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March 2018 Competitive Oil and Gas Lease Sale

Location: Canyon Country District, Moab & Monticello Field Offices
Grand & San Juan Counties, Utah

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CHAPTER 1 - INTRODUCTION

1.1 PROJECT LOCATION AND LEGAL DESCRIPTION

This Environmental Analysis (EA) addresses only those parcels on the preliminary list located within the Canyon Country District Office (CCDO) exclusive of the Moab Master Leasing Plan (MLP) area. Those parcels on the preliminary list located within the Moab MLP area are addressed in a separate Determination of NEPA Adequacy (DNA #DOI-BLM-UT-Y010-2017-0285-DNA).

The preliminary lease sale parcels are located in Utah's Grand and San Juan Counties. Exclusive of parcels within the MLP, thirty-two parcels, a total of 46,539.72 acres within the district, have been nominated by industry for consideration. Three parcels consisting of approximately 5,673.08 acres of split-estate with the surface owned by the Navajo Nation and administered by the Bureau of Indian Affairs (BIA) are recommended for deferral. As a result, the EA for the CCDO March 2018 competitive oil and gas lease sale considers leasing 40,866.64 acres in twenty-nine parcels. Twenty-one parcels totaling approximately 30,341.83 acres are located in the Monticello Field Office (MtFO) area, and eight parcels totaling approximately 10,524.81 acres are located in the Moab Field Office (MFO) area. See the parcel list in Appendix A and maps in Appendix B. Parcels recommended for deferral are contained in Appendix C.

1.2 BACKGROUND

It is the policy of the Bureau of Land Management (BLM) as derived from various laws, including the Mineral Leasing Act of 1920 (MLA) and the Federal Land Policy and Management Act of 1976 (FLPMA), to make mineral resources available for disposal and to encourage development of mineral resources to meet national, regional, and local needs.

Utah is a major source of natural gas for heating and electrical energy production in the lower 48 states. The continued sale and issuance of lease parcels facilitates exploration and production as oil and gas companies seek new areas for production or attempt to develop previously inaccessible or uneconomical reserves.

The BLM's Utah State Office conducts quarterly competitive lease sales to sell available oil and gas lease parcels. A Notice of Competitive Lease Sale (NCLS), which lists lease parcels to be offered at the auction, is published by the Utah State Office at least 90 days before the auction is held. Lease stipulations applicable to each parcel are specified in the NCLS. The decision as to which public lands and minerals are open for leasing and what leasing stipulations may be necessary, based on information available at the time, is made during the land use planning process. Constraints on leasing and any future development of split-estate parcels are determined by the BLM in consultation with the appropriate surface management agency or the private surface owner.

In the process of preparing a lease sale, the Utah State Office compiles a list of lands nominated and legally available for leasing, and sends a preliminary parcel list to the appropriate District Office where the parcels are located. Field Office staff then review the legal descriptions of the parcels to determine if they are in areas open to leasing under the relevant Resource Management Plan (RMP) and that appropriate stipulations have been included; verify whether any new

information has become available that might change any analysis conducted during the planning process; confirm appropriate consultations have been conducted; and identify any special resource conditions of which potential bidders should be made aware. The nominated parcels are posted online for a 30-day public scoping period. The BLM then prepares an analysis in compliance with the National Environmental Policy Act (NEPA), usually in the form of an EA.

After the Field Office completes the draft parcel review and NEPA analysis and returns them to the State Office, a list of available lease parcels and associated stipulations and notices is made available to the public through a NCLS. Lease sale notices are posted on the Utah BLM website at: http://go.usa.gov/xXk8ch. On rare occasions, the BLM may defer or withhold additional parcels prior to the day of the lease sale. In such cases, the BLM prepares an erratum to the sale notice.

The EA and an unsigned Finding of No Significant Impacts (FONSI) (if appropriate) are made available to the public for a 30-day public comment period by posting the documents on the BLM ePlanning page at: https://go.usa.gov/xNfAT. The BLM also typically issues press releases to publicly announce the public comment period for the EA and unsigned FONSI. Comments received from the public are reviewed and incorporated into the NEPA document, as applicable.

The EA, with any revisions determined appropriate following the public comment period, and, if still considered appropriate, an unsigned FONSI are again made available to the public through the concurrent posting of those documents and a NCLS at least 90 days in advance of the scheduled lease sale. The posting of the NCLS, EA and FONSI initiates a 30-day public protest period for the proposed lease sale offering that will end 60 days before the scheduled lease sale. The stipulations and notices applicable to each parcel proposed for lease will be specified in attachments to the NCLS. If any changes are needed to the parcels or stipulations and notices identified through the NCLS, an erratum is posted to the BLM Utah's Oil and Gas Leasing website, and in the public room for the BLM Utah State Office, in order to notify the public of any such changes. The lease parcels, as identified by the NCLS and any errata, would be offered for sale at a competitive lease sale tentatively scheduled to be held the week of March 19, 2018.

If the parcels are offered but not leased at the March 2018 lease sale, they will remain available to be leased noncompetitively for a period of up to two years to any qualified lessee at the minimum bid cost. Parcels obtained in this way may be re-parceled by combining or deleting other previously offered lands. Mineral estate that is not leased within a two-year period after an initial offering will no longer be available and must go through a competitive lease sale process again prior to being leased.

The act of leasing does not authorize any development or use of the surface of lease lands without further application by the operator and approval by the BLM. In the future, the BLM may receive Applications for Permit to Drill (APDs) for those parcels that are leased. If APDs are received, the BLM conducts additional site-specific NEPA analysis before deciding whether to approve the APD, and what conditions of approval (COA) should apply.

Exclusive of nominated parcels located within the MLP boundary, the Utah State Office preliminary parcel list contained 32 parcels encompassing approximately 46,539.72 acres within the CCDO. As determined through consultation with external stakeholders, three parcels

consisting of approximately 5,673.08 acres are recommended for deferral. The reason for deferral is as follows:

- Three parcels (UT0318-035, UT0318-045 and UT0318-046) are split-estate with the surface owned by the Navajo Nation and administered by the Bureau of Indian Affairs (BIA). The Navajo Nation and BIA do not concur with leasing the parcels.

Refer to Appendix C for a listing with legal descriptions of the location of the parcels recommended for deferral.

The BLM has prepared this EA to disclose and analyze the environmental consequences of leasing 29 parcels during the March 2018 oil and gas lease sale. The EA is an analysis of potential impacts that could result from the implementation of a proposed action or alternatives to the proposed action. The EA ensures compliance with NEPA in making a determination as to whether any significant impacts could result from the analyzed actions. Significance is defined by NEPA and is found in 40 Code of Federal Regulations (CFR) 1508.27. An EA provides evidence for determining whether to prepare an Environmental Impact Statement (EIS) or a FONSI statement. A FONSI statement, if applicable for this EA, would document the reasons why implementation of the selected alternative would not result in significant environmental impacts (effects) beyond those already addressed in the EISs prepared for the current land use plans. The land use plans for the CCDO include the following documents:

- Moab Field Office Resource Management Plan (MFO RMP) (BLM, 2008a)
- Monticello Field Office Resource Management Plan (MtFO RMP) (BLM, 2008c)

If the decision maker determines this project has significant impacts following the analysis in the EA, then an EIS would be prepared for the project. If not, a Decision Record (DR) may be signed for the EA approving the selected alternative, whether the Proposed Action or another alternative. This EA is tiered to and incorporates by reference the environmental impact analysis contained in the MFO Proposed Resource Management Plan and Final Environmental Impact Statement (PRMP) (BLM, 2008b) and the MtFO PRMP (BLM, 2008d).

This EA documents the review of the nominated parcels under the administration of the CCDO exclusive of the Moab MLP area. It serves to verify conformance with the approved land use plans and provides the rationale for the District Office's recommendation to offer or to defer particular parcels from a lease sale. This EA is also used to determine if the stipulations and lease notices attached to the parcels as part of the Proposed Action would be sufficient to protect resources and inform potential lessees of special conditions and restrictions that may constrain development. Additional lease notices may be developed during analysis, if warranted.

1.3 PURPOSE AND NEED

The purpose of the Proposed Action is to respond to the nominations or expressions of interest for oil and gas leasing on specific federal mineral estate through a competitive leasing process. The need for the Proposed Action is established by the BLM's responsibility under the MLA of 1920, as amended, the Mining and Minerals Policy Act of 1970, the Federal Onshore Oil and Gas Leasing Reform Act of 1987 (Reform Act), and the FLPMA, to promote the development of oil and gas on

public domain. Parcels may be nominated by the public, the BLM or other agencies. The MLA establishes that deposits of oil and gas owned by the United States are subject to disposition in the form and manner provided by the MLA under the rules and regulations prescribed by the Secretary of the Interior, where consistent with FLPMA and other applicable laws, regulations, and policies.

1.3.1 Decision to be Made

The BLM will decide whether to lease any or all of the nominated parcels and, if so, under what terms.

1.4 PLAN CONFORMANCE REVIEW

The Proposed Action was reviewed for conformance (43 CFR 1610.5, BLM 1617.3) with the following plans:

Name of Plan: MtFO Record of Decision and RMP

Date Approved: November 2008

Decision Language: The RMP designated approximately 1,290,919 acres of federal mineral estate open for continued oil and gas development and leasing. The RMP (with associated amendments) also describes specific stipulations that would be attached to new leases offered in certain areas. Under the Proposed Action, parcels to be offered would be leased subject to stipulations prescribed by the RMP. Therefore, the Proposed Action conforms to the fluid mineral leasing decisions in the RMP and subsequent amendments, and are consistent with the RMP's goals and objectives for natural and cultural resources.

The Proposed Action specifically conform to the following Land Use Plan decisions:

MIN-1: The plan will provide for a variety of mineral exploration and development activities.

MIN-6: The plan will recognize and be consistent with the National Energy Policy Act and related BLM policy…

MIN-7: All lands are available for leasing subject to standard lease terms, unless otherwise specified in the plan. Lease stipulations will be developed in the plan, where necessary, to mitigate the impacts of oil and gas activity.

MIN-10: Split-estate lands (private surface/federal minerals) and lands administered by other federal agencies are not managed by the BLM. The surface owner or surface management agency (SMA) manages the surface. The BLM administers the operational aspects of oil and gas leases. On split-estate lands, lease stipulations will consist of those necessary to comply with non-discretionary federal laws, such as the Endangered Species Act.

Name of Plan: MFO Record of Decision and RMP

Date Approved: October 2008

Decision Language: The RMP designated approximately 1,451,747 acres of federal mineral estate open for continued oil and gas development and leasing. The RMP (with

associated amendments) also describes specific stipulations that would be attached to new leases offered in certain areas. Under the Proposed Action, parcels to be offered would be leased subject to stipulations prescribed by the RMP. Therefore, the Proposed Action conforms to the fluid mineral leasing decisions in the RMP and subsequent amendments, and are consistent with the RMP's goals and objectives for natural and cultural resources.

The Proposed Action specifically conform to the following Land Use Plan decisions:

MIN-12: The plan will recognize and be consistent with the National Energy Policy Act and related BLM policy…

MIN-14: Lease stipulations have been developed to mitigate the impacts of oil and gas activity. Stipulations reflect the minimum requirements necessary to accomplish the desired resource protection...

The Proposed Action is also consistent with RMP decisions and their corresponding goals and objectives related to the management of (including but not limited to) air quality, cultural resources, recreation, riparian, soils, water, vegetation, fish & wildlife, and Areas of Critical Environmental Concern (ACEC).

Standard lease terms provide for reasonable measures to minimize adverse impacts to specific resource values, land uses, or users (Standard Lease Terms are contained in Form 3100-11, Offer to Lease and Lease for Oil and Gas, U.S. Department of the Interior, BLM, October 2008 or later edition). Compliance with valid, nondiscretionary statutes (laws) is included in the standard lease terms. Nondiscretionary actions include the BLM's requirements under federal environmental protection laws, such as the Clean Water Act, Clean Air Act, Endangered Species Act, National Historic Preservation Act, and FLPMA, which are applicable to all actions on federal lands.

Once the lease has been issued, the lessee has the right to use as much of the leased land as necessary to explore for, drill for, extract, remove, and dispose of oil and gas deposits located under the leased lands, subject to the standard lease terms and additional restrictions attached to the lease in the form of lease stipulations (43 CFR 3101.1-2). Even if no restrictions are attached to the lease, the operations must be conducted in a manner that avoids unnecessary or undue degradation of the environment and minimizes adverse impacts to the land, air, water, cultural, biological, and visual elements of the environment, as well as other land uses or users. Also included in all leases are the two mandatory stipulations for the statutory protection of cultural resources and threatened or endangered species (BLM Handbook 3120-1). BLM would also encourage industry to consider participating in the Environmental Protection Agency (EPA) Natural Gas STAR program. The program is a flexible, voluntary partnership wherein EPA works with companies that produce, process, transmit and distribute natural gas to identify and promote the implementation of cost-effective technologies and practices to reduce emissions of methane, a greenhouse gas.

1.5 PUBLIC PARTICIPATION

1.5.1 Scoping

The principal goal of scoping is to identify issues, concerns, and potential impacts that require detailed analysis. The BLM uses both internal and external scoping to identify potentially affected resources and associated issues.

1.5.1.1 Internal Scoping

Internal scoping was conducted through field visits to the parcels, meetings of an interdisciplinary (ID) team of resource specialists and discussion of the nominated parcels. The following issues were identified:

Air Quality
How would oil and gas development operations that could result from leasing the proposed parcels impact air quality?

Cultural Resources
How would oil and gas development operations that could result from leasing the proposed parcels impact cultural resources?

Greenhouse Gas Emissions/Climate Change
How would oil and gas development operations that could result from leasing the proposed parcels impact greenhouse gas emissions?

Lands With Wilderness Characteristics
How would oil and gas development operations that could result from leasing the proposed parcels impact lands found by the BLM to possess wilderness characteristics?

Migratory Birds including Raptors
How would oil and gas development operations that could result from leasing the proposed parcels impact migratory birds and raptors?

Visual Resources
How would oil and gas development operations that could result from leasing the proposed parcels impact visual resources?

1.5.1.2 External Scoping

External scoping was conducted by posting the proposed parcel list and maps for a 30-day period from June 28 to July 27, 2017, on BLM's ePlanning website at: https://go.usa.gov/xNfAT. This external scoping process gave the public an opportunity to provide comments, which the BLM considered and incorporated into the EA as appropriate. The BLM also sent letters to surface owners whose land overlies federal minerals proposed for leasing.

BLM received 32 comment letters via the CCDO email address, one comment letter via U.S. Mail, five comments via ePlanning, one form letter submitted 446 times, and one form letter submitted 19 times. Seventeen comment letters (including both form letters) expressed concern regarding leasing in Recapture Canyon. The parcel maps in Appendix B show RMP-designated leasing

categories as well as additional areas of no surface occupancy (NSO) due to steep slopes and riparian areas. Active floodplains are also designated as NSO; however, these areas are not shown on the parcel maps. The NSO for steep slopes and riparian areas is an estimate based on geographic information system (GIS) analysis. Other comments expressed concerns including, but not limited to, the effect of oil and gas development to cultural resources, units of the National Park Service (Canyonlands and Arches National Parks and Hovenweep National Monument), the Bears Ears National Monument, and climate change. A few commenters expressed concern regarding oil and gas leasing effects to private homes and property located near the parcels. One private split-estate landowner expressed concern regarding oil and gas leasing effects to their property. Two commenters expressed support of federal oil and gas leasing. All other commenters were opposed to federal oil and gas leasing.

The ID Team Checklists in Appendix D offer a detailed list and rationale for resources/issues determined by the ID Team not to have the potential to be significantly impacted by any of the alternatives and, therefore, are dismissed from detailed analysis.

1.5.2 Public Comment Period

The preliminary EA and the unsigned FONSI are available for a 30-day public review and comment period beginning September 21, 2017, and ending October 23, 2017. The documents are available online at BLM's ePlanning website at https://go.usa.gov/xNfAT and in the public room at the Monticello Field Office and the Moab Field Office/Canyon Country District Office. The documents may be viewed at the field offices during regular business hours (7:45 a.m. to 4:30 p.m.), Monday through Friday, except holidays. Comments must be submitted online via ePlanning at the website address provided above, emailed to BLM_UT_MB_Comments@blm.gov, or mailed to the BLM Moab Field Office located at 82 East Dogwood, Moab, Utah 84532 by close of business on October 23, 2017. Comments received from the public will be reviewed and incorporated into the EA as appropriate.

1.6 RELATIONSHIP TO STATUTES, REGULATIONS, POLICIES OR OTHER PLANS

The Proposed Action is in compliance with federal environmental laws and regulations, Executive Orders, and Department of Interior and BLM policies and is consistent, to the maximum extent possible, with state laws and local and county ordinances and plans, including the following:

- Federal Land Policy and Management Act (1976) as amended and the associated regulations at 43 CFR Part 1600
- Mineral Leasing Act (1920) as amended and the associated regulations at 43 CFR Part 3100
- BLM Utah Riparian Management Policy (2005)
- National Historic Preservation Act (1966) as amended and the associated regulations at 36 CFR Part 800
- Endangered Species Act (1973) as amended
- BLM Manual 6840 - Special Status Species Management
- Bald and Golden Eagle Protection Act (1962)
- Migratory Bird Treaty Act (1918)
- Utah Partners in Flight Avian Conservation Strategy Version 2.0 (Parrish et al., 2002)

- Birds of Conservation Concern 2002 (USFWS 2008)
- Executive Order 13186: Responsibilities of Federal Agencies to Protect Migratory Birds
- Memorandum of Understanding (MOU) between the BLM and U.S. Fish and Wildlife Service (USFWS) to Promote the Conservation and Management of Migratory Birds (BLM 2010)
- Guidance for Utah BLM to Meet Responsibilities under the Migratory Bird Treaty Act and Executive Order 13186 (BLM UT IM 2017–007)
- BLM Manual 6310 - Conducting Wilderness Characteristics Inventory of BLM Lands
- BLM Manual 6320 - Considering Lands with Wilderness Characteristics in the BLM Land Use Planning Process
- BLM Handbook 3120-1 Competitive Leases (P)
- MOU between the U.S. Department of Agriculture (USDA), U.S. Department of the Interior (USDI) and EPA Regarding Air Quality Analysis and Mitigation for Federal Oil and Gas Decisions Through the NEPA Process (2011)
- National Trails System Act of 1968, as amended (NTSA)
- Protection of Ground Water Associated with Oil and Gas Leasing, Exploration and Development (BLM UT IM 2010–055)
- BLM Utah Guidance for Lands with Wilderness Characteristics Resource (IM UT 2016-027)

These documents, and their associated analysis or information, are hereby incorporated by reference, based on their use and consideration by various authors of this document. The ID Team Checklists, Appendix D, were also developed after consideration of these documents and their contents. Each of these documents is available for review upon request to the CCDO.

1.7 DOCUMENTS INCORPORATED BY REFERENCE

In order to reduce redundant paperwork and analysis in the NEPA process (*See* 40 CFR §§ 1502.20 and 1502.21) the following documents and their associated information or analysis are hereby incorporated by reference.

1.7.1 EISs, EAs and Decision Documents

- Monticello Field Office Proposed Resource Management Plan and Final Environmental Impact Statement (PRMP) (BLM, 2008d) and Record of Decision
- Moab Field Office Proposed Resource Management Plan and Final Environmental Impact Statement (PRMP) (BLM, 2008b) and Record of Decision
- Moab Master Leasing Plan and Proposed Resource Management Plan Amendments/Final Environmental Impact Statement (MLP/FEIS) (BLM, 2016b) and Record of Decision
- Vegetation Treatments Using Herbicides on Bureau of Land Management Lands in 17 Western States Programmatic Environmental Impact Statement [BLM 2007] and Record of Decision

CHAPTER 2 - ALTERNATIVES

2.1 INTRODUCTION

This chapter describes the alternatives analyzed in detail. Alternatives considered but not analyzed in detail are also discussed.

2.2 REASONABLY FORESEEABLE DEVELOPMENT SCENARIO

At this time it is unknown when, where, or if future well sites or roads might be proposed on any leased parcel, or even if a lease would be issued. Should a lease be issued, site-specific analysis of individual wells and roads would occur when a lease holder submits an Application for Permit to Drill (APD).

For the purpose of analysis, the BLM created a Reasonably Foreseeable Development (RFD) scenario, which serves as an analytical baseline for identifying and quantifying direct, indirect, and cumulative effects of oil and gas activity and forms the foundation for the analysis of the effects of oil and gas management decisions in planning and environmental documents. These figures are intended for analysis purposes only and imply no guarantee of lease issuance or subsequent development. The RFD for the March 2018 lease sale is based on the proportion of the authorized lease acreage compared to the acreage contained in the nominated lease parcels within the CCDO exclusive of the Moab MLP area. Table 2-1 shows the RFD summary for the Canyon Country District. Refer to Appendix E for additional details regarding the March 2018 lease sale RFD.

Table 2-1: CCDO Predicted Oil and Gas Exploration and Development; and Surface Disturbance

Area	Predicted Wells Per Year	Total Predicted Wells (10 years)	Predicted Annual Surface Disturbance	Total Surface Disturbance (10 years)
Monticello Field Office	1	10	8 acres/year	80 acres
Moab Field Office	0.5	5	7 acres/year	70 acres
Canyon Country District Total	≈ 2	15	15 acres/year	150 acres

The 150 acres of surface disturbance estimated to result from exploration, development and production activities resulting from the proposed March 2018 lease sale amounts to 0.32 % of the acreage included in the lease sale (150 acres of surface disturbance ÷ 46,540 acres in lease sale = 0.32%).

The following sections provide a general discussion of possible post-leasing RFD activities. All of these activities would require additional NEPA review.

2.2.1 Well Pad and Road Construction

Equipment for road and well pad construction would include dozers, scrapers, and graders. Topsoil would be salvaged from all disturbed areas and reserved for interim and final reclamation purposes. The size of a well pad would vary but would average approximately 350 feet by 350 feet plus additional area required for cut and fill slopes, stockpiles of topsoil and spoil, and equipment operation.

Depending on the locations of the proposed wells, it is anticipated that some new or upgraded access roads would be required to access well pads and maintain production facilities. Any new roads constructed for the purposes of oil and gas development would be utilized year-round for maintenance of the proposed wells and other facilities, for the transportation of produced fluids and/or equipment, and would remain open to other land users. New roads or upgrades to existing roads would be constructed to the appropriate standard as required by BLM Manual 9113. Roads accessing oil and gas well locations generally are constructed to the "resource" road standard requiring a 14-foot driving width, a 25-foot to 35-foot construction disturbance width, properly drained and appropriately surfaced.

2.2.2 Well Drilling and Completion Operations

Drilling would be accomplished by using a conventional air-rotary drilling rig. A drilling plan is included in every APD and is subject to review by a BLM engineer for compliance with Onshore Oil and Gas Order No. 2. Onshore Oil and Gas Order No. 2 includes well casing, cementing and testing requirements to insure the integrity of the well bore. After review, the engineer may determine that additional COAs are required to supplement the drilling plan. Transporting drilling equipment and materials to the well pad may require 10 to 40 truckloads. Additionally, six to 10 smaller vehicles would be used to transport drilling personnel and other support services. Drilling operations would continue 24 hours a day.

Water trucks would be used daily to supply water during drilling and, if necessary, completion operations. Water to drill and complete a well would be hauled from a permitted source. A reserve pit may be constructed on the location to contain drill cuttings and produced fluids. Operators are, with increasing frequency, proposing closed loop drilling mud systems as a best management practice (BMP) to eliminate the need for a reserve pit. In addition, the BLM may require, through a COA applied to the APD, an operator use a closed loop drilling system if supported by analysis at the APD stage. Drill cuttings would be contained on location during drilling operations, and depending on a variety of conditions including surface geology and drill fluid and drill cuttings composition; cuttings would be disposed of on location as part of the interim reclamation program or would be transported to an approved disposal facility. Drilling mud could be recycled or hauled to an approved disposal facility. When drilling operations are complete, the reserve pit would be fenced and netted to prevent birds and small animals from gaining access to and becoming trapped in the contents of the pit.

Hydraulic Fracturing

Hydraulic fracturing (HF) is a well stimulation technique used to increase oil and gas production from underground rock formations. As summarized below, HF technology is not used on all wells drilled in the CCDO. The following paragraphs provide a general discussion of the HF process that could potentially be implemented if development were to occur, including well construction information and general conditions encountered within the CCDO.

HF involves the injection of fluids through a wellbore under pressures great enough to fracture the oil and gas producing formations. The fluid is generally comprised of a liquid such as oil, carbon dioxide or nitrogen, and proppant (commonly sand or ceramic beads), and a minor percentage of chemicals to give the fluid desirable flow characteristics, corrosion inhibition, etc. The proppant

holds open the newly created fractures after the injection pressure is released. Oil and gas flow through the fractures and up the production well to the surface.

HF has been used by oil and natural gas producers since the late 1940s and, for the first 50 years, was mostly used in vertical wells in conventional formations. HF is still used in these settings, but the process has evolved. Technological developments (including horizontal drilling) have led to the use of HF in "unconventional" hydrocarbon formations that could not otherwise be profitably produced.

The use of horizontal drilling through unconventional reservoirs combined with high-volume water based multi-stage HF activities has led to an increase in oil and gas activity in several areas of the country which has, in turn, resulted in a dramatic increase in domestic oil and gas production nationally. However, along with the production increase, HF activities are suspected of causing contamination of fresh water by creating fluid communication between oil and gas reservoirs and aquifers. The EPA has conducted an assessment of HF on drinking water resources (https://www.epa.gov/hfstudy).

There are presently no unconventional reservoirs in the CCDO being exploited using high-volume water based HF techniques.

Oil and Gas Fields

Oil and gas fields within the CCDO represent a variety of different geologic and production characteristics. These characteristics, specific to a given oil or gas field, influence how operators drill, complete, and produce wells in that field. Historically, most wells in the area have been vertically drilled, targeting "conventional" sandstone and carbonate (limestone or dolomite) formations. "Conventional" in this usage means geologic formations that possess porosity (i.e. space that oil and gas can occupy) and permeability (connected passages through which oil and gas can move). These characteristics are necessary for oil and gas to flow from the formation into a well bore in sufficient volume to be economically produced. HF has long been used to enhance porosity and permeability in conventional reservoirs, and its use is expected to continue with little change.

In the past 25 years, horizontal drilling into the "unconventional" clastic cycles of the Paradox Formation, such as the Cane Creek shale zone, have been actively pursued because of the potential to produce tremendous volumes of oil and associated gas. Although the Cane Creek zone is shale, and therefore, an unconventional reservoir, operators rely on its natural fractures to provide the pathway allowing oil and gas to flow into the wellbore. Wells are typically drilled horizontally thorough the Cane Creek zone in a direction perpendicular to the expected orientation of the natural fractures. This increases the likelihood of the wellbore intercepting a fracture, or perhaps a series of fractures, which is essential to drilling a productive well.

Because of the reliance on natural fractures to convey oil and gas, and due to other geologic considerations, wells completed in the Cane Creek zone are rarely stimulated using HF. HF poses a risk of damaging the wells productivity by fracturing into the salts that bound the thin shale reservoir, and allowing salt to invade and seal natural fractures and the well. Consequently, HF activities would be limited in size and would be performed only on wells with little production

potential. Because HF has only recently been used in this type of reservoir, its effectiveness is not yet known.

Another unconventional reservoir that could be targeted in the future is the Mancos Shale, which crops-out across the Cisco desert and extends under the Bookcliffs to the north. A few vertical wells within the CCDO produce oil from the Mancos Shale, but to date it has not been an attractive target locally. Nevertheless, it is a thick and laterally extensive carbonaceous shale that is similar in many ways to unconventional reservoirs that are being exploited elsewhere in the country.

Well Construction

Compliance with Onshore Order No. 2 assures wells are appropriately designed and drilled. In addition, the State of Utah regulates drilling and operating practices under Utah Administrative Code R649-3 and HF activities are specifically addressed in R649-3-39. Well construction—casing and cement design—are tailored to the geologic characteristics of the area, and are designed to provide effective isolation of groundwater and mineral deposits, to control formation pressures that may be encountered, and to provide a single pathway for oil and gas to be produced to the surface.

To ensure the effective isolation of any potentially usable groundwater aquifer, a continuous string of steel pipe (or "casing") known as the "surface" casing is placed in the well, extending from the surface to at least 50 feet below the bottom of the aquifer. The entire length of that casing string is then cemented into place. The casing is then pressure tested to ensure there are no leaks before deeper drilling resumes.

After drilling deeper, a second string of casing known as "intermediate" casing could be run, if needed, to isolate water flows, high-pressure zones or lost circulation zones. Intermediate casing is typically cemented along its entire length, back to surface. Whether an intermediate casing string will be run is typically known and planned for prior to drilling.

Drilling then continues to the wells planned total depth. If indications of the wells productivity were positive, another string of steel "production" casing would be run and cemented into place. A sufficient volume of cement would be used to extend above any potentially productive zone to ensure that, following completion of the well, produced fluids can only flow into the cased well.

2.2.3 Production Operations

If wells were to go into production, facilities would typically be located on the well pad and would require no additional surface disturbance. The production facility for natural gas within the CCDO typically consists of a wellhead, separator, dehydrator, meter house, and a storage tank with truck load-out for produced water. A gas well location may also include a flare that would be used during well maintenance. A typical production facility for an oil well in the CCDO consists of a wellhead, pump jack, and storage tanks with truck load-out for oil and produced water. In some instances where production from a well is both oil and gas, the facilities noted for both oil and gas wells would be located on the well pad.

All permanent surface structures would be painted a flat, non-reflective color (e.g., juniper green) specified by the BLM in order to blend with the colors of the surrounding natural environment.

Facilities required to comply with the Occupational Safety and Health Act would be excluded from painting color requirements.

If oil is produced, the oil would be stored on location in tanks and transported off lease by truck to market. The volume of tanker truck traffic for oil production would be dependent upon production of the wells.

If natural gas is produced, construction of a gas sales pipeline would be necessary to transport the gas to market. An additional Sundry Notice, right of way (ROW) and NEPA analysis would be completed, as needed, for any pipelines and/or other production facilities proposed upon public lands. Best Management Practices, such as burying the pipeline or installing the pipeline within the road, would be considered at the time of the proposal.

Interim reclamation would be conducted on areas of the well pad, access roads, and pipelines not needed for production operations, as specified in the approved APD. The following sequence is typical of interim reclamation:

1. Pits used for drilling and completion activities would be properly closed. The well pad would be reduced to the minimum area necessary to safely conduct production operations. Interim reclamation areas would be re-contoured, top soil would be replaced, and a seed mix appropriate to the site would be drilled seeded or broadcast across the prepared areas.
2. Access roads to the well pad would be reclaimed to the edge of the driving surface.
3. Trees cleared during site preparation and large rocks excavated during construction would be scattered across the interim reclamation area.

The goal of interim reclamation is to achieve, to the extent possible, final reclamation standards including re-contouring to achieve the original contour and grade, or a contour that blends with the surrounding topography; and the establishment of a self-sustaining, vigorous native and/or desirable vegetation community with a density sufficient to provide a stable soil surface.

2.2.4 Produced Water Handling

Water is often associated with either produced oil or natural gas. Water is separated out of the production stream and, for a newly completed well, can be temporarily disposed of in the reserve pit for 90 days. Permanent disposal options include discharge to evaporation pits or underground injection. Disposal of produced water is regulated by Onshore Order No. 7.

2.2.5 Maintenance Operations

Traffic volumes during production would be dependent upon whether the wells produced natural gas and/or oil, and for the latter, the volume of oil produced. Well maintenance operations may include periodic use of work-over rigs and heavy trucks for hauling equipment to the producing well, and would include inspections of the well by a pumper on a regular basis or by remote sensing. The road and the well pad would be maintained for reasonable access and working conditions.

2.2.6 Plugging and Abandonment

If a well does not produce economic quantities of oil or gas, or when it is no longer commercially productive, the well would be plugged and abandoned in accordance with procedures contained in Onshore Order No. 2 and approved by a BLM Petroleum Engineer. All fluids in the reserve pit would be allowed to dry or removed and disposed of in accordance with applicable regulations. All equipment would be removed from the location and the well pad, access roads, and pipelines would be subject to final reclamation. The following sequence is typical of final reclamation:

1. In accordance with Onshore Order No. 1, earthwork for interim and/or final reclamation, including pit closure, would be completed within six months of well completion or abandonment.
2. All weather surfacing material would be removed.
3. As appropriate, top soil would be salvaged and reserved for final reclamation.
4. Re-contouring, spreading of salvaged top soil, seed bed preparation, seeding, and scattering trees (woody debris) would be conducted all areas disturbed by well pads, access roads, and pipelines.

The goal of final reclamation is to restore all areas of the well pad and access roads to the original land form or a land form the blends with the surrounding landform, and the establishment of a self-sustaining, vigorous, diverse native and/or desirable vegetation community with a density sufficient to provide a stable soil surface and inhibit non-native plant invasion (Gold Book, 4th Edition, pg.43).

2.3 ALTERNATIVES ANALYZED IN DETAIL

2.3.1 No Action Alternative

The No Action Alternative provides a baseline for comparing environmental effects of the Proposed Action alternative. In the case of a lease sale, the leasing of the nominated parcels would not take place. The BLM would defer all nominated lease parcels from the March 2018 lease sale. The parcels could be considered for inclusion in future lease sales. Surface management would remain the same and ongoing oil and gas development would continue on surrounding private, state, and federal leases.

2.3.2 Proposed Action - Lease Nominated Parcels

Under this alternative, the BLM would lease Federal oil and gas mineral estate in nominated parcels in the CCDO area, exclusive of parcels recommended for deferral (Appendix C) and parcels located within the Moab MLP area, in accordance with the MtFO RMP (November 2008) and the MFO RMP (October 2008). The current lease sale includes parcels in Grand and San Juan Counties. Those lands proposed for lease under this alternative total 40,866.64 acres of federal mineral estate within 29 parcels. Included are a combination of federal and private surface (see Appendix A). The lands have been grouped into appropriate lease parcels for competitive sale as oil and gas leases in accordance with the 43 CFR 3100 regulations. The leases would include the standard lease terms and conditions for development of the surface of oil and gas leases provided in 43 CFR 3100. Stipulations to protect other surface and subsurface resources would also apply, as prescribed by the RMPs. These stipulations are described in Appendix A.

The Competitive Leasing Handbook H-3120-1 also requires the following two standard stipulations be added to every lease:

Cultural Resources Stipulation
This lease may be found to contain historic properties and/or resources protected under the National Historic Preservation Act, American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, E.O. 13007, or other statutes and executive orders. The BLM will not approve any ground disturbing activities that may affect any such properties or resources until it completes its obligations under applicable requirements of the National Historic Preservation Act (NHPA) and other authorities. The BLM may require modification to exploration or development proposals to protect such properties, or disapprove any activity that is likely to result in adverse effects that cannot be successfully avoided, minimized or mitigated.

Endangered Species Act Stipulation
The lease may now and hereafter contain plants, animals, and their habitats determined to be special status species. The BLM may recommend modifications to exploration and development proposals to further its conservation and management objectives to avoid BLM approved activity that will contribute to a need to list such a species or their habitat. The BLM may require modification to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modification of a designated or proposed critical habitat. The BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligation under requirements of the Endangered Species Act as amended, 16 U. S. C. § 1531 *et seq*. including completion of any required procedure for conference.

2.4 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

No other alternatives to the Proposed Action were identified that would meet the purpose and need of the Proposed Action.

CHAPTER 3 – AFFECTED ENVIRONMENT

3.1 INTRODUCTION

This chapter presents the potentially affected existing environment (i.e., the physical, biological, social, and economic values and resources) of the impact area as identified in the ID Team Checklists found in Appendix D. This chapter provides the baseline for comparison of impacts/consequences described in Chapter 4.

The Council on Environmental Quality's (CEQ) Regulations state that NEPA documents "must concentrate on the issues that are truly significant to the action in question, rather than amassing needless detail" (40 CFR 1500.1(b)). While many issues may arise during scoping, not all of the issues raised warrant analysis in an EA. Issues will be analyzed if: 1) an analysis of the issue is necessary to make a reasoned choice between alternatives, or 2) if the issue is associated with a significant direct, indirect, or cumulative impact, or where analysis is necessary to determine the

significance of the impacts. Refer to Appendix D for resources determined to not be present or not expected to be impacted by the Proposed Action.

3.2 GENERAL SETTING

Refer to Appendix B for maps showing the location of the parcels.

Parcels 001 through 008 are located 2 to 12 miles southeast of the town of Green River, Utah in flat to gently rolling with ephemeral drainages. Upland vegetation is salt desert shrub composed of Shadscale, Mat saltbush, Castlevalley saltbush, Rabbitbrush, Snakeweed, Galleta grass, Indian ricegrass, and Squirrel tail. Vegetation along the ephemeral drainages is primarily Black greasewood and Alkali sacatone.

Significant Blackbrush occurs on parcels 035 and 036. Parcel 036 is partly within the San Juan River floodplain and riparian area.

The remaining parcels are located in the Montezuma Creek, Cross Canyon and Recapture Creek drainages. This landscape is primarily moderately deep canyon systems with widths varying from narrow to broad. Between the canyons are relatively flat to rolling mesas. Pinon and Juniper woodlands is the predominant vegetation type. The mesas include extensive areas of Sagebrush. The canyons contain intermittent and ephemeral drainages with riparian vegetation and Black greasewood.

3.3 RESOURCES/ISSUES BROUGHT FORWARD FOR ANALYSIS

3.3.1 Air Quality

Air quality is affected by various natural and anthropogenic factors. Industrial sources such as power plants, mines, and oil and gas extraction activities in the Four Corners region contribute to local and regional air pollution. Urbanization and tourism create emissions affecting air quality over a wide area. Air pollutants generated by motor vehicles include tailpipe emissions and dust from travel over dry, unpaved road surfaces. Wildfires and controlled burns produce smoke that can affect communities and other sensitive areas. Strong winds, especially during the spring months can generate substantial amounts of windblown dust.

Air pollution emissions are characterized as point, area, or mobile. Point sources are large, stationary facilities such as power plants and manufacturing facilities and are accounted for on a facility-by-facility basis. Area sources are smaller stationary sources and, due to their greater number, are accounted for by classes. Production emissions from an oil and gas well and dust from construction of a well pad would be considered area source emissions. Mobile sources consist of non-stationary sources such as cars and trucks. Mobile emissions are further divided into on-road and off-road sources. Engine exhaust from truck traffic to and from oil and gas locations would be considered on-road mobile emissions. Engine exhaust from drilling operations would be considered off road mobile emissions.

The Clean Air Act required the EPA to set National Ambient Air Quality Standards (NAAQS) for pollutants considered harmful to public health and the environment. The Utah Division of Air

Quality (UDAQ) is responsible to ensure compliance with the NAAQS within the state of Utah. Table 3-1 shows NAAQS for the EPA designated criteria pollutants (EPA 2008).

Table 3-1: National Ambient Air Quality Standards

Pollutant		Primary/ Secondary	Averaging Time	Level	Form
Carbon Monoxide (CO)		primary	8 hours	9 ppm	Not to be exceeded more than once per year
			1 hour	35 ppm	
Lead (Pb)		primary and secondary	Rolling 3 month average	0.15 μg/m^3 (1)	Not to be exceeded
Nitrogen Dioxide (NO_2)		primary	1 hour	100 ppb	98th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		primary and secondary	1 year	53 ppb (2)	Annual Mean
Ozone (O_3)		primary and secondary	8 hours	0.070 ppm (3)	Annual fourth-highest daily maximum 8-hour concentration, averaged over 3 years
Particle Pollution (PM)	$PM_{2.5}$	primary	1 year	12.0 μg/m^3	annual mean, averaged over 3 years
		secondary	1 year	15.0 μg/m^3	annual mean, averaged over 3 years
		primary and secondary	24 hours	35 μg/m^3	98th percentile, averaged over 3 years
	PM_{10}	primary and secondary	24 hours	150 μg/m^3	Not to be exceeded more than once per year on average over 3 years
Sulfur Dioxide (SO_2)		primary	1 hour	75 ppb (4)	99th percentile of 1-hour daily maximum concentrations, averaged over 3 years
		secondary	3 hours	0.5 ppm	Not to be exceeded more than once per year

Table 3-1 Notes:

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

(2) The level of the annual NO2 standard is 0.053 ppm. It is shown here in terms of ppb for the purposes of clearer comparison to the 1-hour standard level.

(3) Final rule signed October 1, 2015, and effective December 28, 2015. The previous (2008) O3 standards additionally remain in effect in some areas. Revocation of the previous (2008) O3 standards and transitioning to the current (2015) standards will be addressed in the implementation rule for the current standards.

(4) The previous SO2 standards (0.14 ppm 24-hour and 0.03 ppm annual) will additionally remain in effect in certain areas: (1) any area for which it is not yet 1 year since the effective date of designation under the current (2010) standards, and (2)any area for which implementation plans providing for attainment of the current (2010) standard have not been submitted and approved and which is designated nonattainment under the previous SO2 standards or is not meeting the requirements of a SIP call under the previous SO2 standards (40 CFR 50.4(3)), A SIP call is an EPA action requiring a state to resubmit all or part of its State Implementation Plan to demonstrate attainment of the require NAAQS.

Air Quality Related Value (AQRV) is a resource that may be affected by a change in air quality. Under the Clean Air Act, the Federal official with direct responsibility for management of Federal Class I parks and wilderness areas has an affirmative responsibility to protect the AQRV, including visibility of such lands, and to consider whether a proposed major emitting facility will have an adverse impact on such values (U.S. Forest Service, 2010). As authorized under the Clean Air Act AQRV applies only to major sources of pollutants. An oil and gas well would be considered a minor source of pollutants. AQRV is included in this EA for NEPA analysis purposes.

Arches National Park and Canyonlands National Park (NP) are the nearest Class I areas with the potential to be affected by the proposed action. The closest parcels are located approximately 16 to 21 miles northwest of Arches NP and 24 to 29 miles north of Canyonlands NP. AQRV in both Arches and Canyonlands NP are statistically acceptable and good for most monitored pollutants. Canyonlands NP shares similar traits with regional issues or is better than its surroundings in many cases. The only pollutant of concern is ammonium concentrations in precipitation. This has been increasing in trends for all states west of Texas. Other regional concerns are elevated levels of ozone but this, again, is found similarly to the west. Large cities, shipping lanes, and forest fires add to the cumulative mechanisms for ozone formation. All other AQRV's that the Canyonlands NP clearly summarize the steady or decreasing level of monitored values.

The Summary of Regional Conditions (Table 3-2) shows the trends best. Annual Deciview is becoming clearer when averaged over the years, and wet deposition, which are a major factor from boundary condition sources, show no increase or decrease besides ammonium. Ammonium atmospheric deposition should be the only concern and this is a transport issue and seen increasing in the west compared to other National Park trends.

Table 3-2: Summary of Regional Conditions

	Visibility	Visibility	Nitrogen Deposition	Nitrogen Deposition	Sulfur Deposition	Sulfur Deposition	Ozone	Ozone
National Park or National Recreation Area	**Condition**	**Trend**	**Condition**	**Trend**	**Condition**	**Trend**	**Condition**	**Trend**
Arches	Moderate	None	Significant Concern		Good		Moderate	
Bryce Canyon	Moderate	None	Moderate	None	Good	None	Moderate	
Capitol Reef	Moderate	None	Moderate		Good		Moderate	
Canyonlands	Moderate	None	Moderate	None	Good	None	Moderate	None
Glen Canyon	Moderate	None	Good		Good		Moderate	
Grand Canyon	Moderate	None	Significant Concern	None	Moderate	None	Moderate	None
Grand Teton	Moderate	None	Significant Concern		Significant Concern		Moderate	
Great Basin	Moderate	None	Significant Concern	None	Significant Concern	None	Moderate	None
Mesa Verde	Moderate	None	Moderate	None	Moderate	None	Moderate	None
Timpanogos Cave	Moderate		Moderate		Moderate		Significant Concern	Improving
Yellowstone	Moderate	None	Significant Concern	None	Moderate	None	Moderate	None
Zion	Moderate	None	Moderate		Good		Moderate	None

More information on National Park AQRV Trends can be found here: http://nature.nps.gov/air/who/npsPerfMeasures.cfm (NPS, 2013)

Regional ozone concentrations are of concern in the lease area. Ozone monitoring data collected at Canyonlands National Park (Figure 1) demonstrates that the area encompassing the March 2018 lease sale is approaching the current 8-hr NAAQS of 75 ppb for ozone. Figure 1 shows ozone trends at the Canyonlands monitoring site expressed in terms of the 4th maximum 8-hr value, the primary health-based standard, as well as the W-126 values, which represent a weighted average that is biologically relevant for evaluating impacts to sensitive vegetation. Studies show that some types of vegetation are more sensitive to the deleterious effects of ozone than humans are, and can exhibit injury or harm at ozone concentrations lower than the current primary ozone standard. While Canyonlands and Arches have plant species known to be sensitive to ozone such as Serviceberry (*Amelanchier* sp.), Goodding's willow (*Salix gooddingii*), and Skunkbush (*Rhus aromatica*)[1], no in-park surveys have been completed that document ozone injury. In general, risk to vegetation from ozone injury may be low due to climatic conditions (i.e. low soil moisture); however, vegetation in riparian areas may be vulnerable.

[1] A complete list of ozone sensitive species by park is available at http://www.nature.nps.gov/air/permits/aris/networks/ozonerisk.cfm.

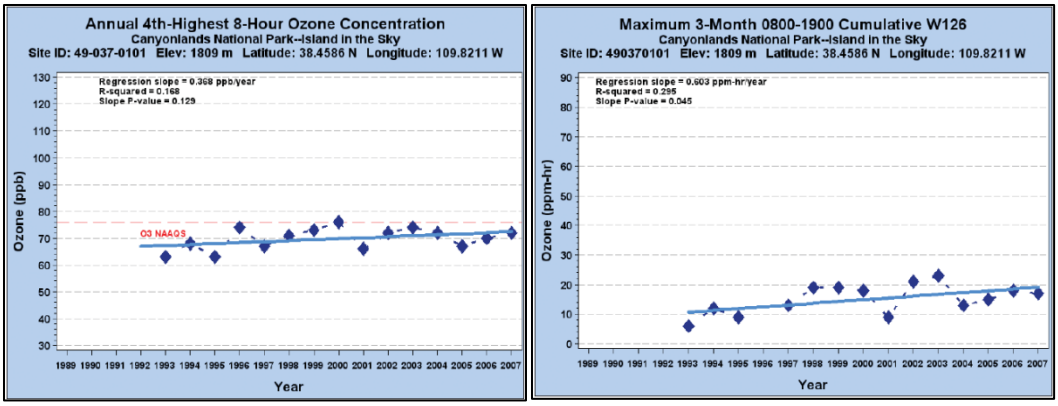


Figure 1. Trends in the annual 4th highest 8-hr ozone concentration (current primary standard, top panel) and the cumulative W126 ozone metric measured at Canyonlands National Park, Island in the Sky. Data excerpted from Perkins 2010.

The UDAQ issued the Division of Air Quality 2016 Annual Report (UDAQ 2016) that includes information on areas of the state where monitoring data shows that levels of criteria pollutants exceed NAAQS. These areas are referred to as non-attainment areas. At present, Grand and San Juan County are considered in attainment or unclassified for all criteria pollutants. An "unclassified" designation indicates that sufficient air monitoring is not available to make a determination as to attainment status. For regulatory purposes, an unclassified county is considered the same as attainment. The UDAQ 2016 annual report also includes an emissions inventory (2014 Triennial Inventory) by county, which includes pollutants released by all emissions sources in the state. Table 3-3 shows the emissions inventory for Grand and San Juan Counties in tons per year (tpy).

Table 3-3: Emissions Inventory (tons/year) (2014)

	CO	NO_x	PM_{10}	$PM_{2.5}$	SO_x	VOC
Grand	14,414.37	3,166.68	1,632.92	371.80	23.04	42,417.82
San Juan	19,987.71	2,057.37	4,750.69	713.93	512.89	85,704.71

A project specific modeling analysis was also conducted in 2010 for a project with similar likely development characteristics as would be expected from these lease sales (Cane Creek Modeling Report, (Golder, 2010)). This modeling analysis analyzed the expected impacts from a 17 well project to NO_2 and PM_{10} Class I Prevention of Significant Deterioration (PSD) Increment Consumption using AERMOD, nitrogen deposition within nearby national parks using CALPUFF-lite, and visibility impacts within nearby national parks using VISCREEN. The project area for this modeling analysis was located closer to the Canyonlands and Arches National Parks than most of the parcels under this lease sale, and can be considered conservative for purposes of this analysis. No adverse impacts to Class I related AQRVs were predicted through this modeling analysis.

Based on the EI for a typical oil and gas well, the Cane Creek modeling analysis (Golder 2010) incorporates by reference to r this EA, the air quality analysis in the MtFO and MFO PRMPs, the proposed action is not likely to violate, or otherwise contribute to any violation of any applicable air quality standards, and may only contribute a small amount to any projected future potential exceedance of any applicable air quality standards.

A more recent modeling analysis was conducted in 2016 within the Moab MLP area. The focus of the modeling analyses is on National Ambient Air Quality Standards (NAAQS) as established by the Clean Air Act, and Air Quality Related Values (AQRV) as defined by the Federal Land Managers' AQRV Work Group (FLAG 2010). Far-field modeling was conducted by the BLM National Operations Center to evaluate multiple source impacts over the entire MLP on NAAQS and AQRVs. The technical details for this modeling are presented in Appendix F of the MLP EIS.

The modeling analysis evaluated three scenarios based on the range of alternatives in the MLP EIS. The EI for all three scenarios show that the proposed action is not likely to violate, or otherwise contribute to any violation of any applicable air quality standards, and may only contribute a small amount to any projected future potential exceedance of any applicable air quality standards.

Lease stipulations and notices are applied to leases when they are issued to notify the operator of what they would be required to do (stipulation) and what they could potentially be required to do (lease notice) at the APD stage. This allows the potential lessee at the time of bidding on the parcel what the range of requirements they can expect when they exercise their lease rights. The following lease stipulations to all parcels: UT-S-01: Air Quality. This stipulation tells the operator that all new and replacement internal combustion gas field engines of less than or equal to 300 design-rated horsepower shall not emit more than 2 grams of NO_x per horsepower-hour. Lease Notices UT-LN-99: Regional Ozone Formation Controls for any development projects, UT-LN-96: Air Quality Mitigation Measures and UT-LN-102: Air Quality Analysis would be applied to all parcels. These lease notices notify that operator that mitigation measures, best management practices, and an air emissions inventory my required at the APD stage to mitigate oil and gas exploration and development activity impacts on air quality. The BLM would do this in coordination with the EPA, UDAQ and other agencies that have jurisdiction on air quality. By applying this lease stipulation and lease notice, leasing would have little impact on air quality. At the APD stage, further conditions of approval could be applied based on the environmental analysis for the APD.

3.3.2 Cultural Resources

Cultural resources are definite locations of human activity, occupation, or use identifiable though field survey, historical documentation, or oral history. The term includes archaeological, historic, and architectural sites, structures, and places with important public and scientific uses, and may include locations (sites or places) of traditional, religious, and cultural importance to specified social and/or cultural groups. Cultural resources are material places and things that are located, classified, ranked, and managed though the system of identifying, protecting, and utilizing for public benefit (BLM 8110 Manual: Glossary).

Throughout this document, National Historic Preservation Act Section 106 terminology is used for cultural resources (e.g., eligible sites, historic properties, and not eligible sites), the process to identify them (e.g., Area of Potential Effect), and analysis of impacts to these resources (e.g., determination of no adverse effect) as a result of this lease sale. Terminology and definitions are available in the Section 106 implementing regulations at 36 CFR 800.

To identify cultural resources within and near the parcels, Monticello and Moab FO archaeologists completed a records review and analysis for all parcels. The Area of Potential Effects for this undertaking is the area bounded by each parcel as well as a half-mile buffer to better account for potential indirect effects. Each parcel was analyzed for whether disturbance associated with a single well pad (as defined by BLM's determined reasonably foreseeable development scenarios) could be accommodated within each parcel without adverse effects to historic properties.

Both archaeologists compiled cultural resources data from their respective field office cultural resource libraries, GIS data (CURES), and the Preservation Pro database. These data sources contain information of all of the recorded cultural resource sites and cultural resource survey data for the area available to BLM and the Utah Division of State History. Additional data sources used as appropriate include the Moab FO cultural resources planning model (Beck et al. 2017); various ethnographies available for both field offices; and data from the National Historic Trails Inventory Project, funded by the American Recovery and Reinvestment Act of 2009 and referred to as the "ARRA Data". The ARRA project sought to identify likely locations of the historic trail as well as any archaeological sites associated with the historic use of the trail. In addition, the field offices are seeking additional cultural resources information from tribes, the public, and consulting parties through the Section 106 process; consultation is ongoing.

Across the parcels, 473 Class III – Intensive Pedestrian Surveys (Class III survey) have been completed. Previous cultural resource inventory intensity varies widely across the parcels, ranging from 2% to 55%.

Known and expected site types within the parcels run a wide spectrum of human activity. From the records review it is clear that human beings have lived on this landscape for thousands of years. The cultural resources that are present within the parcels represents fully nomadic and semi-nomadic hunting and gathering activities, foraging, semi-sedentary to sedentary agriculture, pastoralism and ranching in historic times. From the records review, a total of 1,346 sites have been recorded within these parcels. A total of 984 have been determined to be eligible to the National Register of Historic Places. The parcels analyzed here include such archaeologically rich areas as Recapture Canyon, Mustang Mesa, Alkali Ridge, and Montezuma Creek. The types of eligible and non-eligible prehistoric sites that are present include Ancestral Puebloan habitation sites, structures (habitation, field houses, granaries, etc.), storage features, rubble features, and artifact scatters; short term camps; limited activity areas; petroglyphs and pictographs; and artifact scatters. The types of eligible and non-eligible historic sites include structures, roads and trails, potential segments of the Old Spanish Trail, Navajo sweat houses and hogans, and artifact scatters. Of particular note, two sites within parcels 001 and 005 are components of the Pershing Missile Launch Area of the White Sands Missile Complex.

Archaeological components of the Old Spanish National Historic Trail are near parcel 007, as

identified in the CURES and ARRA data. Only archaeological segments are considered in this section, the congressionally designated National Historic Trial is considered elsewhere in this document. Archaeological segments of the trail identified in the ARRA data are just over a half mile from parcel 007.

In addition to the above, the Alkali Ridge National Historic Landmark is near two parcels. The Alkali Ridge National Historic Landmark (NHL) comprises 2340 acres on Alkali Point in San Juan County, Utah and is composed of two parts: the northern portion is 840 acres and the southern portion is 1,500 acres. The NHL was designated in 1964, though no boundary was specified at the time; this was rectified in 1986. The NHL and its immediate environs are deeply associated with the development of Ancestral Puebloan archaeology and many of the field's pioneers. A search on the Utah Division of State History, Preservation Pro, returned 160 sites within the boundaries of the NHL. Parcel 028 is located just under one mile west of the southern segment of the NHL and just over one mile south of the northern segment and parcel 038 is located just under one mile south of the southern segment.

3.3.3 Greenhouse Gas Emissions/Climate Change

"Climate change" refers to any significant change in the measures of climate lasting for an extended period of time. In other words, climate change includes major changes in temperature, precipitation, or wind patterns, among other effects, that occur over several decades or longer. "Global warming" refers to the recent and ongoing rise in global average temperature near Earth's surface. It is caused mostly by increasing concentrations of greenhouse gases in the atmosphere. Global warming is causing climate patterns to change. However, global warming itself represents only one aspect of climate change. Climate is both a driving force and limiting factor for ecological, biological, and hydrological processes, and has great potential to influence resource management.

Climate change science continues to expand and refine our understanding of the impacts of anthropogenic Greenhouse Gas (GHG) emissions. The CEQ's first Annual Report in 1970 referenced climate change, indicating that "[m]an may be changing his weather." It is now well established that rising global atmospheric GHG emission concentrations are significantly affecting the Earth's climate. These conclusions are built upon a scientific record that has been created with substantial contributions from the United States Global Change Research Program (USGCRP).[2] Studies have projected the effects of increasing GHGs on many resources normally discussed in the NEPA process, including water availability, ocean acidity, sea-level rise, ecosystem functions, energy production, agriculture and food security, air quality and human health. BLM Washington Office Permanent Instructional Memorandum (PIM) 2017-003, provides guidance on incorporating GHG emissions and the effect of climate change in the NEPA process.

Based primarily on the scientific assessments of the USGCRP, the National Research Council, and the Intergovernmental Panel on Climate Change, in 2009 the EPA issued a finding that the changes in our climate caused by elevated concentrations of greenhouse gases in the atmosphere are reasonably anticipated to endanger the public health and public welfare of current and future

[2] See Global Change Research Act of 1990, Pub. L. 101–606, Sec. 103 (November 16, 1990). For additional information on the United States Global Change Research Program [hereinafter "USGCRP"], visit http://www.globalchange.gov.

generations. Broadly stated, the effects of climate change observed to date and projected to occur in the future include more frequent and intense heat waves, longer fire seasons and more severe wildfires, degraded air quality, more heavy downpours and flooding, increased drought, greater sea-level rise, more intense storms, harm to water resources, harm to agriculture, ocean acidification, and harm to wildlife and ecosystems.

This EA includes a qualitative and quantitative analysis of possible greenhouse gas emissions that could occur as a result of reasonably foreseeable oil and gas development associated with the parcels being offered for lease. Additional information about potential emissions would also be available and calculated as part of subsequent site-specific reviews at the APD stage.

It is accepted within the scientific community that global temperatures have risen at an increased rate and the likely cause is gases that trap heat in the atmosphere, referred to as greenhouse gases (GHG). GHGs are composed mostly of carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), water vapor, and ozone. The greenhouse gas effect is the process in which the radiation from the sun that heats the surface of Earth is blocked by GHG molecules in Earth's atmosphere. Since GHGs are composed of molecules that absorb and emit infrared electromagnetic radiation (heat), they form an intrinsic part of the greenhouse effect.

Greenhouse gases are often presented using the unit of Metric Tons of CO_2 equivalent (MT CO2e) or Million Metric Tons (MMT CO_2e), a metric to express the impact of each different greenhouse gas in terms of the amount of CO_2 making it possible to express greenhouse gases as a single number. For example, 1 ton of methane would be equal to 28-36 tons of CO_2 equivalent, because it has a global warming potential (GWP) over 25 times that of CO2 [EPA 2017a].

As defined by EPA, the GWP provides "ratio of the time-integrated radiative forcing from the instantaneous release of one kilogram of a trace substance relative to that of one kilogram of CO_2." The GWP of greenhouse gas is used to compare global impacts of different gases and used specifically to measure how much energy the emissions of one ton of gas will absorb over a given period of time (e.g. 100 years), relative to the emissions of one ton of CO_2. The GWP accounts for the intensity of each GHG's heat trapping effect and its longevity in the atmosphere. The GWP provides a method to quantify the cumulative effects of multiple GHGs released into the atmosphere by calculating carbon dioxide equivalent for the GHGs.

- Carbon dioxide (CO2), by definition, has a GWP of 1 regardless of the time period used because it is the gas being used as the reference. CO_2 remains in the climate system for a very long time; CO_2 emissions cause increases in the atmospheric concentrations of CO_2 that will last thousands of years [EPA 2017a].

- Methane (CH_4) is estimated to have a GWP of 28-36 times that of CO_2 over 100 years. CH_4 emitted today lasts about a decade on average, which is much less time than CO_2. However, CH_4 also absorbs much more energy than CO_2. The net effect of the shorter lifetime and higher energy absorption is reflected in the GWP. The methane GWP also accounts for some indirect effects, such as the fact that methane is a precursor to ozone, and ozone is in itself a greenhouse gas [EPA 2017a].

- Nitrous Oxide (N_2O) has a GWP of 265-298 times that of CO_2 for a 100-year timescale. N_2O emitted today remains in the atmosphere for more than 100 years, on average [EPA 2017a]. Table 3-4 contains GHGs regulated by EPA and global warming potentials.

Table 3-4: GHG Regulated by USEPA and Global Warming Potentials

Air Pollutant	Chemical Symbol/ Acronym	Global Warming Potential
Carbon Dioxide	CO_2	1
Methane	CH4	28-36
Nitrous Oxide	N_2O	298
Hydrofluorocarbons	HFCs	Varies
Perfluorocarbons	PFCs	Varies
Sulfur hexafluoride	SF_6	22,800

Source: [EPA 2017a]

The Intergovernmental Panel on Climate Change (IPCC) concluded "warming of the climate system is unequivocal" and "most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic GHG concentrations." [IPCC 2007] Extensive research and development efforts are underway in the field of carbon capture and sequestration technology, which could help direct management strategies in the future. The IPCC has identified a target worldwide "carbon budget" to estimate the amount of CO_2 the world can emit while still having a likely chance of limiting global temperature rise to 2°C above pre-industrial levels. The international community estimates this budget to be 1 trillion tonnes of carbon [IPCC 2016].

Because GHGs circulate freely throughout Earth's atmosphere, climate change is a global issue. The largest component of global anthropogenic GHG emissions is CO_2. Global anthropogenic carbon emissions reached about 7,000,000,000 MT per year in 2000 and an estimated 9,170,000,000 MT per year in 2010 [Boden, Marland, & Andres 2013]. Oil and gas production contributes to GHGs such as CO_2 and CH_4. Natural gas systems were the largest anthropogenic source category of CH_4 emissions in the United States in 2014 with 176.1 MMT CO_2e of CH_4 emitted into the atmosphere. Those emissions have decreased by 30.6 MMT CO2 e (14.8 percent) since 1990 [EPA 2016].

Global mean surface temperatures have increased nearly 1.0°C (1.8°F) from 1890 to 2006 [NASA 2007]. In 2001, the IPCC (2007) indicated that by the year 2100, global average surface temperatures would increase 1.4 to 5.8°C (2.5 to 10.4°F) above 1990 levels. The National Academy of Sciences [Hansen et al., 2006] has confirmed these findings, but also indicated that there are uncertainties regarding how climate change may affect different regions. Observations and predictive models indicate that average temperature changes are likely to be greater in the Northern Hemisphere. Data indicate that northern latitudes (above 24° N) have exhibited

temperature increases of nearly 1.2°C (2.1°F) since 1900, with nearly a 1.0°C (1.8°F) increase since 1970 alone. It also shows temperature and precipitation trends for the conterminous United States. For both parameters, we see varying rates of change, but overall increases in both temperature and precipitation.

In recent years, many states, tribes, and other organizations have initiated GHG inventories, tallying GHG emissions by economic sector. The EPA provides links to statewide GHG emissions inventories [EPA 2015]. Guidelines for estimating project-specific GHG emissions are available [URSC 2010], but some additional data, including the projected volume of oil or natural gas produced for an average well, number of wells (as well as other factors described in Section 4.2.1 Air Quality) were used to provide GHG estimates.

3.3.4 Lands with Wilderness Characteristics

Lands with wilderness characteristics are roadless areas having at least 5,000, contiguous acres (or meeting an exception in Manual 6310) that appear to be in a natural condition, and that provide outstanding opportunities for solitude and/or primitive and unconfined forms of recreation. All or portions of the following proposed lease parcels occur within lands found to possess wilderness characteristics: 037, 047, 048, 050, and 051. The unit information is summarized from wilderness characteristics inventories completed by the MtFO. Parcel information is summarized in Table 3-5.

Table 3-5: Overlap of lands with wilderness characteristics units and specific nominated lease parcels

Parcel #	Cross Canyon lands with wilderness characteristics unit acreage within parcel	Monument Canyon lands with wilderness characteristics unit acreage within Parcel	Tin Cup Mesa lands with wilderness characteristics unit acreage within Parcel	Percent of lease parcel within a lands with wilderness characteristics unit
037	0	3	0	<1%
047	0	1680	0	88%
048	0	140	0	11%
050	356	0	0	37%
051	584	0	112	36%
Totals	**940**	**1823**	**112**	

Total parcel acreage within lands with wilderness character = 2,875 acres

Table 3-6: Summary table of lands with wilderness characteristics and nominated lease parcels

Lands with wilderness characteristics unit	Acreage of lands with wilderness characteristics unit	Total acreage of lands with wilderness characteristics unit within nominated lease parcels	Percent of lands with wilderness characteristics unit that is overlapped by a nominated lease parcel
Cross Canyon	1,353	940	69%
Monument Canyon	17,200	1,823	11%
Tin Cup Mesa	9,396	112	1.2%
TOTAL	27,949	2,875	10.3%

As noted in the Table 3-6 above, 10.3% of the area within the nominated lease parcels is within lands determined to have wilderness characteristics. Table 3-5 shows the acreage of overlap of lands with wilderness characteristics for the proposed lease parcels.

Parcels 050 and 051 are located within the Cross Canyon lands with wilderness characteristics unit which includes lands contiguous with, but outside of, the Cross Canyon Wilderness Study Area. The Cross Canyon lands with wilderness characteristics unit was analyzed in the MtFO RMP and the unit was not carried forward for the protection and preservation of their wilderness characteristics in the approved plan.

Parcels 037, 047, and 048 are located within the Monument Canyon wilderness characteristics inventory unit. The Monument Canyon lands with wilderness characteristics unit was inventoried after the completion of the MtFO RMP. Therefore, the unit has not been analyzed through a land use planning process. Approximately 17,200 acres of the Monument Canyon unit possess wilderness characteristics.

A portion of Parcel 051 is located within the Tin Cup Mesa wilderness characteristics inventory unit. The Tin Cup Mesa lands with wilderness characteristics unit was inventoried after the completion of the 2008 Monticello FO RMP [BLM 2008]. Therefore, the unit has not been analyzed through a land use planning process. Approximately 9,396 acres of the Tin Cup Mesa unit possess wilderness characteristics.

3.3.5 Migratory Birds including Raptors

A variety of migratory song bird species use habitats within these parcels for breeding, nesting, foraging, and migratory habitats. Migratory birds are protected under the Migratory Bird Treaty Act of 1918 (MBTA). Unless permitted by regulations, the MBTA makes it unlawful to pursue, hunt, kill, capture, possess, buy, sell, purchase, or barter any migratory bird, including the feathers or other parts, nests, eggs, or migratory bird products. In addition to the MBTA, Executive Order 13186 sets forth the responsibilities of Federal agencies to further implement the provisions of the MBTA by integrating bird conservation principles and practices into agency activities and by ensuring that Federal actions evaluate the effects of actions and agency plans on migratory birds.

An MOU between the BLM and USFWS (BLM MOU WO-230-2010-04) provides direction for the management of migratory birds to promote their conservation. At the project level, the MOU direction includes evaluating the effects of the BLM's actions on migratory birds during the NEPA

process; identify potential measurable negative effect on migratory bird populations focusing first on species of concern, priority habitats, and key risk factors. In such situations, BLM would implement approaches to lessen adverse impact. Identifying species of concern, priority habitats, and key risk factors includes identifying species listed on the USFWS Birds of Conservation Concern (BCC) that are most likely to be present in the project area and evaluating and considering management objectives and recommendations for migratory birds resulting from comprehensive planning efforts, such as Utah Partners in Flight American Land Bird Conservation Plan. The Utah Partners in Flight (UPIF) Working Group completed a statewide avian conservation strategy identifying "priority species" for conservation due to declining abundance distribution, or vulnerability to various local and/or range-wide risk factors. One application of the strategy and priority list is to give these birds specific consideration when analyzing effects of proposed management actions and to implement recommended conservation measures where appropriate.

The UPIF Priority Species List, the BCC list for Region 16 (Colorado Plateau) and the Utah Conservation Data Center database (Utah Division of Wildlife Resources 2012) were used to identify potential habitat for priority species that could utilize habitats within the CCDO. Table 3-5 lists the UPIF Priority Species list and the FWS BCC species that are a concern within the CCDO. These species could occur anywhere within the District at any given time.

Table 3-5: CCDO UPIF & FWS BCC Species 2008 (Region 16)

Species	BCC	UPIF	DWR Habitats	1st Breeding Habitat	2nd Breeding Habitat	Winter Habitat
Bald Eagle	X		Winter	Lowland Riparian	Agriculture	Lowland Riparian
Band-tailed Pigeon			High/ Substantial	Ponderosa pine	Mixed conifer	Migrant
Black Rosy-finch	X	X	Substantial/ Critical	Alpine	Alpine	Grassland
Black-throated Gray Warbler		X	Prime Breeding	Pinyon-Juniper	Mountain Shrub	Migrant
Bobolink		X	Winter	Wet Meadow	Agriculture	Migrant
Brewer's Sparrow	X	X	Critical/High	Shrub/steppe	High Desert Shrub	Migrant
Broad-tailed Hummingbird		X	Critical/ Substantial	Lowland Riparian	Mountain Riparian	Migrant
Burrowing Owl	X		Primary Breeding	High Desert Shrub	Grassland	Migrant
Gambel's Quail		X	High	Low Desert Shrub	Lowland Riparian	Low Desert Shrub
Golden Eagle	X		Critical/High	Cliff	High Desert Shrub	High Desert Shrub
Grace's Warbler	X		Critical	Ponderosa pine	Mixed conifer	Migrant
Gray Vireo	X	X	Prime Breeding/Winter	Pinyon-Juniper	Oak	Migrant
Juniper Titmouse	X		Critical/High	Pinyon-Juniper	Pinyon-Juniper	Pinyon-Juniper
Long-billed Curlew	X	X	Substantial/Prime Breeding	Grassland	Agriculture	Migrant
Pinyon Jay	X		Critical/High	Pinyon-Juniper	Ponderosa pine	Pinyon-Juniper
Prairie Falcon	X		Critical/High	Cliff	High Desert Shrub	Agriculture
Sage Sparrow		X	Critical	Shrub/steppe	High Desert Shrub	Low Desert Shrub
Virginia's Warbler		X	Prime Breeding/Winter	Oak	Pinyon-Juniper	Migrant
Willow Flycatcher	X		Critical	Lowland Riparian	Lowland Riparian	Migrant
Yellow-billed Cuckoo	X	X	Critical	Lowland Riparian	Agriculture	Migrant

‡Utah Partners in Flight Avian Conservation Strategy Version 2.0 (Parrish et al., 2002), §Birds of Conservation Concern 2008 (USFWS, 2008)
†Utah Conservation Data Center, *Utah Sensitive Species, **=Federally List, *Italic=Utah Sensitive Species*

Raptors. Habitats within the CCDO area have the potential to support breeding, nesting, and foraging raptors, golden eagle and wintering bald eagles. Raptor nest sites are typically located on promontory points such as cliff faces and rock outcrops in areas with slopes of 30 percent or

greater, but they may also nest in pinyon, juniper, or deciduous trees. Raptors typically use the same nest site year after year. Raptor young tend to disperse to areas near the traditional nest sites. The project area also offers suitable wintering and migration habitats for several raptor species. The nesting season for most raptors in the CCDO area extends from March 1 through August 31.

Raptor species with the potential to occur in the CCDO area are identified in Table 3-6 with a description of their nesting and foraging habitats.

Table 3-6: Raptor Species with the Potential to Occur in CCDO and USFWS Spatial and Seasonal Buffers

Common Name	Scientific Name	General Habitat and Potential to Occur in the Canyon County District	Spatial Buffer (miles)	Seasonal Buffer
Sharp-shinned Hawk	*Accipiter striatus*	Moderate to high potential to nest and forage in P-J woodlands, nesting in more dense areas that have older and larger trees or riparian areas and drainages. . Low potential to nest in desert shrub.	0.5	3/15-8/31
Cooper's Hawk	*Accipiter cooperii*	Moderate to high potential to nest and forage in deciduous, mixed-deciduous, and pinyon/juniper (PJ) woodlands nesting in more open areas that have older and larger trees or riparian areas and drainages. Low potential to nest in desert shrub.	0.5	3/15-8/31
Golden Eagle	*Aquila chrysaetos*	Occurs throughout the district. Commonly nests on cliff ledges and rock outcrops. High potential to forage in desert shrub, canyon habitats and lower elevation open PJ woodlands.	0.5	1/1-8/31
Bald Eagle	*Haliaeetus leucocephalus*	Winter habitat typically includes areas of open water, adequate food sources, and sufficient diurnal perches and night roosts. High potential to occur during the winter along the river corridors, in desert shrub and canyon habitats and lower elevation PJ woodlands. Nesting occurs long the river corridors. No potential for nesting in lease parcels.	0.5	1/1/-8/31
Burrowing Owl	*Athene cunicularia*	Low potential to nest in PJ woodland area due to lack of prairie dog colonies in the area. High potential to forage and nest in sagebrush/grassland community and desert scrublands. Utilizes open habitats such as grasslands that also offer prairie dog or other burrowing mammal habitats. Commonly utilizes prairie dog burrows for nesting.	0.25	3/1-8/31
Long-eared Owl	*Asio otus*	Occurs throughout the district. High potential to nest in dense vegetation adjacent to open grasslands or shrublands; also open coniferous or deciduous woodlands. Moderate to high potential to nest in PJ woodlands. Moderate to high potential to forage in desert shrub, grasslands and open canopy PJ woodlands.	0.25	2/1-8/15
Great-horned Owl	*Bubo virginianus*	Occurs throughout the district in a variety of habitats. Nests on cliff ledges, deciduous and pinyon-juniper trees, and nests of other species. Moderate to high potential to nest and forage in canyon habitats, shrub-steppe, desert shrub and PJ woodlands.	0.25	12/1-9/31
Mexican Spotted Owl	*Strix occidentalis lucida*	Occurs in steep-walled rocky canyons below 8,000 feet elevation with no or few trees. Moderate to high potential to nest and forage in canyon habitats	0.5	3/1-8/31
Red-tailed Hawk	*Buteo jamaicensis*	Occurs throughout the district in a variety of habitats including deserts, grasslands, coniferous and deciduous forests. Typically nests in the tallest tree. Moderate to high potential to nest on cliffs and low	0.5	3/15-8/15

Common Name	Scientific Name	General Habitat and Potential to Occur in the Canyon County District	Spatial Buffer (miles)	Seasonal Buffer
		potential to nest in dense PJ woodlands unless tall ponderosas are available. High potential to forage in desert shrub and PJ woodlands.		
Swainson's Hawk	*Buteo swainsoni*	Not likely to nest in the district. Moderate potential to forage in desert shrub and PJ woodlands.	0.5	3/1-8/31
Ferruginous Hawk	*Buteo regalis*	Can occur throughout the district. High potential to nest and forage in sagebrush/grassland community and desert scrublands. Avoids high elevations, forests, and narrow canyons.	0.5	3/1-8/1
Northern Harrier	*Circus cyaneus*	Moderate potential to forage and nest in sagebrush/grassland vegetative community and desert scrublands. Low potential to nest in PJ woodlands. Utilizes open habitats such as marshes, fields, and grasslands.	0.5	4/1-8/15
Peregrine Falcon	*Falco peregrinus*	High potential to nest on cliffs and ledges. High forage potential in Lowland riparian and wetlands.	1.0	2/1-8/31
Prairie Falcon	*Falco mexicanus*	High potential to nest on cliffs and ledges. Moderate potential to forage in desert shrub, moderate in PJ woodland.	0.25	4/1-8/31
American Kestrel	*Falco sparverius*	Moderate potential to nest on cliffs, and ledges. Moderate potential to forage from cliffs and ledges and low potential in desert shrub and PJ woodland.	0	4/1-8/15

3.3.6 Visual Resources

In accordance with its mandate in the FLPMA, the BLM inventories and manages the scenic values of the public lands in accordance with national level policies established in BLM Manual Series 8400: Visual Resource Management (VRM). The BLM's VRM system uses four types of management classes (Classes I through IV) and their associated objectives to describe the different degrees of surface disturbance or modification allowed on the public lands (Table 3-7). VRM classes for the parcels included in this analysis were last established in the 2008 Approved Moab and Monticello Field Office RMPs. Sensitive viewsheds that could potentially be impacted by the proposed action are all located within the Monticello Field Office.

The 1.8 million-acres of public lands administered by the Monticello Field Office contain a large number of areas that possess a high degree of scenic quality and a high level of visual sensitivity. The visual attributes of the region have made the Monticello Field Office a popular outdoor recreation destination, and each year, an increasing number of recreational visitors come to the field office to recreate and sightsee. In general, high scenic quality within the field office results from the extraordinarily diverse and distinct topography, geology, and cultural history. The area possesses scenically unique vistas and river ways; rare and unusual geologic formations of sandstone, limestone, and shale; colorful and highly contrasting sandstone cliffs, arches, canyons, and spires; a diversity of vegetation ranging from aspen, pinyon and juniper, to cottonwood and cacti; and an extraordinary concentration of prehistoric rock art, and prehistoric and historic structures.

Sensitive viewsheds that could potentially be impacted by future development of the parcels being proposed for leasing include those parcels within and nearby Recapture Canyon (Parcels 029, 030, 031, 032, 033, 034, and 038), the parcel adjacent to and near the San Juan River (Parcel 036), and those parcels near Hovenweep National Monument (Parcels 050 and 051). These viewsheds were

considered sensitive because introduced changes in these landscapes from future mineral resource development could affect the experiences of recreational visitors to these local, regional, national, and/or international outdoor recreation destinations. Table 3-7 identifies the acreages of each VRM Class and their corresponding RMP objectives for the proposed parcels located within sensitive viewsheds.

Table 3-7 VRM Class Objectives within Parcels with Sensitive Viewsheds

VRM Class	VRM Objective	BLM Acreages of VRM Classes within Parcels with Sensitive Viewsheds
Class I	The objective of this class is to preserve the existing character of the landscape. This class provides for natural ecological changes; however, it does not preclude very limited management activity. The level of change to the characteristic landscape should be very low and should not attract attention.	029: 0 acres 030: 0 acres 031: 0 acres 032: 0 acres 033: 0 acres 034: 0 acres 036: 0 acres 038: 0 acres 050: 3 acres 051: 0 acres
Class II	The objective of this class is to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.	029: 0 acres 030: 0 acres 031: 0 acres 032: 0 acres 033: 0 acres 034: 0 acres 036: 154 acres 038: 0 acres 050: 0 acres 051: 0 acres
Class III	The objective of class III is to partially retain the existing character of the landscape. The level of change to the landscape should be moderate. Management activities may attract the attention of the casual observer, but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.	029: 0 acres 030: 214 acres 031: 0 acres 032: 3 acres 033: 853 acres 034: 0 acres 036: 817 acres 038: 2,297 acres 050: 161 acres 051: 0 acres
Class IV	The objective of Class IV is to provide for management activities that require major modifications to the existing character of the landscape. The level of change to the landscape can be high. The management activities may dominate the view and may be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repetition of the basic visual elements of form, line, color, and texture.	029: 851 acres 030: 2,325 acres 031: 1,879 acres 032: 1,916 acres 033: 224 acres 034: 1,279 acres 036: 549 acres 038: 0 acres 050: 791 acres 051: 1,947 acres

CHAPTER 4 – ENVIRONMENTAL IMPACTS

4.1 INTRODUCTION

This chapter discusses the environmental consequences of implementing the alternatives described in Chapter 2. Under NEPA, actions with the potential to affect the quality of the human environment must be disclosed and analyzed in terms of direct and indirect impacts—whether beneficial or adverse and short or long term—as well as cumulative impacts. Direct impacts are caused by an action and occur at the same time and place as the action. Indirect impacts are caused by an action but occur later or farther away from the resource. Beneficial effects are those that involve a positive change in the condition or appearance of a resource or a change that moves the resource toward a desired condition. Adverse effects involve a change that moves the resource away from a desired condition or detracts from its appearance or condition. Cumulative impacts are the effects on the environment that result from the incremental effect of the action when added to other past, present, and reasonably foreseeable future actions.

No Action Alternative

The No Action Alternative is used as the baseline for comparison with the Proposed Action. Under the No Action Alternative, the 29 parcels totaling 40,866.64 acres would not be leased. There would be no subsequent environmental impacts from oil and/or gas construction, drilling, and production activities. The No Action Alternative would result in the continuation of the current land and resource uses in the proposed lease areas.

The BLM assumes that the No Action Alternative (no lease option) may result in a slight reduction in domestic production of oil and gas. This reduction would diminish federal and state royalty income, and increase the potential for federal lands to be drained by wells on adjacent private or state lands. The public's demand for oil and gas is not expected to change; oil and gas consumption is driven by a variety of complex interacting factors including energy costs, energy efficiency, availability of other energy sources, economics, demographics, and weather or climate. If the parcels are not leased, energy demand would continue to be met by other sources such as imported fuel, alternative energy sources (e.g., wind, solar), and other domestic fuel production. This displacement of supply could offset any reductions in emissions and disturbance achieved by not leasing the subject tracts in the short term.

The No Action Alternative would not meet the purpose and need for the Proposed Action.

4.2 DIRECT AND INDIRECT IMPACTS

4.2.1 Air Quality

4.2.1.1 Impacts of No Action Alternative

The No Action Alternative would result in no impact to the air quality because the parcels would not be leased or developed.

4.2.1.2 Impacts of Proposed Action Alternative

The act of leasing would not result in impacts to air quality. However, should the leases be issued, development of those leases could impact air quality conditions. It is not possible to accurately

estimate potential air quality impacts by computer modeling from the proposed action due to the variation in emission control technologies as well as construction, drilling, and production technologies applicable to oil versus gas production and utilized by various operators, so this discussion will remain qualitative. Prior to authorizing specific proposed projects on the subject lease parcels quantitative computer modeling using project specific emission factors and planned development parameters (including specific emission source locations) may be conducted to adequately analyze direct and indirect potential air quality impacts. In conducting subsequent project-specific analysis, BLM would follow the policy and procedures of the National Interagency MOU Regarding Air Quality Analysis and Mitigation for Federal Oil and Gas Decisions through NEPA, and the Federal land managers' air quality related values work group (FLAG) 2010 air quality guidance document. Air quality dispersion modeling which may be required includes impact analysis for demonstrating compliance with the NAAQS, plus analysis of impacts to AQRV (i.e. deposition, visibility), particularly as they might affect nearby Class I areas (National Parks).

An oil or gas well, including the act of drilling, is considered to be a minor source under the Clean Air Act. Minor sources are not subject to Clean Air Act Title V Operating Permit requirements. A producing oil and gas well may be subject to UDAQ New Source Review requirements. UDAQ requires a New Source Review Permit, also known as an Approval Order, for any new or modified stationary source of air pollution emissions. Table 4-1 lists the UDAQ permit types required for sources of air pollutants.

Table 4-1: UDAQ Permitting Requirements

Permit Type	Emission Levels for Criteria Pollutants[1] Tons per Year (tpy)	Emission Levels for Hazardous Air Pollutants (Pounds per Year[2])
Small Source Exemption -Registration[3]	Less Than 5 tpy	Less Than 500 for one or 2000 for a combination
Approval Order[4]	Greater Than 5 tpy	More Than 500 for one or 2000 for a combination
Title V Operating Permit	Greater Than 100 tpy	More Than 10 TPY for one or 25 TPY for a combination

1 - Criteria pollutants are SOx, NOx, PM_{10}, Volatile Organic Compounds (VOCs), CO, Ozone.
2 - There are 188 Hazardous Air Pollutants, HAPs
3 - The following locations need to submit a small source exemption registration: Ogden City, Davis County, Salt Lake County, Utah County, and East Toole County. All other locations do not need to submit an exemption.
4 - An approval order or operating permit is required throughout the state if your emissions are above the permitting categories.

As indicated in the Table, a small source exemption from obtaining an approval order is available for any stationary source if emissions are less than 5 tpy of criteria pollutants. Registration of a small source exemption is not required in San Juan or Grand Counties.

On June 5, 2014, UDAQ issued GAO for a Crude Oil and Natural Gas Well Site and/or Tank Battery (DAQE-ANI49250001-14; available at: http://www.deq.utah.gov/Permits/GAOs/gaos.htm). An oil and gas applicant may apply for and, if qualified, receive approval to operate under this GAO. The GAO has many requirements, including Best Available Control Technology that reduce emissions and mitigate impacts to air quality. A dispersion modeling analysis was conducted for NO_2. Conditions in this GAO reflect the results of this modeling analysis and will ensure protection of the NAAQS. The HAP emissions are limited by emission controls and equipment.

The UDAQ Modeling Guidelines, revised December 17, 2008 (Utah, 2008) may require dispersion modeling if SO_2 or NOx is greater than 40 tpy, PM_{10} is greater than 5 tpy, CO is greater than 100 tpy, or lead is greater than 0.6 tpy.

Different emission sources would result from the two site-specific lease development phases: well development and well production. Well development includes emissions from earth-moving equipment, vehicle traffic, drilling, and completion activities. NO_X, SO_2, and CO would be emitted from vehicle tailpipes. Fugitive dust concentrations would increase with additional vehicle traffic on unpaved roads and from wind erosion in areas of soil disturbance. Drill rig and completion engine operations would result mainly in NO_X and CO emissions, with lesser amounts of SO_2. These temporary emissions would be short-term during the drilling and completion times.

During well production, there are continuous emissions from separators, condensate storage tanks, and daily tailpipe and fugitive dust emissions from operations traffic. During the operational phase of the proposed action, NO_X, CO, VOC, and HAP emissions would result from the long-term operation of condensate storage tank vents, and well pad separators. Additionally, road dust (PM_{10} and $PM_{2.5}$) would be produced by vehicles servicing the wells.

Project emissions of ozone precursors, whether generated by construction and drilling operations, or by production operations, would be dispersed and/or diluted to the extent where any local ozone impacts from the proposed action would be indistinguishable from background or cumulative conditions. The primary sources of HAPs are from oil storage tanks and smaller amounts from other production equipment. Small amounts of HAPs are emitted by construction equipment. However, these emissions are estimated to be less than 1 ton per year.

Lease stipulation UT-S-01 Air Quality, which regulates the amounts of NO_X emission per horsepower hour based on internal combustion engine size, would be attached to all parcels. However, additional air impact mitigation strategies have recently been developed in the Uinta Basin, and are presented in the cumulative impacts section.

For this analysis an emissions inventory (EI) for the March 2018 Oil and Gas Lease Sale is estimated based on an MFO “typical well” outside of the Moab Master Leasing Planning Area and the production emission estimated by UDAQ for the oil and gas GAO. This “typical well” is based on the following analysis assumptions contained in the MFO PRMP (BLM 2008b: 4-10 to 4-33), the MFO RFD (McClure, Northrop and Fouts 2005) and previous oil and gas development in the MFO.

- Each oil and gas well would cause 15 acres of surface disturbance. This acreage includes well pad, road and pipeline construction. The average pad is about 4.1 acres in size. Access and pipeline acreage can vary. Eleven acres is used here and is from the RFD (pg. 1).
- Construction activity for each well is assumed to be 10 days. It is further assumed that, based on the acreage disturbed, 4.5 days would be spent in well pad construction and 5.5 days would be spent in road and pipeline construction.
- Control efficiency of 25% for dust suppression would be achieved as a result of compliance with Utah Air Quality regulation R307-205.
- Post construction particulate matter (dust) emissions are likely to occur on a short-term basis due to loss of vegetation within the construction areas. Assuming appropriate interim

reclamation, these emissions are likely to be minimal to negligible and will not be considered in this EA.

- Drilling operations would require 20 days.
- Completions and testing operations would require 3 days.
- Well pad, road, and pipeline construction activity emissions (PM_{10}) will be considered. Off road mobile exhaust emissions from drilling activities will be considered.
- Off road mobile exhaust emissions from heavy equipment and on road mobile emissions will not be considered as they are dispersed, sporadic, temporary, and not likely to cause or contribute to exceedance of the NAAQS.

The estimated EI for a typical well includes particulate matter of less than 10 micrometers in diameter (PM_{10}), nitrogen oxides (NOx), carbon monoxide (CO), and volatile organic compounds (VOC). Emissions of sulfur dioxide (SO_2) and lead (Pb) from oil and gas development activities are minor and are not included. $PM_{2.5}$ is not specifically included as it is a component of PM_{10}. Emission factors for activities of the proposed action were based on information contained in the EPA's Emission Factors & AP 42, Volume I, Fifth Edition (EPA, 1995), available at: https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-compilation-air-emission-factors.

Production emissions calculations were prepared by UDAQ for the GAO for production operations (based on 50,000 bbl oil/year and 2 mmcf gas/day production). The GAO has many requirements, including Best Available Control Technology that reduce emissions and mitigate impacts to air quality. In Table 4-2, the first column show estimated emissions without the controls. The second column shows the estimated emissions with controls required by the GAO.

Table 4-2: GAO Estimated Emissions (tpy)

	Uncontrolled Emissions	Controlled Emissions
VOC	138.98	13.55
NOx	16.93	8.45
CO	9.70	12.94
HAP	34.30	2.55
PM10	0.52	0.52
SO2	0.03	0.03

Table 4-3 contains a summary of the estimated EI for the proposed action. The MFO RFD (p.31) predicted that 50 percent of wells drilled would be productive and the remainder would be dry holes. Ongoing annual production emissions are based on this percentage.

Table 4-3: Emissions inventory summary

	Construction Emissions (Tons)	Drilling Emissions (Tons)			Completions Emissions (Tons)				UDAQ GAO Ongoing Production Emissions (controlled) (Tons/year)			
	PM10	**NOX**	**CO**	**VOC**	**VOC**	**NOx**	**CO**	**PM10**	**NOX**	**CO**	**VOC**	**PM10**
Typical Well	0.34	13.31	1.83	0.23	0.85	0.07	0.07	0.00	8.45	12.94	13.55	0.52

	PM10	**NOx**	**CO**	**VOC**	
Activity Emissions (Total emissions for construction, drilling and completion a well)	0.34	13.38	1.90	1.08	**Tons**
Production Emissions (Ongoing annual emissions per well well)	0.52	8.45	12.94	13.55	**tpy**
Activity Emissions × 4 wells (10 year period)	1.36	53.52	7.6	4.32	Tons
Per year activity emissions (next 10 years)	0.14	5.35	0.76	0.43	**Tons**
Annual ongoing production emissions (59% productive ≈ 2 wells)	1.04	16.90	25.88	27.10	**tpy**

A project specific modeling analysis was also conducted in 2010 for a project with similar likely development characteristics as would be expected from these lease sales (Cane Creek Modeling Report, (Golder, 2010)). This modeling analysis analyzed the expected impacts from a 17 well project to NO_2 and PM_{10} Class I Prevention of Significant Deterioration (PSD) Increment Consumption using AERMOD, nitrogen deposition within nearby national parks using CALPUFF-lite, and visibility impacts within nearby national parks using VISCREEN. The project area for this modeling analysis was located closer to the Canyonlands and Arches National Parks than most of the parcels under this lease sale, and can be considered conservative for purposes of this analysis. No adverse impacts to Class I related AQRVs were predicted through this modeling analysis.
Based on the EI for a typical oil and gas well, the Cane Creek modeling analysis (Golder 2010) incorporates by reference to this EA, the air quality analysis in the MtFO and MFO PRMPs, the proposed action is not likely to violate, or otherwise contribute to any violation of any applicable air quality standards, and may only contribute a small amount to any projected future potential exceedance of any applicable air quality standards.

A more recent modeling analysis was conducted in 2016 within the Moab Master Leasing Planning Area (MLP). The focus of the modeling analyses is on National Ambient Air Quality Standards (NAAQS) as established by the Clean Air Act, and Air Quality Related Values (AQRV) as defined by the Federal Land Managers' AQRV Work Group (FLAG 2010). Far-field modeling was conducted by the BLM National Operations Center to evaluate multiple source impacts over the entire MLP on NAAQS and AQRVs. The technical details for this modeling are presented in Appendix F of the MLP EIS.

The modeling analysis evaluated three scenarios based on the range of alternatives in the MLP EIS. The EI for all three scenarios show that the proposed action is not likely to violate, or otherwise contribute to any violation of any applicable air quality standards, and may only contribute a small amount to any projected future potential exceedance of any applicable air quality standards.

Lease stipulations and notices are applied to leases when they are issued to notify the operator of what they would be required to do (stipulation) and what they could potentially be required to do

(lease notice) at the APD stage. This allows the potential lessee at the time of bidding on the parcel what the range of requirements they can expect when they exercise their lease rights. The following lease stipulations to all parcels: UT-S-01: Air Quality. This stipulation tells the operator that all new and replacement internal combustion gas field engines of less than or equal to 300 design-rated horsepower shall not emit more than 2 grams of NO_x per horsepower-hour. Lease Notices UT-LN-99: Regional Ozone Formation Controls for any development projects, UT-LN-96: Air Quality Mitigation Measures and UT-LN-102: Air Quality Analysis would be applied to all parcels. These lease notices notify that operator that mitigation measures, best management practices, and an air emissions inventory my required at the APD stage to mitigate oil and gas exploration and development activity impacts on air quality. The BLM would do this in coordination with the EPA, UDAQ and other agencies that have jurisdiction on air quality. By applying this lease stipulation and lease notice, leasing drilling 16 wells as anticipated under the RFD would have little impact on air quality. At the APD or field development stages, further conditions of approval could be applied based on the environmental analysis for the exploration/development.

4.2.2 Cultural Resources

4.2.2.1 Impacts of No Action Alternative

The No Action Alternative would result in no impact to cultural resources because the parcels would not be leased or developed.

4.2.1.2 Impacts of Proposed Action Alternative

As mentioned previously, National Historic Preservation Act (NHPA) Section 106 terminology is used for much of the cultural resources sections of this EA. This is most relevant in this discussion of effects to cultural resources as a result of this lease sale. Section 106 of the NHPA require federal agencies to consider the potential effects of undertakings on historic properties in the process defined in its implementing regulations at 36 CFR 800. Historic properties are defined as cultural resources which are listed or eligible for listing on the National Register of Historic Places (NRHP).

The Criteria for Adverse Effect found at 36 CFR 800.5(a)(1) are used in this section to analyze the potential effects to historic properties. This regulation states: “An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association.” Under Section 106, when effects from an undertaking to historic properties reach the adverse effects threshold, they must be avoided, minimized or mitigated. Adverse effects are used here as a comparable threshold to significant or severe impacts under NEPA.

In the literature review and analysis, the field offices used a reasonably foreseeable development (RFD) scenario to understand the potential impacts to cultural resources. RFD is partially defined as the expected area of disturbance for one well pad typically encompassing total disturbance from both access and pad construction and use. RFD varies across the Monticello and Moab Field Offices, were determined in analyses contained in the following documents: *Reasonably Foreseeable Development Scenario (RFD) for Oil and Gas, RFD for the Monticello Planning Area (2005), Reasonably Foreseeable Development Scenario (RFD) for Oil and Gas, RFD for the Moab*

Planning Area (2005), and 2012 *Reasonably Foreseeable Development (RFD) Scenario for Oil and Gas in the Moab Master Leasing Plan (MMLP) Area, Canyon Country District* and is further explained in Appendix E.

Table 4-4: RFD per March 2018 Lease Sale Parcels.

Area	RFD	Parcels within Area
Moab Planning Area	*15 acres*	001, 002, 003, 004, 005, 006A, 007, 008
Monticello Planning Area	*9.6 acres*	028, 029, 030, 031, 032, 033, 034, 036, 037, 038, 039, 040, 041, 042, 043, 044, 047, 048, 049, 050, 051

For purposes of this analysis, if 9.6 acres (Monticello FO parcels) or 15 acres (Moab FO parcels) of disturbance can be accommodated within a lease parcel without adverse effects, then BLM determines that that parcel can be leased without adverse effect to historic properties.

Reasonably foreseeable development resulting from leasing within the proposed area has the potential to impact cultural resources. These impacts include direct effects, such as the partial or complete physical damage or destruction to sites and indirect effects, such as changes in the integrity of a contributing component of the property's significance (location, design, setting, materials, workmanship, feeling, or association). Given the types of cultural resources in the area, indirect effects include visual impacts to sensitive rock art sites or to elements of the Old Spanish Trail. The development of a parcel may also lead to more roads in some areas, which could increase public access, potentially leading to increased vandalism and looting.

While this lease sale has the potential to impact cultural resources, these impacts do no reach the significant, or adverse effects, threshold. As its Section 106 analysis, BLM has completed a draft intensive records review which takes into account a wide variety of data, including the parcel size, location, current and past oil and gas leasing and development data for the area, landscape data (e.g., topography, water sources) and cultural resources data, including all previously recorded site data and survey records for the area, ethnographic data, and information gathered through formal consultation with tribes and consulting parties, and through public participation. Using these data, BLM analyzed whether reasonably foreseeable development could occur within each parcel without adverse effects to historic properties.

Analysis of the above data demonstrates that there is room for reasonably foreseeable development in all parcels. For many parcels, this is because there are large or moderate sized areas with known or expected site densities that can easily accommodate the appropriate acreage of disturbance without adverse effects. For the remaining parcels where site densities are higher, there are still sufficient areas to accommodate reasonably foreseeable development and stipulations attached to each parcel will ensure well pad placement will not have adverse effects to historic properties, these stipulations are discussed below. For those parcels where there are sites sensitive to indirect effects, parcels are sufficiently large and topographically complex that these effects can be avoided through judicious placement of a well pad.

BLM further prevents adverse effects by maintaining the authority to require modification of, or even disapprove, parcel development plans if cultural resource conflicts cannot be satisfactorily resolved, and, with some stipulations, to avoid impacts to cultural resources all together. Meeting lease stipulation requirements is a critical component of having any future proposed development approved by the BLM. All stipulations will be enforced during any future authorization to conduct exploration or operational activities under a lease.

The primary authority to modify or disprove future development plans is provided by the Cultural Resources Stipulation, which is applied to all lease parcels. This stipulation authorizes BLM to modify or disapprove any future actions if potential adverse effects relating to future authorizations cannot be satisfactorily resolved.

In addition to the Cultural Resources Stipulation, two controlled surface use stipulations have been applied to some or all of the Monticello FO parcels. All Monticello parcels have the Controlled Surface Use – Cultural, and the Controlled Surface Use – Alkali Ridge Area of Critical Environmental Concern (ACEC) has been applied to those parcels fully or partially within the ACEC. Both stipulations requires that all historic properties be surrounded by an avoidance area sufficient to avoid impacts.

The No Surface Occupancy – San Juan River ACEC stipulation also applies to those portions of Parcel 036 that are within the ACEC, meaning portions of the parcel close to the river cannot be developed on.

Full language for each stipulation is provided in Appendix A. All cultural resources stipulations as applied to each parcel:

Table 4-5: Cultural Resource Stipulations and Lease Notices by Lease Parcel

Parcel	Applicable Cultural Resource Stipulations
001	Standard Cultural Resource Stipulation from H-3120-1
002	Standard Cultural Resource Stipulation from H-3120-1
003	Standard Cultural Resource Stipulation from H-3120-1
004	Standard Cultural Resource Stipulation from H-3120-1
005	Standard Cultural Resource Stipulation from H-3120-1
006A	Standard Cultural Resource Stipulation from H-3120-1
007	Standard Cultural Resource Stipulation from H-3120-1
008	Standard Cultural Resource Stipulation from H-3120-1
028	Standard Cultural Resource Stipulation from H-3120-1 Controlled Surface Use – Cultural (UT-S-170)
029	Standard Cultural Resource Stipulation from H-3120-1 Controlled Surface Use – Cultural (UT-S-170)
030	Standard Cultural Resource Stipulation from H-3120-1 Controlled Surface Use – Alkali Ridge ACEC (UT-S-17) Controlled Surface Use – Cultural (UT-S-170)
031	Standard Cultural Resource Stipulation from H-3120-1 Controlled Surface Use – Cultural (UT-S-170)
032	Standard Cultural Resource Stipulation from H-3120-1 Controlled Surface Use – Alkali Ridge ACEC (UT-S-17) Controlled Surface Use – Cultural (UT-S-170)

Parcel	Applicable Cultural Resource Stipulations
033	Standard Cultural Resource Stipulation from H-3120-1 Controlled Surface Use – Alkali Ridge ACEC (UT-S-17) Controlled Surface Use – Cultural (UT-S-170)
034	Standard Cultural Resource Stipulation from H-3120-1 Controlled Surface Use – Cultural (UT-S-170)
036	Standard Cultural Resource Stipulation from H-3120-1 No Surface Occupancy – San Juan River ACEC (UT-S-16) Controlled Surface Use – Cultural (UT-S-170)
037	Standard Cultural Resource Stipulation from H-3120-1 Controlled Surface Use – Alkali Ridge ACEC (UT-S-17) Controlled Surface Use – Cultural (UT-S-170)
038	Standard Cultural Resource Stipulation from H-3120-1 Controlled Surface Use – Alkali Ridge ACEC (UT-S-17) Controlled Surface Use – Cultural (UT-S-170)
039	Standard Cultural Resource Stipulation from H-3120-1 Controlled Surface Use – Alkali Ridge ACEC (UT-S-17) Controlled Surface Use – Cultural (UT-S-170)
040	Standard Cultural Resource Stipulation from H-3120-1 Controlled Surface Use – Alkali Ridge ACEC (UT-S-17) Controlled Surface Use – Cultural (UT-S-170)
041	Standard Cultural Resource Stipulation from H-3120-1 Controlled Surface Use – Cultural (UT-S-170)
042	Standard Cultural Resource Stipulation from H-3120-1 Controlled Surface Use – Cultural (UT-S-170)
043	Standard Cultural Resource Stipulation from H-3120-1 Controlled Surface Use – Cultural (UT-S-170)
044	Standard Cultural Resource Stipulation from H-3120-1 Controlled Surface Use – Cultural (UT-S-170)
047	Standard Cultural Resource Stipulation from H-3120-1 Controlled Surface Use – Cultural (UT-S-170)
048	Standard Cultural Resource Stipulation from H-3120-1 Controlled Surface Use – Cultural (UT-S-170)
049	Standard Cultural Resource Stipulation from H-3120-1 Controlled Surface Use – Cultural (UT-S-170)
050	Standard Cultural Resource Stipulation from H-3120-1 Controlled Surface Use – Cultural (UT-S-170)
051	Standard Cultural Resource Stipulation from H-3120-1 Controlled Surface Use – Cultural (UT-S-170)

For all future undertakings related to this lease sale, BLM will not approve any ground disturbing activities until it completes its obligations under NEPA, NHPA and other authorities specific to those future undertakings. Consideration of impacts to cultural resources and adverse effects to historic properties will be taken into account during the approval stage of site-specific development plans.

4.2.3 Greenhouse Gas Emissions/Climate Change

4.2.3.1 Impacts of No Action Alternative

The No Action Alternative would result in no impact to the greenhouse gas emissions/climate change because the parcels would not be leased or developed.

4.2.3.2 Impacts of Proposed Action Alternative

As explained in Section 3.3.3, the effects of climate change observed to date and projected to occur in the future include more frequent and intense heat waves, longer fire seasons and more severe wildfires, degraded air quality, more heavy downpours and flooding, increased drought, greater sea-level rise, more intense storms, harm to water resources, harm to agriculture, ocean acidification, and harm to wildlife and ecosystems.

There would be no GHG emissions as a direct result of the Proposed Action, which is administrative in nature – i.e., issuance of leases for Federal mineral resources. Nevertheless, the BLM recognizes that GHG emissions are a potential effect of the subsequent fluid mineral exploration and/or development of any leases that are issued. Oil and gas activities may lead to the installation and production of new wells, which may consequently produce an increase in GHG emissions. The primary sources of GHG emissions include the following:

- Fossil fuel combustion for construction and operation of oil and gas facilities – vehicles driving to and from production sites, engines that drive drill rigs, etc. These produce CO_2 in quantities that vary depending on the age, types, and conditions of the equipment as well as the targeted formation, locations of wells with respect to processing facilities and pipelines, and other site-specific factors;
- Fugitive CH_4 – CH_4 that escapes from wells (both gas and oil), oil storage, and various types of processing equipment. This is a major source of global CH_4 emissions. These emissions have been estimated for various aspects of the energy sector, and starting in 2011, producers are required under 40 CFR 98, to estimate and report their CH_4 emissions to the EPA; and
- Combustion of produced oil and gas – it is expected that future operations would produce marketable quantities of oil and/or gas. Combustion of the oil and/or gas would release CO_2 into the atmosphere. Fossil fuel combustion is the largest source of global CO_2.

In recent years, many states, tribes, and other organizations have initiated GHG inventories, tallying GHG emissions by economic sector. The EPA provides links to statewide GHG emissions inventories [EPA 2015]. Guidelines for estimating project-specific GHG emissions are available [URSC 2010], but some additional data, including the projected volume of oil or natural gas produced for an average well, number of wells (as well as other factors described in Section 4.2.1 Air Quality) were used to provide GHG estimates.

Rule of Reason

Agencies should be guided by a "rule of reason" in ensuring that the level of effort expended in analyzing GHG emissions or climate change effects is reasonably proportionate to the importance of climate change related considerations to the agency action being evaluated. This statement is grounded in the purpose of NEPA to concentrate on matters that that are truly significant to the Proposed Action (40 CFR §§ 1500.4(b), 1500.4(g), 1501.7.). Guidance cautions against using a comparison of global GHG emissions to project-specific GHG emissions as a stand-alone reason for no detailed analysis [BLM 2017]. In light of the difficulties in attributing specific climate impacts to individual projects, it is recommended agencies use the projected GHG emissions as a proxy for assessing a Proposed Action's potential climate change impacts [BLM 2017].

Indirect Greenhouse Gas Emissions
Indirect greenhouse gas emissions from speculative future oil and gas well production on the proposed lease parcels was calculated assuming one well per parcel. Total Greenhouse Gas Warming Potential (GWP), which includes direct emissions of carbon dioxide, methane, and nitrous oxide from an oil or gas producing well is estimated based on using a generic emissions calculator, which found emissions of 1,192 tons per year CO2-e for a single operational well, and 2,305 tons per year CO2-e for a single drill rig.

Downstream Greenhouse Gas Emissions
Indirect GHG emissions are estimated based on an average cumulative production rate of 137,353 barrels of oil and 506,105 mcf of gas over the life of a well, based on the production history for the townships in which the parcels are located. [Utah DOGM 2017] Indirect GHG emissions are also only calculated for carbon dioxide based on combustion of the product. Using an RFD of one well drilled per parcel, and an EPA emissions factor of 0.43 Metric tons of CO2 per Barrel, [EIA 2006] and 0.054717 MT of CO2 per Mcf of gas [EPA 2017b] indirect GHG emissions can be estimated at 86,754 metric tons per parcel. Actual GHG emissions may range from zero (assuming no lease parcels sold or developed) to an indeterminate upper range based on realized production rates, control technology, and physical characteristics of any oil produced.

As it is not possible to assign a "significance" value or impact to these numbers, the emissions estimates themselves are presented as a proxy for impact. This is consistent with PIM 2017-003.

Uncertainties of GHG Calculations
Although this EA presents a quantified estimate of potential GHG emissions associated with reasonably foreseeable oil and gas development, there is significant uncertainty in GHG emission estimates due to uncertainties with regard to eventual production volumes and variability in flaring, construction, and transportation.

End Uses
The estimates above provide a complete GHG lifecycle of a well from site inspection to possible indirect emissions through combustion. A rough estimate was possible using publicly available information and using estimates from future production for reasonably foreseeable development. With respect to the rough estimates of indirect CO_2 emissions, it should be noted that it is a difficult to discern with certainty what end uses for the fuels extracted from a particular leasehold might be reasonably foreseeable. For instance, some end uses of fossil fuels extracted from Federal leases include combustion of transportation fuels, fuel oils for heating and electricity generation, as well as production of asphalt and road oil, and the feedstocks used to make chemicals, plastics, and synthetic materials. At this time, there is some uncertainty with regard to the actual development that may occur.

It is important to note that the BLM does not exercise control over the specific end use of the oil and gas produced from any individual federal lease. The BLM has no authority to direct or regulate the end use of the produced oil and/or gas. As a result, the BLM can only provide an estimate of potential GHG emissions using national approximations of where or how the end use may occur because oil, condensate, and natural gas could be used for combustion of transportation fuels, fuel

oils for heating and electricity generation, as well as production of asphalt and road oil, and the feedstocks used to make chemicals, plastics, and synthetic materials.

Availability of Input Data

In light of the difficulties in attributing specific climate impacts to individual projects, it is recommended agencies use the projected GHG emissions as a proxy for assessing a Proposed Action's potential climate change impacts. Estimates were made based on readily available data and reasonable assumptions about potential future development. There are many factors that affect the potential for GHG emissions estimates at the leasing stage: a lease may not be purchased, so no GHG emissions would be expected; a lease may be purchased but never explored, so again there would be no GHG emissions; a lease may be purchased and an exploratory well drilled that showed no development potential, so minimal GHG emissions would occur; or a lease may be purchased, explored, and developed. If developed there are notable differences in the potential for emissions related to a wide variety of variables, including the production potential of the well, economic considerations, regulatory considerations, and operator dynamics, to name a few. Further NEPA analysis would be conducted at the APD stage, when specific development details with which to analyze potential GHG emissions are likely to be known.

Monetizing Costs and Benefits: Social Cost of Greenhouse Gases

PIM 2017-003 guidance states "NEPA does not require monetizing costs and benefits" and allows for agency discretion in including monetized assessment of the impacts of GHGs in NEPA documents [BLM 2017]. The BLM finds that including monetary estimates of the social cost of GHGs (SC GHG) in its NEPA analysis for this Proposed Action would not be useful. Since the BLM is not doing a cost-benefit analysis in this NEPA document, we do not believe monetizing only SC GHG would be instructive.

Possible Future Best Management Practices, Standard Operating Procedures, and/or Mitigation Measures

The BLM holds regulatory jurisdiction over portions of natural gas and petroleum systems, identified in the USEPA *Inventory of U.S. Greenhouse Gas Emissions and Sinks* [EPA 2016d]. Exercise of this regulatory jurisdiction has led to development of BMPs, which are state-of-the-art mitigation measures applied to oil and natural gas drilling and production to help ensure that energy development is conducted in an environmentally responsible manner. The BLM encourages industry to incorporate and implement BMPs to reduce impacts to air quality through reduction of emissions, surface disturbances, and dust from field production and operations. Typical measures are mentioned below.

- Open burning of garbage or refuse would not occur at well sites or other facilities;
- Drill rigs would be equipped with Tier II or better diesel engines;
- Vent emissions from stock tanks and natural gas triethylene glycol dehydrators would be controlled by routing the emissions to a flare or similar control device which would reduce emissions by 95% or greater;
- All internal combustion equipment would be kept in good working order;
- Flared hydrocarbon gases at high temperatures in order to reduce emissions of incomplete combustion through the use of multi-chamber combustors;

- Watering dirt roads during periods of high use to reduce fugitive dust emissions;
- Co-location wells and production facilities to reduce new surface disturbances;
- Use of natural gas fired or electric drill rig engines;
- The use of selective catalytic reducers and low-sulfur fuel for diesel-fired drill rig engines;
- Adherence to BLM's Notice to Lessees' (NTL) 4a concerning the venting and flaring of gas on Federal leases for natural gas emissions that cannot be economically recovered;
- Protecting frac sand from wind erosion;
- Implementation of directional drilling and horizontal completion technologies whereby one well provides access to petroleum resources that would normally require the drilling of several vertical wellbores;
- Requiring that vapor recovery systems be maintained and functional in areas where petroleum liquids are stored; and
- Performing interim reclamation to reclaim areas of the pad not required for production facilities and to reduce the amount of dust from the pads.

Additionally, the BLM encourages oil and natural gas companies to adopt proven, cost-effective technologies and practices that improve operational efficiency and reduce natural gas emissions. In October 2012, EPA promulgated air quality regulations for completion of hydraulically fractured gas wells [EPA 2015]. These rules required air pollution mitigation measures that reduced the emissions of volatile organic compounds during gas well completions. Mitigation included utilizing a process known as a "green" completion in which natural gas brought up during flowback is captured in tanks rather than in open fluid pits. Among other measures to reduce emissions include the EPA's Natural Gas STAR program. The EPA U.S. inventory data shows that industry's implementation of BMPs proposed by the program has reduced emissions from oil and gas exploration and development [EPA 2016].

4.2.4 Lands with Wilderness Characteristics

4.2.4.1 Impacts of No Action Alternative

The No Action Alternative would result in no impact to lands with wilderness characteristics because the parcels would not be leased or developed.

4.2.4.2 Impacts of Proposed Action Alternative

Although the issuance of the leases would not directly impact the wilderness characteristics (size, naturalness, and outstanding opportunities for solitude and/or primitive, unconfined recreation) of the area, the issuance of leases does convey an expectation that drilling and development would occur. The potential development of the lease could cause indirect impacts to wilderness characteristics if the identified lands with wilderness characteristics could not be avoided when the lease is developed. A number of variables would influence the degree of impact to lands with wilderness characteristics, including the actual location on which surface-disturbing activities occur, land form or topography, vegetation type, sequence of development, and reclamation time. If drilling and development were to occur on lands with wilderness characteristics, the presence of wilderness characteristics in that area would likely be reduced. Impacts could include loss of naturalness and loss of opportunities for solitude or primitive unconfined recreation. Additional impacts from development could include a reduction in the size of the unit. Development

associated with oil and gas leasing (e.g., well pads, access roads) could bisect or fragment a portion of the wilderness characteristics unit so that all or part of the unit no longer meets the size criteria.

Potential impacts to wilderness characteristics as a result of oil and gas development were anticipated in the Monticello FEIS and Proposed RMP, which states:

> "Under [the selected] alternative, non-WSA lands with wilderness characteristics would not be protected or managed to preserve their wilderness characteristics. Surface disturbances resulting from oil and gas leasing decisions that permit development would degrade natural characteristics, diminish opportunities for solitude, and conflict with primitive recreation activities. All or portions of 27 of the 29 non-WSA lands with wilderness characteristics [including Cross Canyon], comprising 547,420 acres, would remain open to leasing and development under standard oil and gas stipulations or under CSU or TL stipulations …It is assumed that the various waivers, exceptions, and modifications under the NSO stipulation would not be granted because they would not be in concert with other resource goals and objectives in these areas."

The Cross Canyon lands with wilderness characteristics unit is within an area noted as the "Blanding Sub-basin". The MtFO RMP further states:

> "In the Blanding Sub-basin area, all of five and a portion of one non-WSA lands with wilderness characteristics, totaling 36,640 acres [and including Cross Canyon], would remain open to leasing under standard stipulations or under CSU or TL stipulations… Based on the percentage of non-WSA lands with wilderness characteristics and/or the existing and pending leases within those areas, the highest potential for leasing and/or development would be in Comb Ridge, Cross Canyon, and Squaw and Papoose Canyon. Given that the projection for drilling for oil and gas is three wells per year for the all of the public lands within the Blanding Sub-basin area, and that just over 9% of the development area encompasses non-WSA lands with wilderness characteristics open to leasing under standard stipulations, CSU, or TL stipulations, it is still anticipated that up to one well per year could be drilled in the non-WSA lands because the Blanding Sub-basin area contains oil and gas fields and the majority of existing wells within the Monticello PA. This could disturb up to 9.6 acres per year, or approximately 144 acres over the next 15 years... Leasing and development within these non-WSA wilderness lands could cause that portion to lose its natural characteristics. Loss of opportunities for solitude and primitive recreation due to exploration for and development of oil and gas resources would be broader than just for the 144 acres of direct surface-disturbing activities, and could impact these values for up to one-half mile from the ongoing activity. However, it is not anticipated that any of the areas would lose their wilderness characteristics in totality because of the small amount of acreage projected to be disturbed and the few projected wells in this development area over the next 15 years." Other stipulations not specific to the protection of wilderness characteristics (e.g., NSO to protect fragile soils or steep slopes) may reduce the potential for these impacts."

The MtFO RMP made the decision not to preserve and protect the wilderness characteristics of the Cross Canyon lands with wilderness characteristics unit. However, as guided by Instruction Memorandum (IM) UT-2016-027 – *BLM-Utah Lands with Wilderness Characteristics Guidance*,

the BLM must document and analyze impacts to lands with wilderness characteristics even when a decision to select an alternative that impairs wilderness characteristics conforms to the RMP.

The Monument Canyon and Tin Cup Mesa wilderness characteristic units have not been analyzed within a land use plan. Generally, impacts from the development of a lease would be similar to those described above.

Table 4-6 shows the projected total potential disturbance to lands with wilderness characteristics under the Proposed Action with the assumption that one well pad (and all associated infrastructure) would be developed per parcel with a total disturbance of 9.6 acres per well pad. Development scenarios that intersect both Tin Cup Mesa and Cross Canyon are discussed for parcel 051, even though under the assumptions only one well pad would be developed.

There are development scenarios for all nominated lease parcels that would completely avoid the identified lands with wilderness characteristics unit. If during the review of the application for a permit to drill the BLM selects an alternative that avoids the identified lands with wilderness characteristics, then there would be no impacts to wilderness characteristics as a result of leasing these parcels.

Table 4-6: Potential Disturbance to Lands with Wilderness Characteristics

Lands with wilderness characteristics Unit	Total Acreage of lands with wilderness characteristics Unit	Number of parcels that intersect LWC unit	Potential disturbance within lands with wilderness characteristics Unit	Percent of potential disturbance to lands with wilderness characteristics Unit
Cross Canyon	1,353 acres	2	19.2 acres	1.4%
Monument Canyon	17,200	3	28.8 acres	<1%
Tin Cup Mesa	9,396	1	9.6 acres	<1%

Under the Proposed Action, the Cross Canyon lands with wilderness characteristics unit could experience oil and gas development in nominated lease parcels 050 and 051; conversely the BLM could select an alternative that avoids the identified lands with wilderness characteristics during the review of any future applications for a permit to drill. If well pads and other associated infrastructure are developed in an area known to have wilderness characteristics, the following would occur:

- The size requirement of 5,000 acres of roadless BLM-administered surface would not be impacted because all or a portion of the Cross Canyon lands with wilderness characteristics unit would still be contiguous with the Cross Canyon Wilderness Study Area, even after the potential development under the Proposed Action.
- The development of up to 19.2 acres of the Cross Canyon lands with wilderness characteristics unit could impact the apparent naturalness of the lands with wilderness characteristics unit. Naturalness, as defined by BLM Manual 6310 – *Conducting Wilderness Characteristics Inventory on BLM Lands*, is an area that must appear to have been affected primarily by the forces of nature, and any work of human beings must be substantially unnoticeable. It is expected that the naturalness of the lands with wilderness characteristics unit will be lost at the each of the potential two well pads and along any of

the associated access roads. Acreage within the unit that is not directly affected by drilling activity and road construction will retain its naturalness. Additionally, topography and vegetative screening can mitigate the visual and auditory impacts from drilling activity.

- Additionally, the development of up to 19.2 acres of the Cross Canyon lands with wilderness characteristics unit could impact the outstanding opportunities for solitude. As described in BLM Manual 6310, visitors must have an outstanding opportunity to avoid the sights, sounds, and evidence of other people in the area. Although the topography of the proposed lease parcels might allow for development in locations that mitigate impacts to outstanding opportunities for solitude, impacts might not be fully avoided.
- The Proposed Action and its associated 19.2 acres of potential disturbance could also impact outstanding opportunities for primitive and unconfined recreation in and near developed areas, particularly by interspersing industrial traffic into the area. Primitive and unconfined recreation is defined by BLM Manual 6130 as activities that provide dispersed, undeveloped recreation which do not require facilities, motor vehicles, motorized equipment, or mechanized transport.

Under the Proposed Action, the Monument Canyon lands with wilderness characteristics unit could experience oil and gas development in nominated lease parcels 037, 047 and 048; conversely, the BLM could select an alternative that avoids the identified lands with wilderness characteristics during the review of any future applications for a permit to drill. If well pads and other associated infrastructure are developed in an area known to have wilderness characteristics, the following would occur:

- The size requirement of 5,000 acres of roadless BLM-administered surface would not be impacted because the Monument Canyon unit would likely continue to contain more than 17,000 roadless acres, even after the potential development under the Proposed Action.
- The development of up to 28.8 acres of the Monument Canyon lands with wilderness characteristics unit could impact the apparent naturalness of the lands with wilderness characteristics unit. It is expected that the naturalness of the lands with wilderness characteristics unit will be lost at the each of the potential three well pads and along any of the associated access roads. Acreage within the unit that is not directly affected by drilling activity and road construction will retain its naturalness. Additionally, topography and vegetative screening can mitigate the visual and auditory impacts from drilling activity.
- Additionally, the development of up to 28.8 acres of the Monument Canyon lands with wilderness characteristics unit could impact the outstanding opportunities for solitude. Although the topography of the proposed lease parcels might allow for development in locations that mitigate impacts to outstanding opportunities for solitude, impacts might not be fully avoided.
- The Proposed Action and its associated 28.8 acres of potential disturbance could also impact outstanding opportunities for primitive and unconfined recreation in and near developed areas, particularly by interspersing industrial traffic into the area.

Under the Proposed Action, the Tin Cup Mesa lands with wilderness characteristics unit could experience oil and gas development in nominated lease parcel 051; conversely, the BLM could select an alternative that avoids the identified lands with wilderness characteristics during the review of any future applications for a permit to drill. If well pads and other associated

infrastructure are developed in an area known to have wilderness characteristics, the following would occur:

- The size requirement of 5,000 acres of roadless BLM-administered surface would not be impacted because the Tin Cup Mesa unit would likely continue to contain more than 15,000 roadless acres, even after the potential development under the Proposed Action.
- The development of up to 9.6 acres of the Tin Cup Mesa lands with wilderness characteristics unit could impact the apparent naturalness of the lands with wilderness characteristics unit. It is expected that the naturalness of the lands with wilderness characteristics unit will be lost at the well pad and along any of the associated access roads. Acreage within the unit that is not directly affected by drilling activity and road construction will retain its naturalness. Additionally, topography and vegetative screening can mitigate the visual and auditory impacts from drilling activity.
- Additionally, the development of up to 9.6 acres of the Tin Cup Mesa lands with wilderness characteristics unit could impact the outstanding opportunities for solitude. Although the topography of the proposed lease parcels might allow for development in locations that mitigate impacts to outstanding opportunities for solitude, impacts might not be fully avoided.
- The Proposed Action and its associated 9.6 acres of potential disturbance could also impact outstanding opportunities for primitive and unconfined recreation in and near developed areas, particularly by interspersing industrial traffic into the area.

4.2.5 Migratory Birds including Raptors

4.2.5.1 Impacts of No Action Alternative

The No Action alternative would result in continuation of already approved land uses with any attendant potential impacts on migratory birds, but would not result in impacts relating to exploration and development of these lease parcels, because they would not be leased. Other exploration and development activities on surrounding areas that are currently leased would continue.

4.2.5.2 Impacts of Proposed Action Alternative

Migratory birds are protected the MBTA and Executive Order 13186. An intentional take under the MBTA is the deliberate taking of migratory birds with the take as the primary purpose of an action. No actions considered in this analysis involve the intentional take of migratory birds.

All parcels may incur impacts to migratory birds, excluding raptors, if surface disturbing activities occur during the nesting season (May 1st through July 31st). Construction and development activities during the nesting season would create the greatest impacts to migratory birds. Impacts to nesting migratory birds could include nest site abandonment, nest failure and chick mortality; and may also cause premature fledging which may also lead to chick mortality. These impacts would be specific to that nesting season, as parent birds would re-nest in following years in more suitable locations.

Two lease notices (UT-LN-44 and UT-LN-45) informing the potential lessee that surveys for nesting migratory birds may be required during migratory bird breeding season whenever surface disturbances and/or occupancy is proposed in association with fluid mineral exploration and

development within priority habitats has been attached to all of the lease parcels. The surveys would be determined on a site-specific basis.

Disturbing activities (such as flaring) outside of migratory bird breeding and nesting season may cause temporary, short distance and short term displacement that would have minimal to no impacts to birds, as birds can easily move to other suitable areas. Immeasurable indirect impacts may include fragmentation and loss of unoccupied suitable habitats in the developed area but there are sufficient suitable habitats in surrounding areas, therefore impacts would be minimal.

The Comprehensive Wildlife Conservation Strategy (CWCS), Utah Partners in Flight Avian Conservation Strategy Version 2.0. (2002), Birds of Conservation Concern (2002), Executive Order 13186: Responsibilities of Federal Agencies to Protect Migratory Birds, MOU between the USDI BLM and USFWS to Promote the Conservation and Management of Migratory Birds (BLM 2010) provide direction to promote migratory bird conservation. Project specific and site specific conservation measures would be developed as needed during project development to ensure impacts to migratory birds and their habitats are minimized during development.

Raptors (eagles, hawks and owls) are given federal protection under the Migratory Bird Act and Executive Order 13186. Extra precautions would be taken to ensure adequate protection is given to nesting raptors. Nesting raptors would be given both seasonal and spatial protection throughout the implementation of this project according to the U.S. Fish and Wildlife Service's 2002 Raptor Protection Guidelines and through the BLM's Best Management Practices for Raptor Protection. There would be no direct effects to nesting raptors as breeding season raptor surveys would be conducted and impacts to nesting raptors would be avoided if nesting raptors were found in the project area.

Raptors may forage in the project area. Construction, operations and maintenance activities may cause foraging raptors to avoid the proposed project area. However, these activities are not likely to affect the raptors, as they could avoid disturbance by moving to other areas to forage and roost. Some degree of habitat degradation or fragmentation may potentially occur as an indirect effect of development. Foraging habitat may be impacted but it would be limited to the disturbance footprint, as prey species may be displaced but individuals would be able to relocate to surrounding suitable habitat within the project area. This habitat loss can be difficult to predict. An immeasurable indirect effect could occur within the project area or in nearby suitable habitats currently unused for nesting if human and vehicular activity increases as a result of development. New disturbance created by increased activity may make nesting habitat undesirable by potential nesting raptors during the following or future breeding seasons.

4.2.6 Visual Resources

4.2.6.1 Impacts of No Action Alternative

The No Action alternative would not result in potential impacts because the parcels would not be leased, and therefore, not developed.

4.2.6.2 Impacts of Proposed Action Alternative

The issuance of the proposed leases would not directly impact Visual Resources, however, the issuance of the leases does convey an expectation that drilling and development would eventually

occur within the parcels in accordance with the reasonably foreseeable development scenario outlined in this EA. These impacts would result from future development in the form of oil wells/pads, pipelines, compressors, power lines, constructed roads, and other linear features. These impacts would include modifications to the existing landscape's form, line, color, and texture.

Such proposed development and modifications to the existing landscape would be allowable so long as it conforms to the VRM Class objectives established in the 2008 Approved Monticello RMP. In addition, a variety of best management practices, design features, and RMP-approved stipulations for future mineral resource development would likely mitigate, limit, and/or prevent such impacts to visual resources. Further detailed analysis of the potential impacts to visual resources would be analyzed as appropriate when oil and gas development plans and permits to drill are submitted.

Impacts to Visual Resources from Recapture Canyon (Parcels 029, 030, 031, 032, 033, 034, and 038)

The BLM completed a viewshed analysis to determine whether future mineral resource development within Parcels 029, 030, 031, 032, 033, 034, and 038 would be visible to recreational visitors to Recapture Canyon. This analysis included the consideration of viewshed impacts from the following five Key Observation Points (KOP): (1) the northern trailhead in the canyon bottom; (2) a planned interpretive site and hiking trail along the western canyon rim; (3) a northern overlook along a planned off-highway vehicle (OHV) route along the western canyon rim; (4) a southern overlook along a planned OHV route along the western canyon rim; and (5) the southern trailhead at Brown's Canyon along the western canyon rim. Map 4-1 identifies the lands that would be visible from each of the five KOPs, and Table 4-7 identifies the acreages and percentages of each parcel that would be visible from all of the KOPs.

Table 4-7 Results of Recapture Canyon Viewshed Analysis						
	KOP 1: Canyon Bottom Trailhead	**KOP 2: Planned Interpretive Site**	**KOP 3: Northern Overlook**	**KOP 4: Southern Overlook**	**KOP 5: Brown's Canyon Trailhead**	**All KOPs***
Acreage of Parcel 029 Visible from KOP	0 acres	1,160 acres	1,262 acres	131 acres	1,541 acres	**1,545 acres** (93% of parcel)
Acreage of Parcel 030 Visible from KOP	0 acres	1,377 acres	1,577 acres	0 acres	1,801 acres	**1,807 acres** (71% of parcel)
Acreage of Parcel 031 Visible from KOP	0 acres	645 acres	512 acres	0 acres	0 acres	**645 acres** (34% of parcel)
Acreage of Parcel 032 Visible from KOP	0 acres	1,853 acres	1,853 acres	0 acres	1,424 acres	**1,866 acres** (97% of parcel)
Acreage of Parcel 033 Visible from KOP	0 acres	186 acres	219 acres	0 acres	355 acres	**380 acres** (35% of parcel)
Acreage of Parcel 034 Visible from KOP	0 acres	398 acres	380 acres	0 acres	0 acres	**403 acres** (31% of parcel)
Acreage of Parcel 038 Visible from KOP	0 acres	20 acres	25 acres	0 acres	1,184 acres	**1,184 acres** (51% of parcel)

Parcel 029: The analysis concluded that 1,545 acres of Parcel 029, or 93%, would be collectively visible from the five KOPs, which is displayed on Map 4-1. Therefore, the 9.6 acres that would be involved in the reasonably foreseeable development scenario could potentially be accommodated throughout approximately 118 acres of Parcel 029 that would not be visible to the casual observer recreating within or on the rim of Recapture Canyon. The use of standard best management practices at the permitting phase of development, including strategic siting, color camouflaging, and vegetative screening of facilities, would also decrease the likelihood that any future development would attract the attention of the casual observer recreating within or on the rim of Recapture Canyon. Because Parcel 029 was designated as a VRM Class IV in the 2008 Monticello RMP, leasing the parcel would conform to all applicable RMP-established VRM objectives, even if future development introduced a high level of change to the landscape.

Parcel 030: The analysis concluded that 1,807 acres of Parcel 030, or 71%, would be collectively visible from the five KOPs, which is displayed on Map 4-1. Therefore, the 9.6 acres that would be involved in the reasonably foreseeable development scenario could be accommodated throughout approximately 737 acres of Parcel 030 that would not be visible to the casual observer

recreating within or on the rim of Recapture Canyon. The use of standard best management practices at the permitting phase of development, including strategic siting, color camouflaging, and vegetative screening of facilities, would also decrease the likelihood that any future development would attract the attention of the casual observer recreating within or on the rim of Recapture Canyon. Because Parcel 030 was designated as VRM Class III and IV in the 2008 Monticello RMP, leasing the parcel would conform to all applicable RMP-established VRM objectives, even if future development introduced a moderate or high level of change to the landscape.

Parcel 031: The analysis concluded that 645 acres of Parcel 031, or 34%, would be collectively visible from the five KOPs, which is displayed on Map 4-1. Therefore, the 9.6 acres that would be involved in the reasonably foreseeable development scenario could be accommodated throughout approximately 1,238 acres of Parcel 031 that would not be visible to the casual observer recreating within or on the rim of Recapture Canyon. The use of standard best management practices at the permitting phase of development, including strategic siting, color camouflaging, and vegetative screening of facilities, would also decrease the likelihood that any future development would attract the attention of the casual observer recreating within or on the rim of Recapture Canyon. Because Parcel 031 was designated as a VRM Class IV in the 2008 Monticello RMP, leasing the parcel would conform to all applicable RMP-established VRM objectives, even if future development introduced a high level of change to the landscape.

Parcel 032: The analysis concluded that 1,866 acres of Parcel 032, or 97%, would be collectively visible from the five KOPs, which is displayed on Map 4-1. Therefore, the 9.6 acres that would be involved in the reasonably foreseeable development scenario could be accommodated throughout approximately 54 acres of Parcel 032 that would not be visible to the casual observer recreating within or on the rim of Recapture Canyon. The use of standard best management practices at the permitting phase of development, including strategic siting, color camouflaging, and vegetative screening of facilities, would also decrease the likelihood that any future development would attract the attention of the casual observer recreating within or on the rim of Recapture Canyon. Because Parcel 032 was designated as a VRM Class III and IV in the 2008 Monticello RMP, leasing the parcel would conform to all applicable RMP-established VRM objectives, even if future development introduced a moderate or high level of change to the landscape.

Parcel 033: The analysis concluded that 380 acres of Parcel 033, or 35%, would be collectively visible from the five KOPs, which is displayed on Map 4-1. Therefore, the 9.6 acres that would be involved in the reasonably foreseeable development scenario could be accommodated throughout approximately 700 acres of Parcel 033 that would not be visible to the casual observer recreating within or on the rim of Recapture Canyon. The use of standard best management practices at the permitting phase of development, including strategic siting, color camouflaging, and vegetative screening of facilities, would also decrease the likelihood that any future development would attract the attention of the casual observer recreating within or on the rim of Recapture Canyon. Because Parcel 033 was designated as a VRM Class III and IV in the 2008 Monticello RMP, leasing the parcel would conform to all applicable RMP-established VRM objectives, even if future development introduced a moderate or high level of change to the landscape.

Parcel 034: The analysis concluded that 403 acres of Parcel 034, or 31%, would be collectively visible from the five KOPs, which is displayed on Map 4-1. Therefore, the 9.6 acres that would be involved in the reasonably foreseeable development scenario could be accommodated throughout approximately 877 acres of Parcel 034 that would not be visible to the casual observer recreating within or on the rim of Recapture Canyon. The use of standard best management practices at the permitting phase of development, including strategic siting, color camouflaging, and vegetative screening of facilities, would also decrease the likelihood that any future development would attract the attention of the casual observer recreating within or on the rim of Recapture Canyon. Because Parcel 034 was designated as a VRM Class IV in the 2008 Monticello RMP, leasing the parcel would conform to all applicable RMP-established VRM objectives, even if future development introduced a high level of change to the landscape.

Parcel 038: The analysis concluded that 1,184 acres of Parcel 038, or 51%, would be collectively visible from the five KOPs, which is displayed on Map 4-1. Therefore, the 9.6 acres that would be involved in the reasonably foreseeable development scenario could be accommodated throughout approximately 1,120 acres of Parcel 038 that would not be visible to the casual observer recreating within or on the rim of Recapture Canyon. The use of standard best management practices at the permitting phase of development, including strategic siting, color camouflaging, and vegetative screening of facilities, would also decrease the likelihood that any future development would attract the attention of the casual observer recreating within or on the rim of Recapture Canyon. Because Parcel 038 was designated as a VRM Class III in the 2008 Monticello RMP, leasing the parcel would conform to all applicable RMP-established VRM objectives, even if future development introduced a moderate level of change to the landscape.

Impacts to Visual Resources from the San Juan River (Parcel 036)

The BLM completed a viewshed analysis to determine whether future mineral resource development within Parcel 036 would be visible to recreational visitors boating on the San Juan River. This analysis included the consideration of viewshed impacts from three KOPs along the river in the immediate vicinity of Parcel 036. The analysis concluded that 944 acres of Parcel 036, or 61%, would be visible from the KOPs along the river, which is displayed on Map 4-2. Therefore, the 9.6 acres that would be involved in the reasonably foreseeable development scenario could be accommodated throughout approximately 593 acres of Parcel 036 that would not be visible to the casual observer boating on the San Juan River.

Future development of Parcel 036 would be required to meet all applicable RMP-approved NSO stipulations that were established for the San Juan River Area of Critical Environmental Concern (UT-S-16), the San Juan River Special Recreation Management Area (UT-S-45), Fragile Soils/Slopes Greater than 40 Percent (UT-S-98), and Floodplains, Riparian Areas, Springs, and Public Water Reserves (UT-S-128); as well as all RMP-approved CSU stipulations that were established for Fragile Soils/Slopes 21-40 Percent (UT-S-106), Cultural Resources (UT-S-170), and Bald Eagles (UT-S-275). These stipulations would likely require any future development of Parcel 036 to occur further away from the river itself, and increasing the distance of potential development from the river would also decrease the likelihood that any such development would attract the attention of the casual observer boating on the river. In addition, the use of standard best management practices at the permitting phase of development, including strategic siting, color

camouflaging, and vegetative screening of facilities, would also decrease the likelihood that any future development would attract the attention of the casual observer boating on the San Juan River. Although approximately 154 acres of Parcel 036 was designated as a VRM Class II in the 2008 Monticello RMP, future development could still be accommodated on the remaining 1,357 acres, or 90%, of the parcel that was designated as a VRM Class III or IV. Because the portions of Parcel 036 that would likely be developed were designated as a VRM Class III and IV in the 2008 Monticello RMP, leasing the parcel would conform to all applicable RMP-established VRM objectives, even if future development introduced a moderate or high level of change to the landscape.

Impacts to Visual Resources from Hovenweep National Monument (Parcels 050 and 051)

The BLM completed a viewshed analysis to determine whether future mineral resource development within Parcels 050 and 051 would be visible to recreational visitors within Hovenweep National Monument. This analysis included the consideration of viewshed impacts from the following four KOPs within both the Utah and Colorado portions of the National Monument: (1) National Monument entrance; (2) National Monument Holly unity; (3) National Monument Cutthroat unit; and (4) the intersection of Highway 10 and the turnoff to the Cutthroat unit. Map 4-3 identifies the lands that would be visible from each of the four KOPs, and Table 4-8 identifies the acreages and percentages of each parcel that would be visible from all of the KOPs.

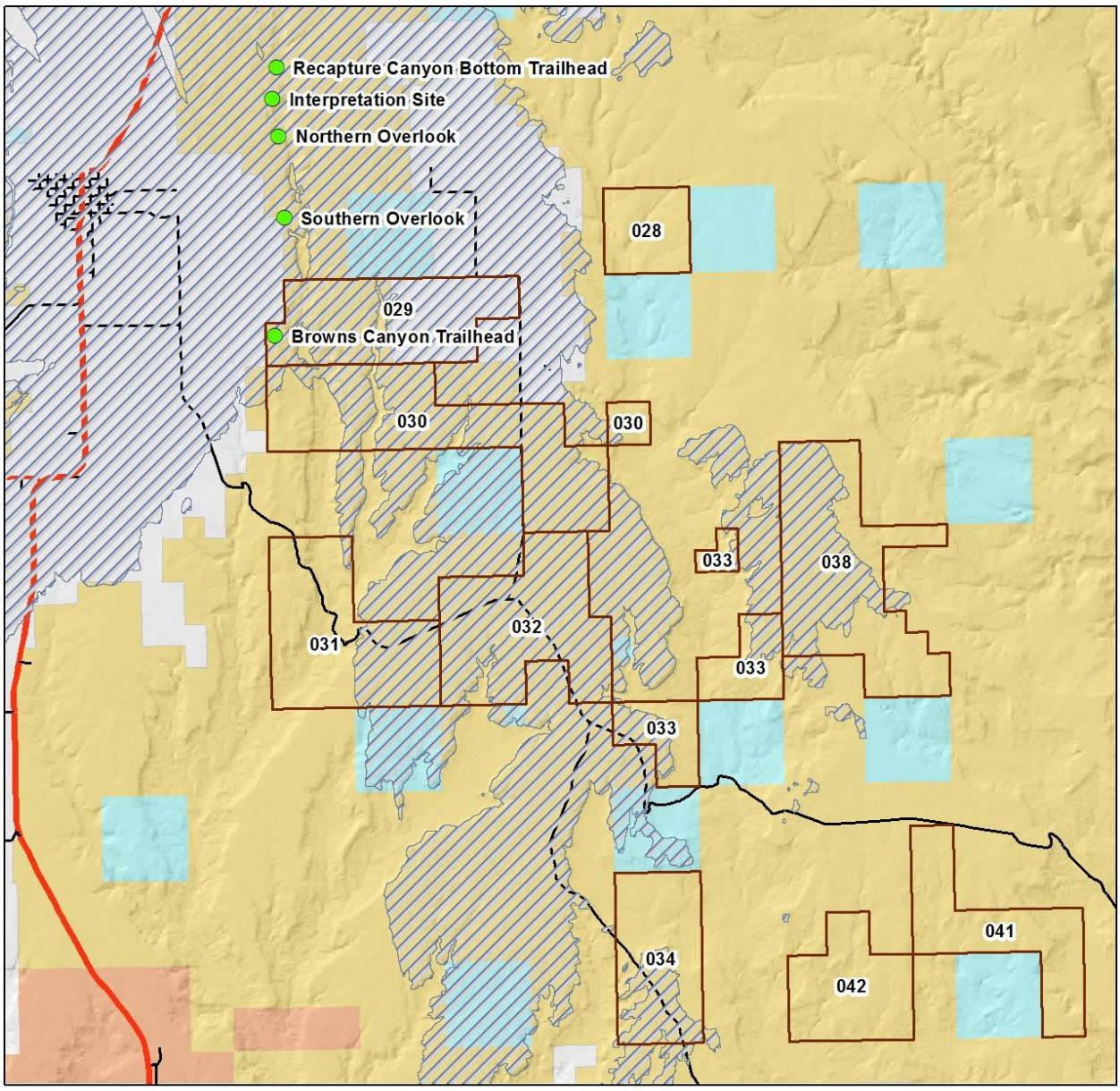
Table 4-8 Results of Hovenweep National Monument Viewshed Analysis

	KOP 1: Monument Entrance	**KOP 2: Monument Holly Unit**	**KOP 3: Monument Cutthroat Unit**	**KOP 4: Highway 10 and Turnoff Intersection**	**All KOPs**
Acreage of Parcel 050 Visible from KOP	29 acres	0 acres	1 acre	82 acres	82 acres (8% of parcel)
Acreage of Parcel 051 Visible from KOP	0 acres	0 acres	0 acres	187 acres	187 acres (10% of parcel)

Parcel 050: The analysis concluded that 82 acres of Parcel 050, or 8%, would be collectively visible from the four KOPs, which is displayed on Map 4-3. Therefore, the 9.6 acres that would be involved in the reasonably foreseeable development scenario could be accommodated throughout approximately 883 acres of Parcel 050 that would not be visible to the casual observer recreating within Hovenweep National Monument. The use of standard best management practices at the permitting phase of development, including strategic siting, color camouflaging, and vegetative screening of facilities, would also decrease the likelihood that any future development would attract the attention of the casual observer recreating within the National Monument. Although approximately 3 acres of Parcel 050 was designated as a VRM Class I in the 2008 Monticello RMP, future development could still be accommodated on the remaining 880 acres, or 91%, of the parcel that was designated as a VRM Class III or IV and would not be visible from the National Monument. Because the portions of Parcel 050 that would likely be developed were designated as a VRM Class III and IV in the 2008 Monticello RMP, leasing the parcel would

conform to all applicable RMP-established VRM objectives, even if future development introduced a moderate or high level of change to the landscape.

Parcel 051: The analysis concluded that 187 acres of Parcel 051, or 10%, would be collectively visible from the four KOPs, which is displayed on Map 4-3. Therefore, the 9.6 acres that would be involved in the reasonably foreseeable development scenario could be accommodated throughout approximately 1,773 acres of Parcel 051 that would not be visible to the casual observer recreating within Hovenweep National Monument. The use of standard best management practices at the permitting phase of development, including strategic siting, color camouflaging, and vegetative screening of facilities, would also decrease the likelihood that any future development would attract the attention of the casual observer recreating within the National Monument. Because Parcel 051 was designated as a VRM Class IV in the 2008 Monticello RMP, leasing the parcel would conform to all applicable RMP-established VRM objectives, even if future development introduced a high level of change to the landscape.



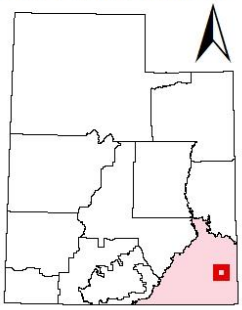
Map 4-1: Viewshed Analysis of Parcels 029, 030, 031, 032, 033, 034 and 038

N

- Key Observation Points
- March 2018 Leases
- Visible from Key Observation Points
- Bureau of Land Management (BLM)
- Indian Reservation (IR)
- Private
- State

Viewshed Analysis is based on a 20 km (12.43 mi) radius, with the transmitter height set at 2 m (6.56 ft) and the receiver height set at 38.10 m (125 ft) above ground level.

0 1 2 4 Miles



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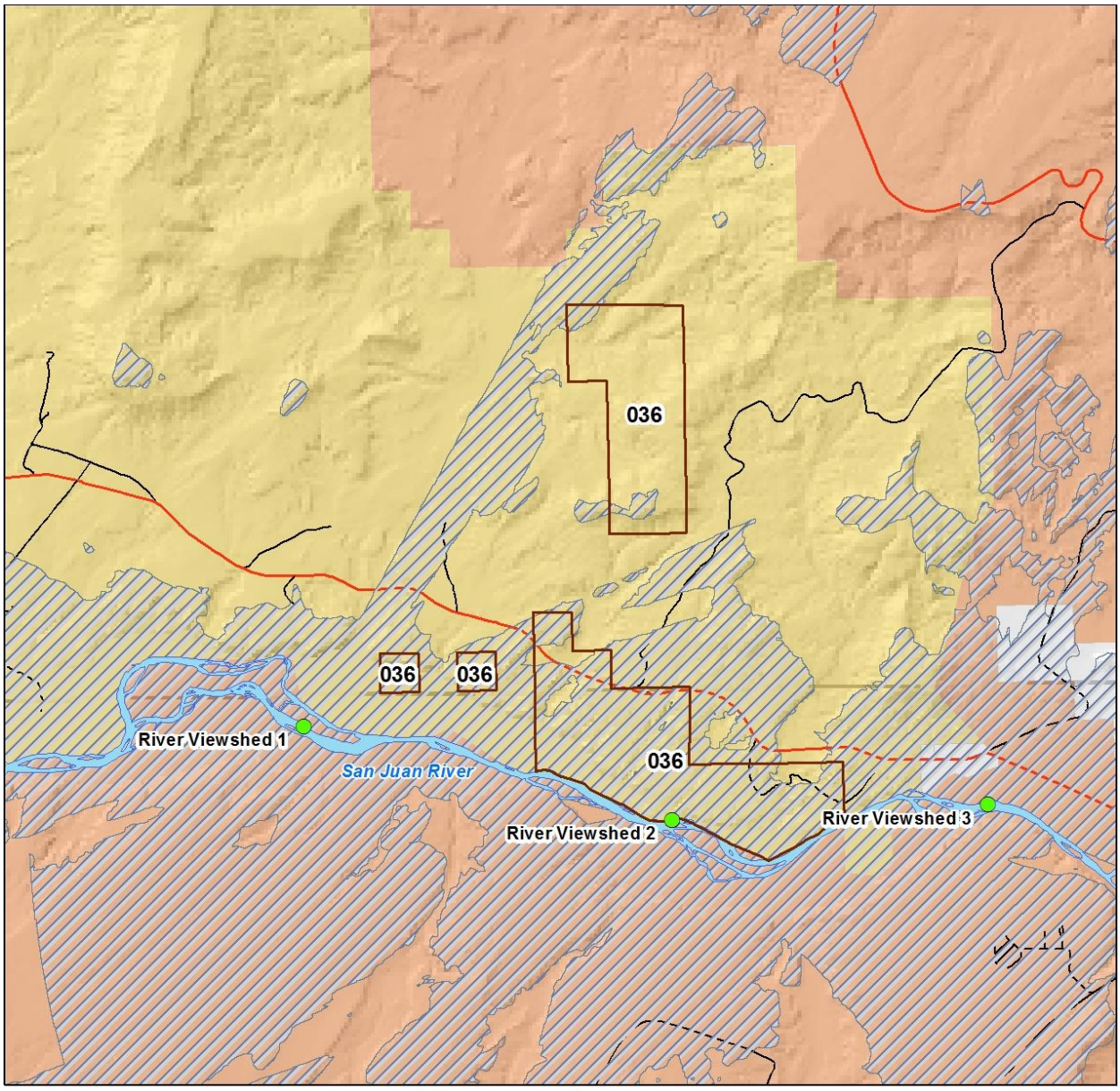
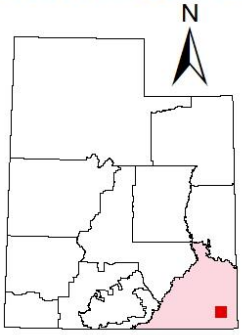


Map 4-2: Viewshed Analysis of Parcel 036

- Key Observation Points
- March 2018 Leases
- Visible from Key Observation Points
- Bureau of Land Management (BLM)
- Indian Reservation (IR)
- Private

Viewshed Analysis is based on a 20 km (12.43 mi) radius, with the transmitter height set at 2 m (6.56 ft) and the receiver height set at 38.10 m (125 ft) above ground level.

0 0.5 1 2 Miles



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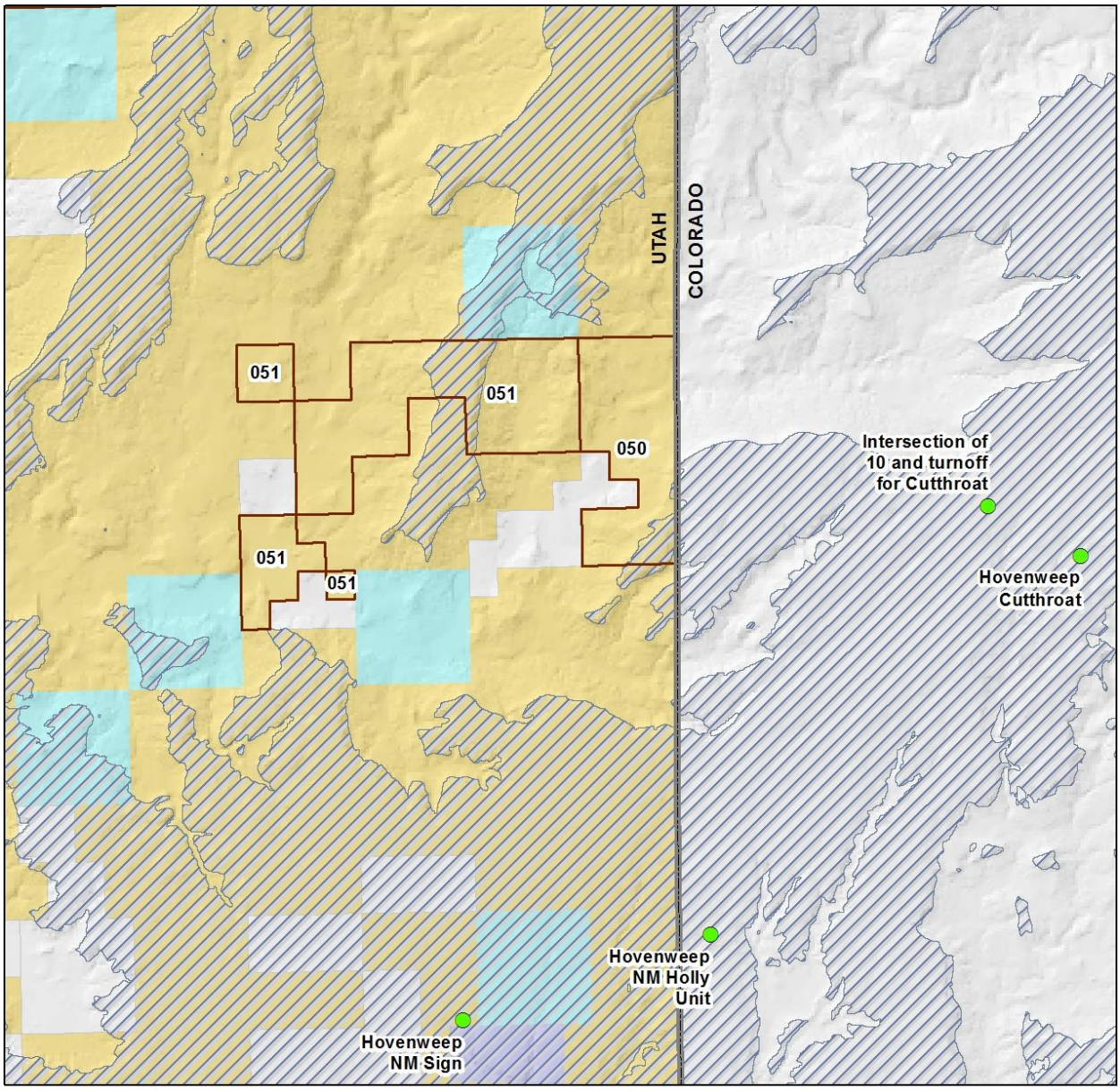
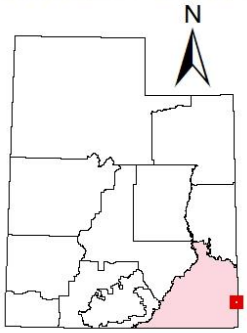


Map 4-3: Viewshed Analysis of Parcels 050 and 051

- Key Observation Points
- March 2018 Leases
- Visible from Key Observation Points
- Bureau of Land Management (BLM)
- National Park Service (NPS)
- Private
- State

Viewshed Analysis is based on a 20 km (12.43 mi) radius, with the transmitter height set at 2 m (6.56 ft) and the receiver height set at 38.10 m (125 ft) above ground level.

0 0.75 1.5 3 Miles



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4.3 CUMULATIVE IMPACTS

4.3.1 Introduction

NEPA requires federal agencies to consider the cumulative effects of proposals under their review. Cumulative effects are defined in the CEQ regulations 40 CFR §1508.7 as "the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions." The CEQ has stated that the "cumulative effects analyses should be conducted on the scale of human communities, landscapes, watersheds, or airsheds" using the concept of "project impact zone" (i.e., the area that might be influenced by the Proposed Action).

Offering and issuing leases for the subject parcels, in itself, would not result in cumulative impacts to any resource. Nevertheless, future development of the leases could be an indirect effect of leasing. The MFO RMP and the MtFO RMP provides the BLM's analysis of cumulative effects of oil and gas development based on the reasonably foreseeable oil and gas development scenario. The cumulative impacts analysis as described in the MFO PRMP and the MtFO PRMP are incorporated by reference. The proposed action would contribute to these cumulative impacts by making 29 parcels (40,866.64 acres) available for lease sale and mineral development, with the potential for future surface disturbance should the leases be developed. The cumulative impacts analysis in the MFO RMP and the MtFO RMP accounted for the potential impacts of development of lease parcels in the planning area as well as past, present and reasonably foreseeable actions known at that time. This analysis expands upon the MFO RMP and the MtFO RMP analysis by incorporating new information.

4.3.2 Past, Present, and Reasonably Foreseeable Future Actions

Past and Present Actions

A variety of activities, such as sightseeing, biking, camping, and hunting, have occurred and are likely to continue to occur near or within some or all of the parcels; these activities likely result in negligible impacts to resources because of their dispersed nature. Other activities, such as livestock grazing, vegetation projects, motorized recreation on unpaved roads, mineral development, and wildland fire, have also occurred within some or all of the parcels and are likely to occur in the future. These types of activities are likely to have a greater impact on resources in the project area because of their more concentrated nature. Because these activities have occurred in the past and are presently occurring within the parcel boundaries, they have the potential to contribute to cumulative effects.

Reasonably Foreseeable Future Actions

The proposed action would contribute to cumulative impacts by making 29 parcels (40,866.64 acres) available for lease sale and mineral development with the potential for future surface disturbance should the leases be developed. The RFD for the proposed action (Appendix E) estimates 16 oil and gas wells could be constructed and drilled in the next 10 years. Currently, the CCDO has 20 approved APDs that have not yet been drilled and 44 pending APDs that are currently being processed but have not yet been approved.

The No Action alternative would not contribute any cumulative impacts. The past, present, and foreseeable future actions with the potential to contribute to surface disturbance include

development of new and existing mineral rights, or realty actions (for example, pipeline or road rights of way).

4.3.3 Cumulative Impacts

4.3.3.1 Air Quality

The Cumulative Impact Analysis Area (CIAA) for air quality is the Four Corners area of southeast Utah and the adjoining states of Arizona, New Mexico, and Colorado. As described in the Affected Environment chapter, regional ozone is a recognized pollutant of concern in the Four Corners region, with ambient concentrations near, but not over, the relevant NAAQS. Oil and gas development does not directly emit ozone, however the formation of ozone at the lower levels of the atmosphere is related to emissions of NOx and VOC, which are pollutants emitted by oil and gas operations. The Air Quality Modeling Study for the Four Corners Region (FC CAMx) (EIC 2009b) was prepared to model the air quality impacts of potential alternative mitigation strategies being developed by various Four Corners Air Quality Task Force work groups. The 4 km modeling domain (EIC 2009b, Figure ES-1) for this study included much of San Juan County, Utah. Ozone predictions in this study indicate that NAAQS ozone levels would not be exceeded.

In 2013, the WRAP WestJump Air Quality Modeling Study was completed (WRAP 2013). This study was intended to initiate the next generation of regional technical analysis and support for ozone transport and attainment demonstrations for the intermountain West. The project incorporated all of the recent western modeling analyses into a single modeling database, and went through a comprehensive model performance evaluation in an open technical forum independent of any specific project or regulatory activity. One of the functions of the modeling platform is the ability to perform a comprehensive source apportionment analysis to evaluate local source, western regional, natural and international impacts of elevated ozone impacts (both rural and urban) across the west and at specific locations within the modeling domain.

For purposes of the analysis for the MLP EIS, Canyonlands National Park was chosen as a source receptor to evaluate both local and regional emission sources impacts on ozone, PM2.5, and visibility. The results in this analysis are that sources within the MLP are unlikely to significantly contribute to modeled and monitored ozone concentrations they do contribute incrementally to both the MLP and regional ozone concentration.

The WestJump source apportionment tool was used to specify source contributions by type; for instance mobile, point, oil and gas and fires. The modeled MLP ozone concentration of 70.0 ppb with 11.7ppb (16.7 percent) is due to regional sources (MLP 2016). Mobile sources (cars and trucks) make up the largest single source category, followed by natural sources (primarily vegetative volatile organic compound [VOC] emissions), and point sources (e.g., power plants). Oil and gas emissions account for less than 1 percent of the regional source category emissions.

Based on extrapolated PM2.5 monitoring data from the IMPROVE monitoring site operated by the Park Service at Canyonlands National Park, ambient PM2.5 concentrations are well below the applicable NAAQS. It would be expected that PM2.5 concentrations regionally are also well below the NAAQS, given the paucity of large sources and dispersed population. Little monitoring data exists to validate this however, and the Planning Area is designated as unclassifiable.

PM2.5 can contribute to regional haze and visibility degradation in Class 1 airsheds (e.g., Canyonlands NP) at lower ambient concentrations than the NAAQS. Understanding the sources and composition of PM2.5 is important for informing management actions related to source controls and mitigation. Using the WestJump source apportionment tool, the composition of modeled PM2.5 concentrations can be estimated for both total sources within the MLP, and specific for the oil and emission category.

As stated in Section 4.2.1, to mitigate any potential impacts from oil and gas development emissions may have on regional ozone formation in the CIAA, the following BMPs would be required through lease notice: UT-LN-99: Regional Ozone Formation Controls for any development projects related to this lease sale. To mitigate any potential impact from oil and gas development to air quality, lease notices UT-LN-96: Air Quality Mitigation Measures and UT-LN-102: Air Quality Analysis would be applied to all lease parcels for this sale. Refer to Appendix A for the full text of these lease notices.

As previously discussed in Chapter 3.3.1, UDAQ conducts an EI every three years of pollutants released by all emissions sources in the state. At present, Grand and San Juan County are considered unclassified or in attainment for all NAAQS criteria pollutants.

Based on the modeling referenced in this section, and the application of these BMPs, it is unlikely emissions from any subsequent development of the proposed leases would significantly contribute to regional ozone formation in the Four Corners area, nor is it likely to contribute to cause exceedances of NAAQS.

4.3.3.2 Cultural Resources

The CIAA for cultural resources is the entirety of the proposed lease parcels and a 0.5-mile buffer around each parcel. Sporadic oil and gas development has occurred in the CIAA, most of which is not active, and exploration and possible development of the lease parcels may contribute to impacts from the past and present development, impacting the setting and feeling of both the individual sites and landscapes surrounding them. The 2008 Monticello RMP EIS found that recreational activities would have the greatest cumulative impact upon cultural resources (BLM 2008 p. 4-774). However, the EIS also stated that, due to federal laws, regulations and policies, cumulative impacts would be minimal.

4.3.3.3 Greenhouse Gas Emissions/Climate Change

Even though the Proposed Action of leasing would not contribute to cumulative effects on air resources, future foreseeable development could contribute to cumulative GHG emissions. The primary sources of emissions include the following:

- Fossil fuel combustion for construction and operation of oil and gas facilities – vehicles driving to and from production sites, engines that drive drill rigs, etc. These produce CO_2 in quantities that vary depending on the age, types, and conditions of the equipment as well as the targeted formation, locations of wells with respect to processing facilities and pipelines, and other site-specific factors.
- Fugitive CH_4 – CH_4 that escapes from wells (both gas and oil), oil storage, and various types of processing equipment. This is a major source of global CH_4 emissions. These emissions have been estimated for various aspects of the energy sector, and starting in

2011, producers are required under 40 C.F.R. §98, to estimate and report their CH_4 emissions to the EPA.

- Combustion of produced oil and gas – it is expected that operations will produce marketable quantities of oil and/or gas. Combustion of the oil and/or gas would release CO_2 into the atmosphere. Fossil fuel combustion is the largest source of global CO_2.

Since climate change and global warming are global phenomena, for purposes of this NEPA analysis, the analysis presented above about the direct and indirect effects of GHG emissions from the Proposed Action is also an analysis of the cumulative effects of the Proposed Action. The BLM has determined that this analysis "adequately addresses the cumulative impacts for climate change from the Proposed Action, and therefore a separate cumulative effects analysis for GHG emissions is not needed.

4.3.3.4 Lands with Wilderness Characteristics

The CIAA for lands with wilderness characteristics is the entirety of the Cross Canyon, Monument Canyon, and Tin Cup Mesa lands with wilderness characteristics units and the adjacent Squaw & Papoose Canyon and Cross Canyon Wilderness Study Areas (WSAs) within the Monticello Field Office (~41,860 acres). The past, present and foreseeable future actions with the potential to contribute to surface disturbance include development of new and existing mineral rights (leases) and/or realty actions (e.g., pipelines and road rights-of-way). Additionally, it is anticipated that the current grazing patterns and recreation activities will continue to occur throughout the CIAA.

Currently, the WSAs are closed to motorized use, while the Monument Canyon, Tin Cup Mesa and Cross Canyon lands with wilderness characteristics units are managed as limited to designated routes. Motorized recreational use, combined with the development of new roads if parcels are leased and developed, increases the likelihood of route proliferation. Route proliferation has the potential to impact wilderness characteristics by impacting the natural setting, outstanding opportunities for solitude, and/or the outstanding opportunities for primitive recreation. Any surface disturbance associated with development would affect naturalness. Following construction or development activities, naturalness would remain impacted for above-ground facilities, while reclamation of subsurface rights-of-way would reduce the loss of naturalness. Providing new access routes could diminish or eliminate wilderness characteristics in the areas adjacent to the access routes. The magnitude and duration of the impact would depend on the location of the route, type of access, and type of development being supported by the access.

Livestock grazing has and will continue to occur throughout the CIAA. However, livestock grazing is an allowable use within lands with wilderness characteristics and Wilderness Study Areas. Thus, the availability of lands for livestock grazing will not affect the presence or absence of wilderness characteristics.

The WSAs are closed to leasing. The direct and indirect effects of leasing the parcels are described in Section4.2.4.2. Currently, there are 40 acres (3 %) leased within the Cross Canyon unit, 3,598 acres (21 %) leased within the Monument Canyon unit, and 2,343 acres (25 %) leased in the Tin Cup Mesa unit. If the proposed action is selected, the combination of the proposed action and all other active leases within these units would result in the total leased area of approximately 8,856 acres within the CIAA (21%). Cumulatively, if the proposed action is selected, 72% of the Cross Canyon inventory unit, 32% of the Monument Canyon unit and 26% of the Tin Cup Mesa unit

would be leased for oil and gas development. These values are displayed in the following Table 4-7:

Table 4-7; LWC Acreage comparison of Authorized Oil and Gas Leases, Lease Parcel and Percentages.

LWC Unit	LWC Unit Acreage	Authorized Oil and Gas Leases within LWC Unit (Acreage)	Percent of Unit under Authorized Lease	2018.03 Parcel Acreage	Percent of Unit 2018 Parcels	Total; Authorized and 2018 Parcels	Percent of Unit Leases
Cross Canyon	1,353	40	3	940	70	980	72
Tin Cup	9,396	2,343	25	112	1	2,455	26
Monument Canyon	17,200	3,598	21	1,823	11	5,421	32
Totals	27,949	5,981	21	2,875	10	8,856	32

Even if all active leases and the leases in the proposed action are developed, portions of Cross Canyon, Monument Canyon, and Tin Cup Mesa would still retain wilderness characteristics.

4.3.3.5 Migratory Birds including Raptors

The CIAA for Migratory Birds is the CCDO Area. Cumulative impacts to migratory birds were adequately analyzed in the MtFO and MFO RMPs and are included in this EA by reference (MFO PRMP Chapter 4.3.24.14, pgs. 4-515 and 516: MtFO PRMP Chapter 4.4.15, pgs. 4-784 and 785). Cumulative impacts include loss of their habitat, habitat fragmentation, and disruption or alteration of seasonal migration routes.

4.3.3.6 Visual Resources

The CIAA for visual resources is the CCDO, and would include any ground-disturbing activities that could potentially degrade the scenic quality of BLM-administered public lands, including mineral resource exploration and development. Cumulative impacts to visual resources were adequately analyzed in the MtFO and MFO RMPs, and are included in this EA by reference (MFO PRMP Chapter 4.3.24.16.2, pgs. 4-517 to 4-518; MtFO PRMP Chapter 4.4.18, pgs. 4-786).

CHAPTER 5 – COORDINATION AND CONSULTATION

Public and agency involvement has occurred as described below.

5.1 PUBLIC PARTICIPATION

Section 1.5 describes the public participation process used to identify the issues that are analyzed in this EA. Public notification was initiated by entering the project information on BLM's ePlanning website at https://go.usa.gov/xNfAT, and a 30-day public scoping period on issue identification and alternative development was conducted from June 28 to July 27, 2017.

BLM received 32 comment letters via the CCDO email address, one comment letter via U.S. Mail, five comments via ePlanning, one form letter submitted 446 times, and one form letter submitted 19 times. Seventeen comment letters (including both form letters) expressed concern regarding leasing in Recapture Canyon. The parcel maps in Appendix B show RMP-designated leasing categories as well as additional areas of NSO due to steep slopes and riparian areas. Active floodplains are also designated as NSO; however, these areas are not shown on the parcel maps.

The NSO for steep slopes and riparian areas is an estimate based on GIS analysis. Other comments expressed concerns including, but not limited to, the effect of oil and gas development to cultural resources, units of the National Park Service (Canyonlands and Arches National Parks and Hovenweep National Monument), the Bears Ears National Monument, and climate change. A few commenters expressed concern regarding oil and gas leasing effects to private homes and property located near the parcels. One private split-estate landowner expressed concern regarding oil and gas leasing effects to their property. Two commenters expressed support of federal oil and gas leasing. All other commenters were opposed to federal oil and gas leasing.

BLM utilized and incorporated the NEPA public participation requirements to assist the agency in satisfying the public involvement requirements under Section 106 of the NHPA (16 U.S.C. 470(f) pursuant to 36 CFR 800.2(d)(3). The information about historic and cultural resources within the area potentially affected by the proposed project/action/approval will assist the BLM in identifying and evaluating impacts to such resources in the context of both NEPA and Section 106 of the NHPA. BLM consulted with Indian tribes on a government-to-government basis in accordance with Executive Order 13175 and other policies. Tribal concerns, including impacts on Indian trust assets and potential impacts to cultural resources, were given due consideration. Federal, State, and local agencies, along with tribes and other stakeholders that may be interested in or affected by the proposed project/action/approval were invited to participate in the scoping process.

A public review and comment period for the EA and unsigned FONSI will occur from September 21 to October 23, 2017.

5.2 LIST OF PERSONS, AGENCIES, AND ORGANIZATIONS CONSULTED

Table 5-1: List of Persons, Agencies, and Organizations Consulted for Purposes of this EA

Name	Purpose & Authorities for Consultation or Coordination	Findings & Conclusions
Utah State Historic Preservation Office (SHPO)	Consultation as required by Section 106 of the NHPA.	SHPO consultation is currently ongoing.
Native American Tribes	Consultation as required by the American Indian Religious Freedom Act of 1978 (42 USC 1531) and NHPA (16 USC 1531)	Consultations letters were mailed on August 10, 2017. Tribal consultation is currently on going.
Old Spanish National Historic Trail Association; National Park Service Trails Administrator; Grand County Historical Society	Stakeholder Coordination	Information sent on June 26 and 28, 2017.
State of Utah, Public Lands Policy Coordination Office	Stakeholder Coordination	UTSO BLM mailed a letter with information and the preliminary list on May 5, 2017.
Utah School and Institutional Trust Lands Administration	Stakeholder Coordination	UTSO BLM mailed a letter with information and the preliminary list on May 5, 2017.
Utah Division of Wildlife Resources	Stakeholder Coordination	UTSO BLM mailed a letter with information and the preliminary list on May 5, 2017. UDWR provided comments during the public scoping period.
San Juan County Commissioners	Stakeholder Coordination	MtFO mailed a letter on June 20, 2017 informing the San Juan county Commission of the proposal.
U.S. Fish & Wildlife Service	Information on Consultation, under Section 7 of the Endangered Species Act (16 USC 1531)	UTSO BLM mailed a memo with information and the preliminary list on May 5, 2017.
U.S. Forest Service	Stakeholder Coordination	UTSO BLM mailed a letter with information and the preliminary list on May 5, 2017.
National Park Service	Stakeholder coordination.	UTSO BLM mailed a memo with information and the preliminary list on May 5, 2017. The NPS provided scoping comments in a letter dated July 25, 2017.
Bureau of Indian Affairs - Navajo Regional Office	Surface Management Agency Coordination	UTSO BLM mailed a letter with information and the preliminary list on May 5, 2017. In a letter dated September 18, 2017, the BIA and Navajo Nation recommended that parcels UT0318-035, UT0318-045, and UT0318-046 be excluded (deferred) from the March 2018 lease sale.
Split-Estate Private Surface Owners	Per IM No. 2010-117, *Oil and Gas Leasing Reform*; split-estate private surface owners will be notified of leasing activities.	The MtFO mailed letters with information and the preliminary list on June 20, 2017. The surface owner of parcel UT0318-029 provided scoping comments in a letter dated July 6, 2017.

5.3 LIST OF PREPARERS AND PARTICIPANTS

Table 5-2: List of Preparers - Monticello Field Office

Name	Title	Responsible for the Following Section(s) of this Document or Determination and Rationale in the ID Team Checklists (Appendix D)
Clifford Giffen	Natural Resource Specialist, Project Lead	Air quality, Greenhouse Gas Emissions/Climate Change, Environmental Justice, Socio-Economics, Soils, Wild Horses and Burros
Charis Tuers	Air Quality Specialist, Utah BLM State Office	Air Quality, GHG Emissions/Climate
Casey Worth	Recreation Planner	ACECs, BLM Natural Areas, Recreation, Wild and Scenic Rivers, Wilderness/WSAs

Jed Carling	Rangeland Management Specialist	Farmlands, Floodplains, Livestock Grazing, Rangeland Health Standards, Wetlands/Riparian Zones, Vegetation
John Chmelir	Archaeologist	Native American Religious Concerns, Cultural Resources
Ashley Losey (Utah State Office)	Archaeologist	Cultural Resources
Melissa Wardle	Wildlife Biologist, Monticello Field Office	Wildlife, Migratory Birds, Threatened and Endangered Plant Species, Threatened and Endangered Animal Species, Water Resources/Quality, Woodland/forestry
Paul Plemons	Fuels Specialist	Fuels/Fire Management
Ted McDougall	Geologist	Minerals Resources/Energy Production
Bill Stevens	Outdoor Recreation Planner	Socio-Economics
Brian Quigley	Assistant Field Office Manager	Lands/Access
ReBecca K. Hunt-Foster	Paleontologist	Paleontology
Nephi Noyes	Rangeland Management Specialist	Invasive Species/Noxious Weeds, Wastes
Misti Haines	Recreation Permit Assistant	Visual Resource Management
Ann Marie Aubry	Hydrologist	Water Resources

Table 5-3: List of Preparers - Moab Field Office

Name	Title	Responsible for the Following Section(s) of this Document or Determination and Rationale in the ID Team Checklists (Appendix D)
Gabriel Bissonette	Fisheries Biologist	Floodplains, Wetlands/Riparian
Becky Doolittle	Assistant Field Manager	Air Quality, GHG Emissions/Climate
Katie Stevens	Outdoor Recreation Planner	ACEC, Historic Trails, Recreation, Wild and Scenic Rivers, Visual Resources
Bill Stevens	Outdoor Recreation Planner	BLM Natural Areas, Socio-Economics, Wilderness/WSA, Lands with Wilderness Characteristics, Environmental Justice
Don Montoya	Archeologist	Cultural Resources, Native American Religious Concerns
Ashley Losey (Utah State Office)	Archaeologist	Cultural Resources
Doug Rowles	Physical Scientist, Project Lead	Moab FO Team Lead, Geology / Mineral Resources/Energy Production
Pam Riddle	Wildlife Biologist	Threatened, Endangered or Candidate Animal Species, Migratory Birds/Raptors, Utah BLM Sensitive Species, Fish and Wildlife Excluding USFWS Designated Species
Jordan Davis	Rangeland Management Specialist	Invasive Species/Noxious Weeds, Livestock Grazing, Rangeland Health Standards, Soils, Woodland / Forestry, Vegetation Excluding USFWS Designated Species
Dave Williams	Rangeland Management Specialist	Threatened, Endangered or Candidate Plant Species
Joshua Relph	Planning Coordinator	Fuels/Fire Management
Jan Denney	Realty Specialist	Lands/Access
R. Hunt-Foster	Geologist/Paleontology	Paleontology
Dave Pals	Geologist	Wastes, Surface and Ground Water

CHAPTER 6 – REFERENCES, ACRONYMS, AND APPENDICES

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6.2 LIST OF ACRONYMS

ACEC	Area of Critical Environmental Concern
APD	Application for Permit to Drill
AQRV	Air Quality Related Value
BCC	Birds of Conservation Concern
BLM	Bureau of Land Management
BMP	Best Management Practice
CFR	Code of Federal Regulations
CCDO	Canyon Country District Office
COA	Condition of Approval
CSU	Controlled Surface Use
DNA	Determination of NEPA Adequacy
DR	Decision Record
EA	Environmental Assessment
EI	Emissions Inventory
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FEIS	Final Environmental Impact Statement
FLPMA	Federal Land Policy and Management Act of 1976
FONSI	Finding of No Significant Impact
GAO	General Approval Order

GHG	Greenhouse Gas
GIS	Geographic Information System
GWP	Global Warming Potential
HF	Hydraulic Fracturing
ID	Interdisciplinary
IM	Instruction Memorandum
KOP	Key Observation Point
NTL	Notice to Lessees
MBTA	Migratory Bird Treaty Act of 1918
MFO	Moab BLM Field Office
MLA	Mineral Leasing Act
MLP	Master Leasing Plan
MtFO	Monticello BLM Field Office
MOU	Memorandum of Understanding
NAAQS	National Ambient Air Quality Standards
NCLS	Notice of Competitive Lease Sale
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NP	National Park
NSO	No Surface Occupancy
NTSA	National Trails System Act, as amended
PIM	Permanent Instructional Memorandum
PRMP	Proposed Resource Management Plan and Final Environmental Impact Statement
PSD	Prevention of Significant Deterioration
RFD	Reasonably Foreseeable Development Scenario for Oil and Gas
ROD	Record of Decision
ROW	Right of Way
RMP	Resource Management Plan
SC GHG	Social Cost of GHG
SMA	Surface Management Agency
UDAQ	Utah Division of Air Quality
UDWR	Utah Division of Wildlife Resources
UPIF	Utah Partners in Flight
USDA	United States Department of Agriculture
USGCRP	United States Global Change Research Program
USDI	United States Department of the Interior
USFWS	United States Fish and Wildlife Service
VOC	Volatile Organic Compound
VRM	Visual Resource Management
WO	Washington Office

6.3 LIST OF APPENDICES

Appendix A – Parcel List, Stipulations, and Notices
Appendix B – Maps
Appendix C – Parcels Recommended For Deferral
Appendix D – Interdisciplinary Team Checklists

Appendix E – Reasonably Foreseeable Development Scenario Calculations