United States Department of the Interior Bureau of Land Management

Environmental Assessment for the February 2013 Oil and Gas Lease Sale

Little Snake Field Office

455 Emerson St.

Craig, Colorado 81625

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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 and the Federal Land Policy and Management Act of 1976, to make mineral resources available for disposal and to encourage development of mineral resources to meet national, regional, and local needs.

The BLM's Colorado State Office conducts quarterly competitive lease sales to sell available oil and gas lease parcels. A Notice of Competitive Lease Sale, 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 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 the 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; if appropriate stipulations have been included; if new information has become available which might change any analysis conducted during the planning process; if appropriate consultations have been conducted, and if there are special resource conditions of which potential bidders should be made aware. Once the draft parcel review is completed and returned to the State Office, a list of available lease parcels and stipulations is made available to the public through a Notice of Competitive Lease Sale (NCLS). Lease sale notices are posted on the Colorado BLM website at: http://www.blm.gov/nm/st/en/prog/energy/oil_and_gas/lease_sale_notices.html. On rare occasions, additional information obtained after the publication of the NCLS may result in withdrawal of certain parcels prior to the day of the lease sale.

The inclusion of a parcel listed in the lease sale notice may be protested. A protest must be received at the BLM's Colorado State Office no later than close of business on the 30th calendar day after the posting of the notice of the lease sale. Nominated parcels that receive no bids during the February lease sale become available for noncompetitive sale beginning the day after the lease sale. Parcels offered noncompetitively remain available on a first-come, first-served basis for a two-year period beginning the day after the sale.

Fifty-nine parcels comprising 63,137.27 acres within the Little Snake Field Office (LSFO) were nominated for the February 2013 Competitive Oil and Gas Lease Sale. This figure is comprised of 31,909.45 acres of federal land and 31,227.82 acres of split-estate land. The legal descriptions of the nominated parcels are in Attachment A.

Colorado BLM Instruction Memorandum No. CO-2010-027 provided guidance and direction for implementing Washington Office (WO) IM 2010-117 and Oil and Gas Leasing Reform-Land Use Planning and Parcel Review. That IM requires the field office to complete a NEPA review and provide a 30 day public review and comment period of the NEPA document for lease sales. It also

provides guidance for parcel review, timeframes, leasing recommendations and attachments to be included with the Environmental Assessment (EA) as well as guidance for use of Master Leasing Plans. This EA has been prepared in accordance with IM CO-2010-027 by the LSFO to analyze leasing of 59 parcels nominated.

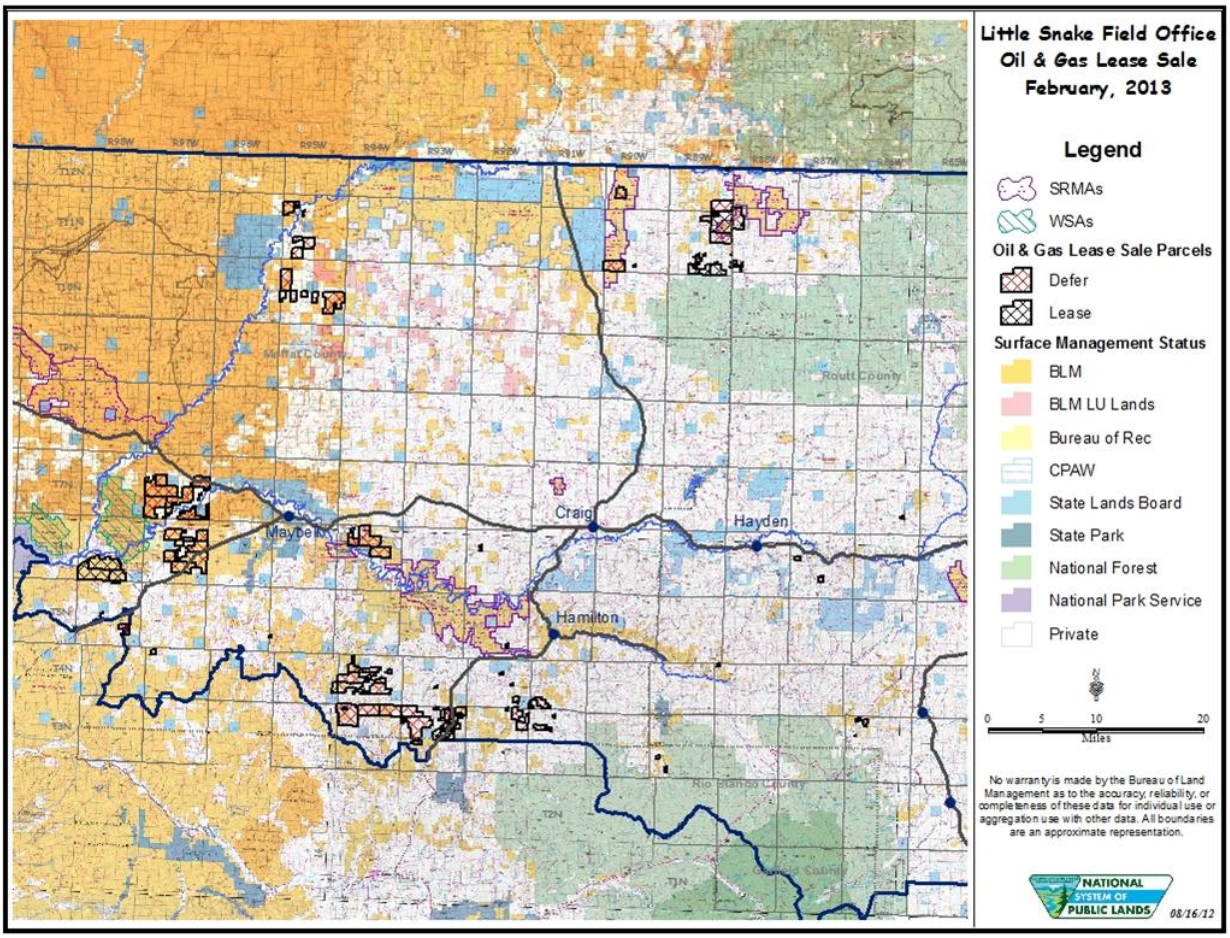
PROJECT NAME: February 2013 Competitive Oil and Gas Lease Sale

PLANNING UNIT: Little Snake Field Office

1.2 PROJECT LOCATION AND LEGAL DESCRIPTION

LEGAL DESCRIPTION: Please see Attachments A, B, and C and Map 1 Below.

Map 1



all nominated parcels in the LSFO

1.3 PURPOSE AND NEED

The purpose of the Proposed Action is to offer parcels for competitive oil and gas leasing to allow private individuals or companies to explore for and develop federal oil and gas resources for sale on public markets.

The need for the action is to satisfy the conditions of the Mineral Leasing Act of 1920 as described in 43CFR 3100 and the Federal Land Policy and Management Act of 1976. The sale of oil and gas leases is needed to meet the growing energy needs of the United States public (43 U.S.C. § 1702 (c)). Production of oil and gas resources on public lands contributes to decreasing the dependence of the United States on foreign energy sources, which is a BLM policy that complies with the Mining and Minerals Policy Act of 1970. Continued leasing is necessary to maintain options for production as oil and gas companies seek new areas for production or attempt to develop previously inaccessible or uneconomical reserves.

1.4 PLAN CONFORMANCE REVIEW

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

Name of Plan: Little Snake Record of Decision and Resource Management Plan (LSFO ROD/RMP [October 2011]).

Date Approved: October 2011

Decision Language: The Proposed Action is in conformance with the LUP because it is specifically provided for in the following LUP goals, objectives, and management decisions:

- Allow for the availability of the federal oil and gas estate (including coalbed natural gas) for exploration and development. Objectives for achieving these goals include:
- Identify and make available the federal oil and gas estate (including coalbed natural gas) for exploration and development.
- Facilitate reasonable, economical, and environmentally sound exploration and development of oil and gas resources (including coalbed natural gas).
- Lease with standard lease terms and conditions stipulations, timing limitations, controlled surface use, or no surface occupancy stipulations.
- No parcels are in areas closed to leasing.

Section/Page: Section 2.13 Energy and Minerals/ page RMP-36

Other related documents that cover the proposed action:

Name of Plan: Colorado Oil and Gas Leasing & Development Final EIS Plan Amendment

Date Approved: October 1991

Section/Page: Record of Decision for the Oil and Gas Plan Amendment to the Little Snake Resource Management Plan/EIS, Chapter 2/ page 11

In January 1997, the Colorado State Office of the BLM approved the Standards for Public Land Health and amended all RMPs in the State. Standards describe the conditions needed to sustain public land health and apply to all uses of public lands.

Standard 1: Upland soils exhibit infiltration and permeability rates that are appropriate to soil type, climate, land form, and geologic processes.

Standard 2: Riparian systems associated with both running and standing water function properly and have the ability to recover from major disturbance such as fire, severe grazing, or 100-year floods.

Standard 3: Healthy, productive plant and animal communities of native and other desirable species are maintained at viable population levels commensurate with the species and habitat's potential.

Standard 4: Special status, threatened and endangered species (federal and state), and other plants and animals officially designated by the BLM, and their habitats are maintained or enhanced by sustaining healthy, native plant and animal communities.

Standard 5: The water quality of all water bodies, including ground water where applicable, located on or influenced by BLM lands will achieve or exceed the Water Quality Standards established by the State of Colorado.

Because standards exist for each of these five categories, a finding must be made for each of them in an environmental analysis. These findings are located in Chapter 3 of this document.

1.5 SCOPING AND ISSUES IDENTIFIED

1.5.1 Scoping: NEPA regulations (40 CFR §1500-1508) require that the BLM use a scoping process to identify potential significant issues in preparation for impact analysis. The principal goals of scoping are to allow public participation to identify issues, concerns, and potential impacts that require detailed analysis.

External Scoping Summary: There was a two week public scoping period of nominated lease parcels including preliminary recommendations and stipulations from June 13 to June 27, 2012. Stipulation summaries, GIS shapefiles, and maps were posted on the BLM Colorado State Office website: http://www.blm.gov/co/st/en/BLM_Programs/oilandgas/oil_and_gas_lease/2013/february_2013_lease_sale.html. This allows the public an opportunity to provide comments, which are then analyzed and

incorporated into the environmental analysis as appropriate. Letters were also mailed to affected private land surface owners whose land overlies federal minerals proposed for leasing.

Issues Identified: 1 letter of comment was received from Dinosaur National Park, 3 letters of comment were received from landowners and 3 letters were received from environmental groups. The letters identified a wide range of issues including, but not limited to: landowner rights and offsets from structure on private property, water, soil, and air quality, noise and light pollution, cultural resource protection, wildlife, forestry, and transportation.

Internal Scoping Summary: Parcels deferred were in Preliminary Priority Habitat for Greater Sage-Grouse.

1.5.1 Public Comment Period: The action in this Environmental Assessment (EA) is included in the NEPA log posted on the Little Snake Field Office (LSFO) web site: http://www.blm.gov/co/st/en/BLM_Information/nepa/lsfo.html.

The preliminary draft of this EA and the unsigned Finding of No Significant Impact (FONSI) have been posted in the public room of the LSFO for a 30-day public review period beginning August 17, 2012 and ending September 18, 2012. The document may be viewed during regular business hours (7:45 a.m. to 4:30 p.m.), Monday through Friday, except holidays. Comments received from the public will be analyzed and incorporated into the EA as appropriate.

Persons/Agencies Consulted: Colorado Parks and Wildlife, Uintah and Ouray Tribal Council, Colorado Native American Commission, Colorado State Historic Preservation Office, Dinosaur National Park, USFS Routt National Forest.

Issues Identified: The BLM received 11 letters as a result of this comment period; 4 letters from environmental organizations, 1 letter from a home owners association, and 6 letters from a private individuals. These letters provided the BLM information on the concerns of the public. No significant issues requiring further analysis or alternative development in the EA were identified in the review of the comments. The review of these comments is included as Attachment E.

1.6 DECISION TO BE MADE

The LSFO will recommend to the CO BLM State Director which parcels to offer for sale in the February 2013 Competitive Oil and Gas Lease Sale based on the analysis contained in this EA. The BLM may choose to: a) offer all of the nominated parcels for sale, b) offer a subset of the parcels for sale, or c) not offer any parcels at this time. The finding associated with this EA may not constitute the final approval for the proposed action. The final decision on which parcels will be sold will be made by the CO BLM State Director.

CHAPTER 2 - PROPOSED ACTION AND ALTERNATIVES

2.1 INTRODUCTION

The purpose of this chapter is to provide information on the Proposed Action and alternatives. Alternatives considered but not analyzed in detail are also discussed.

2.2 ALTERNATIVES ANALYZED IN DETAIL

2.2.1 Alternative 2, Proposed Action: The Proposed Action is to lease Federal mineral estate from lands reviewed and found suitable for leasing in the resource area through the LSFO ROD/RMP (October 2011). The current lease sale includes parcels in Moffat, Rio Blanco, and Routt Counties. Those lands proposed for lease total 12,037.95 acres of federal mineral estate and are described in Attachment C and are a mix of federal and private surface. The lands have been grouped into appropriate lease parcels for purposes of offering lands via competitive lease sale as oil and gas leases. Offered lease parcels are grouped according to regulatory requirements as prescribed in the 43 CFR 3100 regulations, setting parameters for acreage limitations, public lands, acquired lands, and excepted acreage. Regulations also set certain lease terms and conditions under which development of the surface of oil and gas leases may occur. Stipulations for other surface protection will be applied where regulatory lease terms and conditions are not adequate to protect those resources. These stipulations are described in Attachment C and will be attached as stipulations to any of the parcels that are leased in areas where the stipulations apply.
If the parcels are not leased at the proposed lease sales, 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 does not get leased after an initial offering, and is not leased within a two year period, 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 and approval by the BLM.

The BLM may receive future Applications for Permit to Drill (APDs) for those parcels that are leased. When those APDs are received, additional site-specific NEPA analysis will be done.

Justification for deferrals: The deferral process for nominated parcels was established to address situations in which legitimate questions or controversy arises over the leasability of a parcel. The deferral process does not necessarily withdraw a parcel from the leasing arena, but merely indicates that further analysis is needed before possibly being reintroduced in a future lease sale. The following parcels are recommended for deferral in the proposed action for the lease sale.

Attachment A of this document lists all pre EA parcels proposed for lease. Attachment B parcels are those deferred or with deferred portions and Attachment C are those parcels determined by this analysis to be available for lease with applied stipulations. Definitions of applied stipulations can be found in Attachment D and maps of the parcels are found in Attachment E.

2.2.2 Alternative 3, No Action Alternative

The BLM NEPA Handbook (H-1790-1) states that for EAs on externally initiated proposed actions, the No Action Alternative generally means that the Proposed Action would not take place. In the case of a lease sale, this would mean that an expression of interest to lease (parcel nomination) would be denied or rejected.

The No Action Alternative would withdraw the lease parcels from the February 2013 lease sale. The parcels would remain available 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.

No mitigation measures would be required as no new oil and gas development would occur on the unleased lands. No rental or royalty payments would be made to the Federal Government. It is not expected that demand would decrease. It is likely that continuing demand would be addressed through production elsewhere.

It is an assumption that the No Action Alternative (no lease option) may result in a slight reduction in domestic production of oil and gas. This would likely result in reduced federal and state royalty income. Oil and gas consumption is driven by a variety of complex interacting factors including energy costs, energy efficiency, availability of other energy sources, economics, demographics, and weather or climate. If the BLM were to forego its leasing decisions and potential development of those minerals, the assumption is that the public's demand for the resource would not be expected to change. Instead, the resource foregone would be replaced by other sources that may include a combination of imports, fuel switching, alternative fuels, and other domestic production.

2.3 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

2.1 Alternative 1

Originally, 59 parcels, comprising 63,137.27 acres within the LSFO (see map 1) were nominated for the February 2013 lease sale (see Attachment A for complete legal descriptions). An alternative considered but eliminated involved leasing all the nominated parcels as provided in Attachment A, with no deferrals. This alternative was dropped from further consideration and not analyzed in detail because the BLM identified the need for temporary deferral on all but 20 of the parcels, containing 12,037.95 acres, in order to allow for further analysis of these parcels. The list of all deferred parcels and the reasons for deferral can be found in Appendix B.

The parcels in Appendix B were all deferred due their containing Preliminary Priority Habitat for Greater Sage Grouse (an ESA candidate species). The BLM is currently amending the Little Snake RMP to address the management of Greater Sage Grouse habitat, including identified the management of Preliminary Priority Habitat. Leasing the deferred parcels could be analyzed in a future leasing EA when these resource concerns have been addressed.

CHAPTER 3 - AFFECTED ENVIRONMENT AND EFFECTS

3.1 INTRODUCTION

Affected Resources:

The 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 environmental assessment (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. Table 1 lists the resources considered and the determination as to whether they require additional analysis.

Table 3-1: Resources and Determination of Need for Further Analysis

Determination[1]	Resource	Rationale for Determination
Physical Resources		
PI	Air Quality	See 3.2.1 Air Quality and Climate
PI	Floodplains	See 3.2.2 Flood Plains
PI	Hydrology, Ground	See Water Quality, Ground
PI	Hydrology, Surface	See Water Quality, Surface
PI	Minerals, Fluid	See 3.2.3 Minerals, Fluid
PI	Minerals, Solid	CO-01 stipulations required to protect active coal mining on leases COC6336, COC6348, and COC6426.
PI	Soils	See 3.2.4 Soils
PI	Water Quality, Ground	See 3.2.5 Water Quality/Ground
PI	Water Quality, Surface	See 3.2.6 Water Quality/Surface
Biological Resources		
PI	Invasive, Non-native Species	See 3.3.1 Invasive/Non-Native Species
PI	Migratory Birds	See 3.3.2 Migratory Birds
PI	Special Status Animal Species	See 3.3.3 Special Status Animals
NP	Special Status Plant Species	There are no federally listed threatened or endangered plants or the BLM sensitive plant species present on any of the proposed parcels.
NI	Upland Vegetation	Potential impacts to vegetation cannot be determined until site specific proposals have been submitted to LSFO for analysis.
PI	Wetlands and Riparian Zones	See 3.3.4 Wetlands and Riparian Zones

Determination[1]	Resource	Rationale for Determination
PI	Wildlife, Aquatic	See 3.3.5 Wildlife (Aquatic)
PI	Wildlife, Terrestrial	3.3.6 Wildlife (Terrestrial)
NP	Wild Horses	The proposed lease parcels do not fall within the Sand Wash HMA.
Heritage Resources and the Human Environment		
PI	Cultural Resources	See 3.4.1 Cultural Resources
NP	Environmental Justice	According to the most recent Census Bureau statistics (2000), there are no minority or low income populations within the LSFO.
PI	Hazardous or Solid Wastes	See 3.4.2 Hazardous or Solid Wastes
PI	Native American Religious Concerns	See 3.4.3 Native American Religious Concerns
PI	Paleontological Resources	See 3.4.4 Paleontological Resources
PI	Environmental Justice and Socioeconomics	See 3.4.5 Environmental Justice and Socioeconomics
NI	Visual Resources	The proposed parcels 6296, 6297, and 6298 are located in a VRM Class III area where moderate change to the characteristic landscape would be allowed as long as the existing characteristics of the landscape are partially retained. The Scenic Quality Rating is a C. The Sensitivity Level Rating would have maintenance of visual quality with a low value. Parcel 6403, is also located in VRM Class III. The Scenic Quality Rating was identified as A. Sensitivity Level Rating would have maintenance of visual quality with a high value. Both project areas are within the foreground-middle ground zone where management activities and proposed projects may be viewed in more detail in the zone. This is due to the number of primary transportation corridors throughout the field office. The Proposed Action allows the subsequent exploration and development of the lease. Exploration and development includes activities which would physically disturb soils (e.g., building well pads, access roads, installation of pipelines, etc.) that could impact visual resources. However, stipulations (see Exhibit B, e.g., CO-26, LS-111), would rectify some visual impacts over short term and long term during and after proposed project time period.
Resource Uses		
NI	Access and Transportation	No immediate impact. Any future developments would be analyzed on a case-by-case basis to avoid or mitigate any issues that could develop.
NI	Fire Management	There would not be any substantial changes to the Fire Management Plan due to the leasing of the proposed parcels.
NI	Forest Management	Potential impacts to forest management cannot be determined until site specific proposals have been submitted to LSFO for analysis.

Determination[1]	Resource	Rationale for Determination
NI	Livestock Operations	The proposed parcels are located on allotments permitted for livestock use. Any future developments would be analyzed on a case-by-case basis to avoid or mitigate any issues that could develop.
PI	Prime and Unique Farmlands	See 3.5.4 Prime and Unique Farmlands
NP	Lands with Wilderness Characteristics	The proposed parcels were evaluated for suitability as lands with wilderness characteristics and did not meet the roadless criteria for an area greater than 5,000 acres. Parcels 6296, 6297, and 6298, identified as CO-010-272, did not meet the roadless criteria due to the presence of the Yampa Valley Trail, numerous roads, seismic and grazing trails, and improvements.
NI	Recreation	No immediate impact. Any future developments would be analyzed on a case-by-case basis to avoid or mitigate any issues that could develop.
Special Designations		
NP	Areas of Critical Environmental Concern	There are no ACECs in the proposed project areas.
NI	Wilderness Study Areas	There are no WSAs in the proposed parcels. However, Cross Mountain WSA is located less than 5 miles north of proposed parcels 6296, 6297, and 6298.
NP	Wild and Scenic Rivers	There are no WSRs within the proposed parcels.

[1] NP = Not present in the area impacted by the Proposed Action or Alternatives. NI = Present, but not affected to a degree that detailed analysis is required. PI = Present with potential for impact analyzed in detail in the EA.

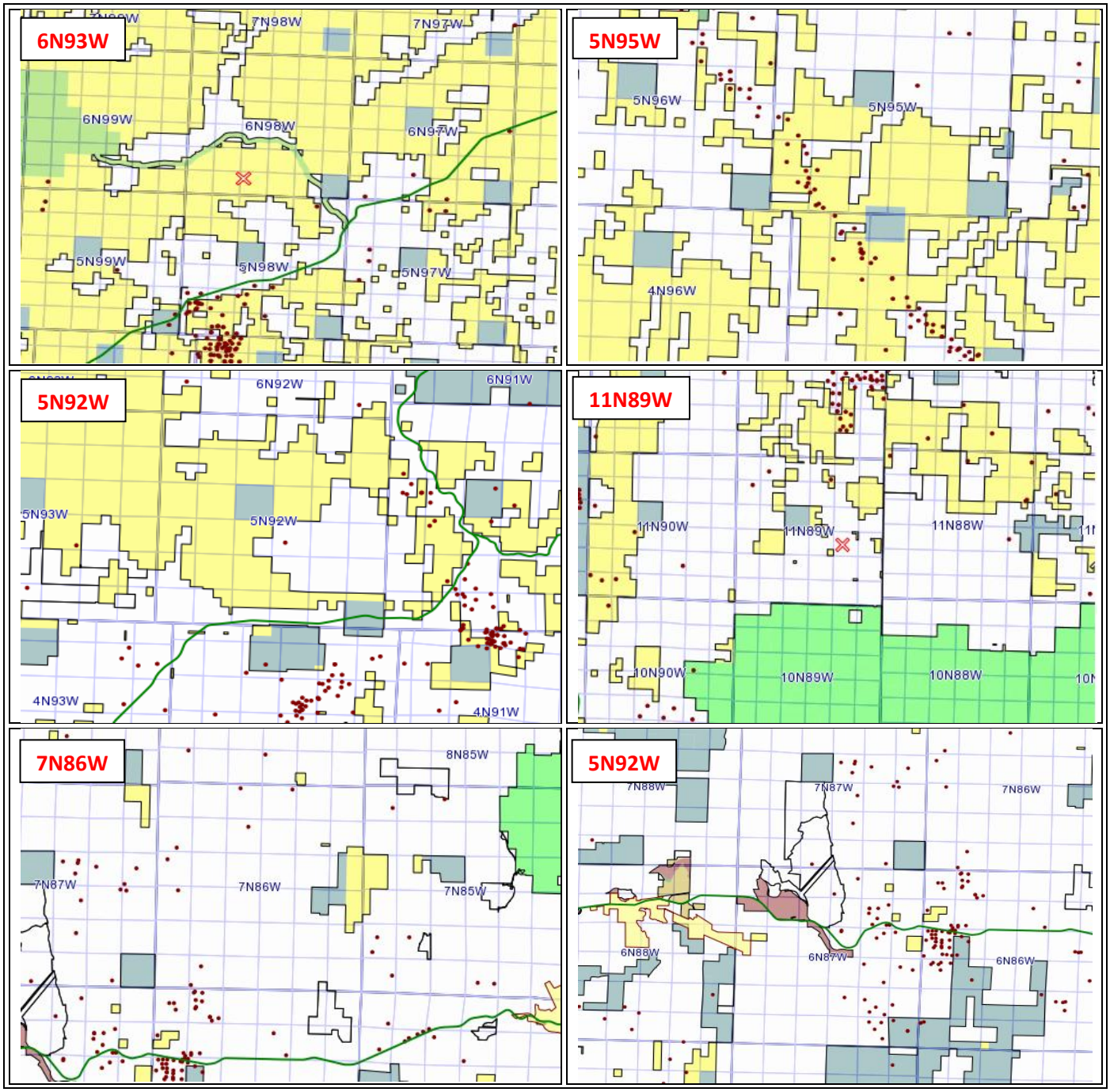
3.2 PHYSICAL RESOURCES

3.2.1 Air Quality and Climate

Affected Environment: The proposed lease parcels are primarily located in rural portions of the Little Snake Field Office planning area boundaries. The nominated parcels are located in Moffat (6302, 6348, 6385, 6386, 6422, 6424, 6525, 6548), Routt (6423, 6427, 6425, 6426, 6531, 6453), and Rio Blanco (6527, 6336, 6296, 6297, 6298) Counties. The Colorado Oil and Gas Conservation Commission (COGCC) parcel maps shown in figure 3-1 below provide a relative scale of current or proposed oil and gas well activity within the vicinity of the nominated parcels. The wells indicators (shown as red dots) include producing, dry, abandoned, shut in, and located but not yet drilled well locations. An analysis of the COGCC database for producing wells near the parcel areas showed limited activity for most of the parcels. The average number of producing wells within 10km of the center of the each parcel cluster shown below is 13 wells. The highest producing well cluster (39 wells) is located around parcel 6336 (3N93W).

Figure 3-1. COGCC Area Maps[1]

[1] Maps also show surface area ownership within parcel vicinities (BLM lands shown in yellow).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7N98W
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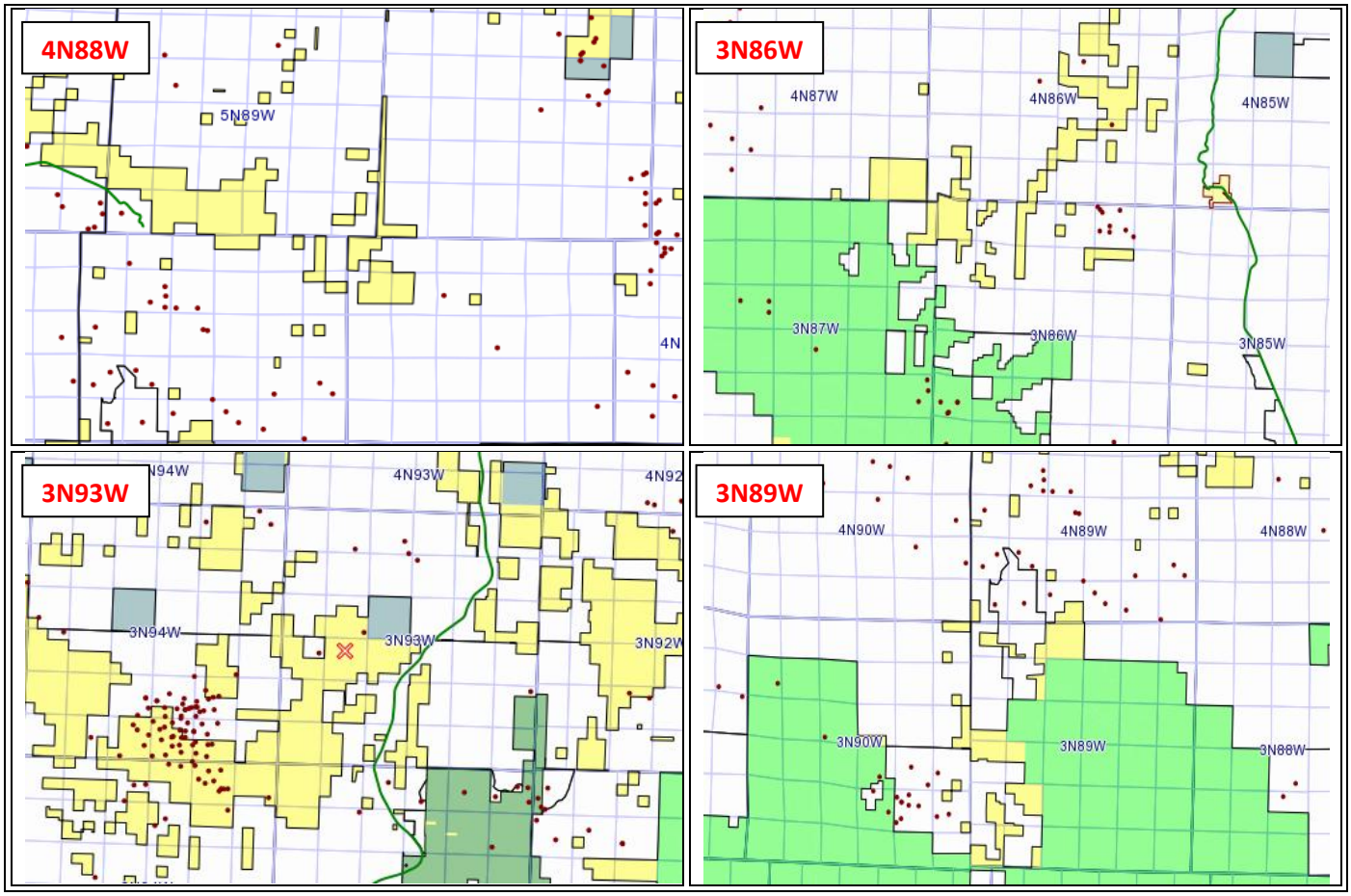

The U.S. Environmental Protection Agency (EPA) has established national ambient air quality standards (NAAQS) for criteria pollutants, including carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$), sulfur dioxide (SO_2), and lead (Pb). Exposure to air pollutant concentrations greater than the NAAQS has been shown to have a detrimental impact on human health and the environment. The EPA has delegated regulation of air quality under the federal Clean Air Act to the State of Colorado. The Colorado Department of Public Health and Environment (CDPHE), Air Pollution Control Division (APCD) administers Colorado's air quality control programs and is responsible for issuing permits for emission sources. The State has established the Colorado Ambient Air Quality Standards (CAAQS), which can be more, but not less stringent then the NAAQS. In addition to the criteria pollutants, regulations also exist to control the release of hazardous air pollutants (HAPs). HAPs are chemicals that are known or suspected to cause cancer or other serious health effects, such as reproductive effects or birth defects, or adverse environmental effects. EPA currently lists 188 identified compounds as hazardous air pollutants, some of which can be emitted from oil and gas development operations, such as benzene, toluene, and formaldehyde. Ambient air quality standards for HAPs do not exist; rather these emissions are regulated by the source type, or specific industrial sector responsible for the emissions.

Ambient air quality in the affected environment (i.e. compliance with the NAAQS) is demonstrated by monitoring for ground level (i.e. receptor height) atmospheric air pollutant concentrations. In general, the ambient air measurements show that existing air quality in the region is good. Concentrations for the various air pollutants are below the applicable state and federal ambient air quality standards. Ozone monitoring data suggests existing air quality concentrations could be approaching the ambient 8-hour air quality standard of 75 ppb (3 year average of the annual 4th highest 8-hour average). However calculation of the NAAQS is not possible at this time since less than 3 years' worth of monitoring data exists. Ozone is not emitted directly from sources, but is chemically formed in the atmosphere via interactions of oxides of nitrogen (NO_X) and volatile organic compounds (VOCs) in the presence of sunlight and under certain meteorological conditions (NO_X and VOCs are Ozone precursors). Ozone formation and prediction is complex, generally results from a combination of significant quantities of VOCs and NO_X emissions from various sources within a region, and has the potential to be transported across long ranges. The current available air monitoring data for the region is shown in table 3-2 below.

Table 3-2. Current Area Monitoring Data

Monitor Name and Location	Owner	Pollutant (Standard, Limit)	Monitor Data		
			2008	2009	2010
Steamboat Springs – 136 6th St.	CDPHE	PM_{10} (24 hour, 150 μg/m^3)	124	83	99
Rangely – Plant Science Bldg.	BLM	O_3 (8 hour, 0.075 ppm)	ND	ND	0.085[a]
Meeker – Golf Course	BLM	O_3 (8 hour, 0.075 ppm)	ND	ND	0.062[a]

[a] Data is for 2011, less than 3 years' worth of data exists to compute NAAQS.

There is broad scientific consensus that humans are changing the chemical composition of our atmosphere. Activities such as fossil fuel combustion, deforestation, and other changes in land use are resulting in the accumulation of trace greenhouse gasses (GHGs) such as carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), water vapor, and several industrial gases in our atmosphere. An increase in GHG emissions is said to result in an increase in the earth's average surface temperature, primarily by trapping and decreasing the amount of heat energy radiated by the earth back into space. The phenomenon is commonly referred to as global warming. Global warming is expected, in turn, to affect weather patterns, average sea level, ocean acidification, chemical reaction rates, precipitation rates, etc., which is commonly referred to as climate change. The Intergovernmental Panel on Climate Change (IPCC) has predicted that the average global temperature rise between 1990 and 2100 could be as great as 5.8°C (10.4°F), which could have massive deleterious impacts on the natural and human environments. Although GHG levels have varied for millennia (along with corresponding variations in climatic conditions), industrialization and burning of fossil carbon sources have caused GHG concentrations to increase measurably, from approximately 280 ppm in 1750 to 396 ppm in 2012 (as of June). The rate of change has also been increasing as more industrialization and population growth is occurring around the globe. This fact is demonstrated by data from the Mauna Loa CO_2 monitor in Hawaii that documents atmospheric concentrations of CO_2 going back to 1960, at which point the average annual CO_2 concentration was recorded at approximately 317 ppm. The record shows that approximately 70% of the increases in atmospheric CO_2 concentration, or build up, since pre-industrial

times have occurred within the last 50 years. In the coming decades climate change may lead to changes in the Mountain West and Great Plains, such as increased drought and wild land fire potential.

Environmental Consequences, Proposed Action: The decision to offer the identified parcels for lease would not result in any direct emissions of air pollutants. However, the future development of these leases would result in emissions of criteria, HAP and GHG pollutants. The assessment of the relationship between GHG emissions and climate change is in a formative phase. While it is not possible to accurately quantify potential GHG emissions in the affected areas as a result of making the proposed tracts available for leasing, some general assumptions can be made (e.g., selling the proposed tracts may lead to the drilling of new wells). Subsequent development of any leases sold would result in an incremental increase in overall emissions of pollutants, including GHGs.

While the act of leasing the parcels would produce no significant air quality impacts, potential future development of the lease could lead to increases in area and regional emissions. Since it is unknown if the parcels would be developed, or the extent of the development, it is not possible to reasonably quantify potential air quality impacts through dispersion modeling or another applicable method at this time. Additional air impacts would be addressed in a subsequent analysis when lessees file an Application for Permit to Drill (APD). 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.

Any 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 would contribute to potential short and longer term increases in the following criteria pollutants: carbon monoxide, ozone (a secondary pollutant, formed photochemically by combining VOC and NOX emissions), nitrogen dioxide, and sulfur dioxide would also occur due to combustion of fossil fuels during exploration and development activities. 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. 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 likely include the installation of pipelines for transportation of raw product. New centralized collection, distribution and/or gas processing facilities may also be necessary.

The BLM will continue to evaluate the impacts of oil and gas exploration and development on the global climate, and apply appropriate management techniques and BMPs to address changing conditions. 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.

Substantial emission-generating activities cannot occur without further BLM analysis and approval of proposals for exploration and development operations. BLM would make its approval of these activities subject to conditions of approval addressing air pollutant emissions, as appropriate.

Environmental Consequences, No Action Alternative: There would be no additional impacts to air quality or climate from the No Action Alternative. Leasing the parcels would not occur, nor would any subsequent potential development of the parcels occur.

Environmental Consequences, Cumulative Impacts: This lease sale, when combined with the past, present and reasonably foreseeable actions (including increased traffic and the need for water disposal facilities) may contribute incrementally to the deterioration of air quality in the region. Increased development of fluid minerals would result in a cumulative increase in surface and subsurface disturbances as well as increase emissions during drilling and completion activities and production. The type of impacts would be the same as described under environmental impacts associated with the proposed action. However, the severity of the impacts could be elevated based on any contemporaneous development in surrounding areas.

An adequate regional air quality analysis was conducted as part of the EIS that was prepared for the recently updated LSFO RMP. The long range dispersion model CALPUFF-lite was used, combined with several conservative oil and gas construction and production operating assumptions, to make the assessment results conservative (likely to over-predict potential air quality and air quality-related value impacts). No impact-significance thresholds were exceeded other than a potential 0 to 2 days greater than a 1.0 deciview (dv) "just noticeable change" in visibility at the mandatory federal prevention of significant deterioration (PSD) Class I Mount Zirkel Wilderness Area. The impacts were predicted for the worst case emissions year which is typically the last inventory year analyzed where linear construction emissions/pace would occur with along with full field production operations. The analysis may or may not be entirely relevant for initial inventory years. Further, any variability or deviation in the pace of development or emissions inventory assumptions (including projected changes to background sources) can have significant positive or negative impacts that would 'nudge' the analysis as far as project level significance is concerned, and thus it is appropriate to require re-evaluation of project level emissions prior to authorizing future lease parcel development. Further, the Hayden and Craig coal-fired power plants have historically been shown to have a significant impact on visibility at the Mount Zirkel Class I area (Watson et al. 1996). As a result of that study, and a subsequent legal consent decree, the Hayden and Craig Power Plants have installed pollution controls resulting in emission reductions of approximately 14,000 tons/year SO2 and 7,000 tons/year NOx for each plant. These two power plants are located closer to the mandatory federal Class I PSD areas (Mount Zirkel, Flat Tops, and Eagles Nest) than most of the assumed oil and gas activity in the Little Snake RMP area. The alternatives analyzed in the Little Snake RMP are projected to bring a maximum increase of 15 and 1,066 tons/year of SO2 and NOX to the region, respectively. These increases are approximately 0.2% and 8% of the SO2 and NOX total emissions reductions from these two power plants combined. Thus, as total SO2 and NOX

emissions in the Little Snake RMP area are lowered in the future, cumulative air quality and AQRV will be reduced from historic levels.

For more detailed information on the modeling analysis, please see the air quality technical support document prepared for the LSFO RMP at the following link:
http://www.blm.gov/style/medialib/blm/co/field_offices/little_snake_field/rmp_revision/documents.Par.60711.File.dat/04_LS_RMP-EIS_AQSupportDoc_AppB_FinalAQTSD_071808.pdf
Mitigation: Oil and or gas may be developed and produced subsequent to the proposed lease sale and ultimately be utilized to produce energy. The BLM will evaluate potential emissions of regulated air pollutants (including GHGs) associated with the development of the oil and gas resources in a subsequent analysis at the APD stage of the lease life cycle.

Conditions of approval (COAs) may be added at the permitting stage based on the review of site specific proposals, other applicable analysis of future exploration/development activities, or if new information becomes available and the mitigation proposed is supported by concise site specific NEPA analysis. COAs cannot take away lease rights or prevent development. All proposed activities including, but not limited to, exploration drilling activities would be subject to local, State, Tribal, and Federal air quality laws and regulations.

Project specific emissions can generally be quantified and compared to overall sector, regional, or global (GHGs) estimates, as well as current air quality monitoring data and trends to provide some measures/context of the level and significance of any potential impacts. The BLM will continue to evaluate climatic variability and change in the future, and apply appropriate management techniques and policy to address changing conditions as developments occur.

3.2.2 Flood Plains

Affected Environment: Based on USDA NRCS Web Soil Survey data, several parcels contain FEMA-identified 100-year floodplains. Flooding is the temporary inundation of an area caused by overflowing streams or by runoff from adjacent slopes (water standing for short periods after rainfall or snowmelt is not considered flooding). Flooding frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent. Parcels proposed for lease have floodplains that flood rarely (primarily ephemeral or intermittent drainages) to frequently (perennial drainages).

Environmental Consequences, Proposed Action: Development within identified floodplains could result in the removal or compression of vegetation, as well as soil compaction, depending on moisture content of the soils at the time of disturbance. Prohibiting development activities within the 100-year floodplain boundaries may eliminate a very small amount of area that is proposed for exploration and development, but would also limit or prevent impacts to overall floodplain function.

Environmental Consequences, No Action Alternative: Implementing the No Action Alternative would have no additional impacts to floodplain health and function, since no leasing would occur in these areas.

Environmental Consequences, Cumulative Impacts: The potential for cumulative impacts to floodplains as a result of implementing the proposed action combined with past, present, and reasonably foreseeable future actions is negligible, since modification of identified floodplains is prohibited.

Mitigation: No ground-disturbing activities or structure development will occur within FEMA-identified 100-year floodplain (per Executive Order 11988 on Floodplain Management).

3.2.3 Minerals, Fluid

Affected Environment: The nominated parcels are within favorability zone 4 (highest for oil and gas potential). Geologic formations would be analyzed during the APD NEPA process.

Environmental Consequences, Proposed Action: The proposed lease parcels will probably lead to the development of recoverable natural gas and oil resources, making revenues available to federal, state, and local treasuries.

Environmental Consequences, No Action Alternative: If the lease parcels were withdrawn from the current lease sale, recoverable natural gas and oil resources in the oil and gas bearing formations would not be developed at this time. Oil and gas would not be available to the national economy. Revenues would be unavailable to federal, state and local treasuries.

Environmental Consequences, Cumulative Impacts: The proposed drilling of the wells would further deplete the hydrocarbon resources of the targeted formations.

Mitigation: None.

3.2.4 Soils

Affected Environment: The type and classification of soils, as well as the magnitude and location of direct and indirect effects on soil resources cannot be predicted until site-specific proposals are made for exploration and development. However, the following table indicates which proposed lease parcels have the potential for sensitive soils. Because many of the parcels are under private surface ownership, the nature and condition of soils there would not be known unless a field visit can be conducted.

Table 3-3: Sensitive soil potential for proposed lease sale parcels

PARCEL ID	POTENTIAL FOR FRAGILE SOILS? (CSU)[1]	SLOPES >35% PRESENT? (CSU)
6296	Not likely	Yes
6297	Not likely	Yes
6298	Not likely	Yes
6302	Not likely	Yes
6336	Yes	Yes
6348	Not likely	Yes
6385	Not likely	Yes

PARCEL ID	POTENTIAL FOR FRAGILE SOILS? (CSU)[1]	SLOPES >35% PRESENT? (CSU)
6386	Not likely	Not likely
6403	Not likely	Yes
6422	Not likely	Yes
6423	Yes	Yes
6424	Not likely	Not likely
6425	Not likely	Not likely
6426	Not likely	Yes
6427	Not likely	Yes
6453	Not likely	Yes
6525	Yes	Yes
6527	Not likely	Yes
6531	Yes	Yes
6548	Yes	Yes

1 – Controlled Surface Use

Environmental Consequences, Proposed Action: The Proposed Action allows the subsequent exploration and development of the lease. Exploration and development includes activities which would physically disturb soils (e.g., building well pads, access roads, installation of pipelines, etc.). The size of well pads would depend on the number of wells and the type of drilling that is being done. Access roads, pipelines and other infrastructure would be developed during both exploration and development activities.

Direct impacts resulting from the construction of well pads, access roads, pipelines and reserve pits would include removal of vegetation, exposure of the soil, mixing of horizons, compaction, and loss of topsoil productivity, susceptibility to wind and water erosion, and possible contamination of soils with petroleum constituents. These impacts would likely result in increased indirect impacts such as runoff, erosion, and off-site sedimentation. This increased surface run-off could be expected in areas downstream of surface disturbance and could cause increased sheet, rill, and gully erosion in some areas.

Impacts to soils will also depend on the type of pad constructed. Although single-well pads are smaller in size than multi-well sites, they result overall in greater soil disturbance since many more pads and access roads are required. Consequently, vehicle trips for well pad services are also greater since wells are spread out, increasing the potential for dust creation, erosion, and soil compaction.

Decreased soil productivity as a result of the loss of topsoil has the potential to hinder revegetation efforts and leave soils further exposed to erosion. Grading, trenching, and backfilling activities may cause mixing of the soil horizons which could diminish soil fertility and reduce the potential for successful revegetation. Segregation and reapplication of surface soils would result in the mixing of shallow soil horizons, resulting in a blending of soil characteristics and types. This blending would modify physical characteristics of the soils, including structure, texture, and rock content, which could lead to reduced permeability and increased runoff from these areas.

The erosion potential for the soil types likely to be disturbed ranges from slight to very high. Impacts are directly related to the erosion potential of soils and the steepness of the slopes in the proposed lease areas.

Contamination of surface and subsurface soils can occur from leaks or spills of oil, produced water, and condensate liquids from wellheads, produced water sumps, and condensate storage tanks. Leaks or spills of drilling and hydraulic fracturing chemicals, fuels, and lubricants could also result in soil contamination. Such leaks or spills could compromise the productivity of the affected soils. Of these materials, leaks or spills of condensate would have the greatest potential environmental impact. Depending on the size and type of spill, the impact to soils would primarily consist of the loss of soil productivity. Typically, contaminated soils would be removed and disposed of in a permitted facility or would be bioremediated in place using techniques such as excavating and mulching to increase biotic activities that would break down petrochemicals into inert and/or common organic compounds.

The Little Snake ROD/RMP has lease stipulations for the protection of soils occurring on slopes 35% or greater and fragile soils. These lease stipulations were reviewed and applied based on data from the USDA Soil Surveys for Moffat and Routt Counties.

Based on USDA NRCS Web Soil Survey data, many of the proposed lease parcels have areas with slopes that are greater than 35%. The 2011 Little Snake Field Office ROD/RMP applies a CSU in areas that are considered unstable are unstable and may require an engineering or reclamation plan before surface disturbance can occur, based on onsite impact analysis. Construction and use of roads, structures, and drill pad locations in areas with slopes that are greater than 35% would likely destabilize soils, would result in severe cut and fill slopes, and would be extremely difficult to reclaim. These direct impacts would result in increased potential to make these areas unstable and subject to slumping and mass movement even after reclamation.

The 2011 Little Snake Field Office ROD/RMP also applies a CSU for fragile soils, defined as areas rated as highly or severely erodible by wind or water (as described in NRCS soil survey reports) or as determined by onsite inspection. Proposed lease parcels are likely to have soils classified as such. Fragile soil criteria are also slopes greater than 35%, particularly if they have one of the following characteristics: a) a surface texture that is sand, loamy sand, very fine sandy loam, fine sandy loam, silty clay, or clay; b) a depth to bedrock that is < 20 inches; c) an erosion hazard rating of high or very high; and d) a K (soil erodibility potential) factor>0.32. Surface disturbing activities can still occur on isolated sites that meet fragile soil criteria, but only when performance standards and objectives can be met. Site-specific engineered designs are likely to be required in these circumstances since often construction and maintenance of these facilities based solely in accordance with guidelines established in The Gold Book will not be adequate in the prevention of erosion, slumping, and structural failure. Prior to locating new structures/infrastructure, particularly structures highly sensitive to movement, site specific geologic hazard studies, movement monitoring, and mapping may also be required.

Environmental Consequences, No Action Alternative: There would be no impacts to the soils from the No Action Alternative.

Environmental Consequences, Cumulative Impacts: This lease sale, when combined with the past, present and reasonably foreseeable actions would elevate *potential* for the deterioration of soil health. Increased development of fluid minerals would result in a cumulative increase in surface disturbances as well as increase potential for leaks or spills during drilling and completion activities. The type of impacts will be the same as described under environmental impacts associated with the proposed action. However, the severity of the impacts would be elevated with increased development in the watershed.

Mitigation: For the purpose of protecting areas from slumping and mass movement of soils or landslides, LS-110 lease stipulation would be applied on all appropriate locations within lease areas. For the purpose of minimizing erosion and sediment transport from slopes equal to or greater than 35%, LS-111 lease stipulation would be applied on all appropriate locations within the lease areas. Specific locations having slopes steeper than 35% would be identified during site specific proposals for exploration and development.

- When saturated soil conditions exist on or along the right-of-way, construction shall be halted until soil material dries out sufficiently for construction to proceed without undue damage and erosion to the right-of way.
- The grant holder shall provide satisfactory reclamation of all sites disturbed by their activity. This may include installation of additional erosion control devices and seeding at the discretion of the BLM Authorized Officer.
- Topsoil shall be conserved during excavation and reused as cover on disturbed areas to facilitate re-growth of vegetation. Topsoil shall only be used for reclamation and shall not be used to bed or pad the pipe during backfilling.
- To control erosion and sediment transport, roads shall be crowned or sloped, ditched, surfaced, drained with culverts and/or water dips, and constructed to BLM Gold Book standards. Culvert outlets shall incorporate controls such as rip-rap, sediment catchments, and anchored straw bales, to slow water velocity and prevent erosion and soil transport. Initial gravel application shall be a minimum of four inches.
- The operator shall provide timely year-round road maintenance and cleanup on roads. A regular schedule for maintenance shall include, but not be limited to, crown or slope reconstruction, blading, ditch, culvert and catchment cleaning, road surface replacement, and dust abatement. When rutting within the traveled way becomes greater than three inches, blading, and/or gravelling shall be conducted as approved by the BLM Authorized Officer.
- Top soil segregation will not occur when soils are saturated or frozen unless special authorization is granted by the BLM Authorized Officer.
- A Winter Construction 1 Plan will be submitted and approved by the BLM Authorized Officer before a Notice to Proceed will be authorized for construction activities in frozen soils.
- All erosion and sediment control practices and measures shall be constructed, applied, and maintained in accordance with the approved erosion and sediment control plan.
- Topsoil stripping shall be confined to the immediate construction areas. A 4 to 6-inch stripping depth is common, but depth may vary depending on the particular soil. All perimeter dikes, basins, and other sediment controls shall be in place prior to stripping.
- After the areas to be reclaimed have been brought to grade, and immediately prior to spreading the topsoil, the subgrade shall be loosened by disking or scarifying to a depth of at least two inches (or as site specific analysis determines 1 appropriate for soil type) to ensure bonding with subsoil.

• Topsoil shall not be placed while in a frozen or muddy condition, when the subgrade is excessively wet, or in a condition that may otherwise be detrimental to proper grading or proposed sodding or seeding.

3.2.5 Water Quality/Ground

Affected Environment: The geologic formations at or near the surface in the area of the nominated parcels consist of Tertiary Age formations: Wasatch (Tw), Browns Park (Tbp); and, Cretaceous Age formations: Iles (Ki), Lewis shale (Kls), Williams Fork (Kw), Fort Union (Tf) and Mancos Shale (Km). These formations can and do contain potable, useable water. Fresh to moderately saline groundwater (TDS < 10,000 ppm) could be found within the formations listed above.

Environmental Consequences, Proposed Action: If drilling were to occur on these parcels, the potential of encountering useable groundwater while drilling the surface holes exists. A combination of fresh water and bentonite is used to the surface holes. This poses no threat to useable groundwater. The surface holes are sealed with casing and cement prior to drilling the production section of the hole.

Environmental Consequences, No Action Alternative: There would be no impacts to the ground water from the No Action Alternative.

Environmental Consequences, Cumulative Impacts: This area has been the location of energy development for over 50 years. There has been no communication or contamination as a result of the energy development. Operators have been diligent in the design and placement of surface casing and cement. It is unlikely that ground water quality would be impacted in the area.

Mitigation: Federal onshore orders require lessees to submit an Application to Drill (APD) prior to the commencement of a drilling operation. Specific casing and cement designs must be included in each APD for the purpose of isolating and protecting useable groundwater from other water, hydrocarbons and minerals. The lessee would be required to submit a report showing the depth and analysis of groundwater encountered during the drilling operation.

3.2.6 Water Quality/Surface

Affected Environment: The following table summarizes only those proposed lease parcels that have the potential to influence surface water quality and conditions of perennial waters that are identified by the State of Colorado Department of Public Health and Environment (CDPHE) as having impairments (Clean Water Act 303(d) List) or as having suspected water quality problems (Monitoring and Evaluation List):

Table 3-4: Surface water quality issues associated with proposed lease parcels

Proposed Parcel IDs	Water body ID	Segment Description	Portion	Monitoring & Evaluation Parameter(s)	Clean Water Act Section 303(d) Impairment
6296, 6297, 6298	COLCLY02	Yampa River, Elkhead Creek to Green River	All	Sediment	Iron (total recoverable); *high priority*

6386, 6403, 6423, 6424, 6548	COLCLY18	Slater Creek, including tributaries from source to Second Creek	All	*E. coli*, Iron (total recoverable); selenium	

Reference: Colorado Department of Public Health and Environment Water Quality Control Commission. 2012. Regulations #33, 37, and 93. http://www.cdphe.state.co.us/regulations/wqccregs/index.html

See Wetland and Riparian Zones discussion for a list of proposed lease parcels with known or potential perennial surface waters.

Environmental Consequences, Proposed Action: The lease sale would lease parcels with lease stipulations to protect surface water resources, including municipal and domestic use sources. The perennial water source lease stipulation in the LSFO ROD/RMP (October 2011) (LS-105) identifies measures to protect water resources. Steep slope and fragile soils lease stipulations (LS-110 and LS-111) are protective of sensitive soils that could contribute to surface water quality degradation if disturbed. CO-28 protects both perennial streams and perennial/ephemeral riparian zones. Collectively, these lease stipulations and BMPs (see Mitigation) will help protect areas from excessive erosion that could impact surface water quality.

Clearing, grading, and soil stockpiling activities associated with exploration and development actions would alter overland flow and natural groundwater recharge patterns. Potential impacts include surface soil compaction caused by construction equipment and vehicles, which would likely reduce the soil's ability to absorb water, increasing the volume and rate of surface runoff. New oil and gas roads and pads could intersect shallow groundwater along cut slopes and alter channel and floodplain characteristics at drainage crossings. The combination of increased surface runoff, decreased infiltration, and changes in drainage features would likely result in increased peak flows and an increase in the frequency and extent of flooding for downstream streams in proportion to the amount of area in a watershed that is impacted by oil and gas development activity.

The success or failure of BMPs designed to manage storm water and reduce erosion during construction and operation of oil and gas facilities will determine much of the impact with regard to surface waters. Runoff associated with storm events would likely increase sediment/salt loads in surface waters down gradient of the disturbed areas. Sediment may be deposited and stored in minor drainages where it would be readily moved downstream during heavy convection storms. Some sediment from future development activity may eventually be carried into perennial tributaries where water quality classifications would limit the amount of sediment and salts that could be present and meet standards. The distance to impacted surface waters would have an attenuating effect on the amount of sediment contributed by lease exploration and development activities. Surface erosion would be greatest during construction and would be controlled using BMPs for storm water.

The magnitude of the impacts to surface water resources from future development activities depends on the proximity of disturbances to drainage channels, slope aspect and gradient, degree and area of soil disturbance, soil character, duration of construction activities, and the timely implementation and success/failure of mitigation measures. Natural factors which attenuate the transport of sediment into

creeks include water available for overland flow; the texture of the eroded material; the amount and kind of ground cover; the slope shape, gradient, and length; and surface roughness. Impacts would likely be greatest shortly after the start of construction activities and would likely decrease in time due to stabilization, reclamation, and revegetation efforts.

Environmental Consequences, No Action Alternative: No impacts identified. Implementation of the no action alternative would result in no additional impacts to existing surface water quality conditions.

Environmental Consequences, Cumulative Impacts: This lease sale, when combined with the past, present and reasonably foreseeable actions would elevate *potential* for the deterioration of surface and groundwater quality in the Plateau Valley. Increased development of fluid minerals would result in a cumulative increase in surface and subsurface disturbances as well as increase potential for leaks or spills during drilling and completion activities. The type of impacts would be the same as described under environmental impacts associated with the proposed action. However, the severity of the impacts would be elevated with increased development in the watershed.

Mitigation:

- Fresh water utilized for drilling and dust suppression would be acquired from private sources with valid existing rights.

For soil stabilization:

For the purpose of protecting areas from slumping and mass movement of soils or landslides, LS-110 lease stipulation should be applied on all appropriate locations within lease areas. For the purpose of minimizing erosion and sediment transport from slopes equal to or greater than 35%, LS-111 lease stipulation should be applied on all appropriate locations within the lease areas. Specific locations having slopes steeper than 35% would be identified during site specific proposals for exploration and development.

- When saturated soil conditions exist on or along the right-of-way, construction shall be halted until soil material dries out sufficiently for construction to proceed without undue damage and erosion to the right-of way.
- The grant holder shall provide satisfactory reclamation of all sites disturbed by their activity. This may include installation of additional erosion control devices and seeding at the discretion of the BLM Authorized Officer.
- Topsoil shall be conserved during excavation and reused as cover on disturbed areas to facilitate re-growth of vegetation. Topsoil shall only be used for reclamation and shall not be used to bed or pad the pipe during backfilling.
- To control erosion and sediment transport, roads shall be crowned or sloped, ditched, surfaced, drained with culverts and/or water dips, and constructed to BLM Gold Book standards. Culvert outlets shall incorporate controls such as rip-rap, sediment catchments, and anchored straw bales, to slow water velocity and prevent erosion and soil transport. Initial gravel application shall be a minimum of four inches.
- The operator shall provide timely year-round road maintenance and cleanup on roads. A regular

schedule for maintenance shall include, but not be limited to, crown or slope reconstruction, blading, ditch, culvert and catchment cleaning, road surface replacement, and dust abatement. When rutting within the traveled way becomes greater than three inches, blading, and/or gravelling shall be conducted as approved by the BLM Authorized Officer.

- Top soil segregation will not occur when soils are saturated or frozen unless special authorization is granted by the BLM Authorized Officer.
- A Winter Construction 1 Plan will be submitted and approved by the BLM Authorized Officer before a Notice to Proceed will be authorized for construction activities in frozen soils.
- All erosion and sediment control practices and measures shall be constructed, applied, and maintained in accordance with the approved erosion and sediment control plan.
- Topsoil stripping shall be confined to the immediate construction areas. A 4 to 6-inch stripping depth is common, but depth may vary depending on the particular soil. All perimeter dikes, basins, and other sediment controls shall be in place prior to stripping.
- After the areas to be topsoiled have been brought to grade, and immediately prior to spreading the topsoil, the subgrade shall be loosened by disking or scarifying to a depth of at least two inches (or as site specific analysis determines 1 appropriate for soil type) to ensure bonding with subsoil.
- Topsoil shall not be placed while in a frozen or muddy condition, when the subgrade is excessively wet, or in a condition that may otherwise be detrimental to proper grading or proposed sodding or seeding.

BMPs will be applied as appropriate at the time of APD application. Examples of BMPs that may be applied include:

<u>For riparian resource protection:</u>

- No surface occupancy and surface-disturbing activities within stream channels, stream banks, and the area 2,500 horizontal feet either side of the ordinary high-water mark (bank-full stage) of major river corridors.

- No surface occupancy and surface disturbing activities within a minimum buffer distance of 325 horizontal feet for all perennial waters, including fens and wetlands, streams, springs and seeps. For perennial streams, the buffer will be measured from ordinary high water mark (bankfull stage), whereas for wetland features, the buffer will be measured from the edge of the mapped extent. For unmapped wetlands, the vegetative boundary (from which the buffer originates) will be determined in the field. Where the riparian zone extends beyond 325 feet, the NSO would be extended to include the entire riparian zone. From 325 to 500 horizontal feet from the perennial water body, controlled surface use restrictions will apply.

- No surface occupancy of 50 horizontal feet as measured from the top of the stream bank for all intermittent or ephemeral streams. If riparian vegetation extends beyond the top of the stream bank, the buffer will be measured from the extent of the riparian vegetation. Controlled surface use restrictions will apply from the edge of NSO buffer to 100 horizontal feet.

- If development in riparian areas cannot be avoided then design, construction, and reclamation activities should be professionally engineered. Site-specific mitigation is developed during the NEPA review of APDs.

<u>For water quality protection:</u>

- No surface occupancy or use is allowed on lands within 1,000 horizontal feet of either side of a classified surface water supply stream segment (as measured from the average high water mark of a water body) for a distance of five (5) miles upstream of a public water supply intake with the classification "Water Supply"[2] by the State of Colorado used as a public (municipal) water supply. For all domestic water supplies using a groundwater well or spring, no surface occupancy will be allowed within a minimum distance of 1000 horizontal feet.
- Surface occupancy or use is subject to the following special operating constraints: Oil and Gas operations located greater than 1,000 horizontal feet but less than 2300 horizontal feet of a classified surface water supply stream segment (as measured from the average high water mark of a water body) for a distance of five (5) miles upstream of a public water supply intake with the classification "Water Supply" by the State of Colorado will require the following protective measures. The buffer may be extended beyond 2300 horizontal feet if site specific conditions warrant it. This also applies to domestic wells and springs:

    - Pitless drilling systems
    - Flowback and stimulation fluids contained within tanks that are placed on a well pad or in an area with down-gradient berming.
    - Use green fracing fluids only.
    - Berms or other containment devices shall be constructed in compliance with rule 603.e. (12) around crude oil condensate and produced water storage tanks.
    - Notification of potentially impacted Public Water Systems 15 miles downstream.
    - The use of evaporation ponds for means of disposing of produced water shall not be permitted on the BLM administered lands or split estate within the municipal watershed.
    - Collection of baseline water quality data (surface and/or groundwater) consisting of a pre drilling sample collected within a 100 feet of well pad, or where sufficient water exists to collect a sample per EPA or USGS collection methods. Additional sampling must be conducted during drilling operations and immediately following well completion. Each sample should analyze at a minimum:
    - pH, alkalinity, specific conductance, major cations, major anions, total dissolved solids, BTEX/GRO/DRO, TPH, PAH's (including benzo (a) pyrene; and metals (arsenic, barium, calcium, iron, magnesium, manganese, lead, and selenium. For municipal watersheds, a coordinated water resources monitoring plan must be developed with the Bureau of Land Management and municipality. Each office will determine the sampling site, intensity, and need for groundwater sampling, depending on site specific geology and risk. Results must be submitted to the

BLM within 3 months of data collection per Section 317b of the Colorado Oil and Gas Conservation Commission regulations.

- Additional site-specific mitigation measures will be implemented at the APD stage based on the submitted Surface Use and Drilling Plans.

Reference: Colorado Oil & Gas Conservation Commission. 2012. http://cogcc.state.co.us/

3.3 BIOLOGICAL RESOURCES

3.3.1 Invasive/Non-Native Species

Affected Environment: Invasive species and noxious weeds occur within the affected area. Downy brome (cheatgrass), yellow alyssum, blue mustard and other annual weeds are common along roadsides and in other disturbed areas. Perennial species in the affected area include hoary cress (white top), leafy spurge, Russian knapweed, houndstongue, Canada thistle and several species of biennial thistles. Other species of noxious weeds can be introduced by vehicle traffic, livestock and wildlife. The LSFO, Moffat County, livestock operators, and oil and gas companies collaborate to control weeds and find the best integrated approaches to achieve positive results. For all actions on public lands that involve surface disturbance or rehabilitation, reasonable steps are required to prevent the introduction or spread of noxious weeds. These steps may include power washing or air blasting of construction equipment to remove soil and vegetative parts and requirements for using certified weed-free seed and weed-free hay, mulch, and straw. In addition, any actions that result in the introduction or spread of invasive non-native or noxious weeds would be mitigated by standard weed management guidelines under the direction of the LSFO.

Environmental Consequences, Proposed Action: If drilling were to occur on these parcels, subsequent activities would create an environment and provide a mode of transport for invasive species and other noxious weeds to become established. Construction equipment and any other vehicles or equipment brought onto the site can introduce weed species. Wind, water, recreation vehicles, livestock and wildlife would also assist with the distribution of weed seed into the newly disturbed areas. The annual invasive weed species (downy brome, yellow alyssum, and other annual weeds) that occur on adjacent rangelands would occupy the disturbed areas. The bare soils and the lack of competition from a perennial plant community would allow these weed species to grow unchecked and can affect the establishment of seeded plant species. Establishment of perennial grasses and other seeded plants is expected to provide the necessary control of invasive annual weeds within 2 or 3 years.

The perennial and biennial noxious weeds in the area less frequently establish on the uplands, but some potential exists for their establishment in draws and swales or areas that would collect additional water. The largest concern in the project area would be for these species to become established and not be detected, providing seed which can move onto adjacent rangelands. At the APD stage the operator

would be required to control any invasive and/or noxious weeds that become established within the disturbed areas involved with drilling and operating the well.

Environmental Consequences, No Action Alternative: There would be no new impacts to invasive species under the No Action Alternative.

Environmental Consequences, Cumulative Impacts: The Proposed Action would not add substantially to existing or proposed disturbances in the LSFO, as there would be no surface disturbing activities due to the sale of the lease. A more site specific analysis would be done at the APD stage to identify any populations or vectors. Invasive species would be treated as COAs require and populations should be kept in check or even eradicated through timely pesticide application and reclamation procedures.

Mitigation: Mitigation attached to the APD as Conditions of Approval (COA) to minimize disturbance and obtain successful reclamation of the disturbed areas, as well as weed control utilizing integrated practices, including herbicide applications would help to control the noxious weed species. A Pesticide Use Proposal (PUP) is required prior to application of herbicide on the BLM land. All principles of Integrated Pest Management should be employed to control noxious and invasive weeds on public lands.

3.3.2 Migratory Birds

Affected Environment: BLM Instruction Memorandum No. 2008-050 provides guidance towards meeting the BLM's responsibilities under the Migratory Bird Treaty Act (MBTA) and Executive Order (EO) 13186. The guidance emphasizes management of habitat for species of conservation concern by avoiding or minimizing negative impacts and restoring and enhancing habitat quality.

Migratory bird habitats on the proposed lease parcels are comprised primarily of sagebrush stands, saltbrush, pinyon-juniper (PJ) woodlands, mixed mountain shrublands and oakbrush. Aspen woodlands and mixed coniferous forests can be found on parcels in higher elevations. A variety of migratory birds may utilize these vegetation communities during the nesting period (May through July) or during spring and fall migrations. The proposed lease parcels provide potential habitat for several species on the USFWS's Birds of Conservation Concern (BCC) List. Those species associated with the Southern Rockies/Colorado Plateau region and the proposed lease parcels are presented by habitat affiliation below.

The primary BCC species associated with shrubland habitats in the LSFO is Brewer's sparrow. Brewer's sparrows are a summer resident in Colorado and nest in sagebrush stands. Nests are constructed in sagebrush and other shrubs in denser patches of shrubs. This species would likely be nesting in the proposed lease area from mid-May through mid-July. Sagebrush is present on most of the parcels and may provide potential habitat for this species.

BCC species associated with PJ woodlands include pinyon jay and juniper titmouse. Pinyon jays are loosely colonial nesters and can be found in most PJ woodlands within the LSFO. The juniper titmouse is a cavity nester and also utilizes most of the PJ woodlands within the field office. Both species can be found within Colorado year-round. Parcels 6296, 6297, 6298, 6385 and 6525 provide potential habitat for these two species.

BCC species that utilize mixed conifer and aspen stands include Cassin's finch and flammulated owl. The Cassin's finch is a year round resident of Colorado. This species nests in higher elevation forests and move to lower elevations for the winter. Flammulated owls nest in tree cavities and inhabit higher elevation aspen and conifer forests during the summer months. Parcels 6302, 6386, 6403, 6423, 6424, 6427, 6453, 6527, 6531 and 6548 provide potential habitat for these two species.

Raptor species are tied to several different habitat types with in the LSFO. Sagebrush and other shrublands provide open spaces for hunting, while rocky outcrops, woodlands, sporadic trees and cottonwood forests provide nesting substrates. Red-tailed hawk and golden eagle nests are associated with Parcels 6426, 6403 and 6525. Other raptor species (bald eagle, northern goshawk, ferruginous hawk and burrowing owl) are also known to inhabit several of the parcels. Because these raptors are also BLM sensitive species, more information is provided in the T&E and Sensitive Animal Section of this EA.

More generally, birds associated with these lease parcels are well distributed in extensive suitable habitats throughout the LSFO and northwest Colorado and habitat-specific bird assemblages appear to be composed and distributed appropriately to the normal range of habitat variability.

Environmental Consequences, Proposed Action: The actual lease sale would not impact any migratory bird species or their habitat, however, potential future development of the proposed leased parcels may impact migratory birds. Impacts to wildlife species from oil and gas development are discussed in the LSFO ROD/RMP (October 2011). Impacts include, but are not limited to, displacement into less suitable habitat, increased stress and loss of habitat. Indirectly, habitat effectiveness adjacent to potential development would be reduced as a result of noise and human activity during construction, drilling and completion activities. Inglefinger and Anderson (2004) documented 40-60% declines in Brewer's sparrow abundance within 100 meters of well access roads in Wyoming, and it is likely that this effect is similar within the LSFO. Indirect habitat loss attributable to this behavioral response adds substantially to the effects of habitat loss due to long term facility occupation and habitat modification.

If drilling activities occur during the nesting season, there could be negative impacts to migratory bird species through nest destruction or increased stress leading to nest abandonment. Combined NSO and TL lease stipulations for nesting raptors are used to prevent reproductive failures and maintain the integrity of nest substrates for subsequent years' nesting activities. Encouraging the use of BMPs that reduce vehicle traffic, reducing public use of well access roads and promoting clustered development would help reduce impacts to migratory birds. Impacts to specific species would be addressed at the APD level and appropriate mitigation or COAs would be developed.

Environmental Consequences, No Action Alternative: There would be no impacts to migratory bird species or their habitat from the No Action Alternative.

Cumulative Effects: Development of one or more of these lease parcels would contribute to activity simultaneous with and in addition to ongoing natural gas and mineral development and recreation use (primarily hunting) in the LSFO. Initial disturbance to migratory birds (e.g., construction, drilling, and completion activities), would be relatively localized and temporary. After these initial activities have

subsided, human activity and effects of habitat fragmentation would continue throughout the production phase and persist for the life of well or field. The consequences of these behavioral influences on migratory birds would vary according to species-specific response through time as modified by habituation or circumstance.

Mitigation: Mitigation would include RMP derived NSO, CSU and TL stipulations (See Attachment C).

3.3.3 Special Status Animals

Affected Environment: There are no Endangered Species Act (ESA) listed or proposed species that inhabit or derive important benefit from any of the lease parcels. In 2010 and 2011, the Routt National Forest, in coordination with USFWS, re-mapped lynx habitat based on new information regarding habitat specifics. The BLM used the Routt Forest's new map to edge map potential lynx habitat. Habitat was mapped on two BLM parcels adjacent to the forest and consists of 428 acres. None of the proposed lease sale parcels are within the 2010/2011 mapped lynx habitat or within a forest service Lynx Analysis Unit.

Parcels 6296 and 6297 are located near the confluence of the Green and Yampa Rivers and are in close proximity to DCH for razorback sucker and Colorado pikeminnow. All parcels occur within the Little Snake and Yampa River Basins and development on these parcels is expected to result in water depletions to the Colorado River Basin which will indirectly affect critical habitat of the bonytail chub, humpack chub, Colorado pikeminnow and razorback sucker.

In 2012, Colorado Parks and Wildlife (CPW) updated greater sage-grouse habitat mapping. Preliminary general habitat (PGH) and preliminary priority habitat (PPH) were designated at this time. Since the LSFO ROD/RMP (October 2011) did not analyze several recommendations outlined in WO IM 2012-043, all parcels located in sage-grouse PPH are being deferred at this time. Parcels 6296, 6297, 6302, 6348, 6403, 6424 and 6525 are located in greater sage-grouse PGH. Greater sage-grouse are a BLM sensitive species and a candidate for listing under ESA. Habitat loss and fragmentation resulting from wildfire, energy development, urbanization, agricultural conversion, conversion of sagebrush to other vegetation types (such as PJ woodlands) and infrastructure development are the primary threats to the species (USFWS 2010). Sage-grouse are considered a sagebrush ecosystem obligate species. Sagebrush provides nesting, brooding, and fall and winter cover, as well as forage for sage-grouse throughout the year.

A number of additional BLM sensitive animal species are known to inhabit or may be directly influenced from development of the proposed lease parcels, including white-tailed prairie dog, bald eagle, burrowing owl, ferruginous hawk, northern goshawk, Columbian sharp-tailed grouse, Brewer's sparrow, northern leopard frog, Great Basin spadefoot and Colorado River cutthroat trout.

White-tailed prairie dogs are found primarily on lands that contain salt desert shrub and sagebrush habitats within the LSFO. White-tailed prairie dog towns create unique vegetative conditions and burrow systems that provide potential habitat for several other species. Documented prairie dog colonies occur on Parcel 6297.

Bald eagles are known to winter and nest along portions of the Yampa River within the LSFO. Large, mature cottonwood trees along the river are used as nesting, roosting and perching sites. Upland habitats adjacent to these water ways are used as scavenging areas primarily for winter killed big game species. Parcels 6296 and 6297 are in close proximity to the Yampa River and known roosting sites for this species.

Burrowing owls and ferruginous hawks are associated with white-tailed prairie dog colonies in the LSFO. Burrowing owls utilize prairie dog burrows for shelter and nesting and are primarily a summer resident of Colorado. Ferruginous hawks prey on small mammals, including prairie dogs and usually nest in single trees or rocky outcrops/cliffs near this prey species. The LSFO has several documented nest locations for both of these raptors. Parcel 6296 provides habitat for burrowing owls and several lower elevation sites with saltbush, sagebrush and cliffs provide potential habitat for ferruginous hawks.

The northern goshawk occupies coniferous and riparian forests. The LSFO has very few goshawk nests documented on BLM lands within the resource area. One documented goshawk nest is in close proximity to Parcels 6386 and 6424.

Columbian sharp-tailed grouse inhabit sagebrush stands and mixed mountain shrublands in the eastern portion of the LSFO. There are no leks located within the boundary of any of the proposed lease parcels, however, there is one lek located .15 mile from Parcel 6525. Several parcels (6348, 6386, 6403, 6422, 6423, 6424, 6425, 6426, 6427, 6525, 6531 and 6548) provide nesting and/or winter habitat for this species.

Brewer's sparrows are common in sagebrush stands and mixed brush communities throughout the LSFO. Potential habitat for this species occurs on most parcels that have a sagebrush component.

Northern leopard frogs are found throughout the LSFO and are associated with riparian communities. Leopard frogs have been documented using riparian habitat along streams, springs, wet meadows and stock ponds in several locations scattered throughout the resource area. There are no know occurrences of this species on any of the proposed lease parcels, however, potential habitat does exist on most parcels.

Northwest Colorado lies on the eastern margin of Great Basin spadefoot toad distribution. Several locations have been documented in Moffat County within the LSFO. Spadefoot toads appear to be associated with ephemeral stock ponds in valley and basin terrain. Although seemingly sporadically distributed in the LSFO, it remains possible that toads occupy shrublands and woodlands near some type of water source. Therefore, several parcels provide potential habitat for this species.

The Colorado River cutthroat trout (CRCT) is a native trout species of the Colorado River Basin. It is one of 3 sub-species of cutthroat that currently reside in Colorado. CRCT, like all cutthroat subspecies, inhabit cold-water streams and lakes with adequate spawning habitat present in the spring. Their primary source of food is aquatic and terrestrial insects. Habitat for this species occurs on/near Parcels 6348, 6336, 6527 and 6548.

Environmental Consequences, Proposed Action:

Colorado River Fish - Cumulative water depletions from the Colorado River Basin are considered likely to jeopardize the continued existence of the Colorado pikeminnow, humpback chub, bonytail and razorback sucker and result in the destruction or adverse modification of their critical habitat. In 2008, the BLM prepared a Programmatic Biological Assessment (PBA) that addressed water depleting activities associated with the BLM's fluid minerals program in the Colorado River Basin in Colorado, including water used for well drilling, hydrostatic testing of pipelines and dust abatement on roads. In response, the U.S. Fish and Wildlife Service (FWS) prepared a Programmatic Biological Opinion (PBO) that addressed water depletions associated with fluid minerals development on BLM lands. The PBO included reasonable and prudent alternatives which allowed the BLM to authorize oil and gas wells that result in water depletions while avoiding the likelihood of jeopardy to the endangered fishes and avoiding destruction or adverse modification of their critical habitat. The reasonable and prudent alternative authorized the BLM to solicit a one-time contribution to the Recovery Implementation Program for Endangered Fish Species in the Upper Colorado River Basin (Recovery Program) in an amount based on the average annual acre-feet depleted by fluid minerals activities on BLM lands. Development associated with this lease sale would be covered by this agreement and water use would be entered into the LSFO water depletion log that is summited to the Colorado State Office at the end of each fiscal year.

Greater sage-grouse - Impacts to greater sage-grouse from oil and gas development are discussed in the LSFO RMP EIS (Section 4.5.6). Impacts include, but are not limited to, displacement into less suitable habitat, nest abandonment, destruction of nests and loss of habitat. Other impacts, such as habitat fragmentation and the spread of weedy plants can also degrade habitat. Noise and increased human activity related to drilling can disrupt breeding and nesting activities. Recent research on sage-grouse suggest that reduced lek attendance, avoidance and displacement from areas of energy development, lower survival of nesting hens and reduced nest success can occur even under moderate levels of fluid minerals development (Holloran 2005, Doherty et al. 2008, Walker et al. 2007). These impacts do not only occur during the drilling phase, but continue during normal operations and maintenance of sites. Sage grouse may avoid otherwise suitable habitat as density of roads, powerlines or energy development increases (Lyon and Anderson 2003; Holloran 2005; Kaiser 2006; Doherty et al. 2008).

If lease development is successful, impacts would continue during routine maintenance and operations of the wells. Sage-grouse would likely avoid habitat in the vicinity of the producing well, due to human presence and infrastructure located at the well site. Indirect habitat loss attributable to this behavioral response adds substantially to the effects of habitat loss due to long term facility occupation. In addition, noise and an increase in traffic on access roads would disturb and likely displace grouse. The LSFO requires mufflers to be placed on any equipment that produces sound/noise in sage-grouse habitat. Additional BMPs and site specific COAs developed at the APD stage (e.g. clustering of wells, limiting traffic) would potentially help mitigate impacts from habitat losses. Controlled surface use stipulations (5% disturbance thresholds) designed to reduce fragmentation in medium priority sagebrush habitat will reduce habitat fragmentation on parcels containing greater sage-grouse PGH.

Columbian sharp-tailed grouse – Impacts to sharp-tailed grouse from oil and gas development include: loss of habitat, habitat fragmentation, disturbance and displacement, increased stress, facilitation of predation and direct mortality from vehicles (Hoffman and Thomas 2007). Most oil and gas research has

focused on greater sage-grouse; however, it is likely that these impacts would be similar to sharp-tailed grouse. Although timing limitations can limit disturbances to birds during the lekking season from drilling activities, impacts from long term disturbances (e.g. roads and facilities) are more difficult to minimize. BMPs and COAs at the APD stage that limit traffic, encourage clustered development and reduce habitat fragmentation would be needed to minimize impacts to Columbian sharp-tailed grouse if development exceeds one disturbance per section. In addition, controlled surface use stipulations (5% disturbance thresholds) designed to reduce fragmentation in medium priority sagebrush habitat will reduce habitat fragmentation potential in sharp-tailed grouse habitat associated with parcels 6348, 6403, 6425, 6426, 6427, 6525 and 6531.

Brewer's Sparrow – Impacts to Brewer's sparrow are discussed in the Migratory Bird section.

Sensitive raptor species – Raptor nest surveys are required prior to project implementation in areas with suitable nesting habitat or with records of nest locations. Information on functional nest sites found in the course of surveys are used as the basis for developing siting alternatives or applying timing limitations that reduce the risk of nest activity disruptions that could result in reproductive failure. In addition, NSOs are used to maintain the integrity of nest substrates for subsequent years' nesting activities. RMP derived TLs and NSOs are also used to protect important bald eagle roosting sites.

Sensitive fish, northern leopard frogs and Great Basin spadefoot – Considering RMP-derived management emphasis on protecting riparian and aquatic habitats (See Riparian and Water Quality, Surface Sections), it is unlikely that lease development would have any substantive consequence on the condition or function of aquatic habitats occupied by special status species. Implementation of State and federally imposed design measures to control erosion and spills would limit the risk of contaminants migrating off-site and degrading water quality in the Yampa River and its contributing tributaries. However, it is likely that populations of fish and amphibians would be subject to water depletion-related effects, to which the development of proposed lease parcels would incrementally contribute.

White-tailed prairie dog - Increased road development and vehicle traffic could result in the direct mortality of prairie dogs and ferrets through vehicular collisions. Indirect impacts could also occur through the introduction of noxious and invasive weeds. The construction of well pads and ROWs could benefit the prairie dogs by creating tracts of open habitat, a preferred characteristic of prairie dogs, which could promote establishment of new colonies. In addition, reclamation activities associated with energy development could potentially enhance habitats by establishing re-growth vegetation preferred by prairie dogs.

Although oil and gas development and white-tailed prairie dogs currently coexist throughout much of the Little Snake RMP area, stipulations for white-tailed prairie dogs (timing limitations for all prairie dog colonies and controlled surface use active prairie dog towns less than 10 acres in size) would provide habitat protection for this species.

Environmental Consequences, No Action Alternative: There would be no impacts to special status species or their habitat from the No Action Alternative.

Cumulative Effects: Development of one or more of these lease parcels would contribute to activity simultaneous with and in addition to ongoing natural gas and mineral development and recreation use (primarily hunting) in the LSFO. Initial disturbance to special status species (e.g., construction, drilling, and completion activities), as conditioned by timing limitations, CSU and COAs would be relatively localized and temporary. After these initial activities have subsided, human activity and effects of habitat fragmentation would continue throughout the production phase and persist for the life of well or field. The consequences of these influences on special status species would vary according to species-specific response through time as modified by habituation or circumstance, such as the use of access restrictions or BMPs that reduce the frequency and duration of well visitation. Development would result in further modifications and reductions in habitat. Roads and working surfaces of pads represent incremental accumulation of acreage removed from habitat base for the life of the well or field.

Mitigation: Mitigation that is used to reduce the duration or severity of impacts to special status species is presented integral with the discussions above. Mitigation applied to subsequent lease development includes RMP-derived CSU, and Timing Limitation (TL) stipulations (see Attachment CA). All parcels are also subject to Exhibit CO-34 to alert lessee of potential habitat for a threatened, endangered, candidate, or other special status plant or animal.

3.3.4 Wetlands and Riparian Zones

Affected Environment: The following table indicates which proposed lease parcels have known or the potential for presence of both perennial and ephemeral surface waters. Because many of the parcels are under private surface ownership, the type and condition of riparian resources there would not be known unless a field visit is be conducted. Where present, the magnitude and location of direct and indirect effects on riparian resources cannot be predicted until site-specific proposals are made for exploration and development.

Table 3-5: Potential for surface water presence in proposed lease parcels

PARCEL ID	KNOWN/POTENTIAL FOR PERENNIAL WATER PRESENT?	KNOWN/POTENTIAL FOR EPHEMERAL WATER PRESENT?
6296	Not likely	Yes
6297	Not likely	Yes
6298	Not likely	Yes
6302	Yes	Yes
6336	Not likely	Yes
6348	Yes	Yes
6385	Not likely	
6386	Not likely	Yes
6403	Not likely	Yes
6422	Not likely	Yes
6423	Yes	Yes

PARCEL ID	KNOWN/POTENTIAL FOR PERENNIAL WATER PRESENT?	KNOWN/POTENTIAL FOR EPHEMERAL WATER PRESENT?
6424	Yes	Yes
6425	Not likely	Not likely
6426	Yes	Yes
6427	Not likely	Not likely
6453	Yes	Not likely
6525	Not likely	Yes
6527	Not likely	Not likely
6531	Yes	Not likely
6548	Yes	Yes

Environmental Consequences, Proposed Action: Although specific influences associated with lease development cannot be predicted at the leasing stage, management direction in the LSFO ROD/RMP (October 2011) requires that land use activity that maintain existing riparian acreage and diversity in riparian plant communities. BLM policy and current LSFO ROD/RMP (October 2011) decisions allow for the site-specific development of COAs at the APD stage that are effective in substantially reducing direct involvement and indirect influences on riparian vegetation and channel function, including facility relocations of up to 200 meters and providing for rapid stabilization and restoration in the event of unavoidable involvement (e.g., typically linear alignments).

Environmental Consequences, No Action Alternative: There would be no action authorized that would have potential to influence riparian zones and wetlands.

Environmental Consequences, Cumulative Impacts: This lease sale, when combined with the past, present and reasonably foreseeable actions would elevate *potential* for the deterioration of riparian resources within the affected watersheds. Effects on riparian zones should be limited due to existing lease stipulations and best management practices that provide protection to these areas. Some impacts could occur if creek crossings cannot be avoided during oil and gas exploration and development activities.

Mitigation:

<u>For soil stabilization</u>:

For the purpose of protecting areas from slumping and mass movement of soils or landslides, LS-110 lease stipulation should be applied on all appropriate locations within lease areas. For the purpose of minimizing erosion and sediment transport from slopes equal to or greater than 35%, LS-111 lease stipulation should be applied on all appropriate locations within the lease areas. Specific locations having slopes steeper than 35% would be identified during site specific proposals for exploration and development.

- When saturated soil conditions exist on or along the right-of-way, construction shall be halted until soil material dries out sufficiently for construction to proceed without undue damage and erosion to the right-of way.

- The grant holder shall provide satisfactory reclamation of all sites disturbed by their activity. This may include installation of additional erosion control devices and seeding at the discretion of the BLM Authorized Officer.

- Topsoil shall be conserved during excavation and reused as cover on disturbed areas to facilitate re-growth of vegetation. Topsoil shall only be used for reclamation and shall not be used to bed or pad the pipe during backfilling.

- To control erosion and sediment transport, roads shall be crowned or sloped, ditched, surfaced, drained with culverts and/or water dips, and constructed to BLM Gold Book standards. Culvert outlets shall incorporate controls such as rip-rap, sediment catchments, and anchored straw bales, to slow water velocity and prevent erosion and soil transport. Initial gravel application shall be a minimum of four inches.

- The operator shall provide timely year-round road maintenance and cleanup on roads. A regular schedule for maintenance shall include, but not be limited to, crown or slope reconstruction, blading, ditch, culvert and catchment cleaning, road surface replacement, and dust abatement. When rutting within the traveled way becomes greater than three inches, blading, and/or gravelling shall be conducted as approved by the BLM Authorized Officer.

- Top soil segregation will not occur when soils are saturated or frozen unless special authorization is granted by the BLM Authorized Officer.

- A Winter Construction 1 Plan will be submitted and approved by the BLM Authorized Officer before a Notice to Proceed will be authorized for construction activities in frozen soils.

- All erosion and sediment control practices and measures shall be constructed, applied, and maintained in accordance with the approved erosion and sediment control plan.

- Topsoil stripping shall be confined to the immediate construction areas. A 4 to 6-inch stripping depth is common, but depth may vary depending on the particular soil. All perimeter dikes, basins, and other sediment controls shall be in place prior to stripping.

- After the areas to be topsoiled have been brought to grade, and immediately prior to spreading the topsoil, the subgrade shall be loosened by disking or scarifying to a depth of at least two inches (or as site specific analysis determines 1 appropriate for soil type) to ensure bonding with subsoil.

- Topsoil shall not be placed while in a frozen or muddy condition, when the subgrade is excessively wet, or in a condition that may otherwise be detrimental to proper grading or proposed sodding or seeding.

BMPs will be applied as appropriate at the time of APD application. Examples of BMPs that may be

applied include:

- No surface occupancy and surface-disturbing activities within stream channels, stream banks, and the area 2,500 horizontal feet either side of the ordinary high-water mark (bank-full stage) of major river corridors.

- No surface occupancy and surface disturbing activities within a minimum buffer distance of 325 horizontal feet for all perennial waters, including fens and wetlands, streams, springs and seeps. For perennial streams, the buffer will be measured from ordinary high water mark (bankfull stage), whereas for wetland features, the buffer will be measured from the edge of the mapped extent. For unmapped wetlands, the vegetative boundary (from which the buffer originates) will be determined in the field. Where the riparian zone extends beyond 325 feet, the NSO would be extended to include the entire riparian zone. From 325 to 500 horizontal feet from the perennial water body, controlled surface use restrictions will apply.

- No surface occupancy of 50 horizontal feet as measured from the top of the stream bank for all intermittent or ephemeral streams. If riparian vegetation extends beyond the top of the stream bank, the buffer will be measured from the extent of the riparian vegetation. Controlled surface use restrictions will apply from the edge of NSO buffer to 100 horizontal feet.

- If development in riparian areas cannot be avoided then design, construction, and reclamation activities should be professionally engineered. Site-specific mitigation is developed during the NEPA review of APDs.

3.3.5 Wildlife (Aquatic)

Affected Environment: There are multiple perennial and ephemeral riparian resources (including streams, wetlands, seeps, and springs) and associated habitats that provide habitat for aquatic wildlife species. The Yampa River, Good Spring Creek, Trout Creek, Slater Creek and tributaries to the William's Fork River support populations of native fish. Riparian habitats provide potential habitat for amphibians (western chorus and northern leopard frogs).

Environmental Consequences, Proposed Action: RMP-derived management emphasis on protecting riparian habitats effectively avoids impacts to aquatic wildlife. Implementation of state and federally-imposed design measure to control erosion and spills also work to limit the risk of contaminants migrating off-site and degrading water quality in these systems (See Riparian and Special Status Animals Sections of this EA).

Environmental Consequences, No Action Alternative: There would be no impacts to aquatic wildlife or associated habitats from this alternative.

Cumulative Effects: Cumulative effects to aquatic wildlife species are similar to those described in the Special Status Animals Section of this EA.

Mitigation: Mitigation designed to protect riparian habitats and perennial water would be adequate to protect aquatic wildlife.

3.3.6 Wildlife (Terrestrial)

Affected Environment: A variety of wildlife habitats and their associated species occur within proposed leasing area. Each habitat type provides food, cover and shelter for a variety of mammal, bird and reptile species common to northwest Colorado. The lease area provides nesting and staging habitat for greater sandhill cranes (Parcels 6403, 6423, 6424, 6425 and 6548).

Large ungulates in the area include pronghorn, mule deer and elk, with some parcels providing important winter range for these species. Parcels 6296, 6297, 6298, 6336, 6348, 6403 and 6525 are mapped as mule deer critical winter range. Parcels 6385, 6403, 6426, 6453, 6525 and 6531 are located within elk winter concentration areas. In addition, Parcels 6302, 6336, 6403 and 6423 provide elk calving habitat. Large predators include mountain lion and black bear. Coyotes, bobcats, jackrabbits, cottontail rabbits and a variety of small rodents, reptiles and birds likely inhabit the general area. Although all of the species are important members of native communities and ecosystems, most are common and have wide distributions within the state, region and field office.

Environmental Consequences, Proposed Action: Although the lease sale itself has no direct effects on wildlife in the area, future potential drilling would impact wildlife species and their habitat. Impacts to wildlife species from oil and gas development are discussed in the LSFO RMP EIS (Section 4.5.5). Impacts include, but are not limited to, displacement into less suitable habitat, increased stress and loss of habitat. These impacts are more significant during critical seasons, such as winter or reproduction. Big game species are often restricted to smaller areas during the winter months and may expend high amounts of energy to move through snow, locate food and maintain body temperature. Disturbances during the winter can displace big game, depleting much needed energy reserves and may lead to decreased over winter survival. Timing limitations would help protect wildlife during critical time periods, however direct and indirect habitat loss is more difficult to minimize. BMPs and site specific COAs developed at the APD stage (e.g. clustering of wells, limiting traffic) would potentially help mitigate impacts from habitat losses. In addition, controlled surface use stipulations (5% disturbance thresholds) designed to reduce fragmentation in medium priority sagebrush habitat will reduce habitat fragmentation on Parcels 6296, 6297, 6302, 6336, 6348, 6385, 6403, 6425, 6426, 6427, 6525 and 6531.

Lease development's influence on small mammal populations, at least in the short team, is likely confined to on-site mortality and direct habitat loss attributable to facility occupation and vegetation clearing. Due to relatively small extent of actual surface occupation and large areas of undisturbed lands, development of the proposed lease parcels would have limited impacts to small mammal populations. Impacts to specific species would be addressed at the APD level and appropriate mitigation or COA would be developed.

Environmental Consequences, No Action Alternative: There would be no impacts to wildlife species or their habitat from the No Action Alternative.

Environmental Consequences, Cumulative Impacts: Cumulative effects to wildlife species are similar to those described in the Special Status Animals Section of this EA.

Mitigation: Mitigation includes Controlled Surface Use to limit fragmentation, No Surface Occupancy stipulations to protect raptor nest sites and Timing Limitations to protect wildlife during critical time period, such as winter and reproduction (See Attachment C).

3.4 HERITAGE RESOURCES AND HUMAN ENVIRONMENT

3.4.1 Cultural Resources

Affected Environment: The BLM has the legal responsibility to take into account the effects of its actions on cultural resources located on federal land or affected by federal undertakings. BLM Manual 8100 Series, the Colorado State Protocol and BLM Colorado Handbook of Guidelines and Procedures for Identification, Evaluation, and Mitigation of Cultural Resources provide guidance on how to accomplish Section 106 requirements with the appropriate cultural resource standards. Section 106 of NHPA requires federal agencies to: 1) inventory cultural resources to be affected by federal undertakings, 2) evaluate the importance of cultural resources by determining their eligibility to the National Register of Historic Places (National Register), and 3) consult with the federal and state preservation agencies regarding inventory results, National Register eligibility determinations, and proposed methods to avoid or mitigate impact to eligible sites. Within the state of Colorado, BLM's NHPA obligations are carried out under a Programmatic Agreement between BLM, the Advisory Council on Historic Preservation, and the State Historic Preservation Officer (SHPO). If the undertaking is determined to have “no effect” by the BLM Little Snake Field Office archaeologist then it may proceed under the terms of the Colorado State Protocol. If the undertaking is determined to have “adverse effects” then consultation is initiated with the SHPO.

The prehistoric and historic cultural context for northwestern Colorado has been described in several recent regional contexts. Reed and Metcalf’s (1999) context for the Northern Colorado River Basin is applicable for the prehistoric context and historical contexts include overviews compiled by Frederic J. Athearn (1982) and Michael B. Husband (1984). A historical archaeology context has also been prepared for the state of Colorado by Church and others (2007). In addition, significant cultural resources administered by the BLM-LSFO have been discussed in a Class 1 overview (McDonald and Metcalf 2006) and valuable contextual information is available in synthesis reports of archaeological investigations for a series of large pipelines in the area (Metcalf and Reed 2011; Rhode and others 2010; Reed and Metcalf 2009).

BLM conducted a literature review of records in the BLM-LSFO field office and database, and reviewed relevant information in the Compass database maintained by the Colorado Office of Archaeology and Historic Preservation. This information is summarized below:

Parcel 6296-Four cultural resource studies have been conducted within the parcel resulting in the inventory of 14 acres (less than 1 percent) of the total 2,112 acres within the parcel. These studies did

not result in the discovery of any cultural resources. Potential undocumented cultural resources were identified on the 1882 and 1907 Government Land Office (GLO) plats. A "cabin" is depicted on the 1882 plat and the "Lily Park to Maybell Road" and a fenceline are depicted on the 1907 plat. The cabin is likely plotted in the wrong location as it is indicated on the North Side of the Bear (Yampa) River. It is therefore not likely to be within the lease area. The road and the fenceline have likely been obliterated by the presence of the modern highway. The potential for undocumented cultural resources and their respective eligibilities for the National Register are unknown due to a lack of inventory. However due to the proximity of the Yampa River it is very likely that there are undocumented aboriginal and historic cultural resources within the parcel. Any undiscovered cultural resources have the potential to be recommended eligible for the National Register.

Parcel 6297-Two cultural resource studies have been conducted within the parcel resulting in the inventory of 25 acres (1 percent) of the total 2,428 acres within the parcel. These studies did not result in the discovery of any cultural resources. Potential undocumented cultural resources were identified on the 1907 Government Land Office (GLO) plat. These include a fenceline and an "Irrigating Ditch". The road and the fenceline have likely been obliterated by the presence of the modern highway. The potential for undocumented cultural resources and their respective eligibilities for the National Register are unknown due to a lack of inventory. However due to the proximity of the Yampa River it is very likely that there are undocumented aboriginal and historic cultural resources within the parcel. Any undiscovered cultural resources have the potential to be recommended eligible for the National Register.

Parcel 6298- One cultural resource studies have been conducted within the parcel resulting in the inventory of 17 acres (2 percent) of the total 960 acres within the parcel. This study resulted in the discovery of three prehistoric isolated finds. None of these isolates are recommended eligible for the National Register. A potential undocumented cultural resource was identified on the 1907 Government Land Office (GLO) plat. The "Lily Park to Maybell Road" has likely been obliterated by the modern highway. The potential for undocumented cultural resources and their respective eligibilities for the National Register are unknown due to a lack of inventory. However due to the proximity of the Yampa River it is very likely that there are undocumented aboriginal and historic cultural resources within the parcel. Any undiscovered cultural resources have the potential to be recommended eligible for the National Register.

Parcel 6302- One cultural resource studies have been conducted within the parcel resulting in the inventory of 7 acres (2 percent) of the total 320 acres within the parcel. This study did not result in the discovery of any cultural resources. No potential unrecorded historic resources were identified on the GLO plats or topographic maps. The potential for undocumented cultural resources is unknown due to the lack of inventory. However, the terrain is extremely rugged which is not generally conducive to aboriginal and historic site locations. Any undiscovered cultural resources have the potential to be recommended eligible for the National Register.

Parcel 6336-Six cultural resource studies have been conducted within the parcel resulting in the inventory of 160 acres (100 percent) of the total 160 acres within the parcel. These studies resulted in the discovery of one aboriginal and three historic isolated finds. None of these isolates are recommended eligible for the National Register. The potential for undocumented cultural resources in the parcel is very low due to the amount of prior inventory. It is possible but unlikely that there are undocumented buried

cultural resources within the parcel. A potential undocumented cultural resource consisting of a "fenceline" is depicted on the 1908 GLO plat. It is unlikely that the fenceline retains any integrity. Any undiscovered cultural resources have the potential to be recommended eligible for the National Register.

Parcel 6348-Six cultural resource studies have been conducted within the parcel resulting in the inventory of 589 acres (71 percent) of the total 825 acres within the parcel. These studies resulted in the discovery of two historic roads (the Meeker-Craig Road [5MF.1938 and 5RB.2607] and State Highway 13 [5MF.5138 and 5RB.4486], and a historic telegraph line (5RB.2607). The segment of the Meeker-Craig road within the parcel has been evaluated as not contributing to the overall eligibility of the road. The segment of State Highway 13 within the parcel has been evaluated as eligible for the National Register. The telegraph line requires additional data before its eligibility for the National Register can be evaluated. The telegraph line and the Meeker-Craig road are depicted on the 1885 GLO plat. The Meeker-Craig road is also depicted on the 1908 GLO plat along with an "Irrigating Ditch" and fenceline. Based on the prior cultural resource inventory it is estimated that a few additional cultural resources will be discovered. There resources will likely be discovered along State Highway 13. The surrounding terrain is extremely rugged which is generally not conducive to aboriginal and historic site locations. Any reevaluated or undiscovered cultural resources have the potential to be recommended eligible for the National Register.

Parcel 6385-No cultural resource studies have been conducted within the parcel. No potential unrecorded historic resources were identified on the GLO plats or topographic maps. The potential for undocumented cultural resources is unknown due to the lack of inventory. However, the terrain is extremely rugged which is not generally conducive to aboriginal and historic site locations. Any undiscovered cultural resources have the potential to be recommended eligible for the National Register.

Parcel 6386-One cultural resource studies have been conducted within the parcel resulting in the inventory of 6 acres (1 percent) of the total 476 acres within the parcel. This study did not result in the discovery of any cultural resources. Three unnamed roads and "Gould Ditch" are depicted on the 1914 GLO. It is unlikely that any of these potential undocumented cultural resources are eligible for the National Register. The potential for undocumented cultural resources is unknown due to the lack of inventory. Any undiscovered cultural resources have the potential to be recommended eligible for the National Register.

Parcel 6403-No cultural resource studies have been conducted within the parcel. No potential unrecorded historic resources were identified on the GLO plats or topographic maps. The potential for undocumented cultural resources is unknown due to the lack of inventory. However, the terrain is extremely rugged which is not generally conducive to aboriginal and historic site locations. Any undiscovered cultural resources have the potential to be recommended eligible for the National Register.

Parcel 6422-No cultural resource studies have been conducted within the parcel. No potential unrecorded historic resources were identified on the GLO plats or topographic maps. The potential for undocumented cultural resources is unknown due to the lack of inventory. However, the terrain is extremely rugged which is not generally conducive to aboriginal and historic site locations. Any undiscovered cultural resources have the potential to be recommended eligible for the National Register.

Parcel 6423-No cultural resource studies have been conducted within the parcel. Four potential undocumented historic resources are depicted on the 1922 GLO plat. These include a fenceline, an unnamed road, and two irrigation ditches. It is unlikely that any of these potential undocumented cultural resources are eligible for the National Register. The potential for undocumented cultural resources is unknown due to the lack of inventory. Any undiscovered cultural resources have the potential to be recommended eligible for the National Register

Parcel 6424-No cultural resource studies have been conducted within the parcel. Two potential undocumented historic resources are depicted on the 1914 GLO plat. These include an unnamed road and the "Gould Ditch". It is unlikely that any of these potential undocumented cultural resources are eligible for the National Register. The potential for undocumented cultural resources is unknown due to the lack of inventory. Any undiscovered cultural resources have the potential to be recommended eligible for the National Register

Parcel 6425-One cultural resource a study has been conducted within the parcel resulting in the inventory of 14 acres (18 percent) of the total 80 acres within the parcel. This study did not result in the discovery of any cultural resources. A potential undocumented historic resource consisting of a fenceline is depicted on the 1915 GLO plat. It is unlikely that this potential undocumented cultural resource is eligible for the National Register. The potential for undocumented cultural resources is low considering the results of prior inventory. In addition a substantial amount of the parcel has been developed as a substation and associated power lines. Any undiscovered cultural resources have the potential to be recommended eligible for the National Register.

Parcel 6426-Three cultural resource studies have been conducted within the parcel resulting in the inventory of 4 acres (2 percent) of the total 160 acres within the parcel. These studies did not result in the discovery of any cultural resources. No potential unrecorded historic resources were identified on the GLO plats or topographic maps. The potential for undocumented cultural resources is high due to the discovery of numerous cultural resources nearby and the proximity to the Yampa River. Any undiscovered cultural resources have the potential to be recommended eligible for the National Register

Parcel 6427-No cultural resource studies have been conducted within the parcel. No potential unrecorded historic resources were identified on the GLO plats or topographic maps. The potential for undocumented cultural resources is unknown due to the lack of inventory. Any undiscovered cultural resources have the potential to be recommended eligible for the National Register

Parcel 6453- One cultural resource studies has been conducted within the parcel resulting in the inventory of 7 acres (3 percent) of the total 228 acres within the parcel. This study did not result in the discovery of any cultural resources. Two potential undocumented historic resources consisting of a "County Road" and an "Irrigating Ditch" are depicted on the 1915 GLO plat. It is unlikely that these potential undocumented cultural resources are eligible for the National Register. The potential for undocumented cultural resources is unknown due to the lack of inventory. Any undiscovered cultural resources have the potential to be recommended eligible for the National Register

Parcel 6525- No cultural resource studies have been conducted within the parcel. No potential unrecorded historic resources were identified on the GLO plats or topographic maps. The potential for

undocumented cultural resources is unknown due to the lack of inventory. Any undiscovered cultural resources have the potential to be recommended eligible for the National Register.

Parcel 6527- No cultural resource studies have been conducted within the parcel. A potential unrecorded historic resources consisting of a fenceline is depicted on the 1915 GLO plat. It is unlikely that this potential undocumented cultural resource is eligible for the National Register. The potential for undocumented cultural resources is unknown due to the lack of inventory. . However, the terrain is extremely rugged which is not generally conducive to aboriginal and historic site locations. Any undiscovered cultural resources have the potential to be recommended eligible for the National Register

Parcel 6531- No cultural resource studies have been conducted within the parcel. No potential unrecorded historic resources were identified on the GLO plats or topographic maps. The potential for undocumented cultural resources is unknown due to the lack of inventory. Any undiscovered cultural resources have the potential to be recommended eligible for the National Register

Parcel 6548- One cultural resource studies has been conducted within the parcel resulting in the inventory of 11 acres (1 percent) of the total 908 acres within the parcel. This study did not result in the discovery of any cultural resources. Five potential undocumented cultural resources are depicted on the 1914 GLO plat. These consist of two unnamed roads, the "Slater to Deckers Mill" road, and two fencelines. It is unlikely that these potential undocumented cultural resources are eligible for the National Register. The potential for undocumented cultural resources is unknown due to the lack of inventory. Any undiscovered cultural resources have the potential to be recommended eligible for the National Register

Environmental Consequences, Proposed Action: Because the proposed lease sale does not involve ground disturbance, the proposed undertaking will have no effect on historic properties. Any future development of parcels that are purchased as a result of the lease sale will be subject to additional Section 106 compliance, including identification, effects assessment, consultation, and if necessary, resolution of adverse effects.

Environmental Consequences, No Action Alternative: While a no action alternative alleviates potential damage from energy development, cultural resources are constantly being subjected to site formation processes or events after deposition (Binford 1981, Schiffer 1987). These processes can be both cultural and natural and take place in an instant or over thousands of years. Cultural processes include any activities directly or indirectly caused by humans. Natural processes include chemical, physical, and biological processes of the natural environment that impinge and or modify cultural materials. A no action alternative will also result in a cultural study not being completed. Without cultural studies it can become difficult to make the appropriate decisions regarding eligibility of resources and appropriate forms of mitigation. In addition, cultural and natural processes may obliterate important cultural resources before they can be documented and evaluated.

Cumulative Effects: The cumulative impacts to cultural resources are broad and include impacts within the project area, adjacent to the project area, and within the viewshed of the project area. Oil and gas have been extracted on the BLM-LSFO for over 50 years. This activity has created a vast amount of surface disturbance including well pads, pipelined, facilities, and access roads. This infrastructure has the

potential to detract from the integrity of cultural resources directly through physical disturbance or indirectly through the degradation of the historical environmental setting. The increased utilization of the area also increases the change of illegal collection of cultural material. Alternatively, the development of the area has resulted in a large amount of cultural resource studies. The information and data gained from these studies would never have been obtained without the presence of energy development.

Mitigation: All lands are subject to Exhibit CO-39 to protect cultural resources. Before any APDs are approved for exploration or drilling, a Class III cultural resource survey will be undertaken to comply with Section 106 of the National Historic Preservation Act. The LSFO requires a minimum 10-acre inventory block around any proposed well location. Class III cultural resource surveys are also required for associated roads (new or improved) and pipelines. Because most cultural resources are unidentified, irreplaceable, and highly sensitive to ground disturbance, it is necessary that the resources are properly identified, evaluated, and reported prior to any future activity that may affect their integrity or condition. Where potential adverse effects to eligible cultural resources are identified, the preferred mitigation is to relocate the proposed well pad(s) or infrastructure to avoid the sites by more than 100 meters, or relocation such that the undertaking's APE does not adversely affect eligible sites. Data recovery of eligible sites may also be initiated in consultation with the Colorado SHPO. Specific mitigation is developed during NEPA review of individual APDs or related undertakings.

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3.4.2 Hazardous or Solid Wastes

Affected Environment: 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.

The most pertinent of the Federal laws dealing with hazardous materials are as follows:

- The Oil Pollution Act (Public Law 101-380, August 18, 1990) prohibits discharge of pollutants into waters of the US, which by definition would include any tributary, including any dry wash that eventually connects with the Colorado River.
- The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (42 U.S.C. 9601–9673), provides for liability, risk assessment, compensation, emergency response, and cleanup (including the cleanup of inactive sites) for hazardous substances. The act requires federal agencies to report sites where hazardous wastes are or have been stored, treated, or disposed of, and requires responsible parties, including federal agencies, to clean up releases of hazardous substances.
- The Resource Conservation and Recovery Act (RCRA), as amended by the Federal Facility Compliance Act of 1992 (42 U.S.C. 6901–6992), authorizes the EPA to manage, by regulation, hazardous wastes on active disposal operations. The act waives sovereign immunity for federal agencies with respect to all federal, State, and local solid and hazardous waste laws and regulations. Federal agencies are subject to civil and administrative penalties for violations and to cost assessments for the administration of the enforcement.
- The Emergency Planning and Community Right-To-Know Act of 1986 (42 U.S.C. 11001–11050) requires the private sector to inventory chemicals and chemical products, report those in excess of threshold planning quantities, inventory emergency response equipment, provide annual reports and support to local and State emergency response organizations, and maintain a liaison with the local and State emergency response organizations and the public.

Environmental Consequences, Proposed Action: The leased parcels would fall under environmental regulations that impact disposal practices and impose responsibility and liability for protection of human health and the environment from harmful waste management practices or discharges. The direct impact

would be if a solid waste or hazardous material is discarded and contaminates land surface either by solid, semi-solid, liquid, or contained gaseous material. Hazardous, civil, and criminal penalties may be imposed if the waste is not managed in a safe manner, and according to EPA regulations.

Environmental Consequences, No Action Alternative: Under the No Action alternative no parcels would be leased, as a result, no drilling or construction activities would be permitted; therefore, there would be no effects.

Environmental Consequences, Cumulative Effects: Historic and continued energy development in the area would not likely have an additive effect on the amount of solid or hazardous waste introduced in the environment if laws and regulations are followed and enforced.

Mitigation: These laws, regulations, standard lease stipulations, and contingency plans and emergency response resources are expected to adequately mitigate any potential hazardous or solid waste issues associated with the Proposed Action.

3.4.3 Native American Religious Concerns

Affected Environment: Four Native American tribes have cultural and historical ties to lands have administered by the BLM LSFO. These tribes include the Eastern Shoshone Tribe, Ute Mountain Ute Tribe, Uinta and Ouray Agency Ute Indian Tribe, and the Southern Ute Indian Tribe.

American Indian religious concerns are legislatively considered under several acts and Executive Orders, namely the American Indian Religious Freedom Act, the Native American Graves Environmental Assessment Protection and Repatriation Act, and Executive Order 13007 (Indian Sacred Sites). In summary, these require, in concert with other provisions such as those found in the NHPA and Archaeological Resources Protection Act, that the federal government carefully and proactively take into consideration traditional and religious Native American culture and life and ensure, to the degree possible, that access to sacred sites, the treatment of human remains, the possession of sacred items, the conduct of traditional religious practices, and the preservation of important cultural properties are considered and not unduly infringed upon. In some cases, these concerns are directly related to “historic properties” and “archaeological resources”. In some cases elements of the landscape without archaeological or other human material remains may be involved. Identification of these concerns is normally completed during the land use planning efforts, reference to existing studies, or via direct consultation.

Tribal consultation was conducted for this undertaking. Letters were sent to the tribes in mid July 2012 regarding this specific lease sale. No comments were received. Additional consultation may be conducted during the APD stage. The decision to consult will occur when Class III inventory is completed.

Environmental Consequences, Proposed Action: Cultural items, sites, or landscapes determined to by culturally significant to the tribes can be directly or indirectly adversely impacted by oil and gas development. Direct impacts could include but are not limited to physical damage, removal of cultural objects or items, and activities thought to be disrespectful. Indirect impacts include but are not limited to

prevention of access (hindering the performance of traditional ceremonies and rituals), increased visitation of a previously little used area, and loss of integrity related to religious feelings and associations.

There are no known cultural items, sites, or landscapes determined to be culturally significant to the tribes within and near the undertaking area. The proposed action does not prevent access to any known sacred sites, prevent the possession of sacred objects, or interfere or otherwise hinder the performance of traditional ceremonies and rituals.

Environmental Consequences, No Action Alternative: None.

Environmental Consequences, Cumulative Effects: Continued energy development in the area has an additive effect of changing the landscape from that ancestrally known by the tribes. There are no specific sites of concern identified in the Project Area; it is rather the broader continued change that modern culture brings to the landscape.

Mitigation: There are no known adverse impacts to any cultural items, sites, or landscaped determined to by culturally significant to the tribes. If new information is provided by Native Americans, additional or edited terms and conditions for mitigation may have to be negotiated or enforced to protect resource values.

3.4.4 Paleontological Resources

Affected Environment: Geologic formations at or near the surface in the area of the nominated parcels consist of Tertiary Age formations: Wasatch (Tw) Class Ia PFYC 4-5, Browns Park (Tbp) Class Ia, PFYC 4-5; and, Cretaceous Age formations: Iles (Ki) Class II PFYC 3, Lewis shale (Kls) Class II, PFYC 3, Williams Fork (Kw) Class Ia PFYC 4-5, Fort Union (Tf) Class II PFYC 3 and Mancos Shale (Km) Class II PFYC 3. Class Ia PFYC 4-5 formations have a high potential for occurrence of scientifically significant fossils. The potential for discovery of significant fossils within Class II PFYC 3 formations is considered to be moderate.

Environmental Consequences, Proposed Action: If any such fossils of paleontological interest are located, construction activities could damage the fossils and the information that could have been gained from them would be lost. The significance of this impact would depend upon the significance of the fossil. The proposed action could also constitute a beneficial impact to paleontological resources by increasing the chances for discovery of scientifically significant fossils.

Environmental Consequences, No Action Alternative: Under the No Action alternative, because no ground disturbance would occur, there would be no effects to paleontological resources.

Environmental Consequences, Cumulative Impacts: The cumulative impacts to the moderate potential for significant fossil discovery are broad within the project area and adjacent to the project area. This area has been the location of energy development for over 50 years. This activity has created a vast amount of surface disturbance including well pads, pipelines, facilities, and access roads. To date, there have been fossil discoveries recorded. Continued activity could prove additional discoveries.

Mitigation: During construction activities, monitoring of surface disturbance to any PFYC 4-5 areas should take place by a BLM permitted paleontologist. Ceasing operations and notifying the Field Office Manager immediately upon discovery of a fossil during construction activities. Appropriate measures to mitigate adverse effects to significant paleontological resources will be determined by the authorized officer after consulting with the operator. The operator is responsible for the cost of any investigation necessary for the evaluation and for any mitigation measures. The operator may not be required to suspend operations if activities can avoid further impacts to a discovered site or be continued elsewhere, however, the discovery shall be brought to the attention of the authorized officer as soon as possible and protected from damage or looting. (modified from 43CFR3802.3-2(f)(2), 43CFR3809.420(b)(8), and BLM IM 2009-011). An assessment of the significance is made and a plan to retrieve the fossil or the information from the fossil is developed.

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3.4.5 Environmental Justice and Socioeconomics

Affected Environment: Executive Order 12898 requires federal agencies to assess projects to "identify and address the disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations." There are no environmental justice communities in the study area, either based on race, ethnicity, or income. The areas involved in the lease sale are rural in nature, and small communities and sparsely populated subdivisions exist within variable distances from the proposed lease parcels.

Profile of County Demographics, 2000-2010

	Moffat	Rio Blanco	Routt	Colorado	U.S.
Population (2010*)	13,519	6,494	22,924	5,029,196	303,965,272
Population (2000)	13,184	5,986	19,690	4,301,261	281,421,906
Population Percent Change (2000-2010*)	2.5%	8.5%	16.4%	16.9%	8.0%

* The data in this table are calculated by ACS using annual surveys conducted during 2006-2010 and are representative of average characteristics during this period.

Data Sources: U.S. Department of Commerce. 2012. Census Bureau, American Community Survey Office, Washington, D.C.; U.S. Department of Commerce. 2000. Census Bureau, Systems Support Division, Washington, D.C.

The three-county region has experienced varying degrees of fluid mineral development. Currently there is oil and gas development dispersed roughly equally throughout the counties of the field office. Rio Blanco County contains the highest number of active wells, though most of these are in the western portion of the county, outside the boundaries of the field office. Employees in the oil and gas sector within these counties earn an average of approximately $60,000 per year (US Census Bureau, County Business Patterns 2010).

The following table reports the average annual fluid minerals production for each county, including an estimated revenue value, figured using the average state wellhead prices from 2009: Oil at $52.33/bbl and natural gas at $3.21/MCF (IPAA, August 2011 Report http://ipaa.org/reports/docs/2010-2011IPAAOPI.pdf). The production values are averaged over the past ten full years of production (2002-2011); (Colorado Oil and Gas Conservation Commission http://cogcc.state.co.us/).

Average Annual Production and Revenue

	Moffat	Rio Blanco	Routt	Total
Oil Production (Thousand bbl)	279	5,409	76.9	4,027
Oil Revenue ($Thousand)	14,579	283,068	4,027	301,673
Gas Production (MMCF)	18,182	53,992	35.3	72,209
Gas Revenue ($Thousand)	58,365	173,314	113.4	231,792

Federal oil and gas leases generate a one-time lease bonus bid as well as annual rents. The minimum competitive lease bid is $2.00 per acre. If parcels do not receive the minimum bid they may be leased later as noncompetitive leases that don't generate bonus bids. Within the Little Snake field office, average bonus bids are approximately $170 per acre for oil and gas leases. Lease rental is $1.50 per acre per year for the first five years and $2.00 per acre per year thereafter. Typically, oil and gas leases expire after 10 years unless held by production. During the lease period annual lease rents continue until one or more wells are drilled that result in production and associated royalties. The royalty rate is 12.5 percent of revenue associated with mineral extraction on federal leases.

Federal mineral lease revenue for the State of Colorado is divided thusly: 48.3 percent of all state mineral lease rent and royalty receipts are sent to the State Education Fund (to fund K-12 education), up to $65 million in FY 2009 – FY 2011, and growing at four percent per year thereafter. Any amounts greater than the upper limit flow to the Higher Education Capital Fund. 10 percent of all state mineral lease rent and royalty receipts are sent to the Colorado Water Conservation Board (CWCB), up to $13 million in FY 2009, and growing at four percent per year thereafter. Any amounts greater than the upper limit flow to the Higher Education Capital Fund. 41.4 percent of all state 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 FML revenue or providing residence to energy employees.

Bonus payments are allocated separately from rents and royalties, in the following manner: 50 percent of all state 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 (COPs). 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 FML revenues decline by ten percent or more from the preceding year.

Environmental Consequences, Proposed Action: No minority or low income populations would be directly affected in the vicinity of the proposed action.

The direct effect of the proposed action would be the payments received, if any, from the leasing of the 11,307.36 acres of federal mineral estate, or a subset thereof. Indirect effects that might result, should exploration and 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 benefits to federal, state, and county governments related to lease payments, royalty payments, severance taxes, and property taxes. Other effects could include the potential for a small increase in transportation, roads and noise disturbance associated with development. These effects would apply to all public land users in the project area.

It is, however, highly speculative to predict exact effects of this action, as there are no guarantees that the leases will receive bids, that any leased parcels will be developed, or that any developed parcels will produce any fluid minerals. A rough estimate for the amount to be raised in the lease sale can be determined using recent lease sales in the field office as a guideline. Approximately 95% of all acres proposed for leasing are bid upon, with an average bid of approximately $170 per acre. Using these values, the lease sale could result in $1,826,139 in total bonus bids, though the actual amount may vary widely. To predict the results of future development would be too speculative in nature. Any APD received in would result in future NEPA analysis taking place, in which further socio-economic effects would be examined. Likewise, any negative socio-economic effects resulting from disturbance and drilling on leased parcels would also be examined in future site-specific analysis. 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. Thus, the types, magnitude and duration of potential impacts cannot be precisely quantified at this time, and would vary according to many factors.

Environmental Consequences, No Action Alternative: Under the no action alternative the proposed parcels will not be leased and therefore there would be no impacts.

Environmental Consequences, Cumulative Impacts: Any possible future development of fluid mineral resources resulting from this lease sale would be in addition to the current level of development, as examined in the affected environment.

Mitigation: None.

3.5 RESOURCE USES

3.5.1 Prime and Unique Farmlands

Affected Environment: Soils designated as prime and unique farmlands as well as farmland of statewide importance occur within several of the proposed lease parcels. To conditionally qualify as prime farmland, soils in these areas must be irrigated and/or reclaimed of excess salts and sodium. Generally, farmlands of statewide importance include those that are nearly prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some may produce as high a yield as prime farmlands if conditions are favorable.

Environmental Consequences, Proposed Action: Irrigating or otherwise manipulating these soil types so as to create conditions favorable to create prime farmland on public land is against BLM management policy. Therefore, any disturbance to or development on these soil types on public lands would have no impact to prime and unique farmlands on public lands. However, development or disturbance to these soils on private lands within the proposed parcels for lease may preclude any opportunity to develop these soils to their full agricultural potential.

Environmental Consequences, No Action Alternative: There would be no action authorized that would have potential to influence special status farmlands.

Environmental Consequences, Cumulative Impacts: This lease sale, when combined with the past, present and reasonably foreseeable actions will elevate *potential* for the degradation of special status farmlands on private lands, effectively reducing the total amount of farmland potentially available under certain conditions. The sale has little to no impact on these farmlands on public lands, since conventional farming practices are not permitted per agency policy.

Mitigation: None.

CHAPTER 4 - CONSULTATION AND COORDINATION

4.1 TRIBES, INDIVIDUALS, ORGANIZATIONS, OR AGENCIES CONSULTED

Prior to the development of the EA, notification letters were sent to Dinosaur National Park, Colorado Parks and Wildlife, Native American Tribes, USFS, and affected surface owners.

4.2 LIST OF PREPARERS AND PARTICIPANTS

INTERDISCIPLINARY REVIEW

Name	Title	Resource
Chad Meister	Air Quality Scientist	Air Quality
Shawn Wiser	Natural Resource Specialist	Invasive/Non-native Species, Hazardous or Solid Wastes, Fire Management, Forest Management, Wild Horses
Emily Spencer	Ecologist	Floodplains, Surface Hydrology, Soils, Water Quality (Surface), Wetlands & Riparian Zones, Prime and Unique Farmlands
Marty O'Mara	Petroleum Engineer	Ground Hydrology, Fluid Minerals, Paleontological Resources, Water Quality (Ground)
Jennifer Maiolo	Mining Engineer	Minerals, Solid
Desa Ausmus	Wildlife Biologist	Migratory Birds, Special Status Animal Species, Wildlife (Aquatic & Terrestrial),
Hunter Seim	Rangeland Management Specialist	Special Status Plant Species
Mark Lowrey	Rangeland Management Specialist	Upland Vegetation, Livestock Operations
Ethan Morton	Archeologist	Cultural Resources, Native American Religious Concerns
Louis McMinn	Realty Specialist	Environmental Justice, Social and Economic Conditions, Realty Authorizations, Land Tenure
Gina Robison	Recreation Planner	Visual Resources, Areas of Critical Environmental Concern, Lands with Wilderness Characteristics, Wilderness Study Areas, Wild and Scenic Rivers
Shane Dittlinger	Recreation Planner	Access and Transportation, Recreation