian Canyon Alternative and Whitmore Park Alternative would each cross inventoried roadless areas within Ashley National Forest and Tribal trust land within the Ute Indian Tribe's Uintah and Ouray Reservation. The Wells Draw Alternative would cross the Lears Canyon Area of Critical Environmental Concern (ACEC) and Lands with Wilderness Characteristics on BLM-administered lands. Noise and visual impacts would disturb recreational activities on those public lands, such as camping, hiking, and hunting, as well as recreational activities on private and tribal lands. If the mitigation measures set forth in this ~~Draft~~ EIS are implemented, the Coalition would need to consult with appropriate federal, state, and tribal land managing agencies to address impacts on land use and recreation (Chapter 4, *Mitigation*), but some impacts would be unavoidable.
- **Socioeconomics**. Construction and operation of the proposed rail line would result in locally significant impacts on socioeconomics. The impacts would include beneficial impacts, such as the creation of jobs for construction and operations and maintenance workers, as well as increased local tax revenue. Adverse socioeconomic impacts would include the acquisition and displacement of residential and nonresidential structures on private land and the severance of properties, which could reduce their value for grazing, agriculture, and other economic uses. The Indian Canyon Alternative would have the greatest adverse impact on smaller private property owners because it would cross the greatest number of smaller-subdivided properties; the Wells Draw Alternative~~Route~~ would affect the smallest area of private property, but would displace the largest number of residences; and the Whitmore Park Alternative would affect the largest total area of private property, and would primarily affect larger property owners and ranching and farming operations.
- **Tribal Concerns**. Through ongoing government-to-government consultation with the Ute Indian Tribe, OEA identified impacts related to vehicle safety and delay, rail operations safety, biological resources, air emissions, and cultural resources as areas of concern for the tribe. OEA has presented those impacts in this ~~Draft~~ EIS and is recommending appropriate mitigation to minimize the impacts. In particular, OEA worked~~is working~~ with the Ute Indian Tribe and other Section 106 consulting parties to develop a Programmatic Agreement that sets~~will set~~ forth how

cultural resources would be protected if the Board were to authorize the proposed rail line. In addition, OEA has identified impacts on the Pariette cactus and the Uinta Basin hookless cactus as disproportionately high and adverse impacts on an environmental justice community. Because those species are culturally important to the Ute Indian Tribe, OEA is recommending mitigation requiring the Coalition to consult with the Ute Indian Tribe regarding impacts on those special status plant species and to abide by the tribe's requirements for addressing the impacts (Chapter 4, *Mitigation*).

S.4.2 Minor Impacts

In addition to the major impacts listed above, this ~~Draft~~ EIS also discusses the following impacts that would not be significant if the Coalition's voluntary mitigation measures and OEA's recommended mitigation measures set forth in Chapter 4, *Mitigation* are implemented. Table S-1 provides additional details on those minor impacts.

- **Vehicle Safety and Delay**. Construction and operation of any of the Action Alternatives would introduce new vehicles (such as construction and maintenance vehicles) on public roadways and would require the construction of new at-grade road crossings. OEA believes that if the mitigation measures set forth in this ~~Draft~~ EIS are implemented impacts from the new vehicles and at-grade road crossings would not significantly affect vehicle safety on public roadways or cause significant delay for people traveling on local roads. Those mitigation measures include a requirement for the Coalition to consult with appropriate federal, tribal, state, and local transportation agencies to determine the final design of the at-grade crossing warning devices and to follow standard safety designs for at-grade road crossings, among other measures.

- **Rail Operations Safety**. Operation of any of the Action Alternatives would involve the risk of rail related accidents, potentially including collisions, derailments, or spills. OEA concludes that the probability of a major rail accident that could result in injuries or fatalities or that could release hazardous materials into the environment or cause a fire would be low if the mitigation measures set forth in this ~~Draft~~ EIS are implemented. Those mitigation measures include the requirement that the Coalition prepare a hazardous materials emergency response plan to address potential derailments or spills and distribute the plan to federal, state, local, and tribal emergency response agencies, among other measures.

- **Big Game**. Any of the Action Alternatives would cross big game movement corridors. The total number of affected movement corridors would be similar between the Action Alternatives. Although the Wells Draw Alternative would affect the smallest total number of big game movement corridors, it would affect a greater number of high-importance movement corridors compared to the Indian Canyon Alternative and the Whitmore Park Alternative. Operation of the proposed rail line could injure big game due to collisions with trains and maintenance equipment around big game movement corridors. Higher mortality rates would likely occur around the locations of the movement corridors that cross or parallel the Action Alternatives (Appendix G, *Biological Resources Figures*, contains figures displaying the movement corridors for each big game species along the Action Alternatives). Disrupted migration along movement corridors could also prevent herds from reaching high-quality forage, which could result in physiological stresses and the expenditure of greater amounts of energy to reach resources. The mitigation set forth in this Final EIS would require the Coalition to work with landowners to define areas of the right-of-way that can be left without fences to maintain big game migration corridors. In addition, OEA is recommending mitigation requiring the Coalition develop a big game movement corridor crossing plan in consultation with the Ute Indian Tribe, UDWR, OEA, and appropriate land management agencies (Chapter 4, *Mitigation*). If this mitigation is implemented, OEA concludes that impacts on big game movement corridors would not be significant.

- **Fish and Wildlife.** In addition to special status animal species and big game species, construction and operation of any of the Action Alternative would affect other species of fish and wildlife, including reptiles, mammals, and birds. Habitat in the footprint of the proposed rail line would be permanently lost and other areas of habitat could be temporarily disturbed during construction. The proposed rail line would create a barrier to the movement of wildlife~~, including big game species~~. Among other measures, the mitigation set forth in this ~~Draft~~ EIS would require the Coalition work with landowners to define areas of the right-of-way that can be left without fences to maintain big game migration ~~measures~~ corridors and develop a big game movement corridor crossing plan that would benefit other wildlife species. If these mitigation measures are implemented, OEA concludes that impacts on biological resources would not be significant.
- **Vegetation.** In addition to the special status plant species discussed above, construction and operation of any of the Action Alternatives would affect other species of vegetation. Vegetation within the footprint of the proposed rail line would be permanently removed and vegetation in construction areas would be temporarily cleared or disturbed. It is possible that operation of the proposed rail line or a rail-related accident could trigger a wildfire, which could destroy larger areas of vegetation, but the risk that the proposed rail line would cause fire would be very low. If the mitigation measures set forth in this ~~Draft~~ EIS are implemented, OEA does not expect that impacts on vegetation would be significant. Among other requirements, the mitigation measures would require the Coalition to revegetate disturbed areas when construction is completed in consultation with appropriate federal, state, and tribal agencies.
- **Geology and Soils.** Construction of any of the Action Alternatives would involve large amounts of earthmoving and soil disturbance. During rail operations, the proposed rail line could potentially be affected by geological hazards, such as landslides, but this impact would be minimized by the implementation of appropriate mitigation measures, including pre-construction geotechnical investigations to identify areas that are at risk of landslide. OEA concludes that impacts related to geology, soils, and geological hazards would not be significant if the Coalition's voluntary mitigation measures and OEA's additional recommended mitigation measures are implemented.
- **Hazard Waste Sites.** Although none of the Action Alternatives would be located near hazardous wastes sites with a documented history of releasing hazardous materials into the environment, construction and operation of the proposed rail line would affect both active and abandoned oil and gas wells. If OEA's recommended mitigation measures are implemented, OEA concludes that impacts involving hazardous wastes sites would not be significant. Among other requirements, those mitigation measures include a requirement for the Coalition to follow appropriate safety procedures for the abandonment of oil and gas wells in the footprint of the proposed rail line.
- **Construction Noise.** Construction activities would result in noise from the operation of construction equipment, such as bulldozers, front end loaders, and dump trucks. The installation of bridges over waterways could involve pile-driving, which is an especially noisy construction activity that could disturb recreationalists and residences, as well as fish and wildlife. Noise impacts during construction would be temporary and would move or end over time. The

mitigation set forth in this ~~Draft~~ EIS include a requirement for the Coalition to develop a construction noise and vibration control plan and to conduct noise and vibration monitoring, as necessary, during construction. If that and other recommended mitigation measures are implemented, noise impacts during construction would not be significant.

- **Vibration.** Construction activities would also result in vibrations, but these would be infrequent, temporary, and well below the intensity that could damage structures, such as residences. During rail operations, the vibrations caused by trains moving on the proposed rail line would not be strong enough to cause damage or annoyance to people living nearby. OEA concludes that vibration impacts would not be significant if OEA's recommended mitigation measures, including the development of a noise and vibration control plan, are implemented.

- **Air Quality and Greenhouse Gases.** During construction, construction equipment would emit air pollutants, including criteria air pollutants that could contribute to poor air quality and greenhouse gases that would contribute to climate change. Construction-related air emissions would not cause concentrations of criteria air pollutants to exceed the National Ambient Air Quality Standards (NAAQS) and would not exceed the de minimis thresholds for air emissions within the Uinta Basin ozone nonattainment area or~~f~~ the Utah County PM10 Maintenance area. During rail operations, locomotives would emit criteria air pollutants and greenhouse gases. Those operations-related emissions would also not cause concentrations of criteria air pollutants to exceed the NAAQS~~expose residents living near the rail line to air pollutant concentrations that would exceed the NAAQS~~, even if rail traffic on the proposed rail line were at the highest projected level of 10.52 trains per day. Greenhouse gas emissions during construction and operation would represent a small percentage of statewide greenhouse gas emissions in Utah.

- **Energy.** Any of the Action Alternatives would cross existing utility corridors and roads used to transport energy resources, such as oil and natural gas. Active oil and gas wells within the footprint of the proposed rail line would be permanently abandoned. OEA's recommended mitigation measures, which include a requirement for the Coalition to design any crossings or relocations of pipelines or electrical transmission lines in accordance with applicable federal and state standards, would prevent significant impacts on energy infrastructure.

- **Paleontological Resources.** Any of the Action Alternatives would cross areas where scientifically important paleontological resources (fossils) may be located. Construction activities, such as digging, earthmoving, and tunnel construction, could damage or destroy known or undiscovered fossils in those areas. To address these potential impacts,~~.~~ OEA is recommending a mitigation measure requiring the Coalition to engage a qualified paleontologist to develop and implement a paleontological resources monitoring and treatment plan. If OEA's recommended mitigation is implemented, OEA concludes that impacts on paleontological resources would not be significant.

- **Visual Resources.** Construction and operation of the proposed rail line would introduce a new and highly noticeable industrial infrastructure that would affect visual resources, including visually sensitive areas. Among other measures, OEA is recommending mitigation requiring the Coalition design bridges,~~ design bridges,~~ communications towers, and other project-related features to complement the natural landscape and minimize visual impacts on the landscape. OEA concludes that, if the mitigation measures are implemented, visual impacts from the proposed rail line would not be significant.

S.4.3 Downline Impacts

Rail traffic from the proposed rail line would merge on to main lines and move to destinations throughout the United States. To assess the potential impacts of increased rail traffic on main lines outside of the immediate project area, OEA defined a downline study area that extends from the proposed connection near Kyune to the northern, eastern, and southern edges of the Denver Metro/North Front Range air quality nonattainment area. The impacts from the additional traffic on these main lines could include air quality impacts associated with locomotive exhaust, increased wayside noise, increased risk of accidents at at-grade road crossings, and increased vehicular delay at road crossings. OEA does not expect that downline impacts would be significant.

S.4.4 Cumulative Impacts

OEA reviewed information on relevant past, present, and reasonably foreseeable projects and actions that could have impacts that coincide in time and location with the potential impacts of the proposed rail line. OEA identified 27~~6~~ relevant projects, including facility and infrastructure improvements, watershed improvements, road improvements, two interstate electric power transmission projects, one crude oil processing facility, one Programmatic Agreement for cultural resource preservation, projects on Forest Service lands, and projects on BLM-administered lands. OEA's cumulative impacts assessment also included an analysis of potential future oil and gas development in the Basin and the potential future construction and operation of new rail terminal facilities near Myton and Leland Bench. Based on the cumulative impacts analysis, OEA concludes that the impacts of those projects in combination with the impacts of the proposed rail line could result in cumulative adverse impacts on water resources, biological resources, paleontological resources, land use and recreation, visual resources, and socioeconomics.

S.4.5 Environmentally Preferred Alternative

Based on OEA's analysis and consultation with appropriate government agencies, the Ute Indian Tribe, other interested stakeholders, and the public, OEA ~~preliminarily~~ concludes that, among the three Action Alternatives, the Whitmore Park Alternative would result in the fewest significant impacts on the environment. In particular, the Whitmore Park Alternative would permanently affect the smallest area of water resources, including wetlands and perennial streams; would minimize impacts on greater sage-grouse leks and associated summer brood rearing habitat; and would avoid impacts on subdivided residential areas.

Compared to the Wells Draw Alternative, the Whitmore Park Alternative would permanently and temporarily affect a smaller area of wetlands and of intermittent streams, as well as a smaller number of springs. It would avoid impacts on special use areas on BLM-administered lands, including Areas of Critical Environmental Concern, Lands with Wilderness Characteristics, and areas classified by BLM as sensitive to visual impacts. The Whitmore Park Alternative would affect a smaller area of suitable habitat for the Pariette Cactus and Uinta Basin Hookless Cactus than the Wells Draw Alternative, would avoid potential impacts on moderately suitable habitat for the threatened Mexican spotted owl and a smaller area of big game habitat. In addition, it would result in fewer total emissions of criteria air pollutants and greenhouse gases during construction and during rail operations; would cross a smaller area of land that may be prone to landslides; would result in fewer displacements of residences; would involve a lower risk for accidents at at-grade road crossings; and would cross a smaller area with high potential for wildfires.

Compared to the Indian Canyon Alternative, the Whitmore Park Alternative would permanently and temporarily affect a smaller area of wetlands, a smaller area of riparian habitat, and smaller number of springs and would also require fewer stream realignments. It would avoid noise impacts on residences during rail operations, as well as visual and other impacts on residential areas in the Argyle Canyon and Duchesne Mini-Ranches areas of Duchesne County. The Whitmore Park Alternative would generate more employment, labor income, and local and state tax revenue during construction than the Indian Canyon Alternative and would cross a smaller area of geological units that may be prone to landslides and a smaller area of land with high wildfire hazard potential.

For these reasons, if the Board decides to authorize construction and operation of the proposed rail line, OEA ~~preliminarily~~ recommends that the Board authorize the Whitmore Park Alternative to minimize impacts of construction and operation on the environment. ~~OEA invites agency and public comment on this preliminary recommendation and will make its final recommendations to the Board in the Final EIS after considering all comments received during the public comment period.~~

S.5 Summary of Impacts

Table S-1 summarizes and compares potential impacts for each resource area as well as downline impacts. The table does not include the No Action Alternative because, under that alternative, existing conditions would remain the same.

Table S-1. Summary of Impacts

Impact	Action Alternative		
	Indian Canyon	**Wells Draw**	**Whitmore Park**
Vehicle Safety and Delay			
Total VMT during construction	194,035,062	328,384,855	234,989,847
Annual VMT during operations	• Low rail traffic scenario:[a] -902,385 • High rail traffic scenario:[a] 1,002,046	• Low rail traffic scenario: -15,409 • High rail traffic scenario: 2,346,551	• Low rail traffic scenario: -835,637 • High rail traffic scenario: 1,135,542
Average daily trips during construction	3,659	3,243	4,163
Average daily trips during operation	• Low rail traffic scenario: 4 • High rail traffic scenario: 104	• Low rail traffic scenario: 34 • High rail traffic scenario: 144	• Low rail traffic scenario: 4 • High rail traffic scenario: 104
Average number of accidents at grade crossings per year	• Low rail traffic scenario: 0.088 • High rail traffic scenario: 0.153	• Low rail traffic scenario: 0.324 • High rail traffic scenario: 0.559	• Low rail traffic scenario: 0.190 • High rail traffic scenario: 0.331
Average delay at grade crossings in 24-hour period	• Low rail traffic scenario: 4.07 minutes • High rail traffic scenario: 11.10 minutes	• Low rail traffic scenario: 7.67 minutes • High rail traffic scenario: 20.89 minutes	• Low rail traffic scenario: 3.99 minutes • High rail traffic scenario: 10.88 minutes
Rail Operations Safety			
Predicted rail accident (collisions and derailments) frequency	0.20 to 0.56 accident per year	0.24 to 0.72 accident per year	0.22 to 0.60 accident per year
Water Resources			
Temporary surface water impacts	• Perennial stream: 15.4 acres • Intermittent stream: 0.2 acre • Ephemeral stream: 8.6 acres • Canal/ditch: 1.3 acres • Pond: 1.0 acre • Playa: <0.1 acre	• Perennial stream: 6.5 acres • Intermittent stream: 28.1 acres • Ephemeral stream: 24.7 acres • Canal/ditch: 1.1 acres • Pond: 4.6 acre • Playa: 1.2 acre	• Perennial stream: 16.4 acres • Intermittent stream: 0.2 acre • Ephemeral stream: 15.7 acres • Canal/ditch: 1.3 acres • Pond: 0.9 acre • Playa: <0.1 acre
Permanent surface water impacts	• Perennial stream: 6.3 acres • Intermittent stream: 0.2 acre • Ephemeral stream: 4.1 acres • Canal/ditch: 0.9 acre • Pond: 1.0 acre • Playa: 0.1 acre	• Perennial stream: 3.0 acres • Intermittent stream: 30.4 acres • Ephemeral stream: 23.5 acres • Canal/ditch: 0.3 acre • Pond: 3.3 acres • Playa: 0.8 acre	• Perennial stream: 5.6 acres • Intermittent stream: 0.2 acre • Ephemeral stream: 6.4 acres • Canal/ditch: 0.9 acre • Pond: 0.4 acre • Playa: 0.1 acre

	Action Alternative		
Impact	Indian Canyon	Wells Draw	Whitmore Park
Stream realignments	59 realignments	17 realignments	55 realignments
Section 303(d) Impaired Assessment Unit impacts	2,660.0 acres	7,089.6 acres	2,866.2 acres
Accidental spills of hazardous materials	Depends on train accident or derailment occurrence and severity, but expected to be minimized with mitigation	Same as Indian Canyon Alternative	Same as Indian Canyon Alternative
Temporary floodplain impacts	0.8 acre	1.7 acres	20.2 acres
Permanent floodplain impacts	0.1 acre	0.2 acre	5.9 acres
Temporary wetland impacts	13.2 acres	16.3 acres	11.2 acres
Permanent wetland impacts	7.0 acres	6.5 acres	3.6 acres
Temporary groundwater wells and springs impacts	• Groundwater wells: 6 • Springs: 7	• Groundwater wells: 4 • Springs: 9	• Groundwater wells: 2 • Springs: 4
Permanent groundwater wells and springs impacts	• Groundwater wells: 2 • Springs: 2	• Groundwater wells: 1 • Springs: 2	• Groundwater wells: 0 • Springs: 2
Water rights	• Water rights within the rail line footprint would be discontinued	• Same as Indian Canyon Alternative	• Same as Indian Canyon Alternative
Biological Resources			
Temporary big game crucial habitat impacts[2]	~~4,803.9~~3,782.8 acres	~~10,712.6~~4,364.6 acres	~~6,342.6~~5,504.6 acres
Permanent big game crucial habitat impacts[2]	~~3,421.6~~2,406.3 acres	~~6,337.6~~2,367.9 acres	~~3,762.8~~2,723.5 acres
Temporary big game substantial habitat impacts[2]	1,837.5 acres	7,595.6 acres	2,144.0 acres
Permanent big game substantial habitat impacts[2]	1,015.5 acres	3,969.8 acres	1,039.3 acres

Impact	Action Alternative: Indian Canyon	Action Alternative: Wells Draw	Action Alternative: Whitmore Park
The largest percent removal of big game crucial habitat in UDWR management unit for any species in any management unit	≤0.38	≤0.97	≤0.59
Number of Big Game Movement Corridor Crossings	36 (6 low importance, 15 medium importance, 15 high importance)	31 (1 low importance, 9 medium importance, 21 high importance)	34 (6 low importance, 15 medium importance, 13 high importance)
Fish habitat degradation	Fewest impacts on fish habitat due to fewest number of surface waters crossed and fewest number of crossing structures	Greatest impacts on fish habitat due to greatest number of surface waters crossed and greatest number of crossing structures	Impacts on fish habitat due to surface water crossings and crossing structures
Temporary vegetation community impacts	2,467.8 acres	5,095.7 acres	3,087.9 acres
Permanent vegetation community impacts	1,340.5 acres	2,559.9 acres	1,430.5 acres
Temporary riparian vegetation impacts	57.1 acres	40.0 acres	54.0 acres
Permanent riparian vegetation impacts	36.5 acres	22.6 acres	27.6 acres
Temporary federally listed plant species habitat impacts	• Barneby ridge-cress Pinyon-juniper habitat: 46.0 acres • Barneby ridge-cress white shale habitat: 5.4 acres • Pariette cactus: 364.0 acres • Uintah Basin hookless cactus: 364.0 acres • Ute's ladies-tresses: 2.8 acres	• Barneby ridge-cress Pinyon-juniper habitat: 0 acre • Barneby ridge-cress white shale habitat: 0 acre • Pariette cactus: 396.5 acres • Uintah Basin hookless cactus: 396.5 acres • Ute's ladies-tresses: 0.1 acres	• Barneby ridge-cress Pinyon-juniper habitat: 97.3 acres • Barneby ridge-cress white shale habitat: 14.1 acres • Pariette cactus: 364.0 acres • Uintah Basin hookless cactus: 364.0 acres • Ute's ladies-tresses: 2.7 acres
Permanent federally listed plant species habitat impacts	• Barneby ridge-cress Pinyon-juniper habitat: 20.0 acres • Barneby ridge-cress white shale habitat: 3.4 acres • Pariette cactus: 140.7 acres • Uintah Basin hookless cactus: 140.7 acres • Ute's ladies-tresses: 1.5 acres	• Barneby ridge-cress Pinyon-juniper habitat: 0 acres • Barneby ridge-cress white shale habitat: 0 acres • Pariette cactus: 153.5 acres • Uintah Basin hookless cactus: 153.5 acres • Ute's ladies-tresses: <0.1 acre	• Barneby ridge-cress Pinyon-juniper habitat: 34.3 acres • Barneby ridge-cress white shale habitat: 6.6 acres • Pariette cactus: 140.7 acres • Uintah Basin hookless cactus: 140.7 acres • Ute's ladies-tresses: 1.5 acres

Impact	Action Alternative: Indian Canyon	Action Alternative: Wells Draw	Action Alternative: Whitmore Park
Temporary Mexican Spotted Owl habitat impacts	865.8 acres	3,535.1 acres	1,531.7 acres
Permanent Mexican Spotted Owl habitat impacts	584.8 acres	1,856.3 acres	777.8 acres
Temporary greater sage-grouse habitat impacts	• UDWR-defined: 459.8 acres • BLM-defined: 544.0 acres	• UDWR-defined: 459.8 acres • BLM-defined: 588.0 acres	• UDWR-defined: 1,123.6 acres • BLM-defined: 1,047.0 acres
Permanent greater sage-grouse habitat impacts	• UDWR-defined: 294.5 acres • BLM-defined: 360.3 acres	• UDWR-defined: 294.5 acres • BLM-defined: 328.3 acres	• UDWR-defined: 482.8 acres • BLM-defined: 486.4 acres
Train noise impacts on at five closest greater sage-grouse leks	37–79 dBA	37–79 dBA	49–64 dBA
Geology, Soils, Seismic Hazards, and Hazardous Waste Sites			
Distance of the proposed rail line that would cross unstable geologic units	21 miles	54 miles	18 miles
Area of soil disturbance	1,340 acres	2,560 acres	1,431 acres
Impacts on hazardous waste sites	None	None	None
Surface fault rupture and seismic ground shaking	Possibility for seismic movement with the potential to cause landslides, but expected to be minimized with mitigation	Same as Indian Canyon Alternative	Same as Indian Canyon Alternative
Noise and Vibration			
Number of receptors adversely affected by construction-related noise	0	0	0
Number of receptors adversely affected by construction-related vibration	0	0	0

Impact	Action Alternative		
	Indian Canyon	**Wells Draw**	**Whitmore Park**
Number of receptors adversely affected by operations-related noise	6	1	2
Number of receptors adversely affected by operations-related vibration	0	0	0
Air Quality			
Construction-related criteria pollutant emissions	• CO: 917 tons • NOx: 512 tons • PM10: 779 tons • PM2.5: 228 tons • SO_2: 2 tons • VOCs: 94 tons	• CO: 1,541 tons • NOx: 649 tons • PM10: 1,075 tons • PM2.5: 299 tons • SO_2: 2 tons • VOCs: 146 tons	• CO: 992 tons • NOx: 598 tons • PM10: 880 tons • PM2.5: 281 tons • SO_2: 2 tons • VOCs: 103 tons
Operations-related criteria pollutant emissions	• Low rail traffic scenario: ○ CO: 136 tons/year ○ NOx: 343 tons/year ○ PM10: 10 tons/year ○ PM2.5: 7 tons/year ○ SO2: 0.4 tons/year ○ VOCs: 13 tons/year • High rail traffic scenario: ○ CO: 373 tons/year ○ NOx: 969 tons/year ○ PM10: 29 tons/year ○ PM2.5: 21 tons/year ○ SO_2: 1 ton/year ○ VOCs: 36 tons/year	• Low rail traffic scenario: ○ CO: 176 tons/year ○ NOx: 413 tons/year ○ PM10: 13 tons/year ○ PM2.5: 9 tons/year ○ SO_2: 0.5 tons/year ○ VOCs: 18 tons/year • High rail traffic scenario: ○ CO: 479 tons/year ○ NOx: 1,162 tons/year ○ PM10: 35 tons/year ○ PM2.5: 26 tons/year ○ SO_2: 2 ton/year ○ VOCs: 48 tons/year	• Low rail traffic scenario: ○ CO: 147 tons/year ○ NOx: 374 tons/year ○ PM10: 11 tons/year ○ PM2.5: 8 tons/year ○ SO_2: 0.4 tons/year ○ VOCs: 14 tons/year • High rail traffic scenario: ○ CO: 405 tons/year ○ NOx: 1,056 tons/year ○ PM10: 32 tons/year ○ PM2.5: 23 tons/year ○ SO_2: 1 ton/year ○ VOCs: 40 tons/year
Concentrations in comparison to the NAAQS	All concentrations would be less than the NAAQS at all modeled locations~~1-hour NO_2 concentration could exceed the NAAQS at one location south of Myton under certain conditions. This outcome is unlikely to occur and would not impact sensitive receptors.~~	Same as Indian Canyon Alternative~~All concentrations would be less than the NAAQS at all modeled locations~~	Same as Indian Canyon Alternative~~1-hour NO_2 concentration could exceed the NAAQS at one location south of Myton under certain conditions. This outcome is unlikely to occur and would not impact sensitive receptors.~~

Impact	Action Alternative		
	Indian Canyon	**Wells Draw**	**Whitmore Park**
Energy			
Electricity consumption and distribution	Existing electricity distribution system would be adequate for construction and operations	Same as Indian Canyon Alternative	Same as Indian Canyon Alternative
Construction-related fuel (gasoline and diesel) consumption	19,859,000 gallons	27,803,000 gallons	23,217,000 gallons
Operations-related fuel (gasoline and diesel) consumption	• Low rail traffic scenario: 3,955,941 gallons/year • High rail traffic scenario: 11,696,171 gallons/year	• Low rail traffic scenario: 5,206,157 gallons/year • High rail traffic scenario: 15,127,985 gallons/year	• Low rail traffic scenario: 4,341,206 gallons/year • High rail traffic scenario: 12,765,347 gallons/year
Impacts on utilities (pipelines and transmission lines)	11~~4~~ utilities would be crossed; some~~but~~ impacts on service would be avoided or minimized with mitigation but some portions of existing pipelines may need to be relocated	6 utilities would be crossed but impacts on service would be avoided or minimized with mitigation	13~~6~~ utilities would be crossed; some ~~but~~ impacts on service would be avoided or minimized with mitigation but some portions of existing pipelines may need to be relocated
Number of oil and gas wells adversely affected by construction	4	11	2
Cultural Resources			
Sensitive cultural resources physically affected	14	12	13
Sensitive cultural resources affected by change in setting	2	7	3
Paleontological Resources			
PFYC acreage in the project footprint	• PFYC 5: 787 acres • PFYC 4: 879 acres • PFYC 3: 628 acres	• PFYC 5: 926 acres • PFYC 4: 4,901 acres • PFYC 3: 628 acres	• PFYC 5: 853 acres • PFYC 4: 977 acres • PFYC 3: 1,370 acres
Scientifically important fossil localities in the project footprint	26	1	26

Impact	Action Alternative: Indian Canyon	Wells Draw	Whitmore Park
Land Use and Recreation			
Temporary disturbance by land ownership	• BLM: 73 acres • SITLA: 285 acres • Tribal: 257 acres • UDOT: 4 acres • Forest Service: 234 acres • Private: 1,614 acres	• BLM: 3,246 acres • SITLA: 554 acres • Tribal: 0 acres • UDOT: 1 acre • Forest Service: 0 acres • Private: 1,293 acres	• BLM: 0 acres • SITLA: 283 acres • Tribal: 255 acres • UDOT: 4 acres • Forest Service: 234 acres • Private: 2,312 acres
Permanent disturbance by land ownership	• BLM: 46 acres • SITLA: 158 acres • Tribal: 121 acres • UDOT: <1 acre • Forest Service: 167 acres • Private: 847 acres	• BLM: 1,571 acres • SITLA: 327 acres • Tribal: 0 acres • UDOT: 0 acre • Forest Service: 0 acres • Private: 662 acres	• BLM: 0 acres • SITLA: 103 acres • Tribal: 118 acres • UDOT: 0 acre • Forest Service: 167 acres • Private: 1,042 acres
Temporary disturbance of agricultural land in the study area	• Irrigated cropland: 145 acres • Prime farmland: 56 acres	• Irrigated cropland: 35 acres • Prime farmland: 15 acres	• Irrigated cropland: 145 acres • Prime farmland: 56 acres
Permanent disturbance of agricultural land in the study area	• Irrigated cropland: 92 acres • Prime farmland: 6 acres	• Irrigated cropland: 6 acres • Prime farmland: 4 acres	• Irrigated cropland: 92 acres • Prime farmland: 6 acres
Temporary loss of AUMs	50	176	73
Permanent loss of AUMs	34	88	37
Special designations	Forest Service Inventoried Roadless Areas	Route would cross BLM's Lears Canyon ACEC, Nine Mile Canyon ACEC, two Lands with Wilderness Characteristics areas, and the Nine Mile SRMA	Same as Indian Canyon Alternative
BLM Land Use Plan Amendment Required	Yes	Yes	No
Forest Service Land Use Plan Amendment Required	Yes	No	Yes
Disturbance within Forest Service Inventoried Roadless Areas	394 acres	0 acres	394 acres

	Action Alternative		
Impact	**Indian Canyon**	**Wells Draw**	**Whitmore Park**
Cooperative Wildlife Management Units impacts	816 acres	466 acres	1,472 acres
Conservation Easements affected	1	0	1
Visual Resources			
RKOP scenic quality ratings on BLM-administered lands	No change in scenic quality rating	Same as Indian Canyon Alternative	Alternative does not cross BLM-administered land
Visual quality ratings on other federal, state, tribal, and private land	• No change in rating at 1 RKOP • -1 reduced rating at 2 RKOPs • -2 reduced rating at 2~~3~~ RKOPs • -3 reduced rating at 1 RKOP • -4 reduced rating at 1 RKOP	• -1 reduced rating at 1 RKOP • -2 reduced rating at 1~~2~~ RKOP~~s~~ • -4 reduced rating at 1 RKOP	• -1 reduced rating at 2~~3~~ RKOPs • -2 reduced rating at 3~~2~~ RKOPs • -3 reduced rating at 1 RKOP
Sensitive viewscapes	• Ashley National Forest • BLM lands • Tribal trust lands • Indian Canyon Scenic Byway • Reservation Ridge Scenic Backway	• Ashley National Forest • BLM lands • Reservation Ridge Scenic Backway	Same as Indian Canyon Alternative
Infrastructure changes	• Install 4 new towers • Install 6 new sidings • Remove 3 nonresidential structures	• Install 4 new towers • Install 3 new sidings • Remove 4 residences • Remove 1 other structure	• Install 4 new towers • Install 9 new sidings • Remove 1 residence • Remove 5 other structures
Socioeconomics			
Land acquisitions required	3,808.2 acres	7,655.3 acres	4,518.3 acres
Impacts on private property	Greatest adverse impact on smaller private property owners because it would cross the greatest number of smaller-subdivided properties in the Argyle Canyon and Duchesne Mini-Ranches areas of Duchesne County	Route would affect the smallest area of private property, but would displace the largest number of residences	Route would affect the largest area of private property across the three Action Alternatives and would primarily affect larger property owners and ranching and farming operations
Annual employment, labor income, and value added impacts from construction	$290.6 million	$351.3 million	$311.8 million

	Action Alternative		
Impact	**Indian Canyon**	**Wells Draw**	**Whitmore Park**
Annual Employment (direct, indirect, induced) during Operations	• Low rail traffic scenario: 170 jobs • High rail traffic scenario: 420 jobs	• Low rail traffic scenario: 220 jobs • High rail traffic scenario: 530 jobs	• Low rail traffic scenario:190 jobs • High rail traffic scenario: 470 jobs
Annual labor income from operation	• Low rail traffic scenario: $8.3 million • High rail traffic scenario: $23.3 million	• Low rail traffic scenario: $10.4 million • High rail traffic scenario: $29.0 million	• Low rail traffic scenario: $9.3 million • High rail traffic scenario: $25.8 million
Operations-related state tax revenue	• Low rail traffic scenario: $0.4–0.5 million • High rail traffic scenario: $1.1–1.4 million	Same as Indian Canyon Alternative	Same as Indian Canyon Alternative
Environmental Justice			
Air Quality, Water Resources, Land Use, Socioeconomics, Vehicle Safety and Delay, Rail Operations Safety, Noise	No disproportionately high and adverse impacts on minority or low-income populations	Same as Indian Canyon Alternative	Same as Indian Canyon Alternative
Cultural resources	Impacts may disproportionately affect the Ute Indian Tribe but would be mitigated and would not be high and adverse	Same as Indian Canyon Alternative	Same as Indian Canyon Alternative
Biological resources	Effects on suitable habitat for the Pariette cactus and Uinta Basin hookless cactus would represent a disproportionately high and adverse effect on the Ute Indian Tribe	Same as Indian Canyon Alternative	Same as Indian Canyon Alternative
Downline			
Delay at downline at-grade road crossings	Increase delay up to 9.84 seconds per vehicle	Same as Indian Canyon Alternative	Same as Indian Canyon Alternative
Predicted downline rail accident frequency at grade crossings	Increase of 0.001 to 0.024 accident per year	Same as Indian Canyon Alternative	Same as Indian Canyon Alternative
Noise level increases at downline receptors	0.4 dB to 6.0 dB	Same as Indian Canyon Alternative	Same as Indian Canyon Alternative

Impact	Action Alternative		
	Indian Canyon	Wells Draw	Whitmore Park
Maximum downline criteria pollutant emissions	• CO: 1,048.35~~1,803.68~~ tons/year • NOx: 2,913.84~~5,013.24~~ tons/year • PM10: 63.00~~108.39~~ tons/year • PM2.5: 61.11~~105.14~~ tons/year • SO_2: 3.70~~6.36~~ tons/year • VOC: 103.66~~178.34~~ tons/year	Same as Indian Canyon Alternative	Same as Indian Canyon Alternative

Notes:

[a]~~[1]~~ The Coalition estimates that rail traffic on the proposed rail line could range from as few as 3.68 trains per day, on average (the low rail traffic scenario), to as many as 10.52 trains per day, on average (the high rail traffic scenario), depending on future market conditions, including future demand for crude oil produced in the Basin.

[b] Notably, there is significant overlap of big game habitat for the different big game species (see Appendix G, *Biological Resources Figures*, for big game habitats along the Action Alternatives), and the permanent and temporary habitat impacts affect multiple big game species in those areas of habitat overlap.

VMT = vehicle miles traveled; UDWR = Utah Division of Wildlife Resources; BLM = U.S. Department of the Interior, Bureau of Land Management; dBA =A-weighted decibels; dB = decibels; CO = carbon monoxide; NOx = nitrogen oxides; PM10 = particulate matter 10 microns or less in diameter; PM2.5 = particulate matter 2.5 microns or less in diameter; SO_2 = sulfur dioxide; VOCs = volatile organic compounds; NO_2 = nitrogen dioxide; NAAQS = National Ambient Air Quality Standards; PFYC = Potential Fossil Yield Classification; AUM = animal unit month; SITLA = School and Institutional Trust Lands Administration; UDOT = Utah Department of Transportation; ACEC = Area of Critical Environmental Concern; SRMA = Special Recreation Management Area; Forest Service = U.S. Forest Service; RKOP = rendered key observation point

S.6 Mitigation

The Coalition has proposed 56 voluntary mitigation measures to address the environmental impacts of construction and operation of the proposed rail line. In addition to the Coalition's voluntary mitigation measures, OEA is ~~preliminarily~~ recommending an additional 91~~73~~ mitigation measures. OEA is making~~will make~~ its final recommendations on mitigation to the Board in this~~the~~ Final EIS after considering all public comments on the~~this~~ Draft EIS. Chapter 4, *Mitigation*, presents the Coalition's voluntary mitigation measures and OEA's additional recommended mitigation measures.

S.7 Public Involvement

S.7.1 Online Public Meetings

OEA hosted~~is hosting~~ six online public meetings on the Draft EIS. During these meetings OEA ~~will~~ provided project information and accepted oral comments on the Draft EIS. The online public meetings were~~will be~~ held at the following date and times; all times are in Mountain Standard Time (MST).

- Monday, November 16, 2020, 2:00–4:00 p.m.
- Wednesday, November 18, 2020, 9:00–11:00 a.m.
- Thursday, November 19, 2020, 6:00–8:00 p.m.
- Monday, November 30, 2020, 6:00–8:00 p.m.
- Tuesday, December 1, 2020, 2:00–4:00 p.m.
- Thursday, December 3, 2020, 6:00–8:00 p.m.

~~Commenters wishing to make oral comments must sign up in advance to do so. The project website (www.uintabasinrailwayeis.com) provides meeting information and sign-up instructions.~~

S.7.2 ~~Request for Comments on Draft EIS~~Public Comment Period for the Draft EIS

OEA requested~~s~~ and encouraged~~s~~ the public and interested parties to submit comments on all aspects of the~~this~~ Draft EIS. All comments on the Draft EIS were~~must be~~ submitted within the published comment period, which was announced to~~will~~ close on **December 14, 2020**, 45 days after the Notice of Availability of the Draft EIS was~~is~~ published in the Federal Register. On December 2, 2020, OEA announced a 45-day extension of the comment period, requesting that comments be submitted by January 28, 2021. On January 28, 2021, OEA announced a second comment period extension of 15 days until February 12, 2021. When submitting comments on the Draft EIS, the Board encouraged~~s~~ commenters to be as specific as possible and substantiate concerns and recommendations. OEA asked that all commenters~~Please~~ refer to Docket No. FD 36284 in all correspondence about this case addressed to the Board, including all comments submitted on the Draft EIS.

OEA accepted~~is accepting~~ oral comments during online public meetings, written comments submitted electronically through the project website, and written comments received through the U.S. mail. OEA gave~~will give~~ oral, electronically submitted, and mailed comments the same consideration so commenters did~~o~~ not have to submit the same comments by more than one method.

- OEA accepted~~will accept~~ oral comments at any of the above-noted public meetings. Commenters wishing to make oral comments were asked to~~must~~ sign up in advance to do so. The project website (www.uintabasinrailwayeis.com) provided~~s~~ meeting information and sign-up instructions.
- Comments on the Draft EIS could~~may~~ be submitted electronically on the Board-sponsored website (www.uintabasinrailwayeis.com).
- Written comments on the Draft EIS could~~may~~ be mailed to the following address.

  Joshua Wayland, PhD
  Surface Transportation Board
  c/o ICF
  9300 Lee Highway
  Fairfax, VA 22031
  Attention: Environmental filing, Docket No. FD 36284

Following the close of the comment period on the Draft EIS on February 12, 2021, OEA issued~~will issue~~ ~~a~~this Final EIS that considers and responds to all substantive comments received on the Draft EIS. Changes made to the Draft EIS appear in blue in the Final EIS. The Board will now~~then~~ issue a final decision based on the Draft EIS and Final EIS and all public and agency comments in the public record for this proceeding. The Board's final decision will address the transportation merits of the proposed project and the entire environmental record. That final decision will take one of three actions: authorize the Coalition's proposal, deny it, or authorize it with mitigation conditions, including environmental conditions.

Chapter 1
Purpose and Need

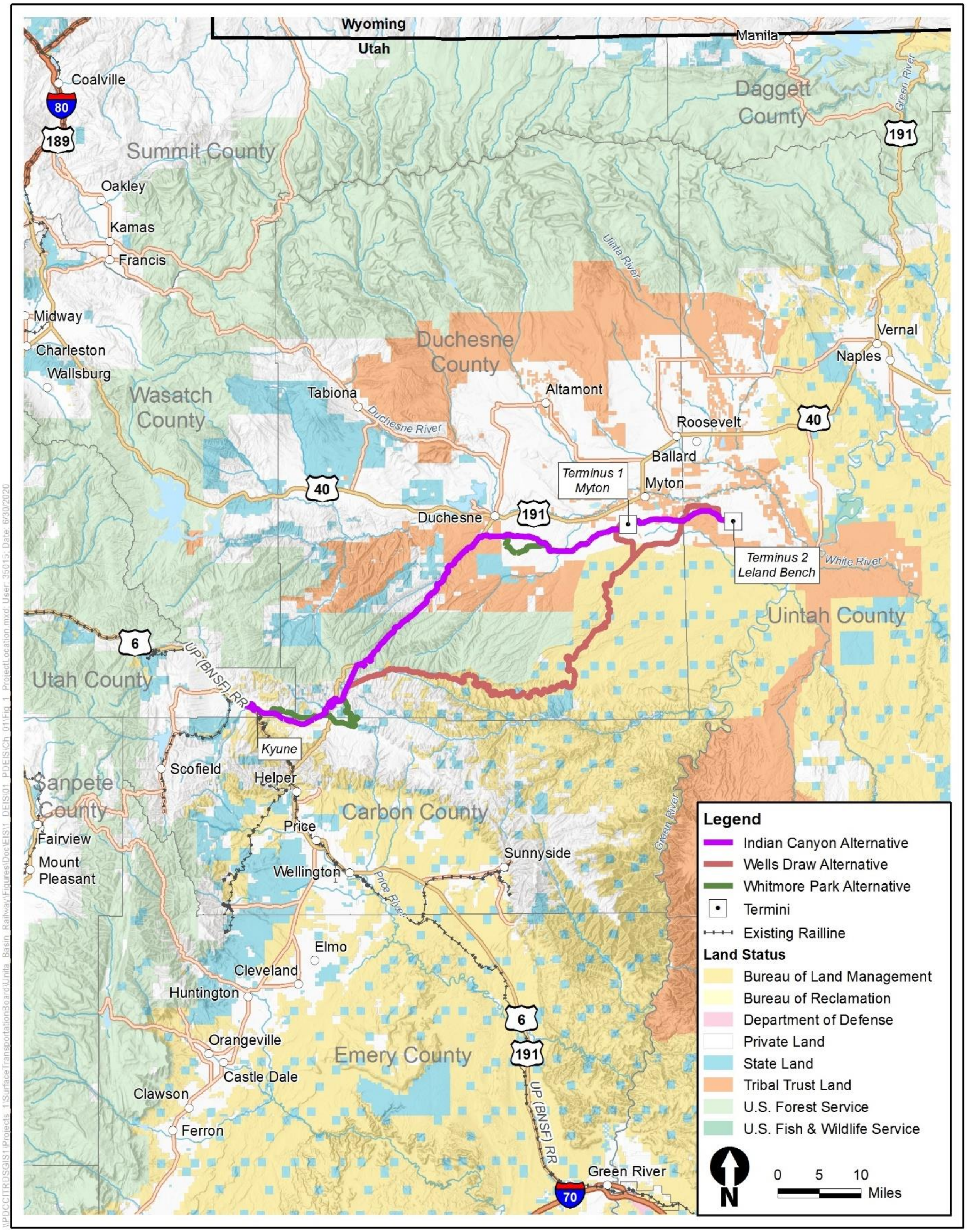
1.1 Introduction

On May 29, 2020, the Seven County Infrastructure Coalition (Coalition) filed a petition for exemption with the Surface Transportation Board (Board) pursuant to 49 United States Code (U.S.C.) § 10502 in Docket No. FD 36284. The petition requests Board authority to construct and operate a new line of railroad in Carbon, Duchesne, Uintah, and Utah Counties, Utah. The Coalition is a political subdivision of the State of Utah established under an inter-local agreement by the Utah counties of Carbon, Daggett, Duchesne, Emery, San Juan, Sevier, and Uintah. The Coalition's proposed rail line would provide a new rail connection between the Uinta Basin in northeastern Utah (Basin) and the existing interstate rail network. It would extend approximately 85 miles from terminus points in the Basin near Myton, Utah and Leland Bench, Utah to an existing Union Pacific (UP) rail line near Kyune, Utah. OEA understands that the Coalition has entered into or intends to enter into agreements with Drexel Hamilton Infrastructure Partners (Drexel Hamilton), Rio Grande Pacific Corporation (RGPC), and the Ute Indian Tribe of the Uintah and Ouray Reservation (Ute Indian Tribe). If the Board were to authorize the proposed construction and operation, the Coalition states that Drexel Hamilton would be responsible for financing and commercialization of the proposed rail line and RGPC would operate and maintain it. The Coalition expects that the Ute Indian Tribe would become an equity partner in the proposed rail line.[1]

Because the construction and operation of the proposed rail line would result in significant environmental impacts, the Board's Office of Environmental Analysis (OEA) has prepared this ~~Draft~~ Environmental Impact Statement (EIS) pursuant to the National Environmental Policy Act (NEPA). 42 U.S.C. § 4321 et seq. Including the Coalition's preferred alternative, OEA identified three reasonable alternatives for consideration in this ~~Draft~~ EIS. Those alternatives are the Indian Canyon Alternative, the Wells Draw Alternative, and the Whitmore Park Alternative (collectively, the Action Alternatives). The Action Alternatives are shown in Figure 1-1 in relation to the project area and are discussed in detail in Chapter 2*, Proposed Action and Alternatives*. The ~~Draft~~ EIS also considers the No-Action Alternative, which would occur if the Board were to deny the Coalition's request for construction and operation authority. The Coalition, the project applicant, has identified the Whitmore Park Alternative as its preferred alternative. Based on the information presented in this ~~Draft~~ EIS, OEA has identified the Whitmore Park Alternative as OEA's environmentally preferred alternative. Should the Board decide to authorize construction and operation of the proposed rail line, OEA ~~preliminarily~~ recommends that the Board authorize the Whitmore Park Alternative to minimize impacts of construction and operation on the environment.

[1] As used in this ~~Draft~~ Environmental Impact Statement (EIS), references to the Coalition as the project applicant also refer to any private partners that may be involved in the construction and operation of the proposed rail line, including Drexel Hamilton Infrastructure Partners (Drexel Hamilton) and Rio Grande Pacific Corporation (RGPC).

Figure 1-1. Project Location



1.2 Purpose and Need

The proposed federal action in this case is the Board's decision to authorize, deny, or authorize with conditions the Coalition's petition. If the Board were to grant~~authorize~~ the petition, the proposed rail line would be operated as a common carrier rail line. As a common carrier, the Coalition would be required to provide rail service to any shipper upon reasonable request. The proposed rail line is not being proposed or sponsored by the federal government. Therefore, the purpose and need of the proposed rail line is informed by both the goals of the Coalition, as the project applicant, and the Board's enabling statute, specifically 49 U.S.C. § 10101 (the Rail Transportation Policy provision), § 10502 (the Board's exemption provision) and § 10901 (the Board's rail construction licensing provision).[2] Construction and operation of new rail lines require prior authorization by the Board either through a certificate under 49 U.S.C. § 10901, or an exemption from the formal application requirements of § 10901 under § 10502. Section 10901(c) directs the Board to grant construction proposals "unless" the Board finds the proposal "inconsistent with the public convenience and necessity (PC&N)." This is a permissive licensing standard that presumes that rail construction projects are in the public interest unless shown otherwise. The Coalition, however, has sought an exemption under § 10502 from the regulatory requirements of § 10901; therefore, the public convenience and necessity standard in § 10901—although instructive—does not directly apply in this case. Under § 10502, the Board here must grant an exemption if it finds that the application of § 10901 (in whole or in part) is not necessary to carry out the Rail Transportation Policy contained in § 10101 and either the rail construction and operation is of limited scope or the application of § 10901 is not needed to protect shippers from the abuse of market power.

As described in the Coalition's petition, the purpose of the proposed rail line would be to provide common carrier rail service connecting the Basin to the interstate common carrier rail network using a route that would provide shippers with a viable alternative to trucking. The Basin is an isolated geographical region, approximately 12,000 square miles in area, extending from northeastern Utah into northwestern Colorado. Because it is surrounded by high mountains and plateaus with elevations up to 13,500 feet above sea level, the Basin has limited access to all transportation modes. Currently, all freight moving into and out of the Basin is transported by trucks on the area's limited road network, which includes one north-south two-lane highway (U.S. Highway 191) and one east-west two-lane highway (U.S. Highway 40).

According to the Coalition, the proposed rail line would provide customers in the Basin with multi-modal options for the movement of freight to and from the Basin; promote a safe and efficient system of freight transportation in and out of the Basin; further the development of a sound rail transportation system; and foster sound economic conditions in transportation and effective competition and coordination between differing modes of transportation. While the Board will ultimately determine whether to authorize or deny the petition, the Coalition's stated purposes appear to be consistent with the PC&N contained in § 10901 and the Rail Transportation Policy contained in § 10101.[3]

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[2] See *Alaska Survival v. STB*, 705 F.3d 1073, 1084-85 (9th Cir. 2013); *Citizens Against Burlington, Inc. v. Busey*, 938 F.2d 190, 199 (D.C. Cir. 1991).

[3] The Board issued a preliminary decision on the transportation merits under the § 10502 exemption criteria in this proceeding on Jan. 5, 2021. *Seven County Infrastructure Coalition – Rail Constr. and Oper. Exemption – In Utah, Carbon, Duchesne, and Uintah Counties, Utah*, FD 36284 (Jan. 5, 2021).

The Coalition anticipates that shippers would use the proposed rail line primarily to transport crude oil from the Basin to markets across the United States. Depending on future market conditions, including future global demand for crude oil and oil refinery capacity, the number of dedicated trains that would transport crude oil on the proposed rail line could range from 3.68 to 9.92 trains per day, on average, including unloaded trains entering the Basin and loaded trains leaving the Basin. The unit trains would consist of approximately 110 oil tanker cars and may be up to 10,000 feet long, including locomotives and buffer rail cars.

The rail line could also be used to transport other mineral and agricultural products out of the Basin, but the volume of those products would likely not be large enough to require dedicated trains. In addition, shippers could use the railroad to transport products and commodities such as frac sand,[4] other proppant material, steel, and machinery to markets in the Basin. Depending on future market conditions, the Coalition estimates that the number of dedicated frac sand trains on the proposed rail line would range between 0 and 0.6 trains per day, on average, including loaded trains entering the Basin and empty trains leaving the Basin. Aside from frac sand, other products entering the Basin would not require dedicated trains. Therefore, the total rail traffic on the proposed rail line would range between 3.68 and 10.52 trains per day, on average, during rail operations.

1.3 National Environmental Policy Act Process

1.3.1 Lead Agency

NEPA requires federal agencies to assess the environmental effects of proposed actions prior to making decisions. OEA is the office of the Board tasked with carrying out the Board's responsibilities under NEPA and related environmental laws. The Board, through OEA, is the lead agency responsible for preparing this ~~Draft~~ EIS to identify and evaluate the potential environmental impacts associated with the proposed rail line and reasonable and feasible alternatives.

1.3.2 Cooperating Agencies

Four federal agencies and one state agency, acting as lead agency for other Utah State agencies, assisted in the preparation of this ~~Draft~~ EIS as cooperating agencies, pursuant to Council on Environmental Quality (CEQ) regulations at 40 Code of Federal Regulations (C.F.R.) § 1501.6. The CEQ regulations emphasize agency cooperation early in the NEPA process and allow a lead agency to request the assistance of other agencies with either jurisdiction by law or special expertise in matters relevant to preparing an EIS.

OEA and the cooperating agencies prepared this ~~Draft~~ EIS[5] in accordance with NEPA, the CEQ regulations, and the Board's environmental regulations (49 C.F.R. Part 1105). This ~~Draft~~ EIS is intended to provide the Board; the cooperating agencies; other federal, state, and local agencies; federally recognized tribes; and the public with clear and concise information on the potential environmental impacts of the proposed rail line and the No-Action Alternative. The Board and the

[4] *Frac sand* is a type of sand that is injected into underground cracks in rocks from which oil is harvested during the hydraulic fracturing (fracking) process.

[5] While much of this ~~Draft~~ EIS refers to OEA as the document's preparer, the analysis and conclusions reflect input from all cooperating agencies.

cooperating agencies will consider the information in this ~~Draft~~ EIS during their decision-making processes. Table 1-1 lists the cooperating agencies and summarizes their regulatory role with respect to the proposed rail line. Additional information regarding the role of each cooperating agency is provided below. Chapter 5, *Consultation and Coordination*, includes information on OEA's consultation with cooperating agencies and tribes.

Table 1-1. Cooperating Agencies

Agency	Role
State of Utah Public Lands Policy Coordinating Office	Coordinates input for Utah state agencies under NEPA and related laws.
U.S. Department of Agriculture, U.S. Forest Service (Forest Service)	May approve or deny a special use permit for Forest Service-managed lands. May approve or deny a project-specific Forest Plan amendment for visual quality objectives.
Department of the Army, U.S. Army Corps of Engineers (Corps)	May issue or deny a Section 404 Clean Water Act permit and/or a Section 10 Rivers and Harbors Act permit.
Department of the Interior, Bureau of Indian Affairs	May approve, deny, or grant with modifications the application for grant of easement(s) or leases on Tribal trust lands.
Department of the Interior, Bureau of Land Management (BLM)	May approve or deny a right-of-way grant for the proposed rail line across BLM-administered lands.

Notes:
NEPA = National Environmental Policy Act

1.3.2.1 U.S. Forest Service

Because the Indian Canyon Alternative and the Whitmore Park Alternative would cross National Forest System (NFS) lands, the Coalition would have to seek U.S. Forest Service (Forest Service) approval for permitting the rail line right-of-way if the Board were to license either of those alternatives. The Forest Service decision on whether to permit the rail right-of-way would also include determining whether to amend the Ashley Forest Land and Resource Management Plan (Ashley Forest Plan) with a project-specific amendment for visual quality. The Forest Service intends to use this ~~Draft~~ EIS to inform its decision on the necessary approvals and the Ashley Forest Plan project-specific amendment. In the event that the Forest Service decides to amend the Ashley Forest Plan, the Forest Service has given notice that the scope is expected to be limited to the proposed rail line only, and the scale of the amendment is the project area that occurs on NFS lands. The Forest Service has also given notice that the substantive requirements of the 2012 Planning Rule (36 C.F.R Part 219) are likely to be directly related and, therefore, applicable to the Ashley Forest Plan amendments are 36 C.F.R. § 219.8(b)(1) and (2) (specifically scenic character), regarding social and economic sustainability, and 36 C.F.R. § 219.10(a)(1) (specifically scenery) and (3) (specifically transportation), regarding integrated resource management for multiple use. The Forest Service responsible official is the Ashley Forest Supervisor. The Indian Canyon Alternative and the Whitmore Park Alternative would cross through roadless areas ~~o~~in Ashley National Forest. To construct either of those alternatives, a roadless review and approval by the Regional Forester would have to be completed to ensure consistency with the 2001 Roadless Area Conservation Rule (36 C.F.R. Part 294, Subparts A and B).

1.3.2.2 U.S. Army Corps of Engineers

The U.S. Army Corps of Engineers (Corps), through the Regulatory Program, administers and enforces Section 10 of the Rivers and Harbors Act of 1899 and Section 404 of the Clean Water Act. Under Rivers and Harbors Act Section 10, a permit is required for work or structures in, over, or under navigable waters of the United States. Under Clean Water Act Section 404, a permit is required for the discharge of dredged or fill material into waters of the United States. On September 30, 2020, the Corps issued a public notice announcing that it was evaluating the Coalition's application for a permit under Section 404 of the Clean Water Act.

1.3.2.3 Bureau of Indian Affairs

The Indian Canyon Alternative and the Whitmore Park Alternative would cross Tribal trust lands in the Uintah and Ouray Reservation. To construct either of those alternatives, the Coalition would have to obtain a consent resolution from the Ute Indian Tribe and a grant of easement for right-of-way or leases (if necessary) from the Bureau of Indian Affairs before beginning construction.

1.3.2.4 Bureau of Land Management

The Indian Canyon Alternative and the Wells Draw Alternative would cross Bureau of Land Management (BLM) lands administered by the BLM's Vernal Field Office, Price Field Office, and Salt Lake Field Office. Therefore, if the Board were to authorize one of those two alternatives, the Coalition would have to seek and obtain a right-of-way permit across BLM-administered public lands, pursuant to 43 C.F.R. Part 2800, before beginning construction. If the Board were to authorize an alternative that would cross BLM-administered land, the issuance of a right-of-way would be subject to the requirements of the BLM's applicable Resource Management Plans (RMPs), including the Vernal Field Office RMP, Price Field Office RMP, and Pony Express RMP. As proposed, the Indian Canyon Alternative and Wells Draw Alternative would not be in compliance with greater sage-grouse noise thresholds and ground disturbance cap in the Price Field Office RMP and Pony Express RMP, and BLM may need to amend these plans to issue a right-of-way grant. BLM may also need to amend the Vernal Field Office RMP based on where the Wells Draw Alternative crosses BLM Visual Resource Management Class II land and the Lears Canyon Area of Critical Environmental Concern.

1.3.2.5 Utah Public Lands Policy Coordinating Office

The State of Utah, through its Public Lands Policy Lands Policy Coordinating Office, is participating in the Board's EIS process by providing recommendations and guidance informed by the specialized expertise of the state agencies in the areas of land use, transportation, safety, water quality, air quality, biological resources, geology, energy, socioeconomics, and cultural resources.

1.3.3 Scoping Process

The Board published a Notice of Intent (NOI) to prepare an EIS and a Draft Scope of Study for the EIS in the *Federal Register* on June 19, 2019. Publication of the NOI initiated a 45-day public scoping period that commenced June 19, 2019, and was scheduled to end on August 3, 2019. In response to requests to extend the public scoping period, the Board extended the scoping comment period for an additional 30 days. The scoping comment period ended September 3, 2019. During the scoping period, OEA held six public scoping meetings in the project area. Information on and materials available at those meetings can be found on the Board-sponsored project website (www.uintabasinrailwayeis.com). Following the end of the scoping period, OEA revised the Draft Scope of Study in response to comments received from agencies, other stakeholders, and the public. The Final Scope of Study for the EIS was published in the *Federal Register* on December 13, 2019.

1.3.4 Public Comment Period for the Draft EIS

OEA requested~~s~~ and encouraged~~s~~ the public and any interested parties to submit comments on any aspect of the~~is~~ Draft EIS. OEA~~ will~~ considered all comments in preparing the~~a~~ Final EIS, which ~~will~~ sets forth OEA's conclusions regarding the potential environmental impacts of the proposed rail line and OEA's final recommendations to the Board, including recommended environmental mitigation measures. All comments on the~~is~~ Draft EIS were~~must be~~ submitted within the published comment period, which ~~will~~ was announced to close on December 14, 2020, 45 days after the Notice of Availability of the EIS is published in the *Federal Register*. On December 2, 2020, OEA announced a 45-day extension of the comment period, requesting that comments be submitted by January 29, 2021. On January 28, 2021, OEA announced a second comment period extension of 15 days until February 12, 2021. When submitting comments on the~~is~~ Draft EIS, the Board encouraged~~s~~ commenters to be as specific as possible and substantiate concerns and recommendations.

Commenters could ~~may~~ submit comments electronically or through the mail. OEA gave~~will give~~ the same consideration to comments submitted electronically as mailed comments. Therefore, persons submitting comments electronically did~~do~~ not have to also send comments by mail. Comments on the~~is~~ Draft EIS could~~may~~ be submitted electronically through the Board-sponsored project website (www.uintabasinrailwayeis.com).

Written comments on the~~is~~ Draft EIS could~~may~~ be mailed to the following address.

Joshua Wayland, PhD
Surface Transportation Board
c/o ICF
9300 Lee Highway
Fairfax, VA 22031
Attention: Environmental filing, Docket No. FD 36284

OEA asked that all commenters p~~P~~lease refer to Docket No. FD 36284 in all correspondence addressed to the Board, including all comments submitted on the Draft EIS.

Following the close of the comment period on the Draft EIS on ~~December 14, 2020~~February 12, 2021, OEA ~~will~~ issued a Final EIS. The Board will now~~then~~ issue a final decision that will address the transportation merits of the proposed project and the entire environmental record, including the Draft EIS, Final EIS, and public and agency comments.

Further information about the project can be obtained by calling OEA's toll-free number for the project at 1-855-826-7596. Assistance for the hearing impaired is available through the Federal Information Relay Service (FIRS) at (800) 877-8339.

This ~~Draft~~ EIS is available for viewing and downloading on the Board's website (www.stb.gov) and on the Board-sponsored project website (www.uintabasinrailwayeis.com).

1.3.5 Public Meetings

In addition to receiving written comments on the Draft EIS, OEA ~~will~~ hosted six public online meetings during which interested parties made~~may~~ oral comments. OEA ~~will begin~~ began each online meeting with an overview of the proposed project and the environmental review process followed by a facilitated comment session for interested individuals who ~~have~~ registered in advance to make oral comments. Each registered commenter ~~will have~~had several minutes to convey his or her oral comments. A court reporter ~~will~~ recorded the oral comments. OEA made the m~~M~~eeting transcripts ~~will be~~ available on the project website after the meetings.

The online public meetings were ~~will be~~ held at the following dates and times; all times are in Mountain Standard Time (MST).

- Monday, November 16, 2020, 2:00–4:00 p.m.
- Wednesday, November 18, 2020, 9:00–11:00 a.m.
- Thursday, November 19, 2020, 6:00–8:00 p.m.
- Monday, November 30, 2020, 6:00–8:00 p.m.
- Tuesday, December 1, 2020, 2:00–4:00 p.m.
- Thursday, December 3, 2020, 6:00–8:00 p.m.

To register for the online public meeting, interested participants visited the Public Involvement page on the Board-sponsored project website (www.uintabasinrailwayeis.com). OEA also ~~will~~ provided additional meeting information and dial-in instructions after registration, and posted that information on the Board-sponsored project website for anyone to use.

Chapter 2
Proposed Action and Alternatives

This chapter describes the Coalition's proposed rail line, the process for developing alternatives to the Coalition's proposal, and the final range of reasonable alternatives that OEA evaluated in this ~~Draft~~ EIS. The alternatives evaluated in this ~~Draft~~ EIS, as described below, are the Whitmore Park Alternative (the Coalition's preferred alternative), the Indian Canyon Alternative, and the Wells Draw Alternatives (collectively, the Action Alternatives). OEA also evaluated the No-Action Alternative, which would occur if the Board were to deny the Coalition's request for Board authority to construct and operate a rail line.

2.1 Proposed Action

The Coalition proposes to construct and operate an approximately 85-mile single-track rail line to connect the Uinta Basin (the Basin) to the existing interstate rail network. The proposed rail line would extend from two terminus points in the Basin near Myton, Utah and Leland Bench, Utah to a proposed connection with the existing Union Pacific (UP) Provo Subdivision near Kyune, Utah. The Coalition has entered into or intends to enter into agreements with Drexel Hamilton Infrastructure Partners (Drexel Hamilton), Rio Grande Pacific Corporation (RGPC) and the Ute Indian Tribe of the Uintah and Ouray Reservation (Ute Indian Tribe). If the Board were to authorize construction and operation for the proposed rail line, the Coalition states that Drexel Hamilton would be responsible for financing and commercialization of the proposed rail line and RGPC would operate and maintain it. The Coalition expects that the Ute Indian Tribe would become an equity partner in the proposed rail line.[1]

The Coalition anticipates that rail traffic on the proposed rail line would primarily consist of trains transporting crude oil from the Basin to markets across the United States. The Coalition also expects that trains would transport frac sand into the Basin for use in the oil and gas extraction industry. The total volume of rail traffic would depend on future markets for crude oil, which is driven by global demand and capacity at oil refineries. Depending on those future market conditions, the Coalition estimates that as few as 3.68 or as many as 10.52 trains could operate on the proposed rail line each day, on average.[2] That estimate includes between 3.68 and 9.92 crude oil trains, including both unloaded trains entering the Basin and loaded trains leaving the Basin, and between 0 and 0.6 frac sand trains, including both loaded trains entering the Basin and unloaded trains leaving the Basin. The Coalition expects that the majority of crude oil transported on the proposed rail line would originate from new extraction projects in the Uinta Basin or increased production at existing oil wells. The Coalition does not expect that the proposed rail line would divert existing oil truck traffic to rail transportation for the purposes of serving existing oil refineries in Salt Lake City in the short term.

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[1] As used in this ~~Draft~~ EIS, references to the Coalition as the project applicant also refer to any private partners that may be involved in the construction and operation of the proposed rail line, including Drexel Hamilton and RGPC.

[2] In its petition, the Coalition has stated that projections of future rail traffic are based on conditions existing before the ongoing COVID-19 pandemic, and that it anticipates these conditions caused by the pandemic will be temporary in nature.

The Coalition expects that shippers could also use the proposed rail line to transport various heavy and bulk commodities found in the Basin, such as soda ash, phosphate, natural gas, oil shale, gilsonite, natural asphalt, limestone, bentonite, heavy clay, aggregate materials, bauxite, low-sulfur coal, and agricultural products. These products would be transported in cars added to crude oil trains or frac sand trains. The Coalition does not anticipate that the volume of other commodities would be large enough to warrant dedicated trains.

The Coalition anticipates that shippers of crude oil or other third parties would construct terminals at the two terminus points of the proposed rail line near Myton and Leland Bench to facilitate the transportation of crude oil. The Coalition is not proposing to construct terminals at the two terminus points as part of its petition filed with the Board, and the Board would not have a role in permitting those facilities if another non-railroad party were to construct them. Because the potential terminals are not part of the proposed action being evaluated in this ~~Draft~~ EIS, those facilities are discussed separately in Chapter 3, Section 3.15, *Cumulative Impacts*.

2.2 Alternatives

This section discusses the process that was used to develop the alternatives considered in this ~~Draft~~ EIS, routes that were considered but were not analyzed in detail, and the final set of reasonable alternatives that were carried forward for detailed review. OEA incorporates by reference the following source documents referred to in this section.

The Board's website (www.stb.gov) and the Board-sponsored project website (uintabasinrailwayeis.com) include all documents incorporated by reference.

- 2014–2015 Utah Department of Transportation (UDOT) Studies:
    - *Alternatives Feasibility Report* (UDOT 2014a)
    - *Alternatives-Development and Screening Methodology Report* (UDOT 2014b)
    - *Uinta Basin Railroad Feasibility Study Summary Report* (UDOT 2015)
- 2019–2020 Coalition Reports:
    - *Uinta Basin Railway: Evaluation of Potential Route Alternatives* (Coalition 2019a)
    - *Uinta Basin Railway: Supplemental Route Selection Information* (Coalition 2020)

2.2.1 Alternatives Development

The National Environmental Policy Act (NEPA) requires that federal agencies consider reasonable alternatives to the proposed action. To be reasonable, an alternative must meet the project purpose and need and must be logistically feasible and practical to implement. In railroad construction cases, OEA typically determines the range of reasonable alternatives by first developing a list of conceptual routes. OEA then carefully considers those potential alternatives in consultation with appropriate agencies, other stakeholders, and the public. In determining whether an alternative is reasonable, OEA considers the totality of circumstances for each potential alternative, including the following:

- **Logistical constraints.** Some potential alternatives may not be logistically feasible because they would involve especially steep grades or high curvature ratios that would increase the risk of derailment and other accidents. A potential alternative may also be unreasonable if it would require unusual or unique design features, such as especially long tunnels or long viaducts that may be impossible or impractical to construct or to operate safely.

- **Length of the rail line.** In general, longer rail lines are more expensive to construct and operate and are likely to result in more environmental impacts than shorter rail lines. A conceptual route that is significantly longer than other potential alternatives may not be reasonable under NEPA if it does not offer potential benefits in terms of lower environmental impacts, improved operational safety, or increased economic efficiency relative to other potential alternatives.
- **Disproportionately significant environmental impacts.** A potential alternative that would cross areas containing especially sensitive environmental or cultural resources may ~~be~~ not be reasonable under NEPA when it is clear from initial desktop review that the potential alternative would result in significant environmental impacts that cannot be mitigated and that would be substantially greater than the impacts associated with other potential alternatives. OEA believes it would be a misuse of public and agency time and resources to analyze in detail a potential alternative that the Board would not be able to ultimately authorize as its environmentally preferable alternative.
- **Construction and operation costs.** Because freight rail lines are typically constructed and operated by private companies using private investment funds, the costs of constructing and operating a new rail line are ultimately passed along to shippers in the form of rates charged by the rail line operator to transport freight. If the cost of constructing and operating a new rail line is prohibitively high, it could make it impossible for the operator to offer rates that would be competitive with other means of transportation. Some potential alternatives may, therefore, be economically infeasible because they would entail prohibitively high construction and operation costs.

Because each rail line construction case is unique, OEA does not have established thresholds for any of the above parameters. Therefore, to determine the range of reasonable alternatives, OEA carefully considered the totality of circumstances for each potential alternative, including agency and public comments received during the scoping process.[3]

The three Action Alternatives examined in this ~~Draft~~ EIS were developed over the course of several years of analysis by the Utah Department of Transportation (UDOT) and the Coalition, and later OEA. Because the Basin is surrounded by high mountains and plateaus, there are very few feasible routes that a rail line could follow that would allow for freight trains to operate within modern standards of safety and efficiency. This section summarizes the processes that UDOT, the Coalition, and OEA used to evaluate the feasibility of conceptual routes and determine the final range of alternatives. Additional details regarding the alternative development process, including the reports referenced in this section and listed in Section 2.2, *Alternatives*, are available to the public on the

[3] OEA recognizes that other agencies may have the responsibility to assess the feasibility of potential alternatives under regulations other than NEPA, including Section 404 of the Clean Water Act (33 U.S.C. § 1344). Section 404 requires that the applicant consider all practicable alternatives and demonstrates the proposed action is the Least Environmental Damaging Practicable Alternative (LEDPA). Although it is beyond the scope of the Board's environmental review under NEPA to present a full analysis for the purposes of Section 404, OEA believes that the information summarized in this section and provided in detail in the 2014–2015 UDOT Studies, the 2019–2020 Coalition Reports, and other sources referenced in this section should be reasonably sufficient to support the identification of practicable alternatives per the section 404(b)(1) guidelines. OEA also believes that the information provided in Chapter 3, *Affected Environment and Environmental Consequences*, is reasonably sufficient to support the selection of the LEDPA.

Board's website (www.stb.gov) and the Board-sponsored project website (www.uintabasinrailwayeis.com).

In 2014 and 2015, UDOT completed alternative feasibility studies that examined the feasibility of constructing a rail line to connect the Basin to the interstate railroad network (2014–2015 UDOT Studies).[4] The 2014–2015 UDOT Studies identified 26 conceptual routes for a potential rail line and applied four levels of screening to determine which, if any, of those routes could feasibly be constructed. In the first-level screening, UDOT assessed whether each route would meet the project's purpose and need. The second-level screening involved a high-level engineering analysis to determine whether the routes that passed the first-level screening would have a maximum grade of no more than 2.4 percent, which UDOT considered to be the maximum grade that a heavy freight rail line can safely and efficiently operate. In the third-level screening, UDOT overlaid the conceptual routes that passed the second-level screening with available geospatial data and eliminated those that would have disproportionate environmental impacts on residences, known resources of cultural and historic value, and unique or particularly sensitive wildlife habitat. In the fourth-level screening, UDOT conducted a more detailed engineering analysis of the conceptual routes that passed the third-level screening and eliminated the routes that would be infeasible to construct.

In 2019 and 2020, the Coalition issued their route alternative selection reports (2019–2020 Coalition Reports)[5], which detailed the Coalition's efforts to reassess the conceptual routes identified in the 2014–2015 UDOT Studies. In addition to the 26 routes that UDOT identified, the Coalition also considered three additional routes that it had identified. The Coalition then conducted a three-level screening process to eliminate routes that would not be reasonable alternatives. In the first-level screening, the Coalition conducted a desktop analysis and eliminated routes that would cross areas of particularly sensitive wildlife habitat, areas known to contain important cultural resources, or highly developed areas with many residences, buildings, and infrastructure. In the second-level screening, the Coalition conducted a high-level engineering review of the routes that passed the first-level screening and eliminated those that would be infeasible to construct and operate; the primary criterion that the Coalition used in this second-level screening was a maximum grade of 2.5 percent, which is slightly higher than UDOT's criterion of 2.4 percent maximum grade. In the third-level screening, the Coalition eliminated several conceptual routes that passed the second-level screening due to being largely duplicative with other routes that passed the second-level screening. For routes that passed all three levels of screening, the Coalition provided additional information regarding the relative technical and economic feasibility of the route and the results of desktop review of potential environmental impacts.

The Coalition proposed that OEA consider three routes as potential alternatives in the EIS, based on UDOT's and the Coalition's screening results. Those proposed alternatives were the Indian Canyon Alternative, the Wells Draw Alternative, and an alignment referred to as the Craig Route. After considering the comments that OEA received during the EIS scoping process, which are available to the public on the Board's website, the Coalition proposed an additional route as a potential alternative. That route, the Whitmore Park Alternative, although largely similar to the Indian Canyon Alternative, would avoid some sensitive habitat and some residential areas relative to the Indian Canyon Alternative. The Coalition also concluded, based on new information received during

[4] See *Alternatives Feasibility Report* (UDOT 2014a); *Alternatives-Development and Screening Methodology Report* (UDOT 2014b); and *Uinta Basin Railroad Feasibility Study Summary Report* (UDOT 2015).

[5] See *Uinta Basin Railway: Evaluation of Potential Route Alternatives* (Coalition 2019a) and *Uinta Basin Railway: Supplemental Route Selection Information* (Coalition 2020).

scoping, that the Craig Route would not meet the Coalition's purpose and need and requested that OEA eliminate that route from further review.

Throughout 2019 and 2020, OEA conducted its own analysis of the conceptual routes that were considered by UDOT and the Coalition. OEA also requested and received from the Coalition additional, more detailed engineering information about some of the routes that were eliminated during the screening analysis that the Coalition conducted. OEA also consulted with and carefully considered comments from federal, state, and local agencies; tribes; other potentially affected stakeholders; and the public about potential alternatives during the scoping process.

Based on the analyses conducted by UDOT, the Coalition, and OEA, as well as comments submitted during scoping, OEA concluded that, of the conceptual routes that were considered at various times, only three routes would be reasonable under NEPA. OEA notes that the major reason that conceptual routes were found to be infeasible is due to the prevailing, challenging topography (e.g., mountain elevations, steep grades) surrounding the Basin. All of the routes identified by UDOT and the Coalition that OEA ultimately found infeasible would require substantial cut-and-fill and large or numerous bridges. Most routes would have also required numerous or large tunnels to pass through mountains. For example, the Coalition estimates that the least-cost route, the Indian Canyon Alternative, would cost approximately 1.29 billion dollars to construct, which is equivalent to approximately 16 million dollars per mile, while a typical rail line constructed on relatively flat terrain typically costs between approximately 1 and 2 million dollars per mile to construct. The other two reasonable alternatives analyzed in detail in this ~~Draft~~ EIS, the Whitmore Park Alternative and the Wells Draw Alternative, would have estimated construction costs of approximately 1.35 billion dollars and 2.14 billion dollars, respectively.

2.2.2 Routes Considered but Not Analyzed in the EIS

This section briefly discusses the conceptual routes that OEA considered but did not analyze in detail in this ~~Draft~~ EIS because they would be logistically infeasible or unreasonable to construct and operate. Additional information regarding the conceptual routes that OEA did not analyze in detail is provided in the 2014–2015 UDOT Studies and the 2019–2020 Coalition Reports, which are publicly available on the Board's website (www.stb.gov) and on the Board-sponsored project website (www.uintabasinrailwayeis.com). Notably, none of the routes are entirely unique and many include substantial overlap with other routes. Where appropriate, this section notes the similarities between routes.

2.2.2.1 Craig Route

The Craig Route would extend approximately 185 miles from terminus points in the Basin to an existing rail line near Axial, Colorado. From the terminus points in the Basin, the Craig Route would proceed generally northward then turn and proceed generally eastward, crossing the Green River approximately 5 miles south of Jensen, Utah. The route would then proceed southeasterly, entering Colorado approximately 3 miles northwest of Dinosaur, Colorado, and would connect to the Deseret Power Railroad (DPR) south of Dinosaur. The Craig Route would use approximately 13 miles of the DPR to proceed eastward and would depart the DPR approximately 2 miles west of the Deserado Mine. It would then proceed generally eastward to connect to the UP Craig Subdivision near the railroad timetable station at Axial.

The Craig Route was first identified in the 2019–2020 Coalition Reports, which concluded that the route would be logistically feasible to construct because, despite having a substantially longer length relative to other conceptual routes, it would traverse less challenging terrain. For this reason, OEA initially decided to carry the Craig Route forward for review in the EIS scoping process as a potential alternative. During scoping, however, OEA received comments raising concerns regarding the potential environmental impacts of the Craig Route, as well as the reasonableness and feasibility of that proposed alternative, as detailed below.

The Coalition submitted a comment letter to OEA explaining that, based on information obtained during scoping, the Coalition no longer believes the Craig Route would meet the project's purpose and need. First, the Coalition stated that two segments of the Craig Route are currently private rail lines, not common-carrier rail lines, which means that the Coalition would need to obtain the right to operate over those segments in order to construct and operate the Craig Route. Second, the Coalition noted that if the Craig Route were constructed, shippers in the Basin would gain access only to a rail line owned and operated by UP. According to the Coalition, the lack of access to two existing carriers on the Craig Route would result in higher rates for shippers and could affect the Coalition's ability to attract shippers and obtain financing. Third, the Coalition stated that the economic feasibility of the Craig Route could be affected by the high maintenance and operating costs on the UP Craig Subdivision, to which the Craig Route would connect. Because trains from the proposed rail line would be the primary source of rail traffic on the UP Craig Subdivision, the Coalition stated it could be forced to either purchase that UP line or incur substantial costs to ensure that it is adequately maintained. Finally, the Coalition noted the comments from federal, state, and local agencies discussed below regarding the disproportionate potential impact of the Craig Route on wildlife and other resources relative to the other proposed build alternatives.

The U.S. Department of the Interior, Bureau of Land Management (BLM) submitted comments requesting that OEA eliminate the Craig Route from detailed analysis in the EIS due to the likelihood of significant environmental impacts on specific resources in Colorado. BLM explained that the Craig Route would be inconsistent with BLM management decisions and would require an amendment to applicable BLM Resource Management Plans (RMPs) to permit a right-of-way. BLM identified potential significant environmental impacts on important greater sage-grouse (*Centrocercus urophasianus*) and sharp-tailed grouse (*Tympanuchus phasianellus*) habitat; important winter habitat for big game species, including pronghorn (*Antilocapra Americana*), mule deer (*Odocoileus hemionus*), and elk (*Cervus canadensis*); and habitat for the black-footed ferret (*Mustela nigripes*) in the Wolf Creek Management Area. Other issues raised by BLM regarding the Craig Route include potential visual impacts and impacts on several threatened and endangered plant species.

The National Park Service submitted comments identifying potential environmental impacts—including increased air pollution, noise, and altered daytime viewsheds and dark night sky views—of the Craig Route on Dinosaur National Monument (DNM) that would be caused by the Craig Route's close proximity (within 5 miles) to DNM. By comparison, the Indian Canyon Alternative and the Wells Draw Alternative would avoid these impacts because both routes would be more than 30 miles away from the DNM.

Colorado Parks and Wildlife (CPW) submitted comments raising concerns about the Craig Route due to the area's extremely high value for numerous wildlife species and the potential of the proposed route to adversely affect those species. CPW identified eight properties in which CPW maintains an interest that would be bisected by the Craig Route, potentially resulting in the fragmentation of wildlife habitat or affecting public use of the properties. CPW noted that the Craig Route would cross numerous tributary streams of the White River and the Yampa River, which serve as spawning areas for threatened and endangered fish species. In addition, CPW commented that the Craig Route would cross crucial winter range areas and migration routes for big game species and raised concerns regarding potential impacts on greater sage-grouse, sharp-tailed grouse, raptors, and black-footed ferrets. Finally, CPW identified several proposed projects in the vicinity of the Craig Route that could potentially result in significant cumulative impacts on biological resources when considered in conjunction with the proposed rail line, including the Transwest Express Transmission Line, Energy Gateway South Transmission Line, Tri-State's Colowyo coal mine expansion, federal oil and gas leasing projects, and proposals for sand and gravel mining.

In comments submitted during scoping, the commissioners of Moffat County, Colorado did not ask OEA to eliminate the Craig Route, but raised several issues unique to the Craig Route that would need to be addressed if that route were carried forward in the EIS. Among these issues are the lack of the Craig Route's connection to an existing common carrier rail line in Colorado, which would require the Coalition to acquire rights to operate over a private rail line in order to implement the proposed rail line if the Craig Route were authorized. Moffatt County also pointed to potential bottleneck issues related to adding new rail traffic to parts of the proposed route that could make the Craig Route infeasible. Moffat County further noted the existence of several wildlife conservation easements along the Craig Route corridor and cited potential rail crossings that would need to intersect public roads and landowner concerns.

OEA's independent analysis of the Craig Route concluded that the route, due to its substantially longer length, would require a greater number of water body crossings than other proposed alternatives, would affect a greater area of wetlands, would likely require greater volumes of water during construction, and would have a greater potential to affect cultural resources, such as undiscovered archeological sites. The Craig Route is also the only one of the three initially proposed alternatives that would cross the Green River, which contains designated critical habitat for federally listed endangered fish species that are endemic to the Colorado River basin.

Based on the serious concerns discussed in this section, OEA concluded that the Craig Route would not be a reasonable alternative because it might not provide shippers with a viable rail alternative to trucking and would have the potential for disproportionately significant environmental impacts, including visual, noise, and air quality impacts on DNM and water quality impacts on the Green River related to the proposed crossing of that river.

2.2.2.2 Craig City Route

The Craig City Route would extend generally eastward approximately 181 miles from terminus points in the Basin to a connection with an existing rail line near Craig, Colorado. From the Basin, the route would head east toward and along DPR into Colorado before generally following U.S. Highway 40 (US 40) northeast to the rail connection near Craig.

The 2014–2015 UDOT Studies concluded that the Craig City Route would not meet the purpose and need of the proposed rail line and did not consider the route further. The 2019–2020 Coalition Reports concluded that the Craig City Route would be substantially duplicative of the Craig Route and did not consider the Craig City Route further as a distinct route. OEA reviewed the available information and concluded that, like the Craig Route, the Craig City Route is not a reasonable alternative because it might not provide shippers with a viable alternative to trucking and would have the potential for disproportionately significant environmental impacts, including visual, noise, and air quality impacts on DNM and water quality impacts on the Green River related to the proposed crossing of that river.

2.2.2.3 Axial-Meeker Route

The Axial-Meeker Route would extend approximately 183 miles from terminus points in the Basin to a connection with an existing privately owned rail line near Axial, Colorado. From the Basin, the route would head east toward and along the existing DPR into Colorado before following Colorado State Highway 64 (CO 64) to Meeker, Colorado. It would then turn north and follow Colorado State Highway 13 (CO 13) to the rail connection near Axial.

The 2014–2015 UDOT Studies concluded that the Axial-Meeker Route would not meet the purpose and need of the proposed rail line and did not consider the route further. The 2019–2020 Coalition Reports concluded that the Axial-Meeker Route would be substantively duplicative of the Craig Route and did not consider it further as a distinct route. OEA reviewed the available information and concluded that the Axial-Meeker Route is not a reasonable alternative because, like the Craig Route, it might not provide shippers with a viable alternative to trucking and would have the potential to result in disproportionately significant environmental impacts, including visual, noise, and air quality impacts on DNM and water quality impacts on the Green River related to the proposed crossing of that river.

2.2.2.4 Echo Canyon Route

The Echo Canyon Route would extend generally northwest approximately 157 miles from terminus points in the Basin to an existing UP rail line near Echo, Utah. From the Basin, the route would extend westward up the Duchesne River valley toward Wolf Creek Pass. It would then descend northwesterly from the summit, paralleling the Provo River through Kamas, Utah toward Echo. The route would require approximately 12.4 miles of tunnels to traverse areas of high elevation surrounding the Basin.

The 2014–2015 UDOT Studies concluded that the Echo Canyon Route would not meet the project's purpose and did not consider the route further. The 2019–2020 Coalition Reports found that the Echo Canyon Route would be feasible to construct in the first-level screening but eliminated the route from further review in the second-level screening due to disproportionate impacts on the built and natural environments. Specifically, the 2019–2020 Coalition Reports concluded that the Echo Canyon Route would pass through extensively developed residential areas in the vicinity of Park City, Utah, and would likely require the relocation of or result in impacts on many residences and other aspects of the built environment. OEA reviewed the available information and concluded that the Echo Canyon Route is not a reasonable alternative because it would result in disproportionately significant impacts on residential areas near Park City, potentially including the relocation of numerous residences in that area, without offering benefits in terms of lower impacts on other environmental resources. OEA also concluded that the potential costs associated with the relocations of numerous residences and the acquisition of numerous properties in the Park City area would result in a prohibitively high construction cost that would make the Echo Canyon Route impractical to construct.

2.2.2.5 Sowers Canyon Route

The Sowers Canyon Route would extend generally southwest approximately 104 miles from terminus points in the Basin to a connection with an existing UP rail line near Kyune, Utah. From the Basin, the route would follow Sowers Canyon by way of Antelope Canyon and then travel through three tunnels to reach the Whitmore Park Plateau to the west of Nine Mile Canyon Road. It would then parallel Emma Park Road to Kyune. The Sowers Canyon Route would be identical along much of its length to the Minnie Maud Canyon—Sowers Canyon Route and the Argyle Canyon—Sowers Canyon Route, all three of which would pass through Sowers Canyon. It would also be similar to the Indian Canyon Alternative, sharing the same terminus points in the Basin and the same connection to the existing UP rail line near Kyune.

The 2014–2015 UDOT Studies concluded that the Sowers Canyon Route would be logistically feasible to construct and operate. However, UDOT recommended that the Sowers Canyon Route not be considered further because it would be largely similar to the Indian Canyon Alternative but would result in more significant environmental impacts. The 2019–2020 Coalition Reports reevaluated the Sowers Canyon Route and concluded, in the second-level screening, that the route would not be logistically feasible to construct and operate while maintaining a maximum grade of 2.5 percent. OEA reviewed the available information and concluded that the Sowers Canyon Route is not a reasonable alternative because it would require extensive tunneling, extensive embankment construction on steep slopes, and numerous stream crossings in narrow canyons, all of which would substantially increase the risk of derailment and accidents, the costs associated with construction and operation, and the potential for significant environmental impacts.

2.2.2.6 Minnie Maud Canyon—Sowers Canyon Route

The Minnie Maud Canyon—Sowers Canyon Route would extend generally southwest approximately 112 miles from terminus points in the Basin to a connection with an existing rail line near Kyune. From the Uinta Basin, the route would follow Antelope Canyon to Sowers Canyon, where two tunnels would provide a connection to Minnie Maud Canyon. It would then extend southward through Nine Mile Canyon to the Whitmore Park Plateau, where it would parallel Emma Park Road to Kyune. The Minnie Maud Canyon—Sowers Canyon Route would be identical along much of its length to the Sowers Canyon Route and the Argyle Canyon—Sowers Canyon Route, all three of which would pass through Sowers Canyon. It would also be similar to the Indian Canyon Alternative, sharing the same terminus points in the Basin and the same connection to the existing UP rail line near Kyune.

The 2014–2015 UDOT Studies concluded that the Minnie Maud Canyon—Sowers Canyon Route would meet the project's purpose and need and would be logistically feasible to construct and operate. However, UDOT's third-level screening concluded that the route would have higher potential for environmental impacts than the largely similar Sowers Canyon Route because it would require a greater number of water crossings and would cross a larger area of wetland and cross larger areas of sensitive wildlife habitat, including greater sage-grouse habitat and black-footed ferret habitat. The 2019–2020 Coalition Reports reevaluated the Minnie Maud Canyon—Sowers Canyon Route and concluded, in the second-level screening, that the route would not be logistically feasible to construct and operate while maintaining a maximum grade of 2.5 percent. OEA reviewed the available information and concluded that the Minnie Maud Canyon—Sowers Canyon Route is not a reasonable alternative because, in order to maintain a safe maximum grade, the route would require extensive tunneling, extensive embankment construction on steep slopes, and numerous stream crossings in narrow canyons, all of which would substantially increase the risk of derailment and accidents, the costs associated with construction and operation, and the potential for significant environmental impacts.

2.2.2.7 Argyle Canyon—Sowers Canyon Route

This conceptual route would extend generally southwest approximately 125 miles from terminus points in the Basin to a connection with an existing UP rail line near Kyune, Utah. From the Basin, the route would follow Antelope Canyon to Sowers Canyon, where a tunnel would connect to Argyle Canyon. It would then follow Argyle Canyon for approximately 13 miles before following Nine Mile Canyon south to the Whitmore Park Plateau, where it would head west along Emma Park Road to Kyune. The Argyle Canyon—Sowers Canyon Route would be identical along much of its length to the Sowers Canyon Route and the Minnie Maud Canyon—Sowers Canyon Route, all three of which would pass through Sowers Canyon. It would also be similar to the Indian Canyon Alternative, sharing the same terminus points in the Uinta Basin and the same connection to the existing UP rail line near Kyune.

The 2014–2015 UDOT Studies concluded that the Argyle Canyon—Sowers Canyon Route would meet the project’s purpose and need and would be logistically feasible to construct and operate. However, UDOT’s third-level screening concluded that the route would have higher potential for environmental impacts than the largely similar Sowers Canyon Route. The 2019–2020 Coalition Reports reevaluated the Argyle Canyon—Sowers Canyon Route and concluded, in the second-level screening, that the route would not be logistically feasible to construct and operate while maintaining a maximum grade of 2.5 percent. OEA reviewed the available information and concluded that the Argyle Canyon—Sowers Canyon Route is not a reasonable alternative because, in order to maintain a safe maximum grade, the route would require extensive tunneling, extensive embankment construction on steep slopes, and numerous stream crossings in narrow canyons, all of which would substantially increase the risk of derailment and accidents, the costs associated with construction and operation, and the potential for significant environmental impacts.

2.2.2.8 Nine Mile Canyon—Wells Draw Route

The Nine Mile Canyon—Wells Draw Route would extend generally southwest approximately 110 miles from termini in the Basin to a connection with an existing UP rail line near Kyune, Utah. From the Basin, the route would follow Wells Draw Road south through Gate Canyon and would then parallel Nine Mile Canyon Road to the Whitmore Park Plateau. It would then head west along Emma Park Road toward the rail connection near Kyune.

The 2014–2015 UDOT Studies concluded that the Nine Mile Canyon—Wells Draw Route would be logistically infeasible to construct due to a maximum grade of approximately 3.5 percent, which is in excess of the criterion of 2.4 percent set in those studies. The 2019–2020 Coalition Reports reevaluated the Nine Mile Canyon—Wells Draw Route and concluded, in the second-level screening, that the route would not be logistically feasible to construct and operate while maintaining a maximum grade of 2.5 percent. OEA reviewed the available information and concluded that the Nine Mile Canyon—Wells Draw Route is not a reasonable alternative because, in order to maintain a safe maximum grade, the route would require extensive tunneling, extensive embankment construction on steep slopes, and numerous stream crossings in narrow canyons, all of which would substantially increase the risk of derailment and accidents, the costs associated with construction and operation, and the potential for significant environmental impacts.

2.2.2.9 Nine Mile Canyon—Upper Green River Canyon Route

The Nine Mile Canyon—Upper Green River Canyon Route would extend generally southwest approximately 144 miles from terminus points in the Basin to a connection with an existing UP rail line near Kyune, Utah. From the Basin, the route would follow Nine Mile Canyon Road through Nine Mile Canyon from the Green River south to the Whitmore Park Plateau. It would then head west along Emma Park Road toward the rail connection near Kyune.

The 2014–2015 UDOT Studies concluded that the Nine Mile Canyon—Upper Green River Canyon Route would be impractical to construct due to the height of the canyon walls in the Green River Canyon, the high water flows that fill the canyon floor, and the lack of continuous bench or beach on which to build the rail line. The 2019–2020 Coalition Reports concluded in the first-level screening that the route would ~~be~~ not be reasonable due to unavoidable impacts on Nine Mile Canyon and Green River Canyon. Nine Mile Canyon contains numerous significant cultural resources, including extensive rock art and archeological features created by the Fremont culture and the Ute people, while Green River Canyon contains significant natural resources, including the Green River, which supports numerous aquatic species, including federally and state listed protected species. OEA reviewed the available information and concluded that the Nine Mile Canyon—Upper Green River Canyon Route is not a reasonable alternative because it would result in disproportionately significant impacts on cultural and natural resources in Nine Mile Canyon and Green River Canyon.

2.2.2.10 Green River Canyon Route

The Green River Canyon Route would extend generally south approximately 159 miles from terminus points in the Basin to a connection with an existing UP rail line near the junction of U.S. Highway 6 (US 6) and Interstate 70 (I-70). From the Basin, the route would follow the Green River from Wild Horse Bench south toward the rail connection.

The 2014–2015 UDOT Studies concluded that the Green River Canyon Route would be impractical to construct due to the height of the canyon walls in the Green River Canyon, the high water flows that fill the canyon floor, and the lack of continuous bench or beach on which to build the rail line. The 2019–2020 Coalition Reports concluded in the first-level screening that the route would not be reasonable due to potential impacts on Green River Canyon. Green River Canyon contains significant natural resources, including the Green River, which supports numerous aquatic species, including federally and state listed protected species. OEA reviewed the available information and concluded that the Green River Canyon Route is not a reasonable alternative because it would result in disproportionately significant impacts on natural resources in Green River Canyon.

2.2.2.11 Thompson Canyon Route

The Thompson Canyon Route would extend generally south approximately 120 miles from terminus points in the Basin to a connection with an existing UP rail line east of Crescent Junction, Utah. From the Basin, it would generally follow Willow Creek to She Canyon and would then follow Bogart Canyon and Thompson Canyon south toward the rail connection.

The 2014–2015 UDOT Studies concluded that the Thompson Canyon Route would be logistically infeasible to construct due to a maximum grade of approximately 4.0 percent, which is in excess of the criterion of 2.4 percent set in those studies. The 2019–2020 Coalition Reports reevaluated the Thompson Canyon Route and concluded, in the second-level screening, that the route would not be logistically feasible to construct and operate while maintaining a maximum grade of 2.5 percent.

OEA reviewed the available information and concluded that the Thompson Canyon Route is not a reasonable alternative because, in order to maintain a safe maximum grade, the route would require extensive tunneling, extensive embankment construction on steep slopes, and numerous stream crossings in narrow canyons, all of which would substantially increase the risk of derailment and accidents, the costs associated with construction and operation, and the potential for significant environmental impacts.

2.2.2.12 Sego Canyon Route

The Sego Canyon Route would be largely similar to the Thompson Canyon Route. It would extend generally south approximately 120 miles from terminus points in the Basin to a connection with an existing UP rail line east of Crescent Junction, Utah. From the Basin, it would generally follow Willow Creek to She Canyon and would then follow Bogart Canyon and Thompson Canyon south toward the rail connection.

The 2014–2015 UDOT Studies concluded that the Sego Canyon Route would be logistically infeasible to construct due to a maximum grade of approximately 3.8 percent, which is in excess of the criterion of 2.4 percent set in those studies. The 2019–2020 Coalition Reports reevaluated the Sego Canyon Route and concluded, in the second-level screening, that the route would not be logistically feasible to construct and operate while maintaining a maximum grade of 2.5 percent. OEA reviewed the available information and concluded that the Sego Canyon Route is not a reasonable alternative because, in order to maintain a safe maximum grade, the route would require extensive tunneling, extensive embankment construction on steep slopes, and numerous stream crossings in narrow canyons, all of which would substantially increase the risk of derailment and accidents, the costs associated with construction and operation, and the potential for significant environmental impacts.

2.2.2.13 Mack Route

As described in the 2014–2015 UDOT Studies, the Mack Route would extend approximately 145 miles generally southeast from terminus points in the Basin to a connection with an existing UP rail line near Mack, Colorado. Although the route passed first-, second-, and third-level screening in the 2014–2015 UDOT Studies, UDOT ultimately eliminated it after more detailed engineering analysis in the fourth-level screening. Specifically, UDOT concluded during field review that the steep slopes and loose material in the Baxter pass area would make construction and operation of a rail line impractical due to the susceptibility of the geology to rockslides. UDOT also concluded that the steep slopes in the area through which the route would pass would make the construction of the rail main line and associated siding logistically infeasible.

The 2019–2020 Coalition Reports revised the Mack Route to accommodate new terminus points in the Basin. The revised route would extend approximately 155 miles from two terminus points near Myton, Utah and Leland Bench, Utah to a connection with an existing UP rail line near Mack. From Leland Bench and Myton, the route would extend northeasterly, crossing the Uinta River south of Fort Duchesne, Utah, then south-southeast to cross the Green River. It would then turn south, crossing the White River, then follow Bitter Creek Canyon to a summit tunnel through the East Tavaputs Plateau. From the summit tunnel, the route would follow Atchee Wash, exiting the Book Cliffs, then traverse Grand Valley to connect to the UP Green River Subdivision. Portions of the Mack Route would be identical to the Westwater Route, the East Rifle Route, the West Rifle Route, the Craig Route, and other conceptual routes.

Approximately 90.4 miles of the Mack Route would cross relatively open terrain. The remaining mileage, however, would cross rugged terrain characterized by mountains and deep valleys. Crossing that topography would require many areas of cut-and-fill, numerous bridges, and approximately 5.1 miles of tunnels to maintain a maximum grade of 2.5 percent. Due to the substantially longer length of the Mack Route relative to other conceptual routes and the significantly higher amounts of regrading that would be required, the Coalition concluded that the Mack Route would not be economically feasible to construct and operate. For the purpose of comparison, the Coalition estimated that the Mack Route would cost approximately 2.78 billion dollars to construct, which is well over twice the estimated construction cost of the least-cost route, the Indian Canyon Alternative. Desktop analysis conducted by the Coalition concluded that the Mack Route would also have greater potential for significant environmental impacts relative to other routes under consideration.

OEA reviewed the available information and concluded that the Mack Route is not a reasonable alternative because the construction and maintenance costs associated with the route's substantial length, as well as the extensive regrading, tunneling, and numerous bridges and other structures that would be required, would make the route impractical to construct and operate.

2.2.2.14 Mack-Evacuation Creek Route

The Mack-Evacuation Creek Route would extend generally southeast approximately 132 miles from terminus points in the Basin to a connection with an existing UP rail line near Mack, Colorado. From the Basin, it would travel east to follow the abandoned Uintah Railway route before following Baxter Pass Road south toward the UP rail connection.

The 2014–2015 UDOT Studies concluded that the route would be logistically infeasible to construct due to a maximum grade of approximately 4.8 percent, which is in excess of the criterion of 2.4 percent set in those studies. The 2019–2020 Coalition Reports reevaluated the Mack-Evacuation Creek Route and concluded, in the second-level screening, that the route would not be logistically feasible to construct and operate while maintaining a maximum grade of 2.5 percent. OEA reviewed the available information and concluded that the Mack-Evacuation Creek Route is not a reasonable alternative because, to maintain a safe maximum grade, the route would require extensive tunneling, extensive embankment construction on steep slopes, and numerous stream crossings in narrow canyons, all of which would substantially increase the risk of derailment and accidents, the costs associated with construction and operation, and the potential for significant environmental impacts.

2.2.2.15 Mack-Park Canyon Route

The Mack-Park Canyon Route would extend approximately 190 miles between terminus points in the Basin and a connection with an existing UP rail line near Mack, Colorado. From the Basin, it would travel east to the DPR and would follow the DPR toward Rangely, Colorado. It would then head southwest along Rio Blanco County 23 to Evacuation Creek and, then, to Baxter Pass. South of the pass, it would generally follow the abandoned narrow-gauge Uintah Railway route to the railroad connection near Mack.

The 2014–2015 UDOT Studies concluded that the Mack-Park Canyon Route would be logistically infeasible to construct due to a maximum grade of approximately 2.7 percent, which is in excess of the criterion of 2.4 percent set in those studies. The 2019–2020 Coalition Reports reevaluated the

Mack-Park Canyon Route and concluded, in the second-level screening, that the route would not be logistically feasible to construct and operate while maintaining a maximum grade of 2.5 percent. OEA reviewed the available information and concluded that the Mack-Park Canyon Route is not a reasonable alternative because, to maintain a safe maximum grade, the route would require extensive tunneling, extensive embankment construction on steep slopes, and numerous stream crossings in narrow canyons, all of which would substantially increase the risk of derailment and accidents, the costs associated with construction and operation, and the potential for significant environmental impacts.

2.2.2.16 Douglas Pass Route

The Douglas Pass Route would extend approximately 178 miles between terminus points in the Basin and a connection with an existing UP rail line near Mack, Colorado. From the Basin, it would travel east to the DPR and would follow the DPR toward Rangely, Colorado. It would then head south along Blue Mountain Road and Colorado State Highway 139 (CO 139) toward Mack via Douglas Pass.

The 2014–2015 UDOT Studies concluded that the Douglas~~s~~ Pass Route would be logistically infeasible to construct due to a maximum grade of approximately 4.0 percent, which is in excess of the criterion of 2.4 percent set in those studies. The 2019–2020 Coalition Reports reevaluated the Douglas Pass Route and concluded, in the second-level screening, that the route would not be logistically feasible to construct and operate while maintaining a maximum grade of 2.5 percent. OEA reviewed the available information and concluded that the Douglas Pass Route is not a reasonable alternative because, to maintain a safe maximum grade, the route would require extensive tunneling, extensive embankment construction on steep slopes, and numerous stream crossings in narrow canyons, all of which would substantially increase the risk of derailment and accidents, the costs associated with construction and operation, and the potential for significant environmental impacts.

2.2.2.17 Wamsutter Route

The Wamsutter Route would extend generally northwest approximately 248 miles from terminus points in the Basin to a connection with an existing UP rail line near Wamsutter, Wyoming. From the Basin, the route would head east toward and along the existing DPR into Colorado before following US 40 and County Road 143 north. It would follow the Little Snake River from its confluence with the Yampa River to Baggs, Wyoming. It would then head north along Wyoming State Highway 789 (WY 789) and Wamsutter Road to the rail connection near Wamsutter.

The 2014–2015 UDOT Studies concluded that the Wamsutter Route would not meet the purpose and need of the proposed rail line and did not consider the route further. The 2019–2020 Coalition Reports reevaluated the Wamsutter Route and concluded, in the second-level screening, that the route would not be logistically feasible to construct and operate while maintaining a maximum grade of 2.5 percent. OEA reviewed the available information and concluded that the Wamsutter Route is not a reasonable alternative because, to maintain a safe maximum grade, the route would require extensive tunneling, extensive embankment construction on steep slopes, and numerous stream crossings in narrow canyons, all of which would substantially increase the risk of derailment and accidents, the costs associated with construction and operation, and the potential for significant environmental impacts.

2.2.2.18 De Beque Route

The De Beque Route would extend approximately 200 miles from terminus points in the Basin to a connection with an existing UP rail line near De Beque, Colorado. From the Basin, the route would head east toward and along the existing DPR into Colorado before following Piceance Creek, Willow Creek, and West Willow Creek south toward the Book Cliffs. It would then continue south along Tom Creek, Clear Creek Road, County Road 204, and Roan Creek toward the rail connection near De Beque.

The 2014–2015 UDOT Studies concluded that the De Beque Route met the basic engineering criteria in its first-level screening, but in its second-level screening found that the route would likely result in disproportionate impacts on the natural and built environments. The 2019–2020 Coalition Reports reevaluated the De Beque Route and concluded, in the second-level screening, that the route would not be logistically feasible to construct and operate while maintaining a maximum grade of 2.5 percent. OEA reviewed the available information and concluded that the De Beque Route is not a reasonable alternative because, to maintain a safe maximum grade, the route would require extensive tunneling, extensive embankment construction on steep slopes, and numerous stream crossings in narrow canyons, all of which would substantially increase the risk of derailment and accidents, the costs associated with construction and operation, and the potential for significant environmental impacts.

2.2.2.19 Parachute-Piceance Creek Route

The Parachute-Piceance Creek Route would extend approximately 194 miles from terminus points in the Basin to a connection with an existing UP rail line near Parachute, Colorado. From the Basin, the route would head east toward and along the existing DPR into Colorado before following CO 64 and Piceance Creek. It would then turn south and follow County Road 215 and the existing American Soda Rail Spur toward Parachute.

The 2014–2015 UDOT Studies conducted by UDOT concluded that the Parachute-Piceance Creek Route would be logistically infeasible to construct due to a maximum grade of 2.5 percent, which is in excess of the criterion of 2.4 percent set in those studies. The 2019–2020 Coalition Reports reevaluated the Parachute-Piceance Creek Route and concluded, in the second-level screening, that the route would not be logistically feasible to construct and operate while maintaining a maximum grade of 2.5 percent. OEA reviewed the available information and concluded that the Parachute-Piceance Creek Route is not a reasonable alternative because, in order to maintain a safe maximum grade, the route would require extensive tunneling, extensive embankment construction on steep slopes, and numerous stream crossings in narrow canyons, all of which would substantially increase the risk of derailment and accidents, the costs associated with construction and operation, and the potential for significant environmental impacts.

2.2.2.20 West Rifle Route

As described in the 2014–2015 UDOT Studies, the West Rifle Route would extend east and southeast approximately 202 miles from terminus points in the Basin to a connection with an existing UP rail line near Rifle, Colorado. UDOT concluded that the West Rifle Route would be logistically infeasible to construct due to a ruling grade of 2.5 percent, which is in excess of the criterion of 2.4 percent set in the 2014–2015 UDOT Studies.

In the 2019–2020 Coalition Reports, the Coalition revised the West Rifle Route to include new terminus points within the Basin. The revised West Rifle Route would be approximately 201.6 miles long, of which approximately 136.9 miles would traverse open terrain. The remaining mileage would cross rugged terrain characterized by mountains and deep valleys. Due to the substantial length of the West Rifle Route and the difficult terrain that it would cross, the Coalition concluded that the West Rifle Route would not be economically feasible to construct and operate. For the purpose of comparison, the Coalition estimated that the West Rifle Route would cost approximately 2.67 billion dollars to construct, which is more than twice the estimated construction cost of the least-cost route. Desktop analysis conducted by the Coalition concluded that the West Rifle Route would also cross a greater number of water bodies and would affect a greater area of wetlands than other routes under consideration.

OEA reviewed the available information and concluded that the West Rifle Route is not a reasonable alternative because the construction and maintenance costs associated with the route's substantial length, as well as the extensive regrading, tunneling, and numerous bridges and other structures that would be required, would make the route impractical to construct and operate. OEA also concluded that, like the Craig Route, the West Rifle Route would result in disproportionately significant environmental impacts, including visual, noise, and air quality impacts on DNM and water quality impacts on the Green River related to the proposed crossing of that river.

2.2.2.21 Parachute-RioBlanco Pass Route

The Parachute-RioBlanco Pass Route would extend approximately 174 miles from terminus points in the Basin to a connection with an existing UP rail line near Parachute, Colorado. From the Basin, the route would head east toward and along the existing DPR into Colorado before following CO 64 to Meeker, Colorado. It would then turn south along CO 13 and would follow East Middle Fork Parachute Creek, County Road 215, and the existing American Soda Rail Spur toward the rail connection near Parachute.

The 2014–2015 UDOT Studies concluded that the Parachute-RioBlanco Pass Route would be logistically infeasible to construct due to a maximum grade of 2.5 percent, which is in excess of the criterion of 2.4 percent set in those studies. The 2019–2020 Coalition Reports reevaluated the Parachute-RioBlanco Pass Route and concluded, in the second-level screening, that the route would not be logistically feasible to construct and operate while maintaining a maximum grade of 2.5 percent. OEA reviewed the available information and concluded that the Parachute-RioBlanco Pass Route is not a reasonable alternative because, to maintain a safe maximum grade, the route would require extensive tunneling, extensive embankment construction on steep slopes, and numerous stream crossings in narrow canyons, all of which would substantially increase the risk of derailment and accidents, the costs associated with construction and operation, and the potential for significant environmental impacts.

2.2.2.22 East Rifle Route

As described in the 2014–2015 UDOT Studies, the East Rifle Route would extend generally east and south approximately 200 miles from terminus points in the Basin to a connection with an existing UP rail line near Rifle, Colorado. UDOT concluded that the East Rifle Route would be logistically infeasible to construct due to a maximum grade of 2.5 percent, which is in excess of the criterion of 2.4 percent set in the 2014–2015 UDOT Studies.

In the 2019–2020 Coalition Reports, the Coalition revised the East Rifle Route to accommodate new terminus points in the Basin. The revised East Rifle Route would be approximately 196.8 miles long, of which approximately 132.1 miles would traverse open terrain. The remaining mileage would cross rugged terrain characterized by mountains and deep valleys. Due to the substantial length of the East Rifle Route and the difficult terrain that it would cross, the Coalition concluded that the route would not be economically feasible to construct and operate. For the purpose of comparison, the Coalition estimated that the East Rifle Route would cost approximately 2.63 billion dollars to construct, which is more than twice the estimated construction cost of the least-cost route. Desktop analysis conducted by the Coalition concluded that the East Rifle Route would also have greater potential for significant environmental impacts relative to other routes under consideration.

OEA reviewed the available information and concluded that the East Rifle Route is not a reasonable alternative because the construction and maintenance costs associated with the route's substantial length, as well as the extensive regrading, tunneling, and numerous bridges and other structures that would be required, would make the route impractical to construct and operate. OEA also concluded that, like the Craig Route, the East Rifle Route would result in disproportionately significant environmental impacts, including visual, noise and air quality impacts on DNM and water quality impacts on the Green River related to the proposed crossing of that river.

2.2.2.23 Newcastle Route

The Newcastle Route would extend approximately 203 miles from terminus points in the Basin to a connection with an existing UP rail line near Newcastle, Colorado. From the Basin, the route would head east toward and along the existing DPR into Colorado before following CO 64 to Meeker, Colorado. It would then head south along Flag Creek and Piceance Creek and would follow West Rifle Creek and County Road 252 past Rifle Gap State Park. It would then head southeast along Elk Creek toward the rail connection near Newcastle.

The 2014–2015 UDOT Studies concluded that the Newcastle Route would be logistically infeasible to construct due to a ruling grade of 2.8 percent, which is in excess of the criterion of 2.4 percent set in those studies. The 2019–2020 Coalition Reports reevaluated the Newcastle Route and concluded, in the second-level screening, that the route would not be logistically feasible to construct and operate while maintaining a maximum grade of 2.5 percent. OEA reviewed the available information and concluded that the Newcastle Route is not a reasonable alternative because, to maintain a safe maximum grade, the route would require extensive tunneling, extensive embankment construction on steep slopes, and numerous stream crossings in narrow canyons, all of which would substantially increase the risk of derailment and accidents, the costs associated with construction and operation, and the potential for significant environmental impacts.

2.2.2.24 Westwater Route

As described in the 2014–2015 UDOT Studies, the Westwater Route would extend generally southward approximately 134 miles from terminus points in the Basin to a connection with an existing UP rail line east of Crescent Junction, Utah. UDOT concluded that the Westwater Route would meet the basic engineering criteria set for its second-level screening and would not result in disproportionate environmental impacts in its third-level screening. In its fourth-level screening, however, more detailed engineering review concluded that the Westwater Route would entail a maximum grade of 2.8 percent, which exceeds the criterion of 2.4 percent maximum grade in the 2014–2015 UDOT Studies.

In the 2019–2020 Coalition Reports, the Coalition revised the Westwater Route to accommodate new terminus points in the Basin. From the Basin, the revised route would follow Willow Creek, Kelly Canyon, and Rock Springs Canyon, then turn southeast and enter a tunnel to Preacher Canyon. It would then follow the Westwater Creek drainage along Book Cliffs Road toward the rail connection east of Crescent Junction. The revised route would extend approximately 159.7 miles, of which 94.9 miles would cross open terrain and the remainder of which would cross rugged terrain characterized by mountains and deep valleys. Due to the substantial length of the Westwater Route and the difficult terrain that it would cross, the Coalition concluded that the Westwater Route would not be economically feasible to construct and operate. For the purpose of comparison, the Coalition estimated that the Westwater Route would cost approximately 2.84 billion dollars to construct, which is well over twice the estimated construction cost of the least-cost route.

OEA reviewed the available information and concluded that the Westwater Route is not a reasonable alternative because the construction and maintenance costs associated with the route's substantial length, as well as the extensive regrading, tunneling, and numerous bridges and other structures that would be required, would make the route impractical to construct and operate.

2.2.2.25 Westwater-Seep Ridge Route

The Westwater-Seep Ridge Route would extend generally south approximately 129 miles from terminus points in the Basin to a connection with an existing UP rail line east of Crescent Junction, Utah. From the Basin, it would follow Bitter Creek Road and Middle Bitter Creek Road toward Sweetwater Canyon. From Sweetwater Canyon, it would follow East Canyon southwest to the Westwater Creek drainage and would then follow Book Cliffs Road toward the rail connection.

The 2014–2015 UDOT Studies concluded that the Westwater-Seep Ridge Route would be logistically infeasible to construct due to a maximum grade of approximately 4.8 percent, which is in excess of the criterion of 2.4 percent set in those studies. The 2019–2020 Coalition Reports reevaluated the Westwater-Seep Ridge Route and concluded, in the second-level screening, that the route would not be feasible to construct and operate while maintaining a maximum grade of 2.5 percent. OEA reviewed the available information and concluded that the Westwater-Seep Ridge Route is not a reasonable alternative because, to maintain a safe maximum grade, the route would require extensive tunneling, extensive embankment construction on steep slopes, and numerous stream crossings in narrow canyons, all of which would substantially increase the risk of derailment and accidents, the costs associated with construction and operation, and the potential for significant environmental impacts.

2.2.2.26 Cisco Route

The Cisco Route would extend generally southward approximately 141 miles from terminus points in the Basin to a connection with an existing rail line east of Crescent Junction, Utah. From the Basin, the Cisco Route would travel south and southwest through She Canyon and through a tunnel toward the junction of Cottonwood Canyon and Upper Cottonwood Canyon. It would follow Cottonwood Canyon to Cisco Springs Road and then head south toward the rail connection east of Crescent Junction.

The 2014–2015 UDOT Studies concluded that the Cisco Route would be logistically infeasible to construct due to a maximum grade of 4.0 percent, which is in excess of the criterion of 2.4 percent set in those studies. The 2019–2020 Coalition Reports reevaluated the Cisco Route and concluded, in the second-level screening, that the route would not be logistically feasible to construct and operate while maintaining a maximum grade of 2.5 percent. OEA reviewed the available information and concluded that the Cisco Route is not a reasonable alternative because, to maintain a safe maximum grade, the route would require extensive tunneling, extensive embankment construction on steep slopes, and numerous stream crossings in narrow canyons, all of which would substantially increase the risk of derailment and accidents, the costs associated with construction and operation, and the potential for significant environmental impacts.

2.2.2.27 Avintaquin Canyon Route

The Avintaquin Canyon Route would extend approximately 97 miles from terminus points in the Basin to a connect with an existing UP rail line near Soldier Summit, Utah. From the Basin, it would proceed generally westward along Strawberry River toward Avintaquin Canyon. It would then turn southwesterly and follow Avintaquin Canyon upstream to a summit tunnel through the West Tavaputs Plateau. It would then descend the Roan Cliffs toward the rail connection near Soldier Summit. The Avintaquin Canyon Route was not considered in the 2014–2015 UDOT Studies. The route was first identified in the 2019–2020 Coalition Reports, which concluded that it would not be economically feasible to construct and operate because a significant proportion of the route would traverse rugged terrain characterized by mountains and deep canyons. Construction in such terrain would require many large cut and fills, retaining walls, numerous bridges, multiple large bridges, and tunnels through mountains that are not practical to cross in the open.

Although the Avintaquin Canyon Route would cross extremely challenging terrain, its shorter length relative to some of the other conceptual routes that were assessed initially led OEA to believe that the route could be feasible to construct and operate. Therefore, OEA requested that the Coalition provide more detailed information regarding that route than what was presented in its 2019–2020 Coalition Reports. In its response to OEA's request, the Coalition clarified that the Avintaquin Canyon Route would entail unique engineering and operational challenges that would make the route logistically infeasible.[6] First, the high altitude of the route would expose the rail line to heavy snowfall that would likely make it inoperable during winter months. Reducing the altitude of the Avintaquin Canyon Route summit to a feasible altitude would require an approximate 11-mile tunnel, a feature that has never before been constructed for a modern, heavy-haul rail line. Additionally, the Avintaquin Canyon Route would require embankments constructed on steep mountain slopes that would be at extreme risk for frequent rockslides, slope failures, and embankment slips. The steep tunnels needed along the Avintaquin Canyon Route would also create the risk of track creep, which occurs when track slides downhill due to the force of uphill-moving trains. According to the Coalition, overcoming track creep on the Avintaquin Canyon Route would be particularly difficult due to the confined space of the tunnels and the relatively thin ballast section, which would have poor adhesion to the solid rock floor of the tunnel beneath the track structure.

OEA has reviewed the available information and concluded that the Avintaquin Canyon Route is not a reasonable alternative because, as described above, it would require impractically extensive regrading and tunneling, as well as requiring logistically impractical engineering features that might not be possible to construct and that, if constructed, would create unacceptable safety risks and maintenance issues during operations.

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[6] See *Coalition's Response to Information Request #4* (Coalition 2019b).

2.2.3 Alternatives Analyzed in the EIS

This section describes the route details and any anticipated permits or amendments needed from other agencies for the three Action Alternatives and No-Action Alternative. The Coalition's voluntary mitigation, found in Chapter 4, *Mitigation*, includes route location and design revisions to minimize or avoid potential impacts. All Action Alternatives would connect two terminus points near Myton, Utah and Leland Bench, Utah to an existing rail line near Kyune, Utah. The following subsections include additional details concerning project features and an overview map for each alternative showing those features. Appendix A, *Action Alternatives Supporting Information*, includes detailed map sets for each alternative illustrating project features and tables showing the same information in tabular form. Chapter 3, *Affected Environment and Environmental Consequences*, discusses specific features relevant to certain resources.

2.2.3.1 Indian Canyon Alternative

The Indian Canyon Alternative would extend approximately 81 miles from two terminus points in the Basin near Myton and Leland Bench to a connection with an existing UP rail line near Kyune (Figure 2-1). Starting at Leland Bench, approximately 9.5 miles south of Fort Duchesne, Utah, the route would proceed westward, past the South Myton Bench area, until intersecting Indian Canyon approximately 2 miles south of Duchesne, Utah. After entering Indian Canyon, the route would turn southwest and follow Indian Creek upstream toward its headwaters below Indian Creek Pass, paralleling U.S. Highway 191 (US 191) for approximately 21 miles. The Indian Canyon Alternative would use a summit tunnel to pass through the West Tavaputs Plateau near Indian Creek Pass on US 191. After emerging from the tunnel, it would descend the Roan Cliffs to reach Emma Park, an open grassy area at the base of the Roan Cliffs. The route would then run westward through Emma Park where it would split into a westbound and eastbound wye[7] configuration that would connect to the UP Provo Subdivision near the railroad timetable station at Kyune. In addition to the summit tunnel, the Indian Canyon Alternative would include two additional tunnels.

The 2014–2015 UDOT Studies concluded that this route would meet the project's purpose and need, would be feasible to construct in terms of engineering and economics, and would result in fewer significant impacts on the natural and built environment than other conceptual routes. The 2019–2020 Coalition Reports also concluded that the route would be feasible to construct and operate and would not result in disproportionate environmental impacts relative to other routes. Among all of the conceptual routes that have been considered for the proposed rail line, the Indian Canyon Alternative would be the shortest in length at approximately 81 miles and would entail the lowest estimated construction cost at approximately 1.29 billion dollars. Because it would be logistically and economically feasible to construct and operate and because it would not present unreasonable challenges related to engineering, economics, or disproportionately significant environmental impacts, OEA concluded that the Indian Canyon Alternative is a reasonable alternative and has analyzed it in detail in this ~~Draft~~ EIS.

The Indian Canyon Alternative would cross 12 miles of National Forest System land within Ashley National Forest. If the Board were to authorize this alternative, the Coalition would have to seek U.S. Forest Service (Forest Service) approval for permitting the rail line right-of-way, which could include amending the Ashley Forest Plan with a project-specific amendment in the areas of visual

[7] The term *wye* refers to the Y-like formation that is created at the point where train tracks branch off the mainline to continue in different directions.

quality and scenery management, pursuant to the requirements of the 2012 Planning Rule (36 C.F.R. Part 219). With the exception of the project-specific amendment for visual quality and scenery management, the Indian Canyon Alternative would be consistent with the Ashley Forest Plan. The project-specific amendment would include the following language:

> The plan amendment adds the following to the Forest Plan Standard and Guideline for Objective 9 for Recreation under IV. Forest Management Direction, C. Goals, Objectives, Standards and Guidelines by Management Area (Forest Plan, page IV-19): This standard and guideline does not apply to the Uinta Basin Railway Project (ROD, [date]).

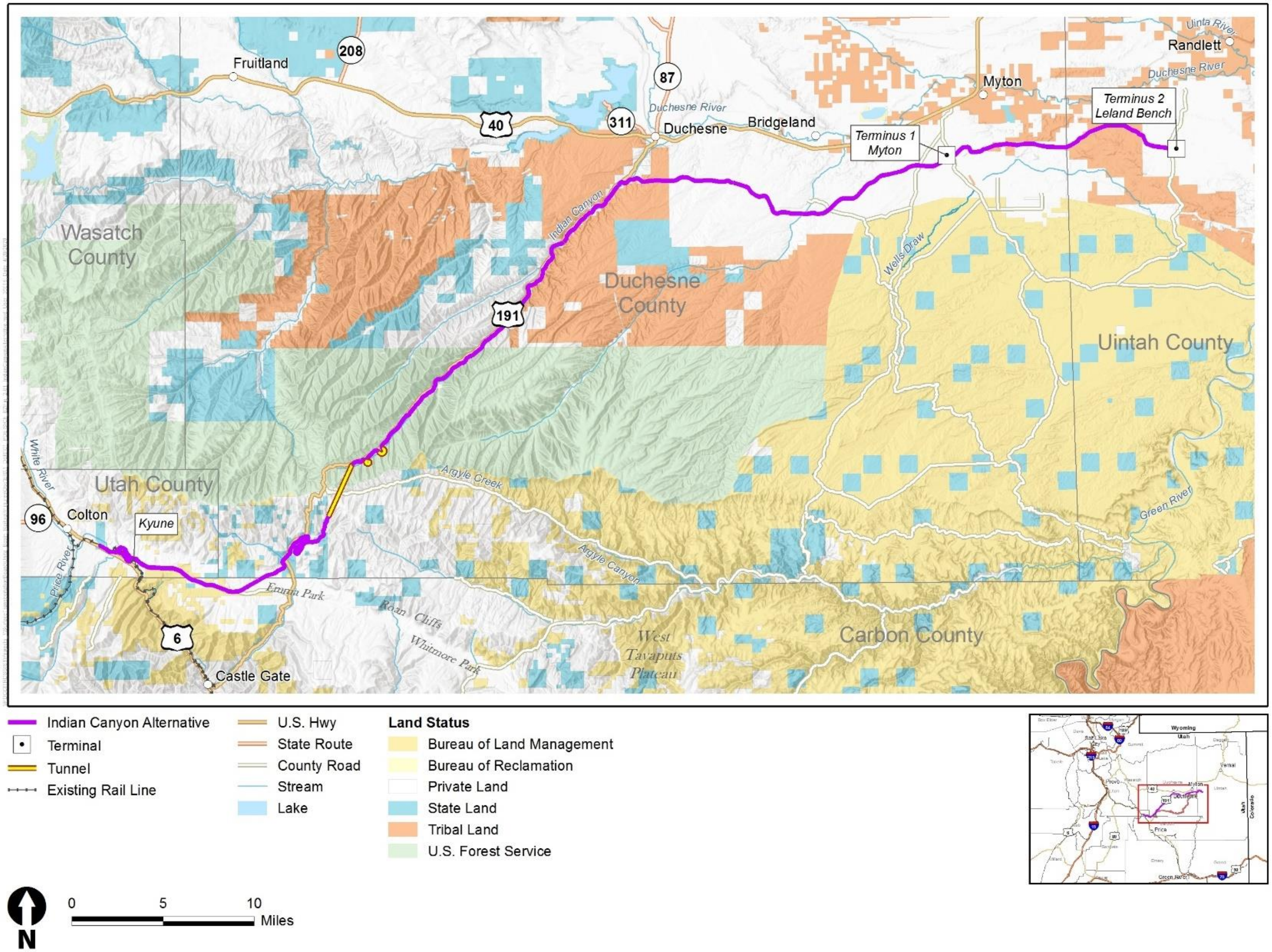
Because the Indian Canyon Alternative would cross through inventoried roadless areas in Ashley National Forest, review and approval by the Regional Forester would have to be completed to ensure consistency with the 2001 Roadless Area Conservation Rule (36 C.F.R., Part 294, Subparts A and B).

The Indian Canyon Alternative would also cross 2.5 miles of BLM land administered by the BLM Vernal Field Office, Price Field Office, and Salt Lake Field Office. Therefore, if the Board were to authorize this alternative, the Coalition would have to seek and obtain a right-of-way permit across BLM-administered public lands, pursuant to 43 C.F.R. Part 2800, before beginning construction. The issuance of a right-of-way would also be subject to the requirements of applicable BLM RMPs, including the Vernal Field Office RMP, Price Field Office RMP, and Pony Express RMP. As proposed, the Indian Canyon Alternative would not be in compliance with greater sage-grouse noise thresholds in the Price Field Office RMP and Pony Express RMP, as amended by the Utah Greater Sage-Grouse Approved RMP Amendment/Record of Decision (2015). In addition, the Indian Canyon Alternative would exceed the ground disturbance cap for greater sage-grouse in the Price Field Office RMP and Pony Express RMP. BLM would need to amend these plans to issue a right-of-way grant for the Indian Canyon Alternative.

The Indian Canyon Alternative would also cross 8.1 miles of Tribal trust lands in the Uintah and Ouray Reservation. If the Board were to authorize this alternative, the Coalition would have to seek and obtain a consent resolution from the Ute Indian Tribe and a grant of easement for right-of-way or leases, if necessary, from the Bureau of Indian Affairs (BIA) before beginning construction.

In addition to Forest Service, BLM-administered, and Tribal trust lands, the Indian Canyon Alternative would also cross lands managed by the state of Utah and private land. If the Board were to authorize this alternative, the Coalition would be responsible for obtaining the necessary rights to construct and operate a new rail line on those lands.

Figure 2-1. Indian Canyon Alternative



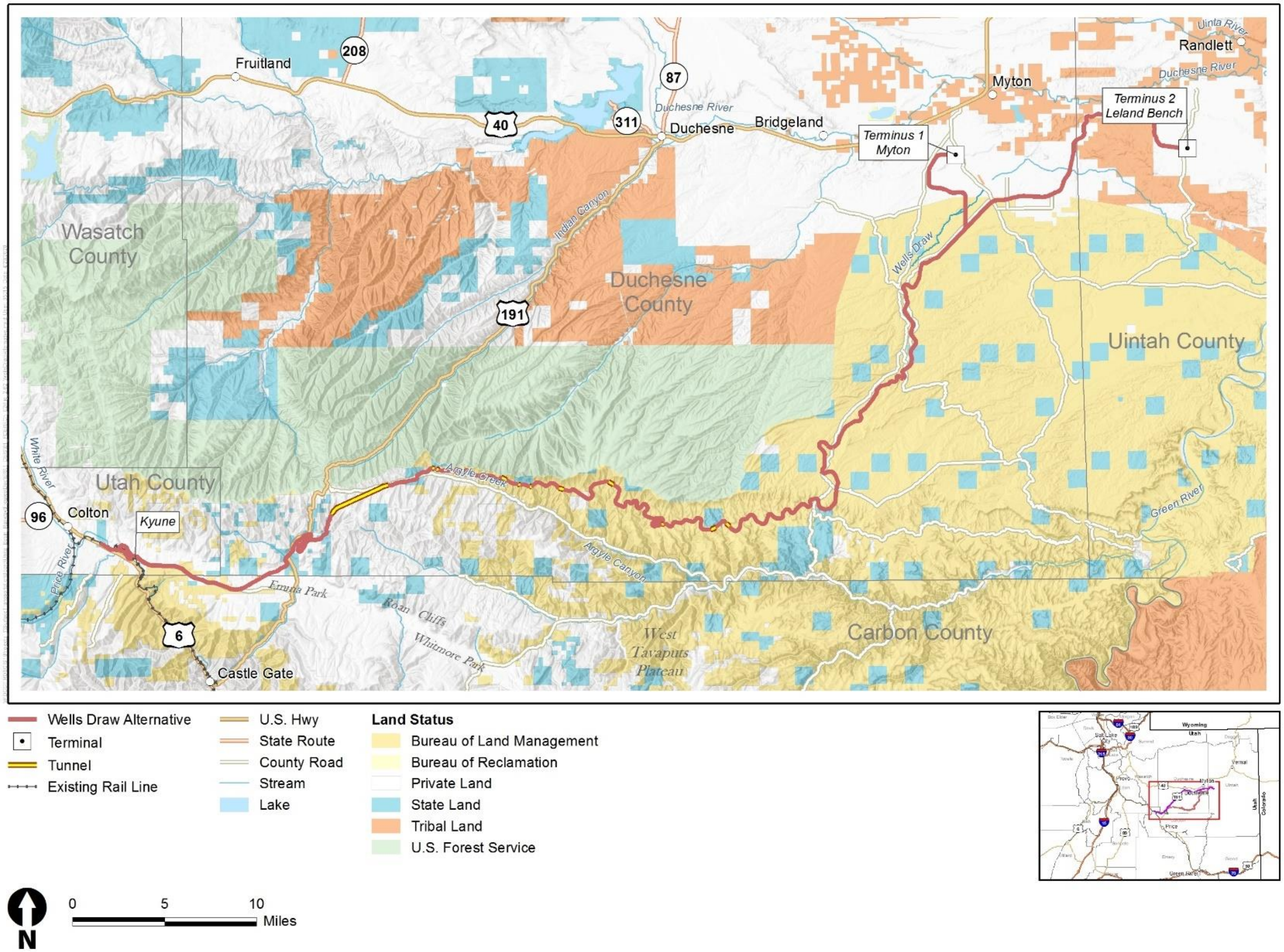
2.2.3.2 Wells Draw Alternative

The Wells Draw Alternative would extend approximately 103 miles from two terminus points in the Basin near Myton and Leland Bench to an existing UP rail line near Kyune (Figure 2-2). The lines from the two terminus points would meet at a junction approximately 6.5 miles south of South Myton Bench. From the junction, the Wells Draw Alternative would run southward, generally following Wells Draw toward its headwaters. After reaching the headwaters of Wells Draw, the alternative would turn westward and enter Argyle Canyon. It would remain on the north wall of Argyle Canyon for approximately 25 miles, eventually reaching the floor of the canyon near the headwaters of Argyle Creek. The Wells Draw Alternative would then enter a summit tunnel through the West Tavaputs Plateau. The location of the summit tunnel's west portal would be similar to the Indian Canyon's summit tunnel west portal, but its east portal would be located in the upper reaches of Argyle Canyon instead of the upper reaches of Indian Canyon. After emerging from the tunnel, the Wells Draw Alternative would descend the Roan Cliffs to reach Emma Park. It would then run westward through Emma Park where it would split into a westbound and eastbound wye configuration that would connect to the UP Provo Subdivision near Kyune. In addition to the summit tunnel, the Wells Draw Alternative would include 12 additional tunnels.

The Wells Draw Alternative was not considered in the 2014–2015 UDOT Studies. The Coalition first identified the route prior to issuing the 2019–2020 Coalition Reports, which concluded that the Wells Draw Alternative would be technically and economically feasible to construct and operate. The Wells Draw Alternative would traverse primarily moderate terrain, characterized by foothills and incised river valleys, as well as some rugged terrain comprising mountains and deep valleys. Construction of this alternative would require numerous bridges, many large areas of cut-and-fill, and 13 tunnels of varying length. The Wells Draw Alternative would, therefore, have a much higher construction cost than the Indian Canyon Alternative at 2.14 billion dollars. However, the available information indicates that the alternative would not require features that would present unreasonable engineering challenges or significant safety or operational risks. Because it would be logistically and economically feasible to construct and operate and because it would not present unreasonable challenges related to engineering, economics, or disproportionately significant environmental impacts, OEA concluded that the Wells Draw Alternative is a reasonable alternative and has analyzed it in detail in this ~~Draft~~ EIS.

The Wells Draw Alternative would cross 57.2 miles of land managed by the BLM Vernal Field Office, Price Field Office, and Salt Lake Field Office. If the Board were to authorize this alternative, the Coalition would have to seek and obtain a right-of-way permit across BLM-administered lands, pursuant to 43 C.F.R. Part 2800, before beginning construction. The issuance of a right-of-way would be subject to the requirements of the BLM Vernal Field Office RMP, Price Field Office RMP, and Pony Express RMP. As proposed, the Wells Draw Alternative would not be in compliance with greater sage-grouse noise thresholds in the Price Field Office RMP and Pony Express RMP, as amended by the Utah Greater Sage-Grouse Approved RMP Amendment/Record of Decision (2015). In addition, the Wells Draw Alternative would exceed the ground disturbance cap for greater sage-grouse in the Price Field Office RMP and Pony Express RMP. BLM would need to amend these plans in order to issue a right-of-way grant. BLM may also need to amend the Vernal Field Office RMP based on where the Wells Draw Alternative crosses BLM Visual Resource Management Class II land and the Lears Canyon Area of Critical Environmental Concern.

Figure 2-2. Wells Draw Alternative



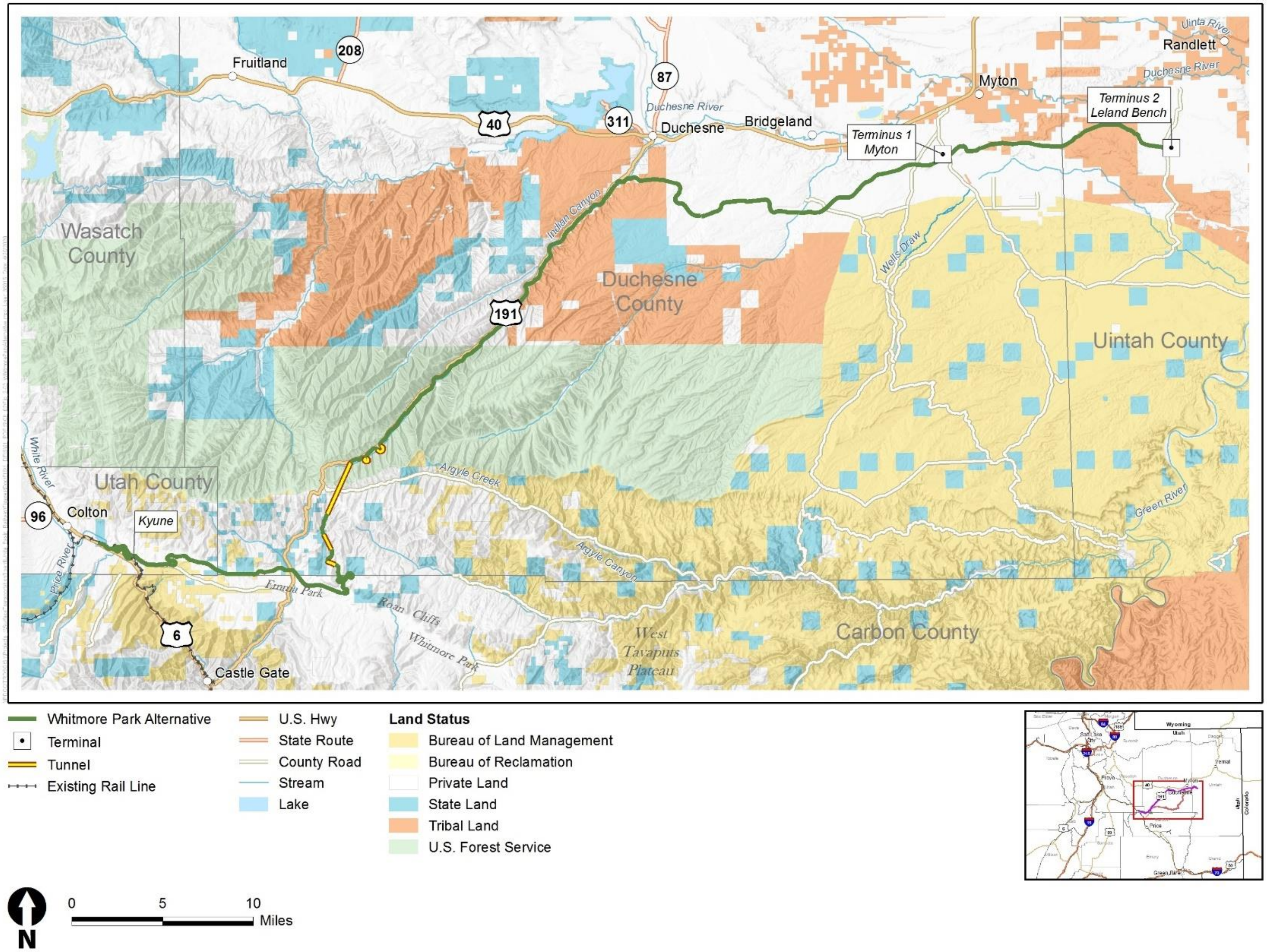
In addition to BLM-administered land, the Wells Draw Alternative would also cross lands managed by the state of Utah and private land. If the Board were to authorize this alternative, the Coalition would be responsible for obtaining the necessary rights to construct and operate a new rail line on those lands. The Wells Draw Alternative would not cross Forest Service land or Tribal trust lands. Although the Wells Draw Alternative would not cross Tribal trust lands, the Wells Draw Alternative would affect lands and resources under the regulatory jurisdiction of the Ute Indian Tribe and likely cross Indian country lands within tribal jurisdiction as defined in Ute Indian Tribe v. Utah, 773 F.2d 1087 (10th Cir. 1985) and Ute Indian Tribe of the Uintah and Ouray Reservation v. State of Utah, 114 F.3d 1513 (10th Cir. 1997).

2.2.3.3 Whitmore Park Alternative (Coalition's Preferred Alternative)

The Whitmore Park Alternative would extend approximately 88 miles from terminus points in the Basin near Myton and Leland Bench to an existing UP rail line near Kyune (Figure 2-3). This alternative would overlap for much of its length with the Indian Canyon Alternative. Approximately 23 miles west of the terminus point near Leland Bench, the Whitmore Park Alternative would diverge from the Indian Canyon Alternative, heading south to avoid the residential Mini Ranches area near Duchesne, Utah. It would then continue west to Indian Canyon and turn southwest to follow Indian Creek, paralleling US 191. Like the Indian Canyon Alternative, the Whitmore Park Alternative would use a summit tunnel to pass through the West Tavaputs Plateau near Indian Creek Pass on US 191. After emerging from the tunnel, the Whitmore Park Alternative would again diverge from the Indian Canyon Alternative to head south and southeast on its descent from the Roan Cliffs. After reaching Emma Park, it would follow Whitmore Park Road westward, cross US 191, and continue west along Quarry Road and Emma Park Road where it would split into a westbound and eastbound wye configuration that would connect to the UP Provo Subdivision near Kyune. In addition to the summit tunnel, the Whitmore Park Alternative would include four additional tunnels.

The Whitmore Park Alternative was not considered in the 2014–2015 UDOT Studies or in the 2019–2020 Coalition Reports. The Coalition developed the alternative during the scoping process in response to comments that OEA received from federal, state, and local agencies; tribes; other affected stakeholders; and the public, as well as additional outreach and consultation that the Coalition conducted. According to the Coalition, the Whitmore Park Alternative was developed specifically to avoid or minimize impacts on the natural and built environments, including residences in the Mini Ranches area near Duchesne and known greater sage-grouse leks in the Carbon Sage-Grouse Management Area. Although it would entail a construction cost of approximately 1.35 billion dollars, which is approximately 60 million dollars higher than the Indian Canyon Alternative, the Coalition has identified the Whitmore Park Alternative as its preferred alternative.

Figure 2-3. Whitmore Park Alternative



The Whitmore Park Alternative would cross 12 miles of Forest Service land within Ashley National Forest. If the Board were to authorize this alternative, the Coalition would have to seek Forest Service approval for permitting the rail line right-of-way, which could include amending the Ashley ~~National~~ Forest Plan with a project-specific amendment in the areas of visual quality and scenery management, pursuant to the requirements of the 2012 Planning Rule. With the exception of the project-specific amendment for visual quality and scenery management, the Whitmore Park Alternative would be consistent with the Ashley Forest Plan. The project-specific amendment would include the following language:

> The plan amendment adds the following to the Forest Plan Standard and Guideline for Objective 9 for Recreation under IV. Forest Management Direction, C. Goals, Objectives, Standards and Guidelines by Management Area (Forest Plan, page IV-19): This standard and guideline does not apply to the Uinta Basin Railway Project (ROD, [date]).

Because the Whitmore Park Alternative would cross through inventoried roadless areas in Ashley National Forest, review and approval by the Regional Forester would have to be completed to ensure consistency with the 2001 Roadless Area Conservation Rule.

The Whitmore Park Alternative would also cross 8.1 miles of Tribal trust lands in the Uintah and Ouray Reservation. If the Board were to authorize this alternative, the Coalition would have to seek and obtain a consent resolution from the Ute Indian Tribe and a grant of easement for right-of-way or leases, if necessary, from BIA before beginning construction.

In addition to Forest Service and Tribal trust lands, the Whitmore Park Alternative would also cross lands managed by the state of Utah and private land. If the Board were to authorize this alternative, the Coalition would be responsible for obtaining the necessary rights to construct and operate a new rail line on those lands. The Whitmore Park Alternative would not cross BLM-administered lands.

2.2.3.4 No-Action Alternative

Under the No-Action Alternative the Board would not license the Coalition to construct and operate the proposed rail line. The Coalition would not construct the proposed rail line and the quality of the human environment would not change from current conditions.

2.3 Construction and Design Features

This section describes the Coalition's plans for constructing the proposed rail line, including information pertaining to the rail line, temporary, and project footprints; railbed and track construction; materials for rail line construction; construction staging areas; staffing and worker housing; bridges, culverts, and other surface water crossings; grade crossings; road relocations; and facilities that the Coalition would construct as part of the proposed rail line. This section also describes the Coalition's anticipated construction schedule if the Board were to authorize the proposed rail line. Figure 2-1 through Figure 2-3 include project construction and features location information for the Indian Canyon Alternative, Wells Draw Alternative, and Whitmore Park Alternative, respectively. Appendix A, *Action Alternatives Supporting Information*, provides additional information regarding project features, as well as detailed map sets for each Action Alternative.

2.3.1 Rail Line, Temporary, and Project Footprints

OEA has defined the following terms to describe the areas where construction and operation of the rail line would occur.

- **Rail line footprint.** The rail line footprint includes the area of the railbed, as well as the full width of the area cleared and cut or filled. The rail line footprint would also include other physical structures installed as part of the proposed rail line, such as fence lines, communications towers, siding tracks, relocated roads, and power distribution lines. The rail line footprint is the area where rail line operations and maintenance would occur. The area would be permanently disturbed.
- **Temporary footprint.** The temporary footprint is the area that would be temporarily disturbed during construction, including areas for temporary material laydown, staging, and logistics. The temporary footprint would be reclaimed and revegetated following construction.
- **Project footprint.** The project footprint is the combined area of the rail line footprint and temporary footprint, both of which would be disturbed during construction, compris~~e~~ing where construction and operations of the proposed rail line would occur.

The width of the rail line footprint would vary depending on site-specific conditions, such as topography, soil slope stability, and other geotechnical conditions. Table 2-1 provides the length and area of the rail line, temporary, and project footprints for each Action Alternative. Appendix A, *Action Alternatives Supporting Information*, provides additional information regarding the footprints.

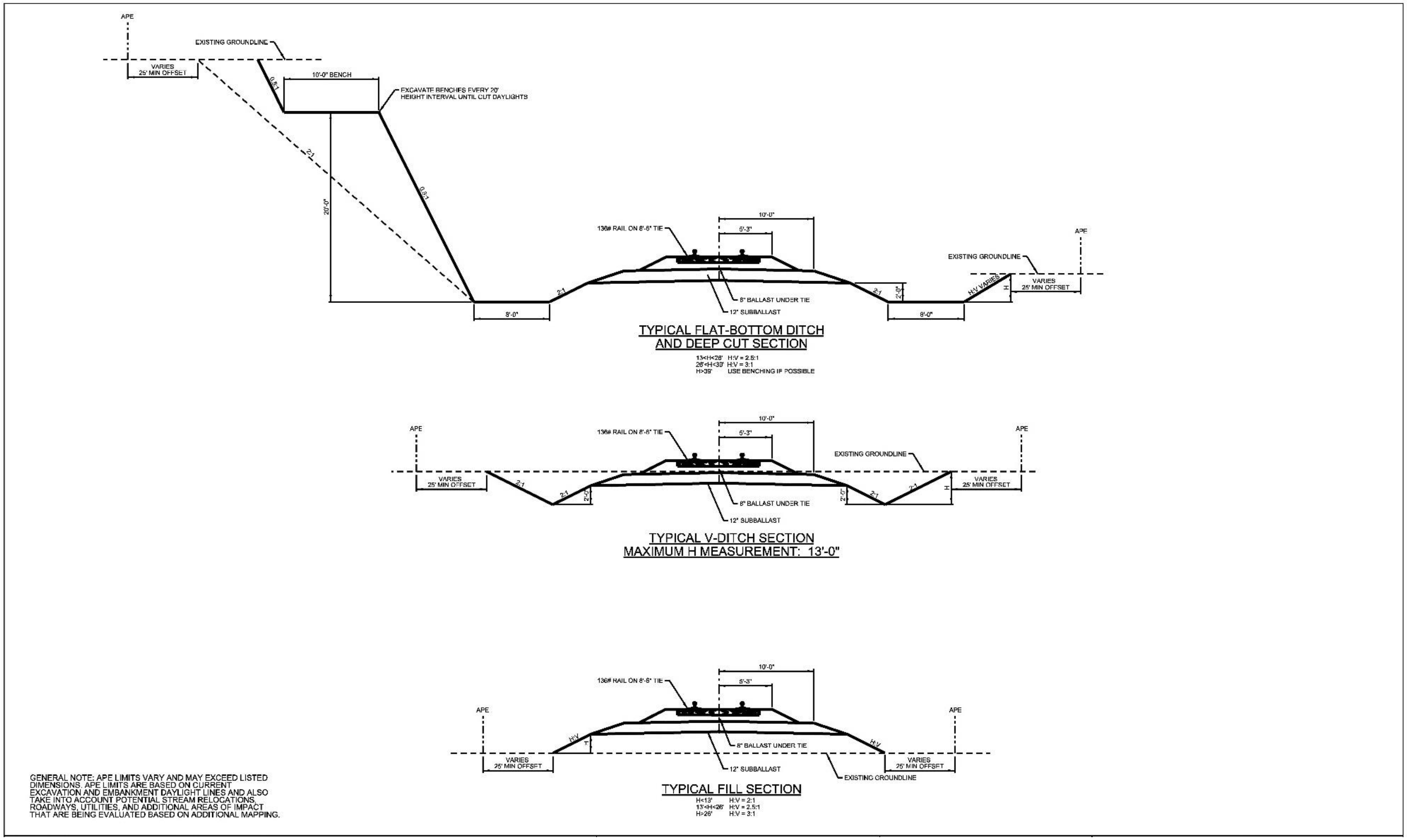
Table 2-1. Length and Footprints by Action Alternative

Action Alternative	Length (miles)	Rail Line Footprint (acres)	Temporary Footprint (acres)	Project Footprint (acres)
Indian Canyon	80.5	1,340.5	2,467.8	3,808.2
Wells Draw	103.3	2,560.1	5,095.2	7,655.3
Whitmore Park	87.7	1,430.6	3,087.7	4,518.3

The Coalition would either purchase the land or obtain easements for the entire project footprint. However, only the rail line footprint would be permanently cleared of vegetation for construction and operation of the proposed rail line. The Coalition might not need to use the entire project footprint after construction. The Coalition has voluntarily committed to mitigation that would require it to limit ground disturbance to only the areas necessary for project-related construction and to reclaim disturbed areas when construction is completed (refer to voluntary mitigation VM-16 and VM-22 in Chapter 4, *Mitigation*).

All Action Alternatives would require constructing temporary and permanent access roads. The Coalition would construct temporary access roads that would provide access to the rail embankment, tunnel portals, and bridge and drainage structure locations during construction. The Coalition would also construct several permanent access roads to provide access to rail sidings and long tunnels during rail operations. OEA expects that temporary and permanent access roads would be 13 feet wide, on average, and would connect to nearest existing roadways to minimize the length of the access roads. Figure 2-4 presents example cross-sections of the rail line footprint.

Figure 2-4. Cross-Sections of the Proposed Rail Line Footprint



Source: Coalition 2019a

2.3.2 Railbed and Track Construction

Under each Action Alternative, the width of the railbed would extend approximately 10 to 20 feet from the centerline to the edge of the subballast. This distance would vary in cut-and-fill locations where ditches could be required. The Coalition would construct the track on top of approximately 12 inches of subballast material and 8 inches of ballast. Timber, steel, or concrete ties would support the continuously welded steel rail. The Coalition could use hot-mix asphalt under the ties if the final design indicates that this is practical. OEA expects that the Coalition would design the track to accommodate loading requirements and to support a gross weight of 315,000 pounds per rail car and 432,000 pounds per locomotive.[8]

2.3.3 Rail Line Construction Equipment and Methods

Construction of the proposed rail line would involve a variety of construction methods and equipment. Bull dozers, front-end loaders, and dump trucks would be used to create the appropriate corridor and grade. Cranes may be needed to construct bridges over roads and surface waters. Mining and potentially blasting methods would be used to construct tunnels. Rail would be laid and welded by track welding machine or crews where necessary.

2.3.4 Materials for Rail Line Construction

The Coalition would use existing, permanent quarries located in Carbon, Duchesne, Uintah, and Utah Counties to obtain and stockpile aggregate and rock materials. Trucks would deliver the materials to the rail line using existing roadways and temporary and permanent access roads. The Coalition anticipates obtaining concrete aggregate and subballast material from existing UDOT-certified quarries and ballast material from an existing rail-served quarry near Milford, Utah. If that source of ballast material were unavailable, the Coalition would obtain ballast material from existing rail-served quarries near Granite Canyon, Wyoming, and Carr, Colorado. The Coalition does not anticipate needing or developing new quarry sources. If the Coalition were to identify the need for additional sources during the final design phase of the proposed rail line, the Coalition would develop those sources in conformance with applicable local and state land use and permitting regulations and applicable UDOT specifications.

The Coalition intends to balance cut-and-fill material so that fill and spoil sites would not be required. During construction, subballast would be transported via truck, and ballast would be delivered by rail directly to its final location. Staging for subballast and ballast material would occur at the quarries from which those materials were obtained. The Coalition intends to obtain water for compaction, dust control, and concrete work from existing water right holders and would not pursue any new water rights. The Coalition would identify the specific existing water rights for construction during the final design phase based on discussions with current water right holders, timing of construction activities and seasonal availability, location of the water right point of diversion, and the type of water right diversion (e.g., well, surface water). The sources for water

[8] The estimated maximum weight of locomotives used by the proposed rail line would range from approximately 380,000 to 432,000 pounds. The typical weight of loaded crude oil rail cars operating over the proposed rail line is expected to be 143 tons, or 286,000 pounds, per car.

used during construction may include groundwater, surface water, potable water, or reclaimed and treated wastewater.

2.3.5 Construction Staging Areas

During construction of the proposed rail line, the Coalition intends to locate all temporary staging areas within the project footprint or in existing permanent industrial sites permitted for construction uses. To receive construction materials by rail, the Coalition would use existing permanent rail-to-truck transload facilities located in Salt Lake City, Ogden, Provo, Helper, Price, and other locations in Utah, and would transfer the materials to trucks for final delivery to the project footprint. The Coalition would establish temporary material laydown, staging, and logistics areas within the project footprint at bridge locations, tunnel portals, roadway crossings, and other locations.

2.3.6 Staffing and Worker Housing

The average annual workforce during construction of all three Action Alternatives would include approximately 1,000 individuals, with peak employment of approximately 1,500 individuals. The Coalition expects that peak employment would occur between May 1 and October 30, during each year of construction. Most construction personnel would reside in their own personal residences or in existing recreational vehicle parks, commercial hotels and motels, but dedicated construction camps would be needed for some staff. Specifically, the Indian Canyon Alternative and Whitmore Park Alternative would each require one temporary construction camp for 30 to 40 people, and the Wells Draw Alternative would require two construction camps for 30 to 40 people and another construction camp for 200 people (Table 2-2). Appendix A, *Action Alternatives Supporting Information*, identifies the proposed location of the temporary housing camps.

Table 2-2. Temporary Housing Camps for Construction Staff

Action Alternative	Capacity (people)	Type of Construction	Size (acres)	Location (milepost)
Indian Canyon	30–40	Tunnel	5	35
Wells Draw	30–40	Tunnel	5	23
	30–40	Tunnel	5	36
	200	Embankments and bridges	8.5	57
Whitmore Park	30–40	Tunnel	5	40

2.3.7 Bridges, Culverts, and Stream Realignments

The proposed rail line and associated access roads and road relocations would require bridges and culverts to cross streams, rivers, and drainages, as well as existing roadways. Table 2-3 shows the number of bridges and culverts for each Action Alternative.

Table 2-3. Bridges and Culverts

Action Alternative	Rail Bridges	Road Bridges	Culverts
Indian Canyon	31	2	372
Wells Draw	33	3	496
Whitmore Park	30	1	423

Notes:
Bridges include Precast Prestressed Concrete Double Cell Box Beam Span, Rolled Steel Beam Span with Steel Pan Deck, Structural Steel Plate Arch, and other bridge types to be determined during final design.

Construction of the proposed rail line would require realignments of stream segments to accommodate permanent project features, including portions of the rail bed and areas of cut and fill. Table 2-4 displays the number and length of streams filled at realignments by Action Alternative.

Table 2-4. Stream Realignments per Action Alternative

Action Alternative	Number of Realignments	Total Length of Streams Filled at Realignments (miles)
Indian Canyon	59	3.9
Wells Draw	17	1.4
Whitmore Park	55	3.8

Appendix A, *Action Alternatives Supporting Information*, includes location information for all bridges, culverts, and stream realignments.

2.3.8 Tunnels

The proposed rail line would require tunnels to traverse the mountainous terrain surrounding the Basin. Drilling and blasting (i.e., "mine" construction methods) may be used in certain locations, depending on the length of the tunnel and the specific geological features at the tunnel locations. Tunnels over 1 mile long would likely require rock stabilization and ventilation features. Shorter tunnels may not require those features, depending on the specific geological features at the tunnel locations. The Coalition may install mechanical ventilation, such as jet fans mounted on tunnel walls or ceilings, depending on the length and configuration of the tunnel. Table 2-5 displays the number of tunnels and total length of tunnels by Action Alternative. Appendix A, *Action Alternatives Supporting Information*, provides design details for the proposed tunnels for each Action Alternative, including milepost references, length of tunnels, and ownership of land crossed.

Table 2-5. Tunnels

Action Alternative	Number of Tunnels	Total Length of Tunnels (miles)
Indian Canyon	3	4.3
Wells Draw	13	5.6
Whitmore Park	5	5.7

2.3.9 Grade Crossings

Table 2-6 shows the number of planned public and private road crossings for each Action Alternative. Paved public roadway crossings, if not grade-separated, would be equipped with active warning devices (bells, flashers, and gates) and constant warning time devices. Gravel and unsurfaced public roadway crossings and all private roadway crossings, if not grade-separated, would be equipped with passive warning devices (stop signs and crossbucks). The Coalition would design grade-crossing warning devices to comply with the *Manual on Uniform Traffic Control Devices* (FHWA 2009) and applicable safety regulations. Appendix A, *Action Alternatives Supporting Information*, provides additional information regarding grade crossings, including the number of public and private roadway crossings.

Table 2-6. Number of Road Crossings per Action Alternative

Action Alternative	At-Grade	Grade-Separated	Total
Indian Canyon	53	17	70
Wells Draw	61	29	90
Whitmore Park	66	14	80

2.3.10 Road Relocations

Construction of the proposed rail line would result in the relocation of existing public and private roads. Table 2-7 shows the number of road relocations and the total length of relocations. Chapter 3, Section 3.11, *Land Use and Recreation*, provides more detailed information on road relocations and potentially disturbed acres of land. Appendix A, *Action Alternatives Supporting Information*, provides additional information regarding road relocations.

Table 2-7. Road Relocations per Action Alternative

Action Alternative	Number of Relocations	Total Length of Relocations (miles)
Indian Canyon	52	11.8
Wells Draw	65	13.7
Whitmore Park	71	13.8

2.3.11 Associated Facilities

2.3.11.1 Support Facilities

The Coalition does not anticipate constructing or operating stations along the proposed rail line. The Coalition expects that UP and BNSF Railway Company would conduct run-through operations on the proposed rail line and does not intend to construct locomotive repair shops, rail car repair shops, marshalling yards, or storage yards as part of the proposed rail line. Shippers could conduct mechanical inspections and repairs at potential shipper-owned facilities.

2.3.11.2 Siding Tracks and Set-Out Tracks

The proposed rail line would consist of a single main track with sidings to enable trains to meet and/or pass. Siding tracks would add 15 to 20 feet to the width of the track structure. Table 2-8 shows the estimated numbers and lengths of sidings for each Action Alternative. The Coalition would determine the exact locations of siding tracks during final design. Appendix A, *Action Alternatives Supporting Information*, provides additional information regarding siding and set-out tracks.

Table 2-8. Siding Tracks and Set-Out Tracks

Action Alternative	Number of Sidings	Total Length of Sidings (miles)	Range of Sidings (miles)
Indian Canyon	6	12.4	1.65–3.69
Wells Draw	3	5.2	1.64–1.85
Whitmore Park	9	18.0	1.65–3.69

2.3.11.3 Distribution Lines and Power

Power distribution lines would be needed for some signals, communications, and safety equipment. The Coalition would determine the exact locations of power distribution lines during detailed design following the conclusion of the Board's environmental review process. OEA anticipates that any needed power distribution lines would be constructed within the rail line footprint, and would connect to existing lines where there are connections adjacent to the rail line footprint. In more remote or inaccessible locations, OEA anticipates that the Coalition would use solar-powered equipment. This would include any power needed for the communications towers and remote grade crossings requiring active warning devices.

2.3.11.4 Communications Towers

The proposed rail line would require the construction of permanent communications towers. Each tower site would be approximately 0.5 acre in area and approximately 120 feet high, though the exact height would depend on final design details. Each Action Alternative would require the construction of four communications towers. The Coalition would construct permanent access roads to provide access to the communications towers. These access roadways would be approximately 13 feet wide and located within the rail line footprint. Appendix A, *Action Alternatives Supporting Information*, provides additional information regarding the location of the communications towers and access roads.

2.3.12 Construction Schedule

The Coalition anticipates that construction of the Indian Canyon Alternative or the Whitmore Park Alternative would take approximately 2 years, but this time frame could range from 20 to 28 months depending on weather conditions. The Coalition expects that construction of the Wells Draw Alternative would take approximately 3 years, but could range from 32 to 48 months depending on weather conditions. The construction season would be different for the different components of the rail line.

Construction of the following features would occur year-round (12 months per year).

- Tunnels
- Bridges
- Signal and communications systems

Construction of the following components would be limited to an 8-month construction season each year, beginning in mid-April and ending in mid-November.

- Embankments (cuts and fills)
- Culverts

- Retaining walls
- Roadways and roadway crossings
- Track
- Fencing

2.4 Operations

Following construction of the proposed rail line, RGPC would operate the proposed rail line. The Coalition anticipates that shippers would primarily use the proposed rail line to transport crude oil using trains composed of 110 tank cars each, on average. The Coalition also expects that shippers could transport frac sand on the proposed rail line using frac sand trains composed of 110 cars each, on average. It is also possible that shippers would transport other commodities in rail cars that would be added to the oil trains or the frac sand trains. Each oil train and each frac sand train would be powered by approximately eight 4,300- to 4,400-horsepower locomotives.

Trains on the proposed rail line would operate at speeds allowable for Federal Railroad Administration (FRA) Class 3 tracks. The Coalition anticipates an average train speed of between 10 and 20 miles per hour. The maximum speed would not exceed the safe operating speed on FRA Class 3 tracks, which is 40 miles per hour for freight rail. Trains on the proposed rail line would operate 365 days per year, 24 hours per day, as permitted by weather conditions.

2.4.1 Rail Traffic

Depending on future market conditions, the Coalition estimates that between 672 and 1,809 loaded oil trains would leave the Basin per year using the proposed rail line. An equal number of empty oil trains would enter the Basin each year on the proposed rail line. These estimates correspond to a daily average of 3.68 to 9.92 loaded and empty oil trains on the proposed rail line. Each loaded oil train would include, on average, 110 tank cars and each tank car would contain, on average, approximately 642 barrels of crude oil. Therefore, the total volume of oil that would be transported on the proposed rail line would range from 130,000 to 350,000 barrels per day, on average. The actual volumes of oil that would move over the proposed rail line would depend on the demand for crude oil from the Basin, which is determined by global crude oil prices and capacity at oil refineries.

In addition, and also depending on future market conditions, the Coalition estimates that between 0 and 110 loaded frac sand trains would enter the Basin each year using the proposed rail line, to support oil mining in the Basin. An equal number of empty frac sand trains would leave the Basin each year on the proposed rail line. These estimates correspond to a daily average of 0 to 0.6 loaded and empty frac sand trains on the proposed rail line.

Including loaded and empty frac sand trains and unloaded and empty oil trains, the Coalition estimates that total rail traffic on the proposed rail line would range from 3.68 to 10.52 trains per day, on average. Shippers could also use the proposed rail line to transport other commodities, but the Coalition does not anticipate that the volume of those commodities would be large enough to support dedicated trains. Therefore, other commodities would be shipped in manifest rail cars attached to the oil trains and frac sand trains. The Coalition estimates that the number of manifest rail cars added to the oil trains and frac sand trains would range from 24 carloads per day to 36 carloads per day, on average, including loaded and empty rail cars.

Because the rail traffic would depend on future market conditions that the Board does not control and that OEA cannot precisely predict, OEA defined two reasonably foreseeable scenarios for future traffic levels for the purposes of this ~~Draft~~ EIS. The two scenarios correspond to the lowest and highest estimated traffic estimates. Under the high rail traffic scenario, 10.52 trains would move on the proposed rail line each day, on average. Under the low rail traffic scenario, 3.68 trains would move on the proposed rail line each day, on average.

2.4.2 Maintenance

OEA expects that the Coalition would construct the proposed rail line using new materials, which would initially require a minimal amount of maintenance. Maintenance activities on the tracks would include rail surfacing, ballast cleaning and tamping, and rail grinding. Other maintenance activities would include maintaining rail sensors; lubricating rails; replacing rail, ties, and ballast; and inspecting track. In addition, any tunnels would need regular inspections and maintenance.

2.4.3 Staffing

Operations and maintenance employment requirements would be similar for the Indian Canyon Alternative and Whitmore Park Alternative. Due to its longer length and the more difficult topography that it would cross, the Wells Draw Alternative would require a greater number of staff for operations and maintenance. Staffing requirements would also depend on the train traffic volume. Table 2-9 lists the operations and maintenance staffing requirements for each Action Alternative for the high rail traffic scenario and the low rail traffic scenario.

Table 2-9. Operations and Maintenance Staffing Requirements

	High Rail Traffic Scenario (10.52 trains per day)	Low Rail Traffic Scenario (3.68 trains per day)
Action Alternative	Employees	Employees
Indian Canyon	100	50
Wells Draw	120	65
Whitmore Park	100	50

Skilled labor and unskilled labor positions would include the following:

- Railroad operations employees, such as engineers, conductors, foremen, and train dispatchers.
- Maintenance-of-way employees, such as track maintainers, bridge maintainers, machine operators, truck drivers, signal and communications systems maintainers, and laborers.
- Mechanical employees, such as rail car and locomotive maintainers and inspectors (i.e., light repairs and replacement of consumables such as brake shoes) and laborers.

Management labor would consist of the following:

- Operations management, which would include supervision of train crews and direction of day-to-day operations.
- Engineering management, which would include supervision of track, bridge, and signal maintainers, and direction of day-to-day fixed infrastructure maintenance.

- Mechanical management, which would include supervision of locomotive and rail car maintainers and inspectors.
- General management and general office staff.

Table 2-10 shows the estimated percentages of the total operations and maintenance workforce by job type.

Table 2-10. Estimated Percentages of Total Operations and Maintenance Workforce by Job Type

Job Type	High Rail Traffic Scenario (%)	Low Rail Traffic Scenario (%)
Operations	60	45
Maintenance of Way	25	35
Mechanical	5	5
Management	10	15

OEA expects that the relative percentage of operations employees would be higher under the high rail traffic scenario. The relative percentages of maintenance-of-way and management employees would be higher under the low rail traffic scenario. The relative percentage of mechanical employees would be the same under both scenarios.

2.5 Summary of Impacts

Chapter 3, *Affected Environment and Environmental Consequences,* discusses the environmental impacts that could occur as a result of construction and operation of the Indian Canyon Alternative, Wells Draw Alternative, or Whitmore Park Alternative. Table 2-11 provides a summary of the findings in Chapter 3 and compares potential environmental between the three Action Alternatives. The table does not include the No-Action Alternative because existing conditions would remain the same under this alternative.

Table 2-11. Summary of Impacts

Impact	Action Alternative		
	Indian Canyon	Wells Draw	Whitmore Park
Vehicle Safety and Delay			
Total VMT during construction	194,035,062	328,384,855	234,989,847
Annual VMT during operations	• Low rail traffic scenario:[a] -902,385 • High rail traffic scenario:[a] 1,002,046	• Low rail traffic scenario: -15,409 • High rail traffic scenario: 2,346,551	• Low rail traffic scenario: -835,637 • High rail traffic scenario: 1,135,542
Average daily trips during construction	3,659	3,243	4,163
Average daily trips during operation	• Low rail traffic scenario: 4 • High rail traffic scenario: 104	• Low rail traffic scenario: 34 • High rail traffic scenario: 144	• Low rail traffic scenario: 4 • High rail traffic scenario: 104
Average number of accidents at grade crossings per year	• Low rail traffic scenario: 0.088 • High rail traffic scenario: 0.153	• Low rail traffic scenario: 0.324 • High rail traffic scenario: 0.559	• Low rail traffic scenario: 0.190 • High rail traffic scenario: 0.331
Average delay at grade crossings in 24-hour period	• Low rail traffic scenario: 4.07 minutes • High rail traffic scenario: 11.10 minutes	• Low rail traffic scenario: 7.67 minutes • High rail traffic scenario: 20.89 minutes	• Low rail traffic scenario: 3.99 minutes • High rail traffic scenario: 10.88 minutes
Rail Operations Safety			
Predicted rail accident (collisions and derailments) frequency	0.20 to 0.56 accident per year	0.24 to 0.72 accident per year	0.22 to 0.60 accident per year
Water Resources			
Temporary surface water impacts	• Perennial stream: 15.4 acres • Intermittent stream: 0.2 acre • Ephemeral stream: 8.6 acres • Canal/ditch: 1.3 acres • Pond: 1.0 acre • Playa: <0.1 acre	• Perennial stream: 6.5 acres • Intermittent stream: 28.1 acres • Ephemeral stream: 24.7 acres • Canal/ditch: 1.1 acres • Pond: 4.6 acre • Playa: 1.2 acre	• Perennial stream: 16.4 acres • Intermittent stream: 0.2 acre • Ephemeral stream: 15.7 acres • Canal/ditch: 1.3 acres • Pond: 0.9 acre • Playa: <0.1 acre
Permanent surface water impacts	• Perennial stream: 6.3 acres • Intermittent stream: 0.2 acre • Ephemeral stream: 4.1 acres • Canal/ditch: 0.9 acre • Pond: 1.0 acre • Playa: 0.1 acre	• Perennial stream: 3.0 acres • Intermittent stream: 30.4 acres • Ephemeral stream: 23.5 acres • Canal/ditch: 0.3 acre • Pond: 3.3 acres • Playa: 0.8 acre	• Perennial stream: 5.6 acres • Intermittent stream: 0.2 acre • Ephemeral stream: 6.4 acres • Canal/ditch: 0.9 acre • Pond: 0.4 acre • Playa: 0.1 acre

Impact	Action Alternative: Indian Canyon	Action Alternative: Wells Draw	Action Alternative: Whitmore Park
Stream realignments	59 realignments	17 realignments	55 realignments
Section 303(d) Impaired Assessment Unit impacts	2,660.0 acres	7,089.6 acres	2,866.2 acres
Accidental spills of hazardous materials	Depends on train accident or derailment occurrence and severity, but expected to be minimized with mitigation	Same as Indian Canyon Alternative	Same as Indian Canyon Alternative
Temporary floodplain impacts	0.8 acre	1.7 acres	20.2 acres
Permanent floodplain impacts	0.1 acre	0.2 acre	5.9 acres
Temporary wetland impacts	13.2 acres	16.3 acres	11.2 acres
Permanent wetland impacts	7.0 acres	6.5 acres	3.6 acres
Temporary groundwater wells and springs impacts	• Groundwater wells: 6 • Springs: 7	• Groundwater wells: 4 • Springs: 9	• Groundwater wells: 2 • Springs: 4
Permanent groundwater wells and springs impacts	• Groundwater wells: 2 • Springs: 2	• Groundwater wells: 1 • Springs: 2	• Groundwater wells: 0 • Springs: 2
Water rights	• Water rights within the rail line footprint would be discontinued	• Same as Indian Canyon Alternative	• Same as Indian Canyon Alternative
Biological Resources			
Temporary big game crucial habitat impacts[2]	~~4,803.9~~3,782.8 acres	~~10,712.6~~4,364.6 acres	~~6,342.6~~5,504.6 acres
Permanent big game crucial habitat impacts[2]	~~3,421.6~~2,406.3 acres	~~6,337.6~~2,367.9 acres	~~3,762.8~~2,723.5 acres
Temporary big game substantial habitat impacts[2]	1,837.5 acres	7,595.6 acres	2,144.0 acres
Permanent big game substantial habitat impacts[2]	1,015.5 acres	3,969.8 acres	1,039.3 acres

Impact	Action Alternative: Indian Canyon	Action Alternative: Wells Draw	Action Alternative: Whitmore Park
The largest percent removal of big game crucial habitat in UDWR management unit for any species in any management unit	≤0.38	≤0.97	≤0.59
Number of Big Game Movement Corridor Crossings	36 (6 low importance, 15 medium importance, 15 high importance)	31 (1 low importance, 9 medium importance, 21 high importance)	34 (6 low importance, 15 medium importance, 13 high importance)
Fish habitat degradation	Fewest impacts on fish habitat due to fewest number of surface waters crossed and fewest number of crossing structures	Greatest impacts on fish habitat due to greatest number of surface waters crossed and greatest number of crossing structures	Impacts on fish habitat due to surface water crossings and crossing structures
Temporary vegetation community impacts	2,467.8 acres	5,095.7 acres	3,087.9 acres
Permanent vegetation community impacts	1,340.5 acres	2,559.9 acres	1,430.5 acres
Temporary riparian vegetation impacts	57.1 acres	40.0 acres	54.0 acres
Permanent riparian vegetation impacts	36.5 acres	22.6 acres	27.6 acres
Temporary federally listed plant species habitat impacts	• Barneby ridge-cress Pinyon-juniper habitat: 46.0 acres • Barneby ridge-cress white shale habitat: 5.4 acres • Pariette cactus: 364.0 acres • Uintah Basin hookless cactus: 364.0 acres • Ute's ladies-tresses: 2.8 acres	• Barneby ridge-cress Pinyon-juniper habitat: 0 acre • Barneby ridge-cress white shale habitat: 0 acre • Pariette cactus: 396.5 acres • Uintah Basin hookless cactus: 396.5 acres • Ute's ladies-tresses: 0.1 acres	• Barneby ridge-cress Pinyon-juniper habitat: 97.3 acres • Barneby ridge-cress white shale habitat: 14.1 acres • Pariette cactus: 364.0 acres • Uintah Basin hookless cactus: 364.0 acres • Ute's ladies-tresses: 2.7 acres
Permanent federally listed plant species habitat impacts	• Barneby ridge-cress Pinyon-juniper habitat: 20.0 acres • Barneby ridge-cress white shale habitat: 3.4 acres • Pariette cactus: 140.7 acres • Uintah Basin hookless cactus: 140.7 acres • Ute's ladies-tresses: 1.5 acres	• Barneby ridge-cress Pinyon-juniper habitat: 0 acres • Barneby ridge-cress white shale habitat: 0 acres • Pariette cactus: 153.5 acres • Uintah Basin hookless cactus: 153.5 acres • Ute's ladies-tresses: <0.1 acre	• Barneby ridge-cress Pinyon-juniper habitat: 34.3 acres • Barneby ridge-cress white shale habitat: 6.6 acres • Pariette cactus: 140.7 acres • Uintah Basin hookless cactus: 140.7 acres • Ute's ladies-tresses: 1.5 acres

	Action Alternative		
Impact	**Indian Canyon**	**Wells Draw**	**Whitmore Park**
Temporary Mexican Spotted Owl habitat impacts	865.8 acres	3,535.1 acres	1,531.7 acres
Permanent Mexican Spotted Owl habitat impacts	584.8 acres	1,856.3 acres	777.8 acres
Temporary greater sage-grouse habitat impacts	• UDWR-defined: 459.8 acres • BLM-defined: 544.0 acres	• UDWR-defined: 459.8 acres • BLM-defined: 588.0 acres	• UDWR-defined: 1,123.6 acres • BLM-defined: 1,047.0 acres
Permanent greater sage-grouse habitat impacts	• UDWR-defined: 294.5 acres • BLM-defined: 360.3 acres	• UDWR-defined: 294.5 acres • BLM-defined: 328.3 acres	• UDWR-defined: 482.8 acres • BLM-defined: 486.4 acres
Train noise impacts on at five closest greater sage-grouse leks	37–79 dBA	37–79 dBA	49–64 dBA
Geology, Soils, Seismic Hazards, and Hazardous Waste Sites			
Distance of the proposed rail line that would cross unstable geologic units	21 miles	54 miles	18 miles
Area of soil disturbance	1,340 acres	2,560 acres	1,431 acres
Impacts on hazardous waste sites	None	None	None
Surface fault rupture and seismic ground shaking	Possibility for seismic movement with the potential to cause landslides, but expected to be minimized with mitigation	Same as Indian Canyon Alternative	Same as Indian Canyon Alternative
Noise and Vibration			
Number of receptors adversely affected by construction-related noise	0	0	0
Number of receptors adversely affected by construction-related vibration	0	0	0

Impact	Action Alternative: Indian Canyon	Action Alternative: Wells Draw	Action Alternative: Whitmore Park
Number of receptors adversely affected by operations-related noise	6	1	2
Number of receptors adversely affected by operations-related vibration	0	0	0
Air Quality			
Construction-related criteria pollutant emissions	• CO: 917 tons • NOx: 512 tons • PM10: 779 tons • PM2.5: 228 tons • SO_2: 2 tons • VOCs: 94 tons	• CO: 1,541 tons • NOx: 649 tons • PM10: 1,075 tons • PM2.5: 299 tons • SO_2: 2 tons • VOCs: 146 tons	• CO: 992 tons • NOx: 598 tons • PM10: 880 tons • PM2.5: 281 tons • SO_2: 2 tons • VOCs: 103 tons
Operations-related criteria pollutant emissions	• Low rail traffic scenario: o CO: 136 tons/year o NOx: 343 tons/year o PM10: 10 tons/year o PM2.5: 7 tons/year o SO2: 0.4 tons/year o VOCs: 13 tons/year • High rail traffic scenario: o CO: 373 tons/year o NOx: 969 tons/year o PM10: 29 tons/year o PM2.5: 21 tons/year o SO_2: 1 ton/year o VOCs: 36 tons/year	• Low rail traffic scenario: o CO: 176 tons/year o NOx: 413 tons/year o PM10: 13 tons/year o PM2.5: 9 tons/year o SO_2: 0.5 tons/year o VOCs: 18 tons/year • High rail traffic scenario: o CO: 479 tons/year o NOx: 1,162 tons/year o PM10: 35 tons/year o PM2.5: 26 tons/year o SO_2: 2 ton/year o VOCs: 48 tons/year	• Low rail traffic scenario: o CO: 147 tons/year o NOx: 374 tons/year o PM10: 11 tons/year o PM2.5: 8 tons/year o SO_2: 0.4 tons/year o VOCs: 14 tons/year • High rail traffic scenario: o CO: 405 tons/year o NOx: 1,056 tons/year o PM10: 32 tons/year o PM2.5: 23 tons/year o SO_2: 1 ton/year o VOCs: 40 tons/year
Concentrations in comparison to the NAAQS	All concentrations would be less than the NAAQS at all modeled locations~~1-hour NO_2 concentration could exceed the NAAQS at one location south of Myton under certain conditions. This outcome is unlikely to occur and would not impact sensitive receptors.~~	Same as Indian Canyon Alternative~~All concentrations would be less than the NAAQS at all modeled locations~~	Same as Indian Canyon Alternative~~1-hour NO_2 concentration could exceed the NAAQS at one location south of Myton under certain conditions. This outcome is unlikely to occur and would not impact sensitive receptors.~~

Impact	Action Alternative Indian Canyon	 Wells Draw	 Whitmore Park
Energy			
Electricity consumption and distribution	Existing electricity distribution system would be adequate for construction and operations	Same as Indian Canyon Alternative	Same as Indian Canyon Alternative
Construction-related fuel (gasoline and diesel) consumption	19,859,000 gallons	27,803,000 gallons	23,217,000 gallons
Operations-related fuel (gasoline and diesel) consumption	• Low rail traffic scenario: 3,955,941 gallons/year • High rail traffic scenario: 11,696,171 gallons/year	• Low rail traffic scenario: 5,206,157 gallons/year • High rail traffic scenario: 15,127,985 gallons/year	• Low rail traffic scenario: 4,341,206 gallons/year • High rail traffic scenario: 12,765,347 gallons/year
Impacts on utilities (pipelines and transmission lines)	114 utilities would be crossed; some~~but~~ impacts on service would be avoided or minimized with mitigation but some portions of existing pipelines may need to be relocated	6 utilities would be crossed but impacts on service would be avoided or minimized with mitigation	13~~6~~ utilities would be crossed; some ~~but~~ impacts on service would be avoided or minimized with mitigation but some portions of existing pipelines may need to be relocated
Number of oil and gas wells adversely affected by construction	4	11	2
Cultural Resources			
Sensitive cultural resources physically affected	14	12	13
Sensitive cultural resources affected by change in setting	2	7	3
Paleontological Resources			
PFYC acreage in the project footprint	• PFYC 5: 787 acres • PFYC 4: 879 acres • PFYC 3: 628 acres	• PFYC 5: 926 acres • PFYC 4: 4,901 acres • PFYC 3: 628 acres	• PFYC 5: 853 acres • PFYC 4: 977 acres • PFYC 3: 1,370 acres
Scientifically important fossil localities in the project footprint	26	1	26

Impact	Action Alternative: Indian Canyon	Action Alternative: Wells Draw	Action Alternative: Whitmore Park
Land Use and Recreation			
Temporary disturbance by land ownership	• BLM: 73 acres • SITLA: 285 acres • Tribal: 257 acres • UDOT: 4 acres • Forest Service: 234 acres • Private: 1,614 acres	• BLM: 3,246 acres • SITLA: 554 acres • Tribal: 0 acres • UDOT: 1 acre • Forest Service: 0 acres • Private: 1,293 acres	• BLM: 0 acres • SITLA: 283 acres • Tribal: 255 acres • UDOT: 4 acres • Forest Service: 234 acres • Private: 2,312 acres
Permanent disturbance by land ownership	• BLM: 46 acres • SITLA: 158 acres • Tribal: 121 acres • UDOT: <1 acre • Forest Service: 167 acres • Private: 847 acres	• BLM: 1,571 acres • SITLA: 327 acres • Tribal: 0 acres • UDOT: 0 acre • Forest Service: 0 acres • Private: 662 acres	• BLM: 0 acres • SITLA: 103 acres • Tribal: 118 acres • UDOT: 0 acre • Forest Service: 167 acres • Private: 1,042 acres
Temporary disturbance of agricultural land in the study area	• Irrigated cropland: 145 acres • Prime farmland: 56 acres	• Irrigated cropland: 35 acres • Prime farmland: 15 acres	• Irrigated cropland: 145 acres • Prime farmland: 56 acres
Permanent disturbance of agricultural land in the study area	• Irrigated cropland: 92 acres • Prime farmland: 6 acres	• Irrigated cropland: 6 acres • Prime farmland: 4 acres	• Irrigated cropland: 92 acres • Prime farmland: 6 acres
Temporary loss of AUMs	50	176	73
Permanent loss of AUMs	34	88	37
Special designations	Forest Service Inventoried Roadless Areas	Route would cross BLM's Lears Canyon ACEC, Nine Mile Canyon ACEC, two Lands with Wilderness Characteristics areas, and the Nine Mile SRMA	Same as Indian Canyon Alternative
BLM Land Use Plan Amendment Required	Yes	Yes	No
Forest Service Land Use Plan Amendment Required	Yes	No	Yes
Disturbance within Forest Service Inventoried Roadless Areas	394 acres	0 acres	394 acres

	Action Alternative		
Impact	**Indian Canyon**	**Wells Draw**	**Whitmore Park**
Cooperative Wildlife Management Units impacts	816 acres	466 acres	1,472 acres
Conservation Easements affected	1	0	1
Visual Resources			
RKOP scenic quality ratings on BLM-administered lands	No change in scenic quality rating	Same as Indian Canyon Alternative	Alternative does not cross BLM-administered land
Visual quality ratings on other federal, state, tribal, and private land	• No change in rating at 1 RKOP • -1 reduced rating at 2 RKOPs • -2 reduced rating at 2~~3~~ RKOPs • -3 reduced rating at 1 RKOP • -4 reduced rating at 1 RKOP	• -1 reduced rating at 1 RKOP • -2 reduced rating at 1~~2~~ RKOP~~s~~ • -4 reduced rating at 1 RKOP	• -1 reduced rating at 2~~3~~ RKOPs • -2 reduced rating at 3~~2~~ RKOPs • -3 reduced rating at 1 RKOP
Sensitive viewscapes	• Ashley National Forest • BLM lands • Tribal trust lands • Indian Canyon Scenic Byway • Reservation Ridge Scenic Backway	• Ashley National Forest • BLM lands • Reservation Ridge Scenic Backway	Same as Indian Canyon Alternative
Infrastructure changes	• Install 4 new towers • Install 6 new sidings • Remove 3 nonresidential structures	• Install 4 new towers • Install 3 new sidings • Remove 4 residences • Remove 1 other structure	• Install 4 new towers • Install 9 new sidings • Remove 1 residence • Remove 5 other structures
Socioeconomics			
Land acquisitions required	3,808.2 acres	7,655.3 acres	4,518.3 acres
Impacts on private property	Greatest adverse impact on smaller private property owners because it would cross the greatest number of smaller-subdivided properties in the Argyle Canyon and Duchesne Mini-Ranches areas of Duchesne County	Route would affect the smallest area of private property, but would displace the largest number of residences	Route would affect the largest area of private property across the three Action Alternatives and would primarily affect larger property owners and ranching and farming operations
Annual employment, labor income, and value added impacts from construction	$290.6 million	$351.3 million	$311.8 million

Impact	Action Alternative: Indian Canyon	Action Alternative: Wells Draw	Action Alternative: Whitmore Park
Annual Employment (direct, indirect, induced) during Operations	• Low rail traffic scenario: 170 jobs • High rail traffic scenario: 420 jobs	• Low rail traffic scenario: 220 jobs • High rail traffic scenario: 530 jobs	• Low rail traffic scenario:190 jobs • High rail traffic scenario: 470 jobs
Annual labor income from operation	• Low rail traffic scenario: $8.3 million • High rail traffic scenario: $23.3 million	• Low rail traffic scenario: $10.4 million • High rail traffic scenario: $29.0 million	• Low rail traffic scenario: $9.3 million • High rail traffic scenario: $25.8 million
Operations-related state tax revenue	• Low rail traffic scenario: $0.4–0.5 million • High rail traffic scenario: $1.1–1.4 million	Same as Indian Canyon Alternative	Same as Indian Canyon Alternative
Environmental Justice			
Air Quality, Water Resources, Land Use, Socioeconomics, Vehicle Safety and Delay, Rail Operations Safety, Noise	No disproportionately high and adverse impacts on minority or low-income populations	Same as Indian Canyon Alternative	Same as Indian Canyon Alternative
Cultural resources	Impacts may disproportionately affect the Ute Indian Tribe but would be mitigated and would not be high and adverse	Same as Indian Canyon Alternative	Same as Indian Canyon Alternative
Biological resources	Effects on suitable habitat for the Pariette cactus and Uinta Basin hookless cactus would represent a disproportionately high and adverse effect on the Ute Indian Tribe	Same as Indian Canyon Alternative	Same as Indian Canyon Alternative
Downline			
Delay at downline at-grade road crossings	Increase delay up to 9.84 seconds per vehicle	Same as Indian Canyon Alternative	Same as Indian Canyon Alternative
Predicted downline rail accident frequency at grade crossings	Increase of 0.001 to 0.024 accident per year	Same as Indian Canyon Alternative	Same as Indian Canyon Alternative
Noise level increases at downline receptors	0.4 dB to 6.0 dB	Same as Indian Canyon Alternative	Same as Indian Canyon Alternative

Impact	Action Alternative		
	Indian Canyon	Wells Draw	Whitmore Park
Maximum downline criteria pollutant emissions	• CO: 1,048.35~~1,803.68~~ tons/year • NOx: 2,913.84~~5,013.24~~ tons/year • PM10: 63.00~~108.39~~ tons/year • PM2.5: 61.11~~105.14~~ tons/year • SO_2: 3.70~~6.36~~ tons/year • VOC: 103.66~~178.34~~ tons/year	Same as Indian Canyon Alternative	Same as Indian Canyon Alternative

Notes:

[a]~~[1]~~ The Coalition estimates that rail traffic on the proposed rail line could range from as few as 3.68 trains per day, on average (the low rail traffic scenario), to as many as 10.52 trains per day, on average (the high rail traffic scenario), depending on future market conditions, including future demand for crude oil produced in the Basin.

[b] Notably, there is significant overlap of big game habitat for the different big game species (see Appendix G, *Biological Resources Figures*, for big game habitats along the Action Alternatives), and the permanent and temporary habitat impacts affect multiple big game species in those areas of habitat overlap.

VMT = vehicle miles traveled; UDWR = Utah Division of Wildlife Resources; BLM = U.S. Department of the Interior, Bureau of Land Management; dBA =A-weighted decibels; dB = decibels; CO = carbon monoxide; NOx = nitrogen oxides; PM10 = particulate matter 10 microns or less in diameter; PM2.5 = particulate matter 2.5 microns or less in diameter; SO_2 = sulfur dioxide; VOCs = volatile organic compounds; NO_2 = nitrogen dioxide; NAAQS = National Ambient Air Quality Standards; PFYC = Potential Fossil Yield Classification; AUM = animal unit month; SITLA = School and Institutional Trust Lands Administration; UDOT = Utah Department of Transportation; ACEC = Area of Critical Environmental Concern; SRMA = Special Recreation Management Area; Forest Service = U.S. Forest Service; RKOP = rendered key observation point

2.6 Environmentally Preferred Alternative

Based on OEA's analysis and consultation with appropriate government agencies, the Ute Indian Tribe, other interested stakeholders, and the public, OEA ~~preliminarily~~ concludes that, among the three Action Alternatives, the Whitmore Park Alternative would result in the fewest significant impacts on the environment. In particular, the Whitmore Park Alternative would permanently affect the smallest area of water resources, including wetlands and perennial streams; would minimize impacts on greater sage-grouse leks and associated summer brood rearing habitat; and would avoid impacts on subdivided residential areas.

Compared to the Wells Draw Alternative, the Whitmore Park Alternative would permanently and temporarily affect a smaller area of wetlands and of intermittent streams, as well as a smaller number of springs. It would avoid impacts on special use areas on BLM-administered lands, including Areas of Critical Environmental Concern, Lands with Wilderness Characteristics, and areas classified by BLM as sensitive to visual impacts. The Whitmore Park Alternative would affect a smaller area of suitable habitat for the Endangered Species Act-listed Pariette cactus (*Sclerocactus brevispinus*) and Uinta Basin hookless cactus (*Sclerocactus wetlandicus*) than the Wells Draw Alternative, would avoid potential impacts on moderately suitable habitat for the ESA-listed Mexican spotted owl (*Strix occidentalis lucida*) and would affect a smaller area of big game habitat. In addition, it would result in fewer total emissions of criteria air pollutants and greenhouse gases during construction and during rail operations; would cross a smaller area of land that may be prone to landslides; would result in fewer displacements of residences; would involve a lower risk for accidents at at-grade road crossings; and would cross a smaller area with high potential for wildfires.

Compared to the Indian Canyon Alternative, the Whitmore Park Alternative would permanently and temporarily affect a smaller area of wetlands, a smaller area of riparian habitat, and smaller number of springs and would also require fewer stream realignments. It would avoid noise impacts on residences during rail operations, as well as visual and other impacts on residential areas in the Argyle Canyon and Duchesne Mini-Ranches areas of Duchesne County. The Whitmore Park Alternative would generate more employment, labor income, and local and state tax revenue during construction than the Indian Canyon Alternative and would cross a smaller area of geological units that may be prone to landslides and a smaller area of land with high wildfire hazard potential.

For these reasons, should the Board decide to authorize construction and operation of the proposed rail line, OEA ~~preliminarily~~ recommends that the Board authorize the Whitmore Park Alternative to minimize impacts of construction and operation on the environment. ~~OEA invites agency and public comment on this preliminary recommendation and will make its final recommendations to the Board in the Final EIS after considering all comments received during the public comment period.~~

Chapter 3
Affected Environment and Environmental Consequences

This chapter describes the affected environment and environmental consequences for each resource of concern for the proposed rail line and the contribution of the proposed rail line to cumulative impacts on each resource. OEA determined the resources of concern through scoping and agency and tribal consultation.

OEA took the following steps to analyze each resource.[1]

1. Defined a study area or study areas to be analyzed.
2. Developed analysis methods.
3. Reviewed the current conditions of the resource in the relevant study area(s).
4. Determined the level of potential impact that the construction and operation of the proposed rail line would or could have on the resource.
5. Identified mitigation that would minimize or compensate for impacts, if required.[2]
6. Reviewed regulations and guidance relevant to each resource, which are summarized in Appendix B, *Applicable Regulations*.
7. For cumulative impacts, analyzed the effects of the proposed rail line when combined with impacts of other past, present, and reasonably foreseeable future projects and actions.

OEA compared all potential impacts of the proposed rail line Action Alternatives and the No-Action Alternative. Under the No-Action Alternative, the proposed rail line would not be constructed or operated.

[1] OEA used the best available data to inform its analysis. These data may not reflect recent changes in conditions caused by the COVID-19 pandemic. In its petition, the Coalition has stated that projections of future rail traffic are based on conditions existing before the ongoing COVID-19 pandemic and anticipates these conditions caused by the pandemic will be temporary in nature.

[2] The Coalition has proposed voluntary mitigation, and OEA ~~has made preliminary recommendations for~~is recommending additional mitigation. OEA is making its final recommendations on mitigation to the Board in this Final EIS after considering all public comments on the Draft EIS. ~~OEA will finalize recommended mitigation measures after comments are received on the Draft EIS and will present the final recommended mitigation measures in the Final EIS.~~ The Board has the authority to impose mitigation measures as conditions to mitigate environmental impacts. Chapter 4, *Mitigation*, contains the complete list of mitigation measures. Each mitigation measure has a unique identifier that consists of a prefix and a number. The Coalition's voluntary mitigation measures follow the format VM-1, VM-2, etc. OEA's recommended mitigation measures include a unique prefix for each resource topic. For example, mitigation measures for biological resources follow the format BIO-MM-1, and mitigation measures for land use and recreation follow the format LUR-MM-1. OEA uses these unique identifiers to refer to specific mitigation measures throughout Chapter 3.

3.1 Vehicle Safety and Delay

This section describes the potential impacts on vehicle safety and delay that could result from construction and operation of the proposed rail line. Vehicle safety refers to the number of accidents that occur on roadways involving passenger cars, trucks, or other motor vehicles. Vehicle delay refers to how long passenger cars, trucks, or other motor vehicles have to slow down or stop on roadways. As a roadway approaches its capacity, or the number of vehicles that a roadway is designed to accommodate, vehicle delay increases and vehicle safety decreases. The proposed rail line would involve construction of new at-grade road crossings where motor vehicles would have to stop and wait while trains pass through the crossing.[1] The new at-grade road crossings would affect both vehicle safety and vehicle delay. The subsections that follow describe the study areas, data sources and methods used to analyze the impacts, the affected environment, and the potential impacts of the Action Alternatives on vehicle safety and delay.

3.1.1 Analysis Methods

This subsection identifies the study areas, data sources, and analysis methods OEA used to analyze vehicle safety and delay.

3.1.1.1 Study Area

The study area for vehicle safety and delay analysis includes both a defined study area for the proposed rail line (project study area) and a study area for downline impacts (downline study area) that would likely experience a project-related increase in rail traffic.

- **Project study area**. For the project study area, OEA considered public roadways in the Uinta Basin (the Basin) that could have increased vehicle traffic as a result of construction and operation of the proposed rail line. The project study area includes the new at-grade road crossings on public roadways that the Action Alternatives would cross between the two terminus points in the Basin at Myton, Utah, and Leland Bench, Utah, and the connection with the existing Union Pacific (UP) rail line near Kyune, Utah.
- **Downline study area.** For the downline study area, OEA considered public at-grade road crossings on existing rail lines that could experience an increase in rail traffic if the Board were to authorize the proposed rail line. The Coalition estimates that rail traffic on the proposed rail line could range from as few as 3.68 trains per day, on average (the low rail traffic scenario), to as many as 10.52 trains per day, on average (the high rail traffic scenario), depending on future market conditions, including future demand for crude oil produced in the Basin. OEA defined the downline study area based on the potential destinations and origins of those trains and the potential routes that they could follow. The downline study area extends from the proposed connection near Kyune to the northern, eastern, and southern edges of the Denver Metro/North Front Range air quality nonattainment area (Appendix C, *Downline Analysis Study Area and Train Characteristics*, Figure C-1). Existing rail lines in this area could experience an increase in rail traffic that would exceed OEA's thresholds for analysis set forth at 49 Code of Federal

[1] An at-grade crossing refers to an intersection where two modes of transportation cross at the same elevation level, so that one mode of traffic (trains) would impede the other (motor vehicles).

Regulations (C.F.R.) § 1105.7(e)(5). UP and BNSF Railway Company (BNSF) own and operate the rail lines in the downline study area that are used for freight and passenger rail service. Light rail passenger lines share some at-grade crossings with the UP rail lines in the Denver, Colorado metropolitan area. Appendix C, *Downline Analysis Study Area and Train Characteristics*, contains additional information about the downline study area.

3.1.1.2 Data Sources

OEA reviewed the following data sources to determine the potential impacts on vehicle safety and delay that could result from construction and operation of the proposed rail line.

Project Study Area

- Annual average daily traffic (AADT) data from the Utah Department of Transportation (UDOT), State of Utah Department of Public Safety Highway Safety Office, *Duchesne County Transportation Master Plan* (2017), UDOT traffic maps (2020a), and *Utah Department of Transportation 2019–2050 Long-Range Transportation Plan* (UDOT 2020b).
- Forecast increases in vehicle traffic from the U.S. Energy Information Administration (2020).
- Project-related construction data, including peak employment during construction and operations, construction material transporting, and locations of temporary construction camps provided by the Coalition.
- Proposed train characteristics, including length and speed, provided by the Coalition.

Downline Study Area

- AADT from UDOT, UDOT traffic maps (UDOT 2020a), Federal Railroad Administration (FRA) database (FRA 2020a), Denver Regional Council of Governments Regional Traffic Count Maps (DRCG 2020), and Colorado Information Marketplace Road Traffic Counts (State of Colorado 2014).
- Forecasted increases in vehicle traffic from the U.S. Energy Information Administration (2020).
- Existing train traffic (average number of trains per day), operating speed, and grade-crossing characteristics, including accident history, for downline rail segments (FRA 2020b).
- Existing train length estimated by OEA (Appendix C, *Downline Analysis Study Area and Train Characteristics*).
- Project-related train traffic (average number of trains per day) and train length estimated by the Coalition (Appendix C, *Downline Analysis Study Area and Train Characteristics*).

3.1.1.3 Analysis Methods

OEA used the following methods to analyze vehicle safety and delay in the project study area and downline study area.

Project Study Area

- **OEA evaluated roadway safety by analyzing the potential for increases in vehicle crashes.** OEA used the estimated vehicle miles traveled (VMT) during construction and operation of the proposed rail line to compare the relative likelihood of each Action Alternative to result in increased vehicle crashes. As VMT increases, OEA estimated the potential for crashes would also increase. OEA described the impacts on roadway safety qualitatively.

- **OEA evaluated potential vehicle delay on roadways by comparing existing roadway volumes and capacity to the estimated increases in vehicle traffic resulting from construction and operation of the proposed rail line.** OEA determined the general roadway capacity for roads in the project study area using Federal Highway Administration (FHWA) guidelines for calculating highway capacity (FHWA 2018). Roadway capacity describes the maximum number of vehicles a roadway can accommodate. OEA collected AADT roadway volumes of the state and county roadways in the project study area from UDOT and other sources. OEA then compared these volumes, where available, and roadway capacities to the estimated increases in vehicle traffic resulting from construction and operation of the proposed rail line to determine the potential impacts on vehicle delay.
- **OEA evaluated safety at public at-grade crossings by estimating future accident frequency.** For new public at-grade crossings that the Coalition would construct as part of any of the Action Alternatives, OEA estimated future accident frequency and the predicted interval between accidents using the *Accident Severity Prediction Formula for Rail-Highway Crossings from the Rail-Highway Crossing Resource Allocation Procedure User's Guide* (FRA 1987). For any grade crossing for which an AADT value could not be located using FRA or state data sources, OEA applied an average AADT value based on collected AADT values for the same road type in Utah. OEA estimated AADT values for analysis year 2026[2] using the available data and annual growth rate of 1.0 percent (U.S. Energy Information Administration 2020).
- **OEA estimated the delay that vehicles would experience at new grade crossings in the project study area as a result of project-related rail traffic.** For new public at-grade crossings that the Coalition would construct as part of any of the Action Alternatives, OEA calculated the time that each crossing would be blocked for each train-crossing event and the average number of vehicles that would be delayed by each crossing event. OEA also calculated the average delay for all vehicles using each crossing in a 24-hour period and the total delay for all crossings associated with each Action Alternative. OEA estimated AADT values as described for the grade crossing safety analysis.

Downline Study Area

- **OEA estimated potential increases in rail traffic on existing rail lines.** As described in Section 3.15, *Cumulative Effects*, and Appendix C, *Downline Analysis Study Area and Train Characteristics*, OEA identified regions that could be markets for crude oil produced in the Basin and the routes that trains transporting crude oil could take from the Basin to those regions. Based on the refinery capacity at the potential market regions that OEA identified, OEA estimated the number of loaded and unloaded trains that could move each day on different segments of existing rail lines in the downline study area. Depending on future market conditions, including the future price of crude oil, existing rail lines in the downline study area could experience an increase in rail traffic ranging from 0.4 additional train per day, on average, to 9.5 additional trains per day, on average. Given that there is some uncertainty associated with

[2] OEA used 2026 as the analysis year because it is the latest year in which OEA expects that any of the Action Alternatives would be in full operation.

the estimated distribution of rail traffic and that the estimated traffic is close to the 3-train-per-day threshold on the Denver Northbound route for the low rail traffic scenario, OEA has elected in this case to examine potential downline impacts associated with all estimated project-related rail traffic between and Kyune, Utah, and Denver, Colorado, and within the Denver Metro/North Front Range air quality nonattainment area.

- **OEA evaluated safety at public at-grade crossings in the downline study area by estimating future accident frequency.** OEA estimated future accident frequency and the corresponding predicted interval between accidents using the *Accident Severity Prediction Formula for Rail-Highway Crossings from the Rail-Highway Crossing Resource Allocation Procedure User's Guide* (FRA 1987). OEA estimated accident frequency based on the existing rail traffic volumes and AADT per the FRA grade-crossing database (2020a) and calculated the change in estimated accident frequency with the addition of project-related rail traffic for the analysis year 2026. OEA used the available data and an annual growth rate of 1.0 percent (U.S. Energy Information Administration 2020) to estimate the AADT values for analysis year 2026.
- **OEA estimated the delay that vehicles would experience at grade crossings in the downline study area as a result of project-related rail traffic.** For existing public at-grade crossings in the downline study area, OEA estimated the change in vehicle delay due to project-related rail traffic by estimating delay for existing rail traffic and delay with the addition of project-related rail traffic using the same calculations described for new grade crossings in the project study area. OEA estimated AADT values as described for the grade crossing safety analysis and included Colorado.

Appendix D, *Grade-Crossing Safety and Delay Analysis*, provides additional information regarding the methods OEA used to evaluate vehicle safety and delay impacts at public at-grade crossings.

3.1.2 Affected Environment

This subsection identifies the existing environmental conditions related to vehicle safety and delay in the project study area and downline study area.

3.1.2.1 Project Study Area

Roadway Safety

Nationally, the average vehicle crash rate is approximately 201 crashes per 100 million miles traveled (NHTSA 2019). In the project study area, the crash rate is lower than this estimate. Carbon, Duchesne, and Uintah Counties had less than 110 crashes per 100 million miles traveled, and Utah County had a crash rate above the national average (212 crashes per 100 million miles traveled) in 2018 (Christofferson pers. comm.). Table 3.1-1 shows the total number of crashes in 2018 in Carbon, Duchesne, Uintah, and Utah Counties.

Table 3.1-1. 2018 Crash Total by County

County	Population	Total Number of Crashes	Non-Injury	Injury	Fatal
Carbon	20,512	423	327	94	2
Duchesne	20,259	319	229	86	4
Uintah	36,343	469	356	110	3
Utah	576,496	10,495	7,218	3,238	39

Notes:
Sources: Christofferson pers. comm.; U.S. Census Bureau 2017

The greater number of crashes in Utah County is attributable to Utah County containing a much larger population than the other three counties, and larger urban communities (Provo and south suburban Salt Lake City). The Utah geographic information system (GIS) portal map shows a much greater concentration of crashes in the urban northwest portion of Utah County versus the rural southeast portion, where the proposed rail line would be located (UDOT 2020c).

Roadway Delay

Most of the public roadways in the project study area are two-lane rural highways, with the exception of U.S. Highway 6 (US 6), which includes both two-lane and five-lane sections near the proposed rail line. Existing vehicular traffic data are available for the major routes in the area, including US 6, U.S. Highway 191 (US 191), U.S. Highway 40 (US 40), Federal Aid Route 1300 (9 Mile Canyon Road), and Federal Aid Route 1552 (8000 S/8250 S). To estimate baseline traffic volumes on these roadways, OEA used the latest published UDOT traffic data from 2017 and estimated the 2020 volumes based on the historical growth rate for each of the roadways (Table 3.1-2). US 6 has the greatest AADT in the project study area of approximately 8,866 vehicles per day in 2020, of which 49 percent are trucks.

Table 3.1-2. Annual Average Daily Traffic in 2017 and 2020

Roadway	2017 AADT (vehicles per day)	Estimated 2020 AADT (vehicles per day)
US 6	7,659	8,866
US 191	2,130	2,341
US 40	6,599	6,799
9 Mile Canyon Road	2,508	2,854
8000 S/8250 S	342	377

Notes:
US 6 = U.S. Highway 6; US 191 = U.S. Highway 191; US 40 = U.S. Highway 40; AADT = annual average daily traffic
Source: UDOT 2020a

Using FHWA guidelines for calculating highway capacity, OEA estimated the capacity of the major public roadways in the project study area to be 1,490 vehicles per hour (VPH) per lane (FHWA 2018). To determine the amount of roadway capacity being used, OEA estimated the directional (one-way) design hour volume (a measure of traffic at the daily one-hour peak volume) based on the

AADT values presented in Table 3.1-2 for each of the major roadways.[3] Table 3.1-3 shows the daily design hour volumes and the amount of roadway capacity used for the major roadways in the project study area. The amount of capacity being used varies from 2 percent for 8000 S/8250 S to 45 percent for US 6. The low volume-to-capacity ratio contributes to the general overall safety of the roadways because the number of crashes tends to increase when roadways near capacity.

Table 3.1-3. Used Roadway Capacity during Peak Hour Traffic Flow

Roadway	One-Way Roadway Capacity (vehicles per hour)	2020	
		One-Way DHV (vehicles per hour)	Roadway Capacity Used (%)
US 6	1,490	665	45
US 191	1,490	180	12
US 40	1,490	510	34
9 Mile Canyon Road	1,490	215	14
8000 S/8250 S	1,490	30	2

Notes:
US 6 = U.S. Highway 6; US 191 = U.S. Highway 191; US 40 = U.S. Highway 40; DHV = design hour volume

3.1.2.2 Downline Study Area

Grade-Crossing Safety

OEA analyzed existing vehicle accident frequency at 231 at-grade crossings in the downline study area. Appendix C, *Downline Analysis Study Area and Train Characteristics*, Figure C-1, displays the locations of the downline grade crossings. In 2026, the existing at-grade crossings for the downline segments would have an average predicted interval ranging from 6.1to 20.4 years between accidents. The individual downline at-grade crossings with the ten lowest predicted intervals between accidents include the Chambers Road crossing for the Denver Eastbound segment with 1.3 years between accidents, to the Tennyson Street crossing for the Kyune to Denver segment with 4.5 years between accidents.

Grade-Crossing Delay

OEA analyzed existing vehicle delay at the 231 at-grade crossings in the downline study area. The average number of vehicles stopped per day at these at-grade crossings ranges from 48 for the Kyune to Denver segment to 2,782 vehicles per day for the Denver East/North segment. The average number of vehicles delayed per day at all downline at-grade crossings is 749. The average total delay for vehicles in a 24-hour period at at-grade crossings on downline segments ranges from 63 minutes per day for the Kyune to Denver segment to 10,415 minutes per day for the Denver East/North segment. The average vehicle delay per crossing for each segment ranges from 0.36 to 24.92 seconds per vehicle. Appendix D, *Grade-Crossing Safety and Delay Analysis*, shows the existing vehicle delay at each downline at-grade crossing for the five segments analyzed.

[3] OEA reviewed local hourly vehicle count data and determined that the peak hour of a roadway in the project study area contains approximately 10 percent of the average daily traffic volumes. OEA then used a conservative 75/25 directional split of the peak hour volume to calculate one-way directional flow design hour volume.

3.1.3 Environmental Consequences

Construction and operation of the proposed rail line could result in impacts on vehicle safety and delay. This subsection first presents the potential impacts that would be the same for all three Action Alternatives and then compares the potential impacts that would be different across the Action Alternatives. For comparison purposes, this subsection also discusses the status of vehicle safety and delay under the No-Action Alternative.

3.1.3.1 Impacts Common to All Action Alternatives

This subsection describes the potential environmental impacts on vehicle safety and delay that would be the same across the three Action Alternatives.

Project Study Area

Construction

During construction of any of the Action Alternatives, the Coalition would move workers, equipment, and construction materials by truck and other vehicles via roadways in the project study area. Construction would also require temporary roadway closures and the realignment of existing roadways. These construction activities could contribute to increased roadway traffic, vehicle accidents, and vehicle delay.

Roadway Safety

Construction vehicle traffic originating in Provo and Salt Lake City would use the major public highways (US 6, US 191, and US 40) to access the construction sites along the proposed rail line. Local traffic, including commuting employees and truck tips to quarries for subballast and landfills to drop off waste, would use a combination of federal and state highways, county roads, and private roads (subject to the permission of the landowner). The increase in traffic volumes from construction activity on these and other roadways in the project study area could affect roadway safety by increasing the number of vehicles on these roads, and thereby, the chance for vehicle crashes.

The proposed rail line would require construction of new roadways, including temporary and permanent access roads and road realignments. OEA is recommending mitigation requiring the Coalition design and construct new roads and road realignments in conformance with the *Utah Department of Transportation Roadway Design Manual* (UDOT 2020d) and other applicable road construction guidance (e.g., county encroachment standards, BLM H-9113-1 Road Design Handbook) to ensure safe roadway conditions and to obtain approvals for construction in UDOT rights-of-ways (VSD-MM-1, VSD-MM-3). If this mitigation is implemented, OEA concludes that impacts on vehicle safety related to new roadways and road realignments would not be significant.

Roadway Delay

Construction of the proposed rail line would require vehicle trips for the movement of materials, equipment, and workers to and from work sites, construction staging areas, and construction camps. These construction-related vehicle trips could increase vehicle delays on local roadways. The level of impacts would depend on the increase in construction vehicle traffic, which would vary by Action Alternative, and the available capacity of the roadways in the project study area (Section 3.1.3.2, *Impact Comparison between Action Alternatives*). In addition, some temporary delays could occur on portions of existing roads during construction due to temporary road closures required for the construction of grade crossings, road relocations, and connection points of temporary access roads to existing roads. To minimize temporary construction impacts on vehicle delay, the Coalition has committed to consulting with tribal and local transportation officials regarding installing detours and associated signs or maintaining at least one open lane of traffic at all times to allow the quick passage of emergency and other vehicles (VM-3). In addition, OEA is recommending a mitigation measure (VSD-MM-2) requiring the Coalition ensure that its employees and contractors comply with speed limits and applicable laws and regulations when operating vehicles and equipment on public roadways. If these measures are implemented, construction of the proposed rail line would not significantly increase vehicle delay in the project study area.

Operations

Roadway Safety and Delay

Operation of the proposed rail line would generate limited additional road traffic, primarily associated with employees commuting. This additional traffic has the potential to contribute to vehicle safety and delay impacts in the project study area by increasing the number of vehicles on roads. Similar to the discussion above for construction, the level of impacts would depend on the amount of operations-related vehicle traffic, which would vary between the Action Alternatives (Section 3.1.3.2, *Impact Comparison between Action Alternatives*).

Operation of the proposed rail line would reduce truck traffic on some local roadways because some freight that is currently transported by truck would move by rail instead. The primary commodity produced in the Basin that would move on the proposed rail line is crude oil. Currently, trucks transport crude oil from production areas in the Basin to refineries in Salt Lake City and the Price River Terminal in Wellington, Utah, where crude oil is loaded onto trains for transport to markets across the country. In the short term, OEA does not expect that the proposed rail line would divert truck transportation of crude oil to rail transportation for the purpose of serving existing oil refineries in Salt Lake City because those refineries currently do not have rail access. However, OEA anticipates that the proposed rail line would eliminate the existing tanker truck traffic transporting crude oil from production areas in the Basin to the Price River Terminal.[4] If the proposed rail line were constructed, the tanker trucks that currently transport crude oil to the Price River Terminal would likely go to the proposed rail line terminals in the Basin instead because the proposed rail line terminals would be significantly closer to oil production areas in the Basin than the Price River Terminal.

Based on information provided by the Coalition, OEA estimates that tanker trucks transport approximately 10,000 barrels of crude oil per day to the Price River Terminal. This corresponds to approximately 17,464 tanker trucks per year. OEA estimates that the average distance between crude oil production areas and new rail terminals in the Basin would be approximate 80 miles less (one way) than the distance to the Price River Terminal. Thus, OEA anticipates that operation of the proposed rail line would reduce tanker truck mileage by approximately 2.8 million miles per year and that may lead to fewer crashes. In addition, the removal of trucks from the road would reduce traffic on US 191 through Indian Canyon and on other roadways along the route from the Basin to

[4] Crude oil from the Uinta Basin has been and may be hauled to other terminals outside the Basin. It is OEA's understanding that Price River Terminal is the most frequent destination and so it has been used in this analysis.

the Price River Terminal, but because traffic on these roads is already low, OEA does not expect that this impact would be significant. Any beneficial transportation impacts of the proposed rail line related to the diversion of truck traffic to rail would be the same for any of the Action Alternatives.

Grade-Crossing Safety and Delay

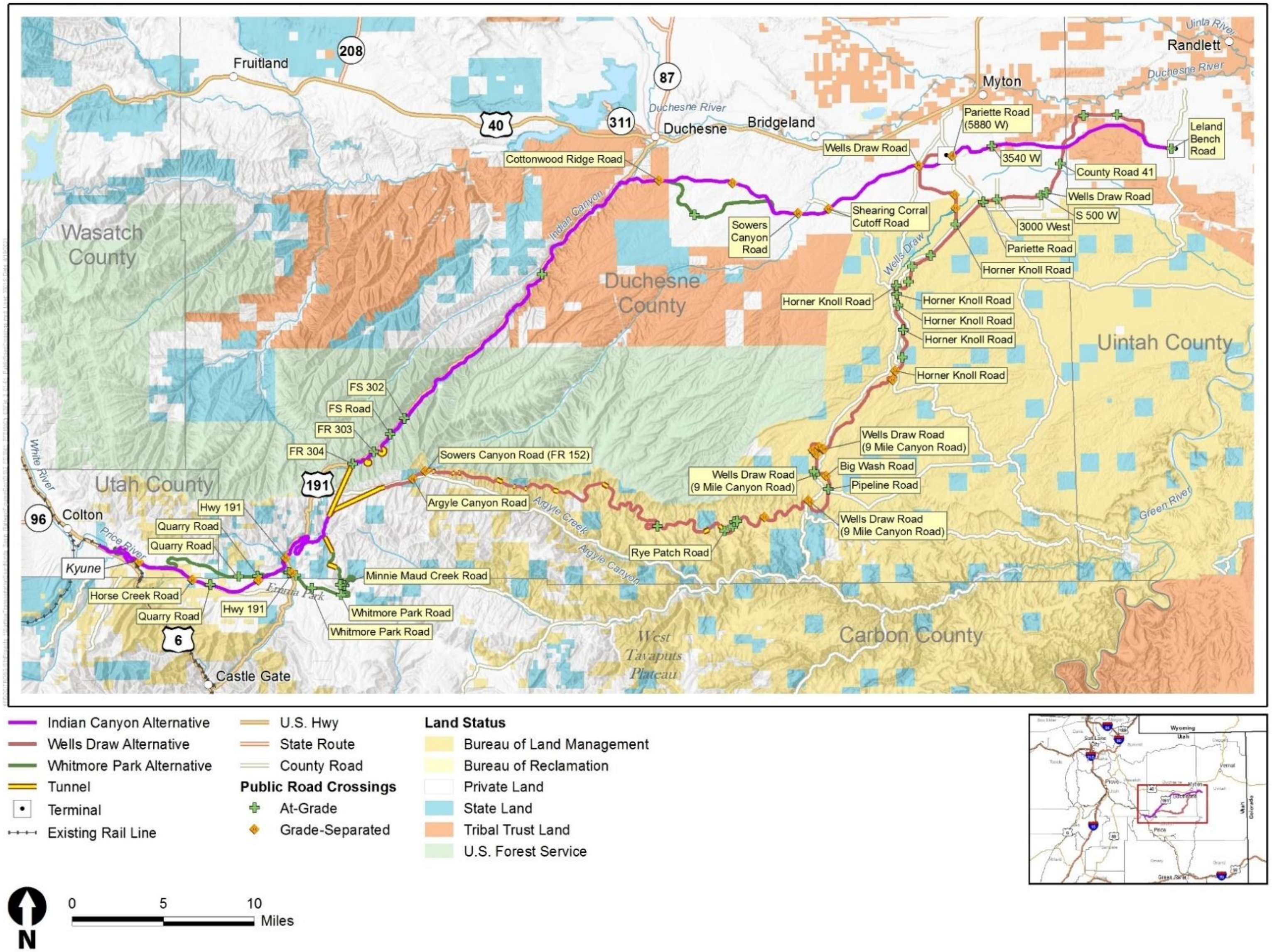
Operation of the proposed rail line would introduce vehicle safety and delay impacts at new at-grade road crossings. The Coalition would install grade-separated crossings[5] at major public roadways, such as US 191 and Pariette Road, which would avoid the potential for rail–vehicle accidents and delays due to passing trains on these roadways. For smaller roads, the Coalition would install at-grade road crossings~~as shown in Figure 3.1-1~~. These new at-grade road crossings would result in the potential for vehicle accidents and vehicle delays at these crossings. The locations of proposed at-grade and grade-separated crossings are shown in Figure 3.1-1. ~~maps in Appendix A, *Action Alternatives Supporting Information*, show the locations of all proposed at-grade crossings and grade-separated crossings.~~

To minimize the potential for accidents involving motor vehicles and trains operating on the proposed rail line, the Coalition has committed to consulting with federal, state, and local agencies and the Ute Indian Tribe on the design and location of at-grade crossings. The Coalition has also committed to following standard safety designs for installing proposed warning devices and signs, including the Federal Highway Administration *Manual on Uniform Traffic Control Devices* (FHWA 2009) and other applicable guidance and safety requirements (VM-1, VM-2). Even if these mitigation measures are implemented, however, there would be potential for accidents at at-grade road crossings. To estimate the probability of accidents at each new at-grade road crossing, OEA calculated the accident rate at existing at-grade road crossings on existing rail lines and adjusted that rate to account for road type, train speed, train traffic volume, and other factors specific to the proposed rail line. Appendix D, *Grade-Crossing Safety and Delay Analysis*, contains the predicted accident frequency for each new at-grade road crossing. Across the three Action Alternatives, OEA estimates that the crossing with the highest predicted accident rate would experience an accident approximately once every 29 years under the high rail traffic scenario and approximately once every 47 years under the low rail traffic scenario. The crossing with the lowest predicted accident rate would experience an accident approximately once every 56 to 99 years, depending on the volume of rail traffic.

For any of the Action Alternatives, impacts related to vehicle delay at new at-grade road crossings would be minor. As discussed in Section 3.1.3.2, *Impact Comparison between Action Alternatives*, OEA predicts that the average time required for a train to transit across a new at-grade crossings would range between 3.06 and 3.21 minutes, depending primarily on the length of the train. Under the low rail traffic scenario, an average of 1.30 to 2.42 vehicles would be delayed at each crossing per day, depending on the Action Alternative. Under the high rail traffic scenario, an average of 3.55 to 6.75 vehicles would be delayed at each crossing per day, depending on the Action Alternative.

[5] A grade-separated crossing refers to an intersection at which traffic crosses at different elevations, so that vehicular traffic and train traffic are not impeded by each other.

Figure 3.1-1. Proposed At-Grade and Grade-Separated Crossings for the Action Alternatives



In addition to public at-grade road crossings, any of the Action Alternatives would also cross private roads. OEA anticipates that impacts on vehicle safety and delay at private road crossings would be similar to the impacts at new at-grade crossings of local public roadways (refer to Appendix D, *Grade-Crossing Safety and Delay Analysis*, for the predicted accident frequency and delay at each new public at-grade crossing). However, OEA expects that traffic on private roads would be lower than on public roads and, therefore, that the proposed rail line would affect fewer vehicles at these private grade crossings. Implementation of the Coalition's voluntary mitigation measure VM-4 would minimize potential safety impacts on private road crossings by requiring the Coalition consult with private landowners to determine the final details and reasonable signage for grade crossings on private roads.

Like other motor vehicles, emergency vehicles could experience delays at new at-grade crossings. Emergency service vehicles would be subject to the same grade-crossing delays described for all traffic. The estimated maximum time an emergency vehicle could be delayed at any new at-grade crossing would be 3.21 minutes if the vehicle arrived at the same moment as a train of average length approaches the grade-crossing. All of the at-grade crossings in the project study area are located on rural local or collector roads,[6] emergency vehicle use of roads is infrequent, and only a few vehicles per day of all types would experience any delay at a typical grade crossing. Therefore, OEA concludes that emergency vehicles would rarely be delayed and, when delayed, they would be delayed for a relatively short duration.

In the event of an emergency, such as a wildfire, local residents may need to evacuate quickly. For residents located in isolated or mountainous terrain in the study area, there may be limited routes for ingress or egress, and new at-grade crossings could potentially delay evacuation. These delays would be the same as those described previously for all traffic. Evacuation and emergency vehicle access routes could be blocked for longer periods of time in the event of a train derailment or collision at an at-grade crossing (refer to Section 3.2, *Rail Operations Safety*, for a discussion of the likelihood of rail accidents). The Coalition has committed to developing an emergency response plan that would describe procedures to be followed by rail employees in the event of a collision or derailment, emergency routes for vehicles, and the location of emergency equipment (VM-11). OEA is recommending an additional mitigation measure that would require the Coalition consult with private landowners and communities affected by new at-grade crossings to identify measures to mitigate impacts on emergency access and evacuation routes and incorporate the results of this consultation into the emergency response plan identified in VM-11 (VSD-MM-6). These measures may include identifying new ingress and egress routes that could be used to improve safety in the event of an emergency. OEA anticipates that with implementation of these mitigation measures, impacts on emergency access and evacuation routes would be minimized.

To ensure that impacts related to safety at at-grade road crossings would be minimized, OEA is recommending additional mitigation measures (VSD-MM-4, VSD-MM-5) requiring the Coalition support Operation Lifesaver educational programs in communities along the proposed rail line to help prevent accidents at highway/rail grade crossings and to adhere to FHWA regulations for grade

[6] Based on classifications in *Federal Highway Administration, Highway Functional Classification Concepts, Criteria and Procedures* (FHWA 2013), rural roads are defined as roads that serve a population of 5,000 or less. Local roads are defined as roads not intended for use in long distance travel, except at the origin or destination end of the trip, due to their provision of direct access to abutting land. Collector roads are major and minor roads that connect local roads and streets with arterials roads.

crossing signage. If these mitigation measures are implemented, OEA concludes that impacts related to safety and delay at at-grade road crossings would not be significant.

Downline Study Area

Grade-Crossing Safety

OEA anticipates that the proposed rail line would increase rail traffic on existing rail lines in the downline study area. Under all of the Action Alternatives, the increase in rail traffic on existing lines would depend on the volume of rail traffic on the proposed rail line, which would depend on future market conditions, including future demand for crude oil produced in the Basin. An increase in rail traffic on existing rail lines would increase the predicted accident frequency at at-grade road crossings on the existing rail lines.

OEA identified five segments of existing rail lines in the downline study area that could experience an increase in rail traffic if the proposed rail line were constructed. Most trains heading into or out of the Basin would travel on the existing 157.4-mile segment of rail line between Kyune and Denver, Colorado, so this rail line segment would experience the greatest increase in rail traffic of any downline segment. The increase in rail traffic on the Kyune to Denver segment could be up to 9.5 additional trains per day, on average, under the high rail traffic scenario, or as few as 3.3 additional trains per day, on average, under the low rail traffic scenario. The predicted accident rate at at-grade road crossings for this segment would increase from an estimated baseline rate of 0.051 accident per year, on average, to 0.054 accident per year under the low rail traffic scenario or 0.064 accident per year under the high rail traffic scenario. This means that the predicted interval between accidents would decrease from one accident approximately every 20 years, on average, under the No-Action Alternative to one accident approximately every 19 years under the low rail traffic scenario or one accident approximately every 16 years under the high rail traffic scenario.

Table 3.1-4 shows the estimated increase in train accidents per year for each segment in the downline study area. Regardless of the volume of rail traffic on the proposed rail line, the potential for accidents at existing at-grade road crossings in the downline study area would not increase significantly. Because downline impacts would occur on existing rail lines that are not owned or operated by the Coalition, and railroads have the right to determine how to operate and route their traffic, any potential increase in the risk of accidents at existing at-grade road crossings in the downline study area would be beyond the Board's control in this proceeding; therefore, OEA is not recommending mitigation to address this potential impact.

Grade-Crossing Delay

The addition of new rail traffic on existing rail lines would increase delay at at-grade road crossings in the downline study area. Table 3.1-5 shows the estimated potential vehicle delay per grade crossing on the five downline segments that OEA identified, as well as the number of crossings on each downline segment that could experience a decrease in the level of service (LOS)[7] designation as

[7] Level of service (LOS) is a mechanism used to determine how well a roadway is operating from a traveler's perspective. Typically, six levels of service are defined and each is assigned a letter designation from A to F, with LOS A representing the best operating conditions, and LOS F the worst. Appendix D, *Grade-Crossing Safety and Delay Analysis*, provides more information on LOS.

a result of increased rail traffic. Appendix D, *Grade-Crossing Safety and Delay Analysis,* provides additional details on grade-crossing delay.

Because it is located in the urban area of Denver, the Denver East/North segment would experience the greatest increase in the number of vehicles delayed of any downline segment, if the proposed rail line were constructed. This segment is part of a heavily used UP mainline that extends north from downtown Denver toward Cheyenne, Wyoming, and would likely be used to transport crude oil trains from the Basin to markets along the Gulf Coast in Texas and Louisiana (Appendix C, *Downline Analysis Study Area and Train Characteristics*). Delays at the two at-grade crossings on this segment currently affect an estimated 5,563 total vehicles per day, on average. This would increase to an estimated 6,347 total vehicles under the low rail traffic scenario or 7,781 total vehicles under the high rail traffic scenario.

Across all the at-grade crossings in the downline study area, the largest increase in average delay per vehicle would occur at the crossing of Broadway Street on the Denver East/North segment. At that crossing, average delay would increase from an estimated 21.19 seconds per vehicle under baseline conditions to 24.72 seconds per vehicle under the low rail traffic scenario or 31.03 seconds per vehicle under the high rail traffic scenario.

Regardless of the volume of rail traffic on the proposed rail line, the potential increase in vehicle delay at existing at-grade road crossings in the downline study area would not increase significantly. Because downline impacts would occur on existing rail lines that are not owned or operated by the Coalition, and railroads have the right to determine how to operate and route their traffic, any potential increase in delay at existing at-grade road crossings in the downline study area would be beyond the Board's control in this proceeding; therefore, OEA is not recommending mitigation to address this potential impact.

Table 3.1-4. Estimated Increase in Downline Train Accidents per Year

Segment	Length (miles)	Number of Public At-Grade Crossings	Estimated Accidents Per Year in 2026				
			Baseline (No Action Alternative)	Low Rail Traffic Scenario		High Rail Traffic Scenario	
				Increase over Baseline	Total	Increase over Baseline	Total
Kyune to Denver	457.4	91	0.051	0.002	0.054	0.013	0.064
Denver East/North	3.2	2	0.164	0.009	0.172	0.024	0.188
Denver Southbound	16.6	16	0.072	0.001	0.072	0.001	0.073
Denver Eastbound	59	33	0.151	0.001	0.152	0.004	0.155
Denver Northbound	69.2	89	0.049	0.005	0.054	0.013	0.062

Table 3.1-5. Estimated Maximum Potential Vehicle Delay per Grade Crossing on Downline Segments (2026)

Segment	Length (miles)	Number of At-Grade Crossings	Increase in Trains per Day		Estimated Average Number of Vehicles Delayed per Day[a]			Total Estimated Delay in a 24-Hour Period (minutes per crossing)[b]			Number of Crossings with Project-Related Decrease in LOS	
			Low Traffic	High Traffic	Baseline	Low Traffic	High Traffic	Baseline	Low Traffic	High Traffic	Low Traffic	High Traffic
Kyune to Denver	457.4	91	3.3	9.5	48	64	99	63	96	158	0	0
Denver East/North	3.2	2	2.9	8.4	2,782	3,174	3,891	10,415	12,149	15,251	1	1
Denver Southbound	16.6	16	0.4	1.1	460	466	477	1,349	1,371	1,407	0	0
Denver Eastbound	59	33	0.4	1.1	394	403	415	274	297	306	0	0
Denver Northbound	69.2	89	2.5	7.3	62	79	94	92	121	148	0	0

Notes:
[a] Represents an average across all at-grade crossings for each downline segment.
[b] Represents the delay per stopped vehicle times the number of vehicles delayed per day divided by the annual average daily traffic.
[c] Represents the delay per stopped vehicle times the number of vehicles delayed at all crossings.

3.1.3.2 Impact Comparison between Action Alternatives

This subsection compares the potential environmental impacts on vehicle safety and delay across the three Action Alternatives.

Project Study Area

Construction

Construction of the proposed rail line would result in the following impacts on roadway safety and roadway delay.

Roadway Safety

OEA compared the potential impacts on vehicle safety across the three Action Alternatives by comparing the estimated VMT during construction for each Action Alternative because a higher VMT would correspond to a higher potential for vehicle accidents. Table shows the annual VMT during construction of each of the Action Alternatives. As the table shows, the Whitmore Park Alternative would have the greatest potential to result in increased crashes in any single construction year, while the Wells Draw Alternative would have the potential for the greatest increase in total crashes across the construction period. The rural highways in the project study area have substantial additional capacity (Table 3.1-3). Therefore, if the Coalition's voluntary mitigation measures and OEA's recommended mitigation measures for construction-related travel are implemented (VM-3, VSD-MM-1, VSD-MM-2), OEA concludes that construction of the proposed rail line would not significantly affect roadway safety in the project study area.

Table 3.1-6. Vehicle Miles Traveled during Construction

	Vehicle Miles Traveled[a]		
Year	**Indian Canyon Alternative**	**Wells Draw Alternative**	**Whitmore Park Alternative**
2022	83,125,349	82,096,214	100,670,533
2023	83,125,349	82,096,214	100,670,533
2024	27,784,363	82,096,214	33,648,781
2025	--	82,096,214	--
Total	**194,035,062**	**328,384,855**	**234,989,847**

Notes:
[a] OEA determined VMT based on the estimated number of vehicle trips (Table), and the average trip length during construction of 52 to 86 miles, depending on the type of construction activity (e.g., tunnel construction, employees commuting) and Action Alternative. Appendix M, *Air Quality Emissions and Modeling Data*, includes more information regarding how OEA estimated VMT, trip length, and the number of trips.
VMT = vehicle miles traveled

Roadway Delay

Table 3.1-7 shows the estimated vehicle traffic during construction for each of the Action Alternatives, including total annual trips, average daily trips, and one-way design hour volume (a measure of traffic at the daily one-hour peak volume) during each year of construction. While the Wells Draw Alternative would result in the greatest total number of vehicle trips during construction compared to the other Action Alternatives, the Whitmore Park Alternative would result in the most traffic in any single construction year.

Table 3.1-7. Vehicle Traffic during Construction

Year[a]	Traffic Characteristics	Action Alternative: Indian Canyon	Wells Draw	Whitmore Park
2022	Annual trips	1,335,386	1,183,745	1,519,498
	AADT	3,659	3,243	4,163
	One-way DHV (vehicles per hour)	274	243	312
2023	Annual trips	1,335,386	1,183,745	1,519,498
	AADT	3,659	3,243	4,163
	One-way DHV (vehicles per hour)	274	243	312
2024	Annual trips	446,348	1,183,745	507,887
	AADT	3,659	3,243	4,163
	Maximum VPH per lane	274	243	312
2025	Annual trips	--	1,183,745	--
	AADT	--	3,243	--
	One-way DHV (vehicles per hour)	--	243	--
Total Annual Trips		3,117,120	4,734,980	3,546,883

Notes:
[a] Construction of the Indian Canyon Alternative and Whitmore Park Alternative would take up to 2 years 4 months, and construction of the Wells Draw Alternative would take up to 4 years.
AADT = average annual daily traffic; DHV = design hour volume

To determine the potential impacts on roadway delay, OEA compared the available capacity on the roadways in the project study area to the estimated construction vehicle traffic. The distribution of construction vehicle traffic on the roadways in the project study area is unknown. Therefore, to compare the increase in project-related construction traffic to roadway capacity, OEA assumed that all construction traffic would be routed on US 6, which is the busiest roadway in the project study area. Table 3.1-8 shows the baseline used roadway capacity on US 6 for all years of construction and the used roadway capacity during peak hour traffic flow under each of the Action Alternatives.

Table 3.1-8. Used Roadway Capacity during Peak Hour Traffic Flow on US 6 during Construction

	Used Roadway Capacity (%)						
		Indian Canyon Alternative		Wells Draw Alternative		Whitmore Park Alternative	
Year	Baseline	Increase	Total	Increase	Total	Increase	Total
2022	49	18	68	16	66	21	70
2023	52	18	70	16	68	21	73
2024	54	18	73	16	71	21	75
2025	57	--	57	16	73	--	57

The Whitmore Park Alternative would result in the largest increase in used roadway capacity in any given year (21 percent), followed by the Indian Canyon Alternative (18 percent), and the Wells Draw Alternative (16 percent). Under any of the Action Alternatives, there would be adequate roadway lane capacity remaining during each year of construction. Because US 6 is the busiest of the major roadways in the project study area (Table 3.1-2), OEA anticipates that all roadways used by construction vehicles would have substantial excess capacity during each year of construction. In addition to using the major roadways in the study area, construction traffic could be routed on smaller, local roads, such as those that pass through the communities of Randlett, Myton, and Fort Duchesne (e.g., Leland Bench Road, 7500 E, AR-88, and Sandwash Road/6000 W/5888 W) near the northern end of the proposed rail line. These smaller roads could see localized increases in traffic during the construction period. With implementation of the Coalition's voluntary mitigation measures and OEA's recommended mitigation measures for construction-related travel (VM-3, VSD-MM-1, VSD-MM-2), OEA concludes that construction of any of the Action Alternatives would not significantly affect vehicle delay in the project study area.

Operations

Operation of the proposed rail line would result in the following impacts on roadway safety, roadway delay, grade-crossing safety, and grade-crossing delay.

Roadway Safety

Table 3.1-9 shows the annual VMT during operations of the Action Alternatives under the low and high rail traffic scenarios. Annual VMT estimates include reduced mileage anticipated for crude oil trucking that would be expected with rail terminals located in the Basin, as discussed previously. Based on VMT, OEA predicts that the Wells Draw Alternative could result in slightly greater impacts on vehicle safety than the other two Action Alternatives. This is because the Wells Draw Alternative would require more employees to operate and would have longer commuting distances, both of which contribute to higher VMT and may lead to increased crashes. Because roadways in the project study area have substantial additional capacity (Table 3.1-3), OEA does not anticipate that operation of any of the Action Alternatives would significantly affect roadway safety on roadways in the project study area, if the Coalition's voluntary mitigation measures and OEA's recommended mitigation measures are implemented (VM-1, VSD-MM-1).

Table 3.1-9. Annual Vehicle Miles Traveled during Operations

	Vehicle Miles Traveled[a]		
Scenario	Indian Canyon Alternative	Wells Draw Alternative	Whitmore Park Alternative
Low rail traffic	-902,385	-15,409	-835,637
High rail traffic	1,002,046	2,346,551	1,135,542

Notes:
[a] OEA determined VMT based on the estimated number of vehicle trips (Table), and the average trip length during operations of 52 to 80 miles, depending on the Action Alternative, and accounting for reduced crude oil trucking mileage due to anticipated rail terminals that would be closer to crude oil production areas. Appendix M, *Air Quality Emissions and Modeling Data*, includes more information regarding how OEA estimated VMT, trip length, and the number of trips.
VMT = vehicle miles traveled

Roadway Delay

Table 3.1-10 shows the estimated vehicle traffic during operations for each of the Action Alternatives, including total annual trips, average daily trips, and one-way design hour volume of traffic under the low rail traffic scenario and high rail traffic scenario. The Wells Draw Alternative would result in a greater number of vehicle trips during operations than the Indian Canyon Alternative and Whitmore Park Alternative and, therefore, would result in the greatest impacts on vehicle safety and delay. However, under any of the Action Alternatives, the one-way design hour traffic volumes would be relatively low and would lead to little addition to vehicle delay on roadways in the project study area. Using the same methodology as described for construction, OEA estimates that the used roadway lane capacity during peak hour traffic flow for US 6 would increase by less than 1 percent under both the low rail traffic scenario and the high rail traffic scenario for each Action Alternative. If the Coalition's voluntary mitigation measures and OEA's recommended mitigation measures are implemented (VM-1, VSD-MM-1), OEA concludes that operation of the proposed rail line would not significantly affect roadway delay in the project study area.

Table 3.1-10. Vehicle Traffic during Operations by Action Alternative

	Action Alternative		
Traffic Characteristics	**Indian Canyon**	**Wells Draw**	**Whitmore Park**
Low Rail Traffic Scenario			
Annual trips	1,572	12,522	1,572
AADT	4	34	4
One-way DHV (vehicles per hour)	<1	3	<1
High Rail Traffic Scenario			
Annual trips	38,072	52,672	38,072
AADT	104	144	104
One-way DHV (vehicles per hour)	8	11	8

Notes:
AADT = average annual daily traffic; DHV = design hour volume

Grade-Crossing Safety

Table 3.1-11 shows the estimated overall predicted accident frequency by Action Alternative under the low rail traffic scenario and high rail traffic scenario. Under the low rail traffic scenario, the Indian Canyon Alternative would result in the lowest per-crossing impact on vehicle safety with an average of one estimated accident every 91 years per crossing. The Whitmore Park Alternative and Wells Draw Alternative would follow with an average of one estimated accident every 90 and 83 years per crossing, respectively. Similarly, under the high rail traffic scenario, the Indian Canyon Alternative would result in the lowest per-crossing impact on vehicle safety with one accident every 52 years, followed by Whitmore Park Alternative and Wells Draw Alternative, at 51 and 48 years between accidents, respectively.

Table 3.1-11. Estimated Overall Predicted Accident Frequency by Action Alternative[a]

		Low Rail Traffic Scenario		High Rail Traffic Scenario	
Action Alternative	**Number of At-Grade Crossings**	**Overall Predicted Accident Frequency (per year)**	**Overall Predicted Intervals between Accidents (years)**	**Overall Predicted Accident Frequency (per year)**	**Overall Predicted Intervals between Accidents (years)**
Indian Canyon	8	0.088	11.3	0.153	6.5
Wells Draw	27	0.324	3.1	0.559	1.8
Whitmore Park	17	0.190	5.3	0.331	3.0

Notes:
[a] Predicted frequencies and intervals are the sums for all crossings for each Action Alternative.

To ensure that impacts related to safety at at-grade road crossings would be minimized, the Coalition has committed to designing new crossings in consultation with federal, state, and local agencies and the Ute Indian Tribe, to follow standard safety designs for installing proposed warning devices and signs, and to ensure that operators using the rail line comply with federal safety requirements imposed by FRA regarding train operations on the rail line (VM-1, VM-2). In addition, OEA is recommending mitigation measures requiring the Coalition support Operation Lifesaver educational programs in communities along the proposed rail line to help prevent accidents at highway/rail grade crossings and to adhere to FHWA regulations for grade crossing signage (VSD-MM-4, VSD-MM-5). If these mitigation measures are implemented, OEA concludes that impacts related to safety at new at-grade road crossings would not be significant under any of the Action Alternatives.

Grade-Crossing Delay

Table 3.1-12 shows the estimated average delay by Action Alternative under the low rail traffic scenario and high rail traffic scenario. Overall, the Wells Draw Alternative would result in the greatest impact on vehicle delay per crossing followed by the Indian Canyon Alternative, then the Whitmore Park Alternative. Even with such estimated increases in delays, the LOS designation for all new grade crossings along any Action Alternative would be at LOS A, an acceptable LOS with free-flowing traffic. Appendix D, *Grade-Crossing Safety and Delay Analysis*, shows the vehicle delay for each proposed at-grade crossing under the Action Alternatives. If the Coalition's voluntary mitigation measures and OEA's recommended mitigation regarding safe rail operations and the design of new at-grade road crossings is implemented (VM-1, VM-2, VSD-MM-4, VSD-MM-5), OEA concludes that impacts related to vehicle delay at at-grade road crossings would not be significant. Some minor increase in vehicle delay at new at-grade road crossings would, however, be unavoidable.

Table 3.1-12. Estimated Average Increase in Grade-Crossing Delay per Crossing by Action Alternative

		Low Rail Traffic Scenario		High Rail Traffic Scenario	
Action Alternative	Number of At-Grade Crossings	Average Number of Vehicles Delayed per Day[a]	Average Delay in 24-Hour Period (minutes)[b]	Average Number of Vehicles Delayed per Day	Average Delay in 24-Hour Period (minutes)[b]
Indian Canyon	8	1.30	4.07	3.62	11.10
Wells Draw	27	2.42	7.67	6.75	20.89
Whitmore Park	17	1.27	3.99	3.55	10.88

Notes:

[a] An average across all at-grade crossings for each Action Alternative.

[b] An average across all at-grade crossings of delay per stopped vehicle times the number of vehicles delayed.

Downline Study Area

Impacts on vehicle safety and delay in the downline study area would depend on the volume of rail traffic moving on the proposed rail line. The volume of rail traffic on the proposed rail line would, in turn, depend on future market conditions, including future demand for crude oil produced in the Basin. Because the volume of rail traffic on the proposed rail line would be the same for any of the Action Alternatives, downline impacts would be the same, and insignificant, across the three Action Alternatives.

3.1.3.3 No-Action Alternative

Under the No-Action Alternative, the Coalition would not construct and operate the proposed rail line. There would be no increased vehicular traffic as a result of rail line construction activities and there would be no risk of train-related accidents or potential for vehicle delay at at-grade road crossings in the project study area. In the downline study area, the risk of accidents and vehicle delay at at-grade road crossings would not change from baseline conditions.

Under the No-Action Alternative, crude oil produced in the Basin would continue to be transported by truck. Crude oil that currently moves to the Price River Terminal and/or other existing rail terminals by truck would continue to move by truck, and the benefits of the proposed rail line in terms of prevented vehicular accidents would not be realized. If the proposed rail line were not constructed, truck traffic on local roadways could increase in the future, depending on future market conditions, including the price of crude oil. In the absence of a rail alternative to trucking, OEA expects that truck traffic would be most likely to increase along US 191 and other roads on the route between oil production areas in the Basin and the Price River Terminal. Increased truck traffic would increase the risk of traffic accidents and traffic delays along this route.

3.1.4 Mitigation and Unavoidable Environmental Effects

Any of the Action Alternatives would result in impacts on vehicle safety and vehicle delay. In the project study area, impacts would result from the installation of new at-grade road crossings along the Action Alternatives. In the downline study area, impacts would result from increased probability of accidents and increase vehicle delay at existing at-grade road crossings on rail lines that could experience an increase in rail traffic if the proposed rail line were constructed.

Across the three Action Alternatives, the Wells Draw Alternative would involve constructing the most at-grade road crossings and would result in the greatest potential for vehicle accidents and vehicle delays at those new crossings. Because it is the longest Action Alternative, the Wells Draw Alternative would also result in the highest construction-related VMT during the construction period. Because it is the shortest Action Alternative and would require the fewest new at-grade road crossings, the Indian Canyon Alternative would result in the least impacts on vehicle safety and delay.

If the Coalition's voluntary mitigation measures and OEA's recommended mitigation measures are implemented, OEA concludes that impacts on vehicle safety and delay would not be significant (Chapter 4, *Mitigation*). Some impacts, including potential for accidents and delay at new at-grade road crossings in the project study area and an increased potential for accidents and delay at existing road crossings in the downline study area, would be unavoidable.

3.2 Rail Operations Safety

This section describes OEA's analysis of potential rail safety impacts from operation of the proposed rail line. The subsections that follow describe the study areas, data sources, methods OEA used to analyze the impacts, the affected environment, and the impacts of the Action Alternatives and No-Action Alternative on rail safety. OEA focused the discussion of existing rail operations safety conditions on downline segments outside of the immediate project area because there are currently no active rail lines in the Uinta Basin (the Basin).

3.2.1 Analysis Methods

This subsection identifies the study areas, data sources, and analysis methods OEA used to analyze rail operations safety. The rail operations safety analysis focuses on the operation of the proposed rail line and the operation of existing rail lines, not rail construction.

3.2.1.1 Study Areas

The study area for rail operations safety includes both a defined study area for the proposed rail line (project study area) and a study area for downline impacts (downline study area) that OEA anticipates could experience a project-related increase in rail traffic.

- **Project study area**. The project study area for rail operations safety includes the track for each of the Action Alternatives. Under any of the Action Alternatives, the proposed rail line would extend from two terminus points in the Basin near Myton, Utah, and Leland Bench, Utah, to a connection with an existing rail line near Kyune, Utah.
- **Downline study area**. The downline study area includes segments of existing rail lines outside of the Basin that could experience an increase in rail traffic above OEA's thresholds at 49 C.F.R. § 1105.7(e)(5) if the proposed rail line were constructed. As described in Section 3.1, *Vehicle Safety and Delay*, the downline study area extends from the proposed connection near Kyune to the northern, eastern, and southern edges of the Denver Metro/North Front Range air quality nonattainment area (Appendix C, *Downline Analysis Study Area and Train Characteristics*, Figure C-1).

3.2.1.2 Data Sources

OEA reviewed the following data sources to determine the potential impacts on rail operations safety that could result from operation of the proposed rail line.

- Information from the Coalition related to train composition, train traffic volumes, track class, track length, train speed, and rail car design for each Action Alternative.
- Available information from the Coalition on commodities other than crude oil that might move on the proposed rail line and how those commodities would affect the length and composition of trains.

- Specific information from the Coalition on any additional speed restrictions beyond those for the track class, such as those required for train operations on steep inclines, on bridges, or in tunnels.
- Data on rail accidents obtained from publicly available national databases and media, for descriptions of possible accidents.
- Federal Railroad Administration (FRA) accident statistics nationwide and by carrier, track class, and state, as available. The Coalition has indicated that Rio Grande Pacific Corporation would operate the proposed rail line if it were authorized and constructed. Because Rio Grande Pacific Corporation does not currently operate in the Basin or elsewhere in Utah, OEA based the analysis on broader data sets that included rail operations in other states and by other operators.
- Available data on spill likelihood and ignition probabilities from prior studies.
- Existing train traffic (average number of trains per day) from the FRA (2020).

3.2.1.3 Analysis Methods

OEA used the following methods to analyze potential impacts related to rail operations safety. This subsection describes the methods OEA used to determine the potential likelihood of rail accidents, including collisions, derailments, and spills and fires resulting from accidents during rail operations. As discussed in Chapter 2, *Proposed Action and Alternatives,* operations at the terminus points in the Basin are not part of the proposed action and are covered in the cumulative impacts analysis (Section 3.15, *Cumulative Impacts*).

OEA identified potential accidents that could occur during rail operations and estimated both the likelihood of occurrence (the frequency) and the potential impacts of potential accidents, including spills of crude oil or other bulk liquids. OEA conducted a separate analysis for each of the Action Alternatives to develop representative frequencies and potential impacts associated with a set of representative release scenarios in the study area and the selected downline areas. The resulting estimates are most meaningful when compared to each other, as opposed to considering them as predicting absolute frequencies or potential impacts.

Estimating the chance of a release from a rail accident is a two-part process. The first part is to estimate the chance that a train will be involved in an accident, particularly a derailment or collision. The second part is to estimate the chance of a release given the occurrence of the accident, including both the probability that one or more tank cars will be damaged or derailed and that those cars will release some or all of their cargo. The number of cars derailing and releasing product determines the ultimate spill size. The purpose of the analysis was to estimate the relative likelihood of different types of potential accidents, not to make predictions of the potential for various impacts occurring in specific locations.

OEA's specific analysis process included the following. Appendix E, *Rail Accident Rates*, provides additional information regarding the analysis process.

- **OEA considered the railroad operations safety context**. The context includes applicable FRA track safety standards (49 C.F.R. Part 213) and the types of railroad cars that could be used on the proposed rail line, particularly for crude oil. OEA also considered specific design features, such as sidings, which would allow loaded and empty trains to effectively pass each other and could create conditions for collisions if safety systems were to fail.

- **OEA estimated the potential for project-related rail accidents**. OEA used available FRA data on accidents by track type, as well as other estimates of accident rates by track class, to assess the potential for collisions and derailments on the proposed rail line. For the proposed rail line, OEA used a predicted accident rate of 2 per million train miles; for the downline study area, OEA used a predicted accident rate ranging from 0.5 to 2 per million train miles depending on track class (Appendix E, *Rail Accident Rates*). The number of accidents on the proposed rail line would depend on the number of trains that would move on the line. The Coalition estimates that rail traffic on the proposed rail line could range from as few as 3.68 trains per day, on average (the low rail traffic scenario), to as many as 10.52 trains per day, on average (the high rail traffic scenario), depending on future market conditions, including future demand for crude oil produced in the Basin. OEA estimated accident frequencies separately for the high rail traffic scenario and the low rail traffic scenario. OEA also estimated accident frequencies separately for trains carrying loaded and unloaded rail cars under each of the Action Alternatives.
- **OEA estimated the likelihood and volume of possible crude oil spills.** Because the proposed rail line is anticipated to primarily transport crude oil, OEA focused on this commodity in its analysis of potential spills. OEA estimated the probability of crude oil releases (spills) and the amount of crude oil that could be released based on the anticipated rail car types and numbers of cars per train, as well as previous studies and models of spill probabilities for other rail projects in a number of industries. OEA did not assess the possibility of releases of other commodities in detail because OEA anticipates that the volumes of commodities other than crude oil would be low. As described in Chapter 2, *Proposed Action and Alternatives*, other commodities would be transported in manifest rail cars added to the oil trains and would not require dedicated trains.

3.2.2 Affected Environment

This subsection identifies the existing environmental conditions related to rail operations safety in the study areas. In 2019, there were 1,869 train accidents across all track types and across all railroads; 607 of these were on main lines or sidings (FRA 2020). There are no rail operations at present within the project study area, so there is no baseline for rail operations safety in that study area. For the downline study area, there are existing main line operations that provide a baseline for rail safety impacts.

Table 3.2-1 provides the rail traffic and predicted accidents per year for the downline segments that OEA included in its analysis. OEA analyzed the baseline traffic using the same accident rates as for the traffic that would originate or terminate on the proposed rail line.

Table 3.2-1. Downline Segment Rail Traffic and Predicted Accidents per Year

Downline Segment[a]	Miles[a]	Distance from Kyune	Trains per Day[a]	Predicted Accidents per Year[b]
Kyune to Denver				
Kyune to Grand Junction	189.4	0–189.4	8	1.1
Grand Junction to Denver	268	189.4–457.4	11	0.54
Denver Eastbound	**59**	**460.6–519.6**	**3**	**0.032**
Denver Southbound				
Southbound-a	12.4	268–280.4	38	0.086
Southbound-b	4.2	280.4–284.6	20	0.015
Denver Northbound				
Northbound-a	27.2	460.6–487.8	14	0.069
Northbound-b	42	487.8–529.8	10	0.077
Denver East/North	**3.2**	**457.4–460.6**	**25**	**0.015**

Notes:

[a] Miles and train counts derived from the downline analysis.

[b] Accidents were calculated as part of this analysis.

3.2.3 Environmental Consequences

Operation of the proposed rail line would introduce the possibility of a rail-related accident in the project study area and increase the likelihood of a rail-related accident in the downline study area. This subsection first presents the potential impacts that would be the same for all three Action Alternatives and then compares the potential impacts that would be different across the Action Alternatives. This subsection also discusses rail operations safety under the No-Action Alternative.

3.2.3.1 Impacts Common to All Action Alternatives

This subsection discusses potential impacts on rail operations safety that would be the same across the three Action Alternatives.

Project Study Area

Predicted Accidents

Based on accident rates on existing rail lines that are similar to the proposed rail line, OEA predicts that rail accidents would be uncommon under any of the Action Alternatives. Depending on the rail traffic volume and which Action Alternative was constructed, OEA predicts that an accident involving a loaded oil train would occur approximately once every 3 to 10 years. These accidents would not all be serious—some might involve derailments of a few rail cars and no release of crude oil, while others could involve more derailed cars and could release crude oil into the environment. Accidents involving trains carrying unloaded oil tanker cars would involve limited, if any, crude oil releases regardless of the number of cars that derailed. To minimize the likelihood and consequences of accidents during rail operations, the Coalition is volunteering mitigation (VM-1, VM-15) to ensure that train operators using the rail line would comply with the requirements of the

Hazardous Materials Transportation Act, as implemented by the U.S. Department of Transportation, and with FRA safety requirements, including any applicable speed limits and train-lighting requirements. In addition, OEA is recommending a mitigation measure (ROS-MM-2) that would require the Coalition to inspect, as part of their routine rail inspections or at least twice annually, both track geometry and local terrain conditions. Implementation of this measure would minimize the potential for problems with the track or track bed that could potentially lead to accidents.

Accident Consequences

If an accident were to occur along the proposed rail line, there could be a variety of possible outcomes. A minor accident might involve the derailment of a single rail car and no release of crude oil, while a major accident might involve multiple cars or trains and could cause injuries or fatalities to workers or passengers on the train or the trains involved. On existing rail lines, major accidents that result in spills, injuries, or fatalities are much less likely than minor accidents, and OEA expects that the same would be true for the proposed rail line. Because OEA predicts that accidents would be equally likely to occur for loaded trains leaving the Basin and empty trains entering the Basin, only half of the predicted accidents would involve loaded trains with the potential to release any quantity of crude oil. For those derailment accidents involving loaded trains, most would result in the derailment of only a few cars, and only one in four of those accidents would be expected to have a release of crude oil (Appendix E, *Rail Accident Rates*, provides additional information on the typical sizes of derailments).

Accidents involving a loaded oil train could result in several different outcomes and associated consequences, depending on the force of the collision or derailment, the location of the accident, and the number of train cars involved. If an accident were to release crude oil near a waterway, crude oil could enter the waterway, which would affect water quality. If the force of the accident were sufficient to ignite the crude oil, a fire could result that could remain confined to a single car or could surround other cars and cause them to rupture if the thermal protection[1] on the other cars were breached or damaged. A fire that surrounds other cars could, in turn, cause a larger fire. In general, the greater the potential damage of an accident, the lower the likelihood that such an accident would occur because more concurrent factors (such as the spill being larger, ignition occurring, and the accident occurring in a sensitive area) would have to be involved.

For a smaller release (e.g., minor collision or derailment with spills equivalent to one to three rail cars), there is a chance of ignition; however, OEA expects that most spills of this size would not cause a fire because the force of the accident would not be strong enough to cause ignition (Appendix E, *Rail Accident Rates*). Of those smaller releases that could result in a fire, the fire could engulf or affect other rail cars. As the material in adjacent rail cars heats up, the pressure would build and could eventually cause other rail cars to fail. The likelihood of this occurring would depend on the exact configuration of the release and the fire compared to the location of the other rail cars after the derailment, any fire suppression capabilities, and the timing and nature of response actions. Thus, there is a chance of a small spill escalating into a larger spill due to a fire. For larger spills (e.g., spills involving five or more loaded rail cars), the likelihood of an accident having sufficient energy to yield an ignition would be greater, i.e., closer to 50 percent or more (Appendix E, *Rail Accident Rates*). The additional number of cars that would be derailed in the accident and the

[1] Thermal protection increases the chance of rail cars staying intact in the event of exposure to a fire, whether a nearby pool fire if a spill on the ground is ignited or a jet fire from a smaller hole in an adjacent car. Jacketed thermal protection adds both strength to the car and protection of the insulating material.

additional amount of material that would be released would increase the likelihood that ignited cars would affect other rail cars and cause a larger fire.

To ensure that the consequences of a potential accident would be minimized, the Coalition is committing to developing an internal Emergency Response Plan for operations on the proposed rail line. The plan would include a roster of agencies and people to be contacted for specific types of emergencies during rail operations and maintenance activities, procedures to be followed by particular rail employees in the event of a collision or derailment, emergency routes for vehicles, and the location of emergency equipment (VM-8). In addition, the Coalition's voluntary mitigation measure (VM-14) and OEA's recommended mitigation measure (ROS-MM-1) would require the Coalition to ~~would~~ immediately notify state and local authorities in the event of a release of crude oil and to immediately commence cleanup actions in compliance with federal, state, and local requirements ~~(VM-8, VM-9)~~. If these recommended mitigation measures are implemented, OEA concludes that impacts related to rail operations safety would not be significant.[2]

Downline Study Area

Impacts on the downline segments would depend on the length of the downline segment and the number of trains that would use the segment. Increased rail traffic would have the greatest impacts on the segment of the existing UP rail line between Kyune and Denver because this segment is the longest existing rail line segment in the downline study area and would receive the most new rail traffic if the proposed rail line were constructed. Under the high rail traffic scenario, the Kyune to Denver segment would experience more than two times the risk of an accident than under baseline (existing) conditions, and the low rail traffic scenario would increase the predicted accident risk by about 40 percent from the baseline risk. This is because the Kyune to Denver segment currently has a low volume of rail traffic relative to the predicted traffic on the proposed rail line.

Table 3.2-2 presents the predicted frequencies of accidents on the downline segments. Any potential increase in rail traffic on existing rail lines in the downline study area would depend on the volume of rail traffic originating or terminating on the proposed rail line. The volume of rail traffic on the proposed rail line would depend, in turn, on future market conditions, such as future demand for crude oil produced in the Basin. Because the volume of rail traffic on the proposed rail line would not depend on which Action Alternative is constructed, the predicted impacts on downline segments are the same for all of the Action Alternatives. The table shows predicted accidents for loaded and unloaded trains separately, along with those for baseline (existing) traffic.

Table 3.2-2. Predicted Annual Train Accidents by Downline Segment

Downline Segment	Length (miles)	Predicted Accidents per Year				
		Baseline	High Rail Traffic-loaded	High Rail Traffic-unloaded	Low Rail Traffic-loaded	Low Rail Traffic-unloaded
Kyune to Denver	457.4	1.6	0.89	0.89	0.31	0.31
Denver Eastbound	59	0.032	0.0059	0.0059	0.0022	0.0022
Denver Southbound	16.6	0.10	0.0017	0.0017	0.00061	0.00061

[2] These requirements are similar to those for unit trains of more flammable crude oil (http://dothazmat.vividlms.com/docs/Emergency-Response/TRIPR%20HHFT%20ER%20Supplement%20(Rev%209.3).pdf).

Downline Segment	Length (miles)	Predicted Accidents per Year: Baseline	High Rail Traffic-loaded	High Rail Traffic-unloaded	Low Rail Traffic-loaded	Low Rail Traffic-unloaded
Denver Northbound	69.2	0.15	0.046	0.046	0.016	0.016
Denver East/North	3.2	0.015	0.0025	0.0025	0.00085	0.00085

Table 3.2-2 shows that the predicted accident risk involving trains coming from or heading to the proposed rail line would be lower than the baseline accident risk on all downline segments except for the Kyune to Denver segment. Aside from that segment, the chance of an accident involving a loaded crude oil train would be low on an annual basis. On the Kyune to Denver segment, OEA predicts that accidents involving a loaded crude oil train would occur slightly less than once per year under the high rail traffic scenario. Because downline impacts would occur on existing rail lines that are not owned or operated by the Coalition, and railroads have the right to determine how to operate and route their traffic, any potential increase in the risk of accidents in the downline study area would be beyond the Board's control in this proceeding; therefore, OEA is not recommending mitigation to address this potential impact.

3.2.3.2 Impact Comparison between Action Alternatives

This subsection compares the potential environmental impacts related to rail operations safety across the three Action Alternatives.

If the proposed rail line were authorized and constructed, OEA estimates that rail operations would result in 0.2 to 0.72 predicted train accidents per year (primarily collisions and derailments) in the project study area, depending on the Action Alternative and the volume of rail traffic. OEA predicts that approximately half of the accidents would involve loaded trains and approximately a quarter of accidents involving loaded oil trains would result in a release of crude oil (Appendix E, *Rail Accident Rates*). The chance of a major spill with or without a fire would be lower, as described in Appendix E. Table 3.2-3 shows the predicted annual number of accidents by Action Alternative and rail traffic scenario.

Table 3.2-3. Predicted Annual Train Accidents by Action Alternative

Action Alternative	Low Rail Traffic Scenario			High Rail Traffic Scenario		
	Loaded	Unloaded	Combined	Loaded	Unloaded	Combined
Indian Canyon	0.10	0.10	0.20	0.28	0.28	0.56
Wells Draw	0.12	0.12	0.24	0.36	0.36	0.72
Whitmore Park	0.11	0.11	0.22	0.30	0.30	0.60

Because the Wells Draw Alternative is the longest of the Action Alternatives, OEA predicts that it would have the highest chance of accidents (0.24 to 0.72 accident per year), followed by the Whitmore Park Alternative (0.22 to 0.60 accident per year) and the Indian Canyon Alternative (0.20 to 0.56 accident per year). Given that approximately one in four accidents involving loaded trains would result in a release of crude oil of any size, OEA predicts that rail operations under the Wells Draw Alternative would result in a spill approximately once every 11 years (under the high rail traffic scenario) to approximately once every 33 years (under the low rail traffic scenario). Under the Indian Canyon Alternative, a spill would be expected approximately once every 14 to 40 years, while OEA predicts that the Whitmore Park Alternative would experience a spill approximately once every 13 to 36 years, depending on the volume of rail traffic.

The chance of a large spill or a spill into sensitive areas such as waterways would be smaller. For example, both the Indian Canyon Alternative and the Whitmore Park Alternative would parallel Indian Canyon Creek for approximately 22 miles. Using the same per-mile accident rate, a spill of any size along Indian Canyon Creek would be expected to occur approximately once every 55 to 154 years, depending on the volume of rail traffic, under either the Indian Canyon Alternative or the Whitmore Park Alternative.

3.2.3.3 No-Action Alternative

Under the No-Action Alternative, the Coalition would not construct and operate the proposed rail line. Therefore, there would be no risk of a rail-related accident in the project study area, and the probability of a rail-related accident on existing rail lines in the downline study area would not change from current conditions.

If the proposed rail line were not constructed, crude oil produced in the Basin would continue to be transported by truck. On a per-mile basis, rail transportation is significantly safer than truck transportation. Therefore, diversion of truck transportation of freight such as crude oil to rail transportation would be a potential safety benefit of the proposed rail line. As discussed in Section 3.1, *Vehicle Safety and Delay*, OEA does not expect that the proposed rail line would divert truck transportation of crude oil to rail transportation for the purpose of serving existing oil refineries in Salt Lake City in the short term because those refineries currently do not have rail access. However, OEA anticipates that the proposed rail line would eliminate the existing tanker truck traffic transporting crude oil from production areas in the Basin to the Price River Terminal in Wellington, Utah. Under the No-Action Alternative, crude oil that currently moves to the Price River Terminal from the Basin by truck would continue to move by truck and the benefits of the proposed rail line in terms of prevented vehicular accidents would not be realized.

If oil production in the Basin were to increase in the future in response to market conditions, truck traffic on local roadways could increase under the No-Action Alternative because there would be no alternative transportation option available. This potential future increase in truck traffic would result in a greater number of vehicular accidents and decreased transportation safety under the No-Action Alternative relative to any of the Action Alternatives.

3.2.4 Mitigation and Unavoidable Environmental Effects

Operation of any of the Action Alternatives would involve a risk of potential rail-related accidents. The likelihood of an accident along the proposed rail line would depend on the volume of rail traffic, which would depend on future market conditions, including future demand for crude oil produced in the Basin. Across the three Action Alternatives, the Wells Draw Alternative would have the highest probability of experiencing accidents because of its longer length relative to the other Action Alternatives. Because the operation of rail lines inherently involves the potential for accidents, some impacts related to rail operations safety in the project study area would be unavoidable. OEA concludes, however, that these impacts would be minimized and would not be significant if the Coalition's voluntary mitigation measures, OEA's recommended mitigation measures, and all applicable federal requirements are implemented (Chapter 4, *Mitigation*)

Accidents involving trains originating on or heading to the proposed rail line could also occur in the downline study area. Because downline impacts would occur on existing rail lines that are not owned or operated by the Coalition, and railroads have the right to determine how to operate and route their traffic, any potential increase in the risk of accidents in the downline study area would be beyond the Board's control in this proceeding; therefore, OEA is not recommending mitigation to address this potential impact.

3.3 Water Resources

This section describes the impacts on water resources that would result from the construction and operation of the proposed rail line. Water resources include surface waters, floodplains, wetlands, and groundwater. The subsections that follow describe the study areas, data sources, the methods used to analyze potential impacts, the affected environment, and the potential impacts of the proposed rail line on water resources.

3.3.1 Analysis Methods

This subsection identifies the study areas, data sources, and analysis methods OEA used to analyze surface waters, floodplains, wetlands, and groundwater.

3.3.1.1 Study Areas

OEA defined the study areas for water resources as a study area for the surface waters, floodplains, and wetlands analysis and a separate study area for the groundwater analysis.

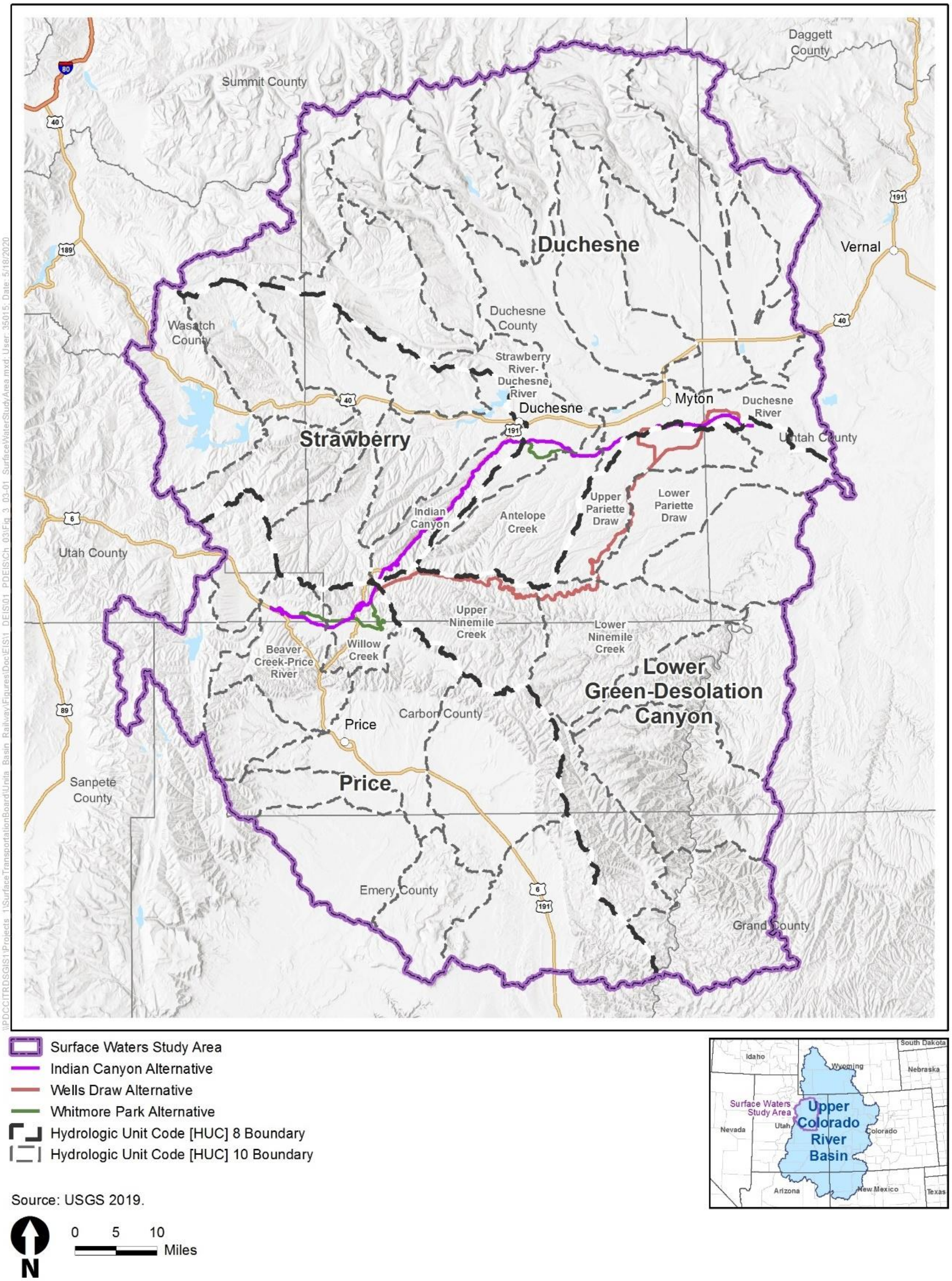
Surface Waters, Floodplains, and Wetlands

The study area for the surface waters, floodplains, and wetlands analysis consists of two areas:

- **Watershed study area.** This study area consists of the watersheds (Hydrologic Unit Code [HUC] 8) that the proposed rail line would cross. OEA used this study area for describing the general hydrologic context in the vicinity of the proposed rail line (Figure 3.3-1).
- **Field survey study area.** This study area corresponds to where the Coalition conducted field surveys for surface water and wetlands. The Coalition designed the field survey study area to encompass the rail line footprint and temporary footprint.[1] The field survey area consists of a 1,000-foot-wide corridor along much of the rail centerline (500 feet on either side of the centerline) for each Action Alternative (Appendix F, *Water Resources Figures*). Because the rail line footprint is less than 200 feet wide, on average, the field survey area includes a buffer of 800 feet or more beyond the edge of permanent disturbance in most locations. The field survey study area is wider than 1,000 feet in a few areas where permanent or temporary disturbance could extend further than 500 feet from the rail centerline due to large areas of cut and fill.

[1] The *rail line footprint* includes the area of the railbed, as well as the full width of the area cleared and cut or filled. The rail line footprint would also include other physical structures installed as part of the proposed rail line, such as fence lines, communications towers, siding tracks, relocated roads, and power distribution lines. The rail line footprint is the area where rail line operations and maintenance would occur. The area would be permanently disturbed. The *temporary footprint* is the area that could be temporarily disturbed during construction, including areas for temporary material laydown, staging, and logistics. Disturbed areas within the temporary footprint would be reclaimed and revegetated following construction. The *project footprint* is the combined area of the rail line footprint and temporary footprint, where construction and operations of the proposed rail line would occur.

Figure 3.3-1. Surface Waters, Floodplains, and Wetlands—Watershed Study Area



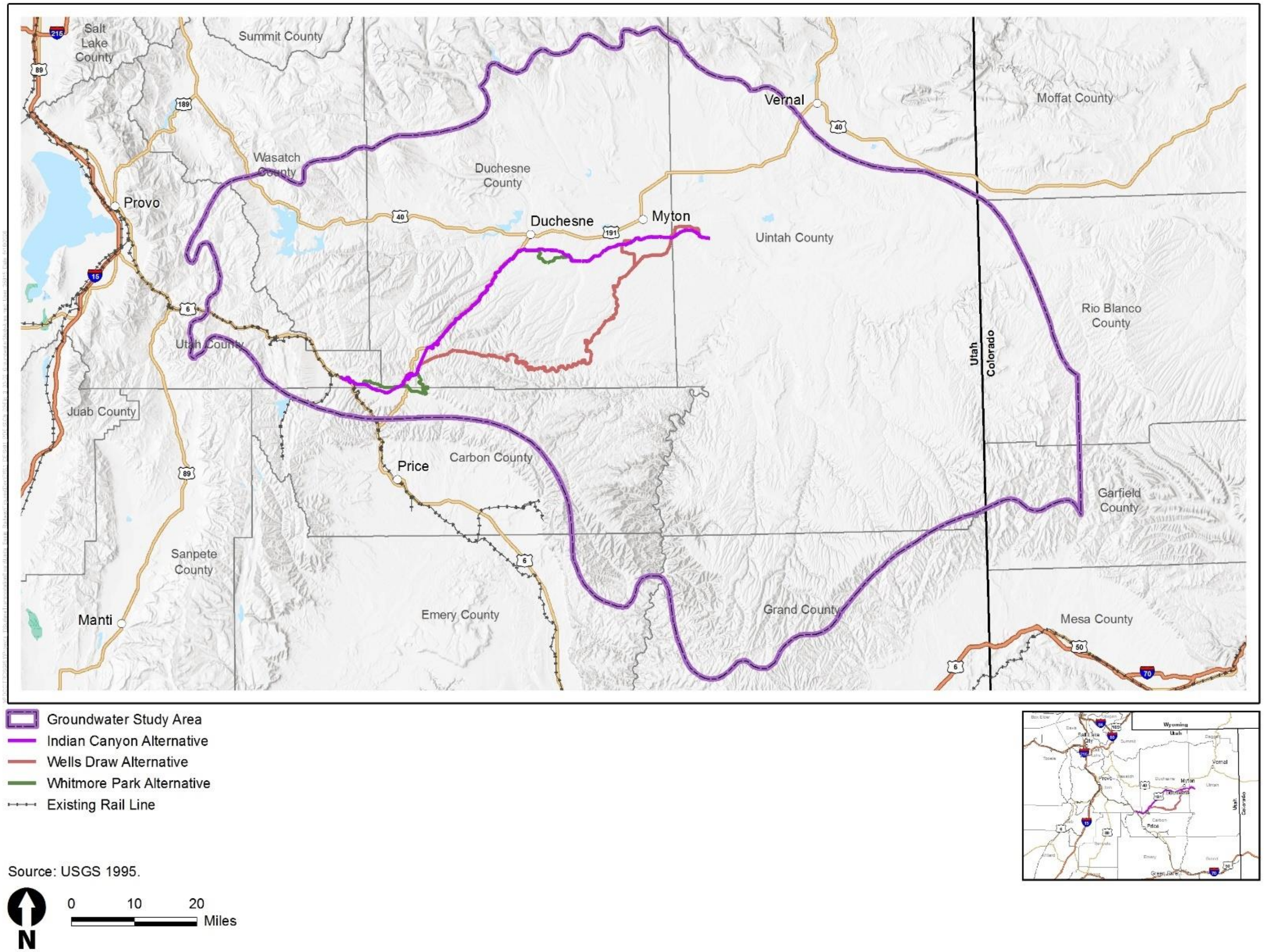
The exact locations of certain construction activities and the precise extent of the temporarily disturbed area are not known. If the Board were to authorize one of the Action Alternatives, then the Coalition would undertake final engineering and construction planning, taking into account topography, land access, and other considerations. In general, OEA expects that the Coalition would confine construction activities to the rail line footprint to the extent practicable to minimize the amount of land that would have to be accessed during construction. The Coalition has committed to limiting ground disturbance to only the areas necessary for project-related construction activities (VM-16). To account for the uncertainty in the construction area, the temporary footprint is conservative, meaning that it is likely much larger than the actual area that would be temporarily disturbed during construction. The field survey study area encompasses the entire temporary footprint and is considerably wider (200 feet or more) than both the rail footprint and the temporary footprint in most locations. Therefore, the field survey study area is sufficient for assessing potential impacts on water resources, including both direct and indirect impacts.

The field survey study area also includes a supplemental study area that is specific to communications towers and access roads outside of the field survey study area. The final locations of communications towers are not known at this stage of design because signal testing would have to be conducted before those towers are sited. If the Board were to authorize one of the Action Alternatives, then the Coalition would determine the final locations of communications towers and communications access roads based on the results of final engineering and signal testing. To account for the impact of communications towers on water resources, the Coalition provided OEA with estimated potential locations of communications towers, and OEA estimated the potential locations of communications access roads. The supplemental study area consists of a 1,000-foot-wide corridor along the communications access road centerlines and a 500-foot-wide buffer around communications towers. This supplemental study area makes up a small percent (approximately 2 percent or less) of the overall field survey study areas for the Action Alternatives.

Groundwater

Impacts on groundwater from construction and operation of the proposed rail line could affect groundwater in the Uinta-Animas aquifer, which is the nearest aquifer to the ground surface. Therefore, the study area for the groundwater analysis corresponds to the boundaries of the Uinta-Animas aquifer (Figure 3.3-2).

Figure 3.3-2. Groundwater Study Area



Source: USGS 1995.

3.3.1.2 Data Sources

OEA reviewed the following data sources to determine the potential impacts on water resources that could result from construction and operation of the proposed rail line.

- *Utah's Final 2016 Integrated Report* (UDWQ 2016).
- Federal Emergency Management Agency (FEMA) National Flood Hazard Layer geospatial database (FEMA 2020).
- U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) geospatial soils data (NRCS 2019a).
- National Wetland Inventory (USFWS 2019).
- NRCS *National Soil Survey Handbook Part 618* (NRCS 2019b).
- Utah State Water Plan: Uinta Basin (UDWR 1999).
- Utah State Water Plan: Uinta Basin (UDWR 2016).
- *Ground Water Atlas of the United States* (USGS 1995).
- Utah Points of Diversion database (UDWRi 2020).
- The National Hydrography Dataset (USGS 2019).
- The Coalition's *Waters of the United States Baseline Environment Technical Memorandum: Uinta Basin Railway* (Coalition 2020a).[2]
- *Uinta Basin Railway Bridge and Culvert Drainage Crossing Summary* (Coalition 2020b).[3]

3.3.1.3 Analysis Methods

This subsection describes the methods that OEA used to analyze impacts on water resources.

Surface Waters

OEA used the following methods, information, and assumptions to evaluate the impacts of construction and operation of the proposed rail line on surface waters.

- **OEA used the Coalition's field survey data and federal agency GIS data to describe surface waters in the field survey study area and supplemental field survey study area,**

[2] The Coalition conducted surface water and wetland field surveys along the Action Alternatives throughout the spring, summer, and fall of 2019. OEA independently verified the fieldwork and data collection by reviewing field methods, conducting site visits, observing fieldwork, and reviewing survey reports and the underlying data. Additional information on the surface water and wetlands identification and delineation methodology can be found in the *Waters of the United States Baseline Environment Technical Memorandum: Uinta Basin Railway* (Coalition 2020a), which is available to the public on the Board's website (www.stb.gov) and the Board-sponsored project website (www.uintabasinrailwayeis.com).

[3] Appendix A, *Action Alternatives Supporting Information* and Appendix F, *Water Resources Figures*, provide detailed information on surface water crossings, including culverts and bridges, associated with the proposed rail line. Submissions from the Coalition related to project design information are available to the public on the Board's website (www.stb.gov) and the Board-sponsored project website (www.uintabasinrailwayeis.com).

respectively. OEA used the Coalition's *Waters of the United States Baseline Environment Technical Memorandum: Uinta Basin Railway* (Coalition 2020a) report to describe surface waters in the field survey study area.

As discussed previously, OEA defined the supplemental field survey study area to include areas where communications towers and associated access roads could be constructed. The final locations of communications towers and access roads would be developed during the final design phase if the Board were to authorize one of the Action Alternatives. Because the locations of communications towers and access roads are estimated, the Coalition did not collect field data for those areas. Therefore, to describe surface waters in the supplemental field survey study area OEA used the USGS National Hydrography Dataset (USGS 2019). USGS data are subsumed by the Coalition's surface water data presented in Subsection 3.3.2, *Affected Environment*, and Subsection 3.3.3, *Environmental Consequences*. Although relying on the National Hydrography Dataset may not be appropriate for Section 404 permitting purposes, it is reasonably sufficient for comparing surface water impacts between the Action Alternatives under NEPA, given the uncertainty of the final communications tower and access road locations. Additional studies of impacts on surface waters from communications tower and communications access road construction may be required during the Section 404 permitting process (VM-25).

- **OEA reviewed Coalition surface water crossings and conveyance structures information.** The Coalition conducted a hydrologic review of surface water data collected in the field, topographic maps, drainage areas maps, and surface water flow data to determine the placement and types of surface water crossing structures that would be required (Coalition 2020b). This process generated a preliminary list of culverts and bridges that would be needed for each Action Alternative. The water crossing structure locations, types, and sizes were based on the Coalition's preliminary hydrologic review. Conveyance structures include 36-inch corrugated metal pipe (CMP), 48-inch CMP, and 72-inch CMP culverts; 8-foot-by-8-foot concrete box culverts; and bridges. OEA reviewed the preliminary information provided by the Coalition and supplemented the list of culverts and bridges as needed (Appendix A, *Action Alternatives Supporting Information* and Appendix F, *Water Resources Figures*). If the Board were to authorize one of the Action Alternatives, the Coalition would determine the final design and placement of conveyance structures during the final permitting and design phase, in consultation with, and for development and permitting requirements of, the U.S. Army Corps of Engineers (Corps), the Utah State Engineer's office, local counties, and other appropriate agencies.
- **OEA determined potential stream realignment locations and impacts.** OEA used the results of the surface water data collected in the field to determine potential stream realignment locations. These stream realignments would occur in the rail line footprint where the proposed rail line would parallel a stream and topography, existing infrastructure (e.g., highways), or rail line design standards (e.g., curvature ratio) would make it impossible to avoid the stream. OEA determined the number of stream realignments for each Action Alternative by comparing the locations of streams to the rail line footprint, and calculated an estimate of the affected stream miles and requiring realignment using GIS methods.
- **OEA assessed impacts on surface water quality and hydrology.** OEA used the results of the hydrologic review and other data sources to analyze impacts on surface waters qualitatively. OEA's surface water impact analysis focused on water quality and hydrology, based on construction activities and conveyance structures proposed at each surface water crossing. The

primary factors for determining impacts on surface waters are the number of surface water crossings and conveyance structures. OEA determined the number of surface water crossings through desktop analysis and the surface waters field survey (Coalition 2020a). OEA's analysis of impacts from conveyance structures was informed by the bridge and culvert design information provided by the Coalition, including the following design criteria.

  - The Coalition would design the top invert of culverts and bottom soffits of bridges to clear the predicted 50-year flood event water elevation without causing a backwater increase.
  - The Coalition would design bridges and culverts so that the predicted 100-year flood event water elevation would be no more than 1 foot above the top invert of culverts or the bottom of soffits of bridges and would be below the top of embankment subgrade elevation. These structures would be designed so that the predicted 100-year flood event would cause no more than a 1-foot backwater increase.
  - The Coalition would design culverts and bridges located in FEMA-mapped floodplains to meet the required floodplain development regulations. Substructure units, piers, and bents for bridges and culverts could be placed within the ordinary high-water mark and would include openings sufficient to meet the standards described above. The Coalition does not anticipate constructing any clear span bridges.

- **OEA evaluated the potential for soil erosion to affect surface waters.** A secondary factor for assessing surface water impacts is the presence of highly erodible soils that could affect water quality during construction and operations. Subsection 3.5.2.2, *Soils*, provides information on soil erosion and slope characteristics for soils crossed by the proposed rail line.
- **OEA evaluated the potential for impacts on surface water due to water use during construction and operation.** The Coalition would obtain water needed for construction activities (i.e., for dust suppression and soil compaction) and operations through existing water rights near the proposed rail line. The Coalition does not intend to pursue new water rights. Because OEA anticipates that the Coalition would use water from existing state-approved water sources, including existing surface water sources, OEA did not assess impacts related to new surface water withdrawals.
- **OEA assessed impacts on surface waters adjacent to the project footprint.** OEA assessed indirect impacts on surface waters in the study area that are adjacent to the project footprint. Surface waters adjacent to the project footprint would not be filled, cleared, excavated, or touched at all during construction. Some surface waters are located both within and adjacent to the project footprint. While there would be no construction within surface waters or portions of surface waters adjacent to the project footprint, impacts from construction and operation could affect surface waters adjacent to the project footprint. OEA has quantified the area of surface waters adjacent to the project footprint that would be susceptible to potential indirect impacts and described the potential impacts.

Floodplains

OEA used the following methods, information, and assumptions to evaluate the impacts of construction and operation of the proposed rail line on floodplains.

- **OEA identified floodplains that could be affected by the proposed rail line.** OEA identified floodplains in the watershed study area and field survey study area based on the most current

FEMA National Flood Hazard Layer geospatial database and NRCS soil geospatial data (FEMA 2020; NRCS 2019a). OEA used the NRCS data to estimate floodplain areas where FEMA has not mapped floodplains by identifying soil types that are susceptible to flooding.[4] The five NRCS flood frequency classifications for mapped soils are very rare, rare, occasional, frequent, and very frequent. These flood classifications range from a 0.2 to less than 1 percent chance of flooding in any year (very rare) to flooding with more than a 50 percent chance in all months of any year (very frequent). The NRCS *National Soil Survey Handbook Part 618* (NRCS 2019b) provides full definitions for each NRCS flood classification.

- **OEA used GIS methods to quantify floodplain impacts in disturbed areas.** Construction activities within the project footprint would consist of clearing, excavation, and placement of fill material. Areas where fill placement would occur would be likely to experience greater impact on floodplains and floodplain functions than areas where excavation or vegetation removal would occur because the placement of fill can result in permanent loss of floodplain area. OEA assumed that rail line construction would meet local (i.e., county/city) floodplain development ordinances and permitting requirements (Appendix B, *Applicable Regulations*) and that features related to the proposed rail line that would be located in FEMA-mapped floodplains would be designed to meet the required federal and local ~~(i.e., county/city)~~ floodplain development regulations. Design criteria for bridges and culverts, which can affect floodwater conveyance, are listed above for surface waters.

Wetlands

OEA used the following methods, information, and assumptions to evaluate the impacts of construction and operation of the Action Alternatives on wetlands.

- **OEA used the Coalition's field survey data and federal agency GIS data to describe wetlands in the field survey study area and supplemental field survey study area, respectively.** OEA used the Coalition's *Waters of the United States Baseline Environment Technical Memorandum: Uinta Basin Railway* (Coalition 2020a) report to describe wetlands in the field survey study area. Where the Coalition's wetland biologists were granted access to properties, the Coalition identified and delineated wetlands in the field in accordance with the *Corps of Engineers Wetlands Delineation Manual* (Corps 1987), *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys and Coast* (Version 2.0) (Corps 2010), and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region* (Version 2.0) (Corps 2008). In areas where access was not granted or in unsafe areas (e.g., steep terrain), wetland biologists conducted a desktop evaluation to map approximate wetland locations and types. OEA verified the fieldwork and data collection by reviewing field methods, conducting site visits, observing fieldwork, and reviewing survey reports and the underlying data.

  As discussed previously, OEA defined the supplemental field survey study area to include areas where communications towers and associated access roads could be constructed. The final locations of communications towers and access roads would be developed during the final design phase if the Board were to authorize one of the Action Alternatives. The supplemental

[4] Some floodplains in communities that participate in the National Flood Insurance Program (NFIP) may not be mapped because they are located in areas that are undeveloped and do not have any structures to insure under NFIP. For this reason, a large portion of the study area has not been mapped by FEMA, mostly due to Duchesne County having not been mapped.

field survey study area makes up approximately 2 percent or less of the field survey study area, depending on the Action Alternative. Because the locations of communications towers and access roads are estimated, the Coalition did not collect field data for those areas. Therefore, to describe wetlands in the supplemental field survey study area OEA used the National Wetland Inventory (NWI) dataset (USFWS 2019). Although relying on NWI data may not be appropriate for Section 404 permitting purposes, it is reasonably sufficient for comparing wetland impacts between the Action Alternatives under NEPA, given the uncertainty of the final communications towers and access road locations. Additional studies of impacts on wetlands from communications tower and access road construction may be required during the Section 404 permitting process (VM-25).

- **OEA qualitatively described wetland functions.** Based on the Coalition's wetland field biologists' consultations with the Corps to discuss wetland field delineations and methods, the Corps confirmed that an approved quantitative functional assessment model currently does not exist for Utah. The Corps stated that it would be appropriate to describe general functions and conditions of wetlands and other aquatic resources qualitatively (Coalition 2020a).
- **OEA used GIS to quantify wetland impacts in disturbed areas.** Construction activities within the project footprint would consist of clearing, excavation, and placement of fill material. Some areas would be permanently disturbed (i.e., rail line footprint) and some areas would be temporarily disturbed (e.g., construction staging areas). Areas of permanent fill placement are likely to have a greater impact on wetlands and wetlands functions than wetlands cleared of vegetation because fill would result in loss of wetland.
- **OEA assessed impacts on wetlands adjacent to the project footprint.** OEA assessed indirect impacts on wetlands in the study area that are adjacent to the project footprint. Wetlands adjacent to the project footprint would not be filled, cleared, excavated, or touched in any other way during construction. Some wetlands are located both within and adjacent to the project footprint. While there would be no construction in wetlands or portions of wetlands adjacent to the project footprint, impacts from construction and operation could affect wetlands adjacent to the project footprint. OEA has quantified the area of wetland adjacent to the project footprint that would be susceptible to potential indirect impacts and describes the potential impacts. ~~However, it is not possible to determine the extent of, nor to quantify, the actual impact on these adjacent wetlands because there is no way to predict how a wetland adjacent to the project footprint would react to construction or operation.~~

Groundwater

OEA used the following methods, information and assumptions to evaluate the impacts of construction and operation of the proposed rail line on groundwater.

- **OEA identified groundwater well/spring locations in the study area.** OEA obtained GIS groundwater well and spring location data from the Utah Division of Water Rights (2020) to determine the number of wells and springs in the study area. In addition, OEA identified additional springs in the field survey study area based on the surface water and wetland ground surveys conducted along the Action Alternatives in 2019 (Coalition 2020a).
- **OEA used GIS to determine potential impacts on groundwater resources.** OEA overlaid the rail line footprint and temporary footprint GIS data layers with the groundwater well and spring GIS data layers (UDWRi 2020; Coalition 2020a) to determine the number of groundwater wells

and springs that would be directly affected by construction and operation of the proposed rail line. OEA assumed that groundwater wells and springs in the rail line footprint that would be permanently affected would no longer be useable. OEA assumed that groundwater wells and springs within the temporary footprint would be temporarily affected during construction. OEA also qualitatively assessed potential construction and operation impacts on groundwater recharge, groundwater quality, and interruption of shallow groundwater flow in localized stream channel aquifers.

- **OEA evaluated the potential for impacts on groundwater due to water use during construction and operation.** As stated for surface waters, the Coalition would not pursue new water rights for construction or operations. Because water sources (which could include groundwater) are anticipated to be from a previous state-approved water rights source, OEA's analysis did not include impacts related to groundwater use (i.e., supply or drawdown).

3.3.2 Affected Environment

This subsection identifies the existing environmental conditions related to surface waters, floodplains, wetlands, and groundwater in the study areas.

3.3.2.1 Surface Water

The Action Alternatives are located in the Price River, Duchesne River, Strawberry River, and Lower Green-Desolation Canyon HUC 8 watersheds (Table 3.3-1; Figure 3.3-1), which are all part of the Upper Colorado River Basin. Major streams in these watersheds include Nine Mile Creek, Duchesne River, Strawberry River, and Price River. All of these streams flow to the Green River, which is a major tributary to the Colorado River. Combined, the four HUC 8 watersheds total 7,677 square miles (mi^2). The largest watershed is the Duchesne River watershed (2,679 mi^2), followed by the Lower Green-Desolation Canyon watershed (1,946 mi^2), the Price River watershed (1,887 mi^2), and the Strawberry River watershed (1,165 mi^2). Based on the National Hydrography Dataset, the four watersheds contain approximately 3,087 miles of perennial streams, 15,600 miles of intermittent streams, 1,097 miles of canals/ditches, 36,573 acres of lake and ponds, 418 acres of reservoir, and 942 springs and seeps (USGS 2019).

Approximately 97 percent of surface water withdrawals are for irrigation and the remaining 3 percent are for public water supply, including potable and secondary water supply (UDWR 2016). Table 3.3-1 lists the HUC 8 watersheds, along with the smaller HUC 10 watersheds, crossed by each of the Action Alternatives.

Table 3.3-1. Watersheds Crossed by the Action Alternatives

HUC 8 Watershed[a]	HUC 10 Watershed	Action Alternative
Duchesne	Strawberry River-Duchesne River	Indian Canyon, Whitmore Park
	Antelope Creek	Indian Canyon, Whitmore Park
	Duchesne River	All
Strawberry	Indian Canyon	Indian Canyon, Whitmore Park

HUC 8 Watershed[a]	HUC 10 Watershed	Action Alternative
Lower Green-Desolation Canyon	Upper Pariette Draw	All
	Lower Pariette Draw	All
	Upper Nine Mile Creek	All
	Lower Nine Mile Creek	Wells Draw
Price	Willow Creek	All
	Beaver Creek-Price River	All

Notes:

[a] The four HUC 8 watersheds fall within the Upper Colorado River Basin, which covers parts of Wyoming, Colorado, Utah, Arizona, and New Mexico.

Source: USGS 2019

HUC = Hydrologic Unit Code

The field surveys OEA conducted in 2019 identified six types of surface waters in the field survey study area, as shown in Table 3.3-2. The surface water definitions in this section are similar to Clean Water Act (CWA) Section 404 definitions; final jurisdictional status would be determined during the CWA Section 404 permit process. If the Board were to authorize one of the Action Alternatives, the Coalition would need to obtain a CWA Section 404 permit from the Corps prior to beginning construction, which would require a jurisdictional determination of surface water. Under NEPA, OEA must address impacts on all surface waters regardless of jurisdictional status under CWA Section 404.

Table 3.3-2. Surface Water Types Identified in the Field Survey Study Area

Surface Water	Definition
Perennial stream	Streams that usually flow continuously during typical years or have low to no flow during short periods during drier years.
Intermittent streams	Streams with surface flows that are continuous during certain times of the year. These flows are not solely in direct response to precipitation events.
Ephemeral streams	Streams with surface water flowing or pooling only in direct response to precipitation during typical years. They can be distinguished from upland swales and erosion features by receiving flows sufficiently often (typically at least every year) to maintain a clear and definable OHWM.
Ponds	Depressional ponds and impoundments in which depth and duration of surface water precludes emergent vegetation.
Playas	A relatively flat-floored bottom of an undrained desert basin that becomes, at times, a shallow lake which on evaporation may leave a deposit of salt or gypsum.
Ditches/canals	Canals and ditches are artificial waterways that are used to transport water to be used primarily for agriculture and drainage.

Notes:

Source: Coalition 2020a

OHWM = ordinary high-water mark

Table 3.3-3 summarizes the lengths and areas of surface waters in the field survey study area for each Action Alternative. Additional information, including detailed descriptions of the surface water features identified during field surveys, can be found in the *Waters of the United States Baseline Environment Technical Memorandum: Uinta Basin Railway* (Coalition 2020a), which is available on the Board's website (www.stb.gov) and the Board-sponsored project website (www.uintabasinrailwayeis.com).

Table 3.3-3. Surface Waters Lengths and Areas in the Field Survey Study Area

Surface Water	Indian Canyon Alternative	Wells Draw Alternative	Whitmore Park Alternative
Perennial stream	189,699 linear feet (53.84 acres)	58,089 linear feet (18.53 acres)	197,321 linear feet (56.14 acres)
Intermittent streams	23,544 linear feet (1.77 acres)	108,970 linear feet (71.74 acres)	19,726 linear feet (1.45 acre)
Ephemeral streams	393,171 linear feet (36.38 acres)	396,409 linear feet (68.44 acres)	446,310 linear feet (47.71 acres)
Ponds	4.14 acres	17.32 acres	4.18 acres
Playas	0.44 acre	4.9 acres	3.82 acres
Ditches/canals	47,629 feet (3.10 acres)	24,123 linear feet (3.25 acres)	44,802 linear feet (2.95 acres)

Indian Canyon Alternative

Twelve named streams occur in the field survey study area for the Indian Canyon Alternative: Antelope Creek, Argyle Creek, Beaver Creek, Cripple Creek, Fivemile Creek, Horse Creek, Indian Canyon Creek, KP Creek, Kyune Creek, Price River, West Fork Willow Creek, and Willow Creek (Coalition 2020a; USGS 2019). The Price River is the largest perennial stream in the field survey study area in terms of width (varies from about 20 to about 45 feet) and flow. Apart from the embankment along the streambank supporting an existing UP rail line and several rail crossings, the Price River appears to be in relatively good condition within the field survey study area. The river generally maintains its natural meanders and floodplain functions to support low terrace wetlands and some woody riparian habitat. From the proposed rail connection with the existing UP rail line near Kyune, Utah (milepost 0) to the southern portal of the proposed summit tunnel (at about milepost 18), the field survey study area contains a few perennial streams and many ephemeral and intermittent streams that drain into the Price River. Many of these stream channels are highly incised, which is likely due to a combination of naturally erosive soils and livestock grazing in the Price River watershed. Stream incision is a process of downcutting into a stream channel that results in decreasing the stream channel bed elevation.

North of the summit tunnel (milepost 21 to about milepost 46), the Indian Canyon Alternative would generally follow Indian Canyon Creek, a perennial stream that begins near the top of Indian Canyon and drains into the Strawberry River near the canyon's mouth. The characteristics of Indian Canyon Creek vary at different elevations and several segments contain irrigation diversions. Portions of this stream in the upper canyon appear to be in good condition with natural meanders, clear flows along a cobble substrate, low terraces, and abundant woody riparian vegetation. Other portions of Indian Canyon Creek, mainly in the middle to lower portions of Indian Canyon, are highly modified and diverted for irrigation. In some places, at the time of the field survey, nearly all surface flows were diverted into adjacent ditches. In the lower portions of Indian Canyon, Indian Canyon Creek becomes increasingly incised with steep unvegetated banks and patches of tamarisk species at the base of the banks. There are multiple ephemeral and intermittent streams that drain into Indian Canyon Creek, with characteristics typical of intermittent and ephemeral streams in mountainous terrain. Alluvial features such as floodplains and bankfull benches are generally lacking along these steeper drainages.

East of Indian Canyon (milepost 46 to milepost 80), the field survey study area traverses low arid benchlands, with a few perennial streams and numerous ephemeral and intermittent streams. The stream gradients in the area vary from relatively steep to relatively low. Alluvial features such as floodplains, braiding, low flow channels, and bankfull benches are present in areas of lower gradient. Many portions of these streams are in good condition, but some segments are heavily disturbed by land uses such as oil and gas development.

Canals and ditches in the field survey study area are primarily located in Indian Canyon as diversion to Indian Canyon Creek (milepost 34 to milepost 46). In addition, the Upper Pleasant Valley Canal crosses the field survey study area in the Myton Bench area (milepost 66.5). Delineated open water features generally consist of constructed impoundments such as irrigation ponds and stock ponds, and beaver ponds along Indian Canyon Creek (milepost 23 to milepost 40.5). In addition, 0.44 acre of playa were delineated in the field survey study area for the Indian Canyon Alternative (milepost 69).

Wells Draw Alternative

Seven named streams occur in the field survey study area for the Wells Draw Alternative: Argyle Creek, Beaver Creek, Horse Creek, Kyune Creek, Price River, West Fork Willow Creek, and Willow Creek (Coalition 2020a; USGS 2019). The surface water descriptions for the Wells Draw Alternative are the same as described for the Indian Canyon Alternative for the segment between the proposed rail connection at Kyune (milepost 0) and the portal of the proposed summit tunnel (at about milepost 18). East of the tunnel, Argyle Creek is the main perennial stream that is specific to the Wells Draw Alternative field survey study area (milepost 21 to milepost 23.75). Argyle Creek is a relatively high-elevation mountain stream that is in relatively good condition along much of its length, with natural meandering, beaver dam impoundments, low terraces, and woody riparian vegetation.

Numerous ephemeral and intermittent streams are also specific to the field survey study area for Wells Draw Alternative. Along Argyle Canyon (from about milepost 21 to milepost 43), these streams are typical of intermittent and ephemeral streams in mountainous terrain and are generally in good condition, showing little evidence of disturbance. North of Argyle Canyon (from about milepost 43 to the terminus points in the Basin, including milepost 0M to milepost 6.75M), ephemeral and intermittent streams are numerous and vary from relatively steep to relatively low gradient. At lower elevations, alluvial features such as floodplains, braiding, low flow channels, and bankfull benches are generally present. Many portions of these streams appear to be in good condition, but some segments are heavily disturbed by land uses such as oil and gas development.

Canals and ditches along the field survey study area are primarily located in the Myton Bench area (milepost 82 to milepost 91). These canals and ditches include the Upper Pleasant Valley Canal, Lower Pleasant Valley Canal, and Myton Townsite Canal. Delineated open water features generally consist of constructed impoundments such as irrigation ponds and stock ponds in the Myton Bench area (milepost 81.5 to milepost 89.25 and near milepost 6.75M[5]) and beaver ponds along Argyle Creek (milepost 22). In addition, 4.90 acres of playa were delineated in the field survey study area for the Wells Draw Alternative. This acreage includes a large playa in the Myton Bench area (milepost 88). This playa is mostly unvegetated and exhibits hypersaline conditions.

[5] In some cases, the Coalition uses the single letter M to refer to milepost.

Whitmore Park Alternative

Thirteen named streams occur in the field survey study area for the Whitmore Park Alternative: Antelope Creek, Argyle Creek, Beaver Creek, Cripple Creek, Dry Fork, Fivemile Creek, Horse Creek, Indian Canyon Creek, KP Creek, Kyune Creek, Price River, Pole Creek, and Willow Creek (Coalition 2020a; USGS 2019). The surface water descriptions for the Whitmore Park Alternative are the same as described for the Indian Canyon Alternative for most of the field survey study area, except for the following. Pole Creek and a segment of a Pole Creek tributary (Dry Fork) are the only perennial streams specific to the field survey study area for the Whitmore Park Alternative (milepost 16 to milepost 19). These streams descend from steep mountain slopes down Pole Canyon through Whitmore Park and drain to the Price River. Most portions of Pole Creek are incised with steep banks, which may be due to a combination of naturally erosive soils and livestock grazing in the area. There are multiple ephemeral streams specific to the field survey study area for this alternative, mostly east of Duchesne (from about milepost 53.5 to milepost 62). These ephemeral streams vary from relatively steep to relatively low-gradient. At lower gradients, development of alluvial features such as floodplains, braiding, low flow channels, and bankfull benches is generally present. Most of these ephemeral streams are in good condition. In addition, the Coalition delineated 3.82 acres of playa in the field survey study area for the Whitmore Park Alternative (milepost 52 to 75.75).

Surface Water Quality

Under CWA Section 303(d), states, territories, and authorized tribes are required to develop lists of impaired surface waters, which are those waters that are not attaining beneficial uses according to the established water quality standards. The CWA requires that these jurisdictions establish priority rankings and develop total maximum daily loads (TMDLs) of pollutants for these listed surface waters. Sometimes broad watershed-based TMDLs are developed to address combined cumulative impacts on specific water quality parameters. A TMDL is a calculation of the maximum amount of a pollutant that a surface water body can receive and still safely meet water quality standards. In Utah, the Utah Division of Water Quality (UDWQ) has been delegated authority by the U.S. Environmental Protection Agency (USEPA) to assess water quality of Utah surface waters and to develop the state's Section 303(d) list of impaired surface waters for the state's defined beneficial uses. UDWQ protects surface water under four broad classes of beneficial use: domestic water systems, recreational use and aesthetics, aquatic wildlife, and agricultural uses. Table 3.3-4 lists the four broad classifications and associated subclassifications of surface water beneficial uses.

Table 3.3-4. Classification of Utah Surface Water Beneficial Uses

Class 1 – Domestic Water Systems   **Class 1C** – Drinking Water

Class 2 – Recreational Use and Aesthetics
    Class 2A – Primary contact recreation (e.g., swimming, rafting)
    Class 2B – Secondary contact recreation (e.g., wading, hunting, and fishing)

Class 3 – Aquatic Wildlife
    Class 3A – Cold water aquatic life
    Class 3B – Warm water aquatic life
    Class 3C – Nongame aquatic life
    Class 3D – Wildlife
    Class 3E – Habitat-limited waters

Class 4 – Agricultural (e.g., irrigation of crops and stock watering)

Class 1C waters are often culinary water supply sources, and local municipalities may have facilities such as raw water intakes on streams and rivers to supply culinary water to the public. OEA's review of the Utah Department of Environmental Quality (UDEQ) Public Drinking Water Facilities information (2020)—which includes locations of river water intakes, well intakes, spring intakes, storage facilities, and diversions—found that the nearest downstream public drinking water facility to any Action Alternative is approximately 4 miles away in the City of Duchesne. The next closest downstream drinking water facility to the Action Alternatives is a raw water intake on the Price River water approximately 8 miles downstream of the Action Alternatives.

Every 2 years, UDWQ reviews and assesses the water quality of surface waters statewide and issues a new Section 303(d) list of impaired surface waters. USEPA approved the 2016 Utah Section 303(d) list of impaired surface waters in April 2018 (USEPA 2018a). Table 3.3-5 lists the Section 303(d) impaired surface waters in the field survey study area; Figure 3.3-3 shows the locations of the impaired surface waters.

Table 3.3-5. Section 303(d) Impaired Waters Status of Surface Waters in the Field Survey Study Area

Assessment Basin[a]	Beneficial Use Class	Impairment Status[d]
Price River (1)[b]	Class 1C, 2B, 3A, 4	Class 3A: Dissolved oxygen, OE bioassessment
Willow Creek-Carbon	Class 2B, 3A, 4	No surface water impairments reported
Nine Mile	Class 2B, 3A, 4	Class 3A: Temperature
Indian Canyon Creek	Class 1C, 2B, 3A, 4	Class 1C: Arsenic Class 3A: Selenium Class 4: Boron, TDS
Duchesne River (3)[c]	Class 1C, 2B, 3A, 4	No surface water impairments reported
Antelope Creek	Class 1C, 2B, 3A, 4	Class 1C: Arsenic Class 3A: Selenium Class 4: Boron, TDS
Pariette Draw Creek	Class 2B, 3B, 3D, 4	Class 3B: Selenium, temperature Class 3D: Selenium Class 4: Boron, TDS
Duchesne River (2)[c]	Class 2B, 3B, 4	Class 2B: E. coli Class 4: Boron, TDS
Green River – 3 Tributaries	Class 1C, 2A, 3B, 4	No surface water impairments reported

Notes:

[a] The Section 303(d) impaired water assessment is conducted basin-wide and the impairment status includes all surface waters in the assessment basin. While the assessment basins do not always correlate exactly with the HUC 10 basins in Table 3.3-1, they are within the overall watershed study area.

[b] The Price River basin is split into five assessment basins. Price River Assessment Basin 1 is from Price City Water Treatment intake to Scofield Reservoir.

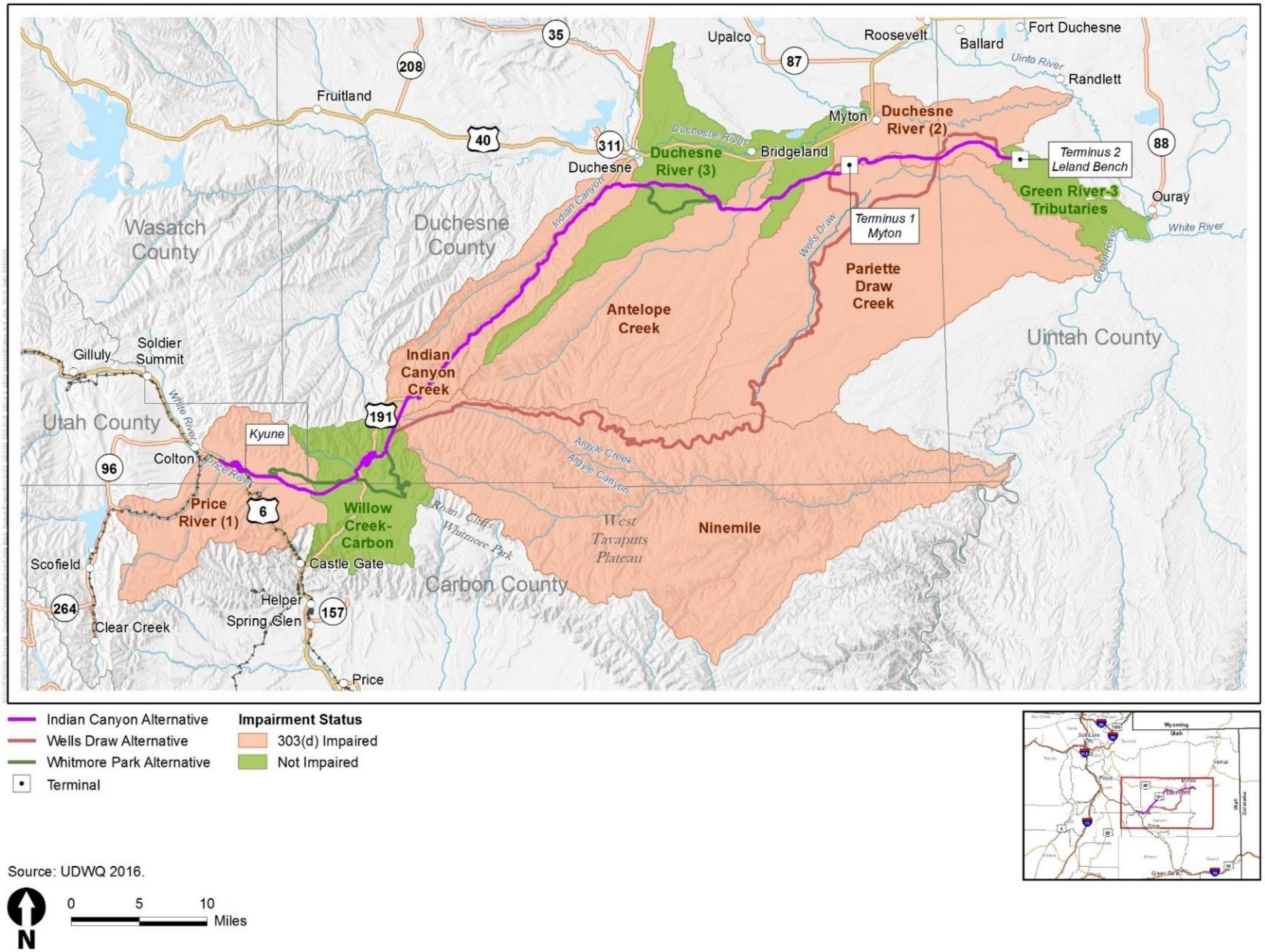
[c] The Duchesne River basin is split into four assessment basins. Duchesne River Assessment Basin 2 is from the confluence with Uinta River to Myton. Assessment Basin 3 is from Myton to Strawberry River confluence.

[d] The Utah 303(d) list does not extend to those waters that are within Indian country, as defined in 18 U.S.C. Section 1151 (USEPA 2018a).

Source: UDWQ 2016

OE = Observed versus Expected; TDS = Total Dissolved Solids; E. coli = Escherichia coli, a bacteria indicator species

Figure 3.3-3. Impaired Surface Waters



3.3.2.2 Floodplains

Floodplains are defined as any land area susceptible to being inundated by waters from any source (44 C.F.R. § 59.1) and are often associated with surface waters and wetlands. Floodplains are valued for their contribution to natural flood and erosion control, enhancement of biological productivity, and socioeconomic benefits and functions. For human communities, however, floodplains can be considered a hazard area because buildings, structures, and properties located in floodplains can be inundated and damaged during floods.

Mapped Floodplains and Flood-Prone Soils

FEMA has mapped approximately 87,086 acres of 100-year floodplains throughout the watershed study area. The agency has not mapped large areas of the watersheds, including nearly all of Duchesne County. Based on NRCS soils data, approximately 146,995 acres of flood-prone soils are mapped throughout the watershed study area. Table 3.3-6 summarizes FEMA-mapped floodplains and NRCS-mapped flood-prone soils in the field survey study area along the Action Alternatives.

Table 3.3-6. Acres of Floodplains in the Field Survey Study Area by Action Alternative

Action Alternative	FEMA-mapped 100-Year Floodplains (acres)	NRCS-mapped Flood-prone Soils[a] (acres)
Indian Canyon	1.40	1,305
Wells Draw	3.19	218
Whitmore Park	46.14	1,277

Notes:

[a] Flood-prone soils include soils with flood classifications of *very rare*, *rare*, *occasional*, *frequent,* and *very frequent*.

Sources: FEMA 2020; NRCS 2019a

Streambank flooding and overbank flooding are examples of typical types of flooding that could occur along mapped floodplains in the field survey study area. Most natural streams follow a channel that has developed over a long period of time and have the capacity to carry water flow collected in the watershed to the point where it discharges into another water body (e.g., larger stream, lake). During intense rains over short periods of time or periods of snowmelt, streams could collect more water than the channel can handle, and the water is forced out over the river or streambank, temporarily inundating adjacent land (Utah Floodplain and Stormwater Management Association, no date; National Weather Service, no date). Streambank flooding could also occur when debris or ice accumulates in a stream channel and creates a debris dam, backing water up and forcing it out of the channel (Utah Floodplain and Stormwater Management Association no date). Peak runoff on streams in the field survey study area is normally due to snowmelt. For example, discharge data indicate that peak runoff from the Strawberry and Duchesne Rivers and Indian Canyon Creek usually occurs in May or June (FEMA 1988).

Cloudburst Floods and Mud-Rock Flows

Cloudburst[6] floods are common to the southern part the Colorado River basin in Utah, which includes the study areas for surface water. Although cloudburst storms could occur on many days in

[6] Cloudbursts are commonly used to designate a torrential downpour of rain, which by its spottiness and relatively high intensity, suggests the discharge of a whole cloud at once. Associated with thunderstorms, cloudbursts are

one season and could be distributed over a rather wide area, the high-intensity rainfall is limited to very small areas, often less than 1 square mile. Some drainage basins are subject to more cloudburst floods than others in the same general locality because of physical features (e.g., topography, vegetation cover), and other contributing factors. The probability of a cloudburst or high-intensity rainfall recurring in the same small drainage area during consecutive years is unlikely. A cloudburst flood could occur with or without producing a mud-rock flow.[7] Although mud-rock flows could be associated with cloudburst floods, the presence of certain soil conditions is required to produce them. Because of infrequent observation of these flows, it is difficult to estimate the probable recurrence interval of cloudburst floods at any given site (USGS 1962).

Cloudburst floods have occurred historically in the study area. The USGS historical cloudburst study of Utah identified four cloudburst floods between 1939 and 1969 along Indian Canyon Creek (USGS 1972 in FEMA 1988) that caused damage downstream near Duchesne, primarily to the bridge on State Highway 33 (now US 191) entering the city. An older USGS study (1946) documented a cloudburst flood in Indian Canyon on September 9, 1938, that resulted in a “highway covered with debris,” presumably US 191, which also runs through Indian Canyon. Cloudburst storms in this region occur primarily in late summer and fall (FEMA 1988).

3.3.2.3 Wetlands

Wetlands are important features in the landscape that provide numerous beneficial services or functions. Some of these include protecting and improving water quality, providing fish and wildlife habitats, storing floodwaters, providing aesthetic value, ensuring biological productivity, filtering pollutant loads, and maintaining surface water flow during dry periods. NWI has mapped approximately 66,027 acres of wetlands throughout the watershed study area, including 51,102 acres of palustrine emergent wetlands and 14,925 acres of palustrine forested/shrub wetlands (USFWS 2019). Many of these wetlands are found adjacent to streams and rivers in valley bottoms and in flat areas, such as the Basin. The *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin Classification) defines the following classes of wetlands (Cowardin et al. 1979).

- **Palustrine Emergent wetlands (PEM).** Emergent wetlands are characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants.
- **Palustrine Forested wetlands (PFO).** Forested wetlands are characterized by woody vegetation that is 20 feet tall or taller.
- **Palustrine Scrub-shrub wetlands (PSS).** Scrub-shrub wetlands are dominated by woody vegetation less than 20 feet tall. The species include true shrubs, young trees (saplings), and trees or shrubs that are small or stunted because of environmental conditions.

Field surveys conducted in 2019 identified three types of wetlands in the field survey study area: emergent marsh, wet-meadow, and scrub-shrub wetlands. Emergent marsh and wet meadows fall under PEM Cowardin Classification and scrub-shrub under the PSS Cowardin Classification. Table 3.3-7 summarizes the wetlands in the field survey study area.

common in the hilly and mountainous districts of the western United States, including Utah. The resulting floods are often flashy and destructive (USGS 1946). Cloudbursts have been recorded in Utah for over a century and continue to be unpredictable events (Utah Division of Emergency Management 2019).

[7] Mud-rock flows are flows of mud, rock, debris, and water, mixed to a consistency similar to that of wet concrete.

Table 3.3-7. Wetlands in the Field Survey Study Area by Action Alternative (acres)

	Action Alternative		
Wetland Type	**Indian Canyon**	**Wells Draw**	**Whitmore Park**
Emergent marsh	0.57	16.21	0.57
Wet meadow	52.55	50.43	36.35
Scrub-shrub	11.64	6.67	8.83
Total	**64.76**	**73.31**	**45.75**

Indian Canyon Alternative

Wetland characteristics in the field survey study area for the Indian Canyon Alternative vary due to elevation, landscape position, soils, local hydrology, and land use. Wetland functions specific to the field survey study area include providing wildlife habitat, performing biochemical processes such as nutrient uptake, stabilizing channel edges to reduce sedimentation, attenuating peak flooding, and trapping sediments during flooding. The extent of these functions varies by wetland characteristics, including whether the wetland's condition is good or degraded.

Wetlands in the western end of the field survey study area for the Indian Canyon Alternative (milepost 0 to milepost 2.5) are common in low terraces along the Price River. These wetlands are primarily wet meadow and scrub-shrub wetlands that are supported by shallow groundwater associated with the Price River and are occasionally inundated by flood flows. Dominant plant species in these wet meadows include Nebraska sedge (*Carex nebrascensis*), clustered field sedge (*Carex praegracilis*), common spikerush (*Eleocharis palustris*), baltic rush (*Juncus arcticus*), and reed canarygrass (*Phalaris arundinacea*). Scrub-shrub wetlands are dominated by willow species (*Salix* sp.) with an herbaceous understory similar to wet meadow communities. These wetlands generally appear to be in good condition with relatively low cover by invasive species and little evidence of human disturbance. The existing rail line embankment, which abuts wetlands at some locations, is an exception to low disturbance characterization.

East of the Price River, wet meadows are relatively common along the high bench area and drainage slopes known as Emma Park (milepost 2.5 to about milepost 12). Relatively narrow wet meadows occur within multiple drainage channels. Most of these wetlands are hydrologically supported by intermittent flows through the drainages, and a few of these wetlands abut perennial channels. All of these drainages flow into the Price River. Some larger wet meadows near Emma Park Road appear to be located in a groundwater discharge zone. These wetlands are supported primarily by shallow groundwater, seeps, and springs. Dominant plant species in these wet meadows include Nebraska sedge, clustered field sedge, common spikerush, and baltic rush. The conditions of these wetlands range from moderately degraded to good; invasive plant cover is generally low, but most of these wetlands are degraded by livestock grazing, and several wetlands are bisected by Emma Park Road.

North of Emma Park adjacent to US 191 (milepost 12 to milepost 18), there are some low terrace wetlands along perennial streams and a few relatively small wetlands in hillslope drainages. The low terrace wetlands are scrub-shrub and wet-meadows wetlands primarily supported by shallow groundwater and by ponding due to beaver dams with some occasional inundation by stream surface flows. Dominant plant species in the wet meadows include Nebraska sedge, common spikerush, and baltic rush. Scrub-shrub wetlands are dominated by willow species with an herbaceous understory similar to the wet meadows. Wetlands in the hillslope drainages are wet meadows dominated by Baltic rush; these wetlands are supported by shallow groundwater, surface flows in drainage channels, and hillside seeps. Wetlands in this area are in good condition with little human disturbance and minimal invasive plant species cover despite the proximity of several wetlands to dirt roads and US 191.

In Indian Canyon (milepost 21 to about milepost 46), multiple relatively small low-terrace wetlands are located in the field survey study area along Indian Canyon Creek. These wetlands are primarily wet meadow and scrub-shrub wetlands supported by shallow groundwater associated with Indian Canyon Creek and are occasionally inundated by flood flows. A few relatively large wet meadows are located above Indian Canyon Creek's low terraces and appear to be supported by a combination of shallow groundwater and irrigation diversions or return flows. Some stream flows are impounded by beaver dams, which create alluvial dynamics to support wetlands. In addition, seeps were identified in some of the wet meadows. Dominant plant species in wet meadows include Nebraska sedge, common spikerush, and baltic rush. Scrub-shrub wetlands are dominated by willow species at moderate to higher elevations in the canyon, while dominant species at lower elevations include tamarisk species (*Tamarix* sp.), narrowleaf willow (*Salix exigua*), and Russian olive (*Elaeagnus angustifolia*). A few emergent marsh wetlands are also found in this area, and are dominated by Nebraska sedge, reed canarygrass, common reed (*Phragmites australis*), hardstem bulrush (*Schoenoplectus acutus*), and cattail (*Typha latifolia*). Apart from a few wetlands dominated by invasive species at lower elevations, most low terrace wetlands are in good condition, with the larger wet meadows moderately degraded by livestock grazing.

East of Indian Canyon (milepost 46 to milepost 80), wetlands are uncommon. A few wet meadow and emergent marsh wetlands appear to be associated with irrigation drainages and impoundments. The condition of these wetlands has been degraded by adjacent agricultural land use and relatively high cover by invasive plants (reed canarygrass and common reed).

Wells Draw Alternative

The wetland descriptions for the Wells Draw Alternative are the same as described for the Indian Canyon Alternative for the segment that is shared between the two Action Alternatives (milepost 0 to 19). Wetlands located toward the top of Argyle Canyon (milepost 21 to milepost 23) and wetlands located in the Myton Bench area (milepost 81.5 to milepost 89.5) are specific to the field survey study area. Low terrace wetlands are common along Argyle Creek, and most of these floodplain areas are augmented by beaver dams. Hillside seeps help support some of these wetlands. Scrub-shrub wetlands dominated by willow species are the most common wetland in this area. A few wet meadows are also present and are dominated by Baltic rush and Nebraska sedge. These wetlands are generally in good condition, though a dirt road parallels Argyle Creek and there are several culvert crossings in the area. No wetlands were identified between milepost 24 and milepost 81.5. Wetlands in the Myton Bench area (milepost 81.5 to milepost 89.5) are mostly associated with irrigation drainages that are mostly vegetated as emergent marsh wetlands. Adjacent to these emergent marshes are some wet meadows dominated by saltgrass (*Distichlis spicata*). Wetlands in the Myton Bench area appear to range from moderately degraded to good condition, and are variably affected by agricultural land uses and a cover of invasive plant species, especially common reed.

Whitmore Park Alternative

The Whitmore Park Alternative coincides with the Indian Canyon Alternative for much of its length, and the wetland descriptions are the same for these areas. A few additional wetlands were identified in the field survey study area for the Whitmore Park Alternative in the vicinity of Emma Park, where the study areas of the two alternatives diverge (milepost 5 to milepost 14). These wetlands are wet meadows similar in character and description as wet meadows described for the Indian Canyon Alternative. These wet meadows occur in relatively narrow drainage channels supported by intermittent flows and groundwater. Dominant plant species include Nebraska sedge, baltic rush, common spikerush, and clustered field sedge (*Carex praegracilis*). Conditions range from moderately degraded to good. Invasive plant cover is generally low, but most of the wet meadows are degraded by livestock grazing.

3.3.2.4 Groundwater

Groundwater is subsurface water that saturates the pores and cracks in soil and rock and is transmitted via geologic layers called aquifers. Aquifers are natural reservoirs that collect and store water that comes from precipitation, snowmelt runoff, and streamflow. A sole-source aquifer is defined by USEPA as an aquifer that supplies at least 50 percent of the drinking water consumed in an area overlying the aquifer (USEPA 2018b).

Groundwater Use

An estimated 31 million acre-feet of groundwater is stored in the upper 100 feet of saturated material in aquifers of the Basin (UDWR 1999). The principal aquifer (and shallowest aquifer nearest the proposed rail line) that comprises the groundwater study area is the Uinta-Animas aquifer in the Basin. The Uinta-Animas aquifer is present in water-yielding beds of sandstone, conglomerate, and siltstone of the Duchesne River and Uinta Formations. Water-yielding units in the aquifer commonly are separate from each other and from underlying aquifers by units of low permeability composed of claystone, shale, marlstone, or limestone (USGS 1995).

Natural discharge and recharge rates in the Basin are approximately equal and the rate of groundwater withdrawals is small (USGS 1995). Groundwater recharge to the Uinta-Animas aquifer generally occurs in areas of higher altitude along the margins of the Basin, especially along the northern margin of the Basin, which is outside the location of the proposed rail line. This is because more water, particularly in the form of precipitation, is available to enhance the recharge in the Uinta Mountains than is available to the much lower upland areas at the southern edge of the Basin (UDWR 1999).

Groundwater is discharged mainly to streams and springs and by transpiration from vegetation growing along stream valleys. It could also discharge through groundwater wells and by upward and downward leakage into overlying and underlying geological formations (USGS 1995; UDWR 1999). In some areas adjacent to active stream channels and below floodplains, groundwater can be discharged to streams from localized stream channel aquifers; this discharge can be critical to supplying late-season stream flow and late-season water for wetlands. The total annual estimated recharge of 630,000 acre-feet per year (AFY) includes precipitation infiltration (600,000 AFY), irrigation water infiltration (20,000 AFY), and return flow from wells and springs (10,000 AFY) (UDWR 1999, 2016). The total annual estimated discharge of 630,000 AFY includes transpiration (246,000 AFY), seepage to streams and discharge to springs (363,000 AFY), and well withdrawal (21,000 AFY); subsurface inflow and outflow in the Basin is considered to be negligible (UDWR 1999).

The Uinta-Animas aquifer water table extends as deep as 500 feet below land surface, with shallower or near surface water tables occurring in valleys in areas of groundwater discharge. The water table is generally furthest from the surface in highland areas that are remote from streams or other sources of recharge (USGS 1995). West of the Green River, groundwater primarily flows toward the central part of the Basin to the discharge area along the Strawberry and Duchesne Rivers (USGS 1995).

Groundwater use in the study area has been developed primarily for municipal and industrial uses (UDWR 2016). According to the Utah Division of Water Resources (UDWR) (2016), use of groundwater resources in the study area has been limited for several reasons:

- Existing surface water sources have been adequate to meet the demands imposed for irrigation and municipal and industrial needs.
- The consolidated aquifers generally have hydraulic properties that preclude large-scale groundwater development.
- The quality of the groundwater in some areas is unsuitable for domestic, municipal, or agricultural use.
- The cost of drilling and pumping water from deep aquifers is prohibitive.

Total groundwater withdrawals from wells and springs in the study area are estimated at 21,060 AFY, including for 10,290 AFY for municipal water supply, 7,000 AFY for power production, 3,000 AFY for mining (3,000 AFY), and 770 AFY for oil production (UDWR 1999, 2016).

The Utah Division of Water Rights (UDWRi) administers the appropriation and distribution of the state's water resources, including groundwater, and is the office of public record for information pertaining to water rights. Table 3.3-8 summarizes the UDWRi records of groundwater use in the study area. UDWRi data records water rights for 5,010 wells and 232 springs in the study area (UDWRi 2020); these numbers are less than the totals for the water rights shown in Table 3.3-8 because wells and springs can have more than one reported use.

Table 3.3-8. Groundwater Use in the Study Area

Groundwater Use	Wells[a]	Springs
Domestic	2,878	60
Irrigation	2,575	56
Municipal	184	12
Power	39	0
Stock watering	2,196	176
Mining	6	0
Other[b]	732	37

Notes:

The table includes water rights that have been approved or are in use. The table does not include nonproduction wells; these wells are typically described as monitoring or testing wells in the water rights database. Table does not include the 14 springs identified by ground surveys in the combined Action Alternative field survey study area, as they may not be associated with water rights.

[a] Wells include wells, tunnels, sumps, and undergrounds drains.

[b] Not defined in the database.

Source: UDWRi 2020

Groundwater Quality

The Utah Groundwater Quality Protection Program classifies groundwater quality into four classes based on Total Dissolved Solids (TDS) concentration and contaminant concentration (Table 3.3-9). In general, any groundwater with a TDS concentration of less than 10,000 milligrams per liter (mg/l) with no or limited contaminant exceedances is considered useable (Class I, II, and III); groundwater with higher concentrations greater than 10,000 mg/l is considered unusable (Class IV). The Federal Safe Drinking Water Act regulations also consider the 10,000 mg/l concentration as a useable groundwater threshold; they define an Underground Source of Drinking Water as an aquifer or portion of aquifer that supplies any public water system, or contains a sufficient quantity of groundwater to supply a public water system and currently supplies drinking water for human consumption or contains fewer than 10,000 mg/l of TDS (40 C.F.R. § 144.3).

Table 3.3-9. Utah Groundwater Classes

Class	Description
Class I	**Class IA (Pristine Groundwater):** TDS less than 500 mg/l; no contaminant concentrations that exceed groundwater quality standards.[a] **Class IB (Irreplaceable Groundwater)**: A source of water for an existing community public drinking water system for which no reliable or comparable water quality and quantity is available because of economic or institutional constraints. **Class IC (Ecologically Important Groundwater):** A source of groundwater discharge important to the continued existence of wildlife.
Class II	**Drinking Water Quality groundwater:** TDS greater than 500 mg/l and less than 3,000 mg/l; no contaminant concentrations that exceed groundwater quality standards.[a]
Class III	**Limited Use Groundwater:** TDS is greater than 3,000 mg/l and less than 10,000 mg/l; one or more contaminants that exceed groundwater quality standards.[a]
Class IV	**Saline Groundwater:** TDS greater than 10,000 mg/l.

Notes:
[a] Utah groundwater quality standards can be found at Utah Administrative Code Rule R317-6-2, *Groundwater Quality Standards*.
Source: UDEQ 2019a
TDS = Total Dissolved Solids; mg/l = milligrams per liter

Groundwater quality classification of an aquifer under the Utah Groundwater Quality Protection Program requires a person to petition the Utah Water Quality Board. To date, there have been no petitions submitted to the Utah Water Quality Board for the aquifers in the study area (UDEQ 2019b). However, most groundwater in the study area is acceptable for use in municipal, industrial, and agricultural operations with only a few restrictions in isolated areas of poorer quality (UDWR 1999). The groundwater TDS concentrations of the entire Uinta-Animas aquifer in the Basin range between 25 mg/l in the Uinta Mountains Group and 178,200 mg/l found in the Green River Formation. However, TDS concentrations for most areas generally range from 500 to 3,000 mg/l, which would be considered Class II under Utah's groundwater classification system. Smaller TDS concentrations are prevalent near recharge areas and larger dissolved solids concentrations are more common near discharge areas (USGS 1995). The overall chemistry of the groundwater changes as it moves from higher recharge areas toward the deeper central part of the Basin (UDWR 1999). Most groundwater pollution in the study area is from natural geological sources such as the Green River and Wasatch Formations (UDWR 1999).

3.3.3 Environmental Consequences

Construction and operation of the proposed rail line could result in impacts on water resources, including surface waters, floodplains, wetlands, and groundwater. This subsection first presents the potential impacts that would be the same for all three Action Alternatives and then compares the potential impacts that would be different for each Action Alternative. For comparison purposes, this subsection also describes water resources under the No-Action Alternative. Section 3.4, *Biological Resources*, addresses impacts on fish species associated with water resources in the study area.

3.3.3.1 Impacts Common to All Action Alternatives

Surface Waters

Surface water impacts could result from construction and operation of the proposed rail line through vegetation removal, excavation, fill placement, use of equipment, and installation of surface water crossing structures (i.e., culverts and bridges). Construction and operation could result in both physical and chemical alteration of surface waters crossed by or adjacent to the proposed rail line. Potential physical alterations could include changes in sediment transport and deposition, modification of channel configuration and shape, and streamflow characteristics (e.g., volume/velocity). Potential chemical alterations from the release of pollutants into surface waters could affect water quality. The extent of physical and chemical impacts would depend on specific construction activities and their proximity to surface water, which would be determined in the final design stage of project planning. The intensity of impacts on surface water would vary between the Action Alternatives depending on the number of surface water crossings, number of bridges and culverts, number of stream realignments, presence of easily erodible soils, and presence of impaired surface waters. While the impact types and mechanisms described in this section apply to all surface water types, the potential impacts on surface waters with little or no annual flow may not be as immediate or to the same extent compared to surface waters with perennial or more frequent flows. For example, ephemeral streams are typically dry most of the year (i.e., no flow), and any construction that would occur during those dry periods would not affect flow or water quality at the time of construction, although potential impacts may occur at a later time if a precipitation event initiates temporary stream flow. The ecological and hydrological significance of ephemeral streams or streams with intermittent flows in a watershed context is well documented (e.g., USEPA 2008), but the extent of potential construction and operation impacts of the proposed rail line on these surface waters may be different than perennial streams or streams with more frequent flows.

OEA understands that the Coalition would design the proposed rail line to meet or exceed local, state, federal, and railway standards for the design of surface water crossings. The Coalition would design all culverts and bridges to clear the predicted 50-year flood event water elevation without causing a backwater increase and the predicted 100-year flood event with no more than a 1-foot backwater increase. The Coalition intends to design the proposed rail line so that existing stormwater drainage patterns would not be impeded significantly and to avoid risk of damage to the proposed rail line infrastructure (e.g., drainage impediments that would cause washouts along the rail line). The Coalition also intends to obtain a CWA Section 404 permit for any proposed filling of jurisdictional surface waters. CWA Section 404 requires that all appropriate and practicable steps be taken first to avoid and minimize impacts on aquatic resources; for unavoidable impacts, compensatory mitigation is required to replace the loss of surface waters. In assessing the potential impacts on surface waters, OEA assumed that the Coalition would implement these design and regulatory standards.

Construction

Surface Water Hydrology

Clearing, excavation, and fill-placement activities would expose soil and construction materials (e.g., subballast) to the erosive forces of wind, rain, and surface runoff. This exposure would increase sediment, erosion, and the potential for material to be transported to surface waters during rainstorms or snowmelt. Introduction of increased sediment loads to a stream system could change the sediment deposition and transport characteristics of that system, resulting in potential changes in downstream channel morphology, including a reduction in channel sinuosity,[8] increased channel gradient, and reduced pool depth (USEPA 2007).

Depending on the time of year and the level of water flow, culvert and bridge installation could require surface water alterations during construction, including temporary channel blockage or stream rerouting to isolate in-water worksites, channel straightening to achieve the proper culvert or bridge approach alignment, channel and streambank excavation and fill placement for culvert installation and bridge abutment construction, placement of bridge pilings, and placement of engineered streambank structures for erosion protection. Such activities could temporarily alter stream configuration and hydraulics, resulting in higher discharge velocities. This could cause increased streambed erosion and sediment loads, changes to stream structure, and increased transport of nutrients and other pollutants (USEPA 2007). These potential impacts would be temporary (lasting for the duration of construction) and would occur locally around the culvert and bridge installation sites.

To minimize impacts on surface water hydrology, OEA is recommending mitigation requiring the Coalition design culverts and bridges so as to maintain existing surface water drainage patterns, flow conditions, and long-term hydrologic stability and design project-related supporting structures, such as bridge piers, to minimize scour (sediment removal) and avoid increased flow velocity, to the extent practicable (WAT-MM-1, WAT-MM-2, WAT-MM-4). In addition, to minimize effects on surface water flow, the Coalition has proposed voluntary mitigation that would commit the Coalition to constructing stream crossings during low-flow periods, when practical (VM-30). These mitigation measures would minimize the impact of construction activities on surface water hydrology, but some impacts would be unavoidable.

Stream Channel Realignment

Construction of any of the Action Alternatives would involve realigning stream channels. These stream realignments would occur in areas where the proposed rail line would parallel a stream and topography, existing infrastructure (e.g., highways), or rail line design standards (e.g., curvature ratio) would make it impossible to avoid the stream. Stream realignments would involve filling and abandoning segments of the stream and moving the stream channel to maintain hydrologic connectivity and stream flow. The stream realignment process typically involves designing and constructing the new stream channel prior to placement of permanent fill in the existing stream. Once construction of the new channel is completed, flow is diverted into the new channel by blocking flow into the existing stream channel. After flow is established in the new channel, the

[8] Sinuosity refers to how much a stream or river meanders across the landscape.

original stream is permanently filled and any stream segment outside of the rail line footprint would likely be abandoned up to the point where the new stream channel was created. If improperly designed, realigned stream channels can present a set of physical and ecological issues. Primary changes to the channel dimensions (including length/sinuosity) and materials, alongside changes to flow velocity or channel capacity, can lead to various problems, such as heightened erosion or deposition, changes in geomorphology and sediment transport dynamics downstream, hanging tributaries, vegetation loss, water quality issues, and associated ecological impacts (Flatley et. al. 2018). OEA is recommending mitigation requiring the Coalition design all stream realignments in consultation with the Corps as part of the CWA Section 404 permit compensatory mitigation plan development to ensure that affected stream functions are adequately mitigated (WAT-MM-3). In addition, the Coalition has proposed voluntary mitigation that would commit the Coalition to relocating streams using bioengineering methods and obtaining stream alteration permits (VM-29, VM-31). These mitigation measures would offset the impact of stream realignments, but some impacts would be unavoidable.

Water Quality Degradation

Clearing, excavation, and fill placement to construct the proposed rail line could degrade water quality through the erosion and transport of sediment to surface waters. Surface waters that would be crossed by the proposed rail line as well as downstream receiving surface waters would be the most directly affected. Sediment deposition into surface waters can affect water quality by increasing turbidity, which can then directly affect aquatic species and habitats, and limit the beneficial use of surface waters (e.g., recreation). Turbidity can decrease light penetration and lead to higher water temperatures because darker sediment particles absorb more heat from solar radiation, and higher water temperatures can decrease dissolved oxygen levels (USEPA 2007). Sediment deposition into surface waters can also increase pollutant and nutrient levels (e.g., phosphorous), which can alter water quality conditions. For example, excess nutrients in surface water could enhance the growth of algae, which can affect the availability of oxygen in water.

Construction would require the use of construction equipment and common construction materials (e.g., paint, concrete) that may affect water quality. The use of construction equipment could result in accidental spills or leaks of petrochemicals (e.g., gasoline, hydraulic fluids) directly into surface waters or onto the ground surface, which could reach surface waters if not contained and cleaned up. Although the risk of a major spill and contamination of surface waters is low, accidental spills of petrochemicals and construction materials could degrade surface water quality, which could adversely affect aquatic habitat or limit the beneficial use of waters (e.g., recreation). Because there are no municipal drinking water facilities in the vicinity of the project footprint, construction activities would not affect these facilities or the water used by these facilities.

Although the degradation of water quality in surface waters could occur during construction, this impact would be temporary. Any turbid surface waters caused by construction activities would return to baseline conditions once the fine sediment material settled. To minimize construction-related impacts, the Coalition has proposed voluntary mitigation that would commit the Coalition to obtaining a Section 401 water quality certification and a National Pollutant Discharge Elimination System (NPDES) permit[9] from prior to beginning construction (VM-19, VM-21, VM-26). These

[9] NPDES is the permit system mandated by Clean Water Act Section 402 to control pollutants in waters of the United States. With the exception of Tribal trust lands, the U.S. Environmental Protection Agency (EPA) has

permits would involve developing and implementing a stormwater pollution prevention plan (SWPPP) to prevent sediment and other contaminants from entering surface waters. The 401 water quality certification, SWPPP, and NPDES permit conditions would contain site-specific measures to avoid and minimize erosion and sedimentation and petrochemical spills that could cause water quality impacts. In addition, to minimize impacts on water quality, OEA is recommending mitigation requiring the Coalition minimize soil compaction, implement erosion prevention and sediment control best management practices, implement runoff control and conveyance best management practices, and remove construction debris in surface waters (WAT-MM-5, WAT-MM-6, WAT-MM-8). Therefore, with the permit protections and OEA-recommended mitigation, OEA does not expect long-term impacts on water quality from construction activities. Because mitigation would minimize impacts on water quality during construction and because those impacts would occur in surface waters immediately adjacent to the proposed rail line, impacts on water quality downstream of the proposed rail line or in surface waters outside of the immediate vicinity of the proposed rail line would not be significant.

Water Quality in Section 303(d)-Listed Impaired Assessment Units

Any of the Action Alternatives would cross Section 303(d) impaired assessment units (Figure 3.3-3). Two of the assessment units—Duchesne River (2)[10] and Pariette Draw Creek—have TMDLs developed for the identified surface water impairments (Table 3.3-5). A TMDL is the maximum amount of a pollutant a surface water can receive without violating water quality standards. The remaining Section 303(d) impaired assessment units do not have TMDLs developed for the impairments identified. Impacts on impaired surface waters from construction would be the same as those described previously for all surface waters and would include impacts related to erosion and sedimentation and contaminant spills. However, as described in *Water Quality Degradation*, the Coalition would develop a SWPPP and obtain an NPDES permit to ensure water quality standards for all surface waters, including Section 303(d) impaired waters (with or without TMDLs), are not exceeded. The Coalition would also obtain a Section 401 water quality certification from UDWQ before issuance of a Section 404 permit and an NPDES permit. The SWPPP, NPDES permit conditions, and Section 401 water quality certification conditions would contain site-specific measures to avoid and minimize water quality impacts, including impacts on Section 303(d)-listed impaired waters. If those conditions are implemented, OEA does not expect construction to result in long-term impacts on Section 303(d)-listed impaired waters.

Operations

Surface Water Flows

During rail operations, culverts and bridges would continue to alter channel hydraulics because both types of crossing structures would confine the flow, which could increase flow velocity (USEPA 2007). This could result in increased channel scour and erosion processes, which could lead to increased sediment loads and downstream sedimentation. Impacts caused by increased flow velocity from culverts and bridges would most likely continue until dynamic equilibrium in the

delegated authority to issue NPDES permits to the state of Utah, referred to as Utah Pollutant Discharge Elimination System (UPDES) permits. On Tribal trust lands, EPA retains authority to issue NPDES permits. NPDES refers to both UPDES and NPDES permits in this section.

[10] The Duchesne River basin is split into four assessment basins. Duchesne River Assessment Basin 2 is from the confluence with Uinta River to Myton.

stream channel is reestablished. Dynamic equilibrium refers to the natural balance that a stream maintains in terms of such characteristics as sediment size and volume, stream slope, and discharge. The installation of a culvert or bridge can disrupt the equilibrium of a stream, which triggers a process of stream adjustments and self-correcting mechanisms in order to reestablish the balance (Vermont Department of Environmental Conservation 2011). During operations, deposits of soils and debris could obstruct culverts and bridges and block flows. Such obstructions would reduce the capacity of the culvert or bridge to convey water and could lead to increased flooding near the culvert or bridge crossing.

During operations, realigned streams would continue to alter flow velocity or channel capacity, potentially leading to continued heightened erosion or deposition, and changes in geomorphology and sediment transport dynamics downstream. This would likely continue until dynamic equilibrium in the stream channel is established. OEA is recommending mitigation requiring the Coalition design all stream realignments in consultation with the Corps as part of the CWA Section 404 permit compensatory mitigation plan development to ensure that affected stream functions are adequately mitigated (WAT-MM-3). In addition, the Coalition has proposed voluntary mitigation that would commit the Coalition to relocating streams using bioengineering methods and obtaining stream alteration permits (VM-29, VM-31). These mitigation measures would offset the impact of stream realignments, but some impacts would be unavoidable.

OEA is recommending mitigation requiring the Coalition design culverts and bridges to maintain existing surface water drainage patterns, to the extent practicable, and to regularly inspect all project-related stream crossings during rail operations to ensure that those crossings are clear of debris that could cause flow blockages, flow alteration, or increased flooding (WAT-MM-1, WAT-MM-10). These mitigation measures would minimize the impact of culverts and bridges on surface water hydrology, but some impacts would be unavoidable.

Water Quality Degradation

Operation and maintenance activities could result in water quality impacts on surface waters. Stormwater runoff from the railbed and access road surface could transport fine-grained sediments and other pollutants from trains and maintenance vehicles into surface waters where they could alter water chemistry. Fugitive dust generated by rail operation and maintenance vehicles could also affect water quality by depositing fine sediments into surface waters. Maintenance associated with tracks, access roads, ditches, bridges, culverts, and other rail infrastructure could disturb the ground surface, require the use of chemicals (such as herbicides), or result in petroleum leaks and spills from maintenance vehicles and equipment. Such impacts typically would be limited to those portions of the proposed rail line that are near surface waters.

Rail operation could also deposit pollutants into surface waters. One of the most common types of pollutants connected with railway transport are polycyclic aromatic hydrocarbons (PAHs) (Wilkomirski et al. 2011). PAHs have middling to high toxicity impacts on aquatic life and tend to bioaccumulate in the aquatic food chain (Igwe and Ukaogo 2015). PAHs occur naturally throughout the environment in the air, water, and soil but can also be manufactured. PAHs are found in substances such as asphalt, oil, coal, and creosote (U.S. Department of Health and Human Services 1995), and can be found in the diesel fuel, oils, grease, and other fluids required for the operation and maintenance of railroad locomotives and rail cars. These fluids could drip or leak directly into surface waters through the openings on bridges and trestles, and could also be deposited onto the rail bed where they could be exposed to precipitation and storm flows that could carry them into adjacent surface waters. Most PAHs do not dissolve easily in water; they stick to solid particles and settle at the bottom of surface waters (U.S. Department of Health and Human Services 1995). Breakdown of PAHs in water generally takes weeks to months and is caused primarily by the actions of microorganisms (U.S. Department of Health and Human Services 1995). Any releases of PAHs associated with fluids for operating the proposed rail line could degrade surface water quality in the immediate vicinity of the rail line.

During operations there is a risk of rail-induced wildfires and potential soil erosion and landslides from burned areas that could result in water quality impacts. Impacts related to wildfire risk are addressed in Section 3.4, *Biological Resources*, which shows that most areas along the Action Alternatives have low wildfire risk and that rail-induced fires make up a small percentage of wildfire causes. (Landslides are addressed in Section 3.5, *Geology, Soils, Seismic Hazards, and Hazardous Waste Sites*.) The impact of a wildfire would depend on the location, the size of the area burned, precipitation regime, and season. Because fires result in removal of vegetation cover, most precipitation that falls in the burned area is converted to surface flow and moves unimpeded downslope, which can produce large amounts of sediment, ashes, and other chemical contaminants that can affect water quality (Tecle and Neary 2015).

During consultation leading to the issuance of this ~~Draft~~ EIS, some stakeholders in the field survey study area expressed concern that ground-borne vibration from trains could result in loosening and erosion of soils that could deposit in surface waters. As described in Section 3.6, *Noise and Vibration*, train-generated ground vibration is relatively low, and the damage contour for buildings extend only 5 feet from the rail line. Therefore, while soil settlement could occur due to vibration, vibration impacts would be extremely localized and any potential water quality impacts would be negligible.

To address these potential impacts, OEA is recommending mitigation requiring the Coalition implement best management practices to convey, filter, and dissipate runoff from the proposed rail line, which could include vegetated swales, vegetated filter strips, streambank stabilization, and channelized flow dissipation (WAT-MM-9). In addition, OEA is recommending geotechnical investigation to identify potential areas of mass movement or slumping and to implement engineering controls to avoid mass movement or slumping (GEO-MM-2). If those measures are implemented, OEA expects that rail operations would not significantly affect surface water quality. Because mitigation would minimize impacts on water quality during rail operations and because those impacts would occur in surface waters immediately adjacent to the proposed rail line, impacts on water quality downstream of the proposed rail line or in surface waters outside of the immediate vicinity of the proposed rail line would not be significant.

Accidents and Spills of Hazardous Materials

The Coalition anticipates rail traffic on the proposed rail line would primarily consist of trains transporting crude oil and frac sand. Train accidents or derailments could cause train~~tanker~~ cars to rupture or overturn and spill crude oil or frac sand into the environment. The Coalition has also indicated that the other products could move on the rail line, though the volume of these products would be very low. Therefore, OEA is not analyzing accidents and spills of those products in detail. Section 3.2, *Rail Operations Safety*, discusses the probability of rail accidents. Factors in determining the potential impact from such an incident include the crude oil and frac sand properties and the probability of a train accident or derailment occurring.

Uinta Basin black and yellow crude oils are waxy crude oils that have a wax content higher than most North American crude oils. The oil does not flow at room temperature and must be heated at higher temperatures for it to flow. Because of this characteristic, the oil, if spilled onto land, tends to not disperse, and if spilled in water, tends to form globules of semisolid material that lock it in place. UDEQ documented an oil spill incident (July 12, 2018) and cleanup effort where a tanker truck spilled 1,000 gallons of crude oil that reached the Price River in Carbon County (UDEQ 2018, 2019c). Due to the oil's properties, as the crude oil spilled onto the road surface, it began to harden, so a smaller amount entered the river. Once the oil reached the river, instead of forming a giant slick on the water surface, the oil solidified and formed floating chunks that were easily removed by hand and with assistance from a boom that captured the oil chunks. Sampling of public drinking water supply intakes downstream of the spill showed no exceedances of drinking water standards. In the report for this spill (UDEQ 2019c), UDEQ stated that Uinta Basin crude oil has been described as "cleanup friendly" and that "thanks to the nature of the crude oil, most of these spills can be easily cleaned up afterward." A similar incident occurred in the Provo River in 2015 with similar results (CUWCD 2015, 2016; Orvis News 2015). As with most crude oils, Uinta Basin crude oil is toxic, and an accidental release would have negative effects on the environment. Waxy crude oil may persist in the environment for a longer time relative to other non-waxy crude oil (Boufadel et al. 2015). However, the oil's other properties would help reduce the potential impact and make cleanup easier than with most crude oils, which would help to avoid or minimize the long-term chronic effects from typical crude oils that would spread out over large areas as giant slicks in the event of a spill.

Rail traffic on the proposed rail line would also consist of trains transporting frac sand. Frac sand is a naturally occurring, highly pure silica sand, with rigorous physical specifications, that is used during hydraulic fracturing of oil and gas wells (USGS 2015). The physical properties of frac sand are quite specific and include high silica content, homogeneous grain size, high sphericity and roundness, high crush resistance, low solubility, and low turbidity (USGS 2015). If a train accident were to occur and result in a release of frac sand that were to reach a surface water, there would be little, if any, toxic effects because frac sands are naturally occurring and have low solubility. The other potential effects could include turbidity and smothering of aquatic habitats. Because low turbidity is a property of frac sand, due to the extensive washing away of sediments during processing, there would be little impact on water quality from turbidity. The physical presence of frac sand in a surface water could result in a complete loss of aquatic habitat until cleanup is completed. Frac sand deposited in a stream could also affect stream channel configuration and hydraulics, which could result in altered discharge velocities, thus, affecting streambed erosion, sediment loads, and stream structure.

The potential environmental impact of crude oil or frac sand being transported on the proposed line would depend on a train accident or derailment occurring and if the accident or derailment were severe enough to result in a rupture and release of crude oil or frac sand. Based on train accident and derailment modeling in Section 3.2, *Rail Operations Safety*, operation of any of the Action Alternatives would yield a small number of predicted accidents per year, with roughly one accident involving a loaded train every 3 to 10 years, depending on the alternative, and only a quarter of those would be expected to have any release. The Coalition has also proposed voluntary mitigation measures to minimize potential impacts related to spills of crude oil. These measures include a commitment to preparing a hazardous materials emergency response plan; complying with applicable regulations and tribal ordinances related to the safe and secure transportation of hazardous materials; and notifying appropriate federal, state, and tribal environmental agencies as required under federal, state, and tribal law in the event of a reportable spill (VM-11, VM-12, VM-13, VM-14, VM-15).

Floodplains

Impacts on floodplains and flood flows could result from construction and operation of the proposed rail line, potentially resulting in changes in floodplain capacity and diversion of flows, constriction of flows, and reduced floodwater retention. The extent of such impacts would depend on the specific activity and its proximity to floodplains, which would depend on the final design characteristics of the Action Alternative that is authorized and built. The intensity of impacts on floodplains would vary depending on the floodplain area affected by construction. The Coalition has indicated that the proposed rail line would be designed to meet the requirements of the local county floodplain ordinances and codes. The Coalition would build all culverts and bridges to clear the predicted 50-year flood event water elevation without causing a backwater increase and the predicted 100-year flood event with no more than a 1-foot backwater increase. Any part of the proposed rail line within FEMA-mapped 100-year floodplains would be designed to meet the required floodplain development regulations. The following potential floodplain impacts should be considered taking into account these regulatory requirements and design standards.

Construction

Storage Capacity and Flows with Fill Placement

Any of the Action Alternatives would cross FEMA-mapped 100-year floodplains and NRCS-mapped flood-prone soils, and construction would involve placing fill in these areas. The proposed rail line and road relocations would either cross a stream and floodplain perpendicularly or would run parallel to and encroach on a floodplain along a stream. Placement of fill in a floodplain can reduce the overall floodplain system storage capacity, resulting in an increase of flooding in areas that would normally not flood. Placement of fill material would also constrict flood-flow paths and increase floodwater elevation upstream of the constriction, resulting in a backup of floodwaters and potential upstream flooding. Placement of fill would redirect flood flows to existing channels, leading to channel erosion and the potential alteration of channel alignment. In the unlikely event that a construction staging area is needed in a floodplain, natural drainage patterns would be affected should a flood occur. This would block or divert flood flows, which would reduce flood capacity and increase flooding elevations.

The Coalition has proposed voluntary mitigation that would commit the Coalition to designing the proposed rail line in accordance with all FEMA or FEMA-approved local floodplain construction requirements and with a goal of not impeding floodwaters and not raising water surface elevations to levels that would change the regulated floodplain boundary (VM-32). This mitigation measure would minimize impacts of construction on floodplain storage capacity and flows, but some impacts would be unavoidable.

Flows with Bridge and Culvert Construction

Construction of bridges and culverts could affect floodplains and flood flows. Typically, bridge spans are supported by building up the edges of the streambank, installing bridge abutments, and setting the bridge on top. Similarly, placement of culverts requires building up to the edges of the streambank with fill as the proposed rail line approaches the culverts. Water flow during a flood is restricted at the culvert because of the artificially narrowed streambank. This restriction would result in two impacts: 1) water flow would back up behind the bridge or culvert and this ponded, slower moving water would lack the energy to move sediments, which would drop in the streambed, upstream of the structure, and 2) water flow would accelerate as it passes through the culvert in the narrow channel, which could increase the flow's erosive force downstream of the structure. These impacts could lead to changes in channel alignment, increased erosion, increased channel migration, and the potential for increased flooding upstream.

The diversion of stream flows during bridge and culvert construction could also affect floodplains and flood flows. Diversion would temporarily reduce channel capacity in the area of construction, leading to higher floodwaters in the surrounding areas. OEA's recommended mitigation measures (WAT-MM-1, WAT-MM-2, WAT-MM-4) regarding the design of bridges and culverts would minimize these potential impacts, but some impacts would be unavoidable.

Floodwater Retention

Clearing floodplain vegetation would impair a floodplain's ability to slow down, retain, and absorb floodwaters. Denser floodplain vegetation has a greater ability to retain floodwater flows. Vegetation removal could lead to increased downstream flood flows, sedimentation, channel erosion, and flooding. The areas of floodplain that would be cleared and maintained along the proposed rail line would be a small part of the total floodplain area in the watersheds. OEA is recommending mitigation requiring the Coalition minimize the area of temporary disturbance during construction and to remediate affected areas by promoting vegetation regrowth after construction is complete (WAT-MM-5). In addition, the Coalition has proposed voluntary mitigation that would commit the Coalition to minimizing ground disturbance and to revegetating temporarily disturbed areas (VM-16, VM-22, BIO-MM-16). If these mitigation measures are implemented, construction impacts on floodwater retention would be minimal.

Operations

Flood Dynamics

While most potential floodplain impacts would occur during construction, specifically, during filling and clearing activities, potential impacts on flood flows could occur from the presence of rail infrastructure. If placed in floodplains, culverts, stream realignments, the rail line embankment, and other permanent project-related features could change floodplain hydraulics, which could alter channel alignment and channel erosion. Channel stabilization measures, such as riprap, designed to protect the proposed rail line from channel migration, could increase channel migration upstream and downstream by altering flow velocities and erosive forces. If OEA's recommended mitigation measures related to the design of water crossings are implemented (WAT-MM-1, WAT-MM-2, WAT-MM-4), OEA expects that impacts on the floodplain system in the watersheds would be minimal.

Deposition of soils and debris from overland runoff and stream flows could obstruct culverts and block flows. Such obstructions would reduce the conveyance capacity of the culvert and lead to increased flooding near the culvert crossing. Obstructions could be of particular concern in the rare event of a cloudburst flood where high-intensity rainfall in a small area and over a short period of time could result in movement of debris and other ground material that could reach the proposed rail line and impede or block flows at culverts and bridges. If OEA's recommended mitigation related to the inspection and clearing of debris at water crossings is implemented (WAT-MM-10), OEA does not expect that significant impedance or blockage of flood flows from culvert or bridge obstructions would occur.

Accidents and Spills of Hazardous Materials

As stated under *Surface Waters, Accidents and Spills of Hazardous Materials,* train accidents or derailments could cause train~~tanker~~ cars to rupture or overturn and spill crude oil or frac sand into the environment. Oil or frac sand could spill from a train~~tanker~~ car onto a floodplain should a train accident or derailment occur in or near a floodplain. Cleanup and oil and frac sand removal would likely commence immediately, which would avoid changes to floodplain capacity. However, some permanent and temporary floodplain vegetation impacts could occur during cleanup, which could affect floodwater retention functions. The Coalition has proposed voluntary mitigation measures to minimize potential impacts related to spills of crude oil. These measures include a commitment to preparing a hazardous materials emergency response plan; complying with applicable regulations and tribal ordinances related to the safe and secure transportation of hazardous materials; and notifying appropriate federal, state, and tribal environmental agencies as required under federal, state, and tribal law in the event of a reportable spill (VM-11, VM-12, VM-13, VM-14, VM-15).

Wetlands

Construction of the proposed rail line would require clearing, excavating, and filling in the project footprint, which could result in the loss or alteration of wetlands and affect wetland habitat, water quality, and flood and storage capacity functions. Construction of the rail line would not directly affect wetlands adjacent to the project footprint but could result in indirect impacts, such as edge effects on wetland habitat, interruption or alteration of shallow groundwater flow from compaction of soil, or loss of or alteration of hydrology in wetlands that would be located partially adjacent to the project footprint (i.e., fragmentation). The extent of wetland impacts in and adjacent to the project footprint would depend on specific construction activities and their proximity to wetlands, which would be determined during the final design stage. The intensity would vary depending on the acreage of wetland that would be affected for each Action Alternative (Subsection 3.3.3.2, *Impact Comparison between Action Alternatives*). The Coalition intends to obtain a CWA Section 404 permit from the Corps, which would require the Coalition to take all appropriate and practicable steps to avoid and minimize impacts on wetlands; for unavoidable impacts, compensatory mitigation would be required to replace the loss of wetland and associated functions. The following impacts should be considered taking into consideration these regulatory requirements.

Construction

Wetland Habitat

Fill material placed in wetlands during construction would result in the permanent loss of wetlands, associated vegetation, and any habitat that the wetland provides for fish and wildlife. If a wetland were completely filled, these habitat functions would be lost entirely. If a wetland were partially filled and fragmented or if wetland vegetation were trimmed or cleared, vegetation and habitat would be altered and degraded. Any fragmentation or interruption of wetland habitat and vegetation could affect wildlife use of the wetland. Wetland habitat and vegetation could also be affected if the hydrology of the wetland system is altered by construction of the proposed railbed, which could result in wetland draining or ponding on either side of the rail or access road embankments, including wetlands adjacent to the project footprint. For example, if the railbed were built through the middle of a wetland, the interruption and fragmentation of the wetland's hydrology could result in the draining or ponding of water in the remaining wetland fragments on either side of the rail embankment. In addition, impacts on shallow groundwater from rail embankment compaction and related interruption or redirection of groundwater flow could cut off a hydrology source to wetlands. These hydrology alterations could affect vegetation and wetland habitat by changing plant species' composition (i.e., from wetland to upland plants if the wetland were to dry up over time).

To minimize wetland impacts, the Coalition has proposed voluntary mitigation that would commit the Coalition to obtaining a Section 404 permit prior to beginning construction and to minimizing wetland impacts to the extent practicable (VM-25, VM-27). As part of the Section 404 permitting process, the Coalition would need to demonstrate that impacts on water resources, including wetlands, have been avoided or minimized, to the extent practicable. For unavoidable impacts, the Section 404 permit would provide for compensatory mitigation to be developed in consultation with the Corps. In addition, to minimize impacts on wetlands, OEA is recommending the Coalition use temporary barricades, fencing, and/or flagging around wetlands to contain project-related impacts during construction (WAT-MM-7).

During rail construction, fugitive dust from loose soil could be generated by heavy equipment operation. Any accumulation of fugitive dust on wetland vegetation could affect plant growth by inhibiting photosynthesis, which could result in reduced vegetation density and plant diversity. This could also allow invasive plant species to take hold and colonize wetland areas, which could reduce plant species' richness. Impacts related to fugitive dust would be temporary and would cease once construction is complete. To minimize this temporary impact, the Coalition has proposed voluntary mitigation (VM-23) that would commit the Coalition to implement measures to reduce fugitive dust from project-related construction activities.

Wetland Water Quality

Fill material placed in a wetland during rail construction would result in a permanent reduction in the wetland's ability to improve water quality; on a watershed level, any permanent wetland loss could reduce the capacity of regional wetlands to improve water quality. Aside from filling wetlands, other alterations of wetland hydrology could also reduce a wetland's ability to improve water quality by changing the natural hydrologic flows; this could extend to wetlands adjacent to the project footprint. For example, if a wetland with a high ability to retain water were channelized to direct flow through a culvert under the railbed, the amount of time water remained in the wetland could be reduced, thereby affecting the ability of the wetland to retain and filter sediments and other contaminants. Conversely, railbeds could fragment the normal flow through wetlands, leading to the creation of surface water impoundments that would decrease water circulation and lead to water stagnation. In addition, impacts on shallow groundwater from rail embankment compaction and related interruption or redirection of groundwater flow could cut off or alter a hydrology source to wetlands, which could adversely affect water quality functions or result in complete wetland loss. Decreased water circulation can result in increased water temperature, lower dissolved oxygen levels, changes in salinity and pH, the prevention of nutrient outflow, and increased sedimentation (USEPA 1997). Wetland fragmentation impacts would be reduced by placement of bridges or culverts in the railbed in wetland areas to maintain hydrologic connection. If OEA's recommended mitigation measures related to the design of water crossings were implemented (WAT-MM-1, WAT-MM-2, WAT-MM-4), OEA expects that impacts on wetland functions would be localized to the wetlands that the proposed rail line would cross or wetlands adjacent to the project footprint, and that water quality would not be affected on a watershed level.

Ground disturbance in or near wetlands could degrade water quality of the wetland itself. The primary concerns would be potential impacts associated with sedimentation and petroleum products. Soil disturbance and exposure to rain and surface runoff during construction could increase sediment in nearby wetlands, potentially increasing surface water turbidity, smothering vegetation, reducing water oxygen levels, and reducing water storage capacity. Petroleum leaks and accidental spills from rail construction equipment are other potential sources of wetland water contamination. While many wetlands act to filter out sediment and contaminants, any significant increase in sediment or contaminant loading could exceed the capacity of a wetland to perform its normal water quality functions. Although the degradation of water quality in wetlands could occur during construction, this impact would be short-term and temporary. OEA expects that the Coalition's NPDES permit, Section 401 water quality certification, and SWPPP would include site-specific measures to avoid and minimize erosion, sedimentation, and spills that could cause wetland water quality impacts. If those measures were implemented, OEA does not expect that construction activities would result in long-term impacts on wetland water quality.

Wetland Stormwater and Floodwater Storage Capacity

Fill material placed in a wetland during rail construction would result in the permanent loss of the wetland's ability to impede and retain stormwater and floodwater. On a watershed level, any permanent wetland loss could reduce the capacity of regional wetlands to impede and retain these flows. Any alteration of wetland hydrology could also reduce a wetland's ability to retain water by changing the natural hydrologic flows; this could extend to wetlands adjacent to the project footprint. For example, if a wetland with a high ability to retain stormwater and floodwater were channelized to flow directly through a culvert under the railbed, the volume of water that the wetland would have otherwise been able to retain could be reduced. Clearing and trimming of wetland vegetation would also reduce the capacity of wetlands to impede and retain stormwater and floodwater. Densely vegetated wetlands have a greater ability to slow down and retain stormwater and floodwater; clearing or removing wetland vegetation for rail construction would reduce this functional capacity.

OEA is recommending mitigation measures requiring the Coalition design and install water crossings so as to maintain existing wetland hydrology, to the extent practicable (WAT-MM-1, WAT-MM-4). If these mitigation measures and the conditions of the Coalition's CWA Section 404 permit are implemented, OEA concludes that decreases in wetland stormwater and floodwater storage capacity from construction of the proposed rail line would be localized and minimal and would not significantly affect the capacity of regional wetlands to impede and retain stormwater and floodwater at the watershed level.

Operations

Maintenance Activities

Most wetland impacts would occur during construction of the proposed line. However, potential impacts on wetlands also could occur during rail operations because of maintenance activities and incidental pollutant discharges. Maintenance activities would include vegetation maintenance in the right-of-way and repairs and maintenance associated with tracks, access roads, ditches, bridges, culverts, and other associated rail infrastructure. These activities would be infrequent and brief. Vegetation would be periodically cleared or trimmed in the right-of-way to ensure safe rail operations. Clearing or trimming could alter wetland vegetation and structure (e.g., a scrub/shrub wetland that is continuously cleared for maintenance could convert an existing wetland to an emergent wetland). Any change in wetland vegetation structure could alter the habitat, water quality, and hydrology functions that the wetland provides, and could extend to wetlands adjacent to the project footprint. Maintenance associated with tracks, access roads, ditches, bridges, culverts, and other rail infrastructure could disturb the ground surface, require the use of chemicals (such as herbicides), or result in petroleum leaks and spills from maintenance vehicles and equipment. Any mobilized sediment, spilled chemicals, or petroleum products could reach wetlands, which could degrade vegetation communities, habitat, water quality, and overall wetland productivity.

OEA is recommending mitigation that would require the Coalition implement best management practices to convey, filter, and dissipate runoff from the new rail line, which could include but would not be limited to vegetated swales, vegetated filter strips, streambank stabilization, and channelized flow dissipation (WAT-MM-9). If OEA's recommended mitigation measures are implemented, OEA expects that wetland vegetation and wetland water quality impacts from maintenance activities would be infrequent, brief, localized, and minimal.

Accidents and Spills of Hazardous Materials

As stated under *Surface Waters, Accidents and Spills of Hazardous Materials*, train accidents or derailments could cause train~~tanker~~ cars to rupture or overturn and spill crude oil or frac sand into the environment. Oil or frac sand could spill from a train~~tanker~~ car onto a wetland should a train accident or derailment occur in or near a wetland. Some permanent and temporary wetland vegetation impacts could occur from the spill and during cleanup, which could affect wetland hydrology and habitat functions. The Coalition has proposed voluntary mitigation measures to minimize potential impacts related to spills of crude oil. These measures include a commitment to preparing a hazardous materials emergency response plan; complying with applicable regulations and tribal ordinances related to the safe and secure transportation of hazardous materials; and notifying appropriate federal, state, and tribal environmental agencies as required under federal, state, and tribal law in the event of a reportable spill (VM-11, VM-12, VM-13, VM-14, VM-15). ~~In the event of a spill, some permanent and temporary wetland vegetation impacts could occur during cleanup, which could affect wetland hydrology and habitat functions.~~

Groundwater

Impacts on groundwater could result from construction and operation of the proposed rail line through clearing, fill placement, tunnel construction, and use of equipment, potentially altering infiltration, degrading groundwater quality, and affecting groundwater wells and springs.

Construction

Infiltration and Recharge Characteristics, Shallow Groundwater Flow Interruption, and Water Quality

Construction of the proposed rail line would alter infiltration and recharge characteristics and permanently reduce or impede infiltration due to surface soil compaction. These impacts would be limited to the rail line footprint. The rail line footprint represents a small fraction of the total recharge area because of the extensive Uinta-Animas aquifer that makes up the groundwater study area. In addition, groundwater recharge to the Uinta-Animas aquifer generally occurs in areas of higher altitude along the margins of the Basin, the majority of which is in the northern half of the Basin outside the location of the Action Alternatives. Therefore, OEA does not expect that construction would significantly affect groundwater infiltration and recharge.

Construction of the proposed rail line could affect shallow groundwater in localized stream channel aquifers where rail embankment soil compaction could interrupt and redirect shallow groundwater flow away from wetlands and streams that are supported in whole or part by groundwater in these shallow aquifers. OEA's recommended mitigation measure regarding the design, construction, and operation of the rail line to maintain existing water patterns and flow conditions (including shallow aquifer subsurface flow) and providing long-term hydrologic stability would minimize these potential impacts (WAT-MM-4).

Any accidental contaminant (e.g., petrochemicals used for operating construction equipment) released to the ground during construction could infiltrate and temporarily degrade groundwater quality if the contaminant were to reach groundwater. However, recharge areas more susceptible to groundwater contamination from surface activities and these areas are generally outside of the location of the Action Alternatives. To minimize impacts on groundwater quality, the Coalition has proposed voluntary mitigation that would commit the Coalition to developing a SWPPP and obtaining an NPDES permit to minimize and contain spills during construction (VM-20, VM-21). If these voluntary measures are implemented, the likelihood of a large contaminant spill would be low making it unlikely that large amounts of contaminants would reach groundwater and impair quality. Therefore, OEA does not anticipate any long-term impacts related to groundwater quality.

Water Rights of Wells and Springs

Construction of the proposed rail line would affect a very small proportion of the groundwater wells and springs that OEA identified in the study area. Depending on the Action Alternative, up to three groundwater wells and two springs would be located in the rail line footprint. Groundwater wells in the rail line footprint would be closed and springs in the rail line footprint would no longer be available for water users. Groundwater would no longer be extracted from these wells, which could increase the amount of water in the aquifer and, thus, the water available for discharge to surface waters and available for withdrawal at other nearby wells. OEA is recommending mitigation concerning the loss of a landowner's groundwater well (WAT-MM-11).

There are no groundwater wells or springs directly above any of the proposed tunnels for the Action Alternatives (UDWRi 2020; USGS 2019); however. there are groundwater wells and springs in the vicinity of the tunnels (UDWRi 2020; USGS 2019). The water rights details of groundwater wells in the vicinity (within approximately 2,000 feet) of several of the tunnels proposed for the Action Alternatives indicate that groundwater depths typically range from 100 feet to 500 feet below the ground surface (UDWRi 2020). Near-surface construction activities associated with tunnel construction, such as blasting, boring, and excavation, could disrupt or modify the flow of groundwater that could be present around the construction activities. However, because tunnel construction activities would be limited to the near surface (upper 100 feet) and the occurrence of groundwater is generally deeper than 100 feet, the impacts of these activities on groundwater flow is not expected to be significant. The lateral extent of the water-bearing units, regardless of whether groundwater is shallow or deep, would generally be orders of magnitude more extensive than the relatively limited dimensions of a construction impact zone. Groundwater springs are smaller in scale and more localized; since no springs are known to occur above any of the proposed tunnels, it is unlikely that tunnel construction would affect springs.

Depending on the Action Alternative, up to six groundwater wells and up to nine springs would be located in the temporary footprint. Groundwater wells and springs in the temporary footprint would not be lost.

Operations

Groundwater Quality

Any accidental contaminant released to the ground during operations, such as gasoline or diesel fuel from maintenance vehicles, could infiltrate into the ground and could temporarily degrade groundwater quality if the contaminant were to reach groundwater. However, by implementing best management practices, the likelihood of a large contaminant spill would be low. In addition, because clean-up procedures would commence immediately after a spill, it would be unlikely that a large amount of a contaminant would reach groundwater and impair quality. No long-term impacts are anticipated.

As stated under *Surface Waters, Accidents and Spills of Hazardous Materials,* train accidents or derailments could cause train~~tanker~~ cars to rupture or overturn and spill crude oil or frac sand into the environment. Due to Uinta Basin crude oil properties, the oil would start to congeal and solidify upon contact with the ground and cooling down and, therefore, would be unlikely to physically seep into the ground. Similarly, frac sand is a solid substance that would not penetrate into the ground, and due to its non-toxic properties, it would have no effect on groundwater quality. The Coalition has also proposed voluntary mitigation measures to minimize potential impacts related to spills of crude oil and frac sand. These measures include a commitment to preparing a hazardous materials emergency response plan; complying with applicable regulations and tribal ordinances related to the safe and secure transportation of hazardous materials; and notifying appropriate federal, state, and tribal environmental agencies as required under federal, state, and tribal law in the event of a reportable spill (VM-11, VM-12, VM-13, VM-14, VM-15).

3.3.3.2 Impact Comparison between Action Alternatives

This subsection describes the potential impacts on water resources that would differ between the three Action Alternatives.

Surface Water

Construction and Operations

Although all three Action Alternatives would result in similar types of construction and operations impacts on surface waters, the severity of those impacts would vary across the Action Alternatives based on the number and area of surface waters that each Action Alternative would cross. To compare impacts on surface waters across the three Action Alternatives, OEA considered 1) the area and linear distance of surface waters that each Action Alternative would affect, 2) the number of surface waters that each Action Alternative would cross, and 3) the area of surface disturbance, including disturbance within impaired assessment units, associated with each Action Alternative. Should the Board license one or more of the Action Alternatives, the Coalition, as part of the CWA Section 404 permit process, would develop detailed engineering and design to determine the precise surface water impacts (in both area and linear distance) from bridges, culverts, and fill.

Table 3.3-10 shows the linear feet and area of surface waters that each Action Alternative would affect, based on the surface waters within the project footprint. As the table shows, the Wells Draw Alternative would affect the greatest area and the most linear feet of surface waters across the three Action Alternatives. Overall, the Wells Draw Alternative would affect a larger area of surface water and greater linear distances of streams and canals/ditches than the Whitmore Park Alternative or Indian Canyon Alternative. The Whitmore Park Alternative would affect a somewhat greater area of surface water and linear distance of streams and canals/ditches than the Indian Canyon Alternative mostly because the Whitmore Park Alternative would affect a greater area and linear distance of ephemeral streams than the Indian Canyon Alternative.

Table 3.3-10. Surface Water Impacts by Action Alternative

	Action Alternative[a,b]		
Surface Water	**Indian Canyon**	**Wells Draw**	**Whitmore Park**
Perennial stream			
Permanent	22,744 feet/6.3 acres	12,599 feet/3.0 acres	20,261 feet/5.6 acres
Temporary	52,896 feet/15.4 acres	20,566 feet/6.5 acres	58,143 feet/16.4 acres
Intermittent stream			
Permanent	3,076 feet/0.2 acre	46,980 feet/30.4 acres	2,667 feet/0.2 acre
Temporary	2,473 feet/0.2 acre	36,423 feet/28.1 acres	2,275 feet/0.2 acre
Ephemeral stream			
Permanent	51,464 feet/4.1 acres	94,262 feet/23.5 acres[c]	65,682 feet/6.4 acre
Temporary	109,599 feet/8.6 acres	148,000 feet/24.7 acres	149,645 feet/15.7 acre
Canal/ditch			
Permanent	15,264 feet/0.9 acre	2,449 feet/0.3 acre	14,440 feet/0.9 acre
Temporary	12,635 feet/ 1.3 acres	9,271 feet/1.1 acre	12,493 feet/1.3 acre
Pond			
Permanent	1.0 acre[d]	3.3 acres	0.4 acre[d]
Temporary	1.0 acre	4.6 acres	0.9 acre
Playa			
Permanent	0.1 acre	0.8 acre	0.1
Temporary	<0.1 acre	1.2 acres	<0.1 acre

Notes:

[a] Stream/canal/ditch impacts in this table generally do not represent permanent impacts (i.e., permanent fill) but are streams/canals/ditches in the disturbance areas of the culvert and bridge installation sites where these structures are being installed to maintain hydrologic flow. Several stream realignments would occur along each Action Alternative that would permanently fill the stream channel but would also create new stream channel to maintain stream hydrology and flow (Table 3.3-11 provides stream realignment numbers).

[b] Does not include impacts on surface waters over proposed rail tunnels, which total 0.3 acre each for the Indian Canyon Alternative and Whitmore Park Alternative, 0.6 acre for the Wells Draw Alternative. There would be no surface construction disturbance above these tunnels.

[c] OEA identified two springs associated with an ephemeral stream, but installed culverts are anticipated to maintain flow of both the stream and any flow from the spring.

[d] OEA identified one spring associated with a pond ~~both~~ in the permanent impact area.

Sources: Coalition 2020a; USGS 2019

Surface waters in the field survey study area that are adjacent to the project footprint would not be filled, cleared, or excavated during rail construction, but could be affected by rail construction and operation in the project footprint. These impacts are described in Subsection 3.3.3.1, *Impacts Common to All Action Alternatives*, *Surface Waters*, and could include alterations to hydrology, erosion, and stream flow. OEA has quantified the distance and area of streams adjacent to the project footprint that would be susceptible to potential indirect impacts.~~Impacts on surface waters adjacent to the project footprint cannot be quantified, but~~ Action Alternatives with more surface waters adjacent to the project footprint would result in a greater surface water area that could be susceptible to construction and operation impacts when compared to Action Alternatives with fewer surface waters adjacent to the project footprint. The Wells Draw Alternative has the least area of surface waters adjacent to the project footprint, while the Indian Canyon Alternative and the Whitmore Park Alternative have about the same (Table 3.3-11).

Table 3.3-11. Surface Waters Adjacent to Project Footprint by Action Alternative

	Action Alternative		
Surface Water	**Indian Canyon**	**Wells Draw**	**Whitmore Park**
Perennial stream	113,360 feet/32.0 acres	24,520 feet/8.9 acres	118,232 feet/34.0 acres
Intermittent stream	15,798 feet/1.2 acres	23,797 feet/12.7 acres	12,578 feet/0.9 acre
Ephemeral stream	232,176 feet/23.6 acres	154,027 feet/20.3 acres	230,996 feet/25.6 acres
Canal/ditch	19,730 feet/0.9 acre	12,403 feet/1.9 acres	17,872 feet/0.8 acre
Pond	2.1 acres	9.4 acres	3.0 acres
Playa	0.3 acre	2.8 acres	0.3 acre
Total	**381,064 feet/60.1 acres**	**214,747 feet/56.0 acres**	**379,734 feet/64.6 acres**

Notes:
Sources: Coalition 2020a; USGS 2019

Table 3.3-12 shows the number of surface water crossing structures and stream realignments for each Action Alternative. Because it would cross the most surface waters, the Wells Draw Alternative would have the greatest number of crossing structures, followed by the Whitmore Park Alternative and Indian Canyon Alternative. Over 70 percent of all surface water crossing structures for all Action Alternatives are at ephemeral streams. The number of stream realignments and distance of stream fill impacts at stream realignment locations is similar for the Indian Canyon Alternative and Whitmore Park Alternative. The Wells Draw Alternative would have less stream realignments and less stream fill impacts where streams would be realigned. Stream realignments would primarily affect perennial stream types across all Action Alternatives.

Table 3.3-12. Surface Waters Crossings by Crossing Structure and Number of Stream Realignments

	Action Alternative[a,b]		
Estimated Crossing Structure[a]	**Indian Canyon**	**Wells Draw**	**Whitmore Park**
36- or 48-inch CMP	193	295	229
72-inch CMP	22	24	20
8-foot-by-8-foot box culvert	44	30	56
Bridge[c]	19	10	20
Other culvert[d]	113	147	118
Culvert Total	**391**	**506**	**443**
Number of Stream Realignments	**59**	**17**	**55**
Miles of Stream Impact at Realignment Locations			
Perennial	2. 4~~5~~	1.1	2.3
Intermittent	0.2	0	0.2
Ephemeral	0.6	0.3	0.7
Ditch/canal	0.6	0	0.6

Notes:
[a] Crossing structure type, size, and number is based on preliminary hydrologic analysis. Should the Board license an Action Alternative, site-specific detailed engineering and design would determine the exact type, size, and number of crossing structures.

[b] While the majority of crossing structures are at stream crossings, the table does include crossing structures at open water and wetland crossings. Also, numbers do not include surface waters over tunnels, as they would not require any crossing structure.

[c] Some bridges cross/span a stream and an adjacent road together.

[d] These are non-surface water and nonwetland culverts that may be needed along the proposed rail line to minimize disruption of overall hydrology (e.g., to accommodate stormwater flows and overland runoff in low areas, and preventing ponding).

CMP = Corrugated metal pipe [culvert]

Table 3.3-13 shows the sinuosity impacts on realigned streams, based on preliminary design information provided by the Coalition. Sinuosity impacts account for the meandering stream channel distance that is lost and potentially replaced with a realigned stream channel that may lack the sinuosity of the affected stream. During Section 404 permitting, the Coalition would consult with the Corps to design the stream realignments so as to adequately replace the functions of the affected stream channel. Based on preliminary design information provided by the Coalition, the Indian Canyon Alternative and Whitmore Park Alternative would have about the same loss in sinuosity, while the Wells Draw Alternative would have a net zero sinuosity impact.

Table 3.3-13. Sinuosity Impacts at Stream Realignments

	Action Alternative (miles)		
Impact	**Indian Canyon**	**Wells Draw**	**Whitmore Park**
Filled stream channel[a]	-3.8	-1.4	-3.8
Abandoned stream channel[b]	-1.5	-0.4	-1.5
Total	**-5.3**	**-1.8**	**-5.3**
New channel[c]	**+4.5**	**+1.8**	**+4.3**
Sinuosity difference[d]	**-0.8**	**0.0**	**-1.0**

Notes:

[a] Stream channel filled and permanently lost in the rail line footprint.

[b] Stream channel between the permanently filled channel and the point of new channel. This part of the stream channel may or may not be filled, but is otherwise disconnected from the new stream channel.

[c] New stream channel is the realigned stream in the form of a straight line, based on preliminary information provided by the Coalition. During Section 404 permitting, the designs of realigned streams are unlikely to be straight lines, as this would not adequately replace the functions of the affected stream channel.

[d] Sinuosity difference indicates the change in sinuosity from realigning a stream channel. A negative number indicates a loss in sinuosity.

Table 3.3-14~~13~~ shows the summary of proposed rail line distances and impact areas within Section 303(d) impaired assessment units. The numbers reported in the table refer to total disturbance within 303(d) impaired assessment units, not only the area of disturbance within impaired surface waters. Because any disturbance within impaired assessment units could directly or indirectly affect impaired surface waters due to runoff from construction areas or the rail line itself, OEA expects that the severity of impacts on impaired surface waters would be related to the total extent of disturbance within impaired assessment units. While all Action Alternatives would affect water quality, the Wells Draw Alternative would disturb the greatest surface area overall and within Section 303(d) impaired assessment units, followed by the Whitmore Park Alternative and Indian Canyon Alternative. Surface waters within Section 303(d) impaired assessment basins could be more sensitive to sedimentation and pollutant discharge during construction and operations, which could result in impacts on the beneficial uses of these surface waters.

Table 3.3-14 ~~-13~~. Distance and Area of Impact in Section 303(d) Impaired Assessment Units

	Action Alternative		
Assessment Unit	**Indian Canyon**	**Wells Draw**	**Whitmore Park**
Price River (1)	8.9 miles/434.0 acres	8.9 miles/434.0 acres	10.6 miles/634.6 acres
Nine Mile	0.5 mile/12.1 acres	37.4 miles/4,064.1 acres	0.5 acre/12.1 acres
Indian Canyon Creek	28.2 miles/1,077.0 acres	0 miles/0 acres	28.2 miles/1075.8 acres
Antelope Creek	4.3miles/204.6 acres	<0.1 mile/0.1 acre	4.3 miles/211.7 acres
Pariette Draw Creek	4.3 miles/230.5 acres	34.5 miles/2,081.3 acres	4.3 miles/230.5 acres
Duchesne River (2)	11.1 miles/701.5 acres	9.7 miles/510.1 acres	11.1 miles/701.5 acres
Total	**57.3 miles/2,660.0 acres**	**90.6 miles/7,089.6 acres**	**59 miles/2,866.2 acres**

Notes:
The Willow Creek-Carbon, Duchesne River (3), and Green River – 3 assessment units are not included in table because they are not Section 303(d) impaired.
Ephemeral streams are not included in Utah's Integrated Report (UDWQ 2016).
Source: UDWQ 2016

A secondary factor differentiating surface water impacts between the Action Alternatives is the area of erosive soils along each Action Alternative. A greater area of soil susceptible to water and wind erosion would increase the potential for sedimentation and turbidity impacts on surface waters during construction and operations. However, as stated in Section 3.5, *Geology, Soils, Seismic Hazards, and Hazardous Waste*, only a small portion of the study area for each Action Alternative is rated as having high risk to wind and water erosion and all of the Action Alternatives would have similar areas of susceptibility to wind erosion and water erosion. Therefore, soil susceptibility to water and wind erosion is not a significant factor in differentiating surface water impacts between the Action Alternatives.

Floodplains

Construction and Operations

Construction and operation of any of the Action Alternatives would affect floodplains. The primary factor in differentiating floodplain impacts between the Action Alternatives is the area of floodplains that each Action Alternative would affect. A greater floodplain impact would generally indicate a greater potential for floodplain and flood flow construction and operations impacts as described in Subsection 3.3.3.1, *Impacts Common to All Action Alternatives, Floodplains*. Table 3.3-154 summarizes the floodplain impacts by Action Alternative.

Table 3.3-15-~~14~~. Floodplain Impacts by Action Alternative

Action Alternative	FEMA-Mapped 100-Year Floodplain	NRCS Flood-prone Soil[a]
Indian Canyon		
Permanent	0.1 acre	218.7 acres
Temporary	0.8 acre	246.1 acres
Wells Draw		
Permanent	0.2 acre	49.6 acres
Temporary	1.7 acres	87.6 acres
Whitmore Park		
Permanent	5.9 acres	216.4 acres
Temporary	20.2 acres	245.8 acres

Notes:
[a] For all Action Alternatives, the NRCS flood-prone soil frequency classification of *rare* and *very rare* make up approximately 99 percent of all flood-prone soils; the remaining 1 percent of the soils is classified as *frequent* and *occasional* flooding.
Sources: FEMA 2020; NRCS 2019a

Based on FEMA-mapped floodplains, the Whitmore Park Alternative would affect the greatest area of 100-year floodplain, followed by the Wells Draw Alternative and Indian Canyon Alternative. The Whitmore Park Alternative's FEMA-mapped floodplain impacts would occur primarily on floodplains mapped along Pole Creek and Dry Fork in Carbon County; a small area of floodplain impact would also occur along an unnamed tributary to the Duchesne River in Uintah County. The Indian Canyon Alternative's and the Wells Draw Alternative's small area of FEMA-mapped floodplain impacts would occur along the unnamed tributary to the Duchesne River in Uintah County.

Any part of an Action Alternative within a FEMA-mapped 100-year floodplain would have to be designed to meet the required federal and local floodplain development regulations. Based on NRCS flood-prone soil information, the Indian Canyon Alternative and Whitmore Park Alternative would affect the most, and approximately the same, acreage of floodplains. The much higher area of NRCS flood-prone soil along the Indian Canyon Alternative and Whitmore Park Alternative compared to the Wells Draw Alternative is a result of the greater area of flood-prone soils in the bottom of Indian Canyon. However, it should be noted that nearly all (approximately 99 percent) of the NRCS flood-prone soils for all Action Alternatives are classified as *rare* or *very rare* flooding.

As described in Subsection 3.3.3.1, *Impacts Common to All Action Alternatives, Floodplains*, cloudburst floods are known to occur in Utah and have been documented along the Action Alternatives. Cloudburst floods are rare and unpredictable, and given the conditions necessary for such an event (i.e., torrential downpour of rain in a short time period over specific terrain), it is not possible to determine exactly where and when a cloudburst flood would occur. However, in the rare event cloudburst floods were to occur along the Action Alternatives, they would be limited to the hilly and mountainous terrain associated with these events, including Indian Canyon and Argyle Canyon.

The Indian Canyon Alternative and Whitmore Park Alternative would travel through Indian Canyon for about 22 miles, and the Wells Draw Alternative would travel through Argyle Canyon for about 24 miles. While the distance through these canyons is similar for each of the Action Alternatives and is unlikely to be a differentiating factor for the chance of cloudburst flood occurrence, the location of the Action Alternatives in the canyons could indicate if an Action Alternative is more susceptible to cloudburst flood impacts if one were to occur. The Indian Canyon Alternative and Whitmore Park Alternative would travel through the bottom of Indian Canyon while the Wells Draw Alternative would travel through the upper half of Argyle Canyon, which could indicate that a cloudburst flood could cause more damage to the Indian Canyon Alternative and Whitmore Park Alternative, as the cloudburst flood could increase in flow, volume, and momentum as it moves downslope toward the bottom of Indian Canyon.

Wetlands

Construction and Operations

Although all three of the Action Alternatives would result in similar types of construction impacts and operations impacts on wetlands, the severity of those impacts would vary across the Action Alternatives based on the area of wetlands that each Action Alternative would affect. Table 3.3-16~~5~~ shows the total acres of wetlands that each Action Alternative would temporarily and permanently disturb. OEA assumed that temporary impacts on wetlands would last for the duration of construction, which would be approximately 20 to 28 months for the Indian Canyon Alternative and the Whitmore Park Alternative and approximately 32 to 48 months for the Wells Draw Alternative.

Table 3.3-16~~-15~~. Wetland Impacts by Action Alternative

	Action Alternative (acres)		
Wetland Type	**Indian Canyon**	**Wells Draw**	**Whitmore Park**
Emergent Marsh			
Permanent	<0.1	1.1	<0.1
Temporary	<0.1	6.6	<0.1
Wet Meadow			
Permanent	4.0[a]	3.2	2.8[a]
Temporary	9.8	9.0	8.9
Scrub-Shrub			
Permanent	2.9	2.2	0.7
Temporary	3.3	0.7	2.2
Total Permanent	**7.0**	**6.5**	**3.6**
Total Temporary	**13.2**	**16.3**	**11.2**

Notes:
[a] OEA identified one spring associated with a wet meadow in the permanent impact area.
Sources: Coalition 2020a; USFWS 2019

While the Wells Draw Alternative would temporarily affect the greatest area of wetlands, the Indian Canyon Alternative would have the greatest permanent wetland impact. The Whitmore Park Alternative would have the least permanent and temporary wetland impacts. While any of the Action Alternatives would affect wetland water quality, the Wells Draw Alternative would disturb the greatest surface area overall and within Section 303(d) impaired assessment units, followed by the Whitmore Park Alternative and Indian Canyon Alternative (Table 3.3-14~~3~~). Wetlands within Section 303(d) impaired assessment basins would be more sensitive to sedimentation and pollutant discharge during construction and operations. Wetland culvert crossings are included in the numbers in Table 3.3-14~~3~~. The Wells Draw Alternative would have the greatest number of crossing structures in wetland areas, including one bridge and 14 culverts. The Indian Canyon Alternative would have one bridge and 11 culverts across wetlands, while the Whitmore Park Alternative would have five culverts in wetland areas. The majority of wetlands affected by permanent fill actions for the Action Alternative would be from partial filling; however, several wetlands would be completely filled, including 12 wetlands along the Indian Canyon Alternative, seven wetlands along the Wells Draw Alternative, and four wetlands along the Whitmore Park Alternative. Some of the partially filled wetlands would also be bifurcated by the Action Alternatives, including nine wetlands along the Indian Canyon Alternative and Wells Draw Alternative, and seven wetlands along the Whitmore Park Alternative.

Wetlands in the field survey study area that are adjacent to the project footprint would not be filled, cleared, or excavated during rail construction, but could be affected by rail construction and operation in the project footprint. These impacts are described in Subsection 3.3.3.1, *Impacts Common to All Action Alternatives*, *Wetlands*, and could include alterations to wetland hydrology, including impacts on shallow subsurface water flow, water quality, and vegetation growth and diversity. OEA has quantified the area of wetland adjacent to the project footprint that could be susceptible to potential indirect impacts.~~Impacts on wetlands adjacent to the project footprint cannot be quantified, but~~ Action Alternatives with more wetland area adjacent to the project footprint would result in a greater wetland area that could be susceptible to construction and operation impacts when compared to Action Alternatives with fewer acres of wetlands adjacent to the project footprint. The Wells Draw Alternative has the greatest area of wetland adjacent to the project footprint, followed by the Indian Canyon Alternative and the Whitmore Park Alternative (Table 3.3-17~~6~~).

Table 3.3-17~~-16~~. Wetlands Adjacent to Project Footprint by Action Alternative

	Action Alternative (acres)		
Wetland Type	**Indian Canyon**	**Wells Draw**	**Whitmore Park**
Emergent marsh	0.4	8.4	0.4
Wet meadow	38.7	38.3	24.8
Scrub-shrub	5.4	3.7	5.9
Total	**44.5**	**50.4**	**31.1**

Notes:
Sources: Coalition 2020a; USFWS 2019

A secondary factor differentiating wetland impacts between the Action Alternatives is how susceptible the surrounding soils are to wind and water erosion along each Action Alternative. A greater area of soil susceptible to water and wind erosion would increase the potential for sedimentation and turbidity impacts on wetlands during construction and operations. However, as stated in Section 3.5, *Geology, Soils, Seismic Hazards, and Hazardous Waste*, only a small portion of the study area for each Action Alternative is rated as having high risk to wind and water erosion and all Action Alternatives would have similar areas of susceptibility to wind erosion and water erosion. Therefore, soil susceptibility to water and wind erosion is not a significant factor in differentiating wetland impacts between the Action Alternatives.

Groundwater

Construction and Operations

Construction of any of the Action Alternatives would affect groundwater. To compare groundwater impacts between Action Alternatives, OEA considered 1) the area of the rail line footprint and temporary footprint for each Action Alternative, and 2) the number of groundwater wells and springs in the rail line footprint and temporary footprint for each Action Alternative. In general, the Action Alternatives with a larger project footprint would create more impervious or compacted surfaces that could affect water infiltration and groundwater recharge. Table 3.3-18~~7~~ shows the number of groundwater wells and springs located in the groundwater study area by Action Alternative.

Table 3.3-18~~-17~~. Impacts on Groundwater Wells and Springs by Action Alternative

Action Alternative	Number of Groundwater Wells[a]	Number of Springs[b]
Indian Canyon		
Rail line footprint	2	2
Temporary footprint	6	7
Wells Draw		
Rail line footprint	1	2
Temporary footprint	4	9
Whitmore Park		
Rail line footprint	0	2
Temporary footprint	2	4

Notes:

This table includes Utah water rights for groundwater wells and springs that are identified as being approved or in use, and springs identified during field surveys that are not in the Utah water rights database. Numbers include wells and springs in both the rail line footprint (e.g., permanent impact area of fill) and excavation and temporary footprint (e.g., staging areas).

[a] Includes wells, tunnels, sumps, undergrounds drains, and non-production wells (i.e., monitoring or testing wells).

[b] Includes springs or surface waters identified as being sourced by a nearby spring.

Sources: UDWRi 2020; Coalition 2020a

The Wells Draw Alternative would have the largest rail line footprint and temporary footprint, followed by the Whitmore Park Alternative and the Indian Canyon Alternative. However, as stated in Subsection 3.3.2.2, *Groundwater*, groundwater recharge areas are generally outside of the area of the Action Alternatives, and therefore, none of the Action Alternatives are anticipated to have any measurable impact on groundwater recharge. The Indian Canyon Alternative would affect the greatest number of groundwater wells, followed by the Wells Draw Alternative and Whitmore Park Alternative. All Action Alternatives would affect two springs in the rail line footprint, but the Wells Draw Alternative would affect the greatest number of springs in the temporary footprint, followed by the Indian Canyon Alternative and Whitmore Park Alternative. Because springs are considered important and difficult to replace resources under CWA regulations, the Coalition would need to develop measures to avoid, minimize, and mitigate impacts on springs in the temporary footprint in consultation with the Corps as part of the Section 404 permitting process, if the Board were to authorize one of the Action Alternatives.

As discussed in Subsection 3.3.3.1, *Impacts Common to All Action Alternatives, Groundwater,* OEA anticipates that impacts on groundwater quality during construction and operations would be minimal. There are no significant differentiating factors between the Action Alternatives other than footprint area and length of Action Alternative, with a larger footprint equating to more construction and the potential for more spills, and a longer rail line equating to a longer distance for train travel over a greater area of groundwater that would be susceptible to spills during operations. However, as previously mentioned, groundwater recharge areas are generally outside the locations of the Action Alternatives, and implementing best management practices during construction would contain and quickly clean up a spill.

3.3.3.3 No-Action Alternative

Under the No-Action Alternative, the Coalition would not construct and operate the proposed rail line, and there would be no impacts on surface water, floodplains, wetlands, and groundwater from construction or operation of the proposed rail line.

3.3.4 Mitigation and Unavoidable Environmental Impacts

Any of the Action Alternatives would result in impacts on water resources, including surface waters, wetlands, floodplains, and groundwater. In general, the Wells Draw Alternative would result in the most impacts on surface waters and wetlands. The Indian Canyon Alternative and the Whitmore Park Alternative would have largely similar impacts on perennial streams and intermittent streams, but the Whitmore Park Alternative would affect a larger area of ephemeral streams and the Indian Canyon Alternative would affect a larger area of wetlands.

The Coalition has proposed eight voluntary mitigation measures related to water resources (Chapter 4, *Mitigation*). Those mitigation measures include the requirement that the Coalition obtain a CWA Section 404 permit from the Corps prior to undertaking any construction-related activities. As part of the CWA Section 404 permitting process, the Coalition shall demonstrate, in consultation with the Corps, that all appropriate and practicable steps have been taken to avoid and minimize impacts on water resources under the jurisdiction of the Corps. For unavoidable impacts, the Coalition shall develop and implement compensatory mitigation in consultation with the Corps to replace the loss of surface waters. In addition to the Coalition's voluntary mitigation measures, OEA is also recommending that the Board impose additional measures to avoid, minimize, and mitigate impacts on water resources in any decision authorizing construction and operation of the proposed rail line.

Even if the Board were to impose the Coalition's voluntary mitigation measures and OEA's recommended mitigation measures, some adverse impacts on surface waters and wetlands would be unavoidable. Those unavoidable impacts would include changes to natural drainage around water crossings; changes to channel morphology and sinuosity; increased potential for debris jams and water backup; increased channel scour and erosion; increased turbidity, sediment loads, and concentration of pollutants during construction; degradation of wetland stormwater and floodwater storage capacity and wetland quality from alterations or filling of wetlands; decreased wetland quality from discharges of pollutants into wetlands; the loss of wetland habitat; and the loss of springs. Due to the large number of surface water crossings and the large area of potentially affected wetlands, OEA concludes that unavoidable impacts on surface waters and wetlands, including and in particular, the loss of wetland habitat and permanent changes to surface water hydrology from crossing structures and stream realignments, would be locally significant for any of the Action Alternatives. Construction and operation of the proposed rail line would not significantly affect water quality or ecological services associated with water resources on a watershed or regional level.

Construction and operation of any of the Action Alternatives would result in some minor adverse impacts on floodplains and groundwater, including decreased floodplain storage capacity, diversion of flood flows by fill placement, constriction of flood flows at bridge and culvert locations, decreased floodplain water retention, and altered flood dynamics from the presence of rail infrastructure; altered infiltration recharge characteristics and temporary degradation of groundwater quality. The Coalition's voluntary mitigation measures and OEA's recommended mitigation measures would minimize these impacts, and OEA does not anticipate that construction and operation of the proposed rail line would significantly affect floodplains or groundwater.

3.4 Biological Resources

This section describes the impacts on biological resources that would result from construction and operation of the proposed rail line. Biological resources considered in this section include wildlife, fish, vegetation, and special status species. Special status species include species that are listed or proposed to be listed as threatened or endangered under the Endangered Species Act (ESA); candidate species for ESA listing; bald and golden eagles; and sensitive species listed by BLM, the Forest Service, the state of Utah, or the Ute Indian Tribe. The subsections that follow describe the study areas, data sources, the methods OEA used to analyze potential impacts, the affected environment, and the potential impacts of the proposed rail line on biological resources.

3.4.1 Analysis Methods

This subsection identifies the study areas, data sources, and analysis methods OEA used to analyze biological resources.

3.4.1.1 Study Areas

The study areas for biological resources consists of the following three~~two~~ areas.

- **Field survey study area.** The field survey study area corresponds to where the Coalition conducted field surveys for biological resources during spring, summer, and fall of 2019, and spring and summer of 2020. The Coalition designed the field survey study area to encompass the rail line footprint and temporary footprint.[1] The field survey study area consists of a 1,000-foot-wide corridor along much of the rail centerline (500 feet on either side of the centerline) for each Action Alternative. The field survey study area is wider than 1,000 feet in a few areas where permanent or temporary disturbance would extend slightly further than 500 feet from the rail centerline. Appendix G, *Biological Resources Figures*, Figure G-10, shows the field survey study area.

  The field survey study area also includes a supplemental survey study area that is specific to communications towers and access roads. The supplemental survey study area consists of a 1,000-foot-wide corridor along access road centerlines and a 500-foot-wide buffer around communications towers. This supplemental survey study area makes up a small percent of the field survey study area (approximately 2 percent or less for all Action Alternatives).

- **Noise disturbance study area.** The noise disturbance study area is the area in which wildlife could be affected by train noise. This area is defined by the 100 A-weighted decibel (dBA) sound exposure level (SEL), the noise level at which studies have shown animals (domestic and wild)

[1] The *rail line footprint* includes the area of the railbed, as well as the full width of the area cleared and cut or filled. The rail line footprint would also include other physical structures installed as part of the proposed rail line, such as fence lines, communications towers, siding tracks, relocated roads, and power distribution lines. The rail line footprint is the area where rail line operations and maintenance would occur. The area would be permanently disturbed. The *temporary footprint* is the area that could be temporarily disturbed during construction, including areas for temporary material laydown, staging, and logistics. Disturbed areas in the temporary footprint would be reclaimed and revegetated following construction. The *project footprint* is the combined area of the rail line footprint and temporary footprint, both of which would be disturbed during construction, comprising where construction and operations of the proposed rail line would occur.

exhibit a response to train noise (FRA 2005). Section 3.4.1.3, *Analysis Methods*, provides an additional explanation regarding why OEA is using this noise level. Based on noise modeling for the proposed rail line, the 100-dBA SEL is estimated to extend 350 feet from the rail line for wayside (locomotive engine and wheel on rail) noise and 460 feet for horn noise at grade crossings. The noise disturbance study area is subsumed by the field survey study area.

- **Greater sage-grouse study area.** The greater sage-grouse study area extends a distance of 3.1 miles from the centerline of the proposed rail line. This corresponds to the distance at which anthropogenic land use activities associated with linear features (e.g., rail lines) have been observed to affect sage-grouse leks (USGS 2014), which are areas where greater sage-grouse congregate during the spring breeding season.

3.4.1.2 Data Sources

OEA reviewed the following data sources to determine the potential impacts on biological resources that could result from construction and operation of the proposed rail line.

- U.S. Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) Environmental Conservation Online System.
- Forest Service, USFWS, BLM, UDWR, and Utah Natural Heritage Program data, including lists of special status species within or near the study areas.
- Data on fish species and fish habitat in the study areas from UDWR, the UDEQ, scientific literature, and regional watershed program documentation.
- Data on big game in the study areas from UDWR, including big game state management plans, UDWR-mapped big game habitats, and general locations of big game movement corridors mapped by UDWR big game biologists.
- The Coalition's *Biological Resources Baseline Environment Technical Memorandum: Uinta Basin Railway* (Coalition 2020a).[2] In addition to the sources listed above, the Coalition used the following additional data sources to characterize biological resources in the field survey study areas in its technical memorandum:
  - U.S. Geological Survey (USGS) GAP/LANDFIRE National Terrestrial Ecosystems data set (USGS 2016 as cited in Coalition 2020a).
  - NatureServe Explorer.
  - Utah Conservation Data Center database (UDWR 2019a).

[2] The Coalition conducted biological resources field surveys along the Action Alternatives throughout the spring, summer, and fall of 2019. OEA independently verified the fieldwork and data collection by reviewing field methods, conducting site visits, observing fieldwork, and reviewing survey reports and the underlying data. Additional information on the Coalition's field survey methodology can be found in the *Biological Resources Baseline Environment Technical Memorandum: Uinta Basin Railway* (Coalition 2020a), which is available to the public on the Board's website (www.stb.gov) and the Board-sponsored project website (www.uintabasinrailwayeis.com).

- The Coalition's habitat field survey reports for the following federally threatened species:[3]
    - Barneby Ridge-cress Habitat Evaluation Memorandum (Coalition 2020b).
    - Ute Ladies'-tresses Habitat Evaluation Memorandum (Coalition 2020c).
    - Mexican Spotted Owl Habitat Evaluation Memorandum (Coalition 2020d).
- Federal, state, and local wildland fire occurrence data (Forest Service~~USGS~~ 2017a~~9~~).
- Forest Service Wildlife Hazard Potential data (Forest Service 2020a~~18~~).
- Forest Service invasive plants database (Forest Service 2020b~~a~~).
- *Ashley National Forest Assessment Tribal Uses Report* (Forest Service 2017b).

3.4.1.3 Analysis Methods

OEA used the following methods to analyze impacts on biological resources in the study areas.

- **OEA used the Coalition's field survey information and federal agency GIS data to describe biological resources in the field survey study area and supplemental survey study area, respectively.** OEA used the Coalition's *Biological Resources Baseline Environment Technical Memorandum: Uinta Basin Railway* (Coalition 2020a) and data sources listed in Section 3.4.1.2, *Data Sources*, to identify the wildlife, fish, and vegetation species (including special status species) that are known to be present or that have the potential to be present in the field survey study area. OEA independently verified the Coalition's fieldwork and data collection by reviewing field methods, conducting site visits, observing fieldwork, and reviewing survey reports and the underlying data. To describe biological resources in the supplemental survey study area, which makes up 2 percent or less of the field survey study areas for the Action Alternatives, OEA used GIS datasets; the GIS data are subsumed by the Coalition's data presented in Section 3.4~~3~~.2, *Affected Environment*, and Section 3.4~~3~~.3, *Environmental Consequences*.
- **OEA estimated the amount of disturbance to vegetation and wildlife habitat.** OEA used GIS to estimate the amount of vegetation and wildlife habitat that would be permanently (e.g., fill and excavation) and temporarily (e.g., staging areas) affected by the proposed rail line.
- **OEA qualitatively assessed construction and operation impacts.** OEA qualitatively evaluated the potential impacts on biological resources from construction and operation of the proposed rail line, including temporary impacts from rail construction activity (e.g., temporary clearing of habitat), permanent impacts from the presence of rail infrastructure (e.g., habitat fragmentation), impacts from operation of the rail line itself (e.g., train-wildlife collisions), potential impacts on wildfire occurrence and suppression, and the potential for noxious and invasive weeds to establish and spread. The analysis was informed by OEA's review of scientific literature on the life-history and habitat requirements for each potentially affected species;

[3] The Coalition conducted habitat suitability surveys for three federally listed species in 2020: Barneby ridge-cress, Ute ladies'-tresses, and Mexican spotted owl. Additional information on the survey methodology can be found in the *Barneby ridge-cress Habitat Evaluation Memorandum* (Coalition 2020b), *Ute Ladies'-tresses Habitat Evaluation Memorandum* (Coalition 2020c), and *Mexican Spotted Owl Habitat Evaluation Memorandum* (Coalition 2020d), which are available to the public on the Board's website (www.stb.gov) and the Board-sponsored project website (www.uintabasinrailwayeis.com).

federal and state wildlife and land management agency plans and policies for the study areas; and the professional judgment of OEA's biological resources team.

- **OEA addressed greater sage-grouse impacts through an interagency working group.** To inform the analysis of impacts on greater sage-grouse (*Centrocercus urophasianus*) and implications of the BLM and state greater sage-grouse management plans, OEA convened a working group of federal and state agencies with expertise on greater sage-grouse and used information from the working group to prepare the analysis.

- **OEA assessed noise impacts on wildlife.** OEA used noise thresholds established by FRA to determine the potential for noise impacts on wildlife. FRA uses an SEL of 100 dBA (refer to Section 3.6, *Noise and Vibration*, for a description of SEL and dBA) as a noise threshold above which animals (domestic and wild) exhibit a response to train noise (FRA 2005). FRA established this threshold after reviewing available studies that relate actual noise levels to effects in domestic and wild animals. OEA estimated the 100 dBA SEL to extend approximately 350 feet from the rail line for wayside noise and approximately 460 feet for horn noise at grade crossings.

- **OEA analyzed stream crossings to determine impacts on fish.** OEA used the number of streams that would be intersected by each Action Alternative to determine potential impacts on fish. The Action Alternatives that would cross more streams, have multiple crossings of a stream, or parallel a stream would have a greater potential to affect more fish and fish habitat than the Action Alternatives with fewer stream crossings and fewer streams adjacent to the rail corridor.

3.4.2 Affected Environment

This subsection identifies the existing environmental conditions related to biological resources in the study areas. The proposed rail line would be located primarily within the Colorado Plateau ecoregion and would cross the following subregions (Woods et al. 2001).

- **Semiarid Benchlands and Canyonlands.** The Semiarid Benchlands and Canyonlands subregion is characterized by benches[4] and mesas covered with broad grass, shrub, and woodlands. Bedrock exposures are common and common plant species include warm season grasses, winterfat (*Krascheninnikovia lanata*), Mormon tea (*Ephedra viridis*), four-wing saltbush (*Atriplex canescens*), sagebrush, and pinyon and juniper woodlands.

- **Escarpments.** The Escarpments subregion is characterized by deeply dissected cliff-bench complexes that ascend from lower regions to the mountain rims. Common vegetation includes Douglas-fir forest on steep, north-facing slopes at higher elevations to desert and semidesert grassland or shrubland on lower, drier sites.

- **Uinta Basin Floor.** The Uinta Basin Floor subregion lies in a large basin that is enclosed by the Uinta Mountains and Tavaputs Plateau. Precipitation is typically low and soils are arid, but the area receives stream runoff from the nearby mountains. Stream runoff is often diverted for crop and pasture irrigation on gentle slopes and the valley floor.

[4] A bench (or structural bench) is a shelf or step-like landform.

A small portion of the proposed rail line would be located in the Wasatch Montane Zone and Mountain Valleys subregions of the Wasatch and Uinta Mountains ecoregion (Woods et al. 2001). The Wasatch Montane Zone consists of forested mountains and plateaus where Douglas-fir and aspen forests are common and Engelmann spruce and subalpine fir grow on steep, north-facing slopes. The Mountain Valleys subregion, which is mostly unforested, contains terraces, floodplains, alluvial fans,[5] and hills and is naturally dominated by sagebrush. Irrigated cropland, irrigated pastureland, and rangeland are common.

The existing habitat in the vicinity of the proposed rail line has been fragmented by previous construction of highway corridors and smaller roads and conversion of land for agricultural, residential, commercial, and industrial uses. The major highways in or near the study areas are US 191 and US 6. Smaller paved and dirt roads provide access to homes, businesses, and oil well pads. These land use changes have disrupted the continuity of the original wildlife habitat. This disruption of continuity has likely affected the function of the original wildlife habitat and the foraging habits, reproductive habits, and migratory movements of many species.

3.4.2.1 Wildlife

Common Wildlife

Large mammals found in the study areas include mule deer (*Odocoileus hemionus*), elk (*Cervus canadensis*), moose (*Alces alces*), pronghorn antelopes (*Antilocapra americana*), bighorn sheep (*Ovis canadensis*), coyotes (*Canis latrans*), cougars (*Felis concolor*), bobcats (*Lynx rufus*), and black bears (*Ursus americanus*) (Coalition 2020a; Wiken et al. 2011). Smaller animals include raccoons (*Procyon lotor*), skunks (*Mephitis mephitis*), red foxes (*Vulpes vulpes*), badgers (*Taxidea taxus*), white-tailed prairie dogs (*Cynomys leucurus*), porcupines (*Erethizon dorsatum*), beavers (*Castor canadensis*), rabbits (*Sylvilagus nuttallii*; *Lepus townsendii*; *Lepus californicus*; *Lepus americanus*; *Sylvilagus audubonii*), red squirrels (*Tamiasciurus hudsonicus*), and several species of snakes, lizards, bats, and mice (Coalition 2020a; Wiken et al. 2011). Birds are abundant throughout the study areas, and 57 bird species were identified in the study areas during field surveys (Coalition 2020a: Table 6-1).

Big Game

The study areas cross a number of areas identified as big game range (UDWR 2019b). UDWR, which manages big game populations~~species~~ in ~~Utah~~ distinct management units throughout Utah, characterizes big game habitat in terms of its seasonal use (year-long, winter, spring, or summer) and habitat value.[6] Crucial-value habitat is defined as habitat on which the local population of a wildlife species depends for survival because there are no alternate ranges or habitats available. Substantial-value habitat is defined as habitat that is used by a wildlife species but is not considered crucial for population survival. Bighorn sheep, elk, mule deer, and pronghorn antelope all have crucial year-long habitat in the study areas, and moose have crucial winter habitat in the study areas. Table 3.4-1 identifies the big game habitat in the study areas by Action Alternative, along with seasonal use of the habitat by species. Appendix G, *Biological Resources Figures,* contains figures displaying the relevant habitat for each species.

[5] Alluvial fans are fan-shaped deposits of water-transported material (called alluvium). They typically form at the base of topographic features where there is a noticeable break in slope.

[6] Management units serve as the basis for big game population management recommendations.

Table 3.4-1. Seasonal Use of Existing Big Game Habitat in the Study Areas

	Action Alternative		
Species	**Indian Canyon**	**Wells Draw**	**Whitmore Park**
Bighorn sheep (*Ovis canadensis*)	• Year-long, crucial	• Year-long, crucial • Year-long, substantial	• Year-long, crucial
Elk (*Cervus canadensis*)	• Summer, crucial • Winter, crucial • Winter, substantial • Year-long, substantial	• Summer, crucial • Winter, crucial • Winter, substantial • Year-long, crucial • Year-long, substantial	• Summer, crucial • Winter, crucial • Winter, substantial • Year-long, substantial
Moose (*Alces alces*)	• Winter, crucial • Winter, substantial • Year-long, crucial	• Winter, crucial • Winter, substantial • Year-long, crucial	• Winter, crucial • Winter, substantial • Year-long, crucial
Mule deer (*Odocoileus hemionus*)	• Summer, crucial • Winter, crucial • Winter, substantial • Year-long, substantial	• Summer, crucial • Winter, crucial • Winter, substantial • Year-long, substantial	• Summer, crucial • Winter, crucial • Winter, substantial • Year-long, crucial • Year-long, substantial
Pronghorn antelope (*Antilocapra americana*)	• Year-long, crucial • Year-long, substantial	• Year-long, crucial • Year-long, substantial	• Year-long, crucial • Year-long, substantial

Notes:
Source: Coalition 2020a

Table 3.4-2 identifies the UDWR big game management units that are crossed by the Action Alternatives; the big game population within these management units are primarily managed to ensure healthy animals for a broad range of recreational opportunities (e.g., hunting and viewing) and to sustain healthy populations at a level that is within the long-term carrying capacity of the available habitat. Table 3.4.3 identifies big game movement corridors that UDWR mapped for OEA around the Action Alternatives. UDWR mapped movement corridors for big horn sheep, pronghorn, elk, and mule deer and identified each movement corridor as low, medium, or high importance. No moose movement corridors were identified along any Action Alternative. Bighorn sheep movement corridors are limited to a small area along the Indian Canyon Alternative and Whitmore Park Alternative in Indian Canyon. Pronghorn movement corridors are found in the Basin. Elk movement corridors are found in Emma Park area and upper Argyle Canyon/Bad Land Cliffs, as well as along the Wells Draw Alternative as it turns north of Bad Land Cliffs. Mule deer movement corridors are found in the Emma Park area, around Indian Canyon and Argyle Canyon. Appendix G, *Biological Resources Figures*, contains figures displaying the movement corridors for each big game species along the Action Alternatives.

Table 3.4-2. UDWR Big Game Management Units Crossed by the Action Alternatives

Species	UDWR Management Unit
Bighorn sheep (*Ovis canadensis*)	Nine Mile Unit 11, Wasatch Mountains Unit 17
Elk (*Cervus canadensis*)	Central Mountains Unit 16, Nine Mile Unit 11, South Slope Unit 9, Wasatch Mountains Unit 17
Moose (*Alces alces*)	Nine Mile Unit 11, Wasatch Mountains Unit 17
Mule deer (*Odocoileus hemionus*)	Central Mountains Unit 16, Nine Mile Unit 11, South Slope Unit 9, Wasatch Mountains Unit 17
Pronghorn antelope (*Antilocapra americana*)	Central Mountains Unit 16, Nine Mile Unit 11

Notes:
Sources: UDWR 2015, 2017a, 2017b, 2018, 2019d, 2021a

Table 3.4-3. Big Game Movement Corridors along the Action Alternatives

	Movement Corridors Identified by Importance		
Species	Indian Canyon	Wells Draw	Whitmore Park
Bighorn sheep (*Ovis canadensis*)	High	N/A	High
Elk (*Cervus canadensis*)	High, Medium, Low	High, Medium, Low	High, Medium, Low
Mule deer (*Odocoileus hemionus*)	Medium	Medium	Medium
Pronghorn antelope (*Antilocapra americana*)	High, Medium	High	High, Medium

Notes:
Source: UDWR 2021b
N/A = no movement corridors present; Low = the movement corridor is used by a limited number of individuals in the population each year; Medium = the movement corridor is used by a moderate number of individuals in the population each year; High = the movement corridor is used by a significant number of individuals in the population and/or corridor provides a critical connection between seasonal habitats for the population.

OEA notes that the Ute Indian Tribe has jurisdiction over wildlife and habitat within the Uintah and Ouray Reservation, including hunting, pursuant to the Law and Order Code of the Ute Indian Tribe of the Uintah and Ouray Reservation, Title VIII – Ute Indian Wildlife and Outdoor Recreation Code (Appendix B, *Regulations*).

Birds of Conservation Concern

USFWS maintains a Birds of Conservation Concern (BCC) list (USFWS 2015) that identifies species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the ESA. Table 3.4-~~2~~4 lists BCC that could occur in or near the study areas. OEA identified potentially suitable habitat in the study areas for 12 of the 14 BCC species.

Table 3.4-~~2~~4. Migratory Birds of Conservation Concern Potentially in or near the Study Areas

Species Name	Is Species Listed as Potentially Present in the Study Areas by USFWS?[a]			Is Potentially Suitable Habitat Present in the Study Areas?[b]
	Indian Canyon Alternative	Wells Draw Alternative	Whitmore Park Alternative	
Black rosy-finch (*Leucosticte atrata*)	Yes	Yes	Yes	Potentially suitable habitat exists in the study areas for all three Action Alternatives.
Brewer's sparrow (*Spizella breweri*)	Yes	Yes	Yes	Potentially suitable habitat exists in the study areas for all three Action Alternatives.
Burrowing owl (*Athene cunicularia*)	Yes	No	Yes	Potentially suitable habitat exists in the study areas for the Indian Canyon Alternative and Whitmore Park Alternative.
Clark's grebe (*Aechmophorus clarkii*)	No	Yes	No	There is no suitable habitat in the study areas.
Golden eagle (*Aquila chrysaetos*)	Yes	Yes	Yes	Potentially suitable habitat exists in the study areas for all three Action Alternatives.
Grace's warbler (*Dendroica graciae*)	Yes	Yes	Yes	Potentially suitable habitat exists in the study areas for all three Action Alternatives.
Lesser yellowlegs (*Tringa flavipes*)	Yes	Yes	Yes	Potentially suitable habitat exists in the study areas for all three Action Alternatives.
Long-billed curlew (*Numenius americanus*)	Yes	Yes	Yes	Potentially suitable habitat exists in the study areas for all three Action Alternatives.
Marbled godwit (*Limosa fedoa*)	No	No	No	There is no suitable habitat in the study areas.
Olive-sided flycatcher (*Contopus cooperi*)	Yes	Yes	Yes	Potentially suitable habitat exists in the study areas for all three Action Alternatives.
Pinyon jay (*Gymnorhinus cyanocephalus*)	Yes	No	Yes	Potentially suitable habitat exists in the study areas for all three Action Alternatives.
Virginia's warbler (*Leiothlypis virginiae*)	Yes	Yes	Yes	Potentially suitable habitat exists in the study areas for all three Action Alternatives.
Willet (*Tringa semipalmata*)	Yes	Yes	Yes	Potentially suitable habitat exists in the study areas for all three Action Alternatives.

Species Name	Is Species Listed as Potentially Present in the Study Areas by USFWS?[a]			Is Potentially Suitable Habitat Present in the Study Areas?[b]
	Indian Canyon Alternative	Wells Draw Alternative	Whitmore Park Alternative	
Willow flycatcher (*Empidonax traillii*)	Yes	Yes	Yes	Potentially suitable habitat exists in the study areas for all three Action Alternatives.

Notes:

[a] Known or potential species presence as provided by USFWS 2020a, 2020b, 2020c.

[b] Information based on the Coalition's field surveys (Coalition 2020a) and Cornell Lab of Ornithology (Undated), NatureServe (Undated), and UDWR (2019a).

USFWS = United States Fish and Wildlife Service

3.4.2.2 Fish

The Action Alternatives are located in the Price River, Duchesne River, Strawberry River, and Lower Green-Desolation Canyon HUC 8 watersheds, which are all part of the Upper Colorado River Basin (Section 3.3, *Water Resources*, Figure 3.3-1). Major streams in these watersheds include Nine Mile Creek, Duchesne River, Strawberry River, and Price River; these all flow to the Green River, which is a major tributary to the Colorado River. Section 3.3, *Water Resources,* provides additional information on watersheds and surface waters that intersect the proposed rail line.

Perennial, intermittent, and ephemeral streams, as well as ponds, ditches, and canals in the study areas provide or support downstream habitat for fish. Although ephemeral streams may only temporarily support fish or may not support fish at all, they can indirectly support fish populations by helping to delivering required nutrients and other materials to perennial segments (USEPA 2008). Fish species in Utah are managed primarily by UDWR in cooperation with BLM, Forest Service, and USFWS. The Ute Indian Tribe Fish and Wildlife Department manages fish species native to the Uintah and Ouray Indian Reservation in cooperation with USFWS (Ute Indian Tribe 2015). Fish species in the study areas can be categorized as native nongame, native game, nonnative game, and nonnative nongame species. Table 3.4-~~3~~5 lists species known to occur in the study areas watersheds, organized by these categories. Table 3.4-~~3~~5 also includes an assessment of fish species that have been recorded in perennial waterbodies crossed by the proposed rail line.

Table 3.4-~~3~~5. Fish Species Known to Occur in the Study Area Watersheds and Documented in Perennial Streams Crossed by the Proposed Rail Line

Common Name[a]	Scientific Name
Native Nongame Fish	
Colorado pikeminnow[b]	*Ptychocheilus lucius*
Razorback sucker	*Xyrauchen texanus*
Bluehead sucker[b]	*Catostomus discobolus*
Bonytail	*Gila elegans*
Flannelmouth sucker[b]	*Catostomus latipinnis*
Longnose dace	*Rhinichthys cataractae*
Mottled sculpin[b]	*Cottus bairdii*
Mountain sucker [b]	*Catostomus platyrhynchus*
Roundtail chub[b]	*Gila robusta*
Speckled dace[b]	*Rhnichthys osculus*
Native Gamefish	
Mountain whitefish	*Prosopium williamsoni*
Colorado River cutthroat trout[b, c]	*Oncorhynchus clarki*
Nonnative Gamefish	
Bear Lake (Bonneville) cutthroat trout	*Oncorhynchus clarki utah*
Black bullhead[b]	*Ameiurus melas*
Black crappie	*Pomoxis nigromaculatus*
Bluegill	*Lepomis macrochirus*
Brown trout[b]	*Salmo trutta*
Rainbow trout[b]	*Oncorhynchus mykiss*

Common Name[a]	Scientific Name
Brook trout	*Salvelinus fontinalis*
Kokanee salmon	*Oncorhynchus nerka*
Largemouth bass	*Micropterus salmonides*
Smallmouth bass	*Micropterus dolomieu*
Channel catfish[b]	*Ictalurus punctatus*
Green sunfish[b]	*Lepomis cyanellus*
Walleye	*Sander vitreus*
Yellowstone cutthroat trout	*Oncorhynchus clarki bouvieri*
Nonnative Nongame Fish	
Brook stickleback	*Culea inconstans*
Fathead minnow[b]	*Pimephales promelas*
Grass carp	*Ctenopharyngodon idella*
Red shiner[b]	*Cyprinella lutrensis*
Redside shiner	*Richardsonius balteatus*
Sand shiner[b]	*Notropis stramineus*
Utah chub[b]	*Gila atraria*
White sucker	*Catostomus commersonii*
Common carp[b]	*Cyprinus carpio*

Notes:

[a] The fish species listed in this table represent species known to occur in the study area watersheds. This species list is based on multiple sources of publicly available information, including the sources listed below.

[b] These species have been documented in perennial waterbodies crossed by the action alternatives. Additional fish species represented by various suckers, minnows, darters, and sculpins could occur in all aquatic habitat types (e.g., perennial, intermittent, and ephemeral streams) present in the study areas.

[c] Colorado River cutthroat trout is a sensitive species that is managed under a conservation agreement between several federal agencies (e.g., BLM), three states (Utah, Colorado, and Wyoming), and the Ute Indian Tribe (Colorado River Cutthroat Trout Conservation Team 2006).

Sources: UDEQ 2015a, 2015b, 2017; UDWR 2010; URS 2003; USFWS 2003; Forest Service 1997; Brunson pers. comm.

Review of available reports and plans for the study areas indicate that 18 fish species are present in perennial waterbodies crossed by the Action Alternatives (Table 3.4-~~3~~5). There are 17 other fish species that are known to occur in the study area watersheds, but have not been documented in perennial waterbodies crossed by the Action Alternatives (Table 3.4-~~3~~5). Based on available data for fish species occurrence, the fish species potentially present are the same for all Action Alternatives (UDWR 2010). Across the three Action Alternatives, the study areas for the Whitmore Park Alternative contain the most perennial stream habitat, with 197,321 linear feet, followed by the study areas for the Indian Canyon Alternative with 189,699 linear feet of perennial streams and the study areas for the Wells Draw Alternative with 58,089 linear feet of perennial streams.

Indian Canyon Creek is the longest perennial stream found in the study areas of any of the Action Alternatives. The stream is adjacent to and parallels the Indian Canyon Alternative and Whitmore Park Alternative for approximately 25 miles. Fish surveys in multiple locations of Indian Canyon Creek were completed by UDWR in 2016; however, no fish were collected during the surveys (Brunson pers. comm.). UDWR has since stocked Colorado River cutthroat trout in Indian Canyon Creek ~~by UDWR~~, and the species were observed in Indian Canyon Creek by Forest Service biologists in fall of 2019 (Brunson pers. comm.). The Forest Service (1997) also noted that mottled sculpins were reintroduced to Indian Canyon Creek in 1994. Additional fish species, including various suckers, minnows, darters, and sculpins not listed in Table 3.4-~~3~~5 could occur in all aquatic habitat types present in the study areas.

Game fish species are an important focus in UDWR's management of wildlife resources due to the species' recreational value. Game fish species in the study areas primarily consist of cold water (trout) and warm water species (sunfish and catfish). The majority of perennial streams in the study areas (e.g., Price River, Indian Canyon Creek, Nine Mile Creek and the western portion of the Duchesne River) are managed for cold water fishery beneficial use (Use Class 3A) (UDWQ 2016). Perennial streams generally in the eastern portion of the study areas and at lower elevations are primarily managed for warm water fishery beneficial use (Use Class 3B), such as in the eastern portions of the Duchesne River and Pariette Draw Creek (UDWQ 2016). Twelve game fish species are known to occur within the study area watersheds (Table 3.4-~~3~~5). None of the Action Alternatives cross UDWR-designated Blue Ribbon Fisheries, which are waters that have exceptional fishing quality, quality fish habitat, economic benefits, and contribute to a great outdoor experience (UDWR undated).

Management Indicators are defined by the Forest Service as: "[p]lant and animal species, communities, or special habitats selected for emphasis in planning, and which are monitored during forest plan implementation in order to assess the effects of management activities on their populations and the populations of other species with similar habitat needs which they may represent" (Forest Service 1991). The *Ashley National Forest Land Management Plan* (Forest Service 1986) identifies one fish, cutthroat trout, as a Management Indicator Species for Ashley National Forest.

3.4.2.3 Vegetation

Vegetation Communities

Vegetation communities in the study areas can be categorized into six broad land cover types based on USGS GAP data (USGS 2004): agriculture/altered, badland/bedrock, forest/woodland, meadow/grassland, open water, and shrubland. Table 3.4-~~4~~ 6 shows the acres of these vegetation communities in the study areas by Action Alternative. A total of 261 plant species were recorded during field surveys (Coalition 2020a: Appendix E). Detailed descriptions of the six land cover types and the corresponding GAP vegetation communities in the study areas are described in more detail in the Coalition's *Biological Resources Baseline Environment Technical Memorandum: Uinta Basin Railway* (Coalition 2020a: 9–27).

Table 3.4-~~4~~6. Vegetation Communities in the Study Areas by Land Cover Type (acres)

	Action Alternative		
Vegetation Communities by Land Cover Type	**Indian Canyon**	**Wells Draw**	**Whitmore Park**
Agriculture/Altered Land Cover Type			
Agriculture	561.4	197.0	561.4
Developed, Medium – High Intensity	9.6	0.0	9.5
Developed, Open Space – Low Intensity	0.0	2.8	0.2
Disturbed, Oil Well	0.0	53.7	0.0

	Action Alternative		
Vegetation Communities by Land Cover Type	**Indian Canyon**	**Wells Draw**	**Whitmore Park**
Recently Chained Pinyon-Juniper Areas	0.0	10.5	0.0
Total	**571.0**	**264.0**	**569.9**
Badland/Bedrock Land Cover Type			
Colorado Plateau Mixed Bedrock Canyon and Tableland	216.2	464.6	217.7
Inter-Mountain Basins Shale Badland	387.1	134.4	386.8
Rocky Mountain Cliff and Canyon	158.6	591.5	149.7
Total	**761.9**	**1,190.5**	**754.2**
Forest/Woodland Land Cover Type			
Colorado Plateau Pinyon-Juniper Woodland	954.3	3,306.2	1,003.8
Inter-Mountain West Aspen-Mixed Conifer Forest and Woodland Complex	3.8	11.0	3.0
Invasive Southwest Riparian Woodland and Shrubland	0.0	3.3	0.0
Rocky Mountain Aspen Forest and Woodland	198.7	170.1	74.4
Rocky Mountain Lower Montane Riparian Woodland and Shrubland	141.6	37.5	142.9
Rocky Mountain Montane Dry-Mesic Mixed Conifer Forest and Woodland	193.5	186.9	161.7
Rocky Mountain Montane Mesic Mixed Conifer Forest and Woodland	95.1	74.2	70.2
Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland	1.8	2.5	1.8
Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland	7.3	51.4	7.3
Total	**1,596.1**	**3,843.1**	**1,465.1**
Meadow/Grassland Land Cover Type			
Inter-Mountain Basins Semi-Desert Grassland	84.5	191.7	85.6
Invasive Annual Grassland	18.4	26.7	18.3
Rocky Mountain Alpine-Montane Wet Meadow	211.8	74.0	161.0
Southern Rocky Mountain Montane-Subalpine Grassland	111.4	197.9	155.1
Total	**426.1**	**490.3**	**420.0**
Open Water Land Cover Type			
Open Water	10.6	9.2	10.6
Total	**10.6**	**9.2**	**10.6**
Shrubland Land Cover Type			
Colorado Plateau Mixed Low Sagebrush Shrubland	1,047.6	1,095.6	1,099.4
Colorado Plateau Pinyon-Juniper Shrubland	542.8	229.2	651.4
Inter-Mountain Basins Big Sagebrush Shrubland	968.0	1,175.6	1,091.4
Inter-Mountain Basins Greasewood Flat	385.4	315.5	364.8

Vegetation Communities by Land Cover Type	Action Alternative		
	Indian Canyon	Wells Draw	Whitmore Park
Inter-Mountain Basins Mat Saltbush Shrubland	65.9	55.1	65.8
Inter-Mountain Basins Mixed Salt Desert Scrub	1,272.1	1,720.7	1,275.1
Inter-Mountain Basins Montane Sagebrush Steppe	1,392.3	1,954.7	1,871.3
Inter-Mountain Basins Semi-Desert Shrub Steppe	276.1	254.4	269.3
Rocky Mountain Gambel Oak–Mixed Montane Shrubland	204.9	84.3	203.2
Total	**6,155.1**	**6,885.1**	**6,891.7**

Notes:
Sources: Coalition 2020a; USGS 2004

Riparian Vegetation

Riparian vegetation occurs along water courses in areas transitioning from aquatic to upland environments. These transitional areas provide important habitat for many plant and animal species. Descriptions of riparian communities in the GAP forest/woodland land cover type are found in the Coalition's *Biological Resources Baseline Environment Technical Memorandum: Uinta Basin Railway* (Coalition 2020a:15, 18). To identify the extent of riparian areas more accurately, the Coalition mapped riparian vegetation (including woody and herbaceous) in the study areas for each Action Alternative based on field surveys and interpretation of aerial images. Riparian areas total about 205.7 acres in the study areas for the Indian Canyon Alternative, about 135.6 acres in the study areas for the Wells Draw Alternative, and about 178.5 acres in the study areas for the Whitmore Park Alternative.

Wildfire Ecology

Wildfires, which affect vegetation, are a common occurrence in Utah because of a primarily arid climate (Utah Division of Emergency Management 2019). Wildfires are part of the normal vegetative cycle for some vegetation communities and are an integral part of healthy forest and grassland growth and regeneration. However, recent climatic trends of hotter and drier weather and earlier snowmelt are resulting in wildfires in the West that start earlier in the spring, last later into the fall, and burn more acreage (Melillo et al. 2014).

According to the Forest Service, each year more than 73,000 wildfires burn about 7 million acres of federal, tribal, state, and private land and more than 2,600 structures in the United States (Forest Service 2020c~~b~~). The state of Utah estimates there are 800 to 1,000 wildfires every summer in Utah (Utah Division of Emergency Management 2019). Long periods of drought increase the length of fire seasons and create dangerous conditions that allow a fire to spread rapidly. In 2017, wildfires consumed over 200,000 acres in Utah (Utah Division of Emergency Management 2019). In Utah, firefighters suppress 95 percent of wildfires on initial attack, but adverse weather and topography, heavy fuel loads, and urban development all combine to create catastrophic wildfire conditions in the state (Utah Division of Emergency Management 2019). Some of the largest fires in Utah have occurred since 2018, including the Dollar Ridge Fire (July 2018) that burned 68,869 acres in western Duchesne County, and the East Fork Fire (August–October 2020) that burned 89,463 acres in northern Duchesne County (National Wildfire Coordinating Group 2020; Utah Division of

Emergency Management 2019). ~~One of Utah's largest wildfires, t~~The Neola North Fire (2007)~~,~~ ~~occurred in Duchesne County and~~ burned about 43,800 acres in Duchesne County~~2007~~ (Utah Division of Emergency Management 2019).

Wildfires are caused by natural and human factors, including railroads. The Forest Service~~USGS~~ has compiled wildfire occurrence data collected by federal, state, and local fire organizations ~~land management agencies~~ from 1992~~80~~ through 2015~~6~~ (~~USGS~~Forest Service 2017a~~9~~). The data include~~s~~ the approximate size of the wildfire and the cause of the wildfire, if known. ~~Of all the wildfires with a reported cause, a~~Over the 24 years of wildfire records, approximately 1.8~~0.5~~ percent of wildfires in the United States and 0.5~~2~~ percent of the wildfires in ~~the lower 48 states and~~ Utah~~, respectively,~~ were caused by railroads. Table 3.4-~~5~~7 presents the cause and number of wildfires and acres burned in Utah from 1992~~80~~ to 2015~~6 (for data that included a cause)~~. Acres burned as a result of wildfires started by railroads represent 1.9~~0.06~~ percent of all acres burned in Utah over 24~~36~~ years of wildfire records (Table 3.4-~~5~~7).

Table 3.4-~~5~~7. Wildfires in Utah (1992~~80~~–2015~~6~~)

~~Cause of Fire~~	~~Number of Fires~~	~~Percent of Fires~~	~~Acres Burned~~
~~Lightning~~	~~6,668~~	~~73.9~~	~~451,385~~
~~Equipment Use~~	~~105~~	~~1.2~~	~~37,910~~
~~Smoking~~	~~164~~	~~1.8~~	~~993~~
~~Campfire~~	~~1,280~~	~~14.2~~	~~62,250~~
~~Debris Lighting~~	~~65~~	~~0.7~~	~~8,544~~
~~Railroad~~	~~22~~	~~0.2~~	~~413~~
~~Arson~~	~~183~~	~~2.0~~	~~9,160~~
~~Children~~	~~84~~	~~0.9~~	~~1,269~~
~~Miscellaneous~~	~~451~~	~~5.0~~	~~110,975~~
~~Total~~	**~~9,022~~**	**~~100~~**	**~~682,899~~**

~~Notes:~~
~~Source: USGS 2019~~

Cause of Fire	Number of Fires	Percent of Fires	Acres Burned
Lightning	16,747	54.5	2,718,318
Missing/Unidentified	7,609	24.8	320,466
Miscellaneous	1,689	5.5	465,528
Campfire	1,515	4.9	117,062
Debris Burning	871	2.8	25,119
Equipment Use	855	2.8	121,634
Arson	467	1.5	178,232
Children	226	0.7	6,884
Smoking	225	0.7	7,424
Railroad	168	0.5	78,953
Fireworks	165	0.5	9,218
Powerline	148	0.5	65,923
Structure	40	0.1	165
Total	**30,725**	**100**	**4,114,926**

Notes:
Source: Forest Service 2017a

The Forest Service created a Wildfire Hazard Potential (WHP) map for the continental United States to help inform evaluations of wildfire risk or prioritization of fuel-management needs across very large landscapes (Forest Service 2020a~~18~~). The Forest Service's objective with the WHP map is to depict the relative potential for wildfire that would be difficult for suppression resources to contain. According to the Forest Service, the WHP map approximates relative wildfire risk to highly valued resources and assets (e.g., communities, structures, and powerlines).

The WHP map displays those areas within the continental United States that have different levels of fire potential, categorized by five WHP classes (very low, low, moderate, high, and very high) and two non-WHP classes (non-burnable and water). Appendix G, *Biological Resources Figures,* Figure G-1, shows the fire potential within and near the study areas for the Action Alternatives.

Table 3.4-~~6~~8 shows the amount of the WHP classes in the study areas by Action Alternative. Of the total area assigned WHP class, approximately 90 percent of the study areas for the Indian Canyon Alternative and Whitmore Park Alternative and approximately 87~~4~~ percent of the study area for the Wells Draw Alternative, are associated with very low, low, or moderate wildfire hazard potential. The very high WHP class is not present in the study areas for any Action Alternative.

Table 3.4-~~6~~8. Wildfire Hazard Potential in the Study Areas (acres)

Wildfire Hazard Potential Class	Action Alternative		
	Indian Canyon	Wells Draw	Whitmore Park
Very low	2,330.1~~002.4~~	2,620.2~~589.7~~	2,252.2~~106.2~~
Low	4,549.7~~678.4~~	5,482.6~~173.7~~	5,080.1~~106.4~~
Moderate	634.6~~761.7~~	1,611.8~~43.0~~	731.2~~987.0~~
High	880.5~~786.0~~	1,446.3~~617.7~~	990.4~~675.8~~
Very high	--	--	--
Nonburnable	1,126.1~~292.5~~	1,521.6~~658.2~~	1,077.8~~256.3~~
Water	--	--~~0.3~~	0.1~~--~~

Notes:
Source: Forest Service 2020a~~18~~

Table 3.4-9 shows the area of WHP class for rail line segments downline of the proposed rail line that could experience an increase in rail traffic above OEA's thresholds at 49 C.F.R. § 1105.7(e)(5) if the proposed rail line were constructed (see Appendix C, *Downline Analysis Study Area and Train Characteristics*). For consistency with the description of WHP in the study areas of the Action Alternatives, the areas shown in Table 3.4-9 include a 1,000-foot buffer (500 feet on either side of the centerline) for each downline segment. Overall, approximately 88 percent of the combined downline segments' study areas are associated with very low, low, nonburnable, and water WHP classes; high and very high WHP classes make up only 5 percent, while the moderate WHP class makes up only 7 percent.

Table 3.4-9. Wildfire Hazard Potential along Downline Segments (acres)

Wildfire Hazard Potential Class	Downline Segment: Kyune to Denver	Denver Eastbound	Denver Southbound	Denver Northbound	Denver East/North
Very low	19,965	24	292	1,306	2,912
Low	12,523	5	1,675	1,336	881
Moderate	4,440	--	1,133	14	15
High	2,825	--	322	--	--
Very high	958	--	15	--	--
Nonburnable	10,380	322	3,162	5,670	3,348
Water	4,330	19	12	37	--

Notes:
Source: Forest Service 2020a

Invasive and Noxious Weeds

Invasive weeds are weeds that establish, persist, and spread widely in natural ecosystems outside the plant's native range. These weeds often lack natural controls to curtail their growth, enabling them to overrun native plants and ecosystems. Many invasive weeds are also classified as noxious weeds by government authorities.

A noxious weed is any plant designated by federal, state, or local government officials as injurious to public health, agriculture, recreation, wildlife, or property. Once a weed is classified as noxious, authorities can implement quarantines and take other actions to contain or destroy the weed and limit its spread. Under the authority of the Utah Noxious Weed Act (Utah Code § 4-17-101 et seq.), the Utah Department of Agriculture and Food maintains a list of noxious weeds (Utah Department of Agriculture and Food 2019).

Invasive and noxious weeds can grow in upland, wetland, and aquatic environments (e.g., streams)~~Invasive and noxious weeds~~; they are typically found in areas where the ground or soil has been disturbed and are commonly found along transportation corridors (e.g., roads, highways, rail lines); along utility corridors (e.g., transmission lines and pipelines); in residential, commercial, and industrial areas; around agricultural lands; and in other developed, disturbed, or human-influenced areas.

The following two land cover types present in the study areas include areas dominated by invasive or noxious species (Table 3.4-~~4~~6).

- The Invasive Southwest Riparian Woodland and Shrubland vegetation community consists of areas dominated by introduced riparian woody species, such as salt cedars (*Tamarix* spp.) and Russian olive (*Elaeagnus angustifolia*), both of which are state-designated noxious weeds. Based on GAP vegetation data (Table 3.4-~~4~~6), approximately 3.3 acres of this invasive vegetation community is in the study areas for the Wells Draw Alternative.
- The Invasive Annual Grassland vegetation community includes areas dominated by introduced annual grass species, such as *Avena* species, *Bromus* species, and *Schismus* species. Based on the vegetation data (Table 3.4-~~4~~6), this invasive vegetation community is present in the study areas for all the Action Alternatives (approximately 18.4, 26.7, and 18.3 acres in the study areas for

the Indian Canyon Alternative, Wells Draw Alternative, and Whitmore Park Alternative, respectively).

In addition to using the GAP vegetation data to identify invasive and noxious species, OEA looked at the Forest Service's current invasive plants database (Forest Service 2020b~~a~~). This database contains the latest invasive plant infestation polygons collected by the National Invasive Plant Inventory Protocol. Based on this data, the study areas for the Indian Canyon Alternative and Whitmore Park Alternative contains populations of nodding plumeless thistle (*Carduus nutans*), which is a state-designated noxious weed. Another state-designated noxious weed, hardheads (*Acroptilon repens*), is located near the study areas for the Indian Canyon Alternative and Whitmore Park Alternative.

3.4.2.4 Special Status Species

Special status species are species that are afforded special protections under federal or state regulations. These include species that are listed or proposed to be listed as threatened or endangered under the ESA; candidate species for ESA listing; bald and golden eagles; and sensitive species listed by BLM, the Forest Service, and the state of Utah.

ESA-Listed Species

Four ESA-listed plant species are known to occur or could occur in or near the study areas (Table ~~-~~3.4-~~7~~10). The study areas do not contain designated or proposed critical habitat for any ESA-listed plant species. Field surveys identified suitable habitat for Barneby ridge-cress (*Lepidium barnebyanum*) in the field survey study area for the Indian Canyon Alternative and Whitmore Park Alternative. The field survey study areas of all three Action Alternatives contain suitable habitat for Pariette cactus (*Sclerocactus brevispinus*) and Uinta Basin hookless cactus (*Sclerocactus wetlandicus*). In addition, there is suitable habitat for Ute ladies'-tresses (*Spiranthes diluvialis*) in the study areas for all three Action Alternatives. Appendix G, *Biological Resources Figures,* Figures G-2a and G-2b, shows areas of known occurrence and suitable habitat for Barneby ridge-cress, Pariette cactus, and Uinta Basin hookless cactus.

Eight ESA-listed animal species could occur or are known to occur in or near the study areas (Table 3.4-~~8~~11), including two bird species, five fish species, and one mammal species. OEA identified suitable habitat for two of these eight species in the study areas during field surveys. The study areas do not include designated or proposed critical habitat for any ESA-listed animal species.

Table 3.4-~~7~~10. ESA-Listed Plant Species Known to Occur or Potentially Occur in or near the Study Areas

Species Name	Status	Is Species Listed as Potentially Present in the Study Areas by USFWS?[a] Indian Canyon	Wells Draw	Whitmore Park	Is Potentially Suitable Habitat Present in the Study Areas?[b]
Barneby ridge-cress (*Lepidium barnebyanum*)	E	Yes	No	Yes	The range of potentially suitable habitat is within the study areas for the Indian Canyon Alternative and Whitmore Park Alternative (Appendix G, *Biological Resources Figures,* Figure G-2a).[c] Field habitat surveys conducted in this area found two habitat types that would support the species, including Pinyon-juniper habitat and white shale habitat. The Indian Canyon Alternative includes 36.2 acres of white shale habitat and 252.4 acres pinyon-juniper habitat. The Whitmore Park Alternative includes 50.8 acres of white shale habitat and 338.7~~89.5~~ acres of pinyon-juniper habitat (Coalition 2020b: Table 1 and Appendix A).
Pariette cactus (*Sclerocactus brevispinus*)	T	Yes	Yes	Yes	Suitable habitat exists in the study areas for all Action Alternatives (Appendix G, *Biological Resources Figures,* Figure G-2b~~2~~), including 1,087 acres in the study areas for the Indian Canyon Alternative and Whitmore Park Alternative and 1,254 acres in the study area for the Wells Draw Alternative.
Uinta Basin hookless cactus (*Sclerocactus wetlandicus*)	T	Yes	Yes	Yes	Suitable habitat exists in the study areas for all Action Alternatives (Appendix G, *Biological Resources Figures*, Figure G-2b~~2~~), including 1,087 acres in the Indian Canyon Alternative and Whitmore Park Alternative study areas, and 1,254 acres in the study area for the Wells Draw Alternative.
Ute ladies'-tresses (*Spiranthes diluvialis*)	T	Yes	Yes	Yes	Suitable habitat exists in the study areas along water courses and in wet meadows where vegetation is relatively open and below 7,000 feet. There are 11.4 acres of potential habitat in the study areas for the Indian Canyon Alternative, 1.0 acre for the Wells Draw Alternative, and 11.3 acres for the Whitmore Park Alternative (Coalition 2020c: Table 1 and Appendix B).

Notes:

[a] Known or potential species presence as provided by USFWS (2020a, 2020b, 2020c) and Utah Natural Heritage Program (2020a, 2020b, 2020c).

[b] Information is based on the Coalition's field surveys (Coalition 2020a, 2020b, 2020c)) and NatureServe (Undated), UDWR (2019a), and Utah Native Plant Society (2020).

[c] USFWS is evaluating the Barneby ridge-cress range/suitable habitat requirements, which could alter the amount of suitable habitat mapped in the study area. Pre-construction surveys (Appendix I, *Biological Assessment*) would consider the best available USFWS information on the species' range/habitat requirements.

USFWS = United States Fish and Wildlife Service; E = endangered; T = threatened

Table 3.4-~~8~~11. ESA-Listed Animal Species Known to Occur or Potentially Occur in or near the Study Areas

		Is Species Listed as Potentially Present in the Study Areas by USFWS?[a]			
Species Name[a]	**Status**	**Indian Canyon**	**Wells Draw**	**Whitmore Park**	**Is Potentially Suitable Habitat Present in the Study Areas?[b]**
Mammals					
Canada lynx (*Lynx canadensis*)	T	Yes	Yes	Yes	Potentially suitable habitat exists in the study areas for all three Action Alternatives. Year-long crucial[c] habitat for snowshoe hare (primary food of the Canada lynx) is present at higher elevations and can indicate potential suitable habitat (Appendix G, *Biological Resources Figures,* Figure G-4). However, potentially suitable habitat in the study areas (which mostly coincides with the higher elevations of Ashley National Forest) is marginal, and there are no historic lynx locations anywhere in or around the study areas. In addition, Ashley National Forest is not considered to contain lynx habitat sufficient to support a breeding female lynx. Further, Utah has not historically, and does not currently, support resident lynx populations because the habitat in the state is naturally incapable of supporting persistent populations. Historical and future occurrences in Utah most likely represent occasional dispersing lynx.
Birds					
Mexican spotted owl (*Strix occidentalis lucida*)	T	Yes	Yes	Yes	USFWS habitat models identify potentially suitable habitat in the study areas (Appendix I, *Biological Assessment*, Figure 4-2~~Appendix G, *Biological Resources Figures,* Figure G-3~~). However, detailed field habitat surveys for Mexican spotted owl found very little suitable habitat in the study areas that could be used by the species (Appendix G, *Biological Resources Figures*, Figure G-3). The survey found that nearly all of the habitat along the Action Alternatives, including all of the habitat within Ashley National Forest, would be defined as low quality, meaning that most of the required nesting and foraging characteristics are absent; therefore, these areas are unlikely to support or be used by the species. A few small, isolated areas along the Wells Draw Alternative on BLM land were determined to be moderate quality habitat (Coalition 2020d: Table 2 and Figure 3). While nesting and foraging habitat characteristics are present in these areas and would support use by the species, these moderate quality habitat areas lack connectivity, which likely reduces the probability of occupancy. Habitat defined as high quality was not found along any Action Alternative.

Species Name[a]	Status	Is Species Listed as Potentially Present in the Study Areas by USFWS?[a] Indian Canyon	Wells Draw	Whitmore Park	Is Potentially Suitable Habitat Present in the Study Areas?[b]
Yellow-billed cuckoo (*Coccyzus americanus*)	T	Yes	Yes	Yes	There is no suitable habitat large enough in or within 0.5 mile of the study areas for the three Action Alternatives, including within Ashley National Forest or on other public lands.
Fish					
Bonytail (*Gila elegans*)	E	Yes	Yes	Yes	There is no suitable habitat in the study areas for any of the Action Alternatives. Suitable habitat is available downstream of the rail line corridor for each Action Alternative. Indian Canyon Creek is located in the study areas for the Indian Canyon Alternative and Whitmore Park Alternative, Argyle Creek is located in the study areas for the Wells Draw Alternative, and Willow Creek and the Price River are located in the study areas for all Action Alternatives. All of these waterways ultimately drain to the Green River system, which provides suitable habitat for this fish species.
Colorado pikeminnow (*Ptychocheilus lucius*)	E	Yes	Yes	Yes	There is no suitable habitat in the study areas for any of the Action Alternatives. Suitable habitat is available downstream of the rail line corridor for each Action Alternative. Indian Canyon Creek is located in the study areas for the Indian Canyon Alternative and Whitmore Park Alternative, Argyle Creek is located in the study areas for the Wells Draw Alternative, and Willow Creek and the Price River are located in the study areas for all three Action Alternatives. All of these waterways ultimately drain to the Green River system, which provides suitable habitat for this fish species.
Humpback chub (*Gila cypha*)	E	Yes	Yes	Yes	There is no suitable habitat in the study areas for any of the Action Alternatives. Suitable habitat is available downstream of the rail line corridor for each Action Alternative. Indian Canyon Creek is located in the study areas for the Indian Canyon Alternative and Whitmore Park Alternative, Argyle Creek is located in the study areas for the Wells Draw Alternative, and Willow Creek and the Price River are located in the study areas for all three Action Alternatives. All of these waterways ultimately drain to the Green River system, which provides suitable habitat for this fish species.
June sucker (*Chasmistes liorus*)	E	Yes	Yes	Yes	There is no suitable habitat in the study areas for any of the Action Alternatives, nor is there downstream habitat.

Species Name[a]	Status	Is Species Listed as Potentially Present in the Study Areas by USFWS?[a] Indian Canyon	Wells Draw	Whitmore Park	Is Potentially Suitable Habitat Present in the Study Areas?[b]
Razorback sucker (*Xyrauchen texanus*)	E	Yes	Yes	Yes	There is no suitable habitat in the study areas for any of the Action Alternatives. Suitable habitat is available downstream of the rail line corridor for each Action Alternative. Indian Canyon Creek is located in the study areas for the Indian Canyon Alternative and Whitmore Park Alternative and eventually drains in the Duchesne River, which is a tributary of the Green River (suitable habitat for this fish species). Argyle Creek is located in the study areas for the Wells Draw Alternative and Willow Creek and the Price River are located in the study areas for all Action Alternatives. All of these waterways ultimately drain to the Green River system, which provides suitable habitat for this fish species.

Notes:

[a] Known or potential species presence as provided by USFWS (2017, 2020a, 2020b, 2020c) and UNHP (2020a, 2020b, 2020c).

[b] Information based on the Coalition's field surveys (Coalition 2020a, Coalition 2020d), NatureServe (Undated), UDWR (2019a), and Christensen and Groves pers. comm.

[c] Crucial habitat is habitat on which the local population of a wildlife species depends for survival because there are no alternative ranges or habitats available. Crucial habitat is essential to the life history requirements of a wildlife species. Degradation or unavailability of crucial habitat will lead to significant declines in carrying capacity and/or numbers of wildlife species in question.

USFWS = United States Fish and Wildlife Service; E = endangered; T = threatened

Bald and Golden Eagles

Potentially suitable habitat for bald and golden eagles exists in the study areas. During the field surveys, both eagle species were recorded in the study areas for all three Action Alternatives, as well as within a 2-mile radius of the study areas (Coalition 2020a).

Sensitive Species

BLM and the Forest Service provided a list of 24 sensitive plant species that are known to occur or suspected to occur in Carbon, Duchesne, Uintah, or Utah Counties. Based on field surveys, potentially suitable habitat might exist for 15 of the 24 species in the study areas (Coalition 2020a: Table 5-3). OEA further consulted Forest Service biologists on Forest Service-designated sensitive plants for the development of and support for the Forest Service's Biological Evaluation. The Biological Evaluation, included as Appendix H, *Biological Evaluation*, to this ~~Draft~~ EIS, is a standalone Forest Service document that is required for addressing the proposed rail line's potential impact on Forest Service-designated sensitive species. OEA's screening process and consultation with Forest Service biologists resulted in identification of two sensitive plant species that could occur along the Indian Canyon Alternative and Whitmore Park Alternative (the Wells Draw Alternative would not cross Forest Service lands). These species are Goodrich blazingstar (*Mentzelia goodrichii*) and low greenthread (*Thelesperma caespitosum*). However, the proposed rail line would be located outside the elevation where these species occur or potentially occur and were dismissed from further analysis in the Biological Evaluation.

Plants of tribal importance to the Ute Indian Tribe include 31 tree, shrub, and herbaceous species or genus of species that are used for medicinal, ceremonial, utilitarian, and food purposes (Forest Service 2017b). During field surveys, 23 plant species of tribal importance were observed in the study areas, including aspens, sagebrushes, dandelions, chokecherry, gooseberries, willows, elderberry, pine, mahoganies, onion, mint, yarrow, and yucca.

OEA consulted the Utah Conservation Data Center (UDWR 2019a), as well as representatives of Ashley National Forest and BLM to determine the state-listed, Forest Service-listed, and BLM-listed sensitive animal species that might occur in the study areas. Forty-five sensitive wildlife species were identified, including 2 amphibians, 15 birds, 11 fish, 11 mammals, 4 mollusks, and 2 reptiles. Based on field surveys, potentially suitable habitat was identified in the study areas for 26 of the 45 species (Coalition 2020a: Table 6-4). OEA further consulted Forest Service biologists and also reviewed Forest Service survey data on Forest Service-designated sensitive wildlife for the Biological Evaluation (Appendix H, *Biological Evaluation*). OEA's screening process and consultation with Forest Service biologists resulted in identification of four sensitive wildlife species—flammulated owl (*Psiloscops flammeolus*), three-toed woodpecker (*Picoides dorsalis*), northern goshawk (*Accipiter gentilis*), bighorn sheep (*Ovis canadensis*) —that could occur along and potentially be adversely affected by the Indian Canyon Alternative and Whitmore Park Alternative (the Wells Draw Alternative would not cross Forest Service lands). However, as described in the Biological Evaluation (Appendix H, *Biological Evaluation*), the proposed rail line would have little or no likelihood of adversely affecting these species. The Biological Evaluation (Appendix H, *Biological Evaluation*) provides more detail on this assessment and conclusion.

3.4.2.5 Greater Sage-Grouse

The greater sage-grouse is a sensitive bird species of particular concern in the study areas. All three Action Alternatives would cross areas containing mapped greater sage-grouse habitat in the Emma Park area between the connection with the existing UP rail line near Kyune, Utah, (milepost 0) and the portal of the proposed summit tunnel (approximately milepost 18). The Action Alternatives would pass through or near known leks~~, which are areas where greater sage-grouse congregate during the spring breeding season~~. These are usually located in sparsely vegetated areas where the males' courtship display can be easily seen by females.

USFWS found in March 2010 that greater sage-grouse warranted listing under the ESA. That finding was attributed to habitat fragmentation and "inadequate regulatory mechanisms" designed to protect habitat at the local, state, and federal levels. In response, BLM amended its land use plans to incorporate specific conservation measures across the geographic range of the greater sage-grouse (discussed further below). Also, Utah Governor Gary Herbert established a task force to review relevant information and develop a statewide plan to conserve sage-grouse and their habitat. The state of Utah finalized its first Conservation Plan for Greater Sage-Grouse in February 2013. The conservation plan identified Utah's Sage-Grouse Management Areas (SGMAs), which represent the highest-priority areas for sage-grouse conservation.

In October 2015, USFWS found that greater sage-grouse did not warrant listing under the ESA. That decision was based on new scientific information and voluntary conservation measures put in place since 2010, including state-led conservation actions. Utah has continued its sage-grouse management practices and revised its conservation plan to incorporate practices identified by USFWS in 2015 (State of Utah~~UDWR~~ 2019~~c~~).

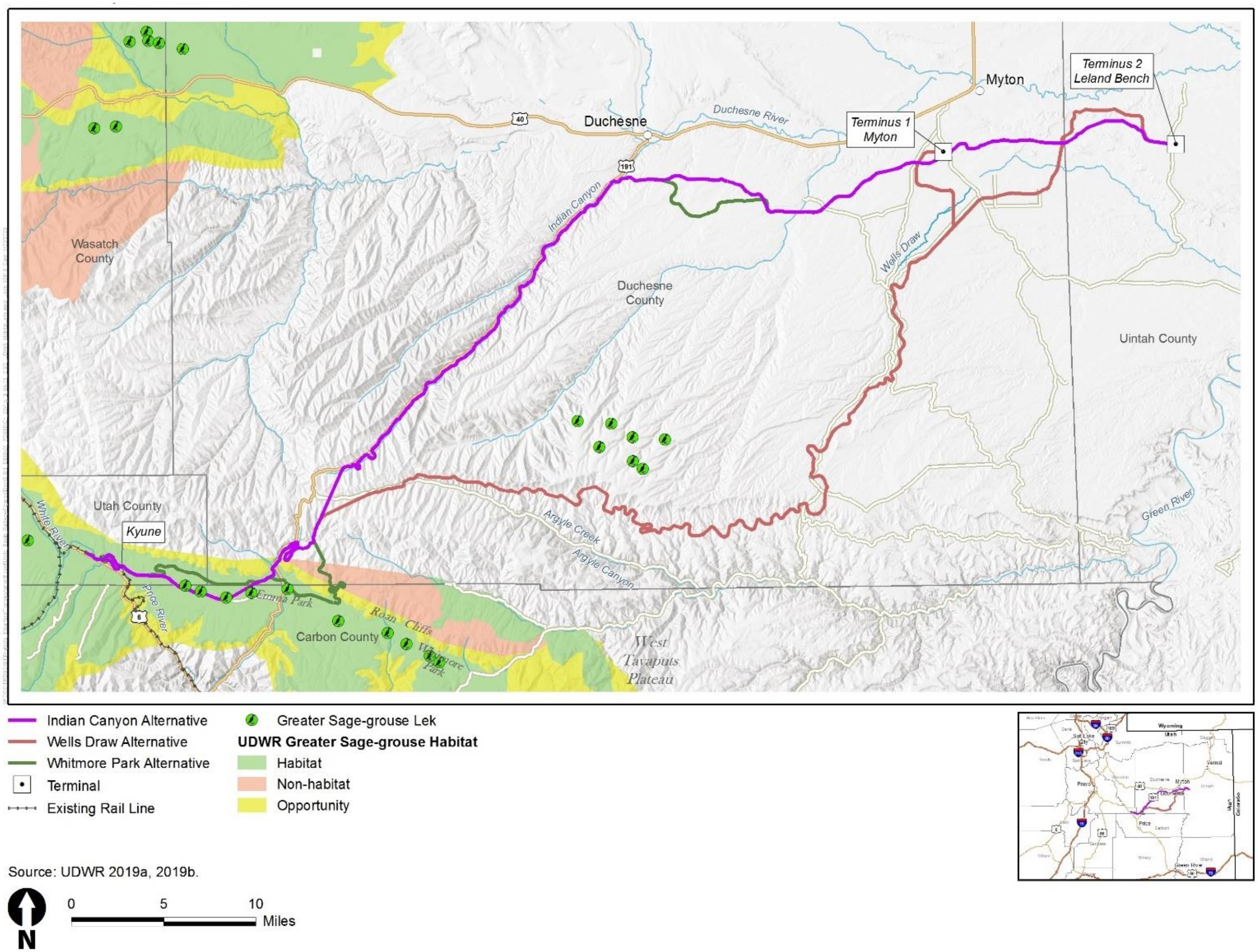
UDWR Carbon Greater Sage-grouse Management Area

The Carbon SGMA is located in the area of Emma Park, near the southern end of the three Action Alternatives. The Coalition obtained information regarding greater sage-grouse habitat and lek locations from UDWR range maps and metadata (UDWR 2019b). Figure 3.4-1 shows the Carbon SGMA in relation to the three Action Alternatives. The figure shows habitat, nonhabitat, and opportunity areas.

- **Habitat areas.** Habitat areas include the "combined total of seasonal habitats used by greater sage-grouse at some point during their lifecycle. Habitat includes the geographical extent of leks, nesting, brood-rearing, transitional, and winter areas" (State of Utah~~UDWR~~ 2019~~c~~).
- **Nonhabitat areas.** Nonhabitat areas are land that does not contribute to the lifecycle of greater sage-grouse (State of Utah~~UDWR~~ 2019~~c~~).
- **Opportunity areas.** Opportunity areas are those portions of the SGMA that "currently do not contribute to the lifecycle of sage-grouse, but they are areas where restoration or rehabilitation efforts can provide additional habitat when linked to existing sage-grouse populations" (State of Utah~~UDWR~~ 2019~~c~~).

Table 3.4-~~9~~12 shows the acreage of habitat, nonhabitat, and opportunity areas in the study areas by Action Alternative. At least four known lek locations are near the southern end of the Indian Canyon Alternative and Wells Draw Alternative, and five are located near the Whitmore Park Alternative (Figure 3.4-1).

Figure 3.4-1. UDWR Greater Sage-Grouse Habitat



Source: UDWR 2019a, 2019b.

Table 3.4-~~9~~12. UDWR-defined Greater Sage-Grouse Habitat in the Study Areas (acres)

	Action Alternative		
Type of Area[a]	**Indian Canyon**	**Wells Draw**	**Whitmore Park**
Habitat	1,668.5	1,668.5	2,271.8
Nonhabitat	239.3	186.6	461.7
Opportunity	58.4	58.5	96.5
Total	**1,966.2**	**1,913.6**	**2,842.8**

Notes:
[a] Acreages are of greater sage-grouse habitat type in the field survey study areas for each Action Alternative. Table 3.4-22 shows the UDWR-defined greater sage-grouse habitat that would be permanently and temporarily disturbed within the project footprint for each Action Alternative.
Source: Coalition 2020a; UDWR 2019b

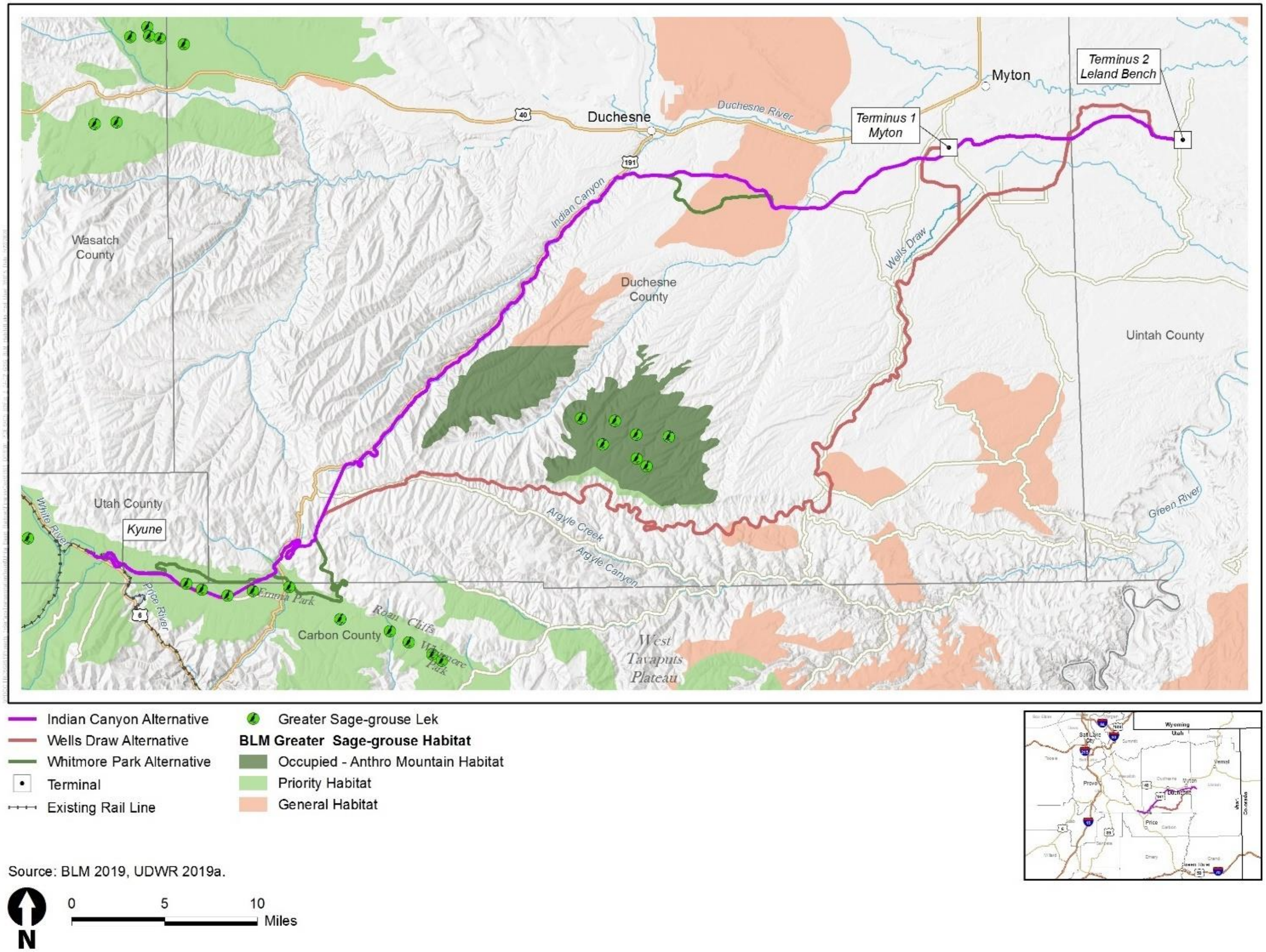
BLM Greater Sage-Grouse Management Area

BLM prepared the *Utah Greater Sage-Grouse Approved Resource Management Plan Amendment* (BLM 2015a) to amend the resource management plans for BLM field offices that manage land containing greater sage-grouse priority and general habitats. BLM prepared this plan amendment in response to USFWS's March 2010 ESA listing decision for greater sage-grouse in which USFWS identified the present or threatened destruction, modification, or curtailment of habitat or range for this species and the inadequacy of existing regulatory mechanisms as significant threats. BLM recognized that changes in management were necessary to avoid the continued decline of greater sage-grouse populations across the species' range. Figure 3.4-2 shows the BLM priority and general habitat areas in relation to the Action Alternatives. The figure shows priority and general habitat management areas and a separate occupied habitat category.

- **Priority habitat management areas (PHMAs).** Priority habitat management areas are "BLM-administered lands identified as having the highest value to maintaining sustainable greater sage-grouse populations. These areas include breeding, late brood-rearing, winter concentration areas, and migration or connectivity corridors" (BLM 2015a).
- **General habitat management areas.** General habitat management areas are "BLM-administered lands where some special management will apply to sustain greater sage-grouse populations. Areas of occupied seasonal or year-round habitat outside of priority" (BLM 2015a).
- **Occupied habitat.** Occupied habitat refers to lands where the surface and mineral estates are owned or administered by separate entities. In these areas, BLM administers the mineral rights, but not the surface estate (BLM 2015a).

Table 3.4-~~10~~13 shows the acreage of BLM priority and general habitat management areas in the study areas by Action Alternative.

Figure 3.4-2. BLM Greater Sage-Grouse Habitat



Source: BLM 2019, UDWR 2019a.

Table 3.4-~~10~~13. BLM Greater Sage-Grouse Habitat in the Study Areas (acres)

Habitat Type[a]~~Species~~	Action Alternative		
	Indian Canyon	Wells Draw	Whitmore Park
Priority	~~**1,667.5**~~	~~**1,667.5**~~	~~**2,283.2**~~
BLM	346.4	346.6	83.6
SITLA	198.0	198.0	322.1
Tribal	0	0	0
UDOT	11.6	11.6	10.0
Forest Service	0	0	0
Private	1,111.4	1,111.2	1,867.4
Total	**1,667.4**	**1,667.4**	**2,283.1**
General	~~**640**~~	~~**345.9**~~	~~**811.8**~~
BLM	0	345.9	0
SITLA	0	0	0
Tribal	0	0	0
UDOT	0	0	0
Forest Service	0	0	0
Private	640.1	0	811.8
Total	**640.1~~2,307.5~~**	**345.9~~2,013.4~~**	**811.8~~3,095.0~~**

Notes:
Source: Coalition 2020a; BLM 2015b
[a] Acreages are of greater sage-grouse habitat type in the field survey study areas for each Action Alternative. Table 3.4-23 shows the BLM greater sage-grouse habitat that would be permanently and temporarily disturbed within the project footprint for each Action Alternative.
BLM = Bureau of Land Management; SITLA = Utah School and Institutional Trust Lands Administration; UDOT = Utah Department of Transportation

3.4.3 Environmental Consequences

Construction and operation of the proposed rail line would result in impacts on biological resources. This subsection first presents the potential impacts that would be the same for all three Action Alternatives and then compares the potential impacts that would be different across the Action Alternatives. For comparison purposes, this subsection also discusses the status of biological resources under the No-Action Alternative. Section 3.3, *Water Resources*, also addresses impacts that could be associated with biological resources.

3.4.3.1 Impacts Common to All Action Alternatives

This subsection discusses potential impacts on wildlife, fish, vegetation, and special status species that would be the same across the three Action Alternatives. Potential impacts caused by rail line construction are discussed first for each resource, followed by potential impacts caused by rail operations.

Wildlife

Construction

Construction-related activities, such as land clearing in the project footprint, earthmoving (cut and fill), constructing the railbed, laying rail line, relocating roads, and installing support facilities (e.g., fences, communications towers, and power distribution lines), would result in temporary and permanent impacts on wildlife. The intensity of these impacts would vary depending on the type of habitat and specific species affected.

Habitat Loss or Alteration and Wildlife Displacement

Construction of the proposed rail line would remove or alter habitat, resulting in permanent habitat loss or alteration in the rail line footprint. Table 3.4-~~4~~ 6 shows the types of habitats (vegetation communities) that construction would affect. Habitat removal could affect many different species of wildlife, including birds, mammals, reptiles, amphibians, and invertebrates. In areas where construction would involve clearing habitat, the wildlife that currently occupies the habitat would be displaced, or forced to move to other habitat areas. Construction-related noise and the presence of humans in construction areas could also displace wildlife. Displacement could affect normal foraging, migratory, and breeding behaviors. Displacement could also reduce survival and productivity because animals might need to expend more energy to locate suitable replacement habitat. In addition, wildlife that is less familiar with new habitat areas might be more susceptible to predation, which can affect survival.

The effects of habitat clearing on wildlife would be permanent in areas where permanent rail components (e.g., railbed) would be placed and would be temporary in areas where habitat would be restored (e.g., construction staging areas). Some affected habitats in the temporary footprint, such as shrub and forest, would take many years to be completely restored to pre-construction conditions. In some areas of the rail line~~project~~ footprint beyond the rail bed, habitat would be permanently altered from forested habitat to herbaceous or low shrub habitats~~ as a result of temporary clearing~~. The abrupt change in habitat type could lead to a permanent change in the types of species present in the area because some species of wildlife avoid herbaceous and low shrub habitats while others seek out these habitats.

Construction of any of the Action Alternatives would require removal or alteration of riparian vegetation, which is an important habitat in the western United States, although the extent of these impacts would vary between the three Action Alternatives (Section 3.4.3.2, *Impact Comparison between Action Alternatives*). In the western United States, riparian ecosystems make up a small percentage of the landscape but provide essential ecological functions for both human and wildlife populations (Poff et al. 2012). They are unique because they have high species diversity and densities, as well as high productivity, and they allow for continuous interactions to occur between riparian, aquatic, and upland ecosystems through the exchange of energy, nutrients, and species (Poff et al. 2012). Therefore, the removal or alteration of riparian vegetation during construction would have negative impacts on wildlife.

The big game species in the study area (bighorn sheep, elk, moose, mule deer, and pronghorn antelope) all have year-long substantial and/or crucial habitat in the project footprint (Table 3.4-1). Construction of any of the Action Alternatives would temporarily and permanently remove or alter big game habitat, although the extent of these impacts would vary between the Action Alternatives (Section 3.4.3.2, *Impact Comparison between Action Alternatives*). Construction activities could also degrade forage quality for big game species because dust generated by construction equipment and vehicles could be deposited on vegetation near construction areas. This impact would be localized and temporary, lasting only the duration of construction. Big game species would be able to forage on undisturbed vegetation in the areas surrounding the construction footprint.

Large amounts of cleared vegetation and debris placed in piles along the proposed rail line during construction could attract bark beetles, which, if the conditions are right, could result in an increase in bark beetle populations and risk a potential bark beetle outbreak. While bark beetles are native to U.S. forests and play important ecological roles, they can cause extensive tree mortality, which can have indirect effects on wildlife that use forest habitats. This issue is of important concern in any forested area, particularly in and around Ashley National Forest.

Wildlife disturbed or displaced by temporary construction activities would likely move to suitable habitats near the project footprint and would likely return to temporarily affected areas after construction is completed and workers and equipment are no longer present. The magnitude of these impacts on wildlife would depend mostly on the timing of construction activities. However, the large areas of suitable habitat around the Action Alternatives would be sufficient to allow for wildlife movement and dispersal. To minimize impacts related to the clearing of habitat, the Coalition has proposed voluntary mitigation that would commit the Coalition to limit ground clearing to only the areas necessary for project-related construction and to restore and revegetate temporarily cleared areas using native vegetation (VM-16, VM-22, BIO-MM-16). In addition, OEA is recommending mitigation requiring the Coalition develop a detailed reclamation and mitigation plan for temporarily disturbed areas (BIO-MM-16). To address potential adverse impacts on potential bark beetle outbreaks, OEA is recommending mitigation requiring the Coalition remove all cleared vegetation and green debris from construction areas, including trees from woodland and timber clearing (BIO-MM-14).

Wildlife Injury or Mortality

Construction of the proposed rail line could result in wildlife mortality or injury from construction-related collisions or crushing. Collisions or crushing would be more likely to affect smaller, less mobile species (e.g., reptiles, insects) that are not able to move away quickly from construction equipment. Collisions would be less likely to occur with larger animals (e.g., big game animals) and birds because these animals could move more quickly and vacate a construction area. Because construction vehicles typically move at slow speeds, OEA expects that wildlife fatalities and injuries from operating construction equipment would be infrequent. While some species could be more susceptible to collisions or crushing, many species would likely vacate a construction area once land clearing activities start and noise and construction equipment become perceptible to wildlife. This temporary impact would only last for the duration of construction.

The installation of new infrastructure that would also be present during rail operations could disrupt predator–prey relationships in and near the project footprint. For example, new infrastructure or movement corridors associated with the proposed rail line could provide certain predators with greater hunting opportunities. This could result in increased mortality rates in the prey of those predators. As species adapt to disturbances associated with operations, predator–prey relationships would stabilize.

Accidents and Spills of Hazardous Materials

An accidental release of hazardous materials during construction (e.g., spill of gasoline, oil, or lubricants) could affect individual animals if they were exposed to the contaminant, which could cause injury, sickness, or death. Because construction activities would not involve using or storing large volumes of hazardous materials, OEA expects that any uncontained spills of hazardous materials during construction would be small and would affect a limited area. To minimize potential impacts related to accidents and spills of hazardous materials, the Coalition has proposed voluntary mitigation that would commit the Coalition to obtaining a Section 401 water quality certification and an NPDES permit,[7] and developing a SWPPP (VM-19, VM-21, VM-26). These measures would limit the chance of a spill occurring and would facilitate a rapid cleanup should a spill occur.

Habitat Fragmentation and Barrier to Movement

During and following construction, the proposed rail line would split large areas of contiguous habitat into smaller areas. The presence of the rail line could create a barrier to wildlife, both physically and behaviorally. Physical barriers created by rail corridors mainly affect small animals, such as lizards and amphibians (Barrientos and Borda-de-Agua 2017). Smaller animals are less mobile and find it more difficult to cross rail corridors due to the physical and visual obstructions created by the railbed itself. Large animals (e.g., big game) would be physically able to cross the rail corridor, but their perception of a barrier (e.g., visual effects of rail infrastructure) could still prevent them from crossing the rail corridor. Fences along rail corridors can create partial barriers to movement for larger species, especially big game species. Disrupted migration could prevent herds from reaching high-quality forage, which could result in physiological stresses and the expenditure of greater amounts of energy to reach resources beyond the study area. However, the Coalition is not proposing fences unless a landowner agreement requests one. Barriers to movement could affect the ability of wildlife to disperse into other areas to feed, shelter, or breed, which could affect population-level genetics by restricting gene flow. On a landscape level, some of the habitat within and adjacent to the study areas is already fragmented by highways, small roads, and other development, and the addition of the proposed rail line would not greatly increase habitat fragmentation impacts relative to existing landscape conditions in most locations. Nevertheless, localized impacts from fragmentation would result in vegetation changes and changes in species composition along the corridor. However, even with habitat fragmentation, the large areas of suitable habitat around the Action Alternatives would be sufficient to allow for wildlife movement and dispersal. To minimize the potential impacts related to habitat fragmentation, the Coalition has committed to working with UDWR, the Ute Indian Tribe, and adjacent landowners to define areas of the right-of-way that can be left without fences to maintain big game movement~~migration~~ corridors and to installing wildlife-safe fences to confine livestock within grazing allotments where practical and necessary (VM-40, VM-41). In addition, OEA is recommending mitigation requiring the Coalition develop a big game movement corridor crossing plan in consultation with the Ute Indian Tribe, UDWR, OEA, and appropriate land management agencies (BIO-MM-18).

[7] NPDES is the permit system mandated by Clean Water Act Section 402 to control pollutants in waters of the United States. With the exception of Tribal trust lands, the U.S. Environmental Protection Agency (EPA) has delegated authority to issue NPDES permits to the state of Utah, referred to as Utah Pollutant Discharge Elimination System (UPDES) permits. On Tribal trust lands, EPA retains authority to issue NPDES permits. NPDES refers to both UPDES and NPDES permits in this section.

Operations

Rail operations could temporarily and permanently affect wildlife by introducing new sources of noise in the study area; changing the likelihood and spread of wildfires; introducing a source of potential spills and leaks of toxic substances; and altering vegetation in the rail corridor during maintenance. Total rail traffic on the proposed rail line could range from 3.68 to 10.52 trains per day, on average, depending on future market conditions. The number of trains per day would not change the types of operations impacts, but it could affect the frequency of the impact (e.g., more trains could result in increased maintenance activities) or increase the chance of the impact occurring (e.g., more trains could increase the risk of sparking a wildfire).

Wildlife Injury or Mortality

Operation of the proposed rail line could injure or kill individual wildlife due to collisions with trains and maintenance equipment. Higher mortality rates would likely occur where the density of wildlife is higher. For big game species, these higher density areas would be at the locations of the movement corridors that cross or parallel the Action Alternatives (see Appendix G, *Biological Resources Figures*, for figures displaying the movement corridors for each big game species along the Action Alternatives). Species that feed on carrion (flesh of dead animals), species that could use the rail corridor for moving around, and species that would use habitats adjacent to the rail line would have an increased chance of being killed by a collision.

Habitat Degradation and Wildlife Displacement

Rail operations could displace wildlife and render adjacent habitat unsuitable. There is evidence that disturbances (e.g., noise, vibration, and light) associated with operation of a rail line could cause some species to avoid habitat near the rail line, such as meadow/grassland birds (Waterman et al. 2002). In contrast, other studies suggest that some wildlife species (e.g., reptiles, woodland bird species, and small and large mammals) ignore or adapt to rail line disturbances (Ghosh et al. 2010; Wiacek et al. 2015; Mundahl et al. 2013). The severity of rail line disturbance depends on the species and on the degree of the disturbance (Rytwinski and Fahrig 2012).

Operation of the proposed rail line would degrade habitat because of increased noise, dust, and potential spills of contaminants. Increased noise levels could result in fright responses, such as flushing or escaping, or increased communications, such as louder or more extended periods of birdsong or begging vocalizations from young birds. These noise impacts could cause species to expend more energy near the rail line or avoid the area. Noise related to rail operations could cause birds, especially raptors, to abandon their nests with the subsequent demise of young. As discussed previously, displacement could result in reduced survival and productivity because it requires species to expend energy to locate replacement habitat, which may have fewer resources and be of a lower value. Wildlife would also be less familiar with new areas and at greater risk of predation, thus, limiting survival of offspring or adults.

OEA anticipates that most wildlife would become used to, or habituate to, the noise of an operating train and maintenance equipment and would likely avoid the area for the short period that a train or equipment is present. Research indicates that different species of animals habituate to noise differently; some animals habituate to noise after several repetitions of exposure, while other species do not become accustomed to high noise levels (Schulte-Werning et al. 2007). OEA expects that noise-related effects on wildlife would mostly occur within approximately 350 feet of the proposed rail line. This is the distance at which wayside noise levels would be at or above 100 dBA

SEL, the noise level at which studies have shown animals (domestic and wild) exhibit a response to train noise (FRA 2005). For horn noise at grade crossings, noise-related effects could occur out to approximately 460 feet from the locomotive. Noise levels beyond this distance are not expected to adversely affect wildlife (FRA 2005).

Dust from train movement and maintenance activity would lower the quality of forage adjacent to the proposed rail line, potentially causing wildlife to expend more energy seeking higher quality forage in undisturbed areas further away from the proposed rail line. Spills of fuels, oils, lubricants, or other hazardous materials during maintenance activities could degrade habitats and prevent use for forage or refuge. However, the large areas of suitable habitats around the Action Alternatives would be sufficient to allow for wildlife movement and dispersal.

The proposed rail line could act as a fire source or a potential fire break (i.e., a gap in vegetation type that slows or stops a fire), which could change the natural fire regime of the ecosystem, thereby altering the composition of wildlife habitat over time. Potential wildfire impacts, including OEA's recommended mitigation related to wildlife, is discussed further under *Vegetation*.

Encounters with Project Infrastructure

Rail line infrastructure could affect species survival and reproductive success. Power distribution lines, communications towers, and fences associated with the proposed rail line would provide perches for predatory birds, facilitating predation on ground-nesting birds and other small wildlife. However, the Coalition is not proposing fences unless a landowner agreement requests one and OEA anticipates that installation of new power distribution lines would be limited. The Coalition would construct power lines primarily near road crossings where they could be connected to existing distribution lines. In more remote or inaccessible locations, OEA anticipates the Coalition would use solar-powered equipment, which would have fewer wildlife impacts. Communications towers, which would be approximately 120 feet tall, also could present a collision hazard, especially for larger migrating birds. Each Action Alternative would require the construction of four communications towers. At the same time, birds could use power lines, communications towers, or fences for nesting and perching (Daniel and Willard 1978), potentially providing a beneficial impact on many bird species (Table 3.4-~~2~~4), such as increasing individual reproductive success. To address potential adverse impacts on wildlife related to communications towers, OEA is recommending mitigation requiring the Coalition follow the USFWS *Recommended Best Practices for Communication Tower Design, Siting, Construction, Operation, Maintenance, and Decommissioning* (USFWS 2018) to avoid or minimize the risk of bird mortality at communications towers (BIO-MM-1).

Accidents and Spills of Hazardous Materials

The Coalition anticipates that rail traffic on the proposed rail line would consist primarily of trains transporting crude oil. Train accidents or derailments could cause tanker cars to rupture and spill crude oil into the environment. The potential impact of crude oil on the environment would first depend on a train accident or derailment occurring, and then on whether or not the accident or derailment was severe enough to result in a rupture and release of crude oil. Based on train accident and derailment modeling in Section 3.2, *Rail Operations Safety*, operation of any of the Action Alternatives would yield a small number of predicted accidents per year, with roughly one accident involving a loaded train every 3 to 10 years, depending on the Action Alternative. OEA expects that most accidents involving loaded trains would be small and that only approximately one-quarter of those accidents would result in a release of any size.

Uinta Basin black and yellow crude oils are waxy crude oils that have a wax content higher than most North American crude oils. The oil does not flow at room temperature and must be heated at higher temperatures for it to flow. Because of this, the oil tends not to disperse if it is spilled onto land. If it is spilled in water, the oil tends to form globules of semisolid material that tend to stay in place. For example, UDEQ documented an oil spill incident (July 12, 2018) and cleanup effort where a tanker truck spilled 1,000 gallons of crude oil that reached the Price River in Carbon County (UDEQ 2018, 2019). Due to the oil's properties, as the crude oil spilled onto the road surface, it began to harden, so only a small amount actually made it to the river. Once the oil reached the river, instead of forming a large slick on the water surface, the oil solidified and formed floating chunks that were easily removed by hand and with assistance from a boom. Sampling of public drinking water supply intakes downstream of the spill showed no exceedances of drinking water standards. In the report for this spill (UDEQ 2019), UDEQ stated that Uinta Basin crude oil has been described as "cleanup friendly" and that "thanks to the nature of the crude oil, most of these spills can be easily cleaned up afterward." A similar incident occurred in the Provo River in 2015 with similar results (Central Utah Water Conservancy District 2015, 2016; Orvis News 2015).

As with most crude oils, Uinta Basin crude oil is toxic and an accidental release could have adverse effects on the environment, including permanent and temporary impacts on vegetated habitats and less mobile wildlife. However, the oil's properties would help reduce the potential impact and make cleanup easier than most crude oils, thereby helping to avoid or minimize the long-term chronic effects from spill of typical crude oils that would spread out over large areas as giant slicks. The Coalition has also proposed voluntary mitigation measures to minimize potential impacts related to spills of crude oil. These measures include a commitment to prepare a hazardous materials emergency response plan; comply with applicable regulations and tribal ordinances related to the safe and secure transportation of hazardous materials; and notify appropriate federal, state, and tribal environmental agencies as required under federal, state, and tribal law in the event of a reportable spill (VM-11, VM-12, VM-13, VM-14, VM-15).

An accidental release of other hazardous materials during operations (e.g., fuel leaks from locomotives or maintenance vehicles) could affect individual animals if they were exposed to the contaminant, which could cause injury, sickness, or death. OEA expects that any release of hazardous materials during operations would be small and would affect a limited area. To minimize impacts related to the accidental release of hazardous materials during operations, the Coalition has proposed voluntary mitigation that would commit the Coalition to promptly cleaning up the spill and notifying responsible agencies in accordance with federal, state, and tribal regulations (VM-10) This measure would help contain a release of hazardous materials and would facilitate rapid cleanup should a spill occur.

Fish

Construction

Construction of the proposed rail line would require installation of bridges and culverts at stream crossings and stream realignments (Section 3.3, *Water Resources*, Table 3.3-12, lists the bridges, ~~and~~ culverts, and stream realignments for each Action Alternative). Bridge and culvert construction could affect fish by injuring or killing fish from in-stream construction activities, increasing sedimentation and turbidity in streams, prohibiting fish movement, degrading water quality from release of hazardous materials into streams, and temporarily and permanently removing riparian vegetation. Stream realignments would permanently fill stream channels and replace them with a human-made channel. Potential direct impacts (e.g., fish injury or mortality) would be more likely to occur in those surface waters that support fish and have fish present at the time of construction (e.g., perennial and intermittent streams). Ephemeral streams, which can support fish during flows and provide important indirect support to downstream fish populations (e.g., delivering nutrients to perennial streams), could be dry during construction, which would preclude these potential direct impacts on fish at the time of construction.

Injury or Mortality

Construction could kill or injure fish if they are present at the construction site. Use of construction equipment in active stream channels could injure or crush eggs, larvae, and juvenile fish. Construction equipment could compact soils and substrate in the streambed, resulting in the death of larvae and eggs in or on substrate material. Where there is a soft sediment bottom, equipment movement could redirect streamflow. Portions of the streambed could become dry and isolated, resulting in mortality of fish. If water diversions and temporary dewatering are needed, developing eggs and pre-emergent larvae could dry out and die. Eggs, larvae, and juvenile fish would be more susceptible to harm than adult fish from in-stream construction because they are immobile or less mobile. Adult and larger juvenile fish are generally more capable of moving away from disturbance and would likely avoid exposure where possible. Potential fish mortality impacts from construction activities would be localized and temporary, lasting only for the duration of the in-stream construction.

Bridge construction could also injure fish from underwater noise associated with vessel movement and installation of bridge supports. OEA expects that the Coalition would install bridge foundations by either pile driving or inserting steel piles into drilled shafts, depending on site-specific geological conditions. Sound generated by pile driving has the potential to affect fish in several ways, ranging from alteration of behavior to physical injury or mortality, depending on the intensity and characteristics of the sound, the distance and location of the fish in the water column relative to the sound source, the size and mass of the fish, and the fish's anatomical characteristics (Hastings and Popper 2005). Injuries can include change in hearing capability or actual damage to the inner ear, damage or destruction of the swim bladder, other cellular and molecular effects, and possible adverse effects on eggs and larvae (Hastings and Popper 2005). Behavioral effects, such as fish leaving or avoiding an area, have been observed (Swan 2012).

The effects of hearing loss in fish could increase their vulnerability to predators and/or result in a reduced ability to locate prey, inability to communicate, or inability to sense their physical environment (Hastings and Popper 2005). Popper et al. (2005) found that fish experiencing temporary shifts in sensitivity to sounds were able to recover in less than 18 hours post exposure. Therefore, OEA expects that potential noise impacts on fish would be temporary, lasting only the duration of in-stream construction.

To minimize the risk of killing or injuring fish during in-stream construction work, OEA is recommending mitigation requiring the Coalition comply with any federal, state, or local in-water work windows and timing restrictions for the protection of fish species (BIO-MM-2). In addition, OEA is recommending mitigation requiring the Coalition implement appropriate noise-attenuating methods, such as bubble curtains or wood or nylon pile caps when installing or proofing pilings below the ordinary high water line of fish-bearing streams to minimize underwater sound impacts on fish (BIO-MM-3).

Sedimentation and Turbidity

Construction activities could increase sedimentation and turbidity (cloudiness) in streams that the proposed rail line would cross. High turbidity levels can directly affect the physical health of fish and alter fish behavior, but the severity of these impacts would vary depending on species susceptibility. High turbidity affects gill function, blood sugar levels, and osmoregulatory[8] function in fish. Increased turbidity can also affect fish behavior by changing responses to predation risk and predator avoidance, changing foraging ability, and reducing territoriality. Species that can tolerate high turbidity levels (e.g., carp) would be less susceptible to elevated turbidity compared to species that are less tolerable of turbidity (e.g., trout), particularly if the impacts were to be short term and did not cause permanent habitat degradation.

Increased sediment in streams would affect juvenile fish by changing their behavior and/or affecting their food sources. Many juvenile fish primarily eat macroinvertebrates that live on the streambed. Fill and sediment in the stream could be deposited on the substrates where the macroinvertebrates live, which would reduce the food available for juvenile fish. Excessive sediment in a stream could decrease the depth of the stream and reduce the number of pools and the physical space available for juvenile fish, which could decrease their survival rate.

Although construction would cause sedimentation and turbidity in surface waters, this impact would be temporary. To minimize impacts related to the sedimentation and turbidity in surface waters, the Coalition has proposed voluntary mitigation that would commit the Coalition to obtaining a Clean Water Act Section 401 water quality certification and an NPDES permit, and developing a SWPPP (VM-19, VM-21, VM-26). The Section 401 water quality certification, SWPPP, and NPDES permit conditions would contain site-specific measures to avoid and minimize erosion and sedimentation that could cause turbidity in surface waters and thereby minimize potential impacts on fish.

Fish Movement

Culvert and bridge installation in fish-bearing streams could involve installing temporary pipe and pump system streamflow diversions to bypass streamflow around the culvert and bridge work area, which would temporarily impede fish movement. In-stream work could involve installing a cofferdam to create a dry work area. This would temporarily prevent fish migration through the culvert and bridge installation area and would block access to upstream and downstream habitat. This impact would be temporary, lasting only for the duration of the culvert and bridge installation.

To minimize impacts on fish movement during construction, OEA is recommending mitigation requiring the Coalition use block-nets to remove and exclude fish from in-water work areas, to the extent practicable and comply with reasonable federal, state, or local in-water work windows and timing restrictions for the protection of fish species, and other reasonable requirements of the in-water work permits (BIO-MM-2, BIO-MM-4).

Water Quality

Construction would require the use of common construction materials (e.g., concrete, paint, and wood preservatives) and petroleum products (e.g., fuels, lubricants, and hydraulic fluids) that may be toxic to fish. These materials could be stored within the rail corridor and/or in staging areas

[8] Osmoregulation is the process of maintaining salt and water balance across membranes.

during construction. An accidental spill of hazardous materials in or near a water body could reach a stream or other surface water and degrade water quality, which would affect the health or survival of fish and fish habitat. The nature and extent of these impacts would depend on the type and amount of material that would reach the surface waters, the timing of the spill, and the ecological sensitivity of the affected habitat. Spills during the spawning season would be particularly detrimental for nest-spawning species or species with immobile (nondrifting) eggs, but the high-flow conditions that are typical during the spring spawning season would dilute spills and limit the duration and severity of their impacts. Spills in slow-moving water environments (e.g., pool and backwater habitats) could result in long-term impacts because there would not be regular water flows to flush toxic materials from these habitats.

Although construction could result in hazardous materials reaching surface waters, which could affect fish, the Coalition has proposed voluntary mitigation that would commit the Coalition to obtaining a Clean Water Act Section 401 water quality certification and an NPDES permit, and developing a SWPPP (VM-19, VM-21, VM-26) to reduce impacts on surface water quality.

In-stream and Riparian Habitats

Construction would require some removal or alteration of riparian vegetation, which would influence the quality of fish habitat by reducing streambank stability; food production; and in-stream cover, complexity, and temperature. The severity of these impacts would depend on the area of affected riparian habitat and the duration of construction activities, which would vary across the three Action Alternatives (Section 3.4.3.2, *Impact Comparison between Action Alternatives*). Woody debris from streamside trees provides cover and habitat complexity, which are essential components of fish habitat. Riparian zones are sources of terrestrial nutrients, such as insects and plant matter, that are transported to the aquatic system. Riparian vegetation also provides shade and an insulating canopy that moderates water temperatures and creates a natural filter that reduces the transport of fine sediment to the stream. The roots of riparian vegetation stabilize streambanks, providing foraging habitat and cover for rearing fish. The removal of riparian vegetation would eliminate these benefits for fish. It would also accelerate the natural processes of channel meandering and erosion, which could affect fish habitat. To minimize the impacts related to the removal or alteration of riparian vegetation, OEA is recommending mitigation requiring the Coalition avoid clearing riparian vegetation to the extent practicable, minimize the area and duration of construction-related disturbances in riparian areas and along streambanks, and immediately restore and revegetate temporarily disturbed riparian areas with native vegetation once construction is complete (BIO-MM-5).

Stream Channel Realignment

Construction of any of the Action Alternatives would involve realigning stream channels. These stream realignments would occur in areas where the proposed rail line would parallel a stream and topography, existing infrastructure (e.g., highways), or rail line design standards (e.g., curvature ratio) would make it impossible to avoid the stream. Stream realignments would involve filling segments of the stream and moving the stream channel to maintain hydrologic connectivity and stream flow, which would result in the permanent loss of the original aquatic habitat and stream functions. The stream realignment process typically involves designing and constructing the new stream channel prior to placement of permanent fill in the existing stream. Once construction of the new channel is completed, flow is diverted into the new channel by blocking flow into the existing stream channel. After flow is established in the new channel, the original stream is permanently filled. If improperly designed, realigned stream channels can result in physical and ecological impacts on aquatic habitat. Primary changes to the channel dimensions and materials, alongside changes to flow velocity or channel capacity, can lead to various problems, such as heightened erosion or deposition, changes in geomorphology and sediment transport dynamics downstream, hanging tributaries, vegetation loss, water quality issues, and associated ecological impacts (Flatley et al. 2018). Fundamentally, a realigned channel replaces a natural section of a stream with a human-made channel. The artificial channel is usually different from the natural channel in several ways, such as being shorter and steeper, having different bed and bank material, having no floodplain, and cutting across tributaries, all of which can lead to erosion, flooding, and fish passage issues (Flatley et al. 2018). OEA is recommending mitigation requiring the Coalition to design all stream realignments in consultation with USACE as part of the CWA Section 404 permitting process compensatory mitigation plan development to ensure that affected stream functions are adequately mitigated (WAT-MM-3). In addition, the Coalition has proposed voluntary mitigation that would commit the Coalition to relocating streams using bioengineering methods and obtaining stream alteration permits (VM-29, VM-31). These mitigation measures would offset the impact of stream realignments, but some impacts would be unavoidable.

Operations

Fish Movement

The main impact from rail operations on fish would be related to culverts. Culverts could impede fish movement if not designed properly. Common issues with culverts that restrict fish movement include increased water velocity, decreased water depth, and culvert outlet drop heights. The effects of culverts can alter instream habitats and fish assemblages (Huser 2009). Culverts have localized effects on instream habitat and fish assemblages. In addition, culverts can disrupt the normal, within-stream movements of some macroinvertebrates. Macroinvertebrates are key components of the aquatic ecosystem and are important food sources for fish. Disruption to the movement and dispersal of stream macroinvertebrates could reduce available habitat and lead to genetic isolation of some populations (Vaughan 2002). OEA is recommending mitigation requiring the Coalition implement culvert best management practices to ensure all culverts are sufficiently clear of debris to avoid flow blockages and design culverts to allow aquatic organisms to pass relatively unhindered, which would minimize impacts on fish movement (WAT-MM-10, BIO-MM-6).

Accidents and Spills of Hazardous Materials

As discussed previously, the characteristics of Uinta Basin crude oil would limit its spread if it were spilled into or near surface water as a result of a derailment or other accident. The Coalition has proposed voluntary mitigation measures to minimize potential impacts related to spills of crude oil. These measures include a commitment to preparing a hazardous materials emergency response plan; complying with applicable regulations and tribal ordinances related to the safe and secure transportation of hazardous materials; and notifying appropriate federal, state, and tribal environmental agencies as required under federal, state, and tribal law in the event of a reportable spill (VM-11, VM-12, VM-13, VM-14, VM-15). Some temporary impacts on aquatic habitat and fish would be unavoidable in the event of a spill, and could include impacts from disturbances caused by collecting globules of oil during cleanup.

An accidental release of other hazardous materials during operations (e.g., fuel leaks from locomotives or maintenance vehicles) could affect aquatic habitat and fish if the fuel were to reach the aquatic habitat. OEA expects that any release of hazardous materials during operations would be small and would affect a limited area. To minimize impacts related to the accidental release of hazardous materials during operations, the Coalition has proposed voluntary mitigation that would commit the Coalition to promptly cleaning up the spill and notifying responsible agencies in accordance with federal, state, and tribal regulations (VM-10). These measures would prevent large quantities of fuel (if any) reaching aquatic habitat.

Vegetation

Construction

Construction of the proposed rail line would involve clearing, excavating, and filling within the project footprint, which would result in the permanent or temporary loss or alteration of vegetation. Construction could also affect vegetation beyond the project footprint as a result of fugitive dust emissions, the introduction and/or spread of noxious weeds, and releases of hazardous materials. The extent of such impacts would vary based on the affected vegetation, relative abundance of vegetation, soil conditions, hydrology, topography, and the extent of earthmoving required for construction.

Clearing and Fill Placement

Within the rail line footprint, construction would involve the permanent removal of vegetation to allow for the placement of fill for regrading of the rail corridor, construction of the railbed, and installation of permanent project-related features, such as permanent access roads. Following construction, some natural vegetation regrowth could occur in areas within the rail line footprint that are not periodically maintained for vegetation control. However, regrowth would be sparse in areas that would be continually disturbed by railroad maintenance. In the temporary footprint, construction would involve temporarily clearing vegetation for construction staging areas, temporary access roads, and temporary facilities. Disturbed areas in the temporary footprint would be reclaimed and revegetated following construction. Some affected vegetations types in the temporary footprint, such as shrub and forest, would take many years to be completely restored to pre-construction conditions. Although vegetation would return to the ~~temporarily~~ disturbed areas in the rail line footprint beyond the rail bed, the clearing of shrub and forest vegetation would alter and likely permanently change the vegetation cover class to nonwoody herbaceous cover classes. The Coalition has proposed voluntary mitigation stating that it would limit ground disturbance to only the areas necessary for project-related construction activities and would revegetate disturbed areas when construction is completed (VM-21, VM-26). In addition, OEA is recommending mitigation requiring the Coalition to develop a detailed reclamation and mitigation plan for temporarily disturbed areas (BIO-MM-16).

Even if the Coalition's voluntary mitigation measures are implemented, however, permanent impacts on vegetation in the project footprint would be unavoidable.

Plant Germination and Growth

The movement of heavy equipment and supplies during construction could compact the soil, which would affect vegetation germination and growth within the project footprint. Compaction is caused when soil particles are squeezed together, making soils denser, oxygen-deprived, and less able to absorb water (Alabama Cooperative Extension System 2013). This condition would prevent seeds from germinating and would make it difficult for roots to penetrate the soil surface. Vegetation removal and soil compaction would expose soil to erosion caused by rain and overland stormwater runoff, which could reduce soil quality and negatively affect vegetation within and beyond the rail corridor, especially in areas with steep terrain. To minimize these impacts, OEA is recommending mitigation requiring the Coalition minimize the duration and extent of activity at temporary construction facilities (e.g., staging areas), provide surface treatments to minimize soil compaction, and promote vegetation growth after the facilities are no longer needed to support construction (WAT-MM-5).

Noxious and Invasive Weeds

Rail construction could introduce and increase the spread of noxious and invasive weeds in the following ways.

- Construction equipment could carry weed seeds or plant parts from infested areas outside the project footprint into the project footprint.
- Construction equipment could disturb existing weed infestations in the project footprint and cause the spread of these infestations.
- Overburden and cut materials containing weeds could be transferred to offsite locations.
- Fill material could contain weeds.
- Seed mixtures containing weed seeds could be used for revegetation.

Noxious and invasive weeds introduced during construction activities would compete with native vegetation. Noxious and invasive weeds are often more aggressive than native vegetation, and the disturbed conditions of a construction site can create an environment (e.g., bare and compact soil, disturbed surfaces) where some noxious and invasive weeds thrive. Noxious and invasive weeds that encroach beyond the rail corridor could out-compete native vegetation and result in altered vegetation structure, a reduction in plant species richness, and overall disruption of the plant ecosystem. To minimize impacts related to noxious and invasive weeds, the Coalition has proposed voluntary mitigation that would commit the Coalition to preparing a noxious and invasive weed control plan, in consultation with the Ute Indian Tribe, that will include the policies and strategies in Utah's *Strategic Plan for Managing Noxious and Invasive* Weeds, where practical (VM-38, BIO-MM-15). If implemented, this mitigation measure would minimize impacts related to noxious and invasive weeds during project-related construction.

Dust Deposition

The operation of construction equipment would generate fugitive dust from loose soil. Accumulation of fugitive dust on vegetation in or near the project footprint could affect plant growth by inhibiting photosynthesis and reducing vegetation density and plant diversity. More tolerant native plant species could benefit from decreased competition. Increased dust could cause some noxious weeds to colonize and disrupt the overall plant ecosystem. The magnitude and duration of dust exposure, tolerance of native vegetation, and aggressiveness of noxious weeds would determine vegetation response and the intensity of impacts. However, any dust accumulation on vegetation would be temporary and would last only for the duration of construction or until a precipitation event washes away the accumulated dust. To minimize impacts related to fugitive dust deposition, the Coalition has proposed voluntary mitigation that would commit the Coalition to implementing fugitive dust controls (VM-23). If this measure is implemented, OEA expects that the impact of construction-related fugitive dust on vegetation would be temporary and insignificant.

Accidental Spills of Hazardous Materials

Accidental release of hazardous materials during construction, such as an inadvertent spill of gasoline or oil when fueling or storing construction equipment, could damage vegetation and affect plant growth. The extent of the impact would depend on the type and volume of the material spilled, the location, and the vegetation affected. Because construction activities would not involve using or storing large volumes of hazardous materials, OEA expects that any uncontained spills of hazardous materials during construction would be small and would affect a limited area. To minimize impacts related to accidental spills of hazardous materials, the Coalition has proposed voluntary mitigation that would commit the Coalition to obtaining a Clean Water Act Section 401 water quality certification and an NPDES permit, and developing a SWPPP (VM-19, VM-21, VM-26).

Operations

The primary operation activities that could affect vegetation are maintenance, incidental pollutant discharges from train operation, and wildfires. Total rail traffic on the proposed rail line would range from 3.68 to 10.52 trains per day, on average. The number of trains per day would not change the types of operation impacts, but it could affect the frequency of the impact (e.g., more trains could result in increased maintenance activities) or increase the chance of the impact occurring (e.g., more trains could increase the risk of sparking a wildfire).

Maintenance Activities

Maintenance activities would include controlling vegetation and maintaining tracks and other features in the rail line footprint. These activities would be infrequent and brief. Vegetation would be periodically cleared or trimmed in the corridor, which could permanently alter vegetation. For example, shrub vegetation that would be continuously cleared for maintenance could convert to herbaceous vegetation. Maintenance activities could disturb the ground surface or result in leaks and spills of fuels, oils, or lubricants from maintenance vehicles and equipment. Any mobilized sediment, spilled chemicals, or petroleum products could reach adjacent vegetation, affecting plant density and diversity and degrading the plant ecosystem on a localized scale. However, the area of vegetation that could be affected would be small, and maintenance activities would be infrequent and brief. To minimize impacts related to the accidental release of hazardous materials during operations, the Coalition has proposed voluntary mitigation that would commit the Coalition to promptly clean up the spill and notify responsible agencies in accordance with federal, state, and tribal regulations (VM-10). However, some impacts related to vegetation control within the rail line footprint would still be unavoidable.

Pollutant Deposition

Rail operations would release pollutants that could affect vegetation. The two most important types of pollutants associated with rail transport are PAHs and heavy metals (Wilkomirski et al. 2011). PAHs occur naturally in air, water, and soil but can also be manufactured. They are found in substances such as asphalt, oil, coal, and creosote (Agency for Toxic Substances and Disease Registry 1995). The main sources of PAHs around rail lines are substances used for rolling stock use, such as machine grease, fuel oils, and transformer oils (Wilkomirski et al. 2011). Heavy metals in emissions and rail car materials can build up on plants and in soil near rail lines (Wilkomirski et al. 2011).

Stormwater discharges from the railbed and access roads could convey low concentrations of these pollutants to vegetated areas. Some plant species accumulate and tolerate PAHs (Simonich and Hites 1994 in Liu et al. 2009). However, PAHs can also stunt plant growth and affect root physiology (Liu et al. 2009). Heavy metals may inhibit growth and damage plant physiology, but plants also have resistance mechanisms against toxic effects (Cheng 2003). Any releases of PAHs and heavy metals associated with rail operations would be localized and could result in the degradation of vegetation within the rail line footprint. OEA does not expect that these pollutants would affect vegetation outside of the rail line footprint.

Wildfire

Trains can contribute to wildfires by providing an ignition source. The two most common ignition sources associated with railroads are exhaust sparks (carbon particles, such as chunks or flakes) emitted from the locomotive engine and hot brake shoe fragments (California Department of Forestry and Fire Protection et al. 1999). With the advent of composition brake shoes, brake-shoe sparks and fragments are much less common, unless the shoe is worn out (California Department of Forestry and Fire Protection et al. 1999).

Several factors are important for assessing where exhaust sparks are most likely to occur. These include how long a locomotive has been idling, where it accelerates and decelerates, and where downgrades are located (California Department of Forestry and Fire Protection et al. 1999). When a locomotive is idling or operating at minimum power, carbon particles can build up in the locomotive. When power is turned up after a period of idling or operating at minimum power, those carbon particles can be ejected out of the locomotive. Locomotives are most likely to idle or operate at minimum power in rail yards, on sidings, while negotiating downgrades and decelerating for a stop or for a restricted speed zone (California Department of Forestry and Fire Protection et al. 1999). Exhaust-spark fires are most likely to occur at yard exits and sidings, at locations where long downgrades change to level or upgrade track, and where the rail line grade changes from level to steep upgrade track (California Department of Forestry and Fire Protection et al. 1999).

Any of the Action Alternatives would require sidings (Chapter 2, *Proposed Action and Alternatives*, Table 2-7), which would increase the potential for locomotive carbon particle buildup and emissions. Locomotives would also be stopped or operating at minimum power when materials would be loaded into rail cars at the terminus points of the rail line. Many grade changes would occur along the Action Alternatives that could contribute to carbon particle buildup and emissions.

If rail operations were to start a fire, impacts on vegetation would vary, depending on the conditions at the time of the wildfire and on prevention and suppression efforts. Some wildfires alter vegetation structure in relatively subtle ways (reducing litter and dead herbs in small areas). Other wildfires change nearly every aspect of vegetation structure. Woody plants may be stripped of foliage and killed; litter and organic matter may be consumed, exposing mineral soil; and underground structures, such as roots and rhizomes, may be killed (e.g., in most coniferous trees) or rejuvenated (e.g., in many grass and shrub species, aspen, and oak) (Forest Service 2000). To the extent that conditions become drier due to climatic trends, there could be greater potential for wildfire starts earlier and later in the year, and more acreage burned.

The probability of a train-induced wildfire would be very low because of several reasons, including improvements in locomotive technology and the fact that trains make up a small percentage of fire starts (Table 3.4-~~5~~7). OEA is also recommending mitigation requiring the Coalition develop and implement a wildfire management plan in consultation with appropriate state and local agencies, including local fire departments (BIO-MM-7). The plan should incorporate specific information about operations, equipment, and personnel on the rail line that might be of use in case a fire occurs and should evaluate and include, as appropriate, site-specific techniques for fire prevention and suppression. If OEA's recommended mitigation is implemented, OEA concludes that the impacts of wildfire on vegetation would not be significant.

In response to comments received on the Draft EIS, OEA considered impacts from rail operations along existing rail line segments downline of the proposed rail line for some biological resources, including impacts related to wildfires. Trains originating or terminating on the proposed rail line could be an ignition source for wildfires along existing rail lines outside of the study area. However, because those existing rail lines are active rail lines that have been in operation for many years, construction and operation of the proposed rail line would not introduce a new ignition source for wildfires along the downline segments. For the reasons discussed above, the probability that a train would trigger a wildfire is very low, and nearly 90 percent of the area along the downline segments consists of very low, low, nonburnable, and water WHP classes (Table 3.4-9). Therefore, the downline wildfire impact of the proposed rail line would not be significant. Because the Coalition does not and would not operate any existing rail lines downline of the proposed rail line, the Board cannot impose mitigation on the Coalition that would address potential downline impacts from rail operations related to wildfire. However, any trains operating on downline segments would be subject to the same federal regulations as the proposed rail line for rail transportation, including regulations related to fire safety and the transportation of crude oil by rail, which would minimize potential wildfire impacts.

Accidental Spills of Hazardous Materials

Oil could spill from a tanker car onto vegetation should a train accident or derailment occur. Section 3.4.3.1, *Impacts Common to All Action Alternatives, Wildlife*, discusses the probability of an oil spill occurring during operations and the characteristics of Uinta Basin crude oil that limits its spread when spilled in the natural environment. If cleanup and oil removal were to commence immediately after a spill, impacts on vegetation would be minimized. However, some permanent and temporary vegetation impacts could occur during cleanup, which could result in the loss of vegetation and establishment and spread of noxious and invasive weeds. The Coalition has proposed voluntary mitigation measures to minimize potential impacts related to spills of crude oil. These measures include a commitment to preparing a hazardous materials emergency response plan; complying with applicable regulations and tribal ordinances related to the safe and secure transportation of hazardous materials; and notifying appropriate federal, state, and tribal environmental agencies as required under federal, state, and tribal law in the event of a reportable spill (VM-11, VM-12, VM-13, VM-14, VM-15).

Special Status Species

Construction

The types of construction-related impacts on special status species would be the same as those described previously for wildlife, fish, and vegetation in general. These potential impacts include individual injury or mortality, habitat loss or alteration, wildlife displacement, and barriers to movement.

Endangered Species Act-Listed Species

Construction of the proposed rail line could affect 10 federally listed species: Barneby ridge-cress, Pariette cactus, Uinta Basin hookless cactus, Ute ladies'-tresses, Canada lynx, Mexican spotted owl, bonytail, Colorado pikeminnow, humpback chub, and razorback sucker. OEA is currently conducting ESA Section 7 consultation with USFWS to assess the potential effects of the proposed rail line on ESA-listed species and has prepared a ~~Draft~~ Biological Assessment that discusses those potential effects (Appendix I, *~~Draft~~ Biological Assessment*). The ~~Draft~~ Biological Assessment concludes that construction and operation of any of the Action Alternatives would be likely to adversely affect Colorado pikeminnow, humpback chub, bonytail, razorback sucker, Pariette cactus, Uinta Basin hookless cactus, and Ute ladies-tresses. Depending on the Action Alternative, construction and operation of the proposed rail line would also be likely to adversely affect Barneby ridge-cress. The ~~Draft~~ Biological Assessment also concludes that construction and operation of any of the Action Alternatives would be not likely to adversely affect Canada lynx and Mexican spotted owl. To minimize impacts on federally listed threatened and endangered species, OEA is recommending mitigation requiring the Coalition implement all terms and conditions of USFWS' Biological Opinion (BIO-MM-9).

Bald and Golden Eagles

Eagles have been observed in the study areas for all Action Alternatives. During field surveys, the Coalition did not observe any eagle nests in the study areas. Suitable nesting, perching, and foraging habitat exists in the study areas and immediate vicinity. While golden eagles are common throughout Utah and habitat is found throughout the study area, bald eagles primarily winter in Utah for a few months out of the year. The Utah GAP Analysis (1999) modeled potential bald eagle habitat in Utah and very little breeding habitat was identified. In the event an eagle nest is observed in or near construction sites prior to or during construction, OEA is recommending mitigation requiring the Coalition comply with the Bald and Golden Eagle Protection Act and to follow the USFWS *National Bald Eagle Management Guidelines* (USFWS 2007), which may include contacting USFWS to coordinate efforts to avoid or minimize disturbance of eagle nests (BIO-MM-8). Such efforts might include the following.

- Maintaining a distance between the construction activity and the nest (distance buffers).
- Maintaining forested (or natural) areas between the construction activity and around nest trees (landscape buffers).
- Avoiding disruptive (loud) activities during the breeding season.

If take[9] of an eagle or eagle nest cannot be avoided, the Coalition would obtain a permit from USFWS. To minimize potential impacts on eagles, OEA is recommending mitigation requiring the Coalition abide by the reasonable requirements of all appropriate federal and state permits to possess, relocate, or disassemble a bald or golden eagle nest, and/or work within 0.5 mile of a bald eagle or golden eagle nest, regardless of whether the nest is active or inactive (BIO-MM-11). OEA is recommending the Coalition also follow the guidelines for avoiding and minimizing impacts set out

[9] The Bald and Golden Eagle Protection Act defines take as "pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." Disturb means "to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, 1) injury to an eagle, 2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or 3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

in the *Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances* for the protection of bald and golden eagles, as applicable (BIO-MM-11). OEA expects that construction-related impacts on eagles would be insignificant if OEA's recommended mitigation measures are implemented.

Sensitive Species

The types of construction-related impacts on BLM- and Forest Service-sensitive species would be the same as those described previously for wildlife, fish, and vegetation in general, including potential injury or mortality, habitat loss or alteration, wildlife displacement, and barriers to movement. If individual sensitive plant species are located in the project footprint, they could be permanently removed or temporarily disturbed during construction. If sensitive fish or wildlife species are encountered during construction, they could be injured or killed. However, given the mobility of the sensitive wildlife species that might be present during construction, OEA expects injury or mortality of a sensitive wildlife species would be rare. Those species that depend on habitats that are permanently removed would be displaced and forced to use similar adjacent habitat. The large areas of suitable habitats around the Action Alternatives would be sufficient to allow for wildlife movement and dispersal. OEA consulted with the Forest Service and developed a Biological Evaluation (Appendix H, *Biological Evaluation*) to assess the potential effects on Forest Service-designated sensitive species. The Biological Evaluation concludes that operation of the proposed rail line would have little or no impact on Forest Service-designated sensitive species within Ashley National Forest. To address construction-related impacts on sensitive species, OEA is recommending mitigation requiring the Coalition implement the requirements of land management agencies that would issue rights-of-way across public lands, including BLM and the Forest Service, as appropriate (LUR-MM-3, LUR-MM-4). These requirements would include appropriate measures to minimize impacts on BLM- and Forest Service-designated sensitive species.

Greater Sage-Grouse

In general, development activities adversely affect greater sage-grouse populations due to habitat loss, presence of humans and infrastructure, and noise (Aldridge and Boyce 2007; Aldridge 2005; Doherty et al. 2008; Holloran 2005; Lyon and Anderson 2003; Walker et al. 2007). There is also evidence suggesting that greater sage-grouse avoid noise from human activities independent of disturbance, associated infrastructure, and habitat fragmentation and that intermittent noise, such as traffic noise, has a larger effect on greater sage-grouse than continuous noise (Blickley et al. 2012).

Any of the Action Alternatives would cross greater sage-grouse habitat, including breeding, nesting, brood-rearing, and wintering habitat, and would result in the permanent removal of and temporary disturbance to that habitat (Table 3.4-~~9~~ 12 and Table 3.4-~~10~~13). Disturbed areas in the temporary footprint would be reclaimed and revegetated following construction; however, affected sagebrush habitat in the temporary footprint would take many years to be restored to pre-construction conditions due to the difficulty in reestablishing this type of habitat (Meyer 1992). Greater sage-grouse could also be killed or injured by collisions with construction equipment, workers' vehicles, and project-related infrastructure (fences and communications towers). Noise from construction equipment and the presence of people in construction areas could displace greater sage-grouse and cause them to disperse into habitat areas further away from the rail line (Appendix J, *Bureau of Land Management Greater Sage-Grouse Resource Management Plan Compliance*). There are also several greater sage-grouse leks in the vicinity of all three Action Alternatives within the Carbon SGMA

(Figure 3.4-1). The habitat removal and noise associated with construction of the proposed rail line could cause greater sage-grouse to avoid or abandon those leks, especially if construction were to take place during the breeding season.

Because the Indian Canyon Alternative and the Wells Draw Alternative would cross mapped greater sage-grouse PHMAs on BLM-administered lands, construction of the proposed rail line would need to comply with the BLM *Utah Greater Sage-Grouse Approved Resource Management Plan Amendment* (BLM 2015a) for BLM to be able permit either of these Action Alternatives. OEA is recommending mitigation requiring the Coalition abide by the requirements of that plan and BLM's other reasonable requirements related to construction impacts on greater sage-grouse if the Board were to authorize either the Indian Canyon Alternative or the Wells Draw Alternative (BIO-MM-13). Because the Whitmore Park Alternative would not cross BLM-administered lands, mitigation related to the BLM plan would not be necessary. OEA is also recommending mitigation requiring the Coalition follow the reasonable requirements of the *Utah Conservation Plan for Greater Sage Grouse* (State of Utah~~UDWR~~ 2019~~c~~) during project-related construction for any of the Action Alternatives (BIO-MM-13). Section 3.4.3.2, *Impact Comparison between Action Alternatives*, describes how these plans relate to each of the Action Alternatives. In addition, the Coalition's voluntary mitigation states that the Coalition will execute a Mitigation Agreement with UDWR (Appendix K, *Greater Sage-Grouse Mitigation Strategies Memorandum*) to address impacts within the Carbon SGMA. That agreement will specify the actions that the Coalition would take to avoid and minimize impacts on greater sage-grouse habitat during construction and operation of the proposed rail line, as well as strategies for compensatory mitigation (VM-35).

Operations

The types of operations-related impacts on special status species would be the same as those described previously for wildlife, fish, and vegetation in general. These potential impacts include individual injury or mortality, habitat fragmentation and degradation, wildlife displacement, barriers to movement, and affects from accidents and spills of hazardous materials.

Endangered Species Act-Listed Species

Operation of the proposed rail line could affect 10 federally listed species: Barneby ridge-cress, Pariette cactus, Uinta Basin hookless cactus, Ute ladies'-tresses, Canada lynx, Mexican spotted owl, bonytail, Colorado pikeminnow, humpback chub, and razorback sucker. OEA is currently conducting ESA Section 7 consultation with USFWS to assess the potential impacts of the proposed rail line on ESA-listed species and has prepared a ~~Draft~~ Biological Assessment discussing those potential impacts (Appendix I, ~~*Draft*~~ *Biological Assessment*). The ~~Draft~~ Biological Assessment concludes that construction and operation of any of the Action Alternatives would be likely to adversely affect Colorado pikeminnow, humpback chub, bonytail, razorback sucker, Pariette cactus, Uinta Basin hookless cactus, and Ute ladies'-tresses. Depending on the Action Alternative, construction and operation of the proposed rail line would also be likely to adversely affect Barneby ridge-cress. The ~~Draft~~ Biological Assessment also concludes that construction and operation of any of the Action Alternatives would be not likely to adversely affect Canada lynx and Mexican spotted owl. To minimize impacts on federally listed threatened and endangered species, OEA is recommending mitigation requiring the Coalition implement all terms and conditions of USFWS' Biological Opinion (BIO-MM-9).

In response to comments received on the Draft EIS, OEA considered impacts from rail operations along existing rail line segments downline of the proposed rail line for some biological resources, including impacts on ESA-listed species. OEA notes that the existing UP rail line between Kyune and Denver crosses critical habitat for the Colorado pikeminnow and razorback sucker in the Green River and closely parallels critical habitat for the Colorado pikeminnow, razorback sucker, humpback chub, and bonytail in the Colorado River. Because the existing UP rail line is an active rail line that has been in operation for many years, impacts from rail operations on ESA-listed fish species and critical habitat along that rail line have occurred and would continue to occur, and the addition of up to 9.5 additional trains per day, on average, would not substantially change the severity of those impacts. Along any active rail line, including the existing UP rail line, minor leaks or drips of fuel or lubricants from locomotives, maintenance vehicles, or rail cars may occur during rail operations and, if those substances were to be deposited into waterways, impacts on aquatic organisms, including fish, would occur. However, the proposed rail line would not introduce a new potential source of pollution along the existing UP rail line because that rail line is already an active rail line that has been in operation for many years. OEA notes that, if a large release of crude oil were to occur on a downline segment that crosses or is immediately adjacent to critical habitat for ESA-listed fish species, adverse impacts on those fish would occur. However, as discussed in Section 3.1, *Rail Operations Safety*, the probability of a large spill of crude oil is very low and such an outcome is not reasonably foreseeable. Because the Coalition does not and would not operate any existing rail lines downline of the proposed rail line, the Board cannot impose mitigation on the Coalition that would address potential downline impacts from rail operations on the Colorado pikeminnow, razorback sucker, humpback chub, and bonytail. However, any trains operating on downline segments would be subject to the same federal regulations as the proposed rail line for rail transportation, including regulations for the transportation of crude oil by rail, which would minimize potential impacts on ESA-listed species and critical habitat.

Bald and Golden Eagles

As discussed previously, OEA expects that a noise level of 100 dBA SEL from rail operations would disturb wildlife. This level of noise could occur in areas up to 350 feet from the rail line for wayside noise and 460 feet from the rail line for horn noise. If eagles nested within these distances from the rail line, train operation and noise, as well as noise from maintenance activities, could disturb nesting eagles, potentially resulting in failed nesting attempts or mortality to young. While there is some evidence that eagle nests are more successful when located farther away from highways and rail lines, (Mundahl et al. 2013), eagles are known to successfully nest near disturbances that they do not directly associate with humans (Mundahl et al. 2013; Peterson 1986). Because wildlife-disturbing noise impacts from rail operations would primarily occur within 350 to 460 feet of the proposed rail line, OEA does not anticipate significant impacts on eagles if the Coalition's voluntary mitigation measures and OEA's additional recommended mitigation measures are implemented (BIO-MM-8, BIO-MM-11).

Train operation could injure or kill individual eagles due to collisions with trains. Eagles feed on carrion (flesh of dead animals), and dead animals along the rail line from train strikes could attract eagles where they would be susceptible to train strikes, which could result in eagle injury or death. The maximum speed for a loaded train would be 10 to 20 miles per hour, which would likely be slow enough for large and medium sized animals, including eagles, to see and hear the train in advance of a potential strike, allowing animals to flee the area. Unloaded trains may move faster, and the track is designed for a maximum speed of 40 miles per hour, which would increase the risk of animal strikes, including eagles feeding on carrion. OEA is recommending mitigation requiring the Coalition ensure that rail employees engaged in routine rail line inspections remove any carcasses observed along the rail line in order to minimize potential eagle strikes and record and submit data on carcass observations to UDWR (BIO-MM-12).

Sensitive Species

The types of operations-related impacts on BLM- and Forest Service-designated sensitive species would be the same as those described for common species, including potential injury or mortality, habitat fragmentation and degradation, wildlife displacement, and barriers to movement. Train operations would likely result in long-term avoidance of the area near the proposed rail line by greater sage-grouse. OEA consulted with the Forest Service and developed a Biological Evaluation (Appendix H, *Biological Evaluation*) to assess the potential effects to Forest Service-designated sensitive species. The Biological Evaluation concludes that operation of the proposed rail line would have little or no impact on Forest Service-designated sensitive species on Forest Service lands. To address operations-related impacts on sensitive species, OEA is recommending mitigation requiring the Coalition implement the requirements of land management agencies that would issue rights-of-way across public lands, including BLM and the Forest Service, as appropriate (LUR-MM-3, LUR-MM-4). These requirements would include appropriate measures to minimize impacts on BLM- and Forest Service-designated sensitive species.

Greater Sage-Grouse

During rail operations, any of the Action Alternatives would result in noise impacts on greater sage-grouse habitat and leks, but the severity of these impacts would vary between the three Action Alternatives (Section 3.4.3.1, *Impact Comparison between Action Alternatives*). As discussed previously, noise from human activities, and especially intermittent noise, can affect greater-sage grouse behavior. The introduction of new noise sources near leks during the breeding season could cause greater sage-grouse to avoid or abandon the leks. If the Board were to authorize the Indian Canyon Alternative or the Wells Draw Alternative (both of which would cross PHMA on BLM-administered lands), OEA is recommending mitigation requiring the Coalition ensure that rail operations would comply with the BLM *Utah Greater Sage-Grouse Approved Resource Management Plan Amendment* (BLM 2015a) (BIO-MM-13). OEA is also recommending mitigation requiring the Coalition ensure that rail operations would comply with the *Utah Conservation Plan for Greater Sage Grouse* (State of Utah~~UDWR~~ 2019~~c~~) for any of the Action Alternatives (BIO-MM-13). Section 3.4.3.2, *Impact Comparison between Action Alternatives*, describes how these plans relate to each of the Action Alternatives. In addition, the Coalition's voluntary mitigation states that the Coalition will execute a Mitigation Agreement with UDWR to address impacts within the Carbon SGMA. That agreement will specify the actions that the Coalition would take to avoid and minimize impacts on greater sage-grouse habitat during construction and operation of the proposed rail line, as well as strategies for compensatory mitigation (VM-35).

In response to comments received on the Draft EIS, OEA considered impacts from rail operations along existing rail line segments downline of the proposed rail line for some biological resources, including impacts on greater sage-grouse. OEA does not expect that increased rail traffic on existing rail lines would adversely affect greater sage-grouse because greater sage-grouse using habitat along those existing rail lines would have already become habituated to intermittent train noise due to exposure to such noise on a regular basis over the many years that the existing rail lines have been in operation. Because the Coalition does not and would not operate any existing rail lines downline of the proposed rail line, the Board cannot impose mitigation on the Coalition that would address potential downline impacts from rail operations on greater sage-grouse. However, any trains operating on downline segments would be subject to the same federal regulations as the proposed rail line for rail transportation, including regulations establishing speed and noise limits for rail operations, which would minimize potential impacts on greater sage-grouse.

3.4.3.2 Impact Comparison between Action Alternatives

This subsection compares the potential environmental impacts from construction and operation on wildlife, fish, vegetation, and special status species between the three Action Alternatives.

Wildlife

Construction and Operations

Construction and operation of any of the Action Alternatives would affect wildlife habitat. The most important factor for comparing impacts on wildlife between the Action Alternatives is the amount of habitat that would be permanently removed. In general, a greater amount of habitat removed would result in more severe impacts, such as impacts from displacement of wildlife, fragmentation of habitat, and blocking wildlife movement.

Table 3.4-~~11~~ 14 shows the area of big-game habitat (bighorn sheep, elk, moose, mule deer, and pronghorn antelope) that construction of each Action Alternative would permanently remove or temporarily disturb. The Wells Draw Alternative would permanently remove the greatest area of all big-game habitats, followed by the Whitmore Park Alternative and the Indian Canyon Alternative. However, the Whitmore Park Alternative would permanently remove the greatest area of big game crucial habitat (2,723.5 acres), followed by the Indian Canyon Alternative (2,406.3 acres) and Wells Draw Alternative (2,367.9 acres). Notably, there is significant overlap of big game habitats for the different big game species (see Appendix G *Biological Resources Figures* for big game habitats along the Action Alternatives), and the permanent and temporary habitat impacts affect multiple big game species in those areas of habitat overlap. Of the big-game species with habitat in the study areas, the Action Alternatives would affect mostly elk and mule deer habitat. Table 3.4-15 shows the percent of crucial habitat that construction of each Action Alternative would disturb (combined permanent and temporary removal) within each big game species' UDWR management unit. The percent area of crucial big game habitat affected in each management unit compared to all crucial habitat available in the management unit is less than 1 percent for all big game species for all management units. In addition, the habitat in the temporarily disturbed areas would be restored, resulting in a lesser percent area of crucial habitat impact than what is shown in Table 3.4-15 once restoration is complete. This small percent area of crucial habitat impact across all Action Alternatives is anticipated to have minimal indirect effects on big game populations and is not anticipated to affect the management and sustainability of big game populations within the available big game habitats in the UDWR management units. Table 3.4-16 shows the number of big game movement corridor crossings for each Action Alternative. The total number of affected movement corridors is similar between the Action Alternatives, with the Wells Draw Alternative having the smallest number. However, the Wells Draw Alternative would affect the greatest number of high importance movement corridors compared to the Indian Canyon Alternative and Whitmore Park Alternative.

Table 3.4-~~11~~14. Permanent Removal of and Temporary Disturbance to Big-Game Habitat (acres)

	Permanent Removal			Temporary Disturbance		
Species	**Indian Canyon**	**Wells Draw**	**Whitmore Park**	**Indian Canyon**	**Wells Draw**	**Whitmore Park**
Bighorn sheep (*Ovis canadensis*) ~~264.7571.0264.7333.01,201.8332.9~~						
Crucial habitat	264.7	32.9	264.7	333.0	63.8	332.9
Substantial habitat	-	538.2	-	-	1,138.1	-
Elk (*Cervus canadensis*) ~~1,017.02,111.11,107.21,579.73,957.32,199.6~~						
Crucial habitat[a]	693.8	691.1	878.1	1,041.4	1,309.5	1,740.7
Substantial habitat[a]	323.3	1,419.9	229.0	538.3	2,647.7	458.9
Moose (*Alces alces*)	~~681.9~~	~~1,126.7~~	~~748.6~~	~~1,045.6~~	~~1,758.1~~	~~1,556.4~~
Crucial habitat[b]	457.5	776.8	524.2	750.1	1,272.4	1,261.3
Substantial habitat[b]	224.4	349.9	224.5	295.5	485.7	295.1
Mule deer (*Odocoileus hemionus*) ~~1,171.62,163.11,261.82,089.84,114.22,709.7~~						
Crucial habitat[c]	841.3	520.1	907.5	1,295.7	844.0	1,807.1
Substantial habitat[d]	330.4	1,643.0	354.3	794.1	3,270.2	902.6
Pronghorn antelope (*Antilocapra americana*) ~~286.4365.7380.5572.3928.8850.0~~						
Crucial habitat	149.0	347.0	149.0	362.6	874.9	362.6
Substantial habitat	137.4	18.8	231.5	209.6	53.9	487.4
~~**Total**~~	~~**3,421.86**~~	~~**6,337.76**~~	~~**3,762.8**~~	~~**5,620.3 4,803.9**~~	~~**11,960.2 10,712.6**~~	~~**7,648.66, 342.6**~~

Notes:
[a] Includes summer, winter, and year-long habitats.
[b] Includes winter and year-long habitats.
[c] Includes year-long, winter, and summer habitats.
[d] Includes year-long and winter habitats.
Sources: Coalition 2020a; UDWR 2019b

Table 3.4-15. Percent Removal of All Big Game Crucial Habitats in UDWR Management Units

	Percent Removal of All Crucial Habitats in Management Unit[a]		
UDWR Management Unit	**Indian Canyon**	**Wells Draw**	**Whitmore Park**
Bighorn sheep (*Ovis canadensis*)			
Nine Mile Unit 11	0.07	0.01	0.06
Wasatch Mountains Unit 17	<0.01	0[b]	<0.01
Elk (*Cervus canadensis*)			
Central Mountains Unit 16	<0.01	<0.01	<0.01
Nine Mile Unit 11	0.17	0.23	0.26
South Slope Unit 9	0.01	0[b]	0.01
Wasatch Mountains Unit 17	0.05	0.05	0.08
Moose (*Alces alces*)			
Nine Mile Unit 11	0.38	0.97	0.59
Wasatch Mountains Unit 17	0.04	0.04	0.05

UDWR Management Unit	Percent Removal of All Crucial Habitats in Management Unit[a] Indian Canyon	Wells Draw	Whitmore Park
Mule deer (*Odocoileus hemionus*)			
Central Mountains Unit 16	<0.01	<0.01	<0.01
Nine Mile Unit 11	0.25	0.12	0.30
South Slope Unit 9[b]	0	0	0
Wasatch Mountains Unit 17	0.04	0.04	0.06
Pronghorn antelope (*Antilocapra americana*)			
Central Mountains Unit 16[b]	0	0	0
Nine Mile Unit 11	0.13	0.31	0.13

Notes:

[a] The percentage is based on the project footprint, which includes both the rail line footprint and temporary footprint.

[b] A zero means the project enters that UDWR management unit, but does not cross crucial habitat within that management unit.

Sources: Coalition 2020a; UDWR 2015, 2017a, 2017b, 2018, 2019b, 2019d, 2021a

Table 3.4-16. Big Game Movement Corridors Crossed by the Action Alternatives

Species	Number of Big Game Movement Corridor Crossings[a] Indian Canyon	Wells Draw	Whitmore Park
Bighorn sheep (*Ovis canadensis*)	6(H)	N/A	6(H)
Elk (*Cervus canadensis*)	6(L), 3(M), 5(H)	1(L), 3(M), 14(H)	6(L), 1(M), 3(H)
Mule deer (*Odocoileus hemionus*)	9(M)	6(M)	11(M)
Pronghorn antelope (*Antilocapra americana*)	3(M), 4(H)	7(H)	3(M), 4(H)
Total	**36** 6(L), 15(M), 15(H)	**31** 1(L), 9(M), 21(H)	**34** 6(L), 15(M), 13(H)

Notes:

Source: UDWR 2021b

[a] Does not include any big game movement corridors that cross above proposed tunnels; L=low importance movement corridor; M=medium importance movement corridor; H = high importance movement corridor

N/A = not applicable because there are no bighorn sheep movement corridors along the Wells Draw Alternative

In addition to big-game habitat, OEA calculated the temporary and permanent impacts on other wildlife habitat types. The Wells Draw Alternative would permanently remove the greatest area of vegetation/land cover (Table 3.4-~~12~~17) that provides habitat for wildlife, followed by the Whitmore Park Alternative and Indian Canyon Alternative. The Indian Canyon Alternative would permanently remove the greatest area of riparian vegetation (Table 3.4-~~13~~18), which provides high-value wildlife habitat, followed by the Whitmore Park Alternative and Wells Draw Alternative.

Table 3.4~~12~~-17. Permanent Removal of and Temporary Disturbance to Vegetation Communities (acres)

Vegetation Communities by Land Cover Type	Permanent Removal			Temporary Disturbance		
	Indian Canyon	Wells Draw	Whitmore Park	Indian Canyon	Wells Draw	Whitmore Park
Agriculture/Altered Land Cover Type						
Agriculture	84.0	12.3	83.7	125.7	48.8	126.0
Developed, Medium – High Intensity	0.7	--	0.7	3.4	--	3.4
Developed, Open Space – Low Intensity	--	--	--	--	0.7	--
Disturbed, Oil Well	--	2.3	--	--	11.9	--
Recently Chained Pinyon-Juniper Areas	--	2.6	--	--	3.7	--
Subtotal	**84.7**	**17.2**	**84.4**	**129.1**	**65.1**	**129.4**
Badland/Bedrock Land Cover Type						
Colorado Plateau Mixed Bedrock Canyon and Tableland	13.2	123.6	13.8	34.3	248.1	34.5
Inter-Mountain Basins Shale Badland	55.8	19.8	55.8	152.9	43.0	152.9
Rocky Mountain Cliff and Canyon	12.1	188.2	8.0	21.1	314.6	25.4
Subtotal	**81.1**	**331.6**	**77.6**	**208.3**	**605.7**	**212.8**
Forest/Woodland Land Cover Type						
Colorado Plateau Pinyon-Juniper Woodland	109.4	799.9	122.2	186.7	1,597.6	230.4
Inter-Mountain West Aspen-Mixed Conifer Forest and Woodland Complex	0.004	0.04	--	0.8	1.5	0.8
Invasive Southwest Riparian Woodland and Shrubland	--	1.3	--	--	2.0	--
Rocky Mountain Aspen Forest and Woodland	41.5	36.2	15.3	69.2	59.8	29.4
Rocky Mountain Lower Montane Riparian Woodland and Shrubland	34.6	4.3	34.0	51.2	10.0	49.8
Rocky Mountain Montane Dry-Mesic Mixed Conifer Forest and Woodland	33.0	51.7	24.2	61.9	84.2	59.5
Rocky Mountain Montane Mesic Mixed Conifer Forest and Woodland	4.0	15.9	3.1	21.4	25.0	16.2
Rocky Mountain Subalpine Dry-Mesic Spruce-Fir Forest and Woodland	--	--	--	0.8	0.8	0.8
Rocky Mountain Subalpine Mesic Spruce-Fir Forest and Woodland	--	16.8	--	4.9	13.6	4.9
Subtotal	**222.5**	**926.1**	**198.8**	**396.9**	**1,794.5**	**391.8**
Meadow/Grassland Land Cover Type						
Inter-Mountain Basins Semi-Desert Grassland	14.3	25.8	14.4	20.6	64.5	21.2
Invasive Annual Grassland	2.3	5.4	2.0	5.2	9.0	5.5

Vegetation Communities by Land Cover Type	Permanent Removal			Temporary Disturbance		
	Indian Canyon	Wells Draw	Whitmore Park	Indian Canyon	Wells Draw	Whitmore Park
Rocky Mountain Alpine-Montane Wet Meadow	51.1	10.9	42.0	37.9	9.3	31.8
Southern Rocky Mountain Montane-Subalpine Grassland	16.6	49.8	26.3	19.5	86.5	43.5
Subtotal	**84.3**	**91.9**	**84.7**	**83.2**	**169.3**	**102.0**
Open Water Land Cover Type	**0.7**	**0.1**	**0.7**	**3.8**	**2.3**	**3.8**
Shrubland Land Cover Type						
Colorado Plateau Mixed Low Sagebrush Shrubland	129.4	166.3	131.8	211.0	441.2	239.1
Colorado Plateau Pinyon-Juniper Shrubland	51.7	41.4	66.7	83.9	103.2	144.9
Inter-Mountain Basins Big Sagebrush Shrubland	170.4	204.8	175.6	255.4	410.4	346.9
Inter-Mountain Basins Greasewood Flat	44.9	40.0	42.6	113.8	104.1	110.6
Inter-Mountain Basins Mat Saltbush Shrubland	1.2	10.5	1.2	16.7	20.3	16.7
Inter-Mountain Basins Mixed Salt Desert Scrub	149.4	218.4	152.0	425.6	540.4	431.6
Inter-Mountain Basins Montane Sagebrush Steppe	240.5	451.1	344.3	380.3	710.4	794.5
Inter-Mountain Basins Semi-Desert Shrub Steppe	35.0	34.1	35.2	86.5	80.3	86.6
Rocky Mountain Gambel Oak–Mixed Montane Shrubland	44.7	26.4	34.9	73.3	48.5	77.2
Subtotal	**867.2**	**1,193.0**	**984.3**	**1,646.5**	**2,458.8**	**2,248.1**
Total	**1,340.5**	**2,559.9**	**1,430.5**	**2,467.8**	**5,095.7**	**3,087.9**

Notes:
Sources: Coalition 2020a; USGS 2004

Fish

Construction and Operations

Construction and operation of any of the Action Alternatives would affect surface waters and, thus, fish habitat. The primary factors in differentiating potential fish impacts between the Action Alternatives include the area and/or linear distance of surface waters affected, the number of surface waters crossed, ~~and~~ the amount of riparian vegetation that would be permanently removed, and the number and distance of realigned streams. A greater number or area of surface waters affected and a greater amount of riparian vegetation removed generally indicates a greater potential for more severe impacts on fish.

Section 3.3, *Water Resources,* Table 3.3-11, shows the linear feet and area of surface water that would be disturbed by construction of the proposed rail line. The Wells Draw Alternative would affect the greatest area of surface waters and linear distances of streams, followed by the Whitmore

Park Alternative and Indian Canyon Alternative. Section 3.3, *Water Resources*, Table 3.3-12, shows the number of surface water crossings by structure type and the number of stream realignments for the Action Alternatives. The Wells Draw Alternative would cross the most surface waters and have the greatest number of crossing structures, followed by the Whitmore Park Alternative and Indian Canyon Alternative. Appendix F, *Water Resources Figures,* shows the streams crossed by the Action Alternatives. Section 3.3, *Water Resources*, Table 3.3-12 also shows the number of stream realignments and the distance of stream realignment impact (i.e., stream channel filled). The Indian Canyon Alternative and Whitmore Park Alternative would involve a similar number of stream realignments and would affect similar total distances of stream channel, while the Wells Draw Alternative would require the fewest stream realignments and would affect the smallest distance of stream channel. The Indian Canyon Alternative would permanently remove the greatest area of riparian vegetation (Table 3.4-~~13~~18), followed by the Whitmore Park Alternative and Wells Draw Alternative. All temporary riparian habitat disturbances would be reclaimed and revegetated following construction.

Another factor for comparing impacts on fish between the Action Alternatives is the area of erosive soils along each Action Alternative. A greater area of soil susceptible to water and wind erosion would increase the potential for sedimentation and turbidity impacts in surface waters during construction and operations and would thus result in a greater potential to affect fish. However, as discussed in Section 3.5, *Geology, Soils, Seismic Hazards, and Hazardous Waste*, only a small portion of the study areas for each Action Alternative is rated as having high risk to wind and water erosion. Based on soil erosion ratings, all Action Alternatives would have similar areas of susceptibility to wind erosion and water erosion. Therefore, OEA concludes that all of the Action Alternatives would have the same potential to result in minimal impacts from wind and water erosion that could degrade fish habitat.

Vegetation

Construction and Operations

The most important factors for differentiating impacts on vegetation between the Action Alternatives are the amount of vegetation that would be permanently removed; the amount of affected land that is likely to support invasive and noxious weeds; and the amount of land assigned a high WHP along the Action Alternatives.

Table 3.4-~~12~~ 17 shows the amount of vegetation that would be permanently removed or temporarily disturbed by construction of the rail line. The Wells Draw Alternative would permanently remove the greatest area of vegetation/land cover, followed by the Whitmore Park Alternative and Indian Canyon Alternative. Among the different types of land cover in the study area, shrublands (particularly the Colorado Plateau Mixed Low Sagebrush Shrubland vegetation community) and woodlands (particularly the Colorado Plateau Pinyon-Juniper Woodland vegetation community) would be most affected by any of the Action Alternatives.

Invasive and noxious weeds are associated with the Invasive Southwest Riparian Woodland vegetation community, the Shrubland land cover type, and the Invasive Annual Grassland land cover type. Invasive and noxious weeds are also generally associated with the Agriculture/Altered Land Cover type because of the disturbed conditions that are likely to support these species. A greater disturbance to these land cover types generally indicates a greater potential for the invasive and noxious weed impacts described in Section 3.4.3.1, *Impacts Common to All Action Alternatives*. OEA expects that the Indian Canyon Alternative and Whitmore Park Alternative would involve the greatest potential for impacts related to invasive and noxious weeds because these Action Alternatives would affect a much greater area of land cover types associated with invasive and noxious weeds than the Wells Draw Alternative.

Table 3.4-~~13~~ 18 shows the amount of riparian vegetation that would be permanently removed or temporarily disturbed by construction of the rail line. The Indian Canyon Alternative would permanently remove the greatest area of riparian vegetation, followed by the Whitmore Park Alternative and Wells Draw Alternative.

Table 3.4-~~13~~18. Permanent Removal of and Temporary Disturbance to Riparian Vegetation (acres)

Action Alternative	Permanent Removal	Temporary Disturbance
Indian Canyon	36.5	57.1
Wells Draw	22.6	40.0
Whitmore Park	27.6	54.0

Notes:
Source: Coalition 2020a~~USGS 2004~~

As shown in Table 3.4-~~6~~8, the study areas for the Wells Draw Alternative contain the most amount of land assigned as high WHP, indicating that this alternative crosses through more area with high risk of wildfire compared to the other Action Alternatives. As discussed above, the probability of a train-induced wildfire is low, and OEA considers the potential for any of the Action Alternatives to result in wildfire unlikely if OEA's recommended mitigation measures are implemented. Under any of the Action Alternatives, the proposed rail line would act as a potential wildfire break (i.e., a gap in vegetation type that slows or stops a fire) if there was a wildfire in the area. Large portions of the Indian Canyon Alternative and Whitmore Park Alternative are located next to a highway, which already acts as a fire break. Thus, the potential added benefit of creating a new fire break in the landscape would be greatest for the Wells Draw Alternative compared to the other two Action Alternatives.

Special Status Species

Construction and Operations

Endangered-Species Act Listed Species

Construction and operation of any of the Action Alternatives would affect ESA-listed species. The primary factors in differentiating impacts between the Action Alternatives are the amount of potential and suitable habitat for each of the ESA-listed plant species that would be affected and the amount of potentially suitable snowshoe hare habitat (Canada lynx proxy habitat) that would be permanently removed. Although the snowshoe hare is not an ESA-listed species, it is an important prey animal for the Canada lynx, so the extent of snowshoe hare habitat can be used to estimate the extent of potentially suitable habitat for Canada lynx.

Table 3.4-~~14~~ 19 shows the amount of potential and suitable habitat for federally listed plant species that would be permanently removed or temporarily disturbed. The Whitmore Park Alternative would permanently remove the greatest total area of suitable habitat for federally listed plant species, followed by the Indian Canyon Alternative and Wells Draw Alternative. A greater amount of habitat removed generally indicates a more severe impact on the species in the study areas.

Table 3.4-~~14~~19. Permanent Removal of and Temporary Disturbance to Federally Listed Plant Species Suitable Habitat (acres)

Plant Species	Permanent Removal Indian Canyon	Permanent Removal Wells Draw	Permanent Removal Whitmore Park	Temporary Disturbance[b] Indian Canyon	Temporary Disturbance[b] Wells Draw	Temporary Disturbance[b] Whitmore Park
Barneby ridge-cress Pinyon-juniper habitat	20.0	0	34.3	46.0	0	97.3
Barneby ridge-cress white shale habitat	3.4	0	6.6	5.4	0	14.1
Pariette cactus	140.7	153.5	140.7	364.0	396.5	364.0
Pariette cactus/ Uinta Basin hookless cactus[a]	20.9	--	20.9	39.6	--	39.6
Uinta Basin hookless cactus	140.7	153.5	140.7	364.0	396.5	364.0
Ute's ladies'-tresses	1.5	<0.1	1.5	2.8	0.1	2.7

Notes:

[a] Core 2 Conservation Area. These areas are subsumed by the suitable habitat areas and are core conservation areas that include dense aggregations of the species. No Core 1 Conservation Areas are within the project footprint.

[b] OEA considers temporary disturbance to federally listed plant species habitat to be a permanent impact even if revegetation were to occur.

Sources: USFWS 2011, 2019

Table 3.4-~~15~~ 20 shows the amount of potentially suitable snowshoe hare habitat (i.e., Canada lynx proxy habitat) that would be permanently removed or temporarily disturbed. The Wells Draw Alternative would permanently remove the greatest area of potentially suitable snowshoe hare habitat, followed by the Indian Canyon Alternative and the Whitmore Park Alternative. However, as stated in Table 3.4-~~8~~11, potentially suitable Canada lynx habitat in the study areas is marginal and is not considered sufficient to support a breeding female Canada lynx, and there are no historic lynx locations anywhere in or around the study area (Christensen and Groves pers. comm). Utah has not historically and does not currently support resident lynx populations because the habitat in the state is naturally incapable of supporting persistent populations (USFWS 2017). Historical and future occurrences in Utah most likely represent occasional dispersing lynx (USFWS 2017). Therefore, Canada lynx are not likely to be present in the study area and OEA concludes that construction and operation of any of the Action Alternatives would not affect Canada lynx.

Table 3.4-~~15~~20. Permanent Removal of and Temporary Disturbance to Snowshoe Hare Habitat (acres)

Action Alternative	Permanent Removal	Temporary Disturbance
Indian Canyon	163.4	302.7
Wells Draw	165.2	263.3
Whitmore Park	83.7	203.7

Notes:

Habitat includes crucial year-long and substantial year-long habitats

Source: UDWR 2006

Table 3.4-~~16~~ 21 shows the amount of potentially suitable Mexican spotted habitat that would be permanently removed or temporarily disturbed. As stated in Table 3.4-~~8~~11, most of the habitat identified along the Action Alternatives is considered low quality and would be unlikely to support or be used by the species. The Indian Canyon Alternative and Whitmore Park Alternative would not impact any moderate quality habitat, while the Wells Draw Alternative would permanently and temporary impact a very small area of moderate quality habitat.

Table 3.4-~~16~~21. Permanent Removal of and Temporary Disturbance to Mexican Spotted Owl Habitat (acres)

	Permanent Removal		Temporary Disturbance	
Action Alternative	**Low Quality**	**Moderate Quality**	**Low Quality**	**Moderate Quality**
Indian Canyon	584.8	0	865.8	0
Wells Draw	1,856.0	0.3	3,533.3	1.8
Whitmore Park	777.8	0	1,531.7	0

Notes:
Habitat defined as high quality during Mexican spotted owl habitat surveys was not observed along any Action Alternative.
Source: Coalition 2020d

Forest Service Species

As described in Section 3.4.2.4, *Special Status Species*, Forest Service-sensitive wildlife species are unlikely likely to occur in the study areas or have little or no likelihood of being negatively affected by the Indian Canyon Alternative and Whitmore Park Alternative. Appendix H, *Biological Evaluation*, provides the details on this conclusion. The Wells Draw Alternative would not cross Forest Service land and would, therefore, not affect Forest Service sensitive species on Forest Service land.

BLM Sensitive Species

The Indian Canyon Alternative and Wells Draw Alternative would affect BLM-listed sensitive species on BLM-administered land. The Indian Canyon Alternative would permanently displace 46.3 acres of habitat on BLM-administered land and would temporarily affect 72.8 acres of habitat on BLM-administered land, while the Wells Draw Alternative would permanently displace 1,571.1 acres and temporarily affect 3,246.2 acres of habitat on BLM-administered land. Within these habitat areas on BLM-administered lands, the Coalition identified potentially suitable habitat for 14 BLM sensitive plants and three BLM sensitive plants along the Wells Draw Alternative and Indian Canyon Alternative, respectively (Coalition 2020a: Table 5-3). The Wells Draw Alternative would affect two Areas of Critical Environmental Concern on BLM-administered land that contain valuable habitat for BLM-designated sensitive species. Section 3.11, *Land Use and Recreation*, describes potential impacts related to construction and operation of the proposed rail line on those areas.

Tribal Species

Species of importance to the Ute Indian Tribe inhabit a range of habitats within the study area. In general, OEA expects that the Wells Draw Alternative would have the greatest impact on species of tribal importance because that Action Alternative would affect the greatest area of habitat in all categories of land cover (Table 3.4-~~12~~17). However, the Wells Draw Alternative would not affect habitat for species of tribal importance on Tribal trust land because it would not cross Tribal trust lands. The Indian Canyon Alternative would permanently displace 121.2 acres of habitat on Tribal trust lands and would temporarily affect 257.3 acres of habitat on Tribal trust lands, while the Whitmore Park Alternative would permanently displace 118.4 acres and temporarily affect 254.9 acres of habitat on Tribal trust lands. To minimize potential impacts on species of importance to the Ute Indian Tribe, OEA is recommending mitigation requiring the Coalition implement the ~~reasonable~~ requirements of the Ute Indian Tribe for minimizing impacts on wildlife, fish, and vegetation on Tribal trust lands (BIO-MM-10, EJ-MM-1).

Greater Sage-Grouse

Any of the Action Alternatives would affect habitat for greater sage-grouse. Table 3.4-~~17~~ 22 shows the amount of UDWR-defined greater sage-grouse habitat that construction of each Action Alternative would permanently remove or temporarily disturb. The Whitmore Park Alternative would permanently remove the greatest area of UDWR-defined habitat and opportunity areas for greater sage-grouse.

Table 3.4-~~17~~22. Permanent Removal of and Temporary Disturbance to UDWR-defined Greater Sage-Grouse Areas (acres)

	Permanent Removal			Temporary Disturbance		
Type of Area	**Indian Canyon**	**Wells Draw**	**Whitmore Park**	**Indian Canyon**	**Wells Draw**	**Whitmore Park**
Habitat	275.8	275.8	377.8	413.7	413.7	869.0
Nonhabitat	8.6	8.6	74.8	9.4	9.4	218.3
Opportunity	10.1	10.1	30.1	36.7	36.7	36.3
Total	**294.5**	**294.5**	**482.8**	**459.8**	**459.8**	**1,123.6**

Notes:
Source: UDWR 2019b

Table 3.4-~~18~~23 shows the amount of BLM-defined greater sage-grouse habitat that would be permanently removed or temporarily disturbed. The Whitmore Park Alternative would permanently remove the greatest area of BLM-defined habitat for greater sage-grouse, followed by the Indian Canyon Alternative and Wells Draw Alternative.

Table 3.4-~~18~~23. Permanent Removal of and Temporary Disturbance to BLM-defined Greater Sage-Grouse Habitat (acres)

	Permanent Removal			Temporary Disturbance		
Type of Habitat	**Indian Canyon**	**Wells Draw**	**Whitmore Park**	**Indian Canyon**	**Wells Draw**	**Whitmore Park**
Priority	276.0	276.0	378.0	413.9	413.9	869.5
General	84.4	52.3	108.4	130.1	174.1	177.5
Total	**360.3**	**328.3**	**486.4**	**544.0**	**588.0**	**1,047.0**

Notes:
Source: BLM 2015b

Although the Whitmore Park Alternative would affect the largest total area of mapped greater sage-grouse habitat, OEA concludes that the Whitmore Park Alternative would minimize impacts on greater sage-grouse in the Carbon SGMA relative to the Indian Canyon Alternative and the Wells Draw Alternative. This conclusion is based on OEA's consultation with UDWR, BLM, and other agencies involved through the inter-agency working group that OEA convened to study impacts on greater sage-grouse, as well as OEA's independent analysis. Compared to the other Action Alternatives, the Whitmore Park Alternative would be located farther away from most sage-grouse leks and associated summer brood-rearing habitat within the Carbon SGMA and would, therefore, result in less noise impacts on those areas. For example, Table 3.4-~~19~~24 shows the distance between each Action Alternative and the closest leks in the Carbon SGMA (Appendix L, *Noise and Vibration Analysis Methods*, provides more detail on predicted train noise). Each lek can be several acres in size, so the distances reported in Table 3.4-~~19~~24 are measured between the Action Alternatives and the center of the lek. The Indian Canyon Alternative and Wells Draw Alternative would each pass through or immediately adjacent to the Cabin Spring and Matt's Summit leks and would also pass within approximately 850 feet of the Horse Creek lek. The closest lek to the Whitmore Park Alternative would be more than 900 feet away from the rail centerline and all other leks would be more than 3,000 feet away.

Table 3.4-~~19~~24. Predicted Train Noise at the Closest Greater Sage-Grouse Leks in the Carbon Sage-Grouse Management Area

	Indian Canyon Alternative		Wells Draw Alternative		Whitmore Park Alternative	
Lek	Distance[a] (feet)	Train Noise[b] (dBA)	Distance (feet)	Train Noise (dBA)	Distance (feet)	Train Noise (dBA)
Antone Creek	22,665	37	22,664	37	5,141	49
Cabin Spring	167	79	168	79	3,751	52
Horse Creek	850	65	851	65	3,900	52
Matt's Summit	321	73	322	73	3,924	52
Moynier Meadow	1,928	58	1,927	58	3,099	54
Whitmore Park	5,820	48	5,819	48	905	64

Notes:

[a] Distance is measured from the rail line to the center point of the lek.

[b] The noise metric is equivalent sound level (Leq).

dBA = A-weighted decibels

Table 3.4-~~19~~24 also shows the estimated equivalent sound level (Leq) from wayside train noise that could occur at the center of each lek, measured in dBA. The Leq is equivalent to the total sound energy generated as a train passes by. As the table shows, the Leq from train noise could exceed 66 dBA at the Cabin Spring and the Matt's Summit leks under either the Indian Canyon Alternative or the Wells Draw Alternative. Although OEA did not conduct ambient noise monitoring in the Emma Park area, ambient noise elsewhere in the study area ranged from 33 dBA to 56 dBA, which suggests that those two leks could experience an increase in noise of at least 10 dBA and potentially as high as 43 dBA. A lek that experiences a 10-dBA increase in noise above ambient conditions is considered to potentially have significant impacts on leks under the BLM *Utah Greater Sage-Grouse Approved Resource Management Plan Amendment* (ARMPA) and the *Utah Conservation Plan for Greater Sage-Grouse* (State Plan) (State of Utah 2019).

The Indian Canyon Alternative and Wells Draw Alternative would cross BLM-administered lands in the Carbon SGMA. Therefore, in order for BLM to permit the proposed rail line, construction and operation of either of those Action Alternatives would need to comply with the BLM ARMPA.[10] OEA consulted extensively with BLM greater sage-grouse experts and management plan administrators to determine which ARMPA management actions would apply by reviewing land ownership, greater sage-grouse habitat types and locations, greater sage-grouse lek locations, proposed rail line facilities (e.g., communications towers), and proposed rail line construction ground disturbance and operational noise disturbance for each Action Alternative. Table 3.4-~~20~~25 summarizes the ARMPA management actions that would apply under the 2015 and 2019 ARMPAs for each of the Action Alternatives; details of each management action are provided in Appendix J, *Bureau of Land Management Greater Sage-Grouse Resource Management Plan Compliance.* OEA determined that the Whitmore Park Alternative would not be subject to either the 2015 or 2019 ARMPAs because it does not cross BLM-administered lands. In contrast, certain management actions of the 2015 and 2019 ARMPAs would apply to the Indian Canyon Alternative and the Wells Draw Alternative because both would cross BLM-administered lands that are within PHMA in the Emma Park area (Table 3.4-~~20~~25).

Table 3.4-~~20~~25. Applicable ARMPA Management Actions by Action Alternative

Applicable BLM Management Actions[a]		Indian Canyon Alternative		Wells Draw Alternative		Whitmore Park Alternative	
2015 Plan	2019 Plan	2015 Plan	2019 Plan	2015 Plan	2019 Plan	2015 Plan	2019 Plan
MA-LR-1	MA-LR-1	Yes	Yes	Yes	Yes	No	No
MA-LR-2	MA-LR-2	Yes	Yes	Yes	Yes	No	No
MA-LR-7	N/A	No	No	Yes	No	No	No
MA-SSS-3	MA-SSS-3	Yes	Yes	Yes	Yes	No	No
MA-SSS-5	N/A	No	No	Yes	No	No	No
MA-SSS-6	N/A	No	No	Yes	Yes	No	No

Notes:

[a] Details on each management action are provided in Appendix J, *Bureau of Land Management Greater Sage-Grouse Resource Management Plan Compliance*.

MA-LR = Management Action - Lands and Realty; MA-SSS = Management Action – Special Status Species; N/A = not Applicable (management action in 2015 ARMPA has been removed in the 2019 ARMPA)

Management action MA-SSS-3 in both the 2015 and 2019 ARMPAs includes three elements that can be quantified and can aid BLM in determining if the proposed rail line would result in the need to amend the BLM Price and Pony Express Regional Management Plans (RMP):[11] exceedance of a 3-percent disturbance cap[12] of PHMA; noise exceedance of 10 decibels above ambient conditions

[10] The recent 2019 ARMPA for Utah (among other states) was suspended by a preliminary injunction issued by a U.S. District Court (Case No. 1:16-CV-83-BLW); as a result, the 2015 ARMPA is in effect until the injunction is lifted.

[11] The Emma Park area is covered by the BLM Price and Pony Express RMPs. Because the ARMPA amends BLM's greater sage-grouse management actions for all Utah BLM RMPs, BLM would need to amend the Price and Pony Express RMPs and not the ARMPA.

[12] The disturbance cap applies to PHMA within 1) PHMA associated with a greater sage-grouse population area, and 2) the project authorization scale. Therefore, there are two separate disturbance cap calculations that BLM considers. The disturbance caps stipulate~~s~~ that BLM cannot permit activities on BLM lands that would result in temporary or permanent disturbances to more than 3 percent of the total habitat in the PHMA, regardless of land ownership. In the PHMA, discrete anthropogenic disturbances (temporary or permanent) must be managed so they cover less than 3 percent of PHMA associated with a greater sage-grouse population area. If either of the 3-percent caps are~~is~~ exceeded, then no further disturbances are permitted by BLM in the PHMA until the disturbance has been reduced to less than the cap.

around known leks; and disturbance within a 3.1-mile buffer around known leks. Table 3.4-~~21~~26 summarizes the effects of the Action Alternatives in the context of these three elements.

Table 3.4-~~21~~26. Quantifiable Elements of Management Action MA-SSS-3

MA-SSS-3 Management Action Element	Indian Canyon Alternative	Wells Draw Alternative	Whitmore Park Alternative
Ground disturbance exceeds 3% disturbance cap associated with population area in PHMA?[a]	No	No	N/A[e]
Ground disturbance exceeds 3% disturbance cap at project authorization scale?[b]	Yes	Yes	N/A[e]
Noise levels exceed 10 decibels above ambient conditions at leks during breeding season?	Yes	Yes	N/A
Number of leks within 3.1-mile buffer[~~b~~c]	5	8[d]	N/A

Notes:

[a] There is no exceedance of the 3% disturbance cap under any Action Alternative. Indian Canyon Alternative = 2.45% and Wells Draw Alternative = 2.45%.

[b] The 3% disturbance cap is exceeded under both Action Alternatives:~~.~~ Indian Canyon Alternative = 3.1% and Wells Draw Alternative = 3.1%.

[~~b~~c] The distance for which anthropogenic land use and activity has observed effects found in the scientific literature for linear features (e.g., rail lines) (USGS 2014).

[d] The Wells Draw Alternative would be located within 3.1 miles of five leks in the Carbon SGMA and within 3.1 miles of three leks in the Anthro Mountain area.

[e] The Whitmore Park Alternative's impact on PHMA, while not subject to the ARMPA, would still be taken into consideration for any future BLM disturbance cap calculation needed for the approval of future actions that could occur on BLM lands in the PHMA.

PHMA = Priority Habitat Management Areas; N/A = not applicable (the ARMPA is not applicable to the Whitmore Park Alternative)

Because the project authorization scale disturbance caps would exceed 3 percent, OEA concludes that, as currently proposed, the Indian Canyon Alternative and Wells Draw Alternative would not be in compliance with the ARMPA or the BLM Price and Pony Express RMPs. In addition,~~Because~~ rail operations would likely result in noise levels at leks that would be more than 10 dBA above ambient levels during the breeding season, and OEA concludes that, as currently proposed, the Indian Canyon Alternative and Wells Draw Alternative would not be in compliance with the ARMPA or the BLM Price and Pony Express RMPs. Therefore, for BLM to permit the Indian Canyon Alternative or the Wells Draw Alternative across BLM-administered lands, the ARMPA and/or the Price and Pony Express RMPs may need to be amended. Amendments to those BLM plans would not be necessary if the Board were to authorize the Whitmore Park Alternative because this alternative would not cross BLM-administered lands.

Construction and operation of any of the Action Alternatives would need to comply with the State Plan. Unlike the BLM ARMPA, the State Plan applies regardless of land ownership, and, therefore, applies to all activities that affect SGMAs.[13] However, the State Plan management actions and mitigation practices are voluntary and not required or regulated under state law. The State Plan recommends considering similar elements as the ARMPA in assessing greater sage-grouse and lek impacts, including the same 3-percent disturbance cap, the same 10-decibel noise threshold around leks during breeding season, and a buffer around leks for permanent disturbances (although smaller

[13] The State Plan's SGMAs largely coincided with BLM's PHMA. The only SGMA affected by the Action Alternatives would be the Carbon SGMA, which is located in the Emma Park area.

than the ARMPA) at 1 mile. For both the Indian Canyon Alternative and Wells Draw Alternative, the 10-decibel threshold would be exceeded for at least two leks and could be exceeded for up to five leks, depending on current ambient noise levels. There are four leks in the 1-mile buffer for the Indian Canyon Alternative and four~~seven~~ leks in the 1-mile buffer for the Wells Draw Alternative, and the 3-percent disturbance cap would not be exceeded for these Action Alternatives (Table 3.4-~~20~~25).[14] For the Whitmore Park Alternative, the 3-~~-~~percent disturbance cap would not be exceeded (2.66 percent)~~,~~; the 10-decibel noise threshold could be exceeded for at least one lek and potentially up to six leks, depending on current ambient noise levels~~,~~; and there are six leks within the 1-mile buffer.

As discussed previously, the Coalition has committed to executing a Mitigation Agreement with UDWR that will specify the actions that the Coalition would take to avoid and minimize impacts on greater sage-grouse habitat during construction and operation of the proposed rail line, as well as strategies for compensatory mitigation (VM-35). Compensatory mitigation could take the form of restoring wet meadow habitat in the Carbon SGMA. Wet meadows provide grasses, forbs and insects critical for meeting dietary needs of sage-grouse broods, especially during summer. In addition, OEA is recommending mitigation requiring the Coalition avoid construction in the Carbon SGMA during the nesting and breeding season (BIO-MM-19). Based on consultation with BLM, UDWR, and other agencies, as well as OEA's independent analysis, OEA concludes that, if the Board authorizes the Whitmore Park Alternative and if the Coalition's voluntary mitigation measures and OEA's additional recommended mitigation measures are implemented, impacts on greater sage-grouse from construction and operation of the proposed rail line would not be significant.

3.4.3.3 No-Action Alternative

Under the No-Action Alternative, the Coalition would not construct and operate the proposed rail line and there would be no impacts on biological resources.

3.4.4 Mitigation and Unavoidable Environmental Effects

Any of the Action Alternatives would result in impacts on biological resources, including the temporary and permanent disturbance of habitat; impacts on wildlife and fish movement; the spread of noxious and invasive weeds; and impacts related to noise, wildfires, fugitive dust emissions, water and soil quality, and the interaction of wildlife and rail-related features. Among the three Action Alternatives, the Wells Draw Alternative would generally result in the most impacts on wildlife, fish, and vegetation because it would affect the largest total area of land. Because of its longer length and larger footprint, the Wells Draw Alternative would temporarily and permanently disturb more habitat than the other Action Alternatives for most land cover types (Table 3.4-~~12~~17). However, the Indian Canyon Alternative would disturb the greatest area of riparian vegetation, which is a particularly important habitat type in the study area for wildlife and fish.

The Wells Draw Alternative would disturb the largest area of big game habitat, but the Whitmore Park Alternative would disturb the largest area of big game crucial habitat. The Wells Draw Alternative would~~and would also~~ result in the most impacts on fish movement due to the greater number of water crossings associated with that alternative. The Wells Draw Alternative would disturb the largest area of~~ potentially~~ suitable habitat for the ESA-listed Pariette cactus and the

[14] The State Plan requires that only the population area disturbance cap be calculated. Unlike BLM's ARMPA, the State Plan does not require calculation of the project authorization scale disturbance cap.

Uinta Basin hookless cactus, but would disturb the smallest area of~~for~~ suitable habitat for the Barneby ridge-cress and Ute ladies'-tresses. The Wells Draw Alternative would not disturb any Pariette cactus or Uinta Basin hookless cactus Core 2 Conservation Areas, but the Indian Canyon Alternative and Whitmore Park Alternative would each result in impacts on Core 2 Conservation Areas in the same amount. The Whitmore Park Alternative would affect the greatest area of mapped greater sage-grouse habitat but would minimize impacts on greater sage-grouse because it would be located further away from most leks and from summer brood-rearing habitat than the Wells Draw Alternative or the Indian Canyon Alternative.

Due to the large number of species, including ESA-listed and other special status species, as well as the largely undisturbed condition of the study area, OEA concludes that impacts on biological resources related to habitat disturbance and noise would be significant under any of the Action Alternatives. If implemented, the Coalition's voluntary mitigation measures and OEA's additional recommended mitigation measures related to biological resources would lessen impacts of construction and operation on animal and plant species, including ESA-listed species (Chapter 4, *Mitigation*). Some significant impacts, however, including the permanent loss of existing habitat in the rail line footprint, would be unavoidable.

3.5 Geology, Soils, Seismic Hazards, and Hazardous Waste Sites

This section describes the geology, soils, and seismic hazards impacts that could result from construction and operation of the proposed rail line, as well as impacts related to hazardous waste sites that could result from construction and operation of the proposed rail line. The subsections that follow describe the study areas, data sources, methods OEA used to analyze the impacts, the affected environment, and the impacts of the Action Alternatives and No-Action Alternative. Section 3.2, *Rail Operations and Safety*, ~~and~~ Section 3.3, *Water Resources*, and Section 3.4, *Biological Resources*, discuss impacts related to the transportation of potentially hazardous materials, including the risk of accidents and spills.

3.5.1 Analysis Methods

This subsection identifies the study areas, data sources, and analysis methods used to analyze geology, soils, seismic hazards and hazardous waste conditions associated with the proposed rail line.

3.5.1.1 Study Areas

OEA delineated two study areas for the analysis of potential impacts related to geology, soils, seismic hazards, and hazardous waste sites.

- **Geology, soils, and seismic hazards**. OEA defined the study area for geology and soils as a 0.5-mile buffer surrounding the project footprint[1] for each Action Alternative and the study area for seismic hazards as a 60-mile buffer surrounding the project footprint for each Action Alternative.
- **Hazardous waste sites**. OEA defined the study area for hazardous waste sites to include a 2,000-foot buffer from the project footprint. The 2,000-foot study area is intended to identify hazardous waste sites in the vicinity of the proposed rail line, especially sites with potential groundwater contaminant plumes migrating toward (and with the potential of reaching) each Action Alternative. OEA provides a summary of all sites identified in the study area below.[2]

[1] The *rail line footprint* includes the area of the railbed, as well as the full width of the area cleared and cut or filled. The rail line footprint would also include other physical structures installed as part of the proposed rail line, such as fence lines, communications towers, siding tracks, relocated roads, and power distribution lines. The rail line footprint is the area where rail line operations and maintenance would occur. The area would be permanently disturbed. The *temporary footprint* is the area that would be temporarily disturbed during construction, including areas for temporary material laydown, staging, and logistics. The temporary footprint would be reclaimed and revegetated following construction. The *project footprint* is the combined area of the rail line footprint and temporary footprint, both of which would be disturbed during construction, comprise where construction and operations of the proposed rail line would occur.

[2] All sites within the project footprint (regardless of the database in which it was found) are described in detail due to the proximity of the hazardous waste sites. The only off-site locations (sites beyond the project footprint, but within the study area) discussed in detail are those with a potential of affecting an Action Alternative.

3.5.1.2 Data Sources

Geology, Soils, and Seismic Hazards

OEA reviewed the following data sources to determine the potential impacts related to geology, soils, and seismic hazards that could result from construction and operation of the Action Alternatives and the No-Action Alternative.

- Available data from applicable federal, state, and local agencies including reports on the geologic setting of the area (Leighty & Associates, Inc. 2001; Hintze 1988).
- Geologic mapping for the study area (Sprinkel 2018;[3] Bryant 2010; Sprinkel 2007; Weiss et al. 1990; Utah Geological Survey 2010a, 2010b).
- Physiography of the study area (Fenneman and Johnson 1946).
- Reports and mapping on seismic faults (Utah Geological Survey ~~2017~~2020c; Howe 2021).
- Information on geologic hazards, including landslide and rock fall (Utah Geological Survey n.d., 2005).
- Mapping for oil and gas fields, active and abandoned wells, and active and abandoned mines (Utah Division of Oil, Gas, and Mining 2020; Utah Geological Survey 2015, 2018; Utah Abandoned Mine Reclamation Program n.d.).
- Soil data from the Gridded Soil Survey Geographic (gSSURGO) database for Utah (NRCS 2018).
- Reporting on effects of invasive species on soil function (Norton et al. 2004).

Hazardous Waste Sites

OEA reviewed the following data sources to determine the potential impacts on hazardous waste sites that could result from construction and operation of the Action Alternatives and No-Action Alternative.

- Data from environmental databases obtained via EDR Lightbox in the EDR Area/Corridor Report (EDR 2020).[4]
- Data available from applicable state agencies, including the Utah Department of Environmental Quality to supplement environmental database information.
- The USEPA Envirofacts database (USEPA 2020).

[3] Sprinkel 2018 is the most current geologic map for the northern portion of the study area. Because this geologic map covers only a portion of the proposed rail line and was not available in GIS format at the time this document was prepared, OEA based its analysis on the other geologic mapping (Bryant 2010; Sprinkel 2007; Weiss et al. 1990; Utah Geological Survey 2010a, 2010b), which was augmented by qualitative analysis based on review of Sprinkel 2018. According to the Utah Geological Survey through agency consultation with OEA, Sprinkel 2018 has been updated with revised geologic mapping, as well as new/revised mapping of the Duchesne-Pleasant Valley fault system, which will be published in the latter part of 2021.

[4] EDR Lightbox uses proprietary techniques to search federal, state, local, and other databases to obtain information on facilities that use, store, transport, or generate regulated substances. OEA obtained an EDR report of all sites within a 2,000-foot radius from the project footprint.

3.5.1.3 Analysis Methods

Geology, Soils, and Seismic Hazards

OEA used the following methods to analyze geology, soils, and seismic hazards in the study area. The methods included a combination of quantitative analysis (i.e., GIS mapping) and qualitative analysis (i.e., risk assessment).

- **OEA assessed the potential for landslide, debris flow, and rock fall**. OEA used GIS to overlay maps of the project footprint onto maps of landslide, debris flow, rock fall, and geologic unit data.
- **OEA assessed the potential for soil hazards, including expansiveness, erosion, and corrosivity**. OEA overlaid maps of the project footprint onto maps of soil data and analyzed the area of soil disturbance and the engineering properties of soils in the study area, including susceptibility to expansiveness during alternative periods of wet and dry, susceptibility to wind and water erosion, and corrosivity to concrete and steel.
- **OEA determined the potential for primary seismic hazards**. Primary seismic hazards include surface fault rupture and seismic ground shaking. To assess risks related to these hazards, OEA overlaid the project footprint onto maps of seismic faults that have been active in historic and Holocene times. The project footprint does not intersect an active fault; therefore, OEA did not assume a potential for surface fault rupture. OEA assumed a high potential for ground shaking within 20 miles of faults with potential for Magnitude 6.0 or greater.
- **OEA determined the potential for secondary seismic hazards**. Secondary seismic hazards include landslides and liquefaction. Liquefaction occurs when ground shaking causes soil that is saturated with water to temporarily lose strength and act like a liquid. This can cause structures and infrastructure built on the soil to collapse. Liquefaction is more likely to occur in areas where the groundwater is closer to the surface and where the soil is loose and sandy. OEA performed a qualitative analysis for risk of landslide based on areas where groundwater discharges to the surface and sediments are unconsolidated sand or sandy gravel.

Hazardous Waste Sites

OEA used the following methods to analyze hazardous waste sites in the study area. The hazardous waste sites analysis evaluates both the potential for hazardous waste sites to affect the proposed rail line and the potential for the proposed rail line to affect hazardous waste sites. As mentioned previously, Section 3.2, *Rail Operations Safety*, Section 3.3, *Water Resources*, and Section 3.4, *Biological Resources*, discuss impacts related to risk of accidents and spills of potentially hazardous materials during construction and operation of the proposed rail line.

- **OEA defined hazard waste sites**. USEPA defines hazardous waste as waste specifically listed as a known hazardous waste or that meets the characteristics of a hazardous waste. These include wastes from common manufacturing and industrial processes and from specific industries that generate waste from discarded commercial products. Hazardous wastes include wastes that exhibit any one or more of the following characteristics: ignitability, corrosivity, reactivity, or toxicity. For the purpose of OEA's analysis, a hazardous waste site is an area that has been affected by a release (e.g., a spill) of hazardous waste into soil, groundwater, surface water, sediments, and/or air.

- **OEA analyzed information on hazardous waste sites obtained via EDR Lightbox.** OEA used the EDR Lightbox data (EDR 2020) to identify sites where hazardous waste is stored or used, as well as the location of sites with a history of contamination and closed status sites where remediation has been performed (and closure has been granted by the applicable oversight agency). Handling hazardous waste alone does not constitute a potential impact in OEA's analysis. The EDR Area/Corridor Report is available to the public on the Board's website at www.stb.gov and the Board-sponsored project website at www.uintabasinrailwayeis.com.
- **OEA ranked hazardous waste sites based on the potential to affect or be affected by the proposed rail line**. Two criteria are particularly important when evaluating the risk associated with a hazardous waste site in the context of a rail line construction project. These are the history of the site and its proximity to the proposed rail line. OEA evaluated whether past releases from each hazardous waste site affected soil or groundwater by considering the type of contamination, the media (soil, air, or water) affected, the severity of release, the direction of groundwater flow and whether the release was effectively contained. OEA categorized hazardous waste sites as low risk, medium risk, or high risk based on the following criteria.
  - **Low risk**. A low-risk site is within or adjacent to the study area, has no known documented releases, and is not identified on databases indicative of environmental concern.
  - **Medium risk**. A medium-risk site is within or adjacent to the study area and may or may not have a known documented release. Its historical operations and information analyzed indicate a potential release(s) to the environment or it is identified on databases indicative of release(s) to the environment. A site involving a documented release(s) to soils outside of project soil disturbance areas would be considered a medium risk.
  - **High risk**. A high-risk site is within the study area, has a known active-status documented release or residual contamination that is situated within or adjacent to the study area, and is identified on databases indicative of release(s) to the environment. A site might also be considered high risk if limited information is available about the site, which creates greater uncertainty about the extent of contamination and the costs of remediation.

3.5.2 Affected Environment

This subsection identifies the existing environmental conditions related to geology, soils, seismic hazards, and hazardous waste sites in the study areas.

3.5.2.1 Geology

Physiography

The study area lies within the Uinta Basin section of the Colorado Plateau Physiographic Province (Fenneman and Johnson 1946). The Uinta Basin (the Basin) is a structural depression bounded by the Uinta Mountains to the north, the Douglas Creek Arch and Roan Plateau to the east, the Book Cliffs/Tavaputs Plateau to the south, and the Wasatch Range to the west (Leighty & Associates 2001:9). The geologic deposits within the Basin generally slope northward and are dissected by steep and narrow stream valleys (Cashion 1967:4). Streams in the study area drain into the Green River, located east of the study area, which flows from the Uinta Mountains across the Basin and south into Desolation Canyon. Elevations in the study area range from 4,930 feet above mean sea level in the northeast portion of the study area to 9,462 feet above mean sea level in the southwest portion of the study area. The terrain includes steep slopes, cliffs, and dissected uplands predominantly in the west, as well as areas of more moderate slope to the northeast.

Geologic Units

A geologic unit is a layer or layers of rocks that can be grouped together and mapped based on their characteristics. A geologic unit can be a single rock formation or layer, a group of many formations that are associated with each other, a subgroup or member of a larger formation, or a collection of loosely associated rocks and sedimentary deposits. Table 3.5-1 quantifies and Figure 3.5-1 shows the extent of geologic units in the study area. These geologic units encompass the Green River Formation (Eocene) and Uinta Formation (Eocene), Colton Formation and Flagstaff Limestone/North Horn Formation, and other geologic units (Bryant 2010; Sprinkel 2007, 2018; Weiss et al. 1990).

The Green River Formation is exposed at ground surface over approximately 40 to 50 percent of the surface in the study area (Cashion 1967: 8; Bryant 2010; Sprinkel 2007; Weiss et al. 1990). The formation consists of beds of oil shale, marlstone, shale, siltstone, sandstone, limestone and tuff deposited in a lacustrine environment (Cashion 1967: 7). The Green River Formation is exposed at ground surface throughout the western portion of the study area and underlies the Uinta Formation where it is exposed in the east (Sprinkel 2018: 10).

Table 3.5-1. Geologic Units in the Study Area by Action Alternative (acres in study area)

Geologic Unit	Indian Canyon Alternative	Wells Draw Alternative	Whitmore Park Alternative
Green River Formation	20,547	28,704	20,748
Uinta Formation	10,344	11,086	11,267
Colton Formation, Flagstaff Limestone/North Horn Formation	7,856	7,856	11,089
Other geologic units[a]	10,860	14,319	10,451

Notes:

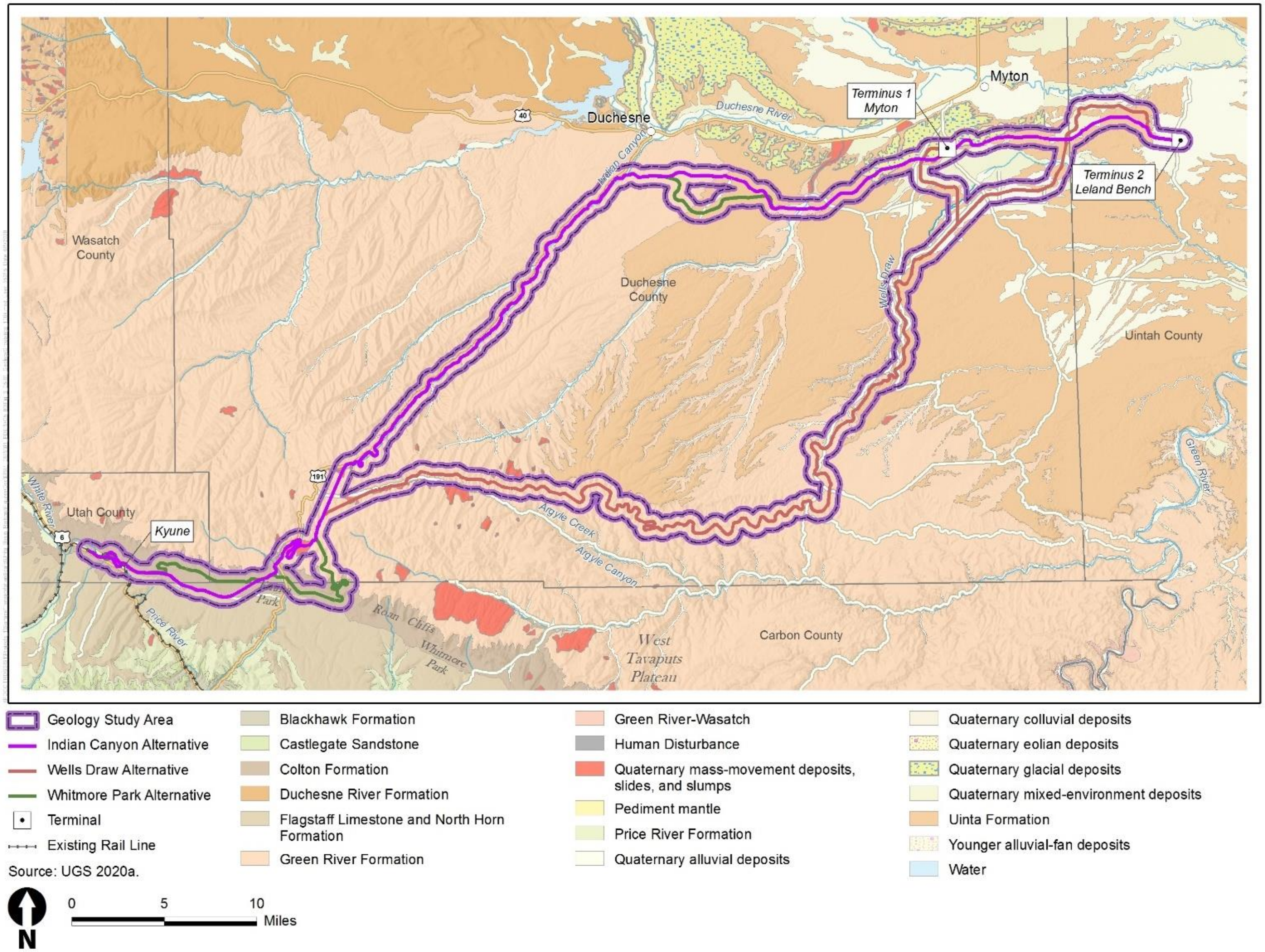
[a] Including Quaternary alluvium, glacial, mass-movement, mixed-environment.

Sources: Bryant 2010; Sprinkel 2007, 2018; Weiss et al. 1990

The Uinta Formation is exposed at ground surface over approximately 20 percent of the surface in the study area (Bryant 2010; Sprinkel 2007; Weiss et al. 1990). The Green River Formation interfingers with and underlies fluvial deposits of the Uinta Formation (Cashion 1967: 21; Sprinkel 2018: 10). The Uinta Formation consists of claystone and sandstone. Most sediments in this formation were deposited in streams and on floodplains. The Uinta Formation is exposed at ground surface in the central and eastern portion of the study area.

The Colton Formation and Flagstaff Limestone/North Horn Formation are exposed at ground surface over approximately 10 to 20 percent of the surface in the study area (Bryant 2010; Sprinkel 2007; Weiss et al. 1990). The Colton Formation consists of mudstone and shaly siltstone interfingered with sandstone (Weiss et al. 1990). Flagstaff Limestone/North Horn Formation consist of mudstone with interbedded calcareous siltstone, sandstone, limestone conglomerate, and limestone, as well as some carbonaceous shale. All three of these formations are exposed at ground surface in the southwest portion of the study area.

Figure 3.5-1. Geologic Formations in the Study Area



Other geologic units are exposed at ground surface over 10 to 20 percent of the surface in the study area (Bryant 2010; Sprinkel 2007, 2018; Weiss et al. 1990). These deposits include alluvial deposits, colluvial, aeolian, glacial deposits, and mass-movement deposits, slides, and slumps (Sprinkel 2018: 2). These deposits are exposed at ground surface in the northeast portion of the study area. The study area includes geologic units that are prone to mass movement, particularly the Green River Formation. Mass movement refers to the downward movement of rocks and soils on hillsides and other slopes in response to the pull of gravity. Examples of mass movement in the study area include slope collapse (landslides), slumping and soil creep, debris flow, and rock falls. Soil erosion can increase the potential for and severity of mass movement (Subsection 3.5.2.2, *Soils*). Mass movement can, in turn, leave the land surface more prone to additional erosion as mass movement typically disturbs or removes vegetation and loosens soil.

Landslide Hazards

Landslides have several potential contributing causes such as weak, weathered, or sheared rock; changed morphology such as erosion at the toe of a slope; or human causes such as grading a slope (Beukelman and Hylland 2016: 63-64) (see also Subsection 3.5.2.2, *Soils*, *Soil Hazards*, for a discussion of factors that may contribute to erosion). Triggers that cause a landslide in slopes with such conditions include intense precipitation and earthquake. Seismic activity, particularly in areas with steep slopes, can cause a landslide through ground shaking and liquefaction. In some locations, the weak and weathered Green River Formation has failed, resulting in mass movement. Approximately 2,200 acres in the study area have been mapped as landslide, debris flow, and rockslide areas (Utah Geological Survey 2010a). These include deep or unclassified landslides that are generally more than 10 feet thick and deep, as well as shallow landslides from talus, colluvial, rock-fall, glacial, or soil-creep deposits (Utah Geological Survey 2010b) (Figure 3.5-2). Mapped landslides lie primarily in the southwestern portion of the study area underlain by the Green River Formation. However, this portion of Utah has not undergone an extensive landslide mapping; accordingly, this mapped acreage likely represents only a small proportion of areas affected by mass movement. Table 3.5-2 shows the mapped acreage in the study area with landslide, debris flow, and rockslide deposits by alternative. Figure 3.5-2 shows the areas in the study area mapped as affected by mass movement.

Table 3.5-2. Quaternary Mass Movement (Landslide, Debris Flow, and Rockslide) in the Study Area by Action Alternative

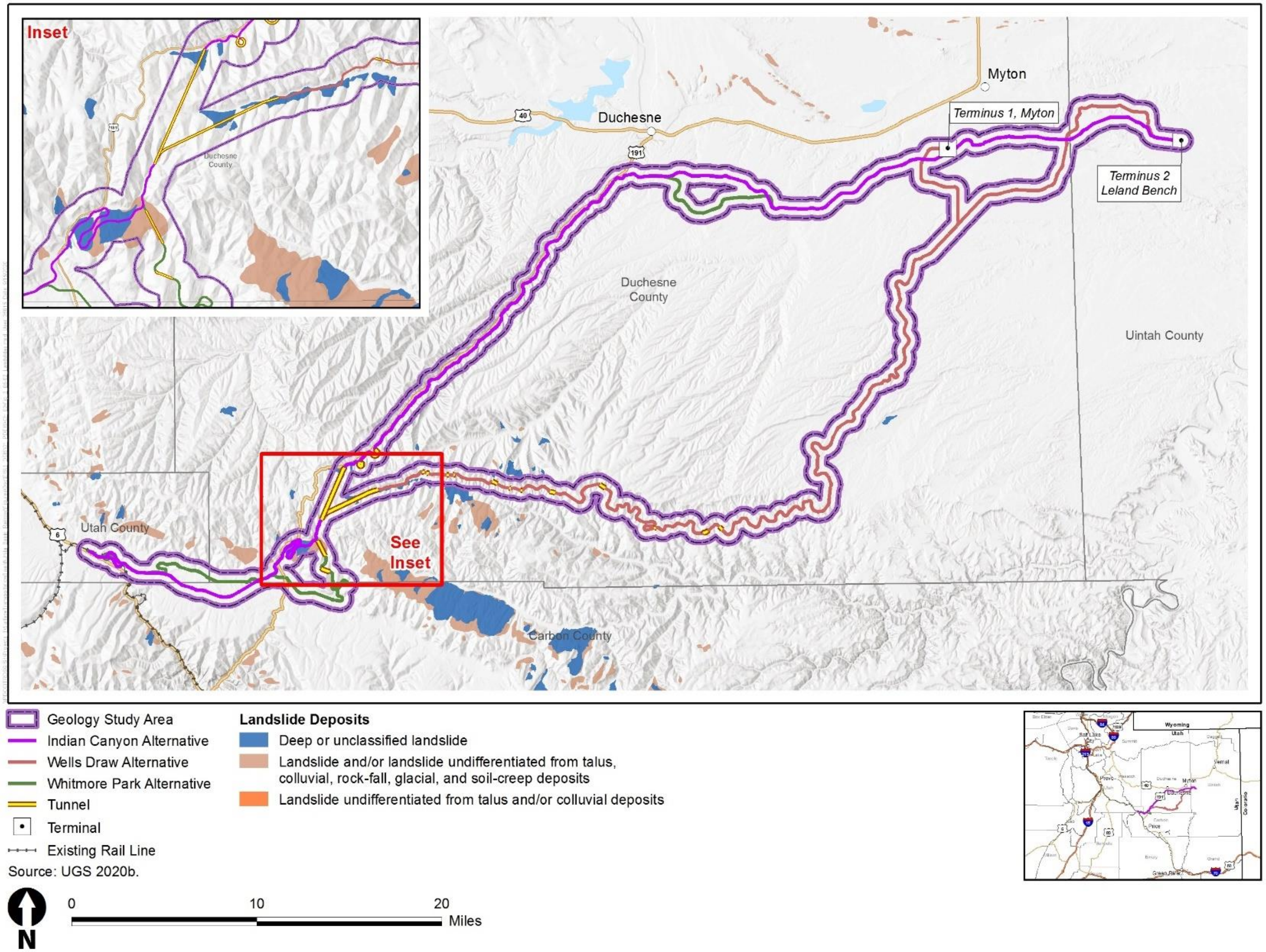
Geologic Unit	Indian Canyon Alternative	Wells Draw Alternative	Whitmore Park Alternative
Landslide, debris flow, and rockslide deposits (acres)	1,238	1,667	582

Notes:
Sources: Bryant 2010; Sprinkel 2007, 2018; Weiss et al. 1990

In addition, steep slopes (greater than 35 percent) can fail whether or not rocks are prone to slide if the angle of repose[5] is exceeded. The study area includes some areas of steep slopes in the southwest portion of the study area.

[5] The angle of repose is the steepest slope that a pile of material can have before the material starts to slide downward. Different types of soil and rocks can have different angles of repose depending on their structure and composition.

Figure 3.5-2. Landslide Deposits in the Study Area



Snow Avalanche Hazards

The two types of snow avalanches are loose snow slides and slab avalanches (Mock and Birkeland 2000). Loose snow slides, or sluffs, occur when loose snow on top of a snow pack slides down a mountainside. Because they are usually small and are made up of loosely consolidated snow, loose snow slides typically do not result in significant damage to property or injuries to people. Slab avalanches are more dangerous than loose snow slides because they involve more snow, traverse longer distances, and are more likely to result in death, injury, and damage to property. Slab avalanches occur in snowpacks in which a cohesive slab overlies a less-cohesive or weak slab. Added weight, such as new snow or a person on the slope, as well as loud noise and vibration, such as an explosion, can destabilize the layers and trigger a slab avalanche. Slab avalanches are common in the intermountain region because of climate. Specifically, continental climates have colder temperatures and more winter sun, characteristics that contribute to formation of weak layers.

The Utah Avalanche Center reports on snow avalanche occurrence in Utah; observations are tracked and show multiple slab avalanches each snow season (Utah Avalanche Center n.d.). The mountainous portion of the study area contains steep slopes and experiences climatic conditions that are conducive to formation of slab avalanches.

3.5.2.2 Soils

Soil Hazards

~~In general, soil hazards are not high throughout much of the study area.~~ Soil hazards in the study area include susceptibility to water and wind erosion and corrosivity to concrete and steel (NRCS 2018). Conditions in the study area that may contribute to erosion include unconsolidated deposits, high silt, and high carbonate contents. Conditions in the study area that may contribute to corrosivity include acidity (pH), moisture content, electrical resistivity of the soil, and temperature. Soils data indicate that mapped areas have low or moderate susceptibility to expansion and contraction (NRCS 2018).

Table 3.5-3 shows the acres and percentage of the study area with high and very high risk of soil hazards for each Action Alternative. These ratings are based on NRCS soil hazard ratings. Specifically, the values in the table for wind erosion correspond to a severe rating in the Gridded Soil Survey Geographic (gSSURGO) data; the values for water erosion correspond to the severe and very severe ratings; the values for corrosivity to concrete correspond to a high rating, and the values for corrosivity to steel correspond to a high rating. Figure 3.5-3 illustrates the regions of high and very high risk.

Table 3.5-3. High and Very High Risk of Soil Hazards by Action Alternative (acres in study area and percentage of study area)

	Indian Canyon Alternative		Wells Draw Alternative		Whitmore Park Alternative	
Soil Risk	Acres	Percent	Acres	Percent	Acres	Percent
Wind erosion	1,516	3.2	897	1.5	1,446	2.8
Water erosion	4,884	10.2	5,517	9.2	5,325	10.3
Corrosivity to concrete	1,364	2.8	1,767	2.9	1,386	2.7
Corrosivity to steel	5,393	11.3	9,320	15.5	5,460	10.6

Notes:
Source: NRCS 2018

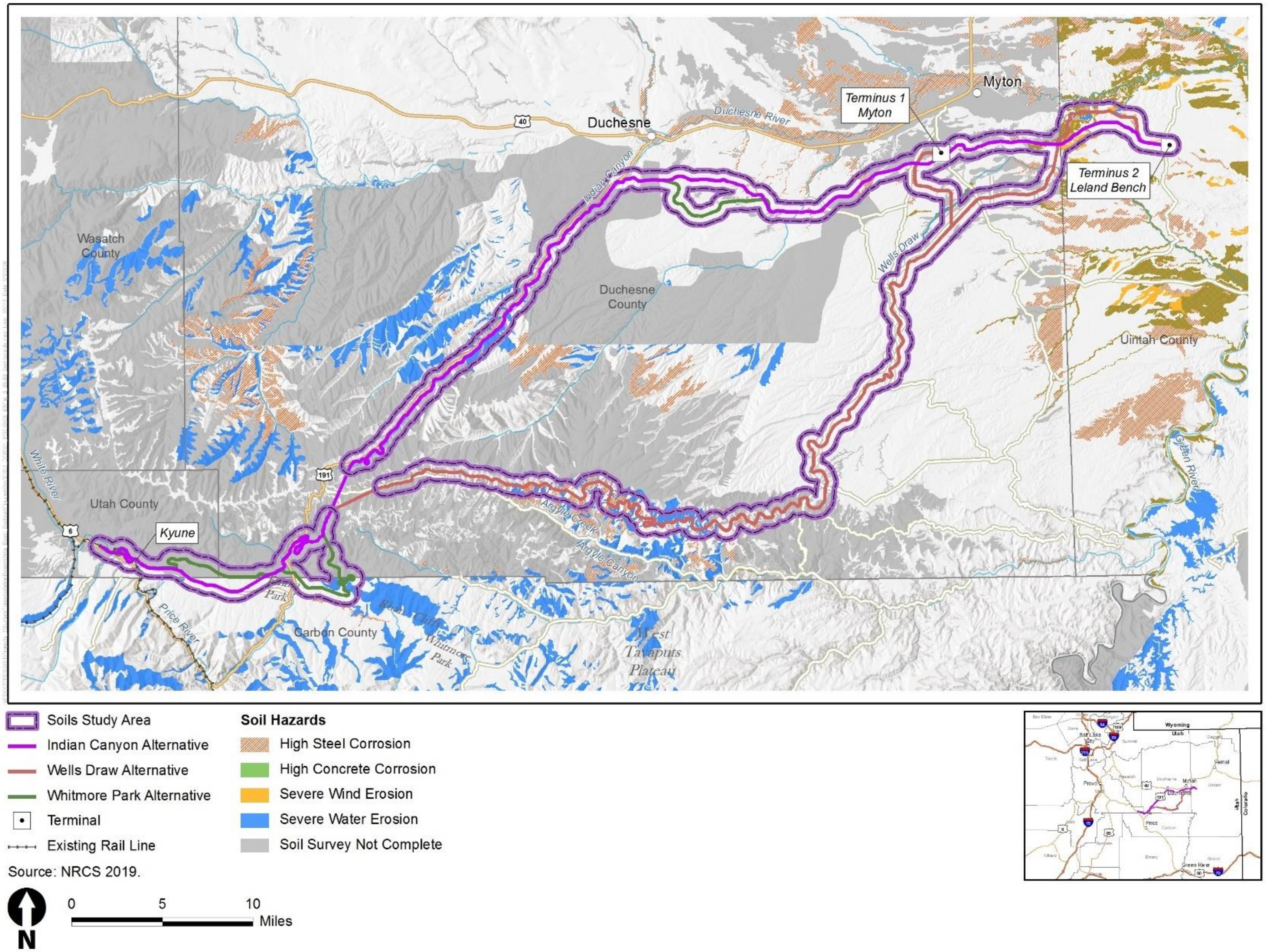
The areas with high and very high susceptibility to wind erosion are primarily in the northeast portion of the study area along the Indian Canyon Alternative and Whitmore Park Alternative (Figure 3.5-3). The areas with high susceptibility to water erosion are primarily in the western portion of the study area along all three Action Alternatives, with some areas in the northeast along all Action Alternatives (Figure 3.5-3).

The areas of high risk of susceptibility to corrosivity to concrete are primarily in the northern portion of the study area along the Indian Canyon Alternative and Whitmore Park Alternative and in the northeast along all Action Alternatives (Figure 3.5-3). The areas with high risk of susceptibility to corrosivity to steel are primarily in the southern portion of the study area along the Wells Draw Alternative and in the northeast portion of the study area along all Action Alternatives (Figure 3.5-3).

Soil Productivity

Soils perform multiple ecological services (Forest Service 2014~~2004~~). They promote and sustain biological and hydrologic functions and store carbon and water. Soil disturbance can disrupt the soils' ability to perform these services by causing wind and water erosion, compaction, and contamination. When disturbances occur, the likelihood that nonnative plants can move into an area is increased. Some of these nonnative plants can be noxious or invasive. The Utah Department of Agriculture and Food is responsible for designating the State of Utah Noxious Weed List, although counties may set priorities for responding to invasive plant threats.

Figure 3.5-3. Soil Hazards in the Study Area



3.5.2.3 Seismic Hazards

Earthquakes

The seismic hazards study area includes several faults that have been active in Holocene time[6] (Utah Geological Survey ~~2017~~2020c). Table 3.5-4 shows the earthquake scenario magnitude[7] and distance from the Action Alternatives to these faults. Figure 3.5-4 displays the faults in the study area, and Figure 3.5-5 depicts the named faults in proximity to the proposed rail line. Several of the faults are capable of generating a large earthquake (i.e., at least M 6.9) (Lund 2014:5-8). ~~The closest of these faults, the Strawberry fault, is approximately 19 miles away from all Action Alternatives, and its design earthquake for planning purposes is Magnitude 6.9. In addition, the~~ The Duchesne-Pleasant Valley fault system, which crosses the Indian Canyon and Whitmore Park Alternatives and lies within 0.4 mile of the Wells Draw Alternative, may have been active in the Holocene to the late Quaternary, between now and approximately 130,000 years ago (Howe 2021; Black and Hecker 1999a). The Towanta Flat graben, which lies approximately 20 miles north of the Action Alternatives, may also have been active in the late Quaternary (Black and McDonald 1999). The Pot Creek faults, which lie approximately 40 miles northeast of the Action Alternatives, was active during the Quaternary, but its history is poorly understood (Black and Hecker 1999b).

Table 3.5-4. Active Faults in the Study Area and Distance to Action Alternatives

Fault	Design Earthquake[a] (Magnitude)	Distance from Indian Canyon Alternative (miles)	Distance from Wells Draw Alternative (miles)	Distance from Whitmore Park Alternative (miles)
Bear River fault zone	6.9	53	60	53
Duchesne-Pleasant Valley fault[b]	N/A	0	0.4	0
Gunnison fault	7.0	39	39	39
Joe's Valley	6.7	23	23	23
Snow Lake graben	6.5	43	43	43
Strawberry fault	6.9	19	19	19
Utah Lake faults	6.8	47	47	47
Wasatch fault zone	6.9	36	36	36

Notes:

[a] Design earthquake for planning purposes.

[b] Design earthquake magnitude for the Duchesne-Pleasant Valley fault is not available.

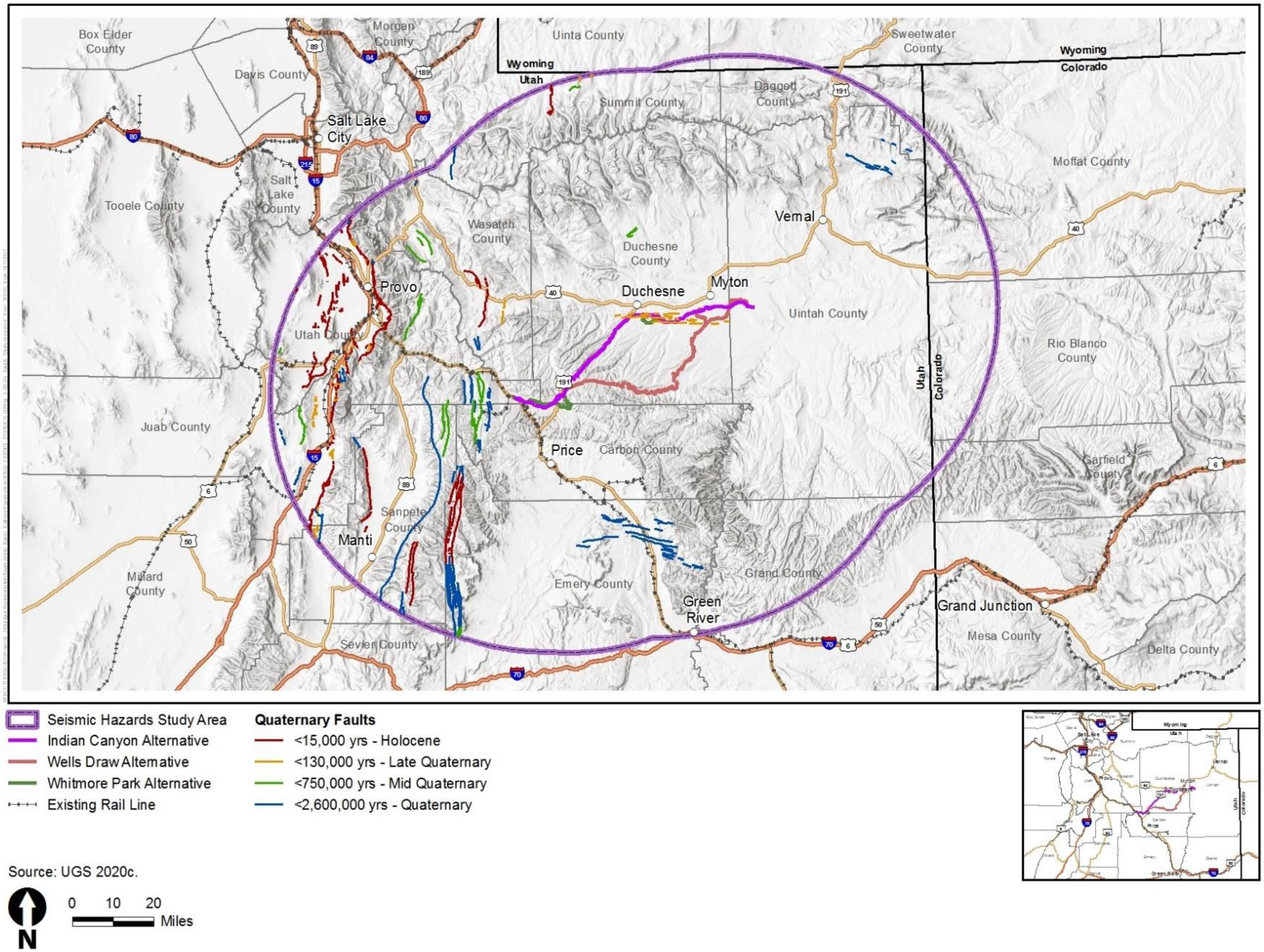
Sources: Utah Geological Survey ~~2017~~2020c; Lund 2014

NA = not applicable

[6] Faults that have not moved in the Holocene epoch (the past 11,650 years) are not considered to be active.

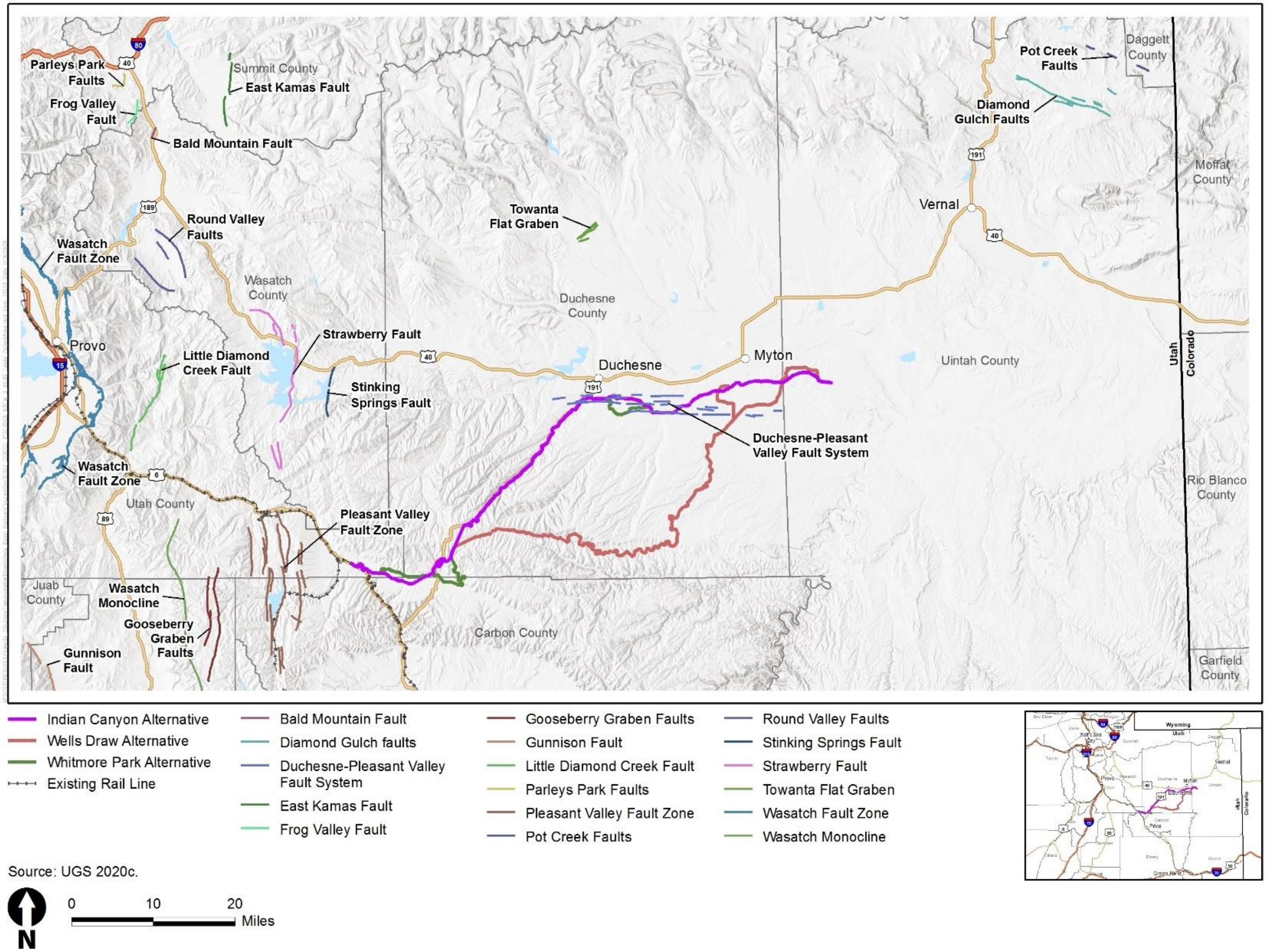
[7] The earthquake scenario magnitude or design earthquake magnitude is the magnitude earthquake that a fault is thought to be capable of producing based on fault dimensions, slip rate, and other factors.

Figure 3.5-4. Active Quaternary Faults in the Study Area



Source: UGS 2020c.

Figure 3.5-5. Named Faults in the Project Vicinity



Source: UGS 2020c.

Earthquakes can trigger liquefaction where sediments are unconsolidated and saturated. Unconsolidated sediments occur in the northeast portion of the study area where Quaternary alluvial deposits; colluvial, aeolian, glacial deposits, and mass-movement deposit; slides; and slumps predominate, as well as in the southwest area where landslides on the Green River Formation have occurred. Depth to groundwater varies considerably across the study area. Near stream beds where groundwater discharges into waterways, groundwater depth is shallow, but can be up to several feet below ground surface in areas between streams (Winter et al. 1998). As discussed in Section 3.3, *Water Resources*, the water rights details of groundwater wells in the vicinity (within approximately 2,000 feet) of tunnels proposed for the Action Alternatives indicate that groundwater depths typically range from 100 feet to 500 feet below the ground surface (UDWRi 2020). Because depth to groundwater is at least 100 feet in these areas, liquefaction is unlikely to occur. In lower-lying areas where groundwater discharges to the surface and unconsolidated granular soils are present, liquefaction could present a hazard.

Earthquakes can also trigger rockslides and landslides (Subsection 3.5.3, *Environmental Consequences*). Steep slopes and unconsolidated sediments can exacerbate risk of rockslide and landslide.

3.5.2.4 Mines, ~~and~~ Oil and Gas Fields, and Wells

Active and inactive mines occur in the study area. According to the Utah Mineral Occurrence System database, no mapped mines intersect the project footprint for any of the Action Alternatives, one inactive mine occurs in the temporary construction area for each Action Alternative, between six and eight active and inactive mines lie within the study area, depending on Action Alternative, and approximately 50 active and inactive mines lie within 5 miles of the study area (Utah Geological Survey 2015). Table shows the number of mines with respect to each Action Alternative.

Table 3.5-5. Active and Inactive Mines and Mine Prospects by Alternative

Fault	Indian Canyon Alternative	Wells Draw Alternative	Whitmore Park Alternative
Project footprint	0	0	0
Temporary construction area	1	1	1
Study area	6	8	7
Within 5 miles of study area	50	50	49

Notes:
Source: Utah Geological Survey 2015

These mines include sand and gravel and tar sands (within the temporary construction area) and also include limestone and sandstone (within the study area) and minerals and gilsonite[8] (within 5 miles of the study area).

[8] Gilsonite is a lightweight organic material that originates from the solidification of petroleum (Utah Geological Survey 2004). Gilsonite is soluble in organic solvents and has many industrial applications. The gilsonite deposits in Utah are unusually large; within the Uinta Basin, Gilsonite occurs in a 60-mile by 30-mile area in long, vertical veins ranging in width from a few inches to almost 18 feet (Utah Geological Survey 2004).

As a result of mining practices before 1975, when Utah passed the Utah Mining Reclamation Act making it illegal to abandon mines, there are an estimated 17,000 abandoned mine openings across the state (Utah Abandoned Mine Reclamation Program n.d.). Utah's Abandoned Mine Reclamation Program is working to seal off access to these old mine openings. Because mining has taken place in the study area, it is possible that unmapped mines could exist.

In addition to sandstone, limestone, and hydrocarbons including gilsonite, geologic units in the study area (particularly Green River Formation and Wasatch Formation) have yielded fossil fuels (Utah Geological Survey 2018). Oil and gas fields occur primarily in the north and east portion of the study area and do not intersect the proposed tunnels (Utah Division of Oil, Gas, and Mining 2017) (Section 3.15, *Cumulative Impacts*, Figure 3.15-1). As Table 3.5-6 shows, oil and gas wells also lie both within and near the study area.

Table 3.5-6. Oil and Gas Wells in the Study Area by Action Alternative

Well Type	Indian Canyon Alternative	Wells Draw Alternative	Whitmore Park Alternative
Producing wells (oil)	63	69	64
Plugged and abandoned wells (dry hole, gas, oil, test, and water injection)	14	14	10
Shut-in wells (gas and oil)	12	25	12
Total	**279**	**613**	**272**

Notes:
Source: Utah Division of Oil, Gas, and Mining 2020

3.5.2.5 Hazardous Waste Sites

Listed Hazardous Waste Sites

The EDR Area/Corridor Report (EDR 2020) identified 14 hazardous waste sites in the project footprint. However, two sites—Uintah and Ouray Reservation and Utah Department of Highways Pit 25104—were included multiple times, reducing the number of identified sites to 11. OEA identified an additional 195 sites in the study area outside of the project footprint (off-site locations). The EDR Area/Corridor Report (EDR 2020) identified eight "orphan" sites that have incomplete addresses and cannot be mapped. Because their locations are uncertain, OEA assumed that these orphan sites have not had significant releases subject to regulatory oversight and did not evaluate them further.

Table 3.5-7 lists the hazardous waste sites located in the project footprint (Figure 3.5-6). Because of their location, all sites in the project footprint were included in the table regardless of the database it was found in, along with the site's likelihood of affecting the proposed rail line. The sites are grouped by the database they were identified in (EMI/AIRS and Underground Injection Control [UIC] listings contain multiple sites). The table also includes the approximate distances of hazardous waste sites to large rivers in the study area for context. As denoted in Table 3.5-7, all sites located as being in the project footprint were identified as low-risk.

Table 3.5-7. Hazardous Waste Sites in the Project Footprint

Site	Distance to Nearest Large Rivers	Database(s)	Notes	Ranking and Reason for Ranking
Uintah and Ouray Reservation	Portions of Duchesne and Indian Canyon rivers within reservation footprint.	INDIAN RESERV	Indian reservation. No violations or releases associated with site.	Low. No violations or releases identified.
Newfield Production Company-Lamb 14-2-4-1W Oil & Gas Tank Battery	1.7 miles south of Duchesne River.	EMI/AIRS	Division of Air Quality Emissions inventory sites. All sites are associated with oil production and denoted as owned by Newfield Production Company. No violations or releases associated with the sites.	Low. No violations or releases identified.
Newfield Production Company-Ute Tribal 3-9-4-1e O	2.5 miles southeast of Duchesne River.			
Newfield Production Company-Ute Tribal 7-10-4-1e	3.5 miles southeast of Duchesne River.			
Newfield Production Company-Federal 7-8-9-16 Production Tank Battery	7.2 miles south of Duchesne River.			
Newfield Production Company-W Point 12-8-9-16 Oil & Gas Tank Battery	7.3 miles south of Duchesne River.			
Environmental Energy LLC Land Spreading	3 miles southeast of Duchesne River.	SWF/LF	Solid Waste Facilities /Landfill Sites. Facility noted as an open land treatment site. Owner listed as Environmental Energy Innovations, LLC. Land-spreading facilities are where solid waste is applied onto or incorporated into the soil surface for the purpose of biodegradation. No violations or releases associated with the sites.	Low. No violations or releases identified.
West Point 14-8-9-16	8.4 miles south of Duchesne River.	UIC	Underground injection control wells site location. Two sites are listed as active, one is inactive (MonFed 41-18-9-16YD). All water injection wells and operated by the Newfield Production Company. No violations or releases associated with the sites.	Low. No violations or releases identified.
Nine Mile 16-7-9-16	8.4 miles south of Duchesne River.			
Mon Fed 41-18-9-16yd	8.6 miles south of Duchesne River.			
Utah Department of Highways Pit 25104	Adjacent to Price River.	MINES MRDS	Mineral Resources Data System site. Primary commodities listed as sand and gravel for construction. No violations or releases associated with the site.	Low. No violations or releases identified.

Figure 3.5-6. Hazardous Waste Sites

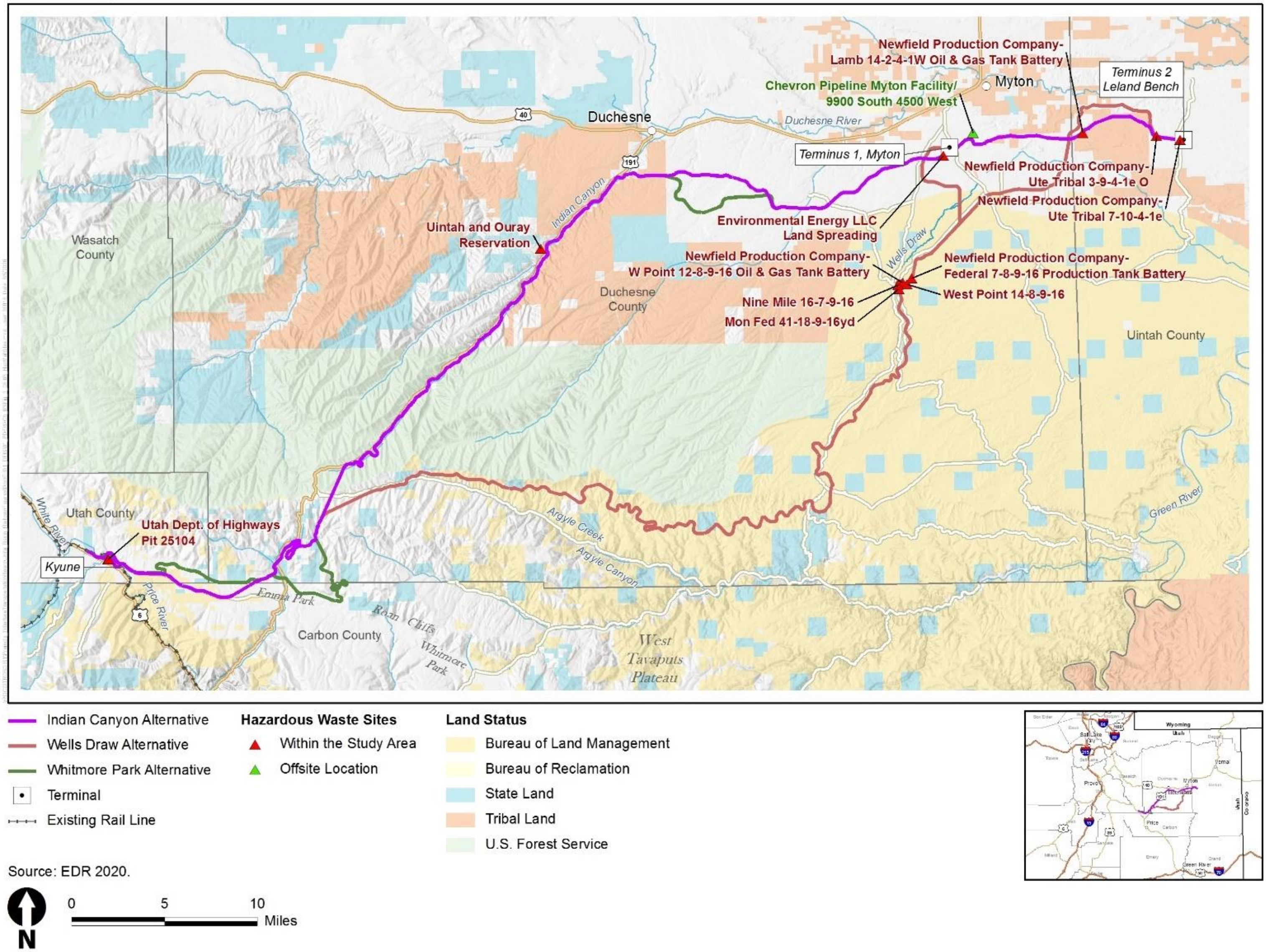


Table 3.5-8 reports the number of off-site locations identified in each of 10 databases that were included in the EDR Area/Corridor Report (EDR 2020). Because a single site can be included in multiple database listings, the number of sites is generally lower than the number of listings identified.

Table 3.5-8. Off-Site Locations Identified in the Database Search

Database	Database Description	Number of Sites Listed
UIC	Site location listing for underground injection control wells	129
EMI	Division of Air Quality Emissions inventory. Permitted sites	34
Tier 2	Tier 2 facilities under the Emergency Planning and Community Right-to-Know Act (EPCRA)	11
FINDS	Facility Index System/Facility Registry System	12
ECHO	Enforcement & Compliance History Information	10
MINES MRDS	Mineral Resources Data System. 8 listings	8
NPDES	Permitted Facilities Listing, Division of Water Quality	2
ICIS	Integrated Compliance Information System	2
ERNS	Emergency Response Notification System	1
RMP	Risk Management Plans	1
Total		**195**

With the exception of the ERNS listing Chevron Pipeline Myton Facility/9900 South 4500 West (Figure 3.5-6), none of the off-site locations had a known history of accidental hazardous materials releases into the environment, on-site contamination, or major violations that could indicate a release. The two listings under ICIS contained violations that were administrative in nature and therefore unlikely to involve a release of hazardous waste. Table 3.5-9 describes ERNS-listed Chevron Pipeline Myton Facility and evaluates the potential for the site to affect or be affected by the proposed rail line. OEA concluded that the potential for impacts related to the off-site locations would be negligible and did not evaluate them further.

Crude Oil and Natural Gas Pipelines

Pipelines in the study area include one natural gas pipeline operated by Dominion Questar and one crude oil pipeline operated by Chevron. The Chevron pipeline is associated with the site presented in Table 3.5-9. Additional details regarding these pipelines can be found in Section 3.8, *Energy*; pipeline locations can be found in Figure 3.8-1.

Table 3.5-9. Off-Site Locations with the Potential to Affect the Action Alternatives

Site	Distance from Study Area	Database	Notes	Ranking and Reason for Risk Class
Chevron Pipeline Myton Facility/ 9900 South 4500 West	1,421 feet to the north, northeast	ERNS	In June 2012, a release of 2,000 gallons of heavy crude was discovered just north of this location. At the time, the cause was under investigation. Diking and weirs were installed was conducted as mitigation. The responsible company is listed as Chevron Pipeline Company.	Medium. The release occurred in 2012 1,421 feet from the Indian Canyon Alternative and the Whitmore Park Alternative. The material was being contained at the time and it is expected that the area would have been remediated soon after. Therefore, because of the distance from the Action Alternatives and the containment of the release, the ranking is medium. Impacts on the proposed rail line associated with the Chevron Pipeline Myton Facility are considered unlikely.

3.5.3 Environmental Consequences

Construction and operation of the proposed rail line could result in impacts related to geology, soils, seismic hazards, and hazardous waste sites. This subsection first presents the potential impacts that would be the same for all three Action Alternatives and then compares the potential impacts that would be different for each Action Alternative. For comparison purposes, this subsection also describes geology, soils, seismic hazards and hazardous waste sites under the No-Action Alternative.

3.5.3.1 Impacts Common to All Action Alternatives

This subsection describes the potential impacts related to geology, soils, seismic hazards, and hazardous waste sites that would be the same across the three Action Alternatives.

Construction

Unstable Geologic Units

Each of the Action Alternatives would cross geologic units known to be susceptible to mass movement. In the study area, the geologic units that are most susceptible to mass movement are the Green River Formation (Table 3.5-1) and various Quaternary deposits where landslide, debris flow, and rock slide have occurred (Table 3.5-2). In addition to mapped landslide deposits, as stated in Subsection 3.5.2.1, *Geology*, unmapped landslide deposits are likely to occur in the study area. Construction activities that would create steep slopes or disturb the surface within unstable geologic units could cause geologic hazards such as landslides, slumping, debris flows, and rockslide. This is especially true for areas where excavations would occur for the construction of tunnels (discussed in more detail below under *Hazards Associated with Tunnel Construction*), bridges, embankments, culverts, retaining walls, and grade separations. If mass movement were to occur during or following construction, it could dislocate, damage, or destroy rail-related facilities and result in both environmental damage and potentially cause injury or death.

To address these potential impacts, OEA is recommending mitigation measures that would require the Coalition to conduct geotechnical investigations prior to construction to identify soils and bedrock in excavation areas that have the potential for mass movement, to implement engineering controls to prevent mass movement in those areas, and to institute immediate remedial actions in the event that mass movement occurs during construction (GEO-MM-2). If the Coalition were to implement these mitigation measures, OEA does not anticipate that construction would affect slope stability and result in landslide, slumping, rock fall, or debris flow that would affect the environment or the proposed rail line.

Snow Avalanche

Each of the Action Alternatives would traverse steep mountain terrain that could be susceptible to slab snow avalanches. If such an avalanche were to occur during or following construction, it could dislocate, damage, or destroy rail-related facilities and result in both environmental damage and potentially cause injury or death.

To address these potential impacts, OEA is recommending mitigation requiring the Coalition to consult with applicable land management agencies and other agencies with expertise in avalanche mitigation to identify areas with a high risk of snow slab avalanche, investigate the use of nonstructural and structural methods to control the effects of slab avalanches, and implement appropriate avalanche control methods (GEO-MM-7). Nonstructural methods could include artificial triggering of avalanche, and structural measures could include installing diversion structures, retarding structures, and avalanche sheds. Implementation of these mitigation measures would minimize the risk of damage created by snow avalanche.

Soil Disturbance

Construction of the proposed rail line would require moving and stockpiling soil, that would result in mixing soil layers and compaction. When soils are mixed and compacted, their biological productivity can be affected. Excavating and stockpiling soil damages soil quality and alters the physical, biological, and chemical properties of soil. Among the impacts would be the destruction of soil structure, which would reduce porosity, allow organic materials to decompose more readily, and damage the soil microbial community that cycles nutrients. To limit these impacts, the Coalition has committed to limit ground disturbance to only the areas necessary for project-related construction activities and to stockpile and reuse topsoil (VM-16, VM-17, VM-18). In addition, OEA is recommending additional mitigation requiring the Coalition minimize surface disturbance, ~~and~~ provide surface treatments to minimize soil compaction, and seed disturbed ground and stockpiled soil to stabilize soil and prevent erosion in accordance with land management agency requirements (WAT-MM-5, WAT-MM-6).

Soil that has lost some or all of its cover is more susceptible to wind and water erosion, which exacerbates the loss of soil productivity, creating a cycle of increasing loss of soil at the point of erosion. Soil erosion in turn can contribute to mass movement and other environmental impacts.

Disturbed soil, such as is created during excavation, grading, and cut-and-fill activities, is susceptible to wind and water erosion. Both types of erosion result in soil loss at the point of erosion and deposition at points distant from the erosion site. Loss of soil at the point of origin diminishes the ability for plants to grow. Offsite sedimentation can increase risk of flooding (and subsequent erosion) and damage plant life (resulting in further increased risk of erosion).

When soil is disturbed, the risk that invasive plant species can become established is increased. Research has demonstrated that some invasive species change soil chemistry and area ecological services (Norton et al. 2004), making it harder for established native plants to compete successfully with the invasive species and thus creating a downward cycle. Section 3.4, *Biological Resources*, provides additional discussion about the impacts of construction of the proposed rail line on invasive species establishment and spread.

Based on soil ratings, all of the Action Alternatives would have a similar susceptibility to wind and water erosion. Construction activities could increase erosion risk. Vegetation removal would expose the underlying soil to erosive forces of both wind and water. The use of heavy machinery during construction would compress soils, reducing the amount of water that can infiltrate. This could result in increased runoff, which would then increase erosion. Earth-moving machinery would change drainage patterns, potentially causing gullies to form as a result of increased runoff in new areas. All of these issues would be exacerbated by steep slopes and unstable geologic units. In the extreme case, excessive erosion could increase the risk of landslide.

The Coalition has proposed voluntary mitigation measures related to soil disturbance and OEA is recommending additional mitigation measures to address these potential impacts. If those mitigation measures are implemented, the Coalition would obtain an NPDES permit[9] prior to beginning construction activities and would implement an SWPPP during construction. The SWPPP would include limiting ground disturbance to only the areas necessary for project-related construction activities; implementing erosion control measures to minimize the potential for erosion of soil stockpiles until they are removed and the area is restored; and restoring disturbed areas as soon as practicable after construction ends on a particular stretch of rail line (VM-19, VM-20, VM-21, VM-22). OEA is also recommending additional mitigation measures (WAT-MM-6) requiring the Coalition coordinate with the appropriate land management agency, private landowner, or the Ute Indian Tribe to select seed mixes for use in restoration and reclamation activities that are appropriate to the ecological site and would avoid invasive species establishment and spread. In addition, OEA is recommending mitigation (GEO-MM-1) to minimize the quantities of materials required to be excavated, transported, or placed off site. These mitigation measures would prevent excessive construction-related erosion that could significantly affect the environment or create a hazard to the proposed rail line.

Collapse

No mapped mines intersect the project footprint under any of the Action Alternatives, and only one mapped inactive mine intersects the temporary footprint for each Action Alternative. Because the location of these mines is known and construction activities would consider these areas, OEA concludes that the risk of collapse due to the presence of known abandoned mines is minimal. Construction of any of the Action Alternatives would have similar risk.

Because unmapped abandoned mines could occur at any location in the study area, construction of all of the Action Alternatives would have a similar risk of collapse due to construction on unmapped abandoned mines. Construction of the proposed rail line over or near an abandoned mine would

[9] NPDES is the permit system mandated by Clean Water Act Section 402 to control pollutants in waters of the United States. With the exception of Tribal trust lands, the U.S. Environmental Protection Agency (EPA) has delegated authority to issue NPDES permits to the state of Utah, referred to as Utah Pollutant Discharge Elimination System (UPDES) permits. On Tribal trust lands, EPA retains authority to issue NPDES permits. NPDES refers to both UPDES and NPDES permits in this section.

present a risk of collapse. Heavy vehicles could overload the bearing capacity of the geologic units present and excavation could remove material that is currently providing stability. OEA is recommending mitigation (GEO-MM-4) requiring the Coalition conduct geotechnical studies prior to beginning construction and to take actions to appropriately stabilize areas where unmapped abandoned mines are identified. If the Coalition were to implement these mitigation measures, OEA concludes that collapse would not occur as a result of construction over abandoned mines.

Hazards Associated with Tunnel Construction

Each of the Action Alternatives would require construction of tunnels. Tunnel construction involves numerous potential geologic hazards, including collapse, water inrush, portal landslide, gas explosion, and avalanche (Wang et al. 2019: 767). Collapse and water inrush are the most common failures during project construction (Wang et al. 2019: 769). When in-situ stress (as on faults, weak rock features, and groundwater) is released, it can trigger collapse and, if groundwater is involved, an inrush of water into the tunnel (Li et al. 2010: 232). A tunneling-induced portal landslide can occur when unstable geologic units are further destabilized by excavation and other ground-moving activities and can be exacerbated by precipitation and water inrush (Wang et al. 2019: 770). Gas explosion occurs when explosive gases, such as methane, are encountered during tunneling when inadequate ventilation is provided (Wang et al. 2019: 768). Avalanche is less common than collapse and water inrush (Wang et al. 2019: 773) and occurs when construction, project operation, or other disturbance triggers movement of deep snow on steep slopes.

Because of geologic conditions in the study area, all of these geologic hazards present potential risks to construction of the proposed rail line tunnels. The tunnels would be constructed in a seismically active area (Utah Geological Survey 2020a), so faults would potentially be present in the tunnel area, increasing likelihood of collapse. While depth to groundwater at tunnel entrances has been measured at 100 feet below ground surface or more (UDWRi 2020), it is possible that higher groundwater could be encountered and water inrush could occur. The tunnel in the southwestern portion of the Action Alternatives would be constructed in the Green River Formation (Bryant 2010; Sprinkel 2007; Weiss et al. 1990), which is known to be unstable and prone to mass movement, increasing risk of both collapse and portal landslide. The area is known to have both gas and oil reserves (Utah Division of Oil, Gas, and Mining 2017, 2020), meaning that inflammable gases may be present.

OEA is recommending mitigation requiring the Coalition design and construct tunnels in accordance with applicable U.S. Occupational Safety and Health Administration guidelines for underground construction (OSHA 2003). These guidelines includes measures for controlling geologic hazards associated with underground constructing (tunneling) and include required safety measures, such as ensuring adequate ventilation, air monitoring, and emergency procedures (GEO-MM-6). Further, OEA is recommending mitigation requiring the Coalition conduct geotechnical studies prior to beginning construction and take actions to identify and address such geologic hazards before starting tunnel construction (GEO-MM-2). If the Coalition were to implement these mitigation measures, OEA concludes that the risks associated with collapse, water inrush, portal landslide, and gas explosion during tunnel construction would be minimized.

Wells, Crude Oil, and Natural Gas Pipelines—Potential Spills and Accidental Releases

Three UIC water injection wells occur in the study area for the Wells Draw Alternative (Table 3.5-6) and various active, plugged, and other wells are located in the study area for all three Action Alternatives (Table 3.5-4). If soil disturbance activities occur where these wells are located and if they intersect the area of excavation, there is potential for an accidental release of oil or gas to the environment. Thus, OEA anticipates that oil and gas-producing wells and shut-in wells would need to be plugged and abandoned as part of construction of the proposed rail line. Proper abandonment or plugging of these wells would minimize the potential for construction to affect or be affected by the existence of oil, gas, or water wells in the study area. Therefore, OEA is recommending mitigation requiring the Coalition to abide by the requirements of the Utah Department of Natural Resources, Division of Oil, Gas and Mining Permitting for the proper abandonment or plugging of wells under Utah Administrative Code Rule R649-3-24 (ENGY-MM-2).

As discussed in Subsection 3.5.2.4, *Hazardous Waste*, two pipelines are located in the study area, one natural gas pipeline and one crude oil pipeline. If soil disturbance activities occur near these pipelines, there is potential for an accidental release of natural gas or crude oil. Because construction would not require any pipelines to be temporarily or permanently relocated, modified, removed, or abandoned in place, the potential for crude oil or natural gas release is low. The Coalition has committed to securing agreements with utilities to establish responsibility for protecting or relocating existing utilities, if affected by construction (VM-47). Additionally, OEA is recommending mitigation requiring the Coalition design crossings of pipeline rights-of-way in accordance with applicable Utah Division of Public Utilities regulatory standards (ENGY-MM-3).

Operations

Unstable Geologic Units

As discussed previously, the proposed rail line would be located on geologic units known to be unstable and susceptible to mass movement, including landslides. Cut and fill for tunnels, bridges, embankments, culverts, retaining walls, and grade separations could exacerbate the risk of mass movement. Other factors that can exacerbate instability during rail operations include changes in drainage patterns, increased erosion, heavy precipitation, freezing and thawing cycles, and seismic ground shaking. The Coalition has submitted voluntary mitigation stating that the Coalition would comply with FRA regulations, which address track safety requirements and engineering standards during rail construction and operations (VM-1). If this mitigation is implemented, OEA does not anticipate that rail operations, including maintenance, would affect slope stability and result in landslide, rock fall, or debris flow that would affect the environment or the rail line.

Erosion

Operation and maintenance activities could result in erosion. Based on soil ratings, all of the Action Alternatives would have similar susceptibility to wind erosion and water erosion during rail operations. Erosion effects during operation of the proposed rail line would result from changed drainage patterns and from maintenance activities that may disturb vegetation and soils. Substantial erosion could undermine foundations including bridge foundations, the railbed, and other support for rail facilities. With the implementation of the Coalition's voluntary mitigation measures and OEA's additional recommended mitigation measures (VM-19, VM-20, VM-21, VM-26, WAT-MM-6) these impacts would be insignificant.

Corrosion

Corrosivity to concrete and steel are important considerations because many rail line components are made of these materials. Corrosion could cause damage to the rail line that could result in derailments and other accidents that could affect the environment and cause injury to people.

Based on soil ratings, all of the Action Alternatives would have similar susceptibility to corrosivity to concrete and steel. A small portion of the study area includes soils with high corrosivity to concrete or steel. In these soils, support structures including foundations for rail and vehicle bridges and culverts that are either buried or extend underground would be vulnerable to corrosion. OEA is recommending mitigation measures that would require the Coalition to conduct geotechnical investigations to identify areas where corrosive soils are present. If corrosive soils are identified, the Coalition would be required to implement site-specific measures to address the issue. These measures could include replacing corrosive soils with non-corrosive engineered soils (GEO-MM-3). These mitigation measures would prevent excessive corrosion that could significantly affect the environment or create a hazard to the proposed rail line.

Surface Fault Rupture, Seismic Ground Shaking, and Seismically Induced Liquefaction

Two of the Action Alternatives, the Indian Canyon Alternative and the Whitmore Park Alternative, would cross the Duchesne-Pleasant Valley fault system, and the Wells Draw Alternative would lie within 0.4 mile of that fault system. Although this fault system is not well understood, it could have been active in the late Quaternary, possibly even in the Holocene; therefore, there is a risk that seismic movement along this fault could result in surface fault rupture. Ground rupture could distort, break, or otherwise damage the alignment, resulting in derailments, and could also damage any structural foundations present in the fault zone. In addition, there is a risk of strong seismic ground shaking that could affect the project footprint. Ground shaking could cause landslide, which could damage or dislocate rail line features and could potentially result in derailments. Because all of the Action Alternatives are a similar distance from faults with potential for large earthquakes, all of the Action Alternatives would have similar susceptibility to surface fault rupture and seismic ground shaking. The Coalition's voluntary mitigation measures state that the Coalition would construct and operate the rail line in accordance with applicable FRA safety regulations, which would minimize risks associated with ground shaking and surface fault rupture (VM-1). In addition, OEA is recommending mitigation requiring the Coalition conduct geophysical investigations to assess the likely seismic hazards associated with the Duchesne-Pleasant Valley fault prior to construction (GEO-MM-8).

Some of the active fault zones near the Action Alternatives have a history of ground-rupturing seismic events and strong ground shaking. These events have caused numerous rock falls. The risk exists of similar rock falls in the future, particularly in the unstable Green River Formation, including along Indian Canyon. OEA is recommending mitigation requiring the Coalition conduct geotechnical investigations to identify soils and bedrock in cut areas with potential for mass movement or slumping (GEO-MM-2). These mitigation measures would minimize the risk from rock falls caused by seismic events to damage the rail line.

Because all of the Action Alternatives are a similar distance from faults with potential for a large earthquake and traverse unconsolidated Quaternary deposits in the northeast portion of the proposed rail line, all of the Action Alternatives would also have similar susceptibility to seismically induced liquefaction. The depth to groundwater in the study area is variable, lying close to ground surface where water discharges into streams and much deeper in higher terrain. Liquefaction may occur in areas with saturated sandy to somewhat gravelly soils to a depth of 30 to 50 feet in case of seismic ground shaking, depending on type of sediments that occur and strength of ground shaking. Liquefaction can result in both settlement and differential settlement, changing the alignment of the track, which could, if not repaired promptly, result in a derailment. OEA is recommending mitigation to require the Coalition to conduct geotechnical studies to identify areas at risk of liquefaction and to implement site-specific measures in areas where liquefaction risk is identified. These measures could include replacing soils subject to liquefaction with engineered soils that are not prone to liquefaction (GEO-MM-5).

3.5.3.2 Impact Comparison between Action Alternatives

This subsection describes the potential impacts related to geology, soils, seismic hazards, and hazardous waste sites that would be different between the three Action Alternatives.

Unstable Geologic Units

The rail line footprint of the Wells Draw Alternative would include the largest area (approximately 30,000 acres) located on the unstable Green River Formation and existing mapped landslide areas, followed by the Indian Canyon Alternative (just over 21,000 acres) and Whitmore Park Alternative (just less than 21,000 acres). Therefore, the Wells Draw Alternative would have a greater risk of mass movement than the Indian Canyon Alternative or the Whitmore Park Alternative. Table 3.5-10 shows the risk of mass movement by Action Alternative. In addition, the Wells Draw Alternative would have the greatest area (approximately 1,000 acres) located on steep slopes (30 percent slope and greater) on unstable geologic units, followed by the Indian Canyon Alternative (approximately 150 acres) and the Whitmore Park Alternative (approximately 115 acres).

Table 3.5-10. Risk of Mass Movement on Green River Formation and Mapped Landslide Area by Action Alternative

Risk	Indian Canyon Alternative	Wells Draw Alternative	Whitmore Park Alternative
Area of unstable geologic units[a] in the rail line footprint[b] (acres)	394	1,740	287
Area of unstable geologic units in the temporary footprint[c] (acres)	1,089	5,178	991
Area of unstable geologic units[a] in the study area	21,304	29,889	20,914
Distance of the proposed rail line that would cross unstable geologic units (miles)	21	54	18
Number of sensitive project features[d] within unstable geologic units	84	262	85

Notes:

[a] Unstable geologic units include the Green River formation and other mapped units of high landslide risk.

[b] The rail line footprint is the area that would be permanently disturbed by the proposed rail line.

[c] The temporary footprint is the area that could be temporarily disturbed by construction activities.

[d] Sensitive project features include bridges, tunnels, and culverts. These features may be especially sensitive to geologic hazards and their construction could exacerbate the risk of mass movement in unstable geologic units.

Soil Disturbance

Each of the Action Alternatives would permanently affect soils in the rail line footprint, which would vary based on the dimensions of the area of disturbance. Table shows the dimensions of each Action Alternative by maximum and minimum width of disturbance and length. The width varies considerably from a minimum of 100 feet to a much wider area where cut and fill or other facilities would be required.

Table 3.5-11. Dimensions of Each Action Alternative (Rail Line Footprint)

Length of Disturbance	Indian Canyon Alternative	Wells Draw Alternative	Whitmore Park Alternative
Minimum Width (feet)	100	100	100
Maximum Width (feet)	1,027	3,254	1,043
Length (miles)	81	103	88

As shown in Figure 3.5-3, the study area contains areas where soils have been mapped (NRCS 2018) and other areas where no soil data exist. It is not known what soils exist in the unmapped areas; it is possible that soils are thin or nonexistent where bedrock outcrops. Table shows the area of mapped and unmapped soils that would be permanently disturbed within the rail line footprint for each Action Alternative. The Wells Draw Alternative would result in the greatest area of soil disturbance among the Action Alternatives, followed by the Whitmore Park Alternative and Indian Canyon Alternative.

Table 3.5-12. Soil Disturbance by Action Alternative (Rail Line Footprint)

	Indian Canyon Alternative		Wells Draw Alternative		Whitmore Park Alternative	
Disturbed Area	Acreage	Percent of Area	Acreage	Percent of Area	Acreage	Percent of Area
Mapped	816	61%	1,611	63%	885	62%
Unmapped	524	39%	949	37%	546	38%
Total disturbance	1,340	100%	2,560	100%	1,431	100%

Hazardous Waste Sites

As stated previously, OEA identified 11 hazardous waste sites in the project footprint, none of which would be likely to affect or be affected by the proposed rail line. OEA identified one off-site location in the study area that does have a history of releasing hazardous waste. That site is the Chevron Pipeline Myton Facility, which is located approximately 1,421 feet to the north-northeast of the Indian Canyon Alternative and the Whitmore Park Alternative. A release of approximately 2,000 gallons of heavy crude oil occurred north of this location in June 2012. It was contained at the time to minimize impacts on the surrounding environment. Because this site is located outside of the project footprint for the Indian Canyon Alternative and the Whitmore Park Alternative, construction of either of those alternatives would not disturb soil that could have been contaminated during the June 2012 release. Therefore, the Chevron Pipeline Myton Facility hazardous waste site would not affect and would not be affected by construction and operation of the proposed rail line.

Hazards Associated with Tunnel Construction

The Action Alternatives differ regarding the number and length of proposed tunnels. The Indian Canyon Alternative would have 3 tunnels totaling 4.3 miles, the Wells Draw Alternative would have 13 tunnels totaling 5.6 miles, and the Whitmore Park Alternative would have 5 tunnels totaling 5.7 miles. Because each tunnel is susceptible to geologic hazards, including collapse, water inrush, portal landslide, gas explosion, and avalanche, the Action Alternatives with the largest number and most tunnel mileage—the Wells Draw Alternative and the Whitmore Park Alternative—would incur the greatest risk from geohazards associated with tunnel construction. The Action Alternative with the least number and length of tunnels—the Indian Canyon Alternative—would incur the least risk. Implementation of OEA's recommended mitigation measures (GEO-MM-2, GEO-MM-5, GEO-MM-6) to address such geologic hazards before starting tunnel construction would minimize the risks from geohazards for all Action Alternatives.

3.5.3.3 No-Action Alternative

Under the No-Action Alternative, the Coalition would not construct and operate the proposed rail line, and there would be no impacts related to geology, soils, seismic hazards, and hazardous waste sites.

3.5.4 Mitigation and Unavoidable Environmental Effects

In general, impacts related to erosion, collapse, corrosion, and seismic hazards would be similar across the three Action Alternatives. The Coalition has proposed voluntary mitigation measures and OEA is recommending additional mitigation measures to avoid or mitigate impacts from construction and operations related to geology, soils, seismic hazards, and hazardous waste sites (Chapter 4, *Mitigation*). If the Coalition were to implement these mitigation measures, these impacts would not be significant. Across the three Action Alternatives, the Wells Draw Alternative would have a slightly higher potential for impacts related to mass movement, including landslides, because it would cross a larger area of unstable geologic units than the Indian Canyon Alternative or the Whitmore Park Alternative. The Wells Draw Alternative would also have a slightly higher potential for impacts related to hazardous waste sites because its study area includes more crude oil wells than the study areas for the Indian Canyon Alternative or the Whitmore Park Alternative. OEA concludes that the potential for impacts related to hazardous waste sites would be insignificant if OEA's recommended mitigation measures were implemented.

3.6 Noise and Vibration

This section describes the noise and vibration impacts that could result from construction and operation of the proposed rail line. The subsections that follow describe the noise and vibration study areas; the methods used to analyze the impacts; the affected environment, including ambient noise measurement results; and potential noise and vibration impacts of the Action Alternatives and No-Action Alternative, including modeled noise contours and the estimated number of receptors (i.e., noise-sensitive locations) potentially affected.

3.6.1 Analysis Methods

This subsection identifies the study areas, data sources, and analysis methods OEA used to analyze noise and vibration associated with rail construction and operations.

3.6.1.1 Study Areas

OEA delineated two study areas for the analysis of potential noise and vibration impacts. The project study area refers to the area in the vicinity of the Action Alternatives, while the downline study area refers to areas near existing rail lines in Utah and Colorado where rail traffic could increase if the proposed rail line were constructed.

- **Project study area.** For the project study area, OEA considered areas within approximately 1 mile from the track centerline for each Action Alternative. OEA selected this distance prior to conducting the analysis because in OEA's experience, this distance is sufficient to identify potential noise and vibration impacts from the proposed rail construction and operations. Because the Action Alternatives would primarily traverse sparsely populated areas, there are many locations within 1 mile of the centerline that do not warrant a noise and vibration analysis. Therefore, OEA's analysis focused on areas with particularly sensitive wildlife habitat, areas known to contain important cultural resources, and areas with buildings where people live or congregate, such as residences, churches, and schools.
- **Downline study area.** For the downline analysis of noise and vibration, OEA defined a study area that includes existing rail lines extending from the proposed rail connection near Kyune, Utah, to the eastern and southern boundaries of the Denver Metro/North Front Range air quality nonattainment area, as described in Section 3.1, *Vehicle Safety and Delay*.

3.6.1.2 Data Sources

OEA reviewed the following data sources to determine the potential impacts due to noise and vibration that could result from construction and operation of the Action Alternatives and compared those impacts to the No-Action Alternative.

- Locations of proposed bridges and other structures provided by the Coalition, as well as the Coalition's construction plans and schedules, including plans for pile-driving and blasting.
- Anticipated train traffic volumes, train composition, and train speed obtained from the Coalition.

- Train traffic characteristics on existing rail lines in the downline study area obtained from multiple sources, as described in Appendix C, *Downline Analysis Study Area and Train Characteristics*.
- Locations of at-grade road crossings that would be constructed as part of the proposed rail line provided by the Coalition and locations of existing at-grade road crossings in the downline study area obtained from the Federal Railroad Administration (FRA) crossings database. Road crossing locations are important for the noise analysis because of greater noise exposure due to locomotive warning horn sounding at crossings.
- Geographic information system (GIS) data, including aerial photographs and design details of the proposed rail line obtained from the Coalition.
- OEA noise criteria and FRA vibration criteria.
- Digital Terrain Model (DTM) employing Google Earth imagery to account for acoustic shielding where appropriate. This type of acoustical modeling can result in narrower noise contours than by assuming flat ground. Conversely, wider noise contours can result due to other acoustic features, such as curved sections of track.
- Greater sage-grouse lek locations identified through agency consultation.
- Locations of noise-sensitive receptors (e.g., houses, nursing homes, schools, places of worship, campgrounds) identified using aerial photographs or agency information, and cultural resources identified through OEA's consultation with tribes, agencies, other stakeholders, and the public.
- Federal Transit Administration (FTA) methods for construction noise and vibration and operational vibration analyses.
- The *Conrail Acquisition Environmental Impact Statement* (Board 1998a) and the *Draft Environmental Assessment for the Canadian National/Illinois Central Railway Acquisition* (Board 1998b) for wayside noise[1] estimates.
- The *Draft Environmental Impact Statement, Proposed Rule for the Use of Locomotive Horns at Highway-Rail Grade Crossings* (FRA 1999) for horn noise estimates.
- Information on other relevant projects or actions for analyzing cumulative impacts.

3.6.1.3 Analysis Methods

OEA used the following methods to analyze noise and vibration impacts. For the noise analysis, OEA evaluated whether construction and operation of the proposed rail line would result in a 3 A-weighted decibel (dBA)[2] or greater increase in noise levels and whether railroad noise levels (due to wayside noise and locomotive warning horn noise) would equal or exceed a 65 day-night average

[1] Wayside noise is train noise adjacent to a rail line that comes from sources other than the locomotive horn, such as engine noise, exhaust noise, and noise from steel train wheels rolling on steel rails. Wayside noise is primarily a function of train speed, train length, and number of locomotives.

[2] A-weighted decibel (dBA) is a measure of noise level used to compare noise from various sources. A-weighting approximates the frequency response of human hearing.

noise level (DNL),[3] consistent with the Board's environmental regulations at 49 C.F.R. § 1105.7e(6). OEA also assessed whether vibration would cause impacts. Appendix L, *Noise and Vibration Analysis Methods*, provides the equations and further describes the methods OEA used to perform the noise and vibration analysis.

- **OEA identified noise sources from rail construction and operation**. OEA based wayside noise estimates on noise level measurements and associated train composition, speeds, and related information compiled for previous OEA analyses (Board 1998a, 1998b) and used data on horn noise compiled by FRA (1999). OEA used information on train composition, frequency, length, and speed provided by the Coalition for project-related rail traffic and information from multiple sources, as described in Appendix C, *Downline Analysis Study Area and Train Characteristics*, for rail traffic on the existing rail lines in the downline study area.
- **OEA evaluated noise impacts from construction.** OEA used the FTA general assessment method (FTA 2006) to evaluate noise impacts from rail construction. This method is used when details of construction methods and schedule are not yet known. OEA estimated the combined noise level for general construction equipment at the receptor nearest each Action Alternative and compared the noise level with established assessment criteria.
- **OEA modelled noise contours for rail operation**. OEA used an environmental noise computer software application (CadnaA -Computer Aided Noise Abatement) and wayside noise and horn reference levels from previous studies to generate noise level contours. The noise model inputs include horn noise; wayside noise; and train frequency, length, and speed.
- **OEA collected baseline noise data**. To establish a baseline for determining if there would be a 3 dBA or greater increase in noise, OEA measured ambient noise[4] in the project study area. For the downline study area, OEA based existing noise level estimates on current rail traffic levels because train noise is the dominant source of noise in those areas.
- **OEA estimated noise exposure from rail construction and operations**. OEA estimated noise exposure that would result from rail construction in terms of equivalent sound level (L_{eq}).[5] OEA quantified potential noise impacts on wildlife from rail construction and operations in terms of Sound Exposure Level (SEL).[6] OEA estimated human noise exposure from rail operations in terms of DNL based on information provided by the Coalition about potential operations on the proposed rail line and the results of OEA's rail noise model.
- **OEA estimated the number of noise-sensitive receptors potentially affected by each Action Alternative**. OEA estimated the number of noise-sensitive receptors within the 65 DNL noise contour for each Action Alternative and noise-sensitive receptors that would experience an increase in DNL of at least 3 dBA. OEA used digital aerial photographs and GIS software to

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[3] Day-night average noise level (DNL or Ldn) is the energy average of dBA sound level over a 24-hour period; it includes a 10-decibel adjustment factor for noise between 10:00 p.m. and 7:00 a.m. to account for the greater sensitivity of most people to noise during the night. The effect of nighttime adjustment is that one nighttime event, such as a train passing by between 10:00 p.m. and 7:00 a.m., is equivalent to 10 similar events during the daytime.

[4] Ambient noise is the sum of all noise (from human and naturally occurring sources) at a specific location over a specific time. It is usually used to characterize the noise environment without the new proposed noise source.

[5] Equivalent sound level (L_{eq}) is the energy-averaged sound pressure level averaged over a specified unit of time, frequently 1 hour.

[6] Sound exposure level (SEL) describes cumulative noise exposure from a single noise event. It is represented by the total A-weighted sound energy during the event, normalized to a 1-second interval.

identify noise-sensitive receptors within the 65 DNL noise contour. The result of this analysis was an estimate of the total number of noise-sensitive receptors likely to be exposed to project-related noise levels of 65 DNL or greater and the number of receptors where the DNL would increase by at least 3 dBA. This method was used for both the project study area and the downline study area.

- **OEA assessed vibration impacts from rail construction and operations**. OEA based the analysis of potential vibration impacts on published train and construction equipment vibration data and FTA methods. Specifically, OEA evaluated vibration impacts using peak particle velocity (PPV) for building damage and root-mean square velocity (VdB) for human annoyance.

3.6.2 Affected Environment

This subsection identifies the existing environmental conditions related to noise and vibration in the study areas. Existing noise conditions vary considerably in the study areas. For example, existing ambient sound levels generally are higher in populated areas than in unpopulated areas. In areas with low ambient sound levels, such as remote areas, rail noise could be more noticeable than in areas with higher ambient sound levels.

3.6.2.1 Project Study Area

OEA measured ambient noise levels in the project study area from September 23 through 25, 2019 (Monday through Wednesday). OEA's noise field monitoring team placed five calibrated noise monitors[7] at representative noise-sensitive receptor locations. The criteria for selecting locations included the proximity to noise-sensitive receptors (e.g., residence), proximity to proposed alignments, and coverage of the entire study area. Figure 3.6-1 shows the noise monitoring locations and noise-sensitive receptors in the project study area. Table 3.6-1 shows the results of the ambient noise monitoring. OEA identified 222 noise-sensitive receptors in the 1-mile-wide study area by visually inspecting aerial photography. All of the 222 receptors are residences. OEA excluded from the noise analysis receptors that are entirely or partially within the rail line footprint that would likely be permanently displaced by construction of the Action Alternatives[8]. These receptors include one residence (R-09) for the Indian Canyon Alternative, five residences (R-03, R-04, R-05, R-06, and R-07) for the Wells Draw Alternative, and two residences (R-01 and R-09) for the Whitmore Park Alternative. Appendix L, *Noise and Vibration Analysis Methods*, identifies the locations of these receptors.

[7] Noise monitor refers to an environmentally protected sound level meter that can automatically collect sound data over a period of several days.

[8] The rail line footprint includes the area of the railbed, as well as the full width of the area cleared and cut or filled. The rail line footprint would also include other physical structures installed as part of the proposed rail line, such as fence lines, communications towers, siding tracks, relocated roads, and power distribution lines. The rail line footprint is the area where rail line operations and maintenance would occur. The area would be permanently disturbed. The temporary footprint is the area that could be temporarily disturbed during construction, including areas for temporary material laydown, staging, and logistics. Disturbed areas in the temporary footprint would be reclaimed and revegetated following construction. The project footprint is the combined area of the rail line footprint and temporary footprint, both of which would be disturbed during construction, comprising where construction and operations of the proposed rail line would occur.

Figure 3.6-1. Noise Monitoring Locations and Noise-Sensitive Receptors in the Project Study Area

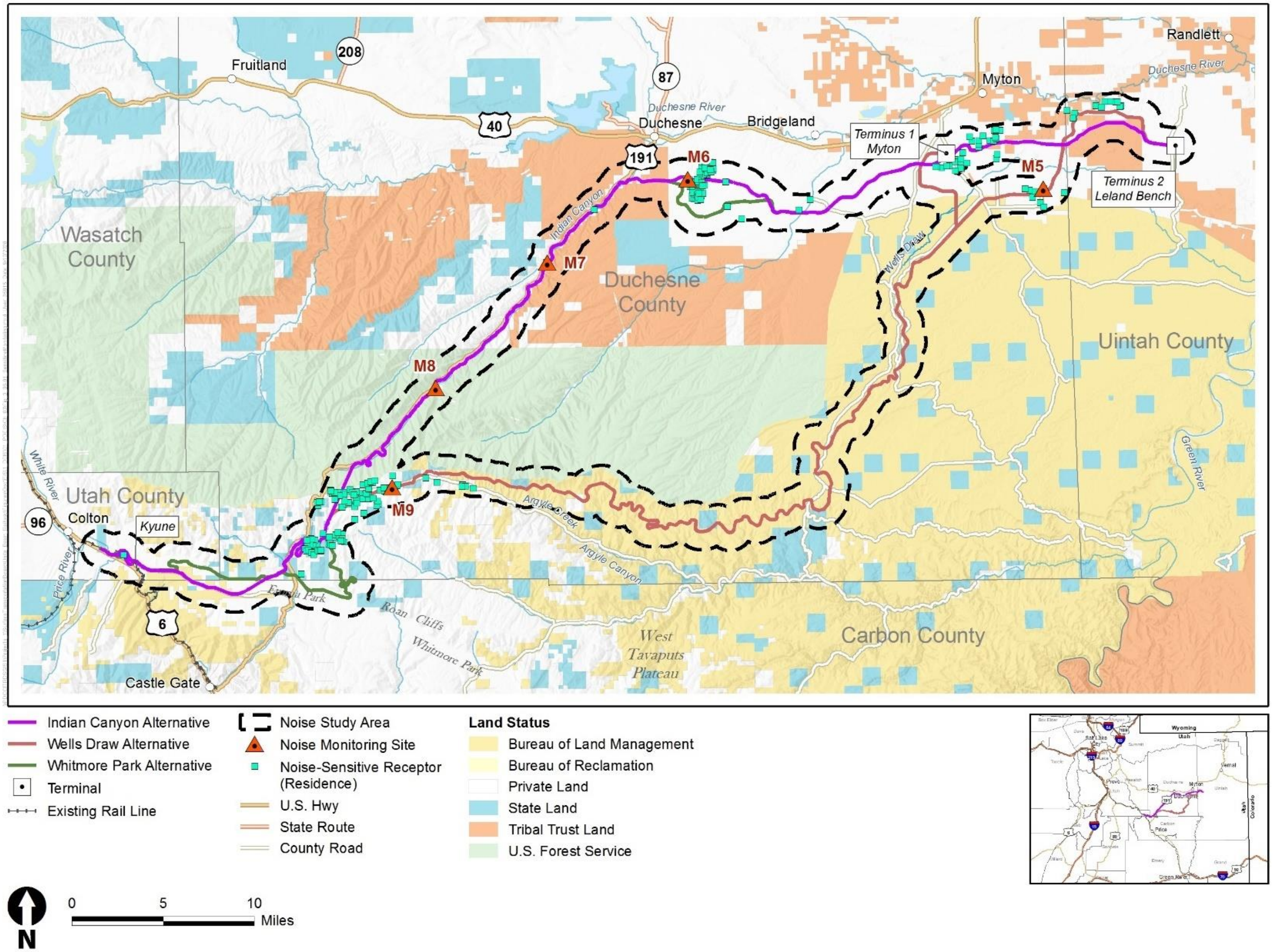


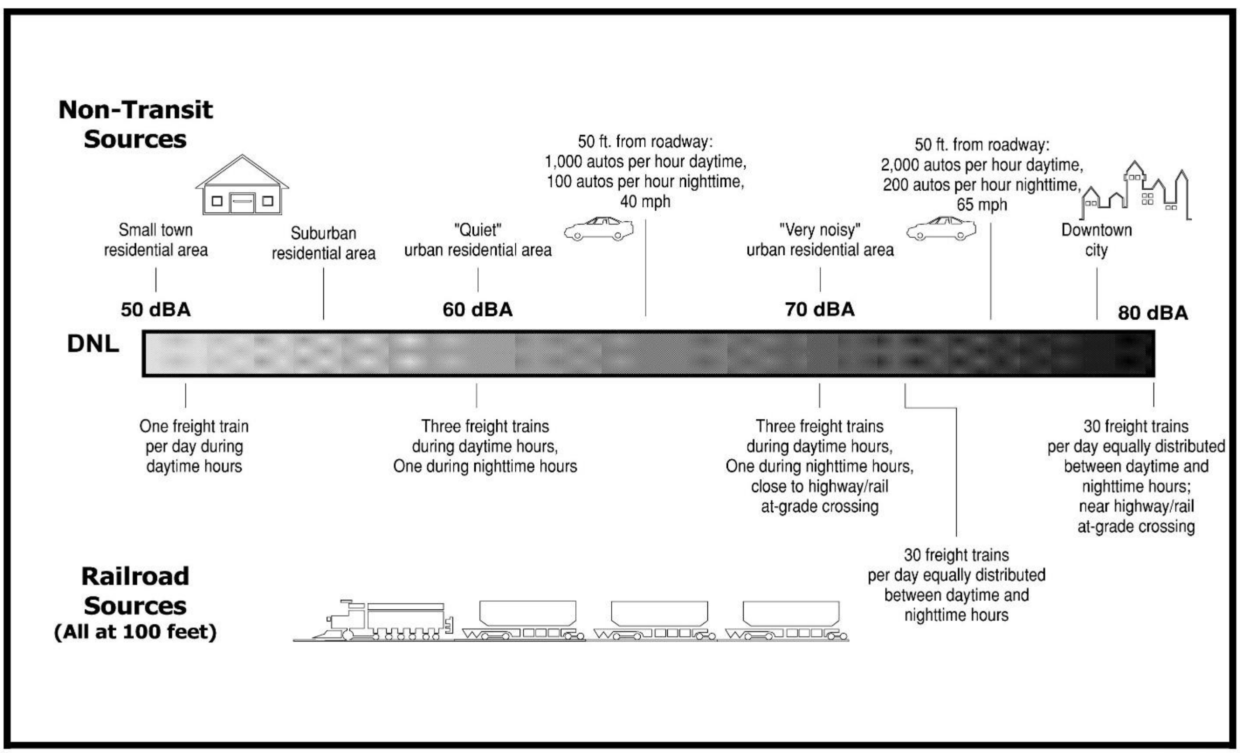
Table 3.6-1. Ambient Noise Monitoring Results

Location	DNL dBA
M5	56
M6	47
M7	52
M8	52
M9	33

Notes:
DNL = day-night average sound level; dBA = A-weighted decibel

Ambient sound levels ranged from DNL dBA 33 to 56. These sound levels range from quieter than the USEPA “small town residential” to “suburban residential” categories (Figure 3.6-2). This result is typical for an area like the project study area that contains both remote locations and more populated areas.

Figure 3.6-2 Typical Day-Night Average Noise Levels



Source: USEPA 1974

3.6.2.2 Downline Study Area

Estimated noise levels for the downline study area are detailed in Appendix L, *Noise and Vibration Analysis Methods*, along with the estimated changes in noise levels.

3.6.3 Environmental Consequences

Construction and operation of the proposed rail line could result in impacts related to noise and vibration. This subsection first presents the potential impacts that would be the same for all three Action Alternatives and then compares the potential impacts that would be different across the Action Alternatives. For comparison purposes, this subsection also discusses noise and vibration under the No-Action Alternative. OEA's analysis of noise impacts on wildlife is presented in Section 3.4, *Biological Resources*.

3.6.3.1 Impacts Common to All Action Alternatives

This subsection discusses potential noise and vibration impacts that would be the same across the three Action Alternatives.

Project Study Area

Construction

Construction of any of the Action Alternatives could result in noise and vibration impacts. Operation of heavy equipment to construct tunnels, bridges, rail embankments, and installation of other rail facilities would result in noise and vibration that could affect noise-sensitive receptors (i.e., residences) in the study area.

Noise Levels

FTA publishes standardized reference construction noise levels for construction equipment, referenced to a standard noise measurement distance of 50 feet. These "source" levels can be used to compute construction noise levels at various distances. During construction of any of the Action Alternatives, the two noisiest pieces of general construction equipment would be heavy trucks and bulldozers, both of which would likely operate simultaneously. Table 3.6.2 lists FTA reference noise levels for these pieces of equipment and the combined heavy truck and bulldozer noise level at 50 feet from the noise source. The table also shows the noise level for an impact pile-driver, the noisiest piece of specialized construction equipment, which OEA analyzed separately because it would be used only in certain applications, such as bridge construction.

Table 3.6-2. Reference Noise Levels for Construction Equipment

Equipment	Noise Level at 50 Feet (dBA)
Heavy truck	88
Bulldozer	85
Heavy truck and bulldozer combined	90
Pile-driver (impact type)	101

Notes:
Source: FTA 2006
dBA = A-weighted decibels

For comparison, Table 3.6.3 shows the FTA construction noise criteria for residential, commercial, and industrial areas. OEA used these FTA thresholds to assess the severity of construction noise at noise-sensitive receptors in the study area. The FTA thresholds that OEA used to assess rail construction noise are higher than the thresholds that OEA used for rail operations because construction noise would be temporary, whereas operations-related noise would be permanent.

Table 3.6-3. Federal Transit Administration Construction Noise Criteria

Land Use	Daytime 1-hour L_{eq} (dBA)	Nighttime 1-hour L_{eq} (dBA)
Residential	90	80
Commercial	100	100
Industrial	100	100

Notes:
Source: FTA 2006
L_{eq} = equivalent sound level; dBA = A-weighted decibels

Subsection 3.6.3.2*, Impact Comparison between Action Alternatives*, presents the estimated noise levels during rail construction at sensitive receptors in the study area for each Action Alternative. For any of the Action Alternatives, the closest residence would be located more than 300 feet from the rail line and the estimated combined noise level from general construction equipment at the closest receptor would be approximately 73 dBA. Because this estimate is lower than the FTA construction noise thresholds for residential areas, OEA concludes that none of the Action Alternatives would result in adverse noise impacts from general construction equipment. OEA is recommending mitigation requiring the Coalition develop and implement a construction noise and vibration control plan (NV-MM-1) that addresses noise from general construction equipment.

OEA estimated that noise from pile-driving would range from 78 dBA to 84 dBA at the closest sensitive receptor, depending on the Action Alternative. Because the estimated noise from pile-driving would be less than the FTA construction noise thresholds for residential areas during the daytime, OEA concludes that none of the Action Alternatives would result in adverse noise impacts from pile-driving provided that pile-driving does not take place at night. To ensure that noise impacts from pile-driving are minimized, OEA is recommending mitigation requiring the Coalition avoid nighttime construction and pile-driving near residential areas, to the extent practicable, and employ quieter vibratory pile-driving or noise curtains for project-related construction where FTA construction noise criteria could be exceeded (NV-MM-2). If OEA's recommended mitigation is implemented, OEA concludes that noise impacts from construction would not be significant.

Vibration

To assess vibration impacts from general construction equipment, OEA estimated vibration levels at sensitive receptors from bulldozer operation, based on FTA data. OEA used bulldozers as representative construction equipment for the vibration analysis because they are commonly used in rail construction and produce relatively high vibration levels. As discussed in Subsection 3.6.3.2, *Impact Comparison between Action Alternatives*, vibration levels from bulldozer operations at the closest receptors would range from 0.001193 to 0.001864 inch per second, depending on the Action Alternative. Vibration from pile-driving at the closest sensitive receptors would range from 0.0108 to 0.0273 inch per second, depending on the Action Alternative. Construction-related vibration could be perceptible at certain locations, but vibration would be infrequent, temporary, and well below the FTA fragile building damage criterion of 0.20 inch per second. To ensure that construction-related vibration impacts are minimized, OEA is recommending mitigation requiring the Coalition prepare a construction noise and vibration control plan (NV-MM-1). If OEA's recommended mitigation is implemented, OEA concludes that construction-related vibration impacts would not be significant.

Operations

Operation of any of the Action Alternatives would result in noise and vibration impacts. The severity of these impacts would depend on the alternative, the volume of rail traffic, and the locations of sensitive receptors relative to the proposed rail line. Operations-related noise would include noise from diesel locomotive engines and the sound of locomotive and railcar wheels on the rail line (collectively referred to as wayside noise). The amount of wayside noise from each train depends on train speed, train length, and the number of locomotives. In addition to wayside noise, operations-related noise also includes noise from locomotive warning horns that would sound at at-grade road crossings.

As discussed in Section 3.1, *Vehicle Safety and Delay*, OEA expects that operation of the proposed rail line would reduce truck traffic on some roadways because some crude oil that is currently transported by truck would move by rail instead. Specifically, OEA anticipates that the proposed rail line would eliminate the existing tanker truck traffic transporting crude oil from production areas in the Basin to the Price River Terminal near Wellington, Utah. If the proposed rail line were constructed, the tanker trucks that currently transport crude oil to the Price River Terminal likely would go to the new rail line terminals near Myton and Leland Bench instead, because the rail line terminals would be significantly closer to oil production areas in the Basin than the Price River Terminal. Decreased truck traffic between oil production areas and the Price River Terminal could result in reduced noise along local roadways compared to current conditions.

Noise Levels

OEA considered operations-related noise for both the high rail traffic scenario and the low rail traffic scenario. Under the high rail traffic scenario, an average of 10.52 trains would pass by receptors along the proposed rail line per day. OEA assumed that each of these trains would include approximately eight locomotives and 113 rail cars. Under the low rail traffic scenario, an average of 3.68 trains would pass by receptors along the proposed rail line. OEA assumed that each of these trains would include eight locomotives and 116.5 cars. For both scenarios, OEA assumed that each of the eight locomotives would be 76 feet long, rail cars would be 60 feet long, and the overall train length would be approximately 7,403 feet. The typical operating speed of the trains would be 15 miles per hour.

Based on the Board's thresholds and past precedent, OEA concluded that rail operations would result in an adverse noise impact if wayside or horn noise would cause noise levels at the receptor to increase by at least 3 dBA and cause noise levels at the receptor to meet or exceed 65 DNL. To identify receptors where both of those thresholds could be met, OEA modeled the 3 dBA noise increase contour and the 65 DNL noise level contour along each of the three Action Alternatives.

Table 3.6-4 shows the distances to the 65 DNL contour lines (wayside noise and horn noise) for both rail traffic scenarios. These distances are based on train horn, locomotive, and rail car sound power levels, number of cars and locomotives, speed, number and time of day of train passbys; they do not account for topography, track curvature, and other site-specific factors.

Table 3.6-4. 65 DNL Noise Contour Distances by Rail Traffic Scenario

Noise Type	Feet
High Rail Traffic Scenario	
Horn noise	654
Wayside noise	516
Low Rail Traffic Scenario	
Horn noise	325
Wayside noise	256

Using noise modeling software, OEA modified these 65 DNL contour distances based on site-specific factors. The computer-generated noise contour distances can vary substantially from the values in Table 3.6-4 because of the shielding effects of topography and other factors, such as curved sections of track. Depending on the exact track geometry, curved sections can focus sound on a particular area, thus, increasing the noise contour distances. The wayside noise contour distance for the proposed rail line would be substantial because of the relatively large number of locomotives that would generate diesel engine noise coupled with slow train speed. The slow train speed increases the amount of time locomotive noise persists in a particular geographic area, which in turn, increases the cumulative noise exposure.

Beyond the computer-generated noise contour distances, noise levels would be less than 65 DNL during rail operations. Under the low rail traffic scenario, all sensitive receptors would be located outside of the 65 DNL contour. Therefore, OEA concluded that the low rail traffic scenario would not result in adverse noise impacts and did not analyze this scenario further.

Under the high rail traffic scenario, operation of the proposed rail line would result in adverse noise impacts on between one and six residences, depending on the Action Alternative. Subsection 3.6.3.2, *Impact Comparison between Action Alternatives*, presents the number of receptors that could be affected under each Action Alternative. Appendix L, *Noise and Vibration Analysis Methods*, includes the equations and data used for calculating wayside and locomotive horn noise levels. Appendix L, Figure L-4 through Figure L-6, show the 65 DNL and 3 dBA increase contours for the rail segments that have noise-sensitive receptors in the project study area. OEA calculated the 3 dBA increase contour using the ambient sound measurements (Table 3.6.1) to characterize the existing noise conditions. The area within the 3 dBA increase contour can be large if the ambient sound level is sufficiently low.

Vibration

There are two types of impacts that result from rail-related ground vibration: damage to buildings and annoyance to humans. Building damage thresholds are much higher than human annoyance thresholds. Because ground-borne vibration levels generated by trains are typically relatively low, even cosmetic building damage from vibration is rare (Appendix L, *Noise and Vibration Analysis Methods*). Based on the average train speed of 15 miles per hour and assuming a crest factor (the ratio between average and peak vibration levels) of 4.0,[9] the building damage contour for the FTA fragile building damage criterion of 0.20 inch per second would be 10 feet wide (5 feet on each side

[9] FTA recommends a crest factor of 4 to 5 for ground-borne vibration analysis of trains. Appendix L, *Noise and Vibration Analysis Methods*, includes a graph that shows the crest factor in terms of the relationship between peak and average (RMS) vibration levels.

of the track centerline). No buildings would be within 5 feet of any of the Action Alternatives; therefore, OEA does not expect any damage to buildings due to vibration from rail operations.

Using the FTA infrequent event (less than 30 trains per day) criterion of 80 VdB[10] (FTA 2006), the vibration annoyance contour along the proposed rail line would extend 25 feet from the track centerline. Because no receptors would be within 25 feet of any of the Action Alternatives, vibration levels resulting from rail operations would be lower than FTA's infrequent event criterion of 80 VdB. Therefore, OEA concludes that operation of the proposed rail line would not result in any adverse vibration impacts.

Downline Study Area

OEA performed a noise analysis to estimate the potential project-related increase in noise levels along the rail segments in the downline study area (Appendix C, *Downline Analysis Study Area and Train Characteristics*) potentially affecting adjacent noise-sensitive receptors. Potential impacts in the downline study area would be the same for all Action Alternatives. OEA's analysis of downline noise impacts considered the volume, composition, routes, and speed of trains that would originate in the Basin, as well as the existing volumes, composition, and speed of passenger and freight trains on existing rail lines in the downline study area.

OEA found that downline train noise could increase by as little as 0.4 dB to as much as 6 dB, depending on the previously mentioned factors. Table displays the range in noise level increases along the five downline rail segments that OEA analyzed (Appendix C, *Downline Analysis Study Area and Train Characteristics*, Figure C-1). Noise levels would increase by 3 dB or more along four of the five downline rail segments.

Table 3.6-5. Estimated Train Noise Level Increases by Downline Segment

		Noise Level Increase (dB)	
Downline Segment	**Length (miles)**	**Minimum**	**Maximum**
Kyune to Denver	457.4	3.4	6.0
Denver Eastbound	59.0	1.0	3.6
Denver Southbound	16.6	0.4	0.6
Denver Northbound	69.2	2.6	4.5
Denver East/North	3.2	3.2	3.2

Appendix L, *Noise and Vibration Analysis Methods,* shows the calculated noise level increase for each downline rail segment for the high rail traffic scenario. Ground-borne vibration from trains increases as a function of train speed. Downline project trains would be at the same speed as existing train traffic. Consequently, there would be no train speed-related changes in vibration levels.

[10] FTA defines infrequent events as 30 or less vibration events per day, occasional events as between 30 and 70 events per day, and frequent events as more than 70 events per day. FTA's human annoyance criterion for residences is 80 root-mean square velocity (VdB) for infrequent events, 75 VdB for occasional events, and 72 VdB for frequent events.

3.6.3.2 Impact Comparison between Action Alternatives

This subsection compares the potential noise and vibration impacts between the three Action Alternatives.

Construction

The most important factor for comparing construction noise and vibration impacts between the Action Alternatives is the number of sensitive receptors that would experience construction-related noise and vibration levels above the FTA criteria. Table 3.6-6 presents the estimated general construction (combined) noise levels and bulldozer vibration levels at the sensitive receptors that would be closest to each Action Alternative. As the table shows, none of the Action Alternatives would result in construction-related noise levels at sensitive receptors that would exceed the FTA criteria of 90 dBA for daytime noise or 80 dBA for nighttime noise in residential areas (Table 3.6-3). Construction-related vibration could be perceptible at some locations, but the frequency of vibration events would be low (and temporary) and would be well below the FTA fragile building damage criterion of 0.20 inch per second.

Table 3.6-6. Estimated Construction-Related Noise and Vibration Levels at Sensitive Receptors

Action Alternative	Receptor	Distance to Rail Line (feet)	Bulldozer Vibration (PPV in inches per second)	General Construction (combined) Noise Level (dBA)
Indian Canyon	R-12	329	0.001864	73
	R-02	335	0.001814	73
	R-11	338	0.001790	73
	R-13	343	0.001751	73
	R-08	362	0.001615	73
	R-10	443	0.001193	71
Wells Draw	R-02	337	0.001798	73
Whitmore Park	R-08	362	0.001615	73
	R-10	443	0.001193	71

Notes:
PPV = peak particle velocity; dBA = A-weighted decibel

OEA assumed that pile-driving would occur during construction of bridges over water bodies or at rail–roadway crossings. The precise location and method of bridge construction would be determined during the final engineering and design stage, which would occur after the Board issues its final decision and only if the Board decides to authorize construction and operation. Table 3.6-7 reports the estimated potential pile-driving noise and vibration levels at the closest receptor to any proposed bridge location for each Action Alternative. If the Coalition were to use other techniques for bridge construction, such as vibratory or sonic pile-driving, noise and vibration levels would be lower than those shown in the table.

Table 3.6-7. Estimated Pile-Driving Noise and Vibration Levels at Proposed Bridge Locations

Action Alternative	Distance to Nearest Receptor (feet)	Pile-Driving Vibration PPV (inches per second)	Pile-Driving Noise Level (dBA)
Indian Canyon	364	0.0273	84
Wells Draw	485	0.0178	81
Whitmore Park	676	0.0108	78

Notes:
PPV = peak particle velocity; dBA = A-weighted decibel

Estimated vibration levels from pile-driving activity for any of the Action Alternatives would be below the FTA fragile building damage criterion of 0.20 inch per second; therefore, OEA does not anticipate any building damage due to vibration from pile-driving. Estimated noise levels from pile-driving would be below the FTA criteria for daytime noise (Table 3.6-3) for any of the Action Alternatives. For the Wells Draw Alternative and the Indian Canyon Alternative, noise from pile-driving would exceed the FTA thresholds if pile-driving were to occur at night. OEA is, therefore, recommending mitigation requiring the Coalition avoid nighttime construction and pile-driving near residential areas, to the extent practicable, and employ quieter vibratory pile-driving or noise curtains for project-related construction where FTA construction noise criteria could be exceeded (NV-MM-2).

Tunnel construction may require drill and blast mining techniques in certain locations. Pile-driving may also be needed for certain tunnel structures. In addition, other noise sources could include truck traffic for hauling excavation materials. These activities could cause noise and vibration impacts at nearby sensitive locations. Vibration due to blasting can be calculated based on the distance to receptors and pounds of explosive charge. ~~A U.S. Bureau of Mines (1989) study estimated that b~~Blasting shots at a square root distance of 70 feet/lb$^{1/2}$ would typically result in ground PPV values of 0.08 to 0.15 inch per second, which is lower than the FTA fragile building damage criterion of 0.20 inch per second (Dowding 2006). OEA assumes that once tunnel construction details are known, the Coalition would adjust blasting shots and other vibration/noise sources to minimize impacts. OEA is recommending mitigation requiring the Coalition develop and implement a construction noise and vibration monitoring plan that addresses blasting noise and vibration issues related to tunnel construction, in addition to noise and vibration from general construction and pile-driving (NV-MM-1). The Coalition should provide the construction noise and vibration plan to OEA for review and approval prior to undertaking construction activities.

Operations

For operations-related noise impacts, OEA compared the three Action Alternatives in terms of the number of sensitive receptors that would fall within the 3 dBA increase contour and the 65 DNL contour for each Action Alternative. Consistent with the Board's thresholds for noise analysis and OEA's established methods for assessing noise impacts, OEA concluded that receptors that would fall within both contours would experience an adverse noise impact as a result of rail operations.

Because ambient sound levels in the project study area are low at many locations, the contour for the 3 dBA increase is large, ranging from 455 to 15,140 feet in width (Appendix L, *Noise and Vibration Analysis Methods*). Table 3.6-8 shows the total number of residential receptors within the +3 dBA contours for each Action Alternative. The Indian Canyon Alternative would have the most receptors (68) within the 3 dBA increase contour, followed by the Wells Draw Alternative (51), and then the Whitmore Park Alternative (28). Appendix L displays the locations of the receptors within the 3 dBA contours.

Table 3.6-8. Receptors within 3 dBA Increase Contour by Action Alternative

Action Alternative	Receptors within +3 dBA Contour
Indian Canyon	68
Wells Draw	51
Whitmore Park	28

For any of the Action Alternatives, the 65 DNL contour would fall entirely within the 3 dBA increase contour. Table 3.6.9 identifies the receptors that would fall within both contours and that, therefore, would experience adverse noise impacts during rail operations. The table also identifies the DNL values at those receptors. As the table shows, operation of the Indian Canyon Alternative would result in adverse noise impacts on the largest number of receptors (6), followed by the Whitmore Park Alternative (2) and then the Wells Draw Alternative (1).

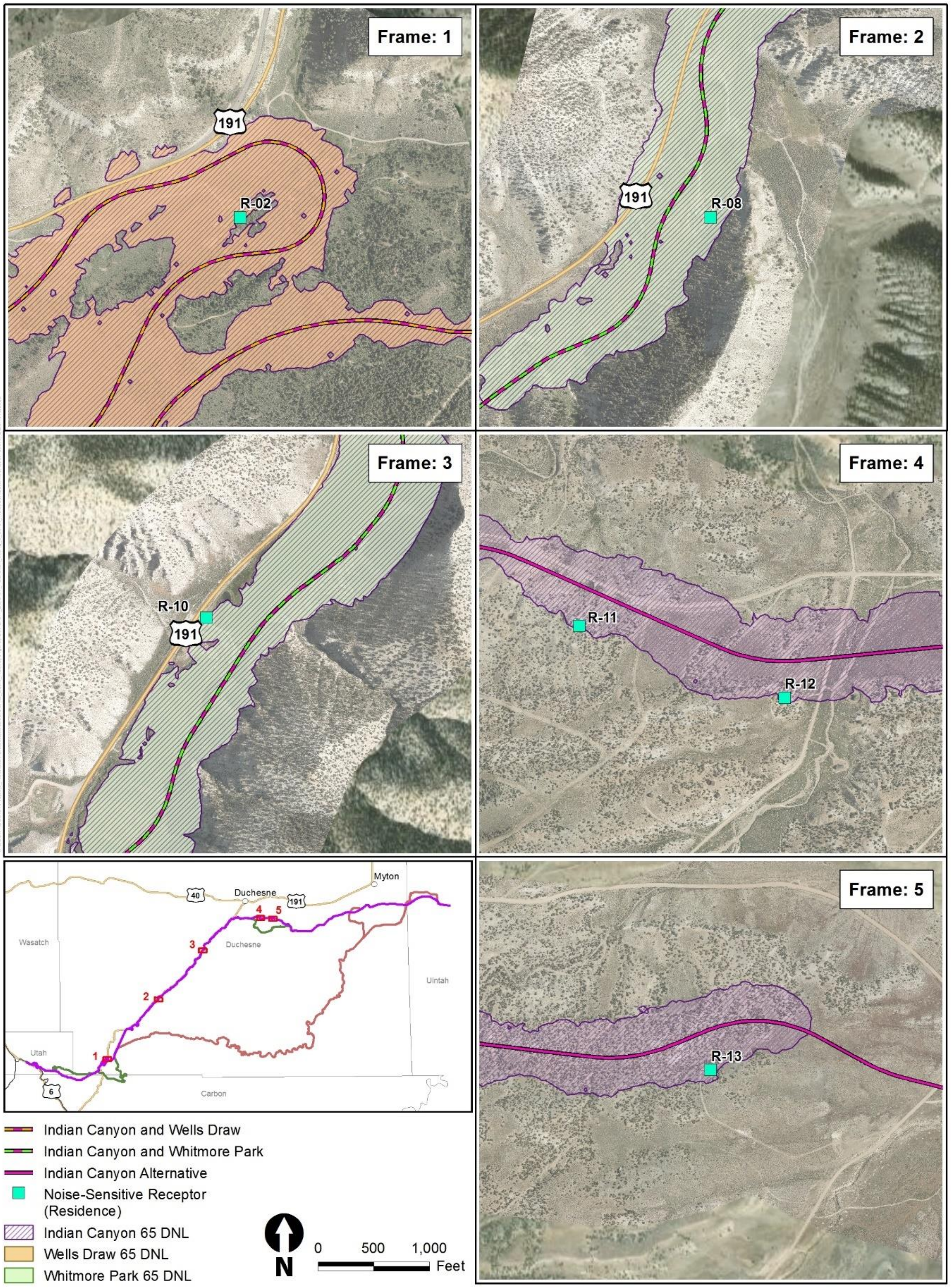
Table 3.6-9. Receptors within the 65 DNL Contour by Action Alternative

Receptor ID	Indian Canyon Alternative	Wells Draw Alternative	Whitmore Park Alternative
DNL Value at Receptor Locations			
R-02	65	65	--
R-08	67	--	67
R-10	65	--	65
R-11	66	--	--
R-12	66	--	--
R-13	66	--	--
Number of Receptors in 65 DNL Contour			
Total	6	1	2

All of the receptors identified in Table 3.6-9 are residences and all would fall within the wayside noise contour, meaning that the increase in noise levels would be a result of wayside noise, not necessarily horn noise. Figure 3.6-3 shows close-up views of the receptors within the 65 DNL contours for the three Action Alternatives. Appendix L, *Noise and Vibration Analysis Methods,* includes the noise contours for additional portions of the project study area.

To minimize operations-related noise impacts, OEA is recommending mitigation requiring the Coalition to install rail lubrication systems at curves along the rail line where doing so would reduce noise associated with wheel squeal for residential or other noise-sensitive receptors and to regularly inspect and maintain locomotives, rail cars, tracks, and the railbed to control wayside noise (NV-MM-4). Impacts would also be minimized through implementation of the Coalition's voluntary mitigation measure VM-53, which commits the Coalition to comply with FRA regulations establishing decibel limits for train operation. In addition, OEA is recommending mitigation requiring the Coalition to install noise insulation for sensitive receptors that would experience an increase in noise levels that would exceed the Board's thresholds, as appropriate and feasible (NV-MM-3).

Figure 3.6-3. Noise-Sensitive Receptors (Residences) within 65 DNL Contours



3.6.3.3 No-Action Alternative

Under the No-Action Alternative, the Coalition would not construct and operate the proposed rail line and there would be no noise or vibration impacts.

3.6.4 Mitigation and Unavoidable Environmental Effects

Construction and operation of the proposed rail line would result in noise and vibration impacts. During construction, noise from general construction equipment and pile-driving would not exceed FTA thresholds for residential areas under any of the Action Alternatives, provided that pile-driving activities are performed during the day. Vibration from construction activity would not exceed thresholds for building damage at any sensitive receptors under any of the Action Alternatives. If the Coalition's voluntary mitigation measures and OEA's recommended mitigation measures for construction-related noise and vibration (Chapter 4, *Mitigation*) are implemented, OEA concludes that construction of the proposed rail line would not result in significant noise and vibration impacts. Some minor to moderate increases in noise and vibration in the project study area would, however, be unavoidable during construction.

During rail operations, vibration would not exceed thresholds for building damage or human annoyance at any sensitive receptors. Depending on the volume of rail traffic on the proposed rail line, wayside and horn noise could adversely affect sensitive receptors (i.e., residences). Under the high rail traffic scenario, wayside and horn noise would increase noise levels by 3 dBA or more at 68 residences under the Indian Canyon Alternative, 51 residences under the Wells Draw Alternative, and 28 residences under the Whitmore Park Alternative. OEA concludes that most of those residences would not experience adverse noise impacts because noise levels would remain under 65 DNL even with an increase of 3 dBA or more. If rail traffic were high (such as under the high rail traffic scenario), wayside noise could cause noise levels to exceed OEA's threshold of 65 DNL at up to six residences under the Indian Canyon Alternative, up to two residences under the Whitmore Park Alternative, and up to one residence under the Wells Draw Alternative. Implementation of OEA's recommended mitigation measures and the Coalition's voluntary mitigation measure would minimize operations-related noise impacts (Chapter 4, *Mitigation*), but increases in noise in the project study area, including at sensitive noise receptors, would be unavoidable during rail operations.

3.7 Air Quality and Greenhouse Gases

This section describes the impacts on air quality and greenhouse gas (GHG) emissions that could result from construction and operation of the proposed rail line. Air quality is a concern because of the demonstrated effects of air pollutant emissions on human health. GHG emissions are a concern because of their contributions to global climate change. The subsections that follow describe the study area, data sources, OEA's analysis methods, the affected environment, and the potential environmental impacts of the proposed rail line.

3.7.1 Analysis Methods

This subsection identifies the study area, data sources, and analysis methods that OEA used to analyze impacts on air quality and GHG emissions.

3.7.1.1 Study Area

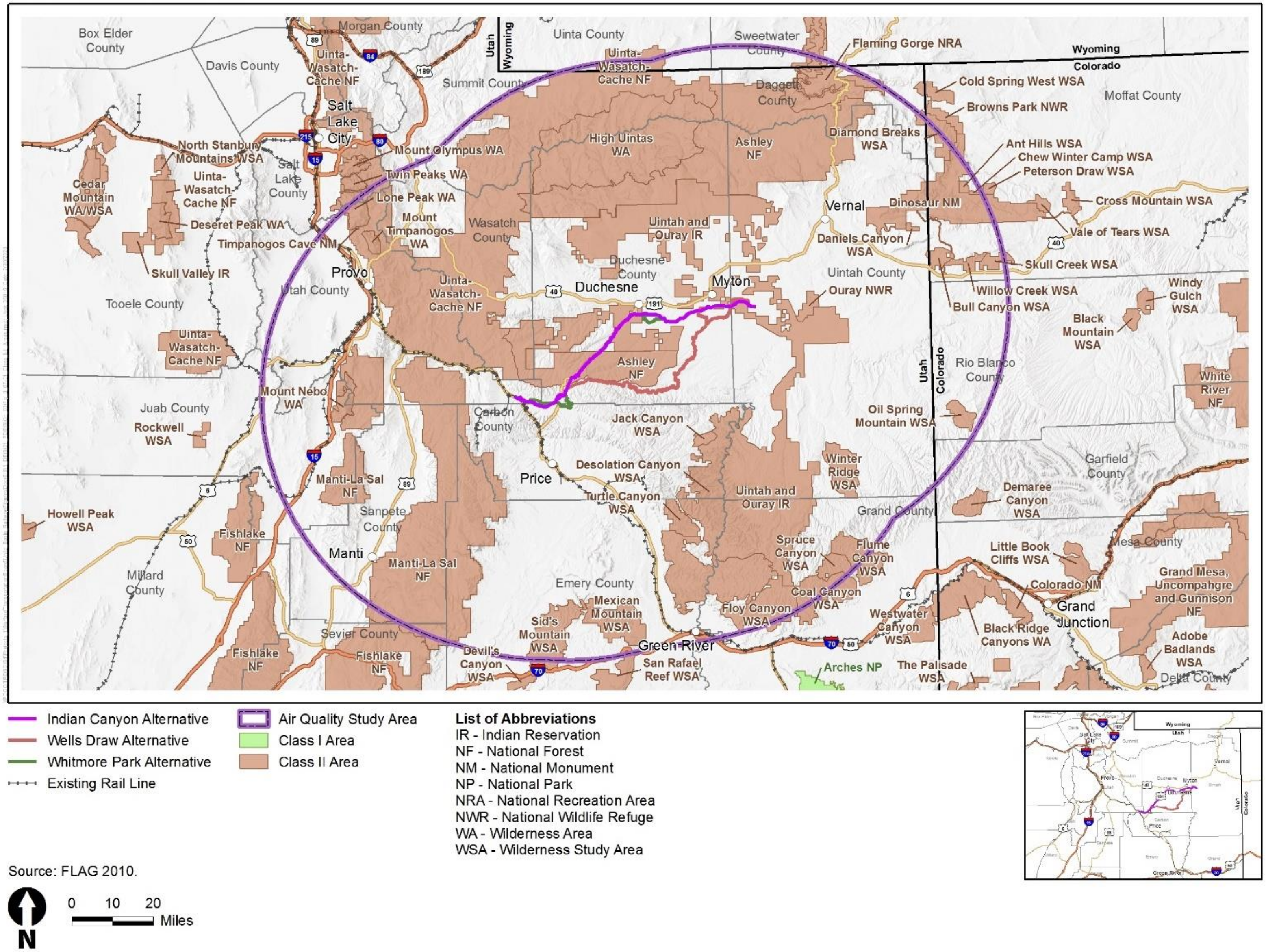
The study area for the air quality analysis includes a local study area, regional study area, and a downline impacts study area. The study area for GHG emissions is the global atmosphere because climate change is a global phenomenon.

- **Local study area.** The study area for local air quality includes an area extending generally 1,000 feet on either side of the centerline of each Action Alternative. OEA increased the size of the study area in some locations, however, to account for localized differences in factors that could affect air quality, such as local topography and certain design features of the proposed rail line. ~~The local air quality study area also includes existing rail lines between the proposed rail connection near Kyune, Utah, and the boundaries of the Denver Metro/North Front Range air quality nonattainment area that could experience an increase in rail traffic if the proposed rail line were constructed, as described in Section 3.1, *Vehicle Safety and Delay*.~~
- **Regional study area.** The study area for regional air quality includes the area within 100 kilometers (62 miles) of the proposed rail line as shown in Figure 3.7-1. It is located in the Wasatch Front Air Quality Control Region and the Utah Intrastate Air Quality Control Region in Utah, as designated by the U.S. Environmental Protection Agency (USEPA). The eastern edge of the regional study area also extends about 18 miles into the Yampa Intrastate Air Quality Control Region in Colorado. Within the regional air quality study area, OEA considered air quality related values (AQRVs), which are resources that could be adversely affected by a change in air quality, such as visibility[1] and acidic deposition.[2]

[1] Visibility impairment or haze is caused when sunlight encounters tiny pollution particles in the atmosphere and is either absorbed or scattered, which reduces the clarity and color of what can be seen. Deciviews or standard visual range are terms used to express visibility.

[2] Acidic deposition occurs when nitrates and sulfates formed in the atmosphere are deposited to soil, vegetation, and surface water. Acid deposition to lakes can impair water quality by reducing their acid-neutralizing capacity.

Figure 3.7-1. Air Quality Regional Study Area



Source: FLAG 2010.

- **Downline study area.** The study area for downline air quality includes segments of existing rail lines outside of the Basin that could experience an increase in rail traffic above OEA's thresholds at 49 C.F.R. § 1105.7(e)(5) if the proposed rail line were constructed. As described in Section 3.1, *Vehicle Safety and Delay*, the downline study area extends from the proposed connection near Kyune to the northern, eastern, and southern edges of the Denver Metro/North Front Range air quality nonattainment area (Appendix C, *Downline Analysis Study Area and Train Characteristics*, Figure C-1).

There are no federal Class I[3] air quality areas within 100 kilometers of the proposed rail line, although there are Class II air quality areas in the study area. The study area includes part of Dinosaur National Monument, the Colorado portion of which is designated by the Colorado Department of Public Health and Environment as a state-level Class I area for sulfur dioxide (SO_2).

3.7.1.2 Data Sources

OEA reviewed the following data sources to determine the potential impacts on air quality and GHGs that could result from construction and operation of the proposed rail line.

- Ambient air quality information as measured by Utah Department of Environmental Quality (Utah DEQ) and USEPA.
- Information on existing emissions sources in the region (from Utah DEQ and USEPA).
- Information on oil and gas development in the region obtained from public sources and agency consultation.
- Information on truck traffic in the region obtained from public sources and agency consultation.
- Data on meteorology and climate in the region.
- Information on anticipated construction and operation activities provided by the Coalition.
- Standard air pollutant emissions rates for anticipated project-related construction and operation activities, such as for operation of locomotives, from USEPA.

3.7.1.3 Analysis Methods

OEA used the following methods to evaluate the impacts of air pollutant emissions, including GHG emissions, related to construction and operation of the proposed rail line.

- **OEA identified and characterized the emissions sources.** OEA reviewed information provided by the Coalition about the Coalition's plans for rail construction and operation to identify sources of air pollutant and GHG emissions. The emissions sources included equipment and vehicles that construction contractors would use during rail construction, as well as the locomotives that would pull the trains on the proposed rail line during rail operations, among other sources.

[3] Class I air quality areas, as defined by the Clean Air Act, include national parks larger than 6,000 acres and wilderness areas larger than 5,000 acres that existed or were authorized as of August 7, 1977. Class I areas are areas of special national or regional natural, scenic, recreational, or historic value, and this category allows for very little degradation in air quality, whereas Class II areas allow for reasonable industrial/economic expansion.

- **OEA estimated total emissions related to rail construction and operation.** OEA calculated the emissions from each emissions source and aggregated them to estimate total emissions for rail line construction and total emissions per year for rail line operation for each air pollutant. OEA used the following references, methods, data, and models to estimate emissions.
  - The USEPA MOVES2014b (USEPA 2019a) model to estimate emissions rates from construction equipment and vehicles and from motor vehicles traveling on roads.
  - USEPA (2009) guidance to estimate exhaust emissions rates from locomotives. USEPA emissions standards for locomotives have become more restrictive over time. The emissions averaged over all locomotives in a fleet will therefore decrease over time as newer locomotives subject to lower (more restrictive) emissions standards enter the fleet and older locomotives are retired.
  - Western Region Air Partnership (2006) guidance and the USEPA AP-42 emissions factor compilation (USEPA 1998a, 1998b, 2006) to estimate emissions of fugitive[4] particulate matter from earthmoving and exposed earth surfaces.
- **OEA modeled the concentration and deposition of air pollutants.** OEA used the USEPA AERMOD dispersion model (USEPA 2019b) to estimate the concentrations of airborne pollutants that could result from the operation of the proposed rail line. Concentrations of air pollutants are important for characterizing potential air quality impacts. OEA used the estimated emissions rates and meteorological data for the regional study area as inputs into the dispersion model. Appendix M, *Air Quality Emissions and Modeling Data*, contains further details on the modeling.
- **OEA compared air pollutant and GHG emissions from rail construction and operation to existing emissions in the study areas.** OEA compared the increases in emissions of criteria pollutants,[5] hazardous air pollutants, and GHGs that would result from construction and operation of the proposed rail line with existing emissions levels in the regional study area and the state of Utah. OEA also compared the estimated concentrations of criteria pollutants to the applicable standards and thresholds.

3.7.2 Affected Environment

This subsection identifies the existing environmental conditions related to air quality and climate in the study areas. OEA relied on current air quality and climate information regarding the Uinta Basin (Basin) region for existing conditions. The Basin is a rural area of northeastern Utah where the majority of the state's oil and gas production occurs. The regional study area accounts for more than 90 percent of the state's criteria pollutant emissions from the oil and gas sector (Utah DEQ 2020).

3.7.2.1 Existing Emissions in the Region

Table 3.7-1 shows the total emissions of each pollutant in the regional study area and statewide.

[4] Fugitive emissions are emissions that are not emitted from a stack, vent, or other specific point that controls the discharge. For example, windblown dust is fugitive particulate matter.

[5] The criteria air pollutants are carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter, and sulfur dioxide.

Table 3.7-1. Existing Emissions in the Regional Study Area and Utah Statewide

	Emissions[a] in 2014[b]		
Pollutant	Regional Study Area[c]	Utah Statewide	Regional Study Area Percent of State
Criteria Pollutants (U.S. tons/year)			
Carbon monoxide	152,372	657,617	23
Nitrogen oxides	61,911	181,844	34
PM10	54,500	186,074	29
PM2.5	10,708	39,643	27
Sulfur dioxide	17,204	26,964	64
Volatile organic compounds	286,281	957,968	30
Lead	1.18	8.33	14
Hazardous Air Pollutants (U.S. tons/year)			
1,3-Butadiene	63	305	21
Acetaldehyde	4,063	18,115	22
Acrolein	66	305	22
Benzene	1,238	2,481	50
DPM[d]	859	3,712	23
Ethylbenzene	360	1,028	35
Formaldehyde	5,710	25,496	22
Napthalene	77	359	21
POM (as PAH)	6.54	6.57	99
Greenhouse Gases (metric tons/year)			
Carbon dioxide	4,406,531	20,427,325	22
Methane	1,060	5,066	21
Nitrous oxide	120	546	22
CO_2e[e] (100-year GWP)	4,468,836	20,716,546	22
CO_2e[e] (20-year GWP)	4,517,531	20,949,871	22

Notes:

[a] Emissions are rounded to the nearest ton, except lead and POM emissions, which are rounded to the nearest 0.01 ton.

[b] 2014 is the most recent year for which complete data are available.

[c] Emissions data are available at the county level. OEA compiled air quality data for the eight-county area consisting of Carbon, Daggett, Duchesne, Emery, Sanpete, Uintah, Utah, and Wasatch Counties. OEA selected these counties because they correspond most closely to the regional air quality study area. These differ from the seven counties of the Coalition (Carbon, Daggett, Duchesne, Emery, San Juan, Sevier, and Uintah Counties).

[d] DPM values include PM10 emissions in all USEPA National Emissions Inventory mobile source sectors that specify use of diesel fuel.

[e] CO_2e values were calculated using the ~~100-year potential~~ GWP values from IPCC 4th Assessment Report (IPCC 2007). 100-year GWP values are: carbon dioxide = 1; methane = 25; nitrous oxide = 298. 20-year GWP values are: carbon dioxide = 1; methane = 72; nitrous oxide = 289.

Sources: U.S. Environmental Protection Agency 2014; IPCC 2007

PAH = polyaromatic hydrocarbons; PM10 = particulate matter 10 microns or less in diameter; PM2.5 = particulate matter 2.5 microns or less in diameter; DPM = diesel particulate matter; POM = polycyclic organic matter; CO_2e = carbon dioxide equivalent; GWP = global warming potential

Within the regional study area, the largest contributions of criteria pollutant emissions by sector are as follows (Utah DEQ 2020).

- Point sources (e.g., power plants) account for about 39 percent of emissions of nitrogen oxides (NO_X) ~~emissions~~ and about 96 percent of SO_2 emissions in the regional study area.
- Area sources (smaller, widespread sources as well as fugitive dust) account for about 88 percent and 74 percent of emissions of particulate matter with diameter equal to or less than 10 microns (PM10) and 2.5 microns (PM2.5), respectively, and 78 percent of volatile organic compound (VOC) emissions in the regional study area.
- Mobile sources account for about 47 percent of carbon monoxide (CO) emissions and 33 percent of NO_X emissions in the regional study area.
- The oil and gas sector accounts for about 20 percent of NO_X emissions and 19 percent of VOC emissions in the regional study area.

3.7.2.2 Regional Meteorology

The Basin is the most northerly portion of the Colorado Plateau, at an elevation of predominately 5,000 to 10,000 feet above sea level. Because of this elevation, the average temperatures tend to be lower than at lower elevations. The Basin is considered to have a semi-arid, mid-continental climate. The mountain ranges in the western United States alter the prevailing westerly air currents from the Pacific region by forcing the moist air to rise and drop much of its moisture as precipitation. As a result, the prevailing winds reaching Utah are comparatively dry, and there is relatively little precipitation in the Basin (WRCC 2020a). Table 3.7-2 summarizes representative meteorological data measured at locations from west to east in the local study area.

Table 3.7-2. Representative Meteorological Data in the Local Study Area

Description	Price	Nutters Ranch[a]	Duchesne	Myton
Average max. temperature (°F)	63.7	62.1	60.3	62.0
Average min. temperature (°F)	36.1	30.2	30.0	30.3
Average total precipitation (inches)	9.41	11.57	9.45	6.69
Average total snowfall (inches)	20.2	45.6	26.4	14.6

Notes:
[a] The Nutters Ranch monitor is located in the Argyle Canyon area near the Wells Draw Alternative.
Source: WRCC 2020b
max. = maximum; °F = degrees Fahrenheit; min. = minimum

Wind speed and direction are important to the dilution and transport of air pollutants. The prevailing winds in the region are generally from the westerly directions. At Indian Canyon Summit, a meteorological monitoring station representative of the western part of the regional study area, winds are usually from the west-northwest or southeast and the average wind speed is 6.2 miles per hour (University of Utah 2020). At Five Mile, a meteorological monitoring station representative of the Argyle Canyon area along the Wells Draw Alternative, winds are usually from the south-southwest to west-southwest or the west-northwest to northwest and the average wind speed is 8.2 miles per hour (Iowa State University 2020). At Pleasant Valley, a meteorological monitoring station representative of the eastern part of the regional study area including the Myton area, winds are usually from the west and the average wind speed is 6.0 miles per hour (Utah State University

2020). Because of the rough topography in much of the region, winds in the area can vary considerably from regional conditions. For example, in a narrow valley or canyon the wind may tend to blow predominantly along the length of the canyon rather than across the valley or canyon.

3.7.2.3 Measured Pollutant Concentrations

Utah DEQ measures ambient air quality at numerous locations around the state including three monitoring stations located in the Basin. These are located in the cities of Price, Roosevelt, and Vernal. Table 3.7-3 summarizes ambient pollutant concentrations measured at these stations for the most recent 3 years of available data.

Table 3.7-3. Measured Ambient Concentrations in the Uinta Basin

Pollutant[a]	Monitor Location (USEPA Site Identifier)	Averaging Period, Unit, Form of Standard	NAAQSs	Measured Concentrations		
				2017	2018	2019
Nitrogen dioxide	Price (49-007-1003)	1-hour, parts per billion, 98th percentile	100	22	13	17
		Annual, parts per billion, annual mean	53	2.7	1.6	2.1
	Roosevelt (49-013-0002)	1-hour, parts per billion, 98th percentile	100	26.3	20.4	28.8
		Annual, parts per billion, annual mean	53	4.1	3.4	4.6
	Vernal (49-047-1004)	1-hour, parts per billion, 98th percentile	100	32	19	30
		Annual, parts per billion, annual mean	53	4.0	2.6	3.3
Ozone	Price (79-007-1003)	8-hour, parts per million, 4th maximum	0.070	0.066	0.073	0.068
	Roosevelt (49-013-0002)	8-hour, parts per million, 4th maximum	0.070	0.078	0.071	0.087
	Vernal (49-047-1004)	8-hour, parts per million, 4th maximum	0.070	0.068	0.069	0.065
PM2.5	Roosevelt (49-013-0002)	24-hour, micrograms per cubic meter, 98th percentile	35	28.2	24.9	23.0
		Annual, micrograms per cubic meter, annual mean	12	6.2	7.0	6.3
	Vernal (49-047-1004)	24-hour, micrograms per cubic meter, 98th percentile	35	20.6	19.8	16.1
		Annual, micrograms per cubic meter, annual mean	12	5.7	5.8	5.2

Notes:

[a] There are no Utah DEQ monitoring stations in the Uinta Basin that measure carbon monoxide, lead, particulate matter - 10 microns, or sulfur dioxide.

Source: USEPA 2019c
PM2.5 = particulate matter 2.5 microns or less in diameter; USEPA = U.S. Environmental Protection Agency; NAAQS = National Ambient Air Quality Standards

USEPA designates areas where criteria air pollutant levels are less than the National Ambient Air Quality Standards (NAAQS) as “attainment” areas and where pollutant levels exceed the NAAQS as “nonattainment” areas. USEPA designates former nonattainment areas that have attained the NAAQS as “maintenance” areas. USEPA has designated the Basin as an attainment area for all pollutants except ozone because measured concentrations of ozone in the eastern part of the Basin have exceeded the NAAQS in winter (Figure 3.7-2). For example, Table 3.7-3 indicates that ozone concentrations at the Roosevelt monitor exceeded the NAAQS in 2017, 2018, and 2019. These high ozone levels have been observed only in the Basin during winter when the ground is covered by snow and stagnant atmospheric conditions are present; ozone levels at other times have been less than the NAAQS (Utah DEQ 2015a).

The eastern portion of the proposed rail line would be located in the Uinta Basin Ozone Nonattainment Area. A smaller portion of the proposed rail line, at the western edge of the Basin, would be located in Utah County, which is a maintenance area for PM10 (Figure 3.7-2). The remainder of the proposed rail line would be located in attainment areas.

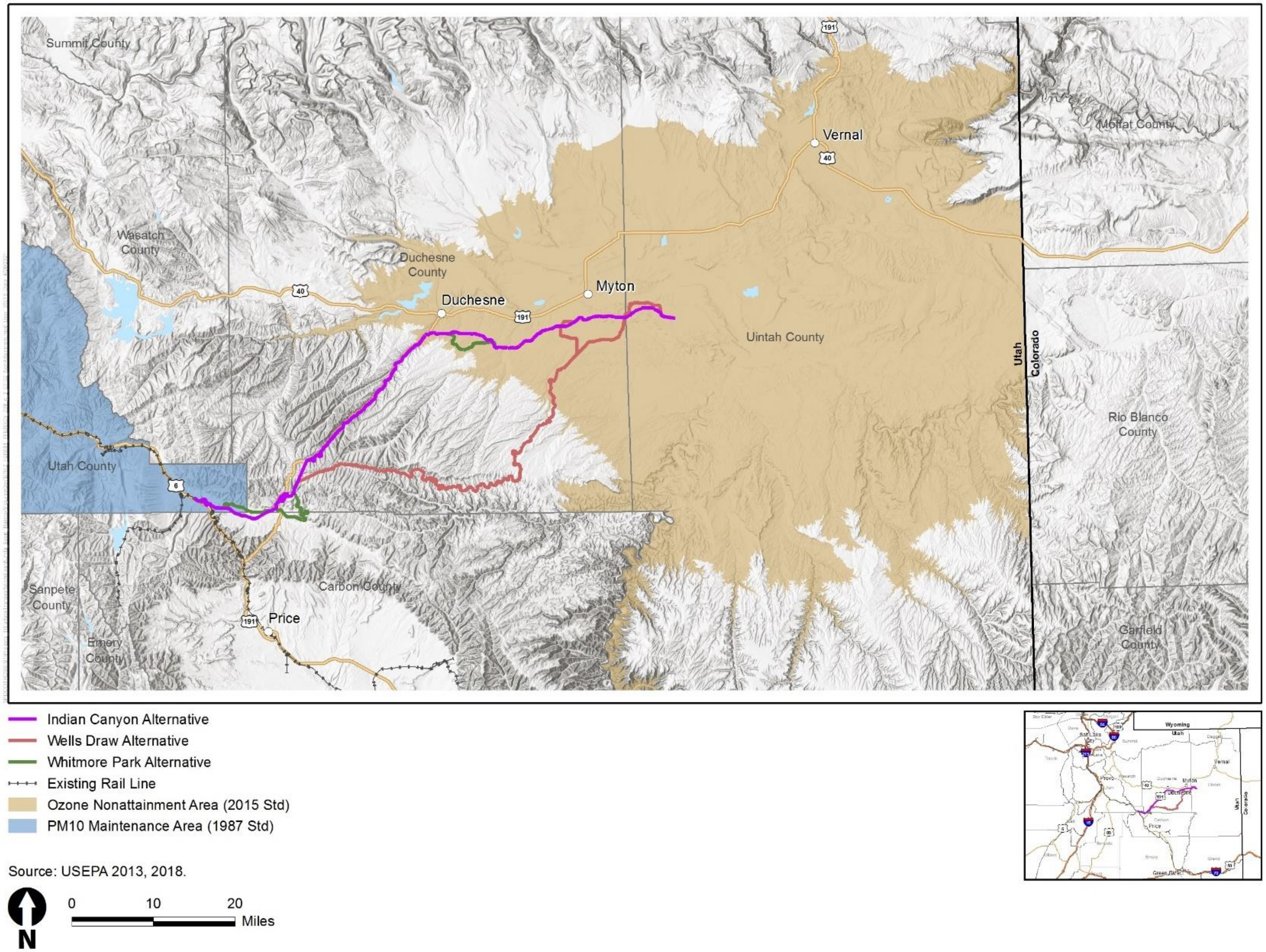
~~3.7.2.1~~3.7.2.4 Air Quality Related Values

The primary AQRVs of concern in the regional study area are visibility and acid deposition. USEPA monitors visibility and acid deposition at national parks, national monuments, and other locations where AQRVs are of concern. USEPA monitors visibility at national parks through its Interagency Monitoring of Protected Visual Environments (IMPROVE) Program. The IMPROVE stations nearest to the regional study area are located at Capitol Reef and Canyonlands National Parks, approximately 44 miles and 37 miles from the regional study area, respectively. Visibility at these parks, measured in 2008 through 2018, was worse than natural conditions but showed improving trends for the clearest and haziest days (BLM 2018).

USEPA also monitors deposition of air pollutants at national parks through its Clean Air Status and Trends Network (CASTNET) program. The CASTNET stations nearest to the regional study area are located at Dinosaur National Monument, which is within the regional study area, and Canyonlands National Park, which is approximately 37 miles from the regional study area.

The National Park Service rates deposition levels as *good condition*, *moderate concern*, or *significant concern*. At Dinosaur National Monument, nitrogen deposition is rated moderate concern, while sulfur deposition is rated good condition (BLM 2018). At Canyonlands National Park, nitrogen deposition is rated significant concern, while sulfur deposition is rated good condition (BLM 2018).

Figure 3.7-2. ~~Ozone~~ Nonattainment and PM10 Maintenance Areas



3.7.2.5 Downline Study Area

The downline study area includes attainment areas as well as the Denver Metro/North Front Range air quality nonattainment area (Appendix C, *Downline Analysis Study Area and Train Characteristics*, Figure C-1), and maintenance areas for CO and PM10. The Colorado Department of Public Health and Environment has prepared plans to address air quality in the nonattainment and maintenance areas. These plans include the *Denver Metro 2008 8-hour Ozone NAAQS Moderate Nonattainment Area Plan* (2016), which will be superseded upon approval of the *Denver Metro 2008 8-hour Ozone NAAQS Serious Nonattainment Area Plan* (draft released in September 2020), the *Denver Metro Carbon Monoxide Maintenance Plan* (2005), and the *Denver Metro PM10 Maintenance Plan* (2005). Meteorological and climatic conditions in the downline study area vary widely because of its large geographic area, varied topography, and multiple airsheds.

3.7.2.6 Climate

There is broad scientific consensus that humans are changing the chemical composition of Earth's atmosphere. Activities such as fossil fuel combustion, deforestation, and other changes in land use are resulting in the accumulation of GHGs such as carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and several industrial gases in Earth's atmosphere. The International Panel on Climate Change (IPCC) estimates that the global average concentrations of CO_2, CH_4, and N_2O in the atmosphere have increased by around 40, 150, and 20 percent, respectively, from pre-industrial times until today (IPCC 2014). An increase in GHG emissions is thought to result in an increase in Earth's average surface temperature, primarily by trapping heat and, thus, decreasing the amount of heat energy radiated by Earth back into space. This phenomenon is commonly referred to as *global warming*. Global warming is expected, in turn, to affect land and sea surface temperatures, precipitation rates, weather patterns, average sea level, polar ice levels, ocean acidification, and other climatic variables, effects which collectively are referred to as *climate change*.

The IPCC Fifth Assessment Report (IPCC 2014) indicates that the climate system is warming. The report states that global mean surface temperature has increased since the late 19th century and that maximum and minimum temperatures over land have increased on a global scale since 1950. In addition, the globally averaged combined land and ocean surface temperature data show a warming of 0.85 degrees Celsius (°C) or 1.5 degrees Fahrenheit (°F) since 1950. The IPCC concludes that it is extremely likely that human influence has been the dominant cause of the observed warming. The IPCC (2014) has predicted that the average global temperature rise between 1986 and 2100 could be as great as 4.8°C (8.6°F), which could have massive deleterious impacts on the natural and human environments.

Observed data indicate that climate change is not uniform across the globe and varies by region. The U.S. Global Change Research Program (GCRP) has reported significant trends in regional climate over the last few decades. Data collected during the last half century in the Mountain West show an approximate 1.5°F increase in average surface temperature (GCRP 2009), with the largest increase in average temperature occurring in the winter months. The research also notes a decrease in the number of relatively cold days, an increase in the number of relatively warm days, and an increase in precipitation. The most recent assessment for the GCRP Southwest Region (GCRP 2018), which includes Utah, predicts that temperatures and precipitation over the region will continue to increase. In addition, the assessment predicts that the frequency of extreme weather events such as heat waves, droughts, and heavy rainfall will also increase and may affect water resources, forests and wilderness areas, agricultural and ranching activities, and human health.

The U.S. Geological Survey (USGS 2021) notes that mountain ecosystems in the western United States are particularly sensitive to climate change, especially in the higher elevations, where much of the snowpack occurs, and which have experienced three times the global average temperature increase over the past century. Higher temperatures are causing more winter precipitation to fall as rain rather than snow, which contributes to earlier snowmelt. Additional declines in snowmelt associated with climate change are projected, which would reduce the amount of water available during summer (GCRP 2009). Rapid spring snowmelt due to sudden and unseasonal temperature increases can also lead to greater erosive events and unstable soil conditions. Increases in average summer temperatures and earlier spring snowmelt are expected to increase the risk of wildfires by increasing summer moisture deficits (GCRP 2009). Studies have shown that earlier snowmelts can lead to a longer dry season, which increases the incidence of catastrophic fire (Westerling et al. 2006). Together with historic changes in land use, climate change is anticipated to increase the occurrence of wildfire throughout the western United States (USGS 2021).

Predictions of climate change in Utah are similar to the more general predictions for the Mountain West and western United States and are summarized below (Salt Lake County Health Department 2017).:

- Overall warming will continue, with longer and hotter heat waves in the summer, a longer freeze-free season, a higher average annual temperature, and fewer cold spells.
- Droughts will become hotter, more severe, and more frequent.
- Late--season snowpack will continue to decrease, as will levels of soil moisture and river flow.
- Precipitation extremes in winter will become more frequent and more intense.
- Seasonal flooding will become more frequent and intense.
- The distribution of plant and animal species in the region will change, as will the timing of species' regional life cycles.
- Occurrence of wildfires will increase.

3.7.3 Environmental Consequences

Construction and operation of the proposed rail line could result in impacts on air quality and GHG emissions. This subsection first presents the potential impacts that would be the same for all three Action Alternatives and then compares the potential impacts that would be different for each Action Alternative. For comparison purposes, this subsection also describes air quality and GHG emissions under the No-Action Alternative.

3.7.3.1 Impacts Common to All Action Alternatives

This subsection describes the potential impacts related to air quality and GHG emissions that would be the same across the three Action Alternatives. The analysis in this subsection quantifies the emissions of air pollutants and discusses the predicted dispersion of criteria air pollutants in the study area. Section 3.15, *Cumulative Impacts*, and Appendix M, *Air Quality Emissions and Modeling Data*, include additional assessments of impacts on AQRVs, including visibility and acid deposition, in a larger geographic context. With the elimination of lead in automotive gasoline, lead is no longer emitted from transportation sources in more than negligible quantities. Therefore, this analysis does not address lead.

Construction

Exhaust Emissions

Construction of any of the Action Alternatives would emit air pollutants and GHGs. Construction equipment, trucks, and workers' personal vehicles would emit diesel and gasoline exhaust, which contain various air pollutants, including CO, NO_X, and particulate matter. Exhaust emissions from construction activities would be temporary and, at any given time, would occur only where construction is occurring or along roads traveled by construction vehicles. The effects of construction emissions on ambient air quality would vary with time due to the construction schedule, the mobility of the emissions sources, the types of equipment in use, and local meteorology. GHG emissions from construction activities would also only take place during the construction period, which would last between 20 and 48 months, depending on the Action Alternative and weather conditions. The majority of CO emissions during construction would be associated with vehicles commuting construction employees, which would account for between 73 and 83 percent of CO emissions. Much of NO_X and particulate emissions during construction would be associated with constructing surface track, which would account for between 46 and 53 percent of NO_X emissions, and between 61 and 63 percent of particulate matter emissions during construction, depending on the Action Alternative. Emissions related to tunnel construction would be temporary and located away from sensitive receptors; tunnel construction emissions from haul trucks would be well dispersed along access roads. Tunnel construction emissions from off-road equipment and blasting would be highly localized to the staging area immediately adjacent to the tunnel entrances, as well as within the tunnels themselves.

To minimize emissions from construction equipment, the Coalition is proposing voluntary mitigation (VM-24) to work with its contractors to make sure that construction equipment is properly maintained and that mufflers and other required pollution-control devices are in working order. In addition, OEA is recommending mitigation that would require the Coalition ensure that all engine-powered equipment and vehicles used in construction are inspected regularly and maintained on schedule (AQ-MM-1) and ensure construction contractors provide transportation for workers from a central location to reduce vehicular traffic in order to minimize air pollutant emissions (AQ-MM-2). OEA is also recommending mitigation requiring the Coalition to post signage and/or fencing during construction, including tunnel construction, to ensure that members of the public would be unable to enter areas within the construction easement that could experience temporary adverse air quality impacts (AQ-MM-7). If these mitigation measures are implemented, OEA does not expect that the exhaust emissions from construction activities would significantly affect air quality. The construction emissions calculations include mitigation measures VM-24 and AQ-MM-1; emissions would be reduced further with mitigation measure AQ-MM-2. Subsection 3.7.3.2, *Impact Comparison between Action Alternatives*, compares air pollutant emissions from construction activities, including exhaust emissions, and concentrations of air pollutants across the three Action Alternatives. Appendix M, *Air Quality Emissions and Modeling Data,* provides further detail on the construction emissions calculations, including exhaust emissions.

Fugitive Dust Emissions

Excavation and earthmoving activities, vehicle and equipment movement over unpaved roads and surfaces, and wind erosion of exposed soil and materials would emit fugitive particulate matter, including small particles (PM10 and PM2.5) that can reduce air quality and are dangerous for human health. These emissions would be temporary and would occur only in areas construction is occurring at any given time. The Coalition has proposed voluntary mitigation to minimize fugitive dust emissions during construction by spraying water and implementing other dust treatments (VM-23). Because fugitive dust emissions from construction activities would be temporary and would move over time, OEA does not expect that those emissions would significantly affect air quality if the Coalition implemented its voluntary mitigation. The construction emissions calculations assume implementation of mitigation measure VM-23. Subsection 3.7.3.2, *Impact Comparison between Action Alternatives*, compares air pollutant emissions from construction activities, including fugitive dust emissions, and concentrations of air pollutants across the three Action Alternatives. Appendix M, *Air Quality Emissions and Modeling Data,* provides further detail on the construction emissions calculations, including fugitive dust emissions.

Operations

Locomotive Exhaust Emissions

During rail operations, locomotives would emit exhaust, which would affect air quality. Locomotives would be the largest source of emissions associated with rail operations~~, but total locomotive emissions would be small relative to existing emissions in Utah and in the regional study area (Table 3.7-1)~~. The amount of locomotive exhaust emitted would vary depending on the volume of train traffic. The Coalition anticipates that average train traffic on the proposed rail line could be as low as 3.68 trains per day (low rail traffic scenario) or as high as 10.52 trains per day (high rail traffic scenario), including trains both entering and leaving the Basin. The number of trains that would actually move on the proposed rail line would depend on future market conditions, including demand for crude oil from the Basin, but would be between these two scenarios. The amount of locomotive exhaust emitted would also vary between the Action Alternatives, as described in Subsection 3.7.3.2, *Impact Comparison between Action Alternatives*. OEA is recommending mitigation (AQ-MM-3) requiring the Coalition develop and implement an anti-idling policy for rail operations. This mitigation measure would ensure that equipment operators receive training on best practices for reducing fuel consumption to reduce project-related emissions. Most impacts related to locomotive emissions, however, would be unavoidable.

During the scoping process, several commenters expressed concerns regarding air pollutant emissions in rail tunnels. Typically, air pollutants in rail tunnels are either expelled at the tunnel entrances and, for longer tunnels, at ventilation shafts. The Coalition would finalize the design of tunnels, including the design of any ventilation-related features, during the final design process following the end of the Board's environmental review. Mechanical ventilation could be provided by jet fans (small-diameter, ductless fans mounted to the tunnel walls or ceiling that move air at high velocity toward the entrances) or other fan types. OEA anticipates that air quality impacts related to locomotive exhaust emissions in tunnels would occur within the tunnels themselves or immediately adjacent to the tunnel entrances. If the Coalition were to install ventilation shafts, then air pollutant concentrations would be elevated in the area immediately adjacent to the ventilation shaft outlet.

Motor Vehicle Exhaust Emissions

Operation of any of the Action Alternatives would contribute vehicle exhaust emissions from vehicles that are idling while delayed at road-rail grade crossings. Idling emissions have decreased significantly since the Clean Air Act was passed. Exceedances of the NAAQS are now very rare even at the most congested, high-rail-traffic intersections. OEA estimated the increase in vehicle delays based on the estimated delays discussed in Section 3.1, *Vehicle Safety and Delay*. Based on the estimated amounts of increased delay, OEA concluded that the increases in exhaust emissions from idling vehicles delayed at grade crossings under any of the Action Alternatives would be small, would be very unlikely to lead to an exceedance of the NAAQS, and as a result would not have a substantial impact on air quality.

Truck Exhaust Emissions

Operation of any of the Action Alternatives would reduce exhaust emissions from trucks carrying crude oil. Currently, crude oil from the well fields in the Basin is trucked to the Price River Terminal in Wellington, Utah, for shipment to refineries, or is trucked to refineries in Salt Lake City. OEA does not expect the proposed rail line to affect truck traffic to refineries in Salt Lake City in the short term. However, OEA expects that trucks that currently access the Price River Terminal would, instead, access the new terminals in Myton and Leland Bench for shipment on the proposed rail line, because the distance to the new terminals would be less than to the Price River Terminal. The resulting reduction in truck vehicle miles traveled would lead to reductions in the trucks' exhaust emissions. OEA quantified these reductions, which would reduce the regional air quality impacts of the proposed rail line. These emissions reductions (i.e., benefits) are presented in Table 3.7-4. The values in Table 3.7-4 reflect the assumptions discussed in Section 3.1, *Vehicle Safety and Delay.*

Depending on market conditions, including the price of crude oil, the production of crude oil in the Basin could increase significantly in the future. If the proposed rail line were constructed, trucks would likely transport much of the additional crude oil to the rail terminals near Myton and Leland Bench. This would increase local truck traffic and truck exhaust emissions. Because increased crude oil production in the Basin is not part of the Coalition's proposed action and because the Board has no jurisdiction over and no way to predict future oil development in the Basin, an assessment of increased exhaust emissions from local truck traffic in the Basin would not be appropriate in this section. OEA has instead assessed emissions related to increased oil production, including truck exhaust emissions, in Section 3.15, *Cumulative Impacts*.

Table 3.7-4. Emissions Benefits from Diverted Crude Oil Truck Trips

Pollutants and GHGs	Change in Emissions[a]
Criteria Pollutants (U.S. tons/year)	
Carbon monoxide	-3.36
Nitrogen oxides	-9.21
PM10	-0.31
PM2.5	-0.29
Sulfur dioxide	-0.04
VOCs	-0.42
Hazardous Air Pollutants (U.S. tons/year)	
Acetaldehyde	-0.020
Acrolein	-0.003
Benzene	-0.004
1,3-Butadiene	-0.001
DPM	-0.002
Ethylbenzene	-0.053
Formaldehyde	-0.289
Napthalene	-0.005
POM	-0.006
Greenhouse Gases (metric tons/year)	
Carbon dioxide	-4,524
Methane	-0.143
Nitrous oxide	-0.006
CO_2e[b] (100-year GWP)~~CO_2e[b]~~	-4,529
CO_2e[b] (20-year GWP)	-4,536

Notes:

[a] Negative emissions represent an emissions reduction or benefit.

[b] CO_2e values were calculated using the 100-year ~~potential~~ global warming potential (GWP) values from the IPCC Fourth Assessment Report (IPCC 2007). ~~GWP values: carbon dioxide = 1; methane = 25; nitrous oxide = 298.~~100-year GWP values are: carbon dioxide = 1; methane = 25; nitrous oxide = 298. 20-year GWP values are: carbon dioxide = 1; methane = 72; nitrous oxide = 289.

PM10 = particulate matter 10 microns or less in diameter; PM2.5 = particulate matter 2.5 microns or less in diameter; VOCs = volatile organic compounds; DPM = diesel particulate matter; POM = polycyclic organic matter; CO_2e = carbon dioxide equivalent

Downline Air Quality

New rail traffic associated with operation of the proposed rail line would result in changes to rail traffic on existing downline routes. See Appendix C, *Downline Analysis Study Area and Train Characteristics*, for more information about the downline routes and existing traffic levels.

The analysis method for downline air quality impacts is the same as the method OEA used to assess direct air quality impacts in the study area (Subsection 3.7.1, *Analysis Methods*). Based on Board regulations (49 C.F.R. § 1105.7), OEA evaluated air quality impacts for downline segments meeting the following conditions.

- The proposed rail line would result in an estimated maximum increase of eight or more trains per day or at least a 100 percent increase in rail traffic (measured in annual gross ton-miles) in areas designated by USEPA as attainment or maintenance areas under the Clean Air Act for all criteria pollutants. OEA determined that rail traffic would exceed this threshold on one segment (Kyune to Denver) for attainment and maintenance areas. Portions of this segment also pass through designated nonattainment areas.
- The proposed rail line would result in an increase of three or more trains per day or a 50 percent increase in rail traffic (measured in annual gross ton-miles) in areas classified as Class I or nonattainment areas under the Clean Air Act. OEA determined that the estimated maximum increase in rail traffic would exceed this threshold on ~~one~~two segments (Denver Northbound ~~and Denver Eastbound~~and Denver East/North) that traverse nonattainment areas, in addition to the segment with an estimated increase in rail traffic of more than eight trains per day that also traverses nonattainment areas (Kyune to Denver). OEA also determined that that the estimated maximum increase in rail traffic would not exceed the threshold of more than three trains per day on two additional segments that traverse nonattainment areas (Denver Eastbound and Denver Southbound).

OEA calculated air quality impacts related to additional trains resulting from the proposed rail line as follows.

- OEA added the emissions from new rail traffic in each downline segment.
- For rail segments with estimated emissions increases that would exceed the Board's air quality analysis thresholds in attainment areas, and for all segments in nonattainment and maintenance areas, OEA compared the emissions increases to the sum of county-level emissions for the counties through which each segment passes. This indicates how much rail traffic on that segment would contribute to regional emissions.

New rail traffic on ~~two~~three downline rail segments (~~Denver Eastbound,~~ Kyune to Denver, Denver East/North, and Denver Northbound) would exceed the OEA regulatory thresholds as noted previously. All or parts of these segments are in areas that USEPA has designated as nonattainment areas or maintenance areas for the NAAQS. Most of the total mileage of the downline segments is part of the Kyune to Denver segment and located in attainment areas (Table 3.7-5).

Locomotive Exhaust Emissions

OEA estimated the impacts of locomotive exhaust emissions for the five downline segments (Table 3.7-5 and Table 3.7-6) based on the estimated increase in project-related rail traffic for the high rail traffic scenario in 2025. Emissions for the low rail traffic scenario would be less. As shown in Table 3.7-5 and Table 3.7-6, for rail segments in attainment areas, only rail segments with a traffic increase that exceeds the Board's air quality analysis thresholds are shown. In nonattainment or maintenance areas all rail segments are shown.

- Emissions increases of hazardous air pollutants from locomotives would be less than 5 tons per year for any segment and pollutant (Table 3.7-6). Diesel particulate matter (DPM) is an exception at about 108 tons per year because for diesel engines DPM is nearly equivalent to PM10.
- Segment emissions of criteria pollutants as a percent of county-level emissions would be higher for segments that are longer, have more rail traffic, and traverse counties with relatively low

emissions. Because segment emissions represent small percentages of county-level emissions, OEA concludes that comparison to county-level emissions is sufficient to describe the potential impact of the proposed rail line in downline areas, and that further analysis is not necessary. Emissions as a percent of county-level emissions would range as follows (Table 3.7-7).

- **CO:** from less than 0.02 percent (Denver Eastbound segment) to 0.5 percent (Kyune to Denver segment).
- **NO_X:** from 0.17 percent (Denver Eastbound segment) to 4.79 percent (Kyune to Denver segment).
- **PM10:** from less than 0.01 percent (Denver Eastbound segment) to 0.17 percent (Kyune to Denver segment).
- **PM2.5:** from less than 0.01 percent (Denver Eastbound segment) to 0.67 percent (Kyune to Denver segment).
- **VOC:** from less than 0.01 percent (Eastbound segment) to 0.06 percent (Kyune to Denver segment).

The emissions contributions would be spread out over the entire length of the rail segments and would be diluted and dispersed by wind and atmospheric turbulence. As a result, increases in concentrations measured at air quality monitoring sites, if any, are expected to be negligible. The increased downline rail traffic associated with the proposed rail line would not lead to a violation of the NAAQS for counties that are in attainment, and would not increase the severity of conditions in counties that are not in attainment.

- Downline impacts on ambient pollutant concentrations would be comparable to the impacts estimated for the study area. Total concentrations at any particular location would vary depending on total train traffic, local background concentrations, and local topographic and meteorological conditions.
- Emissions increases of GHGs from locomotives would be 712,828 metric tons per year (MT/yr) of ~~carbon dioxide (~~CO_2~~)~~, 56 MT/yr of ~~methane (~~CH_4~~)~~, and 18 MT/yr of ~~nitrous oxide (~~N_2O~~)~~, or 719,204 MT/yr of carbon dioxide equivalent (CO_2e). Compared to the total existing CO_2e emissions of 24,459,223 MT/yr from all downline counties, the locomotive emissions increases would represent 2.9 percent of the county total CO_2e emissions.

Motor Vehicle Emissions

Operation of any of the Action Alternatives would contribute vehicle exhaust emissions from vehicles that are delayed at downline road-rail grade crossings. OEA estimated the increase in vehicle delays based on the estimated delays discussed in Section 3.1, *Vehicle Safety and Delay*. OEA concluded that the estimated increase in vehicle exhaust emissions from idling vehicles delayed at downline grade crossings under any of the Action Alternatives would be small and would not have a substantial impact on air quality.

Table 3.7-5. Estimated Downline Emissions of Criteria Pollutants—Increase in Trains per Day

Rail Segment Description[a] (Attainment Status)[b]	Segment-Subsegment Number	Segment Length (miles)	Maximum Increase in Trains per Day	Locomotive Criteria Pollutant Emissions (tons/year)					
				CO	NO_x	PM10	PM2.5	SO_2	VOC
Denver East/North (N)	DE-01	3.2	8.4	11.04	30.69	0.66	0.64	0.04	1.09
Denver Eastbound (N)	EB-01	1.4	1.1	0.65	1.82	0.04	0.04	0.00	0.06
Denver Eastbound (N)	EB-02	0.7	1.1	0.30	0.83	0.02	0.02	0.00	0.03
Denver Eastbound (N)	EB-03	8.6	1.1	3.91	10.86	0.23	0.23	0.01	0.39
Denver Eastbound (N)	EB-04	18.5	1.1	8.46	23.53	0.51	0.49	0.03	0.84
Denver Eastbound (N)	EB-05	1.1	1.1	0.50	1.39	0.03	0.03	0.00	0.05
Denver Eastbound (A/N)	EB-06	28.8	1.1	13.13	36.49	0.79	0.77	0.05	1.30
Kyune to Denver (A/N)	KD-01	11.1	9.5	43.78	121.68	2.63	2.55	0.15	4.33
Kyune to Denver (A)	KD-02	3.3	9.5	12.96	36.03	0.78	0.76	0.05	1.28
Kyune to Denver (A)	KD-03	171.2	9.5	675.34	1877.08	40.59	39.37	2.38	66.78
Kyune to Denver (A)	KD-04	3.1	9.5	12.35	34.32	0.74	0.72	0.04	1.22
Kyune to Denver (A)	KD-05	0.6	9.5	2.42	6.74	0.15	0.14	0.01	0.24
Kyune to Denver (A/N)	KD-06	265.8	9.5	1048.35	2913.84	63.00	61.11	3.70	103.66
Kyune to Denver (N)	KD-07	2.1	9.5	8.48	23.56	0.51	0.49	0.03	0.84
Denver Northbound (N)	NB-01	43.9	7.3	132.95	369.53	7.99	7.75	0.47	13.15
Denver Northbound (N)	NB-02	15.7	7.3	47.73	132.66	2.87	2.78	0.17	4.72
Denver Northbound (N)	NB-03	0.5	7.3	1.49	4.15	0.09	0.09	0.01	0.15
Denver Northbound (N)	NB-04	9.1	7.3	27.56	76.61	1.66	1.61	0.10	2.73
Denver Southbound (N)	SB-01	4.1	1.1	1.89	5.25	0.11	0.11	0.01	0.19
Denver Southbound (N)	SB-02	8.2	1.1	3.75	10.42	0.23	0.22	0.01	0.37
Denver Southbound (N)	SB-03	42.2	1.1	19.28	53.58	1.16	1.12	0.07	1.91

Rail Segment Description[a] (Attainment Status)[b]	Segment-Subsegment Number	Segment Length (miles)	Maximum Increase in Trains per Day	Locomotive Criteria Pollutant Emissions (tons/year)					
				CO	NO_x	PM10	PM2.5	SO_2	VOC
~~Denver Eastbound (N)DE-013.28.411.0430.690.660.640.041.09Kyune to Denver (A)~~	~~KD-01~~	~~1.2~~	~~9.5~~	~~4.85~~	~~13.47~~	~~0.29~~	~~0.28~~	~~0.02~~	~~0.48~~
~~Kyune to Denver (A)~~	~~KD-02~~	~~175.0~~	~~9.5~~	~~690.11~~	~~1,918.14~~	~~41.47~~	~~40.23~~	~~2.43~~	~~68.24~~
~~Kyune to Denver (N)~~	~~KD-03~~	~~29.9~~	~~9.5~~	~~118.04~~	~~328.09~~	~~7.09~~	~~6.88~~	~~0.42~~	~~11.67~~
~~Kyune to Denver (A)~~	~~KD-04~~	~~184.5~~	~~9.5~~	~~727.71~~	~~2,022.63~~	~~43.73~~	~~42.42~~	~~2.57~~	~~71.95~~
~~Kyune to Denver (N)~~	~~KD-05~~	~~2.1~~	~~9.5~~	~~8.48~~	~~23.56~~	~~0.51~~	~~0.49~~	~~0.03~~	~~0.84~~
~~Subtotal Kyune to Denver~~	~~KD-01–KD-05~~	~~457.4~~	~~9.5~~	~~1,803.68~~	~~5,013.24~~	~~108.39~~	~~105.14~~	~~6.36~~	~~178.34~~
~~Denver Northbound (N)~~	~~NB-01~~	~~69.2~~	~~7.3~~	~~209.73~~	~~582.95~~	~~12.60~~	~~12.23~~	~~0.74~~	~~20.74~~

Notes:

[a] In attainment areas, only rail segments with a traffic increase that exceeds the Board's air quality analysis thresholds are shown. In nonattainment or maintenance areas all rail segments are shown.

[b] A = attainment area, N = nonattainment or maintenance area.

CO = carbon monoxide; NO_X = nitrogen oxides; PM10 = particulate matter 10 microns or less in size; PM2.5 = particulate matter 2.5 microns or less in size; SO_2 = sulfur dioxide; VOC = volatile organic compounds

Table 3.7-6. Estimated Downline Emissions of Hazardous Air Pollutants—Increase in Trains per Day

Rail Segment Description[a] (Attainment Status)[b]	Segment-Subsegment Number	Segment Length (miles)	Maximum Increase in Trains per Day	Locomotive Hazardous Air Pollutant Emissions (tons/year)[c]								
				Acetaldehyde	Acrolein	Benzene	1, 3-Butadiene	Ethylbenzene	Formaldehyde	DPM	Naphthalene	POM
~~Denver Eastbound (N)~~	~~DE-01~~	~~3.2~~	~~8.4~~	~~0.02~~	~~0.00~~	~~0.02~~	~~0.00~~	~~0.00~~	~~0.03~~	~~0.66~~	~~0.00~~	~~0.00~~
~~Kyune to Denver (A)~~	~~KD-01~~	~~1.2~~	~~9.5~~	~~0.01~~	~~0.00~~	~~0.01~~	~~0.00~~	~~0.00~~	~~0.01~~	~~0.29~~	~~0.00~~	~~0.00~~
~~Kyune to Denver (A)~~	~~KD-02~~	~~175.0~~	~~9.5~~	~~1.16~~	~~0.14~~	~~1.41~~	~~0.06~~	~~0.00~~	~~1.78~~	~~41.47~~	~~0.13~~	~~0.03~~
~~Kyune to Denver (N)~~	~~KD-03~~	~~29.9~~	~~9.5~~	~~0.20~~	~~0.02~~	~~0.24~~	~~0.01~~	~~0.00~~	~~0.30~~	~~7.09~~	~~0.02~~	~~0.01~~
~~Kyune to Denver (A)~~	~~KD-04~~	~~184.5~~	~~9.5~~	~~1.22~~	~~0.15~~	~~1.49~~	~~0.06~~	~~0.00~~	~~1.88~~	~~43.73~~	~~0.14~~	~~0.04~~
~~Kyune to Denver (N)~~	~~KD-05~~	~~2.1~~	~~9.5~~	~~0.01~~	~~0.00~~	~~0.02~~	~~0.00~~	~~0.00~~	~~0.02~~	~~0.51~~	~~0.00~~	~~0.00~~
~~Subtotal Kyune to Denver~~	~~KD-01–KD-05~~	~~457.4~~	~~9.5~~	~~3.03~~	~~0.37~~	~~3.68~~	~~0.15~~	~~0.00~~	~~4.66~~	~~108.39~~	~~0.33~~	~~0.09~~
~~Denver Northbound (N)~~	~~NB-01~~	~~69.2~~	~~7.3~~	~~0.35~~	~~0.04~~	~~0.43~~	~~0.02~~	~~0.00~~	~~0.54~~	~~12.60~~	~~0.04~~	~~0.01~~
Denver East/North (N)	DE-01	3.2	8.4	0.02	0.00	0.02	0.00	0.00	0.03	0.66	0.00	0.00
Denver Eastbound (N)	EB-01	1.4	1.1	0.00	0.00	0.00	0.00	0.00	0.00	0.04	0.00	0.00
Denver Eastbound (N)	EB-02	0.7	1.1	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00
Denver Eastbound (N)	EB-03	8.6	1.1	0.01	0.00	0.01	0.00	0.00	0.01	0.23	0.00	0.00
Denver Eastbound (N)	EB-04	18.5	1.1	0.01	0.00	0.02	0.00	0.00	0.02	0.51	0.00	0.00
Denver Eastbound (N)	EB-05	1.1	1.1	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00
Denver Eastbound (A/N)	EB-06	28.8	1.1	0.02	0.00	0.03	0.00	0.00	0.03	0.79	0.00	0.00
Kyune to Denver (A/N)	KD-01	11.1	9.5	0.07	0.01	0.09	0.00	0.00	0.11	2.63	0.01	0.00
Kyune to Denver (A)	KD-02	3.3	9.5	0.02	0.00	0.03	0.00	0.00	0.03	0.78	0.00	0.00
Kyune to Denver (A)	KD-03	171.2	9.5	1.13	0.14	1.38	0.06	0.00	1.74	40.59	0.13	0.03

Rail Segment Description[a] (Attainment Status)[b]	Segment-Subsegment Number	Segment Length (miles)	Maximum Increase in Trains per Day	Locomotive Hazardous Air Pollutant Emissions (tons/year)[c]								
				Acetaldehyde	Acrolein	Benzene	1, 3-Butadiene	Ethylbenzene	Formaldehyde	DPM	Naphthalene	POM
Kyune to Denver (A)	KD-04	3.1	9.5	0.02	0.00	0.03	0.00	0.00	0.03	0.74	0.00	0.00
Kyune to Denver (A)	KD-05	0.6	9.5	0.00	0.00	0.00	0.00	0.00	0.01	0.15	0.00	0.00
Kyune to Denver (A/N)	KD-06	265.8	9.5	1.76	0.21	2.14	0.09	0.00	2.71	63.00	0.19	0.05
Kyune to Denver (N)	KD-07	2.1	9.5	0.01	0.00	0.02	0.00	0.00	0.02	0.51	0.00	0.00
Denver Northbound (N)	NB-01	43.9	7.3	0.22	0.03	0.27	0.01	0.00	0.34	7.99	0.02	0.01
Denver Northbound (N)	NB-02	15.7	7.3	0.08	0.01	0.10	0.00	0.00	0.12	2.87	0.01	0.00
Denver Northbound (N)	NB-03	0.5	7.3	0.00	0.00	0.00	0.00	0.00	0.00	0.09	0.00	0.00
Denver Northbound (N)	NB-04	9.1	7.3	0.05	0.01	0.06	0.00	0.00	0.07	1.66	0.01	0.00
Denver Southbound (N)	SB-01	4.1	1.1	0.00	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00
Denver Southbound (N)	SB-02	8.2	1.1	0.01	0.00	0.01	0.00	0.00	0.01	0.23	0.00	0.00
Denver Southbound (N)	SB-03	42.2	1.1	0.03	0.00	0.04	0.00	0.00	0.05	1.16	0.00	0.00

Notes:

[a] In attainment areas, only rail segments with a traffic increase that exceeds the Board's air quality thresholds are shown. In nonattainment or maintenance areas, all rail segments are shown.

[b] A = attainment area, N = nonattainment or maintenance area.

[c] Values less than 0.005 have been rounded to zero.

DPM = diesel particulate matter; POM = polycyclic organic matter

Table 3.7-7. Estimated Annual Average Downline Emissions Compared to County-Level Emissions

Rail Segment Description[a] (Attainment Status)[b]	Segment-Subsegment Number	Segment Length (miles)	Maximum Increase in Trains per Day	Project Locomotives[c] (tons/year)						Total County Emissions Levels[d] (tons/year)						% of County Level[e] (tons/year)					
				CO	NOx	PM10	PM2.5	SO_2	VOC	CO	NOx	PM10	PM2.5	SO_2	VOC	CO	NOx	PM10	PM2.5	SO_2	VOC
~~Denver Eastbound (N)~~	~~DE-01~~	~~3.2~~	~~8.4~~	~~11~~	~~31~~	~~1~~	~~1~~	~~0~~	~~1~~	~~60,756~~	~~18,029~~	~~11,084~~	~~2,833~~	~~3,314~~	~~17,127~~	~~0.02~~	~~0.17~~	~~0.01~~	~~0.00~~	~~0.02~~	~~0.00~~
~~Kyune to Denver (A)~~	~~KD-01~~	~~1.2~~	~~9.5~~	~~5~~	~~13~~	~~0~~	~~0~~	~~0~~	~~0~~	~~57,190~~	~~14,739~~	~~16,059~~	~~3,017~~	~~268~~	~~32,240~~	~~0.01~~	~~0.09~~	~~0.00~~	~~0.00~~	~~0.11~~	~~0.00~~
~~Kyune to Denver (A)~~	~~KD-02~~	~~175.0~~	~~9.5~~	~~690~~	~~1,918~~	~~41~~	~~40~~	~~6~~	~~68~~	~~82,003~~	~~34,336~~	~~16,731~~	~~4,144~~	~~16,895~~	~~142,396~~	~~0.84~~	~~5.59~~	~~0.25~~	~~0.97~~	~~0.01~~	~~0.05~~
~~Kyune to Denver (N)~~	~~KD-03~~	~~29.9~~	~~9.5~~	~~118~~	~~328~~	~~7~~	~~7~~	~~0~~	~~12~~	~~170,151~~	~~37,917~~	~~24,097~~	~~6,111~~	~~6,023~~	~~49,892~~	~~0.07~~	~~0.87~~	~~0.03~~	~~0.11~~	~~0.01~~	~~0.02~~
~~Kyune to Denver (A)~~	~~KD-04~~	~~184.5~~	~~9.5~~	~~728~~	~~2,023~~	~~44~~	~~42~~	~~3~~	~~72~~	~~88,543~~	~~22,940~~	~~13,700~~	~~4,099~~	~~347~~	~~111,155~~	~~0.82~~	~~8.82~~	~~0.32~~	~~1.03~~	~~0.74~~	~~0.06~~
~~Kyune to Denver (N)~~	~~KD-05~~	~~2.1~~	~~9.5~~	~~8~~	~~24~~	~~1~~	~~0~~	~~0~~	~~1~~	~~60,756~~	~~18,029~~	~~11,084~~	~~2,833~~	~~3,314~~	~~17,127~~	~~0.01~~	~~0.13~~	~~0.00~~	~~0.00~~	~~0.02~~	~~0.00~~
~~Subtotal Kyune to Denver~~	~~KD-01–KD-05~~	~~457.4~~	~~9.5~~	~~1,804~~	~~5,013~~	~~108~~	~~105~~	~~6~~	~~178~~	~~360,894~~	~~104,604~~	~~64,807~~	~~15,628~~	~~23,412~~	~~295,874~~	~~0.50~~	~~4.79~~	~~0.17~~	~~0.67~~	~~0.03~~	~~0.06~~
~~Denver Northbound (N)~~	~~NB-01~~	~~69.2~~	~~7.3~~	~~210~~	~~583~~	~~13~~	~~12~~	~~1~~	~~21~~	~~206,737~~	~~64,211~~	~~47,197~~	~~10,929~~	~~4,326~~	~~128,982~~	~~0.10~~	~~0.91~~	~~0.03~~	~~0.11~~	~~0.02~~	~~0.02~~
Denver East/North (N)	DE-01	3.2	8.4	11.04	30.69	0.66	0.64	0.04	1.09	60,756	18,029	11,084	2,833	3,314	17,127	0.02	0.17	0.01	0.02	0.00	0.01
Denver Eastbound (N)	EB-01	1.4	1.1	0.65	1.82	0.04	0.04	0.00	0.06	139,862	33,519	23,693	5,351	3,880	31,482	0.00	0.01	0.00	0.00	0.00	0.00
Denver Eastbound (N)	EB-02	0.7	1.1	0.30	0.83	0.02	0.02	0.00	0.03	79,106	15,490	12,609	2,518	566	14,355	0.00	0.01	0.00	0.00	0.00	0.00
Denver Eastbound (N)	EB-03	8.6	1.1	3.91	10.86	0.23	0.23	0.01	0.39	139,862	33,519	23,693	5,351	3,880	31,482	0.00	0.03	0.00	0.00	0.00	0.00
Denver Eastbound (N)	EB-04	18.5	1.1	8.46	23.53	0.51	0.49	0.03	0.84	135,579	28,868	23,577	5,522	3,485	33,566	0.01	0.08	0.00	0.01	0.00	0.00
Denver Eastbound (N)	EB-05	1.1	1.1	0.50	1.39	0.03	0.03	0.00	0.05	60,756	18,029	11,084	2,833	3,314	17,127	0.00	0.01	0.00	0.00	0.00	0.00
Denver Eastbound (A/N)	EB-06	28.8	1.1	13.13	36.49	0.79	0.77	0.05	1.30	142,694	30,747	27,186	6,159	3,491	42,249	0.01	0.12	0.00	0.01	0.00	0.00
Kyune to Denver (A/N)	KD-01	11.1	9.5	43.78	121.68	2.63	2.55	0.15	4.33	67,474	20,569	19,971	3,788	10,595	51,793	0.06	0.59	0.01	0.07	0.00	0.01
Kyune to Denver (A)	KD-02	3.3	9.5	12.96	36.03	0.78	0.76	0.05	1.28	57,190	14,739	16,059	3,017	268	32,240	0.02	0.24	0.00	0.03	0.02	0.00
Kyune to Denver (A)	KD-03	171.2	9.5	675.34	1,877.08	40.59	39.37	2.38	66.78	122,486	41,960	29,327	6,701	6,875	123,903	0.55	4.47	0.14	0.59	0.03	0.05
Kyune to Denver (A)	KD-04	3.1	9.5	12.35	34.32	0.74	0.72	0.04	1.22	36,994	5,328	5,780	1,744	121	39,808	0.03	0.64	0.01	0.04	0.04	0.00
Kyune to Denver (A)	KD-05	0.6	9.5	2.42	6.74	0.15	0.14	0.01	0.24	36,994	5,328	5,780	1,744	121	39,808	0.01	0.13	0.00	0.01	0.01	0.00
Kyune to Denver (A/N)	KD-06	265.8	9.5	1,048.35	2,913.84	63.00	61.11	3.70	103.66	195,118	50,967	30,287	7,970	4,613	172,518	0.54	5.72	0.21	0.77	0.08	0.06
Kyune to Denver (N)	KD-07	2.1	9.5	8.48	23.56	0.51	0.49	0.03	0.84	60,756	18,029	11,084	2,833	3,314	17,127	0.01	0.13	0.00	0.02	0.00	0.00
Denver Northbound (N)	NB-01	43.9	7.3	132.95	369.53	7.99	7.75	0.47	13.15	127,631	48,721	34,588	8,411	3,761	114,627	0.10	0.76	0.02	0.09	0.01	0.01
Denver Northbound (N)	NB-02	15.7	7.3	47.73	132.66	2.87	2.78	0.17	4.72	66,875	30,692	23,504	5,578	446	97,500	0.07	0.43	0.01	0.05	0.04	0.00

Rail Segment Description[a] (Attainment Status)[b]	Segment-Subsegment Number	Segment Length (miles)	Maximum Increase in Trains per Day	Project Locomotives[c] (tons/year)						Total County Emissions Levels[d] (tons/year)						% of County Level[e] (tons/year)					
				CO	NOx	PM10	PM2.5	SO_2	VOC	CO	NOx	PM10	PM2.5	SO_2	VOC	CO	NOx	PM10	PM2.5	SO_2	VOC
Denver Northbound (N)	NB-03	0.5	7.3	1.49	4.15	0.09	0.09	0.01	0.15	66,875	30,692	23,504	5,578	446	97,500	0.00	0.01	0.00	0.00	0.00	0.00
Denver Northbound (N)	NB-04	9.1	7.3	27.56	76.61	1.66	1.61	0.10	2.73	66,875	30,692	23,504	5,578	446	97,500	0.04	0.25	0.01	0.03	0.02	0.00
Denver Southbound (N)	SB-01	4.1	1.1	1.89	5.25	0.11	0.11	0.01	0.19	139,862	33,519	23,693	5,351	3,880	31,482	0.00	0.02	0.00	0.00	0.00	0.00
Denver Southbound (N)	SB-02	8.2	1.1	3.75	10.42	0.23	0.22	0.01	0.37	153,929	26,329	25,103	5,207	736	30,794	0.00	0.04	0.00	0.00	0.00	0.00
Denver Southbound (N)	SB-03	42.2	1.1	19.28	53.58	1.16	1.12	0.07	1.91	111,737	17,544	18,222	3,919	319	30,321	0.02	0.31	0.01	0.03	0.02	0.01

Notes:

[a] In attainment areas, only rail segments with a traffic increase that exceeds the Board's air quality analysis thresholds are shown. In nonattainment or maintenance areas, all rail segments are shown.

[b] A = attainment area, N = nonattainment or maintenance area.

[c] Values less than 0.5 have been rounded to zero.

[d] Sum of county-level emissions inventories for all counties through which segment passes (USEPA 2020).

[e] Values less than 0.005% have been rounded to zero.

CO = carbon monoxide; NO_X = nitrogen oxides; PM10 = particulate matter 10 microns or less in size; PM2.5 = particulate matter 2.5 microns or less in size; SO2 = sulfur dioxide; VOC = volatile organic compounds

3.7.3.2 Impact Comparison between Action Alternatives

This subsection describes the potential impacts related to air quality and GHG emissions that would be different between the three Action Alternatives.

Construction

Table 3.7-8 shows the total emissions of air pollutants during construction for each Action Alternative, including emissions from construction equipment, trucks, and workers' personal vehicles. As the table shows, construction of the Wells Draw Alternative would result in the most emissions of air pollutants and of GHGs, followed by the Whitmore Park Alternative and the Indian Canyon Alternative.

Table 3.7-8. Emissions during Rail Line Construction

	Action Alternative		
Pollutants and GHGs	**Indian Canyon**	**Wells Draw**	**Whitmore Park**
Criteria Pollutants (U.S. tons)			
Carbon monoxide	917	1,541	992
Nitrogen oxides	512	649	598
PM10	779	1,075	880
PM2.5	228	299	281
Sulfur dioxide	2	2	2
Volatile organic compounds	94	146	103
Hazardous Air Pollutants (U.S. tons)			
Acetaldehyde	3	5	4
Acrolein	1	1	1
Benzene	3	6	4
1,3-Butadiene	<0.5	1	<0.5
DPM	1	2	1
Ethylbenzene	8	10	9
Formaldehyde	15	17	18
Napthalene	<0.5	1	1
POM	3	3	3
Greenhouse Gases (metric tons)			
Carbon dioxide	206,592	286,499	242,910
Methane	14	21	18
Nitrous oxide	6	10	7
CO_2e[a] (100-year GWP)~~**Total (CO_2e[a])**~~	208,697	289,737	245,304
CO_2e[a] (20-year GWP)	209,411	290,788	246,200

Notes:

[a] OEA calculated CO_2e values using the 100-year ~~potential~~ global warming potential (GWP) values from the IPCC Fourth Assessment Report (IPCC 2007). ~~GWP values: carbon dioxide = 1; methane = 25; nitrous oxide = 298.~~ 100-year GWP values are: carbon dioxide = 1; methane = 25; nitrous oxide = 298. 20-year GWP values are: carbon dioxide = 1; methane = 72; nitrous oxide = 289.

PM10 = particulate matter 10 microns or less in diameter; PM2.5 = particulate matter 2.5 microns or less in diameter; DPM = diesel particulate matter; POM = polycyclic organic matter; CO_2e = carbon dioxide equivalent

< = less than

In consultation with USEPA, OEA has determined that construction of the proposed rail line in the Uinta Basin Ozone Nonattainment Area and the Utah County PM10 Maintenance Area is subject to the USEPA General Conformity Rule (Appendix B, *Applicable Regulations*). OEA compared the estimated construction emissions in these areas to the thresholds in the rule for the applicable pollutants, as shown in Table 3.7-9. The table demonstrates that the estimated construction emissions in each area are less than the conformity thresholds. Therefore, the General Conformity Rule does not require further evaluation of conformity.

Table 3.7-9. Emissions during Rail Line Construction in Areas Subject to General Conformity

Applicable Pollutants (tons per year)	Action Alternative			General Conformity Threshold
	Indian Canyon	Wells Draw	Whitmore Park	
Uinta Basin Ozone Nonattainment Area[a]				
Nitrogen oxides	76.4	49.9	97.1	100
Volatile organic compounds	22.5	18.5	27.1	100
Utah County PM10 Maintenance Area[a]				
Nitrogen oxides[b]	9.6	5.5	15.6	100
PM10	16.2	9.5	26.8	100
Sulfur dioxide[b]	0.03	0.02	0.05	100

Notes:

[a] For each Action Alternative and area, the emissions for the year having the largest construction emissions are shown.

[b] The Utah DEQ PM10 maintenance plan identifies NO_X (but not SO_2) as a PM10 precursor in Utah County (Utah DEQ 2015b).

PM10 = particulate matter 10 microns or less in diameter; SO_2 = sulfur dioxide

Operations

Table 3.7-10 shows the estimated emissions during rail operations for each Action Alternative. The estimates include emissions from locomotives, worker commuting, and reductions in truck trips carrying crude oil from production areas in the Basin to the Price River Terminal. Because emissions would depend on the number of trains operating on the proposed rail line, OEA reported emissions for both the low rail traffic scenario and high rail traffic. To quantify locomotive emissions, OEA assumed that rail traffic would reach full volume in the first year of operation, which is a conservative[6] assumption because locomotive emissions decrease over time as emissions standards become more restrictive and older locomotives are replaced by newer locomotives with lower emissions rates. Unlike construction emissions, locomotive emissions during rail operations are not subject to the General Conformity Rule because the Board does not exercise continuing program control over rail operations and would not exercise such control over the operation of the proposed rail line.

[6] A conservative assumption is an assumption that tends to overstate impacts.

Table 3.7-10. Emissions during Rail Operations

	Low Rail Traffic Scenario			High Rail Traffic Scenario		
Pollutants and GHGs	**Indian Canyon Alternative**	**Wells Draw Alternative**	**Whitmore Park Alternative**	**Indian Canyon Alternative**	**Wells Draw Alternative**	**Whitmore Park Alternative**
Criteria Pollutants (U.S. tons/year)[a]						
Carbon monoxide	136	176	147	373	479	405
Nitrogen oxides	343	413	374	969	1,162	1,056
PM10	10	13	11	29	35	32
PM2.5	7	9	8	21	26	23
Sulfur dioxide	0.4	0.5	0.4	1	2	1
VOCs	13	18	14	36	48	40
Hazardous Air Pollutants (U.S. tons/year)[a]						
Acetaldehyde	0.2	0.3	0.2	0.6	0.8	0.7
Acrolein	<0.05	<0.05	<0.05	0.1	0.1	0.1
Benzene	0.3	0.4	0.3	0.8	1.0	0.9
1,3-Butadiene	<0.05	<0.05	<0.05	<0.05	0.1	<0.05
DPM	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Ethylbenzene	0.3	0.4	0.3	0.9	1.1	1.0
Formaldehyde	7	9	8	21	25	23
Napthalene	<0.05	<0.05	<0.05	0.1	0.1	0.1
POM	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Greenhouse Gases (metric tons/year)[a]						
Carbon dioxide	40,106	52,837	44,036	119,041	154,026	129,950
Methane	3	4	4	10	12	10
Nitrous oxide	1	2	1	3	4	3
CO_2e[b] (100-year GWP)~~CO_2e[b]~~	40,511	53,359	44,476	120,162	155,466	131,169
CO_2e[b] (20-year GWP)	40,685	53,584	44,666	120,656	156,101	131,708

Notes:

[a] Values greater than or equal to 1 are rounded to the nearest ton. Values less than 1and greater than or equal to 0.05 are rounded to the nearest 0.1 ton.

[b] CO_2e values were calculated using the 100-year ~~potential~~ global warming potential (GWP) values from the IPCC Fourth Assessment Report (IPCC 2007). ~~GWP values: carbon dioxide = 1; methane = 25; nitrous oxide = 298.~~ 100-year GWP values are: carbon dioxide = 1; methane = 25; nitrous oxide = 298; 20-year GWP values are: carbon dioxide = 1; methane = 72; nitrous oxide = 289.

PM10 = particulate matter 10 microns or less in diameter; PM2.5 = particulate matter 2.5 microns or less in diameter; VOCs = volatile organic compounds; DPM = diesel particulate matter; POM = polycyclic organic matter; CO_2e = carbon dioxide equivalent; < = less than

Regardless of the Action Alternative, the high rail traffic scenario would result in higher emissions than the low rail traffic scenario for all pollutants. Across the three Action Alternatives, the Wells Draw Alternative would result in the most emissions, primarily due to its greater length compared to the Indian Canyon Alternative and the Whitmore Park Alternative.

Under any of the Action Alternatives, air pollutant emissions (Table 3.7-10) would generally represent a small percentage of existing emissions in the regional study area (Table 3.7-1), ranging from less than 0.05 percent to 3.5 percent depending on the pollutant. For GHGs, the Wells Draw Alternative could result in up to 156,101~~211,621~~ metric tons of CO_2e per year under the high rail traffic scenario based on 20-year GWP, which represents approximately 5 percent of GHG emissions in the regional study area, 1 percent of statewide GHG emissions, and 0.0004 percent of global GHG emissions (IPCC 2014). Emissions would be lower for the low rail traffic scenario and under the other two Action Alternatives and would, therefore, represent a smaller percentage of existing GHG emissions. OEA is recommending mitigation measures requiring the Coalition consider actions that would reduce GHG emissions during rail construction and operations (AQ-MM-4, AQ-MM-5, AQ-MM-6, AQ-MM-8).

Air Pollutant Concentrations

Emissions during rail operations would affect the concentration of air pollutants in the regional study area. To quantify air quality impacts for each Action Alternative, OEA modeled the potential ambient concentrations of nitrogen dioxide (NO_2) and PM2.5, which are the pollutants of greatest concern for locomotive emissions. OEA compared the results of the modeling to the NAAQS for NO_2 and PM2.5, to assess the severity of air quality impacts because the NAAQS were established as thresholds to protect human health. For diesel-fueled emissions sources, such as railroads and heavy trucks, the 1-hour NO_2 and 24-hour PM2.5 concentrations are the most likely to approach or exceed the NAAQS among all criteria pollutants and averaging periods. OEA assumed that if the modeled concentrations of NO_2 and PM2.5 would be less than the NAAQS, then concentrations of CO, PM10, and SO_2 for operations also would be less than the NAAQS. OEA also assumed that if the modeled concentrations of NO_2 and PM2.5 would be less than the NAAQS, then there would be no other anticipated NAAQS exceedances in the study area due to operation of the proposed rail line. Appendix M, *Air Quality Emissions and Modeling Data*, provides further information on the air quality modeling methodology.

To determine whether localized pollutant concentrations with locomotive operations could approach or exceed the NAAQS, OEA identified the locations (known as receptors) along the three Action Alternatives that would be most likely to experience higher pollutant concentrations due to topography, meteorology, and rail alignment, as well as emissions. The conditions that can lead to high concentrations include the following factors:

- Steep grade
- Switchbacks
- Winds frequently oriented along the direction of the rail alignment
- Valley location where emissions could be trapped under temperature inversions[7]
- Frequent stagnation conditions[8] or low wind speeds

[7] In a temperature inversion, the temperature of the atmosphere increases with altitude in contrast to the ~~normal~~ typical decrease with altitude. During a temperature inversion, air pollution released into the atmosphere's lowest layer is trapped there and its dispersion is inhibited.

[8] Stagnation is an atmospheric phenomenon where an air mass remains in place over a geographic region for an extended period of time. Stagnation typically consists of these conditions: light winds so that horizontal dispersion is at a minimum, a stable lower atmosphere that inhibits vertical dispersion of pollutants, and absence of precipitation to wash any pollution away.

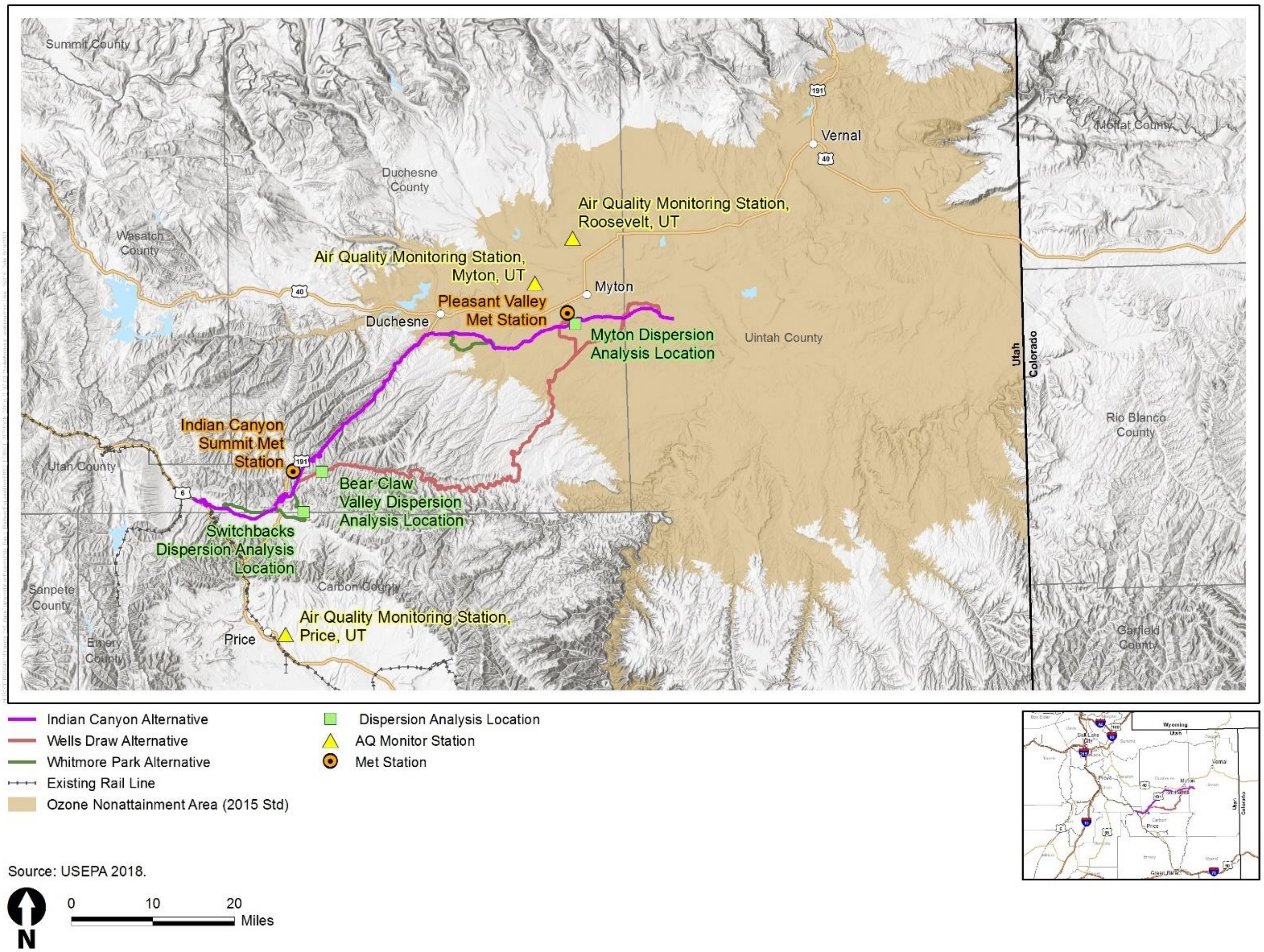
Based on these criteria, OEA identified the following three locations (Figure 3-7.3) as having the greatest likelihood of experiencing concentrations that could exceed the NAAQS.

- **Switchbacks near Minnie Maud Road (Whitmore Park Alternative)**. The rail tracks have four switchbacks climbing from about 7,435 feet to 7,795 feet elevation in 3.10 miles, a 2.2 percent grade. Meteorological data for the area suggest that the wind direction frequently aligns parallel to the rail alignment at this location. Very low wind speeds occur about 5 percent of the time, which could lead to high pollutant concentrations. No residences or other sensitive land uses are near this location.
- **Bear Claw Valley south of Argyle Canyon Road (Wells Draw Alternative).** Meteorological data for the area suggest that the wind direction frequently aligns parallel to the rail alignment at this valley location with relatively slow wind speeds. Very low wind speeds occur about 5 percent of the time, which could lead to high pollutant concentrations. The nearest sensitive land use to this location is a residence about 1,000 feet from the proposed rail alignment.
- **Rail alignment south of Myton (all Action Alternatives).** Meteorological data for the area suggest that the wind direction frequently aligns parallel to the rail alignment at this valley location with relatively slow wind speeds about 10 percent of the time, which could lead to high pollutant concentrations. However, very low wind speeds occur less frequently. There are nearby residences south of Myton. The distance to the nearest residence is about 650 feet for the Wells Draw Alternative, about 1,800 feet for the Whitmore Park Alternative, and about 2,000 feet for the Indian Canyon Alternative.

OEA determined that identifying three study locations based on the expected location of maximum concentrations was the appropriate analysis approach because the proposed rail line represents a single, linear, near-ground source. This analysis approach differs from USEPA's standard modeling guidance, which is oriented toward stationary-source permitting, typically of multiple elevated stationary sources. OEA modeled concentrations of NO_2 and PM2.5 that could occur at these locations just outside of the rail right-of-way,[9] as the maximum concentrations for a rail line source are anticipated to occur within a few hundred meters of the track. OEA only modeled concentrations that could occur under the high rail traffic scenario because that scenario represents the maximum predicted rail traffic that could move on the proposed rail line. To be conservative, OEA assumed for purposes of analysis that the full train volume would occur in the first year of rail operations.

[9] The air quality analysis does not consider concentrations within the right-of-way because entry by humans at any point would constitute trespass except at specific approved locations. These locations would include primarily grade crossings, where human crossing of the right-of-way would not lead to air quality impacts because exposure to pollutant concentrations within the right-of-way would last only seconds to minutes. In addition, portions of the right-of-way could be fenced, which would prevent entry by humans at fenced locations.

Figure 3.7-3~~3~~. Modeling Analysis Locations



Source: USEPA 2018.

OEA used the USEPA AERMOD dispersion model, with the estimated emissions rates,[10] along with meteorological and topographical data for both the local and regional study area, to estimate the concentrations of NO_2 and PM2.5. OEA used background air quality data that are representative of the regional air quality. In modeling the 24-hour PM2.5 and the annual PM2.5 and NO_2 impacts, OEA assumed that the number of trains per day would be constant throughout the year. In modeling 1-hour NO_2 impacts, OEA assumed conservatively that two trains pass by the receptors in the same hour, for every modeled hour. With the predicted train volumes of up to 10.52 trains per day, the time between trains normally would be greater than 1 hour, but two trains passing by in the same hour would be possible. OEA expects that no more than two trains would pass by in the same hour during rail operations. Appendix M, *Air Quality Emissions and Modeling Data*, includes further details on the dispersion modeling. Table 3.7-11 reports the maximum predicted concentrations for the high rail traffic scenario. In all cases, the maximum concentration occurs at the assumed right-of-way boundary (50 feet from the track). Concentrations at larger distances from the track, including at the nearest residences, are lower.

Table 3.7-11 shows that predicted 24-hour PM2.5, annual PM2.5, 1-hour NO_2, and annual NO_2 concentrations would be less than the NAAQS at all three locations that OEA modeled. ~~Predicted 1-hour NO_2 concentrations would be less than the NAAQS at all locations for the Wells Draw Alternative.~~ As discussed previously, nitrogen oxides and particulate matter are the pollutants of greatest concern for locomotive emissions. Locomotive emissions are more likely to cause an exceedance of the 1-hour NO_2 and the 24-hour PM2.5 NAAQS than to cause an exceedance of the NAAQS for other pollutants. Because OEA's model predicts that concentrations of NO_2 and PM2.5 would be less than the 1-hour NO_2 and the 24-hour PM2.5 NAAQS for all three locations, ~~the Wells Draw Alternative,~~ OEA concludes that locomotive emissions would not cause the concentrations of CO, SO_2, and PM10 to exceed the NAAQS for ~~the Wells Draw Alternative~~ any of the Action Alternatives. Because OEA's model was based on the high rail traffic scenario, which represents the maximum predicted volume of train traffic on the proposed rail line, OEA also concluded that lower levels of train traffic, such as what would occur under the low rail traffic scenario, would not result in concentrations of air pollutants that would exceed the NAAQS for any pollutant under any of the Action Alternatives.

[10] OEA based the emissions rates for locomotives on USEPA (2009) guidance and determined that a fleet average emissions rate is the most appropriate approach for this analysis. Use of fleet average emissions is standard practice in mobile source emissions modeling as conducted in state implementation planning (SIPs) as well as in EIS studies. A mix of locomotives that is older than the fleet average would have~~Earlier years provide~~ higher individual emissions rates and would provide more conservative estimates of short-term average concentrations paired with worst-case meteorological conditions. Therefore, modeling an older fleet of locomotives than the fleet average would result in higher estimated concentrations than shown in Table 3.7-11. However, modeling a train that is only pulled by low~~er~~-Tier, higher-emitting locomotives is ~~a worst-case, excessively conservative assumption~~ equivalent to assuming that all trains are pulled by only such locomotives, and that they are operated simultaneously with the occurrence of meteorology that is not conducive to pollutant dispersion, and that this scenario occurs often enough to generate the number of NAAQS exceedances necessary to define a modeled violation of the NAAQS. OEA believes that this is a worst-case, excessively conservative assumption. NEPA does not require analysis of a worst-case scenario.~~ Thus, a fleet average provides a realistic estimate of emissions.~~ Appendix M, *Air Quality Emissions and Modeling Data*, includes further details on modeled emissions rates.

Table 3.7-11. Modeled Maximum Air Pollutant Concentrations in the Project Opening Year under the High Rail Traffic Scenario

		PM2.5 (μg/m³)						NO_2 (μg/m³)					
		24-Hour[a]			Annual[b]			1-Hour[c]			Annual[d]		
Analysis Location, Action Alternative	Receptor Type	Background[e]	Project	Total	Background[e]	Project	Total	Background[ef]	Project	Total	Background[ef]	Project	Total
Switchbacks near Minnie Maud Road													
Whitmore Park	Maximum Impact	25.2	0.2 ~~0.1~~	25.4 ~~25.3~~	6.3	0.1 ~~<0.1~~	6.4 ~~6.3~~	Variable hourly[g] ~~48.6~~	~~63.7~~	108.0 ~~112.4~~	4.3 ~~3.9~~	3.9 ~~0.6~~	8.2 ~~4.5~~
	Nearest Residence	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bear Claw Valley South of Argyle Canyon Road													
Wells Draw	Maximum Impact	25.2	0.1 ~~<0.1~~	25.3	6.3	<0.1	6.4 ~~6.3~~	Variable hourly[g] ~~48.6~~	~~42.2~~	94.3 ~~90.8~~	4.3 ~~3.9~~	1.6 ~~0.4~~	5.9 ~~4.2~~
	Nearest Residence	25.2	0.1 ~~<0.1~~	25.3	6.3	<0.1	6.4 ~~6.3~~	Variable hourly[g] ~~48.6~~	~~25.1~~	91.0 ~~73.7~~	4.3 ~~3.9~~	0.9 ~~0.3~~	5.2 ~~4.2~~
Rail Alignment South of Myton													
Indian Canyon, Whitmore Park	Maximum Impact	25.2	0.2	25.4 ~~25.3~~	6.3	0.1	6.4	Variable hourly[fg]		111.4 ~~197.4~~	8.3 ~~3.9~~	2.5 ~~2.8~~	10.8 ~~6.7~~
	Nearest Residence	25.2	<0.1	25.3	6.3	<0.1	6.3	Variable hourly[g] ~~48.6~~	~~59.6~~	79.7 ~~108.2~~	8.3 ~~3.9~~	0.7 ~~0.6~~	9.0 ~~4.5~~
Wells Draw	Maximum Impact	25.2	0.1	25.3	6.3	<0.1	6.3	Variable hourly[g] ~~48.6~~	~~124.7~~	103.8 ~~173.3~~	8.3 ~~3.9~~	2.2 ~~1.8~~	10.5 ~~5.7~~
	Nearest Residence	25.2	<0.1	25.~~2~~3	6.3	<0.1	6.3	Variable hourly[g] ~~48.6~~	~~14.1~~	37.2 ~~62.7~~	8.3 ~~3.9~~	0.5 ~~0.2~~	8.8 ~~4.1~~
NAAQS				**35.0**			**12.0**			**188**			**100**

Notes:

[a] Highest of the ~~3~~5-year averages ~~combinations~~ of the 98th percentile of the annual distribution of 24-hour concentrations predicted each year at each receptor for Switchbacks near Minnie Maud Road and Bear Claw Valley South of Argyle Canyon Road, which were modeled with 5 years of meteorological data. For the rail alignment South of Myton, which only had 2 years of meteorological data, the 98th percentile of the daily average was averaged over ~~3~~ 2 years.

[b] Highest of the ~~3~~5-year ~~combinations~~ averages of the annual ~~of the annual average~~ concentrations at each receptor for the 5 years of meteorological data used for Switchbacks near Minnie Maud Road and Bear Claw Valley South of Argyle Canyon Road. For the rail alignment South of Myton, which only had 2 years of meteorological data, the value shown is the highest receptor concentration of the annual average concentration averaged over 2 years.

[c] Highest of the multiyear averages used in the air quality modeling of the 98th percentile of the annual distribution of maximum daily 1-hour concentrations modeled each year at each receptor.

[d] Highest of the annual mean.
[e] Measured at Utah DEQ Roosevelt monitoring site, 290 South 1000 West, Roosevelt, Utah (EPA AIRS code 49-013-0002).
~~Values that exceed the NAAQS are shown in **bold**.~~ [f] Measured at Myton Uinta Tribal Monitor, Utah (EPA AIRS code 49-013-7011) for rail alignment south of Myton and Price Utah DEQ monitoring site 351 South 2500 East, Price Utah (EPA AIRS code 49-007-1003) for rail alignment for Switchback near Minnie Maud Road and Bear Claw Valley South of Argyle Canyon Road.
~~[f]~~ [g] ~~Because high modeled concentrations were expected at this location,~~ As explained in Appendix M, *Air Quality Emissions and Modeling Data*, hourly NO_2 background values varied both hourly and seasonally; ~~were used for the rail alignment south of Myton under the Indian Canyon Alternative and Whitmore Park Alternative~~ t~~.~~ ~~T~~herefore, there is no single value to report for the background value, ~~as both vary hourly.~~ The range in the seasonal and hour of the day 1-hour NO_2 background concentration is ~~3.6~~ 7.5 to ~~49.4~~28.4 μg/m³ for Myton and 3.0 to 30.8 μg/m³ for Price~~.~~ The maximum combination of the paired background and project impact by hour of the day and season is reported as the total.
< = less than; NA = not applicable; NAAQS = National Ambient Air Quality Standards; NO_2 = nitrogen dioxide; PM2.5 = particulate matter 2.5 microns or less in diameter; μg/m³ = micrograms per cubic meter

~~Under the high rail traffic scenario for the Indian Canyon Alternative and Whitmore Park Alternative, OEA's modelling found that the 1-hour NO_2 concentration could exceed the NAAQS at one location south of Myton under certain conditions. If two trains were to pass by this area each hour under unfavorable local weather conditions, then the model suggests that NO_2 concentrations could reach as high as 197.4 μg/m^3 near the rail right-of-way, which is higher than the NAAQS of 188 μg/m^3 for 1-hour NO_2. OEA believes that this outcome is unlikely to actually occur during rail operations because trains would rarely pass a receptor as frequently as twice in an hour, even under the high rail traffic scenario. In addition, a number of studies have found that the AERMOD model may over-predict maximum 1-hour NO_2 concentration by between 1.7 and 2 times the observed concentration.[11] The maximum modeled 1-hour NO_2 concentrations for the Indian Canyon Alternative and Whitmore Park Alternative might not exceed the NAAQS if the results were adjusted downward for this model bias. The potential exceedance, if it were to occur, would occur within or immediately adjacent to the rail right-of-way. Although there are several residences near the rail line, they are located well outside the right-of-way, and OEA does not expect that those sensitive receptors would experience NO_2 concentrations that would exceed the 1-hour NO_2 NAAQS.~~

In response to public comments on the Draft EIS, and in consultation with USEPA, OEA reran the dispersion models using different data inputs recommended by USEPA and different modeling parameters recommended by USEPA. Changes to the modeling procedure are documented in Appendix M, *Air Quality Emissions and Modeling Data*. Based on the results of the revised modeling, OEA does not expect that operation of the proposed rail line would result in exceedances of the 1-hour NO_2 NAAQS or the NAAQS for other pollutants.~~OEA does not expect that operation of the Indian Canyon Alternative or the Whitmore Park Alternative would result in an exceedance of the 1-hour NO_2 NAAQS or the NAAQS for other pollutants at the other modeled locations~~. Figure 3.7-4 shows the spatial distribution of the maximum predicted 1-hour NO_2 concentrations (with~~out~~ background concentrations) for the Indian Canyon Alternative and Whitmore Park Alternative in the area south of Myton where maximum impacts are predicted. The highest modeled concentrations are shown within the small areas close to and just south of the rail alignment labeled as having maximum 1-hour NO_2 concentrations of 100 ug/m^3~~This is the only area in which a potential exceedance of the NAAQS was modeled. In Figure 3.7-4, the potential NAAQS exceedance could occur locations predicted to experience project-related NO_2 concentrations of 140 μg/m^3 or higher. The small areas labeled as having NO_2 concentrations of 140 μg/m^3 or higher are the only locations of predicted exceedances.~~

Figure 3.7-5 through Figure 3.7-7 show the maximum predicted 1-hour NO_2 concentrations (with~~out~~ background concentrations) for the Wells Draw Alternative south of Myton, the Whitmore Park Alternative at the switchbacks near Minnie Maud Road, and the Wells Draw Alternative at Bear Claw Valley south of Argyle Canyon Road, respectively. No exceedances of the NAAQS were predicted at any of those modeling locations. As the figures show, residences near the proposed rail line could experience air pollutant concentrations that would be elevated above background concentrations, but OEA does not expect that any residences or other sensitive receptors would experience air pollutant concentrations that would exceed the NAAQS.

~~[11] USEPA is aware of this problem and has been actively working on approaches and methods to improve the modeling of the 1-hour NO_2 concentration (American Petroleum Institute 2012; Brode 2014; Owen 2014; RTP Environmental Associates 2013; Podrez 2015).~~

Figure 3.7-44**. Maximum 1-Hour NO_2 Concentrations (with background) South of Myton (Indian Canyon Alternative and Whitmore Park Alternative)**

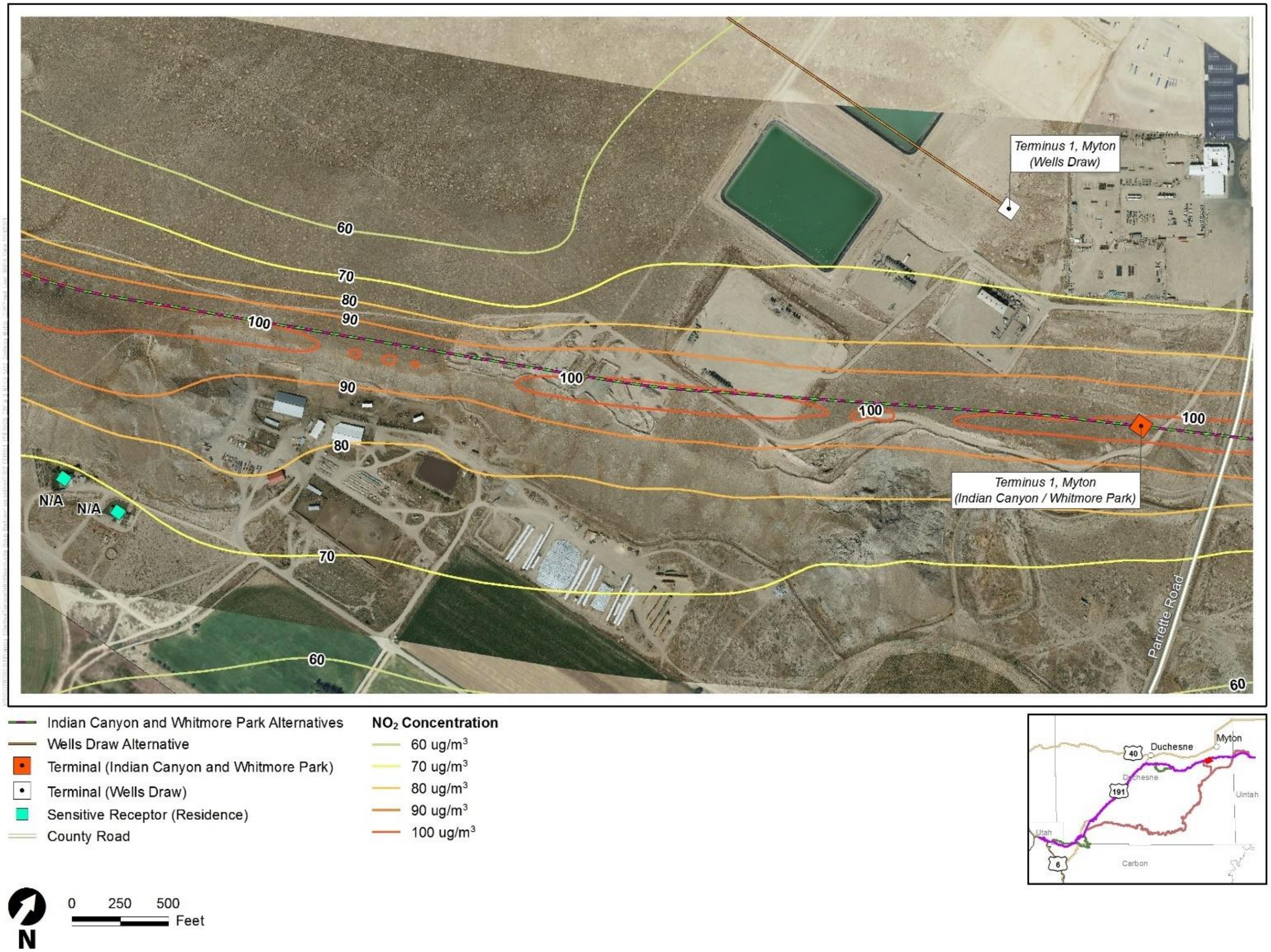


Figure 3.7-5. Maximum 1-Hour NO_2 Concentrations (with background) South of Myton (Wells Draw Alternative)

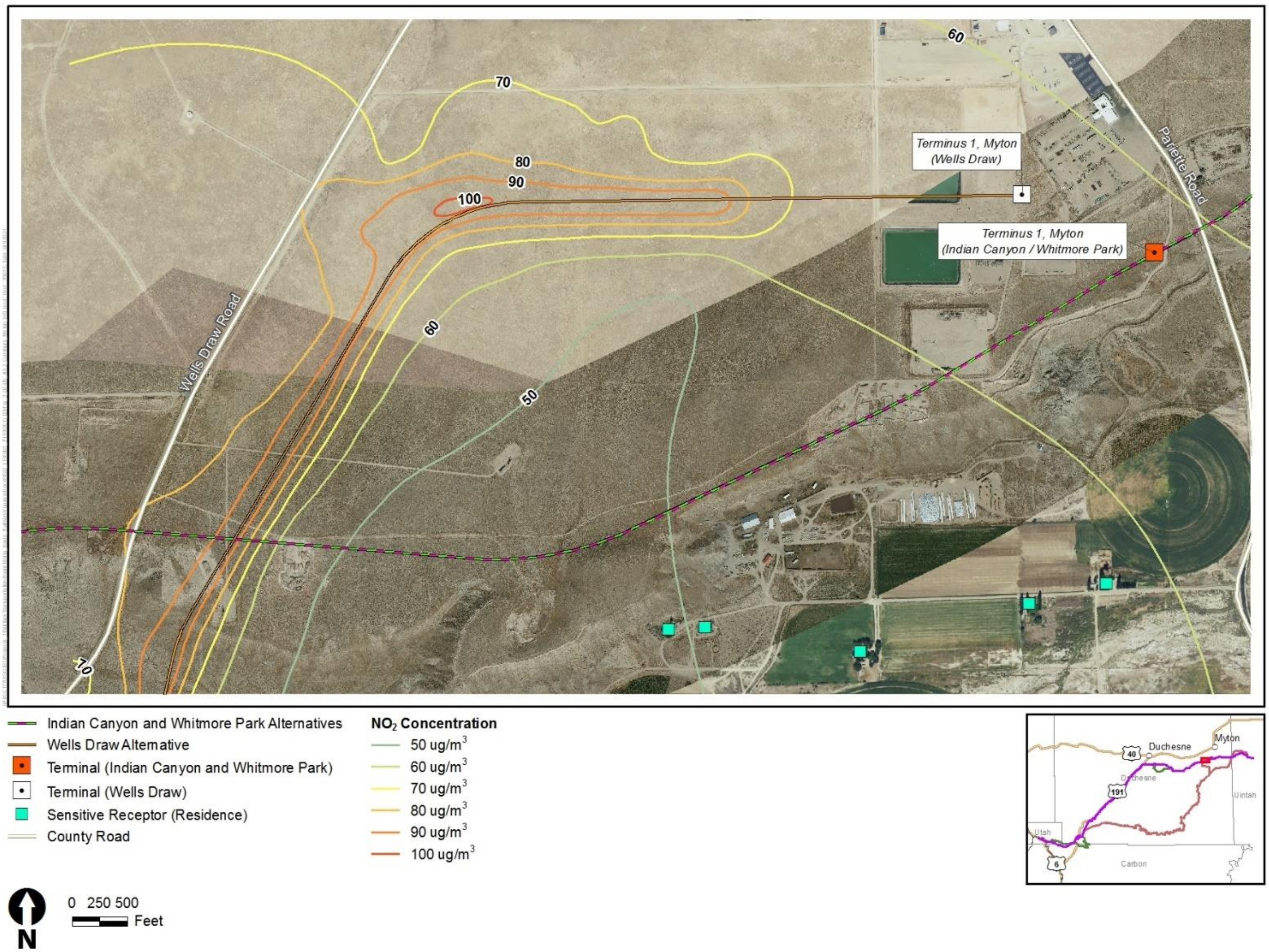


Figure 3.7-6. Maximum 1-Hour NO_2 Concentrations (with background) at Switchbacks South of Minnie Maude Road

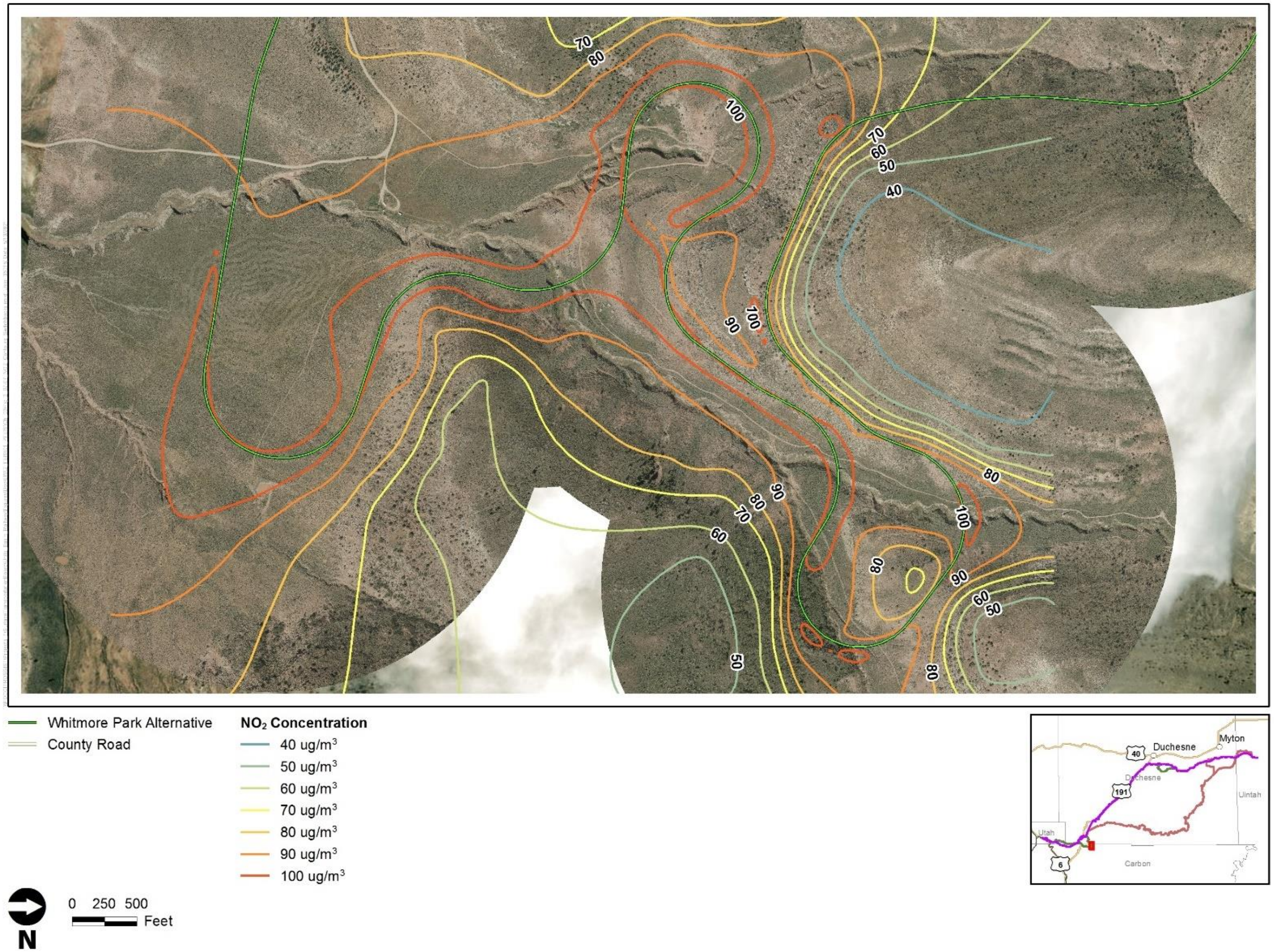
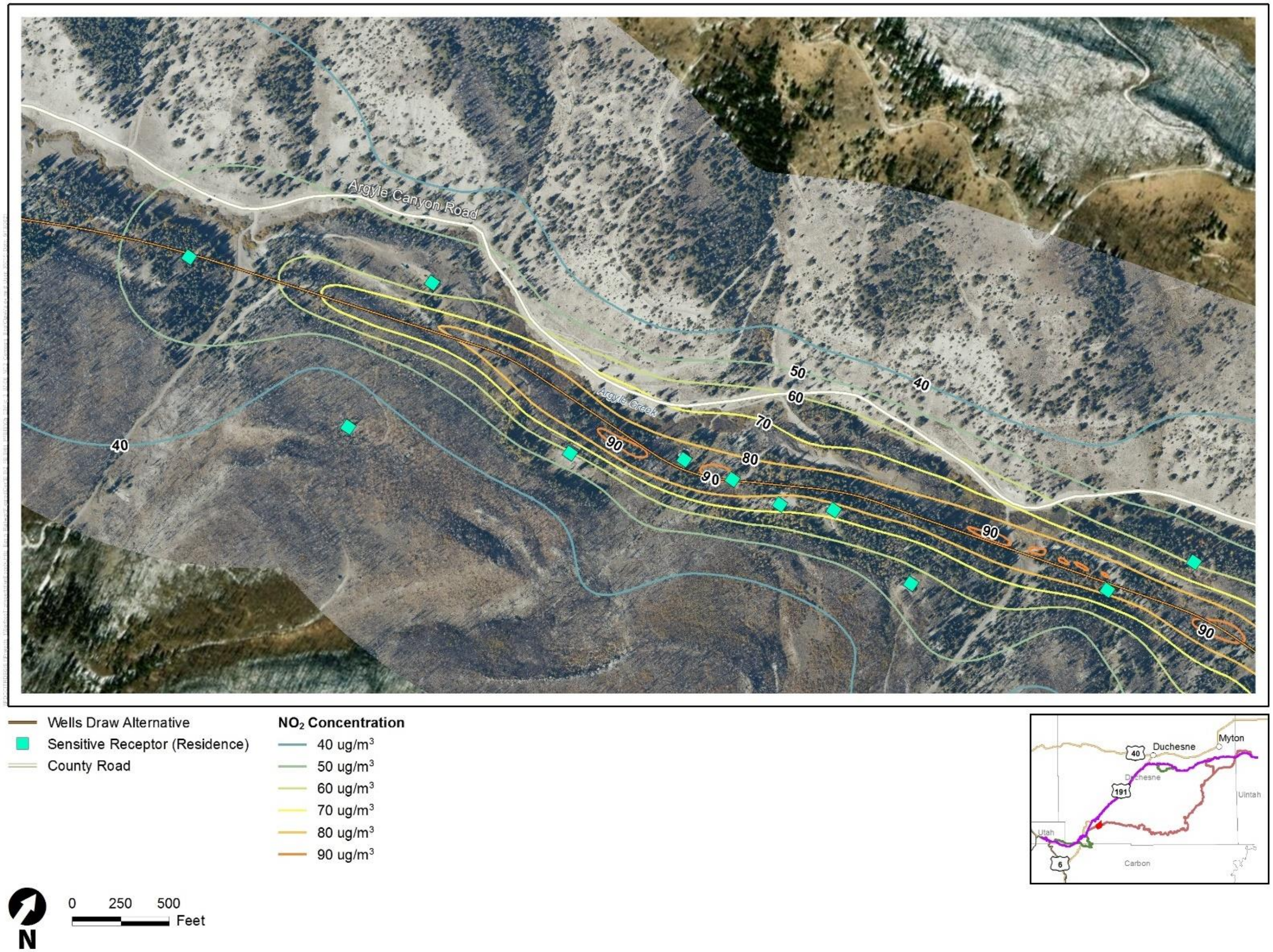


Figure 3.7-7. Maximum 1-Hour NO_2 Concentrations (with background) at Bear Claw Valley South of Argyle Canyon Road



As discussed previously, commenters during the scoping process expressed concerns regarding air quality impacts related to rail operations in tunnels. OEA expects that air quality impacts would be most likely to occur in areas immediately adjacent to tunnel entrances. For the Indian Canyon Alternative and Whitmore Park Alternative, there are no receptors immediately adjacent to the tunnel entrances. For those two Action Alternatives, the closest receptors to tunnel entrances would be more than 1,000 feet of the tunnel entrances, well outside the area that OEA expects could experience adverse air quality impacts. Due to the distance of receptors from tunnel entrances, OEA concludes that the NAAQS would not be exceeded due to locomotive exhaust from tunnels under the Indian Canyon Alternative or Whitmore Park Alternative. For the Wells Draw Alternative, there are three residences within 1,000 feet of the northeastern entrance of the approximate 3.53-mile summit tunnel in Bear Claw Valley, just south of Argyle Canyon Road. These receptors are located 442 feet, 689 feet, and 822 feet from the tunnel entrance. At these distances from the entrances and the track OEA expects that all pollutant concentrations would be less than the NAAQS under the high rail traffic scenario.

3.7.3.3 No-Action Alternative

Under the No-Action Alternative, the Coalition would not construct and operate the proposed rail line, and no construction-related air pollutant emissions would occur. Trucks would continue to transport crude oil from the Basin to the Price River Terminal in Wellington and potentially to other intermodal facilities outside of the Basin. This truck traffic could increase depending on future market conditions, including the price of crude oil, which would result in increased truck exhaust emissions. However, there would be no new locomotive exhaust emissions in the study areas under the No-Action Alternative.

3.7.4 Mitigation and Unavoidable Environmental Effects

Construction of the proposed rail line would involve activities that would emit air pollutants and GHGs. Across the three Action Alternatives, the Wells Draw Alternative would result in the most construction-related air pollutant and GHG emissions, followed by the Whitmore Park Alternative and the Indian Canyon Alternative. Emissions from construction activities would be temporary and would move continually during the construction period. With implementation of the Coalition's voluntary mitigation measure and OEA's recommended mitigation measures, (Chapter 4, *Mitigation*), OEA concludes that impacts related to air quality and GHG emissions would not be significant if those mitigation measures were implemented.

During rail operations, the primary source of air emissions would be locomotives operating on the proposed rail line. Because it is the longest Action Alternative, the Wells Draw Alternative would result in the most total emissions of all pollutants, followed by the Whitmore Park Alternative and then Indian Canyon Alternative. Based on the revised air quality modeling, OEA concludes that operation of the proposed rail line would not cause air pollutant concentrations to exceed the NAAQS at any location. ~~OEA's dispersion model suggests that the Wells Draw Alternative would not cause air pollutant concentrations to exceed the NAAQS under any rail traffic scenario or meteorological conditions. If the Indian Canyon Alternative or the Whitmore Park Alternative were constructed, the maximum 1-hour NO_2 concentration could exceed the NAAQS under the high rail traffic scenario at a location south of Myton in the Basin. This exceedance would be unlikely because it would only occur under unusual operational and meteorological conditions and only if rail traffic on the proposed rail line were at the maximum projected level.Residences in the vicinity of the~~

~~proposed rail line would not experience air quality that would exceed the NAAQS even under those unlikely conditions~~Therefore, OEA concludes that operation of the proposed rail line would not result in significant air quality impacts. ~~The moderate air quality impacts that could result from locomotive emissions during rail operations would be unavoidable.~~ Because the Board does not regulate the volume or composition of train traffic on the interstate rail network or types of locomotives that can operate on rail lines, there is no mitigation that OEA can recommend or that the Board can impose to address air quality impacts related to locomotive emissions.

OEA is recommending mitigation measures (Chapter 4, *Mitigation*) related to GHG emissions, but operation of the proposed rail line would result in unavoidable GHG emissions even if these measures were implemented. GHG emissions from rail operations (Table 3.7-10) would represent a small percentage (ranging from 0.9 percent to 3.5 percent) of existing regional and statewide GHG emissions (Table 3.7-1), however, and would not contribute significantly to global climate change.

3.8 Energy

This section describes the impacts on energy resources that would result from construction and operation of the proposed rail line. Energy resources in this context include the diesel fuel, gasoline, electricity, and natural gas used during construction and operation of the proposed rail line, as well as the infrastructure required to distribute those energy resources. The subsections that follow describe the study area, data sources and methods used to analyze the impacts, the affected environment, and the impacts of the Action Alternatives on energy.

3.8.1 Analysis Methods

This subsection identifies the study area, data sources, and analysis methods used to analyze potential impacts on energy resources.

3.8.1.1 Study Area

The study area for energy resources includes the project footprint[1] for each Action Alternative, where all construction and operation activities that would consume energy would take place. The study area also includes the energy supply and distribution infrastructure, including electricity transmission, oil and gas wells, crude oil pipelines, natural gas pipelines, and petroleum product pipelines that could intersect the proposed rail line, and existing fuel (gasoline, diesel fuel) transport, storage, and distribution infrastructure that could supply fuel to the proposed construction and operation of the rail line.

The study area excludes energy consumption related to the construction and operation of crude oil loading and unloading (terminal) facilities and the disposition of crude oil that would be transported by the rail line. These considerations are discussed in Section 3.15, *Cumulative Impacts*. The study area excludes construction and operation of diesel fuel storage or distribution equipment for fueling diesel locomotives at terminal locations. Potential terminal locations are discussed in Section 3.15, *Cumulative Impacts*.

3.8.1.2 Data Sources

OEA reviewed the following data sources to determine the potential impacts on energy resources that could result from construction and operation of the proposed rail line.

- Publicly available geographic information system (GIS) data (ArcGIS 2019a, 2019b; EIA 2020a) for existing electric transmission lines and electrical substations in the study area.

[1] The *rail line footprint* includes the area of the railbed, as well as the full width of the area cleared and cut or filled. The rail line footprint would also include other physical structures installed as part of the proposed rail line, such as fence lines, communications towers, siding tracks, relocated roads, and power distribution lines. The rail line footprint is the area where rail line operations and maintenance would occur. The area would be permanently disturbed. The *temporary footprint* is the area that could be temporarily disturbed during construction, including areas for temporary material laydown, staging, and logistics. Disturbed areas in the temporary footprint would be reclaimed and revegetated following construction. The *project footprint* is the combined area of the rail line footprint and temporary footprint, both of which would be disturbed during construction, comprising where construction and operations of the proposed rail line would occur.

- Publicly available GIS data (ArcGIS 2018, 2019c, 2019d; PHMSA 2020a) for crude oil, natural gas, and petroleum product pipeline rights-of-way in the study area.
- Publicly available GIS data (UDOGM 2019) for oil and gas well locations in the study area.
- Locations of natural gas-gathering pipelines and compression sites, which were digitally mapped using aerial imagery and information from an oil and gas operator in the Basin (Berry Petroleum 2021).
- Utah Geological Survey publication Utah's Energy Landscape (Vanden Berg 2020a, 2020b, 2020c), which includes location information for electric transmission line and crude oil, natural gas, and petroleum product pipeline.
- GIS data (Coalition 2019) of road-rail and rail-rail crossings for each Action Alternative.
- U.S. Energy Information Administration (EIA) data including the State Energy Profile - Utah (EIA 2020b) for statewide energy (electricity and petroleum products) supply and statewide data for consumption of diesel fuel, gasoline, and electricity.
- Information regarding the energy distribution infrastructure (e.g., electric power distribution lines) that would be constructed or modified for each Action Alternative.

3.8.1.3 Analysis Methods

OEA used the following methods to analyze potential impacts in the study area related to energy resources.

- **OEA estimated the energy consumption for construction and operation**. OEA estimated the amount of energy that would be needed for construction and operation of each Action Alternative. Energy consumption for construction of the proposed rail line includes fuel for construction equipment, fuel for construction personnel vehicles, and electricity for construction, including lighting of construction site areas. Energy consumption for operation of the proposed rail line includes diesel fuel for locomotives, fuel for operations personnel vehicles, and electricity for powering communications equipment, signals, and other rail-related equipment. OEA used the EPA MOVES model to calculate diesel fuel and gasoline consumption for operating on-road and off-road equipment for both construction and operation. Modeled energy consumption units (joules) were converted into physical units (gallons) using EIA conversion factors for diesel fuel and gasoline (EIA 2020c). For operations, OEA modeled two scenarios: the high rail traffic scenario (10.52 trains per day) and the low rail traffic scenario (3.68 trains per day).
- **OEA assessed availability of energy resources for construction and operation**. OEA compared the energy that would be needed for construction and operation of each Action Alternative to the statewide energy supply and statewide energy demand to assess whether adequate electricity and petroleum products are available for construction and operation of the proposed rail line. OEA also assessed whether new energy supply, transport, or distribution infrastructure or modifications to existing infrastructure would be needed to supply electricity or fuel for construction or operation of the alternatives.
- **OEA assessed impacts on existing energy infrastructure**. OEA identified existing fixed energy transport and distribution infrastructure, including oil and gas wells, crude oil, natural gas, and petroleum product pipeline and electric transmission lines in the study area, and evaluated

whether construction or operation of the alternatives would result in any impacts on that infrastructure. OEA identified places where the proposed rail line would cross roadways (road-rail crossings) or existing rail lines (rail-rail crossings) for each Action Alternative and evaluated whether construction or operation of each alternative would result in any impacts on truck routes that are used to transport energy (i.e., transport of crude oil and petroleum products).

The impact analysis for energy resources excludes energy consumption for quarrying and transport of ballast and aggregate, as well as the production and transport of cement. OEA assumes that the Coalition would obtain cement, aggregate, ballast, and other materials required for construction of the rail line from existing permitted facilities, and that no new facilities would be required to support rail line construction.

3.8.2 Affected Environment

This subsection describes the existing conditions related to energy resources in the study area. The Coalition would obtain the electricity and fuel needed to construct and operate the proposed rail line from existing energy supply, transport, and distribution infrastructure in Carbon, Duchesne, Uintah, and Utah Counties, including electric transmission and distribution lines and substations, petroleum product pipelines, and petroleum product storage and distribution facilities that would be supplied by fuel trucks operating on public roads.

3.8.2.1 Electricity Supply Infrastructure

There are two main existing electricity suppliers in the study area. The Moon Lake Electric Association provides electricity service to customers in Duchesne and Uintah Counties (MLEA 2020). The Rocky Mountain Power Company provides electricity to Carbon, Duchesne, Uintah, and Utah Counties (RMP 2020).

3.8.2.2 Statewide Energy Consumption

Statewide consumption of motor gasoline (not including ethanol) was 135 trillion British thermal units (TBtu) in 2018. The transportation sector represented 32 percent (267 TBtu) of total energy consumption in 2018 (EIA 2020b). Statewide consumption of distillate fuel oil was 90.4 TBtu in 2018 (EIA 2020b). Statewide gasoline consumption in Utah was 1,170,761,966 gasoline gallon equivalents (GGEs)[2] (140.83 TBtu) in 2018. Statewide diesel fuel consumption in Utah was 589,596,284 GGEs (70.13 TBtu) in 2018 (EIA 2020c; EIA 2020d).

3.8.2.3 Petroleum Product Supply

There are five petroleum refineries located in Utah, all in the Salt Lake City area. These refineries process approximately 200,000 barrels of crude oil per day. Crude oil processed by the refineries mainly arrives by pipeline from Colorado, Wyoming, and Canada, and by truck from the Uinta Basin (Basin) and other areas of Utah (Vanden Berg 2020d; EIA 2020e). The five Utah petroleum refineries represent approximately 30 percent of the refining capacity in the Rocky Mountain region, and the refineries produce motor gasoline, diesel fuel, jet fuel, and other fuel oils (Vanden Berg 2020d; EIA

[2] Gasoline gallon equivalent (GGE) is the amount of fuel it takes to equal the energy content of one liquid gallon of gasoline where one GGE equals 120,167 BTUs. (EIA no date). 1 gallon = 1 GGE gasoline; 1 gallon diesel fuel = 1.155 GGE diesel fuel (EIA no date).

2020e). Refined products move by pipeline and by truck from the Utah refineries to markets in Utah, Idaho, Nevada, Wyoming, Washington, and Oregon. Pipelines also transport refined petroleum products into Utah from refineries in Wyoming and Montana. Petroleum refineries in the Salt Lake City area (Salt Lake County, Davis County) include Holly Frontier, Big West, Chevron, Silver Eagle, and Marathon Oil. The Chevron Salt Lake Refinery processes approximately 54,720 barrels per day (bpd) of crude oil into petroleum products including gasoline, diesel fuel, propane, and jet fuel (EIA 2020i). The Holly Frontier Woods Cross Refinery processes approximately 39,330 bpd of crude oil into refinery products (Holly Frontier 2019; EIA 2020i). The Marathon Oil refinery in Salt Lake City is the largest refinery in Utah, refining approximately 63,000 bpd (Marathon Oil 2019; EIA 2020i). The Silver Eagle refinery processes approximately 15,000 bpd, and the Big West refinery processes approximately 31,664 bpd (EIA 2020i).

3.8.2.4 Electricity-Generating Capacity and Electricity Consumption

Statewide electricity-generating capacity in Utah was 9,003 megawatts (MW) in 2018. Statewide net electricity generation in Utah in 2018 was 39,375,424 megawatt hours (MWh) (EIA 2020f). Utah is a net exporter of electricity to other states and exported 32 TBtu (5.63 million MWh) of electricity to other states in 2018 (Vanden Berg 2020e; EIA 2020f, 2020g).

3.8.2.5 Electric Transmission Lines

Figure 3.8-1 shows the electric transmission lines in the study area. Electric transmission lines in the study area include a 34.5-kilo-volt-ampere (kVa) transmission line operated by Rocky Mountain Power and a 138-kVa transmission line operated by UPALCO (EIA 2020b; PacifiCorp 2016).

3.8.2.6 Crude Oil, Natural Gas, and Petroleum Product Pipelines

Figure 3.8-1 shows crude oil, natural gas, and petroleum product pipelines in the study area. Pipelines in the study area include one natural gas pipeline operated by Dominion Questar, ~~and~~ one crude oil (hazardous material) pipeline operated by Chevron, and natural gas-gathering pipelines (Questar 2018, 2019; PHMSA 2020b, 2020c; Berry Petroleum 2021). OEA did not identify any petroleum product pipelines in the study area.

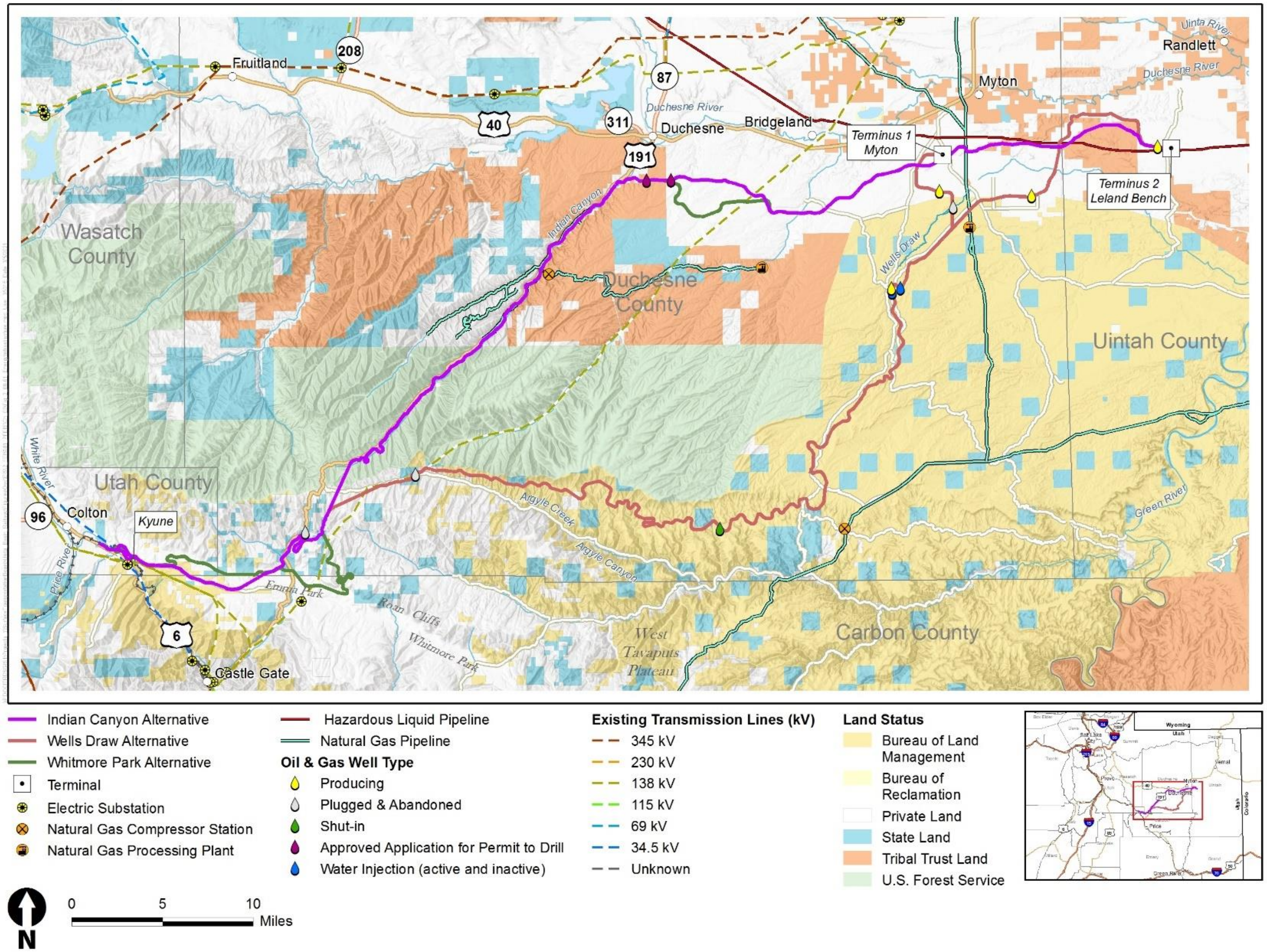
3.8.2.7 Oil and Gas Wells

Figure 3.8-1 shows the oil and gas wells and water injection wells, which are used in oil and gas recovery, in the study area. Wells in the study area include four producing wells, three plugged and abandoned wells, one shut-in well, two approved but not drilled wells, and three water injection wells.

3.8.2.8 Road-Rail Crossings

Road-rail crossings include roads that could be used as transport routes for petroleum products (truck tankers). At-grade road-rail crossings in the study area include Forest Road (FR) 303, FR 304, Wells Draw Road, and Horner Knoll Road in Duchesne County, Leland Bench Road in Uinta County, ~~and~~ Quarry Road in Utah County, and unnamed roads that provide access to oil and gas infrastructure. Road-rail crossings in the study area are shown in Section 3.1, *Vehicle Safety and Delay*, Figure 3.1-1. A list of public at-grade crossings for each Action Alternative is included in Appendix D, *Grade-Crossing Safety and Delay Analysis*.

Figure 3.8-1. Oil and Gas Pipelines, Transmission Lines, and Oil and Gas Wells



Source: ArcGIS 2018, 2019c, 2019d; PHMSA 2020a, UDOGM ~~2020~~2019; Berry Petroleum 2021

3.8.2.9 Rail-Rail Crossings

The Action Alternatives would not require the construction of any new rail-rail crossings.

3.8.3 Environmental Consequences

Construction and operation of the proposed rail line could result in impacts on energy resources, including impacts on energy consumption and impacts on existing energy transportation infrastructure. This subsection first presents the potential impacts that would be the same for all three Action Alternatives and then compares the potential impacts that would be different for each Action Alternative. For comparison purposes, this subsection also describes energy resources under the No-Action Alternative.

3.8.3.1 Impacts Common to All Action Alternatives

Construction

Electricity Consumption and Distribution

Construction of any of the Action Alternatives would require electricity for construction site lighting and operation of electricity-driven equipment. The Coalition would obtain electric power for construction sites by installing temporary connections within the rail line footprint to nearby existing electric distribution lines. Where existing electric distribution lines are not accessible, OEA expects that the Coalition would use portable generators or solar power to provide electricity for rail construction. OEA anticipates that electricity consumption during construction would be minimal and that the existing electricity distribution system would be adequate to provide the electricity that would be needed for construction. Therefore, construction of the proposed rail line would not require new or expanded electrical substations or other fixed electrical distribution facilities.

Road Closures and Realignments

Road closures and realignments associated with the construction of any of the Action Alternatives would not affect access to or operation of energy fixed facilities (Figure 3.8-1) or transport of energy products. While temporary road closures during construction could temporarily affect access, standard traffic control measures, such as detours and temporary access roads, would minimize impacts and the potential for delays (VM-3). Each of the Action Alternatives would involve permanently realigning existing roads in some locations (refer to Appendix A, *Action Alternatives Supporting Information*, for locations of road relocations). The Coalition would design these road realignments so as to allow continued vehicle access to existing fixed facilities, such as oil pads, during and following construction of the proposed rail line (ENGY-MM-1).

Operations

Electricity Consumption and Distribution

Operation of any of the Action Alternatives would require electricity for signal, communication, and safety equipment. The Coalition states that it would obtain this electric power by installing permanent connections within the rail line footprint to nearby existing electric distribution lines. Where existing electric distribution lines are not accessible, the Coalition would use solar power to provide electricity for signal, communication, and safety equipment. The consumption of electricity for railroad operations would be negligible compared to available electricity capacity in the region.

Fuel Consumption

In the short term, OEA does not expect that the proposed rail line would divert truck transportation of crude oil to rail transportation for the purpose of serving existing oil refineries in Salt Lake City because those refineries currently do not have rail access. If the proposed rail line were constructed, therefore, tanker trucks would continue transporting crude oil from production areas in the Basin to Salt Lake City refineries, and the consumption of diesel fuel by those trucks would not change as a result of the proposed rail line.

OEA anticipates, however, that the proposed rail line would eliminate the existing tanker truck traffic transporting crude oil from production areas in the Basin to the Price River Terminal in Wellington, Utah. If the proposed rail line were constructed, the tanker trucks that currently transport crude oil to the Price River Terminal would likely go to the proposed rail line terminals in the Basin instead because the proposed rail line terminals would be significantly closer to oil production areas in the Basin than the Price River Terminal. Based on information provided by the Coalition, OEA estimated that tanker trucks transport approximately 10,000 barrels of crude oil per day to the Price River Terminal.[3] This corresponds to approximately 17,464 tanker trucks per year. Because this tanker truck traffic would be diverted to rail transportation if the proposed rail line were constructed, OEA estimates that the diesel fuel consumption for truck transportation would be reduced by approximately 47,500 gallons per year under any of the Action Alternatives. Operation fuel consumption estimates for the Action Alternatives include the reduction in fuel consumption from diverted trucks.

Rail Transportation of Energy Resources

If the Coalition were to construct and operate any of the Action Alternatives, the proposed rail line would offer a new transportation option for moving crude oil out of the Basin to markets across the United States. As discussed in detail in Section 3.15, *Cumulative Impacts*, oil producers in the Basin could expand production of crude oil in the future and transport that crude oil on the proposed rail line. Because the proposed rail line would be operated as a common carrier, all oil producers in the Basin would be able to ship oil on the proposed rail line. Depending on future conditions in the global market for crude oil, the Coalition estimates that the proposed rail line could transport between 130,000 barrels and 350,000 barrels of crude oil per day, on average. Those estimates correspond to between 1.84 loaded oil trains per day (the low rail traffic scenario) and 4.96 loaded oil trains per day (the high rail traffic scenario). OEA anticipates that these trains would transport crude oil from the Basin to markets in the Texas Gulf Coast, the Louisiana Gulf Coast, the Midwest, the West Coast, and other regions (Appendix C, *Downline Analysis Study Area and Train Characteristics*).

The volume of crude oil that would move on the proposed rail line under either the high rail traffic scenario or the low rail traffic scenario would be less than one-half of one percent of total global

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[3] Based on the Coalition's Response to OEA's Information Request #2 (Coalition 2019), as of October 2019, operators were producing approximately 90,000 barrels of oil per day in Uintah and Duchesne counties, of which up to 80,000 barrels were being trucked to the Salt Lake City refineries. The remaining 10,000 barrels were being sent to rail terminal facilities outside the Basin. For the purposes of this section, OEA assumed that all 10,000 barrels were being shipped to the Price River Terminal, which is currently the closest rail terminal to the Basin.

crude oil production. Therefore, OEA concludes that the availability of a new transportation option for crude oil from the Basin would have an insignificant effect on global crude oil supply and a negligible impact on crude oil prices, which depend on many factors, including refinery capacity and consumer demand for petroleum products. OEA anticipates that crude oil transported on the proposed rail line would displace shipments of crude oil from production areas outside of the Basin, including oil produced elsewhere in the United States and oil imports from abroad. Potential environmental impacts related to the combustion of the crude oil that could be transported on the proposed rail line are discussed in Section 3.15, *Cumulative Impacts*.

3.8.3.2 Impact Comparison between Action Alternatives

Construction

Fuel Consumption

Construction of any of the Action Alternatives would involve the consumption of different amounts of diesel fuel and gasoline to power construction equipment, trucks, and construction personnel vehicles. Table 3.8-1 shows the diesel fuel and gasoline consumption for each year of construction for each of the Action Alternatives.

Table 3.8-1. Diesel and Gasoline Consumption for Each Year of Construction

Action Alternative	Diesel (thousand gallons)	Gasoline (thousand gallons)	Total (Thousand gallons)	Total (million BTUs)	Percent of Annual Statewide Fuel Consumption (%) Diesel/Gasoline
Indian Canyon Alternative					
Year 1	6,902	1,584	8,486	1,138,697	1.05/0.14
Year 2	6,954	1,536	8,490	1,140,068	1.06/0.14
Year 3	2,386	497	2,883	387,613	0.36/0.04
Total	**16,242**	**3,617**	**19,859**	**2,666,378**	**N/A**
Wells Draw Alternative					
Year 1	5,172	1,786	6,958	925,348	0.8/0.16
Year 2	5,210	1,732	6,942	924,126	0.8/0.15
Year 3	5,347	1,678	7,025	936,466	0.8/0.15
Year 4	5,254	1,624	6,878	917,135	0.8/0.14
Total	**20,984**	**6,819**	**27,803**	**2,785,940**	**N/A**
Whitmore Park Alternative					
Year 1	8,269	1,639	9,908	1,333,128	1.3/0.15
Year 2	8,337	1,590	9,927	1,336,606	1/3/0.14
Year 3	2,868	515	3,383	455,900	0.4/0.05
Total	**19,473**	**3,744**	**23,217**	**3,125,635**	**N/A**

Notes:
OEA calculated energy consumption using EPA MOVES model.
BTU = British thermal unit; N/A = not applicable; -- = no construction

The table reports fuel consumption in gallons of fuel consumed and, for comparison, as a percentage of total fuel use in Utah. Construction of the Wells Draw Alternative would result in the highest total fuel consumption, followed by the Whitmore Park Alternative and Indian Canyon Alternative. Tunnel track construction would require the most fuel (approximately 40 to 48 percent of the total consumption amount depending on the alternative) compared to other construction activities. Total fuel consumption would be small relative to the refining capacity of the Salt Lake City area refineries and would therefore not affect regional fuel supply.

Oil and Gas Wells

Table displays the number, types of wells, and lease ~~ownership~~ type within the study area of each Action Alternative that would be affected by construction of the proposed rail line.

Table 3.8-2. Wells in the Study Area of each Action Alternative by Lease ~~Ownership~~Type

	Number of Wells by Lease ~~Ownership~~Type				
	Federal	**Fee (Private)**	**Tribal**	**State**	**Total**
Indian Canyon Alternative					
Producing	--	--	1	--	1
Plugged and Abandoned	--	--	--	1	1
Shut-in	--	--	--	--	--
Approved Application for Permit to Drill	--	--	2	--	2
Water Injection (active and inactive)	--	--	--	--	--
Total	**--**	**--**	**3**	**1**	**4**
Wells Draw Alternative					
Producing	1	1	2	--	4
Plugged and Abandoned	1	--	--	2	3
Shut-in	1	--	--	--	1
Approved Application for Permit to Drill	--	--	--	--	--
Water Injection (active and inactive)	3	--	--	--	3
Total	**6**	**1**	**2**	**2**	**11**
Whitmore Park Alternative					
Producing	--	--	1	--	1
Plugged and Abandoned	--	--	--	--	--
Shut-in	--	--	--	--	--
Approved Application for Permit to Drill	--	--	1	--	1
Water Injection (active and inactive)	--	--	--	--	
Total	**--**	**--**	**2**	**--**	**2**

Notes:

Source: UDOGM ~~2020~~2019

Producing = well is actively producing oil or gas; plugged and abandoned = well is no longer producing and is permanently closed; shut-in = well for which construction has been completed but that is not currently being operated; Approved Application for Permit to Drill = well has been approved by the Utah Division of Oil, Gas, and Mining but drilling has not commenced; water injection = well used to inject produced water

Of the three Action Alternatives, the Wells Draw Alternative would affect the greatest number of wells, followed by the Indian Canyon Alternative and the Whitmore Park Alternative. The Wells Draw Alternative would affect the most wells on federal, private, and state leases, while the Indian Canyon Alternative would affect the most wells on tribal leases. OEA anticipates that oil and gas-producing wells and shut-in wells would be plugged and abandoned in accordance with Utah Administrative Code Rule R649-3-24, *Plugging and Abandonment of Wells*, resulting in loss of actual and potential oil and gas production from these locations. For locations where an Application for Permit to Drill has been approved, the application would be withdrawn, which would result in the loss of potential production. Active and inactive water injection wells would be plugged and abandoned, resulting in the loss of water injection capacity. To minimize the potential for impacts on abandoned wells, OEA is recommending mitigation requiring the Coalition to follow construction safety procedures that would entail identifying plugged and abandoned wells and protecting them from potential damage due to rail construction activities (ENGY-MM-2).

The Action Alternatives would also intersect well pads where the wells themselves are located outside of the project footprint. In these cases, the wells may be able to remain in production if the integrity of the well infrastructure is not affected by construction of the proposed rail line. Depending on the area and configuration of the well pad intersected by the project footprint, construction of the proposed rail line may affect operational activity on the well pads. Impacts may include restricting internal circulation of trucks on a pad, relocating equipment or physical infrastructure, and restricting other operational activity to maintain the safety of workers, equipment, and infrastructure during and after construction. To minimize impacts on oil and gas well pad operations, OEA is recommending mitigation requiring the Coalition consult with oil and gas operators of existing facilities, including well pads, affected by the proposed rail line prior to construction to develop appropriate measures to mitigate impacts on these facilities (ENGY-MM-4). These measures may include, but are not limited to, adjusting the location of construction activities within the temporary footprint to avoid oil and gas facilities or relocating the facilities if impacts cannot be avoided during construction and operations of the proposed rail line (ENGY-MM-4).

Electric Transmission Lines and Pipelines

Table 3.8-3 shows the number of utility corridors crossed by each Action Alternative. The Whitmore Park Alternative would result in the most utility crossings (nine pipeline and four electric transmission line crossings), followed by the Indian Canyon Alternative (nine pipeline and two electric transmission line crossings), and the Wells Draw Alternative (two pipeline and four electric transmission line crossings).~~The Wells Draw Alternative and Whitmore Park Alternative would each cross four electric transmission lines and two pipelines, while the Indian Canyon Alternative would cross two transmission lines and two pipelines.~~ Any crossing of utility rights-of-way would occur in accordance with applicable regulatory standards (refer to Appendix A, *Regulations*). Except for natural gas-gathering pipelines, as described below, OEA does not anticipate that construction of the proposed rail line would require any existing electric transmission lines, pipelines, or other surface or underground utility infrastructure to be temporarily or permanently relocated, modified, removed, or abandoned in place. Underground utility lines traversing the rail right-of-way could require installation of casings or other types of protection-in-place, which could occur without interfering significantly with existing utility services. Therefore, OEA does not anticipate that construction of the proposed rail line would require planned temporary or permanent interruption of utility services. To ensure that impacts on utility corridors are minimized, OEA is recommending mitigation requiring the Coalition to ensure that industry standards and applicable Utah Division of Public Utilities' regulations and guidelines are met in the event that temporary or permanent utility relocation is needed and to coordinate any alterations with utility service providers to avoid interruption of utility services to customers to the extent possible (ENGY-MM-3).

Based on comments that Berry Petroleum Company LLC (Berry Petroleum) submitted on the Draft EIS, OEA digitally mapped the locations of the natural gas-gathering pipelines operated by Berry Petroleum that would be intersected by the proposed rail line (Appendix T, *Responses to Comments*). The Indian Canyon Alternative and Whitmore Park Alternative, which have the same alignment in this area, would each cross Berry Petroleum's gathering pipelines seven times and follow the same corridor as those pipelines for several miles. The project footprint of both Action Alternatives would overlap the pipelines for a total of 3.5 miles (2.4 miles of the rail line footprint and 1.1 miles of the temporary footprint). OEA anticipates that portions of Berry Petroleum's pipelines within the project footprint may need to be relocated. Natural gas-gathering pipelines operated by other oil and gas operators in the study area could similarly be affected by the proposed rail line. To minimize impacts on natural gas-gathering pipelines, OEA is recommending mitigation requiring the Coalition consult with oil and gas operators of existing facilities, including gathering pipelines, affected by the proposed rail line prior to construction to develop appropriate measures to mitigate impacts on these facilities. These measures may include, but are not limited to, adjusting the location of construction activities within the temporary footprint to avoid oil and gas facilities or relocating the facilities if impacts cannot be avoided during construction and operations (ENGY-MM-4).

Table 3.8-3. Utilities Crossed by Action Alternative

		Number of Crossings per Action Alternative		
Utility Type/Utility Name	**Size**	**Indian Canyon**	**Wells Draw**	**Whitmore Park**
Natural Gas Pipeline/ Questar Pipeline Company	20-inch	1	1	1
Crude Oil Pipeline/ Chevron Salt Lake Crude Pipeline	---	1	1	1
Berry Petroleum Gathering Pipeline	---	7	0	7
Electric Transmission Line/ Rocky Mountain Power	34.5 kVa	1	1	1
Electric Transmission Line/ UPALCO	138 kVa	1	3	3
Total		**~~4~~11**	**6**	**~~6~~13**

Notes:
Sources: ArcGIS 2018, 2019c, 2019d; PHMSA 2020a; EIA 2020h; Berry Petroleum 2021
kVa = kilovolt-ampere

Operation

Fuel Consumption

The primary use of diesel fuel during rail operations would be to power the locomotives. Gasoline consumption would be primarily for operation of equipment and on-road and off-road vehicles. Table 3.8-4 shows the diesel and gasoline fuel consumption for each Action Alternative under the low rail traffic scenario and high rail traffic scenario. Because it is the longest route, operation of the Wells Draw Alternative would consume the most fuel, followed by the Whitmore Park Alternative and the Indian Canyon Alternative.

Table 3.8-4. Fuel Consumption by Scenario

Fuel Type	Low Rail Traffic Scenario		High Rail Traffic Scenario	
	Gallons/Year	Million Btu/Year	Gallons/Year	Million Btu/Year
Indian Canyon Alternative				
Diesel	3,883,928	533,578	11,552,146	1,587,045
Gasoline	72,013	8,662	144,026	17,324
Total	**3,955,941**	**542,240**	**11,696,171**	**1,604,370**
Wells Draw Alternative				
Diesel	5,103,837	701,170	14,939,087	2,052,347
Gasoline	102,320	12,308	188,899	22,722
Total	**5,206,157**	**713,478**	**15,127,985**	**2,075,069**
Whitmore Park Alternative				
Diesel	4,266,669	586,159	12,616,273	1,733,236
Gasoline	74,537	8,966	149,074	17,931
Total	**4,341,206**	**595,125**	**12,765,347**	**1,751,168**

Notes:
OEA calculated fuel consumption using EPA MOVES model.
Btu = British thermal unit

Table 3.8-5 expresses the consumption of diesel fuel and gasoline during rail operations as a percentage of total diesel and gasoline consumption in Utah. As the table shows, total fuel usage would represent a small fraction of statewide consumption under both the high rail traffic scenario and the low rail traffic scenario. Under either scenario, therefore, fuel consumption for rail operations would have a negligible effect on regional fuel supply.

Table 3.8-5. Percentage of Statewide Fuel Consumption for First Year of Operation

Action Alternative	Low Rail Traffic Scenario		High Rail Traffic Scenario	
	Diesel (%)	Gasoline (%)	Diesel (%)	Gasoline (%)
Indian Canyon	0.59	0.01	1.76	0.01
Wells Draw	0.78	0.01	2.27	0.02
Whitmore Park	0.65	0.01	1.92	0.01

Road Crossings

As discussed in Section 3.1, *Vehicle Safety and Delay*, each of the Action Alternatives would cross public and private roads at grade. Trucks transporting energy products and utility maintenance vehicles could experience delays at at-grade road crossings, but these delays would be infrequent and of relative short duration and would not affect overall operations of energy facilities. The Whitmore Park Alternative would require the most at-grade road crossings (49 private and 17 public at-grade crossings) and, therefore, could contribute to greater delays for the transport of the energy products or access to energy facilities than either the Wells Draw Alternative (34 private and 27 public at-grade crossings) or the Indian Canyon Alternative (45 private and 8 public at-grade crossings). OEA concludes, however, that none of the Action Alternatives would significantly affect access to or operation of energy facilities or the transport of energy products. The proposed rail line would not affect energy substations and other energy facilities located on US 191 and other major roads because the crossings over those roads would be grade separated (Figure 3.8-1).

3.8.3.3 No-Action Alternative

Under the No-Action Alternative, the Coalition would not construct the proposed rail line and would not transport crude oil by rail. No energy would be consumed to construct or operate the proposed rail line. The No-Action Alternative would not affect existing transmission lines, pipelines, truck transportation routes, or other energy distribution infrastructure. Under the No-Action Alternative, trucks would continue to transport crude oil from production areas in the Basin to refineries in Salt Lake City and to the Price River Terminal in Wellington.

3.8.4 Mitigation and Unavoidable Environmental Impacts

OEA is recommending ~~three~~ four mitigation measures related to energy resources and concludes that, if the Board were to impose those mitigation measures, the construction and operation of the proposed rail line would result in insignificant impacts on energy resources (Chapter 4, *Mitigation*). Construction and operation of any of the Action Alternatives would consume energy, including diesel fuel, gasoline, and electricity, but this energy demand would represent only a small percentage of the available supply of energy in the study area. Each of the Action Alternatives would cross electric transmission line and crude oil pipelines and gathering pipeline rights-of-way. The Coalition would design these crossings in accordance with industry regulatory standards, and OEA anticipates that these standards would minimize any chance of disrupting pipeline and transmission line operation. Construction of any of the Action Alternatives would result in the closure of producing and approved oil wells, but the closure of these wells would not significantly affect the supply of energy resources in the study area. OEA is recommending mitigation requiring the Coalition consult with oil and gas operators of existing facilities (e.g., wells, well pads, gathering pipelines, access roads) affected by the proposed rail line prior to construction to identify measures to mitigate impacts on affected oil and gas facilities. The rail transportation of crude oil on the proposed rail line would also not significantly affect the national or global supply of crude oil or crude oil prices. Any potential future increase in crude oil production in the Basin would not be a direct or indirect impact of the proposed rail line. Therefore, impacts related to crude oil production are discussed in Section 3.15, *Cumulative Impacts*.

3.9 Cultural Resources

This section describes OEA's analysis of potential impacts on cultural resources that could result from construction and operation of the proposed rail line. The primary laws that govern the Board's consideration of cultural resources for the proposed rail line are NEPA and the National Historic Preservation Act (NHPA) (54 U.S.C. § 300101 *et seq*.). The Board is coordinating compliance with NEPA and Section 106 of NHPA (54 U.S.C. § 306108). The regulations that implement Section 106 encourage agencies to do so to prevent redundant reviews.

Board authorization of construction and operation of a proposed rail line is an undertaking under the Section 106 regulations of NHPA (36 C.F.R. Part 800). Therefore, in determining whether to authorize such construction and operation, the Board is required to take into account the potential effects of authorization on historic properties. Historic properties under Section 106 are cultural resources that are listed in or eligible for listing in the National Register of Historic Places (National Register), as defined by the regulations for implementing Section 106 (36 C.F.R. Part 60). Historic properties can include buildings, prehistoric and historic archaeological sites, districts, objects, and structures, as well as traditional cultural properties and landscapes (both tribal and historic). The term historic property includes properties of religious or cultural significance to tribes. The NEPA term *cultural resources* as used in this chapter is interchangeable with the Section 106 term *historic properties*.

In consultation with the Utah State Historic Preservation Officer (SHPO), the Ute Indian Tribe, and 16 other Section 106 consulting parties, OEA developed a Programmatic Agreement (PA) that specifies how Section 106 compliance would proceed if the Board were to authorize the construction and operation of the proposed rail line. A Draft PA was appended to the Draft EIS to provide opportunity for Section 106 consulting parties and the public to review and comment on the Draft PA. OEA considered all comments received on the PA and distributed a revised PA to the Section 106 consulting parties on March 11, 2021. The PA was executed on March 25, 2021, and is appended to this Final EIS as Appendix O, *Programmatic Agreement*.

The subsections that follow describe the study area, data sources and methods used to analyze the impacts, the affected environment, and the impacts of the Action Alternatives on cultural resources.

3.9.1 Analysis Methods

This subsection identifies the study area, data sources, and analysis methods OEA used to assess impacts on cultural resources.

3.9.1.1 Study Area

OEA defined the study area for cultural resources as the area that could be affected by the proposed rail line (40 C.F.R. § 1502.15). Section 106 uses the term area of potential effects (APE) instead of the term study area and defines the APE as the "geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties." The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by an undertaking (36 C.F.R. § 800.16(d)). In this section, the term APE refers to the study area for cultural resources.

In delineating the APE for each of the three Action Alternatives, OEA relied on the terms *rail line footprint*, *temporary footprint*, and *project footprint* defined in Chapter 2, *Proposed Action and Alternatives*.[1] This cultural section incorporates those definitions. The project footprint is conservative, meaning that it may overstate the areas of permanent and temporary disturbance during construction and operation of the proposed rail line.

As described in Section 3.9.3.1, *Impacts Common to All Action Alternatives*, OEA considered the types of activities associated with construction and operation of the proposed rail line, the potential for those activities to result in adverse effects, and the types of historic properties that the proposed construction and operation could affect. As described in more detail in OEA's historic properties technical memorandum (Appendix N, *Historic Properties Technical Memorandum*), OEA defined the APE to include potential impacts on resources located below ground (including resources located on the surface of the ground) and above ground, as follows.

- **Below-ground resources.** OEA defined the below-ground portion of the APE to include the project footprint, plus an additional 50-foot buffer. In some areas, it is not possible to add the additional 50-foot buffer to the project footprint because of topographical constraints, such as cliffs. Due to the irregular size and shape of the project footprint, it is not possible to provide a uniform width for the below-ground portion of the APE. OEA anticipates that physical impacts on historic properties could occur within this portion of the APE.
- **Above-ground resources.** OEA also defined the APE to include the average width of the project footprint (240 feet), plus an additional 1,500-foot buffer on each side of centerline to conservatively estimate potential impacts. This 1,500-foot buffer is large enough to include potential impacts related to noise, vibration, hydrology, visual resources, and air quality. The above-ground portion of the APE, therefore, extends to 1,740 feet on each side of the centerline for a total width of 3,480 feet. The above-ground portion of the APE encompasses the below-ground portion of the APE. Although OEA does not anticipate physical changes to historic properties within this portion of the APE, changes to their settings are possible.

Table 3.9-1 details the area of the APE for the three Action Alternatives. Appendix N, *Historic Properties Technical Memorandum*, displays the APE.

[1] The *rail line footprint* includes the area of the railbed, as well as the full width of the area cleared and cut or filled. The rail line footprint would also include other physical structures installed as part of the proposed rail line, such as fence lines, communications towers, siding tracks, relocated roads, and power distribution lines. The rail line footprint is the area where rail line operations and maintenance would occur. The width of the rail line footprint would vary depending on site-specific conditions, such as topography, soil slope stability, and other geotechnical conditions. The area would be permanently disturbed. The *temporary footprint* is the area that would be temporarily disturbed during construction, including areas for temporary material laydown, staging, and logistics. The temporary footprint would be reclaimed and revegetated following construction. The *project footprint* is the combined area of the rail line footprint and temporary footprint, both of which would be disturbed during construction, comprise where construction and operations of the proposed rail line would occur.

Table 3.9-1. Area of Potential Effects by Action Alternative

			Action Alternative (acres)		
Area of Potential Effects	Resources Affected	Type of impacts	Indian Canyon	Wells Draw	Whitmore Park
Below-ground portion (includes project footprint plus 50-foot buffer)	All types of resources	Physical impacts	5,010.8	9,297.6	5,814.7
Above-ground portion (1,500-foot buffer beyond below-ground portion)	Above-ground resources only	Impacts on setting	29,001.3	33,422.1	30,996.4
Total			**34,012.1**	**42,719.7**	**36,811.0**

3.9.1.2 Data Sources

OEA reviewed a wide variety of background documents and data for this project. The following reports and studies were particularly useful in identifying cultural resources recorded in the APE and determining the potential impacts on these cultural resources that could result from construction and operation of the proposed rail line.

- *Selective Reconnaissance-Level Survey of Archaeological Resources Along Potential Route Alternatives for the Uinta Basin Railway Project in Utah, Carbon, Duchesne, and Uintah Counties, Utah* (Coalition 2020a). These documents are referred to collectively in this section as the Coalition's Technical Reports.
- *Selective Reconnaissance-Level Survey of Historic Architectural Resources Along Proponent Routes for the Uinta Basin Railway Project in Utah, Carbon, Duchesne, and Uintah Counties, Utah* (Coalition 2020b).
- *Badlands ATV Trail Connections* (Knox and Isaacs 2017a).
- Indian Canyon Trail/Indian Canyon Road Utah Archaeology Site Form (Knox and Isaacs 2017b).
- Letter from Elizabeth Hora, Utah ~~State Historic Preservation Office (~~SHPO~~)~~, to Kristy Groves, Ashley National Forest, concurring with determination of eligibility for Indian Canyon Trail/Indian Canyon Road, October 2017 (Hora pers. comm.).
- Prehistoric Temporary Campsites in the Uinta Basin, National Register of Historic Places Multiple Property Documentation Form (SWCA Environmental Consultants 2017a).
- Irrigation in the Uinta Basin, 1869 to 1972, National Register of Historic Places Multiple Property Documentation Form (SWCA Environmental Consultants 2017b).
- Sheepherding and Sheep Camps in the Uinta Basin, 1879 to 1972, National Register of Historic Places Multiple Property Documentation Form (SWCA Environmental Consultants 2017c).
- *A Cultural Resources Survey of Ames US-6 Cultural Survey project, Utah County, Utah* (Karpinski 2008a).
- IMACS Site Form, Historic Highway 6 (Karpinski 2008b); includes State Historic Preservation Office stamp indicating concurrence with determination of eligibility.

3.9.1.3 Analysis Methods

OEA used the following methods to analyze cultural resources in the APE.

- **OEA coordinated NEPA and NHPA review**. The Board coordinated the Section 106 and NEPA reviews. Appendix N, *Historic Properties Technical Memorandum*, details OEA's approach for fulfilling its responsibilities under Section 106.
- **OEA conducted a Phased Identification approach**. Pursuant to 36 C.F.R. § 800.4(b)(2), OEA applied a Phased Identification approach to satisfy its obligations under Section 106. A Phased Identification is appropriate "where alternatives under consideration consist of corridors or large land areas, or where access to properties is restricted" (36 C.F.R. § 800.4(b)(2)). Use of the Phased Identification process is appropriate in the review of the Coalition's proposed operation and construction because 1) OEA is analyzing three Action Alternatives; 2) the Action Alternatives consist of corridors between 81 and 103 miles long; 3) the APE consists of large land areas; and 4) access to land for field investigation was restricted.[2]

  The Phased Identification approach allows federal agencies to "defer final identification and evaluation of historic properties" through the use of a ~~Programmatic Agreement (~~PA~~)~~ (36 C.F.R. § 800.13 (b)). It requires that OEA establish the "likely presence of historic properties within the area of potential effects for each alternative … through background research, consultation, and an appropriate level of field investigation, taking into account the number of alternatives under consideration, the magnitude of the undertaking and its likely effects, and the views of the SHPO and or Tribal Historic Preservation Office (THPO), and any other consulting parties." Appendix O, ~~*Draft*~~ *Programmatic Agreement,* includes the executed ~~Draft~~ PA. Prior to finalizing the PA, OEA ~~is requesting~~requested comments on the Draft PA from Section 106 consulting parties, other interested stakeholders, and the public. OEA distributed the~~The~~ revised PA ~~was distributed~~ to the Section 106 consulting parties for signature on March 11, 2021, and the document was executed on March 25, 2021.
- **OEA established the likely presence of historic properties**. OEA is carrying out the Phased Identification in two phases. Phase 1 is ongoing as the Board considers the three Action Alternatives assessed in this ~~Draft~~ EIS. It involves establishing the likely presence of historic properties. During this phase, OEA is taking the following actions (Appendix N, *Historic Properties Technical Memorandum*, describes these actions in greater detail).
  - Reviewing and incorporating the Coalition's background research and its reconnaissance level survey and inventory. Details regarding the portions of the APE that the Coalition has surveyed and inventoried are provided in Appendix N, *Historic Properties Technical Memorandum*.
  - Reviewing and incorporating background research from other sources listed above.
  - Developing an APE for each of the three Action Alternatives.
  - Conducting consultation with Section 106 consulting parties.

[2] Appendix N, *Historic Properties Technical Memorandum*, identifies the amount of land within the APE that was accessible during field surveys.

- Making preliminary determinations of eligibility and conducting preliminary effects analysis.
- Developing a PA pursuant to 36 C.F.R. § 800.14(b)(1)(ii).

OEA would proceed to Phase 2 if the Board authorizes an Action Alternative. OEA's actions during Phase 2 would include completing the identification and evaluation of historic properties within the APE for the authorized Action Alternative, conducting a robust assessment of effects, and resolving adverse effects in accordance with the terms of the PA. Appendix O, *~~Draft~~ Programmatic Agreement*, describes Phase 2 actions in greater detail.

- **OEA reviewed and verified the Coalition's field investigations and literature search**. During the period May through October 2019, the Coalition conducted literature searches and carried out cultural resources field investigations in accordance with an OEA-approved methodology and reported its results in technical reports that OEA reviewed and approved (Coalition 2020a, 2020b). Those technical reports are publicly available online on the Board-sponsored project website (www.uintabasinrailwayeis.com) and are incorporated by reference in this ~~Draft~~ EIS. Consistent with OEA's Phased Identification approach, field investigations established the presence of historic properties in the APE and the likely presence of additional historic properties in the APE. Appendix N, *Historic Properties Technical Memorandum*, provides additional information about the field investigations including the acreage of land surveyed within the APE of each Action Alternative.
- **OEA initiated NHPA consultation with an extensive group of potential consulting parties**. In addition to public outreach and stakeholder engagement under NEPA (Chapter 5, *Consultation and Coordination*), OEA initiated NHPA consultation with an extensive group of potential consulting parties. These parties included federal agencies, the Advisory Council on Historic Preservation (ACHP), the SHPO, the Ute Indian Tribe of the Uintah and Ouray Reservation, other federally recognized Indian tribes that may have affiliation with or interest in the region, state agencies, counties, the Coalition, and other parties with knowledge of and interest in historic properties in the APE. OEA conducted extensive consultation with parties that accepted consulting party status, including hosting monthly consulting party teleconferences. OEA also solicited comments from consulting parties on OEA's Phased Identification approach, OEA's preliminary identification and National Register eligibility evaluation efforts, OEA's preliminary assessment of effects, and the content of the Draft PA. OEA intends to continue consultation with all consulting parties ~~regarding~~ under Appendix O, *~~Draft~~ Programmatic Agreement*~~, until it is finalized and the Board determines whether to authorize an alternative~~. Appendix N, *Historic Properties Technical Memorandum*, provides a detailed record of consultation.
- **OEA conducted government-to-government consultation with the Ute Indian Tribe**. During consultation, the Ute Indian Tribe indicated its preference for providing information regarding cultural resources on Tribal trust lands directly to OEA through government-to-government consultation rather than permitting the Coalition or OEA access to these lands for the purpose of identification and evaluation during Phase 1 of the Phased Identification process. For purposes of the Phased Identification process and the EIS analysis, the Ute Indian Tribe shared preliminary information regarding tribal cultural resources with OEA. OEA will continue consultation with the Ute Indian Tribe under the terms of the *~~Draft~~ Programmatic Agreement*

(Appendix O), which includes provisions for identifying, evaluating, and assessing effects on properties of religious and cultural significance to the tribe.

- **OEA preliminarily identified historic properties.** Based on the literature search performed by the Coalition, the Coalition's field investigation, information provided by the SHPO, Ute Indian Tribe, and Forest Service, and National Register listings, OEA preliminarily identified 30 historic properties in the APE. OEA requested SHPO concurrence with its eligibility determinations. The SHPO concurred with OEA's determinations by letter dated November 2, 2020.~~As of the date of the issuance of this Draft EIS, SHPO's response is pending.~~

- **OEA preliminarily analyzed effects on historic properties.** Consistent with the Phased Identification approach, OEA analyzed effects on the National Register-eligible historic properties. OEA presented the results of its Section 106 analysis in a Historic Properties Technical Memorandum and requested SHPO concurrence.~~[3]~~ (OEA's analysis of potential impacts on cultural resources in this ~~Draft~~ EIS follows the same methodology as the Appendix N, *Historic Properties Technical Memorandum*). The SHPO concurred with OEA's overall adverse effect finding by letter dated November 2, 2020.

  For the purpose of its preliminary analysis of effects, OEA assumed that construction of the proposed rail line would result in a physical impact on any National Register-eligible archaeological sites located on the ground surface or below ground that are located in the below-ground portion of the APE. Depending on the final design of the proposed rail line and the final construction plan, archaeological sites within the rail line footprint would likely be removed or destroyed, and sites within the temporary footprint could be destroyed or damaged by construction activities.

  For built historic resources and archaeological sites above the ground surface (such as rock art sites), OEA defined a preliminary historic property boundary and compared the location of the boundary to the APE. For the purpose of this ~~Draft~~ EIS, OEA defined the historic property boundaries as contiguous with the legal boundary of the real estate parcel on which the resource is located, except as follows:

  - For properties located within the jurisdiction of the Bureau of Land Management where real estate parcels do not exist, OEA created a historic boundary by drawing a polygon around the resource to identify its footprint and then applied a 200-foot buffer around that footprint.

  - For surface archaeological sites, OEA used the site boundary recorded on the associated inventory form.

  - For above-ground archaeological sites, OEA applied a 200-foot buffer around the site boundary recorded on the inventory form.

  - For National Register-listed properties, OEA used the boundary description described on the National Register Registration Form.

  If OEA found that any part of a historic property boundary is present within the below-ground portion of the APE (the project footprint plus a 50-foot buffer), OEA concluded that construction of the proposed rail line could result in a physical impact on the historic property. In general,

~~[3] As of the date of the issuance of theis Draft EIS, SHPO's response regarding concurrence is pending.~~

OEA expects that physical impacts on historic properties would adversely impact those properties because it would change the characteristics that make them historically significant.

For above-ground historic properties where any part of the historic property boundary is located within the APE but entirely outside of the below-ground portion of the APE, OEA concluded that construction and operation of the proposed rail line would not result in a physical impact but would result in a change to the property's setting. Depending on the characteristics of a particular historic property, a change in setting might or might not be an adverse effect. If the setting of a historic property contributes to the historical significance of the property, then changing the setting may adversely affect the property, even if the property is not physically altered.

This section reports which known historic properties in the APE would experience a physical impact and which resources would experience a change in setting if the Coalition were to construct and operate the proposed rail line. In accordance with the Phased Identification approach, final assessment of effects would occur consistent with the PA if the Board were to authorize an Action Alternative. If the Board were to authorize one of the Action Alternatives, OEA would work with the Coalition and the other Section 106 consulting parties to avoid, minimize, or mitigate adverse effects on historic properties within the APE in accordance with the terms of the PA.

3.9.2 Affected Environment

This subsection identifies the existing environmental conditions related to cultural resources in the APE. The existing environmental conditions are also described in detail in the Coalition's *Selective Reconnaissance-Level Survey of Archaeological Resources* (Coalition 2020a) and *Selective Reconnaissance-Level Survey of Historic Architectural Resources* (Coalition 2020b).

3.9.2.1 Context

As discussed in more detail in Appendix N, *Historic Properties Technical Memorandum*, the Basin has a complex history of human settlement dating back to the Paleoarchaic period. Archaeological evidence shows a steady increase of the land's use by people who remained mobile until the sedentary Fremont tradition became recognizable in the area around 500 A.D. This shift in settlement pattern was accompanied by other changes, including growing reliance on agriculture, semi-permanent architecture, and the introduction of ceramic technology.

Spanish contact with the Basin in 1776 began a long history of Native American dispossession and more intensive Euro-American settlement. The creation of the Uintah Valley Reservation in 1861 formalized Native American removal from the Basin's lands, which some local tribes met with political and physical resistance. Despite this unrest, various Euro-American parties used the land through the 19th century, including the United States Army, miners, ranchers, and members of the Church of Jesus Christ of Latter-Day Saints.

At the turn of the 20th century, the federal government passed laws to reduce the Uintah Valley Reservation's size, which spurred another wave of Euro-American settlement, defined by agriculture and resource extraction. Advances in irrigation and transportation infrastructure made the land more arable and accessible, giving ranchers, miners, and homesteaders better access to marketplaces. The extraction of various metals, natural gas, and oil became important local industries. After declining sharply during the Great Depression, these industries strengthened during World War II and the post-war era and remain important to the local economy today.

3.9.2.2 Ethnography

Ethnography is the study of the culture of a specific group of people and describes how that group uses natural resources and what it considers important in the physical landscape. OEA conducted a literature review of previous studies, books, and other materials regarding the ethnography of the Ute Indian Tribe of the Uintah and Ouray Reservation and analyzed each document for information relating to the Basin. Appendix N, *Historic Properties Technical Memorandum,* presents the results of OEA's research on the ethnography of the Ute Indian Tribe.

Tribal members maintain a holistic worldview, which defines their relationship to the land. They believe a spiritual connection flows between people, animals, plants, water, air, and the landscape itself. This network makes humans responsible for the earth and the many forms of life it sustains. This worldview informed the Ute approach to life as hunter-gatherers with a deep knowledge of their ecosystem and its change between seasons. Although reservation life imposed by Euro-Americans has constricted their relationship to their surroundings, their traditional and spiritual uses for plants, animals, and landscape features persists.

3.9.2.3 Types of Identified Cultural Resources

During Phase 1 of the NHPA Phased Identification process, OEA identified 28 specific historic properties in the APE for the three Action Alternatives that are either listed in or eligible for listing in the National Register and 20 ineligible properties,[4] which include previously identified and newly identified properties. OEA expects to identify additional National Register-eligible examples of these property types, and likely other property types, during Phase 2 of its NHPA compliance effort.

Tribal Resources

Based on government-to-government consultation between OEA and the Ute Indian Tribe, sensitive tribal cultural resources are present in the APE outside of the project footprint. To protect confidentiality, OEA is not reporting the number, locations, or characteristics of these resources.

Archaeological Resources

Precontact and historic period archaeological evidence is present throughout the Basin. OEA has preliminarily identified one National Register-eligible prehistoric archaeological site within the APE of the three Action Alternatives, which consists of a rock art and artifact scatter site (Table 3.9-2).

Table 3.9-2. Archaeological Resources

Resource Identification No.	Trinomial	Resource Description
015	42DC4128	Rock art and artifact scatter

[4] Several segments of Emma Park Road and Indian Canyon Road are present in the APE. For clarity, OEA counted different segments of the same road as parts of the same resource. Therefore, although Indian Canyon Road has two Resource IDs (004 and 005), OEA counts them together as one resource. Similarly, Emma Park Road has two Resource IDs (026 and 027), which OEA counts as one resource.

Agricultural Resources

Starting in the 19th century, the Basin supported extensive agricultural uses, particularly sheep and cattle ranching. OEA identified nine National Register-eligible resources in the APE of the three Action Alternatives, including cairns, corrals, and a loafing shed, that represent this historical context (Table 3.9-3). Ranchers used cairns as landmarks to navigate the wide-open terrain that livestock herding demanded. They housed and penned livestock in corrals and sheds.

Table 3.9-3. Agricultural Resources

Resource Identification No.	Trinomial or Parcel No.	Resource Description
017	No Parcel No. 3 BLM	Cairn
020	No Parcel No. 7 BLM/42DC1541	Cairn
021	No Parcel No. 6 BLM/42DC2646	Cairn
002	2A-0313-0000/42CB1898	Corral
018	No Parcel No. 4 BLM	Corral
019	No Parcel No. 8 BLM	Corral
022	2A-0312-0001	Corral
024	330840001	Corral
025	00-0010-7882	Loafing shed

Transportation Resources

Settlement and economic development of the Basin are closely tied to transportation links. OEA preliminarily identified seven National Register-eligible transportation resources in the APE of the three Action Alternatives, including several segments of roads and a railroad, and bridges (Table 3.9-4).

Table 3.9-4. Transportation Resources

Resource Identification No.	Trinomial or Parcel No.	Resource Description
028	330970002	Bridge
029	330970001	Bridge
030	00-0009-9154	Bridge
007	42UT1370	Denver and Rio Grande Railroad segment
026	42CB1871	Emma Park Road segment
027	42UT1085	Emma Park Road segment
004	42DC328	Indian Canyon Road segments
005	42DC3802	Indian Canyon Road segments
006	42UT1124	U.S. Highway 6

Residential Resources

OEA identified eight residential National Register-eligible historic properties in the APE, including homesteads, cabins, and vernacular dwellings (Table 3.9-5). Built by homesteaders and settlers, these early 20th century residential resources convey the region's early settlement themes and are becoming increasingly rare.

Table 3.9-5. Residential Resources

Resource Identification No.	Trinomial or Parcel No.	Resource Description
003	00-0009-9329 (24191)	Cabin
010	2A-0425-0000	Cabin
012	00-0009-9287	Cabin
014	150310001B	Cabin
023	2A-0344-0000	Cabin
013	170720004	Homestead
011	00-0001-0373	~~National Folk-Style~~Single-cell dwelling
016	00-0010-7965	~~National Folk-Style dwelling~~Cabin

Land Management Resource

The Forest Service constructed the National Register-listed Indian Canyon Ranger Station in 1914 to house the resident forest ranger responsible for monitoring Ashley National Forest and implementing Forest Service management plans (Table 3.9-6). This property was listed in the National Register in 1999 under Criteria A and C.

Table 3.9-6. Land Management Resources

Resource Identification No.	Trinomial or Parcel No.	Resource Description
001	42465/42DC348	Indian Canyon Ranger Station[a]

Notes:

[a] The Forest Service proposes to decommission and demolish the Indian Canyon Ranger Station (Ashley National Forest 2020).

Water-Related Resources

Because it is a relatively arid region, settlement and economic development in the Basin depended on reliable access to water. OEA identified two National Register-eligible water-related resources in the APE of one of the three Action Alternatives (Table 3.9-7).

Table 3.9-7. Water-Related Resources

Resource Identification No.	Trinomial or Parcel No.	Resource Description
008	42UN2787	Myton Canal
009	28063/42DC230	Smith's Well

Yet-to-be-Identified Resources

During Phase 2, OEA expects to identify additional property types in the APE, particularly archaeological and tribal cultural resources. These property types could include, but are not limited to, home sites; sheep camps; mining-related sites; rock shelters; camps; ranches; pipelines, and artifact, lithic, and trash scatters. If these or other property types are identified during Phase 2, OEA would evaluate the properties' eligibility for listing in the National Register in accordance with the terms of the PA and in consultation with the Section 106 consulting parties.

3.9.3 Environmental Consequences

Construction and operation of the proposed rail line would result in impacts on cultural resources. This subsection first presents the potential impacts that would be the same for all three Action Alternatives and then compares the potential impacts that would be different for each Action Alternative. For comparison purposes, this subsection also describes cultural resources under the No-Action Alternative.

As stated previously, OEA assumed that construction of the proposed rail line would impact all National Register-listed or eligible historic properties in the below-ground portion of the APE (the project footprint plus a 50-foot buffer). OEA concluded that a physical impact would occur if any portion of a historic property's boundary is present in the below-ground portion of the APE. A change in setting would occur if a historic property boundary were within the APE but entirely outside of the below-ground portion of the APE. In accordance with the Phased Identification approach, final assessment of effects would occur consistent with the PA if the Board were to authorize an Action Alternative.

3.9.3.1 Impacts Common to All Action Alternatives

This subsection discusses potential impacts on cultural resources that would be the same across the three Action Alternatives.

Construction

Construction of any of the Action Alternatives would require clearing, grading, and operation of heavy equipment that could affect cultural resources above, at, or below the ground surface. Above-ground resources located within the APE but outside the below-ground portion of the APE could experience changes to their setting as a result of construction. Table 3.9-8 shows construction impacts based on historic property type. With the exception of temporary noise, dust, or vibration impacts during construction, all impacts described below would be permanent.

Table 3.9-8. Construction Impacts by Property Type

Construction Activity	Type of Impact	Potentially Affected Property Types
Clearing rail line footprint for staging and construction grading, cuts, excavating earth and rock on previously undisturbed land Excavating footings for structures including communications towers, bridges, and tunnels	Physical destruction of or damage to all or part of the property	All types that are in the path of construction or staging
• Railbed construction and staging • Construction of access roads	Alteration of a property that is not consistent with the Secretary's Standards for the Treatment of Historic Properties (36 C.F.R. Part 68) and applicable guidelines	All types that can be altered by compression or spreading of fill including but not limited to districts and linear features that need to be rerouted (e.g., roads, trails)

Construction Activity	Type of Impact	Potentially Affected Property Types
• Rerouting irrigation or drainage	Alteration of a property that is not consistent with the Secretary's Standards for the Treatment of Historic Properties (36 C.F.R. Part 68) and applicable guidelines	All types in the path of rerouting, e.g., water-related features
• Clearing the rail line footprint for construction • Existing road relocation	Removal of the property from its historic location	All historic properties in the path of construction or staging that can be moved/relocated
• Existing road relocation	Change of the character of the property's use or of physical features within the property's setting that contribute to its historic significance	Properties whose setting contributes to its significance
• Pile driving or heavy construction equipment that generates temporary noise or vibration • Fugitive dust	Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features	All types sensitive to temporary visual, noise, vibration, or atmospheric elements
• Property acquisition, lease, or easement	Transfer, lease or sale out of Federal ownership or control	All types on federally managed lands, e.g., BLM and Forest Service

Operations

Operation of any of the Action Alternatives, including train movement and maintenance activities, could result in limited physical effects on the historic properties themselves and could affect the setting of above-ground historic properties. Table 3.9-9 shows potential operations impacts based on historic property type. These impacts would be permanent.

Table 3.9-9. Operations Impacts by Property Type

Consequences from Operation Activities	Type of Impact	Potentially Affected Property Types
• Changes in water flow from culverts and other drainage structures may lead to erosion or flooding	Physical destruction of or damage to all or part of the property	All property types that could be damaged by erosion or flooding.
• Atmospheric elements (engine emissions, dust) • Long-term railroad noise and vibration	Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's significant historic features	All property types sensitive to visual, noise, vibration, or atmospheric elements
• Change in land use that results in abandonment	Neglect of a property that causes its deterioration	Ranches, buildings or structures if their continued use becomes no longer practical
• Access limitation that results in abandonment	Neglect of a property that causes its deterioration	Ranches, buildings or structures if their continued use becomes no longer practical

3.9.3.2 Impact Comparison between Action Alternatives

This subsection compares the potential impacts on cultural resources between the three Action Alternatives. Consistent with the Phased Identification approach, this analysis is preliminary. Final identification and evaluation of historic properties, assessment of effects, and resolution of adverse effects would occur in accordance with the terms of the PA. Table 3.9-10 shows a comparison of cultural resources impacts between the Action Alternatives.

Construction

Construction of the proposed rail line would physically alter and potentially destroy cultural resources located within the below-ground portion of the APE (the project footprint plus a 50-foot buffer). Construction activities would also result in visual and noise impacts on cultural resources within the APE but outside the below-ground portion. Cultural resources within the APE that would not be physically changed would experience changes in setting that would continue during rail operations. In addition to the specific cultural resources discussed in this section, it is likely that additional unidentified cultural resources are present in the below-ground portion of the APE that would be physically altered or destroyed during construction. To ensure that effects on ~~unidentified~~ cultural resources are properly assessed and resolved, the Coalition will comply with the terms and conditions of the executed PA ~~that OEA is developing in consultation with the Section 106 consulting parties~~ (VM-42, VM-43).

The APE for the Indian Canyon Alternative includes 16 known historic properties, as well as sensitive tribal cultural resources. Of the known resources in the APE for the Indian Canyon Alternative, 14 are located within the project footprint and could be physically altered or destroyed during construction. These 14 resources include three corrals (002, 022, and 024), two road segments (004/005 and 026/027), a segment of railroad (007), three bridges (028, 029, and 030), ~~two National-Folk-Style~~a single-cell dwelling~~s~~ (011~~ and 016~~), three~~wo~~ cabins (003, ~~and~~ 012, and 016), and one loafing shed (025). Indian Canyon Road, a linear resource located in the APE for the Indian Canyon Alternative, would experience a physical impact. It is a historic transportation route that passed from Duchesne toward Helper parallel to present-day U.S. Highway 191 (US 191). This roadway's alignment follows an older trail network that dates back to the Precontact period, and the extant segments played an important role in the regional economy for pedestrian, wagon, and later automobile traffic from the turn of the 20th century until US 191 replaced the route in the 1970s.

The APE for the Wells Draw Alternative includes 19 known historic properties. 12 of the known cultural resources in the APE for the Wells Draw Alternative are located within the project footprint and could be physically altered or destroyed during construction. These 12 cultural resources include one rock art and archeological artifact scatter site (015), one cairn (020), three corrals (002, 022, and 024), road segments (004/005 and 026/027), a segment of railroad (007), two bridges (028 and 029), one cabin (014), and segments of the Myton Canal (008). A rock art site from the Formative period located on a sandstone boulder in the APE for this alternative would experience physical impact. Consisting of a petroglyph and an artifact scatter, the site is likely associated with Fremont culture, is distinctive and well preserved, and has the potential to yield information on prehistoric human behavior in the area, including activity related to subsistence and cultural production.

Table 3.9-10. Cultural Resources Impact Comparison between Action Alternatives

			Type of Change (. Physical vs. Setting) by Action Alternative[a]		
Resource Description	**Resource ID**	**Location within APE**	**Indian Canyon Alternative**	**Wells Draw Alternative**	**Whitmore Park Alternative**
Indian Canyon Ranger Station[b]	001	1,500-foot buffer	Setting	N/A	Setting
Corral	002	Project footprint	Physical	Physical	N/A
Cabin	003	Project footprint	Physical	N/A	Physical
Indian Canyon Road segments	004 and 005	Project footprint	Physical	Physical	Physical
U.S. Highway 6	006	1,500-foot buffer	Setting	Setting	Setting
Denver and Rio Grande Railway segments	007	Project footprint	Physical	Physical	Physical
Myton Canal	008	Project footprint	N/A	Physical	N/A
Smith's Well	009	1,500-foot buffer	N/A	Setting	N/A
Cabin	010	Project footprint	N/A	N/A	Physical
~~National-Folk-Style~~Single-cell dwelling	011	Project footprint	Physical	N/A	Physical
Cabin	012	Project footprint	Physical	N/A	Physical
Homestead	013	1,500-foot buffer	N/A	Setting	N/A
Cabin	014	Project footprint	N/A	Physical	N/A
Rock art and artifact scatter	015	Project footprint	N/A	Physical	N/A
~~National-Folk-Style dwelling~~Cabin	016	Project footprint	Physical	N/A	Physical
Cairn	017	1,500-foot buffer	N/A	Setting	N/A
Corral	018	1,500-foot buffer	N/A	Setting	N/A
Corral	019	1,500-foot buffer	N/A	Setting	N/A
Cairn	020	Project footprint	N/A	Physical	N/A
Cairn	021	1,500-foot buffer	N/A	Setting	N/A
Corral	022	Project footprint	Physical	Physical	N/A
Cabin	023	1,500-foot buffer	N/A	N/A	Setting
Corral	024	Project footprint	Physical	Physical	Physical
Loafing shed	025	Project footprint	Physical	N/A	Physical

			Type of Change (. Physical vs. Setting) by Action Alternative[a]		
Resource Description	**Resource ID**	**Location within APE**	**Indian Canyon Alternative**	**Wells Draw Alternative**	**Whitmore Park Alternative**
Emma Park Road segments	026 and 027	Project footprint	Physical	Physical	Physical
Bridge	028	Project footprint	Physical	Physical	Physical
Bridge	029	Project footprint	Physical	Physical	Physical
Bridge	030	Project footprint	Physical	N/A	Physical
Resources Physically Impacted			**14**	**12**	**13**
Resources Impacted by Change in Setting			**2**	**7**	**3**
Total			**16**	**19**	**16**

Notes:

[a] N/A = not within APE

[b] The Forest Service proposes to decommission and demolish the Indian Canyon Ranger Station (Ashley National Forest 2020).

The APE for the Whitmore Park Alternative includes 16 known historic properties, as well as sensitive tribal cultural resources. Of the known resources in the APE for the Whitmore Park Alternative, 13 are located within the project footprint and could be physically altered or destroyed during construction. These 13 resources include road segments (004/005 and 026/027), a segment of railroad (007), three bridges (028, 029, and 030), one corral (024), a single-cell ~~two National-Folk-Style~~ dwelling~~s~~ (011~~ and 016~~), four~~three~~ cabins (002, 010, 012, and 016), and one loafing shed (025). In the APE for this alternative, newly recorded segments of the previously recorded Denver and Rio Grande Western Railroad would experience a physical impact. The railroad ran southwest of Emma Park along U.S. Highway 6 (US 6) and the Price River. These segments of the railroad dating back to 1883 played a role in the Euro-American history of the Basin in the late 19th and early 20th centuries and contributed to significant trends in national transportation and commerce during this period of general westward expansion and settlement.

Operations

During rail operations, cultural resources in the APE would be impacted by changes in setting, including permanent visual changes and noise from passing trains. Operation of the Indian Canyon Alternative would affect sensitive tribal resources and two known historic properties within the APE, including a segment of US 6 (006) and the Indian Canyon Ranger Station (001). The setting of the Indian Canyon Ranger Station, a National-Register-listed complex of buildings including a one-story residence, would change. Constructed by the Forest Service in 1914 and located in Indian Canyon adjacent to present-day US 191, the property embodies the role the Forest Service played in land management in the Basin during the early 20th century.[5] Operation of the Wells Draw Alternative would affect eight known historic properties, including three cairns (017, 020, and 021), two corrals (018 and 019), a segment of US 6 (006), a homestead (013), and Smith's Well (009). Constructed in circa 1890, Smith's Well would undergo changes to its setting. A previously recorded water-related resource, the well is significant for its role as an early waystation along Nine Mile Road between Fort Duchesne and Nine Mile Canyon along an otherwise arid transportation route. Operation of the Whitmore Park Alternative would affect three known historic properties and sensitive tribal resources within the APE, including a segment of US 6 (006), one cabin (023), and the Indian Canyon Ranger Station (001).[6] US 6, a previously recorded linear transportation resource undergoing changes to its setting, is a segment of a historic roadway constructed in the 1910s that ran from the eastern United States to California and played a significant role in goods movement and settlement patterns in the immediate area and greater region.

3.9.3.3 No Action Alternative

Under the No-Action Alternative, the Coalition would not construct and operate the proposed rail line and there would be no impacts on cultural resources.

3.9.4 Mitigation and Unavoidable Environmental Effects

Construction and operation of any of the Action Alternatives would result in impacts on cultural resources. Following the Section 106 regulations, OEA has~~is~~ adopted~~ing~~ a phased approach for

[5] The Forest Service proposes to decommission and demolish the Indian Canyon Ranger Station (Ashley National Forest 2020).

[6] The Forest Service proposes to decommission and demolish the Indian Canyon Ranger Station (Ashley National Forest 2020).

identifying historic properties and assessing effects within the APE. OEA ~~is~~ developed~~ing~~ a PA in consultation with the SHPO, the Ute Indian Tribe, and other Section 106 consulting parties that ~~will~~ sets forth how identification of historic properties and the assessment of effects would proceed if the Board were to authorize an Action Alternative, and how adverse effects on historic properties would be resolved. OEA ~~is~~ requested~~ing~~ comments from the Section 106 consulting parties, other interested stakeholders, and the public on the Draft PA, which was appended to the Draft EIS. The PA was executed on March 25, 2021,~~ appended to this Draft EIS~~ and is appended to the Final EIS as ~~(~~Appendix O, ~~*Draft*~~ *Programmatic Agreement*~~)~~. Based on the preliminary analysis conducted to date, OEA concludes that the three Action Alternatives would impact similar numbers of identified cultural resources. Depending on the Action Alternative, these resources include tribal cultural resources, archeological sites, historic agricultural properties, historic transportation corridors, historic residences, historic land management buildings, and historic water-related features.

Because the APE has not been surveyed comprehensively, OEA concludes that additional cultural resources, such as previously unidentified archeological sites, are likely to be present in the APE and could be impacted by construction and operation of the proposed rail line. Construction and operation of any of the Action Alternatives would likely result in impacts on cultural resources that have not yet been identified. To ensure that any adverse effects on cultural resources are appropriately avoided, minimized, or mitigated, the Coalition will comply with the terms of the executed PA ~~being developed through Section 106 consultation~~ (VM-42, VM-43).

3.10 Paleontological Resources

This section describes OEA's analysis of potential impacts on paleontological resources from construction and operation of the proposed rail line. Paleontology is a multidisciplinary science that combines elements of geology, biology, chemistry, and physics in an effort to understand the history of life on earth. Paleontological resources, or fossils, are the remains, imprints, or traces of once-living organisms preserved in rocks and sediments. These include mineralized, partially mineralized, or unmineralized bones and teeth, soft tissues, shells, wood, leaf impressions, footprints, burrows, and microscopic remains (Murphey and Daitch 2007). Paleontological and fossil resources vary widely in their relative abundance and distribution and not all are regarded as scientifically important (BLM 2008):

> A paleontological resource is considered to be scientifically important if it is a rare or previously unknown species, it is of high quality and well-preserved, it preserves a previously unknown anatomical or other characteristic, provides new information about the history of life on earth, or has an identified educational or recreational value. Paleontological resources that may be considered not to have scientific significance include those that lack provenience or context, lack physical integrity due to decay or natural erosion, or that are overly redundant or are otherwise not useful for research. Vertebrate fossil remains and traces include bone, scales, scutes, skin impressions, burrows, tracks, tail drag marks, vertebrate coprolites (feces), gastroliths (stomach stones), or other physical evidence of past vertebrate life or activities.

The subsections that follow describe the study area, data sources, methods OEA used to analyze potential impacts, the affected environment, and the potential impacts of the proposed rail line on paleontological resources.

3.10.1 Analysis Methods

This subsection identifies the study area, data sources, and analysis methods OEA used to analyze paleontological resources.

3.10.1.1 Study Area

The study area for paleontological resources is the project footprint,[1] which includes all areas of temporary disturbance where construction activities and staging would occur. The project footprint also includes all areas of permanent disturbance, including the railbed, access roads, communications towers, and areas of cut and fill.

[1] The *rail line footprint* includes the area of the railbed, as well as the full width of the area cleared and cut or filled. The rail line footprint would also include other physical structures installed as part of the proposed rail line, such as fence lines, communications towers, siding tracks, relocated roads, and power distribution lines. The rail line footprint is the area where rail line operations and maintenance would occur. The area would be permanently disturbed. The *temporary footprint* is the area that could be temporarily disturbed during construction, including areas for temporary material laydown, staging, and logistics. Disturbed areas in the temporary footprint would be reclaimed and revegetated following construction. The *project footprint* is the combined area of the rail line footprint and temporary footprint, both of which would be disturbed during construction, comprising where construction and operations of the proposed rail line would occur.

3.10.1.2 Data Sources

OEA reviewed the following data sources to determine potential impacts on paleontological resources that could result from construction and operation of the proposed rail line.

- Geologic maps of the study area (Bryant 2010; Sprinkel 2007, 2018; Weiss et al. 2003).
- Museum and agency fossil locality databases (Utah Geological Survey 2020).
- Previous paleontological technical reports containing record search data and geologic maps (SWCA 2020).
- Published scientific literature cited throughout the section.

3.10.1.3 Analysis Methods

OEA used the following methods to analyze paleontological resources in the study area.

- **OEA reviewed information on paleontological resource potential in the study area.** The Coalition's paleontology contractor, SWCA, collected baseline information on paleontological resources in the study area (SWCA 2020), which OEA reviewed and independently verified. SWCA reviewed spatial geologic data to map the geologic units within the study area and their corresponding Potential Fossil Yield Classification (PFYC) values. The Bureau of Land Management (BLM) and other agencies use the PFYC system to identify geologic areas that are more or less likely to contain fossils (Section 3.10.2.1, *Geologic Setting,* provides a description of paleontological resource potential and the BLM PFYC system). OEA consulted with BLM to confirm the PFYC values for geologic units in the study area (BLM 2016; McDonald pers. comm.).
- **OEA reviewed information on known fossil locations.** The abundance of reported fossil discoveries in a particular area is a useful indicator for the potential of that area to contain previously undiscovered paleontological resources. OEA reviewed published scientific literature to evaluate the paleontological potential of the study area. OEA also obtained and analyzed paleontological locality data from the Utah Geological Survey (Utah Geological Survey 2020) and SWCA (SWCA 2020).
- **OEA assessed the potential impacts on fossil-bearing formations and known fossil localities.** OEA evaluated potential project-related impacts based on scientific importance, number, and locations of previously recorded fossil discoveries (or fossil localities) within the study area and the likelihood, based on maps of PYFC designations, that the study area could contain previously undiscovered fossils. OEA's analysis focused on the potential for discovering scientifically important paleontological resources during construction. OEA mapped the geologic units that each Action Alternative would cross, assigned the corresponding PFYC value, and calculated the acreage within each PFYC unit that each Action Alternative would cross. The Action Alternatives encompassing larger areas of high potential rock units would have a higher potential for paleontological resource impacts.

3.10.2 Affected Environment

This subsection identifies the existing environmental conditions related to paleontological resources in the study area.

3.10.2.1 Geologic Unit Classification

Paleontological resources occur in many geologic units. A geologic unit is a layer or layers of rocks that can be grouped together based on their characteristics and mapped. A geologic unit can be a single rock formation or layer, a group of many formations that are associated with each other, a subgroup, or member, of a larger formation, or a collection of loosely associated rocks and sedimentary deposits. The BLM PFYC system classifies geologic units based on the relative abundance of vertebrate, invertebrate, plant, and trace fossils that have been documented within them, with a higher classification number corresponding to a higher potential for fossil occurrences. Since its adoption as policy by BLM (BLM 2007), the PFYC system has come to be widely used by both paleontologists and government agencies. Paleontologists apply the PFYC value to the geologic formation, member, or other distinguishable unit at the most detailed mappable level available. The six PFYC classes are briefly described as follows.

- **PFYC 1 (very low potential).** Geologic units that are not likely to contain recognizable paleontological resources.
- **PFYC 2 (low potential).** Geologic units that are not likely to contain paleontological resources.
- **PFYC 3 (moderate potential):** Geologic units where paleontological resources vary in significance, abundance, and predictable occurrence.
- **PFYC 4 (high potential).** Geologic units known to contain a high occurrence of paleontological resources.
- **PFYC 5 (very high potential).** Geologic units that consistently and predictably produce significant paleontological resources.
- **PFYC U (unknown potential).** Geologic units that cannot receive an informed PFYC assignment.

BLM has assigned PFYC rankings to all geologic units in the study area.

3.10.2.2 Geologic Setting

The geology of the area through which the proposed rail line would pass consists of the Uinta Basin (Basin) and the highlands and mountains that surround it. The Basin occupies approximately 6,800 square miles of northeastern Utah. Structurally, it is an asymmetrical, elongate synclinal[2] basin that is oriented east–west. It is bounded by the Uinta Mountains to the north, the Douglas Creek Arch and Roan Plateau to the east, the Book Cliffs/Tavaputs Plateau to the south, and the Wasatch Range to the west. Many of the rocks in the study area formed from stream and lake sediments that were deposited between approximately 83 million years ago and 1,000 years ago, although most of the sequence consists of rocks of middle Eocene age (approximately 40 to 49 million years old). Between approximately 80 and 35 million years ago, during a period of mountain building in western North America known as the Laramide orogeny, these sedimentary deposits were pushed upward by geologic uplift, creating the Uinta Mountains and the adjacent Basin. During that time, more than 25,000 feet of shallow-water sandstone and shale accumulated (Stokes 1986). As the mountains were uplifted, Paleozoic-age and Mesozoic-age rocks became exposed. Throughout

[2] A syncline is a feature made up of rock layers that have been deformed, or folded, by geologic processes so that the youngest rock layers are closest to the center of the fold. Synclines that are circular or elongated are known as basins.

the Basin, layers of newer rock from the Paleogene period dip gently from all directions to the northern margin, where the strata are sharply upturned and faulted along the southern flank of the Uinta Mountains uplift (Johnson 1985).

The Basin and the highlands surrounding it are well known for their geologic history and paleontological importance.[3] The fossil record in this region is discontinuous but rich, spanning a period of at least 535 million years from the Cambrian Period to the Pleistocene Epoch. The region has produced many important fossil specimens, including numerous holotypes, or specimens of previously unknown species. Many of these specimens are now housed in museums throughout the United States. Important specimens documented from within and around the study area include protoreodons (extinct pig-like mammals), rodents (*Pseudotomus* sp. and *Mytonomys sp*. [Black 1968]), perissodactyls and artiodactyls (*Triplopus* sp., Mytonomeryx sp.), primates (*Mytonius* sp.), lagomorphs (*Mytonolagus* sp.), and reptiles (e.g. *Procaimanoidea utahensis* [Gilmore 1946]). In addition, isolated trace fossils from as early as 1,100 million years ago have been reported in the Precambrian Uinta Mountain Group that some scientists have interpreted to be tiny fossil algal globules (Graham 2006). Trace fossils have also been reported in the Uinta Formation (Hamblin et al. 1998, 1999; Scott and Smith 2015).

The study area includes 11 sedimentary bedrock geologic units ranging in age from Cretaceous to Eocene, as well as 11 unnamed Quaternary surficial sedimentary deposits (Table 3.10-1). From oldest to youngest, the bedrock units consist of the North Horn, Flagstaff Limestone, Colton, Green River, and Uinta formations and their constituent members. Pleistocene-aged and Holocene-aged sediments deposited by rivers, streams, gravity, and wind overlie the bedrock geologic units in valleys and floodplains. Fossils occur in all sedimentary bedrock geologic units, as well as older surficial sedimentary deposits from the Pleistocene age.

The most scientifically important geologic units in the study area—which have high and very high paleontological potential (PFYC 4 and 5)—are found in the North Horn Formation, the Green River Formation, and the Uinta Formation. The Late Cretaceous to Eocene sedimentary units in these formations contain a rich and diverse fossil record spanning the Cretaceous-Paleocene boundary that documents the evolution of plants and animals, as well as the evolution of environments in North America. Noteworthy events recorded in these rocks include the extinction of dinosaurs (North Horn Formation), the transition from tropical to more-open woodland ecosystems during the early and middle part of the Eocene Epoch (Colton and Green River formations), the development and history of massive Lake Uinta during the early and middle part of the Eocene Epoch (Green River and Uinta formations), and the evolutionary diversification of mammals during the Paleocene and Eocene ages of North America (North Horn, Green River, and Uinta formations). Table 3.10-1 provides a list of geologic units in the study area and the acreage of each geologic unit that the Action Alternatives would cross.

[3] The information in this section was largely excerpted with minor modifications from Murphey and Daitch (2007) with approval of the authors.

Table 3.10-1. Geologic Units in the Study Area

Geologic Unit	Map Symbol	Typical Fossils	Age	BLM PFYC	Acres[a] Indian Canyon Alternative	Acres[a] Wells Draw Alternative	Acres[a] Whitmore Park Alternative
Alluvium and colluvium, mixed; mixed alluvium and eolian; flood-plan and channel alluvium	Qac, Qae, Qal	Holocene deposits are too young to contain *in-situ* fossils.	Holocene	2	141	270	141
Alluvial-fan deposits; alluvium; Piedmont alluvium, undivided	Qaf; Qa, Qal; Qa	Pleistocene deposits may contain mineralized or partially mineralized remains; Holocene deposits are too young to contain *in-situ* fossils.	Pleistocene and Holocene	2	859	385	875
Landslide deposits	Ql	Pleistocene deposits could contain mineralized or partially mineralized remains, though landslide deposits are not conducive to fossil preservation; Holocene deposits are too young to contain *in-situ* fossils.	Quaternary	2	232	315	26
Glacial outwash deposits of pre-Bull Lake age	Qgpb	Pleistocene deposits may contain mineralized or partially mineralized remains.	Pleistocene	2	401	94	401
Older pediment deposits	Qop	Pleistocene deposits may contain mineralized or partially mineralized remains.	Pleistocene	2	--	412	--
Pediment mantle	QTpm	Miocene, Pliocene, and Pleistocene deposits may contain mineralized or partially mineralized remains; Holocene deposits are too young to contain *in-situ* fossils.	Miocene[b] to Holocene	2	15	15	31

Geologic Unit	Map Symbol	Typical Fossils	Age	BLM PFYC	Acres[a]		
					Indian Canyon Alternative	Wells Draw Alternative	Whitmore Park Alternative
Uinta Formation; upper, lower, B, and C members	Tuu, Tul, Tub, Tuc	Mammals including primates, chalicotheres, uintatheres, artiodactyls and perissodactyls; reptiles including many types of turtles, and fish. Index taxa include *Amynodon reedi*, *Eobasileus cornutus, Eomoropus amororum*, and *Hyrachyus eximius* among many others (Gunnell et al. 2009; Murphey et al. 2011).	Eocene	5	787	926	853
Green River Formation, middle and lower members	Tgm, Tgl	Various fish, turtles, crocodiles and alligators, birds, many types of mammals, and varieties of invertebrates including insects, snails and clams. Diverse and well preserved plants.	Middle to Upper Eocene	4	313	326	381
Green River Formation, sandstone and limestone facies	Tgsl	Contains numerous stromatolites. Vertebrates (fishes, amphibians, reptiles, bird, mammals), invertebrates (insects, arthropods, mollusks), plants, ichnofossils.	Middle to Lower Eocene	4	231	984	286
Green River Formation; saline facies and upper member	Tgs, Tgu	Plants, insects, vertebrates including rays, primates, rodents, and *Hyracotherium* (an early horse).	Eocene	4	284	3,540	284
Colton Formation	Tc	Invertebrates including freshwater mollusks, ostracods and charophytes, as well as one occurrence of a bird (Hardy 1959)	Paleocene to early Eocene	3	628	628	1,370

Geologic Unit	Map Symbol	Typical Fossils	Age	BLM PFYC	Acres[a]		
					Indian Canyon Alternative	Wells Draw Alternative	Whitmore Park Alternative
Flagstaff Limestone and North Horn Formation (Undivided)	TKfn	North Horn: dinosaurs including ceratopsians, hadrosaurs, theropods, and the titanosaurid sauropod *Alamosaurus sanjuanensis,* as well as dinosaur eggs (Jensen 1966), crocodilians, testudinids, teiid lizards, and two mammal localities that produced the Late Cretaceous marsupial *Aletridelphys hatcheri* (Clemens 1961). Flagstaff: gastropods and pelecypods and one occurrence of a pantodont (mammal) from a roadcut (Miller 1986).	Paleocene and Upper Cretaceous	4	51	51	26

Notes:

The North Horn Formation (PFYC 4) and Flagstaff Limestone (PFYC 3) are mapped as undivided in the study area. Therefore, per standard BLM procedure, PFYC 4 is applied to the entire undivided unit.

[a] Acres are rounded to the nearest whole acre.

[b] The age of the Pediment mantle may extend back to the late Miocene but this is uncertain.

3.10.2.3 Record Search Results

There are numerous previously recorded scientifically important and unimportant fossil localities in the Green River Formation and Uinta Formation within 1 mile of the study area. In addition, four previously recorded fossil localities in the Colton Formation are located near the study area. No previously recorded fossil localities occur near the study area in the Flagstaff Formation or North Horn Formation. Table 3.10-2 lists the previously recorded fossil localities in the study area of each Action Alternative. In total, there are 26 important fossil localities in the study areas of the Indian Canyon Alternative and Whitmore Park Alternative, and one important fossil locality in the study area of the Wells Draw Alternative. All of these scientifically important localities are in the Uinta Formation.

Table 3.10-2. Previously Recorded Paleontological Localities in the Study Area by Action Alternative

Localities	Indian Canyon Alternative	Wells Draw Alternative	Whitmore Park Alternative
Scientifically Important Localities			
Private land	2	1	2
Federal land	0	0	0
State land	0	0	0
Tribal trust land	24	0	24
Total Scientifically Important Localities	26	1	26
Nonimportant Localities			
Private land	0	0	0
Federal land	0	3	0
State land	0	0	0
Tribal trust land	145	0	145
Total Nonimportant Localities	145	3	145
Total Localities (Important and Nonimportant)	**171**	**4**	**171**

Notes:
Source: Utah Geological Survey 2020

3.10.3 Environmental Consequences

Construction and operation of the proposed rail line could result in impacts on paleontological resources. This subsection first presents the potential impacts that would be the same for all three Action Alternatives and then compares the potential impacts that would be different across the Action Alternatives. For comparison purposes, this subsection also discusses the status of paleontological resources under the No-Action Alternative.

3.10.3.1 Impacts Common to All Action Alternatives

Construction

Construction of any of the Action Alternatives would involve excavation activities within geologic units that have a PFYC value of 3 or greater. Those excavation activities could potentially result in direct adverse impacts on scientifically important paleontological resources. Depending on the depth of sensitive geologic units, grading, drilling, and trenching could damage or destroy paleontological resources at or below the surface. These activities could also lead to discovery of previously unknown paleontological resources. Without mitigation, these fossils, as well as the paleontological data they could provide if properly salvaged and documented, could be adversely affected (destroyed), rendering them permanently unavailable. Direct adverse impacts can typically be mitigated through implementation of a paleontological monitoring and treatment plan (Section 3.10.4, *Mitigation and Unavoidable Environmental Effects*). Mitigation also creates a beneficial impact because it results in the salvage of fossils that may never have been unearthed via natural processes. With mitigation, these newly salvaged fossils become available for scientific research, education, display, and preservation into perpetuity at a public museum.

Temporary surface activities, such as vegetation removal and staging, generally do not extend deep enough to affect paleontologically sensitive geologic units, but those activities could cause indirect impacts by exposing subsurface fossils to weathering by wind and water.

Operations

Rail operation activities, such as train movements, inspections, maintenance, and minor repairs, would not result in direct adverse impacts on paleontological resources because those activities would not involve ground disturbance. However, indirect impacts could result from the public accessing new roads developed as part of construction of the proposed rail line. Increases in public access could increase the likelihood of the loss of paleontological resources through vandalism and unlawful collecting (i.e., poaching). Human activities that result in increased erosion could cause indirect impacts through increases in exposure of subsurface fossils and their destruction via weathering. Most indirect impacts on paleontological resources would be difficult to avoid, but they could be greatly reduced by increasing public awareness about the scientific importance of paleontological resources through education, community partnerships, and interpretive displays, as well as informing the public about penalties for vandalism and unlawful collection.

3.10.3.2 Impact Comparison between Action Alternatives

Construction

All ~~six~~ three of the paleontologically sensitive (PFYC 3-5) geologic units occur in the study area for each Action Alternative (Table 3.10-1 and Figure 3.10-1). Table 3.10-3 summarizes the paleontologically sensitive PFYC acreage and fossil localities that could be affected by surface and subsurface construction activities in the study area of each of the Action Alternatives.

Table 3.10-3. PFYC Acreage and Fossil Localities in the Study Area by Action Alternative

Action Alternative	PFYC 5 Acres[a]	PFYC 4 Acres[a]	PFYC 3 Acres[a]	Localities[b]	Scientifically Important Localities[b]
Indian Canyon	787	879	628	171	26
Wells Draw	926	4,901	628	4	1
Whitmore Park	853	977	1,370	171	26

Notes:
[a] Source: BLM 2016; SWCA 2020; Foss 2007; McDonald pers. comm.
[b] Source: Utah Geological Survey 2020

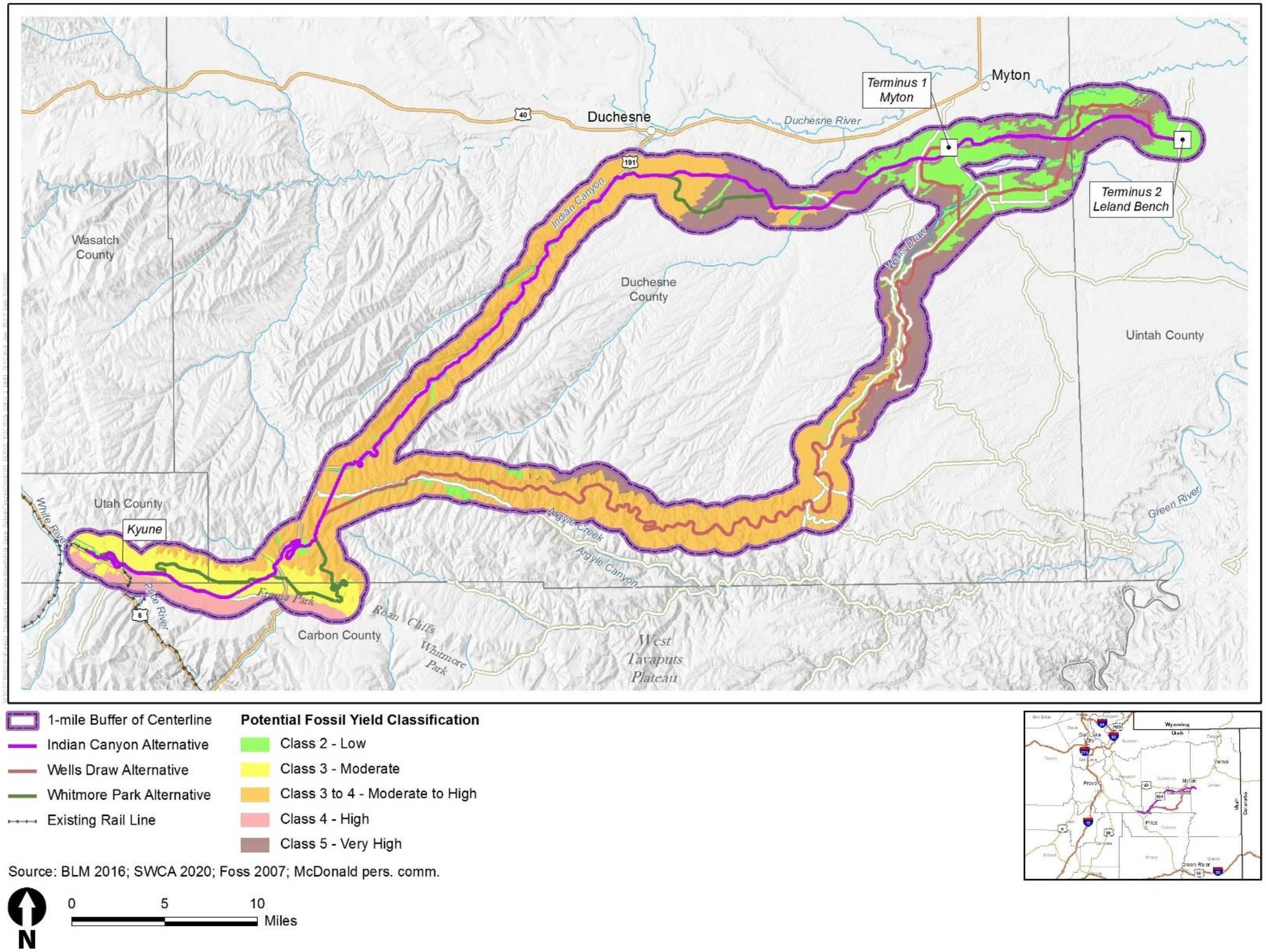
While detailed information regarding the size and locations of surface and subsurface construction activities is not known at this stage of design, OEA used general locational information about project features (e.g., areas of cut and fill) to estimate impacts on paleontological resources from excavating activities. As discussed previously, excavating activities pose a greater risk of damaging or destroying scientifically important paleontological resources than temporary surface activities. Table 3.10.4 identifies the acreage of paleontologically sensitive PFYC acreage within areas of cut and fill where the Coalition would remove material (i.e., the areas of cut), and within tunnels where the Coalition would use drilling and blasting procedures to construct the tunnel. Other construction activities, such as grading, for which specific location information is not known, could also result in direct impacts depending on the depth of sensitive geologic units. The Wells Draw Alternative would have the highest potential for adverse impacts on scientifically important undiscovered paleontological resources because it would affect the most acreage of PFYC 4 and 5 geologic units at the surface and subsurface, followed by the Whitmore Park Alternative and then the Indian Canyon Alternative.

Table 3.10-4. PFYC Acreage in Areas of Cut and Tunnels in the Study Area by Action Alternative

Action Alternative	Construction Type	PFYC 5 Acres	PFYC 4 Acres	PFYC 3 Acres
Indian Canyon	Cut	95	96	103
	Tunnel[a]	--	46	--
	Total	**95**	**142**	**103**
Wells Draw	Cut	98	664	100
	Tunnel[a]	--	54	--
	Total	**98**	**718**	**100**
Whitmore Park	Cut	100	82	174
	Tunnel[a]	--	56	--
	Total	**100**	**138**	**174**

Notes:
[a] Based on the 100-foot-wide rail line footprint and estimated tunnel lengths. OEA anticipates the width of the tunnels to be much narrower; therefore, this acreage estimate likely overestimates impacts.
Sources: BLM 2016; SWCA 2020; Foss 2007; McDonald pers. comm.

Figure 3.10-1. Potential Fossil Yield Classification



Notes:

PFYC is shown for a 1-mile buffer from the Action Alternative centerlines for reference. The study area for paleontological resources is the project footprint.

To minimize potential impacts on scientifically important paleontological resources, OEA is recommending mitigation requiring the Coalition to develop and implement a paleontological resources monitoring and treatment plan (PALEO-MM-1). Except for tunnel mining and blasting, which cannot be safely monitored, impacts resulting from construction activities can be mitigated by following the procedures of a paleontological monitoring and treatment plan. To address impacts from tunnel construction, OEA is recommending mitigation requiring the Coalition inspect the spoils piles created by tunnel construction activities, which would allow for the potential recovery of fossil resources (PALEO-MM-1).

Of the 26 known scientifically important localities in the study area for the Indian Canyon Alternative and Whitmore Park Alternative, two are located on private land and the remaining 24 are located on Tribal trust land. There is one scientifically important fossil locality within the study area of the Wells Draw Alternative located on private land. None of these localities were removed at the time of discovery, and OEA assumes that the fossils remain at the sites.

All three Action Alternatives would cross a scientifically well-known and fossil-rich area named Myton Pocket, which has produced abundant, well-preserved, and scientifically important paleontological resources. Six of the documented fossil localities in the study area of the Indian Canyon Alternative and one of the documented localities in the study area of the Wells Draw Alternative are within the Myton Pocket area. Although OEA has not identified any previously discovered Myton Pocket fossil localities within the study area of the Whitmore Park Alternative, it is likely that the study area contains undiscovered fossil localities. Because all three Action Alternatives would cross the Myton Pocket, there is a high potential for adverse impacts on recorded and unknown fossil localities in this area. OEA concludes that any of the Action Alternatives would adversely affect scientifically important paleontological resources in the Myton Pocket area if mitigation measures were not implemented.

Operations

Operation of the Action Alternatives could result in indirect impacts on paleontological resources through construction of new roads that would increase public access and, thus, the likelihood of the loss of paleontological resources through vandalism and unlawful collecting. OEA anticipates that the Action Alternatives with the longest rail lines would have the most access roads and, therefore, the greatest potential for impacts on paleontological resources. The Wells Draw Alternative, the longest rail line at approximately 103 miles long would have the greatest potential for impacts, followed by the Whitmore Park Alternative and the Indian Canyon Alternative. To minimize potential impacts from increased public access, OEA is recommending mitigation requiring the Coalition to undertake activities to increase public awareness of the importance of paleontological resources, as part of its paleontological resources monitoring and treatment plan (PALEO-MM-1).

3.10.3.3 No-Action Alternative

Under the No-Action Alternative, the Coalition would not construct and operate the proposed rail line and there would be no impacts on paleontological resources.

3.10.5 Mitigation and Unavoidable Environmental Effects

To avoid or minimize impacts on paleontological resources during construction and operation of the proposed rail line, OEA is recommending that the Board impose a mitigation measure that would require the Coalition to contract with a qualified paleontologist to develop and implement a paleontological resources monitoring and treatment plan to mitigate impacts on paleontological resources on lands classified as PFYC 3 or higher (Chapter 4, *Mitigation*). The plan should include a preconstruction survey to locate, document, and recover scientifically important paleontological resources found on the surface; monitoring of ground-disturbing activities during construction to recover scientifically important subsurface paleontological resources; inspection of spoils piles created by tunnel construction for fossils; preparation, identification, and analysis of fossils collected during surveys and monitoring; curation and deposition of scientifically important paleontological resources into a federally approved repository; and increasing public awareness of the importance of paleontological resources.

If OEA's recommended mitigation measure is imposed, OEA concludes that construction and operation of the proposed rail line would not significantly affect paleontological resources. Some direct impacts, including damage to fossils, may be unavoidable during construction, depending on the final construction methods used. Tunnel construction activities, including mining and blasting, for example, could result in the loss of scientifically important paleontological resources because these activities cannot be safely monitored. OEA believes, however, that these unavoidable impacts would be minimized by the implementation of OEA's recommended mitigation measure.

3.11 Land Use and Recreation

This section describes the impacts on land use and recreation that would result from construction and operation of the proposed rail line. Land uses and recreational resources considered in this analysis include land ownership, land use patterns, land use plans and authorizations, and designated recreational areas. This section also discusses Section 4(f) of the U.S. Department of Transportation (USDOT) Act of 1966 and Land and Water Conservation Fund (LWCF) Section 6(f). The subsections that follow describe the study areas, methods used to analyze the impacts, the affected environment, and the impacts of the Action Alternatives on land use and recreation.

3.11.1 Analysis Methods

This subsection identifies the study areas, data sources, and analysis methods used to analyze potential impacts on land use and recreation.

3.11.1.1 Study Areas

OEA delineated two study areas for the analysis of potential land use and recreation impacts.

- **Land use study area.** The study area for land use includes the project footprint,[1] which includes temporarily and permanently disturbed areas. The study area also includes land for which access would be limited or lost because of construction or operation of each Action Alternative.
- **Recreation study area.** The study area for recreation includes all public general recreational areas and special recreation management areas managed by federal, state, and local land management agencies crossed by the project footprint of the proposed rail line. The study area also includes privately owned recreational facilities and operations that would be affected by the Action Alternatives.

3.11.1.2 Data Sources

OEA reviewed the following data sources to determine the potential impacts on land use and recreation that could result from construction and operation of the proposed rail line.

- Current land use information obtained from publicly available GIS data, topographic maps, and desktop tools, such as GoogleEarth™.
- Federal, state, and local land use plans for the study area, as described in Section 3.11.2.1, *Land Use, Land Use Plans and Authorizations*.

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[1] The *rail line footprint* includes the area of the railbed, as well as the full width of the area cleared and cut or filled. The rail line footprint would also include other physical structures installed as part of the proposed rail line, such as fence lines, communications towers, siding tracks, relocated roads, and power distribution lines. The rail line footprint is the area where rail line operations and maintenance would occur. The area would be permanently disturbed. The *temporary footprint* is the area that could be temporarily disturbed during construction, including areas for temporary material laydown, staging, and logistics. Disturbed areas in the temporary footprint would be reclaimed and revegetated following construction. The *project footprint* is the combined area of the rail line footprint and temporary footprint, both of which would be disturbed during construction, comprising where construction and operations of the proposed rail line would occur.

- Maps, reports and datasets from internet websites for BLM (BLM 2020a), USGS (USGS 2011), and the State of Utah (State of Utah 2020).
- Livestock grazing allotment information provided by the BLM field offices and Ashley National Forest (BLM 2020b; Forest Service 2020a).

3.11.1.3 Analysis Methods

OEA used the following methods to analyze impacts on land use.

- **OEA identified land resources in the study area.** OEA reviewed land ownership maps, aerial photographs, land management plans and regulations, zoning ordinances, and other information available in the public domain to identify land uses and authorizations that could be affected by the proposed rail line. Additionally, OEA obtained publicly available data from federal, state, tribal, and local agencies regarding leasing agreements, conservation easements, and recreational areas.
- **OEA used GIS to visualize and analyze land use impacts.** OEA used spatial data from BLM, the Forest Service, Utah Department of Wildlife Resources, and State of Utah Automated Geographic Reference Center (State of Utah 2020) to identify potential impacts on land uses. Land uses analyzed include agriculture, oil and gas development, residential/ranching activities, and livestock grazing, which is the dominant land use in the study area. OEA analyzed potential impacts on livestock grazing areas by estimating the number of Animal Unit Months (AUMs) that would be lost under each Action Alternative. An AUM is the amount of forage required by one head of cattle (and a suckling calf) for 1 month. To estimate AUM loss, OEA first determined an average of 12 acres per AUM by dividing the total acreage of each allotment in the study area by their existing permitted AUMs. OEA then divided the acreage in each allotment that each Action Alternative would temporarily or permanently disturb by the average acres per AUM (12 acres per AUM).

OEA used the following methods to analyze recreational resources in the study area.

- **OEA identified recreational resources in the study area.** OEA reviewed available recreational data from the BLM, Forest Service, UDWR, and Ute Indian Tribe. OEA reviewed plans and documents to identify site-specific recreational activities, the nature of dispersed-use recreational activities (such as hunting and fishing), and surface land use designations compatible with recreational use. OEA reviewed maps of the Action Alternatives in coordination with publicly available maps of recreational management areas to identify affected areas and key recreation access points and paths. OEA obtained publicly available data from federal, state, and local agencies about recreational areas and activities under their respective jurisdiction or management.
- **OEA used GIS to visualize and analyze recreation impacts.** OEA used GIS to visualize, analyze, and interpret spatial data sources for recreational resources and identify potential consequences of the Action Alternatives on recreation.

3.11.2 Affected Environment

3.11.2.1 Land Use

This subsection identifies the existing environmental conditions related to land use in the study area.

Land Status

Landowners and land management agencies in the study area include federal and state government agencies, Tribal trust lands within the Ute Indian Tribe's Uinta and Ouray Indian Reservation, and numerous private landowners (Chapter 2, *Proposed Action and Alternatives*, Figures 2-1 through 2-3). Table 3.11-1 shows status in the study area by Action Alternative.

Table 3.11-1. Land Status by Action Alternative

Action Alternative	Land Status (acres)[a]						
	BLM	SITLA	Tribal	UDOT	Forest Service	Private	Total
Indian Canyon	119	444	379	5	401	2,461	3,808
Wells Draw	4,817	881	0	1	0	1,955	7,656
Whitmore Park	0	386	373	4	401	3,355	4,518

Notes:

[a] Acreages are rounded to the nearest full acre.

Source: SITLA 2020

BLM = Bureau of Land Management; SITLA = School and Institutional Trust Lands Administration; UDOT = Utah Department of Transportation; Forest Service = United States Forest Service

The Wells Draw Alternative would cross the most public land, followed by the Indian Canyon Alternative and then the Whitmore Park Alternative. Federal land in the study area is managed by the BLM's Price, Salt Lake and Vernal, Utah field offices and by Ashley National Forest. The BLM field offices and Ashley National Forest have guiding plans and documents that set forth allowable land uses within each designated area under the jurisdiction of the governing agency. These plans are discussed below under *Land Use Plans and Authorizations*.

Most of the state land in the study area is managed by the Utah School and Institutional Trust Lands Administration (SITLA). SITLA works with private business to generate revenue from energy and mineral royalties, and real estate and surface development. SITLA lands account for approximately 12 percent of the land in the study areas of the Indian Canyon Alternative and Whitmore Park Alternative and 9 percent of the study area of the Wells Draw Alternative. In addition to SITLA lands, relatively small acreages of the lands owned by UDOT are present in the study area.

Tribal trust lands within the Uinta and Ouray Indian Reservation are located in the study areas of the Indian Canyon Alternative and Whitmore Park Alternative. No Tribal trust lands are located in the study area for the Wells Draw Alternative. However, the Wells Draw Alternative would affect lands and resources under the regulatory jurisdiction of the Ute Indian Tribe and likely cross Indian country lands within tribal jurisdiction as defined in Ute Indian Tribe v. Utah, 773 F.2d 1087 (10th Cir. 1985) and Ute Indian Tribe of the Uintah and Ouray Reservation v. State of Utah, 114 F.3d 1513 (10th Cir. 1997). Based on consultation with BIA, OEA did not identify any Individual Indian Allotments, which are plots of Tribal trust land allotted to individual tribal members in the study area. During ongoing government-to-government consultation between OEA and the Ute Indian

Tribe, the Ute Indian Tribe has not provided OEA with any specific land use plans that the Coalition would need to comply with in order to construct and operate the proposed rail line (Chapter 5, Section 5.3, *Tribal Coordination and Consultation*). If the Board were to authorize the proposed rail line, the Coalition would need to continue to consult with the Ute Indian Tribe during the final design phase to ensure that construction and operation of the proposed rail line on land under the tribe's jurisdiction would be consistent with the tribe's requirements. Most of the land in the study areas of the Indian Canyon Alternative and Whitmore Park Alternative is privately owned (approximately 65 and 74 percent of each study area, respectively). Approximately 26 percent of land in the study area of the Wells Draw Alternative is privately owned. These private lands are primarily used for agricultural purposes, including cattle ranching operations.

Existing Land Uses

The majority of the study area is rural and sparsely populated. Five residences are located in the study area of the Indian Canyon Alternative and Whitmore Park Alternative, and nine residences are located in the study area of the Wells Draw Alternative. The primary land use for all land ownerships is livestock grazing. Principal or major uses of federal lands in the study areas of all Action Alternatives include livestock grazing, oil and gas production, and recreation. Due to the semi-arid and arid climates present in the study area, agricultural production is generally limited to irrigated land along watercourses or in areas where sufficient supplies of groundwater are available for irrigation. Approximately 237 acres of irrigated cropland occurs in the study areas for the Indian Canyon Alternative and Whitmore Park Alternative; approximately 41 acres of irrigated cropland is present in the study area of the Wells Draw Alternative (State of Utah 2020).

There are 15 BLM grazing allotments and two Forest Service grazing allotments that overlap the study area. The Indian Canyon Alternative and Whitmore Park Alternative would cross portions of two Forest Service grazing allotments, Left Fork of Indian Canyon and Mill Hollow, and four BLM grazing allotments, Kyune I, Kyune II, Price Canyon-West, and West Fork. The Wells Draw Alternative would not cross any Forest Service grazing allotments, but would cross portions of all 15 BLM grazing allotments in the study area: Antelope Powers; Argyle Ridge; Big Wash; Castle Peak; Currant Canyon; Eight Mile Flat; Five Mile; Kyune I; Kyune II; Lears Canyon; Parleys Canyon; Price Canyon-West; Water Canyon #2; Wells Draw; and West Fork (BLM 2020b; Forest Service 2020a). Although the majority of the allotments are for cattle, horses are also found on two of the allotments and sheep are found on one grazing allotment. The Indian Canyon Alternative and Whitmore Park Alternative would cross one Forest Service horse pasture, the Indian Canyon Horse Pasture. OEA understands that tribal grazing range units occur in the vicinity of the study area but are vacant because they would require intense management. Additional tribal grazing range unit data were not available for the study area. Table 3.11-2 shows the acreage of grazing allotments that overlap the study area by land ownership, and the total number of current AUMs for the entire extent of the allotments, by Action Alternative.

Table 3.11-2. Grazing Allotments and Animal Unit Months in Study Area

Action Alternative	Grazing Allotment Acreage[a]					Existing AUMs[b]
	BLM	Forest Service	SITLA	Private	Total	
Indian Canyon	119	398	107	396	1,020	2,817
Wells Draw	4,759	0	413	509	5,681	10,163
Whitmore Park	0	398	198	714	1,310	2,817

Notes:

[a] Allotments in the study area are managed by the BLM and Forest Service; however, allotments include federal, state, and private lands.

[b] Existing AUMs reported are for the entire extent of allotments crossed by the Action Alternatives. Total existing AUMs for all 15 BLM grazing allotments equals 10,163 AUMs. The Forest Service Left Fork of Indian Canyon and Mill Hollow allotments have 521 AUMs and 795 AUMs, respectively.

Source: BLM 2020b, Forest Service 2020a; Remund-Kaminski pers. comm.

BLM = Bureau of Land Management; Forest Service = United States Forest Service; SITLA = Utah School and Institutional Trust Lands Administration; AUM = Animal Unit Month

Oil and gas development occurs on federal, private, state and Tribal trust land in the study area. BLM is the main federal administrating agency for oil and gas leasing and development in the study area. Oil and gas leasing of federal mineral rights can occur in areas where BLM is the surface and mineral owner, or in places where the surface rights are privately owned but the federal government owns the mineral rights (referred to as split estate lands). Table 3.11-3 lists the number of existing federal oil and gas leases and total acreage held under current oil and gas leases in the study area. Other tribal, state, and private leases may occur in the study area. Section 3.8, *Energy*, provides a description of oil and gas wells in the study area by lease ~~ownership~~type.

Table 3.11-3. Existing Federal Oil and Gas Leases in the Study Area by Action Alternative

Action Alternative	Existing Federal Oil and Gas Leases	
	Number of Leases	Acres
Indian Canyon	2	69
Wells Draw	46	2,705
Whitmore Park	1	70

Notes:

Source: BLM 2020c

As identified through agency consultation between BLM and OEA, the Wells Draw Alternative would pass through designated mineral material sites and special tar sand areas on BLM-administered land and mineral estate. The mineral material sites include areas open for public and commercial stone collection. The special tar sand areas, including Argyle Canyon, Sunnyside, and Pariette, were identified by BLM for future commercial tar sand leasing in the 2013 *Programmatic EIS for Oil Shale and Tar Sands* (BLM 2013). Tar sands are sedimentary rocks containing a heavy hydrocarbon compound called bitumen, which can be refined into oil.

Land Use Plans and Authorizations

The following land use plans guide the management of federal lands in the study area.

- *Pony Express Resource Management Plan* (BLM 1990)
- *Price Field Office Record of Decision and Approved Resource Management Plan* (BLM 2008a)

- *Vernal Field Office Record of Decision and Approved Resource Management Plan* (BLM 2008b)
- *Land Resource Management Plan for the Ashley National Forest* (Forest Service 1986) (LRMP)

The Federal Land Policy and Management Act (FLPMA) of 1976 requires that public lands be managed on a "multiple use and sustained yield basis" (FLPMA Sec. 302(a) and Sec. 102(7)). Allowable land uses in the area covered by each resource management plan (RMP) and the LRMP are defined in each of the plans listed above. For proposed projects that are not compatible with current allowable uses identified in the BLM RMPs or Ashley National Forest LRMP, amendments to the plans may be necessary. Chapter 2, *Proposed Action and Alternatives*, Section 2.2.3, *Alternatives Analyzed in the EIS*, provides a discussion of amendments needed from other agencies for the three Action Alternatives.

Projects crossing state or federal lands require right-of-way grants, special use permits, easements, or other authorizations. Utah Administrative Code R850 lists and defines SITLA agency rules, including the lease, sale, or exchange of SITLA lands. Planning documents, including the RMPs and LRMP applicable to the study area identify constrained areas where future rights-of-way are discouraged (designated avoidance areas) or denied (designated exclusion areas) on federal land. Applications for linear rights-of-way within BLM- or Forest Service-designated avoidance areas can be processed if the proposed project would meet the goals and objectives of the applicable BLM RMP, or the standards and guidelines of the Forest Service LRMP for resources within the designated avoidance areas. Additionally, special designation areas identified in the BLM RMPs and Forest Service LRMP may have additional restrictions on allowable land uses for the protection of sensitive resources. Section 3.11.2.2, *Recreation*, provides a discussion on special designations in the study area.

The proposed rail line would cross portions of privately owned land in Utah, Carbon, Duchesne, and Uintah Counties. Allowable land uses on private lands are typically covered in county land use plans or zoning ordinances. The guiding land use plans for the counties in the study area include:

- *Utah County General Plan* (Utah County 2014)
- *Utah County Land Use Ordinance* (Utah County 2011)
- *Carbon County Master Plan* (Carbon County 1997)
- *Carbon County Natural Resource Use and Management Plan* (Carbon County 2010)
- *Duchesne County General Plan* (Duchesne County 2017)
- *Duchesne County Zoning Ordinance* (Duchesne County 2012)
- *Uintah County General Plan* (Uintah County 2011)
- *Uintah County Code of Ordinances* (Uintah County 2005)

Special Designations

Special designations are units of land managed by federal or state agencies for the protection and enhancement of specific resource values that are unique to that area and require more intensive management emphasis than is applied to surrounding public lands. Agency-designated special designations in the study area include Areas of Critical Environmental Concern (ACECs), Lands with Wilderness Characteristics, and Forest Service Inventoried Roadless Areas (IRAs). Congressionally designated special designations (e.g., national wildlife refuges, national monuments, wilderness areas, wilderness study areas, wild and scenic rivers, national conservation areas, and national historic and scenic trails) are not located in the study area. Special Recreation Management Areas (SRMAs) are discussed in Section 3.11.2.2, *Recreation*.

ACECs are an administrative BLM designation made through a land use plan and are defined as an area "within the public lands where special management attention is required to protect and prevent irreparable damage to important historic, cultural, or scenic values, fish and wildlife resources, or other natural systems or processes, or to protect life and safety from natural hazards" (43 U.S.C. § 1702). Two ACECs (Lears Canyon and Nine Mile Canyon) have been designated on BLM-administered lands in the study area for the Wells Draw Alternative (Figure 3.11-1). The Lears Canyon ACEC contains important plant communities that once had a much wider geographical range (relict communities). Nationally significant Fremont, Ute, Archaic rock art and structures, and special status plant habitat comprise the relevant and important ACEC values of the Nine Mile Canyon ACEC (BLM 2008b). No ACECs have been designated in the study areas for the Indian Canyon Alternative or Whitmore Park Alternative.

Figure 3.11-1 shows the special designations and recreation areas in the study area of the three Action Alternatives and the federal and state highways, county roads, Forest Service roads, and scenic byways in the vicinity of these areas.

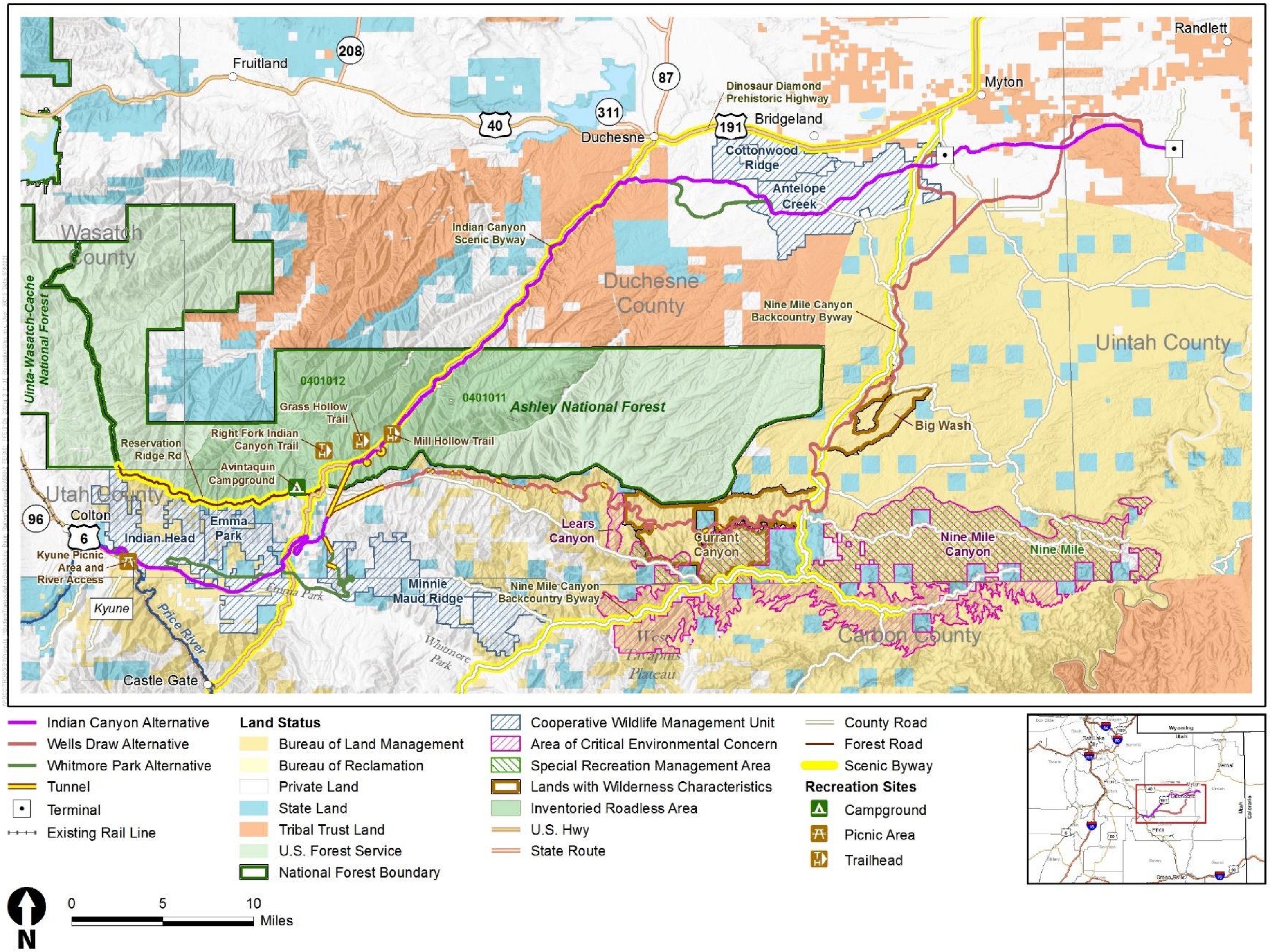
Lands with Wilderness Characteristics are areas having 5,000 acres of, or areas less than 5,000 acres that are contiguous to, designated wilderness, wilderness study areas, or other lands administratively endorsed for wilderness; or in accordance with the Wilderness Act's language, areas "of sufficient size as to make practicable its preservation and use in an unimpaired condition" (BLM 2008b). BLM has determined that two Lands with Wilderness Characteristics areas in the study area for the Wells Draw Alternative (Big Wash and Currant Canyon) meet the size, naturalness, and outstanding solitude/outstanding primitive and unconfined recreation criteria (Figure 3.11-1). No Lands with Wilderness Characteristics have been designated in the study areas for the Indian Canyon Alternative or Whitmore Park Alternative (BLM 2008b).

IRAs are Forest Service lands that have been identified as lands without existing roads that could be suitable for roadless area conservation. The 2001 Roadless Rule (36 C.F.R. Part 294) establishes prohibitions on road construction, road reconstruction, and timber harvesting on inventoried roadless areas of National Forest System Lands. Approximately 394 acres, or 98 percent of Forest Service lands in the study areas of the Indian Canyon alternative and Whitmore Park Alternative have been identified as within IRA~~s~~ #0401011 (Figure 3.11-1). There are no Forest Service lands or IRAs in the study area for the Wells Draw Alternative.

Uintah and Ouray Reservation and Indian Trust Assets

According to the Utah Division of Indian Affairs, the Ute Indian Tribe of the Uintah and Ouray Reservation is the second largest Indian Reservation in the United States and covers 4.5 million acres of northeastern Utah (Utah Division of Indian Affairs 2019). Over half of the tribal membership chooses to live on the Uintah and Ouray Reservation (Ute Indian Tribe 2013), which occupies a large percentage of the land area in Uintah and Duchesne counties. The Indian Canyon Alternative and Whitmore Park Action Alternative cross approximately 379 acres and 373 acres of Tribal trust land, respectively. The Ute Indian Tribe also controls tribal mineral rights in the Basin and receives royalties from oil and gas production from those mineral rights.

Figure 3.11-1. Special Designations and Recreation Areas



Tribal trust lands and mineral rights are held in trust by the United States government and are administered by BIA, a cooperating agency for this EIS. A formal management plan does not exist for the Uintah and Ouray Reservation; however, the elected Ute Indian Tribe Business Committee and BIA determine approval of land use activities on Tribal trust lands. The regulatory responsibilities of BIA include promoting the economic development objectives of the Ute Indian Tribe under its government-to-government relationship with, and trust responsibility to, the tribe.

Indian Trust Assets (ITAs) are legal interests in property held in trust by the United States for federally recognized Indian tribes or individual Indians (e.g., Reclamation 2009: Section 4.19-1 and Reclamation 2017: Section 19). ITAs may include land, minerals, federally reserved hunting and fishing rights, federally reserved water rights and claims, and instream flows associated with trust land. Beneficiaries of the Indian trust relationship are federally recognized Indian tribes with trust land; the United States is the trustee. By definition, ITAs cannot be sold, leased, or otherwise encumbered without approval of the United States. OEA requested information on ITAs located near the proposed rail line from the Ute Indian Tribe, BIA (Western Region Office), and BLM. OEA did not identify ITAs outside of Tribal trust lands in the study area.

Conservation Easements

Conservation easements in Utah are used for a variety of purposes such as preserving and maintaining land or water areas predominantly in a natural, scenic, or open condition, or for recreational, agricultural, cultural, wildlife habitat or other use or condition consistent with the protection of open land (Utah Code 57-18). ~~There are no conservation easements in the study area~~ One conservation easement, the Indian Canyon Conservation Easement (UDWR deed number 348092), has been identified in the study area for the Indian Canyon Alternative and Whitmore Park Alternative. The Indian Canyon Conservation Easement is located in Sections 14, 15, and 22, Township 4 South, Range 5 West of Duchesne County (State of Utah 2020; NCED 2021). No additional conservation easements have been identified in the study area.

Section 4(f) and Section 6(f) Resources

Section 4(f) of the USDOT Act (49 U.S.C. § 303(c)) (Section 4(f)) applies to USDOT agencies and protects recreational areas, wildlife and waterfowl refuges, and historic properties or archaeological sites, whether publicly or privately owned, on or eligible for listing in the National Register of Historic Places. The Board is an independent decision-making body that is not part of USDOT and, as such, Section 4(f) is not applicable to Board actions. Because the proposed rail line would not require approval from an USDOT agency, nor would it require the involvement of the Federal Railroad Administration for grant funding, Section 4(f) does not apply to the proposed rail line.

Section 6(f) of the LWCF (16 U.S.C. §§ 460l–4 et seq.) provides the following.

> No property acquired or developed with assistance under [the Land and Water Conservation Fund Act], without the approval of the Secretary [of Interior], be converted to other than public outdoor recreational uses. The Secretary shall approve such conversion only if he finds it to be in accord with the then existing comprehensive statewide outdoor recreation plan and only upon such conditions as he deems necessary to assure the substitution of other recreational properties of at least equal fair market value and of reasonably equivalent usefulness and location (16 U.S.C. § 460l-4 et seq.).

Section 6(f) is intended to protect parks and other recreational resources from conversion to other uses. Section 6(f) applies only to those state, county, or local recreational resources that have received funding through LWCF. OEA reviewed the list of properties acquired or funded through the LWCF and determined that there were no LWCF properties along the Action Alternatives (Utah Division of Parks and Recreation 2016). As a result, no properties protected by LWCF Section 6(f) would be converted to a nonrecreational use as a result of construction and operation of the proposed rail line.

3.11.2.2 Recreation

Federal Recreation Areas

Ashley National Forest

Managed by the Forest Service, Ashley National Forest consists of nearly 1.3 million acres in the northeastern portion of Utah and the southwestern portion of Wyoming. Recreational activities include hunting, fishing, snowmobiling, snowshoeing, cross-country skiing, hiking, picnicking, bicycling, renting cabins, camping, caving, climbing, horseback riding, nature viewing, off-highway vehicle (OHV) riding, scenic driving, and winter sports (Forest Service 2020b). The portion of the Ashley National Forest in the study areas for the Indian Canyon Alternative and Whitmore Park Alternative along U.S. Highway 191 (US 191) provides access to the trailheads of the Right Fork Indian Canyon Trail, Grass Hollow Trail, and Mill Hollow Trail (Figure 3.11-1). These trails are open to hiking, horseback riding, mountain biking, and dispersed camping (Forest Service 2020b). The Avintaquin Campground is located atop Indian Canyon off US 191, approximately 2.4 miles west of the study areas for the Indian Canyon Alternative and Whitmore Park Alternative (Figure 3.11-1). Visitors come to the area for its scenic beauty, birding, hunting, and wildlife viewing opportunities and to explore the Reservation Ridge Scenic Backway (Forest Service 2020c).

Bureau of Land Management

Recreational opportunities on BLM-administered lands within the BLM Price, Salt Lake, and Vernal field offices include, but are not limited to, camping, scenic backcountry driving, OHV use, hiking, horseback riding, hunting, fishing, mountain biking, rock climbing, wilderness backpacking, wildlife viewing, nature photography, and rock hounding (BLM 1990; 2008a, 2008b). BLM-administered lands are limited (119 acres) in the study area of the Indian Canyon Alternative, and the Whitmore Park Alternative avoids BLM-administered lands entirely.

All BLM-administered lands within the Indian Canyon Alternative (119 acres), and the majority of BLM-administered lands within the Wells Draw Alternative are located in an Extensive Recreation Management Area (ERMA). ERMAs are areas where dispersed recreation is encouraged and where visitors have recreational freedom-of-choice with minimal management controls. ERMAs can also include developed and primitive recreational sites with minimal facilities, none of which are located in the study area (BLM 2008b).

The study area for the Wells Draw Alternative includes approximately 64 acres of the Nine Mile ~~Canyon~~ SRMA (Figure 3.11-1). BLM manages SRMAs to provide special recreational opportunities that would not otherwise be available to the public, reducing conflicts among users, minimizing damage to resources, and reducing visitor health and safety problems. Recreational opportunities within or along these areas may be developed or dispersed. BLM manages the Nine Mile SRMA to protect high-value cultural resources and scenic quality and provides various recreational opportunities, including hiking, backpacking, rock art viewing, and historic inscriptions (BLM 2008b). There are no designated SRMAs in the study areas for the Indian Canyon Alternative or the Whitmore Park Alternative.

State Recreational Areas and Facilities

The Utah Outdoor Recreation Plan is Utah's State Comprehensive Outdoor Recreation Plan (Utah Department of Natural Resources and the Utah Division of Parks and Recreation 2019). The Utah Outdoor Recreation Plan includes an overview of statewide recreation supply and needs based on a survey of recreational professionals throughout the state of Utah and a statewide survey of residents. Goals of the plan include providing funding and support for the development of outdoor public recreation, renovating existing public outdoor recreational facilities, and improving awareness of Utah's LWCF program.

SITLA allows public access to most trust lands for recreational activities including hunting, fishing, hiking, camping, and OHV use. However, SITLA reserves the right to withdraw or restrict recreational access on trust lands to meet its mandate of generating revenue to support the trust beneficiaries (Utah Department of Natural Resources and the Utah Division of Parks and Recreation 2019).

UDWR administers the Cooperative Wildlife Management Unit (CWMU) program to recognize the contribution made by private landowners in providing big game habitat on their private land. CWMUs are hunting areas consisting of mostly private land that have been authorized for the specific purpose of managing and hunting certain big game species (Figure 3.11-1). Table 3.11-4 lists the existing CWMUs in the study area by Action Alternative.

Table 3.11-4. Existing Cooperative Wildlife Management Units in the Study Area

Action Alternative	CWMU/Unit Identification Number
Indian Canyon	Antelope Creek/581
	Cottonwood Ridge/824
	Emma Park/538
	Indian Head/735
Wells Draw	Antelope Creek/581
	Emma Park/538
	Indian Head/735
Whitmore Park	Antelope Creek/581
	Emma Park/538
	Indian Head/735
	Minnie Maud Ridge/551

Notes:
Source: UDWR 2020
CWMU = Cooperative Wildlife Management Unit

Other Recreational Uses in the Study Area

As discussed in Section 3.3, *Water Resources*, the Price River is the largest perennial stream in the study area in terms of width (varies from about 20 to about 45 feet) and flow. Segments of the Price River are frequented by whitewater paddlers, especially outside of the study area through Price

Canyon, below Scofield Reservoir, and also in the study area along U.S. Highway 6 near Kyune, Utah where an important river access point is located adjacent to Kyune Pass Road (Figure 3.11-1) (Southwest Paddler 2014; American Whitewater 2021). Generally, the Price River is not considered suitable for rafting due to low-flow volume flows and narrow channels that make steering larger watercraft difficult (Southwest Paddler 2014). April through June is considered peak season for canoe and kayak paddling the Price River when flows are suitable following rainfall events and snowmelt at higher elevations (Southwest Paddler 2014). Segments of the Price River in the study area are frequented by anglers, and as described in Subsection 3.4.2.2, *Fish*, are managed by UDWR for cold water fishery beneficial use.

3.11.3 Environmental Consequences

Construction and operation of the proposed rail line could result in impacts related to land use and recreation. This subsection first presents the potential impacts that would be the same for all three Action Alternatives and then compares the potential impacts that would be different across the Action Alternatives. For comparison purposes, this subsection also discusses the status of land use and recreation under the No-Action Alternative.

3.11.3.1 Impacts Common to All Action Alternatives

Land Use

This subsection discusses potential impacts on land use that would be the same across the three Action Alternatives.

Construction

Land Ownership

Construction of the proposed rail line would permanently change land ownership or control under all of the Action Alternatives. The acquisition or easement and associated conversion of land needed for the proposed rail line would preclude public, private, and/or Tribal trust lands from being used for other purposes, such as grazing, agriculture, and mineral development.

Construction of the Action Alternatives would result in temporary road closures, which could affect access to properties near the proposed rail line. The Coalition has proposed voluntary mitigation (VM-3) to implement traffic-control measures, such as detours and signage to minimize impacts and the potential for delays. Construction of the Action Alternatives would involve road realignments in some locations to ensure that levels of access prior to construction are maintained. OEA is recommending that the Board impose mitigation (VSD-MM-1) requiring the Coalition consult with appropriate agencies in designing road realignments to minimize disruption to existing traffic.

Construction of the proposed rail line could sever properties. Severance in this context is defined as the rail line footprint crossing a contiguous property in such a manner as to render the property or portions of the property unsuitable for their current use. Irrigated farmland could also be severed if irrigation systems (e.g., sprinklers, pivots, and drainage systems) no longer function on both sides of the rail line footprint. In the case of farmland irrigated by drainage ditches and other gravity-fed systems crossed by the proposed rail line, water flow to the irrigated lands on the downhill side of the rail line could be disrupted. This type of severance could be mitigated by installing certain improvements (e.g., culverts that allow for continuous drainage). Rail construction could also disrupt the use of acreage outside the rail line footprint if land acquisition for construction would restrict the movements of animals and equipment between different operating areas of a ranch or farm, or reduce the acreage available in an operating area to an acreage that is no longer economical to ranch or farm. Section 3.13, *Socioeconomics,* provides additional analysis of impacts associated with acquisitions, displacements, and severance, including OEA's recommended mitigation measures (SOCIO-MM-1, SOCIO-MM-2).

Existing Land Use

Construction of any of the Action Alternatives would permanently change existing land use and land designations. Construction activities would temporarily impede movement across the study area and could affect land uses in the study area by creating a barrier-restricting access to properties. Once constructed, the proposed rail line could create a barrier, limiting legal access across the rail line footprint to designated crossings. As part of the preliminary design, the Coalition plans to install grade-separated and at-grade crossings at public roads, private roads or drives, and roads owned by the Ute Indian Tribe (if crossed by the Action Alternatives). However, not all roads and drives that would be crossed by an Action Alternative would have a designated crossing; access would be impeded by the proposed rail line in these cases.

Construction of the Action Alternatives could displace or interfere with existing land uses and improvements along the proposed rail line. Development of the proposed rail line could result in the displacement of groundwater wells or other capital improvements located in the study area. Section 3.3, *Water Resources*, addresses potential impacts on groundwater wells. Construction of all Action Alternatives would require the closure or relocation of existing oil or natural gas production wells. Section 3.8, *Energy*, addresses the analysis of impacts on oil and gas development. Each of the Action Alternatives would cross through forest and woodland areas and may require the removal of forest products. OEA is recommending mitigation that would require the Coalition to adhere to reasonable conditions imposed by land management agencies in any right-of-way authorization, which may include compensating land management agencies for removal of forest products (LUR-MM-2, LUR-MM-3, LUR-MM-4, LUR-MM-5, LUR-MM-6).

All of the Action Alternatives would require crossing existing rights-of-way. Section 3.8, *Energy*, lists existing utility corridors that would be crossed by the Action Alternatives. Any crossing of utility rights-of-way would occur in accordance with applicable regulatory standards (Appendix B, *Applicable Regulations*). To ensure that impacts on utility corridors are minimized, the Coalition has proposed voluntary mitigation (VM-47) to secure agreements with utilities to establish responsibility for protecting or relocating existing utilities, if affected by construction. In addition, OEA is recommending mitigation (ENGY-MM-3) requiring the Coalition to ensure that industry standards are met in the event that temporary or permanent utility relocation is needed and to coordinate any alterations with utility service providers to avoid interruption of utility services to customers. During the land acquisition process, the Coalition would coordinate with rights-of-way holders and the land management agencies or landowners for any authorized rights-of-way that would be crossed by the proposed rail line.

Agriculture

Construction could also result in the loss of grazing lands and AUMs for livestock in the study area. Indirect impacts on livestock grazing would include the potential spread of noxious weeds and invasive plant species (including new species not already present in the study area), alteration of livestock distribution and forage utilization, potential impacts on livestock management, and the potential loss of access to range improvements, such as fenced areas, wells, or other facilities, located in the study area. Potential impacts on livestock management could include the loss of forage, fragmentation of grazing allotments, potential disruptions to lambing and/or calving areas, and increased mortality and injuries to livestock resulting from increased vehicle traffic. Construction could also result in the disruption of grazing patterns and livestock distribution, which could result in some areas of pasture being grazed lightly while other areas could be over used by displaced livestock. Additionally, temporary displacement of livestock from range improvements, preferred grazing areas and water sources could occur during construction. Following construction activities, noxious weeds and invasive plant species could readily spread and colonize areas that typically lack or have minimal vegetation cover or areas that have been recently disturbed.

Operations

Crops and Livestock

Operation activities, such as the movement of trains and maintenance vehicles, could result in the spread of weeds in the study area, which could displace grasses on which livestock graze. Crops actively managed and cultivated in the study area would also be affected by the introduction of weeds.

Wayside noise and train horns during operations could result in avoidance responses from livestock in areas adjacent to the study area. OEA expects that noise-related effects on livestock would mostly occur within approximately 350 feet from the rail line for wayside train noise and 460 feet for horn noise. This is the distance at which noise levels would be at or above 100 dBA SEL, the noise level at which animals (domestic and wild) have been shown to exhibit a response to train noise (FRA 2005). In these locations, livestock may move away from trains as they pass through but would most likely move back in close to the tracks to graze once trains passed. Avoidance patterns by livestock would depend on the frequency of trains. Section 3.6, *Noise and Vibration,* provides more information on operations-related noise impacts.

Operation of the proposed rail line could also result in increased injury or mortality of livestock. Most areas of the rail line would not be fenced, unless required by the land management agency or landowner. In these areas of open range, livestock may move back and forth across the tracks while grazing, and some may lie down on the tracks, resulting in the potential for livestock being hit by trains. In stretches where the railway would run near major roadways, such as US 191, disturbance from passing trains could scare livestock onto roadways resulting in vehicles hitting the livestock. Livestock could congregate near tunnel entrances and enter into tunnels where they could be hit by trains. To minimize the potential impacts on livestock during operation, the Coalition has proposed voluntary mitigation (VM-46) to install safety fences and signs for grazing allotment entrances and exits to enable continuance of livestock operations within grazing allotments. OEA is recommending additional mitigation measures (LUR-MM-9, LUR-MM-10, LUR-MM-11) that would require the Coalition consult with appropriate land management agencies to develop measures to mitigate impacts on grazing allotments, construct barriers to tunnel entrances or design tunnel entrances to be raised above the ground level so that cattle cannot enter tunnels, and consider installing cattle underpasses along the right-of-way as appropriate and practical.

Recreation

This subsection discusses potential impacts on recreation that would be the same across the three Action Alternatives.

Construction

Road Access

Because access across the proposed rail line via roads could be temporarily impeded during construction, access to areas used for recreation on federal, state, and tribal lands could also be temporarily restricted or limited during construction.

Noise

Construction activities would generate noise that would be more noticeable in undeveloped areas, which generally have low levels of background noise. Recreationists such as hunters, hikers, campers, and anglers could hear noise generated by construction activities, which could diminish their enjoyment of recreational areas depending on the distance of the users from the railroad construction sites. This noise could also affect hunting and wildlife viewing because it could result in animals avoiding the study area. However, noise impacts associated with construction activities would be temporary. Section 3.6, *Noise and Vibration*, provides more information on construction-related noise impacts.

Visual Resources

Active construction and temporary staging areas near recreational resources could create visual distractions, including fugitive dust from land clearing, the presence of construction equipment, and glare from nighttime lighting used during construction. Construction of any of the Action Alternatives would create temporary changes in the view of and from recreational areas. Construction equipment, construction sites, staging areas, and associated facilities would introduce heavy industrial elements to a primarily rural landscape. Construction activities within the ~~construction~~ project footprint, including the earthwork required for construction, would create a visual disturbance for recreationists. These impacts would be most visible to recreationists adjacent to the area of the construction corridor. Section 3.12, *Visual Resources*, provides additional information on construction-related visual impacts. Construction activities adjacent to scenic byways and backways would result in the introduction of construction equipment, fugitive dust, vegetation removal, large areas of cut and fill, and potentially new bridges and drainage culverts. Section 3.12, *Visual Resources*, provides conceptual renderings of impacts on scenic byways and backways resulting from the Action Alternatives.

Wildlife

Construction activities, including noise and the presence of humans, could alter the local distribution of wildlife and affect the experience of users engaging in recreational hunting or wildlife viewing in the study area. Impacts on hunters would depend on the timing of construction in relation to the hunting season. Because construction of all Action Alternatives would occur year-round, hunting could be affected for all game species.

Price River Recreation

Any of the Action Alternatives would connect two terminus points near Myton, Utah and Leland Bench, Utah to an existing rail line near Kyune. Construction activities at the Kyune terminus, including noise and the presence of construction equipment, could alter the recreational experience of boaters on the Price River. Impacts on recreationists would be greatest from April through June when river flows are at their peak and a higher number of boaters would be recreating on the river.

Impacts on recreationists on the Price River under any of the Action Alternatives would create temporary changes in the view and noise setting along the segment of the Price River near Kyune, where boaters access the river from Kyune Pass Road, immediately adjacent to the project footprints of the Action Alternatives.

As described in Subsection 3.4.3, *Biological Resources, Environmental Consequences*, construction of the proposed rail line could affect fish through in-stream construction activities, by altering habitat and water quality, and impeding fish movement. Bridge construction over the Price River could also injure fish from underwater noise associated with vessel movement and the installation of bridge supports. To minimize the risk of killing or injuring fish during in-stream construction work, OEA is recommending mitigation requiring the Coalition comply with any federal, state, or local in-water work windows and timing restrictions for the protection of fish species (BIO-MM-2). To minimize impacts on fish movement during construction, OEA is recommending mitigation requiring the Coalition use block-nets to remove and exclude fish from in-water work areas, to the extent practicable, and comply with reasonable federal, state, or local in-water work windows and timing restrictions for the protection of fish species, and other reasonable requirements of the in-water work permits (BIO-MM-2, BIO-MM-4). Implementation of these measures would also minimize or mitigate impacts on fishing opportunities on the Price River during construction.

Operations

Road Access and Crossings

The proposed rail line would create a barrier that would restrict access across the proposed rail line footprint. Because each public road crossed by the rail line footprint would require the installation of a crossing, access to areas used by recreationists by a public roadway would not be reduced. Figure 3.11-1 depicts the federal and state highways, county roads, Forest Service roads, and scenic byways in the vicinity of the recreation areas in the study area. Recreationists, however, would only be able to cross the rail line footprint at designated at-grade crossings. Access to some recreational resources could be delayed by train operations at the at-grade crossings or could require recreationists, who may be accustomed to using a variety of different routes to access certain portions of an area, to use only those with designated crossing points. This impact would be particularly pronounced to some OHV users on federal lands if the rail line footprint created a barrier to designated routes for OHV travel. Access to recreation and hunting areas on private land may also be affected where the proposed rail line could inhibit use of roads or trails used to access these areas. Section 3.1, *Vehicle Safety and Delay*, provides an analysis of impacts from grade crossings and delays for the Action Alternatives. OEA is recommending mitigation measures (LUR-MM-7, LUR-MM-8) requiring the Coalition consult with land management agencies and landowners to provide adequate access to recreation areas during construction and operations.

Noise

Operation of the proposed rail line would introduce a new source of noise in relatively undeveloped areas. Recreationists near the proposed rail line could be able to hear noise from trains and maintenance vehicles. Train horns would be a new, intermittent source of high-intensity noise at at-grade crossings, where safety regulations would require trains to sound their horns. Visitors would likely experience less recreational enjoyment due to the noise of trains, train horns, and maintenance vehicles; some recreationists could decide not to visit areas near the proposed rail line at all. Wayside and train horn noise may also affect the quality of hunting experiences. Section 3.6, *Noise and Vibration*, provides more information on operations-related noise impacts.

Wildlife

OEA does not expect that the loss of habitat in the rail footprint would significantly affect fishing, hunting, or wildlife viewing because of the abundance of habitat in the study area. OEA anticipates that most wildlife would become used to, or habituate to, the noise of an operating train and maintenance equipment and would likely avoid the area for the short period that a train or equipment is present. However, the presence of the proposed rail line could affect wildlife movement patterns in some places, including within CWMUs. Game animals and other wildlife might avoid some areas where they are currently found. Section 3.4, *Biological Resources*, provides more information on operations-related impacts on wildlife.

Price River Recreation

While the existing rail line along the Price River corridor has already introduced noise and visual impacts on river recreationists, operation of the proposed rail line would result in an increased frequency of noise and visual impacts on recreationists accessing the Price River near Kyune, Utah. Recreationists would hear noise from trains and maintenance vehicles and see passing trains on a more frequent basis under any of the Action Alternatives. As a result, the recreational experience may be diminished, particularly for boaters accessing the Price River near Kyune Pass Road during peak flow periods (April through June).

As described in Subsection 3.4.3, *Biological Resources, Environmental Consequences*, the main impact from rail operations on fish would be related to culverts and bridges. OEA is recommending mitigation requiring the Coalition implement best management practices to ensure all culverts and bridges are sufficiently clear of debris to allow aquatic organisms to pass relatively unhindered, which would minimize impacts on fish movement (WAT-MM-10, BIO-MM-6). As a result, OEA does not expect operation of the proposed rail line to significantly affect fishing opportunities on the Price River.

3.11.3.2 Impact Comparison between Action Alternatives

Land Use

This subsection compares the potential environmental impacts on land use across the three Action Alternatives.

Construction and Operations

This subsection compares the potential environmental impacts on land use across the three Action Alternatives. Table 3.11-5 shows the acreage of public, private, and Tribal trust land that each Action Alternative would temporarily or permanently disturb, as well as the area of irrigated cropland, prime farmland, and the number of AUMs that would be lost under each Action Alternative.

Table 3.11-1. Land Use Impacts by Action Alternative

Action Alternative		Landownership (acres)[a]							Irrigated Cropland (Acres)	Prime Farmland (Acres)[c]	Loss of AUMs[d]
		BLM	SITLA	Tribal	UDOT	Forest Service	Private	Total[b]			
Indian Canyon	Temporary Disturbance	73	285	257	4	234	1,614	2,468	145	56	50
	Permanent Disturbance	46	158	121	<1	167	847	1,340	92	6	34
	Total	**119**	**444**	**379**	**5**	**401**	**2,461**	**3,808**	**237**	**62**	**84**
Wells Draw	Temporary Disturbance	3,246	554	0	1	0	1,293	5,095	35	15	176
	Permanent Disturbance	1,571	327	0	0	0	662	2,560	6	4	88
	Total	**4,817**	**881**	**0**	**1**	**0**	**1,955**	**7,655**	**41**	**19**	**264**
Whitmore Park	Temporary Disturbance	0	283	255	4	234	2,312	3,088	145	56	73
	Permanent Disturbance	0	103	118	0	167	1,042	1,431	92	6	37
	Total	**0**	**386**	**373**	**4**	**401**	**3,355**	**4,518**	**237**	**62**	**110**

Notes:

[a] All impacts are expressed in acreages of temporary and permanent disturbance, except for AUMs. An AUM is the amount of forage required by one animal unit for one month. Land disturbance estimates for each Action Alternative were divided by the average acre per AUM in each allotment to estimate AUM loss.

[b] Represents total impacts by landownership and excludes irrigated cropland and loss of AUMs values.

[c] Prime farmland, if irrigated. Acreages represent irrigated areas of this soil map unit. Nonirrigated areas do not meet prime farmland criteria.

[d] OEA first determined an average of 12 acres per AUM by dividing the total acreage of each allotment in the study area by their existing permitted AUMs. To estimate AUM loss, OEA then divided the acreage in each allotment that each Action Alternative would temporarily or permanently disturb by the average acres per AUM (12 acres per AUM).

Sources: Utah Department of Natural Resources 2018; USDA NRCS 2018

BLM = Bureau of Land Management; SITLA = School and Institutional Trust Lands Administration; UDOT = Utah Department of Transportation; Forest Service = United States Forest Service; AUM = Animal Unit Month

As the table shows, the Wells Draw Alternative would affect the most total land, followed by the Whitmore Park Alternative and then the Indian Canyon Action Alternative. The Wells Draw Alternative would also affect the most public land among the Action Alternatives, most of which would be BLM-administered land. To minimize impacts on public lands and resources, OEA is recommending mitigation (LUR-MM-3, LUR-MM-4, LUR-MM-5) requiring the Coalition adhere to the reasonable conditions imposed by public land management agencies in any right-of-way authorizations or permits and adhere to any applicable land use plans and other agency requirements.

The Whitmore Park Alternative would affect the most private land, followed by the Indian Canyon Alternative and then the Wells Draw Alternative. The Wells Draw Alternative would ~~also~~ have the largest impact on livestock production because it would cause the loss of the most AUMs, followed by the ~~Wells Draw~~Whitmore Park Alternative and then the Indian Canyon Alternative. The Indian Canyon Alternative and the Whitmore Park Alternative would affect the same area of irrigated cropland and prime farmland, while the Wells Draw Alternative would affect a much smaller area of irrigated cropland and prime farmland.

The Whitmore Park Alternative would require the greatest amount of private land acquisition (3,355 acres), followed by the Indian Canyon Alternative (2,461 acres) and Wells Draw Alternative (1,955 acres). To compare differences between the Action Alternatives, OEA considered not only the total acreage that the Coalition would need to acquire, but also the size of the affected parcels. The Action Alternatives would cross a range of parcel sizes on private land. These include smaller subdivided lots that are typically 2.5 to 10 acres in size, to parcels 10 to 80 acres in size, to larger parcels that range from over 80 to 640 acres or more in size.

In general, OEA anticipates that the Coalition would not have to fully acquire the larger properties. On those parcels, the Coalition could acquire a portion of the property on which to construct the proposed rail line, and the property owner would still be able to use the rest of their land. Where the Action Alternatives would cross smaller parcels, however, OEA expects that the Coalition would likely have to acquire the entire parcel. Therefore, the land use impacts of construction and operation would be greatest in areas where the proposed rail line would cross many smaller parcels, such as subdivided residential areas. Two such areas that were specifically identified during scoping are Argyle Canyon and the Duchesne Mini-Ranches, both of which are located in Duchesne County. Section 3.13, *Socioeconomics*, provides more information on acquisitions and displacements within Argyle Canyon and the Duchesne Mini-Ranches.

The Indian Canyon Alternative and Whitmore Park Alternative would bisect four BLM grazing allotments and the Left Fork of Indian Canyon and Mill Hollow Forest Service Grazing allotments. The Wells Draw Alternative would not bisect the Left Fork of Indian Canyon and Mill Hollow Forest Service Grazing allotments but would cross 15 BLM grazing allotments. In addition to loss of AUMs, disruption of grazing patterns and livestock distribution would also occur. This is expected to be most evident during construction and would result in some areas of a pasture being grazed lightly while other areas could be over used by displaced livestock.

The Indian Canyon Alternative and Whitmore Park Alternative would also intersect the northwest edge of the Forest Service Indian Canyon Horse Pasture. Under both the Indian Canyon Alternative and Whitmore Park Alternative, approximately 8.4 acres of temporary disturbance and 8.6 acres of permanent disturbance would occur within the Indian Canyon Horse Pasture. The 8.6 acres of permanent disturbance under either action alternative would represent approximately 17 percent of the 50.2-acre horse pasture. OEA is recommending mitigation measure (LUR-MM-4) requiring the Coalition adhere to the reasonable mitigation conditions imposed by the Forest Service in any special use permit allowing the Coalition to cross National Forest System Lands. Conditions may include avoiding or minimizing impacts on horse pastures to maintain adequate pasture size and replacing pasture fences removed during construction, as determined appropriate through consultation with the Forest Service.

The Wells Draw Alternative would cross designated mineral material sites and special tar sand areas on BLM-administered land and mineral estate. Construction of the proposed rail line could affect operations of the mineral material sites if construction activities result in temporary closures of roads used to access the sites or if the project footprint restricts opportunities for stone collection. OEA is recommending mitigation requiring the Coalition adhere to the reasonable mitigation conditions imposed by BLM in any right-of-way granted by BLM, which may include measures to minimize the project footprint in these locations and maintain access to mineral material sites (LUR-MM-3). The Wells Draw Alternative would also cross through several special tar sand areas, including Argyle Canyon, Sunnyside, and Pariette, identified for future commercial tar sand leasing in the 2013 *Programmatic EIS for Oil Shale and Tar Sands* (BLM 2013). Construction of the proposed rail line could affect access to these special tar sand areas and limit the land that could be used to lease and develop tar sands in the future. Based on agency consultation, OEA understands these areas are not currently being leased and that any future leasing actions for tar sands would require additional site-specific NEPA review in accordance with the programmatic EIS. With implementation of OEA's recommended mitigation, OEA concludes that the Wells Draw Alternative would not result in significant impacts on mineral material sites or tar sands leasing and development.

During scoping, several commenters expressed concerns about the impact of the Action Alternatives on ranching and farming operations. The Indian Canyon Alternative would require the acquisition of land from Indian Head Ranch, Broken Pipe Ranch, Jensen Ranch, Arthur Taylor Ranch, Altamont Land & Farm, Basin Land & Farm, Moon Family Farm, and Nielsen Properties (multiple owners). The Wells Draw Alternative would require the acquisition of land from Indian Head Ranch, Broken Pipe Ranch, Jensen Ranch, Henderson Ranch, and Moon Family Farm. The Whitmore Park Alternative would require the acquisition of land from Indian Head Ranch, Broken Pipe Ranch, Jensen Ranch, William Marsing Livestock, Arthur Taylor Ranch, Altamont Land & Farm, Basin Land & Farm, Moon Family Farm, and Nielsen Properties (multiple owners). Section 3.13, *Socioeconomics*, Figure 3.13-4, Figure 3.13-5, and Figure 3.13-6 show the location of the rail line footprint and the temporary footprint relative to each identified ranch and farming operation.

Land and temporary construction easements acquired for construction of the proposed rail line would no longer be available for ranching, farming, or other existing land uses. Construction of the Action Alternatives could also disrupt use of land outside the project footprint if acquisition of land or temporary construction easements would sever contiguous parcels, restrict access to irrigation systems or water supplies, restrict the movements of animals and equipment between different operating areas of a ranch or farm, or reduce the acreage available in an operating area to an acreage that is no longer economical to ranch or farm.

To construct any of the Action Alternatives, the Coalition would need to acquire land and temporary construction easements from Indian Head Ranch, Broken Pipe Ranch, William Marsing Livestock, and Jensen Ranch along the westernmost segment of the proposed rail line (Section 3.13, *Socioeconomics,* Figure 3.13-3). Indian Head Ranch includes multiple parcels with a combined acreage of over 15,000 acres. All of the Action Alternatives would traverse the southern portion of Indian Head Ranch, but the Coalition would need to acquire more land and area for temporary construction easements from Indian Head Ranch to construct the Whitmore Park Alternative (523.1 acres) than to construct the Indian Canyon Alternative or Wells Draw Alternative (264.5 acres). All of the Action Alternatives would cross Broken Pipe Ranch. The Coalition would acquire 15.1 acres of land and temporary construction easement (or 50.2 percent of the ranch) for the Indian Canyon Alternative or Whitmore Park Alternative and 25.0 acres of land and temporary construction easement (or 83.2 percent of the ranch) for the Wells Draw Alternative.

All of the Action Alternatives would cross Jensen Ranch, but the Coalition would acquire substantially more land and area for temporary construction easement to construct the Whitmore Park Alternative (376.0 acres) than to construct the Indian Canyon Alternative or the Wells Draw Alternative (36.6 acres). Only the Whitmore Park Alternative would cross William Marsing Livestock and the Coalition would need to acquire 137.0 acres of land and temporary construction easement from that ranch to construct the alternative. The Whitmore Park Alternative would also divide contiguous parcels of both the Jensen Ranch and the William Marsing Ranch (Section 3.13, *Socioeconomics,* Figure 3.13-4).

Inventoried Roadless Areas

If the Board were to approve the Indian Canyon Alternative or the Whitmore Park Alternative, construction of the proposed rail line could alter values and characteristics on 394 acres of IRA~~s~~ #0401011 within Ashley National Forest (Figure 3.11-1). Disturbances within IRAs would be limited to vegetation removal, cut and fill, and grading activities within the project footprint. Nonrecreation special uses, including railroads, may be authorized in IRAs if the use can be accommodated without road access and the use and occupancy is consistent with the management objectives for the IRA values (Forest Service 2000). Construction of new temporary access roads within IRAs under any of the Action Alternatives would be incompatible with the 2001 Roadless Rule (36 C.F.R. Part 294). For either the Indian Canyon Alternative or the Whitmore Park Alternative, the Coalition would seek Forest Service approval for the rail line right-of-way, which would include review by the Regional Forester to ensure consistency of the proposed rail line with the 2001 Roadless Rule (LUR-MM-4). Unlike the Indian Canyon Alternative and Whitmore Park Alternative, the Wells Draw Alternative would not cross Forest Service lands in Ashley National Forest, and it would not result in construction or operation disturbances to IRAs.

Following the release of the Draft EIS, the Forest Service prepared the *Uintah Railroad Inventoried Roadless Area Report*, which analyzes the impacts from the proposed rail line on IRA #0401011 (Forest Service 2021). The Forest Service evaluated the potential effects on the IRA based on 14 resource indicators and measures identified in the 2001 Roadless Area Conservation Rule (36 C.F.R. Section 294.11) and the Roadless Area Resource Evaluation of 1979 (Forest Service 1979). Table 3.11-6 describes the effects from the proposed rail line on IRA #0401011 by resource indicator and measure, as presented in the Forest Service's report. As shown in Table 3.11-6, construction and operation of either the Indian Canyon Alternative or Whitmore Park Alternative would have an adverse impact on roadless area characteristics. However, the Forest Service concluded that, due to the size of the IRA and the location of the proposed rail line adjacent to the western boundary of the IRA, the IRA conditions would remain stable during construction and operation of the proposed rail line. The *Uintah Railroad Inventoried Roadless Area Report* contains additional information relating to the effects of the construction and operation of the proposed rail line on IRA #0401011 (Forest Service 2021).

Table 3.11-2. Impacts on Inventoried Roadless Area #0401011 under the Indian Canyon Alternative and Whitmore Park Alternative

Resource Element	Indicator/Measure	Effects under the Indian Canyon and Whitmore Park Alternatives
Natural ~~I~~integrity	Long-term ecological processes of area intact and operating	Natural Integrity would be affected by construction of the railroad along the proposed rail line in the Left Fork of Indian Canyon. The natural integrity would remain stable in most of the IRA.
Apparent ~~N~~naturalness	Area appears natural to casual observer	The proposed rail line would disturb the IRA and alter the apparent naturalness in the Left Fork of Indian Canyon. The existing apparent naturalness would remain the same in most of the IRA.
Remoteness or ~~S~~solitude	Level of remoteness or solitude	Sense of remoteness and solitude would be reduced in the Left Fork of Indian Canyon by construction and operation of the proposed rail line. The level of remoteness and solitude in most of the IRA would remain the same.
Opportunities for Primitive ~~R~~recreation	Level of primitive recreation	Opportunities for primitive recreation would be reduced in the Left Fork of Indian Canyon due to the construction and operation of the proposed rail line but would remain the same in most of the IRA.
Special features	Ecological, Geologic, Scenic, or Historical values	There are no special features in the area.
Manageability	Ability to meet size criteria (5,000 acres plus) and the wilderness potential	There are multiple Forest Service System Roads cherry stemmed through the IRA and five oil and gas well pads in the area. The presence of the proposed rail line would have a small effect on the manageability of the area because it is adjacent to the western boundary.
Soil, ~~W~~water, and ~~A~~air ~~R~~resources	Watershed resources	Four drainages that the IRA spans are considered functioning at risk. The proposed rail line would influence the soil, air, and water resources within the Left Fork of Indian Canyon, but would not have an effect on the remainder of the IRA.
Sources of public drinking water	Public water source	Proposed rail line would not be located in a municipal watershed.
Diversity of plant and animal communities	Support of diverse plant and animal communities	Diversity of plant and animal communities would remain stable and typical for high to mid elevation plateau/escarpment habitat throughout most of the IRA. The diversity of plant and animal communities in the Left Fork of Indian Canyon would be affected by the proposed rail line.
Habitat for threatened and endangered species and species dependent on large	Habitat for threatened and endangered species and other species	Marginal habit for wolverine and a small amount of habitat for lynx are present. There is also habitat for black bear, moose, mule deer, pronghorn, Rocky Mountain bighorn sheep, and elk. The construction and operation of the proposed rail line would affect the habitat within

Resource Element	Indicator/Measure	Effects under the Indian Canyon and Whitmore Park Alternatives
undisturbed areas of land		the Left Fork Indian Canyon for the above species. The habitat would remain the same in most of the IRA.
Primitive and semi-primitive classes of recreation	Presence of primitive and semi-primitive classes of recreation	The proposed rail line would not decrease the semi-primitive recreation classes.
Reference ~~L~~landscapes	Presence of reference landscapes	The area is not considered a reference landscape.
Natural appearing landscapes with high scenic quality	Presence of high-quality scenery	Scenic quality of the majority of the area is high to moderate and low in some locations within the IRA due to past and current human activities. The scenic quality of the Left Fork of Indian Canyon would be reduced due to the construction and operation of the proposed railroad, but would remain stable within most of the IRA.
Traditional cultural properties and sacred sites	Presence of cultural properties and sacred sites	Surveys have provided evidence of prehistoric activity, but no sites have been found.

Notes:

Information in this table was derived from Table 4 in the *Uintah Railroad Inventoried Roadless Area Report* (Forest Service 2021). OEA has made minor modifications to the text of the table for consistency with the terminology and presentation format used in this EIS.

Source: Forest Service 2021.

IRA = inventoried roadless area; Forest Service = U.S. Forest Service

BLM Resource Management Plans

As discussed in Chapter 2, *Proposed Action and Alternatives*, both the Indian Canyon Alternative and Wells Draw Alternative would cross public lands administered by the BLM Price, Salt Lake and Vernal field offices and would affect land use on those BLM-administered lands. As currently proposed, construction and operation of the proposed rail line would likely not be in compliance with existing BLM RMPs. Therefore, if the Board were to approve one of those two Action Alternatives, BLM would likely have to amend the existing RMPs to grant a permit across BLM-administered lands. Unlike the Indian Canyon Alternative and Wells Draw Alternative, the Whitmore Park Alternative would not cross BLM-administered lands. Therefore, construction and operation of the Whitmore Park Alternative would not result in direct disturbances to existing land uses on BLM-administered lands.

Construction of the Wells Draw Alternative may require a plan amendment if the proposed rail line is constructed within the Lears Canyon ACEC established in the Approved Vernal Field Office RMP (BLM 2008b). Additional discussion of potential impacts on this ACEC follows in the *BLM Special Designations* section below. Construction and operation of the proposed rail line under the Indian Canyon Alternative and Wells Draw Alternative would need to comply with the BLM *Utah Greater Sage-Grouse Approved Resource Management Plan Amendment* (ARMPA). BLM would need to amend its Price RMP and Pony Express RMP should the Board license the Indian Canyon Alternative or the Wells Draw Alternative in order to permit the proposed rail line (Section 3.4, *Biological Resources,* provides additional information on compliance with the BLM Utah Greater Sage-Grouse ARMPA).

OEA is recommending mitigation (LUR-MM-3) requiring the Coalition adhere to the mitigation conditions imposed by BLM in any right-of-way granted by BLM allowing the Coalition to cross BLM-administered lands and ensure that construction and operation of the rail line is in compliance with applicable RMPs, including any potential amendments to those plans.

BLM Special Designations

If the Board were to approve the Wells Draw Alternative, construction and operation of the proposed rail line would occur within approximately 104 acres of the Lears Canyon ACEC and approximately 64 acres of the Nine Mile Canyon ACEC (Figure 3.11-1). Both ACECs are within the BLM Vernal Field Office and are given special management attention as identified in the Vernal Field Office RMP, to protect and prevent irreparable damage to important resource values. Relict plant communities[2] meet relevance and importance criteria as described in 43 C.F.R. Section 1610.7.2 within the 1,375-acre Lears Canyon ACEC (BLM 2008b). Relevance and importance values for the Nine Mile Canyon ACEC include nationally significant Fremont, Ute, and Archaic rock art and structures, high-quality scenery, and special status plant habitat. The Nine Mile Canyon ACEC totals 44,168 acres.

The Vernal Field Office RMP protects the Lears Canyon ACEC through Visual Resource Management (VRM) Class II objectives and a closure to OHV use (BLM 2008b). These protections were identified to protect the relict plant community relevance and importance values for which it was designated. As described in Section 3.12, *Visual Resources*, the proposed rail line would not conform to the VRM Class II objectives because it would not reflect the characteristics of the existing visual environment and would attract viewers' attention. Construction of the proposed rail line would also require temporary and permanent roads in the project footprint that would not conform to the closure to OHV use. Because the Wells Draw Alternative would not conform to the Vernal Field Office RMP, BLM would need to amend the RMP to issue a right-of-way grant through the Lears Canyon ACEC.

Construction of the Wells Draw Alternative has the potential to affect special status plant habitat, a relevance and importance value for the Nine Mile Canyon ACEC. Section 3.4, *Biological Resources*, describes the potential impacts on BLM sensitive plant communities from construction of the proposed rail line, which would include removal of habitat and loss of individual plants if they are located in the project footprint. While these impacts on BLM-listed sensitive species could diminish the ACEC's values for providing habitat for sensitive plant species, the geographic extent of the impacts would be small relative to the overall size of the ACEC. The Wells Draw Alternative would pass along the ~~northeastern~~ northern edge of the ACEC boundary and would affect only 0.1 percent of the ACEC. Because the proposed rail line would affect only a small portion of the ACEC and would not bisect contiguous habitat in the ACEC, OEA anticipates the relevance and importance values would be retained.

The Wells Draw Alternative would cross the Nine Mile Canyon ACEC in VRM Classes III and IV. As described in Section 3.12, *Visual Resources*, while the proposed rail line would attract viewers' attention, the area crossed by the rail line would partially retain the characteristics of the existing visual environment and would, therefore, conform to VRM Class III and IV objectives. Because the Wells Draw Alternative would be in conformance with the VRM objectives of the ACEC, OEA anticipates the relevance and importance value of scenery would be retained.

[2] Relict plant communities are a remnant or fragment of the vegetation of an area that remains from a former period when the vegetation was more widely distributed.

Construction of the Wells Draw Alternative has the potential to affect rock art and structures, a relevance and importance value for the Nine Mile Canyon ACEC. Through the Programmatic Agreement, the Board and other consulting parties are identifying methods to identify and mitigate for impacts on rock art. To ensure that any adverse effects on rock art are appropriately avoided, minimized, or mitigated, the Coalition has proposed voluntary mitigation (VM-43) to comply with the terms of the Programmatic Agreement ~~being~~ developed through Section 106 consultation and which the Coalition has signed as an invited signatory. With implementation of the Programmatic Agreement, the relevance and importance value of rock art for which the Nine Mile Canyon ACECs was designated would remain following construction of the Wells Draw Alternative.

BLM Rights-of-Way

The Indian Canyon Alternative and Wells Draw Alternative would cross BLM-administered lands and could affect existing rights-of-way on those lands. OEA consulted with BLM and identified 49 existing rights-of-way on BLM-administered lands in the vicinity of the proposed rail line (BLM 2020d). These rights-of-way include the right-of-way for the Questar natural gas pipeline, which the Wells Draw Alternative would cross on BLM-administered land. If the Board were to authorize the Indian Canyon Alternative or Wells Draw Alternative, the Coalition would need to obtain a right-of-way from BLM and abide by the measures imposed by BLM as a condition of the right-of-way, including conditions related to existing rights-of-way (LUR-MM-3). The Coalition has proposed voluntary mitigation (VM-47) to secure agreements with utilities to establish responsibility for protecting or relocating existing utilities, if impacted by construction. Additionally, as discussed in Section 3.8, *Energy*, OEA is also recommending mitigation requiring the Coalition design any crossings or relocations of utilities in accordance with applicable regulations and consult with appropriate utility providers to coordinate construction activities (ENGY-MM-3). If the Coalition's voluntary mitigation measures and OEA's recommended mitigation measures are implemented, OEA does not expect that impacts on existing BLM rights-of-way would be significant.

Uintah and Ouray Reservation and Indian Trust Assets

As Table 3.11-5 shows, the Indian Canyon Alternative and the Whitmore Park Alternative would each affect Tribal trust lands, which are ITAs within the Ute Indian Tribe's Uintah and Ouray Reservation. The Indian Canyon Alternative would permanently displace 121 acres and could temporarily affect 257 acres of Tribal trust land, while the Whitmore Park Alternative would permanently displace 118 acres and could temporarily affect 255 acres. Based on consultation with the Ute Indian Tribe and BIA, OEA understands that the main land use on Tribal trust lands that would fall within the project footprint is oil and gas development. Aside from Tribal trust lands, no ITAs were identified in the study area that would be affected by any of the Action Alternatives. OEA is recommending mitigation measures (LUR-MM-1, LUR-MM-2, LUR-MM-6) requiring the Coalition consult with the Ute Indian Tribe during the final engineering and design phase of the proposed rail line, implement reasonable mitigation measures imposed by the Ute Indian Tribe, and implement the reasonable terms and conditions imposed by BIA in any decision granting a right-of-way on Tribal trust lands.

Conservation Easements

The Indian Canyon Alternative and the Whitmore Park Alternative would cross the Indian Canyon Conservation Easement held by UDWR in Sections 14, 15 and 22, Township 4 South, Range 5 West, Duchesne County. Construction of the proposed rail line, an access road, and a communications tower under the Indian Canyon Alternative and the Whitmore Park Alternative would temporarily disturb approximately 52 acres within the conservation easement. Permanent disturbance within the Indian Canyon Conservation Easement would total approximately 35 acres under both the Indian Canyon Alternative and the Whitmore Park Alternative. The 35 acres of permanent disturbance under either alternative would represent approximately 3.5 percent of the total 1,000 acres held in the Indian Canyon Conservation Easement. OEA is recommending mitigation (LUR-MM-12) requiring the Coalition coordinate with landowners and holders of conservation easements crossed by the proposed rail line to develop appropriate measures to mitigate the impacts of construction and operation of the proposed rail line on affected conservations easements.

Recreation

This subsection compares the potential environmental impacts on recreation across the three Action Alternatives.

Construction and Operations

Cooperating Wildlife Management Units

All of the Action Alternatives would create temporary and permanent disturbances to CWMUs, resulting in adverse impacts on hunting opportunities (Figure 3.11-1). Table 3.11-~~6~~7 compares the temporary and permanent disturbances to CWMUs by Action Alternative. As the table shows, the Whitmore Park Alternative would result in the most disturbances to CWMUs, followed by the ~~Wells Draw~~Indian Canyon Alternative and then the ~~Indian Canyon~~Wells Draw Alternative.

Table 3.11-~~6~~7. Temporary and Permanent Disturbances to Cooperative Wildlife Management Units by Action Alternative

Action Alternative	CWMUs	Acres of Temporary Disturbance[a]	Acres of Permanent Disturbance[b]	Total Disturbance
Indian Canyon	Antelope Creek/581	326	165	491
	Cottonwood Ridge/824	7	7	14
	Emma Park/538	82	76	157
	Indian Head/735	91	62	153
	Total	**506**	**310**	**816**
Wells Draw	Antelope Creek/581	113	43	156
	Emma Park/538	82	76	157
	Indian Head/735	91	62	153
	Total	**286**	**181**	**466**
Whitmore Park	Antelope Creek/581	334	168	503
	Emma Park/538	132	45	177
	Indian Head/735	224	117	341
	Minnie Maud Ridge/551	317	135	452
	Total	**1,006**	**466**	**1,472**

Notes:

[a] ~~Construction~~ Temporary footprint.

[b] Rail Line footprint.

Source: UDWR 2020

CWMU = Cooperative Wildlife Management Unit

Ashley National Forest Recreational Areas

The Indian Canyon Alternative and the Whitmore Park Alternative would cross a portion of Ashley National Forest near the trailheads of the Right Fork Indian Canyon Trail, Grass Hollow Trail, and Mill Hollow Trail (Figure 3.11-1). Recreationalists using those trails could be disturbed by noise during construction activities and by train noise during operations. The rail line could also be visible from some portions of those trails, which could create visual distractions. These impacts would be greatest for users of the Mill Hollow Trail because its trailhead is located immediately adjacent to the Indian Canyon Alternative and Whitmore Park Alternative project footprints at Mill Hollow and US 191. An at-grade crossing of the unnamed Forest Service road providing access to the Mill Hollow Trail trailhead would also be required for the Indian Canyon Alternative and Whitmore Park Alternative, resulting in potential access delays and intermittent disturbances from train horn noise for recreationalists during operation.

Because the Indian Canyon Alternative and the Whitmore Park Alternative would be located approximately 2.4 miles away from the Avintaquin Campground (Figure 3.11-1), OEA does not believe construction and operation of either of these alternatives would affect recreationists at the campground. The Wells Draw Alternative would not cross Ashley National Forest and would, therefore, not affect recreational opportunities in the forest.

Bureau of Land Management Recreational Areas

The Wells Draw Alternative would temporarily disturb 3,197 acres of ERMAs and would permanently displace 1,556 acres of BLM ERMAs. The Indian Canyon Alternative would temporarily disturb 73 acres of BLM ERMAs and would permanently displace 46 acres of ERMAs. During construction, recreationists would not be able to access temporarily disturbed ERMAs on BLM-administered land for camping, hiking, horseback riding, hunting, fishing, mountain biking, rock climbing, wilderness backpacking, wildlife viewing, nature photography, or other activities. The displacement of EMRAs within the rail line footprint would lead to the permanent loss of recreational opportunities on those lands. The Whitmore Park Alternative would not cross BLM-administered land and would, therefore, not affect ERMAs.

The Wells Draw Alternative would also cross several special designation areas on BLM-administered lands (Figure 3.11-1). Table 3.11-~~7~~8 lists the BLM special designation areas that the Wells Draw Alternative would affect. Construction impacts on relevant and important ACEC values would occur for the areas of the Wells Draw Alternative requiring vegetation removal, overland travel, cut and fill, or grading in these areas. Construction of the Wells Draw Alternative would bisect the Big Wash and Currant Canyon areas managed as Lands with Wilderness Characteristics and could result in portions of these areas no longer meeting the size requirements to be managed as Lands with Wilderness Characteristics. During construction, noise and activity in an SRMA would temporarily adversely affect recreational activity for which the SRMA is managed. This would primarily affect recreationists engaged in hiking, backpacking, and rock art viewing. The Indian Canyon Alternative and the Whitmore Park Alternative would not cross BLM special designation areas. During operation, recreationists in special designation areas near the proposed rail line would be able to hear noise from trains and maintenance vehicles. Wayside and train horn noise would likely reduce recreational enjoyment within portions of the Big Wash and Currant Canyon areas managed as Lands with Wilderness Characteristics, and within a small portion of the Nine Mile SRMA.

Table 3.11-~~7~~8. BLM Special Designation Areas Affected by the Wells Draw Alternative

Special Designation	Name	Temporary Disturbance[a] (acres)	Permanent Disturbance[b] (acres)	Total Disturbance (acres)
ACEC	Lears Canyon	68	36	104
	Nine Mile Canyon	49	15	64
Lands with Wilderness Characteristics	Big Wash	307	147	454
	Currant Canyon	998	462	1,460
SRMA	Nine Mile SRMA	49	15	64
Total		**1,471**	**675**	**2,146**

Notes:

[a] ~~Construction~~ Temporary footprint.

[b] Rail line footprint.

Source: BLM 2008b

ACEC = Areas of Critical Environmental Concern; SRMA = Special Recreation Management Area

3.11.3.3 No-Action Alternative

Under the No-Action Alternative, the proposed rail line would not be constructed and operated, and land would not be permanently converted to railroad use. Current land uses and recreational opportunities and experiences would not be affected and would continue as is.

3.11.4 Mitigation and Unavoidable Environmental Effects

Any of the Action Alternatives would result in temporary and permanent changes to existing land use and would adversely affect recreational opportunities in the study area. Each of the Action Alternatives would affect public land, but the affected land management agencies would vary by alternative. The Coalition has proposed voluntary mitigation measures and OEA is recommending additional mitigation measures to avoid or minimize impacts on land use and recreation (Chapter 4, *Mitigation*). Even if those mitigation measure are imposed; however, construction and operation of the proposed rail line would result in unavoidable consequences on land use and recreation, including the permanent loss of irrigated cropland and grazing land, the severance of properties, and visual and noise disruption of recreational activities on public and private lands. OEA concludes that these unavoidable impacts on land use and recreation would be locally significant because each of the Action Alternatives would permanently alter existing land use and the availability and quality of recreational activities in the study area, including special designation areas on public lands.

3.12 Visual Resources

This section describes the impacts on visual resources that would result from construction and operation of the proposed rail line. Appendix P, *Visual Resources Terminology, Methodology, and Rating System*, provides further information on the key observation points (KOPs) used for the analysis. KOPs are locations from which people would be able to see the proposed rail line in the landscape if it were constructed. KOPs include locations along travel routes and places where people may be especially sensitive to changes in the visual landscape, such as recreational areas (sensitive viewscapes[1]). Appendix P, *Visual Resources Terminology, Methodology, and Rating System*, also addresses the assumptions related to the conceptual renderings included in this section, as well as the visual quality rating summaries recorded during the assessment.

3.12.1 Analysis Methods

This subsection identifies the study area, data sources, and analysis methods OEA used to analyze visual resources.

3.12.1.1 Study Area

OEA based the study area for visual resources on the project viewshed. A viewshed is the area that is visible from a particular location (e.g., an overlook or scenic vista) or sequence of locations (e.g., a roadway or trail). A viewshed includes the foreground (up to 0.5 mile from the viewer), the middleground (from 0.5 mile to 3 miles from the viewer), and the background (more than 3 miles from the viewer) (FHWA 2015). Scenic vistas generally encompass a wide area with long-range views to surrounding elements in the landscape. Such vistas are often available to viewers due to open, flat agricultural lands with few obstructions and from elevated vantages with views over the landscape. In addition, vistas also have a directional range, i.e., some areas have scenic vistas with a 360° view in all directions, while others may be limited in one direction in a manner that reduces the line of sight angle and amount of vista that is visible, resulting in a narrower vista view. This EIS also considers impacts on scenic byways. Scenic byways are designations awarded to roads across the country that exhibit one or more of six core intrinsic qualities—scenic, natural, historic, recreational, archaeological, or cultural—that contribute toward a unique travel experience. There are four scenic byways in the study area, Dinosaur Diamond Prehistoric Highway, Indian Canyon Scenic Byway, Nine Mile Canyon Scenic Backway, and Reservation Ridge Scenic Backway, as shown in Figure 3.12-1.

OEA defined the study area so that it includes areas where the proposed rail line would be visible in the foreground or middleground for areas with high elevations or with expansive views. OEA did not assess views where the proposed rail line would be visible in the background because project features do not typically stand out at that distance (FHWA 2015; Litton 1968:3–5). OEA did consider visual features in the background, such as mountain ranges and water features, in areas where the proposed rail line could affect views of those features.

[1] A viewscape is a visual connection that occurs between a person and the spatial arrangement of landscape features.

3.12.1.2 Data Sources

OEA reviewed the following data sources to determine the potential impacts on visual resources that could result from construction and operation of the proposed rail line.

- GIS files showing the design of the proposed rail line, locations of permanent project-related features that could affect visual resources, and locations of recreational areas where viewsheds could be affected.
- Information pertaining to lighting associated with the Action Alternatives, including the location of proposed nighttime construction, any nighttime activities that would require nighttime lighting (e.g., rail traffic and operations and maintenance activities), and any permanent sources of fixed lighting, including flashing safety signals.
- *Land and Resource Management Plan for the Ashley National Forest* (Forest Service 2017a).
- *Vernal Field Office Approved Resource Management Plan* (BLM 2008).
- Information on other relevant projects and actions for analyzing cumulative impacts.

3.12.1.3 Analysis Methods

OEA used the following methods to analyze impacts on visual resources in the study area.

- **OEA identified key concepts for the visual assessment.** Key concepts for the visual assessment include the visual character of an area, including natural and cultural features. The regulatory context of an area, such as land management objectives on public lands, is an important consideration for understanding the area's visual character. Visual preferences, or what people in the study area like and dislike about the area's visual character, define the study area's visual quality. Visual quality serves as the baseline for determining the degree of a project's visual impacts and whether those impacts would be adverse, beneficial, or neutral (FHWA 2015). Appendix P, *Visual Resources Terminology, Methodology, and Rating System*, provides details on these concepts and terms and their use in the visual resource assessment.
- **OEA identified the KOPs.** OEA prepared a viewshed analysis to determine the extent of the area where the proposed rail line would be visible in the foreground and middleground of the landscape. OEA visited the accessible portions of the study area and photographed KOPs, following the approach described in Appendix P, *Visual Resources Terminology, Methodology, and Rating System*. OEA photographed 21 KOPs from October 1 to October 3, 2019, photographs of which are also provided in Appendix P.
- **OEA analyzed the physical context**. OEA analyzed the physical context of each Action Alternative in three steps. First, OEA identified the visual features of the landscape, including any designated scenic vistas or state scenic highways. Next, OEA assessed the visual character and visual quality of the visual features relative to the overall regional visual character. Finally, OEA determined the importance of the visual resources to viewers, taking into consideration how the lands on which the KOPs are managed and used.
- **OEA created computer renderings of the proposed rail line at each KOP.** OEA produced computer-generated conceptual renderings to evaluate visual changes that would occur if the proposed rail line were constructed. These rendered key observation points (RKOPs) illustrate specific project elements (e.g., road-rail crossings, bridge crossings, and areas of cut and fill) at

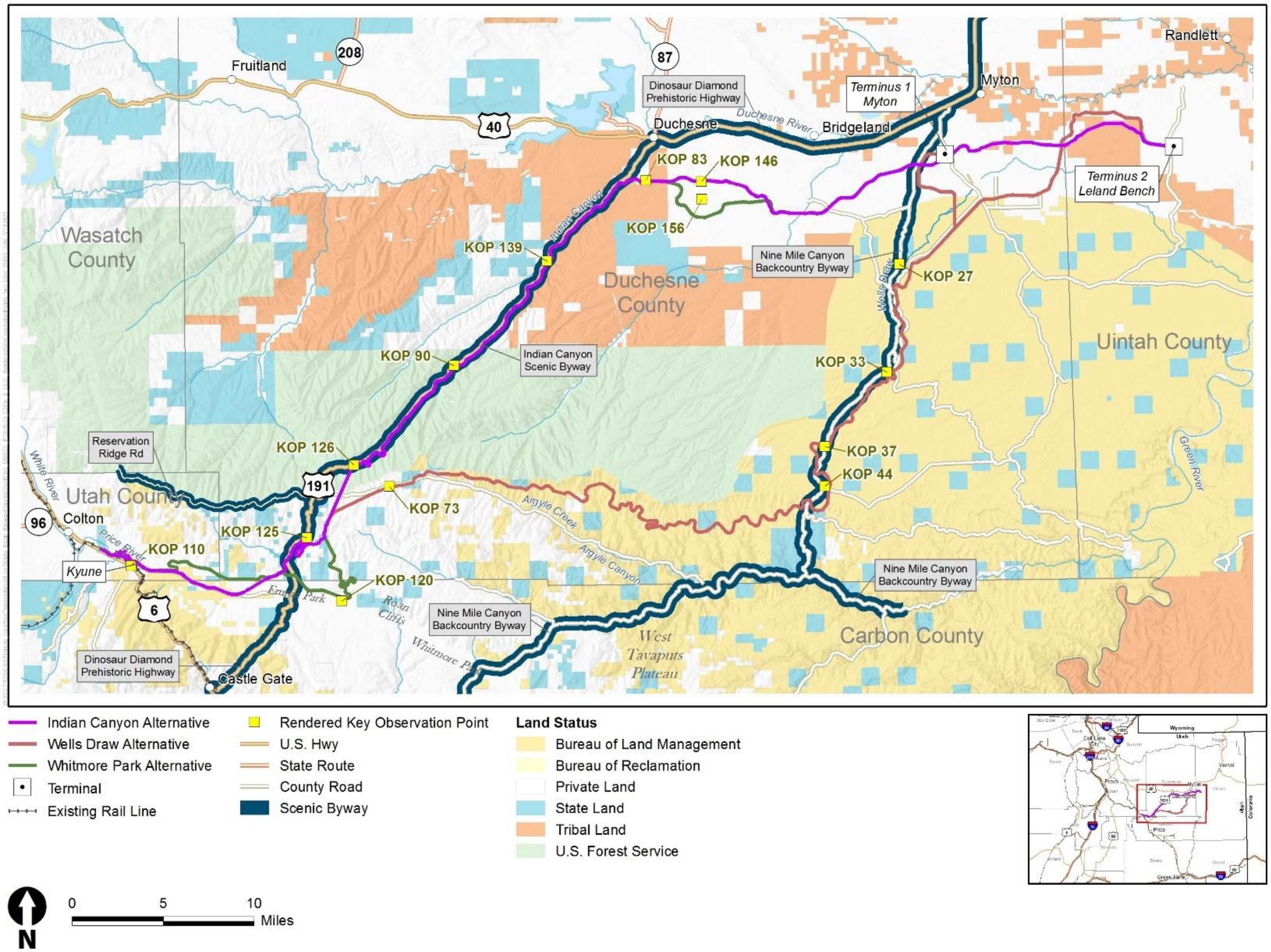
~~13~~ 14 different vantage points. OEA selected vantage points that provide representative views from which specific project elements would be visible to the public. Figure 3.12-1 identifies the RKOP locations, and the renderings are provided in Subsection 3.12.3, *Environmental Consequences*. Appendix P, *Visual Resources Terminology, Methodology, and Rating System*, describes the approach OEA used to select, prepare, and analyze the renderings and describes the RKOPs in detail.

- **OEA rated the RKOP visual characteristics.** OEA used different approaches to rate the quality from RKOPs of existing landscapes and potential changes from the proposed rail line. For RKOPs located on BLM-administered lands, OEA used an adaptation of the BLM's visual resource inventory (VRI) method Manual H-8410-1 (BLM 1986) and BLM Form 8400-5 Scenic Quality Rating Summary, to assign a scenic quality rating score for each RKOP, consistent with OEA's approach on past Board projects. OEA prepared rating forms for the existing view (the KOP) and for the view with the computer-rendered rail line added (the RKOP). OEA assessed the scenic quality of each viewshed in terms of landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications to determine how the KOPs and RKOPs would differ from each other. The scenic quality rating scores (based on the Scenic Quality Rating Summary form 8400-5) are provided in Appendix P, *Visual Resources Terminology, Methodology, and Rating System*. The scenic quality ratings for RKOPs on BLM-administered lands are also representative of changes that are likely to occur at other locations in the study area across the Action Alternatives. A reduction in scenic quality rating indicates that an impact would occur. OEA used the scenic quality ratings assessment process to inform whether the proposed rail line would conform to the BLM's Visual Resource Management (VRM) Class Objectives (Classes I, II, III, or IV). BLM's VRM Class Objectives indicate how BLM-administered lands should be managed to protect visual resources, as described in Appendix P, *Visual Resources Terminology, Methodology, and Rating System*.

  For the RKOPs on non-BLM-administered lands, including National Forest and other public lands, and scenic byways,[2] OEA prepared a visual quality evaluation by following FHWA methods. These methods include establishing natural harmony, cultural order, and project corridor coherence ratings to determine the overall visual quality rating. The rendering analysis also evaluated daytime and nighttime light and glare ratings. The ratings used in the analysis are summarized in Appendix P, *Visual Resources Terminology, Methodology, and Rating System*. The ratings are representative of changes that are likely to occur at other locations in the study area, including private lands, and across all the Action Alternatives; they are not exclusive to a particular alternative.

[2] National Scenic Byways designations recognize those roads across the country that exhibit one or more of six core intrinsic qualities—scenic, natural, historic, recreational, archaeological, or cultural—that contribute toward a unique travel experience.

Figure 3.12-1. Rendered Key Observation Point Locations



3.12.2 Affected Environment

This subsection identifies the existing environmental conditions related to visual resources in the study area. The study area is located at the western edge of the Rocky Mountain geographic region, within 80 miles of the Basin and Range geographic region.

The natural environment reflects a transition zone between the two regions. It is characterized by small plains intermixed with hills and mountains. Small valleys, streams, and plateaus are also present in this topographically varied landscape. Grasslands and pasturelands mixed with silver-green sagebrush grow on flatter lands and up hillsides that also support mixed-conifer forests.

Across the Action Alternatives, the visual landscape is mostly intact and unaltered by humans. Exposed substrate is present throughout the study area and reveals multicolored rock faces, boulders, gravels, and soils. Outstanding scenic views result from the varied landforms against vast skies within a fairly undeveloped landscape with an absence of distracting human-made features, such as large buildings and transportation structures or large amounts of visible utility infrastructure that are inharmonious with the rural landscape. Scenic vista views also exist throughout the study area. Both the Indian Canyon Alternative and the Whitmore Park Alternative would cross portions of Ashley National Forest characterized by a diverse mix of grasslands, shrublands, meadows, aspens, and mixed-conifer forest that can be accessed by recreational viewers. Small pockets of agricultural land are also present in the study area, located along U.S. Highway 191 (US 191), Sowers Canyon Road, and approximately 3 to 8 miles south of Myton. These agricultural areas take advantage of the limited amount of flat land in the study area and create a circular and rectangular patchwork of brighter and darker greens in the landscape that contrast with surrounding areas that tend to be more arid, consisting of tan and brown vegetation.

In the context of visual resources, the cultural environment refers to features such as developed areas, light sources, and roadways and infrastructure. The cultural environment in the study area consists of rural residences and ranches and lacks dense, concentrated development. Within the study area, there are developed areas, such as small groupings of rural residences that are located off of Argyle Canyon Road and along Willow Creek, east of US 191. The largest community that is located in the study area just southeast of Duchesne, is accessed by County Road 29 (18290 West)~~Avenue 18290 W~~ off of U.S. Highway 40 (US 40). Features associated with these developments that contribute to the cultural environment include fencing and ancillary structures, such as barns and sheds. The northeastern portion of the study area includes oil and gas facilities, rigs, and storage tanks~~wells~~; pipelines transporting oil and gas can be seen across the landscape, primarily on BLM-administered lands. These lands also see a high amount of truck traffic with semi-trailer trucks transporting oil and ~~gas~~ water and maintenance trucks accessing well pads and other oil and gas facilities. The cultural environment also includes dirt roads that wind through the landscape and more heavily traveled~~,~~ paved highways~~ and local routes~~, such as US 191 and~~,~~ US 40. ~~, Avenue 5880 West, Avenue 3540 West, r~~Recreationists ~~who~~ use Sand Wash Road to access Desolation Canyon, and portions of Nine Mile Canyon Road. Additional infrastructure in the landscape includes a limited amount of lattice steel utility lines that cross Argyle Creek Road and wooden utility poles and lines in areas with a higher concentration of development. The study area is largely unlit with the primary sources of artificial light coming from rural residences and developed areas and vehicle headlights at night. Streetlights are generally not present in the study area.

Overall, the visual quality of the study area is high due to the limited amount of distracting human-made features combined with high-quality views of the natural environment. The visual quality of the landscape has contributed to the presence of four scenic byways in the study area. These scenic byways are shown in Figure 3.12-1 and include the following.

- Dinosaur Diamond Prehistoric Highway, a National Scenic Byway and state of Utah scenic byway, which follows US 191 within the study area.
- Indian Canyon Scenic Byway, a state of Utah scenic byway, which also follows US 191 (between US 40 in Duchesne and U.S. Highway 6 [US 6] near Helper) and overlaps with the Dinosaur Diamond Prehistoric Highway.
- Nine Mile Canyon Scenic Backway, a state of Utah scenic backway, which follows Nine Mile Canyon and Soldier Creek Roads from Myton to US 191.
- Reservation Ridge Scenic Backway, a state of Utah scenic backway, which follows Forest Service Road ~~Highway~~ 147 from US 191 to US 6.

People in the study area have different sensitivities to changes to the visual landscape. OEA identified unaffected viewers, residential and tribal viewers, recreational viewers, roadway viewers, and industrial, commercial, and agricultural viewers. The sensitivity of these viewers to visual change ranges from high sensitivity (typically residential, tribal, and recreational viewers) to moderately high sensitivity (such as roadway travelers traveling routes for their scenic quality) to moderate sensitivity (such as roadway travelers that are commuting or transporting goods and industrial, commercial, and agricultural viewers).

3.12.3 Environmental Consequences

Construction and operation of the proposed rail line could result in impacts related to visual resources. This subsection first presents the potential impacts that would be the same for all three Action Alternatives and then compares the potential impacts that would be different across the Action Alternatives. For comparison purposes, this subsection also discusses the status of visual resources under the No-Action Alternative.

3.12.3.1 Impacts Common to All Action Alternatives

This subsection discusses potential impacts on visual resources that would be the same across the three Action Alternatives. All of the Action Alternatives would require vegetation removal, landform changes, building removal, new culverts, and new bridge structures. All of the Action Alternatives would traverse scenic landscapes and would affect viewers; therefore, all of the Action Alternatives would result in similar types of visual impacts. The severity and intensity of these impacts would depend on the change to the viewscape, on how sensitive viewers are to those changes, and on how close viewers would be to the changes.

Construction

During the construction period, construction activities would move along the corridor of the Action Alternative as different segments of the proposed rail line are constructed. These construction activities would affect rural viewers, roadway travelers, tribal viewers, and recreationists adjacent to or in the study area. The introduction of construction activities and equipment into the viewsheds would result in temporary visual changes. All viewer groups are likely accustomed to seeing machinery, trucks, and vehicles on or near the roadway because oil and natural gas production, agriculture, and ranching require such equipment. However, construction of the proposed rail line would involve heavy machinery that is not commonly used in a rural environment. In addition to these more general impacts, the following specific construction impacts would also occur.

Industrial-Looking Elements

Construction activities for any of the Action Alternatives would introduce heavy equipment and associated vehicles, such as dozers, graders, scrapers, and trucks, into the viewshed. The Coalition would determine the locations for construction staging areas and associated facilities in the temporary footprint during the design process but locations would likely be placed within the rail line footprint at bridges, tunnel portals, roadway crossings, and other locations.[3] Depending on location, people in the area would be able to see staging areas with temporary field offices, worker parking, and equipment and materials storage areas, which would add industrial elements into viewsheds that are largely rural in nature. To minimize these impacts, OEA is recommending mitigation requiring the Coalition install visual barriers, as appropriate and practicable, to obstruct undesirable views of project-related construction activities and to maintain the privacy of adjacent landowners (VIS-MM-1).

Fugitive Dust

Construction activities involving heavy equipment use, soil and material transport, and land clearing in the rail line footprint, along public roadways, and at construction staging areas would create fugitive dust. Fugitive dust could temporarily affect viewsheds by introducing particles in the air, which could diminish the visual clarity of the area. The Coalition has proposed voluntary mitigation to implement appropriate fugitive dust suppression controls (VM-23).

Temporary Nighttime Lighting

If nighttime construction activities occur, lighting equipment could create glare that might affect sensitive viewers adjacent to the project footprint. To minimize this potential impact, OEA is recommending mitigation requiring the Coalition direct construction-related nighttime lighting onto the immediate study area to minimize impacts from shining lights on sensitive viewers, sensitive natural resource areas, recreational areas, roadways, and trails (VIS-MM-2).

Privacy of Rural Viewers

Construction activities could occur adjacent to or near rural properties, homes, and agricultural buildings, which would evoke a sense of invaded privacy for rural viewers.

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[3] The *rail line footprint* includes the area of the railbed, as well as the full width of the area cleared and cut or filled. The rail line footprint would also include other physical structures installed as part of the proposed rail line, such as fence lines, communications towers, siding tracks, relocated roads, and power distribution lines. The rail line footprint is the area where rail line operations and maintenance would occur. The area would be permanently disturbed. The *temporary footprint* is the area that could be temporarily disturbed during construction, including areas for temporary material laydown, staging, and logistics. Disturbed areas in the temporary footprint would be reclaimed and revegetated following construction. The *project footprint* is the combined area of the rail line footprint and temporary footprint, both of which would be disturbed during construction, comprising where construction and operations of the proposed rail line would occur.

Operations

The following operation impacts would be common to all Action Alternatives. The intensity of the impact would vary depending on the number of viewers present, proximity of viewers to the proposed rail line, degree of physical change in the landscape, visibility of the physical change, volume of train traffic, and required maintenance.

Permanent Nighttime Lighting

Operation of any of the Action Alternatives would introduce small mobile sources of light from train headlights when trains travel at night. However, because trains would move on the proposed rail line, they would be an intermittent light source, not a fixed source of new lighting, and would not affect most viewer groups. OEA anticipates that some rail-related infrastructure, such as communications towers, would be a source of permanent nighttime lighting. The Coalition would determine specific design features and any related permanent lighting prior to construction and operation of the proposed rail line. To the extent that any permanent nighttime light sources would be visible to sensitive viewers, adverse impacts could result.

Viewshed Visual Quality

Rail operations would affect the visual quality of viewsheds by adding industrial infrastructure to the rural landscape and breaking up the compositional balance between natural landforms and vegetation and by changing natural landscapes to a rail corridor. Figure 3.12-2 shows RKOP 090, which illustrates this impact.

The visibility of any of the Action Alternatives would vary seasonally and under changing atmospheric conditions. Elements of the proposed rail line would be more apparent in the spring when the built features would contrast more with natural features. For example, darker green grasses would contrast against the lighter browns, pinks, tans, grays, and oranges of landscape scars, earthen embankments, unvegetated rights-of-way, and road relocations, as well as the grays of built features, such as bridges and culverts. Conversely, the proposed rail line would be slightly less visible in the summer and fall when it would blend in with the brown grass and exposed earth. In the winter and early spring, some rail-related features would be obscured by snow, which would apply a uniform white cover over the landscape.

Deciduous trees would partially obscure portions of the proposed rail line when in leaf and would reveal more views when leafless. Forest fires along portions of US 191 and Argyle Canyon Road in 2019 have left behind hillsides with few shrubs, little herbaceous vegetation, and charred trunks. Once the forest begins to regrow, over many years, these areas would provide a partial visual buffer from the proposed rail line.

Figure 3.12-2. RKOP 090 Looking SW near Milepost 30.8 (Indian Canyon Alternative) and Milepost 36.8 (Whitmore Park Alternative)

Visual Continuity of Agricultural Landscape

Operation of any of the Action Alternatives would disrupt the visual continuity of agricultural land, which occurs in limited areas throughout the study area. Rural viewers may experience loss of land, fencing, or other landscape features of personal importance. The degree of visual disruption would depend on the existing terrain and degree of modification, presence or absence of vegetation, degree of vegetation removal, and the viewer's position in the landscape. The proposed rail line would be more visually pronounced in the areas where siding would be located because the line there would 15 to 20 feet wider than elsewhere. The proposed rail line would also disrupt the visual continuity of water bodies (Section 3.3, *Water Resources, Subsection* 3.3.3, *Wetlands*, provides an additional discussion on these features). Figure 3.12-3 illustrates this impact that could occur on agricultural lands; the figure shows RKOP 139 with a house removed in the conceptual rendering.

Natural Landforms

Operation of any of the Action Alternatives would alter natural landforms in the viewshed. Large areas of cut would remove portions of hillsides and plant cover, leaving behind large landscape scars. Large, long areas of fill in valleys would create substantial earthen berms and introduce raised visual masses between peaks and valleys. These features would often be parallel to local roadways and would cross rivers and streams. Viewers can currently see along affected rivers and streams where the waterway may bend and disappear from view behind vegetation and terrain. The new berms would create visual masses that would limit views up and down curving waterways. Figure 3.12-4 shows RKOP 125, which illustrates this impact. To minimize these impacts, OEA is recommending mitigation requiring the Coalition implement regrading with undulations and topographical variations to mimic natural terrain, where possible (VIS-MM-3).

Vegetation Removal

Areas of cut and fill would remove portions of plant cover on hillsides and flat areas, including agricultural and grassland areas, shrubs, and mature trees. Vegetation improves visual quality and helps screen-built features in the landscape. Vegetation removal would make landscape scars and the proposed rail line more visually prominent than it would be otherwise. Figure 3.12-5 shows RKOP 083, which illustrates this impact. To minimize these impacts, The Coalition has proposed mitigation to permanently reestablish native ground cover on disturbed areas to prevent soil erosion, where feasible (VM-22).

Engineered Vertical Features

Any of the Action Alternatives would introduce engineered vertical features across unaltered natural landforms that could disrupt and detract from views of the surrounding landscape. Bridge crossings would create visual masses that segment views on either side of the bridge. These features could require the removal of riparian vegetation, where bridges cross streams, rivers, and drainages. Subsection 3.4.3.2, *Impact Comparison between Action Alternatives*, shows the estimated amount of riparian habitat disturbance for each Action Alternative. Construction of tunnels would involve clearing vegetation, regrading topography, and stabilizing hillslopes near tunnel entrances, which would change the appearance of mountainsides. Figure 3.12-6 shows RKOP 126, which illustrates this impact.

Figure 3.12-3. RKOP 139 Looking SW at Milepost 39 (Indian Canyon Alternative) and Milepost 45 (Whitmore Park Alternative)

Figure 3.12-4. RKOP 125 Looking East to South across Willow Creek from US 191 (Indian Canyon Alternative and Wells Draw Alternative)

Figure 3.12-5. RKOP 083 Looking Southeast near Milepost 47.4 (Indian Canyon Alternative) and Milepost 53.4 (Whitmore Park Alternative)

Figure 3.12-6. RKOP 126 Looking Southwest near ~~RC~~ Road Crossing at Milepost 21.6 (Indian Canyon Alternative) and Milepost 26.9 ~~and~~ (Whitmore Park Alternative)

The Coalition would construct up to four new communications towers for each Action Alternative. These towers would add tall vertical elements where few to no such features currently exist that would affect visual resources depending on their placement in the landscape; the height, mass, materials, and associated appurtenances of the structure; and the presence of sensitive viewer groups. In some locations, the Coalition could install single-phase distribution lines to power the signal system and detectors in areas where few to none currently exist. Although common along public roadways and on private land easements, single-phase distribution lines are uncommon in most of the study area, particularly along US 191 and Nine Mile Canyon Road. New power distribution lines would introduce tall vertical features in areas where they do not currently exist. While new power lines would be located in the rail line footprint and would tie into the closest existing power distribution line, the addition of new infrastructure associated with the power lines would still detract from the visual environment.

All vertical features could disrupt views of the surrounding landscape by detracting from the visual quality of the viewshed, altering the visual landscape to accommodate construction of such features (e.g., vegetation removal and landform modification), or obscuring or limiting visible portions of the surrounding landscape, including the hills and sky.

To minimize the visual impact of engineered vertical features, OEA is recommending mitigation measures requiring the Coalition design bridges, communications towers, and other project-related structures to complement the natural landscape, to the extent practicable. OEA's recommended mitigation would also require the Coalition to use paint colors and surfacing that mimic natural features and blend into the surrounding landscape, to the extent practicable (VIS-MM-4).

Road Relocations and Grade Crossings

Under any of the Action Alternatives, various public and private roads would be relocated. The Coalition would install grade crossings where the Action Alternative would cross a roadway. These changes would be visible to rural viewers, roadway travelers, and recreationists. Figure 3.12-7 shows RKOP 146, which illustrates this impact.

3.12.3.2 Impact Comparison between Action Alternatives

Table 3.12-1 summarizes the impacts on visual resources from the RKOPs on BLM-administered lands in the study area and indicates changes in visual quality ratings. OEA rated the RKOPs using the BLM rating system, which includes high (A), moderate (B), and low visual quality (C) ratings. OEA rated all of the RKOPs as having low visual quality for all of the Action Alternatives. Table 3.12-2 summarizes the impacts on visual resources from the RKOPs that are not on BLM-administered lands, using the FHWA Visual Quality Rating guidance. These ratings include very high visual (VH), high (H), moderately high (MH), moderate (M), moderately low (ML), low (L) and very low (VL) visual quality. OEA rated these RKOPs ranging from having moderately high to very low visual quality.

Table 3.12-1 and Table 3.12-2 also indicate which Action Alternatives could affect each RKOP. Figure 3.12-2 through Figure 3.12-16~~1~~ show conceptual renderings for selected KOPs. Appendix P, *Visual Resources Terminology, Methodology, and Rating System*, includes a discussion of criteria OEA used to select KOPs for rendering.

Figure 3.12-7. RKOP 146 Looking North near ~~RC~~ Road Crossing at Milepost 50.50 (Indian Canyon Alternative)

Table 3.12-1. Scenic Quality Rating Summary for BLM-Administered Lands in the Study Area

RKOP	KOP Rating (Existing Vista)[a]	RKOP Rating (Post-Project Vista)[a]	Difference in Rating	Action Alternatives Affected	Reason for Change in Rating
027	C	C	--	Wells Draw Alternative	Trains on the proposed line would be visible on a distant ridgeline, adding to existing oil pumps and related infrastructure, which would provide a discordant landscape and add to the moderate disharmony. The road in the foreground and middleground would disrupt the natural landscape. See Figure 3.12-8.
033	C	C	--	Wells Draw Alternative	Embankments and vegetation clearing for the proposed rail line would introduce a stark modification to the hills in the background. Modifications add variety but are very discordant and promote strong disharmony. The proposed rail line and trains would be visible in the background from this location. See Figure 3.12-12.
037	C	C	--	Wells Draw Alternative	The proposed rail line would create a noticeable disconnect with the surrounding landscape and would distract from the naturalness of the area. The proposed rail line bridge would obstruct the view of the middleground and background. The bridge would present a linear, flat contrast to the surrounding landscape and form. See Figure 3.12-13.
044	C	C	--	Wells Draw Alternative	The proposed rail line would introduce discordant elements to an otherwise largely natural setting. Modifications would be few (roadway in two locations) and would add little visual variety to the area. The addition of cleared areas, embankments, and graded slopes would not greatly increase the effects of cultural modification. See Figure 3.12-9.

Notes:

[a] An A rating indicates having high visual quality, a B rating indicates having moderate visual quality, and a C rating indicates having low visual quality.

KOP = key observation point; RKOP = rendered key observation point

Table 3.12-2. Visual Quality Rating Summary using FHWA Visual Quality Rating Guidance

RKOP	KOP Rating (Existing Vista)[a]	RKOP Rating (Post-Project Vista)[a]	Difference in Rating	Action Alternatives Affected	Reason for Change in Rating
073	M~~L~~	ML	-1	Wells Draw	The proposed rail line would introduce notable visible modifications (cut-and-fill slopes, tracks, train). Some existing healthy trees would be removed, making the burned area more visible, which should improve with time as slopes grow in and trees regrow. The natural and cultural landscape would be adequately balanced, but would require minor to moderate improvement for compatibility (reseeding, reforesting). See Figure 3.12-16.
083	MH	M	-1	Indian Canyon Whitmore Park	The proposed rail line would add another human-made element to the landscape and would likely distract from the naturalness of the area. However, because the proposed rail line would generally follow the valley parallel to the graded roadway and would not remove large amounts of vegetation, and because the graded slopes would mimic the surrounding hillsides, it would not detract greatly from available views. See Figure 3.12-5.
090	MH	M	-1	Indian Canyon Whitmore Park	The landscape would have notable visible modifications (graded slope), that would detract from available views especially if the graded face could not be planted to blend with surrounding area. The proposed rail line would require moderate to substantial redesign to rectify compatibility with surrounding environments, including revegetation of slopes and potentially terracing and revegetation of slopes or rock treatment to blend with natural slopes. See Figure 3.12-2.

RKOP	KOP Rating (Existing Vista)[a]	RKOP Rating (Post-Project Vista)[a]	Difference in Rating	Action Alternatives Affected	Reason for Change in Rating
110-A	MH	ML	-2	Indian Canyon Wells Draw	The natural landscape would have more visible modifications, including the roadway in the foreground, railroad tracks and trains in the foreground and middleground, and significantly more graded slopes in the foreground and middleground. Introducing the proposed rail line into the natural landscape would result in a slightly disjunctive area. The cultural landscape would contain some unifying elements but would generally lack design cohesion. The proposed rail line would moderately degrade the natural or cultural landscape, replacing natural slopes with large embankments. See Figure 3.12-10.
110-B	MH	ML	-2	~~Indian Canyon~~ ~~Wells Draw~~Whitmore Park	The landscape would have more visible modifications, roadway in foreground, railroad tracks and trains in foreground and middleground, significantly more graded slopes in foreground and middleground. The rail line footprint would not correspond to the natural or cultural landscape and could be perceived as disjunctive. The cultural landscape would contain some unifying elements but would generally lack design cohesion, with graded slopes affecting several areas in at different angles, appearing disjointed. See Figure 3.12-11.
120	MH	ML	-2	Whitmore Park	The natural landscape would have many visible modifications including existing and new roadways; significantly more graded slopes in foreground, middleground, and especially background; and railroad tracks and trains in the foreground and middleground. The railroad tracks and trains in the foreground and middleground would be discordant. See Figure 3.12-14.

RKOP	KOP Rating (Existing Vista)[a]	RKOP Rating (Post-Project Vista)[a]	Difference in Rating	Action Alternatives Affected	Reason for Change in Rating
125	MH	VL	-4	Indian Canyon Wells Draw	The natural landscape would be severely degraded. Most of the view would change significantly, replacing the majority of the natural environment with graded slopes, roads, tracks, trains, and shiny culvert pipes. The rail line footprint would be in disarray, and the proposed rail line would replace natural hillsides with massive grading and exposed soil and rock, roadways, and tracks and trains. The Action Alternatives would require substantial redesign to rectify the natural landscape's compatibility with surrounding environments, including revegetation of slopes and potentially terracing and revegetation of slopes or rock treatment to blend with natural slopes, as well as using culvert pipes that blend better with the environment. These issues may not be possible to rectify due to the scale of disturbance. See Figure 3.12-4.
126	H	ML	-3	Indian Canyon Whitmore Park	The landscape would have notable visible foreground modifications that would detract from available views, though background natural views would remain. The natural state would be of lesser quality than natural environments that are more common to the region and vicinity. The cultural landscape would contain some unifying elements but generally would lack design cohesion. The landscape would contain highly disjointed land uses, with tracks and tunnel and roadways appearing disjointed. See Figure 3.12-6.

RKOP	KOP Rating (Existing Vista)[a]	RKOP Rating (Post-Project Vista)[a]	Difference in Rating	Action Alternatives Affected	Reason for Change in Rating
139	H	M	-2	Indian Canyon Whitmore Park	The landscape would have visible modifications that would moderately detract from views. The natural and managed vegetation would be mostly intact. Cut and fill on the hillside would be noticeable and discordant with the surrounding landscape. The cultural landscape would be typical of the region and vicinity. A few farm buildings, including at least one residence, would be removed, but the position of the tracks and train at the edge of the valley would be logical and unobtrusive. See Figure 3.12-3.
146	M	M	--	Indian Canyon	The natural landscape would have visible natural and human modifications. The natural state would be common to the region and vicinity. Only natural vegetation in the foreground would be removed; the background would remain the same. The cultural landscape would contain some unifying elements. The addition of the crossing tracks would be a unifying element, providing a strong horizontal line. The cultural environment could be perceived as ordinary or familiar. The proposed rail line, in the foreground, would respond well to the natural and cultural landscape and could be perceived as being compatible with surrounding environments. See Figure 3.12-7.

RKOP	KOP Rating (Existing Vista)[a]	RKOP Rating (Post-Project Vista)[a]	Difference in Rating	Action Alternatives Affected	Reason for Change in Rating
156	H	MH	-1	Whitmore Park	The landscape would have few visible modifications and the modifications would not greatly detract from available views. A small amount of vegetation would be removed for the railroad embankment. The natural state would be of higher quality than natural environments that are more common to the region and vicinity. Railroad embankments and the bridge would be visible, but would make little contribution to the view due to distance. The rail line footprint would correspond well to the natural and cultural landscape and could be perceived as being compatible with surrounding environments. See Figure 3.12-15.

Notes:

[a] VH indicates having *very high* visual quality; H indicates having *high* visual quality; MH indicates having *moderately high* visual quality; M indicates having *moderate* visual quality; ML indicates having *moderately low* visual quality; L indicates having *low* visual quality; and VL indicates having *very low* visual quality.

KOP = key observation point; RKOP = rendered key observation point

Figure 3.12-8. RKOP 027 Looking toward Milepost 73.2 (Wells Draw Alternative)

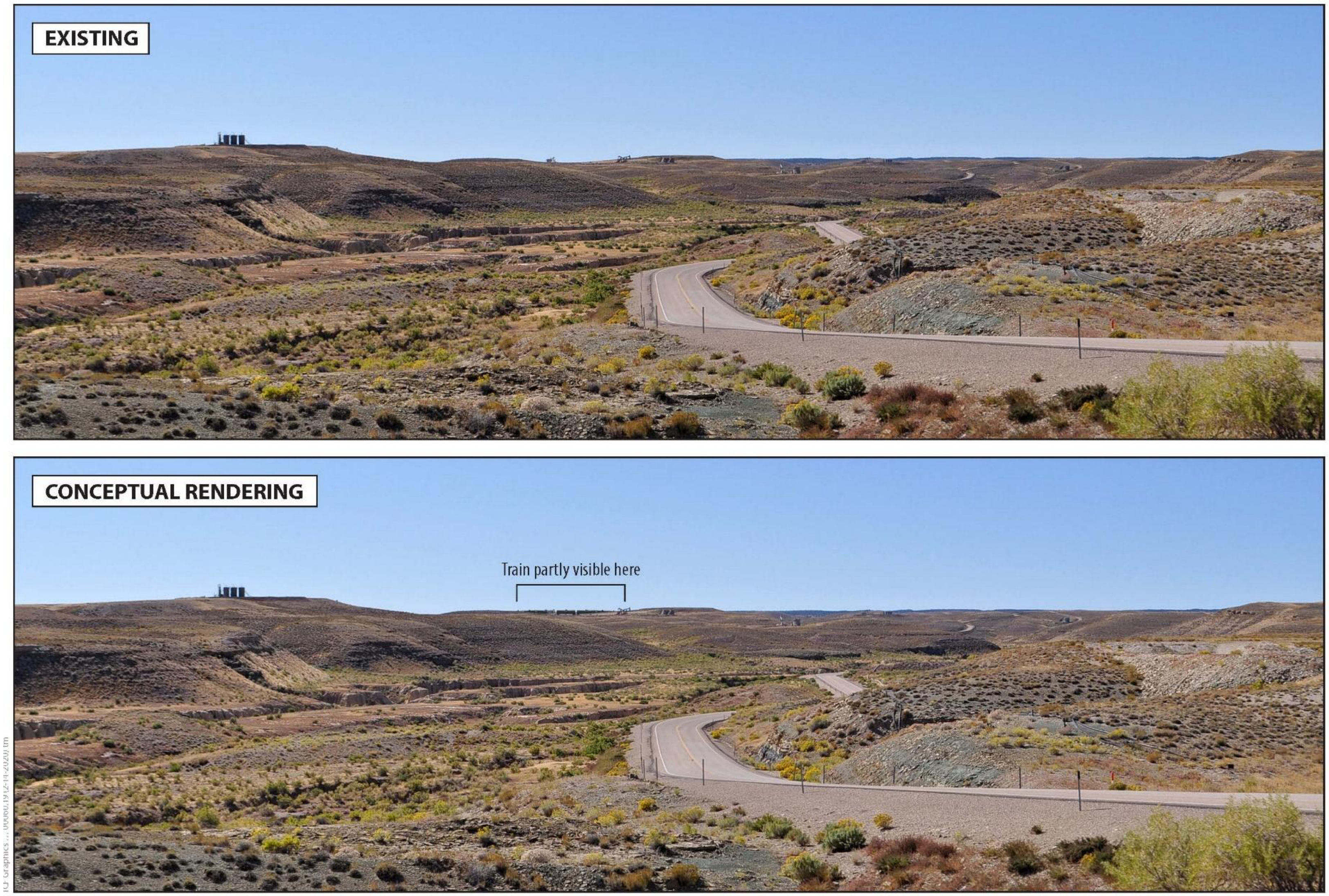


Figure 3.12-9. RKOP 044 Looking East–Southeast toward Milepost 57 (Wells Draw Alternative)

Figure 3.12-10. RKOP 110a Looking North toward Kyune Wye near Milepost 2.5 (Indian Canyon Alternative and Wells Draw Alternative)

Figure 3.12-11. RKOP 110b Looking North toward Kyune Wye near Milepost 2.5 (Whitmore Park Alternative)

Construction and Operations

This subsection compares the potential impacts on visual resources across the three Action Alternatives for both construction and operation. Table 3.12-1 and Table 3.12-2 summarize the impacts of the proposed rail line for typical RKOPs in the study area and indicate changes in visual quality ratings using the BLM and FHWA rating systems, respectively. Table 3.12-3 shows sensitive viewscapes and infrastructure changes by Action Alternative. For reference, Figure 3.12-1 shows the locations of the RKOPs and Figure 3.12-2 through Figure 3.12-16~~1~~ show the conceptual renderings with potential visual intrusions and impacts.

Table 3.12-3. Sensitive Viewscapes and Infrastructure Changes by Action Alternative

Action Alternative	Length[a] (miles)	Sensitive Viewscapes	Infrastructure Changes
Indian Canyon	80.5	• Ashley National Forest • BLM lands • Tribal trust lands • Indian Canyon Scenic Byway • Reservation Ridge Scenic Backway	• Install 4 new towers • Install 6 new sidings • Remove 3 nonresidence structures
Wells Draw	103.2	• Ashley National Forest • BLM lands • Reservation Ridge Scenic Backway	• Install 4 new towers • Install 3 new sidings • Remove 4 residences • Remove 1 other structure
Whitmore Park	88.3	• Ashley National Forest • BLM lands • Tribal trust lands • Indian Canyon Scenic Byway • Reservation Ridge Scenic Backway	• Install 4 new towers • Install 9 new sidings • Remove 1 residence • Remove 5 other structures

Notes:
[a] Represents the length of the Action Alternative.
BLM = U.S. Department of the Interior, Bureau of Land Management

Because of its length, the Wells Draw Alternative would have the most impacts on visual resources and sensitive viewers during both construction and operation. The shorter Indian Canyon Alternative and Whitmore Park Alternative would have fewer impacts. OEA concludes that these adverse impacts would range from minor to moderately adverse and would be minimized by the implementation of OEA's recommended mitigation measures.

Sensitive Viewscapes

The Action Alternatives would affect the sensitive viewscapes described below. Impacts on the landscape are described in Subsection 3.12.3.1, *Impacts Common to All Action Alternatives*.

Ashley National Forest

The Wells Draw Alternative would avoid Ashley National Forest and would not result in visible changes to Ashley National Forest lands. The Indian Canyon Alternative and Whitmore Park Alternative would both result in visible changes to Ashley National Forest lands from the introduction of rail line infrastructure, rail operations, large areas of cut and fill, areas of vegetation removal, and potentially new bridges and drainage culverts. Under the current *Ashley National Forest Land Management Plan* (Forest Service 2017a), there is a 0.25-mile area on either side of US 191, a National Scenic Byway and state of Utah scenic byway, that is mapped as having a Visual Quality Objective (VQO) of "retention" and "partial retention" beyond 0.25 mile. Under the retention VQO, visual changes should not be evident and changes may only repeat form, line, color, and texture that are characteristic of the landscape. Under the partial retention VQO, visual changes should not be very noticeable and changes should remain visually subordinate to the visual strength of the characteristic landscape (Bacon 1979). The Forest Service rated the portion of US 191 that crosses through Ashley National Forest as having a high relative degree of importance, indicating that people have a high regard for the views from US 191 (Forest Service 2017b). A portion of land surrounding US 191 within Ashley National Forest is considered to be distinctive in terms of scenic attractiveness, where landforms, vegetation patterns, water characteristics, and cultural features combine to provide unusual, unique, or outstanding scenic quality (Forest Service 2017b).

As illustrated in Figure 3.12-2 (RKOP 090), the tracks in the foreground would be apparent and a passing train would be noticeable to the casual observer on US 191. The removal of vegetation and cut-and-fill areas would also be noticeable to the casual observer. The Indian Canyon Alternative and the Whitmore Park Alternative would create a distinct visual feature in the landscape when seen from US 191. Train headlights could draw viewers' attention toward trains at night. In addition, the sound and motion of the trains could draw attention to the track and affect visual quality. Under the Indian Canyon Alternative and Whitmore Park Alternative, impacts on visual resources resulting from the proposed rail line would conflict with the existing VQO designations, and the Forest Service would need to amend the *Ashley National Forest Land Management Plan* (Forest Service 2017a) to update VQO designations to permit the proposed rail line.

The same impacts described for RKOP 090 would also occur from the vantage point of RKOP 126, adjacent to US 191 in Ashley National Forest (Figure 3.12-6). The addition of a tunnel as shown in Figure 3.12-6 would attract increased attention from travelers on US 191. To ensure that visual impacts on Forest Service Lands are minimized, OEA is recommending mitigation requiring the Coalition follow the reasonable requirements related to visual resources management of any Forest Service decision permitting the proposed rail line within Ashley National Forest, should the Board authorize either the Indian Canyon Alternative or the Whitmore Park Alternative, and to ensure that construction and operation on Forest Service lands comply with the *Ashley National Forest Land Management Plan* (VIS-MM-5).

BLM-Administered Lands

The Indian Canyon Alternative would result in visible changes to approximately 2.5 miles of BLM-administered lands west of US 191 along Emma Park Road. This area is classified as BLM VRM Class IV lands means that major modifications to the existing visual character are allowed. Visual changes would result from the introduction of rail line infrastructure, rail operations, large areas of cut and fill, areas of vegetation removal, and potentially new drainage culverts and would be consistent with the changes allowed on VRM Class IV lands. OEA expects that construction and operation would result in adverse visual impacts in these areas, but this classification of BLM-administered lands allows for major modification to the existing visual character of the land.~~Because this classification of BLM-administered lands allows for major modification to the existing visual character of the land, OEA does expect that construction and operation would result in adverse visual impacts in these areas.~~

The Wells Draw Alternative would also result in visible changes to BLM-administered lands, including BLM VRM Class IV, Class III, and Class II lands. This Action Alternative would cross approximately 30.7 miles of BLM VRM Class IV lands west of Nine Mile Canyon Road, south of Ashley National Forest, northeast of Nine Mile Canyon Road, and along Emma Park Road to the west of US 191. ~~Because this classification of BLM-administered lands allows for major modification to the existing visual character of the land, OEA does expect that construction and operation would result in adverse visual impacts on these areas.~~ OEA expects that construction and operation would result in adverse visual impacts in these areas, but this classification of BLM-administered lands allows for major modification to the existing visual character of the land. The Wells Draw Alternative would also cross approximately 25.3 miles of BLM VRM Class III lands north of Argyle Canyon Road, near US 191 and along Nine Mile Canyon Road. In these areas, the proposed rail line would stand out in some locations and attract viewers' attention to these lands, but the area would partially retain the characteristics of the existing visual environment. While there would be adverse impacts on the visual landscape, the objectives of BLM VRM Class III lands allow for such modifications, and would be achieved.

South of Ashley National Forest, the Wells Draw Alternative would cross approximately 1.1 miles of BLM VRM Class II lands associated with the Lears Canyon Area of Critical Environmental Concern (ACEC) within the Vernal Field Office (refer to Section 3.11, *Land Use and Recreation*, for additional information regarding the Lears Canyon ACEC). Visual changes to these lands would be the same as those described for BLM VRM Class IV and Class III lands. However, BLM VRM Class II lands have a higher standard of visual management. The proposed rail line would stand out to varying degrees, would not reflect the characteristics of the existing visual environment, and would attract viewers' attention. Therefore, OEA concludes that the Wells Draw Alternative would result in adverse visual impacts on BLM VRM Class II lands. In order for BLM to issue a right-of-way grant for the Wells Draw Alternative, BLM may need to amend the BLM Vernal Field Office Resource Management Plan to change the VRM classification in this area so that the proposed rail line is consistent with VRM class objectives. However, visual access to the VRM Class II parcels would be very limited. These parcels would not be visible from Argyle Canyon Road or Forest Road 163, which are the closest public roads that pass near the BLM VRM Class II area. Construction of the Wells Draw Alternative would not remove any existing buildings or residences on BLM-administered lands (Table 3.12-1). Figure 3.12-12~~8~~ (RKOP 033) and Figure 3.12-13~~9~~ (RKOP 037) represent views from the Nine Mile Canyon Scenic Backway within BLM-administered lands.

If the Board were to authorize the Indian Canyon Alternative or the Wells Draw Alternative, the Coalition would need to obtain a right-of-way from BLM for portions of the proposed rail line that would cross BLM-administered lands. In addition to mitigation requiring the Coalition to implement the reasonable requirements of any BLM decision permitting the proposed rail line on BLM-administered lands, OEA is also recommending additional mitigation measures to ensure that visual impacts on BLM-administered lands would be minimized.

Figure 3.12-12~~-10~~. RKOP 033 Looking Southeast toward Milepost 67 (Wells Draw Alternative)

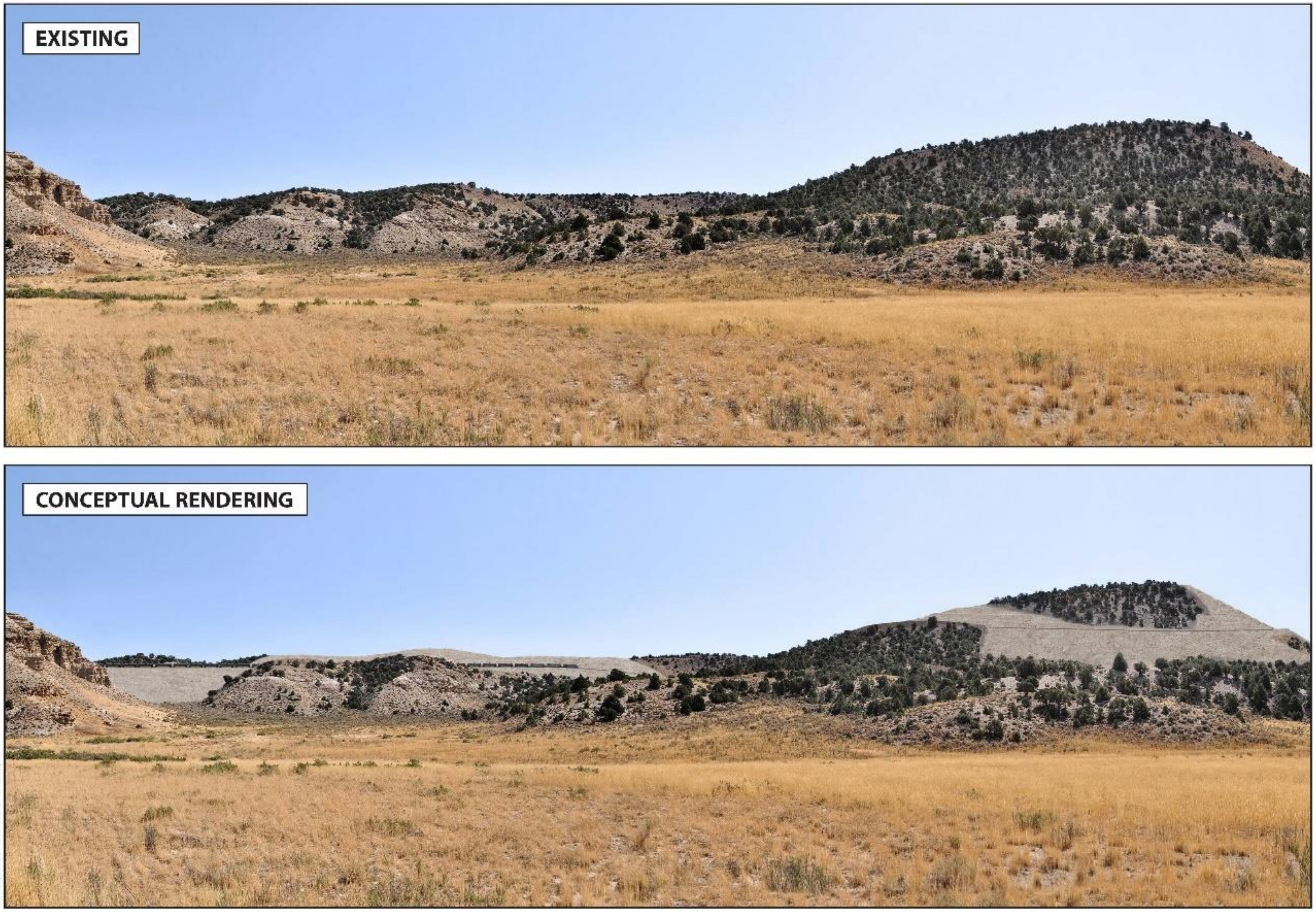


Figure 3.12-13~~-11~~. RKOP 037 Looking Southwest toward Grade-Separated Crossings at Milepost 61.06 and Milepost 61.00 (Wells Draw Alternative)

If implemented, those mitigation measures would require the Coalition to consult with BLM during final project design; comply with all applicable BLM VRM requirements and procedures; incorporate visual design consideration into the design of the proposed rail line on BLM-administered lands; undertake additional visual impact analyses on BLM-administered lands in consultation with BLM, as appropriate; and implement appropriate additional measures to mitigation visual impacts on BLM-administered lands, as required by BLM (VIS-MM-6). OEA is also recommending mitigation requiring the Coalition to implement additional appropriate measures to minimize light pollution on BLM-administered lands, if the Board authorizes the Indian Canyon Alternative or the Wells Draw Alternative (VIS-MM-7). Because the Whitmore Park Alternative would not cross BLM-administered lands, OEA's additional mitigation measures related to visual impacts on BLM-administered lands would not be necessary if the Board were to authorize that Action Alternative.

Tribal Trust Lands

The Indian Canyon Alternative and Whitmore Park Alternative would be more visible from short-range vantage points at the eastern boundary of the Tribal trust lands within the Uintah and Ouray Indian Reservation. Viewers on Tribal trust lands would see cut and fill, altered natural terrain, and passing trains (Figure 3.12-3). These impacts would be noticeable and would likely attract attention from the casual observer in the middleground (0.5 mile to 3 miles from the viewer). OEA is recommending mitigation requiring the Coalition follow the requirements of the Ute Indian Tribe regarding the design of the proposed rail line on Tribal trust lands to minimize visual impacts~~ if the Board should authorize construction and operation of either the Indian Canyon Alternative or the Whitmore Park Alternative (VIS-MM-8). The Wells Draw Alternative would avoid any Tribal trust lands~~.

Scenic Byways and Backways

The Indian Canyon Alternative and Whitmore Park Alternative would run parallel to US 191, which is designated as the Indian Canyon Scenic Byway between US 40 and US 6. The Indian Canyon Alternative and the Whitmore Park Alternative would result in changes visible from this scenic byway due to the introduction of rail line infrastructure, rail operation, large areas of cut and fill, areas of vegetation removal, and potentially new bridges and drainage culverts. An observer on the Indian Canyon Scenic Byway would likely notice the tracks in the foreground, and a passing train would be noticeable and could draw the attention of the casual observer (Figure 3.12-2). The removal of vegetation and cut-and-fill areas would also be noticeable to the casual observer. Both the Indian Canyon Alternative and Whitmore Park Alternative would create a distinct visual feature in the landscape when seen from the Indian Canyon Scenic Byway. OEA's recommended mitigation measures would minimize these impacts (VIS-MM-3, VIS-MM-4), but some changes to the viewshed from the Indian Canyon Scenic Byway would be unavoidable.

The views from the Reservation Ridge Scenic Backway would not be affected by any of the Action Alternatives. Views of the Action Alternatives from this scenic backway would be limited, and if they are visible, project changes would not be discernable.

The Wells Draw Alternative would result in changes visible from the Nine Mile Canyon Scenic Backway. A traveler on the Nine Mile Canyon Scenic Backway would notice the tracks in the foreground and middleground, and a passing train would be noticeable to and could cause attention from the casual observer (Figure 3.12-12~~8~~ [RKOP 033] and Figure 3.12-13~~9~~ [RKOP 037]). Views from RKOP 037 would be affected from the introduction of the bridge (Figure 3.12-13~~9~~). The removal of vegetation and cut-and-fill areas would also be noticeable to the casual observer. The

Wells Draw Alternative would create a distinct visual feature in the landscape when seen from the Nine Mile Canyon Scenic Backway. Although OEA's recommended mitigation measures would minimize these impacts (VIS-MM-3, VIS-MM-4), changes to the viewshed from the Nine Mile Canyon Scenic Backway would be unavoidable under the Wells Draw Alternative.

Historic Sites

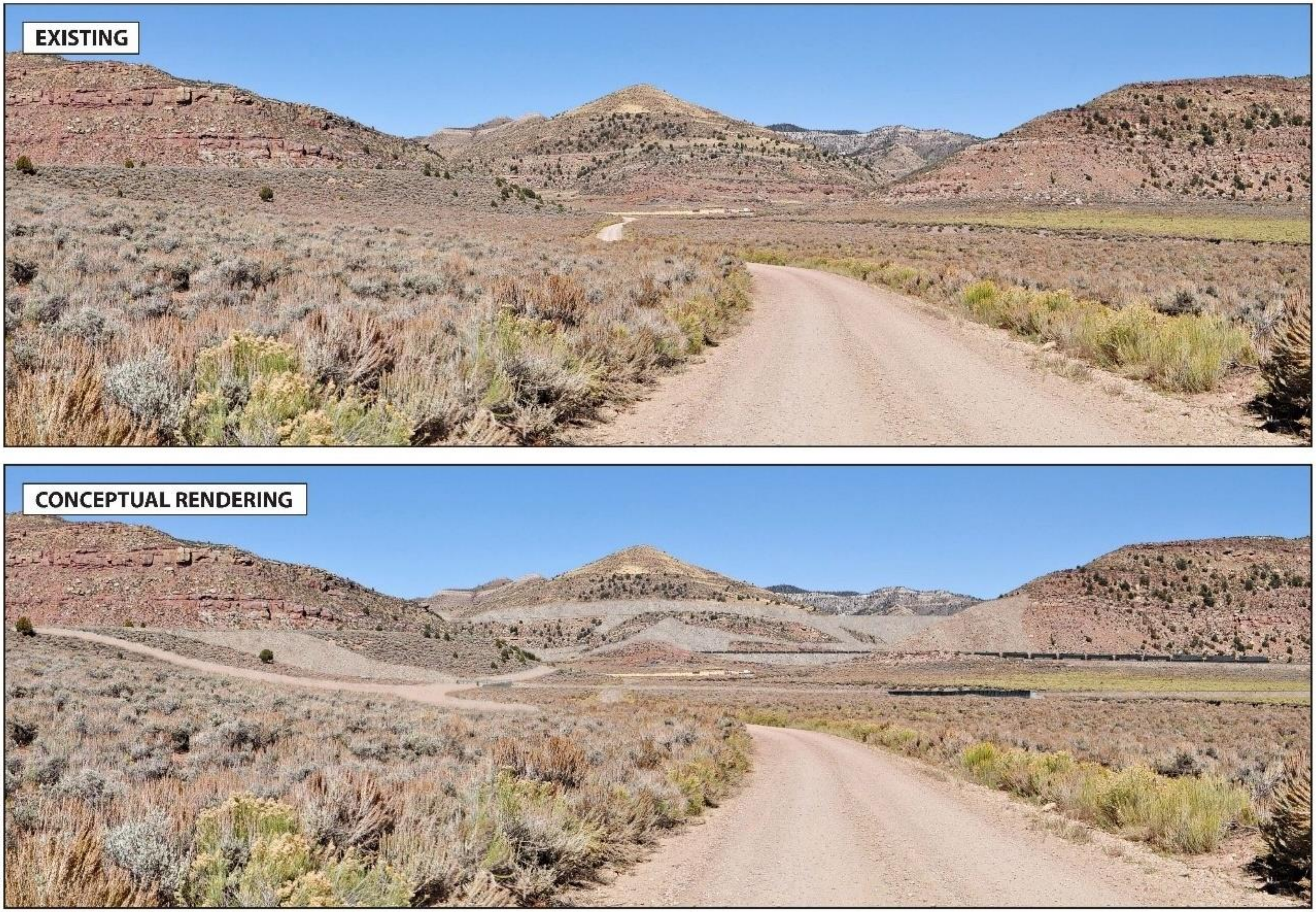
Viewers at historic sites on federal, state and private lands could see cut and fill and altered natural terrain as a result of the Action Alternatives. For the Whitmore Park and Indian Canyon Alternatives, these historic sites would include US 6, a segment of the Denver and Rio Grande Railroad, segments of the Indian Canyon Road, the Indian Canyon Ranger Station,[4] National folk-style dwellings, corrals, bridges, and cabins. Under the Wells Draw Alternative, the historic sites would include US 6, a segment of the Denver and Rio Grande Railroad, Smith's Well, cabins, corrals, bridges, cairns, a homestead, and the Myton Canal. Impacts from construction and operation of these Action Alternatives would range from close-up and direct views of cut and fill, vegetation removal, and structures to distant or obscured views of the Action Alternative. Please refer to Section 3.9, *Cultural Resources*, which provides further information regarding impacts on historic properties.

Sensitive Residential Viewers

Any of the Action Alternatives would involve constructing new rail infrastructure, such as sidings, communications towers, and bridges, all of which would add new visual elements to the rural landscape and would be particularly intrusive to residential viewers living in the study area. The Wells Draw Alternative would involve constructing the most bridges and the Whitmore Park Alternative would involve constructing the most sidings, while the number of communications towers would be the same for all three Action Alternatives (Appendix A, *Action Alternatives Supporting Information*, for a detailed description of project-related features for each Action Alternative). Any of the Action Alternatives would also involve relocating and razing existing buildings, which residential viewers would likely perceive as negative impacts on the viewshed. The Wells Draw Alternative would involve relocating and razing four residences and one additional building; the Whitmore Park Alternative would involve relocating and razing one residence and five additional buildings; and the Indian Canyon Alternative would involve relocating and razing three nonresidential buildings. As shown in Figure 3.12-4 (RKOP 125), the Indian Canyon Alternative and Wells Draw Alternative would substantially alter the viewshed near a visually sensitive residential area along US 191. The Whitmore Park Alternative would avoid this area by heading east. Figure 3.12-14~~10~~ (RKOP 120) depicts a view of the Whitmore Park Alternative from an area with scattered rangelands, located approximately 2.8 miles east of US 191. Here, the Whitmore Park Alternative would cross the roadway and switch back and forth up the hillsides, which would alter the foreground of this scenic vista view.

[4] The Forest Service proposes to decommission and demolish the Indian Canyon Ranger Station (Ashley National Forest 2020).

Figure 3.12-14~~-12~~. RKOP 120 Looking North near ~~RC~~ Road Crossing at Milepost 16.1~~7~~ (Whitmore Park Alternative)



As shown in Figure 3.12-7 (RKOP 146), the Indian Canyon Alternative would introduce new and highly noticeable visual changes in the Duchesne Mini-Ranches area, a residential area of high viewer sensitivity. The Whitmore Park Alternative would also introduce new visual elements that would be visible from the Duchesne Mini-Ranches. Figure 3.12-15~~11~~ (RKOP 156) depicts the view from an elevated vantage point in this residential area located approximately 3.5 miles south of US 40. The figure shows that the proposed rail line would alter the background of this scenic vista view for residents in the area but would not affect the foreground or middleground of the view. The Wells Draw Alternative would avoid visual impacts on the Duchesne Mini-Ranches residential area.

The Wells Draw Alternative would, however, introduce significant visual impacts in a residential area of high viewer sensitivity located along Argyle Canyon Road. Figure 3.12-16~~9~~ (RKOP 073~~37~~) illustrates the introduction of the railbed, cut and fill, and associated vegetation removal where the Wells Draw Alternative would run parallel to Argyle Canyon Road. These impacts would draw the attention of the casual observer and introduce visual impacts in residential areas of high viewer sensitivity. The Indian Canyon Alternative and the Whitmore Park Alternative would avoid visual impacts on residential areas along Argyle Canyon Road.

3.12.3.3 No-Action Alternative

Under the No-Action Alternative, the Coalition would not construct and operate the proposed rail line, and there would be no impacts on visual resources.

3.12.4 Mitigation and Unavoidable Environmental Effects

Construction and operation of the proposed rail line would introduce a new and highly noticeable industrial infrastructure that would affect visual resources, including visually sensitive areas on BLM-administered and Forest Service lands. Any of the Action Alternatives would include substantial cut and fill and the construction of bridges, tunnels, and other features in a largely undeveloped landscape that is currently characterized by natural features and rural vistas. The Wells Draw Alternative would, in general, result in the greatest impacts on visual resources as a result of its longer length and larger project footprint, but any of the Action Alternatives would result in visual impacts. The Coalition has proposed voluntary mitigation measures and OEA is recommending additional mitigation measures to avoid or minimize visual impacts (Chapter 4, *Mitigation*). Even if those mitigation measures are implemented, however, some impacts on visual resources would be unavoidable. OEA concludes that those unavoidable impacts would range from minor to moderately adverse, depending on the specific observation point.

Figure 3.12-15~~13~~. RKOP 156 Looking South near Milepost 59 (Whitmore Park Alternative)

Figure 3.12-16. RKOP 073 Looking Southwest near Milepost 22.1 (Wells Draw Alternative)

3.13 Socioeconomics

This section describes the socioeconomic impacts that could result from construction and operation of the proposed rail line. The subsections that follow describe the study area, data sources and methods OEA used to analyze the impacts, the affected environment, and the socioeconomic impacts of the Action Alternatives. Appendix Q, *IMPLAN Analysis Methods and Results*, provides additional information on Impact Analysis for Planning (IMPLAN) modeling assumptions and outputs.

3.13.1 Analysis Methods

This subsection identifies the study area, data sources, and analysis methods OEA used to analyze socioeconomics.

3.13.1.1 Study Area

OEA defined the study area for socioeconomics as the four-county area that includes Carbon, Duchesne, Uintah, and Utah Counties. These four counties are expected to receive economic benefits resulting from construction and operations expenditures, provide a source of local labor, and provide housing and public services for the construction and operations workforce. Adverse effects related to land acquisition, displacement, nonmarket values, and quality of life are more localized, with effects realized in closer proximity to the Action Alternatives and nearby communities.

3.13.1.2 Data Sources

OEA relied on the following data sources to determine the potential impacts on socioeconomics that could result from construction and operation of the Action Alternatives and the No-Action Alternative.

- U.S. Census Bureau.
- U.S. Department of Agriculture, National Agricultural Statistics Service.
- Utah State Tax Commission.
- County School Districts, Fire Districts, and Sher~~r~~iff’s Offices.
- Government-to-government consultation with the Ute Indian Tribe of the Uintah and Ouray Reservation.
- Consultation with federal, state, and local agencies.

3.13.1.3 Analysis Methods

OEA used the following methods to analyze impacts on socioeconomics in the study area.

- **OEA characterized acquisition and displacement of existing land uses.** OEA used GIS methods to estimate the area of land that would be acquired for the project footprint.[1] OEA characterized land use within the acreage likely to be acquired if rail line construction is authorized (e.g., residential, agricultural, ranching). OEA also estimated the number of residences and other structures that are located within the project footprint and estimated the number that could be displaced.
- **OEA modeled the potential local economic effects of the proposed rail line**. OEA estimated direct employment and expenditures during construction and operation of the proposed rail line based on information provided by the Coalition, as well as indirect, induced, and total employment during construction and operation.[2] OEA used the IMPLAN regional impact model to obtain employment estimates. IMPLAN captures commodity flows among industrial sectors and by county, and allows the estimation of indirect and induced effects of increases in demand on employment, earnings, and output. Appendix Q, *IMPLAN Analysis Methods and Results*, provides additional details on the IMPLAN model inputs and results.
- **OEA estimated potential changes in local population.** OEA estimated population increase in the study area based on the Coalition's estimate of peak employment, the percentage of the labor force that would be locally sourced, and the number of construction workers that would be housed in dedicated construction camps.
- **OEA characterized potential demand for housing and public services.** OEA estimated demand for housing and public services by comparing population increase estimates to available housing and public services in towns located near the Action Alternatives. OEA obtained estimates of vacant housing units and vacant housing units available for rent from the U.S. Census Bureau *American Community Survey 5-Year Estimates* (U.S. Census Bureau 2017a). OEA compiled estimates of available temporary accommodations such as hotels, motels, and recreational vehicle (RV) parks through a review of Google Earth, Google Maps, and other readily available online sources such as hotel, motel, and RV park websites (ICF 2020).

3.13.2 Affected Environment

This subsection identifies the existing environmental conditions related to socioeconomics in the study area. The source of demographic data for this section is ACS 5-year estimates (2013–2017), and may not reflect recent changes in conditions caused by the COVID-19 pandemic.

[1] The *rail line footprint* includes the area of the railbed, as well as the full width of the area cleared and cut or filled. The rail line footprint would also include other physical structures installed as part of the proposed rail line, such as fence lines, communications towers, siding tracks, relocated roads, and power distribution lines. The rail line footprint is the area where rail line operations and maintenance would occur. The area would be permanently disturbed. The *temporary footprint* is the area that could be temporarily disturbed during construction, including areas for temporary material laydown, staging, and logistics. Disturbed areas in the temporary footprint would be reclaimed and revegetated following construction. The *project footprint* is the combined area of the rail line footprint and temporary footprint, both of which would be disturbed during construction, comprising where construction and operations of the proposed rail line would occur.

[2] Direct employment refers jobs created by the hiring of construction workers and rail line employees. Indirect employment refers to jobs created through increased demand for construction materials and services. Induced employment refers to jobs created at businesses where construction workers and rail line employees would spend their incomes.

3.13.2.1 Population

Utah County is the most populous county in the study area with over 576,000 residents in 2017. The populations of other counties in the study area are substantially smaller, ranging from approximately 20,000 residents in Carbon County and Duchesne County to over 36,000 residents in Uintah County (U.S. Census Bureau 2017b).

Population in the study area increased at an annual growth rate of 3.7 percent between 2000 and 2010, but slowed to an annual growth rate of 1.6 percent between 2010 and 2017. Utah County had the highest rate of annual growth in population between 2010 and 2017 at 1.7 percent, while the population of Carbon County declined by 0.6 percent over the same period. Table 3.13-1 shows population and population trends for the study area.

Table 3.13-1. Population in the Study Area

Location	2000	2010	2017	Annual Growth Rate 2000–2010 (%)	Annual Growth Rate 2010–2017 (%)
Carbon County	**20,422**	**21,403**	**20,512**	**0.5**	**-0.6**
Helper	2,025	2,201	2,031	0.9	-1.1
Price	8,402	8,715	8,337	0.4	-0.6
Wellington	1,666	1,676	1,520	0.1	-1.3
Duchesne County	**14,371**	**18,607**	**20,259**	**2.9**	**1.3**
Duchesne	1,408	1,690	1,826	2.0	1.1
Myton	539	569	566	0.6	-0.1
Roosevelt	4,299	6,046	6,771	4.1	1.7
Uintah County	**25,224**	**32,588**	**36,343**	**2.9**	**1.6**
Ballard	566	801	915	4.2	2.0
Vernal	7,714	9,089	10,650	1.8	2.5
Naples	1,300	1,755	2,387	3.5	5.1
Utah County	**368,540**	**516,564**	**576,496**	**4.0**	**1.7**
Provo	105,439	112,488	117,331	0.7	0.6
Four-County Area	**428,557**	**589,162**	**653,610**	**3.7**	**1.6**
Uintah and Ouray[a]	**19,182**	**21,871**	**26,063**	**1.4**	**2.7**

Notes:

[a] Data reported for the tribal census block groups that comprise the Uintah and Ouray Reservation and Off-Reservation Trust Lands.

Sources: U.S. Census Bureau 2012, 2017b

3.13.2.2 Housing and Public Services

This subsection describes the availability of housing and public services in the counties and cities located near the Action Alternatives that could supply temporary accommodations for the construction workforce. Table 3.13-2 shows total housing stock, vacancy status, and temporary accommodations such as hotels, motels, and RV parks that are available to rent in towns near the Action Alternatives. On the western end of the three Action Alternatives, the supply of hotel and motel rooms is greatest in the city of Price, while the city of Helper has the largest supply of RV parking spaces. Near the central and eastern portions of the Action Alternatives, the cities of

Roosevelt, Duchesne, and Ballard have the greatest number of hotel and motel rooms.~~, while t~~The cities of Myton, Roosevelt, Duchesne, and Ballard all ~~have the greatest~~offer a supply of RV parking spaces. Vacant housing units in the study area could also provide short-term or longer-term housing for construction workers. In Uintah County, Vernal has an abundance of temporary accommodations, including hotels, motels, and RV parking spaces but is more distant from the Action Alternatives and would be a longer commute for the construction workforce. The community of Randlett, which is located approximately 6 miles northeast of the proposed rail line terminus near Leland Bench, has a population of 144 and only five vacant housing units for rent (U.S. Census Bureau 2017a). For this reason, OEA considered Randlett unlikely to provide accommodations and other services for the construction workforce. Cities in Utah County, such as Provo, are over 100 miles from the western end of the Action Alternatives, making them outside the commuting distance for nonlocal construction workers. For this reason, Table 3.13-2 does not include an assessment of vacant housing and temporary accommodations in Utah County.

Table 3.13-2. Housing Stock and Vacancy Status

Location	Total Housing Units	Vacant Housing Units			Temporary Accommodations			Total Available Housing Units[a]	Distance to Action Alternatives (miles)[b]
		Total Vacant Units	Vacant Units for Rent	Vacant Units for Sale	Hotel and Motel Rooms	RV Park Spaces	Total Temporary Accommodations		
Carbon County									
Helper	1,181	302	144	51	10	100	110	254	12.3
Price	3,419	481	141	26	587	--	~~584~~587	728	20.5
Wellington	735	116	37	26	70	24	94	131	26.5
Duchesne County									
Myton	258	52	8	3	10	51	61	69	5.0
Roosevelt	2,455	284	153	33	89~~20~~	32~~--~~	121~~20~~	274~~173~~	14.2
Duchesne	730	86	17	8	72	94	166	183	20.2
Uintah County									
Ballard	303	28	2	4	182	54	236	238	16.0
Vernal	4,439	1,131	548	252	551	163	714	1,262	44.0
Naples	765	108	26	0	154	-	154	180	46.6
Total	**14,285**	**2,588**	**1,076**	**403**	**1,~~656~~725**	**~~486~~518**	**2,~~142~~243**	**3,~~218~~319**	**--**
Uintah and Ouray[c]	**12,212**	**4,064**	**262**	**170**	**~~284~~353**	**~~199~~231**	**584~~483~~**	**~~745~~846**	**Varies**

Notes:

[a] Total available housing units include housing units that are vacant for rent and temporary accommodations.

[b] Distance represents the distance between Carbon County communities and the connection to Union Pacific on the western end of the Action Alternatives and between Duchesne County and Uintah County communities and the Myton terminal on the eastern end of the Action Alternatives.

[c] Data on total housing units, vacant units, and vacant units for rent are reported for the tribal census block groups that comprise the Uintah and Ouray Reservation and Off-Reservation Trust Lands. The number of available temporary accommodations is the sum of temporary accommodations that are available in Myton, Roosevelt, Duchesne, and Ballard, and does not reflect temporary accommodations that may be available within the Uintah and Ouray Reservation and Off-Reservation Trust Lands boundary that are more distant from the Action Alternatives.

Sources: U.S. Census Bureau 2017a; ICF 2020; Duchesne County 2021

Law Enforcement

Carbon, Duchesne, Uintah, and Utah Counties all have county sheriff's offices. The cities of Helper, Price, and Wellington in Carbon County, and ~~Myton and~~ Roosevelt in Duchesne County, all have municipal police departments that provide law enforcement. The city of Duchesne contracts with the Duchesne County She~~r~~riff's Office for law enforcement services (Duchesne County 2019). The city of Myton contracts with both the Duchesne County Sheriff's Office and the Bureau of Indian Affairs for law enforcement services (Duchesne County 2021). The cities of Vernal and Naples in Uintah County have their own police departments. The city of Ballard in Uintah County does not have its own police department, and law enforcement is under the jurisdiction of the Uintah County She~~r~~riff's Office. BIA also has a police department in Fort Duchesne that assists with law enforcement (Ute Indian Tribe 2020).

Fire Protection and Emergency Services

Fire protection and emergency services are provided by cities and counties in the study area. Duchesne County has seven volunteer fire departments within its jurisdiction, consisting of four municipal and three rural fire stations. Fire stations are located in the cities of Duchesne, Myton, and Roosevelt (Duchesne County 2020a). The Roosevelt Fire Department provides emergency response for structural fires on Tribal trust lands (Ute Indian Tribe 2020), while BIA and local volunteer fire departments respond to wildland fires. Uintah County has five volunteer fire departments within the Uintah Fire District, including two fire stations located in the city of Vernal and one fire station located in Naples (Uintah County Fire District 2020). In Carbon County, fire stations are located in the cities of Price and Helper (FireDepartment.net 2020).

Public Schools

County school districts administer public schools in the study area. Carbon County School District operates 10 schools within the county boundaries, including two elementary schools, one middle school, and one high school that is located in Price. One elementary and one middle school serve the city of Helper (Carbon County School District 2020). Carbon County School District operates one elementary school in the city of Wellington. The Duchesne County School District operates 12 schools that serve students within the county boundaries. The city of Myton has one elementary school that accommodates grades K-5. Duchesne County School District operates two elementary schools, one middle school, and one high school in the city of Roosevelt. The city of Duchesne has one elementary school and one middle through high school that serves students within the city boundaries (Duchesne County School District 2020). The Uintah County School District operates 10 schools within the county boundaries. Six elementary schools, two middle schools, and one high school operated by Uintah County School District are in Vernal. ~~One elementary school in Roosevelt is operated by Uintah County School District (Uintah County School District 2020).~~ Tribal members typically attend public schools within the Uintah County School District or Duchesne County School District, with the exception that the tribe operates a charter high school, the Uintah River High School, that some older students attend.

3.13.2.3 Employment and Income

The labor force in the study area is shown in Table 3.13-3. Utah County has the largest labor force, followed by Uintah, Carbon, and Duchesne Counties. Based on U.S. Census data, unemployment rates across the study area range from 4.3 percent in Utah County to 6.7 percent in Uintah County.

Unemployment rates are somewhat higher within Uintah and Ouray Reservation and Off-Reservation Trust Lands, at 7.1 percent.

Table 3.13-3. Labor Force and Employment in the Study Area

County	Labor Force	Employed	Unemployed	Unemployment Rate (%)
Carbon	9,412	8,906	506	5.4
Duchesne	8,561	8,026	535	6.2
Uintah	16,163	15,087	1,076	6.7
Utah	269,235	257,679	11,556	4.3
Total	**303,371**	**289,698**	**13,673**	**4.5**
Uintah and Ouray[a]	**10,650**	**9,893**	**757**	**7.1**

Notes:

[a] Data reported for the tribal census block groups that comprise the Uintah and Ouray Reservation and Off-Reservation Trust Lands.

Source: U.S. Census Bureau 2017c

Table 3.13-4 shows employment and median income by industry across the study area. Education, health care, and social assistance and retail trade are important employment sectors across the study area. In addition, mining, quarrying, and the oil and gas industry are locally important to Duchesne and Uintah Counties, while construction is an important source of employment in Carbon and Duchesne Counties, and manufacturing is an important source of employment for Utah County. Utilities, mining, quarrying, oil and gas, and wholesale trade generally provide higher median incomes to their workers.

Utah's energy industry, valued at over $20 billion, generates $656 million in state and local revenues and directly employs 10,000 energy jobs in the state. Table 3.13-4 shows that the mining, quarrying, oil and gas sector is important to Duchesne and Uintah Counties, as the sector employs over 18 percent of the employed labor force in Duchesne and Uintah Counties and on the Uintah and Ouray Reservation. Due to changes in the energy market, mining, quarrying, oil and gas sector jobs can follow a cyclical "boom-and-bust" pattern. Duchesne County experienced "boom" years from 2012 to 2014 followed by a "bust" year in 2015, which resulted in a drop in taxable purchases by about 50 percent from 2014 to 2015 (State of Utah~~,~~ 2018; Uintah County~~,~~ 2017; Duchesne County~~,~~ 2017).

Table 3.13-4. Employment and Median Income by Industry

	Carbon County		Duchesne County		Uintah County		Utah County		Uintah and Ouray[a]	
Sector	Labor Force	Median Income	Labor Force	Median Income	Labor Force	Median Income	Labor Force	Median Income	Labor Force	Median Income
All sectors	8,906	$29,190	8,026	$38,606	15,087	$35,741	257,679	$27,920	9,893	$37,208
Agriculture, Forestry, Fishing, Hunting	1.2%	$22,188	4.6%	$30,729	1.7%	$52,250	0.6%	$23,684	4.6%	$31,034
Mining, Quarrying, Oil/Gas	6.7%	$68,643	19.9%	$64,263	18.9%	$73,186	0.3%	$63,250	19.8%	$63,495
Construction	8.0%	$30,100	8.5%	$42,246	5.8%	$37,094	6.7%	$38,205	7.6%	$41,912
Manufacturing	5.6%	$37,000	2.8%	$43,750	2.2%	$21,827	9.3%	$39,124	2.9%	$38,173
Wholesale Trade	3.0%	$56,452	2.0%	$56,786	2.7%	$49,583	2.7%	$39,429	1.7%	$60,625
Retail Trade	10.5%	$17,262	8.2%	$23,899	13.2%	$19,158	12.5%	$19,858	8.8%	$23,138
Transportation and Warehouse	6.0%	$44,583	6.5%	$44,018	6.4%	$44,688	2.3%	$41,360	6.3%	$46,012
Utilities	3.4%	$91,023	1.7%	$63,333	2.2%	$78,750	0.6%	$60,909	1.5%	$63,194
Information	2.0%	$17,100	1.8%	$26,250	1.5%	$45,156	3.2%	$43,162	2.0%	$36,771
Finance, Insurance, Real Estate	2.8%	$23,220	3.4%	$35,833	2.6%	$27,432	5.6%	$42,002	3.0%	$34,500
Professional, Scientific, Technical	2.6%	$35,568	2.4%	$51,397	3.7%	$31,587	8.9%	$51,368	2.4%	$51,029
Management of Companies and Enterprises	0.0%	--	0.0%	--	0.0%	--	0.1%	$41,346	0.0%	--
Admin, Support, Waste Management	4.4%	$22,500	1.8%	$27,500	1.9%	$28,625	5.7%	$20,850	1.6%	$24,306
Education, Health Care, Social Assistance	22.8%	$25,733	22.2%	$29,549	16.2%	$25,804	26.0%	$21,986	20.8%	$29,118
Arts, Entertainment, Recreation	1.7%	$4,494	0.8%	$15,000	2.7%	$11,607	2.0%	$6,998	1.0%	$6,912
Accommodations and Food	6.8%	$11,325	4.6%	$9,914	7.4%	$12,383	6.0%	$9,838	4.9%	$10,496
Other Services	6.7%	$20,710	3.5%	$16,528	4.6%	$24,152	4.5%	$17,367	3.6%	$23,333
Public Administration	5.8%	$45,821	5.4%	$43,393	6.3%	$43,702	3.0%	$49,029	7.6%	$39,504

Notes:

[a] Data reported for the tribal census block groups that comprise the Uintah and Ouray Reservation and Off-Reservation Trust Lands.

Sources: U.S. Census Bureau 2017d, 2017e

Ranching and farm income are important contributors to the local economy of the study area. Table 3.13-5 reports the value of cattle and calves and the highest value farm products in each county. Corn, wheat, and hay are the most important farm products in the study area based on the annual output. Other important farm products in the study area include oats and barley. Production of cattle and calves is valued at over $100 million in Uintah County and over $150 million in Duchesne and Utah Counties.

Table 3.13-5. Estimated Value of Selected Farm Production in the Study Area, 2017

County	Product	Inventory (heads)	Value[a] ($ million)	Production[b]	Unit	$/Unit	Annual Output ($ million)
Carbon[c]	Cattle	6,378	$18.2	2,614,980	Pounds	--	--
	Hay	--	--	26,676	Tons	$127	$3.4
Duchesne	Cattle	54,683	$156.3	22,420,030	Pounds	--	--
	Corn	--	--	352,367	Bushels	$3.80	$1.3
	Hay	--	--	177,361	Tons	$127	$22.5
Uintah	Cattle	35,632	$101.9	14,609,120	Pounds	-	-
	Corn	--	--	428,620	Bushels	$3.80	$1.6
	Hay	--	--	148,415	Tons	$127	$18.9
Utah	Cattle	54,299	$155.2	22,262,590	Pounds	--	--
	Corn	--	--	492,105	Bushels	$3.80	$1.9
	Wheat	--	--	18,389,524	Bushels	$4.30	$79.1

Notes:

[a] Based on value per head of $2,859, average of cows, heifer calves, and steer calves values on January 1, 2016, and January 1, 2017, for the state of Utah.

[b] For cattle, based on annual production of 410 pounds of meat per head of cattle inventory in Utah in 2012.

[c] Carbon County crop data for crops other than hay were withheld to avoid disclosing data for individual operations.

Sources: USDA 2017a, 2017b

3.13.2.4 Fiscal Revenues

The state of Utah has 3.4 million acres of designated trust land, which are held in a trust for its beneficiaries. SITLA generates revenue from mineral and energy royalties; real estate development and sales; and surface estate sales, leases, and easements whose proceeds are deposited into institutional endowments for higher education, special education, and public institutions.

Since 1994, SITLA has generated $1.96 billion in revenue (SITLA 2020). The full list of beneficiaries includes the following.

- Public Buildings
- Utah Schools for the Deaf and Blind
- Utah Public Schools
- Utah State Hospital
- Utah Department of Human Services Juvenile Justice Services; Miners Hospital and University of Utah

- Colleges of Education at University of Utah, Dixie State, Southern Utah University, Utah State University, Utah Valley University, and Weber State
- Utah Division of Water Resources
- College of Mines and Earth Sciences at the University of Utah; the University of Utah
- Utah State University

Other sources of state revenue include income tax (assessed at a flat rate of 4.95 percent) and the state sales and use tax (assessed at a rate of 4.85 percent). Local jurisdictions may also levy taxes including local sales and use taxes, county option sales taxes, city or town option taxes, and taxes levied specifically to support transit and highways, or public facilities. The combined sales and use tax rate effective April 1, 2020 is 6.35 percent for Carbon and Duchesne Counties, 6.45 percent for Uintah County, and 7.15 percent for Utah County, while sales and use tax rates in some cities in the study area may be slightly higher (Utah State Tax Commission 2020). Additional transient room taxes are a combination of the 0.32 percent statewide tax on temporary lodging; a county tax rate of up to 4.25 percent; and additional city or town-imposed taxes of up to 1 percent. Counties also collect property taxes, which are distributed to various taxing entities in accordance with the tax rates levied and approved for the tax year.

3.13.2.5 Nonmarket Values and Quality of Life

Many resources associated with public lands, private lands, and Tribal trust lands provide quality of life and social value that may not be reflected in market prices (i.e., have nonmarket value). Nonmarket social values include appreciation for areas that are ecologically or culturally unique or sensitive, scenic, undisturbed, and free of pollution and areas that provide opportunities for quiet recreation, or that convey a "sense of place." A review of scoping comments submitted by agencies, organizations, and members of the general public indicated that the scenic, recreational, and wilderness characteristics of land in the study area are important to local residents and other stakeholders. Many comments received during the public scoping period expressed an appreciation for these nonmarket values either generally or in reference to specific locations such as Argyle Canyon and Indian Canyon.

3.13.3 Environmental Consequences

Construction and operation of the proposed rail line could result in socioeconomic impacts. This subsection first presents the potential impacts that would be the same for all three Action Alternatives and then compares the potential impacts that would be different for each Action Alternative. For comparison purposes, this subsection also describes socioeconomics under the No-Action Alternative.

3.13.3.1 Impacts Common to All Action Alternatives

This subsection describes the potential socioeconomic impacts that would be the same across the three Action Alternatives.

Construction

Land Acquisition and Displacement

Under all of the Action Alternatives, the Coalition would acquire land and temporary construction easements from federal, state, tribal, and private landowners for construction of the proposed rail line. On federal land, the Coalition would seek a right-of-way grant from BLM and/or a Forest Service special use authorization, depending on the Action Alternative. The Coalition would also obtain easements from SITLA and UDOT for use of state land. On Tribal trust lands, the Coalition would seek a consent resolution for rail line construction from the Ute Indian Tribe and a grant of easement for rights-of-way or leases (if necessary) from BIA. Section 3.11, *Land Use and Recreation*, discusses impacts of the proposed rail line on public lands.

To construct any of the Action Alternatives, the Coalition would also acquire land from private landowners. The Coalition does not yet know the exact width of the rail right-of-way in all locations because defining the right-of-way would involve negotiations with private landowners and consultation with public agencies following the end of the Board's environmental review process. At a minimum, the Coalition would acquire the full extent of the rail line footprint. OEA expects that in most cases, the Coalition would negotiate a lease of a temporary construction easement for use of land outside of the rail line footprint but within the temporary footprint. The Coalition would return this leased land to landowners at the end of the construction period. However, where the size of the project footprint is large relative to the size of a parcel of private property that it would cross, the Coalition and landowner could negotiate a full acquisition of the parcel rather than a partial acquisition or temporary construction easement. These decisions would be made on a case-by-case basis, subject to negotiations between the Coalition and the private landowners. The Board would not be involved in the land acquisition process, which would take place after the Board has issued a decision authorizing or denying the Coalition's proposal.

Existing residences and other structures located within the rail line footprint would be displaced for construction of the proposed rail line; existing residences and other structures located within the temporary footprint could be displaced, pending negotiations between the Coalition and the private landowner. For portions of the Action Alternatives that would be tunneled, the Coalition would obtain easements for constructing tunnels. OEA does not expect that subsurface tunneling would displace surface uses.

Displaced Economic Activity

Land and temporary construction easements acquired for construction of the proposed rail line would no longer be available for ranching, farming, or other economic activities. Economic activity within temporary construction easements would be displaced during construction only, while economic activity within acquired land would be permanently displaced. The Action Alternatives could also disrupt economic activity outside of areas directly affected by the project footprint where construction and operation of the proposed rail line would sever parcels, limit access to irrigation systems, or restrict the movements of animals and equipment between different operating areas of a ranch or farm.

Construction Employment, Labor Income, and Value Added

Construction of the proposed rail line would create new employment opportunities and contribute to the regional economy. Construction of any of the Action Alternatives would involve directly employing construction labor during the construction period and local spending on materials and services. In addition, construction workers would spend a portion of their income locally. OEA estimated the direct and total employment, labor income, and total market value of all goods and services generated during the construction period under each of the Action Alternatives, as explained in detail in Appendix Q, *IMPLAN Analysis Methods and Results*. Direct and total employment, labor income, and total estimated economic output (or value added) generated by rail line construction would be specific to each Action Alternative, as discussed in Subsection 3.13.3.2, *Impact Comparison by Action Alternative*.

Workforce Demand for Housing and Public Services

Employment generated by construction would bring nonlocal construction workers to communities located within a commuting distance of construction sites. OEA assumed that temporary nonlocal construction workers would reside as close to the construction site as feasible with a shorter commuting distance. Based on commuting distance and availability of temporary accommodations such as hotels, motels, and RV spaces (Table 3.13-2), OEA expects that Helper, Price, Duchesne, Myton, Roosevelt, and Ballard would see the greatest influx of temporary construction workers from outside of the four-county study area. These same communities would also see the greatest demand for housing and public services.

State and Local Revenue

For any of the Action Alternatives, the Coalition would acquire easements for the proposed rail line on lands administered by SITLA. These easements would generate revenue for SITLA trust beneficiaries that would be distributed to institutional endowments for higher education, special education, and public institutions in the state of Utah (SITLA 2020). Construction of the proposed rail line would generate revenue for the state through state income tax on the direct, indirect, and induced labor income of Utah state residents. Construction would also generate state and local sales and use taxes on direct construction expenditures, as well as sales and use taxes on indirect and induced spending. Nonlocal construction workers who reside in temporary accommodations such as hotels and motels during the construction period would generate additional transient room tax revenue.

Socioeconomic Benefits for the Ute Indian Tribe

If constructed, the proposed rail line would provide a new transportation option for shippers in the Basin, including producers of crude oil, which could result in lower transportation costs and access to new markets. The Ute Indian Tribe is a major producer of crude oil in the Basin and could, like other producers, benefit from potential lower transportation costs and access to new markets if the proposed rail line were available as an alternative transportation option. The Coalition has also indicated that the Ute Indian Tribe may become an equity partner in the proposed rail line. If this were to occur, then the tribe would receive additional revenue generated by the operation of the proposed rail line. These economic benefits for the Ute Indian Tribe would be the same for any of the Action Alternatives. As discussed in Subsection 3.13.3.2, *Impact Comparison between Action Alternatives*, the Ute Indian Tribe would also receive payments associated with the granting of a right-of-way across Tribal trust land if the Board were to authorize construction and operation of the Indian Canyon Alternative or the Whitmore Park Alternative.

Nonmarket Values and Quality of Life

Comments received during scoping identified the importance of scenic, recreational, environmental, and wilderness aspects of lands in the study area. Construction of the proposed rail line would change land use within the rail line footprint, which could affect these values. On private and public lands currently used for grazing, agriculture, and recreation, these uses would be displaced during construction within the temporary footprint. Within the rail line footprint, these uses would be permanently displaced. Proposed rail line construction activities would create visual distractions and generate noise that would be more noticeable in undeveloped areas. Noise and visual distractions could diminish the value of areas near construction sites for recreation, hunting, and wildlife viewing, and disrupt residents in rural settings that generally have lower levels of background noise, and a more natural landscape. Construction activities adjacent to scenic byways and backways would result in the introduction of construction equipment, fugitive dust, vegetation removal, large areas of cut and fill, and potentially new bridges and drainage culverts during the construction period. For more information on construction-related quality of life impacts, see Section 3.6, *Noise and Vibration*, Section 3.11, *Land Use and Recreation*, and Section 3.12, *Visual Resources.*

Operations

Employment, Labor Income, and Value Added

Operation of the proposed rail line would support regional employment, generate labor income, and contribute to the regional economy. The Coalition provided annual operations and maintenance (O&M) cost estimates for both a low and high rail traffic scenario. Under the low rail traffic scenario, approximately 3.68 trains would move on the proposed rail line per day, on average. Under the high rail traffic scenario, approximately 10.52 trains would move on the proposed rail line per day, on average. Direct and total employment and total estimated economic output during operations would be specific to each Action Alternative and each scenario, as discussed in Subsection 3.13.3.2, *Impact Comparison by Action Alternative*.

As discussed in Section 3.1, *Vehicle Safety and Delay*, OEA expects that the proposed rail line would displace truck traffic that transports crude oil to the Price River Terminal facility in Wellington, Utah. If the proposed rail line were constructed, the tanker trucks that currently transport crude oil to the Price River Terminal would likely go to the new rail line terminals in the Basin instead, because the new rail line terminals would be significantly closer to oil production areas in the Basin than the Price River Terminal. OEA expects that commercial drivers who are employed in short-haul trucking between production areas in the Basin and Price River Terminal would work instead in short-haul trucking between production areas in the Basin and the new rail terminals in the Basin (Section 3.15, *Cumulative Impacts*). OEA expects that trucks would continue to transport crude oil to refineries in Salt Lake City, so jobs associated with long-haul trucking of crude oil from the Basin to refineries in Salt Lake City would not be affected. In addition, because overall truck traffic would not be reduced—it is forecast to increase under the cumulative traffic scenario (Section 3.15, *Cumulative Impacts*)—OEA expects that operation of the proposed rail line would not lead to a reduction in jobs associated with maintenance of state and local roads.

As discussed in Chapter 2, *Proposed Action and Alternatives*, the Coalition anticipates that the proposed rail line would primarily transport crude oil produced in the Basin to markets outside of the Basin and would also be used to transport frac sand into the Basin for use in the oil and gas industry. Section 3.15, *Cumulative Impacts*, discusses potential impacts that could result from potential future increasing oil and gas production in the Basin, including potential socioeconomic impacts. The Coalition believes that shippers might also use the proposed rail line to transport other various heavy and bulk commodities found in the Basin, such as gilsonite, aggregate materials, and agricultural products. The Coalition does not suggest that the volume of other commodities would be large enough to warrant dedicated trains and expects that these products would be transported in cars added to crude oil trains or frac sand trains. OEA did not assess the environmental impacts associated with the transportation of commodities other than crude oil and frac sand because the volumes of those other commodities would be low and because there are currently no reasonably foreseeable plans for transporting those commodities. However, to the extent that the proposed rail line could be used to transport commodities other than crude oil and frac sand, the availability of a rail transportation option could support the diversification of local economies in the Basin, which could support regional employment, generate labor income, and contribute to the regional economy.

Workforce Demand for Housing and Public Services

Operation of the proposed rail line would create long-term O&M jobs. To the extent that O&M jobs could be filled by nonlocal workers, the influx of nonlocal O&M workers to the study area would increase demand for local housing and public services. Employment for O&M would be substantially lower than for construction and OEA expects that the impact on housing and public services would not be significant under any of the Action Alternatives. Depending on the Action Alternative, the proposed rail line would support between 170 and 220 jobs under the low rail traffic scenario or between 370 and 530 jobs under the high rail traffic scenario. OEA expects that many of the O&M jobs would be filled by local workers and that the influx of nonlocal workers and their families would represent an increase of less than one percent of the combined populations of Carbon County, Duchesne County, and Uintah County, which was 77,000 in 2017. As shown in Table 3.13-2, communities located within commuting distance of the Action Alternatives had over 1,000 vacant housing units available for rent and over 400 vacant housing units for sale in 2017, which is significantly higher than the number of units that would be needed to house new O&M workers moving into the area. Student-teacher ratios in the Carbon County School District (19:1), Duchesne County School District (20:1), and Uintah County School District (23:1) are comparable to the state-wide average (22:1) (Utah Department of Education 2020). OEA does not expect that in-migration of nonlocal workers to fill a portion of the operations jobs generated by the proposed rail line would significantly affect public schools in the study area. Therefore, OEA concludes that the creation of new O&M jobs would not significantly affect long-term population trends in the study area, the availability of housing, housing prices, or the capacity of public services.

State and Local Revenue

Under any of the Action Alternatives, easements on lands administered by SITLA would generate revenue for trust beneficiaries. All of the Action Alternatives would generate state income tax on direct, indirect, and induced annual labor income for each year that the rail line is in operation. Revenue from state and local sales and use taxes on annual O&M expenditures, and indirect and induced spending generated by operation of the proposed rail line would also be generated on an annual basis.

Nonmarket Values and Quality of Life

Operation of the proposed rail line would displace land use within the rail line footprint permanently and would introduce industrial elements to a primarily rural and/or scenic landscape. On private and public lands currently used for grazing, agriculture, and recreation, operations would fully or partially displace these uses within the rail line footprint. Operation of the proposed rail line would also introduce wayside and train horn noise that would be more noticeable in undeveloped areas. Noise and visual distractions could diminish the value of areas near the Action Alternatives for recreation, hunting, and wildlife viewing, and disrupt residents in rural settings that generally have lower levels of background noise, and a more natural landscape. Operations would introduce a freight rail line to corridors that contain scenic byways and backways potentially diminishing their scenic quality. For more information on operations-related quality of life impacts, see Section 3.6, *Noise and Vibration*, Section 3.11, *Land Use and Recreation*, and Section 3.12, *Visual Resources.*

3.13.3.2 Impact Comparison between Action Alternatives

This subsection describes the potential impacts on socioeconomics that would be different between the three Action Alternatives.

Construction

Acquisitions and Displacements

Table 3.13-6 shows the estimated acreage of federal, state, tribal, and private land that the Coalition would acquire to construct each Action Alternative. In addition to surface land, each Action Alternative would require subsurface easements for construction of between 4.3 and 5.7 miles of tunnel. Key differences between the Action Alternatives include the following.

- The Indian Canyon Alternative would cross all land jurisdictions (BLM, Forest Service, SITLA, UDOT, tribal, and private).
- The Indian Canyon Alternative and Whitmore Park Alternative both cross Tribal trust lands. Tribal trust lands that would be crossed by these alternatives are regular reservation trust lands. Based on consultation with BIA, OEA understands that there are no Individual Indian Allotments, which are plots of tribal land allotted to individual tribal members, in the study area.
- The Wells Draw Alternative would avoid Forest Service and Tribal trust land, with a substantial portion of the proposed rail alignment traversing BLM-administered land. The Wells Draw Alternative would require the Coalition acquire the fewest acres of private land, but would acquire the most acreage overall (i.e., approximately twice the acreage needed for the Indian Canyon Alternative).
- The Whitmore Park Alternative would avoid BLM-administered land and would require the Coalition to acquire the most land from private landowners.
- The Indian Canyon Alternative would require the construction of 4.3 miles of tunnel, compared to 5.6 miles for the Wells Draw Alternative and 5.7 miles for the Whitmore Park Alternative.

Table 3.13-6. Acres of Land Acquisition Required for Construction in the Rail Line Footprint and Temporary Footprint

Action Alternative	Acquisition	BLM	Forest Service	SITLA	UDOT	Tribal	Private	Total
Indian Canyon	Rail Line	46.3	166.9	158.5	0.3	121.2	847.3	1,340.5
	Temporary	72.8	234.1	285.4	4.3	257.3	1,613.9	2,467.8
Total		**119.1**	**401.1**	**443.9**	**4.5**	**378.5**	**2,461.1**	**3,808.2**
Wells Draw	Rail Line	1,571.1	--	326.7	0.0	--	662.2	2,560.1
	Temporary	3,246.2	--	554.4	1.5	--	1,293.2	5,095.2
Total		**4,817.3**	**--**	**881.1**	**1.5**	**--**	**1,955.4**	**7,655.3**
Whitmore Park	Rail Line	--	167.1	102.5	0.2	118.4	1,042.4	1,430.6
	Temporary	--	233.8	283.0	3.6	254.9	2,312.4	3,087.7
Total		**--**	**400.9**	**385.5**	**3.8**	**373.3**	**3,354.8**	**4,518.3**

Notes:
BLM = Bureau of Land Management; Forest Service = United States Forest Service; SITLA = Utah School and Institutional Trust Lands Administration; UDOT = Utah Department of Transportation

To compare differences between the Action Alternatives, OEA considered not only the total acreage that the Coalition would need to acquire but also the size of the affected parcels. The Action Alternatives would cross a range of parcel sizes on private land. These include smaller subdivided lots that are typically 2.5 to 10 acres in size, to parcels 10 to 80 acres in size, to larger parcels that range from over 80 to 640 acres or more in size. In general, OEA anticipates that the Coalition would not have to fully acquire the larger properties. On those parcels, the Coalition could acquire a portion of the property on which to construct the rail line, and the property owner would still be able to use the rest of their land. Where the Action Alternatives would cross smaller parcels, however, OEA expects that the Coalition would likely have to acquire the entire parcel. Therefore, the socioeconomic impacts of construction would be greatest in areas where the proposed rail line would cross many smaller parcels, such as subdivided residential areas. Two such areas that were specifically identified during scoping are Argyle Canyon and the Duchesne Mini-Ranches, both of which are located in Duchesne County.

Argyle Canyon

Between mileposts 13.2 and 16.6, both the Indian Canyon Alternative and the Wells Draw Alternative would cross 18 subdivided parcels (Figure 3.13-1) that are generally 10 acres in size, although some parcels are smaller (5 acres) and some are larger (20 to 40 acres). For four of the parcels, the Coalition would need to temporarily or permanently acquire less than 25 percent of the parcel's total acreage. For five of the parcels, the Coalition would need to temporarily or permanently acquire between 25 and 50 percent of the parcel's total acreage. For nine parcels, the Coalition would need to temporarily or permanently acquire more than 50 percent of the parcel's total acreage. The Whitmore Park Alternative would traverse to the east in this area and avoid this impact on smaller subdivided properties (Figure 3.13-1).

All of the Action Alternatives would tunnel under the subdivided parcels in the vicinity of Argyle Canyon Road (Figure 3.13-1). One residence is located above the tunnel alignment for the Indian Canyon Alternative and the Wells Draw Alternative, while two residences and one other structure are located above the tunnel alignments for the Whitmore Park Alternative. OEA does not expect that acquisition of subsurface easements for tunnels would result in displacement of residential or other structures. Scoping comments indicated that residents in this area are concerned about a range of potential impacts related to tunneling, such as impacts from noise and vibration during tunnel construction, potential effects on ground stability and damage to structures, and effects on seeps and springs. Section 3.6, *Noise and Vibration*, and Section 3.3, *Water Resources*, address these potential impact of tunnel construction.

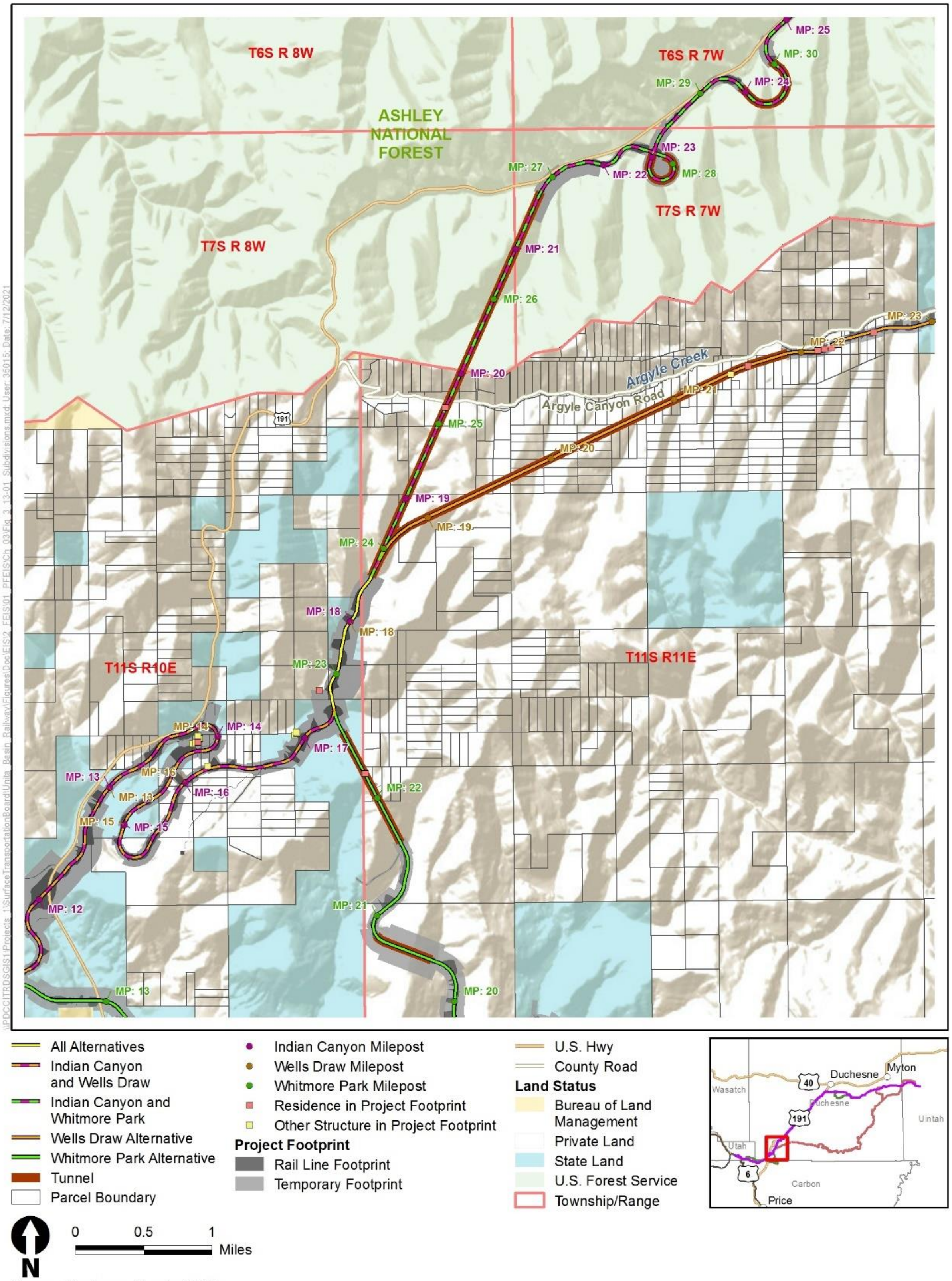
Under the Wells Draw Alternative, the proposed rail line would cross an additional 21 parcels in the Argyle Canyon area between milepost 19.4 and milepost 22.6. Most of these parcels are less than 10 acres, although there are also some parcels that range in size from 10 to 33 acres. For 10 of those parcels, the Coalition would need to temporarily or permanently acquire less than 25 percent of the parcel’s total acreage. For five of the parcels, the Coalition would need to temporarily or permanently acquire between 25 and 50 percent of the parcel’s total acreage. For six of the parcels, the Coalition would need to temporarily or permanently acquire more than 50 percent of the parcel’s total acreage.

Duchesne Mini-Ranches

Further north in Duchesne County, the Duchesne Mini-Ranches area also has a high density of smaller subdivided residential parcels. Lots in the Duchesne Mini-Ranches are typically 2.5 or 5 acres in size. The Indian Canyon Alternative would cross 24 parcels in this subdivision (Figure 3.13-1). For five of these parcels, the Coalition would need to temporarily or permanently acquire less than 25 percent of the parcel’s total acreage. For 12 of the parcels, the Coalition would need to temporarily or permanently acquire between 25 and 50 percent of the parcel’s total acreage. For seven of the parcels, the Coalition would need to temporarily or permanently acquire more than 50 percent of the parcel’s total acreage. A portion of the proposed rail alignment through the Duchesne Mini-Ranches would parallel a private road used to access exiting residences. Because this would create at-grade crossings of the rail line with existing driveways, the Coalition has proposed a number of road relocations in this area to provide alternate access to existing residences.

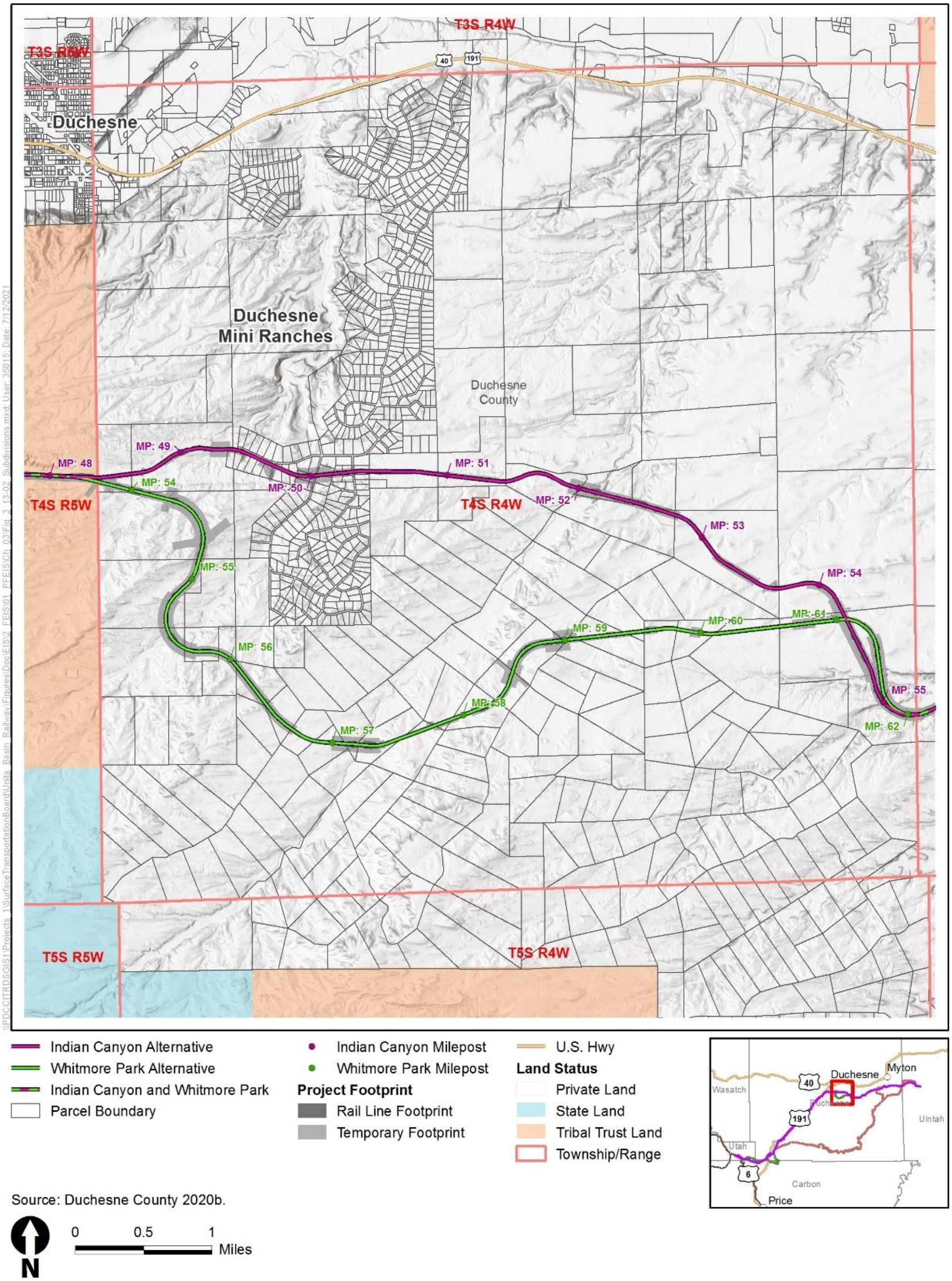
The Whitmore Park Alternative would be located south of the Duchesne Mini-Ranches and would not require the Coalition to acquire properties in this subdivided residential area (Figure 3.13-2). The Wells Draw Alternative would not cross this portion of Duchesne County and, thus, would avoid impacts on the Duchesne Mini-Ranches and the larger subdivided properties to the south.

Figure 3.13-1. Subdivided Parcels in the Vicinity of Argyle Canyon



Source: Duchesne County 2020b.

Figure 3.13-2. Subdivided Parcels in the Vicinity of Duchesne Mini-Ranches



Residences and Other Structures

Table 3.13-7 summarizes residences and other structures (such as outbuildings for ranching) located within the rail line footprint and temporary footprint. Residences and other structures located entirely or partially within the rail line footprint would likely be permanently displaced by construction of the Action Alternatives. These include five residences and one other structure under the Wells Draw Alternative, two residences and five other structures under the Whitmore Park Alternative, and one residence and three other structures under the Indian Canyon Alternative. Residences and other structures within the temporary footprint could also be permanently or temporarily displaced, depending on the terms of the temporary construction easement with each landowner. All of the residences within the rail line footprint or the temporary footprint are located on private land. Depending on the Action Alternatives, other structures may be located on private land and/or public land. None of the residences or other structures within the rail line footprint or the temporary footprint for any of the Action Alternatives are located on Tribal trust lands.

Table 3.13-7. Residences and Other Structures Entirely or Partially within the Rail Line Footprint and Temporary Footprint

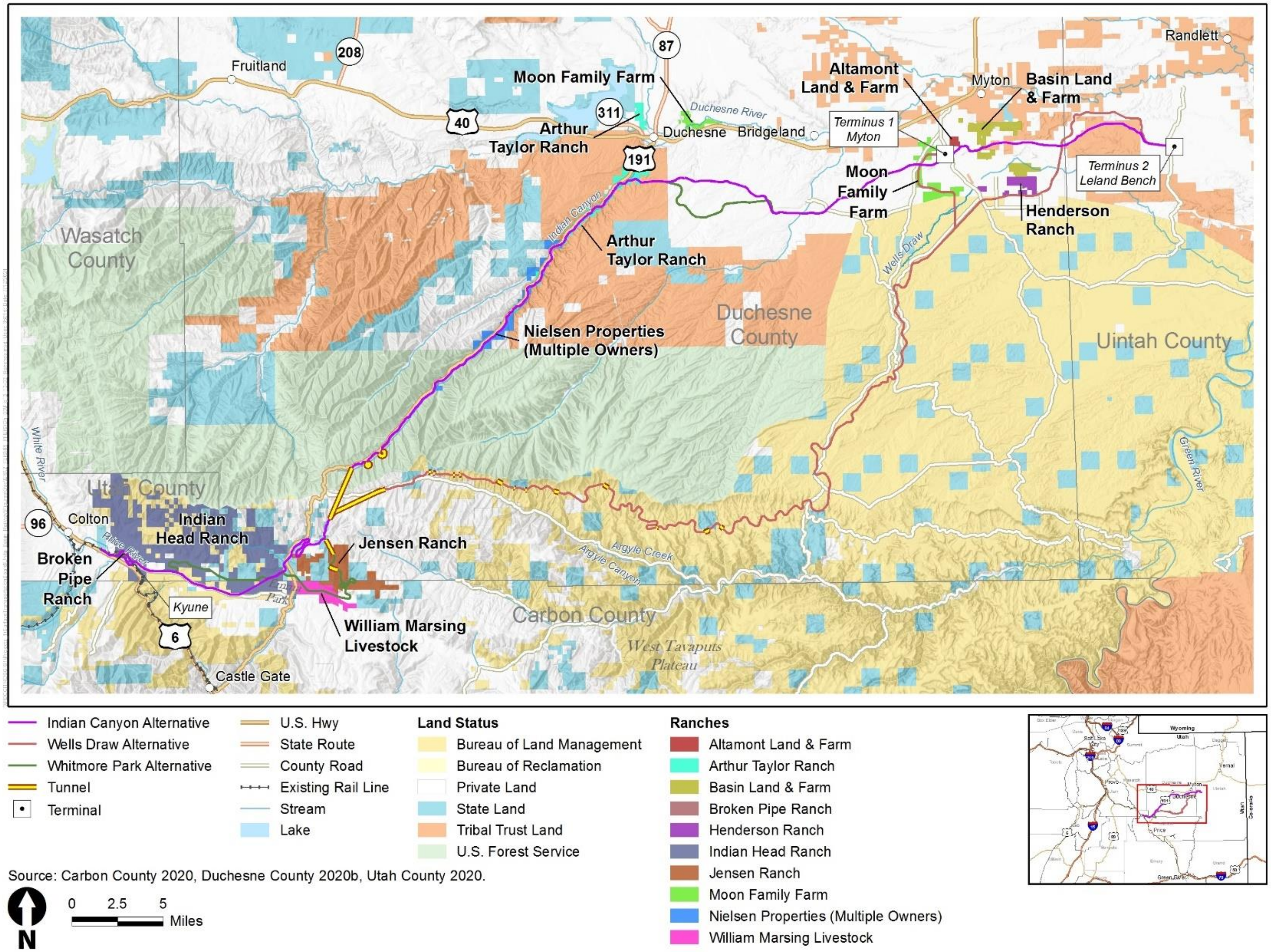
Action Alternative	Footprint Type	Residences	Other Structures	Total
Indian Canyon	Rail line	1	3	4
	Temporary	2	16	18
Total		**3**	**19**	**22**
Wells Draw	Rail line	5	1	6
	Temporary	2	11	13
Total		**7**	**12**	**19**
Whitmore Park	Rail line	1	5	6
	Temporary	2	11	13
Total		**3**	**16**	**19**

Ranching and Farming

During scoping, several commenters expressed concerns about the impact of the Action Alternatives on ranching and farming operations. OEA identified ranches and farming operations by reviewing parcel data for owner names that included key words such as *ranch*, *farm*, or *livestock*. Where multiple contiguous parcels with the same owner name were identified, OEA merged the parcel data to create a single parcel for a ranch, farm, or livestock operation. OEA also reviewed scoping comments to identify commenters who included information on their ranching or farming operations and associated those commenters with owner names in the parcel data to map those ranches and farmland that would be crossed by the Action Alternatives.

Figure 3.13-3 shows ranches and farming operations that OEA identified through scoping and review of parcel data. The Indian Canyon Alternative would require the acquisition of land from Indian Head Ranch, Broken Pipe Ranch, Jensen Ranch, Arthur Taylor Ranch, Altamont Land & Farm, Basin Land & Farm, Moon Family Farm, and Nielsen Properties (multiple owners).

Figure 3.13-3. Identified Ranching and Farming Operations



The Wells Draw Alternative would require the acquisition of land from Indian Head Ranch, Broken Pipe Ranch, Jensen Ranch, Henderson Ranch, and Moon Family Farm. The Whitmore Park Alternative would require the acquisition of land from Indian Head Ranch, Broken Pipe Ranch, Jensen Ranch, William Marsing Livestock, Arthur Taylor Ranch, Altamont Land & Farm, Basin Land & Farm, Moon Family Farm, and Nielsen Properties (multiple owners).

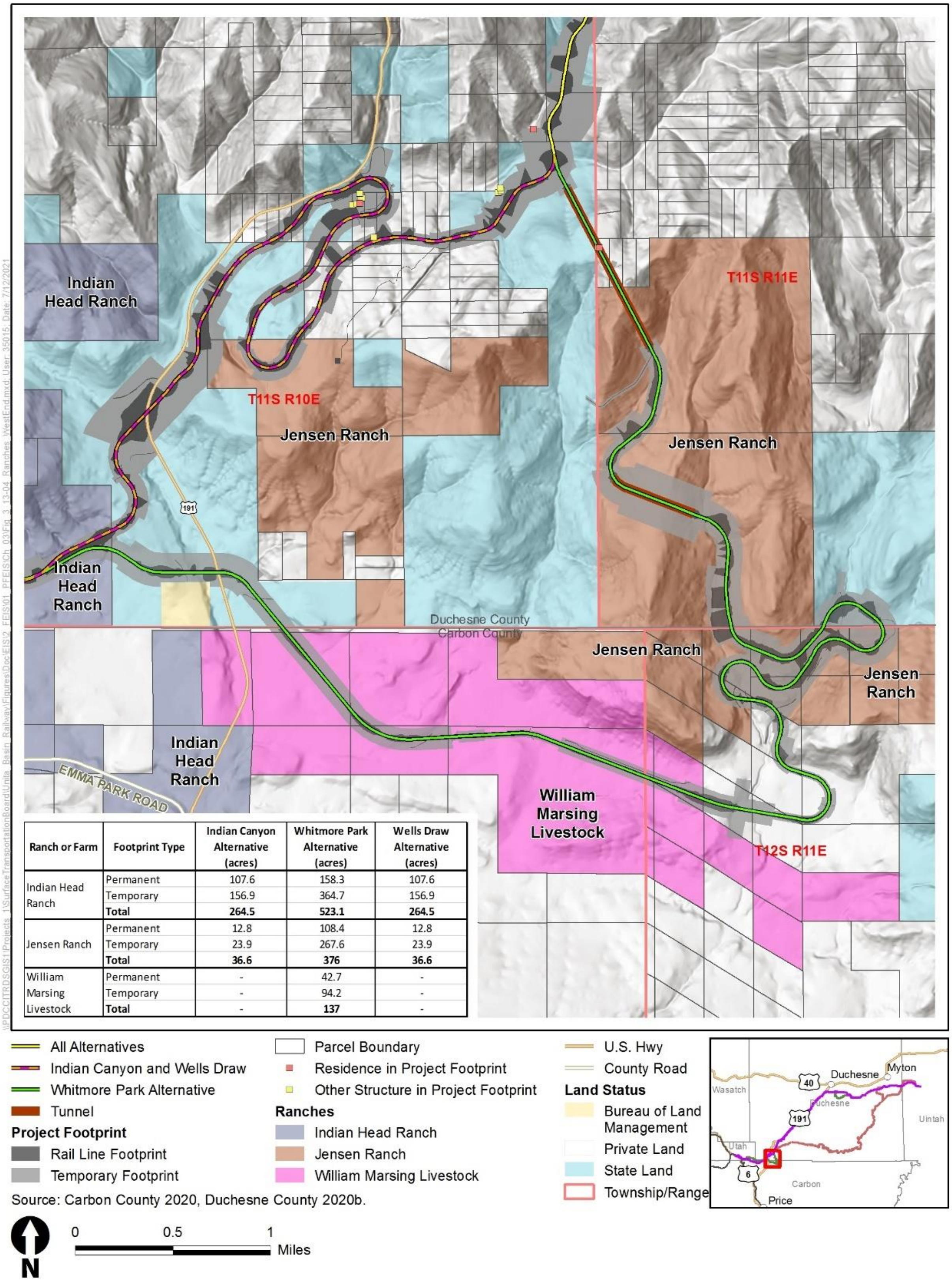
Figure 3.13-4 through Figure 3.13-6 show the location of the rail line footprint and the temporary footprint relative to each identified ranch and farming operation. These figures also report the area of land that the Coalition would have to temporarily or permanently acquire from each identified ranch and farming operation for each Action Alternative. This list of affected ranches and farming operations is not exhaustive, but does include the larger ranch and farming operations that OEA identified through review of landowner records, as well as the specific operations identified by commenters during scoping. Construction could also affect other landowners that have ranching and farming operations that were not identified specifically through parcel data searches and scoping comments.

Displaced Economic Activity

Whether public, private, or tribal, land that would be permanently or temporarily acquired would no longer be available for ranching, farming, or other economic activities. Economic activity within temporary construction easements would be displaced during construction only, while economic activity within land that is acquired would be permanently displaced. Construction of the Action Alternatives could also disrupt use of land outside the project footprint if acquisition of land or temporary construction easements would sever contiguous parcels, restrict access to irrigation systems or water supplies, restrict the movements of animals and equipment between different operating areas of a ranch or farm, or reduce the acreage available in an operating area to an acreage that is no longer economical to ranch or farm. To reduce impacts to ranch and farm operations, OEA is recommending mitigation measures requiring the Coalition to compensate landowners for direct loss of agricultural land in the right-of-way and the indirect loss of agricultural land from severance; relocate, replace or provide compensation to landowners for displaced capital improvements; and limit loss of access to agricultural lands by providing alternate temporary access points if main access routes are obstructed during construction (SOCIO-MM-1, SOCIO-MM-2).

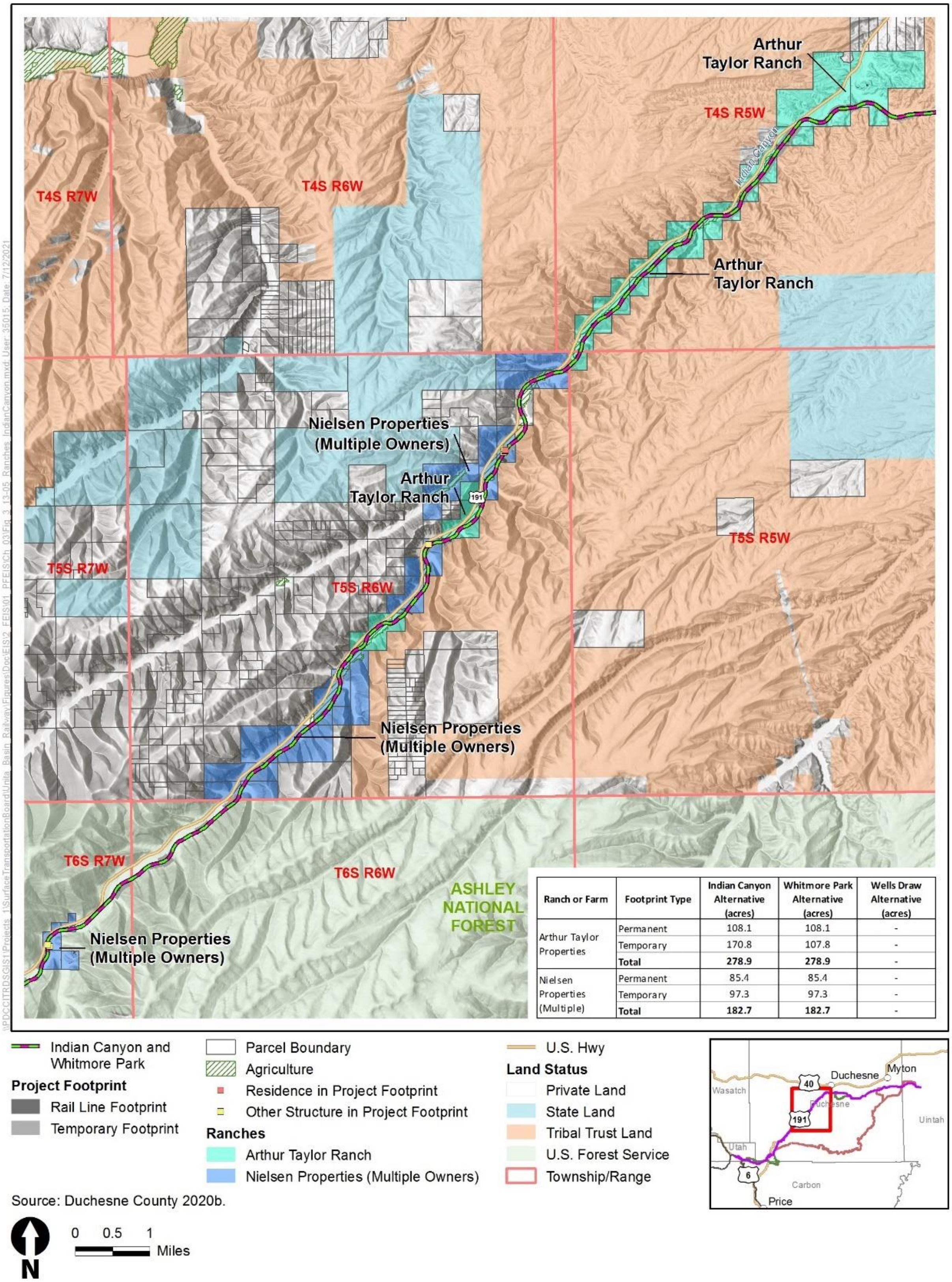
To construct any of the Action Alternatives, the Coalition would need to acquire land and temporary construction easements from Indian Head Ranch, Broken Pipe Ranch, William Marsing Livestock, and Jensen Ranch along the westernmost segment of the proposed rail line (Figure 3.13-3). Indian Head Ranch includes multiple parcels with a combined acreage of over 15,000 acres. All of the Action Alternatives would traverse the southern portion of Indian Head Ranch, but the Coalition would need to acquire more land and area for temporary construction easements from Indian Head Ranch to construct the Whitmore Park Alternative (523.1 acres) than to construct the Indian Canyon Alternative or Wells Draw Alternative (264.5 acres). All of the Action Alternatives would cross Broken Pipe Ranch. The Coalition would acquire 15.1 acres of land and a temporary construction easement (or 50.2 percent of the ranch) for the Indian Canyon Alternative or Whitmore Park Alternative. For the Wells Draw Alternative, the Coalition would need to acquire 25.0 acres of land and a temporary construction easement (or 83.2 percent of the ranch).

Figure 3.13-4. Ranching and Farming Operations—Western End



Ranch or Farm	Footprint Type	Indian Canyon Alternative (acres)	Whitmore Park Alternative (acres)	Wells Draw Alternative (acres)
Indian Head Ranch	Permanent	107.6	158.3	107.6
	Temporary	156.9	364.7	156.9
	Total	**264.5**	**523.1**	**264.5**
Jensen Ranch	Permanent	12.8	108.4	12.8
	Temporary	23.9	267.6	23.9
	Total	**36.6**	**376**	**36.6**
William Marsing Livestock	Permanent	-	42.7	-
	Temporary	-	94.2	-
	Total	-	**137**	-

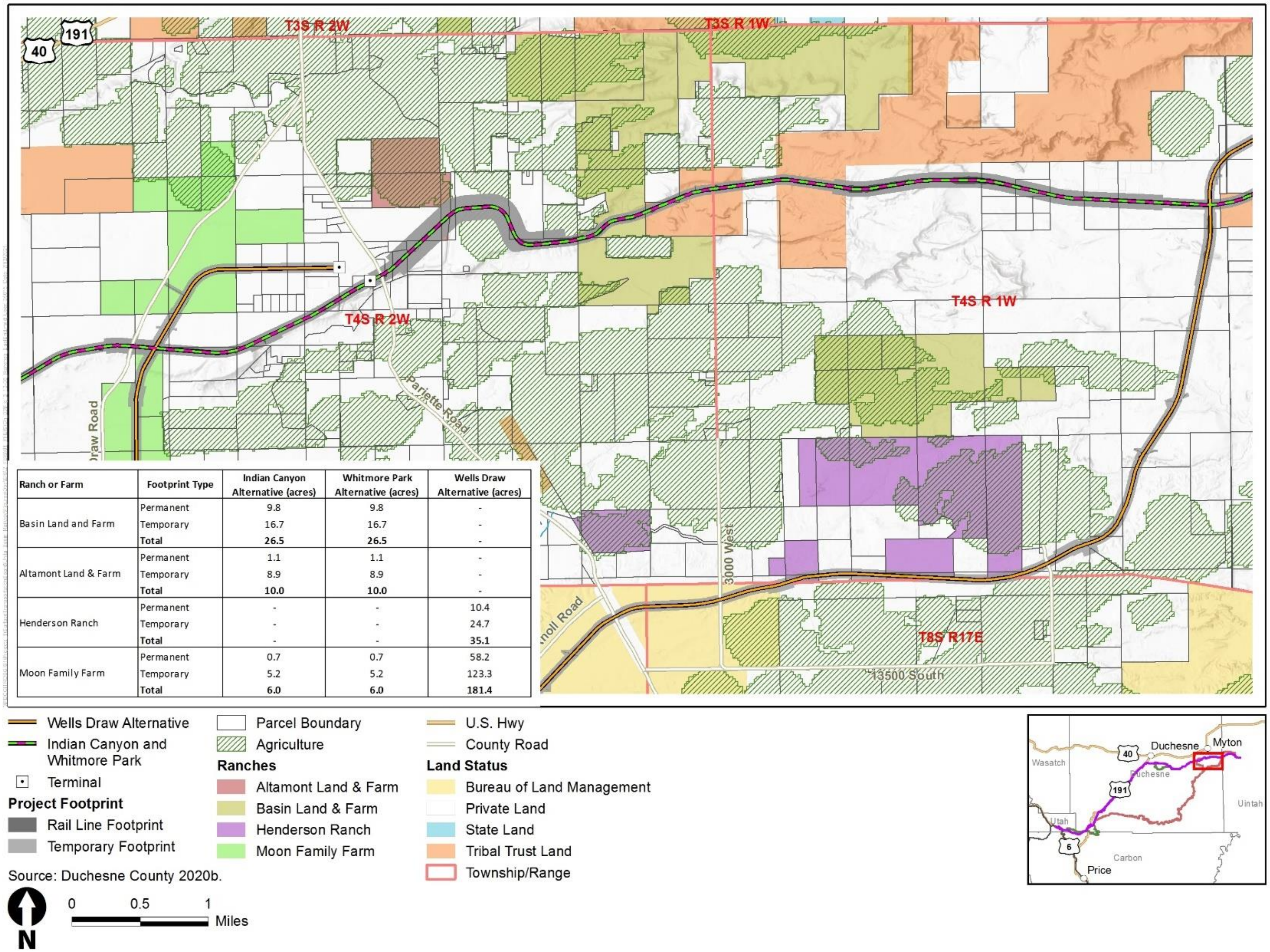
Figure 3.13-5. Ranching and Farming Operations—Indian Canyon



Ranch or Farm	Footprint Type	Indian Canyon Alternative (acres)	Whitmore Park Alternative (acres)	Wells Draw Alternative (acres)
Arthur Taylor Properties	Permanent	108.1	108.1	-
	Temporary	170.8	107.8	-
	Total	**278.9**	**278.9**	-
Nielsen Properties (Multiple)	Permanent	85.4	85.4	-
	Temporary	97.3	97.3	-
	Total	**182.7**	**182.7**	-

Source: Duchesne County 2020b.

Figure 3.13-6. Ranching and Farming Operations—Eastern End



Ranch or Farm	Footprint Type	Indian Canyon Alternative (acres)	Whitmore Park Alternative (acres)	Wells Draw Alternative (acres)
Basin Land and Farm	Permanent	9.8	9.8	-
	Temporary	16.7	16.7	-
	Total	**26.5**	**26.5**	**-**
Altamont Land & Farm	Permanent	1.1	1.1	-
	Temporary	8.9	8.9	-
	Total	**10.0**	**10.0**	**-**
Henderson Ranch	Permanent	-	-	10.4
	Temporary	-	-	24.7
	Total	**-**	**-**	**35.1**
Moon Family Farm	Permanent	0.7	0.7	58.2
	Temporary	5.2	5.2	123.3
	Total	**6.0**	**6.0**	**181.4**

All of the Action Alternatives would cross Jensen Ranch, but the Coalition would need to acquire substantially more land and area for a temporary construction easement to construct the Whitmore Park Alternative (376.0 acres) than to construct the Indian Canyon Alternative or the Wells Draw Alternative (36.6 acres). Only the Whitmore Park Alternative would cross William Marsing Livestock and the Coalition would need to acquire 137.0 acres of land and a temporary construction easement from that ranch to construct the alternative. The Whitmore Park Alternative would also divide contiguous parcels of both the Jensen Ranch and the William Marsing Ranch (Figure 3.13-4).

Both the Indian Canyon Alternative and the Whitmore Park Alternative would parallel US 191 through Indian Canyon. To construct either of these Action Alternatives, the Coalition would need to acquire 278.9 acres of land and a temporary construction easement from Arthur Taylor properties and 182.7 acres of land and a temporary construction easement from the Nielsen Properties (multiple owners) within Indian Canyon (Figure 3.13-5). Within the canyon, US 191 is aligned to the western side of the canyon, while the proposed rail line would be predominantly aligned to the eastern side of the canyon. The project footprint would occupy the bottom of the canyon, where a perennial stream, ponds and springs provide irrigation for hayfields and pasture, and also water for stock. Because the proposed rail line would be located on the opposite side of the canyon from US 191, rail line construction would generally not impede access to agricultural areas in the canyon, although the acreage available for ranching and farming operations would be reduced. In some locations, the width of the temporary footprint would extend across much of the width of the canyon floor, which would displace any agriculture in those locations. There are also residences, cabins, barns, sheds, and corrals located in the bottom of the canyon, some of which would be displaced by construction of the rail line (Figure 3.13-5). The Coalition would not need to acquire land or temporary construction easements in Indian Canyon to construct the Wells Draw Alternative.

For each of the Action Alternatives, construction on the eastern segment of the alternatives, north of Indian Canyon, would involve acquiring land and temporary construction easements from Basin Land & Farm, Moon Family Farm, Altamont Land & Farm, and Henderson Ranch. The Coalition would need to ~~would~~ acquire 26.5 acres of land and a temporary construction easement from Basin Land & Farm, 10.0 acres from Altamont Land & Farm, and 6.0 acres from Moon Family Farm under the Indian Canyon Alternative and Whitmore Park Alternative, and would acquire 181.4 acres of land and a temporary construction easement from Moon Family Farm and 35.1 acres from Henderson Ranch under the Wells Draw Alternative. OEA does not anticipate any significant impacts on center-pivot irrigation agriculture on these three properties (Figure 3.13-6).

As discussed in Section 3.11, *Land Use and Recreation*, there are 15 BLM grazing allotments and two Forest Service grazing allotments that overlap the study area. The Indian Canyon Alternative and the Whitmore Park Alternative would each cross four of the BLM grazing allotments and the two Forest Service grazing allotments. The Wells Draw Alternative would not cross the Forest Service grazing allotments but would cross 15 BLM grazing allotments. Construction of the proposed rail line would temporarily displace grazing activity within the temporary footprint and permanently displace grazing activity within the rail line footprint, reducing the number of Animal Unit Months (AUMs)[3] that each allotment can support and potentially disrupting grazing patterns or livestock distribution (Subsection 3.11.3.2, *Impact Comparison between Action Alternatives*, provides a calculation of total AUM loss for each Action Alternative). Based on consultation with BIA, OEA understands that tribal

[3] An Animal Unit Month (AUM) is the amount of forage required by one animal unit for 1 month.

grazing range units occur in the vicinity of the study area but are vacant because they are marginal and would require intense management.

Construction Employment, Labor Income, and Value Added

OEA estimated the direct and total employment, labor income, and total market value of all goods and services generated during the construction period under each of the Action Alternatives. Direct employment refers to workers hired directly for rail line construction. Total employment includes—in addition to direct employment—indirect and induced employment. Indirect employment refers to jobs supported through increased demand for construction materials and services. Induced employment refers to jobs supported at businesses where construction workers and rail line employees would spend their incomes. The Coalition developed the estimated construction and operation expenditures, material sources, and assumptions about the labor supply (local versus nonlocal, labor mix by job classification, and average wages and benefits) and reported the estimates to OEA in Response to Information Request No. 3 (Coalition 2019). These inputs informed the IMPLAN analysis conducted for each of the Action Alternatives.

Because it is the longest and the costliest of the Action Alternatives, the Wells Draw Alternative would generate the most employment, the most labor income, and the most additional economic output (or economic value added), followed by the Whitmore Park Alternative and the Indian Canyon Alternative (Table 3.13-8).

Table 3.13-8. Annual Employment, Labor Income, and Value Added Impacts from Construction of the Action Alternatives

	Action Alternative[a,b]		
Impact Type	**Indian Canyon**	**Wells Draw**	**Whitmore Park**
Employment (jobs)			
Direct	1,550	1,850	1,630
Indirect	740	930	760
Induced	530	680	620
Total	**2,820**	**3,450**	**3,000**
Labor Income ($ million)			
Direct	$149.7	$195.5	$158.2
Indirect	$30.4	$38.6	$31.2
Induced	$16.7	$21.0	$20.3
Total	**$196.8**	**$255.1**	**$209.7**
Value Added ($ million)			
Direct	$188.5	$222.3	$201.1
Indirect	$62.4	$78.5	$63.7
Induced	$39.6	$50.6	$47.0
Total	**$290.6**	**$351.3**	**$311.8**

Notes:

[a] All dollar values are in 2020 dollars.

[b] Numbers may not sum due to rounding.

Source: Appendix Q, *IMPLAN Analysis Methods and Results*

Economic benefits related to direct, indirect, and induced employment and labor income would extend to tribal members that reside in the four-county study area and to Indian-owned businesses that would benefit from direct, indirect, and induced spending. Based on population size, skilled labor availability and unemployment rates, and distance of travel to the construction area, the Coalition estimated that 5 percent of the construction labor supply would be sourced from the Ute Indian Tribe. For the Indian Canyon Alternative and Whitmore Park Alternative that cross Tribal trust lands, the tribe would negotiate preferential hiring of qualified tribal members through the Ute Tribal Employment Rights Office, which would benefit tribal members seeking direct employment during construction.

As discussed in Subsection 3.13.3.1, *Impacts Common to All Action Alternatives*, the tribe as a producer of crude oil could also benefit from lower transportation costs for shipping crude oil and access to new markets if the proposed rail line is built, and could accrue revenue generated by the operation of the proposed rail line if the tribe becomes an equity partner.

Workforce Demand for Housing and Public Services

OEA estimates that direct employment for rail line construction would be 1,550 jobs for the Indian Canyon Alternative, 1,850 jobs for the Wells Draw Alternative and 1,630 jobs for the Whitmore Park Alternative (Table 3.13-8). The Coalition anticipates that approximately 60 percent of the labor supply would originate from outside the immediate area of Carbon, Duchesne, and Uintah Counties (Coalition 2019). This would be equivalent to 930 workers under the Indian Canyon Alternative, 1,110 workers under the Wells Draw Alternative, and 978 workers under the Whitmore Park Alternative. The Coalition would build dedicated construction camps to house up to 40 workers to support tunnel construction of the Indian Canyon Alternative and Whitmore Park Alternative, and up to 280 workers to support construction of tunnels, embankment, and bridges for the Wells Draw Alternative.

OEA estimated that up to 938 nonlocal construction workers could migrate into nearby communities that are within commuting distance to the Action Alternatives, including the communities of Helper, Price, Wellington, Myton, Roosevelt, Duchesne, Ballard, Vernal, and Naples. OEA expects that the majority of nonlocal construction workers would not bring their families to a remote job site and that the majority of construction workers would use dedicated construction camps or temporary accommodations such as hotels, motels, and RV parks for temporary housing rather than vacant rental properties that may require a lease agreement. Over 2,000 temporary accommodations and over 2,500 vacant housing units are available in these same communities (Table 3.13-2), so OEA anticipates that demand for workforce housing would not exceed available capacity. In addition, because OEA expects construction workers to preferentially reside in temporary accommodations such as hotels, motels, and RV parks, OEA does not expect that the influx of temporary construction workers would have a significant effect on housing prices. Other reasonably foreseeable future actions, including the construction of two interstate electric power transmission lines (Gateway South and TransWest), would also increase demand for public housing and services in the study area. Section 3.15, *Cumulative Impacts*, provides more information regarding these cumulative impacts.

OEA expects that the demand for public services, such as law enforcement and fire protection, would increase in proportion to the increase in population. In 2017, Carbon County, Duchesne County, and Uintah County had over 77,000 residents (Table 3.13-1). The addition of up to 932 nonlocal construction workers to communities in these three counties would represent an up to 1.2 percent increase in population due to construction of the proposed rail line. However, the increase in demand for public services may be considerably higher in some communities with small populations that are close to the Action Alternatives. The communities that could see the greatest change in demand for housing and public services are Helper, Price, Myton, Roosevelt, Duchesne, and Ballard. Increased demand for housing or public services in any of these communities would be temporary. OEA expects that the majority of temporary construction workers would not bring their families to a remote job site and that impacts on public schools from the in-migration of school-age children arriving with temporary construction workers would not be significant.

State and Local Revenues

Construction of the proposed rail line would require the acquisition of easements on lands administered by SITLA. The Wells Draw Alternative would require the acquisition of 881 acres of easement on state lands, followed by the Indian Canyon Alternative (444 acres), and the Whitmore Park Alternative (386 acres). These easements would generate revenue for SITLA trust beneficiaries that would be distributed to institutional endowments for higher education, special education, and public institutions in the state of Utah (SITLA 2020).

Construction would also generate revenue for the state from state income tax on direct, indirect, and induced labor income (Table 3.13-8). The Coalition estimates that up to 30 percent of the labor supply would originate from distant Utah counties or locations outside Utah. Assuming 70 percent of the annual labor income generated by construction of the Action Alternatives would be subject to state income tax, a state income tax rate of 4.95 percent would generate annual state revenues of up to $6.8 million under the Indian Canyon Alternative, $7.3 million under the Whitmore Park Alternative, and $8.8 million under the Wells Draw Alternative during each year of construction.

Construction would also generate state and local sales and use taxes on direct construction expenditures, as well as taxes on indirect and induced spending. Additional transient room taxes would be generated by nonlocal construction workers who reside in temporary accommodations such as hotels and motels during the construction period. The Coalition's construction cost estimate is $1.29 billion for the Indian Canyon Alternative, $1.35 billion for the Whitmore Park Alternative, and $2.14 billion for the Wells Draw Alternative. Table 3.13-9 summarizes the estimated portion of the total construction cost that would be subject to state sales and use tax, and the revenue that would be generated for the state under each Action Alternative at a tax rate of 4.85 percent.

Table 3.13-9. In-State Taxable Construction Expenditures and State Tax Revenue by Action Alternative

Action Alternative	In-State Taxable Expenditures	State Tax Revenue at 4.85% Tax Rate
Indian Canyon	$546,000,000	$26,481,000
Whitmore Park	$574,000,000	$27,839,000
Wells Draw	$921,000,000	$44,668,500

Local jurisdictions, including county and city governments and the Ute Indian Tribe, may also levy taxes on construction expenditures including local sales and use taxes, county option sales taxes, city or town option taxes, and taxes levied specifically to support transit and highways, or public facilities. The combined sales and use tax rate effective April 1, 2020 is 6.35 percent for Carbon and Duchesne Counties, 6.45 percent for Uintah County, and 7.15 percent for Utah County, while sales and use tax rates in some cities in the study area may be slightly higher (Utah State Tax Commission 2020). Based on the overall construction cost, and estimated direct, indirect, and induced labor income and gross regional product, OEA expects that the Wells Draw Alternative would generate the most state and local tax revenue followed by the Whitmore Park Alternative and the Indian Canyon Alternative.

Construction of the Indian Canyon Alternative or the Whitmore Park Alternative would generate revenue for the Ute Indian Tribe through payments for a right-of-way across Tribal trust lands. Other revenue streams that would directly benefit the tribe include taxes and business fees payable to the tribe. As discussed in Subsection 3.13.3.1, *Impacts Common to All Action Alternatives*, the tribe as a producer of crude oil could also benefit from lower transportation costs for shipping crude oil and access to new markets if the proposed rail line is built, and could accrue revenue generated by operation of the proposed rail line if the tribe becomes an equity partner.

Nonmarket Values and Quality of Life

The Wells Draw Alternative would cross several special designation areas on BLM-administered lands including the Lears Canyon and Nine Mile Canyon Areas of Critical Environmental Concern, the Big Wash and Currant Canyon Lands with Wilderness Characteristics, and the Nine Mile Special Recreation Management Area. In these areas, the Wells Draw Alternative would have unique land use and recreation impacts compared to other Action Alternatives that would also adversely affect nonmarket values and quality of life.

The Indian Canyon Alternative and Whitmore Park Alternative would cross Forest Service lands in Ashley National Forest and would result in disturbances to inventoried roadless areas and would adversely affect the nonmarket value of these areas. All of the Action Alternatives would share a corridor with a scenic byway for a portion of the alignment that could diminish the scenic quality of the byway. The Indian Canyon Alternative and Whitmore Park Alternative would be aligned in the same corridor as the Indian Canyon Scenic Byway, while the Wells Draw Alternative would be aligned adjacent to sections of the Nine Mile Canyon Backcountry Byway. For more information on construction-related quality of life impacts, see Section 3.6, *Noise and Vibration*, Section 3.11, *Land Use and Recreation*, and Section 3.12, *Visual Resources.*

Operations

Displaced Economic Activity

Land acquired for operation of the proposed rail line would no longer be available for ranching, farming, or other economic activities. Impacts during operations would be similar to those for construction, except that fewer acres of ranching and farmland would be permanently affected during operations than would be temporarily affected during construction. To reduce impacts to ranch and farm operations, OEA is recommending mitigation requiring the Coalition to install at-grade crossings and relocating roads to maintain adequate access to and movement within ranches and farms after rail operations begin (SOCIO-MM-2). The maps in Figure 3.13-4 through Figure 3.13-6 show the acreage of land that would no longer be available for ranching and farming on the specific ranches that OEA identified through review of parcel data and scoping comments. Other landowners that have ranching and farming operations that were not identified specifically through a search of the parcel data and scoping comments could also be affected. Temporary and permanent impacts on ranching and farming under each Action Alternative expressed as impacted acreage of irrigated cropland and prime farmland, or impacts on grazing values in terms of AUM loss are estimated in Section 3.11, *Land Use and Recreation*, Table 3.11-5. Grazing allotments crossed by the Indian Canyon Alternative and the Whitmore Park Alternative support an estimated 2,817 AUMs while grazing allotments crossed by the Wells Draw Alternative support an estimated 10,163 AUMs

(Section 3.11, Table 3.11-2). Under each of the Action Alternatives, permanent disturbance would result in a permanent loss of approximately 1 percent of the AUMs supported within grazing allotments crossed by the Action Alternatives.

Employment, Labor Income, and Value Added

Operation of the proposed rail line would support regional employment, generate labor income, and contribute to the regional economy. The contribution of rail operations to the regional economy would be much less than the contribution from construction. The Coalition provided annual O&M cost estimates for both a low- and high rail traffic scenario. Annual direct and total employment, labor income, and total estimated economic output during operations would be specific to each Action Alternative, with the Wells Draw Alternative generating the most employment, labor income, and economic value added, followed by the Whitmore Park Alternative and the Indian Canyon Alternative (Table 3.13-10).

Table 3.13-10. Annual Employment, Labor Income, and Value Added Impacts from Operation and Maintenance of the Action Alternatives

	Action Alternative[a,b]		
Impact Type	**Indian Canyon**	**Wells Draw**	**Whitmore Park**
Employment (jobs)			
Low Rail Traffic Scenario			
Direct	110	130	120
Indirect	50	60	50
Induced	20	30	30
Total	**170**	**220**	**190**
High Rail Traffic Scenario			
Direct	250	310	270
Indirect	120	140	120
Induced	60	80	80
Total	**420**	**530**	**470**
Labor Income ($ million)~~5~~			
Low Rail Traffic Scenario			
Direct	$5.8	$7.2	$6.4
Indirect	$1.8	$2.3	$2.0
Induced	$0.7	$0.8	$0.9
Total	**$8.3**	**$10.4**	**$9.3**
High Rail Traffic Scenario			
Direct	$16.5	$20.5	$18.0
Indirect	$2.2	$6.2	$5.3
Induced	$3.2	$2.3	$2.5
Total	**$23.3**	**$29.0**	**$25.8**

Value Added ($ million)			
Low Rail Traffic Scenario			
Direct	$9.6	$12.0	$10.6
Indirect	$3.9	$4.9	$4.2
Induced	$1.7	$2.0	$2.1
Total	**$15.2**	**$18.9**	**$16.8**
High Rail Traffic Scenario			
Direct	$31.4	$35.3	$30.9
Indirect	$4.3	$13.4	$11.5
Induced	$5.4	$5.6	$5.7
Total	**$43.6**	**$54.3**	**$48.1**

Notes:

[a] All output values are in 2020 dollars. Numbers may not sum due to rounding.

[b] Employment is converted from IMPLAN employment to FTE.

Source: Appendix Q, *IMPLAN Analysis Methods and Results*

State and Local Revenues

Under any of the Action Alternatives, easements on lands administered by SITLA would generate revenue for trust beneficiaries. Additionally, all of the Action Alternatives would generate direct, indirect, and induced annual labor income for each year that the proposed rail line is in operation, generating between $0.4 and $0.5 million in state revenue under the low rail traffic scenario and between $1.1 and $1.4 million in state revenue under the high rail traffic scenario. The Wells Draw Alternative would generate the highest level of revenue, followed by the Whitmore Park Alternative and the Indian Canyon Alternative. Revenue from state and local sales and use taxes on annual O&M expenditures, and indirect and induced spending generated by operation of the proposed rail line would also be generated on an annual basis.

3.13.3.3 No-Action Alternative

Under the No-Action Alternative, the Coalition would not construct and operate the proposed rail line, and there would be no impacts related to socioeconomics.

3.13.4 Mitigation and Unavoidable Environmental Effects

Potential socioeconomic impacts of the proposed rail line include property acquisitions and displacements, displaced economic activity, adverse effects on nonmarket values and quality of life, beneficial effects on the local economy, and increased local and state tax revenue. In general, the Indian Canyon Alternative would have the greatest adverse impact on smaller private property owners because it would cross the most smaller-subdivided properties in the Argyle Canyon and Duchesne Mini-Ranches areas of Duchesne County. The Whitmore Park Alternative would affect the largest area of private property across the three Action Alternatives and would primarily affect larger property owners and ranching and farming operations. The Wells Draw Alternative would affect the smallest area of private property, but would displace the largest number of residences within the project footprint. Because it would be the costliest Action Alternative to construct and operate, the Wells Draw Alternative would create the most jobs and would generate the most local economic benefits and local tax revenue, followed by the Whitmore Park Alternative and the Indian Canyon Alternative.

OEA concludes that the impacts on socioeconomics in terms of displaced properties, displaced economic activities, and nonmarket values would be minor to moderate. The beneficial impacts of the proposed rail line in terms of jobs created would be locally significant during construction and would be minor during rail operations. Beneficial impacts in terms of tax revenue would be minor to moderate. In addition to the Coalition's voluntary mitigation measures, OEA is recommending two mitigation measures to minimize adverse impacts related to socioeconomics (Chapter 4, *Mitigation*).

3.14 Environmental Justice

This section describes the impacts on minority and low-income populations and American Indian tribes that could result from construction and operation of the proposed rail line. The subsections that follow describe the environmental justice study area, analysis methods, and affected environment; assess potential high and adverse impacts of the Action Alternatives and the No-Action Alternative on minority populations, low-income populations, and American Indian tribes; and evaluate whether high and adverse impacts would be borne disproportionally by minority populations, low-income populations, or American Indian tribes.

3.14.1 Analysis Methods

This subsection identifies the study area, data sources, and analysis methods OEA used to analyze environmental justice.

3.14.1.1 Study Area

The study area for environmental justice includes all census block groups within Carbon, Duchesne, Uintah, and Utah Counties. This study area encompasses the areas in which high and adverse impacts related to the other resource areas considered in this ~~Draft~~ EIS could potentially occur as a result of construction and operation of the proposed rail line. This study area is appropriate because no disproportionately high and adverse human health or environmental impacts on minority or low-income populations, or American Indian tribes would occur outside the four-county environmental justice study area.

3.14.1.2 Data Sources

OEA used census data from the American Community Survey 5-Year Estimate (2012–2017) to characterize the demographics of the census block groups in the study area. OEA used demographic data related to race, ethnicity, and household income below poverty to identify minority, low-income, and American Indian populations in the study area.

3.14.1.3 Analysis Methods

OEA used the following methods to analyze environmental justice in the study area.

- **OEA identified minority populations, low-income populations, and American Indian tribes in the study area**. In consultation with the Cooperating Agencies that participated in the preparation of this ~~Draft~~ EIS, OEA defined minority and low-income populations as census block groups where the percentage of the population that is minority or low-income is either greater than 50 percent or more than 10 percentage points higher than the overall percentage of the reference community. OEA selected the four-county area as the reference community because this area covers both the full geographic extent of expected regional benefits of the proposed rail line and the more localized area near the Action Alternatives where most adverse impacts would occur. The term minority refers to persons who identify on the census questionnaire as American Indian or Alaskan Native, Asian, Black or African American, Native Hawaiian, other Pacific Islander, some other race, more than one race, or Hispanic or Latino. Low-income refers to persons whose median household income is at or below the poverty threshold set by the U.S. Census. In addition, OEA mapped the percentage of the population that identifies solely as American Indian across the four-county study area to locate areas within the study area that have a high proportion of American Indians OEA assumed that Tribal trust lands in the study area support a population that is predominantly American Indian. For this analysis, OEA opted to access census data directly through GIS rather than through a tool such as EJSCREEN, due to the numerous benefits that GIS analysis offers for back-end data processing, analysis, and mapping of census data.

- **OEA identified all high and adverse impacts.** OEA reviewed the impact analyses for all resource areas assessed in this ~~Draft~~ EIS to identify any high and adverse impacts related to construction and operation of the proposed rail line. For the environmental justice analysis, OEA identified high and adverse impacts where impacts of constructing and operating the proposed rail line would be significant under NEPA or above generally accepted norms and have the potential to adversely affect minority populations, low-income populations, or American Indian tribes. These high and adverse impacts include loss of wetland habitat and permanent changes to surface water hydrology from crossing structures and stream realignments; impacts on biological resources from habitat disturbance and noise; operations-related wayside noise; and locally significant land use changes, including changes related to the permanent loss of irrigated cropland and grazing land, and severance of properties.
- **OEA considered other adverse impacts that the Ute Indian Tribe identified as areas of concern.** Through consultation with the Ute Indian Tribe, OEA identified impacts related to air emissions, vehicle safety and delay, rail operations safety, and cultural resources as areas of concern to the tribe. Although OEA did not determine impacts on these resources to be significant under NEPA, OEA reviewed these resource impacts to determine if impacts would be otherwise high and adverse for tribal members specifically.
- **OEA determined whether high and adverse impacts disproportionately affect minority populations, low-income populations, or American Indian tribes.** Where OEA identified high and adverse impacts that would affect minority populations, low-income populations, or American Indian tribes, OEA evaluated whether those impacts would be disproportionately high and adverse. To make this determination, OEA considered whether the adverse effect was significant under NEPA or above generally accepted norms. OEA also considered whether the affected minority populations, low-income populations, or American Indian tribes would experience exposure to an adverse effect that would be appreciably more severe or greater in magnitude than the adverse effect that the general population in the affected area would experience. In making its determinations, OEA considered the totality of the circumstances, including the benefits that could result from the proposed rail line and application of potential mitigation measures to avoid, minimize, reduce, or compensate for disproportionate adverse effects.

3.14.2 Affected Environment

This subsection identifies the existing environmental conditions related to environmental justice in the study area.

3.14.2.1 Minority Populations

Minorities account for 17.0 percent of the population in the four-county study area. Hispanic or Latino is the largest minority group in the four-county study area, accounting for 11 percent of the total population. American Indians represent 7 percent of the population in Uintah County, 4 percent of the population in Duchesne County, and 12 percent of the population in the tribal census block groups that comprise the Uintah and Ouray Reservation and off-reservation trust lands (Table 3.14-1).

Table 3.14-1. Minority Group Representation in the Study Area

		Percent Population							
			Non-Hispanic or Latino						
County	Population	Hispanic/ Latino	White	Black	Asian	American Indian	Hawaiian/ Pacific Islander	Other[a]	Percent Minority
Carbon	20,512	13	83	1	<1	1	<1	1	16.7
Duchesne	20,259	8	85	<1	<1	4	<1	2	14.6
Uintah	36,343	8	82	<1	1	7	<1	1	18.1
Utah	576,496	11	83	1	1	<1	1	2	17.0
Total[b]	**653,610**	**11**	**83**	**1**	**1**	**1**	**1**	**2**	**17.0**
Uintah and Ouray[c]	**26,063**	**7**	**78**	**<1**	**1**	**12**	**<1**	**1**	**21.8**

Notes:

[a] Includes categories of "some other race" and "more than one race."

[b] Represents the total or overall percentage for the four-county study area.

[c] Data reported for the tribal census block groups that comprise the Uintah and Ouray Reservation and off-reservation trust lands.

Source: U.S. Census Bureau 2017

Pop. = population

To identify locations in the study area that have a higher percent minority population, OEA prepared a gradient map that shows the minority percentage of each census block group in the study area (Figure 3.14-1). OEA clipped the mapped census data to exclude federal and state land because OEA assumed that people do not reside on those lands. OEA also clipped census block group boundaries to avoid Tribal trust lands and assumed that persons residing on Tribal trust lands identify predominantly as American Indian. This assumption is appropriate due to the low population density in Carbon, Duchesne, and Uintah Counties. As a result of the low population density, the census block groups in the vicinity of Tribal trust lands are geographically large and include both reservation and off-reservation trust lands, which dilutes the representation of American Indian populations within those census block groups. This means that American Indian populations might not be identified on some Tribal trust lands if OEA were to rely on census data alone.

Figure 3.14-2 presents a gradient map showing the percent of the population in each census block group that is American Indian alone. This map is consistent with census data reported in Table 3.14-1 showing that census block groups with the highest percent American Indian are located in Uintah County. Figure 3.14-3 shows the census block groups in the vicinity of the Action Alternatives where OEA identified a minority population.

Figure 3.14-1. Percent Minority by Census Block Group

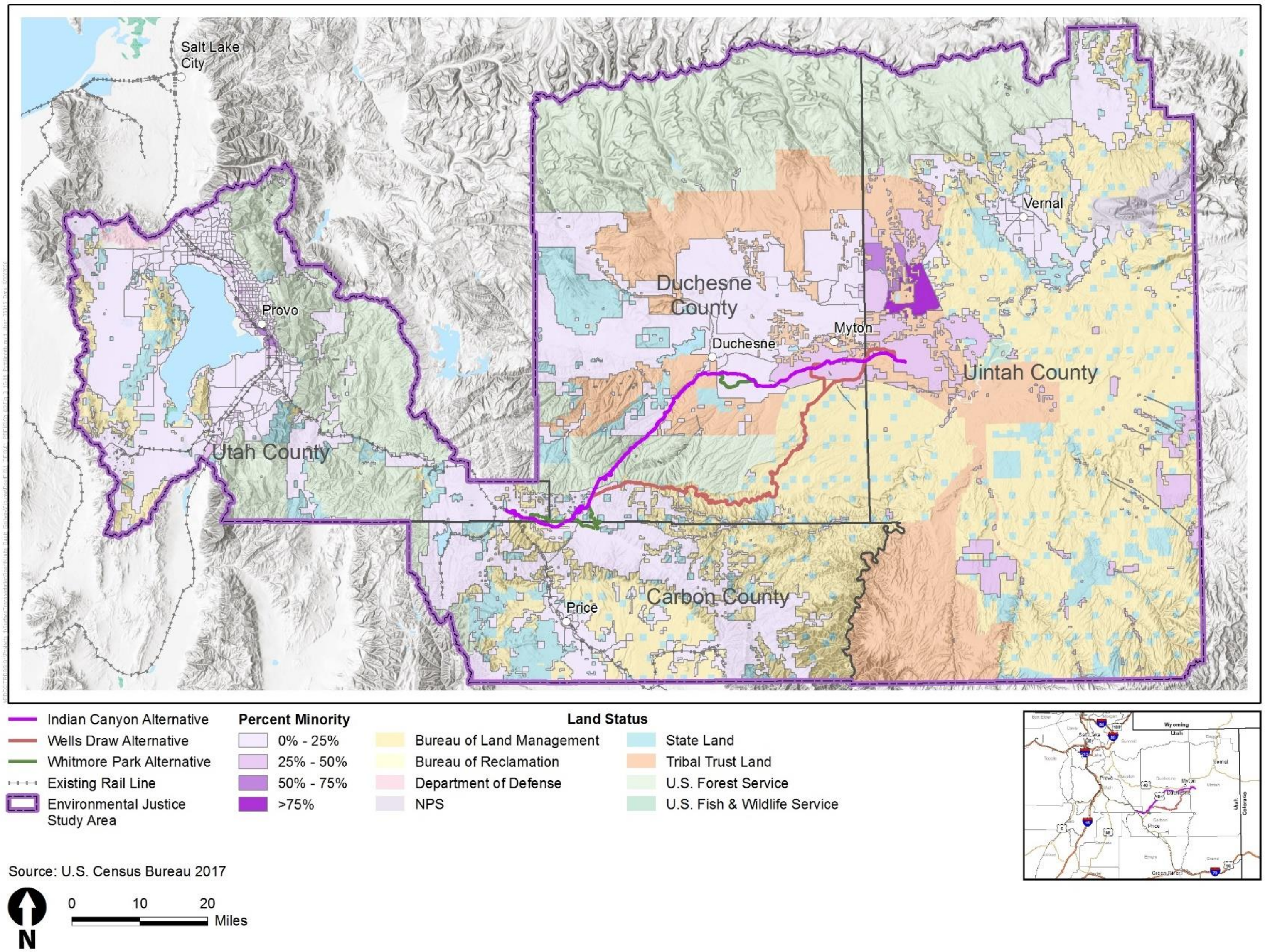


Figure 3.14-2. Percent American Indian by Census Block Group

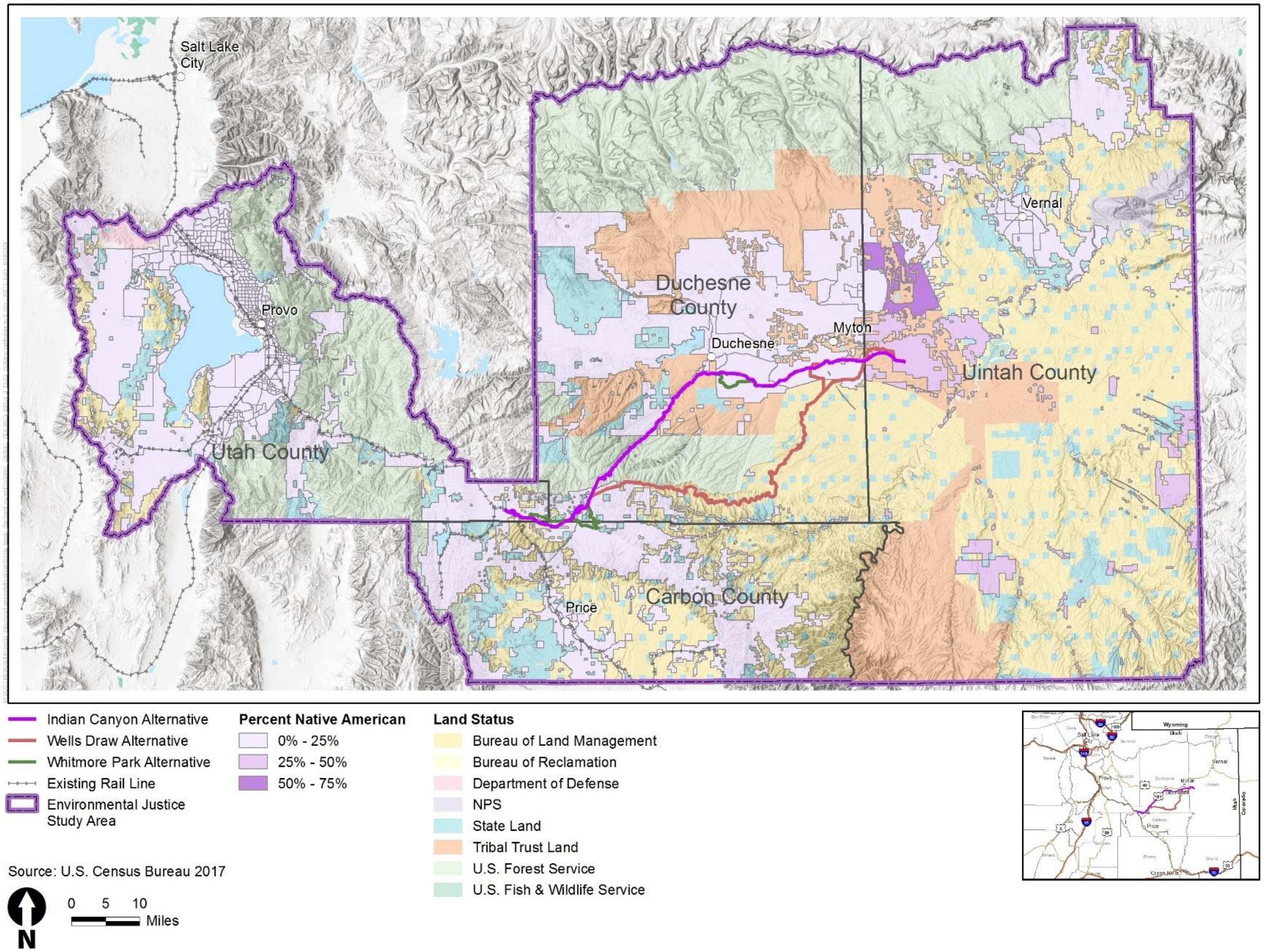
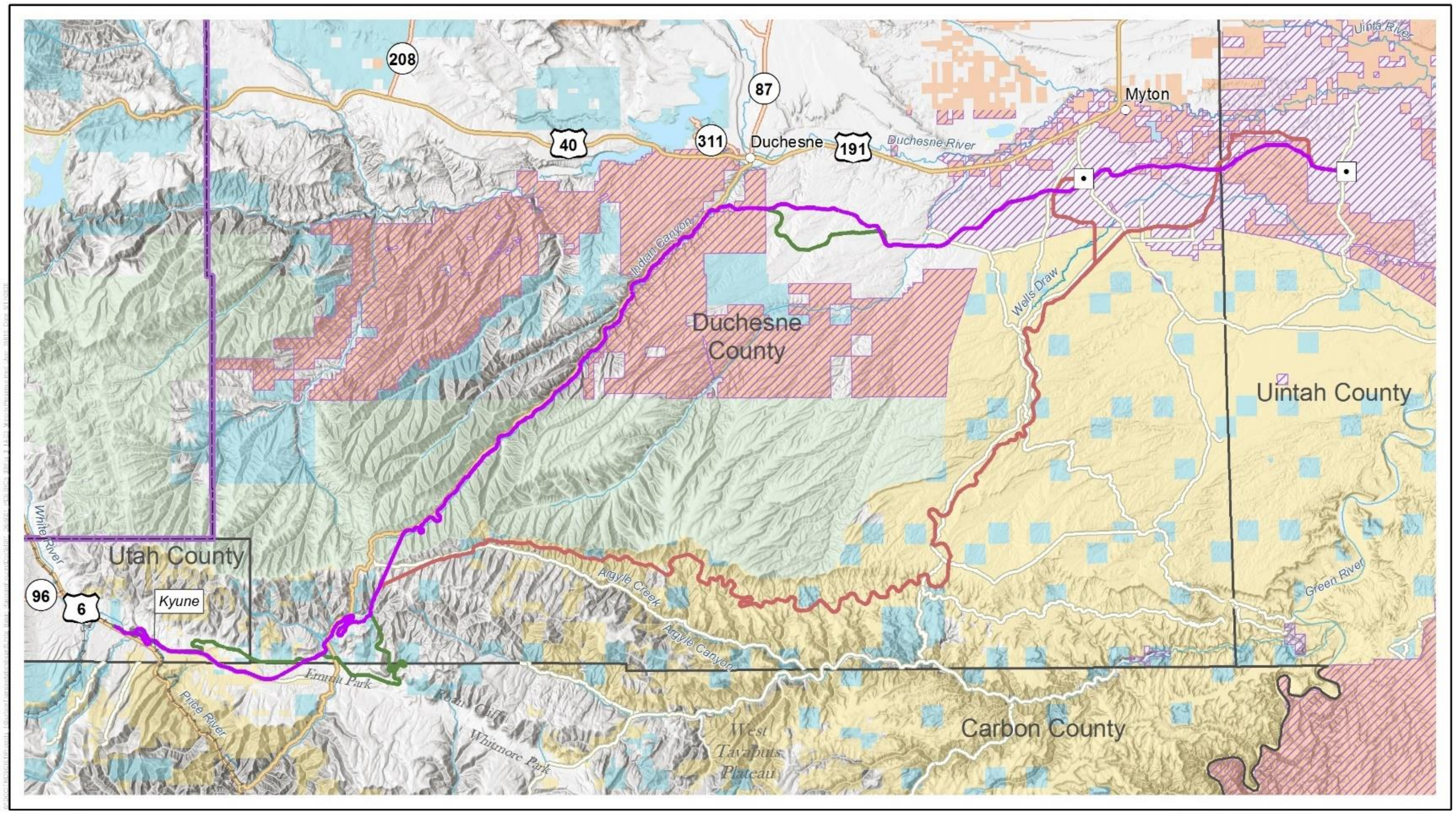


Figure 3.14-3. Minority Populations Present



3.14.2.2 Low-Income Populations

Median household income in the study area ranges from approximately $47,000 in Carbon County to approximately $67,000 in Uintah and Utah Counties (Table 3.14-2). The percent of households that are low-income range from approximately 12 percent in Duchesne, Uintah, and Utah Counties to approximately 16 percent in Carbon County (Table 3.14-2). Median household income within the tribal census block groups that comprise the Uintah and Ouray Reservation and off-reservation trust lands is $62,756 and 12.8 percent of households are low-income.

Table 3.14-2. Median Household Income and Percent of Households that are Low-Income in the Study Area

County	Households	Median Household Income	Percent Low-Income[b]
Carbon	7,841	$46,994	15.8
Duchesne	6,650	$63,000	12.3
Uintah	10,616	$67,012	12.0
Utah	155,664	$67,042	11.9
Total[a]	**180,771**	**--**	**12.1**
Uintah and Ouray[c]	**8,148**	**$62,756**	**12.8**

Notes:

[a] Represents the total or overall percentage for the four-county study area.

[b] Calculated as the percent of households with household income below poverty.

[c] Data reported for the tribal census block groups that comprise the Uintah and Ouray Reservation and off-reservation trust lands.

Source: U.S. Census Bureau 2017

To identify locations in the study area that have a higher percent of low-income households, OEA prepared a gradient map that shows the percent of households with household income below poverty in each census block group in the study area (Figure 3.14-4). Where census block group boundaries extend onto federal, state, or Tribal trust land, OEA clipped the mapped census data to the private land boundary as was done for the presentation of the percentage of minority populations. Figure 3.14-4 shows that census block groups with higher percentages of low-income households are located east of Price in Carbon County, in the vicinity of Myton in Duchesne County, and northeast of Myton in Uintah County.

As noted above, OEA defined minority and low-income populations as census block groups where the percentage of the population that is minority or low-income is either greater than 50 percent or more than 10 percentage points higher than the overall percentage in the four-county study area. Within the four-county study area, 12.1 percent of households are low-income. Therefore, OEA identified a census block as a low-income population if more than 22.1 percent of households have an income at or below the poverty threshold. Figure 3.14-5 shows the census block groups in the vicinity of the Action Alternatives where OEA identified a low-income population.

Figure 3.14-6 combines the layers for minority populations and low-income populations to show where minority and/or low-income populations are present in the study area. The merged layer showing where OEA identified minority and/or low-income populations is the base layer for review of environmental justice impacts.

Figure 3.14-4. Percent Low-Income Households by Census Block Group

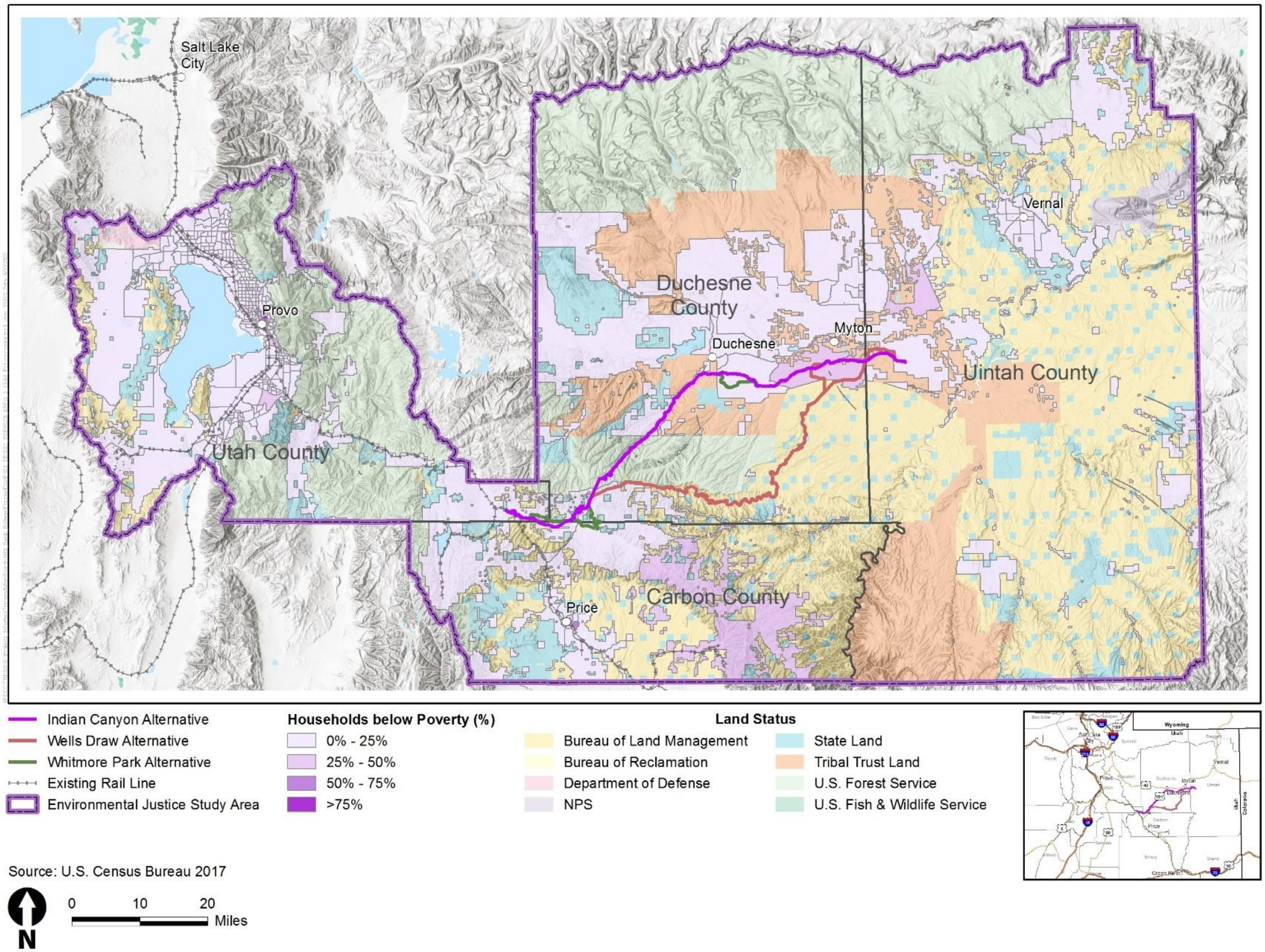


Figure 3.14-5. Low-Income Population Present

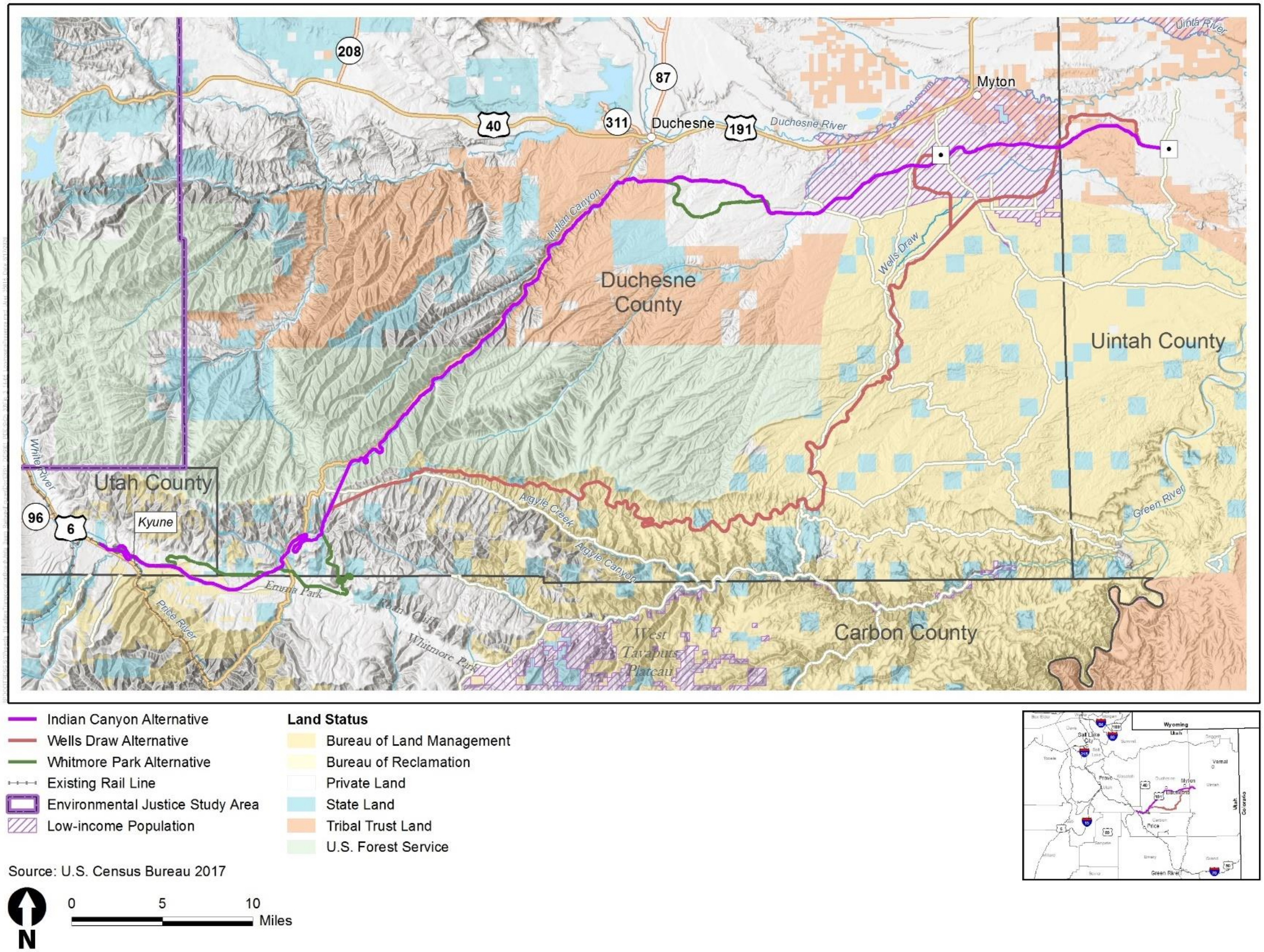
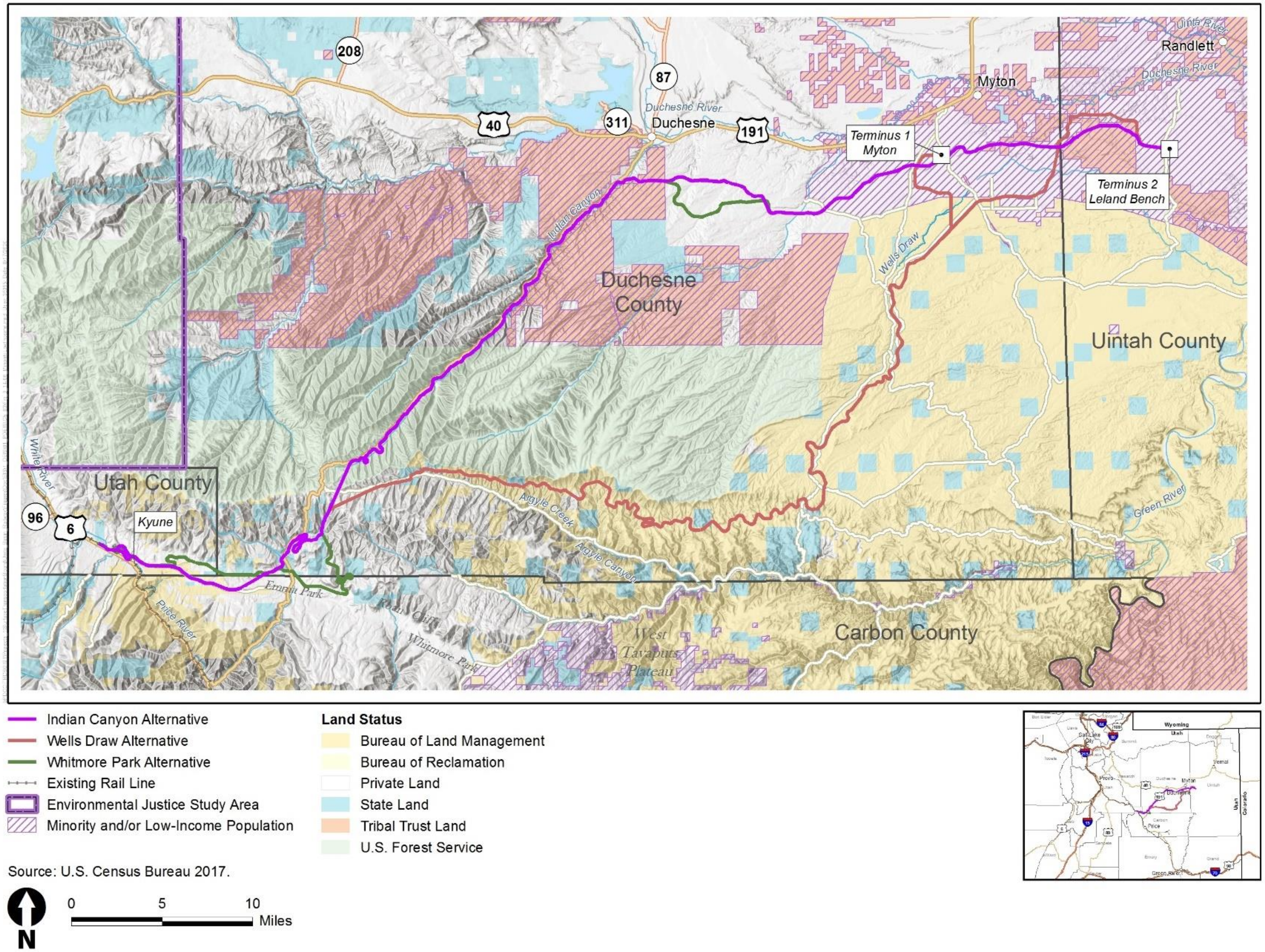


Figure 3.14-6. Minority and/or Low-Income Population Present



3.14.3 Environmental Consequences

Construction and operation of the proposed rail line could result in environmental justice impacts. This subsection first presents the potential impacts that would be the same for all three Action Alternatives and then compares the potential impacts that would be different across the Action Alternatives. For comparison purposes, this subsection also discusses environmental justice under the No-Action Alternative.

3.14.3.1 Impacts Common to All Action Alternatives

This subsection discusses potential environmental justice impacts that would be the same across the three Action Alternatives.

Construction

Water Resources

Due to the large number of surface water crossings and the large area of potentially affected wetlands, OEA concludes that unavoidable impacts on surface waters and wetlands—including and in particular, the loss of wetland habitat and permanent changes to surface water hydrology from crossing structures and stream realignments—would be locally significant for any of the Action Alternatives. Stream realignments and crossing structures, including bridges and culverts, would be distributed across the full extent of all the Action Alternative alignments and would not disproportionately affect minority populations or low-income populations. As discussed in Section 3.3, *Water Resources,* the Coalition has proposed eight voluntary mitigation measures to address impacts on water resources, and OEA is recommending additional mitigation measures to address those impacts. Those mitigation measures include a commitment from the Coalition to obtain a Clean Water Act Section 404 permit authorization from the Corps prior to initiating construction activities in wetlands and other jurisdictional waters of the United States, and to comply with all Section 404 permit conditions (VM-25). The Coalition also commits to minimizing impacts on wetlands to the extent practicable in the final design of the selected alternative (VM-27). If the Coalition's voluntary mitigation measures and OEA's additional recommended mitigation measures are implemented, OEA concludes that impacts on water resources would not result in disproportionately high and adverse impacts on minority or low-income populations under any of the Action Alternatives.

Air Quality

Minority and low-income populations are present in the Uinta Basin Ozone Nonattainment Area~~Denver Metro/North Front Range air quality nonattainment area that~~, which includes the eastern ends of all the Action Alternatives. Construction of any of the Action Alternatives would emit air pollutants and greenhouse gases. Construction equipment, trucks, and workers' personal vehicles used to commute to and from construction areas would emit diesel and gasoline exhaust, which contain various air pollutants, including carbon monoxide, nitrogen oxides, and particulate matter. Exhaust emissions and other air emissions from construction activities would be temporary and, at any given time, would occur only where construction is occurring or along roads traveled by construction vehicles, which are not residential areas. As discussed in Section 3.7, *Air Quality and Greenhouse Gases*, the Coalition has proposed two mitigation measures to minimize air quality impacts during construction, including a commitment to consult with the Ute Indian Tribe in implementing appropriate fugitive dust controls (VM-23). OEA is also recommending additional mitigation measures to minimize impacts related to air quality and greenhouse gases. If those recommended mitigation measures are implemented, OEA concludes that air emissions from construction activities would not significantly affect air quality and therefore would not result in disproportionately high and adverse impacts on minority or low-income populations or American Indian tribes.

Cultural Resources

Construction of any of the Action Alternatives would result in impacts on cultural resources. Pursuant to Section 106 of the National Historic Preservation Act, OEA is adopting a phased approach for identifying historic properties and assessing effects. OEA ~~is developing~~developed a PA in consultation with the Utah SHPO, the Ute Indian Tribe through its Cultural Rights and Protection Department, and other Section 106 consulting parties that ~~will~~ sets forth how identification of historic properties and the assessment of effects would proceed if the Board were to authorize an Action Alternative, and how adverse effects on historic properties would be resolved. The PA was executed on March 25, 2021, and is appended to the Final EIS as Appendix O, *Programmatic Agreement*. Based on the preliminary analysis conducted to date, OEA concludes that the three Action Alternatives would affect similar numbers of identified cultural resources. Because the APE has not been surveyed comprehensively, OEA concludes that additional cultural resources, such as previously unidentified archeological sites and rock imagery sites, are also likely to be present in the APE. It is likely that many of these unidentified cultural resources are of cultural significance to the Ute Indian Tribe and that adverse effects to those resources would, in the absence of mitigation, be a disproportionately high and adverse impact on the tribe.

The PA that OEA ~~is~~ develop~~ing~~ed in consultation with the Ute Indian Tribe, the SHPO, and other Section 106 consulting parties ~~will~~ establishes the process for avoiding, minimizing, or mitigating adverse effects to cultural resources in a manner that is consistent with the practices and preferences of the Ute Indian Tribe. The Coalition has committed to comply with the terms of the PA ~~being~~ developed through Section 106 consultation (VM-43) and ~~OEA intends to invite the Coalition to become an invited signatory to the~~has signed the PA as an invited signatory. Because implementation of the PA would resolve adverse effects on cultural resources of importance to the Ute Indian Tribe, OEA has concluded that impacts on cultural resources could disproportionally affect the tribe but that the effect would not be high and adverse.

3.14.3.2 Impact Comparison between Action Alternatives

This subsection compares the potential environmental justice impacts between the three Action Alternatives.

Construction

Biological Resources

As discussed in Section 3.4, *Biological Resources*, construction of any of the Action Alternatives would temporarily disturb and permanently remove suitable habitat for Pariette cactus (*Sclerocactus brevispinus*) and Uinta Basin hookless cactus (*Sclerocactus wetlandicus*) on the eastern ends of each of the Action Alternatives. The amount of temporary disturbance and permanent removal of suitable habitat would be greatest under the Wells Draw Alternative. The Indian Canyon

Alternative and Whitmore Park Alternative could also temporarily disturb or permanently remove habitat in a Core 2 Conservation Area[1] on Tribal trust land. Pariette cactus and Uinta Basin hookless cactus are endemic to the study area and are culturally important to the Ute Indian Tribe. Because of this importance, OEA believes that adverse effects on Pariette cactus and Uinta Basin hookless cactus would be a disproportionately high and adverse effect for the Ute Indian Tribe. To address impacts on the Pariette cactus and Uinta Basin hookless cactus, OEA is consulting with the U.S. Fish and Wildlife Service to develop appropriate mitigation for those species, pursuant to Section 7 of the Endangered Species Act. In addition, OEA is also recommending mitigation (EJ-MM-1) requiring the Coalition consult with the Ute Indian Tribe regarding impacts on Pariette cactus and Uinta Basin hookless cactus and abide by the requirements of the tribe's *Sclerocactus* Management Plan for project-related activities on Tribal trust land. These activities may include undertaking soil assessments, complying with mitigation measures to be developed in consultation with the tribe, and contributing to a conservation mitigation fund, as appropriate.

Big game species in the study area (bighorn sheep, elk, moose, mule deer, and pronghorn antelope) all have year-long substantial and/or crucial habitat[2] in the rail corridor. Construction of any of the Action Alternatives would temporarily disturb or permanently remove big game habitat in the project footprint[3] and could potentially disrupt ~~migration~~ movement corridors. Temporary disturbance and permanent removal of big game habitat would be greatest under the Wells Draw Alternative, followed by the Whitmore Park Alternative, and Indian Canyon Alternative. The Ute Indian Tribe has strong hunting traditions that are still practiced today and that are important to tribal members' way of life. Impacts on big game from habitat disturbance~~, and~~ noise, and disruption of movement corridors could diminish hunting opportunities and adversely affect tribal hunting traditions. Because this effect would be experienced only by tribal members, OEA concludes that it would represent a disproportionate effect for the Ute Indian Tribe. OEA has concluded, however that the effect would not be high and adverse because large areas of suitable habitat, particularly crucial habitat, around the Action Alternatives would be sufficient to support populations and allow for ~~wildlife~~ movement and dispersal, as discussed in Section 3.4, *Biological Resources*. To address the potential disruption of big game movement corridors along the proposed rail line~~In its voluntary mitigation~~, the Coalition has committed to working with UDWR, the Ute Indian Tribe, and adjacent landowners to define areas of the right-of-way that can be left without fences to maintain big game migration corridors (VM-40), which would reduce impacts on big game during operations. In addition, OEA is recommending mitigation requiring the Coalition develop a big game movement

[1] A *Core 2 Conservation Area* for cactus is an area that contains the densest concentrations of cactus with a 1,000-meter buffer using a kernel density analysis.

[2] Crucial habitat is defined as habitat on which the local population of a big game species depends for survival because there are no alternate ranges or habitats available. Substantial-value habitat is defined as habitat that is used but is not considered crucial for population survival.

[3] The *rail line footprint* includes the area of the railbed, as well as the full width of the area cleared and cut or filled. The rail line footprint would also include other physical structures installed as part of the proposed rail line, such as fence lines, communications towers, siding tracks, relocated roads, and power distribution lines. The rail line footprint is the area where rail line operations and maintenance would occur. The area would be permanently disturbed. The *temporary footprint* is the area that could be temporarily disturbed during construction, including areas for temporary material laydown, staging, and logistics. Disturbed areas in the temporary footprint would be reclaimed and revegetated following construction. The *project footprint* is the combined area of the rail line footprint and temporary footprint, both of which would be disturbed during construction, comprising where construction and operations of the proposed rail line would occur.

corridor crossing plan in consultation with the Ute Indian Tribe, UDWR, OEA, and appropriate land management agencies (BIO-MM-18).

Land Use

As described in Section 3.11, *Land Use and Recreation*, construction of the proposed rail line could result in high and adverse impacts on land use, including the permanent loss of irrigated cropland and grazing land, and the severance of properties. The locations of identified ranching and farming operations relative to minority populations, low-income populations, and American Indian tribes are shown on Figure 3.14-7. The ranching and farming operations that would be most affected are predominantly located in Indian Canyon or on the western end of the Action Alternatives, with the Whitmore Park Alternative having the greatest effect, followed by the Indian Canyon Alternative, and the Wells Draw Alternative. As discussed in Section 3.11, *Land Use and Recreation*, OEA is recommending additional mitigation measures related to land use, including a measure requiring the Coalition to implement the requirements of the Ute Indian Tribe imposed through negotiations for their consent to a grant of right-of-way across ~~Uintah and Ouray Indian Reservation~~Tribal trust lands (LUR-MM-2). These measures are in addition to the five voluntary mitigation measures the Coalition has committed to implementing to reduce impacts on land use (VM-44, VM-45, VM-46, VM-47, VM-48). If those mitigation measures are implemented, and because the greatest effects on ranching and farming operations would occur outside areas identified as containing minority populations, low-income populations or American Indian tribes, OEA has determined that land use changes related to permanent loss of irrigated cropland and grazing land, and the severance of properties would not cause disproportionately high and adverse effects on minority populations, low-income populations, or American Indian tribes.

Socioeconomics

As discussed previously, construction of the proposed rail line would displace or adversely affect current land uses, including ranching and farming operations. Other socioeconomic impacts would include changes in the demand for housing and public services resulting from the influx of construction workers from areas outside of Carbon, Duchesne, and Uintah Counties. As discussed in Section 3.13, *Socioeconomics*, OEA estimates that up to 938 nonlocal construction workers could migrate into communities that are within commuting distance to the Action Alternatives, including the communities of Helper, Price, Wellington, Myton, Roosevelt, Duchesne, Ballard, Vernal, and Naples. This influx of construction workers would be temporary and would not be large enough to significantly affect housing availability or demand for public services, such as law enforcement, fire protection, and emergency health services. Therefore, impacts related to workforce demand for housing and public services would not be high and adverse.

Through government-to-government consultation with the Ute Indian Tribe, OEA learned that the tribe is concerned about quality of life impacts on tribal communities that could result from increased truck traffic, along with potential increases in noise, vehicle exhaust, fugitive dust, and accidents involving trucks and passenger vehicles. In addition, the tribe is concerned that increased truck traffic would result in road damage and a need for increased road maintenance. OEA's analysis for this ~~Draft~~ EIS did not identify high and adverse impacts from increased truck traffic during construction of the proposed rail line. Section 3.15, *Cumulative Impacts*, discusses potential impacts from increased truck traffic and other impacts related to potential future oil and gas development in the Basin.

As discussed in Section 3-13, *Socioeconomics*, OEA is recommending mitigation measures to ensure that adverse socioeconomic impacts would be minimized, including measures requiring the Coalition to compensate landowners for direct loss of agricultural land and indirect loss of agricultural land from severance and to relocate, replace, or provide compensation for capital improvements that would be displaced by the proposed rail line, consistent with applicable state law (SOCIO-MM-1). In addition, the Coalition has committed to numerous voluntary mitigation measures to further reduce construction-related impacts on quality of life in nearby tribal communities. These measures include commitments to control fugitive dust (VM-23), maintain construction equipment to limit construction-related air pollutant emissions (VM-24) and control noise (VM-54), and appoint tribal and community liaisons to consult with affected communities to address concerns regarding construction activities (VM-49, VM-50).

Socioeconomic benefits related to direct, indirect, and induced construction employment and labor income would extend to tribal members that reside in the four-county study area and to American Indian-owned businesses that would benefit from direct, indirect, and induced spending. Construction of the Indian Canyon Alternative or the Whitmore Park Alternative would also generate revenue for the Ute Indian Tribe through payments for rights-of-way across Tribal trust lands. Other revenue streams that would directly benefit the tribe include taxes and business fees that are payable to the tribe.

Construction-related impacts on quality of life would 1) be reduced through OEA's recommended mitigation measures and the Coalition's voluntary mitigation; 2) occur along the entire length of the Action Alternatives and would not be disproportionately borne by minority or low-income populations or American Indian tribes; and 3) occur within the context of offsetting socioeconomic benefits related to construction employment and expenditures. After considering the adverse impacts, voluntary mitigation, and offsetting benefits, OEA has concluded that socioeconomic impacts on minority and low-income populations and American Indian tribes would not be disproportionately high and adverse.

Operations

Vehicle Safety and Delay

The installation of new at-grade road crossings for operation of any of the Action Alternatives would result in impacts on vehicle safety and vehicle delay. Across the three Action Alternatives, the Wells Draw Alternative would involve constructing the most at-grade road crossings and would result in the greatest potential for vehicle accidents and vehicle delays at those new crossings. With implementation of the mitigation set out in Chapter 4, *Mitigation*, OEA concludes that impacts on vehicle safety and delay would not be high and adverse. In addition, as shown on Figure 3.14-7, the Coalition would construct at-grade crossings across the full extent of the Action Alternatives and those crossings would not be concentrated in areas where minority and low-income populations are located. Therefore, OEA concludes that impacts on vehicle safety and delay would not result in disproportionately high and adverse effects on minority and low-income populations or American Indian tribes. The Coalition has proposed voluntary mitigation to address vehicle safety and delay, including a commitment to consult with and obtain approval from the Ute Indian Tribe and appropriate land management agencies for the design and implementation of at-grade road crossings (VM-2). As discussed in Section 3.1, *Vehicle Safety and Delay*, OEA is also recommending additional mitigation measures to ensure that impacts on vehicle safety and delay would be minimized.

Rail Operations Safety

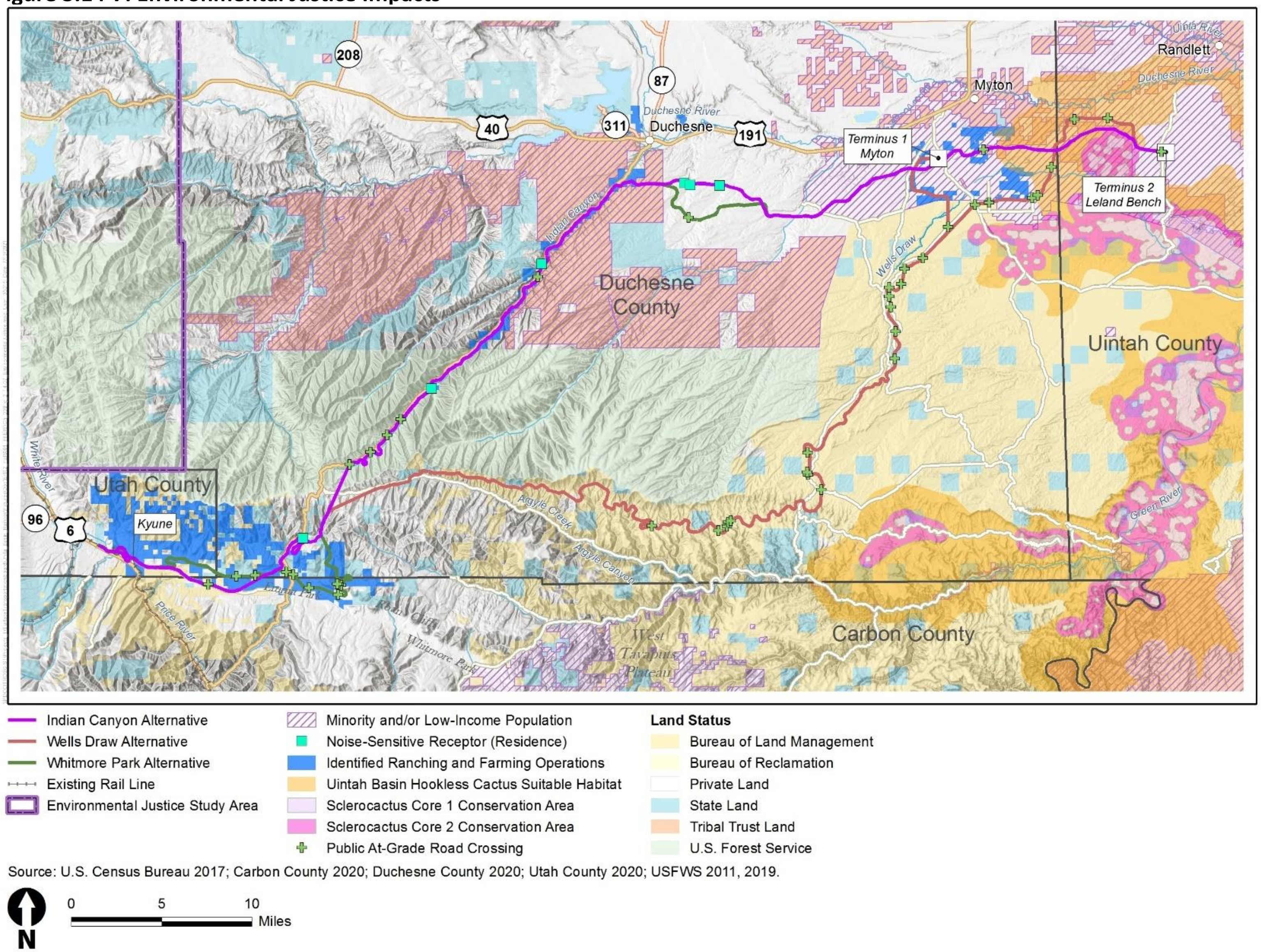
Operation of any of the Action Alternatives would involve a risk of potential rail-related accidents. Across the three Action Alternatives, the Wells Draw Alternative would have the highest probability of experiencing an accident because of its longer length relative to the other Action Alternatives. As discussed in Section 3.2, *Rail Operations Safety*, the Coalition has proposed voluntary mitigation measures related to rail operations safety (VM-1, VM-8, VM-11, VM-15), and has also committed to consult with tribal, federal, state, and local governments to develop a spill prevention, control, and countermeasures plan prior to construction (VM-7). As discussed in Section 3.2, *Rail Operations Safety*, OEA is also recommending additional mitigation measures to ensure that impacts on rail operations safety would be minimized. If ~~the Coalition's voluntary~~ those mitigation measures are implemented, OEA concludes that rail operations safety impacts would not be high and adverse.

OEA estimated the risk of rail-related accidents and the likelihood of crude oil spills based on a number of variables that are constant across the length of the rail line, such as accident rate by track type or track class, the number of trains that would move on the rail line, the types of rail cars, and number of rail cars per train. The risk of rail accidents would be distributed across the entire length of the proposed rail line and would not be higher in areas with minority populations, low-income populations, and American Indian tribes. Because the risk of rail-related accidents is not high and adverse and would not be disproportionately borne by minority or low-income populations or American Indian tribes, OEA concludes that impacts related to rail operations safety would not result in disproportionately high and adverse effects on minority and low-income populations or American Indian tribes.

Noise

During rail operations, wayside noise under the high traffic scenario could cause noise levels to exceed OEA's thresholds of an increase of 3 A-weighted decibels and a 65 day-night average noise level at up to six residences under the Indian Canyon Alternative, up to two residences under the Whitmore Park Alternative, and up to one residence under the Wells Draw Alternative. Because noise levels would exceed OEA's noise thresholds, this effect would be high and adverse. None of the affected residences are located in areas with minority populations, low-income populations, or American Indian tribes (Figure 3.14-7). Therefore, OEA has determined that wayside noise during operations would not result in disproportionately high and adverse effects on minority populations, low-income populations, or American Indian tribes. The Coalition has proposed voluntary mitigation for noise impacts, including a commitment to comply with Federal Railroad Administration regulations establishing decibel limits for train operations, in consultation with the Ute Indian Tribe (VM-53). As discussed in Section 3.6, *Noise and Vibration*, OEA is recommending additional mitigation (NV-MM-3) to address noise and vibration impacts, including requirements for the Coalition to employ reasonable and feasible noise mitigation at residences that would experience adverse noise impacts.

Figure 3.14-7. Environmental Justice Impacts



Air Quality

During rail operations, the primary source of air emissions would be locomotives operating on the proposed rail line. OEA's analysis of air emissions from rail operations concluded that rail operations would not result in significant air quality impacts. As discussed in Section 3.7, *Air Quality and Greenhouse Gases*, OEA conducted air quality modelling for particulate matter and NO_2 at three locations along the Action Alternatives, including at a location south of Myton, which is an area that OEA identified as having minority populations, low-income populations, and American Indian tribal members. OEA's analysis found that none of the Action Alternatives would result in an exceedance of the NAAQS for particulate matter, NO_2, or other pollutants at any location along the proposed rail line. Residences near the proposed rail line could experience air pollutant concentrations that would be elevated above background concentrations, but OEA does not expect that any residences or other sensitive receptors would experience air pollutant concentrations that would exceed the NAAQS. ~~OEA's analysis found that the maximum 1-hour NO_2 concentration could exceed the NAAQS) at the location south of Myton under the high rail traffic scenario[4] for the Indian Canyon Alternative and the Whitmore Park Alternative. However, OEA concluded that an exceedance of the NAAQS at this location would be unlikely because it would only occur under unusual operational and meteorological conditions and only if rail traffic on the proposed rail line were at or near the maximum projected level. If it occurred, the exceedance would be located within or adjacent to the rail right-of-way and would not affect any residences, other sensitive receptors, or areas where members of the public are likely to be present. OEA did not identify any other locations along the Action Alternatives where emissions from rail operations could potentially cause the NAAQS for NO_2 or other criteria pollutants to be exceeded.~~ Therefore, OEA has determined that air quality impacts from rail operations would not be high and adverse impacts that could disproportionately affect minority populations, low-income populations, or American Indian tribal members.

Socioeconomics

Operation of the proposed rail line would support regional employment, generate labor income, and contribute to the regional economy. The contribution of rail operations to the regional economy would be much less than the contribution from construction, but these impacts would be permanent rather than temporary. Similarly, impacts related to increased workforce demand for housing and public services during operations would be less than during construction and would not be high and adverse. Operations-related quality-of-life impacts would also be generally reduced compared to construction-related impacts. The Coalition has proposed voluntary mitigation to address quality-of-life impacts, including commitments to appoint liaisons to consult with the Ute Indian Tribe and other affected communities to develop cooperative solutions to concerns regarding construction activities and rail operations (VM-49, VM-50).

As a producer of crude oil in the Basin, the Ute Indian Tribe would benefit economically from access to a new mode of transportation for crude oil that would offer potentially cheaper rates than trucking and potentially greater access to markets for crude oil across the United States. The Coalition has indicated that the Ute Indian Tribe may become an equity partner in the proposed rail

~~[4] The Coalition estimates that rail traffic on the proposed rail line could range from as few as 3.68 trains per day, on average (the low rail traffic scenario), to as many as 10.52 trains per day, on average (the high rail traffic scenario), depending on future market conditions, including future demand for crude oil produced in the Basin.~~

line. If this were to occur, the tribe would also receive income generated by the operation of the rail line.

Based on the potential adverse socioeconomic impacts and potentially offsetting socioeconomic benefits, OEA has concluded that socioeconomic impacts on minority and low-income populations and American Indian tribes during operations would not be disproportionately high and adverse. Section 3.15, *Cumulative Impacts* discusses potential cumulative socioeconomic effects on minority and low-income populations and American Indian tribes related to potential future oil and gas development and the operation of new rail terminals near Myton and Leland Bench.

3.14.3.3 No-Action Alternative

Under the No-Action Alternative, the Coalition would not construct and operate the proposed rail line and there would be no environmental justice impacts.

3.14.4 Mitigation and Unavoidable Environmental Effects

Any of the Action Alternatives could result in environmental justice impacts. Based on consultation with the Ute Indian Tribe, OEA considered impacts related to noise, air quality, water resources, cultural resources, land use, vehicle safety and delay, rail operations safety, socioeconomics, and big game and concluded that those impacts would not result in disproportionately high and adverse impacts on minority populations, low-income populations, or American Indian tribal members. OEA concluded that construction impacts on the Pariette cactus and Uinta Basin hookless cactus would result in disproportionately high and adverse impacts for the Ute Indian Tribe because those plant species are culturally important to the tribe. In addition to the mitigation measures discussed in the preceding sections of this chapter and the voluntary mitigation measures that the Coalition has proposed, OEA is recommending an additional mitigation measure requiring the Coalition consult with the Ute Indian Tribe regarding impacts on the Pariette cactus and Uinta Basin hookless cactus and to abide by the tribe's requirements for the management of those species. Additionally, OEA is recommending a mitigation measure requiring the Coalition consult with the Ute Indian Tribe regarding final design of the rail line, including the locations and designs of rail-related features, to ensure that impacts on tribal members and land and resources under the tribe's jurisdiction are minimized.

3.15 Cumulative Impacts

This section describes the cumulative impacts that could result from the addition of impacts from the proposed rail line to impacts of other past, present, and reasonably foreseeable future projects and actions. The subsections that follow describe the cumulative impacts study area; the methods used to analyze cumulative impacts; past, present, and reasonably foreseeable future actions that could contribute to cumulative effects; and cumulative impacts by resource topic.

3.15.1 Analysis Methods

OEA followed the guidelines outlined in the CEQ handbook titled *Considering Cumulative Effects under the National Environmental Policy Act* (CEQ 1997) to evaluate whether cumulative impacts could result from adding impacts of constructing and operating the proposed rail line to impacts of past, present, and reasonably foreseeable future projects. Based on the CEQ guidance, OEA undertook the following steps to evaluate the cumulative impacts from construction and operation of the proposed rail line.

- OEA defined the geographic and temporal scope of the analysis.
- OEA relied on information from other agencies and organizations about reasonably foreseeable projects and actions that are beyond the scope of the Board's authority.
- OEA considered impacts of other past, present, and reasonably foreseeable future actions that relate to the geographic and temporal scope of the proposed rail line.
- OEA reached conclusions based on the best available data at the time of the analysis.

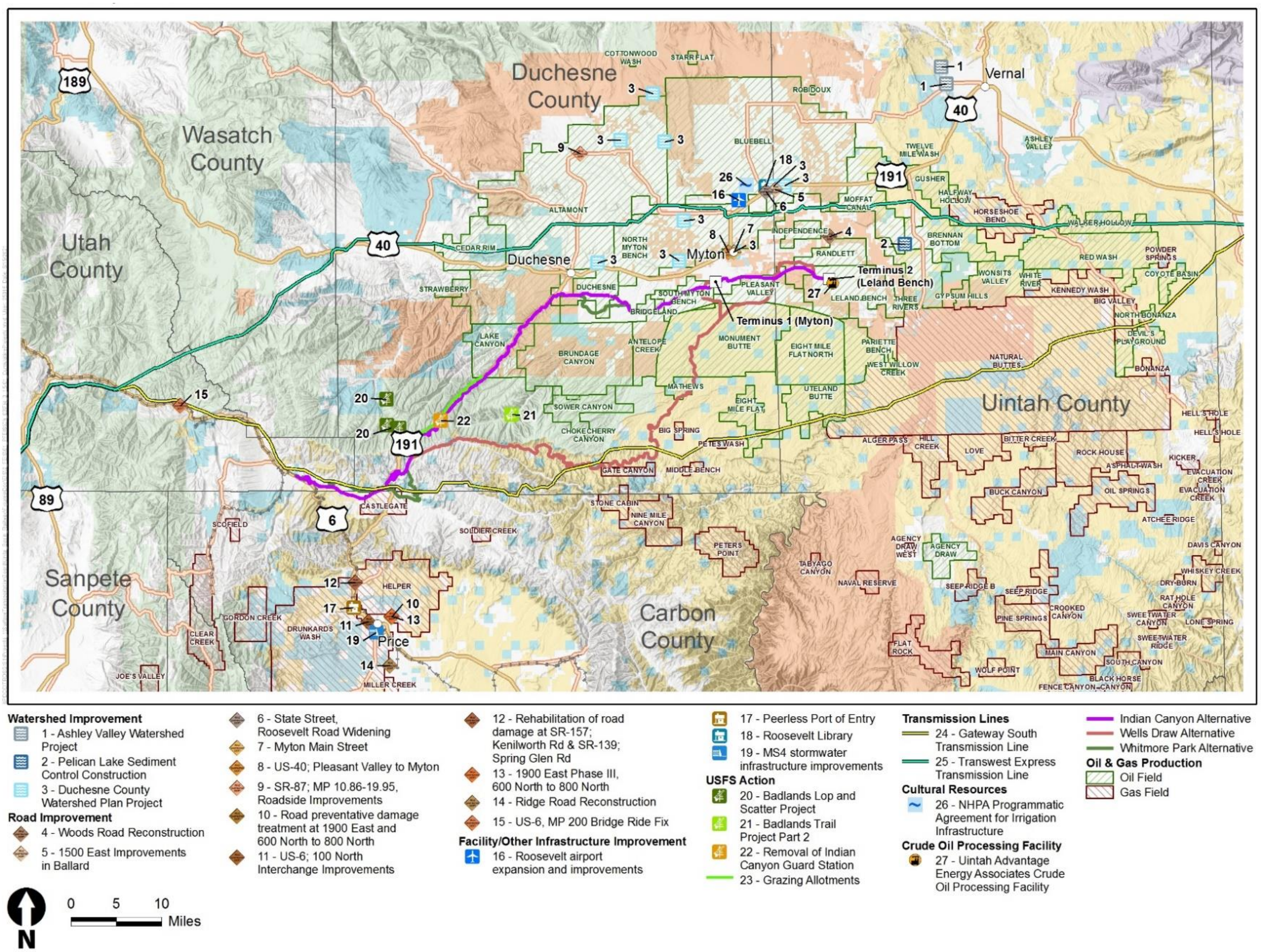
3.15.2 Cumulative Impacts Study Area

The cumulative impacts study area includes the areas identified for oil and gas development as shown on Figure 3.15-1. Consistent with past OEA practice, OEA used a 20-year time period for the analysis, extending from 2020 to 2040. OEA defined the cumulative impacts study area for each resource that would be affected by construction and operation of the proposed rail line, as described in Section 3.15.5, *Cumulative Impacts by Resource*. Some cumulative impacts study areas are identical to the resource study areas described for the analysis of direct and indirect effects in Section 3.1, *Vehicle Safety Delay*, through Section 3.13, *Socioeconomics,* of this ~~Draft~~ EIS. Other resources have a larger cumulative impacts study area.

3.15.3 Affected Environment

The exact location of the proposed rail line would depend on which Action Alternative, if any, the Board authorizes. Any of the Action Alternatives would have the same two terminus points in the Basin near Myton and Leland Bench, Utah, and the same connection with the existing UP rail line near Kyune, Utah. Figure 3.15-1 shows the Action Alternatives along with the other relevant projects included in this cumulative impacts analysis. The overall geographic region is primarily rural and sparsely populated. Predominant land uses include oil and gas production, ranching and farming, and rural residential development on subdivided ranch land.

Figure 3.15-1. Past, Present, and Reasonably Foreseeable Future Actions



The proposed rail line is located primarily within the Colorado Plateau ecoregion, composed of Semiarid Benchlands and Canyonlands, Escarpments, and the Uinta Basin Floor subregions. The region provides habitat for special-status species and big game wildlife species such as elk (*Cervus canadensis*), mule deer (*Odocoileus hemionus*), pronghorn antelope (*Antilocapra Americana*), Western moose (*Alces andersoni*), and bighorn sheep (*Ovis canadensis*). Cultural resources include homestead cabins and nationally significant Fremont, Ute, and Archaic rock art and structures. The study area includes land managed by the Forest Service, BLM, state of Utah, and Ute Indian Tribe. Several BLM special designations are also located in this region, including Areas of Critical Environmental Concern (ACECs), Lands with Wilderness Characteristics, and Special Recreation Management Areas. Forest Service lands include Inventoried Roadless Areas (IRAs). Public lands in the study area support a variety of recreational activities including hunting, fishing, hiking, picnicking, bicycling, camping, horseback riding, nature viewing, OHV riding, scenic driving, and winter sports.

3.15.4 Other Past, Present, and Reasonably Foreseeable Future Actions

3.15.4.1 Oil and Gas Development

Oil and Gas Production

Oil and gas refer generally to fluid petroleum products that are derived from organic material deposited millions of years ago and now lie underground. Over time, heat and pressure transformed those raw materials into energy-rich hydrocarbon liquids and gases. Oil and gas are produced by drilling wells into the formations that contain oil and gas resources. After well sites are selected, they are prepared for drilling by construction of a well pad and supporting infrastructure. Drilling involves a drill rig, associated equipment such as pumps, and truck trips. After the wells are drilled, they are completed using a variety of techniques depending on the characteristics of the formation, such as hydraulic fracturing to create fractures in the rock. Hydraulic fracturing allows fluids to more freely flow from the formation into the well, where the fluids flow up the well to the surface. Oil, gas, and/or water produced by a well are separated at the well site or are transported to nearby facilities for separation. OEA anticipates that, if the Coalition were to construct and operate the proposed rail line, some of the crude oil produced in the Basin would be trucked from wells to rail terminals near Myton and Leland Bench for loading into trains.

The Coalition estimates that rail traffic on the proposed rail line would range from 3.68 trains per day (low rail traffic scenario) and 10.52 trains per day (high rail traffic scenario), on average, depending on future market conditions. The trains would primarily transport crude oil and would have the capacity to ship between approximately 130,000 and 350,000 barrels of oil each day, on average, out of the Basin. The actual volume of oil transported on the proposed rail line and the number of trains would depend on various independent variables and factors including general domestic and global economic conditions, commodity pricing, and the strategic and capital investment decisions of oil producers and their customers (Coalition Response to IR#2).

For the analysis of potential cumulative impacts, OEA developed two potential scenarios for future oil and gas development in the Basin that correspond to the Coalition's estimated range of rail traffic. Under the low oil production scenario, total oil production in the Basin would increase by an average of 130,000 barrels per day compared to historical production levels. Under the high oil production scenario, total oil production in the Basin would increase by an average of 350,000 barrels per day. Historical production has varied substantially from year to year. Where the analysis required quantification of historical production, OEA used 90,000 barrels per day as a conservative baseline level of production, which is slightly lower than the maximum historical production from the Basin of 94,000 barrels per day. Although OEA expects that the proposed rail line would divert some oil that in the past has been trucked to terminals outside the Basin to rail transportation, OEA assumed, for the purposes of the cumulative impacts analysis, that all oil transported on the proposed rail line would come from new production. This is a conservative assumption because it may overstate total future oil production in the Basin and, therefore, potential cumulative impacts.

OEA assumed that future oil and gas development, including well drilling and operation along with construction and operation of related facilities, such as pipelines, would occur throughout the Basin in the fields shown in Figure 3.15-1. The exact locations of new oil and gas development would depend on many factors, including domestic and global demand, as well as future decisions by private, state, tribal, and federal owners of mineral rights in the Basin. The Monument Butte Oil and Gas Development Project, which proposes to develop up to 5,750 oil and gas wells in an area located about 6 miles south of Myton, Utah, is an example of a proposed oil and gas development project in the region (BLM 2016). Crude oil produced by the Monument Butte project wells potentially could be transported on the proposed rail line.

Well Development

To assess the impacts of increased oil and gas development as part of the cumulative analysis, OEA estimated the number of oil wells that would need to be constructed and operated to satisfy the expected increased oil production volume scenarios of 130,000 or 350,000 barrels per day, respectively. Based on consultation with UGS regarding current drilling technologies and methods in the Basin, OEA estimated that new horizontal wells would produce an average 366 barrels of crude oil per day during the first year of production (Vanden Berg pers. comm.). OEA reviewed data about vertical wells drilled between 2014 and 2018 from the Utah Division of Oil, Gas, and Mineral (UDOGM) to estimate an average initial production rate of 66 barrels of crude oil per day for new vertical wells. OEA used historical well data from UDOGM’s completion and production databases to create a 15-year oil production decline curve for horizontal and vertical wells.[1] Based on consultation with UGS, OEA assumed that 20 percent of the new wells drilled each year would be vertical wells and 80 percent would be horizontal wells (Vanden Berg pers. comm.; UGS 2019).

OEA used the initial production rates, decline curves, and estimated ratio of horizontal wells to vertical wells to calculate the annual production rate of an average well in each year of its lifetime and the number of wells that would need to be constructed each year to meet the oil production volume expected in the respective scenarios. For simplicity, OEA assumed it would take one year to

[1] A duration of 15 years was selected to balance the two competing analysis interests: (1) a robust decline curve and (2) an accurate estimate of well production volumes. A longer duration captures a more complete decline curve, including the later period when a well’s annual production begins to plateau from year to year. On the other hand, a shorter duration captures the production volumes of wells that were more recently drilled in the Basin. Compared to wells drilled in earlier years, these wells are more likely to use the same technologies and drilling processes of future wells analyzed under the cumulative analysis and are therefore more representative. Balancing the tradeoffs of optimizing interests (1) and (2), OEA selected a 15-year period of well volume data (i.e., 2004 to 2019).

construct all the wells before they would start producing oil at their expected annual rate. In the second year of the project (i.e., the first year of production), the wells constructed in the first year would be operating at the production volume needed to satisfy each of the two oil production scenarios (i.e., 130,000 or 350,000 barrels per day).

By the third year of the project (i.e., the second year of production) the wells constructed in the first year would not produce enough to satisfy the production scenarios because the average well production volume decreases over a well's lifetime. Therefore, additional wells would need to be constructed in the second year of the project to supplement the reduced production from the wells constructed in the first year. In the third year, the old (first year) and new (second year) wells combined would produce the volume needed to satisfy the production scenarios, and so forth. As the decline curve starts to plateau in later years, fewer and fewer wells would need to be constructed each year. OEA chose year 15 of the analysis to represent steady state development, as this was the analysis year when the number of wells constructed per year was closest to the number of new producing wells in that year (i.e., wells that were constructed in the 14th year). Production from an oil well will steadily decline. By year 15, OEA estimated that an average horizontal well could produce approximately 40 barrels per day and an average vertical well could produce approximately 7 barrels per day.

Based on this approach, steady state annual development under the low oil production scenario requires construction of approximately 80 wells, plus production from 83 wells for each year of production (i.e., under the steady state assumption there are 83 wells of each "vintage" steady state year). Therefore, the steady state total number of wells in the field in any year is 83 wells times 15 years, or 1,245 wells. Under the high oil production scenario, there would be 217 wells constructed and 222 wells operating for each steady state year of production. Therefore, the steady state total number of wells in the field in any year is 222 wells times 15 years, or 3,330 wells. As an example, Table 3.15-1 and Table 3.15-2 display the estimated annual well development for the low oil production scenario and high oil production scenario, respectively.

Table 3.15-1. Estimated Well Development for the Low Oil Production Scenario

Year	New Wells in Production	Wells in Construction	Total Wells in Production	Oil Produced (barrels/day)[a]
1	0	425	0	>=130,000
2	425	184	425	>=130,000
3	184	148	609	>=130,000
4	148	130	757	>=130,000
15 (steady state)	83	80	1,245[b]	>=130,000

Notes:

[a] The number of wells in production and construction in any given year is based on satisfying the condition that at least 130,000 barrels of oil be produced per day.

[b] Steady state development represents the average year of production. For the steady state year, total wells in production are equal to new wells in production (83) multiplied by the number of years from initial development (15).

Sources: UDOGM ~~Mining~~ 2020; UGS 2019; Vanden Berg pers. comm.

Table 3.15-2. Estimated Well Development for the High Oil Production Scenario

Year	New Wells in Production	Wells in Construction	Total Wells in Production	Oil Produced (barrels/day)[a]
1	0	1,144	0	>=350,000
2	1,144	496	1,144	>=350,000
3	496	398	1,640	>=350,000
4	398	349	2,038	>=350,000
15 (steady state)	222	217	3,330[b]	>=350,000

Notes:

[a] The number of wells in production and construction in any given year is based on satisfying the condition that at least 350,000 barrels of oil be produced per day.

[b] Steady state development represents the average year of production. For the steady state year, total wells in production are equal to new wells in production (222) multiplied by the number of years from initial development (15).

Sources: UDOGM~~Utah Division of Oil, Gas, and Mining~~ 2020; UGS 2019; Vanden Berg pers. comm.

OEA's estimate of oil well development exceeds the estimates provided by the Coalition. In response to an Information Request from OEA, the Coalition estimated that, on average, under the low oil production scenario there would be 130 wells operating and 29 under construction and under the high oil production scenario there would be 350 wells operating and 70 under construction. OEA's independent analysis as described in this section determined that the number of producing wells would likely need to be much greater than the Coalition's estimates to produce the low and high oil production scenario volumes.

OEA's estimates of future oil production represent a reasonably foreseeable development scenario based on historical data about the Basin and consultation with UGS. Oil and gas development technology is continually evolving. Changes in technology could affect the number of wells, the typical well mix (i.e., vertical/directional versus horizontal), and the volume of oil produced per well that would be carried on the proposed rail line in the future.

Support Facilities and Truck Trips

Ancillary facilities that support oil field development are expected to include access roads, electric power distribution lines, well pads, surface or subsurface pipelines, and storage tanks. Construction activities would involve vegetation clearing and surface disturbance for the construction of new wells and ancillary facilities. The extent of surface disturbance for construction of new wells and ancillary facilities would depend, in part, on whether the new wells represent infill development within an existing field, including additional well drilling from an existing well pad, or new development within a previously undeveloped area of the field.

OEA assumed that increased production for oil transported on the proposed rail line would originate from oil fields in the Basin, as shown in Figure 3.15-1. OEA estimated that 622 truck trips per day would transport oil from oil fields to the terminals under the low oil production scenario and 1,675 truck trips per day would transport oil from oil fields to the terminals under the high oil production scenario (Appendix M, *Air Quality Emissions and Modeling Data*).

Rail Terminals

If the Coalition were to construct and operate the proposed rail line, OEA anticipates that new rail terminals would be constructed at the terminus points near Myton and Leland Bench to transfer commodities between trucks and rail cars. The Coalition is not seeking Board authority to construct new rail terminals as part of the proposed rail line. The Coalition anticipates that third parties, such as firms that specialize in oil field or freight logistics, would construct and operate the new rail terminals if the proposed rail line is authorized. This has been a common practice for development of truck-to-rail crude oil terminal facilities, for example in North Dakota, as the movement of crude oil in the United States by rail has increased with increasing oil production (Opendatasoft 2019).

Because new rail terminals are not part of the Coalition's proposal or the Board's decision-making in this proceeding, OEA has only general information regarding the potential design of those facilities based on similar projects elsewhere in the country.

Truck-to-rail terminal facilities providing for tank car loading and storage can have several layouts, including the following.

- Multiple relatively short (i.e., 20- to 40-car) tracks
- One or more long (i.e., 10,000-foot) tracks
- One or more loop tracks

If adequate and suitable land is available, loop tracks are often used for handling bulk commodity trains, such as crude oil, coal, or grain because loop tracks minimize the train movements required, which creates efficiencies. OEA reviewed publicly available information about terminals in North Dakota and Colorado and found that terminals with the capacity to load between a few trains per week up to multiple trains simultaneously range in size from a few hundred to more than 500 acres, and that size is not correlated with train-loading capacity. The review of topography and current land development indicate that the Myton and Leland Bench areas could be suitable for loop track facilities plus sidings to accommodate rail-car storage and handling of other commodities. Based on OEA's review of information on existing terminals in other areas of the country, OEA assumed that terminals at Myton and Leland Bench would be 400 acres each and would have two double-tracked loops with 10,000 feet of additional car storage track for both the low oil production scenario and high oil production scenario.

The rail terminal developers would determine the design and features of any terminals, where storage and transfer of crude oil between trucks, tanks, and rail cars would be subject to the Spill Prevention, Control, and Countermeasure regulations per 40 C.F.R. Part 112. Based on existing terminals developed elsewhere, the basic features for such terminals, in addition to the required rail track, would include facilities for offloading crude oil from tanker trucks, heated crude oil storage tanks and associated piping and pumping, multiple rail tank car loading, facilities for handling non-oil commodities, administration and utility buildings, and access roads. A mobile crane would be used for loading/offloading non-oil commodities, and open (lay down) areas would be provided for temporary storage of such commodities. These features are illustrated in Figure 3.15-2.

Figure 3.15-2. Example Crude Oil Rail Loading Terminal

As shown, multiple tanks would be anticipated as part of each terminal facility. Air emissions from tanks and unloading/loading would be controlled by flaring and/or vapor combustion units based on each terminal's permit issued by the Utah Department of Environmental Quality. To account for congestion, weather, or other considerations and potential sources of schedule delay, OEA anticipates that terminals would have approximately 5 days of oil-storage capacity.

For the low oil production scenario, OEA assumed that each terminal would have four heated tanks with an approximate 350,000-barrel total storage capacity. Each terminal would have the capacity to load, on average, one train (approximately 70,000 barrels) per day. OEA assumed that the facility would be able to unload at least six trucks simultaneously, load crude oil into at least 12 rail cars simultaneously, and load a unit train in approximately 12 hours. OEA further assumed, again based on readily available information on North Dakota and Colorado terminals, that each facility would employ approximately 50 personnel, and peak construction employment would be 300 personnel for each facility.

For the high oil production scenario, OEA assumed each terminal would have eight heated tanks with an approximate 900,000-barrel total storage capacity and would have the capacity to load three trains per day. OEA assumed the facility would be able to unload at least 12 trucks simultaneously, load crude oil into at least 24 rail cars and two trains simultaneously, and load a unit train in approximately 12 hours. OEA further assumed that each facility would employ approximately 125 personnel, and that peak construction employment would be 300 personnel.

3.15.4.2 Other Projects and Actions

OEA identified other projects and actions in the cumulative impacts study area with the potential to contribute to cumulative effects (Figure 3.15-1). The other projects and actions considered include infrastructure improvements (i.e., airport expansion, facility improvements, stormwater infrastructure), watershed improvement projects, road improvements projects, Forest Service actions, interstate electric power transmission lines, and cultural resources preservation. These projects are briefly described below; details of specific projects are included in Appendix R, *Other Projects and Actions Considered in the Cumulative Impacts Analysis*.

- **Facility and other infrastructure improvements.** These projects include improvements to the Roosevelt Airport runway and taxiway, new construction or improvements to Peerless Port of Entry facilities, construction of a new library, and stormwater infrastructure improvements.
- **Watershed improvement projects.** Watershed improvement projects address flood protection, sedimentation, water quality, watershed protection, water supply and irrigation infrastructure, agricultural water management, and public recreation development.
- **Road improvement projects**. Road improvement projects include road reconstruction, road widening, rehabilitation of roadway surfaces, drainage improvements, addition of guardrails and shoulder widening, and landscaping.
- **Forest Service actions.** Forest Service actions include forestry management and restoration projects, OHV trail construction, removing a historical guard station, and managing grazing allotments on Forest Service-managed land.
- **BLM actions.** BLM actions include fluid mineral leasing, surface leasing for grazing, issuance and maintenance of right-of-way grants, and management actions to implement the BLM's Resource Management Plans including managing BLM-administered land for recreation, hunting, fishing, wildlife habitat, and special designations.
- **Interstate electric power transmission.** Two planned interstate electric power transmission projects cross the cumulative impacts study area: the Gateway South Transmission Line and the TransWest Express Transmission Line. Following the release of the Draft EIS, BLM notified OEA that a segment of the proposed route for the planned Gateway South Transmission Line in the Emma Park area had been moved south to be closer to the proposed rail line, as shown in Figure 3.15-1. The cumulative impact analysis reflects the new location of this planned transmission line.
- **Cultural resources preservation.** The U.S. Department of the Interior Bureau of Reclamation (Bureau of Reclamation) entered into a Programmatic Agreement with the Utah State Historic Preservation Officer that will govern the mitigation for adverse effects on irrigation infrastructure for projects for which the Bureau of Reclamation is consulting under Section 106 of the National Historic Preservation Act. The Programmatic Agreement applies to projects where the Bureau of Reclamation is the lead federal agency (regardless of land status) and applies to projects that have a determination of adverse effect on historic properties, which include irrigation infrastructure. The duration of the Programmatic Agreement is 10 years from the date it was fully executed (February 6, 2020).
- **Crude oil processing facility.** Uintah Advantage Energy Associates is proposing to develop a crude oil processing facility in the Basin.

3.15.5 Cumulative Impacts by Resource

3.15.5.1 Vehicle Safety and Delay

Cumulative Impacts Study Area

The vehicle safety and delay cumulative impacts study area includes the public roadways in the Basin that could have increased vehicle traffic as a result of construction and operation of the proposed rail line. The cumulative impacts study area for vehicle safety and delay is the same as the project study area for the analysis of direct and indirect effects.

Cumulative Impacts

Oil and Gas Development

Construction and operation of any of the Action Alternatives would, along with oil and gas development activities in the Basin, contribute to increased vehicle trips in the cumulative impacts study area that could increase the potential for vehicle safety and delay impacts. OEA anticipates that construction of the proposed rail line would occur during the same time period as terminal construction and that both activities would contribute additional vehicle trips on study area roads. To be conservative, OEA based the cumulative impacts analysis for the construction period on the Whitmore Park Alternative because the Whitmore Park Alternative would have the greatest number of vehicle trips, and therefore the most vehicle safety and delay impacts, in any single year (Section 3.1, *Vehicle Safety and Delay*, Table 3.1-7). Table 3.15-3~~2~~ displays the estimated annual vehicle traffic, average annual daily vehicle trips, and one-way design hour volume (i.e., a measure of traffic at the daily 1-hour peak volume) that would be associated with construction of the terminals and the proposed rail line, which is the year that OEA expects that construction-related traffic would be the highest.

Table 3.15-3. Estimated Traffic for Terminal Construction and Proposed Rail Line Construction

Activity	Annual Trips	Average Annual Daily Traffic	Design Hour Volume
Terminal construction	438,000	1,200	90
Rail line construction (Whitmore Park Alternative)	1,519,498	4,163	312
Total	1,957,498	5,363	402

Vehicle trips during construction of the proposed rail line, combined with terminal construction, would generate an estimated 402 vehicle trips per hour during peak hour traffic flow. These trips would be distributed over multiple roadways within the Basin. As described in Section 3.1, *Vehicle Safety and Delay*, the major roadways in the study area all have substantial additional capacity. For purposes of comparison, OEA assumed vehicle traffic would be distributed evenly among the major roadways in the study area. Table 3.15-4~~3~~ displays the used roadway capacity for the five major roadways in the study area under baseline conditions during the construction period, which is assumed to be the first year of construction in 2022, and the increase in capacity used during construction of the proposed rail line and terminals. Used roadway capacity would increase by a maximum of 5 percent on the major roadways, leaving substantial remaining capacity.

Table 3.15-4. Percentage of Used Roadway Capacity during Terminal Construction and Proposed Rail Line Construction

Route	Baseline (%)	Increase (%)	Total (%)
US 6	49	5	55
US 191	13	5	18
US 40	35	5	40
9 Mile Canyon Road	16	5	21
8000S/8250S	2	5	7

Notes:
Percentages may not sum to total due to rounding.
US 6 = U.S. Highway 6; US 191 = U.S. Highway 191; US 40 = U.S. Highway 40

In addition to the major roadways, vehicles used for terminal construction would also use a network of local roads, anticipated to include Leland Bench Road, 7500 E~~,~~ /AR-88, and Sandwash Road/6000 W/~~5888~~ 5880 W. Traffic on these roads would increase during construction of the terminals and could result in delays and localized road damage from construction vehicles and heavy equipment. Traffic data are not available for these and other local roads, but in general traffic would be lower than the major roads as they are rural and primarily carry local traffic. The anticipated increase in vehicle use on these local roads could result in vehicle delays, although the impacts would be temporary during the construction period. Damage to local roads as a result of construction equipment could be addressed through road use or easement agreements between the rail terminal developers and local government agencies and landowners. Because of the ample roadway capacity in the study area and temporary nature of the impact, traffic from construction of the proposed rail line, when combined with traffic from terminal construction would not result in significant cumulative impacts on vehicle delay.

Once the proposed rail line and the terminals are constructed, oil and gas construction and operations and terminal operations would increase until the steady state production volumes described above are achieved. These activities would generate vehicle trips as production wells are explored and placed into production and as the rail terminals and proposed rail line operate. OEA has based the cumulative impacts analysis for the steady state operational period on the Wells Draw Alternative because the Wells Draw Alternative would have the greatest number of vehicle trips during rail operations (Section 3.1, *Vehicle Safety and Delay*, Table 3.1-10). Table 3.15-54 displays the estimated annual vehicle traffic, annual average daily vehicle trips, and design hour volumes that would be associated with steady state oil well construction and operation, terminal operations, and operations of the proposed rail line.

Table 3.15-5. Estimated Annual Traffic for Steady State Oil and Gas Development and Operation of Proposed Rail Line

	Annual Trips	Average Annual Daily Traffic	Design Hour Volume
Low Oil Production Scenario			
Well construction	29,033	80	6
Well operations	301,130	825	62
Terminal operations	527,060	1,444	108
Oil and gas development subtotal	*857,223*	*2,349*	*176*
Rail line operations (Wells Draw Alternative)	12,522	34	3
Total	**869,745**	**2,383**	**179**
High Oil Production Scenario			
Well construction	78,752	216	16
Well operations	809,984	2,219	166
Terminal operations	1,405,250	3,850	289
Oil and gas development subtotal	*2,293,986*	*6,285*	*471*
Rail line operations (Wells Draw Alternative)	52,672	144	11
Total	2,346,658	6,429	482

Under the high oil production scenario, 471 trips during one-hour peak traffic volume would be produced from oil and gas development activity. Operation of the proposed rail line would also generate additional vehicle trips, primarily associated with employee commuting, but the number of vehicle trips would be relatively low at about 11 vehicle trips per hour. Similar to what would occur during rail construction, these vehicular trips would be distributed over multiple roadways within the Basin. Table 3.15-6~~5~~ displays the used roadway capacity for the five major roadways in the study area under baseline conditions (i.e., assumed to be the first year of railway operations in 2026) and the increase in used capacity used during steady state oil and gas development and operation of the proposed rail line. As the distribution of traffic on area roadways is unknown, OEA assumed that these five major roadways would carry an approximately even volume of traffic. Traffic would also be disbursed along other local public and private roadways throughout the cumulative impacts study area. Near the rail terminals, these roads include Leland Bench Road, 7500 E~~,~~ /AR-88, and Sandwash Road/6000 W/~~5888~~ 5880 W. Based on consultation with the Ute Indian Tribe, these and other local roads near the rail terminals are used to access communities with tribal populations, such as Randlett and Fort Duchesne. OEA understands that tribal members are concerned about the potential for traffic and road damage on these roads associated with the increased vehicle trips from terminal construction and operations. Increases in traffic to support terminal operations on these roads could be substantial, and without road improvements such as additional turning lanes, would result in vehicle delays. Improvements to public roadways needed to address increased traffic and wear and tear associated with the proposed rail line, as well as other reasonably foreseeable future actions would be paid for by federal, state, and local taxes.

Table 3.15-6. Used Roadway Capacity during Steady-State Oil and Gas Development and Operation of Proposed Rail Line

	Low Oil Production Scenario (%)			High Oil Production Scenario (%)		
Route	Baseline	Increase	Total	Baseline	Increase	Total
US 6	60	2	62	60	6	66
US 191	14	2	17	14	6	21
US 40	37	2	39	37	6	43
9 Mile Canyon Road	19	2	21	19	6	25
8000S/8250S	2	2	5	2	6	9

Notes:
Percentages may not sum to total due to rounding.
US 6 = U.S. Highway 6; US 191 = U.S. Highway 191; US 40 = U.S. Highway 40

Under the high oil production scenario, used roadway capacity would increase by a maximum of 6 percent on the major roadways, leaving substantial remaining capacity. The increased vehicle traffic from oil and gas development would, therefore, have limited impacts on vehicle delay on major roadways. OEA concludes that because of ample roadway capacity and the dispersion of the increased traffic from oil and gas development, impacts on major roadways from the proposed rail line, when combined with traffic from oil and gas development would result in negligible cumulative impacts on vehicle delay. Local roads, however, have smaller roadway capacity, and OEA concludes that the increase in traffic on local roads used to serve the terminals could result in significant cumulative impacts on vehicle delay in the absence of road improvements or other mitigation.

For the analysis of vehicle safety, OEA evaluated the increase in annual VMT because a higher VMT would correspond to a higher potential for vehicle accidents. Table 3.15-7~~6~~ displays the annual VMT that would be associated with construction of the terminals and the proposed rail line. For comparison, the table also shows the county-wide VMT for Duchesne and Uintah Counties, the two counties in which the major portion of the proposed rail line would be constructed, and the two counties in which the terminals would be constructed. Total VMT per year would be approximately 15 percent of the VMT per year in Duchesne and Uintah Counties. The increase in VMT from construction of the terminals and proposed rail line would be primarily from commercial vehicles operated by professional, licensed and trained operators, who would be required to adhere to federal and state safety standards. Again, OEA based the cumulative impacts analysis for the construction period on the Whitmore Park Alternative because the Whitmore Park Alternative would have the greatest number of vehicle trips in a single year (Section 3.1, *Vehicle Safety and Delay*, Table 3.1-7). Vehicle miles traveled from any of the Action Alternatives, when combined with VMT from terminal construction would not result in significant cumulative impacts on vehicle safety because of the commercial vehicle operator safety standards that would apply and the available roadway capacity on major roadways in the Basin.

Table 3.15-7. Annual Vehicle Miles Traveled for Terminal Construction and Proposed Rail Line Construction in 2022

Activity	VMT/year	County-wide VMT[a]	Percent of County-wide VMT
Terminal construction	24,191,536	822,422,977	2.9
Rail line construction (Whitmore Park Alternative)	100,670,533		12.2
Total	**124,862,069**	**822,422,977**	**15.2**

Notes:
[a] Duchesne and Uintah Counties.
VMT = vehicle miles traveled

Table 3.15-8~~7~~ shows the annual VMT associated with steady state oil well construction and operation, terminal operations, and operations of the proposed rail line. Under the high oil production scenario, total VMT per year would be approximately 6 percent of the VMT per year in Duchesne and Uintah Counties. OEA again based the cumulative impacts analysis for the steady state operational period on the Wells Draw Alternative because the Wells Draw Alternative would have the greatest number of vehicle trips during operations (Section 3.1, *Vehicle Safety and Delay*, Table 3.1-10).

Table 3.15-8. Annual Vehicle Miles Traveled for Steady-State Oil and Gas Development and Operation of Proposed Rail Line

	VMT/year	County-wide VMT[a]	Percent of County-wide VMT
Low Oil Production Scenario			
Well Construction	362,912	822,422,977	<0.1
Well Operation	3,764,125		0.5
Terminals Operation	12,225,497		1.5
Oil and Gas Development Subtotal	16,352,534		2.0
Rail line operations (Wells Draw Alternative)	-15,409		0.0
Total	**16,337,125**	**822,422,977**	**2.0**
High Oil Production Scenario			
Well Construction	984,398	822,422,977	0.1
Well Operation	10,124,801		1.2
Terminals Operation	32,595,682		4.0
Oil and Gas Development Subtotal	43,704,881		5.3
Rail line operations (Wells Draw Alternative)	2,346,551		0.3
Total	**46,051,432**	**822,422,977**	**5.6**

Notes:
[a] Duchesne and Uintah Counties.
VMT = vehicle miles traveled

Vehicle safety in the study area is generally good; crash rates in Uintah and Duchesne Counties, where most oil and gas activity is occurring, is below the national average. Because of the commercial vehicle operator safety standards, the available roadway capacity in the Basin, and low existing crash rates, VMT from any of the Action Alternatives, when combined with VMT from oil and gas development would not result in significant cumulative impacts on vehicle safety.

Other Projects and Actions

The proposed rail line would affect vehicle safety and delay, and would result in cumulative impacts on vehicle safety and delay when combined with impacts from other projects. Construction of reasonably foreseeable projects within the cumulative impacts study area, including the Duchesne County Myton Main Street Project, US 40 Improvement Project~~, removal of the Indian Canyon Guard Station~~, Uintah Advantage Energy Associates crude oil processing facility, and additional road improvement projects (Figure 3.15-1, Items 4 to 15) could occur during the same time frame as construction of the proposed rail line, resulting in an increase in vehicle traffic. Construction on ~~these~~ area roadways may also alter traffic patterns temporarily as drivers avoid construction. Because the study area is largely rural with limited detour routes, temporary impacts on vehicle delay could occur for the duration of the rail construction phase. Operations of the Uintah Advantage Energy Associates crude oil processing facility, which would be located near the proposed rail line terminus and one of the rail terminals at Leland Bench, would require trucks to transport products to and from the facility, contributing to increased traffic on area roadways. When combined with the increased traffic from operations of proposed rail line and rail terminals described previously, the effects of vehicle delay on local roadways, such as Leland Bench Road and 7500 E/AR-88, could be significant. Relative to existing road capacity in the cumulative impacts study area, impacts on major roadways from increased traffic due to the other projects and the proposed rail line would be low. Implementation of the mitigation measures listed in Chapter 4, *Mitigation*, such as installation of detour signage during construction, would also reduce the impacts on safety and delay resulting from the proposed rail line. Therefore, OEA concludes that the contribution of impacts from the proposed rail line to cumulative impacts on major roadways would not be significant. Impacts on local roads used to serve the crude oil processing facility and terminal at Leland Bench could result in significant cumulative impacts on vehicle delay in the absence of road improvements or other mitigation.

3.15.5.2 Rail Operations Safety

Cumulative Impacts Study Area

OEA defined the rail operations safety cumulative impacts study area as the track for each of the Action Alternatives. The cumulative impacts study area for rail operations safety is the same as the project study area for the analysis of direct and indirect effects.

Cumulative Impacts

Oil and Gas Development

As noted previously, the two oil production scenarios would have different levels of associated equipment at the new rail terminals at Myton and Leland Bench. Table 3.15-9~~8~~ summarizes the equipment OEA assumed for the purposes of the cumulative impacts analysis for rail operations safety.

Table 3.15-9. Assumed Terminal Facility Equipment

Equipment	Low Oil Production Scenario	High Oil Production Scenario
Heated storage tanks	4	8
Unloading racks	6+	12+
Loading racks	12+	24+
Train tracks for active loading	1	2

These terminal operations each have the potential to have accidents involving injuries to workers; damage to rail cars, trucks, and equipment onsite; or possibly oil spills resulting from equipment failures, human errors, or external events such as vandalism or extreme weather. The terminal operator's use of proper procedures, protective equipment, and training would limit the likelihood of injury or damage. Potential releases would most likely be small leaks from hoses, pipes, valves, or fittings. Larger releases would be much less likely and might be from major pipe breaks, storage tank leaks, or damage to rail cars. Since terminal operations would all take place in a fixed location and the terminals would be constructed in compliance with applicable local, state, and national standards and guidelines (such as 40 C.F.R. Part 112[2]), OEA expects that the terminal facilities would implement and acquire appropriate worker protection, train and truck movement controls, overfill control systems, excess flow valves, emergency response systems and procedures, spill-containment features, and fire protection equipment. This would minimize both the potential for accidents of any kind and the potential consequences of accidents. These anticipated terminal operations are the only identified projects that could contribute to cumulative impacts related to rail operations safety.

Other Projects and Actions

Aside from the potential rail terminals, other planned or proposed projects and actions would not have direct impacts on rail operations safety (or vice versa) since they do not have any rail operations proposed. Therefore, no additional cumulative impacts analysis is warranted.

3.15.5.3 Water Resources

Cumulative Impacts Study Area

OEA defined the water resources cumulative impacts study area for surface waters, floodplains, and wetlands as the hydraulic unit code (HUC) 10 watersheds that would be crossed by the proposed rail line (Figure 3.3-1). OEA did not assess cumulative groundwater impacts specifically because, as described in Section 3.3, *Water Resources*, OEA expects that, because impacts would generally be limited to the rail line footprint, or are not anticipated, the proposed rail line would not have adverse impacts on groundwater use (i.e., supply/drawdown), groundwater recharge, ~~or~~ groundwater quality~~.~~, or shallow groundwater flow. Therefore, the proposed rail line would not contribute to cumulative impacts on groundwater when combined with impacts from oil and gas development. In addition, OEA assumed that cumulative impacts related to water rights of groundwater wells and springs would be unlikely to occur as the cumulative projects take place at specific locations such that the projects would likely be able to avoid any existing groundwater wells or springs as part of the project planning and development process. The cumulative impacts study area for water resources is not the same as for the analysis of direct and indirect effects.

[2] 40 C.F.R. Part 112 addresses oil pollution prevention including spill prevention, control, and countermeasures.

Cumulative Impacts

Oil and Gas Development

Oil and gas development could affect water resources. Past and ongoing oil and gas well construction and operation projects have resulted in ground clearing, soil erosion, placement of fill material, installation of culverts in access roads, use of equipment, and maintenance (e.g., vegetation management) that have affected water resources throughout the study area. Similar activities from foreseeable future oil and gas development would similarly affect water resources; the impacts that would affect surface water, floodplains, and wetlands ~~resources~~ from oil and gas development are similar to those that would occur from the proposed rail line (Section 3.3.3.1, *Impacts Common to All Action Alternatives*). Oil and gas development could also result in accidental releases of crude oil into surface waters at production sites or from tanker trucks. However, the properties of the waxy crude oils produced in the Basin would help reduce the potential impact and make cleanup easier than it would be for most crude oils, thereby helping to avoid or minimize the long-term chronic effects. In addition, oil and gas development could affect groundwater resources, depending on the methods of drilling used and the location of the development activities. Those groundwater impacts could include drawdown of aquifers as a result of water withdrawals for hydraulic fracturing or the discharge of fracturing fluids or wastewater into groundwater. However, as previously discussed, construction and operation of the proposed rail line are not anticipated to contribute to cumulative impacts on groundwater.

The extent of the cumulative impacts would depend on the location of an oil or gas well relative to the Action Alternatives, with a greater potential for a cumulative impact if oil and gas development is near an Action Alternative (i.e., same subwatershed). The distance of each Action Alternative to oil and gas development areas is about the same; therefore, the potential for cumulative impacts would be generally the same: 36.2 miles of both the Indian Canyon Alternative and Whitmore Park Alternative are within oil and gas development areas, and 36.6 miles of the Wells Draw Alternative are within oil and gas development areas. Because future oil and gas projects would be subject to applicable federal, state, and local permitting, cumulative impacts on water resources would be avoided or minimized through compliance with state and federal laws and regulations that protect water resources, including, but not limited to, Clean Water Act (CWA) Sections 401, 402, 404, and National Flood Insurance Program and local floodplain management regulations.

Oil and gas well operations also produce a waste stream, including produced water, which is the largest waste stream component generated during oil and gas production. Produced water is natural groundwater that is extracted along with oil and gas; it is commonly saline and mixed with oil residues, so it must be either disposed of or treated and reused. Produced water disposal could result in cumulative surface water quality impacts depending on the disposal method. Current produced water disposal in the Basin consists of injection into deep wells, storage and evaporation in lined disposal ponds, and supplying water for flooding in enhanced oil recovering programs (UGS 2017). Of the current disposal methods, about 60 percent of the produced water is injected back into the ground via deep wells at sufficient depths, so as not to contaminate shallow aquifers, and where it can no longer be accessed or used; this is the most common method of produced water disposal in the United States (UGS 2018; USEPA 2020). USEPA regulates these injection wells through the Safe Drinking Water Act, which established the requirements and provisions for the Underground Injection Control Program.

Potential uses for future produced water from producing formations in the Basin include waterflooding for secondary recovery, drilling mud formulation, hydraulic fracturing fluid for well completion, and use for possible oil shale production (UGS 2017). None of the current disposal methods or potential future produced water use involve discharging produced water to surface waters. While discharge of produced water is an option for oil and gas producers west of the 98th meridian, which includes Utah, it is a disposal option rarely used due to the cost associated with treating produced waters to a level suitable to discharge to surface waters, as well as the availability of other wastewater management options that are lower cost (USEPA 2020). If in the future treatment of produced waters becomes more cost-effective, discharges to surface waters could occur in the Basin. USEPA regulates produced water discharge under 40 C.F.R. Part 435 and the CWA Section 402 NPDES permit program to ensure there are no exceedances of water quality standards. Therefore, should produced water be discharged to surface waters in the future, OEA believes it would be unlikely to have adverse effects on water quality.

As discussed in Section 3.3, *Water Resources*, OEA concludes that the proposed rail line would result in significant impacts on surface waters and wetlands, including, in particular, the loss of wetland habitat and permanent changes to surface water hydrology from crossing structures and stream realignments. Future oil and gas projects could worsen these impacts if the projects were to take place near the Action Alternatives and affect the same surface waters or wetlands as the proposed rail line. If the mitigation set forth in this ~~Draft~~ EIS were implemented, the Coalition would need to take steps to avoid, minimize, or mitigate impacts on water resources in compliance with state and federal regulations that protect water resources, including CWA Sections 401, 402, and 404. Future oil and gas projects would also need to comply with these and other regulations, which would lessen cumulative impacts on water resources.

The Action Alternatives would connect with new rail terminals at Myton and Leland Bench. The terminal area at Myton contains several ponds and emergent wetlands, as well as the Upper Pleasant Valley Canal and associated intermittent streams and canals. The terminal area at Leland Bench contains one intermittent stream and no wetlands. No floodplains, flood-prone soils, groundwater wells, or springs exist in either terminal area; therefore, there would be no cumulative impacts on these resources. Construction and operation of the terminals would disturb ground, remove vegetation, and add new impervious surfaces, which can all affect surface waters and wetlands within or adjacent to construction activities, including water quality and hydrology. Section 3.3, *Water Resources,* describes in detail how construction activities related to the proposed rail line would affect surface waters and wetlands. Impacts from terminal construction on surface water and wetlands would be similar to those from construction of the proposed rail line but would be smaller in extent because the terminals would have smaller footprints than the proposed rail line. The extent of potential impacts would depend on the exact location and layout of the terminals and if surface waters and wetlands could be avoided. OEA expects that impacts on surface waters and wetlands would be avoided, minimized, or mitigated through compliance with state and federal laws and regulations that protect these resources, including, but not limited to, CWA Sections 401, 402, and 404. If impacts from the terminals on surface waters and wetlands cannot be avoided, construction of the proposed rail line and the new terminals would result in cumulative impacts on water resources in the area of the new terminals.

Other Projects and Actions

In addition to potential future oil and gas development, other past, present, and reasonably foreseeable future projects and actions could affect water resources. OEA identified 23~~2~~ cumulative projects and actions in the study area, most of which are currently under construction or implementation or will be constructed or implemented in the foreseeable future (Figure 3.15-1 and Appendix R, *Other Projects and Actions Considered in the Cumulative Impacts Analysis*). Many of the cumulative projects and activities would disturb ground, remove vegetation, use construction equipment, and/or add new impervious surfaces, which can all affect water resources within or adjacent to project activities, including water quality and hydrology. The impact mechanisms that would affect water resources from these cumulative projects and activities would be similar to those that would occur from the proposed rail line (Section 3.3.3.1, *Impacts Common to All Action Alternatives*).

The extent of potential cumulative impacts would depend on the location of the cumulative project relative to the proposed rail line, with a greater potential for a cumulative impact if the activity is near the proposed rail line (i.e., same subwatershed). For example, two of the 23~~2~~ cumulative projects overlap with the water resources study areas for the Action Alternatives (Section 3.3.1.1, *Study Areas*), including the Ashley National Forest grazing allotments and the Gateway South Transmission Line. Therefore, these two projects would have the greatest likelihood of resulting in cumulative impacts on water resources due to this geographic overlap.

The significant impacts on water resources from construction and operation of the proposed rail line would include the loss of wetland habitat and permanent changes to surface water hydrology from crossing structures and stream realignments. Future projects in the cumulative impacts study area, such as the Ashley National Forest grazing allotments and the Gateway South Transmission Line, could worsen these significant impacts if those projects were to affect the same surface waters or wetlands as the proposed rail line. If the mitigation set forth in this ~~Draft~~ EIS were implemented, the Coalition would need to take steps to avoid, minimize, or mitigate impacts on water resources in compliance with state and federal regulations that project water resources, including CWA Sections 401, 402, and 404. Future projects in the cumulative impacts study area would also need to comply with these and other regulations, which would lessen cumulative impacts on water resources.

3.15.5.4 Biological Resources

Cumulative Impacts Study Area

The biological resources cumulative impacts study area is the same as the study areas defined for biological resources in Section 3.4.1.1, *Study Areas*. While most impacts on biological resources would occur in or around this study area, some species, such as big game, could be affected beyond this area due to their migratory nature.

Cumulative Impacts

Oil and Gas Development

Wildlife

Potential future oil and gas development would affect wildlife species and their habitats. The types and severity of impacts from oil and gas development on wildlife would be similar to many of those that would occur from construction and operation of the proposed rail line (Section 3.4.3.1, *Impacts Common to All Action Alternatives*). Species displacement due to noise would occur during construction and drilling activities and from continuous mechanical well operations. Mortality rates may increase in conjunction with oil and gas development, especially for smaller species that have more difficulty escaping the vegetation-clearing activities. Impacts on habitat would result from vegetation removal for development of the well pad and associated features (e.g., road construction)~~road construction, pad installation, and ditch digging~~. Specific disturbance areas would vary depending on type of development, type of well used, and the necessary infrastructure for development and production. The lifespan of a project would also vary and would depend on many factors (e.g., economic conditions, pumping life of well). OEA assumes that all oil and gas projects would be subject to proper reclamation procedures in compliance with Utah law when the wells are abandoned (per Utah Rule 649-3, Drilling and Operating Practices). Oil and gas wells on BLM-administered lands would be abandoned and reclaimed in compliance with BLM requirements.

Any of the Action Alternatives would be constructed and would operate in landscapes affected by oil and gas development and would contribute to cumulative impacts on wildlife by causing habitat loss, degradation, and alteration, as well as potentially causing injury or mortality of wildlife and changes to species distribution and composition. The extent of potential cumulative impacts would depend on the location of the oil and gas development relative to the proposed rail line, with a greater potential for a cumulative impact if the activity is closer to the proposed rail line. ~~The proposed rail line impact area and oil and gas development impact area must overlap for there to be a cumulative impact. However, there is limited area in which this could occur because oil and gas development would need to occur within several hundred feet of the rail line, which is unlikely.~~ There could be some ~~small~~ areas of wildlife habitat removal from oil and gas development around~~in~~ the proposed rail line cumulative impacts study area related to oil and gas access roads or other ancillary features. However, any impact on habitat would likely be small compared to habitat surrounding the area of impact. In addition, reclamation is required for all oil and gas development once pumping stops, including on all federal lands, which would restore the area's more natural conditions~~, where most of the oil and gas development will likely occur~~. Noise and the presence of the rail line could affect wildlife movement and behavior, but ~~again,~~ this would need to occur near the proposed rail line where there is overlap with the impacts generated by both the proposed rail line and oil and gas development, and the distance at which noise generated by the proposed rail line would no longer rise to the level of a significant disturbance to wildlife is approximately 460 feet from the rail line (Section 3.4.1.3, *Analysis Methods*). Further, the direct and indirect impacts of the proposed rail line would be reduced by the implementation of the mitigation measures listed in Chapter 4, *Mitigation*. For these reasons, OEA anticipates that cumulative impacts on wildlife from the proposed rail line and oil and gas development would not be significant.

Due to their migratory nature and large ranges, big game populations could experience impacts beyond the vicinity of the proposed rail line and throughout the Utah Division of Wildlife Resources (UDWR) management units. While all of the Action Alternatives would remove less than 1 percent of available crucial big game habitat in the UDWR management units (Table 3.4-15), oil and gas development in these management units could remove additional big game crucial habitat. The extent of potential impacts would depend on the exact location and layout of the well pads and if big game habitat could be avoided. A geographic information system (GIS) analysis of the area of big game crucial habitat within oil and gas fields compared to all available crucial habitat in each species' UDWR management unit indicates that the percent of crucial habitat for each species in oil and gas fields is generally small, with the exception of pronghorn (Table 3.15-10). Further, because oil and gas development projects would not disturb the entire area of the oil and gas fields in which they take place, the numbers presented in Table 3.15-10 tend to overstate the percentage of available crucial habitat in UDWR management units that would be disturbed by oil and gas development. Oil and gas development throughout oil and gas fields can affect big game migration similar to the migration impacts described for the proposed rail line. Most of the big game movement corridors mapped by UDWR (see Appendix G, *Biological Resources Figures*, for the movement corridors for each big game species) occur on oil and gas fields. Sawyer et al. (2020) studied the impact of natural gas development in Wyoming on mule deer migration and found that migratory use by mule deer generally decreased as natural gas development and surface disturbance increased. Declines in migratory use related to surface disturbance were nonlinear, where migratory use sharply declined when surface disturbance from development exceeded 3 percent (Sawyer et al. 2020). Disturbance thresholds may vary across regions, species, or migratory habitats (Sawyer et al. 2020). To offset the proposed rail line's impacts on big game migration, OEA is recommending mitigation measure BIO-MM-18, which would require the Coalition to develop a big game movement corridor crossing plan. Oil and gas development that occurs on federal lands (e.g., BLM) would need to comply with the land agency's land use management plan and any requirements to avoid or mitigate impacts on big game and big game migration. Similarly, oil and gas development on state lands, tribal lands, or private lands would need to address big game migration impacts in accordance with applicable state or tribal requirements for oil and gas development. With OEA's recommended big game movement corridor crossing plan for the proposed rail line, along with the requirements and guidance of federal, tribal, and state agencies that address big game impacts from oil and gas development, OEA expects that cumulative impacts on big game and big game migration would be minimized.

Table 3.15-10. Percent of All Big Game Crucial Habitats in Oil and Gas Fields Compared to All Crucial Habitat throughout Each UDWR Management Unit

UDWR Management Unit	Percent Crucial Habitat in Oil and Gas Fields Compared to all Available Crucial Habitat in UDWR Management Unit
Bighorn sheep (*Ovis canadensis*)	
Nine Mile Unit 11	7.32
Wasatch Mountains Unit 17	1.64
Elk (*Cervus canadensis*)	
Central Mountains Unit 16	2.17
Nine Mile Unit 11	2.05
South Slope Unit 9	1.47
Wasatch Mountains Unit 17	1.74
Moose (*Alces alces*)	
Nine Mile Unit 11	0.26
Wasatch Mountains Unit 17	1.66
Mule deer (*Odocoileus hemionus*)	
Central Mountains Unit 16	2.15
Nine Mile Unit 11	1.51
South Slope Unit 9	1.94
Wasatch Mountains Unit 17	1.49
Pronghorn antelope (*Antilocapra americana*)	
Central Mountains Unit 16	5.46
Nine Mile Unit 11	31.70

Notes:

UDWR = Utah Division of Wildlife Resources
Source: Coalition 2020a; UDWR 2015, 2017a, 2017b, 2018, 2019b, 2019d, 2021

The Action Alternatives would connect with terminals at Myton and Leland Bench. The Myton terminal would be within mule deer habitat and both terminals would be within pronghorn antelope habitat (see Appendix G, *Biological Resources Figures*, for big game species habitats). Both terminals would be outside of bighorn sheep, elk, and moose habitat, and the Leland Bench terminal would be outside of mule deer habitat; therefore, there would be no cumulative impacts on those species. There is no mule deer crucial habitat at the Myton terminal (just substantial habitat), and pronghorn crucial habitat is present at the Leland Bench terminal and in part of the Myton terminal location. Similar to the Action Alternatives' impact on pronghorn crucial habitat (Table 3.4-15), impacts on pronghorn crucial habitat would be small compared to the available crucial habitat in the UDWR pronghorn management unit. No mule deer movement corridors were identified by UDWR around the Myton terminal, and several pronghorn high importance movement corridors were identified by UDWR around the Myton terminal (none at the Leland Bench terminal) (see Appendix G, *Biological Resources Figures*, for big game movement corridors). Construction and operation of the terminals would cause habitat loss for various wildlife species, increase potential for wildlife injury and mortality, and result in wildlife avoidance from increased human activity in and around the terminals. The proposed rail line would contribute to these impacts, the extent of which would depend on the exact location and layout of the terminals, and the species affected. For most wildlife species, impacts would likely be localized and habitat impacts small compared to available habitat surrounding the area of impact. For other species, particularly migrating pronghorn, the impacts may extend beyond the immediate vicinity of the proposed rail line and terminals and affect pronghorn populations in the UDWR management unit.~~However, similar to the discussion for oil and gas development, the proposed rail line's contributing impacts on wildlife are not anticipated to be extensive due to the limited overlap of the of the proposed rail line cumulative impacts study area; any impact that would occur in terms of both ground disturbance to habitat and n~~Noise that would be generated by trains would be limited to within several hundred feet of the proposed rail line, which would not extend far into the terminal footprints. ~~Therefore,~~ OEA anticipates that the impacts from the proposed rail line, when combined with construction and operation of the terminals, would not result in significant cumulative impacts on most wildlife species. Impacts on pronghorn movement corridors could be adversely affected by both the proposed rail line and Myton terminal. However, none of the pronghorn movement corridors go through the Myton terminal location, and with OEA's recommended big game movement corridor crossing plan for the proposed rail line (BIO-MM-18), OEA expects that cumulative impacts on pronghorn movement corridors in the area of the Myton Terminal would be minimized.

Fish

As discussed in detail in Section 3.4, *Biological Resources*, construction of the proposed rail line could affect fish by affecting water quality in nearby streams or altering fish habitat. Oil and gas development could also affect fish if construction or operations activities were to degrade water quality of nearby streams or alter fish habitat. The types and severity of impacts from oil and gas development on fish would be similar to many of those that would occur from the proposed rail line (Section 3.4.3.1, *Impacts Common to All Action Alternatives*). OEA assumes that oil and gas developers would minimize surface water impacts by implementing avoidance and minimization measures, such as sediment barriers, in compliance with appropriate federal, state, and local requirements.

Any Action Alternative would add to fish impacts from oil and gas development, including water quality degradation and habitat alteration. The extent of potential cumulative impacts would depend on the location of the oil and gas development relative to the proposed rail line, with a greater potential for a cumulative impact if the activity is closer to the proposed rail line. Fish habitat (i.e., surface waters) is protected through federal and state surface water and water quality regulations and permitting requirements. Because future oil and gas projects and the proposed rail line would be subject to the same applicable federal and state permitting requirements, cumulative impacts on water resources that support fish would be avoided or minimized through compliance with state and federal laws and regulations that protect water resources, including CWA Sections 401, 402, and 404. Any cumulative impacts that could occur would be localized and minimized through implementation of mitigation measures (e.g., sediment barriers) required by applicable permits. Therefore, OEA anticipates that the impacts from the proposed rail line, when combined with impacts from oil and gas development, would not result in significant cumulative impacts on fish.

The terminal areas at Myton and Leland Bench contain no perennial streams that support fish populations. Several ponds, the Upper Pleasant Valley Canal, and associated intermittent streams and canals are located within the terminal areas that could provide habitat for fish. Construction of the rail terminals would add impervious cover and increase surface water runoff that could affect fish habitat. The proposed rail line would contribute to these impacts, the extent of which would depend on the exact location and layout of the terminals and if surface waters containing fish habitat could be avoided. However, as described for oil and gas development, fish habitat (i.e., surface waters) is protected through federal and state surface water and water quality regulations and permitting requirements, which would apply to both the proposed rail line and terminals. As such, cumulative impacts on water resources that support fish would be avoided or minimized through compliance with state and federal laws and regulations that protect water resources, including CWA Sections 401, 402, and 404. Therefore, OEA anticipates that the impacts from the proposed rail line, when combined with construction and operation of the terminals, would not result in significant cumulative impacts on fish.

Vegetation

Oil and gas development would affect vegetation during construction of roads, pads, and other related infrastructure. The types and severity of impacts from oil and gas development on vegetation would be similar to many of those that would occur from the proposed rail line (Section 3.4.3.1, *Impacts Common to All Action Alternatives*). Specific disturbance areas would vary depending on type of development, type of well used, and the necessary infrastructure for development and production. OEA assumes that all oil and gas projects would be subject to proper reclamation procedures in compliance with Utah law when the wells are abandoned (per Utah Rule 649-3, Drilling and Operating Practices). Oil and gas wells on BLM lands would be abandoned and reclaimed in compliance with BLM requirements.

Any Action Alternative would add to vegetation impacts from oil and gas development, such as permanent vegetation loss, constraints to plant germination and growth, the spread of noxious weeds, effects on plant growth, increased risk of wildfires, altered riparian vegetation, and altered vegetation communities. The extent of potential cumulative impacts would depend on the location of the oil and gas development relative to the proposed rail line, with a greater potential for a cumulative impact if the activity is closer to the proposed rail line. The proposed rail line impact area and oil and gas development impact area must overlap for there to be a cumulative impact. However, there is limited area in which this could occur because oil and gas development would need to occur within several hundred feet of the rail line, which is unlikely. There could be some small areas of vegetation removal from oil and gas development in the proposed rail line cumulative impacts study area related to oil and gas access roads or other ancillary features. However, any impact on vegetation would likely be small compared to the area of vegetation surrounding the impact area. In addition, reclamation is required for all oil and gas development once pumping stops, including on all federal lands~~, where most of the oil and gas development will likely occur~~. Further, the direct and indirect impacts of the proposed rail line would be reduced by the implementation of the mitigation measures listed in Chapter 4, *Mitigation*. For these reasons, OEA anticipates that cumulative impacts on vegetation from the proposed rail line and oil and gas development would not be significant.

The Action Alternatives would connect with terminals at Myton and Leland Bench. Land cover at both terminals is primarily Inter-Mountain Basins Mat Saltbush Shrubland. Construction of the terminals would disturb ground, remove vegetation, and add new impervious surfaces, which can all affect vegetation within or adjacent to construction activities. The proposed rail line would contribute to these impacts, the extent of which would depend on the exact location and layout of the terminals. However, OEA expects that the proposed rail line's contributing impacts on vegetation would not be significant due to the limited overlap of the proposed rail line cumulative impacts study area; any ground disturbance and vegetation impact would be limited to within several hundred feet of the proposed rail line, which would not extend far into the terminal footprints. The proposed rail line would terminate in areas with little vegetation cover and low to very low Wildfire Hazard Potential (Forest Service 2020a). Therefore, the risk that operations at new rail terminals could trigger a wildfire would be low and OEA does not anticipate any cumulative wildfire impacts as a result of the proposed rail line and new rail terminals.

Special Status Species

As discussed in Section 3.4, *Biological Resources,* OEA concludes that impacts from construction and operation of the proposed rail line on biological resources would be significant in part because of the number of special-status species that could be affected, including species listed as threatened or endangered under the ESA. The proposed rail line would affect special-status species by displacing, degrading, or altering habitat, introducing a new source of noise that could disturb wildlife, and potentially causing injury or mortality of the species status species and changes to species distribution and composition. New oil and gas development projects could worsen impacts on special-status species if the projects were to take place in the same area as the proposed rail line and affect the same special-status species habitat as the proposed rail line.

Oil and gas development could affect special-status species in the same way that it could affect common plant and animal species. The types and severity of impacts from oil and gas development on special-status species would be similar to many of those that would occur from the proposed rail line (Section 3.4.3.1, *Impacts Common to All Action Alternatives*). The extent of potential cumulative impacts would depend on the location of the oil and gas development relative to the proposed rail line, with a greater potential for a cumulative impact if the activity is closer to the proposed rail line. However, similar to the discussions for wildlife and vegetation, the proposed rail line's contributing impacts on wildlife and vegetation are not anticipated to be extensive; any impact that would occur in terms of both ground disturbance to habitat and wayside noise from trains would generally be limited to within several hundred feet of the proposed rail line.

Implementation of the mitigation measures described in this ~~Draft~~ EIS would avoid, minimize, or mitigate impacts on special-status species from construction and operation of the proposed rail line. OEA is consulting with USFWS under ESA Section 7 to develop measures to avoid, minimize, and mitigate impacts on ESA-listed species, including Pariette cactus (*Sclerocactus brevispinus*), Uinta Basin hookless cactus (*Sclerocactus wetlandicus*), Barneby ridge-cress (*Lepidium barnebyanum*), Ute ladies'-tresses (*Spiranthes diluvialis*), Colorado pikeminnow (*Ptychocheilus Lucius*), humpback chub (*Gila cypha*), bonytail (*Gila elegans*), and razorback sucker (*Xyrauchen texanus*) (Appendix I, ~~*Draft*~~ *Biological Assessment*). New oil and gas development projects would follow either the ESA Section 7 process (for projects with a federal nexus) or ESA Section 10 process (for projects with no federal nexus), which would develop measures to avoid, minimize, or mitigate impacts on ESA-listed species. Under ESA Section 7, federal action agencies must ensure that their proposed action does not jeopardize the continued existence of ESA-listed species or adversely modify designated critical habitat. As part of the ESA Section 10 process, USFWS must also ensure that their action of issuing an Incidental Take Permit to a non-federal entity does not jeopardize the continued existence of ESA-listed species or adversely modify designated critical habitat. These requirements would lessen the cumulative impacts of oil and gas development projects and the proposed rail line on ESA-listed species.

Any of the Action Alternatives would cross habitat for greater sage-grouse (*Centrocercus urophasianus*), a special-status species that is managed by BLM and the State of Utah, in the Emma Park area near the southern ends of the Action Alternatives. As stated in Section 3.4.1.3, *Analysis Methods*, OEA convened a greater sage-grouse interagency working group to address potential construction and operation impacts of the proposed rail line on the species and their habitats. The working group included state and federal staff with expertise on the species and their habitats, assessing potential impacts, and implementation of the current state and BLM greater sage-grouse management plans. The interagency group focused on sage-grouse management areas (SGMAs), which are the areas identified as containing the necessary habitat for over 94 percent of the greater sage-grouse in Utah (UDWR 2021). As stated in the *Utah Conservation Plan for Greater Sage-Grouse* (State Plan) (State of Utah 2019), areas outside of SGMAs are not required for long-term conservation of the species because much of this habitat has already been disturbed by human and natural causes, and it not suitable for enhancement or improvement. Populations outside of SGMAs are not considered essential to perpetuate the species in Utah, and no specific management actions for this habitat are recommended (State of Utah 2019). Therefore, the interagency working group and impact analysis—including those impacts from cumulative projects—focused on the only SGMA that the Action Alternatives cross, the Carbon SGMA (Section 3.4.2.5, *Greater Sage-Grouse*).

Threats to the Carbon SGMA include isolated small-sized~~,~~ fire, weeds/annual grasses, energy development, mining, infrastructure, and recreation (BLM 2015). The Action Alternatives could contribute to fire, spread of weeds/grass, and infrastructure (i.e., habitat removal and noise-related effects) (Section 3.4.3.1, *Impacts Common to All Action Alternatives*, and Section 3.4.3.2, *Impact Comparison between Action Alternatives*). Of all cumulative projects identified and shown in Figure 3.15.1, there are only two cumulative projects that overlap both the Action Alternatives and the Carbon SGMA, the Castlegate gas field (i.e., energy development threat) and the Gateway South Transmission line (see *Other Projects and Actions* below). No other identified cumulative projects are located in the Carbon SGMA. Oil and gas development would contribute to many of the same threats as the proposed rail line, including fire, spread of weeds/grass, and development of the facility (i.e., removal of habitat and operations related impacts, such as noise). Several additional oil and gas fields are also within the Carbon SGMA but outside of the Action Alternatives.

Oil and gas well development (within or outside of a designated field) in the Carbon SGMA would be subject to the same federal and state management plans for protection of greater sage-grouse as the proposed rail line. Under the *Utah Greater Sage-Grouse Approved Resource Management Plan Amendment* (ARMPA) (BLM 2015), any action that would exceed the established 3 percent disturbance cap is not allowed until the disturbance has been reduced to less than the cap. Any future cumulative action that would exceed the BLM disturbance cap (regardless of land ownership) in the Carbon SGMA would not be allowed to proceed. The disturbance cap is a protective measure that limits habitat loss and habitat fragmentation. Additional non-habitat-related measures in SGMAs would also need to be addressed under the ARMPA for cumulative projects to help conserve the species, including noise levels near leks and lek populations within 3.1 miles of a proposed action. If the Board were to approve an Action Alternative that crossed BLM land, the Coalition would need to ensure that construction and operation of the proposed rail line would be in compliance with the ARMPA, which could include working with BLM to minimize impacts on greater sage-grouse (Chapter 4, *Mitigation*, BIO-MM-13). New oil and gas development projects, if on BLM land, would also need to comply with the ARMPA to avoid and minimize impacts on greater sage-grouse. The State Plan has similar protective measures as the ARMPA, but they are suggested measures rather than requirements. However, to offset the proposed rail line's impacts on greater sage-grouse, the Coalition has committed to executing a Mitigation Agreement with UDWR to address impacts on the Carbon SGMA (Chapter 4, *Mitigation*, VM-35). In addition, OEA is recommending mitigation requiring the Coalition avoid construction in the Carbon SGMA during the nesting and breeding season (BIO-MM-16). With the offsetting mitigation commitment for the proposed rail line, along with the requirements and guidance in the ARMPA and State Plan for any cumulative project development within the Carbon SGMA, OEA expects that cumulative impacts on greater sage-grouse would be significantly reduced.

For other BLM sensitive species, ~~I~~if the Board were to approve an Action Alternative that crossed BLM land, the Coalition would need to ensure that construction and operation of the proposed rail line would be in compliance with applicable BLM RMPs, which could include working with BLM to minimize impacts on BLM special-status species. New oil and gas development projects, if on BLM land, would also need to comply with applicable BLM RMPs and other BLM requirements that would minimize impacts on BLM special-status species~~, including greater sage-grouse~~. If the Board were to approve an Action Alternative that crosses Forest Service land, the Coalition would need to abide by any Forest Service requirements for minimizing impacts on Forest Service special-status species. Because the Forest Service Biological Evaluation (Appendix H, *Biological Evaluation*) concludes that the proposed rail line would have little or no impact on Forest Service Sensitive Species, OEA expects that cumulative impacts on Forest Service special-status species would not be significant.

The primary special-status species of concern near Myton and Leland Bench, where new rail terminals could be constructed, would be the Ute Ladies'-tresses, a federally listed threatened plant. With the exception of Ute Ladies'-tresses, there would be no cumulative impacts on ESA-listed species because the rail terminals would be outside of suitable habitat for those species (Appendix I, ~~*Draft*~~ *Biological Assessment*). The area where the Myton terminal could be constructed contains some emergent wetland, which could support Ute Ladies'-tresses. Construction of the terminals would disturb ground, remove vegetation, and add new impervious surfaces, which could all affect Ute Ladies'-tresses within or adjacent to construction activities, if that species is present in the footprint of the terminal. OEA is consulting with USFWS under ESA Section 7 to develop measures to avoid, minimize, or mitigate impacts on Ute ladies'-tresses. Developers of the new terminals would also implement measures developed under ESA Section 7 or ESA Section 10 that would minimize impacts on Ute ladies'-tresses from construction and operation of the new terminals. Both terminals would be outside of any UDWR- or BLM-mapped greater sage-grouse habitat (Figures 3.4-1 and 3.4-2, respectively); therefore, there would be no cumulative impacts on that species.

Other Projects and Actions

In addition to oil and gas development, other projects and actions could contribute to cumulative impacts on biological resources, including wildlife, fish, vegetation, and special-status species. The extent of potential cumulative impacts would depend on the location of the cumulative project relative to the proposed rail line, with a greater potential for a cumulative impact if the activity crosses the proposed rail line. Of the projects that OEA identified, the Forest Service's management of grazing allotments and the Gateway South Transmission Line would intersect the biological resources study area for the proposed rail line; the Uintah Advantage Energy Associates crude oil processing facility is within several hundred feet of the Action Alternative study areas. The Indian Canyon Alternative and Whitmore Alternative would intersect approximately 6 miles of the grazing allotments along US 191 in Ashley National Forest (Figure 3.15-1). The Indian Canyon Alternative would intersect the Gateway South Transmission line at one location, the Wells Draw Alternative would intersect the transmission line at three locations, and the Whitmore Park Alternative would intersect the transmission line at five locations ~~The Indian Canyon Alternative and Whitmore Alternative would each intersect the proposed Gateway South Transmission Line at one location, while the Wells Draw Alternative would intersect the proposed transmission line at two locations~~ (Figure 3.15-1).

Cattle grazing can adversely affect biological resources by controlling the vegetation species composition and structure and removing and/or trampling vegetation that would otherwise be used for wildlife food or cover. Defoliation from grazing can also benefit vegetation by promoting shoot growth; enhancing light levels, soil moisture, and nutrient availability; and aiding in seed dispersal and germination (USFWS 2009).

Electric transmission lines affect biological resources mainly by clearing vegetation (i.e., habitat loss), permanently changing forested habitat to shrubs and/or grasses (via vegetation maintenance in the right-of-way), and temporarily displacing wildlife during construction and operations. The Gateway South Transmission line would cross the greater sage-grouse Carbon SGMA for approximately 18.5 miles and crosses the Indian Canyon Alternative and Wells Draw Alternative once, and the Whitmore Park Alternative twice in the Carbon SGMA. The Gateway South Transmission line would parallel several leks within 1 mile in the Carbon SGMA. Power lines have been shown to affect greater sage-grouse habitat use and demography. Power line infrastructure may influence population dynamics through effects on survival, reproduction, and movements of individuals (Gibson et al. 2018). Direct impacts may occur when development acts directly as an agent of mortality (e.g., collision), and indirect impacts may occur as a by-product of other processes that are altered by infrastructure presence (e.g., raven predation on leks) (Gibson et al. 2018). Any of the three Action Alternatives would contribute to cumulative impacts on greater sage-grouse in the Carbon SGMA (as described in Section 3.4.3.1, *Impacts Common to All Action Alternatives*, and Section 3.4.3.2, *Impact Comparison between Action Alternatives*). If the Board were to approve an Action Alternative that crossed BLM land, the Coalition would need to ensure that construction and operation of the proposed rail line would be in compliance with the ARMPA, which could include working with BLM to minimize impacts on greater sage-grouse (Chapter 4, *Mitigation*, BIO-MM-13). The Gateway South Transmission Line is not on BLM land in the Carbon SGMA, and, therefore, is not subject to the ARMPA. The State Plan has similar protective measures as the ARMPA, but they are suggested measures rather than requirements. As discussed in Section 3.4, *Biological Resources*, the Coalition has committed to executing a Mitigation Agreement with UDWR to offset the proposed rail line's impacts on greater sage-grouse in the Carbon SGMA (Chapter 4, *Mitigation*, VM-35). In addition, OEA is recommending mitigation requiring the Coalition avoid construction in the Carbon SGMA during the nesting and breeding season (BIO-MM-16). With the offsetting mitigation commitment for the proposed rail line, along with the guidance in the State Plan for any cumulative project development within the Carbon SGMA, OEA expects that cumulative impacts of the proposed rail line and the Gateway South Transmission Line on greater sage-grouse would be minimized.

Any of the Action Alternatives would add to the biological resource impacts from cattle grazing and construction and operation of the Gateway South Transmission Line. The impacts from cattle grazing and electrical transmission lines on biological resources would be similar to many of those that would occur from the proposed rail line, specifically vegetation removal and trampling impacts (Section 3.4.3.1, *Impacts Common to All Action Alternatives*). However, similar to the discussions for oil and gas development and rail terminals, the proposed rail line's contributing impacts on most biological resources are not anticipated to be extensive; any impact that would occur in terms of both in ground disturbance to habitat and noise that would be generated by the train would be limited to within several hundred feet of the proposed rail line. For big game species, crucial habitat in UDWR big game management units could be affected by several of the other projects and actions. However, similar to the proposed rail line, the area of impact on crucial habitat for any of the big game species for the other projects and actions would be small compared to the available crucial habitat in the UDWR management unit. In addition, some of the other projects and actions are projects on existing infrastructure (e.g., road rehabilitation), which would not be considered big game habitat even though big game habitat polygons may overlap these areas. Big game movement corridors could be affected by other projects and actions, but many of the projects are existing infrastructure or projects that would unlikely pose a new barrier to movement (e.g., improvements and rehabilitation to existing roads) like the proposed rail line. The Uintah Advantage Energy Associates crude oil processing facility near the Leland Bench terminal is within crucial year-long pronghorn habitat, but similar to the proposed rail line, this area of impact on crucial habitat would be small compared to the available crucial habitat in the UDWR management unit. No big game movement corridors were identified by UDWR around the Uintah Advantage Energy Associates crude oil processing facility.

As discussed previously, the proposed rail line would affect special-status species, including ESA-listed species, by displacing, degrading, or altering habitat, introducing a new source of noise that could disturb wildlife, and potentially causing injury or mortality of special-status species and changes to species distribution and composition. Future projects worsen impacts on special-status species if the projects were to take place in the same area as the proposed rail line and affect the same special-status species habitat as the proposed rail line. Implementation of BLM or Forest Service requirements on BLM and Forest Service land, respectively, and of measures developed through ESA Section 7 or ESA Section 10, as applicable, would minimize these cumulative impacts.

3.15.5.5 Geology, Soils, Seismic Hazards, and Hazardous Waste Sites

Cumulative Impacts Study Area

OEA defined the cumulative impacts study area for geology and soils as a 0.5-mile buffer surrounding the construction footprint[3] of each Action Alternative and a 60-mile buffer surrounding the construction footprint of each Action Alternative for seismic hazards. The cumulative impacts study area for hazardous waste sites includes a 2,000-foot buffer surrounding the right-of-way for each Action Alternative. The cumulative impacts study area for geology and soils, seismic hazards, and hazardous waste sites are the same as for the analysis of direct and indirect effects.

Cumulative Impacts

Typically, only projects occurring adjacent to or very close to the project footprint have the potential to interact with the Action Alternatives to result in cumulative impacts related to geology and soils. The proposed rail line would affect geology and soils and would combine with impacts from the other related projects to result in cumulative impacts on geology and soils in the cumulative impacts study area. The types of impacts from cumulative actions on soils and geology would be similar to many of those that would occur from construction and operation of the proposed rail line (Section 3.4.3.1, *Impacts Common to All Action Alternatives*). Impacts would be related to increased potential for mass movement (e.g., landslide), increased erosion and sedimentation, compaction, mixing soil layers, decomposition of organic material, reduction in soil quality, and construction over unmapped abandoned mines, which could lead to collapse. The contribution of impacts from construction and operation of the proposed rail line to cumulative impacts in each affected project category is summarized as follows.

As it relates to the potential cumulative effect of hazardous waste sites, generally, only projects occurring adjacent or very close to the project footprint would have the potential to affect or be affected by the proposed rail line due to the limited potential impact radius associated with the release of hazardous waste into the environment. As discussed in Section 3.5, *Geology, Soils, Seismic Hazards, and Hazardous Waste Sites*, OEA did not identify any potential direct impacts related to hazardous waste sites in the study area.

Oil and Gas Development

Any of the Action Alternatives would intersect with oil and gas fields in the cumulative impacts study area. This overlap would include existing oil and gas wells, as well as both exploratory and production wells and supporting infrastructure that may be created in the future. Ground-disturbing activities associated with exploration and oil production, including drilling and road construction, would contribute to cumulative impacts, which would affect slope failure, soil erosion, and the potential for collapse. The Action Alternatives would also connect with the terminals at Myton and

[3] The *rail line footprint* includes the area of the railbed, as well as the full width of the area cleared and cut or filled. The rail line footprint would also include other physical structures installed as part of the proposed rail line, such as fence lines, communications towers, siding tracks, relocated roads, and power distribution lines. The rail line footprint is the area where rail line operations and maintenance would occur. The area would be permanently disturbed. The *temporary footprint* is the area that would be temporarily disturbed during construction, including areas for temporary material laydown, staging, and logistics. The temporary footprint would be reclaimed and revegetated following construction. The *project footprint* is the combined area of the rail line footprint and temporary footprint, both of which would be disturbed during construction, comprising where construction and operations of the proposed rail line would occur.

Leland Bench. The Myton terminal area contains soil resources that are vulnerable to both wind and water erosion. Both terminals could be constructed in the area of unmapped abandoned mines. Therefore, ground-disturbing activities associated with all three Action Alternatives would contribute to cumulative impacts affecting soil erosion near the Myton terminal and to cumulative impacts related to the potential for collapse associated with abandoned mines at both terminals. OEA assumes that future oil and gas development would comply with applicable federal and state permits and associated mitigation measures.

However, because future oil and gas development, the terminals, and the proposed rail line would be subject to many of the same applicable federal, state, and local permitting requirements, cumulative impacts related to geology, soils, and seismicity would be avoided or minimized through compliance with state and federal laws and regulations and local permitting requirements, including CWA Section 402, Occupational Safety and Health regulations, and Federal Railroad Administration requirements. Therefore, OEA concludes that the impacts related to geology, soils, and seismicity from the proposed rail line when combined with impacts from the terminals would not result in significant cumulative impacts.

Other Projects and Actions

In addition to potential future oil and gas development projects, the cumulative impacts study area for geology and soils ~~Action Alternatives~~ would intersect with the ~~footprint of the Removal of Indian Canyon Guard Station (Figure 3.15-1, Item 22) and the~~ Gateway South Transmission line (Figure 3.15-1, Item 24) and the Uintah Advantage Energy Associates crude oil processing facility (Figure 3.15-1, Item 27). Ground-disturbing activities associated with ~~all of~~ these actions would contribute to cumulative impacts affecting slope failure, soil erosion, and the potential for collapse. ~~Both the removal of the Indian Canyon Guard Station andt~~The Gateway South Transmission line would be constructed on geologic units subject to slope failure ~~and~~, on soils subject to soil erosion,~~.~~ ~~Both projects~~ and could be constructed in the area of unmapped abandoned mines. The Uintah Advantage Energy Associates crude oil processing facility is located on relatively flat land in the Basin where there is no risk of slope failure, but the facility is in an area that would be subject to wind erosion.

However, because the other projects and actions and the proposed rail line would be subject to many of the same applicable federal, state, and local permitting requirements, cumulative impacts related to geology, soils, and seismicity would be avoided or minimized through compliance with state and federal laws and regulations and local permitting requirements, including CWA Section 402, Occupational Safety and Health regulations, and FRA requirements. Therefore, OEA concludes that the impacts related to geology, soils, and seismicity from the proposed rail line, when combined with impacts from the other actions and projects, would not result in significant impacts.

3.15.5.6 Noise and Vibration

Cumulative Impacts Study Area

OEA defined the noise and vibration cumulative impacts study area as a 1-mile buffer from the track centerline of each Action Alternative. The cumulative impacts study area for noise and vibration is the same as the project study area for the analysis of direct and indirect effects.

Cumulative Impacts

Only projects occurring adjacent to or very close to the project footprint would have the potential to interact with the Action Alternatives to result in cumulative impacts related to noise and vibration. For example, the 65 DNL noise contours for rail operations would be less than 700 feet from the tracks. If another project were to generate noise at that level 700 feet from the tracks, the result would be a cumulative increase in noise level of 3 decibels. Noise sources further away would cause small cumulative increases in noise level, which typically would not be noticeable. Vibration is even more localized; therefore, cumulative vibration effects would be unlikely.

Oil and Gas Development

All of the Action Alternatives would intersect with oil and gas fields in the cumulative impacts study area. This overlap would include existing oil and gas wells, as well as both exploratory and production wells and supporting infrastructure that may be created in the future. As stated previously, cumulative noise and vibration effects are unlikely because of the lack of overlap of associated 65 DNL contours.

Truck-to-rail terminal facilities providing for tank car loading and storage could include multiple short tracks, one or more long tracks, or loop tracks. These activities would generate noise and vibration, as well as truck traffic to and from the terminals. Cumulative noise impacts associated with a terminal and rail line operations would be possible, but unlikely because there would be no through trains in the immediate vicinity of the new terminals. Therefore, OEA concludes that the impacts from the proposed rail line, when combined with impacts from past, present, and reasonably foreseeable actions, would not result in significant cumulative impacts related to noise and vibration.

Other Projects and Actions

The additional planned or proposed projects and actions known to OEA would not have direct impacts on rail operations noise and vibration because of the lack of overlap of associated 65 DNL contours. Therefore, OEA concludes that impacts from the proposed rail line, when combined with impacts from past, present, and reasonably foreseeable actions, would not result in significant cumulative impacts related to noise and vibration.

3.15.5.7 Air Quality and Greenhouse Gases

Cumulative Impacts Study Area

The air quality and greenhouse gases (GHGs) cumulative impacts study area includes the same areas as described in Section 3.7, *Air Quality and Greenhouse Gases*. The cumulative impacts study area for regional air quality includes the area within 100 kilometers (i.e., 62 miles) of the proposed rail line as shown in Section 3.7, Figure 3.7-1. This area is in the Wasatch Front Air Quality Control Region (AQCR) and the Utah Intrastate AQCR in Utah, as designated by USEPA. The eastern edge of the cumulative impacts study area also extends about 18 miles into the Yampa Intrastate AQCR in Colorado. Within the cumulative impacts study area, OEA assessed air quality related values (AQRVs), which are resources that could be adversely affected by a change in air quality, such as visibility and acidic deposition. There are no Class I areas within the cumulative impacts study area. However, OEA assessed AQRVs at the nearest Class I areas and at sensitive Class II areas that are located in the cumulative impacts study area.

Cumulative Impacts

As discussed in detail in Section 3.7, *Air Quality and Greenhouse Gases*, construction and operation of the proposed rail line would result in emissions of criteria air pollutants and hazardous air pollutants, changes in ambient concentrations of such pollutants, and impacts on visibility and acidic deposition. Any of the Action Alternatives would contribute to cumulative impacts on air quality by adding to impacts from other projects. Any of the Action Alternatives would contribute incrementally to climate change by adding GHG emissions. The following subsections describe the impacts of the other projects and how impacts from the proposed rail line, when added to the impacts of these other projects, could result in cumulative impacts on air quality.

Oil and Gas Development

The cumulative air quality impact assessment for oil and gas development is based on the assumptions discussed in Section 3.15.4.1, *Oil and Gas Development.* Although this assessment focuses on oil development because crude oil is the primary product that would be transported on the proposed rail line, the wells in the cumulative impacts study area also may produce natural gas. The construction and operation of infrastructure to process and transport the gas also would contribute to cumulative impacts.

Wells and Infrastructure Emissions

To estimate emissions from construction equipment, drilling equipment, and vehicles used in well development, OEA used information from the BLM *Monument Butte Oil and Gas Development Project Final Environmental Impact Statement*, which evaluated a proposed oil and gas field development project in the Uinta Basin (BLM 2016). The Monument Butte project would consist of 5,750 new oil and gas wells, including both vertical and horizontal oil wells, across 119,743 acres of southeastern Duchesne County and southwestern Uintah County.

As noted, OEA considers Monument Butte to be an example of the development that could occur as part of past, present, and reasonably foreseeable future oil and gas projects. Because of the volatility of energy markets, it would be speculative for OEA to predict the timing and amount of oil and gas development that could occur as part of the Monument Butte project. In the Monument Butte EIS, BLM conservatively calculated the air emissions that could occur if all 5,750 proposed oil and gas wells were operating in a given year (the maximum emissions year), which would be unlikely to occur. Because the number of producing wells in the maximum emissions year for the Monument Butte EIS (5,750 wells) is higher than the number of producing wells that would be needed to support the high oil production scenario in any year (3,330 wells), OEA believes that the air quality impacts described for the maximum emissions year in the Monument Butte EIS represent a conservative estimate of the air quality impacts that could result from producing the crude oil that could move on the proposed rail line.

To assess cumulative impacts on air quality and greenhouse gases, OEA added the estimated emissions from operation of the proposed rail line to estimated emissions from other reasonably foreseeable projects, including the oil and gas development that would be needed to meet the oil production scenarios, and compared those combined emissions to the emissions for the maximum emissions year from the Monument Butte EIS. OEA did not add the maximum emissions year emissions from the Monument Butte EIS to the cumulative emissions from the proposed rail line and reasonably foreseeable future projects because doing so would unreasonably overestimate potential future emissions from oil and gas development and cumulative air quality impacts in the study area.

OEA assumed that total ~~the~~ oil and gas development in the Basin would not increase above baseline levels by more than would be required to meet the high oil production scenario. Oil and gas development at levels greater than would be required to meet the high oil production scenario would be unlikely because the project would not have the capacity to transport the additional production, and no alternative infrastructure exists to transport additional production from the Basin.

The air quality analysis described in the Monument Butte Final EIS drew on the data and results of the Utah Air Resource Management Strategy (ARMS) Modeling Project (BLM 2014), a comprehensive regional modeling study. The ARMS Modeling Project is a cumulative assessment of potential future air quality impacts associated with predicted oil and gas activity in the Basin. The ARMS Modeling Project provides data, models, and estimates of future air quality impacts to facilitate BLM's future NEPA and land use planning efforts. The CMAQ photochemical modeling system was used, primarily because if its ability to replicate observed wintertime ozone formation and timing in the Basin (BLM 2014). To analyze potential future year impacts, model simulations were conducted for a "typical year" based on annualized 2010 emissions, and for four 2021 scenarios reflecting differing levels of emissions controls. Cumulative air quality impacts within the Basin were assessed for criteria pollutants and AQRVs.

As discussed previously, the Monument Butte development project is an example of a recent oil and gas development proposal in the Basin. If the Monument Butte project were developed, crude oil produced from the Monument Butte wells potentially could be transported on the proposed rail line. The Monument Butte EIS considers the environmental impact of developing and operating a total of 5,750 new wells, including both vertical and horizontal wells. OEA recognizes that the characteristics of other potential future oil and gas development projects in the cumulative impact study area could differ from those in the Monument Butte oil field, but there are no available data on the characteristics of other potential future oil and gas development projects. Because the Monument Butte EIS provides the best available data source on oil and gas development projects in the Basin, OEA adopted the assumptions and inputs from the Monument Butte EIS to assess cumulative air impacts. OEA assumed that future oil and gas field development in the cumulative impacts study area would have characteristics similar to those described for the Monument Butte project, including the types and numbers of equipment, trucks, and commuter vehicles that would be required, and that construction emissions on a per-well or per-facility basis would also be similar to those estimated for Monument Butte.

Similarly, OEA assumed that localized air quality impacts of future oil and gas field development in the cumulative impacts study area would be similar to the localized impacts described for the Monument Butte project. The specific locations of localized air quality impacts in the cumulative impacts study area are not known because there are no available data on the characteristics or local site conditions of potential future oil and gas development projects.

Total air pollutant emissions each year would vary according to the number of wells constructed in that year. Construction emissions on a per-well basis would be the same for both the low oil production scenario and high oil production scenario, but the high oil production scenario would result in more wells under construction at any particular time and so would have greater annual emissions than the low oil production scenario. For purposes of estimating cumulative impacts of the proposed rail line, OEA assumed the low oil production scenario would coincide with the low rail traffic scenario, and the high oil production scenario would correspond to the high rail traffic scenario. Table 3.15-11~~9~~ shows the emissions by source type for both oil production scenarios.

OEA assumed that future well operations in the cumulative impacts study area would have characteristics similar to those of the Monument Butte project as discussed previously, including the same facilities, equipment and vehicles, truck trips, and emissions controls.

Once a well is producing, emissions occur from operations and maintenance activities, which generate truck trips to the well site, and from trucks that transport the crude oil to the rail terminals. Emissions also occur from venting, flaring, equipment leaks, and engine exhaust from equipment located at operating wells (e.g., heaters, dehydrators, separators, tanks, pumpjack engines). Operations and maintenance activities for gas wells are similar to those for oil wells, and emissions are assumed to be similar.

Table 3.15-~~9~~11. Estimated Emissions Associated with Oil and Gas Development by Source

Pollutants	Low Oil Production Scenario[a]				High Oil Production Scenario[a]			
	Well Construction	Well Operation	Termini Operation	Total	Well Construction	Well Operation	Termini Operation	Total
Criteria Pollutants and Volatile Organic Compounds (U.S. tons per year)								
CO	9	1,511	146	1,666	25	4,041	388	4,454
NO_X	32	1,092	51	1,175	86	2,922	138	3,146
PM10	159	356	30	546	432	952	79	1,463
PM2.5	17	128	7	152	47	342	17	406
SO_2	0	3	0	3	0	8	0	8
VOCs	4	2,023	51	2,078	10	5,412	136	5,558
Hazardous Air Pollutants (U.S. tons per year)								
Acetaldehyde	0	11	0	11	0	30	0	31
Acrolein	0	11	0	11	0	30	0	30
Benzene	0	9	0	9	0	23	0	23
1,3-Butadiene	0	1	0	1	0	4	0	4
Ethylbenzene	0	0	0	0	0	1	0	1
Formaldehyde	0	80	0	81	1	215	0	216
DPM	1	73	0	75	4	196	1	201
Napthalene	0	0	0	0	0	0	0	1
POM	0	0	0	0	1	0	0	1
GHGs (metric tons per year)								
CO_2	6,744	603,746	7,790	618,279	18,292	1,614,838	20,700	1,653,830
CH_4	0	1,722	0	1,722	0	4,605	1	4,606
N_2O	0	1	0	1	0	3	0	4
CO_2e	6,785	640,198	84,585	731,568	18,404	1,712,337	227,449	1,958,190

Notes:

[a] Values less than 0.5 have been rounded to zero.

CO = carbon monoxide; NO_X = oxides of nitrogen; PM10 = particulate matter 10 microns or less in diameter; PM 2.5 = particulate matter 2.5 microns or less in diameter; SO_2 = sulfur dioxide; VOCs = volatile organic compounds; DPM = diesel particulate matter; POM = polycyclic organic matter; GHGs = greenhouse gases; CO_2 = carbon dioxide; CH_4 = methane; N_2O = ~~nitrogen~~ nitrous ~~di~~oxide; CO_2e = carbon dioxide equivalent

Rail Terminal Emissions

As discussed previously, the Coalition has not proposed to construct and operate new rail terminals in the Basin. OEA assumes that other entities, such as firms that specialize in oil field and/or freight logistics, would construct new rail terminals at the terminus points of the proposed rail line near Myton and Leland Bench. Because those new rail terminals are not part of the Coalition's proposed project, OEA does not know the specific size and design of the terminals and, therefore, cannot quantify the construction emissions. In general, rail terminal facilities consist mostly of rail track, storage tanks, and structures that can be built using standard construction techniques and that occupy a relatively small construction footprint compared to the size of the completed facility. Because new rail terminals would be located in generally flat areas, there would be minimal need for earthmoving, a construction activity that can result in high levels of air emissions. Activities related to the construction of terminal rail tracks would move over time, which would result in more dispersion of emissions than if the activity occurred at only one location. Given these circumstances, OEA anticipates that the emissions from terminal construction, including construction of the rail line leading from the terminal, would not lead to ambient concentrations that could exceed the NAAQS in the local areas of the terminals. Concentrations would be lower at greater distances from the terminals. Therefore, OEA anticipates that terminal construction would not contribute to cumulative air quality impacts.

OEA estimated emissions from terminal operations based on permitted emissions for the existing Price River Terminal in Price, Utah (UDEQ 2015) adjusted for the quantities of oil handled. Table 3.15-11~~9~~ includes the estimated emissions from terminal operations. The terminals would require air quality permits. As part of the permit application process the terminal developer must demonstrate to the satisfaction of UDEQ that the facility would not cause ambient concentrations to exceed the NAAQS. In addition, OEA does not expect that the cumulative impact of terminal operations and rail operations on the line to the terminal would exceed the NAAQS because the locomotives would be moving and would not be near the stationary emissions sources at the terminal for long periods of time, which would result in more dispersion of emissions than if all the sources were concentrated at only one location, and concentrations would be lower at greater distances from the terminals.

Downstream End Use Emissions

Refiners would refine the crude oil transported by the proposed rail line into various fuels and other products. To the extent that the crude oil would be refined into fuels that would be combusted to produce energy, emissions from the combustion of the fuels would produce GHG emissions that would contribute to global warming and climate change.

As discussed in Section 3.7, *Air Quality and Greenhouse Gases*, there is broad scientific consensus that humans are changing the chemical composition of Earth's atmosphere. Activities such as fossil fuel combustion, deforestation, and other changes in land use are resulting in the accumulation of GHGs such as carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), and several industrial gases in Earth's atmosphere. The International Panel on Climate Change (IPCC) estimates that the global average concentrations of CO_2, CH_4, and N_2O in the atmosphere have increased by around 40, 150, and 20 percent, respectively, from pre-industrial times until today (IPCC 2014). An increase in GHG emissions is thought to result in an increase in Earth's average surface temperature, primarily by trapping heat and, thus, decreasing the amount of heat energy radiated by Earth back into space. This phenomenon is commonly referred to as global warming. Global warming is expected, in turn, to affect land and sea surface temperatures, precipitation rates, weather patterns, average sea level, polar ice levels, ocean acidification, and other climatic variables, effects which collectively are referred to as climate change.

The IPCC Fifth Assessment Report (IPCC 2014) indicates that the climate system is warming. The report states that global mean surface temperature has increased since the late 19th century and that maximum and minimum temperatures over land have increased on a global scale since 1950. In addition, the globally averaged combined land and ocean surface temperature data show a warming of 0.85 degrees Celsius (°C) or 1.5 degrees Fahrenheit (°F) since 1950. The IPCC concludes that it is extremely likely that human influence has been the dominant cause of the observed warming. The IPCC (2014) has predicted that the average global temperature rise between 1986 and 2100 could be as great as 4.8°C (8.6°F), which could have massive deleterious impacts on the natural and human environments.

The Board generally cannot restrict the types of products and commodities that are transported on rail lines and, in fact, has held that railroads have a common carrier obligation to carry all commodities, including hazardous materials, upon reasonable request under 49 U.S.C. § 11101. See Riffin v. STB, 733 F.3d 340, 345-47 (D.C. Cir. 2013) (and cases cited therein). In addition, the Board has no role in determining or controlling the final destinations or end uses of any products or commodities transported on the proposed rail line. Therefore, because it has no jurisdiction or control over the destinations or end uses of any products or commodities transported on the proposed rail line, the Board is not required to analyze impacts related to the destinations or end uses of any such products or commodities. Dep't of Transp. v. Public Citizen, 541 U.S. 752, 766-70 (2004). Nevertheless, OEA is reporting the GHG emissions that could be associated with the combustion of fuels produced from crude oil transported on the proposed rail line in the context of cumulative impacts. See id. at 769-70. OEA assumed conservatively that combustion would be the end use of all of the crude oil. OEA estimated the GHG emissions from this combustion, assuming conservatively that these fuels would not displace other fuels from the market~~,~~ but would add to existing fuel consumption. Table 3.15-12~~0~~ shows the estimated GHG emissions from combustion of the crude oil transported by the proposed rail line.

Table 3.15-~~10~~12. Estimated GHG Emissions from Combustion of Fuels Refined from Crude Oil Transported on the Proposed Rail Line

	Estimated Greenhouse Gas Emissions (metric tons per year)			
Scenario	**CO_2**	**CH_4**	**N_2O**	**CO_2e**
Low oil production	19,716,083	807	167	19,785,953
High oil production	53,081,761	2,172	449	53,269,873

Notes:
CO_2 = carbon dioxide; CH_4 = methane; N_2O = ~~nitrogen~~ nitrous ~~di~~oxide~~s~~; CO_2e = carbon dioxide equivalent

For comparison, the downstream end use emissions associated with the combustion of crude oil transported on the proposed rail line under the low oil production scenario represent approximately 0.3 percent of nationwide GHG emissions and 0.04 percent of global GHG emissions. Downstream end use emissions under the high oil production scenario represent approximately 0.8 percent of nationwide GHG and 0.1 percent of global GHG emissions. Downstream end use emissions would represent a higher percentage of statewide emissions in Utah, but such a comparison would not be appropriate because OEA expects that the crude oil transported on the proposed rail line would not be refined or used in Utah. As noted previously, the estimates in Table 3.15-12 and the corresponding percentages of nationwide and global GHG emissions are conservative and may overstate impacts because some of the crude oil transported on the proposed rail line could be refined into products other than fuels and some of the fuels produced from crude oil transported on the proposed rail line could displace other fuels from the market. To the extent that crude oil transported on the proposed rail line could be refined into products other than fuel or the fuels produced from crude oil transported on the proposed rail line could displace other fuels, GHG emissions from downstream end uses would be lower than those shown in Table 3.15-12.

Cumulative Air Quality Effects

Approach

Ambient pollutant concentrations and AQRVs in the cumulative impacts study area are influenced by numerous emissions sources spread throughout the study area and beyond, as well as by regional meteorology and topography. BLM and other agencies have modeled the cumulative impacts of oil and gas development and other reasonably foreseeable development in the region. To assess the cumulative impacts of the proposed rail line and the projected oil and gas development, OEA used information from a detailed photochemical air quality modeling study developed for the Monument Butte EIS (BLM 2016, Appendix K). The Monument Butte Final EIS includes details of the modeling. The maximum emissions year analyzed in the Monument Butte Final EIS assumes that a total of 5,750 wells would be producing in a single year, which is substantially higher than the 3,330 wells that would be needed to support the high oil production scenario, as described in Section 3.15.4.1, *Oil and Gas Development*, for the high oil production scenario.

The Monument Butte development would be located in the Basin in Duchesne County ~~southeast of Duchesne County and~~ south of Myton, and would extend eastward about ~~25~~5 miles into Uintah County. This area is within the region from which producers would truck their crude oil production to the rail terminals. OEA considers the location of the Monument Butte development to be reasonably representative of the cumulative impacts study area in which oil and gas development would occur and, therefore, concluded that the estimated impacts of the Monument Butte development should be used to represent the impacts of the oil and gas development described in Section 3.15.4.1, *Oil and Gas Development*. Because the Monument Butte Final EIS analyzed a maximum emissions year that would involve more wells than would be needed to support the maximum projected rail traffic on the proposed rail line, OEA considers the results of the Monument Butte modeling study to be a conservative representation of the air quality impacts of future oil and gas development. Table 3.15-13~~1~~ shows that the estimated emissions of Monument Butte for the maximum emissions year are larger than the sum of the cumulative emissions from the operation of the proposed rail line and other reasonably foreseeable projects.

OEA estimated the air quality effects of the oil and gas development described in Section 3.15.4.1, *Oil and Gas Production*, by using the Monument Butte study. That study used the Community Multi-scale Air Quality (CMAQ) model, version 5.0. CMAQ is a photochemical grid model, which is a type of computer model that simulates the formation, transport, and fate of ozone and other pollutants in the atmosphere.[4] Further details of the emissions inventories, input parameters, and model assumptions are provided in the BLM study (BLM 2016: Appendix K).

[4] The modeling domain encompassed Utah and western Colorado using a grid of cells 4 kilometers and 12 kilometers on a side.

Table 3.15-~~11~~13. Relative Levels of Monument Butte and Uinta Basin Railway Cumulative Emissions

Project	Number of Producing Wells	Estimated Emissions (tons per year)					
		CO	NO_x	PM_{10}	$PM_{2.5}$	SO_2	VOC
Monument Butte EIS							
Monument Butte proposed action, maximum-emissions year	5,750	8,524	5,690	2,904	617	14	10,360
Proposed Rail Line (Uinta Basin Railway)							
High oil production scenario	3,330	4,454	3,146	1,463	406	8	5,558
Action Alternatives rail operations, high rail traffic scenario (Wells Draw Alternative)	–	1,401	1,238	379	77	2	121
Cumulative: sum of oil and gas and rail operations	3,330	5,855	4,384	1,842	483	10	5,679
Rail operations emissions as percent of cumulative impacts	–	24%	28%	21%	16%	20%	2%
Relative Emissions Levels of Cumulative Impacts and Monument Butte							
Sum of oil and gas and rail operations as percent of Monument Butte	58%	69%	77%	63%	78%	71%	55%

Notes:
Values have been rounded to the nearest ton.
Source: BLM 2016: Appendix K
CO = carbon monoxide; NO_X = oxides of nitrogen; PM_{10} = particulate matter 10 microns or less in diameter; $PM_{2.5}$ = particulate matter 2.5 microns or less in diameter; SO_2 = sulfur dioxide; VOCs = volatile organic compounds

Ambient Concentrations

An important capability of the CMAQ model is the ability to estimate ozone concentrations. Ozone is a component of photochemical smog and is formed from reactions of precursor chemicals (primarily oxides of nitrogen [NO_x] and volatile organic compounds [VOCs]) in the presence of sunlight. Ozone is of particular concern in the Basin because high levels of ozone have been measured there in winter, and USEPA has designated the Basin as nonattainment for ozone.

Appendix M, *Air Quality Emissions and Modeling Data,* Tables M-1 through M-7, shows the predicted impact of the Monument Butte project on criteria pollutant levels in the cumulative impacts study area, as well as the nearest Class I and sensitive Class II areas. The results reported in the Monument Butte project analysis indicate the following.

- The maximum nitrogen dioxide (NO_2) levels at all sites would be less than the NAAQS and Utah Ambient Air Quality Standards (AAQS). Because the high oil production scenario that OEA analyzed would involve a smaller number of wells than were considered in the Monument Butte project, OEA concludes that cumulative NO_2 concentrations from the proposed rail line and potential future oil and gas development would also be less than the NAAQS and Utah AAQS.

- The maximum carbon monoxide (CO) levels at all sites would be less than the NAAQS and Utah AAQS. Because the high oil production scenario that OEA analyzed would involve a smaller number of wells than were considered in the Monument Butte project, OEA concludes that cumulative CO concentrations from the proposed rail line and potential future oil and gas development would also be less than the NAAQS and Utah AAQS.
- The maximum sulfur dioxide (SO_2) levels at all sites would be less than the NAAQS and Utah AAQS. Because the high oil production scenario that OEA analyzed would involve a smaller number of wells than were considered in the Monument Butte project, OEA concludes that cumulative SO_2 concentrations from the proposed rail line and potential future oil and gas development would be less than the NAAQS and Utah AAQS.
- The maximum ozone impact of the Monument Butte project would not lead to exceedances of the ozone NAAQS at most sites. However, modeled total ozone levels exceed the NAAQS at some sites under existing conditions in the absence of Monument Butte. This is consistent with ozone exceedances measured by DEQ in winter in the Basin. Although the Monument Butte project would increase ozone concentrations, the Monument Butte modeling predicted no new exceedances due to Monument Butte. Because the high oil production scenario that OEA analyzed would involve a smaller number of wells than were considered in the Monument Butte project, OEA concludes that cumulative emissions of ozone precursors (VOC and NO_X) from the proposed rail line and potential future oil and gas development would be lower than predicted for the Monument Butte project. Existing exceedances of the ozone NAAQS would still occur.
- The maximum predicted levels of particulate matter 10 microns or less in diameter (PM_{10}) and annual particulate matter 2.5 microns or less in diameter ($PM_{2.5}$) with the Monument Butte project at all sites would be less than the NAAQS and Utah AAQS. Total 24-hour $PM_{2.5}$ levels would be less than the NAAQS and Utah AAQS at all sites except one. Because the high oil production scenario that OEA analyzed would involve a smaller number of wells than were considered in the Monument Butte project, OEA concludes that cumulative PM_{10} and $PM_{2.5}$ concentrations from the proposed rail line and potential future oil and gas development would be less than concentrations described for the Monument Butte EIS.

Prevention of Significant Deterioration

The Prevention of Significant Deterioration (PSD) program applies to projects subject to stationary source permitting in attainment areas. The PSD regulations set limits (i.e., increments) on the incremental pollutant concentrations that a project may contribute. The allowable increments are lower in Class I areas than in Class II areas. (There are no Class I areas in the cumulative impacts study area). PSD requirements did not apply to the Monument Butte project because the modeling was not part of a stationary source permitting process. Nevertheless, PSD increments can be used as a guide to compare results and to provide context for evaluating air quality impacts. PSD increments also do not apply to rail projects because railroads are not stationary sources, but the increments can be used to compare potential impacts for purposes of information. In the Monument Butte project analysis, no predicted impacts exceeded the applicable PSD increments. Because the oil production scenarios that OEA analyzed would involve smaller numbers of wells than were considered in the Monument Butte project, OEA concludes that cumulative impacts of the proposed rail line and potential oil and gas development would also be within the applicable PSD increments.

Visibility

- Under the Clean Air Act, visibility is an AQRV of concern for Class I areas (Section 3.7, *Air Quality and Greenhouse Gases*). In the Monument Butte project modeling, visibility impacts exceeded the applicable thresholds on multiple days. Because the oil production scenarios that OEA analyzed would involve smaller numbers of wells than were considered in the Monument Butte project, OEA concludes that cumulative impacts of the proposed rail line and potential oil and gas development would be lower than those described in the Monument Butte EIS. In general, the number of days on which visibility impacts would exceed the thresholds would be less than estimated for the Monument Butte project.

Acidic Deposition

- Under the Clean Air Act, acidic deposition is an AQRV of concern for Class I areas. The Monument Butte project modeling estimated that the nitrogen deposition analysis threshold (DAT) was exceeded in some areas but the sulfur DAT was not exceeded in any area. Because the oil production scenarios that OEA analyzed would involve smaller numbers of wells than were considered in the Monument Butte project, OEA concludes that cumulative impacts of the proposed rail line and potential oil and gas development relative to acidic deposition would be less than estimated for the Monument Butte project.
- For sensitive lakes, the change in acid neutralizing capacity (ANC) was calculated in the Monument Butte project study using the methodology suggested by the Forest Service (2000). The change in ANC was compared to the threshold of a 10 percent change in ANC for lakes with background ANC values greater than 25 micro-equivalents per liter (μeq/l) and no more than a 1 μeq/l change in ANC for lakes with background ANC values equal to or less than 25 μeq/l. The only sensitive lake in the cumulative impacts study area for which data are available is Dean Lake in the High Uintas Wilderness Area. At Dean Lake the estimated impact due to the Monument Butte project is a 0.18 percent change in ANC, which is less than the 10 percent threshold, and a change in ANC of 0.15 μeq/l, which is less than the 1 μeq/l threshold. Because the oil production scenarios that OEA analyzed would involve smaller numbers of wells than were considered for the Monument Butte project (Table 3.15-13~~1~~), OEA concludes that cumulative impacts of the proposed rail line and potential oil and gas development would also be less than the applicable ANC thresholds.

Other Projects and Actions

The proposed rail line would affect air quality and would combine with impacts from other projects to result in cumulative impacts on air quality in the cumulative impacts study area. Other projects and actions would produce criteria air pollutant and hazardous air pollutant emissions. These emissions, when combined with emissions from other sources in and beyond the cumulative impacts study area, would lead to cumulative impacts on ambient air quality and AQRVs. Figure 3.15-1 shows the other projects and actions in the cumulative impacts study area with the potential to contribute to cumulative impacts, which include infrastructure improvements, watershed improvement projects, road improvement projects, Forest Service actions, interstate electric power transmission lines, ~~and~~ cultural resources preservation, and a crude oil processing facility.

Most projects and actions would occur well outside of the study area for the proposed rail line. These projects would have to comply with Utah DEQ and other state permits and approvals related to air quality. Because of their expected emissions levels and their distance from the proposed rail line, OEA considers the air quality impacts of these projects to be captured in the background concentrations applied in the air quality modeling. The impacts described above based on the modeling would include the cumulative contributions from these projects.

Projects that occur near the proposed rail line, if constructed simultaneously with rail line construction in the same local area, could result in localized cumulative impacts. OEA anticipates that only roadway improvement projects and the crude oil processing facility could occur near the proposed rail line. Once constructed, roadway improvements would not contribute further to air quality impacts. OEA anticipates that the crude oil processing facility would contribute to local air quality impacts during operations. However, the crude oil processing facility would have to comply with Utah DEQ permitting requirements, which are intended to prevent violations of the applicable air quality standards.

Therefore, OEA concludes that the impacts from the proposed rail line, when combined with impacts from past, present, and reasonably foreseeable actions, would not result in new exceedances of the NAAQS or AQRV thresholds. The cumulative impacts of the proposed rail line could increase the pollutant levels that are associated with existing exceedances of the 24-hour PM2.5 NAAQS, the ozone NAAQS, and visibility impact thresholds.

3.15.5.8 Energy

Cumulative Impacts Study Area

OEA defined the energy cumulative impacts study area as the construction footprint for each Action Alternative, because this is the area where all construction and operation activities that would consume energy would take place. The cumulative impacts study area also includes the energy supply and distribution infrastructure, including electricity transmission, crude oil pipelines, natural gas pipelines, and petroleum product pipelines that could intersect the proposed rail line, and existing fuel (gasoline, diesel fuel) transport, storage, and distribution infrastructure that could supply fuel to the proposed construction and operation of the rail line.

OEA has included potential terminal locations and construction and operation of diesel fuel storage distribution equipment for fueling locomotives in the cumulative impacts study area. OEA also considered energy consumption related to the construction and operation of potential new rail terminal facilities and the disposition of crude oil that would be transported by the proposed rail line. For this reason, the cumulative impacts study area for energy is not the same as for the analysis of direct and indirect effects.

Cumulative Impacts

Oil and Gas Development

Construction of any of the Action Alternatives would provide the capacity to transport crude oil from the Basin to locations outside the Basin. Under the low oil production scenario, an estimated 130,000 barrels per day would be transported from the Basin by rail. Under the high oil production scenario, an estimated 350,000 barrels per day would be transported from the Basin by rail. There are five petroleum refineries located in Utah, all in the Salt Lake City area. These refineries have the capacity to process approximately 100,000 barrels per day of crude oil from the Basin received by truck. OEA does not anticipate that crude oil transported via the Action Alternatives would directly serve the existing oil refineries in Salt Lake City ~~in the short-term~~ because those refineries do not currently have the facilities to accept trains carrying crude oil. OEA anticipates that the crude oil would be transported by rail to other states. Therefore, the additional production of crude oil would contribute to the national supply of crude oil but would not directly affect petroleum refining in Utah or directly contribute to petroleum-product production in Utah. OEA expects that the direct impacts from the proposed rail line would not result in cumulative impacts on petroleum refining or petroleum production in Utah.

In the event that the Board authorizes the proposed rail line, rail terminals would be needed in the Basin to transfer commodities between truck and rail transportation modes. Operation of the rail terminals would consume energy directly in the form of fuel (diesel fuel and gasoline) for operation of rail terminal equipment and vehicles and operation of rail terminal personnel vehicles. Rail terminal equipment would include heated crude oil storage tanks and associated piping and pumping and mobile crane and other loading and unloading equipment. Operation of the rail terminals would also consume energy in the form of electricity for operation of terminal equipment, lighting, and administration and utility buildings. OEA anticipates that fuel consumption for rail operations and operation of the rail terminals would be small relative to the refining capacity of the Salt Lake City area refineries and would not, therefore, have a significant impact on regional fuel supply.

Other Projects and Actions

Electric Transmission Line Construction

The right-of-way of the ~~proposed~~ PacifiCorp Gateway South Transmission Line would cross the Indian Canyon Alternative at one location, the Whitmore Park Alternative at ~~one~~ five locations, and the Wells Draw Alternative at three locations. Construction of the Gateway South Transmission Line is anticipated to occur from June 2021 to October 2023 (Rocky Mountain Power 2020). The Action Alternatives also would cross the rights-of-way of two existing electric transmission lines. Figure 3.8-1 shows the existing electric transmission lines in the study area. Figure 3.15-1 shows the routes of the ~~proposed~~ planned electric transmission lines in the cumulative impacts study area.

The Gateway South Transmission Line is expected to be constructed from 2021 to 2023 and could be constructed at the same time as the proposed rail line. It is not known whether construction would commence at the specific points where the Gateway South Transmission Line would cross the Action Alternatives before or after the commencement of construction of the Action Alternatives. In either case, any crossing of utility rights-of-way would occur in accordance with applicable regulatory standards (Appendix B, *Applicable Regulations*). As discussed in Section 3.8, *Energy*, OEA does not anticipate that construction of the proposed rail line would require any modification or relocation of the right-of-way of the ~~proposed~~ Gateway South Transmission Line. The ~~proposed~~ TransWest Express Transmission Line (Figure 3.15-1, Item 25) would not cross any of the Action Alternatives; therefore, no cumulative impacts would result.

Infrastructure ~~Project Construction~~ and Other Cumulative Projects

Construction of infrastructure projects, including the Roosevelt Airport expansion and improvements and Peerless Port of Entry construction and improvements, would consume energy in the form of diesel fuel and gasoline for operation of on-road and off-road construction vehicles and equipment and for operation of construction personnel vehicles. Infrastructure projects constructed during the same timeframe as proposed construction of the Action Alternatives would contribute to demand for diesel fuel and gasoline (Appendix R, *Other Projects and Actions Considered in the Cumulative Impacts Analysis*).

The anticipated construction timeframe for the Indian Canyon Alternative and Whitmore Park Alternative is 2 years (24 months), and the anticipated construction timeframe for the Wells Draw Alternative is 2.6 years (32 months). Cumulative projects, including the Gateway South Transmission Line, the Pelican Lake Sediment Control Project, and several road improvement projects, could be under construction during the same timeframe as the Action Alternatives. Other cumulative projects, including the Roosevelt Airport expansion, the Ashley Valley Watershed Project, the Uintah Advantage Energy Associates crude oil processing facility, and other road improvement projects, are currently in the planning phases and do not have firm estimates of construction dates (Appendix R, *Other Projects and Actions Considered in the Cumulative Impacts Analysis*). Construction of these planned cumulative projects could also occur during the timeframe of construction of the Action Alternatives.

Section 3.8, *Energy*, Table 3.8-1, provides diesel fuel and gasoline consumption for each year of construction for each Action Alternative. OEA anticipates that total fuel consumption from construction of the Action Alternatives and from cumulative projects constructed in the same timeframe would be small relative to the refining capacity of the Salt Lake City area refineries and would, therefore, not affect regional fuel supply during the construction period.

Section 3.8, *Energy*, Table 3.8-4, provides fuel consumption for rail operations by scenario for the low rail traffic and high rail traffic scenarios for each Action Alternative. Cumulative projects, including road improvements, watershed improvements, and Forest Service actions, would not consume fuel after completion of construction except for equipment and vehicle operations associated with maintenance activities. The proposed Roosevelt Airport expansion and improvements, ~~and~~ Peerless Port of Entry construction and improvements, and the Uintah Advantage Energy Associates crude oil processing facility would increase fuel consumption for operation of those facilities. OEA concludes that fuel consumption for rail operations associated with the proposed rail line, when combined with fuel consumption from the operation of past, present, and reasonably foreseeable actions, would not result in significant cumulative impacts on regional fuel supply. The Uintah Advantage Energy Associates crude oil processing facility would process energy feedstocks and base oil and may contribute to the local fuel supply.

3.15.5.9 Cultural Resources

Cumulative Impacts Study Area

The cultural resources cumulative impacts study area is larger than the study area for direct and indirect cultural resources. It includes the area illustrated on Figure 3.15-1, which encompasses the region's oil and gas fields and other proposed projects. Its northern boundary latitude runs though Vernal and its southern boundary through Price. On the west, the boundary longitude is approximately parallel to State Route 89. The eastern boundary is the Utah/Colorado state line.

Cumulative Impacts

Construction and operation of the proposed rail line would result in the following impacts on cultural resources: destruction, removal, or alteration of resources within the project footprint, obstructions to accessing cultural resources, and setting impacts (including visual impacts) on resources outside the project footprint. Any Action Alternative could contribute to cumulative impacts on cultural resources by adding to impacts from other projects.

Oil and Gas Development

Cumulative impacts on archaeological resources from oil and gas development would result from ground disturbance during the construction of new access roads, well pads, pipelines, rail terminals, and other associated infrastructure. To the extent that they are present, archaeological resources located on or below the ground surface would be damaged or destroyed by the digging needed to construct the infrastructure used to extract and transport oil and gas. To the extent that tribal resources, above-ground archaeological resources (e.g., rock imagery), and/or built environment resources are present within the footprint of the new infrastructure, these resources would also be damaged or destroyed by construction. Operation of new oil and gas extraction facilities could also impact the setting of above-ground cultural resources.

Impacts from construction and operation of the proposed rail line combined with impacts from oil and gas development could result in cumulative impacts on cultural resources if oil and gas development projects were to take place within the APE of the Action Alternatives. OEA concludes that adverse cumulative impacts on cultural resources would result because of the potential for permanent damage to or destruction of such resources from construction and degradation of their settings. Mitigation could reduce, but would not eliminate, these cumulative cultural resources impacts. As discussed in Section 3.9, *Cultural Resources*, adverse effects on cultural resources from construction and operation of the proposed rail line would be appropriately addressed by the implementation of the PA that OEA is developing under Section 106 of the NHPA (Appendix O, ~~*Draft*~~ *Programmatic Agreement*). Therefore, OEA concludes that the contribution of the proposed rail line to cumulative impacts on cultural resources would not be significant.

Other Projects and Actions

Although the nature and intensity of each planned project's impacts would vary, the addition of projects or actions in the study area would result in more impacts on cultural resources. Depending on the nature of the other project or action, cultural resources including tribal, archaeological, and built environment resources present within or adjacent to the footprint of the any new infrastructure would be damaged or destroyed by construction. Depending on the character-defining features of cultural resources within the study area of these projects or actions, operation of new projects or actions could also impact the setting of adjacent cultural resources.

Infrastructure Improvement, Watershed Improvement, ~~and~~ Road Improvement, and Crude Oil Processing Facility Projects

To the extent that cultural resources are present within or adjacent to the footprints of any proposed facility, infrastructure, watershed, ~~and~~ road improvement, and crude oil processing facility projects, impacts from such projects would result. Mitigation could reduce, but likely would not eliminate, impacts. If the affected cultural resources are located within the APE of the Action Alternatives, then construction and operation of the proposed rail line could contribute to cumulative impacts on those cultural resources. Because adverse effects on cultural resources from the proposed rail line would be appropriately addressed by the implementation of the PA that OEA is developing in consultation with Section 106 consulting parties, OEA concludes that the contribution of the proposed rail line to cumulative impacts on cultural resources would not be significant.

Federal Agency Actions

Proposed Forest Service projects include removal of a historic guard station, which would be an impact on a cultural resource even with mitigation. Other Forest Service projects may involve ground disturbance or other activities that result in impacts on cultural resources. Some proposed BLM actions may involve ground disturbing activity or other forms of damage/destruction to cultural resources that result in an impact. Mitigation could reduce, but likely would not eliminate, impacts. If the affected cultural resources are located within the APE of the Action Alternatives, then construction and operation of the proposed rail line could contribute to cumulative impacts on those cultural resources. Because adverse effects on cultural resources from the proposed rail line would be appropriately addressed by the implementation of the PA that OEA is developing in consultation with Section 106 consulting parties, OEA concludes that the contribution of the proposed rail line to cumulative impacts on cultural resources would not be significant.

Interstate Electric Power Transmission

The ~~proposed~~ Gateway South and the TransWest Express transmission line projects both anticipate impacts on cultural resources. Both projects have a Section 106 PA in place to address avoiding, minimizing, and mitigating such impacts. Due to the nature of transmission lines, which have some flexibility in terms of siting, it is possible that impacts on cultural resources can be avoided but equally possible that impacts that cannot be mitigated would occur. Mitigation could reduce, but likely would not eliminate, impacts. If the affected cultural resources are located within the APE of the Action Alternatives, then construction and operation of the proposed rail line could contribute to cumulative impacts on those cultural resources. Because adverse effects on cultural resources from the proposed rail line would be appropriately addressed by the implementation of the PA that OEA is developing in consultation with Section 106 consulting parties, OEA concludes that the contribution of the proposed rail line to cumulative impacts on cultural resources would not be significant.

Cultural Resources Preservation

Although the PA between BLM and the Utah State Historic Preservation Office designed to mitigate adverse effects on historic properties, the need for mitigation implies that cultural resources are being impacted. If the affected cultural resources are located within the APE of the Action Alternatives, then construction and operation of the proposed rail line could contribute to cumulative impacts on those cultural resources. Because adverse effects on cultural resources from the proposed rail line would be appropriately addressed by the implementation of the PA that OEA is developing, OEA concludes that the contribution of the proposed rail line to cumulative impacts on cultural resources would not be significant.

3.15.5.10 Paleontological Resources

Cumulative Impacts Study Area

OEA defined the cumulative impacts study area for paleontological resources as the project footprint, which includes all areas of temporary disturbance where construction activities and staging would occur and all areas of permanent disturbance, including the railbed, access roads, communication towers, and areas of cut and fill. The cumulative impacts study area for paleontological resources is the same as for the analysis of direct and indirect effects.

Cumulative Impacts

A cumulative impact on paleontological resources would occur when past, present, and reasonably foreseeable future projects, in combination with the proposed rail line, would cumulatively disturb, damage, or destroy scientifically important paleontological resources. Paleontological resources are nonrenewable resources because once they are lost, they cannot be recovered. Cumulative impacts on paleontological resources involve the loss of scientifically important fossils and associated data and the incremental loss to science and society of these resources over time.

Past construction projects, such as road construction and oil and gas well development, that have disturbed the ground and subsurface in areas of high potential to contain fossils have resulted in cumulative conditions affecting paleontological resources in the Basin. However, existing laws and regulations that provide protections for paleontological resources are known to reduce potential impacts with the implementation of mitigation measures during surface- and subsurface-disturbing actions. When properly designed and implemented, these mitigation measures can result in the recovery and permanent preservation of large numbers of scientifically significant paleontological resources that would otherwise have been damaged or destroyed and can greatly reduce the cumulative impacts of construction projects on paleontological resources. With appropriate mitigation, some construction projects can result in beneficial impacts on paleontological resources by making fossils available for scientific research and education that would otherwise never have been unearthed or discovered.

Oil and Gas Development

Impacts on paleontological resources as the result of oil and gas development in the cumulative impacts study area would occur primarily if fossil-rich geologic units, such as the Green River and Uinta formations, were disturbed during the construction of new access roads, well pads, and pipelines. These actions could damage or destroy surface and subsurface paleontological resources through physical breakage, resulting in direct adverse impacts. New road construction facilitates increased public access to the cumulative impacts study area, which can result in indirect adverse impacts, such as the loss of scientifically important paleontological resources due to unlawful collection and vandalism. With the implementation of appropriate mitigation measures, these impacts could be reduced and could result in beneficial cumulative impacts through the recovery of previously undiscovered paleontological resources of scientific importance. When combined with impacts from past, present, and reasonably foreseeable oil and gas development, OEA expects that impacts from the proposed rail line would not result in significant cumulative impacts on paleontological resources.

The Action Alternatives would connect with the new rail terminals at Myton and Leland Bench. Both terminals would be located in PFYC 2 geologic units, which have low potential to contain paleontological resources (Section 3.10, *Paleontological Resources,* Figure 3.10-1)*.* Therefore, OEA concludes that no cumulative impacts on scientifically important paleontological resources would occur.

Other Projects and Actions

Construction of various planned future projects in the cumulative impacts study area would include surface and subsurface disturbance to geologic units that have the potential to contain scientifically important fossils that could be damaged or destroyed. Additionally, development projects that result in increased public access due to new roads and trails increase the potential for the loss of scientifically important paleontological resources due to theft and vandalism. The Gateway South Transmission Line project could have direct and indirect impacts on paleontological resources. This project, in combination with the Action Alternatives, would have the potential to cumulatively disturb, damage, or destroy scientifically important paleontological resources. Once they are lost, paleontological resources cannot be recovered because they are nonrenewable. However, the implementation of appropriate mitigation measures during the approval process for the construction projects could result in a beneficial impact through the recovery and permanent preservation of scientifically important paleontological resources that would otherwise likely never have been discovered. Therefore, OEA concludes that the impacts from the proposed rail line, when combined with impacts from past, present, and reasonably foreseeable actions, would not result in significant cumulative impacts on paleontological resources.

3.15.5.11 Land Use and Recreation

Cumulative Impacts Study Area

The cumulative impacts study area for land use and recreation encompasses Carbon, Duchesne, Uintah, and Utah Counties in Utah. The cumulative impacts study area differs from the footprint-specific study area defined Section 3.11, *Land Use and Recreation*, because construction of an Action Alternative would preclude any other land use impacts within that footprint. The broader four-county planning cumulative impacts study area supports a cumulative impact analysis of total acres of land use designation and ownership impacts.

Cumulative Impacts

Oil and Gas Development

The impacts from oil and gas development would be consistent with trends associated with the continued development of oil and gas resources in the cumulative impacts study area. These trends include increasingly greater density of surface disturbance and construction of facilities due to infill drilling in known oil and gas fields; increasing the potential for loss of livestock forage due to surface disturbance and livestock mortality from vehicle traffic; and increasing visual and noise impacts on recreational users. The proposed rail line would contribute to these changes in land use, including permanent changes in landownership and the loss of public and private lands used for grazing, agriculture, and mineral development. Construction and operation of any of the Action Alternatives would also contribute to visual and noise impacts on recreational users, particularly on areas of public lands where recreationists seek solitude and unobstructed recreational experiences. In the event the proposed rail line is authorized and constructed, OEA anticipates that rail terminals would be constructed near Myton and Leland Bench to transfer commodities between truck and rail transportation modes. Operation of the rail terminals, as well as construction and operation of the proposed rail line, would require the permanent conversion of historical land uses. The rail terminals would be constructed on private land and would result in permanent changes in land ownership and the loss of lands used for grazing, agriculture, and mineral development if these uses are present and could not be avoided during construction and operation of the terminals. The proposed rail line would contribute to these impacts, as well as to visual and noise impacts on recreational activities, particularly if the immediate vicinity of the terminal areas is used for hunting.

As discussed in Section 3.11, *Land Use and Recreation*, construction and operation of the proposed rail line would result in locally significant impacts on land use and recreation, including the permanent loss of irrigated cropland and grazing land, the severance of properties, and visual and noise disruption of recreational activities on public and private lands. Construction and operation of new oil and gas development projects and new rail terminals could worsen those impacts if they were to occur in the same area as the proposed rail line because of the potential for permanent changes in landownership, the loss of public and private lands, and the increase in visual and noise impacts on recreational users.

Other Projects and Actions

The types of impacts that would affect land use and recreation from past, present, and future actions in the cumulative impacts study area, such as changes in land use and recreational experiences from interstate electric power transmission projects, are similar to those that would occur from the proposed rail line (Section 3.11.3.1, *Impacts Common to All Action Alternatives*). Conversely, Forest Service actions in the cumulative impacts study area such as the Badlands Lop and Scatter Project and the Badlands Trail Project would result in beneficial impacts on land use and recreation by improving hunting and recreational opportunities.

Short-term cumulative impacts on land use, including the potential loss of public and private lands used for grazing, agriculture, and mineral development would result from the combination of any of the Action Alternatives and the past, present, and future actions. The long-term cumulative impacts would include the permanent conversion of existing land use, permanent loss of livestock forage, and loss of existing cropland. The short-term cumulative impacts on recreation from any of the Action Alternatives in combination with the past, present, and future actions would include potential altered access and increased noise and visual impacts during construction. Long-term cumulative impacts on recreation include new infrastructure that would introduce permanent visual and noise impacts on recreationists in the cumulative impacts study area. The contribution of impacts on land use and recreation from the proposed rail line would generally be greatest under the Wells Draw Alternative because it would affect the most total land, followed by the Whitmore Park Alternative and then the Indian Canyon Alternative. The Indian Canyon Alternative and Whitmore Park Alternative would contribute short- and long-term cumulative impacts on IRAs by introducing new visual and noise impacts on National Forest System lands. If the Indian Canyon Alternative or Whitmore Park Alternative were licensed, the Coalition will consult with the Forest Service to ensure that construction and operation of the rail line complies with the *Ashley National Forest Land Management Plan* (Forest Service 2017a), including any existing or potential amendments to that plan, and with the Forest Service 2001 Roadless Rule. Because the Indian Canyon Alternative or the Whitmore Park Alternative alignment would adhere to mitigation conditions imposed by the Forest Service, OEA anticipates that cumulative impacts on IRAs would not be significant.

3.15.5.12 Visual Resources

Cumulative Impacts Study Area

The cumulative impacts study area for visual resources is the viewshed that encompasses both the proposed rail line and the other cumulative projects. The cumulative impacts study area encompasses up to 10 miles from the rail line footprint, which is within the middleground to background zones. This broad study area includes views of the cumulative projects that OEA identified, as well as the proposed rail line. The cumulative impacts study area for visual resources is not the same as for the analysis of direct and indirect effects.

Cumulative Impacts

Oil and Gas Development

Impacts on visual resources resulting from oil and gas development in the cumulative impacts study area would occur where exploration, construction, and operation of oil and gas infrastructure would be visible by a casual observer. Visual intrusions into the landscape could include any type of infrastructure related to the oil and gas development, including new access roads, well pads, and pipelines, as well as associated vegetation clearing. The proposed rail line would contribute to these visual impacts by introducing new humanmade infrastructure into the landscape. These cumulative impacts would occur where oil and gas wells are located in the vicinity of the proposed rail line and visible to viewers passing through the cumulative impacts study area. The area where these cumulative impacts would occur already contains extensive oil and gas infrastructure and the addition of new industrial elements would not change the overall visual character. Therefore, OEA concludes that impacts from the proposed rail line, when combined with impacts from past, present, and foreseeable future oil and gas development, would not result in significant cumulative impacts on visual resources.

The Action Alternatives would connect with the terminals at Myton and Leland Bench. Construction and operation of the terminals would introduce industrial elements on the landscape and generate fugitive dust and temporary nighttime lighting. The proposed rail line would contribute to these visual effects by adding additional rail and industrial infrastructure near Myton and Leland Bench. Because the terminals would be located on private land and in areas where oil and gas industry-related infrastructure already exists on the landscape, impacts on visual resources would be limited. OEA concludes that the proposed rail line, when combined with construction and operation of the terminals, would not result in significant cumulative impacts.

Other Projects and Actions

The proposed rail line would combine with impacts from other projects and actions in the cumulative impacts study area to result in cumulative impacts on visual resources. Construction of new rail terminals and other projects in the cumulative impacts study area, including the *Duchesne County Watershed Plan* (NRCS Utah 2020), the Duchesne County Myton Main Street project, the U.S. Highway 40 improvement project, the removal of the Indian Canyon Guard Station, Ashley National Forest grazing allotments, ~~and~~ the Gateway South Transmission Line, and the Uintah Advantage Energy Associates crude oil processing facility would contribute to impacts on visual resources. Each of these projects and plans would be within 10 miles of the Action Alternatives and would be visible within the foreground to background views from the proposed rail line. Impacts on visual resources from other projects and actions would primarily include construction activities, with the exception of the Gateway South Transmission Line and the Uintah Advantage Energy Associates crude oil processing facility, which would also contribute impacts post-construction. Impacts on visual resources associated with the Duchesne County Myton Main Street Project, U.S. Highway 40 improvement project, and removal of the Indian Canyon Guard Station would be temporary and would decrease to negligible impacts post-construction as the infrastructure for these projects is already present. Temporary impacts on visual resources from these projects could result from increased dust, the presence of construction equipment, and increased traffic. The overall landscape features would likely not be noticeable to the casual observer because the basic elements of form, line, color, and texture would likely remain post-construction.

As stated in Section 3.12, *Visual Resources*, direct impacts resulting from the proposed rail line under the Indian Canyon Alternative and the Whitmore Park Alternative would conflict with the existing Ashley National Forest visual quality objective designations. OEA is therefore recommending mitigation requiring the Coalition follow the reasonable requirements of any Forest Service decision permitting the proposed rail line within Ashley National Forest, should the Board approve either the Indian Canyon Alternative or the Whitmore Park Alternative, and to ensure that construction and operation on Forest Service lands comply with the *Ashley National Forest Land Management Plan* (Forest Service 2017a). The Forest Service may need to amend the *Ashley National Forest Land Management Plan* to update visual quality objective designations to permit the proposed rail line.

The *Duchesne County Watershed Plan* (NRCS Utah 2020), ~~and~~ the Gateway South Transmission Line, and the Uintah Advantage Energy Associates crude oil processing facility would contribute to visual impacts in the cumulative impacts study area during construction and post-construction of those projects. Similar to the description of the temporary impacts from other projects above, impacts on visual resources from these projects could result from increased dust, the presence of construction equipment, and increased traffic. Long-term impacts that could result post-construction include vegetation clearing and the introduction of infrastructure and humanmade features (such as transmission lines and associated infrastructure, canals, flood-control elements, ~~and~~ irrigation elements, and industrial buildings and facilities associated with crude oil processing). The introduction of these features could result in changes in the basic elements of form, line, color, and texture, and would remain post-construction. The Uintah Advantage Energy Associates crude oil processing facility would be located on private land near the proposed rail line terminus at Leland Bench, in an area of the Basin with substantial past, present, and future oil and gas development. The proposed rail line and the crude oil processing facility would add new industrial facilities to an area where oil and gas industry-related infrastructure already exists on the landscape; therefore, impacts on visual resources would be limited.

The Ashley National Forest grazing allotments are within the cumulative impacts study area. The effects of grazing livestock are apparent in the area, such as fences, troughs and small water developments, but the water developments and fences are generally masked by vegetation and are not easily noticeable (Forest Service 2017b). Because these grazing allotments are currently present, and no additional improvements or changes are proposed for the allotments, no additional impacts are anticipated.

Cumulative projects including the Gateway South Transmission Line, *Duchesne County Watershed Plan* (NRCS Utah 2020), Myton Main Street Project, U.S. Highway 40 improvement project, and removal of the Indian Canyon Guard Station could be under construction during the same time as the proposed rail line. Rail terminals could also be constructed during the same time frame as the proposed rail line, which would result in cumulative impacts on visual resources. OEA concludes that the impacts from the proposed rail line, when combined with impacts from past, present, and reasonably foreseeable actions, would not result in significant cumulative impacts on visual resources due to the additional visual disturbances these actions would introduce into the landscape.

3.15.5.13 Socioeconomics

Cumulative Impacts Study Area

OEA defined the cumulative impacts study area for socioeconomics as the four-county area that includes Carbon, Duchesne, Uintah, and Utah Counties. The cumulative impacts study area for socioeconomics is the same as for the analysis of direct and indirect effects.

Cumulative Impacts

Potential socioeconomic impacts of the proposed rail line could result from property acquisitions and displacements, displaced economic activity, adverse effects on nonmarket social values[5] and quality of life, benefits to the local economy, and increased tax revenue. Other past, present, and reasonably foreseeable future actions would contribute to or offset socioeconomic impacts of the proposed rail line as described below.

Oil and Gas Development

Construction of the proposed rail line would increase transportation capacity to ship an additional 130,000 to 350,000 barrels of oil on average each day from existing oil fields in the study area (Figure 3.15-1). To produce a steady state volume of oil to meet the planned transportation capacity of the proposed rail line, OEA estimates that oil and gas companies would need to drill between 49 and 131 new wells annually and would need to construct ancillary facilities for oil field development (i.e., access roads, electric power distribution lines, well pads, and storage tanks). This estimated increase in annual oil production would generate long-term employment, labor income, and increased direct, indirect, and induced spending on goods and services in the cumulative impacts study area and would generate increased state and local revenue through income taxes and sales and use taxes. New wells drilled on state land or accessing state minerals would also generate additional revenue for the state through royalties and lease payments.

Economic benefits related to direct, indirect, and induced spending would extend to members of the Ute Indian Tribe who reside in the cumulative impacts study area and to Indian-owned businesses that would benefit from indirect and induced spending. Other revenue streams associated with oil and gas development that would directly benefit the Ute Indian Tribe include royalties and lease payments associated with oil well development on Tribal trust lands, compensation for water use agreements to provide water for drilling, direct and indirect employment to support oil and gas development on Tribal trust lands, and payment of taxes and business fees to the tribe.

Employment for oil field development could result in short-term or long-term jobs depending on the pace of development over time, with more steady state employment leading to longer-term jobs and more uneven cycles of employment resulting in shorter-term employment. Forecast increases in employment for oil field development would increase demand for housing and public services in the cumulative impacts study area for as long as the rail line is in operation.

In the event the proposed rail line is authorized and constructed, rail terminals would be needed to transfer commodities between truck and rail transportation modes. Construction of the rail

[5] Nonmarket social values include appreciation for areas that are ecologically or culturally unique or sensitive, scenic, undisturbed, and free of pollution and areas that provide opportunities for quiet recreation, or that convey a sense of place.

terminals would generate employment and labor income and would increase direct, indirect, and induced spending on goods and services within the cumulative impacts study area. Construction of the rail terminals would also generate increased state and local revenue through income taxes and sales and use taxes. These economic benefits would extend to tribal members that reside in the cumulative impacts study area and to Indian-owned businesses that would benefit from indirect and induced spending.

OEA estimated that peak employment for construction of the rail terminals would be 300 workers for each facility, or up to 600 workers if the facilities are constructed concurrently. Construction employment for the rail terminals would be additive to construction employment for the proposed rail line and would further increase demand for temporary housing and public services in communities located within a commuting distance to each job site. However, if dedicated construction camps are used for construction of the rail terminals, the demand for temporary housing would be reduced.

During operations, OEA estimated that each of the two rail terminals would employ 50 to 125 personnel for operations. Long-term employment for operation of the rail terminals could be filled by local workers or nonlocal workers that migrate to the study area and increase demand for public services and long-term housing. OEA estimated that between 622 and 1,675 truck trips per day would be needed to transport oil from oil fields in the Basin to the rail terminals during operations, which would increase employment for short-haul trucking in the study area. OEA anticipates that long-haul trucking would continue to serve oil refineries in the Salt Lake City area during rail operations.

In 2017, over 2,000 temporary accommodations and over 2,500 vacant housing units were available in the communities of Helper, Price, Wellington, Myton, Roosevelt, Duchesne, Ballard, Vernal, and Naples in Utah (Section 3.13, *Socioeconomics*, Table 3.13-2), and OEA anticipates that cumulative demand for short-term and long-term workforce housing would not exceed available capacity during construction or operation of the proposed rail line.

Conversion of land in the Basin for additional oil production and construction of the rail terminals would add industrial facilities, construction noise, truck traffic, and air quality emissions, which would result in adverse effects for nonmarket social values and quality of life for populations, including tribal members, that reside in proximity to oil fields and the proposed locations for the rail terminals. These effects would be additive to adverse effects on nonmarket social values and quality of life from construction and operation of the proposed rail line.

The economic benefits of the cumulative actions would generally be regional while the adverse economic effects would be more localized. OEA concludes that, as a whole, the impacts from the proposed rail line, when combined with impacts from past, present, and reasonably foreseeable oil and gas development, would not result in significant adverse cumulative impacts on socioeconomics.

Other Projects and Actions

Other reasonably foreseeable future actions including implementation of watershed improvement projects, road improvements, facility and other infrastructure improvements, ~~and~~ construction of interstate electric power transmission lines, and a crude oil processing facility would generate construction employment, labor income, and increased direct, indirect, and induced spending on goods and services within the cumulative impacts study area. Construction employment and spending would also generate increased state and local revenue through income taxes and sales and use taxes. Increases in employment and revenue generation would be additive to the Action Alternatives.

OEA expects that workers employed for construction of local infrastructure improvement projects would be sourced locally, while construction of the interstate transmission lines would employ a mix of local and nonlocal workers that would move along the transmission lines as they are constructed. Temporary construction workers that do not reside locally would increase demand for public housing and services in the study area. The Uintah Advantage Energy Associates crude oil processing facility would require temporary construction workers to build the facility and a permanent skilled workforce to operate and maintain the facility. OEA anticipates that the operations workforce would reside and contribute to spending in local communities located near the processing facility. To the extent that operations jobs for the proposed rail line and other cumulative projects would be filled by nonlocal workers, the influx of workers to the study area would increase demand for local housing and public services. Road improvements and other facility and infrastructure improvements (i.e., Roosevelt airport and library expansions, Port of Entry improvements, stormwater infrastructure improvements) would increase the capacity or quality of public facilities in the study area, which would be beneficial for meeting the increased demand for those services by nonlocal construction workers.

Acquisition of land for other reasonably foreseeable future actions would be negotiated between the project proponent and landowner, and OEA does not expect there would be cumulative effects related to land acquisition and displacement, or displacement of economic activity. OEA does not expect that cumulative projects on private land that are in areas with existing infrastructure development, such as the Uintah Advantage Energy Associates crude oil processing facility, would substantively alter the landscape or affect recreational setting or wildlife habitat that contribute to quality of life in the study area. Construction of two interstate electric power transmission lines (Gateway South and TransWest) would add large-scale utility infrastructure to the landscape with further deterioration of the scenic, recreational, environmental, and wilderness aspects of lands in the study area. Other existing and reasonably foreseeable future actions offer offsetting benefits for maintaining these qualities in the landscape. For example, large areas within the cumulative impacts study area are managed as public lands administered by BLM and the Forest Service. As such, BLM and Forest Service land management plans and associated land use designations comprise the principal mechanism for maintaining land uses that support nonmarket values and quality of life in the study area. Continued federal management of public lands with special designations (i.e., ACECs, Special Recreation Management Areas, Lands with Wilderness Characteristics, and IRAs) in accordance with BLM and Forest Service land management plans would have offsetting benefits for the maintenance of scenic, recreational, environmental, and wilderness aspects of lands in the study area. In summary, OEA expects that the beneficial impacts from increased employment and spending would offset the adverse impacts from the deterioration of scenic, recreational, environmental and wilderness aspects of lands within the study area. Therefore, OEA concludes that the impacts from the proposed rail line, when combined with impacts from past, present, and reasonably foreseeable actions, would not result in significant adverse cumulative impacts on socioeconomics.

3.15.5.14 Environmental Justice

Cumulative Impacts Study Area

OEA defined the cumulative impacts study area for environmental justice as the four-county area that includes Carbon, Duchesne, Uintah, and Utah Counties. The cumulative impacts study area for environmental justice is the same as for the analysis of direct and indirect effects.

Cumulative Impacts

OEA reviewed the cumulative impact analyses for all resource areas analyzed in Section 3.14, *Environmental Justice*, to identify any high and adverse cumulative impacts related to construction and operation of the proposed rail line in combination with other past, present, and reasonably foreseeable future actions. For the cumulative environmental justice analysis, OEA identified high and adverse impacts where cumulative impacts would be significant under NEPA or above generally accepted norms and have the potential to adversely affect minority populations, low-income populations, or American Indian tribes. These high and adverse impacts include increases in vehicle delay on local roads that would be used for rail terminal operations, and cumulative impacts of oil and gas development on land use, recreation, and air quality.

OEA also reviewed other adverse impacts that the Ute Indian Tribe identified as areas of concern, to determine if impacts would be otherwise high and adverse for tribal members specifically. Through consultation with the Ute Indian Tribe, OEA identified impacts related to air emissions, vehicle safety and delay, rail operations safety, big game habitat and movement~~igration~~ corridors, impacts on habitat for Pariette cactus and Uinta Basin hookless cactus, and protection of cultural resources as areas of concern to the tribe.

Where OEA identified high and adverse cumulative impacts that would affect minority populations, low-income populations, or American Indian tribes, OEA evaluated whether those impacts would be disproportionately high and adverse. To make this determination, OEA considered whether the affected minority populations, low-income populations, or American Indian tribes would experience exposure to an adverse effect that would be appreciably more severe or greater in magnitude than the adverse effect that the general population in the affected area would experience. In making its determinations, OEA considered the totality of the circumstances, including the benefits that could result from the proposed rail line in combination with other past, present, or reasonably foreseeable future actions.

Oil and Gas Development

Vehicle Safety and Delay

Construction and operation of any of the Action Alternatives would—along with oil and gas development activities in the Basin and construction and operation of the rail terminals—contribute to increased vehicle trips in the cumulative impacts study area.

OEA anticipates that construction of the proposed rail line would occur during the same time period as terminal construction and that both activities would contribute additional vehicle trips on study area roads. The major roadways in the study area all have substantial additional capacity. Vehicles would also use a network of local roads near the terminal locations during construction of the terminals. Construction traffic would increase vehicle trips and could result in delays and localized road damage. This impact would be temporary during the construction period. OEA expects that damage to local roads caused by construction activities would be addressed through road use or easement agreements. Because of the ample roadway capacity in the study area and temporary nature of the impact, traffic from construction of the proposed rail line, when combined with traffic from terminal construction would not result in significant impacts on vehicle delay.

Once the proposed rail line and the terminals are constructed, additional vehicle trips would be generated for development and maintenance of oil wells, transporting oil from oil fields to the terminals, and for operation of the proposed rail line and rail terminals, including vehicle trips for employee commuting. Traffic generated for oil field development and maintenance, and for transporting oil out of the field, would be dispersed across the major roadways and other local public and private roadways used to access oil fields in the Basin (Figure 3.15-1).

OEA concludes that because of ample roadway capacity and the dispersion of the increased traffic from oil and gas development, impacts on major roadways from the proposed rail line, when combined with traffic from oil and gas development would not result in significant cumulative impacts on vehicle delay. Local roads, however, have smaller roadway capacity, and an increase in traffic on local roads used to serve the terminals would result in locally significant cumulative impacts on vehicle delay. Local roads near the rail terminals include Leland Bench Road, 7500 E~~,~~ /AR-88, and Sandwash Road/6000 W/~~5888~~ 5880 W. Increases in traffic to support terminal operations on these roads could be substantial, and without road improvements such as additional turning lanes, could result in vehicle delays. The rail terminals are located in an area where minority and low-income populations and American Indian tribal members live. Because high and adverse effects related to vehicle delay on local roads near the terminals would affect communities where these populations are present, and would not occur elsewhere, OEA determined that impacts on local roads from terminal operation would result in a disproportionately high and adverse effect on minority and low-income populations, and the Ute Indian Tribe.

Rail Operations and Safety

Terminal operations involve heated storage tanks, loading and unloading racks, and train tracks for active loading that have the potential for accidents involving injuries to workers; damage to rail cars, trucks, and equipment on site; or possibly oil spills resulting from equipment failures, human errors, or external events (such as vandalism or extreme weather). The terminal operator's use of proper procedures, protective equipment, and training would limit the likelihood of injury or damage. Constructing and operating the rail terminals in compliance with applicable local, state, and national standards and guidelines would minimize both the potential for accidents of any kind and the potential consequences of accidents. OEA determined that the cumulative impact of operating the proposed rail line and rail terminals would not be high and adverse. Therefore, impacts related to rail operations and safety would not result in disproportionately high and adverse impacts on minority and low-income populations, or American Indian tribes.

Air Quality

Ambient pollutant concentrations in the cumulative impacts study area are influenced by numerous emissions sources spread throughout the study area and beyond, as well as by regional meteorology and topography. Oil and gas development would result in air emissions from construction equipment, drilling equipment, and vehicles used in well development. Once a well is producing, emissions occur from operations and maintenance activities, which generate truck trips to the well site, and from trucks that transport the crude oil to the rail terminals. Emissions also occur from venting, flaring, equipment leaks, and engine exhaust from equipment located at operating wells. USEPA has designated the Basin as nonattainment for ozone and OEA expects that existing exceedances of the ozone NAAQS would continue if the proposed rail line was constructed and operated in combination with ongoing oil and gas development in the cumulative impacts study area. Air emissions from oil and gas development would occur throughout the study area within oil fields shown on Figure 3.15-1 and impacts on air quality would not be disproportionately borne by minority or low-income populations, or the Ute Indian Tribe.

The rail terminals are located in an area where OEA has identified the presence of minority and low-income populations, and the Ute Indian Tribe. OEA anticipates that air emissions from terminal construction and operation would not lead to ambient concentrations that could exceed the NAAQS in the local areas of the terminals. In addition, OEA does not expect that the cumulative impact of terminal operations and rail operations on the track to the terminal would exceed the NAAQS. The terminals would require air quality permits. As part of the permit application process the terminal developer must demonstrate to the satisfaction of Utah DEQ that the facility would not cause concentrations to exceed the NAAQS. Locomotives are mobile sources and would only intermittently contribute to ambient pollutant concentrations at the terminals, which are stationary sources.

OEA concludes that cumulative impacts on air quality resulting from construction and operation of the proposed rail line and rail terminals would not be high and adverse, and therefore would not result in disproportionately high and adverse effects on minority or low-income populations, or the Ute Indian Tribe.

Biological Resources

Sclerocactus

Construction of any of the Action Alternatives would temporarily disturb and permanently remove suitable habitat for Pariette cactus and Uinta Basin hookless cactus. The amount of temporary disturbance and permanent removal of suitable habitat would be greatest under the Wells Draw Alternative. The Indian Canyon Alternative and Whitmore Park Alternative could also temporarily disturb or permanently remove habitat in a Core 2 Conservation Area[6] on Tribal trust lands. Oil and gas fields in the cumulative impact study area overlay close to 350,000 acres of suitable habitat for *Sclerocactus* and more than 94,000 acres of Core Conservation Area, and future oil and gas development in the Basin would likely remove additional suitable habitat for Pariette cactus and Uinta Basin hookless cactus.

Pariette cactus and Uinta Basin hookless cactus are both listed as threatened under ESA. To address impacts of the Action Alternatives on the Pariette cactus and Uinta Basin hookless cactus, OEA is consulting with USFWS to develop appropriate mitigation for those species, pursuant to ESA Section 7. Future oil and gas development involving federal surface or federal minerals in the cumulative impact study area would also trigger consultation with USFWS under Section 7. This would reduce the impacts of future oil and gas development on Pariette cactus and Uinta Basin hookless cactus where there is a federal nexus. OEA also expects that oil and gas development on Tribal trust lands would be conducted in accordance with the tribe's *Sclerocactus* management planning, which may include undertaking soil assessments, complying with mitigation measures to be developed in consultation with the tribe, and contributing to a conservation mitigation fund.

[6] A *Core 2 Conservation Area* for cactus is an area that contains the densest concentrations of cactus with a 1,000-meter buffer using a kernel density analysis.

These measures would reduce but not completely avoid adverse effects to these ESA-listed species, particularly in areas that do not involve federal surface, federal minerals, or Tribal trust lands. Of the nearly 350,000 acres of suitable habitat that overlay oil and gas fields in the study area, approximately 281,000 acres are located in areas with federal or tribal jurisdiction, while over 68,000 acres have no federal or tribal jurisdiction. Because Pariette cactus and Uinta Basin hookless cactus are culturally important to the Ute Indian Tribe and the cumulative oil and gas development scenario involves substantial potential for disturbance or removal of suitable habitat, OEA believes that cumulative adverse effects on Pariette cactus and Uinta Basin hookless cactus would be a disproportionately high and adverse effect for the Ute Indian Tribe.

Big Game Habitat and Migration

Big-game species (i.e., bighorn sheep, elk, moose, mule deer, and pronghorn antelope) all have year-long substantial and/or crucial habitat in the cumulative impact study area. Construction of any of the Action Alternatives would temporarily disturb or permanently remove big-game habitat in the project footprint and could potentially disrupt movement~~igration~~ corridors.

Ongoing and future oil and gas development and construction of the rail terminals would contribute to cumulative impacts on wildlife, including big game species by causing habitat loss, degradation, and alteration, as well as potentially causing injury or mortality of wildlife, and wildlife avoidance from increased human activity. The extent of potential cumulative impacts would depend on the location of the oil and gas development relative to the proposed rail line, with a greater potential for a cumulative impact if the activity is closer to the proposed rail line.

The Ute Indian Tribe has strong hunting traditions that are still practiced today and that are important to tribal members' way of life. Impacts on big game from habitat disturbance and noise could diminish hunting opportunities and adversely affect tribal hunting traditions. Because this effect would be experienced only by tribal members, OEA concludes that it would represent a disproportionate effect for the Ute Indian Tribe. OEA has concluded, however that the effect would not be high and adverse. Therefore, OEA concludes that cumulative impacts on big game would not result in disproportionately high and adverse effects on minority or low-income populations, or the Ute Indian Tribe.

Cultural Resources

Oil and gas development would result in ground disturbance for the drilling of new wells and the construction of well pads, pipelines, electric power distribution lines, access roads and other associated infrastructure. To the extent that they are present, archaeological resources could be disturbed by construction activities that involve excavation, grading, and other earthwork. Because the cumulative impact study area has not been surveyed comprehensively, OEA concludes that additional cultural resources, such as previously unidentified archeological sites and rock imagery sites, are likely to be present in the study area. It is likely that many of these unidentified cultural resources are of cultural significance to the Ute Indian Tribe and that adverse effects to those resources would, in the absence of mitigation, be a disproportionately high and adverse impact on the tribe.

Where there is a federal nexus (i.e., use of federal surface or extraction of federal minerals), oil and gas development activities would be subject to NHPA Section 106 consultation and OEA expects that adverse effects would be avoided, minimized, or mitigated through the Section 106 process. Similarly, oil and gas development with a State nexus (i.e., use of State lands or extraction of State-owned minerals) would be subject to state regulations that govern the protection of cultural resources, and development of Tribal trust lands would be subject to consent of the Ute Indian Tribe.

OEA expects that the Ute Indian Tribe would be engaged to resolve adverse effects on cultural resources that are important to the tribe where there is a federal, state, or tribal nexus, such that adverse effects would be less than significant. Oil and gas development on private surface and accessing private minerals would not be subject to the same of level of protection, although a more limited review may be undertaken for a specific activity that requires a federal or state permit, approval, or license. Because there is a lower level of cultural resource protection on private surface accessing private minerals, OEA expects that adverse effects of future oil and gas development on private surface with private minerals could result in a disproportionately high and adverse effect to the Ute Indian Tribe.

Socioeconomics

As described in Section 3.15.5.13, *Socioeconomics*, construction and operation of the proposed rail line and rail terminals, and projected oil field development to meet the transportation capacity of the rail line, would all generate employment, labor income, and spending on goods and services in the cumulative impacts study area. Economic benefits related to direct, indirect, and induced spending would extend to members of the Ute Indian Tribe who reside in the cumulative impacts study area and to Indian-owned businesses that would benefit from indirect and induced spending. Other revenue streams associated with oil and gas development that would directly benefit the Ute Indian Tribe include royalties and lease payments associated with oil well development on Tribal trust lands, compensation for water use agreements to provide water for drilling, direct and indirect employment to support oil and gas development on Tribal trust lands, and payment of taxes and business fees to the tribe.

Conversion of land in the Basin for additional oil production and construction of the rail terminals would add industrial facilities, construction noise, truck traffic, and air quality emissions, which would result in adverse effects for nonmarket social values and quality of life for populations, including tribal members, that reside in proximity to oil fields and the proposed locations for the rail terminals. These effects would be additive to adverse effects on nonmarket social values and quality of life from construction and operation of the proposed rail line. These adverse effects would be offset by economic benefits that would be realized locally and regionally within the four-county study area.

OEA concludes that, as a whole, the impacts from the proposed rail line, when combined with impacts from construction and operation of the rail terminals, and reasonably foreseeable oil and gas development, would not result in high and adverse effects on socioeconomics. Therefore, OEA concludes that cumulative impacts on socioeconomics would not result in disproportionately high and adverse effects on minority or low-income populations, or American Indian tribes.

Other Projects and Actions

The Uintah Advantage Energy Associates crude oil processing facility would be constructed near the proposed rail line terminus at Leland Bench and one of the rail terminals, in an area where minority and low-income populations and American Indian tribal members live. Construction and operation of the crude oil processing facility would primarily contribute to the cumulative effects of increased vehicle traffic, air emissions, and economic benefits from employment, labor income, and increased direct, indirect, and induced spending on goods and services. These effects would be additive to those described previously from construction and operation of the proposed rail line when combined with the rail terminals and oil field development and could continue to disproportionately high and adverse impacts on minority and low-income populations related to vehicle safety and delay.

Except for the Uintah Advantage Energy Associates crude oil processing facility, ~~T~~the other projects and actions considered in this cumulative impact analysis are not concentrated in areas where OEA determined minority or low-income populations, or the Ute Indian Tribe to be present. In addition, the cumulative impact analyses presented in Sections 3.15.5.1 through 3.15.5.13 do not identify any other high and adverse cumulative impacts related to construction and operation of the proposed rail line in combination with other projects and actions. Therefore, OEA concludes that the other projects and actions would not contribute to disproportionately high and adverse effects on minority or low-income populations, or American Indian tribes.

Chapter 4
Mitigation

4.1 Introduction and Approach

This chapter describes mitigation measures that could be imposed to avoid, minimize, or compensate for potential adverse environmental impacts resulting from construction and operation of the proposed rail line. If the Board decides to grant the Coalition's request for construction and operation authority, the proposed mitigation measures set out in this chapter could become conditions to the Board's decision. The regulations implementing NEPA require that agencies consider mitigation to reduce environmental impacts of a project. The Coalition has proposed a number of voluntary mitigation measures, which include regulatory-related requirements and associated best management practices (BMPs) (Section 4.3, *Coalition's Voluntary Mitigation Measures*). In the Draft EIS, OEA ~~is~~ recommended~~ing~~ additional preliminary mitigation measures based on the results of OEA's environmental analysis and public and agency consultation (Section 4.4, *OEA's Recommended Mitigation Measures*). Based on additional tribal government-to-government consultation~~,~~ additional agency consultation, and comments received on the Draft EIS, and to provide clarity, OEA revised certain mitigation measures and added certain mitigation measures. OEA is recommending that the final mitigation measures set out in this chapter be imposed as conditions of any Board authorization of the Coalition's request for construction and operation of the proposed rail line. ~~The preliminary mitigation measures developed by OEA described in this chapter are not final and could be modified based on the comments received on this Draft EIS.~~

4.2 Limits of the Surface Transportation Board's Conditioning Power

The Board has the authority to impose conditions to mitigate environmental impacts that relate directly to the transaction before the Board, are reasonable, and are supported by the record before the Board. The Board's consistent practice has been to mitigate only those impacts that result directly from the proposed action. The Board typically does not require mitigation for pre-existing environmental conditions.

4.2.1 Cooperating Agency Mitigation Matters

Agencies participating as cooperating agencies (Chapter 1, Section 1.3.2, *Cooperating Agencies*) may issue individual decisions concerning the proposed rail line and use information in this ~~Draft~~ EIS for decision-making purposes. They could require additional mitigation measures in their decision documents and permits. Agencies in addition to cooperating agencies are mentioned in OEA's final~~preliminary~~ recommended mitigation, where applicable, because certain mitigation measures would require the Coalition to consult with, apply for a permit from, or obtain approval from these agencies.

4.2.2 Voluntary Mitigation and Negotiated Agreements

The Board encourages railroad applicants to propose voluntary mitigation. In some situations, voluntary mitigation could replace, supplement, or reach farther than mitigation measures the Board could~~might~~ otherwise impose. Because applicants gain a substantial amount of knowledge about the issues associated with a proposed rail line during project planning, and because they consult with regulatory agencies during the permitting process, they are often in a position to offer relevant voluntary mitigation. On August 7, 2020, the Coalition submitted its proposed voluntary mitigation measures to OEA.

The Board encourages applicants to negotiate mutually acceptable agreements with affected communities and other government entities to address potential environmental impacts, if appropriate. Negotiated agreements could be with neighborhoods, communities, counties, cities, regional coalitions, states, and other entities. If the Coalition submits to the Board any such negotiated agreements, the Board would require compliance with the terms of such agreements as environmental conditions in any final decision authorizing construction and operation of the proposed rail line. Any potential negotiated agreement would supersede environmental conditions for that particular community or other entity that the Board might otherwise impose.

4.2.3 The Mitigation Process~~Preliminary Nature of Mitigation~~

OEA requested~~s~~ that commenters review the preliminary mitigation measures in the~~this~~ Draft EIS and submit comments to modify, add, or delete mitigation measures. OEA is now ~~will~~ making~~e~~ its final recommendations on mitigation to the Board in the Final EIS after considering all comments on the Draft EIS. The Board will ~~then~~ now make its final decision on whether to approve the proposed rail line and any conditions it might impose, including mitigation conditions. These conditions would include the Coalition’s voluntary mitigation. In making its decision, the Board will consider the~~this~~ Draft EIS, the Final EIS, public and agency comments, and OEA’s final mitigation recommendations.

The measures listed in the following sections would apply to any Action Alternative authorized for construction by the Board unless otherwise specified in the mitigation measure. OEA does not address the No-Action Alternative in this chapter, because the Board would not be taking an action, and this alternative would result in no change in impacts from those already occurring in the existing environment.

Each mitigation measure listed in the following sections has a unique identifier that consists of a prefix and a number. The Coalition’s voluntary mitigation measures follow the format VM-1, VM-2, etc. OEA’s recommended mitigation measures include a unique prefix for each resource topic. For example, mitigation measures for biological resources follow the format BIO-MM-1, and mitigation measures for land use and recreation follow the format LUR-MM-1. OEA uses these unique identifiers to refer to specific mitigation measures where applicable throughout this EIS.

4.3 The Coalition's Voluntary Mitigation Measures

4.3.1 Construction and Rail Operations Safety

VM-1. The Coalition will follow all applicable federal Occupational Safety and Health Administration (OSHA), Federal Railroad Administration (FRA), tribal, and state construction and operational safety regulations to minimize the potential for accidents and incidents during construction and operation of the rail line.

4.3.2 Grade Crossing Safety

VM-2. The Coalition will consult with appropriate federal, tribal, state, and local transportation agencies to determine the final design of the at-grade crossing warning devices. Implementation of all grade-crossing warning devices on public roadways will be subject to review and approval, depending on location, by the Ute Indian Tribe, Utah Department of Transportation (UDOT), U.S. Forest Service (Forest Service), or Carbon, Duchesne, or Uintah Counties. The Coalition will follow standard safety designs for each at-grade crossing for proposed warning devices and signs. These designs will follow the Federal Highway Administration *Manual on Uniform Traffic Control Devices for Streets and Highways* as implemented by UDOT and the American Railway Engineering and Maintenance-of-Way Association standards for railroad warning devices. They will also comply with applicable UDOT, tribal, city, and county requirements.

VM-3. For construction of road crossings, when reasonably practical, the Coalition will consult with tribal and local transportation officials regarding detours and associated signs, as appropriate, or maintain at least one open lane of traffic at all times to allow the quick passage of emergency and other vehicles.

VM-4. The Coalition will develop a plan to consult with private landowners to determine the final details and reasonable signage for grade crossings on private roads.

VM-5. Where practical, at-grade crossings for minor roads and private roads will be combined and consolidated into right-angle, at-grade crossings for safety, and in order to reduce the total the number of highway-rail at-grade crossings.

VM-6. The Coalition will consult with affected communities regarding ways to improve visibility at highway-rail at-grade crossings, including by clearing vegetation or installing lights at the crossing during construction.

4.3.3 Hazardous Materials Handling and Spills during Construction

VM-7. Prior to initiating any project-related construction activities, the Coalition will develop a spill prevention, control, and countermeasures plan in consultation with federal, tribal, state and local governments. The plan will specify measures to prevent the release of petroleum products or other hazardous materials during construction activities and contain such discharges if they occur.

VM-8. In the event of a spill over the applicable reportable quantity, the Coalition will comply with its spill prevention, control, and countermeasures plan and applicable federal, state, local and tribal regulations pertaining to spill containment, appropriate clean-up, and notifications.

VM-9. The Coalition will require its construction contractor(s) to implement measures to protect workers' health and safety and the environment in the event that undocumented hazardous materials are encountered during construction. The Coalition will document all activities associated with hazardous material spill sites and hazardous waste sites and will notify the appropriate state, local, and tribal agencies according to applicable regulations. The goal of the measures is to ensure the proper handling and disposal of contaminated materials including contaminated soil, groundwater, and stormwater, if such materials are encountered. The Coalition will use disposal methods that comply with applicable solid and hazardous waste regulations.

VM-10. The Coalition will ensure that gasoline, diesel fuel, oil, lubricants, and other petroleum products are handled and stored to reduce the risk of spills contaminating soils or surface waters. If a petroleum spill occurs in the project area as a result of rail construction, operation, or maintenance and exceeds specific quantities or enters a water body, the Coalition (or its agents) will be responsible for promptly cleaning up the spill and notifying responsible agencies in accordance with federal, state, and tribal regulations.

4.3.4 Hazardous Materials Transport and Emergency Response

VM-11. The Coalition will prepare a hazardous materials emergency response plan to address potential derailments or spills. This plan will address the requirements of the Pipeline and Hazardous Materials Safety Administration and FRA requirements for comprehensive oil spill response plans. The Coalition will distribute the plan to federal, state, local, and tribal emergency response agencies. This plan shall include a roster of agencies and people to be contacted for specific types of emergencies during rail construction, operation and maintenance activities, procedures to be followed by particular rail employees, emergency routes for vehicles, and the location of emergency equipment.

VM-12. The Coalition will work with the affected communities to facilitate the development of cooperative agreements with other emergency service providers to share service areas and emergency call response.

VM-13. After construction is completed, the Coalition will implement a desktop simulation of its emergency response drill procedures with the voluntary participation of local emergency response organizations. If necessary, the Coalition will update the hazardous materials emergency response plan based on the findings and observations of the simulated emergency response.

VM-14. In the event of a reportable hazardous materials release, the Coalition will notify appropriate federal, state, and tribal environmental agencies as required under federal, state, and tribal law.

VM-15. The Coalition will comply with FRA, Pipeline and Hazardous Materials Safety Administration, Transportation Security Administration regulations and tribal ordinances or plans applicable to the safe and secure transportation of hazardous materials.

4.3.5 Topography, Geology, and Soils

VM-16. The Coalition will limit ground disturbance to only the areas necessary for project-related construction activities.

VM-17. During project-related earth-moving activities, the Coalition will require the contractor to remove topsoil and segregate it from subsurface soils. Where practical, the contractor will also stockpile topsoil to be applied later during reclamation activities in disturbed areas along the right-of-way.

VM-18. The Coalition will place the topsoil and other excavated soil stockpiles in areas away from environmentally or culturally sensitive areas and will use appropriate erosion control measures on and around stockpiles to prevent or contain erosion.

VM-19. The Coalition will submit a notice of intent to request permit coverage under Utah Pollutant Discharge Elimination System Construction General Permit UTRC00000 for construction stormwater management.

VM-20. The Coalition will submit an application for coverage under the National Pollutant Discharge Elimination System stormwater construction permits pursuant to Section 402 of the Clean Water Act for construction stormwater management on tribal land.

VM-21. The Coalition will develop a stormwater pollution prevention plan, which will include construction BMPs to control erosion and reduce the amount of sediment and pollutants entering surface waters, groundwater, and waters of the United States. The Coalition will require its construction contractor(s) to follow all water quality control conditions identified in all permits, including the Section 404 permit from the U.S. Army Corps of Engineers (Corps) and the Section 401 Water Quality Certification from the Utah Department of Environmental Quality and the U.S. Environmental Protection Agency.

VM-22. The Coalition will revegetate disturbed areas, where practical and in consultation with the Ute Indian Tribe as applicable, when construction is completed. The goal of reclamation will be the rapid and permanent re-establishment of native groundcover on disturbed areas to prevent soil erosion, where feasible. If weather or seasonal conditions prevent vegetation from being quickly re-established, the Coalition will use measures such as mulching, erosion-control blankets, or dust-control palliatives to prevent erosion until vegetative cover is established. The Coalition will monitor reclaimed areas for 3 years. For areas where efforts to establish vegetative cover have been unsuccessful after 1 year, the Coalition will reseed annually for up to 3 years as needed.

4.3.6 Air Quality

VM-23. Where practical and in consultation with the Ute Indian Tribe as applicable, the Coalition will implement appropriate fugitive-dust controls such as spraying water or other dust treatments in order to reduce fugitive-dust emissions created during project-related construction activities. The Coalition will require its construction contractor(s) to regularly operate water trucks on haul roads to reduce dust generation.

VM-24. The Coalition will work with its contractor(s) to make sure that construction equipment is properly maintained and that mufflers and other required pollution-control devices are in working condition in order to limit construction-related air pollutant emissions.

4.3.7 Water Resources

VM-25. The Coalition will obtain a permit from the Corps under Section 404 of the Clean Water Act before initiating project-related construction activities in wetlands and other jurisdictional waters of the United States. The Coalition will comply with all conditions of the Section 404 permit.

VM-26. The Coalition will obtain a Section 401 Water Quality Certification from the State of Utah and Environmental Protection Agency. The Coalition will incorporate the conditions of the Section 401 Water Quality Certification into its construction contract specifications and will monitor the project for compliance.

VM-27. The Coalition will minimize impacts on wetlands to the extent practicable in the final design of the selected alternative. After all practicable steps have been taken to minimize impacts on wetlands, the Coalition agrees to prepare a compensatory mitigation plan for any remaining wetland impacts in consultation with the Ute Indian Tribe where applicable. Compensatory mitigation may include any one or a combination of the following five methods: restoring a previously existing wetland or other aquatic site, enhancing an existing aquatic site's functions, establishing (that is, creating) a new aquatic site, preserving an existing aquatic site, and/or purchasing credits from an authorized wetland mitigation bank.

VM-28. Bridges at perennial streams will be designed to maintain a natural substrate.

VM-29. The Coalition will obtain stream alteration permits from the Utah Division of Water Rights for crossing waters of the state, and any applicable tribal permits, and will comply with all conditions of the permits.

VM-30. The Coalition will construct stream crossings during low-flow periods, when practical.

VM-31. When practical and in consultation with the Ute Indian Tribe where applicable, the Coalition will relocate natural streams using bioengineering methods, where relocation is needed and is unavoidable.

VM-32. For streams and rivers with a floodplain regulated by the Federal Emergency Management Agency or the Ute Indian Tribe, the Coalition will design the stream crossing with the goal of not impeding floodwaters and not raising water surface elevations to levels that would change the regulated floodplain boundary. If flood elevations change, the Coalition will coordinate with Federal Emergency Management Agency and/or tribal or local floodplain managers to obtain a Letter of Map Revision where construction of bridges, culverts, or embankments results in an unavoidable increase greater than 1 foot to the 100-year water surface elevations.

4.3.8 Biological Resources

VM-33. The Coalition will comply with any conditions and mitigation commitments contained in a biological opinion for sensitive species that could potentially be impacted by the project.

VM-34. The Coalition will require its contractor(s) to comply with the requirements of the Migratory Bird Treaty Act in consultation with the Ute Indian Tribe as applicable. The following measures will be conducted by the Coalition and/or its contractor(s).

a. Where practical, any ground-disturbing, ground-clearing activities or vegetation treatments will be performed before migratory birds begin nesting or after all young have fledged.

b. If activities must be scheduled to start during the migratory bird breeding season, the Coalition will take steps to prevent migratory birds from establishing nests in the potential impact area. Birds can be hazed to prevent them from nesting until egg(s) are present in the nest. The Coalition or its agents will not haze or exclude nest access for migratory birds and other sensitive avian species.

c. If activities must be scheduled during the migratory bird breeding season, a qualified biologist will perform a site-specific survey for nesting birds starting no more than 7 days prior to ground-disturbing activities or vegetation treatments. Birds with eggs or young will not be hazed, and nests with eggs or young will not be moved until the young are no longer dependent on the nest. A qualified biologist will confirm that all young have fledged.

d. If nesting birds are found during the survey, the Coalition will establish appropriate seasonal or spatial buffers around nests. Vegetation treatments or ground-disturbing activities within the buffer areas will be postponed, where feasible, until the birds have left the nest. A qualified biologist will confirm that all young have fledged.

VM-35. The Coalition will execute a Mitigation Agreement with the Utah Division of Wildlife Resources (UDWR) to address impacts within the Carbon Sage-grouse Management Area (CSGMA). The Coalition has discussed several potential mitigation strategies with UDWR and other local, state, tribal and federal stakeholders during the EIS process. The final CSGMA Mitigation Agreement will define the appropriate mitigation ratio for the project type and its impacts and the final mitigation approach.

VM-36. The Coalition shall comply with the Ute Indian Tribe's Greater Sage-Grouse Conservation Ordinance as applicable.

VM-37. If the selected alternative impacts U.S. Bureau of Land Management (BLM) lands, the Coalition will request that BLM join as a signatory to the CSGMA Mitigation Agreement.

VM-38. The Coalition will prepare a noxious and invasive weed control plan in consultation with the Ute Indian Tribe as applicable. Where practical, the Coalition will include the policies and strategies in Utah's Strategic Plan for Managing Noxious and Invasive Weeds when designing response strategies for noxious and invasive weeds.

VM-39. The Coalition will comply with any conditions and mitigation commitments contained in a biological opinion for sensitive plant species that could potentially be impacted by the project.

VM-40. The Coalition will work with UDWR, the Ute Indian Tribe, and adjacent landowners to define areas of the right-of-way that can be left without fences to maintain big game migration corridors.

VM-41. Where practical and necessary, the Coalition will install wildlife-safe fences to confine livestock within grazing allotments.

4.3.9 Cultural Resources

VM-42. The Coalition will work with the Ute Indian Tribe and others to develop training materials to educate construction supervisors about the importance of protecting cultural resources and the procedures for handling undocumented discoveries. The Coalition will make reasonable efforts to include the Ute Indian Tribe in the presentation of these materials.

VM-43. The Coalition will comply with the requirements of the Programmatic Agreement being developed by OEA, the Advisory Council on Historic Preservation, Utah State Historic Preservation Office, Ute Indian Tribe, and other federal and state agencies in consultation with federally recognized tribes and other consulting parties.

4.3.10 Land Use

VM-44. If temporary construction easements on private property are needed, the Coalition will document the preconstruction conditions and, to the extent practical, will restore the land to its preconstruction condition after construction is complete.

VM-45. The Coalition will consult with landowners regarding grazing allotments and will install temporary fences during construction to allow continued grazing, where practicable. Once construction is complete, the Coalition will replace all permanent fences removed during construction.

VM-46. Where practical, the Coalition will maintain livestock access to water sources or will relocate water sources, maintain vehicle and livestock access to grazing allotments, and install safety fences and signs for grazing allotment entrances and exits to enable continuance of livestock operations within grazing allotments.

VM-47. The Coalition will secure agreements with utilities to establish responsibility for protecting or relocating existing utilities, if impacted by construction.

VM-48. The Coalition will coordinate with water districts to develop irrigation infrastructure protection or relocation plans, if irrigation infrastructure will be impacted by construction.

4.3.11 Community Outreach

VM-49. The Coalition will appoint a community liaison to consult with affected communities, businesses, and agencies and seek to develop cooperative solutions to local concerns regarding construction activities.

VM-50. The Coalition will appoint a tribal community liaison to address the needs and concerns of Ute Indian Tribe members and communities and seek to develop cooperative solutions to concerns regarding construction activities and rail operations.

VM-51. The Coalition will maintain a project website throughout the duration of construction to provide regular updates regarding construction progress and schedule.

VM-52. The Coalition will install construction warning and detour signs throughout the corridor and at recreation sites around the project area as needed.

4.3.12 Noise and Vibration

VM-53. The Coalition, in consultation with the Ute Indian Tribe, will comply with FRA regulations (49 Code of Federal Regulations [C.F.R.] Part 210) establishing decibel limits for train operation.

VM-54. The Coalition will work with its contractor(s) to make sure that project-related construction and maintenance vehicles are maintained in good working order with properly functioning mufflers to control noise.

4.3.13 Recreation

VM-55. If needed for the selected alternative, the Coalition will obtain approval from the Forest Service and will follow the conditions of the permit regarding access to, or temporary closure of, recreational features during construction.

VM-56. The Coalition will work with its construction contractor to maintain access to Forest Service roads during construction, where feasible.

4.4 OEA's Final Recommended Mitigation Measures

In addition to the Coalition's voluntary mitigation measures, OEA is ~~preliminarily~~ recommending an additional 91~~73~~ mitigation measures~~. OEA will make its final recommendations on mitigation~~ to the Board in th~~e~~is Final EIS~~ after considering all public comments on this Draft EIS~~.

4.4.1 Vehicle Safety and Delay

VSD-MM-1. The Coalition shall design and construct any new temporary or permanent access roads and road realignments to comply with the reasonable requirements of the UDOT Roadway Design Manual (UDOT 2020), other applicable road construction guidance (e.g., county road right-of-way encroachment standards), and land management agency or landowner requirements (e.g., BLM H-9113-1 Road Design Handbook) regarding the establishment of safe roadway conditions.

VSD-MM-2. During project-related construction activities, the Coalition and its contractors shall comply with speed limits and applicable laws and regulations when operating vehicles and equipment on public roadways.

VSD-MM-3. The Coalition shall obtain and abide by the reasonable requirements of applicable permits and approvals for any project-related construction activities within UDOT rights-of way or state highways where UDOT has jurisdiction and off-system roads that are maintained by UDOT.

VSD-MM-4. For each of the public at-grade crossings on the ~~proposed~~ rail line, the Coalition shall provide and maintain permanent signs prominently displaying both a toll-free telephone number and a unique grade-crossing identification number in compliance with Federal Highway Administration regulations (23 C.F.R. Part 655). The toll-free number would enable drivers to report promptly any accidents, malfunctioning warning devices, stalled vehicles, or other dangerous conditions.

VSD-MM-5. The Coalition shall make Operation Lifesaver educational programs available to communities, schools, and other organizations located along the ~~proposed the~~ rail line. Operation Lifesaver is a nationwide, nonprofit organization that provides public education programs to help prevent collisions, injuries, and fatalities at highway/rail grade crossings.

VSD-MM-6. The Coalition shall consult with private landowners and communities affected by new at-grade crossings or that are adjacent to the rail line to identify measures to mitigate impacts on emergency access and evacuation routes and incorporate the results of this consultation into the Coalition's emergency response plan. These measures may include identifying new ingress and egress routes that could be used to improve safety in the event of an emergency.

4.4.2 Rail Operations Safety

ROS-MM-1: In the event of a reportable hazardous materials release, the Coalition shall notify appropriate local (county and city) agencies in addition to appropriate federal, state, and tribal environmental agencies as required under federal, state, and tribal law.

ROS-MM-2: As part of routine rail inspections or at least twice annually, the Coalition shall use appropriate technology to inspect both track geometry (horizontal and vertical layout of tracks) and local terrain conditions to identify problems with either the track or the surrounding terrain. The track inspection shall be designed and conducted so as to identify changes in track geometry that could indicate broken rails or welds, misalignments, and other technical issues with the track itself. The visual inspection of terrain shall be designed and conducted so as to identify evidence of subsidence, rockslides, undermining of the track, erosion, changes in runoff patterns, or other issues that could lead to structural weakening of the track bed and potentially cause an accident.

~~4.4.2~~4.4.3 Water Resources

WAT-MM-1. To the extent practicable, the Coalition shall design culverts and bridges to maintain existing surface water drainage patterns, including hydrology for wetland areas, and not cause or exacerbate flooding. Project-related supporting structures (e.g., bridge piers) shall be designed to minimize scour (sediment removal) and increased flow velocity, to the extent practicable. The Coalition shall consider use of multi-stage culvert designs in flood-prone areas, as appropriate.

WAT-MM-2. The Coalition shall design culverts and bridges on land managed by federal, state, or tribal agencies to comply with reasonable applicable agency requirements. All surface water crossings on land under the jurisdiction of the Ute Indian Tribe shall be designed in consultation with the tribe's Business Committee, Tribal Water Quality Department, the Tribal Fish and Wildlife Department, and the Tribal Water Resources Department to ensure that those crossings would not adversely affect the quality of surface waters on the tribe's Uintah and Ouray Reservation.

WAT-MM-3. The Coalition shall design all stream realignments in consultation with the Corps and Utah Division of Water Rights as part of the Section 404 permit mitigation plan development and Utah Stream Alter~~n~~ation Program, respectively, to ensure that effects on stream functions are taken into account and minimized. The Coalition shall also consult with the Ute Indian Tribe through the tribe's Business Committee, Tribal Water Quality Department, the Tribal Fish and Wildlife Department, and the Tribal Water Resources Department regarding the design of stream realignments to ensure that those realignments would not adversely affect the quality of surface waters on the tribe's Uintah and Ouray Reservation. To the extent practicable, the Coalition shall design realigned streams to maintain existing planform, geomorphology, bed material and flows.

WAT-MM-4. The Coalition shall design, construct, and operate the ~~proposed~~ rail line and associated facilities to maintain existing water patterns and flow conditions and provide long-term hydrologic stability by conforming to natural stream gradients and stream channel alignment and avoiding altered subsurface flow (i.e., shallow aquifer subsurface flow) to the extent practicable.

WAT-MM-5. During project-related construction, the Coalition shall minimize, to the extent practicable, soil compaction and related effects (e.g., increase runoff and erosion), provide surface treatments to minimize soil compaction (e.g., break up compacted soils during reclamation to promote infiltration), and take actions to promote vegetation regrowth after the facilities (e.g., temporary staging areas) are no longer needed to support construction.

WAT-MM-6. During project-related construction, the Coalition shall implement erosion prevention, sediment control, and runoff control and conveyance ~~best management practices (~~BMPs~~)~~ to limit the movement of soils and sediment-laden runoff. On lands managed by federal, state, or tribal agencies, the Coalition shall design and implement these BMPs in consultation with the applicable agency~~;~~. BMPs may include, but are not limited to, seeding disturbed ground and stockpiled soil, seed mixes, silt fences, sediment traps, ~~and~~ ditch checks, and erosion monitoring. The Coalition shall coordinate with the appropriate land management agency, private landowner, or the Ute Indian Tribe to select seed mixes for use in restoration and reclamation activities. This may require consultation with range and ecology specialists to determine seed mixes and timing of seeding appropriate to the ecological site. Within Ashley National Forest, disturbed ground area, including stockpiled soil for later reclamation, shall be seeded to prevent erosion and the influx of weeds and invasive species. The Forest Rangeland Management or Ecology specialists shall be consulted for the appropriate seed mix and timing of seeding on Forest Service lands.

WAT-MM-7. During project-related construction, the Coalition shall use temporary barricades, fencing, and/or flagging around sensitive habitats (e.g., wetlands, flowing streams) to contain project-related impacts within~~on~~ the construction area. The Coalition shall locate staging areas in previously disturbed sites to the extent practicable, avoiding sensitive habitat areas whenever possible.

WAT-MM-8. The Coalition shall remove all project-related construction debris (including construction materials and soils) from surface waters and wetlands as soon as practicable following construction.

WAT-MM-9. The Coalition shall implement stormwater BMPs to convey, filter, and dissipate runoff from the ~~proposed~~ rail line during rail operations. These could include, but would not be limited to, vegetated swales, vegetated filter strips, streambank stabilization, and channelized flow dissipation, as appropriate. On lands managed by federal, state, or tribal agencies, the Coalition shall design and implement stormwater BMPs in consultation with the applicable agency.

WAT-MM-10. During rail operations, the Coalition shall ensure that all project-related culverts and bridges are clear of debris to avoid flow blockages, flow alteration, and increased flooding. The Coalition shall inspect all project-related bridges and culverts semi-annually (or more frequently, as seasonal flows dictate) for debris accumulation and shall remove and properly dispose of debris promptly.

WAT-MM-11. To address the closing of active groundwater wells and permanent impacts on springs, the Coalition shall consult with the owner, the Utah Division of Water Rights, and the Ute Indian Tribe, as appropriate, to attempt to replace each active well closed with a new well and to mitigate the water rights associated with springs, as practicable.

WAT-MM-12. The Coalition shall consider potential future changes in precipitation patterns caused by climate change when designing surface water crossings (bridges and culverts) and other rail line features.

~~4.4.3~~4.4.4 Biological Resources

BIO-MM-1. The Coalition shall implement appropriate measures to reduce collision risks for birds resulting from project-related power communications towers. The Coalition shall incorporate the design recommendations in the U.S. Fish and Wildlife Service (USFWS) *Recommended Best Practices for Communication Tower Design, Siting, Construction, Operation, Maintenance, and Decommissioning* (USFWS 2018) to avoid or minimize the risk of bird mortality at communications towers.

BIO-MM-2. During project-related construction, the Coalition shall comply with any federal, state, tribal, or local in-water work windows and timing restrictions for the protection of fish species, and other reasonable requirements of in-water work permits issued by UDWR and the Corps.

BIO-MM-3. During project-related construction, the Coalition shall use a bubble curtain or other noise-attenuation method (e.g., wood or nylon pile caps) when installing or proofing pilings below the ordinary high water line of a fish-bearing stream to minimize underwater sound impacts on fish.

BIO-MM-4. During project-related construction, the Coalition shall use a block-net to remove and exclude fish from in-water work areas. The Coalition shall deploy the block-net toward the water from land, with the two ends of the net maintained on shore and the middle portion of the net deployed in the water. Any fish handling, exclusion, and removal operation shall be consistent with any reasonable requirements of in-water permits from UDWR and the Corps.

BIO-MM-5. The Coalition shall minimize, to the extent practicable, the area and duration of project-related construction activities within riparian areas and along streambanks. Where construction activities within riparian areas or along streambanks are unavoidable, the Coalition shall implement appropriate erosion control materials to stabilize soil and reduce erosion. Following the completion of project-related construction on a segment of rail line, the Coalition shall promptly restore and revegetate riparian areas using native vegetation.

BIO-MM-6. The Coalition shall design culverts and bridges to allow aquatic organisms to pass relatively unhindered, to the extent practicable.

BIO-MM-7. The Coalition shall develop and implement a wildfire management plan in consultation with appropriate state, tribal, and local agencies, including local fire departments. The plan shall incorporate specific information about operations, equipment, and personnel on the ~~proposed~~ rail line that might be of use in case a fire occurs and shall evaluate and include as appropriate site-specific techniques for fire prevention and suppression. The plan shall also include a commitment for the Coalition and consulting parties to revisit the plan on a regular basis (e.g., every 5 years; but to be determined during plan development) to determine if environmental conditions have changed (e.g., drier conditions) to the point where aspects of the plan would need to be revised to address those changing conditions.

BIO-MM-8: The Coalition shall protect bald and golden eagles by adhering to the Bald and Golden Eagle Protection Act. In addition, the Coalition shall follow the USFWS *National Bald Eagle Management Guidelines* (USFWS 2007), as applicable.

BIO-MM-9. The Coalition shall comply with the terms and conditions of the USFWS Biological Opinion for the protection of federally listed threatened and endangered plants and animals that could be affected by the ~~proposed~~ rail line, and to ensure compliance with Endangered Species Act Section 7.

BIO-MM-10. ~~If the Board authorizes construction and operation of the Indian Canyon Alternative or Whitmore Park Alternative, t~~The Coalition shall implement the ~~reasonable~~ requirements of the Ute Indian Tribe for minimizing impacts on wildlife, fish, and vegetation on Tribal trust lands.

BIO-MM-11. Prior to project-related construction, the Coalition shall acquire and abide by the reasonable requirements of all appropriate federal and state permits to possess, relocate, or disassemble a bald or golden eagle nest, and/or work within 0.5 mile of a bald or golden eagle nest, regardless of whether the nest is active or inactive. The Coalition shall also follow the guidelines for avoiding and minimizing impacts set out in the *Utah Field Office Guidelines for Raptor Protection from Human and Land Use Disturbances* for the protection of bald and golden eagles, as applicable.

BIO-MM-12. Rail employees engaged in routine rail line inspections that observe carcasses along the rail line shall remove carcasses away from the rail line to minimize potential eagle strikes. Carcass data shall be recorded, including species, location, and number, and submitted to UDWR. The Coalition will consult with UDWR to determine the best way to submit this data and the frequency at which it will be transmitted.

BIO-MM-13. The Coalition shall abide by the BLM *Utah Greater Sage-Grouse Approved Resource Management Plan Amendment* for approved Action Alternatives that affect BLM land, and will follow the reasonable requirements of the *Utah Conservation Plan for Greater Sage-Grouse*.

BIO-MM-14. During project-related construction, the Coalition shall employ ecologically sound methods to remove all cleared vegetation and green debris from construction areas, including trees from woodland and timber clearing. On lands managed by federal, state, or tribal agencies, the Coalition shall consult with the appropriate agencies regarding methods for removal or cleared vegetation and green debris and shall implement those agencies' requirements.

BIO-MM-15. Prior to any project-related construction, the Coalition shall consult with the appropriate County Weed Boards/Departments and the Ute Indian Tribe to develop and implement a plan to address the spread and control of nonnative invasive plants during project-related construction. For any construction activities on lands managed by federal, state, or tribal agencies, the Coalition shall seek input on the plan from the appropriate land management agency. The plan shall incorporate the reasonable requirements and recommendations of those agencies and shall identify and address 1) planned seed mixes, 2) weed prevention and eradication procedures, 3) equipment cleaning protocols, 4) revegetation methods, 5) protocols for monitoring revegetation, and 6) ongoing inspection of the rail right-of-way for noxious weeds and invasive species during rail operations.

BIO-MM-16. If the Board authorizes the Indian Canyon Alternative or Whitmore Park Alternative, the Coalition shall comply with the reasonable mitigation conditions imposed by the Forest Service in any special use permit allowing the Coalition to cross National Forest System Lands, including complying with the USDA Forest Service Guide to Noxious Weed Prevention Practices and the Ashley National Forest Noxious Weeds Management Supplement.

BIO-MM-17. Prior to any project-related construction, the Coalition shall consult with the Ute Indian Tribe, USFWS, and UDWR to develop and implement a reclamation and revegetation plan for areas that would be temporarily disturbed by construction activities. For any construction activities on lands managed by federal, state, or tribal agencies, the Coalition shall seek input on the plan from the appropriate agency. The reclamation and revegetation plan shall incorporate the reasonable requirements and recommendations of those agencies and shall clearly identify and address 1) the areas to be reclaimed and revegetated; 2) the proposed reclamation and revegetation materials, methods, and timing; and 3) the proposed monitoring schedule and contingency plans.

BIO-MM-18. The Coalition shall not use bird hazing (or scaring) techniques around documented leks in the Carbon SGMA during construction.

BIO-MM-19. The Coalition shall consult with the Ute Indian Tribe, UDWR, OEA, and appropriate land management agencies to develop and implement a big game movement corridor crossing plan. The plan shall address the need for dedicated big game crossings of the rail line, the need to limit fencing (if applicable), and the need for additional data collection. The plan shall use the latest available big game movement corridor data from UDWR and the Ute Indian Tribe.

BIO-MM-20. The Coalition shall not construct in the Carbon SGMA during the nesting and breeding season to be determined in consultation with OEA, UDWR, and other appropriate land management agencies.

~~4.4.4~~4.4.5 Geology, Soils, Seismic Hazards, and Hazardous Waste Sites

GEO-MM-1. The Coalition shall design and construct the ~~proposed~~ rail line to balance cut and fill earthwork quantities, to the extent practicable, in order to minimize the quantities of materials required to be excavated, transported, or placed off site.

GEO-MM-2. The Coalition shall conduct geotechnical investigations to identify soils and bedrock in cut areas with potential for mass movement or slumping. The geologic hazard investigations shall be conducted in accordance with Utah Geological Survey Circular 122. Where appropriate, the Coalition shall implement engineering controls to avoid mass movement or slumping. If mass movement or slumping of soils or bedrock occurs during project-related construction, the Coalition shall promptly institute appropriate remedial actions. The Coalition shall periodically monitor the railbed during operations to identify changes related to use, cumulative effects of weight and vibration, and changes in underlying soils to prevent deterioration from settling, deformation, collapse, and erosion.

GEO-MM-3. The Coalition shall conduct geotechnical investigations to identify areas within the rail right-of-way where soils with high corrosivity to concrete or steel could affect the rail line. The Coalition shall implement appropriate site-specific measures to address the soil corrosivity in areas identified during the geotechnical investigations, potentially including replacing soils with high corrosivity with non-corrosive engineered soils, as applicable. If soil materials are removed and replaced due to corrosivity to steel or concrete, the Coalition shall consult with the appropriate land management agencies to determine the sites for disposal and the appropriate replacement soil materials. All replacement soil materials shall be certified weed-free engineered material, or shall be checked for the presence of weeds and sprayed for weeds to prevent bringing in invasive species.

GEO-MM-4. The Coalition shall conduct geotechnical studies to identify unmapped abandoned mines that could affect the ~~proposed~~ rail line and shall take actions to appropriately stabilize areas where unmapped mines are identified.

GEO-MM-5. The Coalition shall conduct geotechnical investigations to identify areas within the ~~proposed~~ rail right-of-way that are at risk of seismically induced liquefaction. The geologic hazard investigations shall be conducted in general accordance with *Utah Geological Survey Circular 122*. The Coalition shall implement appropriate site-specific measures to minimize the risk of liquefaction in areas identified during the geotechnical investigations, including replacing soils subject to liquefaction with engineered soils that are not prone to liquefaction, as applicable. If soil materials are removed and replaced due to liquefaction hazards, the Coalition shall consult with the appropriate land management agencies to determine the sites for disposal and the appropriate replacement soil materials. All replacement soil materials shall be certified weed-free engineered material, or shall be checked for the presence of weeds and sprayed for weeds to prevent bringing in invasive species.

GEO-MM-6. The Coalition shall design and construct any tunnels in accordance with applicable OSHA~~U.S. Occupational Safety and Health Administration~~ guidelines for underground construction (OSHA 2003). Conformance shall include ventilation, air monitoring, and emergency procedures.

GEO-MM-7. In consultation with applicable land management agencies and other agencies with expertise in avalanche mitigation, the Coalition shall identify areas with a high risk of snow slab avalanche that have the potential to affect the rail line and investigate the use of nonstructural and structural methods to control the effects of slab avalanches. Nonstructural methods can include triggering and closures. Structural methods can include avalanche dams and retarding structures, starting zone structures, and avalanche sheds.

GEO-MM-8. Prior to construction, the Coalition shall conduct geophysical investigations to identify risks associated with the Duchesne-Pleasant Valley fault that could affect the rail line.

~~4.4.5~~4.4.6 Noise and Vibration

NV-MM-1. Before undertaking any project-related construction activities, the Coalition shall, with the approval of OEA and in consultation with appropriate tribal and local agencies, develop and implement a construction noise and vibration control plan to minimize project-related construction noise and vibration affecting residences along the ~~proposed~~ rail line, including noise and vibration from general construction equipment, specialized equipment, and tunnel construction. For tunnel construction in particular, the plan shall include estimates of construction noise and vibration levels and identify measures that shall be taken if predicted construction noise or vibration levels exceed Federal Transit Administration (FTA) criteria. The Coalition shall also conduct noise and vibration monitoring for receptors that would exceed FTA criteria. The Coalition shall designate a noise control officer to develop the construction noise and vibration plan, whose qualifications shall include at least 5 years of experience with major construction noise projects, and board certification from the Institute of Noise Control Engineering or registration as a Professional Engineer in Mechanical Engineering or Civil Engineering.

NV-MM-2. The Coalition shall minimize, to the extent practicable, construction-related noise disturbances in residential areas. The Coalition shall avoid nighttime construction and pile-driving near residential areas and employ quieter vibratory pile-driving or noise curtains for project-related construction where FTA construction noise criteria are exceeded.

NV-MM-3. In consultation with OEA and appropriate tribal and local agencies, ~~T~~the Coalition shall employ reasonable and feasible noise mitigation for receptors~~where OEA identified receptors~~ that would experience noise impacts at or greater than the regulatory analytical threshold of 65 day-night average sound level (DNL) and an increase of 3 A-weighted decibels (dBA). The design goal for noise mitigation shall be a 10 dBA noise reduction. Using industry standard loudspeaker testing, the building sound insulation performance shall be determined in accordance with ASTM 966-90, Standard Guide for Field Measurements of Airborne Sound Insulation of Building Facades and Façade Elements. The calculated noise reduction shall be at least 5 dBA. Should the calculated noise reduction be less than 5 dBA then no mitigation is warranted as the receptor has sufficient sound insulation. ~~Wayside noise mitigation would be warranted if train traffic reaches 10.5 trains per day. The Coalition shall certify to the Board whether or not traffic volumes reach this level.~~

NV-MM-4. The Coalition shall install and properly maintain rail and rail beds on the ~~proposed~~ rail line according to American Railway Engineering and Maintenance of Way Association standards and shall regularly maintain locomotives, keeping mufflers in good working order to control noise. The Coalition shall install rail lubrication systems at curves along the ~~proposed~~ rail line where doing so would reduce noise associated with wheel squeal for residential or other noise-sensitive receptors. The Coalition shall regularly inspect and maintain rail car wheels on trains that operate on the ~~proposed~~ rail line in good working order and minimize the development of wheel flats (where a round wheel is flattened, leading to a clanking sound when a rail car passes).

~~4.4.6~~4.4.7 Air Quality

AQ-MM-1. In consultation with the TriCounty Health Department and the Ute Indian Tribe as applicable, the Coalition shall implement appropriate fugitive-dust controls such as spraying water or other dust treatments to reduce fugitive-dust emissions created during project-related construction activities. During project-related construction, the Coalition shall ensure that construction contractors offer workers daily transportation to the work site from a central location to minimize vehicular traffic on unpaved roads in the area and thereby reduce exhaust emissions and fugitive dust.

AQ-MM-2. The Coalition shall ensure that all engine-powered equipment and vehicles used in construction, operation, and maintenance of the ~~proposed~~ rail line are subject to a regular inspection and maintenance schedule in order to minimize air pollutant emissions, greenhouse gas emissions, and fuel consumption. Preventive maintenance activities shall include, but shall not be limited to, the following actions:

- Replacing oil and oil filters as recommended by manufacturer instructions.
- Maintaining proper tire pressure in on-road vehicles.
- Replacing worn or end-of-life parts.
- Scheduling routine equipment service checks.

AQ-MM-3. The Coalition shall develop and implement an anti-idling policy for both rail construction and operations and ensure that equipment operators receive training on best practices for reducing fuel consumption to reduce project-related air emissions. The anti-idling policy shall include required warm-up periods for equipment and prohibit idling beyond these periods. The policy shall define any exceptions where idling is permitted for safety or operational reasons, such as when ambient temperatures are below levels required for reliable operation. In addition, the policy shall include provisions addressing the use of technologies such as idle management systems or automatic shutdown features, as appropriate.

AQ-MM-4. The Coalition shall require its contractors to use diesel fuel that contains a minimum biodiesel content of 5 percent (B5 blend). If B5 is not available from local fuel suppliers, the Coalition shall use fuel with the highest biodiesel content that is available to reduce greenhouse gas emissions.

AQ-MM-5. The Coalition shall consider procuring alternative engine and fuel technologies, e.g., hybrid-electric diesel equipment, for construction and operation of the rail line to reduce greenhouse gas emissions.

AQ-MM-6. The Coalition shall evaluate the feasibility of installing solar and wind microgeneration technologies on site offices, lodgings, and other project-related facilities to reduce the use of grid or privately generated electricity to reduce greenhouse gas emissions. As part of its evaluation, the Coalition shall consider the suitability of site conditions and location of solar and wind generation and the technical and economic feasibility of supplementing site electricity demands with renewable power.

AQ-MM-7. The Coalition shall post signage and/or fencing during project-related construction, including tunnel construction, to ensure that members of the public would be unable to enter areas within the construction easement that could experience temporary adverse air quality impacts.

AQ-MM-8. During project-related construction, the Coalition shall require that construction contractors use renewable diesel fuel to minimize and control exhaust emissions from all heavy-duty diesel-fueled construction diesel equipment and on-road diesel trucks to the extent possible. Renewable diesel must meet the most recent ASTM D975 specification for Ultra Low Sulfur Diesel and have a carbon intensity no greater than 50 percent of diesel with the lowest carbon intensity among petroleum fuels sold in Utah. The Coalition may request an exemption from OEA to use traditional diesel if renewable diesel is not available from suppliers within 200 miles of the construction site. The Coalition must identify the quantity of traditional diesel purchased and fully document the availability and price of renewable diesel to meet project demand in consultation with OEA.

AQ-MM-9. To the extent practicable, the Coalition shall avoid conducting project-related construction activities that could result in the emissions of ozone precursors within the Uinta Basin Ozone Nonattainment Area in January and February to minimize emissions of ozone precursor chemicals in the nonattainment area. Construction-related activities covered by this measure include the use of diesel-powered construction equipment and the transportation by truck of materials to construction sites.

~~4.4.7~~4.4.8 Energy

ENGY-MM-1. The Coalition shall design any project-related road realignments to allow continued vehicle access to existing fixed energy facilities, such as oil pads, during and following construction of the rail line. The Coalition shall work with the owners of the energy facilities to coordinate continued access during construction and rail operations.

ENGY-MM-2. The Coalition shall ensure that any oil and gas-producing wells within the rail right-of-way are plugged and abandoned in accordance with Utah Administrative Code Rule R649-3-24, Plugging and Abandonment of Wells. The Coalition shall consult with the Utah Division of Oil, Gas, and Mining prior to undertaking any construction activities that could affect existing wells and shall follow that agency's reasonable recommendations regarding appropriate safety procedures for the abandonment of wells.

ENGY-MM-3. The Coalition shall design any crossings or relocations of pipelines or electrical transmission lines in accordance with applicable Utah Division of Public Utilities' regulations and guidelines. The Coalition shall consult with appropriate utility providers to develop a plan to ensure that construction activities that could affect existing electrical transmission lines or energy pipelines avoid any interruption of utility service to customers to the extent possible.

ENGY-MM-4. The Coalition shall consult with oil and gas operators of existing facilities (e.g., wells, well pads, gathering pipelines, access roads) that would be affected by construction and operation of the rail line during the final engineering and design phase for the rail line and prior to undertaking project-related construction activities to develop appropriate measures to mitigate impacts on these facilities. These measures may include, but are not limited to, adjusting the location of construction activities to avoid oil and gas facilities or relocating the facilities if impacts cannot be avoided during construction and operations.

~~4.4.8~~4.4.9 Paleontological Resources

PALEO-MM-1. The Coalition shall contract with a qualified paleontologist to develop and implement a paleontological resources monitoring and treatment plan to mitigate potential impacts on paleontological resources on lands classified as Potential Fossil Yield Classification 3, 4 or 5. The plan shall include the following requirements:

- A preconstruction survey where appropriate to describe and recover paleontological resources found on the surface.
- Monitoring of ground-disturbing activities during construction to recover paleontological resources, including inspection of spoils piles created by tunnel construction.
- Identification, preparation, and documentation of fossils collected during surveys or monitoring.
- Curation and deposition of significant paleontological resources into a federally approved repository.
- Increasing public awareness about the scientific importance of paleontological resources by developing web-based education material, interpretive displays, or other means.

~~4.4.9~~4.4.10 Land Use and Recreation

LUR-MM-1. The Coalition shall consult with the Ute Indian Tribe during the final engineering and design phase of the ~~proposed~~ rail line and prior to undertaking any project-related construction to ensure that construction and operation of the ~~proposed~~ rail line would not significantly impact land uses on land under the tribe's jurisdiction.

LUR-MM-2. ~~If the Board authorizes the Indian Canyon Alternative or the Whitmore Park Alternative, the Coalition shall implement the reasonable mitigation measures imposed by the Ute Indian Tribe~~

~~during negotiations for the consent of the tribe for a right-of-way across Tribal trust land.~~ The Coalition shall implement any mitigation measures imposed by the Ute Indian Tribe as a condition of a right-of-way across Tribal trust lands.

LUR-MM-3. If the Indian Canyon Alternative or the Wells Draw Alternative is authorized by the Board, the Coalition shall adhere to the reasonable mitigation conditions imposed by BLM in any right-of-way granted by BLM allowing the Coalition to cross BLM lands and shall ensure that construction and operation of the rail line is in compliance with applicable Resource Management Plans, including any potential amendments to those plans, for BLM lands that the rail line would cross.

LUR-MM-4. If the Indian Canyon Alternative or the Whitmore Park Alternative is authorized by the Board, the Coalition shall adhere to the reasonable mitigation conditions imposed by the Forest Service in any special use permit allowing the Coalition to cross National Forest System Lands. These reasonable mitigation conditions may include identifying areas where use and storage of petroleum products, herbicides, and other hazardous materials should be avoided during construction and operation. Conditions may also include avoiding or minimizing impacts on horse pastures to maintain adequate pasture size and replacing pasture fences removed during construction, as determined appropriate through consultation with the Forest Service. The Coalition shall consult with the Forest Service to ensure that construction and operation of the rail line complies with *Ashley Forest Land and Resource Management Plan*, including any existing or potential amendments to that plan, and with the Forest Service 2001 Roadless Rule.

LUR-MM-5. The Coalition shall adhere to the reasonable mitigation conditions imposed by the State of Utah School and Institutional Trust Lands Administration (SITLA) in any right-of-way grant allowing the Coalition to cross SITLA lands.

LUR-MM-6. If the Indian Canyon Alternative or the Whitmore Park Alternative is authorized by the Board, the Coalition shall obtain a right-of-way from the U.S. Bureau of Indian Affairs (BIA) to cross Tribal trust lands and shall implement the reasonable terms and conditions imposed by BIA in any decision granting a right-of-way on Tribal trust lands.

LUR-MM-7. Prior to project-related construction, the Coalition shall consult with BLM, the Forest Service, the Ute Indian Tribe, ~~and~~ SITLA, and local agencies as appropriate, to develop a plan to limit, to the extent practicable, impacts on recreational resources under those agencies' management or jurisdiction, including roads used for recreation and recreational site access. The Coalition shall also consult with private landowners to develop appropriate measures to mitigate impacts on land uses and recreational activities on private land. The Coalition shall develop the plan prior to completing the final engineering plans for the ~~proposed~~ rail line and following the above-mentioned consultation to determine the location of all public roads used as access points to a recreation area that would be crossed by the ~~proposed~~ rail line. The plan shall designate temporary access points if main access routes must be obstructed during project-related construction. The plan shall also include the number and location of access points as decided during consultation with the applicable agencies.

LUR-MM-8. The Coalition shall coordinate with owners of properties used for recreation during project-related right-of-way acquisition negotiations to provide adequate private road at-grade crossings to ensure that recreationists maintain access to and movement within recreational properties and areas. The Coalition shall coordinate with UDWR, the Ute Indian Tribe, SITLA, BLM, and the Forest Service, as appropriate, to develop reasonable measures to maintain access to hunting and recreation access points.

LUR-MM-9. The Coalition shall consult with appropriate land management agencies to develop appropriate measures to mitigate impacts of construction and operation of the rail line on grazing allotments on public lands. These measures could include improving forage production in other areas of affected allotments through implementation of vegetation treatment projects, including sagebrush reduction treatments and/or seedings, to increase forage production and maintain preconstruction carrying capacity.~~requiring vegetation treatments within affected allotments to improve remaining forage, as appropriate.~~

LUR-MM-10. The Coalition shall install cattle guards, livestock exclusion fencing, or other design features, as appropriate, within grazing areas along the rail line to prevent livestock from entering rail tunnels or congregating at tunnel entrances or in other areas in the rail right-of-way that could be hazardous to livestock. The Coalition shall work with landowners and land management agencies, as applicable, to identify appropriate locations for cattle guards, fencing, and other design features and to plan for ongoing maintenance of any of these features.

LUR-MM-11. The Coalition shall consider installing cattle underpasses along the right-of-way, as appropriate and practical. These underpasses could also be used by wildlife. The Coalition shall work with landowners to identify appropriate locations for cattle passes.

LUR-MM-12. The Coalition shall coordinate with landowners and holders of conservation easements crossed by the rail line to develop appropriate measures to mitigate impacts of construction and operation of the rail line on affected conservation easements.

~~4.4.10~~4.4.11 Visual Resources

VIS-MM-1. The Coalition shall install visual barriers, as appropriate, to obstruct views of project-related construction activities and to maintain the privacy of adjacent landowners.

VIS-MM-2. The Coalition shall direct nighttime lighting, if used during construction, onto the immediate construction area during project-related construction to minimize impacts from shining lights on sensitive viewers, sensitive natural resource areas, recreational areas, and roadway or trail corridors.

VIS-MM-3. During project-related construction, the Coalition shall grade contours to create slopes with undulations and topographical variations that mimic natural terrain, where possible. If this grading practice results in larger areas of cut or fill that would further degrade natural features of scenic value, the Coalition shall not implement this measure at those locations. For example, a steeper cut slope may be more desirable than removing many trees to create more rounded terrain. The Coalition shall grade and restore roadbeds that are abandoned because of roadway relocation due to project-related construction to mimic the adjacent natural landscape and revegetate the roadway surface.

VIS-MM-4. The Coalition shall design bridges, communications towers, and other project-related features to complement the natural landscape and minimize visual impacts on the landscape. To the extent practicable, the Coalition shall use paint colors that are similar to colors in the surrounding landscape and shall implement design features that mimic natural materials (e.g., stone or rock surfacing) and colors to reduce visibility and to blend better with the landscape.

VIS-MM-5. If the Board authorizes construction and operation of the Indian Canyon Alternative or Whitmore Park Alternative, the Coalition shall implement the reasonable requirements of any Forest Service decision permitting the ~~proposed~~ rail line within Ashley National Forest and shall ensure that construction and operation on National Forest System lands complies with the requirements for visual resources management in *Ashley National Forest Land and Resource Management Plan*, including any potential amendments to that plan.

VIS-MM-6. If the Board authorizes the Indian Canyon Alternative or the Wells Draw Alternative, the Coalition shall consult with BLM during all phases of project design to ensure that construction and operation of the ~~proposed~~ rail line on BLM lands would be in compliance with all applicable BLM Visual Resource Management requirements and procedures. The Coalition shall incorporate visual design considerations into the design of the ~~proposed~~ rail line on BLM lands; undertake additional visual impact analyses on BLM lands, as appropriate, in consultation with BLM and considering applicable BLM Visual Resources Inventories; and implement appropriate measures to mitigate visual impacts on BLM lands, as requested by BLM.

VIS-MM-7. If the Board authorizes the Indian Canyon Alternative or the Wells Draw Alternative, the Coalition shall, in consultation with BLM, implement appropriate additional measures to minimize light pollution on BLM lands, potentially including limiting the height of light poles, limiting times of lighting operations, limiting wattage intensity for lighting, and constructing light shields, as applicable.

VIS-MM-8. ~~If the Board authorizes construction and operation of the Indian Canyon Alternative or Whitmore Park Alternative, t~~The Coalition shall implement the ~~reasonable~~ requirements of the Ute Indian Tribe regarding the design of the ~~proposed~~ rail line on Tribal trust lands for minimizing visual disturbances to Tribal trust lands.

~~4.4.11~~4.4.12 Socioeconomics

SOCIO-MM-1. The Coalition shall negotiate compensation—for direct loss of agricultural land in the right-of-way and the indirect loss of agricultural land from severance—with each landowner whose property would be affected by construction and operation of the ~~proposed~~ rail line, consistent with applicable state law. The Coalition shall assist landowners in developing alternative agricultural uses for severed land, where appropriate. The Coalition shall apply a combination of alternative land use assistance and compensation as agreed upon during right-of-way negotiations, pursuant to state law. Where capital improvements are displaced by construction or operation of the ~~proposed~~ rail line, the Coalition, in consultation with the landowner and relevant agencies, such as water districts or the local Natural Resources Conservation Services office, shall relocate or replace these improvements or provide appropriate compensation based on the fair market value of the capital improvements being displaced, consistent with applicable state law.

SOCIO-MM-2. The Coalition shall consult with landowners to limit the loss of access to properties during rail construction. The Coalition also shall consult with landowners to determine the location of property access roads that would be crossed by the ~~proposed~~ rail line. The Coalition shall install temporary property access points for landowner use if main access routes must be obstructed during project-related construction. The Coalition shall coordinate with landowners while negotiating the railroad right-of-way easement to identify key access points that would be affected by construction and operation of the ~~proposed~~ rail line. The Coalition shall install at-grade crossings and relocate roads to maintain adequate access to and movement within properties after rail operations begin.

~~4.4.12~~4.4.13 Environmental Justice

EJ-MM-1. The Coalition shall consult with the Ute Indian Tribe regarding potential impacts on the Pariette cactus and Uinta Basin hookless cactus and shall abide by the requirements of the tribe's Sclerocactus Management Plan and the tribe's other ~~reasonable~~ requirements and recommendations for project-related activities on Tribal trust lands, which may include soil assessments, complying with mitigation measures to be developed in consultation with the tribe, and contributing to a conservation mitigation fund, as appropriate.

EJ-MM-2. The Coalition shall consult with the Ute Indian Tribe regarding the final design of the rail line, including the locations and designs of rail-related features, such as sidings, communications towers, culverts, bridges, and warning devices, to ensure that impacts on tribal members and land and resources under the tribe's jurisdiction are minimized.

4.4.14 Monitoring and Compliance

MC-MM-1. The Coalition shall submit quarterly reports to OEA on the progress of, implementation of, and compliance with all Board-imposed mitigation measures. The reporting period for these quarterly reports shall begin on the date of the Board's final decision authorizing the project until 1 year after the Coalition has completed project-related construction activities. The Coalition shall submit copies of the quarterly reports within 30 days following the end of each quarterly reporting period and distribute the reports to appropriate federal, state, local, and tribal agencies, as specified by OEA.

Chapter 5
Consultation and Coordination

This chapter summarizes public, agency, and tribal involvement during the environmental review process leading to the issuance of this Final~~Draft~~ EIS.

5.1 Public Involvement

5.1.1 EIS Scoping

To help determine the scope of this EIS, and as required by the Board's regulations at 49 Code of Federal Regulations (C.F.R.) § 1105.10(a)(2), OEA published a Notice of Intent to Prepare an Environmental Impact Statement, Notice of Availability of the Draft Scope of Study, Notice of Scoping Meetings, and Request for Comments (NOI) (84 *Federal Register* [FR] 28611) on June 19, 2019. OEA sent letters to elected officials; federal, state, and local agencies; tribes; and other potentially interested organizations to notify them of the availability of the NOI and provide details on the scoping process. OEA also prepared and distributed a postcard that introduced the Coalition's proposed rail line, announced OEA's intent to prepare an EIS, and gave notice of scoping meetings to over 360 residents and landowners identified in the vicinity of the preliminary rail line alternatives.

OEA circulated a press release and a public service announcement for distribution to media outlets in the areas surrounding the proposed rail line. OEA also distributed a community flyer with similar information to high-traffic areas including chambers of commerce, libraries, and town halls near the proposed rail line. OEA also conducted a digital campaign to advertise public meetings, increase awareness, and direct interested parties to the project website for additional information. OEA placed notices of the scoping meetings in several newspapers, including the *Salt Lake City Tribune, Deseret News, Uintah Basin Standard, Vernal Express, Craig Daily Press, Rio Blanco Herald Times,* and *Utah County Daily Herald*.

Publication of the NOI initiated a 45-day public scoping period that commenced on June 19, 2019, and was scheduled to end on August 3, 2019. In response to requests to extend the public scoping period, OEA extended the scoping comment period for an additional 30 days to September 3, 2019. During the scoping period, OEA held six public scoping meetings in communities in the vicinity of the proposed rail line and in Salt Lake City, Utah. The first 30 minutes of each public meeting was an open-house format, followed by a brief presentation and an opportunity for public comment at an open microphone. Approximately 410 people attended the scoping meetings, including citizens; tribal members; representatives of organizations; elected officials; and officials from federal, state, and local agencies. Some attendees submitted oral and/or written comments during the meetings, and OEA received additional scoping comment forms and letters by mail.

OEA received 1,530 comment letter submissions during the scoping comment period. This included one form letter campaign comprising 949 submissions. Upon receipt of each comment letter, the submission was parsed into individual comments and sorted by resource topic. OEA identified 961 unique comments during this process. OEA considered all the of the comments and revised the Draft Scope of Study in response to public and agency input. On December 13, 2019, OEA published the

Final Scope of Study in the *Federal Register* (84 FR 68274). The Final Scope of Study includes a summary of the comments received and the potential impacts to be analyzed in the EIS. As part of the environmental review process to date, OEA has conducted broad public outreach activities to inform the public about the proposed rail line and to facilitate public participation. OEA consulted with, and will continue to consult with, federal, state, and local agencies; tribes; affected communities; and all interested parties to disseminate information and gather comments.

5.1.2 Draft EIS Public Comment Period

On October 30, 2020, the Board issued the Draft EIS for review and comment. On that date, the U.S. Environmental Protection Agency (USEPA) published a Notice of Availability (NOA) in the *Federal Register* (85 FR 68871) announcing the availability of the Draft EIS, instructions on how to submit comments on the Draft EIS, and the schedule and instructions for participating in online public meetings. The NOA noted that the comment period would end on December 14, 2020. Following the issuance of the Draft EIS, the Board twice extended the public comment period on the Draft EIS. On December 9, 2020, OEA announced an extension of the public comment period for 60 days until January 28, 2021. On January 28, 2021, OEA announced an additional extension of the comment period for 15 days until February 12, 2021.

OEA conducted extensive notification about these public comment period extensions, including by emailing the Board's announcement to the project distribution list; emailing community flyers to organizations near the proposed rail line, such as libraries and chambers of commerce; emailing a Public Service Announcement and Media Release to media outlets covering the vicinity of the proposed rail line; placing a legal notice in area newspapers of record; and including information on the Project Updates page of the project website and posting the Board's announcement. Table 5-1 through Table 5-4 list the recipients of the community flyers, public service announcements and media releases, newspaper display advertisements, and newspaper legal notices.

Table 5-1. Community Flyer Distribution List

Organization
Duchesne Chamber of Commerce
Vernal Area Chamber of Commerce
Utah Valley Chamber of Commerce
Carbon County Chamber of Commerce
Vernal Area Chamber of Commerce
Naples City
Vernal City
Duchesne County
Carbon County
Duchesne City
Myton City
Roosevelt City
Ballard City
Price City
Helper City

Organization
Duchesne Library
Roosevelt Library
Duchesne County
Uintah Library
Price City Library
Salt Lake City Public Library
Ute Tribe

Table 5-2. Public Service Announcement and Media Release Media Distribution List

Organization	Organization Type	City
Salt Lake Tribune	Newspaper	Salt Lake
Deseret News	Newspaper	Salt Lake
City Weekly	Newspaper, Magazine, Website	Salt Lake
KUTV2	News TV Station	Salt Lake
Fox 13	News TV Station	Salt Lake
KSL	News Radio Station	Salt Lake
KSL	News TV Station	Salt Lake
ABC 4	News TV Station	Salt Lake
Uintah Basin Standard	Newspaper	Vernal
Vernal Express	Newspaper	Vernal
Basin Now	Website/ Digital News, News Radio Station	Vernal
Basin Nickel Ads	Newspaper	Vernal
ETV News	Newspaper	Price
The Daily Herald	Newspaper	Provo

Table 5-3. Newspaper Display Advertisements Announcing Draft EIS Availability and Online Public Meetings

Newspaper	Run Dates
The Daily Herald	Saturday, November 7, 2020
Salt Lake City Tribune	Sunday, November 8, 2020
Deseret News	Sunday, November 8, 2020
Uintah Basin Standard	Tuesday, November 10, 2020
Vernal Express	Tuesday, November 10, 2020
Basin Nickel Ads	Tuesday, November 10, 2020
ETV News	Wednesday, November 11, 2020

Table 5-4. Legal Notices for Comment Period Extensions

Newspaper Outlet	Extension 1 Run Dates	Extension 2 Run Dates
Salt Lake City Tribune	Tuesday, November 21, 2020	Tuesday, December 12, 2020
Vernal Express	Saturday, November 24, 2020	Saturday, December 15, 2020

OEA conducted six online public meetings during the comment period. The online public meetings were held at the following dates and times; all times are in Mountain Standard Time (MST).

- Monday, November 16, 2020, 2:00–4:00 p.m.
- Wednesday, November 18, 2020, 9:00–11:00 a.m.
- Thursday, November 19, 2020, 6:00–8:00 p.m.
- Monday, November 30, 2020, 6:00–8:00 p.m.
- Tuesday, December 1, 2020, 2:00–4:00 p.m.
- Thursday, December 3, 2020, 6:00–8:00 p.m.

These meetings were held online due to OEA's concerns for public safety during the COVOD-19 pandemic and COVID-19-related restrictions on large gatherings and travel. OEA conducted comprehensive notification about the online public meetings and how to register for them. Notification included the following.

- Emailing a letter to the entire project distribution list that detailed the availability of the Draft EIS, the public comment period, and information regarding the online public meetings and how to register for and participate in the online public meetings.
- Emailing community flyers to organizations in the vicinity of the proposed rail line, such as libraries and chambers of commerce.
- Emailing a Public Service Announcement and Media Release to media outlets covering the vicinity of the proposed rail line.
- Placing a legal notice in area newspapers of record for the U.S. Forest Service (Forest Service).
- Updating the Board-sponsored project website with information on the Project Updates page and posting the Board's announcement on the Documents page.

OEA also conducted a zip code-targeted digital campaign advertising the availability of the Draft EIS and linking to the project website and meeting registrations. This campaign resulted in 8,794 unique clicks to the project website, significantly increasing awareness in the vicinity of the proposed rail line of the availability of the Draft EIS and the upcoming online public meetings.

Over the course of the six online public meetings, 209 persons registered to attend, and 55 persons registered in advance to make oral comments. Participation in all meetings was also available at any time by simply dialing the telephone number that OEA made available on the project website and used for all six online meetings. When time permitted during an online public meeting, the meeting facilitator called upon persons desiring to make an oral comment, but who had not registered in advance to do so. OEA also posted the oral presentation that was shared at each online public meeting to the project website to make it available for viewing at any time. A court reporter recorded the oral comments, and OEA made the meeting transcripts available on the project website after the meetings.

OEA received 1,934 comment submissions on the Draft EIS. Of those, 1,065 were form letters associated with one of two master form letters and 184 were form letters with some unique text. Of the total comment submissions, 869 were unique comment submissions (including the form letters with unique text), and of those unique submissions, 68 were oral comments received at an online public meeting. The Public Involvement page of the project website includes all comments submitted on the Draft EIS, oral or written. Appendix T, *Responses to Comments*, includes comments and responses by EIS chapter or section.

~~5.1.2~~5.1.3 Project Website

Early in the EIS scoping process, OEA established a Board-sponsored website (www.uintabasinrailwayeis.com) to communicate project-related information to the public. During the scoping process, OEA posted project information such as the NOI, the Draft Scope of Study, information about scoping meetings, instructions and guidance on how to provide scoping comments, scoping meeting presentation materials, and the Final Scope of Study.

OEA continued to update the website beyond the scoping process and posted relevant project information, such as baseline environmental data, ~~and~~ engineering details, and the Draft EIS files. OEA posted relevant consultation documents to the Documents page as they were available. These documents include the *Biological Assessment* that OEA submitted to the U.S. Fish and Wildlife Service (USFWS) to initiate formal consultation under Section 7 of the Endangered Species Act, as well as the fully executed *Programmatic Agreement* that OEA and Section 106 consulting parties developed under Section 106 of the National Historic Preservation Act. These documents are appended to the Final EIS as Appendix I and Appendix O, respectively.

Throughout the environmental analysis, the project website has included an option for persons to request to be added to the project mailing list. OEA will continue to update the project website throughout the NEPA process to communicate project-related information to the public.

5.2 Agency Coordination and Consultation

5.2.1 National Environmental Policy Act

As part of scoping under NEPA and before the NOI was published, OEA sent consultation letters to agencies soliciting their input, comments, ideas, and concerns (Table 5-1).

Table 5-5. Agencies and Tribes Consulted during Scoping for Input on the ~~Draft~~ EIS

Federal Agencies	State Agencies	Tribes
U.S. Environmental Protection Agency	State of Utah School and Institutional Trust Lands Administration	Ute Indian Tribe of the Uintah and Ouray Reservation
U.S. Fish and Wildlife Service	Utah Public Lands Policy Coordinating Office	
Bureau of Indian Affairs	Utah Governor's Office	
National Park Service	Utah Department of Transportation	
U.S. Army Corps of Engineers	Utah State Historic Preservation Office	

Bureau of Land Management	Utah Department of Environmental Quality
Federal Railroad Administration	Colorado Department of Public Health & Environment
U.S. Forest Service	Colorado Department of Transportation
	Colorado Governor's Office
	Colorado Parks and Wildlife
	Colorado State Historic Preservation Office
	Colorado State Land Board

OEA also sent consultation letters to Carbon, Duchesne, Uintah, and Utah Counties in Utah and Moffat and Rio Blanco Counties in Colorado.

Prior to the issuance of the NOI, OEA invited four federal agencies and one state agency, acting as lead agency for other Utah State agencies, to participate in the EIS process as cooperating agencies (Chapter 1, Section 1.3.2, *Cooperating Agencies*).

OEA held several meetings with the cooperating agencies before and during the scoping period. These included a kickoff teleconference with the cooperating agencies on June 3, 2019, in-person meetings with the cooperating agencies in Salt Lake City, Utah, on July 15, 2019, and November 21, 2019, and a series of biweekly teleconference meetings that began on July 31, 2019, and will continue, as needed through the end of the NEPA process.

During preparation of the Draft and Final EIS, OEA continued consultation with the above agencies and additional agencies, including the Utah Division of Wildlife Resources (UDWR)~~Utah Department of Wildlife Resources~~, Utah Geological Survey, Utah Division of Air Quality,~~ and~~ Utah Department of Agriculture and Food, and the Utah Energy Office.

OEA also held separate teleconference meetings with various agencies, including USEPA, the Bureau of Land Management (BLM), the U.S. Forest Service (Forest Service), the U.S. Army Corps of Engineers (Corps), and USFWS, as needed, to discuss resource-specific topics.~~the U.S. Environmental Protection Agency (EPA), Bureau of Land Management (BLM), U.S. Forest Service (Forest Service), U.S. Army Corps of Engineers, and U.S. Fish and Wildlife Service as needed to discuss resource-specific topics.~~ For example, OEA convened a project-specific Greater Sage-Grouse Interagency Working Group with representatives from BLM, the Corps, USFWS, UDWR, the Utah Public Lands Policy Coordinating Office, and other Utah State agencies.~~ the Bureau of Land Management, U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, Utah Division of Wildlife Resources, Utah Public Lands Policy Coordinating Office, and other Utah State agencies.~~ This working group met six times to exchange information related to greater sage-grouse management, study impacts on greater sage-grouse habitat, and review the Coalition's voluntary mitigation approach for addressing impacts on greater sage-grouse.

Appendix S, *Agency and Tribal Consultation*, provides additional details on OEA's consultation with cooperating agencies and other agencies during the development of this Final~~Draft~~ EIS.

5.2.2 National Historic Preservation Act Section 106

OEA also consulted with appropriate agencies under Section 106 of the National Historic Preservation Act (NHPA). OEA's formal Section 106 consultation effort began in June 2019, when OEA identified and sent letters to an appropriate group of potential consulting parties. OEA invited all parties with whom it initiated consultation to participate in the July 2019 public scoping meetings and to identify any topics related to cultural resources or historic properties that should be included in the EIS. Throughout the remainder of 2019, OEA followed up on the initiation letters by email and telephone to determine whether each invited party wished to participate in consultation.

As of the issuance of this Final~~Draft~~ EIS, the following federal, state, and tribal agencies are participating in the Section 106 process as consulting parties.

- Utah Division of State History, State Historic Preservation Office
- Ute Indian Tribe of the Uintah and Ouray Reservation
- Advisory Council on Historic Preservation
- Department of Agriculture, U.S. Forest Service
- Department of the Interior, Bureau of Indian Affairs
- Department of the Interior, Bureau of Land Management
- Department of the Army, U.S. Army Corps of Engineers
- The State of Utah's Public Lands Policy Coordinating Office
- Utah Trust Lands Administration
- Utah Department of Transportation

Between~~Beginning in~~ January 2020 and April 2021, OEA hosted monthly consulting party teleconferences. OEA also held a topic-specific teleconference to solicit consulting party perspectives on the likely presence and significance of rock imagery in the APE. In addition to these group conversations~~conservations~~, OEA consulted individually with the Forest Service, Utah State Historic Preservation Office, and the Advisory Council on Historic Preservation. OEA, in consultation with consulting parties, executed a Final Programmatic Agreement in March 2021 that specifies~~OEA is continuing to coordinate with appropriate agencies and other consulting parties on development of a Programmatic Agreement (PA) that will specify~~ the procedures and responsible parties for identification and evaluation of historic properties, assessment of potential effects on historic properties, and the resolution of adverse effects on historic properties.

To keep agencies and the public involved and informed, OEA included a page on the Board-sponsored project website (www.uintabasinrailwayeis.com) that includes up-to-date information about the Section 106 process.

5.3 Tribal Coordination and Consultation

This section addresses OEA's coordination and consultation with tribes under NEPA, Executive Order 13175, and Section 106.

5.3.1 Government-to-Government Consultation

Executive Order 13175 requires that federal agencies conduct government-to-government consultations with federally recognized Indian tribes in the development of federal policies (including regulations, legislative comments or proposed legislation, and other policy statements or actions) that have tribal implications. Tribes may have concerns about natural resources that would not be brought up during the NHPA Section 106 process and that can be voiced during government-to-government consultation.

On June 19, 2019, OEA sent letters to the following federally recognized tribes that have current and ancestral connections to the area surrounding the proposed rail line.

- Ute Indian Tribe of the Uintah and Ouray Reservation, Utah
- Apache Tribe of Oklahoma
- Eastern Shoshone Tribe of the Wind River Reservation, Wyoming
- Confederated Tribes of the Goshute Reservation, Nevada and Utah
- Fort Belknap Indian Community of the Fort Belknap Reservation of Montana
- Hopi Tribe of Arizona
- Navajo Nation, Arizona, New Mexico, and Utah
- Northwestern Band of the Shoshone Nation
- Paiute Indian Tribe of Utah
- Shoshone-Bannock Tribes of the Fort Hall Reservation
- Skull Valley Band of Goshute Indians of Utah
- White Mesa/Ute Mountain Ute Tribe

The letters provided information regarding the Board's responsibility for preparing the appropriate NEPA documentation for the proposed rail line. The letters also notified the tribes of the issuance of the NOI, provided directions on how to comment on the Draft Scope of Study, and invited the tribes to engage with OEA in government-to-government consultation. OEA requested that the tribes reply to indicate interest in consultation with OEA regarding the broader range of impacts assessed under NEPA including impacts on tribal lands and resources. The letter also included a questionnaire on which tribes could indicate their interest in future involvement in the NEPA process. OEA has been engaging in government-to-government consultation with the Ute Indian Tribe of the Uintah and Ouray Reservation throughout the NEPA process. The Ute Indian Tribe is the only federally recognized tribe that accepted OEA's invitation to engage in government-to-government consultation.

OEA has met multiple times with members of the Ute Tribal Business Committee and other tribal officials and staff at the Board's Washington, D.C. office, at tribal offices at the Uintah and Ouray Reservation, and by teleconference to review tribal concerns or questions, and to review project updates. These meetings included in-person meetings with the Business Committee at tribal offices on February 5, 2019 and November 20, 2019; in-person meetings with members of the Business Committee at the Board's office on May 30, 2019, September 12, 2019, and January 28, 2020; and virtual meetings with the Business Committee on December 17, 2020 and March 17, 2021.[1] ~~These meetings occurred in February, May, July, September, and November 2019, as well as in January, May, and August 2020.~~

5.3.2 Tribal Consultation under NHPA Section 106

On June 19, 2019, OEA sent a letter outlining the Board's responsibilities to consult regarding potential impacts of the proposed rail line on historic properties as defined, under Section 106 of the NHPA. OEA sent the letter to the following tribes and invited recipients to consult under Section 106 of the NHPA.

- Ute Indian Tribe of the Uintah and Ouray Reservation
- Apache Tribe of Oklahoma
- Confederated Tribes of the Goshute Reservation, Nevada and Utah
- Eastern Shoshone Tribe of the Wind River Reservation, Wyoming
- Fort Belknap Indian Community of the Fort Belknap Reservation of Montana
- Hopi Tribe of Arizona
- Navajo Nation, Arizona, New Mexico, and Utah
- Northwestern Band of the Shoshone Nation, Utah
- Paiute Indian Tribe of Utah
- Shoshone-Bannock Tribes of the Fort Hall Reservation, Idaho
- Skull Valley Band of the Goshute Indians
- White Mesa/Ute Mountain Ute Tribe, Utah and Colorado

The Hopi Tribe of Arizona and Ute Indian Tribe of the Uinta and Ouray Reservation accepted the invitation to participate as NHPA Section 106 consulting parties. The other tribes that received OEA's invitation letter either did not respond to or declined the invitation. In June 2020, OEA contacted all tribes that had not yet responded to invite them to participate as a Section 106 consulting party again. OEA did not receive any responses from this second round of invitations.

OEA held a consulting party kickoff meeting on January 22, 2020, via a teleconference call and held monthly meetings of the consulting parties via teleconferences between January 2020 and April 2021~~throughout the development of this Draft EIS~~. During the monthly calls, OEA provided project updates and a venue for tribes to express any concerns regarding the proposed rail line. OEA consulted directly with the Ute Indian Tribe of the Uinta and Ouray Reservation's Cultural Rights Protection Department in person and by teleconference throughout the development of this Final~~Draft~~ EIS. OEA ~~is continuing to~~ coordinated with tribes and other Section 106 consulting parties to develop a l~~on development of a~~ Programmatic Agreement that was executed in March 2021 and that specifies~~will specify~~ the procedures and responsible parties for identification and evaluation of historic properties, assessment of potential effects to historic properties, and the resolution of adverse effects to historic properties.

[1] These meetings were held online due to concerns for public safety during the COVOD-19 pandemic and COVID-19-related restrictions on gatherings and travel.

To keep the tribal members and the public involved and informed, OEA included a page on the Board-sponsored project website (www.uintabasinrailwayeis.com) that contains up-to-date information about the Section 106 process.

5.4 Consultation with Other Stakeholders

5.4.1 Consultation under NHPA Section 106

In addition to the agencies and tribes listed in the previous sections, OEA also invited other appropriate parties to participate in the Section 106 consultation process. OEA conducted an extensive and inclusive process to provide multiple opportunities for consulting parties to participate in the Section 106 process.

As of the issuance of this Final~~Draft~~ EIS, the following agencies, tribes, and other stakeholders are participating in the Section 106 process as consulting parties.

- Utah Division of State History, State Historic Preservation Office
- Ute Indian Tribe of the Uintah and Ouray Reservation
- Advisory Council on Historic Preservation
- Department of Agriculture, U.S. Forest Service
- Department of the Interior, Bureau of Indian Affairs
- Department of the Interior, Bureau of Land Management
- Department of the Army, U.S. Army Corps of Engineers
- U.S. Environmental Protection Agency
- State of Utah's Public Lands Policy Coordinating Office
- State of Utah School and Institutional Trust Lands Administration
- Utah Department of Transportation
- Uintah County
- Duchesne County
- Carbon County
- Colorado Plateau Archaeological Alliance
- Utah Rock Art Research Association
- Nine Mile Canyon Coalition
- Hopi Tribe of Arizona
- Seven County Infrastructure Coalition

OEA held a consulting party kickoff meeting on January 22, 2020, via a teleconference call and held monthly meetings of the consulting parties via teleconferences between January 2020 and April 2021~~throughout the development of this Draft EIS~~. OEA held multiple workshops with consulting parties to discuss specific resources of concern and to incorporate consulting party input on the Final~~Draft~~ Programmatic Agreement that is appended to this Final~~Draft~~ EIS (Appendix O, *~~Draft~~ Programmatic Agreement*). OEA has also included a page on the Board-sponsored project website (www.uintabasinrailwayeis.com) specifically for Section 106 of the NHPA. This page includes an overview of the Section 106 process; links to lists of invited consulting parties; meeting agendas, materials, and minutes; and information regarding identification and evaluation of effects on historic properties. Chapter 3, Section 3.9, *Cultural Resources*; Appendix N, *Historic Properties Technical Memorandum*; and Appendix S, *Agency and Tribal Consultation,* provide additional information regarding consulting party meetings and other Section 106 communications.

Chapter 6
Additional Topics Required by NEPA

This chapter describes the short-term uses of environmental resources and compares them with the maintenance and enhancement of long-term productivity and any irreversible and irretrievable commitments of resources as a result of the proposed rail line, as required by the National Environmental Policy Act (NEPA), Section 102 (42 United States Code [U.S.C.] § 4332).

6.1 Short-Term Uses of the Environment and Maintenance and Enhancement of Long-Term Productivity

NEPA regulations (40 Code of Federal Regulations [C.F.R.] § 1502.16) recognize that short-term uses and long-term productivity of the environment are linked. Decisions that result in the use of or impacts on environmental resources have corollary opportunity costs because they may affect other potential uses of those resources in the future. This section discusses whether the short-term uses of environmental resources by the proposed rail line would affect the long-term productivity of the environment. Short-term generally refers to construction impacts, and long-term generally refers to operational impacts. Short-term uses of the environment associated with the Action Alternatives are generally the same as the impacts described for each resource in this ~~Draft~~ EIS. OEA considered the effect of these uses on three main types of long-term productivity: land use productivity, water resources productivity, and biological resources productivity. The relationship between short-term uses and long-term productivity would not be appreciably different between the three Action Alternatives.

6.1.1 Land Use Productivity

Construction of the proposed rail line would convert undeveloped land and land used for public recreation, wildlife habitat, agriculture, and grazing to land for rail operations. Temporary productivity losses related to soils would be limited to the temporary footprint[1] where land would be disturbed during construction, including areas for temporary material laydown, staging, and logistics. The Wells Draw Alternative would temporarily disturb the greatest amount of land during construction (5,309 acres), followed by the Whitmore Park Alternative (3,490 acres) and the Indian Canyon Alternative (2,818 acres). Following construction, the temporary footprint would be reclaimed and revegetated and land productivity would be restored. It is unlikely that the proposed

[1] The *rail line footprint* includes the area of the railbed, as well as the full width of the area cleared and cut or filled. The rail line footprint would also include other physical structures installed as part of the proposed rail line, such as fence lines, communications towers, siding tracks, relocated roads, and power distribution lines. The rail line footprint is the area where rail line operations and maintenance would occur. The area would be permanently disturbed. The *temporary footprint* is the area that could be temporarily disturbed during construction, including areas for temporary material laydown, staging, and logistics. Disturbed areas in the temporary footprint would be reclaimed and revegetated following construction. The *project footprint* is the combined area of the rail line footprint and temporary footprint, both of which would be disturbed during construction, comprising where construction and operations of the proposed rail line would occur.

railbed would ever be dismantled; therefore, effects on soils and some land uses would be permanent. These permanent land productivity losses would occur within the rail line footprint, which includes the railbed and the full width of the area cleared and cut or filled.

Depending on the Action Alternative, 1,543 to 2,656 acres of land would be permanently affected. Construction and operation of the proposed rail line would result in unavoidable consequences on land use productivity, including the permanent loss of irrigated cropland and grazing land and the severance of private parcels. The Wells Draw Alternative would affect the most total land, followed by the Whitmore Park Alternative and the Indian Canyon Alternative. The Wells Draw Alternative would also affect the most public land among the Action Alternatives, most of which would be lands administered by the Bureau of Land Management (BLM).

The Whitmore Park Alternative would affect the most private land, followed by the Indian Canyon Alternative and the Wells Draw Alternative. The Wells Draw Alternative would have the largest impact on livestock production because it would cause the loss of the most Animal Unit Months (AUMs) (a measure of grazing forage), followed by the Whitmore Park Alternative and the Indian Canyon Alternative. The Indian Canyon Alternative and the Whitmore Park Alternative would affect the same area of irrigated cropland and prime farmland, while the Wells Draw Alternative would affect a much smaller area of irrigated cropland and prime farmland. While the losses to land use productivity within the proposed rail line would be permanent, the areas adjacent to the rail line would still support a diversity of land uses, including agricultural activity, grazing, and wildlife.

6.1.2 Water Resources Productivity

Water use during construction and operations would result in short-term impacts on groundwater and surface water quantities. Because water sources are anticipated to be from a previous state-approved water rights source, construction of the proposed rail line would not affect the long-term quantity of water resources available for other uses. See Subsection 6.2.1, *Water Resources*, for additional information on water use under the Action Alternatives.

The permanent loss of wetland functions and values through the placement of fill and alterations to wetland vegetation, hydrology, and water quality would affect long-term wetland productivity. Depending on the Action Alternative, the construction of the proposed rail line would permanently affect between 3.6 and 7.0 acres of wetlands. The magnitude of impacts on wetland productivity would depend on both the area of wetlands filled and the quality of the affected wetlands. Wetlands filled during construction would most likely not return to wetlands, and fragmented wetlands could experience permanent changes to their vegetation composition and hydrology. Wetlands that are adjacent to the project footprint would not be filled, cleared, or excavated during rail construction, but could be affected by rail construction and operations in the project footprint.

Construction of the proposed rail line would require 391 to 506 surface water crossing structures (e.g., bridges, culverts), and 17 to 59 stream realignments depending on the Action Alternative. Construction of bridge footers, embankments, culverts, and other features at surface water crossings could alter surface water flows and reduce the ability of floodplains to convey floodwaters. However, the impermeable surface area and the number of structures within the floodplains are considered minimal and, therefore, would not have a substantial effect on the long-term productivity of the floodplain. Additionally, if OEA's recommended mitigation related to maintaining existing surface water flows and the inspection and clearing of debris at water crossings is implemented, OEA does not expect significant impedance or blockage of flood flows from culvert or bridge obstructions to occur.

6.1.3 Biological Resources Productivity

Construction of the proposed rail line would result in some short- and long-term impacts on vegetation, fish, and wildlife resources. The temporary vegetation loss as a result of construction activities would be short term in some areas and long term in others, depending on the type of vegetative cover. Because of the limited precipitation in the region, reclamation of temporary disturbance areas would result in long-term losses in productivity for certain vegetation communities, such as sagebrush. Although vegetation would return to the temporarily disturbed areas, the clearing of shrub and forest vegetation would alter and likely permanently change the vegetation cover class to nonwoody herbaceous cover classes. Vegetation cleared for the railbed and associated infrastructure would be permanent, resulting in long-term impacts on vegetation resources. The Wells Draw Alternative would permanently remove the greatest area of vegetation/land cover, followed by the Whitmore Park Alternative and Indian Canyon Alternative. Among the different types of land cover in the study area, shrublands (particularly the Colorado Plateau Mixed Low Sagebrush Shrubland vegetation community) and woodlands (particularly the Colorado Plateau Pinyon-Juniper Woodland vegetation community) would be most affected by any of the Action Alternatives.

Short-term construction-related impacts on wildlife would include habitat loss, alteration, and fragmentation; a decrease in breeding success from exposure to construction noise and increased human activity; and direct mortality from construction. Rail operations would also increase mortality from collisions with maintenance vehicles, trains, power lines, and communications towers and would create a barrier to wildlife movement. Construction of the rail line could have localized impacts on fish populations during the construction period.

Due to the number of species—including federal Endangered Species Act (ESA)-listed and other special status species, as well as the largely undisturbed condition of the study area—impacts on biological resources related to habitat disturbance and noise would be significant under any of the Action Alternatives. If implemented, OEA's recommended and the Coalition's voluntary mitigation measures would lessen impacts of construction and operations on animal and plant species, including ESA-listed species (Chapter 4, *Mitigation*). Some significant impacts, however, including the permanent loss of existing habitat in the rail line footprint, would be unavoidable, which could affect long-term productivity of the environment. OEA is conducting ESA Section 7 consultation with the U.S. Fish and Wildlife Service to assess the potential impacts of the proposed rail line on ESA-listed species (Appendix I, ~~*Draft*~~ *Biological Assessment*). Based on the analysis of the potential impacts of the proposed rail line on federally listed species, OEA determined that the proposed project *May Affect, but is Not Likely to Adversely Affect* Canada lynx and Mexican spotted owl; *May Affect, and is Likely to Adversely Affect* Colorado pikeminnow, humpback chub, bonytail, razorback sucker, Barneby ridge-cress, Pariette cactus, Uinta Basin hookless cactus, and Ute ladies-tresses; and would have *No Effect* on June sucker and Western yellow-billed cuckoo.

6.2 Irreversible or Irretrievable Commitments of Resources

NEPA requires federal agencies to consider irreversible or irretrievable commitments of resources related to their decisions. Irreversible commitments are uses of resources that cannot be reversed because they involve nonrenewable resources (such as fossil fuels or cultural resources) or because they would affect renewable resources (such as soils or water resources) to the point that they might not be able to completely recover. Irretrievable commitments of resources are uses of resources that cannot be retrieved for a period of time, such as the use of construction materials to construct the proposed rail line. The following subsections describe irreversible or irretrievable commitments of resources from implementing the Action Alternatives.

Construction of the proposed rail line would require the irretrievable commitment of materials to build the track structure (e.g., ballast, subballast, rail ties, and steel rail), track sidings, fences, power distribution lines, access roads, grade-separated crossings, rail bridges, culverts, support facilities, and communications towers. Because it would be substantially longer than the other Action Alternatives, the Wells Draw Alternative would require more construction materials to be irretrievably committed relative to the Indian Canyon Alternative and the Whitmore Park Alternative.

6.2.1 Water Resources

The Coalition would obtain water needed for construction activities (i.e., for dust suppression, soil compaction, and concrete work) and operations through existing water rights near the proposed rail line. The Coalition does not intend to pursue new water rights. The Coalition estimates that 1,650 acre-feet of water would be needed to construct the Indian Canyon Alternative, 8,890 acre-feet to construct the Wells Draw Alternative, and 1,750 acre-feet to construct the Whitmore Park Alternative. The use of groundwater and surface water would be an irretrievable commitment of resources during the construction phase. Among the Action Alternatives, the Wells Draw Alternative would require the greatest amount of water. This water would be replenished through the natural water cycle following the rail construction process.

Construction of the proposed rail line and associated facilities would permanently convert between 3.6 acres (Whitmore Park Alternative) and 7.0 acres (Indian Canyon Alternative) of wetlands, which would represent an irreversible commitment of resources because the proposed rail line would be permanent. The majority of wetlands affected by permanent fill actions for the Action Alternatives would be from partial filling; however, several wetlands would be completely filled, including 12 wetlands along the Indian Canyon Alternative, seven wetlands along the Wells Draw Alternative, and four wetlands along the Whitmore Park Alternative. In addition, temporary construction disturbances to wetlands could result in irreversible changes if the wetlands are not restored to full function.

6.2.2 Biological Resources

Construction of the proposed rail line and associated facilities would irreversibly remove and alter vegetation and wildlife habitat. The Wells Draw Alternative would permanently affect the greatest amount of vegetation communities in the rail line footprint (2,560 acres), followed by the Whitmore Park Alternative (1,431 acres), and the Indian Canyon Alternative (1,341 acres). The permanent conversion of vegetation resources and wildlife habitat along the proposed rail line and at associated facilities would represent an irreversible commitment of biological resources.

6.2.3 Geology and Soils

Construction of the proposed rail line would permanently alter topography. Construction of any of the Action Alternatives would involve extensive grading to create the railbed. The grading would permanently remove bedrock in some locations, which would be an irreversible change to local geology. Construction would also involve placing subballast material obtained from quarries near the rail line into the rail line footprint. Subballast is available at quarries near the proposed rail line.

Construction of the proposed rail line would require moving and stockpiling soil, resulting in mixing soil layers and compaction. These activities could increase susceptibility to wind and water erosion and lead to the irreversible loss of soil productivity under any of the Action Alternatives. The Wells Draw Alternative would result in the greatest area of soil disturbance among the Action Alternatives, followed by the Whitmore Park Alternative and Indian Canyon Alternative. Construction activities would also irreversibly affect soils that are removed or buried under subballast for construction of the railbed. In temporarily disturbed areas, impacts on soils that have been properly stockpiled would be reversible, assuming successful reclamation following construction.

6.2.4 Energy Resources

All construction activities for the proposed rail line would consume fuel, mostly in the form of diesel and gasoline for construction equipment and vehicles. This would be an irreversible use of nonrenewable fossil fuels. Operation of trains on the proposed rail line would also require an irreversible commitment of fuel resources, mostly in the form of diesel for locomotive operation. OEA estimated total fuel usage (diesel and gasoline combined) for construction to be up to 27,803,000 gallons (under the Wells Draw Alternative) and fuel usage for operations to be 15,127,985 gallons per year (under the high rail traffic scenario[2] for the Wells Draw Alternative). The irreversible use of nonrenewable fossil fuels to power construction equipment and locomotives would be partially offset by a reduction of tanker trucks hauling crude oil to existing rail terminals, such as the existing rail terminal in Wellington, Utah.

6.2.5 Cultural Resources

Cultural resources (e.g., archaeological sites, tribal resources, and built resources) are nonrenewable resources, and any loss of such resources would be irreversible. The proposed rail line could affect between 16 known sites (for the Indian Canyon and Whitmore Park Alternatives) and 19 known sites (for the Wells Draw Alternative). Because the area of potential effects (APE) has not been surveyed comprehensively, OEA concludes that additional cultural resources, such as previously unidentified archeological sites, are likely to be present in the APE and could be impacted by construction and operation of the proposed rail line. Construction and operation of any of the Action Alternatives would likely result in impacts on cultural resources that have not yet been identified. To ensure that any adverse effects on cultural resources are appropriately avoided, minimized, or

[2] The Coalition estimates that rail traffic on the proposed rail line could range from as few as 3.68 trains per day, on average (the low rail traffic scenario), to as many as 10.52 trains per day, on average (the high rail traffic scenario), depending on future market conditions, including future demand for crude oil produced in the Basin.

mitigated, the Coalition will comply with the terms of the Programmatic Agreement being developed through Section 106 of the National Historic Preservation Act consultation.

6.2.6 Paleontological Resources

Paleontological resources, like cultural resources, are nonrenewable resources and any loss of scientifically important fossils would be irreversible. Some direct impacts, including damage to fossils, may be unavoidable during construction, depending on the final construction methods used. For example, tunnel construction activities, including mining and blasting, could result in the loss of scientifically important paleontological resources because these activities cannot be safely monitored. Construction of the proposed rail line would involve surface and subsurface activity that could affect between 2,294 acres (Indian Canyon Alternative) and 6,455 acres (Wells Draw Alternative) of paleontologically sensitive geologic units (Potential Fossil Yield Classes [PFYC] 3 through 5). To avoid or minimize impacts on paleontological resources, OEA is recommending that the Board impose a mitigation measure that would require the Coalition to contract with a qualified paleontologist to develop and implement a paleontological resources monitoring and treatment plan to mitigate impacts on paleontological resources on lands classified as PFYC 3 or higher.

6.2.7 Land Use

Construction and operation of the proposed rail line would require a commitment of land for the rail line, access roads, and associated facilities. OEA estimated that the proposed rail line footprint would require a minimum of 1,543 acres (Indian Canyon Alternative) and a maximum of 2,656 acres of land (Wells Draw Alternative). The proposed rail line would be a permanent feature of the landscape. It is not likely that all of the natural landscape would be restored, and most of the changes would remain irreversible.

6.2.8 Visual Resources

The visual impacts of constructing and operating the proposed rail line could permanently affect the visual quality of the surrounding rural landscape by adding industrial infrastructure; clearing vegetation; or creating cuts, fills, and access roads. Where these land commitments are irreversible, the visual impacts would generally remain irreversible.

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7.2 Department of the Army, U.S. Army Corps of Engineers

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7.3 U.S. Department of Agriculture, Forest Service

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7.4 U.S. Department of the Interior, Bureau of Indian Affairs

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7.6 State of Utah Public Lands Policy Coordinating Office

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Kathleen Clarke	Director
Braden Sheppard	Legal Counsel
Sindy Smith	Resource Development Coordinating Committee Coordinator

7.7 Utah State Historic Preservation Office

Name	Title
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7.8 Other Utah State Agencies

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7.9 Contractors and Consultants

ICF and its subcontractors supported the Surface Transportation Board's Office of Environmental Analysis with completing the environmental analyses and preparing this environmental impact statement.

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Jesse Cherry, ICF	Document Production
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Paul Murphey, Paleo Solutions	Paleontological Resources
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Jason Volk, ICF	Noise and Vibration
Elliott Wezerek, ICF	Air Quality and Greenhouse Gases, Cumulative Impacts
Tim Yates, ICF	Cultural Resources

Chapter 8
Distribution List

This chapter provides a list of agencies, tribes, organizations, and individuals that will be notified of the publication of the environmental impact statement.

8.1 Federal Agencies

- Advisory Council on Historic Preservation
- Council on Environmental Quality
- U.S. Department of Agriculture, Forest Service
- U.S. Department of the Army, U.S. Army Corps of Engineers
- U.S. Department of the Interior, Bureau of Indian Affairs
- U.S. Department of the Interior, Bureau of Land Management
- U.S. Department of the Interior, National Park Service
- U.S. Department of the Interior, U.S. Fish and Wildlife Service
- U.S. Department of Transportation, Federal Highway Administration
- U.S. Department of Transportation, Federal Railroad Administration
- U.S. Environmental Protection Agency
- U.S. Office of Management and Budget

8.2 State Agencies

- State of Utah Public Lands Policy Coordinating Office
- State of Utah School and Institutional Trust Lands Administration
- Utah Department of Agriculture and Food
- Utah Department of Environmental Quality
- Utah Department of Transportation
- Utah Division of Air Quality
- Utah Division of Forestry, Fire, and State Lands
- Utah Division of Wildlife Resources
- Utah Geological Survey
- Utah Governor's Office
- Utah State Historic Preservation Office

8.3 County and Local Government Agencies

- Ballard City
- Carbon County
- Daggett County
- Duchesne City
- Duchesne County
- Helper City
- Myton City
- Naples City
- Price City
- Roosevelt City
- Uintah County
- Utah County
- Vernal City

8.4 Tribes

- Ute Indian Tribe of the Uintah and Ouray Reservation
- Apache Tribe of Oklahoma
- Confederated Tribes of the Goshute Reservation, Nevada and Utah
- Eastern Shoshone Tribe of the Wind River Reservation, Wyoming
- Fort Belknap Indian Community of the Fort Belknap Reservation of Montana
- Hopi Tribe of Arizona
- Northwestern Band of the Shoshone Nation, Utah
- Skull Valley Band of the Goshute Indians
- White Mesa/Ute Mountain Ute Tribe, Utah and Colorado

8.5 Elected and Appointed Officials

- J. Stuart Adams, Utah State Senator
- Kera Birkeland, Utah State Representative
- Rob Bishop, U.S. House of Representatives
- Scott Chew, Utah State Representative
- Spencer Cox, Utah State Lieutenant Governor
- John Curtis, U.S. House of Representatives
- Francis Gibson, Utah State Representative
- Gary Herbert, Utah State Governor
- David Hinkins, Utah State Senator
- Mike Lee, U.S. Senate
- Ben McAdams, U.S. House of Representatives
- Mitt Romney, U.S. Senate
- Chris Stewart, U.S. House of Representatives
- Christine Watkins, Utah State Representative
- Elizabeth Weight, Utah State Representative
- Ronald Winterton, Utah State Senator

8.6 Section 106 Consulting Parties, Organizations, Businesses, Other Stakeholders

- All individuals that requested to be added to project mailing list
- All individuals that commented on the Draft EIS (with an email address)
- Alliance for a Better Utah
- Area landowners (as provided by the Coalition)
- Argyle Canyon Wilderness Preservation Alliance
- Audubon Society
- BNSF Railway
- Center for Biological Diversity
- Colorado Plateau Archaeological Alliance
- Deseret Power Railway
- Duchesne County Water Conservancy District
- Duchesne Mini Ranches
- Eastern Utah Tourism & History Association

- Encana Oil and Gas
- Enefit American Oil
- Friends of the Yampa
- Grand Canyon Trust
- Green River Action Network
- Healthy Environment Alliance of Utah
- Henderson Cattle Company
- Kiwanis Club
- Living Rivers
- National Oil Shale Association
- National Trust for Historic Preservation
- Nine Mile Canyon Coalition
- Preservation Utah
- Price River Water District
- Seven County Infrastructure Coalition
- Sevier Citizens for Clean Air and Water
- Sierra Club
- Southern Utah Wilderness Alliance
- The Nature Conservancy
- TransWest Express, LLC
- Uintah Basin Association of Governments
- Uintah Basin Irrigation Company
- Uintah County Cattlemen's Association
- Utah Cattlemen's Association
- Utah Cattlewomen's Association
- Utah Farm Bureau
- Utah Native Plant Society
- Utah Physicians for a Healthy Environment
- Utah Professional Archaeological Council
- Utah Rail Passengers Association
- Utah Rock Art Research Association
- Utah Royalty Owners Association
- Utah Tar Sands Resistance
- Dora Van
- Western Energy Alliance
- Western Wildlife Conservancy
- White River and Douglas Creek Conservation District

8.7 Libraries

- Duchesne Library
- Price City Library
- Roosevelt Library
- Uintah Library

Chapter 9 References

9.1 Proposed Action and Alternatives

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9.2 Affected Environment and Environmental Consequences

9.2.1 Vehicle Safety and Delay

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Service Date: August 6, 2021