STATE OF COLORADO

Cazier - DNR, Tim <tim.cazier@state.co.us>

NOI# P-2013-002 comments - Dawson Gold Project

1 message

Randy and Jeanie <macon1125@gmail.com> Tue, Dec 11, 2018 at 3:21 PM
To: tim.cazier@state.co.us

Mr. Cazier,

Attached, please find our comments related to NOI# P-2013-002 comments - Dawson Gold Project and supplemental materials referenced in the comments.

Thank you for allowing us the opportunity to comment upon this application

Randy and J. Jean Keller
Canon City, CO

3 attachments

NOI# P-2013-002 comments - Dawson Gold Project.pdf
163K

RGFO_EA_Comment_March2019.pdf
1766K

Zephyr CUP Access Documents.pdf
4108K

Randy and J. Jean Keller
10950 Temple Canyon Road
PO Box 1347
Canon City, CO 81212
(719) 276-6622

December 11, 2018

Timothy A. Cazier
Environmental Protection Specialist
Colorado Division of Reclamation, Mining and Safety
1313 Sherman Street, Room 115
Denver, CO 80203

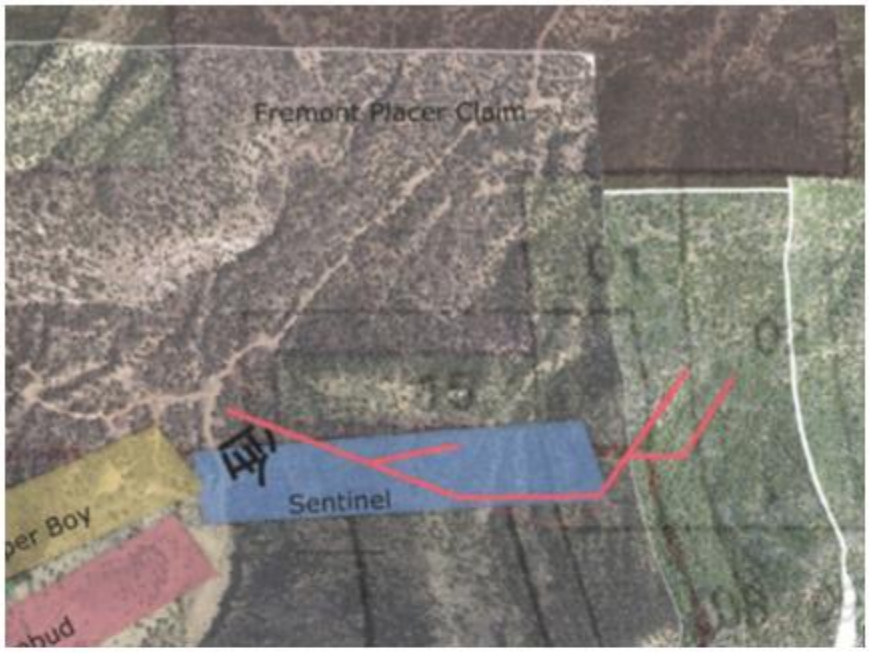
Dear Mr. Cazier,

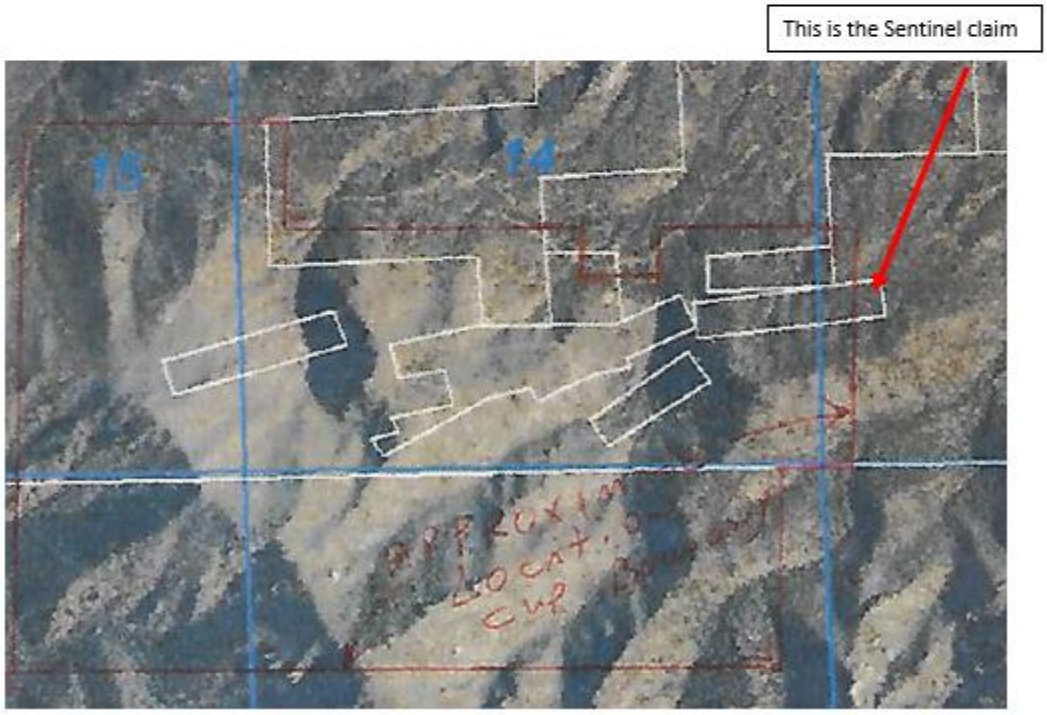
We have recently become aware of the request to modify the Notice of Intent to Conduct Prospecting Operations received by your office from Zephyr Gold USA on November 27, 2018, for the Dawson Gold Project (NOI# P-2013-002). We would like to voice a strenuous objection to this modification. The Dawson Gold Project is extremely unpopular in our community as Zephyr's claims lie immediately adjacent to multiple private homes in a large subdivision of over 400 homes and also lie in a very heavily-used recreational and environmentally sensitive area with close proximity to Grape Creek which helps feed the Arkansas River.

Zephyr has been operating under a Fremont County Conditional Use Permit (CUP) that was issued in 2013 for a three-year period. The permit was extended in January 2016 for an additional three years, and it will expire in February 2019. The legality of the county permit is currently being challenged because Zephyr provided false information on the permit application, listing on the permit that our private property was owned by the Bureau of Land Management (BLM), and, as such, they were not required to obtain an easement to use the road that connects to other private parcels. The BLM has confirmed, in writing, that the access information provided by Zephyr to the County is incorrect. That documentation was provided to Fremont County Government officials. At today's meeting of the County Board of Commissioners, a request was heard for a three-year extension of Zephyr's County CUP. The County agreed to extend the permit only after Zephyr is able to provide proof of legal and properly established access in the form of a deeded easement. Zephyr does not have a deeded easement across our property, and as such, will not be able to meet that contingency to continue legal operations.

The November 27th DRMS modification request falls substantially outside the geographic boundaries of the existing county permit. Figure 1 below shows the map included with the modification application along with the map of the County CUP boundary. The CUP boundary does not encompass the entire Sentinel claim, and it certainly does not extend east of it. Zephyr did not disclose this information to Fremont County Government Officials prior to requesting this latest extension, nor did they disclose it at today's meeting.

Figure 1: Modification map vs. County CUP boundary





The proposed roads on BLM land intersect and overlap the South Canon Trail System in which our community has invested over $350,000 to develop. Drilling on top of or immediately adjacent to these trails and building roads across them would render them completely unappealing. Our community heavily relies on tourist income that is generated, in part, by the draw of this trail system that has won national acclaim. According to a recent BLM draft Environmental Assessment (EA) on Sections 13 and 14 related to an upcoming Oil and Gas Lease Sale (a copy of which is attached to this email), Fremont

County “has a low-income population that can be considered as (an) environmental justice population.” Allowing Zephyr to expand and destroy a trail system that generates revenue for our community would be irresponsible and punitive toward our community.

The proposed modification expansion lies in the two sections which were evaluated in the BLM EA mentioned above. The EA places strict restrictions on surface use in these areas. These sections are subject to the following surface use restrictions:

- CO-09: No surface use is allowed from December 1 through April 30
- CO-18 and CO-19: No surface use is allowed from February 1 through August 15

These restrictions will allow Zephyr a period of only 3 ½ months of the year to complete this project. Given that it has taken the company 6 years to complete their initial drilling project, which was originally estimated in the county CUP to be completed in less than one year (attached), this extreme surface use limitation will possibly cause this project to take several years—years that will continue to damage property values and decrease income generated by our trail system. The completion of this project will likely be delayed by Zephyr’s economic situation as well. In their most recent Financial Statement for the period ending September 30, 2018, “Management of the Company concluded that at September 30, 2018, the Company did not have sufficient funds to meet its minimum corporate, administrative and property obligations for the next 12 months. It is odd that Zephyr is applying for this expansion in addition to their recent Mineral Lease Application (for Section 16) to the State Land Board when they do not have funds to cover their current obligations. In the November 2018 “Mineral Potential Report” produced by the Royal Gorge Field Office of the BLM, the BLM stated that “Despite its rich mining history, not much gold has been recovered in Fremont County. Production of about 4,400 ounces of gold is reported between the years 1881 and 1957 (Del Rio, 1960; Vanderwilt, 1947).” This leads to the conclusion that expanding their prospecting radius will most likely not generate any additional resources that will produce investment revenue for Zephyr to continue operations. No reclamation has been performed to date in the current project area. If the company should fail financially, reclamation will either not happen at all or will have to be performed by government agencies.

Thank you for the opportunity to comment upon this application. We ask that the Division please consider a denial of the modification request for the Dawson Gold Project (NOI# P-2013-002).

Sincerely,

Randy and J. Jean Keller

BLM

United States Department of the Interior
Bureau of Land Management

Environmental Assessment for the March 2019 Competitive Oil and Gas Lease Sale

Royal Gorge Field Office
3028 East Main Street
Canon City, CO 81212

DOI-BLM-CO-F020-2019-0001-EA

DRAFT

November 2018

Chapter 1 Introduction

1.1 Identifying Information

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.

BLM's Colorado State Office conducts quarterly competitive sales to lease available oil and gas parcels. A Notice of Competitive Lease Sale (Lease Sale Notice), which lists lease parcels to be offered at the auction, is published by the Colorado State Office at least 45 days before the auction is held. Lease stipulations applicable to each parcel are specified in the Lease Sale Notice. 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 BLM in consultation with the appropriate surface management agency or the private surface owner.

In the process of preparing a lease sale, the Colorado State Office sends a draft parcel list to each field 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 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 that appropriate consultations have been conducted; and identify any special resource conditions of which potential bidders should be made aware. The parcels are posted online for a thirty day public scoping period. This posting also includes the appropriate stipulations as identified in the relevant Resource Management Plan (RMP). BLM prepares an analysis consistent with the National Environmental Policy Act (NEPA), usually in the form of an Environmental Assessment (EA). Comments received from the public are reviewed and incorporated into the NEPA document, as applicable.

After the field office completes the draft parcel review and NEPA analysis and makes a leasing recommendation to the State Office, a list of proposed lease parcels and associated stipulations is made available to the public through a Lease Sale Notice, which are posted on the Colorado

BLM website at:
https://www.blm.gov/programs/energy-and-minerals/oil-and-gas/leasing/regional-lease-sales/colorado. On rare occasions, BLM may defer or withhold additional parcels prior to the day of the lease sale. In such cases, BLM prepares an addendum to the sale notice. Prior to the lease sale, the Deputy State Director signs a decision in which he or she determines which parcels are available and will be offered for lease in the upcoming sale.

If the parcels are not leased at the March 2019 lease sale, then they will remain available to be leased 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 lessee and approval by BLM.

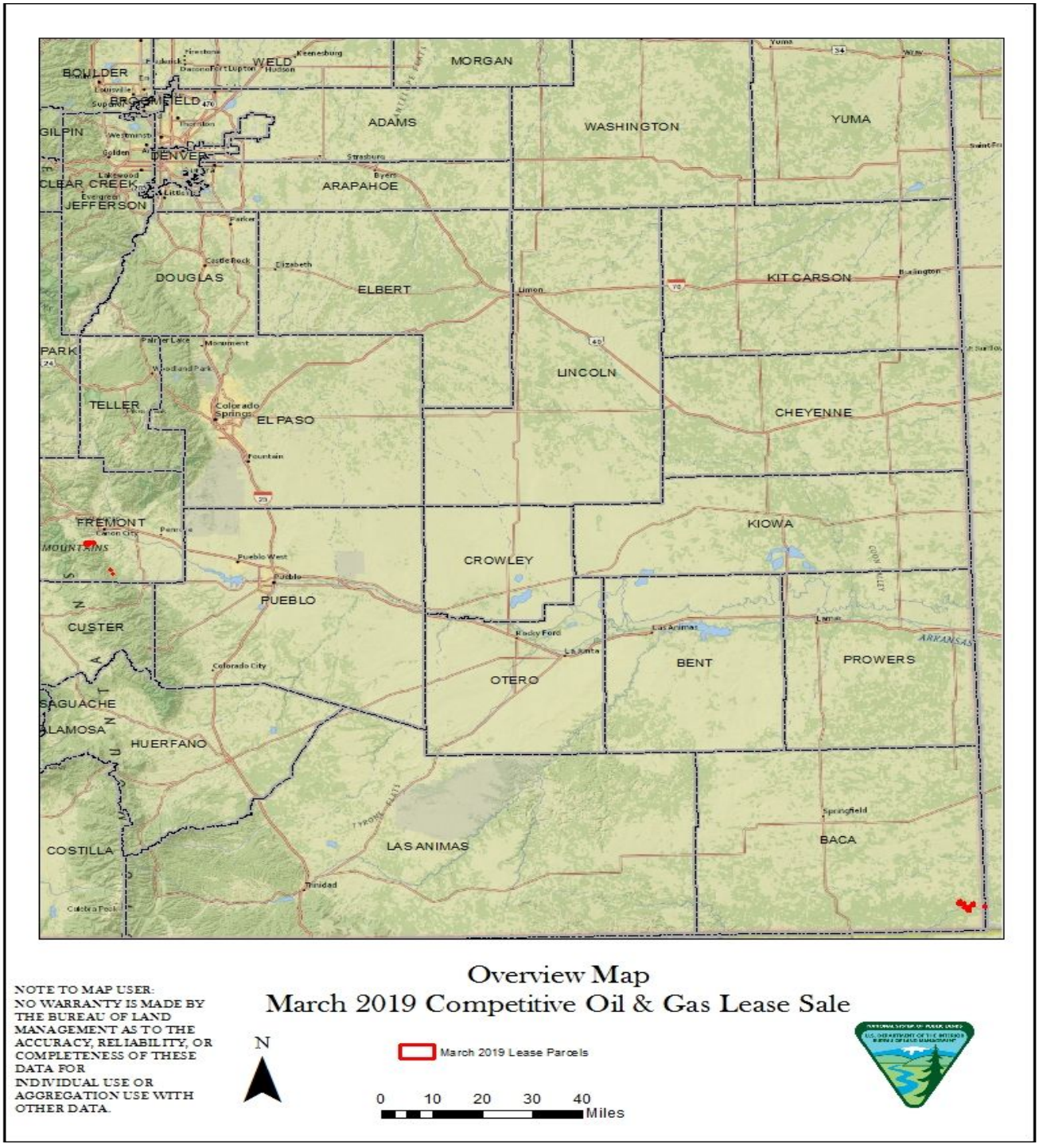
In the future, BLM may receive Applications for Permit to Drill (APDs) for those parcels that are leased. If APDs are received, BLM conducts additional site-specific NEPA analysis before deciding whether to approve the APD, and what conditions of approval (COAs) should apply.

Five parcels comprising 1015.150 acres within the Royal Gorge Field Office (RGFO) are being considered for the March 2019 Competitive Oil and Gas Lease Sale. This figure is comprised of 605.700 acres of federal land and 409.450 acres of split estate land. The parcels are located in Fremont and Baca Counties. The legal descriptions of the proposed parcels are in Attachment C.

This EA documents the review of the parcels under the administration of the RGFO. It serves to verify conformance with the approved land use plans, and provides the rationale for the field office's recommendation to offer or to defer particular parcels from a lease sale.

This EA is being released for for 30 days of public comment. Any comments received within the 30 day timeframe have been considered and incorporated into the EA as appropriate.

1.2 Project Location and Legal Land Descriptions



Legal Land Descriptions:
Please see Attachments A, B, and C and E (Maps)

1.3 Purpose and Need

The purpose of the Proposed Action is to consider opportunities for private individuals or companies to explore and develop oil and gas resources on specific public lands through a competitive leasing process.

The need for the action is to respond to the expression of interest in lands for leasing, consistent with BLM's responsibility under the Mineral Leasing Act (MLA), as amended, to promote the development of oil and gas on the public domain. Parcels may be proposed by the public, 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

BLM will decide whether to lease the proposed parcels and, if so, under what terms.

1.4 Public Participation

1.4.1 Scoping

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

Internal scoping was conducted through review of an interdisciplinary (ID) team of resource specialists and discussion of the parcels being considered for leasing. External scoping for the Fremont County parcels was conducted by posting the parcels being considered for leasing, and stipulations from the RMP, for 15 days from October 1, 2018 to October 16, 2018. Stipulation

summaries, GIS shapefiles, and maps were posted on the BLM Colorado State Office website: https://www.blm.gov/programs/energy-and-minerals/oil-and-gas/leasing/regional-lease-sales/colorado. Scoping for the Baca County parcels was conducted for 30 days from December 4, 2017 to January 4, 2018. These external scoping timeframes gave the public an opportunity to provide comments, which BLM considered and incorporated into the EA as appropriate.

1.4.2 Issues Identified:

BLM considered several issues raised during project scoping. Issues raised at scoping were recreation, hydraulic fracturing, air quality, water quality, proximity to a wilderness study area,mining, wildlife, increased traffic, tourism, lesser prairie chicken and paleontological concerns. The scoping comments were useful in drafting the EA. It should also be noted that some comments related to site specific issues may be more properly addressed in subsequent NEPA analysis if and when actual development on the potential leased areas is proposed.

1.4.3 Public Comment Period

The preliminary EA and the unsigned Finding of No Significant Impact (FONSI) for the March 2019 Oil and Gas Lease Sale were available for a thirty-day public review and comment period beginning November 13, 2018 and ending December 14, 2018. The document is available online at https://www.blm.gov/programs/energy-and-minerals/oil-and-gas/leasing/regional-lease-sales/colorado and in the public room at the Royal Gorge Field Office. The document may be viewed at the field office during regular business hours (8:00 a.m. to 4:30 p.m.), Monday through Friday, except holidays. Comments received from the public will be reviewed and incorporated into the EA as appropriate.

Issues Identified: To be completed after the comment period ends.
The BLM summary and responses to these comments are included as Attachment F.

Chapter 2 Alternatives

2.1 Introduction

This chapter describes the alternatives analyzed in detail.

2.2 Alternatives Analyzed in Detail

2.2.1 No Action Alternative

In an EA, the No Action Alternative typically means that the Proposed Action would not take place. See BLM NEPA Handbook (H-1790-1).

Under the No Action Alternative, BLM would defer all proposed lease parcels from the March 2019 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.

2.2.2 Preferred Alternative

Under the preferred alternative, BLM would offer 5 parcels, a total of 1015.150 acres, for lease. Attachment C lists all parcels that would be offered for lease under the preferred alternative with applied stipulations. Attachment D contains descriptions of the applicable stipulations, and Attachment E contains maps of the parcels.

2.2.3 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.

2.2.4 Plan Conformance Review

Name of Plan: Royal Gorge Record of Decision and Resource Management Plan (RMP)

Date Approved: May 1996

Decision Language: BLM administered mineral estate will be open to fluid minerals leasing, exploration and production, subject to the lease terms and applicable lease stipulations.

Chapter 3 Affected Environment and Effects

3.1 Introduction

The Council on Environmental Quality (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. The following resources and management issues were determined to not be present or not expected to be impacted by the proposed action and alternatives: Forestry, Special Status Plants, Access and Transportation, Fire Management, Range Management, Prime and Unique Farmlands, Realty Authorizations and Land Tenure, Recreation, Special Designations, Areas of Critical Environmental Concern, Wild and Scenic Rivers, Lands with Wilderness Characteristics and Wilderness Study Areas.

3.2 Environmental Consequences of the No Action Alternative

The No Action Alternative is used as the baseline for comparison of the alternatives. Under the No Action Alternative, the five parcels totaling 1015.150 acres would not be leased. There would be no subsequent 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.

BLM assumes that the No Action Alternative (no lease option) may result in less oil and gas production than under the Proposed Alternative. However, oil and gas production and consumption is driven by a variety of complex interacting factors including energy costs, energy efficiency, availability of other energy sources, economics, demographics, geopolitical circumstances, and weather so therefore, it is uncertain if and to what extent the No Action Alternative may have on overall domestic oil and gas production.

3.3 Past, Present and Reasonably Foreseeable Actions

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." In its guidance, 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 RMP/EISs provides BLM's analysis of cumulative effects of oil and gas development based on the reasonable, foreseeable oil and gas development scenario. This analysis is hereby incorporated by reference and is available at https://eplanning.blm.gov/epl-front-office/eplanning/planAndProjectSite.do?methodName=dispatchToPatternPage&currentPageId=99527

The cumulative impacts analysis in the EISs 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 EIS analysis by incorporating new information.

The area of influence for parcels in Fremont County, includes recreation and mining activities. The parcels in Baca County have a patchwork of livestock grazing and dry-land farming on uncultivated short-grass prairie. BLM cannot definitely say what activities may be taking place on split estate (privately owned surface).

3.3.1 Past Actions

Some of the proposed acreage is split estate, where the surface is not managed by BLM. BLM does not maintain information about non-mineral activity on split estate parcels on private land but evidence indicates that parcels in Baca County have had livestock grazing as the predominant use. Aerial photography of the parcels on the eastern plains indicate that over-grazing and several years of drought conditions have produced an almost barren landscape in some locations. No evidence suggests that any past actions by BLM have affected these parcels. Fremont County parcels have recreational trails. Exploration for locatable minerals has occurred in this area since the 1970's.

3.3.2 Present Actions

The Baca County proposed parcels are split estate, where the surface is not managed by BLM. There is minimal BLM managed surface near the proposed parcels so BLM has very limited information about current uses. Evidence from aerial photos suggests that private livestock grazing is currently the predominant use. Most parcels are located in areas that have had minimal oil and gas development. Fremont County parcels main uses are recreation and mining. Recreation and trail usage is an ongoing use. There is currently an active notice for exploration of minerals and activity on the claims in this area.

3.3.3 Reasonably Foreseeable Future Actions

Future actions on the parcels in Fremont County could include mining activity with mining activity expected to continue. Recreational uses in Fremont County are expected to continue in this area as well. Baca County parcels are split estate and it is assumed that the current practices such as livestock grazing on private surface will continue in the future. The Reasonable Foreseeable Development (RFD) Scenario for the RGFO is an estimate of fluid mineral exploration, development, and production potential compiled for the RGFO for a 20-year (2011-2030) timeframe, based on information available at the time the RFD was written. The Fremont County parcels have a mixture of no potential to low potential (1 < 5 wells/township) and the Baca County parcels show low to moderate potential (5 - <10 wells/township).

3.4 Environmental Consequences of Leasing and Potential Development

3.4.1 Physical Resources

3.4.1.1 Air Quality and Climate

Data from the current version of BLM Colorado's 2015 Annual Report for Air Resources is incorporated by reference in this analysis to provide information for the affected environment and cumulative impacts analysis. The current version of the Annual Report is available to the public on BLM Colorado's website at: https://www.blm.gov/programs/natural-resources/soil-air-water/air/colorado.

General Climate:

The RGFO encompasses a large geographical area with an appreciable amount of daily meteorological and climatic variance. Frequent winds and limited topographical influences in the majority of the RGFO provide excellent dispersion characteristics for distributing anthropogenic emissions. More climate information can be found in the "Climate Statistics and Change Analysis" section of the online Annual Report.

Air Quality Standards and Monitored Pollutant Concentrations:

Analysis indicators related to air quality can be described in terms of pollutant classes, standards, and concentrations. The online Annual Report "Criteria Air Pollutants" and "Hazardous Air Pollutants" sub-sections provides additional information for this section.

Air quality in the majority of the RGFO meets the standards, however in certain areas of the Field Office, measurements of pollutants have either exceeded or violated an air quality standard. Historically, these problem areas have centered around the larger Front Range metropolitan areas that tend to have large amounts of pollutant emitting sources and activities. The RGFO currently has five areas that have a designation other than attainment / unclassifiable; the Denver Metro Area / Northern Front Range 8–hour O3 Non-Attainment Area (NAA), the Colorado Springs CO Maintenance Area, and the Denver, Canon City and Larimer Co. PM10 Maintenance Areas. In these areas the state applies more stringent air pollution control requirements. None of the proposed parcels are located within any Maintenance or Non-Attainment Areas.

PSD and AQRVs:

Another relative indicator of air quality is the prevention of significant deterioration (PSD) increments. The PSD program is a Clean Air Act permitting program for new and modified major air pollution sources and is administered in Colorado by the APCD.

Air quality related values (AQRVs) provide another measure of air quality with respect to atmospheric phenomena such as visibility impairment and pollutant deposition. Measuring AQRVs is particularly important in Federal Class I lands, which include areas such as National Parks and Wilderness areas. Class I Areas are granted special air quality protections under Section 162(a) of the Clean Air Act.

Additional information regarding PSD analyses and AQRVs can be found in the "Airshed Classes and the Prevention of Significant Deterioration" and "Air Quality Related Values" sub-sections of the online Annual Report.

Baseline Emissions Data:

Baseline emissions data for counties and areas near the proposed lease parcels can be obtained from the "Emissions Source Classifications and Regulatory Status" section of the online 2015 Annual Report. The online Annual Report user will need to select National Emissions Inventory (NEI) year and Colorado county from a drop-down list.

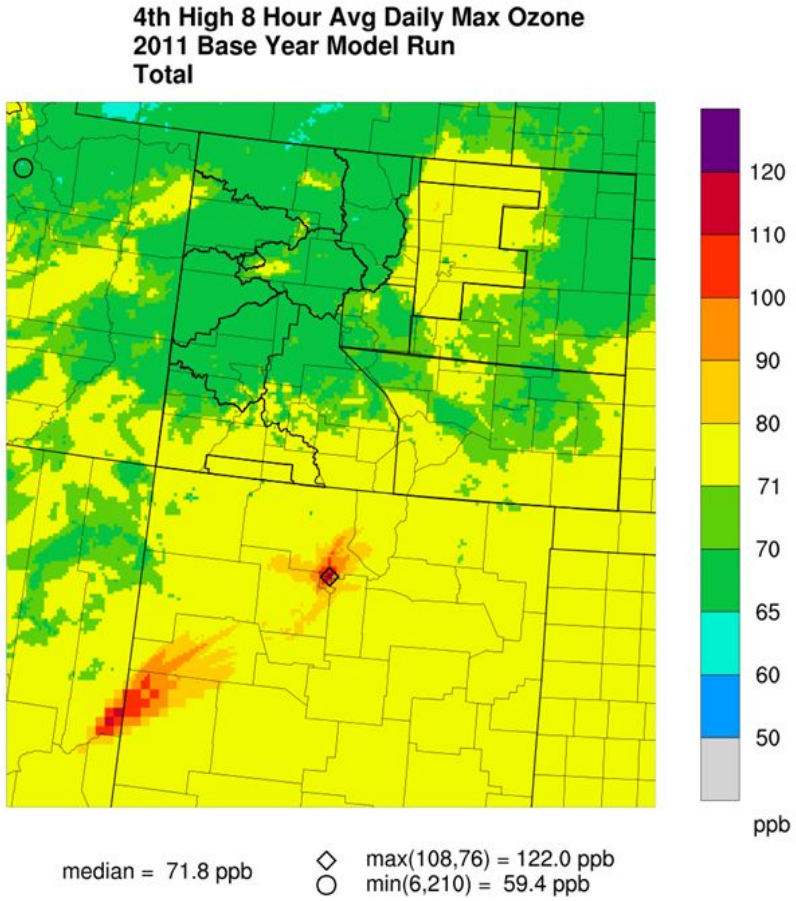
CARMMS Modeling Baseline Conditions:

In addition to Annual Report data/information for actual monitored/observed conditions around the Planning Area to describe the affected environment, CARMMS 2.0 base year 2011 modeling results are being provided to assist with setting up baseline conditions for describing potential air quality related changes associated with potential Planning Area activity (new oil and gas development, etc.) and cumulative emissions inventories for CARMMS 2.0 future year 2025 modeling. CARMMS 2.0 projected year 2025 modeling results and changes from the following baseline conditions can be found in the environmental consequences section of this EA.

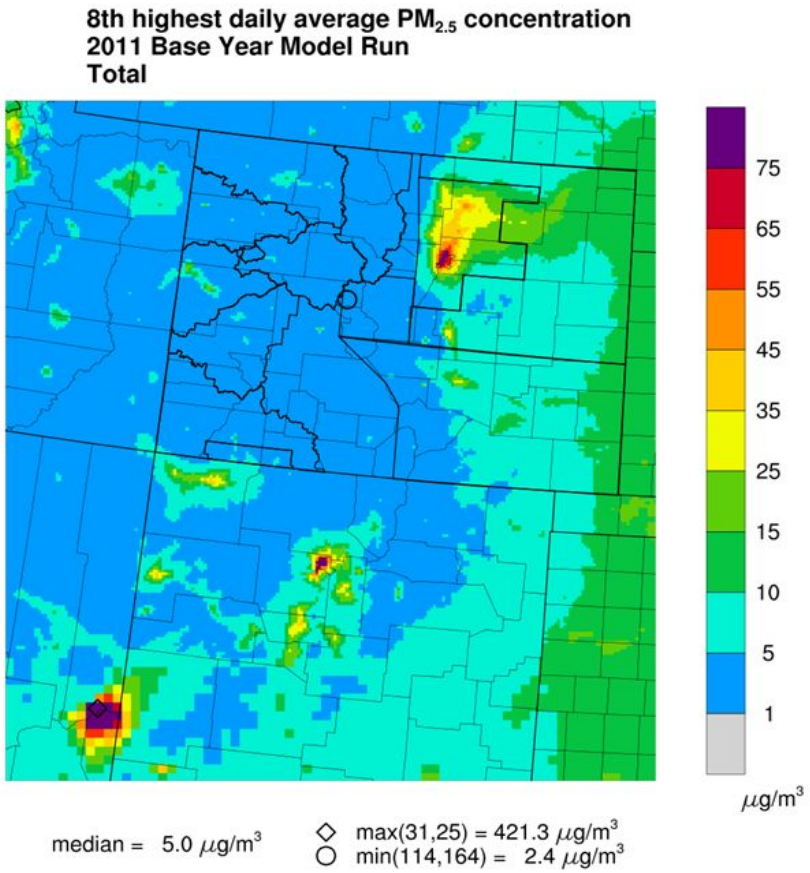
The following lists some of the CARMMS 2.0 modeled baseline conditions around the area; note that the environmental consequences section of this EA describes year 2025 future design values (DVF) that are developed using the 2011 CARMMS 2.0 modeling results (DVBs), and cumulative impact changes from baseline year 2011 through future modeled year 2025 for several air quality related parameters (visibility, deposition, etc.):

- There were nineteen (19) year 2011 baseline modeled ozone design values (DVB) for eastern Colorado Front Range ozone monitors above the current ozone standard (70 ppb).
- Modeled baseline worst (dirtiest) 20% days cumulative visibility metric values (deciview – dv) for Rocky Mountain NP and Great Sand Dunes NP were 11.84 dv and 11.57 dv, respectively.
- CARMMS 2.0 modeled baseline year 2011 total cumulative maximum (max of all grid cells covering Class I Area) annual nitrogen deposition at for Rocky Mountain NP and Great Sand Dunes NP are 3.04 kg/ha-yr and 2.22 kg/ha-yr, respectively.

The following plot shows CARMMS 2.0 modeled 4th highest 8-hour average daily maximum ozone concentrations for base year 2011 cumulative emissions inventories. As shown, baseline year 2011 ozone concentrations along the Denver – Front Range are above the ozone NAAQS (shaded yellow). Note that the maximum modeled ozone concentrations shown in Arizona and New Mexico were associated with wildfires that occurred for year 2011.The CARMMS 2.0 future year 2025 modeling results analysis (presented for the potential impacts section) includes (or references) plots showing changes from these modeled baseline 2011 conditions to future year 2025 for three future year 2025 modeling emissions scenarios.



The following plot is similar to the previous ozone plot and shows CARMMS 2.0 modeled 8th highest 24-hour average $PM_{2.5}$ concentrations for baseline 2011 cumulative emissions inventories. Areas along the Denver – Front Range and near the wildfires (Arizona and New Mexico) were modeled above the $PM_{2.5}$ 24-hour NAAQS.



GHG and Climate Change:

Information from the online Annual Report (https://www.blm.gov/programs/natural-resources/soil-air-water/air/colorado) is incorporated by reference. Baseline GHG and climate change information an be found in the "Climate Change Baselines" section of the online Annual Report.

Environmental Consequences of Leasing and Development - Direct and Indirect Impacts:

The decision to offer the identified parcels for lease would not result in any direct emissions of air pollutants. However, any future development of these leases would result in emissions of criteria, VOC, HAP and GHG pollutants. Subsequent development would result in both short and longer term emissions of pollutants, including GHGs. Developmental air impacts will be examined in a subsequent analysis when lessees file an Application for Permit to Drill (APD). The analysis will evaluate if any contemporaneous incremental increases from project emissions would be expected to cause significant impacts at the local and regional scales. All proposed

activities including, but not limited to, exploratory drilling activities would be subject to applicable local, State, and Federal air quality laws and regulations.

Subsequent activity authorized after APD approval could include soil disturbances resulting from the construction of well pads, access roads, pipelines, power lines, and drilling. Any disturbance is expected to cause increases in fugitive dust and potentially inhalable particulate matter (specifically PM10 and PM2.5) in the project area and immediate vicinity. Particulate matter, mainly dust, may become airborne when drill rigs and other vehicles travel on dirt roads to drilling locations. Air quality may also be affected by exhaust emissions from engines used for drilling, transportation, gas processing, compression for transport in pipelines, and other uses.

These sources will contribute to potential short and longer term increases in the following criteria pollutants: carbon monoxide, ozone (a secondary pollutant, formed via photochemical reactions between VOC and NOX emissions), nitrogen dioxide, and sulfur dioxide. Non-criteria pollutants (for which no national standards have been set) such as carbon dioxide, methane and nitrous oxide (GHGs), air toxics (e.g., benzene), and total suspended particulates (TSP), as well as impacts to visibility and atmospheric deposition may also increase as a result of exploration and development.

During exploration and development, ‘natural gas’ may at times be flared and/or vented from conventional, coal bed methane, and shale wells (depending on the resources present on the lease). The gas is likely to contain volatile organic compounds that could also be emitted from reserve pits, produced water disposal facilities, and/or tanks located at the site. The development stage may include the installation of pipelines for transportation of raw product. New centralized collection, distribution and/or gas processing facilities may also be necessary.

Research has identified the general potential impacts of anthropogenic GHG emissions and their effects on global climatic conditions. Anthropogenic GHGs differentially absorb and emit thermal radiation in the atmosphere and; therefore, may contribute incrementally to climate change. Changes in global temperatures and climate vary significantly with time, and are subject to a wide range of driving factors and complex interrelationships. Research on climate change impacts is an emerging and rapidly evolving area of science, but given the lack of adequate analysis methods it is not possible to identify specific local, regional, or global climate change impacts based on potential GHG emissions from any specific project’s incremental contributions to the global GHG burden. In the coming decades, climate change may lead to changes in the Mountain West and Great Plains, such as increased drought and wildland fire potential. The BLM will continue to evaluate the impacts of oil and gas exploration and development on the global climate as the science and analytical tools evolve, and will apply appropriate adaptive management techniques and BMPs to address changing conditions.

Typical Federal O&G Development and Related Emissions for New Wells in the Area:

Many leases are never developed (see "Statewide Oil and Gas Statistics" section of online Annual Report). But, to hold a lease beyond the 10 year primary lease term, operators must construct at least one well capable of producing economic quantities (unless the parcel is included in a unit which may alter the lease term). For this assessment, BLM developed an estimated average per well emissions inventory based on eleven (11) actual recent oil and gas projects (2017-2018) in the RGFO. The emissions inventory is only useful for estimating a range of potential indirect impacts of leasing the proposed parcels, if developed in the future. Since it is unknown if the parcels would actually be explored and/or developed, or the extent of any subsequent exploration and development on either a temporal or spatial scale, it is not possible to provide definitive air quality impacts through dispersion modeling or another acceptable method at this time. The BLM will request or develop an exploration and development emissions inventory with project-specific information at the time that BLM receives a development proposal and performs a site-specific NEPA analysis. The following per-well emissions rates were developed using project proponent provided information for RGFO oil and gas development. The construction / development emissions rates in the following table are for all pre-production related activities including well-pad, access road and pipeline construction, drilling and completion activities and all related traffic. The production emissions rates are post-development and represent equipment and activities including stationary engines, product stream components, pneumatics, heaters, tanks, maintenance activities and all related traffic.

Table 4: Typical New Well Emissions (TPY)*

Parameter	PM_{10}	$PM_{2.5}$	VOC	NO_X	CO	SO_2	CO_2e	HAPs
Construction / Development (Per well)	2.63	0.77	4.09	12.35	9.65	0.37	17,356.8	0.19
Production** (Per well)	0.15	0.08	3.69	2.48	3.55	0.03	131,280.8	0.23

*Weighted average based on 11 recent / new projects in the RGFO.
**CO2e production emissions include down-stream combustion.

As shown in the table above, per-well NOx emissions for the construction/development phase of a project are relatively high, and the potential impacts associated with construction/development phase NOx emissions are usually a main focus for project-level assessments. These per-well NOx emissions for the construction/development phase are driven primarily by large non-road

engines for drilling and completion/fracking activities, and the following provides details for some of the different equipment and operations that have been implemented for recent projects in the RGFO.

- Project with relatively large number of wells (> 50 wells) for project uses Tier 4 development (frac) related engines at only 4 days of operation per well;
- Project that uses Tier 2 development (frac) related engines operating 6 days per well. Same project will power stationary compressor engines using electricity from traditional power source.
- Two Projects in northeast Colorado with drill rig (spud, primary, completion) engines powered by electricity from traditional power source (not onsite generator); project uses Tier 2 frac engines at 8 days per well.

The latest RGFO 20-year RFD (2012) describes both Federal and non-Federal estimated new oil and gas development projections on a township wide basis (approx. 23,040 acres). Between 2012 and the date of this assessment (August, 2018), there has not been high levels of oil and gas development in the townships where the parcels are located, and since the latest RGFO RFD 20-year projections are for year 2013 out through year 2032, it is reasonable to assume that most of the new oil and gas resources in these townships have not yet been developed. That said, as the largest parcel for this Lease Sale is approximately 522 acres, and townships are approximately 23,040 acres, it would be unreasonable to assume that all of the remaining oil and gas potential for the townships would be developed on these relatively small parcels with no other new oil and gas development to occur on the remaining lands. Nor would it be reasonable to assume that the level of potential oil and gas development on the small parcels would be proportionate to the size of a township, as it is likely that development would be clustered (multiple wells per pad) similar to recent projects in the RGFO (~ 244 new oil and gas wells for 11 new projects). The size (number of wells, etc.) of new oil and gas projects on the proposed lease parcels would likely be similar to other projects in the area, with a similar Federal mineral percentage of total (Federal and non-Federal) minerals extracted.

Projecting the number of potential new Federal wells for any proposed lease parcel (over the remaining life of the 20-year RFD) in a moderate, moderately high or high oil and gas potential area would be highly uncertain, as it would consider several factors including the size of the parcel relative to the township, the average number of new wells and the Federal minerals production percentage for a typical oil and gas project for the area, and how many of these typical projects could be developed on a parcel over the course of the RFD. A reasonable RFD for new Federal oil and gas development for each of the proposed parcels in the moderate, moderately high or high RFD areas is likely greater than one and much less than the overall total (Federal and non-Federal) for the township. Furthermore, with respect to estimating reasonable

foreseeable annual emissions based on RFD for new oil and gas, all the factors described above would have to be considered in addition to the ranges of equipment and operations for new oil and gas projects in the area and the number of "typical" new oil and gas projects that could be developed in a single year. In the last few years, BLM Colorado has approved new Federal oil and gas development for the area, but the number of new projects developed annually has varied in relation to several factors including gas/oil prices.

Project-Level Near-Field Screening:

GIS was used to determine whether sensitive near-field receptors (residence, school, business, hospital, etc.) exist (or likely to exist) near the proposed lease parcels. Considering the potential emissions that could occur for new oil and gas development on the proposed lease parcels, it is determined that new oil and gas development on the proposed parcels for this Lease Sale have a low probability of needing refined (using AERMOD, etc.) future project-level near-field air quality impacts assessments, and this determination was made using emissions magnitude and distance to receptor correlation information assessed in previously completed modeling analyses.

Future Analysis:

Substantial emission-generating activities cannot occur without further BLM analysis and approval of proposals for exploration and development operations.The BLM will assess project-specific impacts on air resources during the parcel development (permitting) stage, including potential impacts to visual and other air quality impacts to nearby Class I areas.The more detailed information available at that stage will allow the BLM to more accurately estimate emissions and determine potential impacts to air quality. BLM Instructional Memorandum CO-2015-009 describes methods for development-stage air-quality impacts analysis. Based on the outcome of our future analysis, approval of these activities may be subject to conditions of approval to address air pollutant impacts and climate change pollutants as appropriate.

Environmental Consequences of Leasing and Development - Cumulative Impacts:

This lease sale, when combined with the past, present, and reasonably foreseeable future actions may (through future development), contribute incrementally to the deterioration of air quality in the region. At present, any future potential cumulative impact is speculative, given that the pace, place, and specific equipment configurations of such development are unknown. Development of fluid minerals on these leases would result in additional surface disturbance and emissions during drilling, completion, and production activities. The severity of these incremental impacts could be elevated based on the amount of contemporaneous development (either Federal or private) in surrounding areas.While recognizing the uncertainties described above, BLM has used mapping and a modeling study to broadly estimate the potential cumulative impacts to air

quality from leasing and development of the parcels under consideration in light of ongoing oil and gas exploration and development in the area.

To examine potential cumulative air quality impacts from activities that it authorizes, this EA will use Colorado Air Resources Management Modeling Study (CARMMS) second iteration (CARMMS 2.0) modeling results. The study includes assessment of statewide impacts of projected oil and gas development (both Federal and fee (i.e. private)) out through year 2025 for three development scenarios (low, medium, and high). Projections for development are based on either the most recent FO Reasonably Foreseeable Development (RFD) document (high scenario), or by projecting the current 5–year average development pace forward through 2025 (low scenario). The medium scenario includes the same well count projections as the high scenario, but assumes restricted emissions, whereas the high and low scenarios assume current development practices and existing emissions controls and regulations (as of year 2015). Each FO was modeled with the source apportionment (SA) option, meaning that incremental impacts to regional ozone and AQRVs from development within each field office are parsed to better understand the significance of development in each area on impacted resources and populations. The RGFO was split into four SA areas, since the field office is so large. The CARMMS project leverages the work completed by the Intermountain West Data Warehouse, and the base model platform and model performance metrics are based on those products (2011). The complete report and associated data is available on our website at: https://www.blm.gov/programs/natural-resources/soil-air-water/air/colorado

The BLM continually tracks authorized oil and gas activity to determine which CARMMS scenario would be most appropriate to estimate air resource impacts based on the source apportionment area's cumulative federal development and total production. Although the predicted impacts will be based on future modeling results (year 2025), the differences in the impacts between the scenarios provide insight into how mass emissions impact the atmosphere on a relative basis, and are thus useful for making qualitative correlations for the tracked emissions levels.

On a cumulative basis, overall Federal oil and gas in Colorado is tracking close to the CARMMS 2.0 low scenario, with higher than CARMMS 2.0 low scenario projected new oil and gas development levels occurring in the DJ Basin (CARMMS 2.0 - Areas 1 [ozone NAA] and 3 [~ DJ Basin outside ozone NAA]) of RGFO and within the Colorado River Valley Field Office (two typically high oil and gas development areas). The cumulative maximum air quality and AQRV impacts described in this EA use the CARMMS 2.0 high scenario modeling results and are far greater than those expected to occur in the near future based on observations of actual new oil and gas development trends (because no area in Colorado is outpacing the high

development scenario and Colorado on a statewide basis is tracking below the CARMMS 2.0 high development scenario).

Table 5: CARMMS 2.0 High Scenario New Federal Emissions (TPY)*

Source Area	PM_{10}	$PM_{2.5}$	VOC	NO_X	SO_2
RGFO	2,814	413	6,178	2,780	4
Colorado	6,518	1,543	33,514	23,714	1,231

*Year 2025 emissions for new Federal oil and gas development years 2016 through 2025.

Table 6: CARMMS 2.0 High Scenario Annual Nitrogen Deposition - RGFO

CARMMS Scenario	Max Class I kg/ha-yr	Class I Area	Max Class II kg/ha-yr	Class II Area
High	0.0003	Rocky Mountain NP	0.0022	Lost Creek Wilderness

Cumulatively, all new Federal oil and gas developed in Colorado through year 2025 for the CARMMS 2.0 high scenario could contribute up to 0.0637 kg/ha-yr of nitrogen deposition annually at the nearby Lost Creek Wilderness (maximum CARMMS 2.0 high scenario predicted annual nitrogen deposition rate for all new Colorado-wide oil and gas development through year 2025 at Great Sand Dunes NP is ~ 0.044 kg/ha-yr). At Rocky Mountain NP, the maximum Colorado Federal cumulative annual nitrogen deposition rate could be approximately 0.0629 kg/ha-yr for the CARMMS 2.0 high scenario. Overall (for all sources) cumulatively, CARMMS 2.0 predicts 0.56 kg/ha-yr and 0.32 kg/ha-yr overall improvements from baseline year 2011 through year 2025 for the high scenario for Rocky Mountain NP and Great Sand Dunes NP, respectively.

Table 7: CARMMS 2.0 High Scenario Visibility Changes - RGFO

CARMMS Scenario	Max Class I dv	Class I Area	Days > 0.5 dv	Days > 1.0 dv	Max Class II dv	Class II Area	Days > 0.5 dv	Days > 1.0 dv
High	0.13977	Rocky Mountain NP	0	0	0.12031	Florissant Fossil Beds NM	0	0

Cumulatively, all new Federal oil and gas in Colorado for the CARMMS 2.0 high scenario could contribute up to 0.29 dv of visibility changes at the Great Sand Dunes National Park (maximum RGFO only predicted potential visibility changes at Great Sand Dunes NP ~ 0.03 dv). At Rocky Mountain NP, the CARMMS 2.0 predicted potential visibility change value for new Colorado Federal O&G (years 2016 through 2025) is approximately 0.30 dv. Overall (for all sources) cumulatively, CARMMS 2.0 future year 2025 worst (dirtiest) 20% days cumulative visibility metric value (deciview – dv) for Rocky Mountain NP is 11.93 dv (not improvement – note that new BLM Colorado Federal O&G development through year 2025 modeled to contribute 0.04 dv of the overall cumulative value) and is 11.43 dv (improvement) for Great Sand Dunes NP.

For all of the metrics outlined above, new Federal oil and gas development within the RGFO through year 2025 for the CARMMS 2.0 high scenario (highest level of new oil and gas development years 2016 through 2025) would not cause significant impacts to air resources. In addition, overall cumulatively, air quality and AQRV improvements (ozone in the Denver – Front Range area, etc.) are expected at many locations around the Region, The following plots show CARMMS 2.0 modeled year 2025 changes from baseline year 2011 conditions for ozone and $PM_{2.5}$, respectively (note that baseline year 2011 plots are provided in the Affected Environment sub-section of this air resources section).

Figure 2: CARMMS 2.0 High Scenario – Ozone - Modeled Year 2025 Change from Baseline Year 2011 Conditions

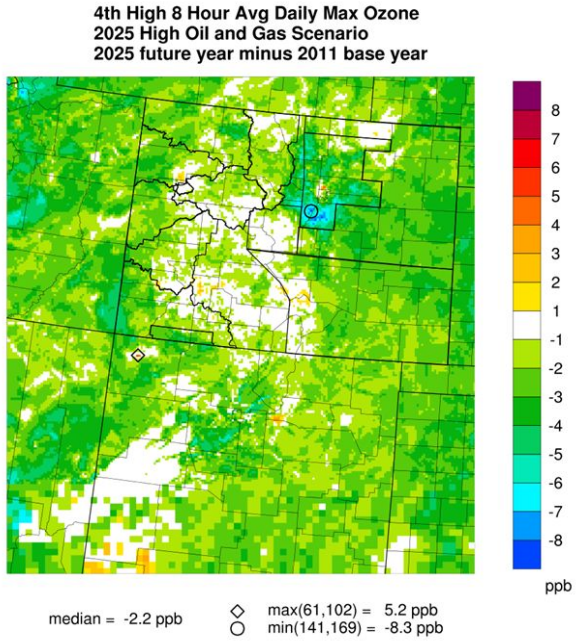
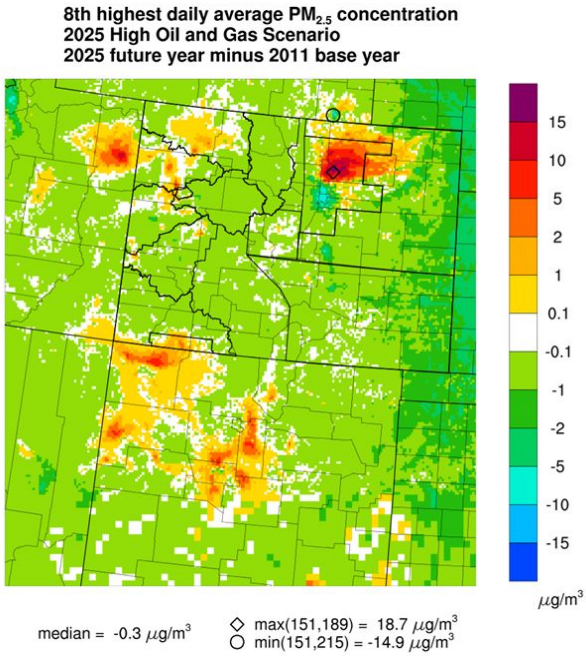


Figure 3: CARMMS 2.0 High Scenario – $PM_{2.5}$ - Modeled Year 2025 Change from Baseline Year 2011 Conditions



GHG and Climate Change:

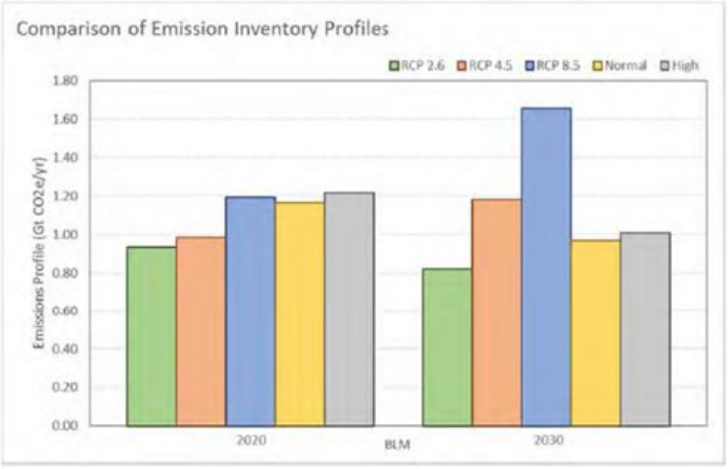
The online Annual Report is incorporated by reference for discussion of GHG emissions and Climate Change. Additional information can be found in the "Projected Emissions for Analysis", "Projected Climate Impacts" and "The Carbon Budget" sections of the Report (https://www.blm.gov/programs/natural-resources/soil-air-water/air/colorado).

In addition, information from BLM's Greenhouse Gas and Climate Change Report (BLM, 2017) is incorporated to describe potential GHG emissions for various future years and energy development scenarios. For that study, GHG emissions were calculated for two energy development scenarios ("normal" rate of energy development and consumption, and an above normal energy production and consumption) for projected years 2020 and 2030 for each BLM State including Colorado. GHG emissions estimates for Federal and non-Federal energy related development (i.e. upstream and midstream) / consumption (i.e. downstream) were developed for coal, oil, natural gas and natural gas liquids. This Report used coal, oil and natural gas production and consumption data presented in the Energy Information Administration's (EIA) 2016 Annual Energy Outlook (AEO) to determine growth factors to estimate 2020 and 2030 normal / high inventories. The following summarizes the projected future years GHG emissions and trends for Colorado Federal resources:

- Colorado Federal Emissions due to oil production and end-use consumption are projected to remain almost static (not much change) from baseline year (2014) to future years (2020 and 2030) with a slight decrease in GHG emissions for both the normal and high energy scenarios.
- Colorado Federal Emissions due to natural gas production and downstream consumption are projected to increase into year 2030 for both the normal and high energy projection scenarios from 42.91 MMTCO2e in base year 2014 to 44.55 and 45.03 MMTCO2e in the 2030 normal and high growth scenarios, respectively.
- Colorado Federal Emissions due to natural gas liquids are projected to decrease from baseline year 2014 to projected year 2030 by approximately 25-30% for both energy projection scenarios.

The Report examined the contribution of GHG emissions from coal, oil, natural gas and LNG for the BLM States in years 2020 and 2030 for both the normal and high production scenarios. Comparing these emissions to the derived BLM emissions profile under the Intergovernmental Panel on Climate Change (IPCC) Representative Concentration Pathway (RCP [GHG concentration trajectory adopted by IPCC for its Fifth Assessment Report in year 2014]) scenarios, the calculated BLM / Federal emissions most closely track with RCP 8.5 in year 2020 and between RCP 2.6 and RCP 4.5 in year 2030 as shown in the following graph. Within the BLM emissions profile, the relative mixture of coal, oil and natural gas changes from baseline

year to 2030. The dependence of coal is reduced, with increased usage of natural gas by year 2030.



In addition, the Golder Report (BLM, 2017) provides a supplemental "Understanding Future Climate Impacts" section and summarizes that projected changes in climate are driven by the cumulative emissions, not the emissions profile. When considering the cumulative emissions on a global scale, the sub-national emissions profile (by BLM as a whole, a BLM Field Office, etc.) is one of many emission contributions. Any single contribution on a sub-national scale is dwarfed by the large number of comparable national and sub-national contributors on a global scale. The best surrogate for understanding the potential impact of sub-national (i.e. RGFO, etc.) emissions on climate is the behavior of the BLM sub-national emissions relative to all the other contributors. If BLM operates under the business-as-usual scenario while all other contributors are reducing their emissions in line with RCP 2.6 (lowest IPCC radiative forcing scenario that will require substantial Global GHG emissions reductions), the relative contribution of BLM increases as the GHG emissions more closely resemble RCP 4.5 (higher radiative forcing / Climate Change impact scenario). If BLM operates under the decreased emissions scenario, keeping their reductions in line with RCP 2.6 like all the other contributors, the relative contribution of BLM remains similar to current contributions. If BLM operates under the decreased emissions scenario, while all other contributors are maintaining constant emissions (business-as-usual) or increasing emissions, the relative contribution of BLM greatly reduces (i.e. BLM's GHG emissions footprint is small compared to other contributors). It is very unlikely that the global cumulative emissions will be strongly influenced by a single contributor (i.e. RGFO, etc.) at a national or sub-national scale. However, the individual behavior of each contributor, through their relative contribution, has the ability to influence which RCP global emissions most closely resembles, and therefore which climate change projections are most likely manifest towards the end of the century.

Potential Future Mitigation:

As noted above, substantial emission-generating activities cannot occur without further BLM analysis and approval of proposals for exploration and development operations. BLM may make its approval of these activities subject to conditions of approval (COA) addressing air pollutant emissions, as appropriate. Prior to approving development activities on a leased parcel, the BLM conducts a refined project-level analysis that considers the impacts of the operator's development plans for the lease, to the extent reasonably foreseeable. The BLM's analyses typically consider the emissions inventory for the proposal (including GHGs), and estimated emissions from other development on and outside the lease and other nearby emissions sources. Additional analyses (such as air dispersion modeling assessments) may be necessary. All operators must comply with applicable local, State and Federal air quality laws and regulations, including Colorado's strict emissions control regulations. BLM impose specific mitigation measures within its authority as COA, based on the review of site-specific proposals or new information about the impacts of exploration and development activities in the region.

Currently, Colorado has some of the strictest emissions regulations in the U.S. for the oil and gas industry not leaving much "available" emissions to reasonably control. The following are examples of some of the additional GHG emissions controls that could be implemented for new Federal O&G development that may occur on the proposed Lease Parcels, and an approximate reduction in future GHG emissions that could result for the additional emissions control:

- A large fraction of CO2 emissions for new O&G wells are associated with large O&G development related engines. NONROAD CO2 emissions factors for large O&G development engines (drilling/completion) are projected to vary little over time even though new equipment technology generally results in cleaner engines, meaning that requiring O&G operators to develop new wells using Tier 4 engines would result in an almost negligible reduction in CO2 emissions for new O&G well development.
- A large portion of CH4 emissions for new O&G wells are associated with pneumatic devices. Implementing no-bleed devices (not feasible for all new oil and gas development) could result in a significant CH4 emissions reduction. These type design features will be implemented (required by BLM) when feasible on a project-by-project basis.

It is reasonable to assume that BLM Colorado oil and gas related emissions development will follow the U.S.-wide emissions pathways/GHG emissions trends based on regulation/policy, or and it is reasonable to assume that Colorado Regulations will reduce Colorado-based emissions even more than other States in the U.S. due to increased oil and gas emissions control

requirements for Colorado. Additional (beyond State and Federal Regulations) mitigation requirements for oil and gas, and mining projects will be developed at the project-level stage when actual proposed actions are submitted to the BLM. BLM will continue to require that activities for projects follow best management practices and continue to encourage operators to control unnecessary GHG emissions using “common sense” and feasible techniques including reducing vegetation clearing when not all is needed (offsets CO2 emissions), reducing truck idling, and double-checking equipment where fugitive emissions could leak (this is also a State and Federal requirement for O&G operations).

3.4.1.2 Minerals/Fluid

Affected Environment:
The 5 parcels proposed for leasing are located throughout the eastern half of Colorado within the RGFO boundary. The development potential according to the most recent reasonable foreseeable development scenario for the field office ranges from Moderate (5 to <10 wells per township) to none (0 wells per township). The parcels in Baca County are considered Moderate to Low (1 to <5 wells per township) Development potential. The parcels in Fremont County are considered low (1 to <5 wells per township) to no development potential.

Environmental Consequences of Leasing and Development - Direct and Indirect Impacts:

Leasing of the parcels would allow for the development and recovery of oil and natural gas resources and help avoid potential drainage of federal fluid minerals from nearby non-federal wells. If development of the parcels takes place, it would result in the extraction and irreversible depletion of hydrocarbon resources from the targeted zones of the leases.

Environmental Consequences of Leasing and Development - Cumulative Impacts:

Should the leases be issued, there would be the potential for development resulting in draining these parcels of fluid minerals, which would add incrementally to the production of overall fluid minerals which may be taking place on non-federal leases, and contribute to the domestic supply of crude oil and natural gas.

Potential Future Mitigation:
None

3.4.1.3 Hydrology/Water Quality

Affected Environment:

The proposed parcels are located on the eastern slope of Colorado, either in the foothills of Fremont County or on the eastern plains.

Surface Water:The proposed lease parcels located in Baca and Fremont Counties are in the Arkansas watershed basin. The Arkansas River originates in the mountains near Leadville, Colorado, and flows south and east over 1,400 miles, until it joins the Mississippi River in Arkansas. There appears to be no permanent surface water on any of the parcels; however, some drainages within the parcels may have intermittent water on them depending on weather. In addition, the Baca County parcels are proximal to the Cimarron River, as close as 250 feet.

Ground Water: The proposed lease parcels within Baca county are located above the Ogallala Formation, which is part of the High Plains aquifer. The High Plains aquifer underlies an area of about 174,000 square miles that extends throughout parts of Colorado, Nebraska, Kansas, New Mexico, Oklahoma, South Dakota, Texas and Wyoming. The aquifer is the principal source of water in one of the major agricultural areas of the United States. In eastern Colorado, the High Plains aquifer has an average saturated thickness of about 75 feet, and the average transmissivity is about 4,500 square feet/day. The base of the aquifer is underlain by the Pierre shale formation that is generally considered impermeable, except for some sands near the top of the Pierre shale that can contain usable water. Dissolved solids concentration of water in the aquifer in eastern Colorado is generally less than 500 mg/l but exceeds 1,000 mg/l in some areas. Potential well yields of more than 750 gpm may be obtainable in the eastern Colorado portion of the aquifer, but many wells yield far less. (USGS 1995)

The proposed lease parcels in Fremont County are located above the Dakota-Cheyenne aquifer. The Dakota-Cheyenne group is an assemblage of sandstones, shales, and mudstones of lower Cretaceous age. Thirty-one percent of Colorado's oil and 25 percent of Colorado's gas has been produced from the Dakota group; however, the group is water bearing when it is close to the surface. The group ranges from 100 to 500 feet thick, and saturated zones are highly variable. Water from the aquifer is used for agricultural and commercial purposes; however, it is unreliable as a source for high volume-production. Domestic yields commonly range from 5 to 50 gallons per minute, and some irrigation wells in Baca County yield more than 1,000 gallons per minute. Total dissolved solids (TDS) typically range from 200 to 25,000 milligrams per liter, and is dependent on the geological composition of the unit.

Environmental Consequences of Leasing and Development - Direct and Indirect Impacts:

The act of leasing the parcels for oil and gas development would have no direct impact on water resources; however, activities at the exploration and development stage could have impacts to

water quality and quantity. The magnitude and location of direct and indirect effects cannot be predicted with accuracy until the site-specific APD stage of development, at which time groundwater resources will be analyzed. No lease stipulations for the proposed parcels specifically address either surface or groundwater quality; however, there are regulations in place that require protection of water quality. If these parcels are developed, operators would be required to adhere to state and federal regulations, and implement proper site specific design features. Therefore, development is not expected to result in waters not meeting quality standards. Similar to water quality, water quantity impacts cannot be predicted with accuracy until the site specific APD stage. Many factors, such as well type, depth, the formation being drilled, and the use of recycled water, influence the amount and timing of water used to construct, drill and complete a well. It is also not known at the leasing stage how many wells associated with these parcels may be drilled. Water usage is regulated by the State of Colorado's water rights system and operators would need to obtain a source of water approved by the state for the intended use.

Surface Water: Impacts to surface water resources would be associated with surface disturbance from the construction of roads, pipelines, well pads, and power lines. Specific impacts could include increased soil movement due to vegetation removal and soil compaction caused by construction that would reduce soil infiltration rates, in turn increasing runoff during precipitation events. Downstream effects of the increased runoff may include sedimentation and changes in downstream channel morphology such as bed and bank erosion or accretion. Impacts would be greatest shortly after the start of the activity and decrease over time. These impacts are expected to be mitigated by the implementation of design features and conditions of approval (COAs) including stormwater control measures that would slow runoff and capture sediment, and require proper revegetation at the interim and final reclamation phases. Construction and reclamation activities would be in accordance with BLM Gold Book standards where applicable. These measures would be applied at the APD stage to address site specific conditions based on submitted surface use plans of operations as required by the BLM. In addition, the State of Colorado requires stormwater protection plans for disturbances greater than one acre.
Oil, saltwater or other fluids, accidentally spilled or leaked during the drilling, completion or production process could result in the contamination of both ground and surface waters; however, the BLM and State of Colorado have regulations that help to minimize the likelihood of contamination of water resulting from spills, and require effective clean-up of spills that may occur. The state also regulates the disposal, remediation and recycling of waste generated by oil and gas development to ensure that water resources are not impacted. Authorization of development projects would be further analyzed at the APD stage and permits would require full compliance with BLM directives and state regulations for surface and groundwater protection.

Groundwater: If the proposed parcels are drilled, wells would most likely pass through usable groundwater. Potential impacts to groundwater resources could occur if proper cementing and casing programs are not followed. This could include loss of well integrity, surface spills, or loss of fluids in the drilling and completion process. Without proper casing and cementing of the well bore, it is possible for chemical additives used in drilling and completion activities to be introduced into usable water (TDS<10,000 ppm) zones. However, BLM Onshore Order #2 requires protection of usable groundwater through proper drilling, cementing and casing procedures. When an operator submits an APD, the operator must submit a site specific drilling plan. The BLM petroleum engineer reviews the drilling plan, and based on site specific geologic and hydrologic information, ensures that proper drilling, casing and cementing procedures are incorporated in the plan in order to protect usable groundwater. This isolates usable water zones from drilling, completion/fracturing fluids, and fluids from other mineral bearing zones, including hydrocarbon bearing zones. Conditions of approval are attached to the APD, if necessary, to ensure groundwater protection. At the end of the well's economic life, the operator must submit a plugging plan which undergoes review by the BLM petroleum engineer prior to well plugging, which ensures permanent isolation of usable groundwater from hydrocarbon bearing zones. BLM inspectors ensure planned procedures are properly followed in the field. The State of Colorado also has regulations for drilling, casing and cementing, completion and plugging to protect freshwater zones.

If the parcels are developed, wells within the parcels may be completed using hydraulic fracturing techniques. Hydraulic fracturing is intended to change the physical properties of producing formations by increasing the flow of water, gas, and/or oil around the wellbore, resulting from the introduction of water, proppant (sand) and chemical additives into the producing formations. Types of chemical additives used in completion activities may include acids, hydrocarbons, thickening agents, gelling agents, lubricants, and other additives that are operator and location specific. The largest components in hydraulic fracturing fluid are water and sand. The State of Colorado requires operators to publicly disclose all chemicals in hydraulic fracturing fluids used on all wells completed in Colorado using hydraulic fracturing techniques on "FracFocus," a database available to the public online at http://fracfocus.org/.

In general, there is some public concern over potential increased seismicity associated with fracking and wastewater injection. Water injection, impoundment of reservoirs, surface and underground mining, and withdrawal of fluids from the subsurface have long been linked to increased seismicity (Ellsworth). More than 100,000 wells have been fracked in recent years, and micro-earthquakes with magnitudes less than 2 are routine in the fracking process. There are millions of naturally occurring micro-earthquakes per year, which are too small to be felt by humans (USGS). The largest earthquake induced by humans was magnitude 3.6, which is very

unlikely to cause damage (Ellsworth). Larger mid-continent earthquakes, like the 2016 magnitude 5.6 Oklahoma earthquake, may be linked to water disposal wells (Ellsworth). The disposal wells may weaken pre-existing faults by elevating pore fluid pressure, causing slippage. However, only a small percentage of the 30,000 existing water disposal wells are problematic. Those wells that inject a large amount of fluid and communicate with faulting in basement rock are most problematic (Ellsworth). The State of Colorado regulates the amounts of water injected, and the geologic formations into which they are injected. The proposed parcels are in areas the USGS has determined to be very low risk for damage occurring from natural and induced earthquakes (Less than 1 percent).

If contamination of aquifers from any source occurs, changes in groundwater quality could impact springs and water wells that are sourced from the affected aquifers. BLM Onshore Order #2 requires that the proposed casing and cementing programs shall be conducted as approved in the APD to protect and/or isolate all usable water zones from other geologic formations (including the hydrocarbon producing zones), and any completion fluids introduced in the wellbore. In addition to BLM's regulations to protect usable water zones, the Colorado Oil and Gas Conservation Commission (COGCC) regulates drilling and hydraulic fracturing, and has extensive operational requirements in place to protect ground (and surface) water. Examples include casing and cementing programs, comprehensive spill clean-up requirements, regulation of waste management, groundwater monitoring, and offset well evaluation for horizontal wells that will be hydraulically fractured. This policy requires operators proposing to hydraulically fracture a horizontal well evaluate existing wells that penetrate the target formation, within 1,500' of the wellbore of the proposed well to be fracture treated, ensuring these offset wells have adequate zonal isolation. If offset wells are deemed to have inadequate zonal isolation, the operator must adequately remediate the well with casing and cementing improvements, or properly plug the offset well. This is to prevent fluid from migrating along offset well bores into freshwater zones from zones that are hydraulically fractured. The wellheads of offset wells are also evaluated and upgraded, if necessary, to ensure that any pressure increase in the wellbore due to the fracture treatment will not result in a spill at the surface, protecting surface water. Requirements of Onshore Order #2 (along with adherence to state regulations) make contamination of groundwater resources highly unlikely. Surface casing and cement would be extended beyond usable water zones. Production casing will be extended and adequately cemented within the surface casing to protect other mineral formations, in addition to usable water bearing zones. These requirements ensure that drilling fluids, hydraulic fracturing fluids and produced water and hydrocarbons remain within the well bore and do not enter groundwater or any other formations.

Environmental Consequences of Leasing and Development - Cumulative Impacts:
Throughout the lease area there are many activities currently occurring, along with historic impacts, which affect water quality. These activities may include: oil and gas development, residential and commercial development, grazing, farming, and mining. Potential development of these parcels would incrementally add an additional impact to water resources into the future. Most of this impact would be phased in and lessened as new wells put on production undergo interim reclamation, older wells are plugged, and those locations reclaimed. Overall, it is not expected that the leasing and possible future development of the parcels would cause long term degradation of water quality below state standards.
Water is used to drill and complete oil and gas wells and potential development would result in the use of water. The State of Colorado regulates water use within Colorado, including water used for oil and gas development. It is not known at the lease stage how many (if any) wells will be drilled on a given lease parcel, how many parcels will be developed, what source would be used for the water and how much water may be used for each potential well. Factors such as the type of well to be drilled (vertical, directional or horizontal), method of well completion (hydraulic fracturing, acidizing etc.) total measured depth of well, and geologic conditions of the formations all determine how much water may be required for each well. This information is not known at the lease stage, but will be analyzed at the APD stage. The act of oil and gas leasing does not directly result in any water use.
Potential impacts to groundwater at site specific locations are analyzed through the NEPA review process at the development stage when the APD is submitted. This process includes geologic and engineering reviews to ensure that cementing and casing programs are adequate to protect all downhole resources.
Potential Future Mitigation: Reclamation practices along with additional drilling and construction requirements (Onshore Order #2, engineering reviews, stormwater management features) at the APD stage are adequate to protect water resources on the parcels being proposed for leasing. Additional site specific mitigation measures would be analyzed and may be required at the APD stage, which could include moving a pad up to 200 meters to avoid sensitive areas, or adding site specific BMPs as required.

3.4.2 Biological Resources

3.4.2.1 Migratory Birds

Affected Environment:
The dominant habitat in this physiographic area is shortgrass prairie. Shortgrass is dominated by two low-growing warm-season grasses, blue grama and buffalo grass; western wheatgrass is also present, along with taller vegetation including widespread prickly-pear cactus and yucca, and cholla in the south. Sandsage prairie is found where sandy soils occur, and is dominated by sand

sagebrush and the grasses sand bluestem and prairie sand-reed. Mixed grass (needle-and-thread, sideoats grama) and tallgrass (big bluestem, little bluestem, switchgrass) communities occur locally.

The following birds are listed on the US Fish and Wildlife Service Birds of Conservation Concern (BCC) – 2008 List for BCR 16-Southern Rockies/Colorado Plateau and BCR 18-Shortgrass Prairie and may occur within the proposed lease area: mountain plover, upland sandpiper, Bell's vireo, Sprague's pipit, lark bunting, McCown's longspur, chestnut-collared longspur, grasshopper sparrow, northern harrier, and prairie falcon. These species have been identified as birds that may be found in the project area, have declining populations and should be protected from habitat alterations.

Environmental Consequences of Leasing and Development - Direct and Indirect Impacts:
Leasing will have no impact on individual migratory birds, populations or habitat. If leases are developed, surface disturbing activities, such as road building or pad and pipeline construction will destroy existing habitat. If surface disturbing activities occur during the nesting season, "take" of nests may occur. Noise and human activity generated during construction, drilling, and production phases will likely result in a larger impact footprint than the disturbance footprint alone.

Migratory birds may be burned, entrapped, and/or killed by exhaust vents, heater-treaters, flare stacks, and open pipes, etc., as a result of development related infrastructure. An increase in activity, i.e. road traffic, will likely result in an increase in vehicular collisions with migratory birds. If oil and/or gas are located in economically feasible quantities, it is likely additional development will occur.

Appropriate lease stipulations to protect some migratory birds and their habitats were attached to parcels and described in Attachments A and C. Further, at the field development and APD stage it is standard procedure to include a COA on all APDs to protect migratory birds. The COA will ensure that operators take measures to prevent destruction of nests and effectively preclude migratory bird access to, or contact with, reserve pit contents that possess toxic properties (i.e., through ingestion or exposure) or have potential to compromise the water-repellent properties of birds' plumage, or other harmful conditions associated with development.

Environmental Consequences of Leasing and Development - Cumulative Impacts:
Throughout the lease area there are many activities currently occurring, along with historic impacts, which affect migratory bird species. These activities include: oil and gas development, residential development, grazing, agriculture, mining and recreation. In areas where human

development had previously modified the natural environment (i.e. agricultural, settlement, past oil and gas development) it is likely that migratory bird species richness and diversity had been compromised. However, new oil and gas development will likely cause an additive negative impact to most species of migratory birds currently present at the site. While the leasing of parcels will not compound these impacts, future oil and gas development may impose deleterious effects. Every parcel is unique and cumulative impacts will need to be addressed in the APD stage.

Potential Future Mitigation:
Pursuant to BLM Instruction Memorandum 2008-050, to reduce impacts to Birds of Conservation Concern (BCC), no habitat disturbance (removal of vegetation such as timber, brush, or grass) is allowed during the periods of May 15 - July 15, the breeding and brood rearing season for most Colorado migratory birds. The provision will not apply to completion activities in disturbed areas that were initiated prior to May 15 and continue into the 60-day period.

An exception to this timing limitation will be granted if nesting surveys conducted no more than one week prior to vegetation-disturbing activities indicate no nesting within 30 meters (100 feet) of the area to be disturbed. Surveys shall be conducted by a qualified breeding bird surveyor between sunrise and 10:00 a.m. under favorable conditions.

Any secondary containment system will be covered in a manner to prevent access by migratory birds. The operator will construct, modify, equip, and maintain all open-vent exhaust stacks or pipes on production equipment to prevent birds and bats from entering and to discourage perching, roosting, and nesting. Production equipment includes, but may not be limited to, tanks, heater-treaters, separators, dehydrators, flare stacks, and in-line units. Any action that may result in a “take” of individual migratory birds or nests that are protected by MBTA will not be allowed.

Additionally, standard lease terms and conditions, which allow the BLM to move an operation up to 200 meters and delay operations for up to 60 day, may be implemented to protect valuable wildlife resources.

3.4.2.2 Special Status Species

Affected Environment:
Many BLM sensitive species (lesser prairie chicken, black-tailed prairie dog, swift fox, Townsend’s big eared bat, common kingsnake, milk snake, massasauga, mountain plover,

Brewer's sparrow, ferruginous hawk and golden eagle) could potentially occur on parcels available for leasing.

All proposed lease parcels are subject to lease stipulation Exhibit CO-34 to alert lessees of potential habitat for a threatened, endangered, candidate, or other special status plant or animal species. Protective measures for these species will be applied, if necessary, at the APD stage and might include the need to move development pads, enforce timing limitations, enforce no surface occupancy restrictions, etc. Additional NEPA analysis will be completed as individual APDs are received for all the parcels identified in this document. Site specific field visits will be conducted as deemed necessary for those parcels that contain federally listed and sensitive species habitat.

Lesser prairie chicken: Lesser prairie chickens (LPC) were likely resident in six counties in Colorado prior to European settlement (Giesen 2000). At present, LPC are known to occupy portions of Baca, Cheyenne, Lincoln, Prowers, and Kiowa counties. The federal status of LPC is currently under review as it has been petitioned as an endangered species under the Endangered Species Act. The Western Association of Fish and Wildlife Agencies (WAFWA) has developed and enacted a Range Wide Plan for LPC in coordination with federal and state agencies. The conservation plan emphasizes tools and incentives to encourage landowners and others to voluntarily partner with agencies in LPC habitat conservation efforts, while also achieving their land use needs. The Southern Great Plains Crucial Habitat Assessment Tool (SGP CHAT) models the estimated occupied range of LPC within the action area. Parcels 8076, 8078, and 8079 occur within the modeled occupied range.

Black-tailed prairie dog: The BLM lists the black-tailed prairie dog a sensitive species. Black-tailed prairie dogs primarily occur in scattered colonies throughout the eastern plains of Colorado. In the summer of 2001, Colorado Parks and Wildlife inventoried colonies by utilizing aerial survey line transects throughout their historic range. Survey results suggest that statewide, approximately 631,000 acres of black-tailed prairie dog habitat are occupied.

Swift fox: Swift fox primarily occur within the shortgrass and mixed grass prairie on the eastern plains of Colorado. The distribution of swift foxes became severely reduced in concert with conversion of mid and shortgrass prairies to agriculture. Swift fox dens occur in ridges, slopes, hill tops, pastures, roadside ditches, fence rows and cultivated fields. Dens may be relatively close to human habitations and swift foxes occasionally den in human-made structures such as culverts.

Townsend's big-eared bat: The Townsend's big-eared bat occurs in Colorado and throughout the west. Habitat associations include: coniferous forests, deserts, native prairies, riparian

communities, and agricultural areas. Distribution is strongly correlated with the availability of caves and cave-like roosting habitat, with population centers occurring in areas dominated by exposed, cavity forming rock and/or historic mining districts. Townsends' habit of roosting on open surfaces makes it readily detectable, and it is often the species most frequently observed (commonly in low numbers) in caves and abandoned mines throughout its range. It has also been reported to utilize buildings, bridges, rock crevices and hollow trees as roost sites.
Foraging associations include: edge habitats along streams adjacent to and within a variety of wooded habitats. They often travel long distances while foraging, including movements of over 10 miles during a single evening. Townsends' are a moth specialist with over 90% of its diet composed of lepidopteron.

The primary threat to the species is almost certainly disturbance or destruction of roost sites (e.g., recreational caving, mine reclamation, renewed mining in historic districts). This species is very sensitive to disturbance events and has been documented to abandon roost sites after human visitation.

Common kingsnake: The common kingsnake is generally associated with lowland river valleys. In southeastern Colorado, it has been found near irrigated fields on the floodplain of the Arkansas River, in rural residential areas in plains grassland, near stream courses, and in other areas dominated by shortgrass prairie. Periods of inactivity are spent in burrows and logs, in or under old buildings, in other underground spaces, or beneath various types of cover.
Known from a few locations in southeastern Colorado (north to the vicinity of the Arkansas River) and a few sites in extreme southwestern Colorado (western Montezuma County), at elevations below about 5,200 feet, the species is generally difficult to find but may be locally fairly common in its very restricted range in Colorado.

Milk snake: The milk snake occupies a wide variety of habitats in Colorado, including shortgrass prairie, sandhills, shrubby hillsides, canyons and open stands of ponderosa pine with Gambel oak in the foothills, pinyon-juniper woodlands, arid river valleys, and abandoned mines. It generally stays hidden, except at night, and may be found under discarded railroad ties in sandhill regions. Hibernation sites include rock crevices that may be shared with other snake species. The species occurs throughout most of Colorado at elevations primarily below 8,000 feet and is generally scarce or at least hard to find, but locally fairly common.

Massasauga: Massasauga habitat in Colorado consists of dry plains grassland and sandhill areas. Massasauga may be attracted to sandy soils supporting abundant rodent populations. The species occurs in southeastern Colorado at elevations below about 5,500 feet.

Mountain plover: Mountain plovers are found throughout the RGFO in suitable habitats. While the species is relatively rare, they can be found generally in open, flat tablelands that display some function of disturbance such as agricultural production, drought, grazing, fire, etc. (Knopf and Miller 1994). Plover habitat associated with this assessment is located in Baca county.

Brewer's sparrow: The Brewer's sparrow breeds primarily in sagebrush shrublands, but will also nest in other shrublands such as mountain mahogany or rabbitbrush. While migrating, the species will occupy wooded, brushy and weedy riparian, agricultural, and urban areas. They are locally uncommon to common on the eastern plains and lower foothills of Colorado.

Burrowing owl: The burrowing owl is closely associated with active prairie dog colonies throughout its range. Burrowing owls require a mammal burrow or natural cavity surrounded by sparse vegetation. Burrow availability is often limiting in areas lacking colonial burrowing rodents. Burrowing owls frequently use burrows of black-tailed prairie dogs. They nest less commonly in the burrows of Gunnison's prairie dogs, skunks, foxes, and coyotes.

Ferruginous hawk: The ferruginous hawk inhabits grasslands and semi-desert shrublands, and is rare in pinyon-juniper woodlands. Ferruginous hawks are typically winter resident on the eastern plains, but may nest in this area on occasion. Winter residents concentrate around prairie dog towns. Winter numbers and distribution fluctuate greatly according to the availability of prairie dogs. Migrants and winter residents may also occur in shrublands and agricultural areas. Breeding ferruginous hawks nest in isolated trees, on rock outcrops, structures such as windmills and power poles, or on the ground.

Golden eagle: Colorado populations of golden eagles occupy a variety of habitat ranging from grasslands and shrublands to forested woodlands. Nesting occurs on cliffs or in trees, but birds will range widely over surrounding habitats.

BLM Sensitive Plants: Three species of BLM sensitive plants that occur near the proposed lease parcels: *Mentzelia chrysantha, Aquilegia chrysantha, and Mentzelia densa*. However, populations of these species are not known to occur within the proposed parcels.

Environmental Consequences of Leasing and Development - Direct and Indirect Impacts:
The act of leasing parcels for oil and gas development would have no direct impact on wildlife resources. However, the authorization to lease parcels for oil and gas development will likely result in future development at some locations. The magnitude and location of direct and indirect effects cannot be predicted until the site-specific APD stage. At this time, the speculative nature of this process does not provide specifics of development; therefore, specific impacts to

terrestrial wildlife from development remain unknown. Potential effects of development for some species are described below.

Lesser prairie chicken: Pitman et al. (2005) studied LPC in southwestern Kansas from 1997-2002. They examined nest distances from anthropogenic features (wellheads, buildings, improved roads, unimproved roads, transmission lines, and center pivot irrigation fields) to determine if the features were related to location and success of nests. They found that anthropogenic features (transmission lines, wellheads, buildings, improved roads, center-pivots) were avoided by nesting LPC when compared to random points within the study area. The study demonstrated the functional loss of habitat beyond the footprint of physical structures by identifying avoidance areas that lost all value as LPC nesting habitat due to the proximity to these features.

Patten et al. (2005) studied populations of LPC in New Mexico and Oklahoma from 1999-2003. They radio-tracked 93 females and 188 males in New Mexico and 62 females and 191 males in Oklahoma and found that female mortality was significantly higher in Oklahoma when compared to their study population in New Mexico. They found that the cause for this increase in mortality was related to collisions with fences, power lines, and vehicles, which was three times higher than that in the study birds in New Mexico.

Bidwell et al. (2003) suggests that LPC avoid high quality habitat within 200 meters of a single oil well or gas pump and they avoid areas within 600 meters of an unimproved road and within 1,000 meters of an elevated power line. Crawford and Bolen (1976) found that a constructed road through rangeland caused the abandonment of the otherwise traditional lek. Woodward et al. (2001) performed geographic information system (GIS) analysis on landscapes and landscape change through time. They then compared this to the trend in LPC populations. They found that LPC populations with a declining population trend were related to landscapes with higher rates of landscape change and greater loss of shrub land cover types.

Recent research indicates that development of anthropogenic infrastructure is causing a deleterious effect on reproductive success and LPC populations. Related to mineral leasing and development, existing LPC habitat should be protected from development as the presence of buildings, improved roads, transmission lines, center-pivot files, and wellheads reduce potential nesting habitat for a radius of up to 1 km. Lease stipulations RG-03 (TL) and CO-02 (NSO) have been attached to parcels 8076, 8078, and 8079.

Black-tailed prairie dog: Many areas within the range of black-tailed prairie dogs have been classified as valuable for oil and gas development. Possible direct negative impacts associated

with oil and gas development include clearing and crushing of vegetation, reduction in available habitat due to pad construction, road development and well operation, displacement and killing of animals, alteration of surface water drainage, and increased compaction of soils. Indirect effects include increased access into remote areas by shooters and OHV users. Gordon et al. (2003) found that shooting pressure was greatest at colonies with easy road access as compared to more remote colonies. Conversely, oil and gas development may create areas with reduced shrub cover, providing additional habitat for prairie dogs to colonize.

Swift fox: Oil and natural gas exploration fragments existing grasslands and increases road traffic and access by humans. Impacts of this type of disturbance on swift foxes are unknown, but both positive and negative effects may be expected. On the positive side, prey abundance for swift foxes may increase in the vicinity of roads. However, loss of local habitat, increased mortality due to vehicle collisions, trapping and accidental shooting may also result (Carbyn et al. 1994).

Townsend's big eared bat: It is unlikely that the proposed lease parcels offer habitat suitable for hibernation or rearing of young Townsend's big-eared bat. Perhaps widely distributed singly or in small groups during the summer months, roosting bats may be subject to localized disturbance from development activity and relatively minor but long term impacts from reductions in the extent of mature woodland stands as sources of roost substrate.
Reptile species: Direct effects to the BLM sensitive reptile species could include injury or mortality as a result of construction, production, and maintenance activities. These effects would most likely occur during the active season for these species, which is generally April to October. Indirect effects could include a greater susceptibility to predation if roads or pads are used to aid in temperature regulation. Overall; however, there is a low likelihood that these species would be substantially affected.

Mountain plover: Mountain plovers nest on nearly level ground (often near roads). Adults and chicks often feed on or near roads, and roads may be used as travel corridors by mountain plovers. These factors make plovers susceptible to being killed by vehicles. Therefore, as oil and gas infrastructure is developed and used, the probability of plover mortality or nest destruction will likely increase. While nesting locations are currently unknown, mitigation (plover nesting survey, timing limitations, etc.) to prevent take will be identified at the APD planning stage.

Brewer's sparrow: Leasing will have no impact on individual migratory birds, populations or habitat. If leases are developed, surface disturbing activities, such as road building or pad and pipeline construction will destroy existing habitat. If surface disturbing activities occur during the nesting season, "take" of nests may occur. Noise and human activity generated during

construction, drilling, and production phases will likely result in a larger impact footprint then the disturbance footprint alone.

Migratory birds, including Brewer's sparrow, may be burned or killed by exhaust vents, heater-treaters, flare stacks, etc., if perched at the opening while in operation. An increase in activity, i.e. road traffic, will likely result in an increase in vehicular collisions with migratory birds. Mitigation proposed in the migratory bird section will be adequate to protect Brewer's sparrow.

Burrowing owl: The primary impact to the burrowing owl from developing leases on federal lands would be from the potential loss of habitat or the disruption of a nest site if development were to occur within an active prairie dog colony. However, standard lease stipulations would allow the BLM the flexibility to move development up to 200-meters to mitigate direct impacts to BLM sensitive species.

Ferruginous hawk: Ferruginous hawks will construct nests upon oil and gas related structures. However, these nests are less successful than nests built upon natural structures due to repeated human visitation. While the footprint of individual oil and gas wells is minimal relative to other energy developments, the total habitat lost to the network of wells and connecting roads can be considerable in areas undergoing full-field development. The potential for oil and gas related disturbance of nesting, foraging or roosting raptors arises not only from new well installation activities, including road and pad construction, drilling and equipment installation over the course of several weeks to months, but also from continual servicing and maintenance of wells over their production lifetime. Raptors are protected by a suite of stipulations (CO-03, CO-18, and CO-19) that require no surface occupancy within one-eighth of a mile of nests and a timing limitation to protect raptor nesting and fledgling habitat.

Golden eagle: Golden eagles are a wide ranging species that is dispersed across the entire RGFO area. Surface disturbing activities that have potential to disrupt golden eagle nesting activity are subject to NSO and TL provisions (CO-03, CO-18) established in the applicable Resource Management Plans. These stipulations have been successful in protecting ongoing nest efforts and maintaining the long term utility of nest sites in the resource area.

BLM Sensitive Plants: Surface disturbing activity may destroy populations of BLM sensitive plants if present. However, standard lease stipulations provide adequate protections for sensitive plant populations by allowing BLM to relocate surface disturbing activities up to 200 meters. Therefore, sensitive plant populations can be avoided and protected.

Environmental Consequences of Leasing and Development - Cumulative Impacts:
Throughout the lease area there are many activities currently occurring, along with historic impacts, which affect wildlife resources. These activities include: oil and gas development, residential development, grazing, agriculture, mining and recreation. While the leasing of parcels will not compound these impacts, future oil and gas development may impose deleterious effects. Every parcel is unique and cumulative impacts will need to be thoroughly addressed at the APD planning stage.

Potential Future Mitigation:
A potential condition of approval that could be applied at the development phase would require operators to conduct a survey for federally listed and BLM sensitive species where potential habitat exists. If these species or key habitat features are located, BLM may implement timing limitations and/or spatial buffers to mitigate conflicts to the extent allowed in the RGFO Resource Management Plan, Northeast Resource Management Plan and Code of Federal Regulations (43 C.F.R. § 3101.1-2).

If development is to occur from April 10 through July 10, a survey for nesting mountain plover will be required where habitat exists. A no surface occupancy buffer of 300–feet will be placed around located nests. Migratory birds and raptors, including golden eagles, ferruginous hawks, and burrowing owls, are protected by federal law. Therefore, it will be required that a raptor nest survey be conducted within a 0.5–mile radius (Colorado Parks and Wildlife recommended golden eagle buffer) of future project sites. Raptor nests located will be protected by species-appropriate no surface occupancy buffers and timing limitations approved by existing resource management plans. As a potential condition of approval, if a ferruginous hawk constructs a nest upon any oil and gas related platforms (e.g. tanks), the BLM will be notified, an alternative nesting structure will be constructed, and the nest moved to the alternate structure at the expense of the lessee. Additionally, BLM may require an operator move an operation and delay activities to protect valuable wildlife resources, if supported by the site-specific NEPA analysis for the development activity.

In addition, movement of proposed surface disturbing may be required, up to 200 meters, to protect BLM sensitive plant species.

3.4.2.3 Wetlands and Riparian Zones

Affected Environment:
The Proposed Action includes leasing parcels previously deferred in southeast portions of the state (Baca County), and two separated parcels in Fremont county (southwest of Florence CO, and west of Canon City CO). One 3-acre sliver (parts of two parcels) in Baca County is entirely

within the floodplain of the Cimarron River. All the other parcels in Baca County have drainages bisecting them, or edge the undefined high water areas of the Cimarron River. RGFO has limited on site knowledge or any site specific details about riparian, wetland or aquatic habitats along the Cimmarron parcels as the surface ownership is private land; however, remote sensing layers are used to determine land use patterns and potential for resource presence. Generally, all parcels are upland with either agriculture on the parcel or nearby, or are grazed rangelands (Baca County). However, parcels in proximity to the higher water table in the often dry Cimmorron River and close by ephemeral drainages on near to Cimmorron River parcels give a probability to seep wetlands being present. In Fremont County, parcels are dry sloped lands at generally foothill elevations. Smaller drainage ways are on these Fremont County parcels, but are known to be ephemeral.

Environmental Consequences of Leasing and Development - Direct and Indirect Impacts:
In all cases, any parcel with a drainage suspected of carrying water with some regular frequency is treated as a stream with riparian and aquatic habitat present. Due to this, stipulations to guide safe placement of drilling areas are applied because seeps, springs, and small perennial habitats may be present even within otherwise ephemeral drainages (CO-28). If development occurs, typical field development impacts to wetlands generally would relate to overland flow acceleration impacts. These cannot be addressed at the leasing stage but are typical potential impacts that would be addressed at the site specific APD stage. All parcels with potential riparian or wetlands habitat have stipulations to protect these resources by direct avoidance of infrastructure otherwise (Appendix C).

Environmental Consequences of Leasing and Development - Cumulative Impacts:
Regional variation in land use modification occurs in the counties where leasing is proposed. Post lease development would be cumulative to development in Fremont County, or agriculture in Baca County. The specific parcels under this lease sale are not in proximity to other oil and gas activity so any new activity would be additive and cumulative to the specific ranching, agriculture, and development land uses. Alterations to overland flow and subsequent erosion entering waterways from new development is the primary effect that is cumulative to existing alterations.

Potential Future Mitigation:
At the APD stage, RGFO will need to evaluate if location stipulations alone are sufficient to protect wetland resources or if other protective measures are necessary.
RGFO will incorporate appropriate oil and gas development BMPs when possible to limit and buffer overland runoff from being accelerated into drainages.

Under a No Action Alternative, leasing or post development does not occur, Under this alternative there are no direct, indirect or cumulative impacts to riparian or wetland habitats.

3.4.2.4 Aquatic Wildlife

Affected Environment:
The Proposed Action includes leasing parcels previously deferred in southeast portions of the state (Baca County), and two separated parcels in Fremont county (southwest of Florence CO, and west of Canon City CO). One 3-acre sliver (parts of two parcels) in Baca County is entirely within the floodplain of the Cimarron River. All the other parcels in Baca County have drainages bisecting them, or edge the undefined high water areas of the Cimarron River. RGFO has limited on site knowledge or any site specific details about riparian, wetland or aquatic habitats along the Cimarron parcels as the surface ownership is private land; however, remote sensing layers are used to determine land use patterns and potential for resource presence. Generally, all parcels are upland with either agriculture on the parcel or nearby, or are grazed rangelands (Baca County). However, parcels in proximity to the higher water table in the often dry Cimarron River and close by ephemeral drainages on near to Cimarron River parcels give a probability to seep wetlands being present providing aquatic habitat, even if only seasonally or in wetter years. In Fremont County, parcels are dry sloped lands at generally foothill elevations. Smaller drainage ways are on these Fremont County parcels, but are known to be ephemeral with no aquatic habitat.

Environmental Consequences of Leasing and Development - Direct and Indirect Impacts:
In all cases, any parcel with a drainage suspected of carrying water providing some aquatic habitat, even seasonally, with some regular frequency is treated as a stream with riparian and aquatic habitat present. Due to this, stipulations to guide safe placement of drilling areas are applied because seeps, springs, and small perennial habitats may be present even within otherwise ephemeral drainages (CO-28). If development occurs, typical field development impacts to wetlands generally would relate to overland flow acceleration impacts. These cannot be addressed at the leasing stage but are typical potential impacts that would be addressed at the site specific APD stage. All parcels with potential riparian, wetlands or aquatic habitat have stipulations to protect these resources by direct avoidance of infrastructure otherwise (Appendix C).

Environmental Consequences of Leasing and Development - Cumulative Impacts:
Regional variation in land use modification occurs in the counties where leasing is proposed. Post lease development would be cumulative to development in Fremont County, or agriculture in Baca County. The specific parcels under this lease sale are not in proximity to other oil and gas activity so any new activity would be additive and cumulative to the specific ranching,

agriculture, and development land uses. Alterations to overland flow and subsequent erosion entering waterways from new development is the primary effect that is cumulative to existing alterations.

Potential Future Mitigation:
At the APD stage, RGFO will need to evaluate if location stipulations alone are sufficient to protect aquatic and wetland resources or if other protective measures are necessary.
RGFO will incorporate appropriate oil and gas development BMPs when possible to limit and buffer overland runoff from being accelerated into drainages.

Under a No Action Alternative, leasing or post development does not occur, Under this alternative there are no direct, indirect or cumulative impacts to riparian or wetland habitats.

3.4.2.5 Terrestrial Wildlife

Affected Environment:
Winter range is that part of the overall range of a species where 90 percent of the individuals are located during the average five winters out of ten from the first heavy snowfall to spring green-up, or during a site specific period of winter as defined for each data analysis unit. All or portions of the following parcels contain big game winter habitat (mule deer severe winter range/critical winter range, elk severe winter range/winter concentration areas, bighorn sheep winter range, and/or pronghorn winter concentration area): 8422, 8423, 8078, 8079, 8076.

Turkey winter range is described as that part of the overall range where 90% of the individuals are located from November 1 to April 1 during the average five winters out of ten. All or portions of the following parcels fall within turkey winter range: 8076 and 8078.

Few raptor nest locations are known within the proposed lease parcels for two primary reasons, lack of information and the fact that many parcels are located on privately owned surface. Lease stipulations attached to each parcel would require raptor nest surveys that maintain site characteristics of existing nests. Additionally, timing limitations will reduce disruption of adult attendance at each known occupied nest location.

Several parcels are located in Colorado Natural Heritage Program (CNHP) Potential Conservation Areas (PCAs). A PCA may include a single occurrence of a rare element or a suite of rare elements or significant features. The goal is to identify a land area that can provide the habitat and ecological processes upon which a particular element or suite of elements depends for their continued existence. The best available knowledge of each species' life history is used in

conjunction with information about topographic, geomorphic, and hydrologic features, vegetative cover, as well as current and potential land uses. The proposed boundary does not automatically exclude all activity. Specific activities or land use changes proposed within or adjacent to the preliminary conservation planning boundary should be carefully considered and evaluated for their consequences to the element on which the conservation unit is based. Affected PCAs include Comanche Grassland, Cimarron Valley,Cimarron River at High Plains, and Grape Creek.

Environmental Consequences of Leasing and Development - Direct and Indirect Impacts:
The act of leasing the parcels for oil and gas development would have no direct impact on wildlife resources; however, impacts at the exploration and development stage could have impacts on wildlife. The magnitude and location of direct and indirect effects cannot be predicted until the site specific APD stage of development.

At this time, specifics of potential future development are unknown; therefore, specific impacts to terrestrial wildlife caused by potential future development cannot be analyzed with accuracy at this stage. If a parcel is leased and development occurs, impacts likely to occur will be habitat loss and fragmentation (well pad construction, road construction, etc.). Wildlife could avoid preferred habitat because of human presence, noise from drilling and production facilities, increased road density and traffic.

Sawyer et al. (2006) demonstrated an avoidance response by mule deer of well pads and roads in the development of a natural gas field in western Wyoming and Northrup et al. (2015) conducted research indicating similar results in mule deer avoidance in the Piceance Basin of Colorado. The response was immediate (i.e., year 1 of development) and no evidence of acclimation occurred during the course of the 3 year study. However, the indirect habitat loss caused by an avoidance response of mule deer could be reduced by 38-63% with the use of advanced technologies and proper planning that minimize the number of well pads and amount of human activity associated with them (Sawyer et al. 2006). Northrup et al. (2015) also suggested that measures aimed at mitigation impacts from drilling, such as seasonal drilling restrictions, sound and light barriers, and reductions in vehicle traffic, are likely to have greatest benefit to deer.

Van Dyke and Klein (1996) and Buchanan et al. (2014) found elk compensated for site-specific environmental disturbance by shifts in use of range, centers of activity, and use of habitat rather than abandonment of range. Elk tended to have behavioral and distributional shifts whereby during development, elk demonstrated a higher propensity to use distances and escape cover to minimize exposure to developmental activity.

Therefore, to protect terrestrial species during critical times of the year, parcels that contain big game winter habitat will have stipulation CO-09 (TL) attached, and parcels within turkey winter range will have stipulation RG-07 (TL) attached to protect the resource.

Raptors are protected by a combination of "no surface occupancy" and "timing limitation" stipulations that are attached to leases to reduce adverse effects of potential oil and gas development. This control method allows the protection of known active nest sites during the APD phase. While the footprint of individual wells is minimal, the functional habitat lost to the network of wells and connecting roads can be considerable. The potential for oil and gas related disturbances of nesting, foraging and roosting raptors arises not only from new well installation activities, including road and pad construction, drilling, and equipment installation over the course of several weeks to months, but also from continual servicing and maintenance of wells over their productive lifetime.

Several lease parcels are located within PCAs; however, the RGFO RMP and the Northeast RMP contain a suite of stipulations that will protect the elements outlined in each PCA in the event that leased parcels are eventually developed.

Environmental Consequences of Leasing and Development - Cumulative Impacts:
Throughout the lease area there are many activities currently occurring, along with historic impacts, which affect wildlife resources. These activities include: oil and gas development, residential development, grazing, agriculture, mining and recreation. While the leasing of parcels will not compound these impacts, future oil and gas development may impose deleterious effects. Every parcel is unique and cumulative impacts will need to be thoroughly addressed in the APD stage.

Potential Future Mitigation:
Because of the lack of raptor nesting information and the lease stipulations attached to each parcel, a standard COA would require a raptor nest survey where habitat existed. If a nest were found, the stipulations would require the lessee to maintain the integrity of site characteristics for existing nests. Additionally, timing limitations will reduce disruption of adult attendance at each known occupied nest location.

Additionally, BLM may require an operator to move an operation and delay activities to protect valuable wildlife resources, if supported by the site-specific NEPA analysis for the development activity.

3.4.3 Heritage Resources and Human Environment

3.4.3.1 Cultural Resources

Affected Environment:

Paleoindian sites are relatively scarce in the eastern half of Colorado, although a relatively large number are located in Weld County, where much oil and gas exploration continues to take place. During the years 10,000-5500 BC, Paleoindian populations appear to have subsisted on large game (based on associated lithic tools), and probably supplemented their diets with a variety of small game and vegetal materials. Paleoindian materials from the Clovis period (9500-8950 BC) have been reported for southeastern Colorado, and although not extensive, Folsom and Plano artifacts seem to suggest an increase in population through time. It appears that Paleoindian populations were living in relatively small groups, and seem to have been mostly nomadic.

Many more cultural materials dating to the Archaic period (5500 BC-AD 500) have been found. The general size reduction of lithic tools, coupled with the presence of groundstone and vegetal evidence, suggests that a gradual shift in subsistence from large game to smaller game and possible horticulture was taking place. As early as 7800 BP, Archaic populations were living in pithouses, and, later, in structures with stone foundations. Based on these and other data, it appears that Archaic groups were sedentary to some extent.

Evidence of the Formative and Late Prehistoric/Protohistoric periods (AD 500-1600) occupations is spotty in the mountain region. While some scholars interpret data from these periods as representing a clearly defined "mountain formative culture," the majority still believe that the mountains were inhabited seasonally by Plains-oriented groups. However, there is little to indicate substantial Formative or Late Prehistoric/Protohistoric settlement in the mountains, most likely due to a nomadic lifestyle.

The appearance of pottery and stemmed, corner-notched projectile points in the archaeological record suggest a change in culture in the Colorado Plains around AD 100. The Late Prehistoric (AD 100-1725) was a time when aboriginal populations in eastern Colorado seemed to have adopted a more sedentary lifestyle than in previous times. The construction of complex structural sites, the adoption of pottery and the increased dependence on horticulture (in the southeastern Plains) are all suggestive of less mobility.

Sites dating to the protohistoric period (beginning with the Diversification Period, AD 1450-1725) are difficult to identify. In southeastern Colorado, sites of that time period are dated

based on the presence of "Apachean" traits, like pottery, rock art, and stone circles. In northeastern Colorado, the Dismal River Aspect (AD 1525-1725) is distinguished by shallow pithouses, bell-shaped roasting pits, and by Dismal River Gray Ware ceramics.

The Protohistoric was a time of increasing population movement, and was further complicated by the arrival of the Spanish, and, later, the Euro-Americans. Starting in 1725, and continuing until they were entirely eliminated by the 1870s, Native American groups identified as the Plains, Jicarilla, and Kiowa Apaches; the Utes; the Arapaho; the Comanches; the Cheyennes; and occasionally the Crow, Shoshoni, and the Blackfeet, were known to occupy the Plains region.

Europeans first explored southeastern Colorado in 1540. By 1822, Spanish dominance of the area ended. The Santa Fe Trail was established that year, bringing American populations into the region. Commercial ranching commenced in the 1860s, and the Homestead Act of 1862 increased the population further. By 1870, all Native American groups had been subdued, following several decades of violence. Buffalo hunting, popular among Euro-Americans in the early 1800s, finally decimated any remaining animals by 1880. After 1900, sugar beet production and dryland farming and ranching were the dominant industries in the area. The Great Depression and the Dust Bowl of the 1930s combined to cause severe problems for agriculturalists. By 1941, programs created by the Roosevelt administration and the industrial needs resulting from the U. S. entry into World War II had greatly improved the economy. Agriculture continues to predominate as the largest revenue-producing industry in eastern Colorado.

BLM conducted a literature review of records in the BLM-RGFO field office and database, and reviewed relevant information in the Compass database maintained by the Colorado Office of Archaeology and Historic Preservation. The records indicate that 146 acres (~14%) of the surface overlaying the proposed lease parcels have been inventoried for cultural resources. A total of 7 sites and isolated finds, of which 2 are eligible for the NRHP, have been recorded on or adjacent to proposed lease parcels.

The Santa Fe National Historic Trail corridor runs through Parcels 8076 and 8079 and adjacent to 8078. Refer to 3.4.3.9. Special Designations section for Visual Resource analysis of the Santa Fe Trail.

Environmental Consequences of Leasing and Development – Direct and Indirect Impacts: Because the leasing of parcels does not involve ground disturbance, it will have no effect on historic properties. Future lease development that might affect all associated historic properties will be subject to the standard National NHPA Lease Stipulation (CSU CO-39). This lease

stipulation requires additional cultural resources work pursuant to Section 106 of the National Historic Preservation Act, 54 U.S.C. § 306108, including identification, effects assessment, consultation, and if necessary, resolution of adverse effects. In an informational letter dated 10/04/18, BLM notified SHPO that no historic properties would be affected by the proposed lease sale (see CR-RG-19-002 L).

Environmental Consequences of Leasing and Development – Cumulative Impacts:
None are known at present. However, any future development of parcels that are purchased as a result of the lease sale will be subject to additional cultural resources work pursuant to Section 106 of the National Historic Preservation Act, 54 U.S.C. § 306108, including identification, effects assessment, consultation, and if necessary, resolution of adverse effects. At that time, any adverse effect on historic properties will be identified and mitigated, if necessary.

Potential Future Mitigation:
None known at present.

3.4.3.2 Native American Religious Concerns

Affected Environment:
The mountains and plains in Colorado were inhabited by numerous tribes throughout history. Because of their nomadic culture, Plains populations used items that were easily transported and light, and therefore generally left little material evidence of habitation or traditional cultural properties. Although sacred locales are present on the lands within the RGFO jurisdiction, no known sites are present on any of the parcels included in the lease sale.

A consultation with potentially interested Native American tribes is ongoing [CR-RG-19-003 NA]. The BLM contacted the following tribes: Apache Tribe of Oklahoma, Cheyenne and Arapaho Tribes of Oklahoma, Cheyenne River Sioux Tribe, Comanche Tribe of Oklahoma, Crow Creek Sioux, Eastern Shoshone, Jicarilla Apache Nation, Kiowa Tribe of Oklahoma, Northern Arapaho Tribe, Northern Cheyenne Tribe, the Ute Tribe of the Uintah and Ouray Reservation, Oglala Sioux Tribe, Rosebud Sioux Tribe, Southern Ute Tribe, Standing Rock Lakota Tribe, and the Ute Mountain Ute Tribe.

Environmental Consequences of Leasing and Development - Direct and Indirect Impacts:
No concerns identified.

Environmental Consequences of Leasing and Development - Cumulative Impacts:
None known at present.

Potential Future Mitigation:
None known at present.

3.4.3.3 Paleontological Resources

Affected Environment:
Occurrences of paleontological resources are closely tied to the geologic units that contain them. The probability for finding paleontological resources can be broadly predicted from the geologic units present at or near the surface. Using the Potential Fossil Yield Classification (PFYC) system, geologic units are classified base on the relative abundance of vertebrate fossils or scientifically significant invertebrate or plant fossils and their sensitivity to adverse impacts, with a higher class number indicating higher potential (WO IM2016-124).
The proposed lease sale parcels contain geologic formations that are classified as PFYC 3, 4, and 5 formations that range from an unknown or moderate to likely potential to highly fossiliferous geologic units that consistently and predictably produce significant paleontological resources that could potentially be impacted by activities associated with oil and gas leasing.

Environmental Consequences of Leasing and Development - Direct and Indirect Impacts:
Locations for proposed oil or gas well pads, pipelines, and associated infrastructure on these parcels will be subject to further analysis for the protection of paleontological resources during APD/development stage NEPA review.

Areas that contain geologic formations that are PFYC 4 or 5, for which new surface disturbance is proposed on or adjacent to bedrock (native sedimentary stone) including disturbance that may penetrate protective soil cover and disturb bedrock, may be subject to an inventory that shall be performed by a BLM permitted paleontologist and approved by the appropriate RGFO specialist. Surface disturbing activities in many areas including PFYC 4 and 5 may also require monitoring by a permitted paleontologist.

Direct impacts to or destruction of fossils would occur from unmitigated activities conducted on formations with high potential for important scientific fossil resources. Indirect impacts would involve damage or loss of fossil resources due to the unauthorized collection of scientifically important fossils by workers or the public due to increased access to fossil localities on or near the lease parcels. Adverse impacts to important fossil resources would be long-term and significant since fossils removed or destroyed would be lost to science. Adverse significant impacts to paleontological resources can be reduced to a negligible level through mitigation of ground disturbing activities. It is possible that the leasing action would have the beneficial impact in that ground disturbance activities might result in the discovery of important fossil resources.

The following lands are likely to contain significant paleontological resources and are subject to Exhibit CO-29 to alert lessees of the (PFYC 4 and 5) paleontological area inventory requirement to protect paleontological values: 8423.

Environmental Consequences of Leasing and Development - Cumulative Impacts:
Cumulative impacts to paleontological resources could result from surface disturbing activities associated with potential development, when added to past, present, and reasonably foreseeable future actions, but would not be expected to contribute to cumulative impacts to paleontological resources in the lease area if protective mitigation measures are followed.

Potential Future Mitigation:
Mitigations will be developed during the NEPA review of individual ground disturbing activities. Typically, such mitigations include provisions for the monitoring of ground disturbance by a BLM permitted paleontologist, a requirement for the operator to inform all persons associated with the project of relevant federal laws protecting fossil resources, and requirements regarding the disclosure to the RGFO of inadvertent fossil discoveries during construction or operation.

3.4.3.4 Social and Economic Conditions

Affected Environment
The proposed parcels for the March 2019 lease sale are located in Baca County and Fremont County, Colorado. Accordingly, the socioeconomic study area includes these two counties and the State of Colorado as the effects of the economic activity generated by the lease sale may impact the social and economic conditions within the counties and state. In 2016 the population of Baca County was 3,568 residents and the population of Fremont County was 47,446 residents (U.S. Census Bureau 2017a).

Agriculture is a traditional use of lands in the two counties and continues to be important today. In 2012 there were 737 farms totaling 1,503,419 acres in Baca County and 809 farms totaling 290,438 acres in Fremont County (USDA NASS 2014). In Baca County in 2012, the market value of agricultural products sold was $125,299,000 and in Fremont County the market value sold was $21,207,000 (USDA NASS 2014). In 2012, Baca County ranked eighth in the state for value of sales for hogs and pigs and first in acres of sorghum for grain (USDA NASS 2014). Fremont County in 2012 ranked third in the state for value of sales in fruits, tree nuts, and berries and second in acres of apples (USDA NASS 2014). Both counties had 14 farms in 2012 that received income from agri-tourism and recreational services which could include such activities as hunting, fishing, and farm or wine tours (USDA NASS 2014).

Leasing mineral rights for the development of federal minerals generates public revenue through the bonus bids paid at lease auctions and annual rents collected on leased parcels not held by production. Nominated parcels approved for leasing are offered by the BLM at a minimum rate of $2.00 per acre at the lease sale. These sales are competitive and parcels with high potential for oil and gas production often command bonus bids in excess of the minimum bid. In addition to bonus bids, lessees are required to pay rent annually until production begins on the leased parcel, or until the lease expires. These rent payments are equal to $1.50 an acre for the first five years and $2.00 an acre for the second five years of the lease.

The State of Colorado receives 49% of the total revenue associated with federal mineral leases. Federal mineral lease revenue for the State of Colorado is divided as such: 48.3 percent of all mineral lease rent and royalty receipts are sent to the State Education Fund (to fund K-12 education). Ten percent of all mineral lease rent and royalty receipts are sent to the Colorado Water Conservation Board. Approximately two percent of all mineral lease rent and royalty receipts are distributed directly to local school districts originating the revenue or providing residence to energy employees and their children. Forty percent of all mineral lease rent and royalty receipts are sent to the Colorado Department of Local Affairs, which then distributes half of the total amount received to a grant program, designed to provide assistance with offsetting community impacts due to mining, and the remaining half directly to the counties and municipalities originating the Federal mineral lease revenue or providing residence to energy employees.

Bonus payments are allocated separately from rents and royalties in the following manner: 50 percent of all mineral lease bonus payments are allocated to two separate higher education trust funds: the “Revenues Fund” and the “Maintenance and Reserve Fund.” The Revenues Fund receives the first $50 million of bonus payments to pay debt service on outstanding higher education certificates of participation. The Maintenance and Reserve Fund receives 50 percent of any bonus payment allocations greater than $50 million. These funds are designated for controlled maintenance on higher education facilities and other purposes. The remaining 50 percent of state mineral lease bonus payments are allocated to the Local Government Permanent Fund, which is designed to accumulate excess funds in trust for distribution in years during which Federal mineral lease revenues decline by ten percent or more from the preceding year.

During the lease period, annual lease rents continue until one or more wells are drilled that result in production and associated royalties. The federal oil and gas royalties on production from public domain minerals equal 12.5 percent of the value of production (43 CFR 3103.3.1).

Past research on social impacts associated with energy development shows that social well-being often decreased during a boom, but then tended to increase once the boom is over. A comparative and longitudinal study conducted in Delta, Vernal, and Tremonton, Utah, and Evanston, Wyoming, addressed issues of social well-being in boomtowns (Brown et al. 2005; Brown et al. 1989; Greider et al. 1991; Hunter et al. 2002; Smith et al. 2001). With the exception of Tremonton, each of these communities experienced a boom during the late 1970s and early 1980s. Delta's boom resulted after the construction of a power plant while the booms in Evanston and Vernal were primarily related to oil and gas development. At least four surveys were conducted in these communities from 1975 to 1995. Several indicators of social well-being were examined, including perceived social integration, relationships with neighbors, trust of community residents and community satisfaction. Delta and Evanston showed similar patterns associated with these indicators. During the peak boom years, residents experienced diminished perceived social integration, relationships with neighbors, trust of residents, and community satisfaction. Interestingly, Brown and others (2005) pointed out that the greatest declines in community satisfaction in Delta occurred just before the largest population increase of the 20 year study period, indicating that changes in population cannot alone account for shifts in community satisfaction and social integration. Nonetheless, by 1995, the levels of these indicators had returned to or exceeded pre-boom levels.

Another 2011 study highlights several of the changes that have been seen across the Bakken oil counties and the impacts to quality of life (Bohnenkamp et. al. 2011). For example, the study highlights that the familiarity of residents with other residents and the safety often felt in small rural communities has shifted to in-migration of new people and safety concerns resulting from not knowing these people. The study also highlights concerns over housing prices and values increasing and the 38 changing of the population. While there is an in-migration of people for oil field jobs, there has also been an out-migration of long-time residents due to not being able to afford the rising housing costs (Bohnenkamp et. al. 2011).

The proximity of oil and gas wells and related facilities can influence nearby residential property sales, especially those on split estate land. Landowners who do not own mineral rights may be subject to federal mineral development on their land. Usually, these landowners enter into a surface use agreement and receive compensation, i.e. income, for the use of their land. Estimates of how individual properties are affected by nearby oil and gas development vary from case to case depending on specific location and the exact character and features of a property.

Several studies published in the past several years have attempted to estimate how property values are impacted by nearby oil or gas exploration, drilling, and production. See Krupnick and Echarte (2017) for a summary of recent studies. In general, these studies find that, at the time of

sale, the presence of oil and gas wells near the property reduces the property value relative to what it would have sold for without a nearby well. Unfortunately, the explicit and implicit assumptions used in these estimates (such as the maximum distance for a 'nearby well') vary a great deal from study to study, as does the size of the price impacts, which range from zero to negative 37 percent (Krupnick and Echarte 2017).

Who owns the minerals appears to be another factor in property values. Split estates are referenced as a possible source of property value differences is several studies and in one (Boslett et. al. 2016) property value estimates tended to be significantly lower in a Colorado region where the minerals were owned by the federal government compared to other areas where a comparable property was located above a non-federal mineral estate.

Additionally, multiple past studies identify concerns about possible environmental impacts associated with oil and gas exploration and development as one reason for property value differences. But these concerns (and their influence on prices) can be tempered. Roddewig and others (2014) states that "(p)ast real estate market studies indicate that investigation and remediation can limit price and value impacts from oil and gas contamination." Note that the BLM actively investigates and seeks remediation for oil and gas contamination resulting from production on federal land or into federal mineral reserves.

Current research also doesn't provide much guidance on how long these price impacts persist. Bennett and Loomis (2015) in a study in Weld County, Colorado estimate a 1% decrease in urban house prices for every well being drilled within one-half mile "during the time the buyer is deciding upon buying the house", but "(o)nce the well moves out of active drilling and into becoming a producing well, all our models show there is no statistically significant negative effect on house prices."

Environmental Consequences of Leasing and Development - Direct and Indirect Impacts:
The direct effect of leasing would be the payments received from leasing all or a subset of the 1015.150 acres of federal mineral estate parcels proposed for the March 2019 sale. Indirect effects that might result, should exploration or development of the leases occur, could include increased employment opportunities related to the oil and gas and service support industry in the region as well as the economic contributions to Federal, State, and County governments related to lease payments, royalty payments, severance taxes, and property taxes. Other effects could include the potential for an increase in transportation, roads, and noise disturbance associated with development, and potential for change in property values due to development. These effects would apply to all public land users in the study area, and surface owners above and adjacent to the proposed lease parcels.

The BLM recognizes that economic activity associated with tourism and recreation can be an important contribution to local communities and their economies. For example, in 2016, visitors spent approximately $64.8 million in Fremont County and $3.0 million in Baca County and overnight travel contributed to an estimated 825 jobs in Fremont County and 41 jobs in Baca County (Dean Runyan Associates 2018). Potential impacts due to oil and gas development can be concerns for communities that promote recreation and tourism. Oil and gas exploration, drilling, or production, would potentially inconvenience visitors through increased traffic and traffic delays, noise, and visual impacts. The level of inconvenience would depend on the activity affected, traffic patterns within the area, noise levels, the length of time and season in which these activities occurred, and other factors. Increased truck traffic hauling heavy equipment, fracking fluids, and water as well as increased traffic associated with oil workers and increased populations could cause more traffic congestion, increase commuting times, and affect public safety. Additionally, impacts to visitors could include reduction of current viewsheds, dark night skies, and soundscapes.

However, it is unknown when, where, how, or if future surface disturbing activities associated with oil and gas exploration and development such as well sites, roads, facilities, and associated infrastructure would be proposed. It is also not known how many wells, if any, would be drilled and/or completed, the types of technologies and equipment would be used and the types of infrastructure needed for production of oil and gas. Potential effects to tourism and the associated economic activity would be less likely to occur with the parcels in Fremont County that have a mixture of no potential to low potential (1 < 5 wells/township) (see Section 3.3.3). Given the very low potential for exploration, development and production in these parcels, there is greater uncertainty in whether any development will actually occur in these parcels and whether this development would affect local tourism. While there is a lower likelihood for development and fewer number of wells per township for these parcels in Fremont County, there is the potential for some possible impacts to tourism in local communities from future oil and gas development if and when it may occur in these parcels.

The parcels in Baca County show low to moderate potential (5 - <10 wells/township) (see Section 3.3.3). The parcels in Baca County are split estate and it appears as though private livestock grazing is the predominate use (see Section 3.3.2). Given that recreation is not likely a dominate use of the parcels in Baca County, it is unlikely that potential future oil and gas development on these parcels would affect local recreation and tourism opportunities. Potential future oil and gas development on these parcels could affect private grazing operations occurring there.

Due to energy market volatility and the dynamics of the oil and gas industry it is not feasible to predict the exact effects of this leasing action, as there are no guarantees that the leases will receive bids, and that any leased parcels will be explored or that exploration will result in discovery of viable fluid mineral production. This may be especially true for parcels in categories of very low for potential well development as discussed in the RFD (see Section 3.3.3). As such, the types, magnitude and duration of potential impacts cannot be precisely quantified at this time, and would vary according to many factors. Therefore, any parcel where future drilling activity would take place would first require an Application for Permit to Drill and requisite NEPA analysis, in which site specific issues would be examined including any identified socioeconomic issues resulting from disturbance and drilling on the leased parcel.

Environmental Consequences of Leasing and Development - Cumulative Impacts:
Any possible future development of fluid mineral resources resulting from this lease sale would be in addition to current levels of development.

Potential Future Mitigation: None

3.4.3.5 Environmental Justice

Affected Environment:
Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, states "each Federal agency shall make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations…" The purpose of EO 12898 is to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects on low-income populations, minority populations, or Indian tribes that may experience common conditions of environmental exposure or effects associated with a plan or project. A review of U.S. Census Bureau 2016 population estimates for race and Hispanic origin (U.S. Census Bureau 2017a), indicates that neither Baca or Fremont counties meet the criteria of having minority populations that are five percentage points greater than the State of Colorado. Based upon U.S. Census Bureau Small Area Income and Poverty 2016 estimates, the percent of population (all ages) in poverty in both Baca and Fremont counties were five percentage points higher than for the State of Colorado (U.S. Census Bureau 2017b). This indicates that Baca and Fremont counties have low-income populations that can be considered as environmental justice populations.

Environmental Consequences of Leasing and Development - Direct and Indirect Impacts:

No surface-disturbing activities are associated with a lease sale and; therefore, impacts from the lease sale would not disproportionately adversely affect environmental justice populations. As previously noted, any parcel where future drilling activity would take place would first require additional NEPA analysis in which site specific impacts including environmental justice issues will be examined. Please also refer to sections 3.4.3.1 Cultural Resources and 3.4.3.2 Native American Religious Concerns for the discussion of potential impacts associated with leasing and development to these resources and issues. The BLM has considered all input from persons or groups regardless of age, income status, race, or other social or economic characteristics. The outreach and public involvement activities taken by the RGFO for this effort, including the consultation of tribes, are described in sections 1.4 Public Participation, 3.4.3.2 Native American Religious Concerns, 4.1 Persons/Agencies Consulted, 4.2 Native American Tribes Consulted, and 4.3 Surface Owner Coordination.

Environmental Consequences of Leasing and Development - Cumulative Impacts:
Any possible future development of fluid mineral resources resulting from this lease sale would be in addition to current levels of development.

Potential Future Mitigation: None

3.4.3.6 Visual Resources

Affected Environment:
BLM manages landscapes and scenic values for varying levels of protection and modification, giving consideration to other resource values and uses and the scenic quality of the landscape. Visual resources (the landscape) consists of landform (topography and soils), vegetation, bodies of water (lakes, streams, and rivers), and human-made structures (roads, buildings, and modifications of the land, vegetation, and water). These elements of the landscape can be described in terms of their form, line, color, and texture or pattern. Normally, the wider variety of these elements in a landscape, the more interesting or scenic the landscape becomes if the elements exist in harmony with each other. Because most of the Project Area is located on private surface ownership, BLM Visual Resource Management (VRM) classifications do not apply to the Project Area. Visual Resource Inventory (VRI) data has been used in this analysis to determine visual changes that would result from implementation of the alternatives. The VRI process provides the BLM with a means to determine visual values based on scenic quality, viewer sensitivity, and distance zones from highly traveled routes. A visual resource inventory (VRI) was conducted for the RGFO in 2015 which included the project area.

Baca County
Parcels 8076 amd 8079 lie within the corridor of the National Historic Santa Fe Trail and parcel 8078 is adjacent to the corridor. Refer to 3.4.3.9. Special Designations section for Visual Resource analysis.

Fremont County
Parcels 8422, and 8423, located in Fremont County, are within a VRI Class II based on a combination of distance zones from key viewing locations, scenic quality, and viewer sensitivity. The VRI describes the area as a backdrop for communities and a recreation destination for front range residents. The area receives some tourism associated with through travel but at lesser levels than other areas. For residents, the landscape integrity is important both as a backdrop and as a recreation / tourism destination.

Environmental Consequences of Leasing and Development - Direct and Indirect Impacts:
For the areas proposed for leasing, the proposed action of leasing parcels would not change the existing landscape. Lease sales do not authorize wells to be drilled prior to issuance of an APD, which requires project-specific application to the BLM and environmental analysis. If a lease were to go into production in these areas, visual contrast would be increased in these areas containing some human development already.
Night skies can be impacted due to artificial lighting. During construction and the drilling phase of a site, artificial lighting would be at its highest level. These lighting impacts are generally short term. Typically, well locations do not have permanent lighting; however, there would be changes to the current conditions and the addition of BMP's would need to be evaluated at the APD stage to minimize the contrast.

Fremont County- Parcels 8422, 8423 are located in Fremont County. Parcel 8423 is south of the community of Canon City and adjacent to Dawson Ranch neighborhood. Residents value the viewshed as an open landscape viewing several peaks in the distance. Parcel 8422 are east of the Wet Mountains and USFS land. For the current proposal of the lease sale, the viewshed, night skies and appearance of human modification to the area is not affected, which fits the VRM class II goal of retaining the existing character of the landscape. VRM Class III goals will be achieved by partially retaining the existing character. However, if development were to occur, contrasts would be introduced that may extend beyond those levels.

Environmental Consequences of Leasing and Development - Cumulative Impacts:
Any subsequent development associated with the lease would add additional contrasts to the environment. The changes associated with oil and gas development in this region would affect the integrity of the landscape and could be seen as an incremental impact to visual resources and

the overall character of the area. This project would add to this overall cumulative impact to visual resources in these areas but at minor levels.

Potential Future Mitigation:
BMPs could include painting equipment a proper color that blends with the environment and locating facilities so they are off ridges. Equipment should be screened from nearby residences. These BMPs would decrease visual contrasts with the natural landscape.

3.4.3.7 Wastes, Hazardous or Solid

Affected Environment:
It is assumed that conditions associated with the proposed project site, both surface and subsurface, are currently clean and that there is no known contamination. A determination will be made by the operator prior to initiating the project whether there is evidence that demonstrates otherwise (such as solid or hazardous substances that have been previously used, stored, or disposed of at the project site).

Environmental Consequences of Leasing and Development - Direct and Indirect Impacts:
The act of leasing the parcels for oil and gas development will not involve the use and management of petroleum products or hazardous substances. However, these activities will take place at the exploration and development stage. The magnitude and location of potential direct and indirect effects cannot be understood or analyzed until the site-specific APD stage of development.

Environmental Consequences of Leasing and Development - Cumulative Impacts:
This action may lead to future operations that would use some type of chemical or petroleum product. However, if mitigation measures are implemented for this action, then future impacts would be limited.

Potential Future Mitigation:
The following mitigations are applied as COAs and assist in reducing potential spills resulting in groundwater and/or soil contamination:

- All Above Ground Storage Tanks will need to have secondary containment constructed in accordance with standard industry practices or an associated Spill Prevention Control and Countermeasures plan in accordance with state regulations (if applicable).
- If drums are used, secondary containment constructed in accordance with standard industry practices or governing regulations is required. Storage and labeling of drums should be in accordance with recommendations on associated MSDS sheets, to account for chemical characteristics and compatibility.

- Appropriate level of spill kits need to be onsite and in vehicles.
- All spill reporting needs to follow the reporting requirements outlined in NTL-3A.
- No treatment or disposal of hazardous wastes (non-E&P) on site is allowed on federal lands.
- All concrete washout water needs to be contained and properly disposed of at a permitted offsite disposal facility.
- If pits are utilized, they need to be lined to mitigate leaching of liquids to the subsurface, as necessary. State and/or federal regulations will apply to pit construction and removal.

3.4.3.8 Recreation

Affected Environment:

Parcel 8423 Parcel 8423 lies within South Canon Trails, a popular trail system with the community of Canon City in Fremont County. South Canon trails were designed and are managed with a specific type of experience and outcome in mind for the recreationist. These are measured by the physical character of the natural landscape, social character of the visitor use, and operational character of the care for the area. The trail system is close to town with the recreational opportunity providing a middle country type of physical setting due to its set back from improved roads. The overall area would not be considered ‘natural’ with chain link fencing, old roads, water ditches, mining disturbances and an improved surface trail. Even so, most visitors value the outdoor setting and ‘natural’ feel of the area. The trail system is highly valued by residents of Canon City for the outdoor setting close to town making it perfect for exercise or relieving stress after work. In addition, recreationists from surrounding towns, Front Range communities and tourists have discovered the trails system.

Environmental Consequences of Leasing and Development - Direct and Indirect Impacts:
For the current proposal of the lease sale, the recreation setting characteristics will not change therefore there would not be any impact to the recreation resource. However, if development were to occur, the introduction of roads, well pads and increased traffic to the developed site would increase the amount of development, noise and travel into the area. This would have a direct impact on the physical setting. Residents and visitors may be less likely to visit the trails system with the changes. Indirect impacts to the economic and tourism industry may be impacted negatively if recreationists are displaced by the development.

Environmental Consequences of Leasing and Development - Cumulative Impacts:
Any subsequent development associated with the lease would add additional changes to the setting. The changes associated with oil and gas development in this region would diminish the

naturalness of the landscape and could be seen as an incremental impact to the recreation setting and experience offered by the overall character of the area. This project would add to this overall cumulative impact to recreation by decreasing the natural character of the area.

Potential Future Mitigation: none

3.4.3.9 Special Designations

Affected Environment:

The Santa Fe Trail played a critical role in the westward expansion of the United States. In 1987 the Santa Fe Trail was designated as a national historic trail by Congress, in accordance with the National Trails System Act. The National Park Service (NPS) is the designated administering agency for the Santa Fe Trail.
A portion of the Santa Fe Trail corridor crosses Baca County mainly on private land. Parcels 8076 and 8079 lie within the corridor and parcel 8078 is adjacent to the corridor and are on BLM public land.
Parcels 8076, 8078, 8079, located in Baca County, are within a VRI Class IV based on a combination of distance zones from key viewing locations, scenic quality, and viewer sensitivity. The VRI describes the area as characterized by flat/rolling plains interrupted occasionally with minor drainages. Vegetation consists of primarily grasses and agricultural land with some pinon/ juniper and riparian areas. Development is clustered into small towns and scattered ranches as well as oil and gas development. This resulted in an overall low scenic quality rating. For residents, the landscape is an integral part of the local heritage which is home to the National Historic Santa Fe Trail. Based on this, visual sensitivity was considered high. The parcels are located in a fairly remote corner of Colorado with a low population and the closest major road, Highway 160 and 287 is more than twenty miles away. Texas Highway 56 is approximately twelve miles away. This resulted in a seldom seen zone in the visual resource inventory.

Environmental Consequences of Leasing and Development - Direct and Indirect Impacts:
For parcels 8076, 8078 and 8079, the proposed action of leasing parcels would not change the existing landscape. Lease sales do not authorize wells to be drilled prior to issuance of an APD, which requires project-specific application to the BLM and environmental analysis. If a lease were to go into production in these areas, visual contrast would be increased in these areas.
In order to determine direct and indirect impacts a site visit to Baca County was conducted on 8/10/2018 and contrast-rating evaluation was completed for parcels 8076, 8078, 8079 (See photos 1-4). The site visit confirmed the results of the visual resource inventory and concluded that if leasing were to occur weak to no contrasts would be observed. This is largely due to the existing oil and gas development in the area which has already introduced minor to moderate

contrasts to the characteristic landscape that would be repeated. Assuming the potential for development, the degree of contrast introduced would be weak to the land and structures. The effect on vegetation would introduce a slight effect on vegetation lines with no contrast effects on other elements. Due to the location of the parcels, BLM conducted a consultation on 9/25/2018 with the National Park Service (NPS). The NPS encouraged the BLM to use Best Management Practices BMP to reduce impacts to Visual Resources.

Photo 1 is a typical view of ranches in the Baca County proposal area.

Photo 2 is a view of an oil and gas distribution site in Baca County proposal area.

Photo 3 shows the view from the observation point used for the Baca County contrast rating form. It also shows a small structure painted a dark color and blending with the surrounding landscape.

Photo 4 is another oil and gas structure near the proposed Baca County lease sale.

Environmental Consequences of Leasing and Development - Cumulative Impacts:
Any subsequent development associated with the lease would add additional visual contrasts to the environment. The changes associated with oil and gas development in this region would affect the integrity of the landscape and could be seen as an incremental impact to visual resources and the overall character of the area. This project would add to this overall cumulative impact to visual resources but at minor levels.

Potential Future Mitigation:
BMPs could include painting equipment a color that blends with the environment and locating facilities so they are off ridges. Equipment should be screened from nearby residences. These BMPs would decrease visual contrasts with the natural landscape.

Chapter 4 Coordination and Consultation

4.1 Persons/Agencies Consulted

- Colorado Parks and Wildlife
- Fremont County
- Baca County
- Colorado State Historic Preservation Office
- US Fish and Wildlife Service

4.2 Native American Tribes Consulted:

A consultation with the following Native American tribes is ongoing:

- Apache Tribe of Oklahoma
- Cheyenne and Arapaho Tribes of Oklahoma
- Cheyenne River Sioux Tribe
- Comanche Tribe of Oklahoma
- Crow Creek Sioux
- Eastern Shoshone
- Jicarilla Apache Nation
- Kiowa Tribe of Oklahoma
- Northern Arapaho Tribe
- Northern Cheyenne Tribe
- Ute Tribe of the Uintah and Ouray Reservation
- Oglala Sioux Tribe
- Rosebud Sioux Tribe
- Southern Ute Tribe
- Standing Rock Lakota Tribe
- Ute Mountain Ute Tribe

4.3 Surface-owner Coordination

A letter was sent to surface owners of split estate proposed lease parcels.

4.4 List of Preparers

INTERDISCIPLINARY REVIEW

Name	Title	Resource
Forrest Cook	Air Quality Scientist	Air Quality
Sharon A. Sales	Natural Resource Specialist	Project Lead, Fluid Minerals
Aaron Richter	Natural Resource Specialist	Invasive Species Management, Upland Vegetation.
Daniel Pike	Natural Resource Specialist	Hydrology/Water Quality, Soils, Prime and Unique Farmland,
Jessica M. Montag	Socio-economic Specialist	Socioeconomics, Environmental Justice
Melissa Smeins	Geologist	Paleontology, Hazardous Waste
Matt Rustand	Wildlife Biologist	Migratory Birds, Special Status Species, Terrestrial Wildlife
David Gilbert	Fishery Biologist	Aquatic Wildlife, Wetlands and Riparian
Michael Kraus	Archaeologist	Cultural Resources, Native American Religious Concerns
Linda Skinner	Recreation Planner	Visual Resources, Areas of Critical Environmental Concern, Lands with Wilderness Characteristics, Wilderness Study Areas, Wild and Scenic Rivers

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Attachment A

All Proposed Parcels with Stipulations

The Bureau of Land Management (BLM) is proposing 5 parcels for internet-based competitive sale of Federal lands containing 1,015.150 acres in the State of Colorado for oil and gas leasing.

THE FOLLOWING PUBLIC DOMAIN LANDS ARE SUBJECT TO FILINGS IN THE MANNER SPECIFIED IN THE APPLICABLE PORTIONS OF THE REGULATIONS IN 43 CFR, SUBPART 3120.

PARCEL ID: 8422

T.0200S., R.0700W., 6TH PM
Section 15: SWSW;
Section 22: SWSE;

Fremont County
Colorado 80.000 Acres

All lands are subject to Exhibit CO-34 to alert lessee of potential habitat for a threatened, endangered, candidate, or other special status plant or animal

All lands are subject to Exhibit CO-39 to protect cultural resources

All lands are subject to Exhibit CO-56 to alert lessee of potential supplementary air analysis

BLM; CORM: RGFO

PARCEL ID: 8423

T.0190S., R.0710W., 6TH PM
Section 13: Lot 3,6-8,12;
Section 13: S2NE;
Section 14: Lot 11-20;
Section 14: NWNE,N2NW,N2S2NW;

Fremont County

Colorado 522.460 Acres

All lands are subject to Exhibit CO-34 to alert lessee of potential habitat for a threatened, endangered, candidate, or other special status plant or animal

All lands are subject to Exhibit CO-39 to protect cultural resources

All lands are subject to Exhibit CO-56 to alert lessee of potential supplementary air analysis

BLM; CORM: RGFO

PARCEL ID: 8078

T.0340S., R.0410W., 6TH PM
Section 17: Lot 1,4;
Section 17: E2NW;
Section 18: Lot 4;
Section 19: E2SW;
Baca County
Colorado 179.990 Acres
All lands are subject to Exhibit CO-28 to protect perennial water impoundments and streams, and/or riparian/wetland vegetation zones, relocation beyond riparian vegetation zone required

All lands are subject to Exhibit CO-34 to alert lessee of potential habitat for a threatened, endangered, candidate, or other special status plant or animal

All lands are subject to Exhibit CO-39 to protect cultural resources

All lands are subject to Exhibit CO-56 to alert lessee of potential supplementary air analysis

PVT/BLM;BLM; CORM: RGFO

PARCEL ID: 8079

T.0340S., R.0410W., 6TH PM
Section 15: Lot 17;

Baca County

Colorado 2.920 Acres
All lands are subject to Exhibit CO-34 to alert lessee of potential habitat for a threatened, endangered, candidate, or other special status plant or animal

All lands are subject to Exhibit CO-39 to protect cultural resources

All lands are subject to Exhibit CO-56 to alert lessee of potential supplementary air analysis

PVT/BLM; CORM: RGFO

PARCEL ID: 8076

T.0340S., R.0420W., 6TH PM
Section 11: W2SE;
Section 13: Lot 5,19,24;
Section 13: NENW;
Section 14: Lot 1;
Section 14: NENE;

Baca County
Colorado 229.780 Acres
All lands are subject to Exhibit CO-28 to protect perennial water impoundments and streams, and/or riparian/wetland vegetation zones, relocation beyond riparian vegetation zone required

All lands are subject to Exhibit CO-34 to alert lessee of potential habitat for a threatened, endangered, candidate, or other special status plant or animal

All lands are subject to Exhibit CO-39 to protect cultural resources

All lands are subject to Exhibit CO-56 to alert lessee of potential supplementary air analysis

PVT/BLM; CORM: RGFO

Attachment B

Recommended Parcel Deferrals

No Parcels have been recommended for deferral

Attachment C

Preferred Alternative Parcels with Stipulations for Lease
March 28, 2019

THE FOLLOWING PUBLIC DOMAIN LANDS ARE SUBJECT TO FILINGS IN THE MANNER SPECIFIED IN THE APPLICABLE PORTIONS OF THE REGULATIONS IN 43 CFR, SUBPART 3120.

PARCEL ID: 8422

T.0200S., R.0700W., 6TH PM
Section 15: SWSW;
Section 22: SWSE;

Fremont County
Colorado 80.000 Acres

All lands are subject to Exhibit CO-03 to protect raptor nests.

The following lands are subject to Exhibit CO-09 to protect big game winter habitat.

T.0200S., R.0700W., 6TH PM
Section 22: SWSE

All lands are subject to Exhibit CO-18 to protect raptor nesting and fledgling habitat.

All lands are subject to Exhibit CO-19 to protect ferruginous hawk nesting and fledgling habitat.

All lands are subject to Exhibit CO-34 to alert lessee of potential habitat for a threatened, endangered, candidate, or other special status plant or animal

All lands are subject to Exhibit CO-39 to protect cultural resources

All lands are subject to Exhibit CO-56 to alert lessee of potential supplementary air analysis

BLM; CORM: RGFO

PARCEL ID: 8423

T.0190S., R.0710W., 6TH PM
Section 13: Lot 3,6-8,12;
Section 13: S2NE;
Section 14: Lot 11-20;
Section 14: NWNE,N2NW,N2S2NW;

Fremont County
Colorado 522.460 Acres

All lands are subject to Exhibit CO-03 to protect raptor nests.

All lands are subject to Exhibit CO-18 to protect raptor nesting and fledgling habitat.

All lands are subject to Exhibit CO-19 to protect ferruginous hawk nesting and fledgling habitat.

The following lands are subject are subject to Exhibit CO-29 to alert lessee of potential paleontological inventory requirement.

T.0190S., R.0710W., 6TH PM
Sec 14: NWNE, N2NW, N2S2NW and lot 11

All lands are subject to Exhibit CO-34 to alert lessee of potential habitat for a threatened, endangered, candidate, or other special status plant or animal

All lands are subject to Exhibit CO-39 to protect cultural resources

All lands are subject to Exhibit CO-56 to alert lessee of potential supplementary air analysis

BLM; CORM: RGFO

PARCEL ID: 8078

T.0340S., R.0410W., 6TH PM
Section 17: Lot 1,4;
Section 17: E2NW;
Section 18: Lot 4;
Section 19: E2SW;
Baca County
Colorado 179.990 Acres

All lands are subject to Exhibit CO-02 to protect grouse dancing grounds

All lands are subject to Exhibit CO-03 to protect raptor nests

All lands are subject to Exhibit CO-09 to protect big game winter habitat

All lands are subject to Exhibit CO-18 to protect raptor nesting and fledgling habitat

All lands are subject to Exhibit CO-19 to protect ferruginous hawk nesting and fledgling habitat

All lands are subject to Exhibit CO-28 to protect perennial water impoundments and streams, and/or riparian/wetland vegetation zones, relocation beyond riparian vegetation zone required

All lands are subject to Exhibit CO-34 to alert lessee of potential habitat for a threatened, endangered, candidate, or other special status plant or animal

All lands are subject to Exhibit CO-39 to protect cultural resources

All lands are subject to Exhibit CO-56 to alert lessee of potential supplementary air analysis

All lands are subject to Exhibit RG-03 to protect lesser prairie chicken habitat

All lands are subject to Exhibit RG-07 to protect wild turkey during the critical winter periods

PVT/BLM;BLM; CORM: RGFO

PARCEL ID: 8079

T.0340S., R.0410W., 6TH PM
Section 15: Lot 17;

Baca County
Colorado 2.920 Acres

All lands are subject to Exhibit CO-02 to protect grouse dancing grounds

All lands are subject to Exhibit CO-03 to protect raptor nests

All lands are subject to Exhibit CO-09 to protect big game winter habitat

All lands are subject to Exhibit CO-18 to protect raptor nesting and fledgling habitat

All lands are subject to Exhibit CO-19 to protect ferruginous hawk nesting and fledgling habitat

All lands are subject to Exhibit CO-34 to alert lessee of potential habitat for a threatened, endangered, candidate, or other special status plant or animal

All lands are subject to Exhibit CO-39 to protect cultural resources

All lands are subject to Exhibit CO-56 to alert lessee of potential supplementary air analysis

All lands are subject to Exhibit RG-03 to protect lesser prairie chicken habitat

PVT/BLM; CORM: RGFO

PARCEL ID: 8076

T.0340S., R.0420W., 6TH PM

Section 11: W2SE;
Section 13: Lot 5,19,24;
Section 13: NENW;
Section 14: Lot 1;

Section 14: NENE;

Baca County
Colorado 229.780 Acres

All lands are subject to Exhibit CO-02 to protect grouse dancing grounds

All lands are subject to Exhibit CO-03 to protect raptor nests

All lands are subject to Exhibit CO-09 to protect big game winter habitat

All lands are subject to Exhibit CO-18 to protect raptor nesting and fledgling habitat

All lands are subject to Exhibit CO-19 to protect ferruginous hawk nesting and fledgling habitat

All lands are subject to Exhibit CO-28 to protect perennial water impoundments and streams, and/or riparian/wetland vegetation zones, relocation beyond riparian vegetation zone required

All lands are subject to Exhibit CO-34 to alert lessee of potential habitat for a threatened, endangered, candidate, or other special status plant or animal

All lands are subject to Exhibit CO-39 to protect cultural resources

All lands are subject to Exhibit CO-56 to alert lessee of potential supplementary air analysis

All lands are subject to Exhibit RG-03 to protect lesser prairie chicken habitat

All lands are subject to Exhibit RG-07 to protect wild turkey during the critical winter periods

PVT/BLM; CORM: RGFO

Attachment D

Stipulation Exhibits

Exhibit CO-02

Lease Number: <LEASE_NUMBER>

NO SURFACE OCCUPANCY STIPULATION

No surface occupancy or use is allowed on the lands described below (legal description or other description):

<LEGAL_DESCRIPTIONS>

For the purpose of:

To protect grouse dancing grounds (including sage and mountain sharp-tailed grouse and lesser and greater prairie chickens) within a one-quarter mile radius from the site.

Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820.)

Exception Criteria:
An exception may be granted depending on current usage of the site or on the geographical relationship to topographic barriers and vegetation screening.

EXHIBIT CO-03

Lease Number: <LEASE_NUMBER>

NO SURFACE OCCUPANCY STIPULATION

No surface occupancy or use is allowed on the lands described below (legal description or other description):

<LEGAL_DESCRIPTIONS>

For the purpose of:

To protect raptor nests within a one-eighth mile radius from the site.

Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820.)

Exception Criteria:
An exception may be granted depending on current usage, or on the geographical relationship to topographic barriers and vegetation screening.

EXHIBIT CO-09

Lease Number: <LEASE_NUMBER>

TIMING LIMITATION STIPULATION

No surface use is allowed during the following time period(s). This stipulation does not apply to operation and maintenance of production facilities.

December 1 through April 30

On the lands described below:

<LEGAL_DESCRIPTIONS>

For the purpose of (reasons):

To protect big game (mule deer, elk, pronghorn antelope, and bighorn sheep) winter range, including crucial winter habitat and other definable winter range as mapped by the Colorado Division of Wildlife. This may apply to sundry notice that require an environmental analysis.

Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of the stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820.)

Exception Criteria:
An exception may be granted under mild winter conditions for the last 60 days of the closure.

EXHIBIT CO-18

Lease Number: <LEASE_NUMBER>

TIMING LIMITATION STIPULATION

No surface use is allowed during the following time period(s). This stipulation does not apply to operation and maintenance of production facilities.

February 1 through August 15
For the purpose of (reasons):

To protect raptor (this includes golden eagles, all accipiters, falcons [except the kestrels], all butteos, and owls) nesting and fledgling habitat during usage for one-quarter mile around the nest site.

Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of the stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820.)

Exception Criteria:

Exceptions may be granted during years when the nest site is unoccupied, when occupancy ends by or after May 15, or once the young have fledged and dispersed from the nest.

EXHIBIT CO-19

Lease Number: <LEASE_NUMBER>

TIMING LIMITATION STIPULATION

No surface use is allowed during the following time period(s). This stipulation does not apply to operation and maintenance of production facilities.

February 1 through August 15

For the purpose of (reasons):

To protect ferruginous hawk nesting and fledgling habitat during usage for
a one-quarter mile buffer around the nest.

Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of the stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820.)

Exception Criteria:
Exceptions may be granted during years when a nest site is unoccupied, when occupancy ends by or after May 15, or once the young have fledged and dispersed from the nest.

EXHIBIT CO-28

Lease Number: <LEASE_NUMBER>
CONTROLLED SURFACE USE STIPULATION
Surface occupancy or use is subject to the following special operating constraints.
On the lands described below:
<LEGAL_DESCRIPTIONS>
For the purpose of:
To protect perennial water impoundments and streams, and/or riparian/wetland vegetation by moving oil and gas exploration and development beyond the riparian vegetation zone.
Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820. See also Geothermal PEIS ROD section 2.3.3 at page 2-6.)
Exception Criteria:
Exceptions may be granted only if an on-site impact analysis shows no degradation of the resource values.

EXHIBIT CO-29

Lease Number: <LEASE_NUMBER>

LEASE NOTICE

The lessee is hereby notified that prior to any surface disturbing activities, an inventory of paleontological resources (fossils) may be required. Mitigation may be required such as monitoring in any area of PFYC 4 or 5 and also upon the discovery of any vertebrate fossil or other scientifically important paleontological resource. Mitigation of scientifically important paleontological resources may include avoidance, monitoring, collection, excavation, or sampling. Mitigation of discovered scientifically important paleontological resources may require the relocation of the surface disturbance activity over 200 meters. Inventory and any subsequent mitigation shall be conducted by a BLM permitted paleontologist.

On the lands described below:

<LEGAL_DESCRIPTIONS>

EXHIBIT CO-34

Lease Number: <LEASE_NUMBER>

ENDANGERED SPECIES ACT SECTION 7 CONSULTATION STIPULATION

The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. The BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. The BLM may require modifications 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 obligations under applicable requirements of the Endangered Species Act as amended, 16 U.S.C. § 1531 et seq., including completion of any required procedure for conference or consultation.

EXHIBIT CO-39

Lease Number: <LEASE_NUMBER>

CONTROLLED SURFACE USE STIPULATION

This lease may be found to contain historic properties and/or resources protected under the National Historic Preservation Act (NHPA), 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 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.

Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of this stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820.)

EXHIBIT CO-56

Lease Number: <LEASE_NUMBER>

LEASE NOTICE

Due to potential air quality concerns, supplementary air quality analysis may be required for any proposed development of this lease. This may include preparing a comprehensive emissions inventory, performing air quality modeling, and initiating interagency consultation with affected land managers and air quality regulators to determine potential mitigation options for any predicted significant impacts from the proposed development. Potential mitigation may include limiting the time, place, and pace of any proposed development, as well as providing for the best air quality control technology and/or management practices necessary to achieve area-wide air resource protection objectives. Mitigation measures would be analyzed through the appropriate level of NEPA analysis to determine effectiveness, and will be required or implemented as a permit condition of approval (COA). At a minimum, all projects and permitted uses implemented under this lease will comply with all applicable National Ambient Air Quality Standards and ensure Air Quality Related Values are protected in nearby Class I or Sensitive Class II areas that are afforded additional air quality protection under the Clean Air Act (CAA).

On the lands described below:

<LEGAL_DESCRIPTIONS>

EXHIBIT RG-03

Lease Number: <LEASE_NUMBER>

TIMING LIMITATION STIPULATION

No surface use is allowed during the following time period(s). This stipulation does not apply to operation and maintenance of production facilities.

March 1 through July 31

On the lands described below:

<LEGAL_DESCRIPTIONS>

For the purpose of (reasons):

To protect lesser prairie chicken habitat.

Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of the stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820.)

Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of the stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820.)

EXHIBIT RG-07

Lease Number: <LEASE_NUMBER>

TIMING LIMITATION STIPULATION

No surface use is allowed during the following time period(s). This stipulation does not apply to operation and maintenance of production facilities.

Winter Range: December 1 – April 1

On the lands described below:

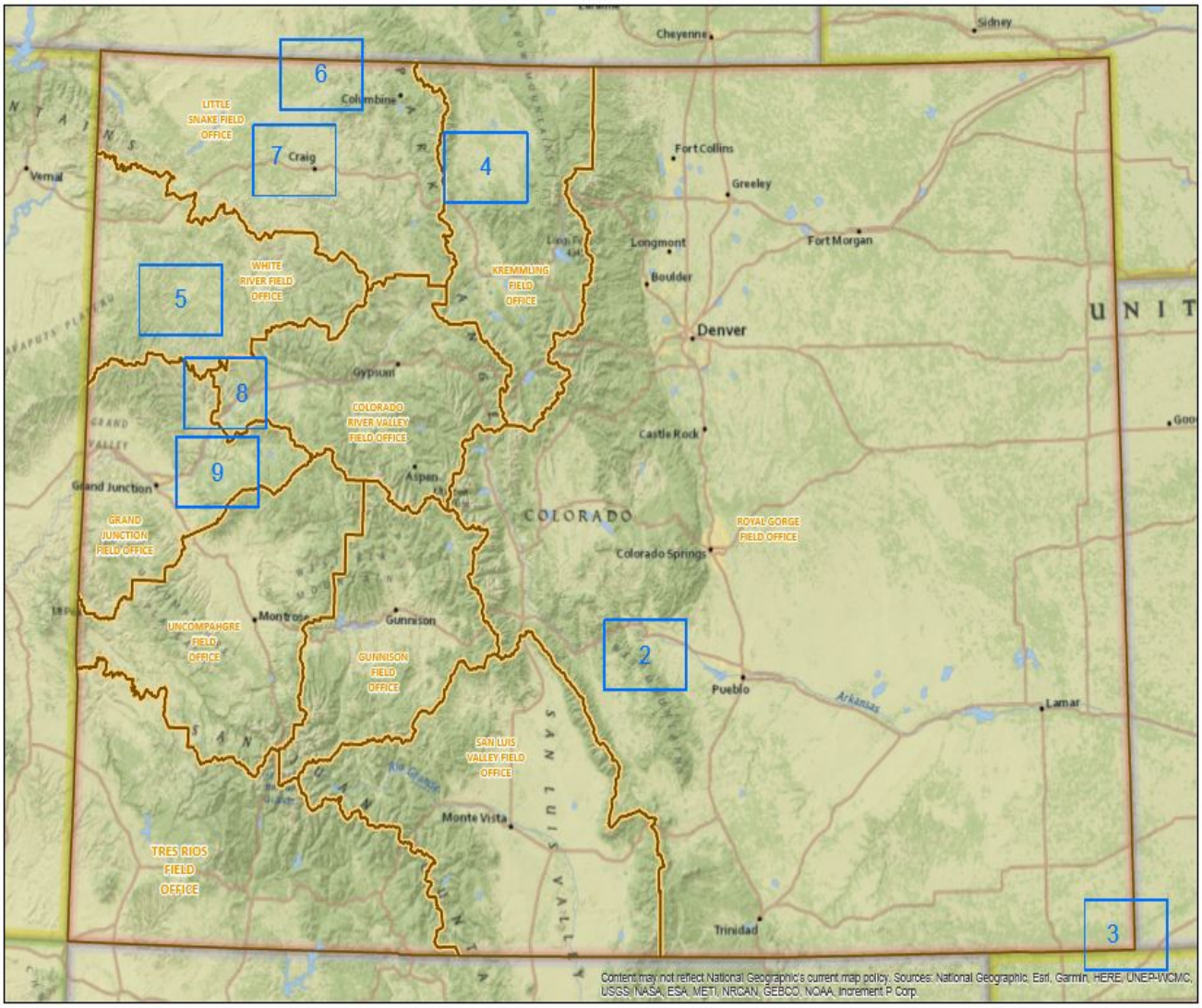
<LEGAL_DESCRIPTIONS>

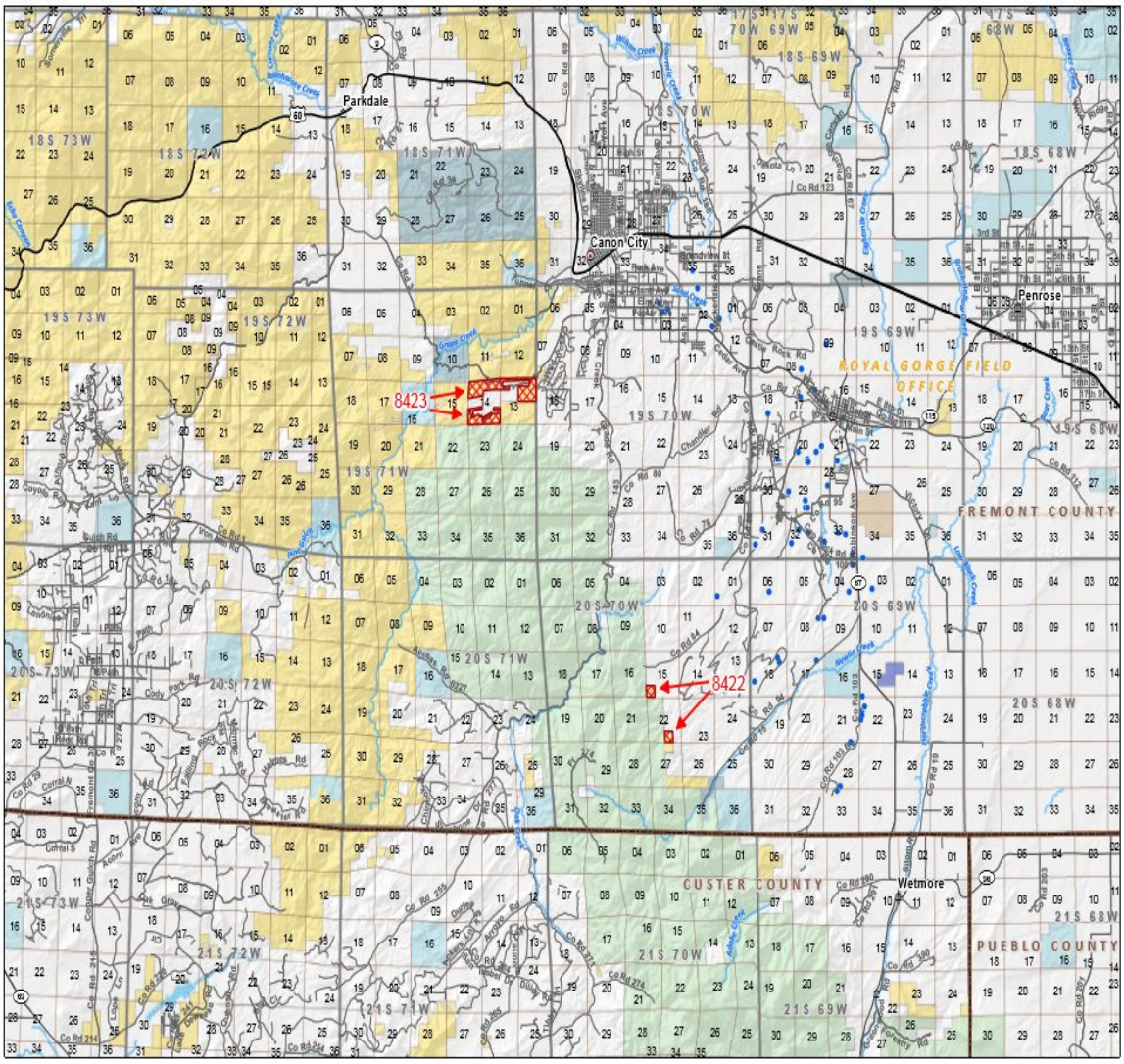
For the purpose of (reasons):

To protect wild turkey during the critical winter periods.

Any changes to this stipulation will be made in accordance with the land use plan and/or the regulatory provisions for such changes. (For guidance on the use of the stipulation, see BLM Manual 1624 and 3101 or FS Manual 1950 and 2820.)

Attachment E





Bureau of Land Management
Competitive Oil & Gas Lease Sale
March, 2019

NOTE TO MAP USERS
No warrantee is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of the data layers shown on this map. The official land records should be checked for the current status on any specific tract of land.

Legend

- BLM Field Office Areas Boundaries

Lease Sale Parcels

Oil & Gas Sale Status

- Sale
- COGCC Oil and Gas Well Locations

Oil and Gas Leases

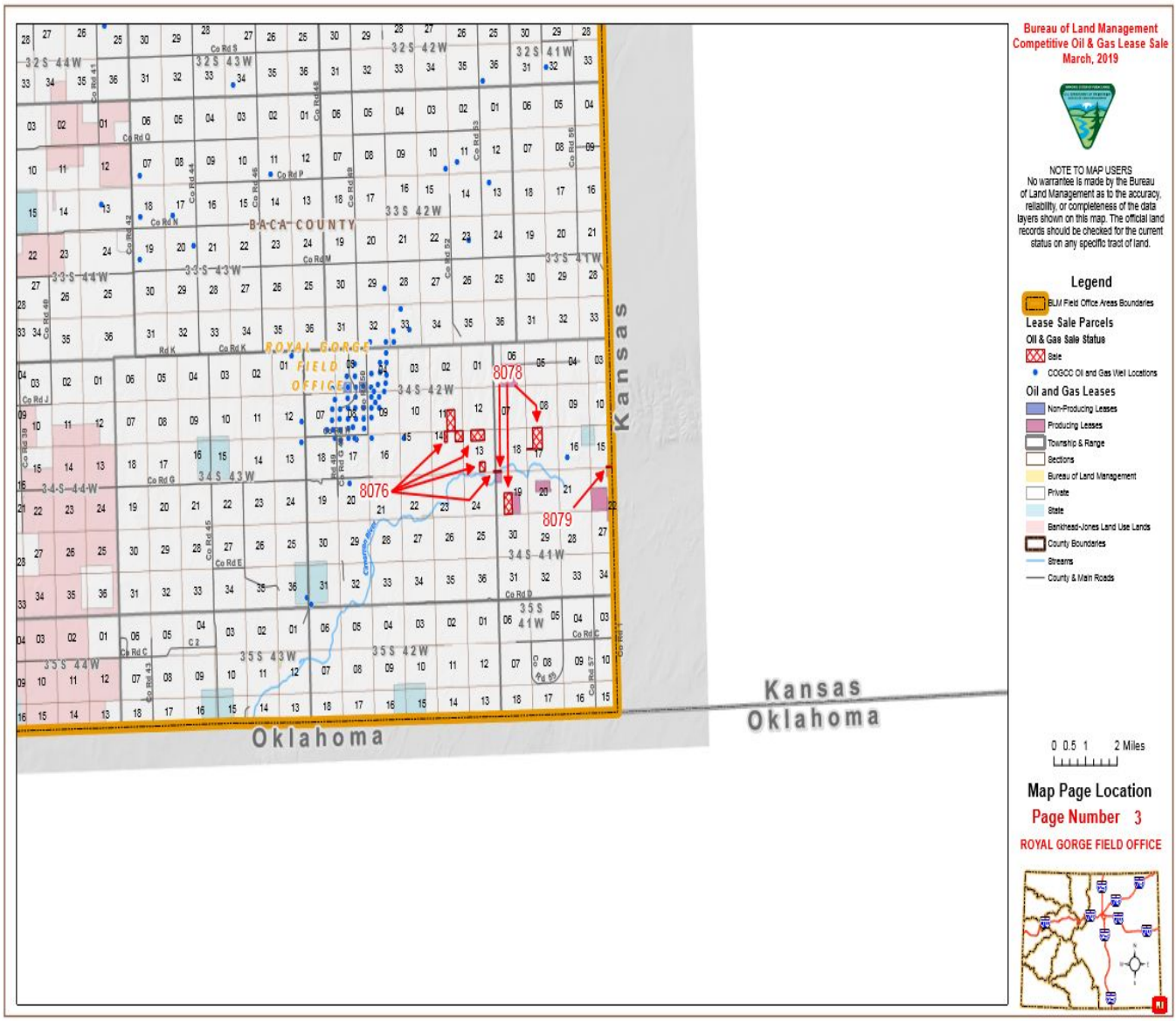
- Non-Producing Leases
- Township & Range
- Sections
- Bureau of Land Management
- Other Federal
- Private
- State
- State, County, City, Areas
- US Forest Service
- County Boundaries
- Lakes and Reservoirs
- Streams
- U.S. Highway
- State Highway
- County & Main Roads
- County Seats
- Other Cities and Towns

0 0.5 1 2 Miles

Map Page Location

Page Number 2

ROYAL GORGE FIELD OFFICE


Bureau of Land Management
Competitive Oil & Gas Lease Sale
March, 2019
NOTE TO MAP USERS
No warrantee is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of the data layers shown on this map. The official land records should be checked for the current status on any specific tract of land.
Legend
BLM Field Office Areas Boundaries
Lease Sale Parcels
Oil & Gas Sale Status
Sale
COGCC Oil and Gas Well Locations
Oil and Gas Leases
Non-Producing Leases
Producing Leases
Township & Range
Sections
Bureau of Land Management
Private
State
Bankhead-Jones Land Use Lands
County Boundaries
Streams
County & Main Roads
BACA COUNTY
ROYAL GORGE FIELD OFFICE
Kansas
Oklahoma
Kansas
Oklahoma
8076
8078
8079
0 0.5 1 2 Miles
Map Page Location
Page Number 3
ROYAL GORGE FIELD OFFICE

Attachment F

March 2019 Oil & Gas Lease EA
Summary of Substantial Public Comment Topics

NO fee ... will be needed IF product Starts. * See Note below

FREMONT COUNTY

DEC 12 2012

ZONING

PERMIT # DOT-12-5

DRIVEWAY ACCESS and ADDRESS PERMIT
FREMONT COUNTY BUILDING DEPARTMENT – faxed to Angela 12/12/12
615 MACON AVE. ROOM 212
Phone: 719-276-7460 Fax: 719-276-7461

(1.) APPLICANT SHALL SCHEDULE AN ON-SITE MEETING WITH DEPARTMENT OF TRANSPORTATION DESIGNEE TO DETERMINE ADEQUATE LOCATION REQUIREMENTS OF THE DRIVEWAY ACCESS, AND FOR FINAL ACCEPTANCE INSPECTION. IF APPLICANT FAILS TO APPEAR, THERE WILL BE A RESCHEDULE FEE OF $45.00
(2.) PLOT MAP OR SKETCH IS REQUIRED. DEPARTMENT OF TRANSPORTATION DESIGNEE WILL INDICATE DRIVEWAY LOCATION & INITIAL

Department of Transportation Designee: ______________________ Phone: 719-275-2047
Name of Applicant: **Zephyr Gold USA Ltd.** Phone: **902-446-4189** Alt. Phone: __________
Current address, City, State, Zip Code of Applicant: **1959 Upper Water Street, Suite 1700, Halifax, Nova Scotia, Canada**
Name of Driveway Contractor installing: ______________________
If existing driveway, please include address: CR3

For County use: The following is to be completed by Department of Transportation Designee:
Name of street being accessed: CR 3 Site distance both directions: E 100' ft. W 500'

- Driveway access shall not interfere with location or functioning of any traffic regulation device.
- More than one driveway access shall not be allowed on any parcel less than 100' in width.
- Driveway access shall be constructed so as not to interfere with the street drainage system.
- No driveway access shall enter or exit on to street at less than 45 degrees.

The following information will be required prior to the final acceptance:
Will drainage study be required: Yes ______ No X If yes, specify below:

Will improvements be required: Yes X No ______
Culvert size: 15" X 40' Type of Culvert (Material) CMP Cover over top of Culvert 7½"
Curb Cut ______ Drop Inlets ______ Downspouts ______ Energy Dissipaters ______
Flared Ends ______ Headwalls ______ Rip Rap ______ Paving & Beveled Ends ______ Deflectors ______
Racks ______ Cribs ______ Raisers ______ Basins ______ Spillways ______ Others ______

- A minimum of 12 inch diameter culvert, unless larger required due to historical drainage.
- Minimum cover over top of the culvert shall be ½ the diameter of the culvert. Minimum length of culvert 24".
- Driveway shall not allow drainage onto County Right-of-Way.
- Culverts shall be set on a grade which will allow for proper drainage.
- Culverts shall be corrugated metal or material of equivalent strength & construction.

(3.) LOCATION AND SITE REQUIREMENTS APPROVED BY DEPARTMENT OF TRANSPORTATION:
DESIGNEE: [signature] DATE: 12-12-12
(4.) A. APPLY FOR ADDRESS AT THE BUILDING DEPARTMENT, 615 MACON, ROOM 212
B. PLOT MAP OR SKETCH AS APPROVED IN (2.) ABOVE, WILL BE REQUIRED WHEN APPLYING FOR AN ADDRESS.
C. SUBMIT COPY OF ISSUANCE OF AN ADDRESS TO THE BUILDING DEPARTMENT WHEN APPLYING FOR A PERMIT

****Permit will expire one year from date of purchase.**

I certify that I understand and agree to the above requirements and conditions.
Signature of Applicant: ______________________ Date: __________ Fee Paid: ______
FINAL ACCEPTANCE OF DRIVEWAY ACCESS BY DEPARTMENT OF TRANSPORTATION:
DESIGNEE: ______________________ DATE: __________

Warranty Deed
****Must submit proof of ownership & Plot Plan indicating location of driveway**
Copies required: 1.Road Supervisor 2.DOT Office Manager 3.Planning & Zoning 4.Building Department 5.Owner

Revised: 9/23/10

* Access onto Roadway will need to be modified if production is started. Access will need to be wider and a 15" X 40' culvert Installed.

Fremont County Department of Planning and Zoning
Roadway Impact Analysis Form

This form shall be used in conjunction with any applications submitted in accordance with Section 8 of the Fremont County Zoning Resolution and or Section VI of the Fremont County Subdivision Regulations. This form is considered a minimum application submittal item and shall be required to be provided at the time of application submittal. This form is intended to provide the minimum items that must be addressed in the roadway impact analysis. The form can be expanded or attachments can be made to further address the roadway impact of the proposed use. **If the estimated average daily traffic increase is less than thirty (30) vehicle trips per day (*one trip to be considered as a single or one-direction vehicle movement with either the origin or the destination [exiting or entering] inside the subject property*) as per the Institute of Transportation Engineers, Trip Generation Handbook, Second Edition or subsequent editions for the entire development, as estimated by the project engineer, then a Roadway Impact Analysis will not be required to be completed by an engineer. In such situations other minimum items shall be addressed by the applicant.**

1. Project Name: **Dawson Gold Project**

2. Type of application:
   - ☐ Zone Change
   - ☒ Conditional Use Permit
   - ☐ Site Development Plan
   - ☐ Subdivision Preliminary Plan
   - ☐ Special Review Use Permit
   - ☐ Temporary Use Permit
   - ☐ Change of Use of Property
   - ☐ Expansion of an existing Business or Industrial Use

3. Engineer: _____ Address: _____

   City: _____ State: _____ Zip Code: _____

   Telephone #: (___) _____ Facsimile #: (___) _____ Email _____

4. Provide a detailed description of the proposed use: **Zephyr Gold USA (Zephyr) is seeking permission to perform surface exploration of precious metals in the Dawson and Windy Gulch gold prospects west of Cañon City, Fremont County, Colorado. Exploration is proposed to occur in three (3) phases, depending on exploration results of each phase: Phase 1 Mineral Resource Delineation Drilling, Phase 2: Preliminary Economic Analysis possibly including bulk sampling for metallurgical testing, Phase 3: Geotechnical Studies and Resource Confirmation Drilling. In Phase 1 up to 15 holes will be drilled in order to further delineate the mineral resource. The drill rig and team will proceed into the exploration claims on the existing mountain trail, stop and drill at a designated location, cement the hole and proceed to the next location on the mountain trail. Due to the remoteness of the claims, construction of approximately 800 linear feet of new mountain trail may be necessary. If BLM deems necessary, the new mountain trail will be reclaimed as the rig recedes down the mountain. In**

the event mineral outcrops are encountered, overburden removal may be necessary to delineate the outcrop for geological evaluation and sampling. Overburden removal will occur with a backhoe, creating a trench the width and approximate depth of the backhoe bucket. Approximately 200 linear feet of trenching is expected. The trenches will be flagged while open and will be filled and reclaimed immediately following geologic evaluation and sampling. Exploration will occur within existing mountain trails as much as possible. If Phase I produces promising results, Phase 2 may entail identifying specific locations for extraction of bulk samples for metallurgical testing. Bulk samples would entail extraction of approximately 5 to 10 tons of material at the surface by means of drill and blasting, loading onto a haul truck for shipment to a testing facility. This will require one (1) 10 ton haul truck. All surface disturbances will be reclaimed immediately. Again, if Phase 2 results are promising, Phase 3 will consist of geotechnical and additional resource confirmation drilling in the same manner as Phase 1. Approximately six (6) employees in two (2) shifts will complete Phase 1 exploration within 60 calendar days if allowed to operate two (2) shifts seven (7) days a week. Drill holes, trenches, sample sites and new trails will be reclaimed according to Colorado Division of Reclamation, Mining and Safety standards and under the supervision of US Bureau of Land Management. Total surface disturbances will be limited to less than two (2) acres. Zephyr hopes to commence Phase 1 exploration in February 2013, completing in April 2013. If the project proceeds, Phase 2 exploration will occur during early summer with Phase 3 in the fall of 2013. The total life of exploration will be less than one(1) year if Phase 1 results are promising.

5. Provide the estimated average daily traffic to be generated by the proposed use(s), using the Institute of Transportation Engineers, Trip Generation Handbook, Second Edition or subsequent editions. The estimated volumes of traffic to be generated by the proposed use(s) shall include as a minimum, the average weekday traffic volume and the peak-hour (*morning and afternoon*) traffic volumes. Specify the number of trips in each category. (*one trip to be considered as a single or one-direction vehicle movement with either the origin or the destination [exiting or entering] inside the subject property*)

Residential: **N/A**	daily, _____	peak-hour am, _____	peak-hour pm
Employee: **6**	daily, **0**	peak-hour am, **0**	peak-hour pm
Customer: **N/A**	daily, _____	peak-hour am, _____	peak-hour pm
Truck generated by the proposed use: **N/A**	daily, _____	peak-hour am, _____	peak-hour pm

Delivery – required by the use:

2 daily, 0 peak-hour am, **0** peak-hour pm

Total Vehicle Trips:

8 daily, _____ peak-hour am, _____ peak-hour pm

I certify that based on the proposed use(s) the total vehicle trips using the Institute of Transportation Engineers, Trip Generation Handbook, Second Edition or subsequent editions will average less than thirty (30) trips per day based on any fourteen (14) day time frame.

_____ Date _____ Seal

Colorado Licensed Professional Engineer

If the above has been certified, then the applicant can complete the form and acknowledge it. If completed by the applicant only the questions marked by asterisk (*) are required to be answered.

NOTE: If the additional information provided warrants improvements to the roadway system, even though the traffic generated by the proposed use is less than thirty (30) trips per day, such improvements will be required. If in the future the use exceeds an average of thirty (30) trips per day a complete analysis could be required.

6. *What is the general location of the subject property? **Approximately 3.1 miles west on County Road 3, then SE approximately 1 mile on dirt road to proposed site.**

7. *What are the names and/or the numbers of the public roadways that serve the site? **County Road 3A, Temple Canyon Road, is the public roadway to the private gated road on BLM property that accesses the site.**

   Provide a site plan drawing that shows the subject property, its proposed access points and all public roadways within a one-half (½) mile radius of the subject property, marked as Exhibit 7.1. ☐ An exhibit has been attached.

8. *What is the classification, according to the Fremont County Master Plan, of the roadway from which the project site will gain access to the public transportation system?
   ☐ Expressway or Freeway --- ☐ Major Arterial --- ☐ Arterial --- ☐ Collector --- ☒ Local

9. *Do the roadways in question lie within a three (3) mile radius of any incorporated town or city limits or the boundary of another County? ☒ Yes --- ☐ No
   If yes, provide the name(s) of the jurisdiction(s): **Cañon City**
   In addition if a new roadway is to be constructed, how will it comply with the transportation plan in effect for the municipality?_____

   _____

10. *Will this project require a Fremont County Driveway Access Permit or a Colorado Department of Transportation (CDOT) State Highway Access Permit? ☐ Yes --- ☒ No
    Please explain: **The proposed activity is temporary with a duration not to exceed one (1) year.**

11. *Will the project require construction of, or improvement to any roadway maintained by the CDOT? ☐ Yes --- ☒ No
If yes, will the proposed construction or improvement be in compliance with CDOT's "5 Year Transportation Plan"? ☐ Yes --- ☐ No Please Explain _____

_____

Has CDOT required that the applicant provide a traffic study? ☐ Yes --- ☐ No
If yes, a copy of the study shall be attached to this application, marked as Exhibit 11.1. ☐ An exhibit has been attached.

12. *Will the project require construction of, or improvement to any roadway currently maintained or proposed to be maintained by the County? ☐ Yes --- ☒ No
If yes, what would be the social, economic, land use, safety and environmental impacts and effects of the new roadway on the existing transportation system and neighborhood?_____

_____

_____

13. *Are any roadways proposed to be vacated or closed in conjunction with the proposed project? ☐ Yes --- ☒ No
If yes, please explain._____

_____

_____

14. *Is the proposed project site adjacent to or viewable from any portion of the Gold Belt Tour Scenic Byway or other scenic corridor designated by the Master Plan? ☐ Yes --- ☒ No
If yes, identify the byway and or scenic corridor:_____
If yes, explain how the scenic quality will be affected by the proposed project._____

_____

_____

If yes, what measures will be taken to not have a negative impact on the byway and or scenic corridor?_____

_____

15. *Will the proposed project gain access to the public transportation system via 3rd, 9th, K and or R Streets in the Penrose-Beaver Park Area of the County? ☐ Yes --- ☒ No

16. *Does the subject property have frontage on a public roadway? ☐ Yes --- ☒ No
If answered no, then documentation evidencing a "right of access" to the subject property for the proposed use shall be attached marked as Exhibit 16.1. ☒ An exhibit has been attached. If answered no, then please explain what the right of access consists of:_____

17. *What is the right-of-way width of the public roadway(s) that serve the site? **50 feet according to measuring tool on Fremont GIS and qpublic websites.**

18. *What is the surface type of the public roadway(s) that serve the site? **Compacted dirt and gravel**

19. *What is the surface width of the public roadway(s) that serve the site? **24 feet**

20. *What are the existing drainage facilities for the public roadway(s) that serve the site? **Side ditches and culverts**

21. *Does the public roadway(s) that serves the site have curb and gutter? ☐ Yes --- ☒ No
If answered yes, what is the type of curb and gutter?_____

22. *Does the public roadway(s) that serves the site have adjacent sidewalks or other pedestrian ways?
☐ Yes --- ☒ No
If answered yes, what is the width(s) and surface type(s)?_____

23. *How many access points will the subject property have to public roadways? **One**

24. *Will the proposed roadways that access the public roadways intersect the public roadways other than at perpendicular? ☒ Yes --- ☐ No
If answered yes, please explain: **Public roadway and access intersection will maintain historic non-perpendicular alignment.**

25. *What are the sight distances, in all directions, from the subject property access point(s) along the public roadway that serves the site? (*mark and provide distance for each that is applicable*)
☐ Northerly, site distance: _____ ☐ Southerly, site distance: _____
☒ Easterly, site distance: **140 feet** ☒ Westerly, site distance: **800 feet**

26. *What are the distances from the subject property access point(s), in all directions, to the nearest intersection with another public roadway along the public roadway that serves the site? (*mark and provide distance for each that is applicable*)
☐ Northerly, distance: **N/A** ☐ Southerly, distance: **N/A**
☒ Easterly, distance: **3.1 miles** ☐ Westerly, distance: **N/A**

27. *What are the distances from the subject property access point(s), in all directions, to the nearest driveway(s) along the public roadway that serves the site? (*mark and provide distance for each that is applicable*)
☐ Northerly, distance: **N/A** ☐ Southerly, distance: **N/A**

☐ Easterly, distance: **N/A** ☐ Westerly, distance: **N/A**

28. *What are the distances from the subject property access point(s), in all directions, to the nearest blind curve(s) along the public roadway that serves the site? (*mark and provide distance for each that is applicable*)
☐ Northerly, distance: _____ ☐ Southerly, distance: _____
☒ Easterly, distance: **140 feet** ☐ Westerly, distance: _____

29. *What are the distances from the subject property access point(s), in all directions, to the nearest blind hill(s) along the public roadway that serves the site? (*mark and provide distance for each that is applicable*)
☐ Northerly, distance: _____ ☐ Southerly, distance: _____
☐ Easterly, distance: _____ ☒ Westerly, distance: **800 feet**

30. *Identify any and all hazardous conditions with regard to the public roadway(s) that provide access to the subject property in the general area of the subject property: **County Road 3 is a winding, dirt road infrequently used for recreation. The winding nature and short site distances maintain slow vehicle speeds.**

If the public roadway(s) that currently serve the subject property have any hazardous conditions, then recommendations shall be made for improvements that will decrease the hazardous conditions on the public roadway(s): **The proposed activity is very temporary, completed in less than one (1) year.**

31. *Explain what effect the proposed use will have on the existing traffic in the neighborhood. If no change is expected, please explain why no change is expected: **The proposed use will increase traffic on County Road 3, two trips every 12 hours.**

32. *Will the proposed use, due to the increase in traffic or the type of vehicle traffic generated by the proposed use, change the level and or type of required maintenance for the public roadway(s) that serve the site? ☐ Yes --- ☒ No, (*please explain*) **The proposed use depends primarily on standard pick-up truck vehicles, consistent with current vehicle traffic. During Phases 1 and 3, two equipment mobilization trucks will bring the drill rig and backhoe into and out of the site. During Phase 2 one (1) 10-ton haul truck and one equipment mobilization truck will be utilized over the life of Phase 2.**

If the proposed use, due to the increase in traffic or the type of vehicle traffic generated by the proposed use, changes the level and or type of required maintenance for the public roadway(s) that serve the site, then recommendations shall be made that would lessen the maintenance impact for the entity in control of maintenance of the public roadway(s): _____

Note: If improvements are required, it may be mandatory that such improvement be installed prior to final approval of the application.

33. *Are new roadways proposed to be constructed, on or off site, in association with the proposed project? ☒ Yes --- ☐ No If yes, provide evidence that the roadways will be constructed to conform to natural contours in order to minimize soil disturbance, cut and fills, protect drainageways and not create to unstable slopes. **Access road improvements will be according to BLM road standards.**

34. Provide an analysis of the existing traffic volumes on the adjacent roadway system, including the average weekday traffic (*vehicles per day*) and the weekday peak-hour traffic (*vehicles per hour – am and pm*), showing the dates and times of traffic counts or source utilized for traffic volume counts. Determine the existing level of service or percentage of roadway capacity currently in use.

Roadway name or # _____ average weekday traffic _____

Weekday peak-hour traffic _____ am _____ dates _____ times

Weekday peak-hour traffic _____ pm _____ dates _____ times

Current level of service - % of roadway in use _____

_____

Roadway name or # _____ average weekday traffic _____

Weekday peak-hour traffic _____ am _____ dates _____ times

Weekday peak-hour traffic _____ pm _____ dates _____ times

Current level of service / % of roadway in use _____

_____

Roadway name or # _____ average weekday traffic _____

Weekday peak-hour traffic _____ am _____ dates _____ times

Weekday peak-hour traffic _____ pm _____ dates _____ times

Current level of service / % of roadway in use _____

_____

35. Provide an estimate of the probable traffic directional distribution from and to the subject property based on the proposed use(s) and assignment of the estimated traffic volumes to the adjacent

roadway network. Estimate the future background and resulting total traffic volumes (*including the estimated generated traffic due to the proposed use*) on the adjacent roadway system for a twenty (20) year design period, showing volumes for both left and right turn movements as well as through traffic.

36. Determine the projected future levels of service or percentage of roadway capacity to be in use at the subject property's access points and key adjacent intersections. Provide recommendations for street and access improvements if any portions of the roadways do not have the capacity to accept the additional estimated traffic volumes. All necessary improvements will be required to be designed, completed and accepted by the County prior to any final action regarding the application.

37. Please provide any additional information considered by the Certifying Engineer to be pertinent to the roadway impact in association with the proposed project:

I hereby certify that the foregoing information was prepared by myself or under my direct supervision and is true and correct to the best of my knowledge and belief.

_____ date _____ SEAL

Colorado Licensed Professional Engineer

If not completed by an Engineer, then the following acknowledgement shall be signed by the applicant and/or owner.

By signing this Application, the Applicant, or the agent/representative acting with due authorization on behalf of the Applicant, hereby certifies that all information contained in the application and any attachments to the Application, is true and correct to the best of Applicant's knowledge and belief.

Applicant understands that any required private or public improvements imposed as a contingency for approval of the application may be required as a part of the approval process.

Fremont County hereby advises Applicant that if any material information contained herein is determined to be misleading, inaccurate or false, the Board of Commissioners may take any and all reasonable and appropriate steps to declare actions of the Board regarding the Application to be null and void.

Signing this Application is a declaration by the Applicant to conform to all plans, drawings, and commitments submitted with or contained within this Application, provided that the same is in conformance with the Fremont County Zoning Resolution.

David Felderhof.		Nov 27, 2012
Applicant Printed Name	Signature	Date
David Felderhof.		Nov 27, 2012
Owner Printed Name	Signature	Date

November 27, 2012

Anthony Adamic
Fremont County
Department of Transportation
615 Macon Avenue
Cañon City, Colorado 81212

RE: Zephyr Gold USA Ltd
Conditional Use Permit Application
Precious Mineral Exploration

Dear Mr. Adamic,

Please accept the following information as requested in our phone conversation on November 21 and meeting on November 26, 2012.

The required Roadway Impact Analysis form was submitted to Fremont County Planning and Zoning Department on Wednesday, November 14, 2012 as Exhibit CUP-23.1.

Item a) Stephanie Carter of US BLM was contacted regarding the driveway access permit since the access in question is not a driveway but rather an intersection of a county road and a federal public road. The driveway application was provided to BLM for review. Since this is not a driveway and the property belongs to the public with right of access via US Mine Act, Zephyr will respond to this request as directed by US BLM.

Item b.1) The closest CDOT maintained roads are Highways 50 and 115. The route to the BLM access may vary depending on point of origination. As stated on the form, daily project traffic will be four pick-up trucks, twice a day.

Item b.2) Mountain trail improvements will utilize a D-6 bulldozer, or similar size dozer. Exploratory drilling will be performed with the available drill rig with depth maximum capacity of 1200 feet. If Phase 2 is required and metallurgists request, a small back hoe, possibly Komatsu 200 or similar size excavator, will place approximately five tons of area rock into a one 10-ton haul truck for analysis. Due to minimal surface disturbance, reclamation will not require specialized equipment. Equipment will be mobilized to and from the site as needed for each phase on flatbed trailers at commencement and completion of each phase, total of 12 trips over 12 months, maximum. This is included as vendor trips on Item 4 of the Roadway Impact Analysis form.

Environmental Alternatives Inc.
1107 Main Street, Cañon City, CO 81212
www.envalternatives.com • e-mail: eai@bresnan.net
Phone: 719-275-8951 • Fax: 719-275-1715

Item b.3) Item 5 of the Roadway Impact Analysis form addresses this concern specifically.

Item c) Item 4 of the Roadway Impact Analysis form addresses this concern specifically.

Item d) Fugitve dust mitigation will occur as minimal surface disturbance, immediate reclamation upon completion of exploration, drilling with water, and slow vehicle speed due to rugged mountain terrain.

Respectfully submitted,

Angela M. Bellantoni

Cc: Dave Felderhof
Loren Komperdo

Environmental Alternatives Inc.
1107 Main Street, Cañon City, CO 81212
www.envalternatives.com • e-mail: eai@bresnan.net
Phone: 719-275-8951 • Fax: 719-275-1715

November 15, 2012

TO: Fremont County Planning and Zoning

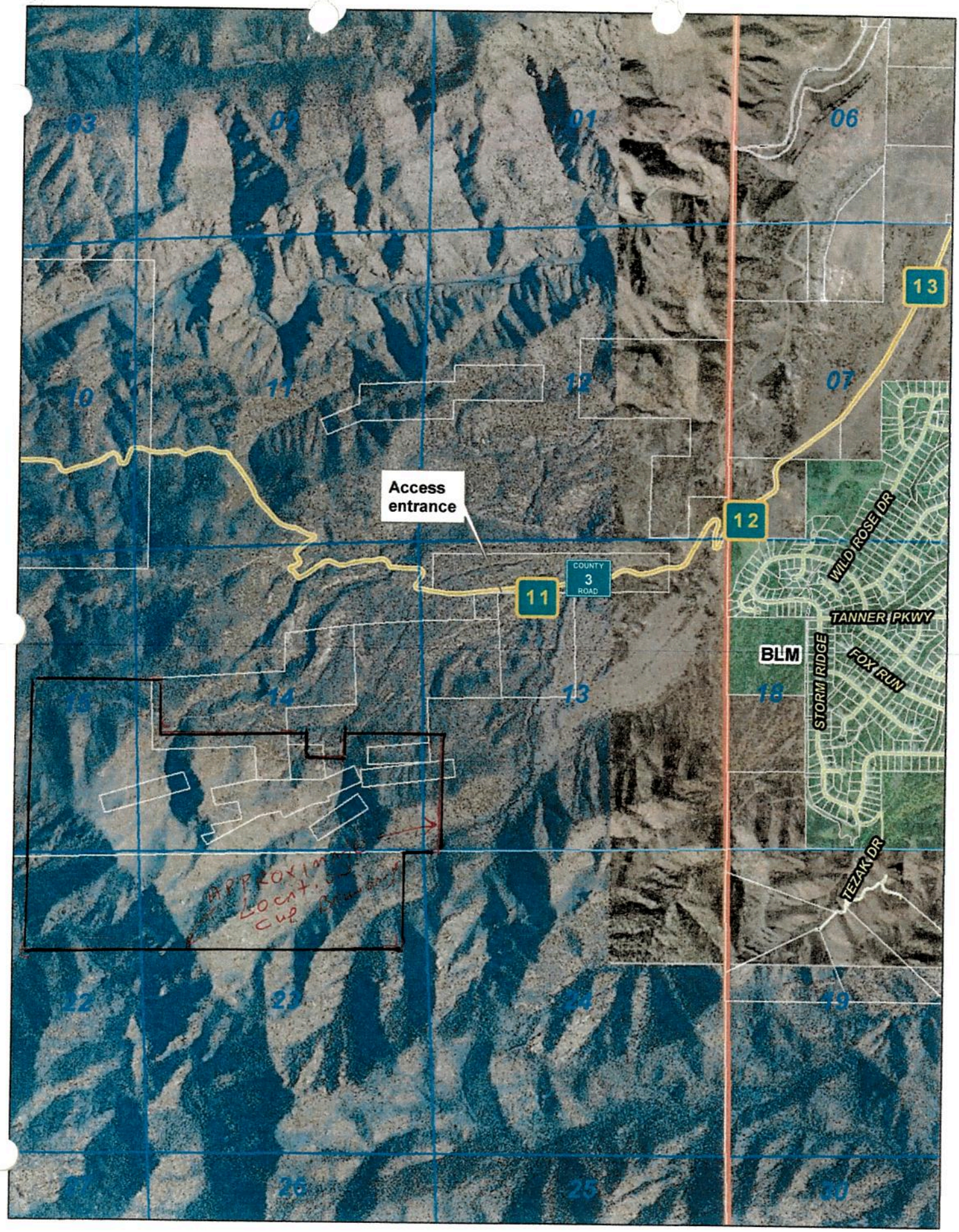
FROM: EAI

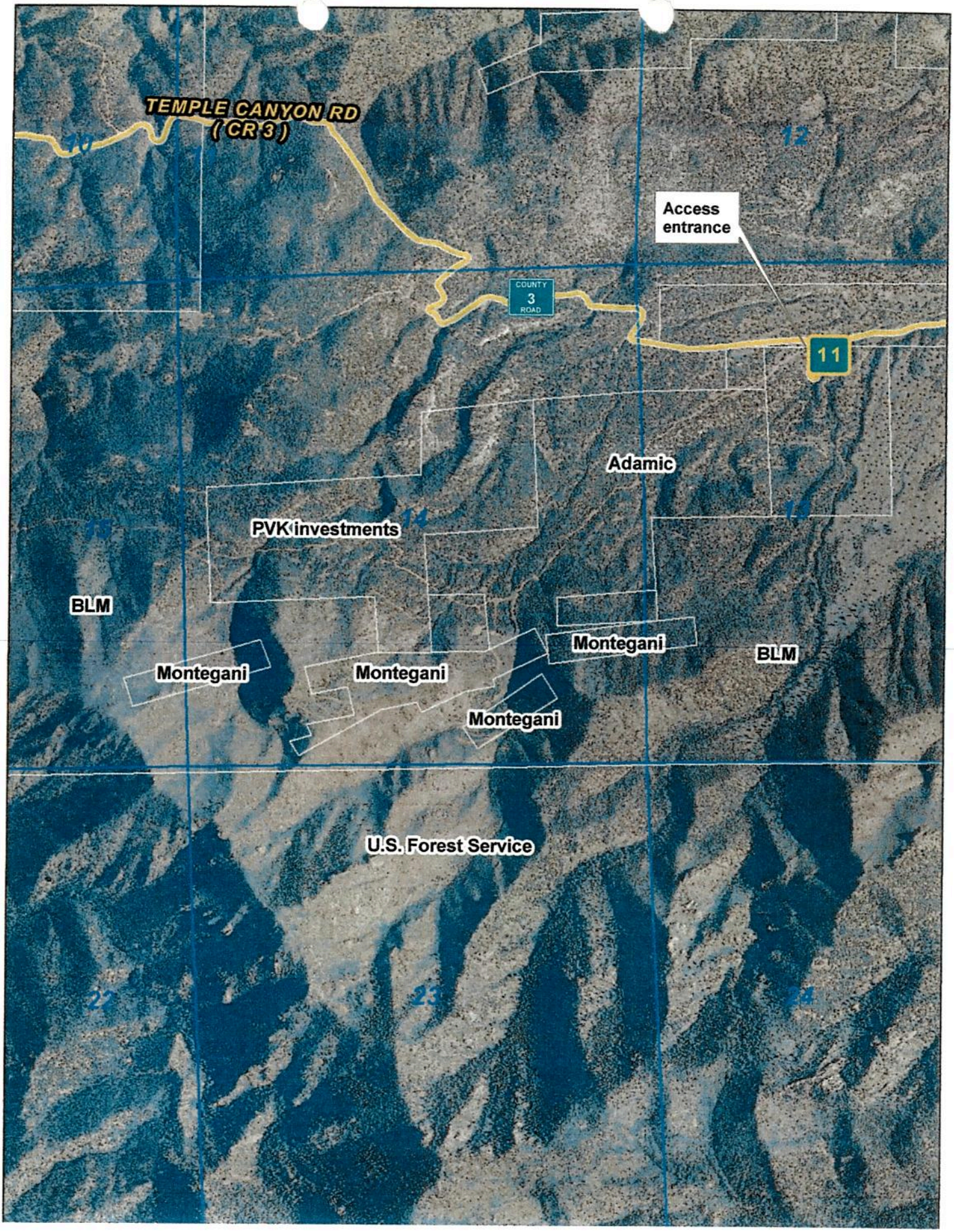
RE: Zephyr Gold USA

Dawson Gold Project, Adjoining Neighbors

Adjoining Neighbors to Permit Boundary

Owner	Address	Parcel
US BLM	3028 East Main, Cañon City, Colorado	
PVK Investment LLC	1018 Venus Drive Colorado Springs, CO 80905	Judith Placer
US Forest Service	3028 East Main, Cañon City, Colorado	
Mary Adamic c/o Isabelle Adamic	860 Chantilly Lane, Idaho Falls, Idaho 83402	Fremont Placer


Access entrance
COUNTY 3 ROAD
11
12
13
BLM
WILD ROSE DR
TANNER PKWY
FOX RUN
STORM RIDGE
TEZAK DR
APPROXIMATE LOCATION OF PROJECT


TEMPLE CANYON RD
(CR 3)
10
12
Access
entrance
COUNTY
3
ROAD
11
Adamic
13
14
PVK investments
BLM
Montegani
Montegani
Montegani
Montegani
BLM
U.S. Forest Service
22
23
24