

August 2012 Lease Parcels

Wind River / Bighorn Basin District

DOI-BLM-WY-050-EA12-17

Wind River/Bighorn Basin District, Wyoming



The BLM's multiple-use mission is to sustain the health and productivity of the public lands for the use and enjoyment of present and future generations. The Bureau accomplishes this by managing such activities as outdoor recreation, livestock grazing, mineral development, and energy production, and by conserving natural, historical, cultural, and other resources on public lands.

BLM/WY/PL-12/001+1310

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1 Purpose and Need

1.1 Introduction

The following Environmental Assessment (EA) documents the review of parcels nominated for oil and gas leasing. All parcels addressed in this EA are under the administration of the Bureau of Land Management (BLM) Wind River / Bighorn Basin District Offices's (WRBBDO) Cody Field Office (CYFO), Worland Field Office (WFO), and Lander Field Office (LFO). It serves to verify conformance with the approved land use plans, addresses new information, and provides the rationale for offering parcels to be sold and subsequently issued during the aforementioned lease sale.

The purpose of this document is to verify conformance with the applicable BLM land use plans, address new information, and determine which stipulations are appropriate for the nominated parcels. This EA will analyze the impacts of offering these lease parcels nominated for the competitive oil and gas lease sale, to provide access to federally managed oil and gas resources to allow exploration for and development of oil and gas resources on lands with Federal Mineral Reserves while meeting the needs of other resource values.

An EA provides evidence for determining whether to prepare an environmental impact statement (EIS) or to support a "Finding of No Significant Impact" (FONSI). If the decision maker determines this project has significant impacts following the analysis in the EA, then an EIS would be prepared for the project. A FONSI documents the reasons why implementation of the selected alternative would not result in "significant" environmental impacts (effects). When a FONSI statement is reached, a Decision Record (DR) may be signed approving the selected alternative which could be the proposed action, another alternative, or a combination thereof.

1.2 Background

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.

As required by 43 CFR 3120.1-2, the BLM Wyoming State Office conducts a quarterly competitive lease sale to sell available oil and gas lease parcels. Interested parties file Expressions of Interest (EOIs) to nominate parcels for leasing by the BLM. A Notice of Competitive Lease Sale (NCLS), which lists lease parcels to be offered at the auction, is published and posted by the BLM State Office at least 45 days before the auction is held. Lease stipulations applicable to each parcel are specified in the Sale Notice. Surface management of non-BLM administered land overlaying federal minerals is determined by BLM in consultation with the appropriate surface management agency or the private surface owner.

In the process of preparing a lease sale the BLM Wyoming 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. Additional information obtained after the publication of the NCLS, may result in withdrawal of certain parcels prior to the day of the lease sale.

1.3 Purpose and Need

The BLM's purpose for offering parcels and subsequent issuance of leases in the August 2012 lease sale is to provide areas for the potential exploration and development of additional oil and gas resources to help meet the nation's current and expanding need for energy sources.

Wyoming is a major source of natural gas for heating and electrical energy production in the United States. The offering for sale and subsequent issuance of oil and gas leases is needed to meet the requirements of MLA, FLPMA, and the minerals management objectives in the Cody, Lander and Worland Resource Management Plans (RMP). Oil and gas leasing provides oil and gas companies the opportunity to expand existing areas of production and to locate previously undiscovered oil and gas resources to help meet the public's energy demands.

Decisions to be made based on this analysis include which parcels would be offered for lease, which parcels would be deferred from the August 2012 lease sale, which parcels are not available for leasing, and what stipulations will be placed on the parcels that would be offered for lease.

1.4 Conformance with BLM Land Use Plans

Pursuant to 40 Code of Federal Regulations (CFR) 1508.28 and 1502.21, this EA tiers to and incorporates by reference the information and analysis contained in the Grass Creek Resource Management Plan (RMP) 1998 (BLM 1998a); Washakie RMP 1988 (BLM 1988b); Cody RMP 1990 (BLM 1990); Lander RMP 1987 (BLM 1987) and Final Environmental Impact Statement and Record of Decision for each RMP. The parcels nominated for the lease sale have been identified as available for leasing in each RMP. Application of stipulations to nominated parcels is directed by these RMPs.

1.5 Relationship to Statues, Regulations, or Other Plans

The proposed action and alternatives are consistent with other plans, program, and policies of affiliated Tribes, other federal agencies, state, and local governments to the extent practical, including but not limited to the following:

- Federal Land Policy and Management Act (FLPMA) of 1976, as amended (43 U.S.c.1701 et seq.)
- Mineral Leasing Act of 1920
- Clean Air Act (42 U.S.C. 1857 et seq.), as amended and recodified (42 U.S.C. 7401 et seq.).
- Clean Water Act (33 U.S.C. 1251 et seq.)
- Rangeland Health Standards
- Endangered Species Act (16 U.S.C. 1531 et seq.)
- Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations
- Migratory Bird Treaty Act (16 U.S.C. 703 et seq.)
- National Historic Preservation Act of 1966, as amended (16 U.S.C. 470 et seq.)
- Protection of Historic Properties (36 CFR 800)

- Native American Graves Protection and Repatriation Act of 1990 and 43 CFR Part 10
- American Indian Religious Freedom Act of 1978
- Native American Trust Resource Policy standards are presented in the Department of the Interior Comprehensive Trust Management Plan dated March 28, 2003
- U.S. Fish and Wildlife Service Bald and Golden Eagle Protection Act, as amended

Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to take into account the effects of their undertakings on historic properties. Compliance with Section 106 of the NHPA is a non-discretionary action that all federal agencies must perform. The implementing regulations at 36 CFR 800 allow for a phased approach to compliance. Since it is impossible to determine the type and extent of surface disturbance associated with oil and gas development at the leasing stage, BLM completes its compliance responsibilities when an operator submits an Application for Permit to Drill (APD) or other application for surface-disturbing activities on the Federal lease. Subsequently, the on-the-ground cultural resources inventory associated with Section 106 compliance does not take place until the APD stage. Due to this approach, BLM may not be aware of all cultural resources that are located in proposed lease parcels. In order to address any lack of data at this stage, every fluid mineral lease issued by BLM includes the special lease stipulation which reads:

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

Cultural resource specialists reviewed each parcel to determine if it contains known sites that are difficult or impossible to mitigate. Reviews included BLM and State Historic Preservation Officer (SHPO) record and file searches for known sites in or near each parcel. When BLM receives an APD, a site-specific cultural records review is completed to determine if there is a need for cultural inventory for areas affected by surface-disturbing activities. Cultural resource inventory is required prior to new surface disturbance. All sites that are determined to be historic properties (sites that are listed on or are eligible for listing on the National Register of Historic Places) are avoided or mitigated. If avoidance or mitigation is not possible, proposals may be modified or denied.

BLM field offices must base site specific lease stipulations (such as controlled surface use (CSU) or no surface occupancy (NSO)) and decisions to close areas from leasing on decisions made within RMP. RMPs are updated every 5 to 30 years and may not contain current information. If a decision maker determines a resource is difficult or impossible to mitigate and wishes to apply lease stipulations or exclude the site from leasing, the RMP must be updated, amended, or a maintenance action performed prior to leasing.

The proposed action, sale and issuance of a lease, does not directly result in surface disturbance. Additional environmental analysis and permitting is required prior to development and production of oil and gas resources.

1.6 Identification of Issues and Scoping

It is unknown whether a particular parcel will be sold and a lease issued. It is also unknown when, where, or if future well sites, roads, and facilities might be proposed. Detailed site-specific analysis of activities associated with any particular parcel would occur when a lease holder submits an APD or other application for surface-disturbing activities on the Federal lease. For purposes of issue identification, BLM assumes each parcel would be sold and developed.

Interdisciplinary teams comprised of Worland, Cody, and Lander BLM resource specialists reviewed the proposed action and identified environmental issues.

Issues have been identified based upon a conceptual determination of realistic foreseeable development. These issues are essentially effects on particular resource components.

The Council on Environmental Quality regulations state: “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)). 40 CFR 1500.4(g) directs that the scoping process should be used “not only to identify significant environmental issues deserving of study but also to deemphasize insignificant issues narrowing the scope of the EIS process accordingly.” Significant issues directly influence the initiation, development, and technical design of the proposal; are disclosed in the analysis; and were used to develop alternatives to the proposed action. Issues are significant because of the extent of their geographic distribution, the duration of their effects, or the intensity of interest or resource conflict (BLM 2008).

Non-significant issues are identified as those: 1) outside the scope of the proposed action; 2) already decided by law, regulation, or other higher level decision; 3) unrelated to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence. The Council on Environmental Quality (CEQ) NEPA regulations explain this delineation in Sec. 1501.7, “...identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)...”

Those issues which cannot be dismissed and must be carried forward through analysis in this EA are the following:

How would air quality be impacted?

How will this contribute to greenhouse gas emissions and climate change?

What economic impact would occur?

How would cultural resources, including historic trails, be affected?

Would livestock grazing management be affected?

How would vegetation be affected?

How would paleontological and geological resources be affected?

How would recreation, visual resources, and special designations be affected?

How would segments of streams eligible for wild and scenic river designation be affected?

How would wilderness characteristics be affected?

How would water resources, including surface and subsurface water, be affected?

How would wildlife habitat, including special status species, be affected?

1.7 Issues Considered and Eliminated From Further Analysis

Through resource review and clearance documents, BLM determined the following resources and supplemental authorities are not present in the area potentially affected or they would be affected to a degree that detailed analysis is required:

- Wilderness and Wilderness Study Areas
 - There are no parcels within Wilderness or Wilderness Study Areas.
- Environmental Justice
 - Executive Order 12898 requires Federal agencies to assess projects to ensure there is no disproportionately high or adverse environmental, health, or safety impacts on minority and low income populations. A review of the parcels offered for lease indicates there are no impacts on minority or low-income populations.
- Wastes, Hazardous or Solid
 - There are no identified hazardous or solid waste sites on the parcels addressed in this EA.
- Public Health and Safety
 - Oil and gas development, as well as other industrial use such as mining has been occurring in the WRBBDO for many decades. Due to the industrial safety programs, standards, and state and federal regulations, offering these parcels is not expected to materially increase health or safety risks to humans, wildlife, or livestock. Leasing of the parcels analyzed in this EA would present no new or unusual health or safety issues not covered by existing state and federal laws and regulation.

2 Description of Alternatives, Including Proposed Action

2.1 Introduction

Chapter 2 provides a detailed description of each alternative that will be analyzed in detail, a brief description of alternatives that were considered but not analyzed in detail, and a brief summary of the environmental effects of the proposed action and alternatives.

2.2 Alternative 1 – 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 this case, this would mean that an EOI to lease (parcel nomination) would be denied or rejected, and a lease would not be offered for that parcel.

2.3 Alternative 2 – Proposed Action

Alternative 2 would offer for sale 295 nominated parcels (12 parcels, 8,541.24 acres, in Cody FO), (242 parcels, 458,874.45 acres, in Lander FO), and (41 parcels, 59,053.50 acres, in Worland FO) covering approximately 526,469.19 acres, found in Appendix A, with stipulations consistent with the approved RMPs, and if sold, a lease issued. Oil and gas leases would be issued for a 10-year period and would continue for as long thereafter as oil and gas is produced in paying quantities. If a lessee fails to produce oil and gas, does not make annual rental payments, does not comply with the terms and conditions of the lease, or relinquishes the lease, the lease would terminate.

2.4 Alternative 3 – Modified and Deferred

Alternative 3 adds stipulations to address resource concerns or defers and partially defers offering parcels for sale due to resource conflicts or protection measure not addressed in the approved RMPs. Under this alternative, 32 parcels covering approximately 32,270.05 acres, would be offered for sale and if sold a lease issued (7 parcels covering 5,681.03 acres in Cody FO), (6 parcels covering 3,960.00 acres in Lander FO), and (19 parcels covering 22,629.02 acres in Worland FO). Rationale for deferral includes management actions from the Bighorn Basin Resource Management Plan (BB RMP) Draft Environmental Impact Statement (EIS) (BLM 2011b) and the Lander Field Office Resource Management Plan (LFO RMP) Draft Environmental Impact Statement (EIS). Appendix B lists the parcels offered for sale with applicable lease stipulations for Alternative 3.

Rationale for deferral includes management actions from the Bighorn Basin Resource Management Plan. For reference, Table 2-1 provides the Bighorn Basin resource Management Plan Management Actions and record numbers referred to in Chapters 3 and 4.

Table 2-1 Bighorn Basin Resource Management Plan Management Actions Cited as Deferral Rationale

Record #	Bighorn Basin Resource Management Plan Management Actions Alternative D (Preferred Alternative)
4038	Apply an NSO restriction on wetland areas greater than 20 acres.
4080	Same as Alternative B, except: 130,895 acres of BLM-administered surface land; 253,159 acres of federal mineral estate. a mix of CSU (130,211 acres), TLS (23,096 acres), NSO (14,217 acres), and unavailable for leasing (85,634 acres) on the federal mineral estate areas available for leasing are open to geophysical exploration with stipulation specific resource protection
4082	Apply wildlife seasonal protections for surface-disturbing and disruptive activities to the maintenance and operation of developed projects on a case-by-case basis.
4117	Implement, where appropriate, conservation measures, terms and conditions, BMPs, and reasonable and prudent measures within the existing state programmatic biological opinion for the grizzly bear and in accordance with the Interagency Grizzly Bear Conservation Strategy signed by the BLM in 2006. In cooperation with the Wyoming Game and Fish Department (WGFD), allow exceptions for black bear baiting.
5020	Same as Alternative A, except avoid surface-disturbing activities and protect the foreground of important cultural sites up to 3 miles where setting is an important aspect of the integrity for the site.
5021	Protect the foreground of important cultural sites (see Glossary) up to 3 miles where setting is an important aspect of the integrity for the site. Use BMPs (Appendix L) to avoid or mitigate adverse effects.
5052	VRM class allocations for BLM-administered surface lands are as follows: Class I – 140,954 acres (4.4%) Class II – 638,929 acres (20.0%) Class III – 836,361 acres (26.2%) Class IV – 1,573,357 acres (49.3%) Unclassified – 4,373 acres (0.1%)
6077	Apply a CSU stipulation on the Absaroka Mountain Foothills SRMA and Absaroka ERMA.
6081	Manage the Absaroka Foothills SRMA as VRM Class II. Manage VRM in the Absaroka ERMA consistent with other resource objectives.
7188	Avoid surface-disturbing activities and protect the foreground of National Historic Trails up to 3 miles where setting is an important aspect of the integrity of the trail.
7189	Protect the foreground of National Historic Trails (defined in Glossary) up to 3 miles where setting is an important aspect of the integrity for the trail. Use BMPs (Appendix L) to avoid or mitigate adverse effects.

2.5 Alternatives Considered and Eliminated from Further Analysis

Offering Subject to Standard Lease Terms and Conditions

Offering all nominated parcel with only the lease terms and conditions on the lease form was considered as a means to reduce impediments to oil and gas development on public lands. Such an alternative is not consistent with the approved RMPs where the applicable RMP prescribes stipulations in accordance with FLMPA’s Section 102(8) mandate to manage the public lands to protect resource values. Therefore this alternative was not analyzed in detail.

Deferral of all Parcels within Greater Sage-Grouse Core Areas

Deferring all parcels within Greater sage-grouse Core Areas was considered but eliminated from detailed analysis as it is within the range of alternatives analyzed in detail.

3 Affected Environment

3.1 Introduction

This section describes the environment that could be affected by implementation of the alternatives described in Section 2, above. Aspects of the affected environment described in this section focus on relevant major resources and issues to determine if a significant impact may occur. Only those aspects of the affected environment that are potentially impacted are described in detail. All parcels were reviewed against the Greater Sage-Grouse key habitat requirements in BLM Wyoming IM WY-2010-013, and against the lands with wilderness characteristics (LWC) requirements in BLM Washington Office (WO) IM 2011-077, and against the Master Leasing Plan (MLP) requirements in WO IM 2010-117 and the approved BLM Wyoming Leasing Reform Implementation Plan.

Parcels WY-1208- 143, 144, 159, 160, 167 - 174, 201, 202, 210 - 218, 243, 244, 246, 253 – 258, 274, 275, 280, 281, 282, are located in the Beaver Rim area identified in the Lander Field Office (LFO) draft Resource Management Plan for MLP development. These parcels would be deferred under Alternative 3 recommendations pending completion of the MLP analysis through the LFO Draft RMP revision. See Appendix F for the MLP screen for all parcels in accordance with WO IM 2010-117.

3.2 General Setting

Cody Field Office

The CYFO encompasses 2.2 million acres of the Big Horn Basin in north central Wyoming and includes portions of Park and Big Horn counties and is bordered by the Shoshone and Bighorn National Forests. CYFO manages 1.1 million acres of public land and 1.5 million acres of federal mineral estate within this area.

Lander Field Office

The LFO encompasses 6.6 million acres in central Wyoming and includes most of Fremont County, the southwest corner of Natrona Country, and small portions of Carbon, Sweetwater and Hot Springs counties. Of the 6.6 million acres, 2.4 million acres are public lands managed by the BLM. The LFO also manages approximately 2.7 million acres of federal mineral estate.

Approximately 2.2 million acres of the planning area are within the Wind River Indian Reservation (WRIR). The BLM has a fiduciary trust responsibility for the management of minerals on the WRIR. The BLM does not make land management decisions for the WRIR, and duties associated with trust responsibilities are performed independent of the provisions of the Lander RMP.

Worland Field Office

The WFO encompasses 3.4 million acres. This area includes Big Horn, Hot Springs, and Washakie counties. The WFO manages over 2 million acres of public land and 2.7 million acres of federal mineral estate.

3.3 Resources Brought Forward for Analysis

3.3.1 Air Quality and Climate Change

Air Quality

The Clean Air Act Amendment of 1970 established National Ambient Air Quality Standards (NAAQS) to protect public health and welfare. The environmental protection agency (EPA) continues to define and set NAAQS. Ambient air is that which is accessible to the public. National air quality health standards have been set for pollutants called “criteria pollutants.” These include ozone, particulates, sulfur dioxide, nitrogen dioxide, carbon monoxide and lead. The Wyoming Department of Environmental Quality (WDEQ) has set standards for these criteria pollutants also called Wyoming Ambient Air Quality Standards (WAQQS).

The State of Wyoming has determined through available monitoring that the area is in compliance with WAAQs and NAAQs. The counties that lie within the jurisdictional boundaries of the WRBBDO are classified as in attainment of all state and national ambient air quality standards as defined in the Clean Air Act of 1977, as amended. Modeling conducted to date by the WDEQ does not indicate that air quality is likely to exceed any limits specified by the Clean Air Act in the near future.

Various state and federal agencies monitor air pollutant concentrations, visibility, and atmospheric deposition throughout Wyoming, and there are four monitors in the Lander planning area (Lander, South Pass, South Pass City, and Sinks Canyon). The WDEQ operates a PM_{2.5} monitor as part of the State and Local Monitoring Site (SLAMS) network in Lander. The SLAMS monitor at South Pass measures ozone, nitrous oxides, PM₁₀, and SO₂. A new air quality monitoring station is being established in the Frenchie Creek area. The USFS operates an IMPROVE monitor in the North Absaroka Wilderness Area in Park County and another IMPROVE monitor is operated at Pinedale in neighboring Sublette County. The Sinks Canyon and South Pass City monitors, which the BLM operates as part of the National Acid Deposition Program (NADP), measure atmospheric deposition (wet) of NH₄⁺, sulfate (SO₄), and various metals.

A monitoring station is being established in the Frenchie Creek 1 area. Air quality, visibility, and atmospheric deposition are monitored throughout Wyoming, including adjacent planning areas.

The WDEQ operates a PM₁₀ monitor as part of the State and Local Monitoring Site (SLAMS) network in Cody, Wyoming (Park County). Additional SLAMS and Special Purpose Monitoring (SPM) sites operate in nearby counties. Nearby monitoring sites include several IMPROVE monitors and BLM administered sites that are part of the Wyoming Air Resource Monitoring System (WARMS). Atmospheric deposition (wet) measurements of ammonium, sulfate, and various metals are taken at the Sinks Canyon, South Pass and Yellowstone Park sites, which the BLM operates as part of the National Acid Deposition Program (NADP).

There are two existing air quality monitors in the Cody area (Cody/PM₁₀ and North Absaroka/IMPROVE). Air quality, visibility, and atmospheric deposition are monitored throughout Wyoming, including adjacent planning areas.

The examination of these data indicates that the current air quality for criteria pollutants in the planning area is considered good overall. Based on measurements within the area, visibility in the planning area is considered excellent.

Climate Change

The climate in the WRBBDO is designated as a combination of Intermountain Semi - desert and Southern Rocky Mountain Steppe. With the exception of the mountain areas, the local climate of this area can be described as a semiarid, continental cold desert climate. The mountains have a sub humid continental climate. Temperatures can range from winter lows of almost -50° Fahrenheit (F) to summertime highs of in excess of 100° (F) with annual air temperatures on the sagebrush-covered rangelands average 33 to 45° (F) and, on forested mountain areas, 33 to 38° (F). The Big Horn Basin is bounded on the northeast by the Pryor Mountains, on the east by the Big Horn Mountains, on the south by Owl Creek and Bridger and Washakie Ranges, on the west by the Absaroka Mountains, and open to the north into Montana. Summers are generally hot and short, and winters long and cold. Precipitation is generally low, though greater at higher elevations, and is generally evenly distributed across the year, with the exception of the drier summer months. Wind speeds are variable and generally strong.

Climate change refers to any significant change in measures of climate (e.g., temperature or precipitation) lasting for an extended period of time (decades or longer). Climate change may result from natural processes, such as changes in the sun's intensity; natural processes within the climate system (such as changes in ocean circulation); human activities that change the atmosphere's composition (such as burning fossil fuels) and the land surface (such as urbanization) (IPCC 2007).

Greenhouse gases that are included in the US Greenhouse Gas Inventory are: carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF₆). CO₂ and methane (CH₄) are typically emitted from combustion activities or are directly emitted into the atmosphere. On-going scientific research has identified the potential impacts of greenhouse gas emissions (including CO₂; CH₄; nitrous oxide (N₂O), water vapor; and several trace gasses) on global climate. Through complex interactions at regional and global scales, these greenhouse gas emissions cause a net warming effect of the atmosphere (which making makes surface temperatures suitable for life on Earth), primarily by decreasing the amount of heat energy radiated by the Earth back into space.

Although greenhouse gas levels have varied for millennia (along with corresponding variations in climatic conditions), recent industrialization and burning of fossil carbon sources have caused CO₂ concentrations to increase dramatically, and are likely to contribute to overall climatic changes, typically referred to as global warming. Increasing CO₂ concentrations also lead to preferential fertilization and growth of specific plant species.

Global mean surface temperatures have increased nearly 1.0°C (1.8°F) from 1890 to 2006 (Goddard Institute for Space Studies, 2007). However, observations and predictive models indicate that average temperature changes are likely to be greater in the Northern Hemisphere. Data indicates that northern latitudes (above 24° N) have exhibited temperature increases of nearly 1.2°C (2.1°F) since 1900, with nearly a 1.0°C (1.8°F) increase since 1970 alone. It also shows temperature and precipitation trends for the conterminous United States. For both parameters we see varying rates of change, but overall increases in both temperature and

precipitation. Without additional meteorological monitoring systems, it is difficult to determine the spatial and temporal variability and change of climatic conditions, but increasing concentrations of greenhouse gases are likely to accelerate the rate of climate change.

In 2001, the Intergovernmental Panel on Climate Change (IPCC) indicated that by the year 2100, global average surface temperatures would increase 1.4 to 5.8°C (2.5 to 10.4°F) above 1990 levels. The National Academy of Sciences (2006) has confirmed these findings, but also indicated that there are uncertainties regarding how climate change may affect different regions. Computer model predictions forecasts indicate that increases in temperature will not be evenly or equally distributed, but are likely to be accentuated at higher latitudes. Warming during the winter months is expected to be greater than during the summer, and increases in daily minimum temperatures is more likely than increases in daily maximum temperatures.

Currently, the WDEQ does not have regulations regarding greenhouse gas emissions, although these emissions are regulated indirectly by various other regulations. Some greenhouse gases such as carbon dioxide occur naturally and are emitted to the atmosphere through natural processes and human activities. Other greenhouse gases (e.g., fluorinated gases) are created and emitted solely through human activities. The primary greenhouse gases that enter the atmosphere as a result of anthropogenic activities include carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), and fluorinated gases such as hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. These synthetic gases are powerful GHGs that are emitted from a variety of industrial processes.

Ongoing scientific research has identified the potential impacts of anthropogenic greenhouse gas (GHG) emissions and changes in biological sequestration due to land management activities on global climate. Through complex interactions on a regional and global scale, these GHG emissions and net losses of biological carbon sinks cause a net warming effect of the atmosphere, primarily by decreasing the amount of heat energy radiated by the earth back into space. Although GHG levels have varied for millennia, recent industrialization and burning of fossil carbon sources have caused CO₂ concentrations to increase dramatically, and are likely to contribute to overall global climatic changes. The IPCC recently concluded that “warming of the climate system is unequivocal” and “most of the observed increase in globally average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations.”

Several activities contribute to the phenomena of climate change, including emissions of GHGs (especially carbon dioxide and methane) from fossil fuel development, large wildfires and activities using combustion engines; changes to the natural carbon cycle; and changes to radiative forces and reflectivity (albedo). It is important to note that GHGs will have a sustained climatic impact over different temporal scales. For example, recent emissions of carbon dioxide can influence climate for 100 years. In contrast, black carbon is a relatively short-lived pollutant, as it remains in the atmosphere for only about a week. It is estimated that black carbon is the second greatest contributor to global warming behind CO₂ (Ramanathan and Carmichael, 2008). The lack of scientific tools designed to predict climate change at regional or local scales limits the ability to quantify potential future impacts. However, potential impacts to air quality due to climate change are likely to be varied. Several activities occur within the planning area that may generate greenhouse gas emissions: oil, gas, and coal development, large fires, livestock grazing, and recreation using combustion engines which can potentially generate CO₂ and CH₄. Some

activities within the WRBBDO generate greenhouse gas (GHG) emissions. Oil and gas development activities can generate CO₂ CH₄. CO₂ emissions result from the use of combustion engines, while methane can be released during processing. Wildland fires also are a source of other GHG emissions, while livestock grazing is a source of methane. Other activities in the area with the potential to contribute to climate change include soil erosion from disturbed areas and fugitive dust from roads, which have the potential to darken snow - covered surfaces and cause faster snow melt. A description of the potential greenhouse gas emissions associated with the proposed leasing activities is included in Chapter 4.

There are several National Parks, National Forests, recreation areas, and wilderness areas in or adjacent to the Big Horn Basin. National Parks, Monuments and some state designated Wilderness Areas are designated as Class I. The Clean Air Act “declares as a national goal the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I Federal areas . . . from manmade air pollution.” 42 U.S.C. § 7491(a) (1).25. Under the BLM Manual Section 8560.36, BLM lands, including wilderness areas not designated as Class I, are managed as Class II, which provides that moderate deterioration of air quality associated with industrial and population growth may occur.

3.3.2 Socioeconomics

Local communities depend heavily upon oil, gas, and mining activities. Agriculture and tourism also support local economies. The State of Wyoming receives a percentage of the lease sales receipts as well as a portion of the royalties should a lease begin production. Furthermore, the county where the lease is located receives monies from the State of Wyoming’s allocation.

3.3.3 Cultural Resources

In accordance with the Wyoming State Protocol Appendix B.2, issuance of leases is exempt from Class III inventory. Prior to conducting surface disturbance on these parcels a Class III cultural resource inventory would be completed.

Cultural resource studies indicate that the general area has been occupied for at least 12,000 years and additional cultural resource sites should be anticipated within the parcels.

The Wind River / Bighorn Basin District archaeologists gathered and evaluated existing cultural and historic resource data and determined there were no cultural features identified that would require Native American consultation as directed in BLM Handbook H-8120 for Native American Consultation.

3.3.3.1 Cody

The lease parcels within the Cody FO contain seventeen (17) known cultural sites. Five (5) of the sites are not eligible for the National Register of Historic Places, three (3) of the sites are eligible for the National Register of Historic Places, and nine (9) are unevaluated. These cultural resources include prehistoric rock art sites, prehistoric open camps, prehistoric lithic scatters, prehistoric stone circle sites, historic roads and trails, historic irrigation ditches and historic mines, and historic oil fields.

In addition, the Nez Perce National Historic Trail is located within close proximity to parcels WY-1208-391, 392, 393, and 394. Also, parcels WY-1208-385, 386, 387, 390, and 392 are

located within close proximity to regionally important Bridger & Fort Washakie to Red Lodge historic trails.

3.3.3.2 Lander

The lease parcels within the Lander FO contain hundreds of known cultural sites, some of which are eligible or unevaluated for the National Register of Historic Places (NRHP). These properties include prehistoric rock art sites, rock shelters, vision quest sites, stone circles, cairns, rock alignments, open camps and lithic scatters, regional historic trails, historic ranches and cabins, historic inscriptions, historic oil fields, railroads, canals, mines, transmission and telegraph lines, and historic debris. In addition, the Oregon, Mormon Pioneer, California, and Pony Express National Historic Trails are located within the main block of the leases being reviewed, and these trails cross many of the lease parcels and are close to many others.

3.3.3.3 Worland

The lease parcels within the Worland FO contain two hundred fourteen (214) known cultural sites. Twenty-nine (29) of the sites are eligible for the National Register of Historic Places and forty (40) are unevaluated for a total of sixty-nine (69) historic properties. The site types identified include prehistoric open camps, prehistoric lithic scatters, prehistoric stone circle sites, prehistoric quarries, historic roads and trails, historic debris, and historic irrigation ditches.

3.3.4 Livestock Grazing Management

Appendix E lists the allotment numbers and names containing nominated parcels.

3.3.4.1 Cody

The proposed action occurs in 16 allotments in the CYFO area. These allotments are permitted for various grazing seasons and types of livestock.

3.3.4.2 Lander

The proposed action occurs in 84 allotments in the LFO area. These allotments are permitted for various grazing seasons and types of livestock.

3.3.4.3 Worland

The proposed action occurs in 24 allotments in the WFO Area. These allotments are permitted for various grazing seasons and types of livestock.

3.3.5 Vegetation (Including Invasive Species and T&E Plant Species)

3.3.5.1 Cody

Upland Vegetation:

The lease areas consists of loamy, shallow loamy, sandy, shallow sandy, gravelly, shale, saline upland and saline lowland range sites all in the 5 to 9 inch precipitation zone. When loamy, shallow loamy, sandy, shallow sandy and gravelly range sites are near potential, they are dominated by mid-sized cool season bunchgrass species such as bluebunch wheatgrass, needle-and-thread grass and Indian ricegrass. Other major species expected are western wheatgrass and

shrubs such as big sagebrush. However, historic grazing has resulted in changing portions of these sites from their potential to sites dominated by blue grama, threadleaf sedge, cactus and sagebrush. These sites are difficult to return back to their original state except through proper grazing management and mechanical treatment. Some areas have completely or almost completely lost their native perennial vegetation which has been replaced by halogeton. Sandy range sites are very unstable when the cover created by the vegetation is reduced or the species composition is shifted to species that have shallower root systems.

Shale range sites near the proposed parcels are dominated by Gardner's saltbush, squirreltail and western wheatgrass. Historic grazing practices have resulted in reducing or eliminating the squirreltail and Gardner's saltbush in some of these sites in favor of Sandberg's bluegrass and birdfoot sage.

When saline upland range sites are near potential, they are dominated by Gardner's saltbush and are subdominated by squirreltail, Indian ricegrass and western wheatgrass. There are many areas within the lease areas that reflect this potential. Historic grazing has resulted in reducing or eliminating squirreltail and Indian ricegrass from some of these sites resulting in increases in Sandberg's bluegrass and cactus. On these sites, the Gardner's saltbush is retained, but in some sites the Gardner's saltbush has been replaced in whole or in part by birdfoot sagebrush.

Saline lowland range sites are largely found along Dry Creek. When these sites are near their potential they are dominated by alkali sacaton, basin wildrey, western wheatgrass and greasewood. Other species associated with these sites include squirreltail, indian ricegrass, sandberg bluegrass, Canada wildrye, inland saltgrass, mat muhly, blue grama, shadscale and rubber rabbitbrush. Other species found include cottonwood, coyote willow, saltcedar and Russian olive. The sites found within the analysis area are created by produced water, largely from the Oregon Basin oil field.

Invasive, Non-Native Plant Species:

Invasive, non-native plant species, including State of Wyoming Designated Noxious Weeds, may be present in or near the proposed lease parcels. Cheatgrass, an invasive, non-native annual grass species is becoming more prevalent in the Cody Field Office and is likely present in or near all of the proposed lease parcels. Other invasive, non-native annual broad-leaved plants such as halogeton, Russian thistle, etc. and/or State of Wyoming Designated Noxious Weeds may also be present. Invasive, non-native plant species that are present in or near riparian-wetland habitat are listed by parcel in the Riparian-Wetland Vegetation Section below.

Riparian-Wetland Vegetation:

Riparian-wetland vegetation is present within, adjacent to, and/or down gradient from the proposed lease parcels as follows:

Parcel WY-1208-268

Riparian-wetland vegetation is present within the parcel along Dry Creek and down gradient from the parcel along Dry Creek and the Bighorn River. Some riparian vegetation is also found along Little Dry Creek. Vegetation associated with these riparian-wetland areas includes narrow-leaf and/or Plains cottonwood, silver buffaloberry, Wood's rose, skunkbush sumac, snowberry, and various species of willows, currents, cattails, bulrushes, sedges, rushes, grasses,

and forbs. Russian olive, salt cedar, and other Wyoming State Noxious Weed species, i.e., Canada thistle, are also present.

Parcel WY-1208-325

Riparian-wetland areas are present within the parcel along Dry Creek and down gradient from the parcel along Dry Creek and the Bighorn River. Vegetation associated with these riparian-wetland areas includes narrow-leaf and/or Plains cottonwood, silver buffaloberry, Wood's rose, skunkbush sumac, snowberry, and various species of willows, currents, cattails, bulrushes, sedges, rushes, grasses, and forbs. Russian olive, salt cedar, and other Wyoming State Noxious Weed species, i.e., Canada thistle, are also present.

Parcel WY-1208-385

Riparian-wetland areas are present down gradient from the parcel along Polecat Creek, Little Polecat Creek, the Frannie Canal, and the Shoshone River. Vegetation associated with these riparian-wetland areas includes narrow-leaf and/or Plains cottonwood, silver buffaloberry, Wood's rose, skunkbush sumac, snowberry, and various species of willows, currents, cattails, bulrushes, sedges, rushes, grasses, and forbs. Russian olive, salt cedar, and other Wyoming State Noxious Weed species, i.e., Canada thistle, are also present.

Parcel WY-1208-386

Riparian-wetland areas are present down gradient from the parcel along Polecat Creek, Little Polecat Creek, the Frannie Canal, and the Shoshone River. Vegetation associated with these riparian-wetland areas includes narrow-leaf and/or Plains cottonwood, silver buffaloberry, Wood's rose, skunkbush sumac, snowberry, and various species of willows, currents, cattails, bulrushes, sedges, rushes, grasses, and forbs. Russian olive, salt cedar, and other Wyoming State Noxious Weed species, i.e., Canada thistle, are also present.

Parcel WY-1208-387

Riparian-wetland areas are present down gradient from the parcel along Mantua Creek and the Shoshone River. Vegetation associated with these riparian-wetland areas includes narrow-leaf and/or Plains cottonwood, silver buffaloberry, Wood's rose, skunk bush sumac, snowberry, and various species of willows, currents, cattails, bulrushes, sedges, rushes, grasses, and forbs. Russian olive, salt cedar, and other Wyoming State Noxious Weed species, i.e., Canada thistle, are also present.

Parcel WY-1208-388

Riparian-wetland areas are present down gradient from the parcel along Bitter Creek and most unlined irrigation canals, drainage ditches, and other poorly drained areas. Vegetation associated with these riparian-wetland areas includes narrow-leaf and/or Plains cottonwood, silver buffaloberry, Wood's rose, skunk bush sumac, snowberry, and various species of willows, currents, sedges, rushes, grasses, and forbs. Russian olive, salt cedar, and other Wyoming State Noxious Weed species, i.e., Canada thistle, are also present.

Parcel WY-1208-389

Riparian-wetland areas are present within and down gradient from the parcel along Bitter Creek and most unlined irrigation canals, drainage ditches, and other poorly drained areas. Vegetation associated with these riparian-wetland areas includes narrow-leaf and/or Plains cottonwood,

silver buffaloberry, Wood's rose, skunk bush sumac, snowberry, and various species of willows, currents, sedges, rushes, grasses, and forbs. Russian olive, salt cedar, and other Wyoming State Noxious Weed species, i.e., Canada thistle, are also present.

Parcel WY-1208-390

Riparian-wetland areas are present within and down gradient from the parcel along Big Sand Coulee and its tributaries and along the Clarks Fork of the Yellowstone River. Vegetation associated with these riparian-wetland areas includes narrow-leaf cottonwood, silver buffaloberry, Wood's rose, skunk bush sumac, snowberry, and various species of willows, currents, cattail and bulrush, sedges, rushes, grasses, and forbs. Several Wyoming State Noxious Weed species such as Russian olive, salt cedar, and Canada thistle are also present.

Parcel WY-1208-391

Riparian-wetland areas are present within the parcel along the Kelly Irrigation Ditch and on about 3 acres of sub-irrigated wetland along Bennett Creek. Riparian-wetland areas are also present down gradient from the parcel along the Clarks Fork of the Yellowstone River and Bennett Creek. Vegetation associated with these riparian-wetland areas includes narrow-leaf and Plains cottonwood, waterbirch, silver buffaloberry, red osier dogwood, Wood's rose, skunk bush sumac, and various species of willows, currents, sedges, rushes, grasses, and forbs. Russian olive and other Wyoming State Noxious Weed species such as common burdock and hound's tongue are also present.

Parcel WY-1208-392

Riparian-wetland areas are limited within the parcel to irrigation ditches and associated moist areas and are present down gradient from the parcel along the Clarks Fork of the Yellowstone River and Line Creek. Vegetation associated with these riparian-wetland areas includes narrow-leaf and Plains cottonwood, silver buffaloberry, Wood's rose, skunk bush sumac, snowberry, and various species of willows, currents, sedges, rushes, grasses, and forbs. Salt cedar, Russian olive and other Wyoming State Noxious Weed species such as common burdock and hound's tongue are also present.

Parcel WY-1208-393

Riparian-wetland areas are present within the parcel along Little Rock Creek and an unnamed irrigation ditch. Riparian-wetland areas are also present down gradient from the parcel along Little Rock Creek, Bennett Creek, the Bennett Irrigation Ditch, and the Clarks Fork of the Yellowstone River. Vegetation associated with these riparian-wetland areas includes narrow-leaf and Plains cottonwood, alder, waterbirch, silver buffaloberry, red osier dogwood, Wood's rose, skunk bush sumac, snowberry, and various species of willows, currents, sedges, rushes, grasses, and forbs. Several Wyoming State Noxious Weed species such as leafy spurge and Canada thistle are also present.

Parcel WY-1208-394

Riparian-wetland areas are present within and down gradient from the parcel along the Clarks Fork of the Yellowstone River. Vegetation associated with riparian-wetland areas along the Clarks Fork includes narrow-leaf cottonwood, silver buffaloberry, Wood's rose, skunk bush sumac, snowberry, and various species of willows, currents, sedges, rushes, grasses, and forbs.

Several Wyoming State Noxious Weed species such as Russian olive, salt cedar, common burdock, hound's tongue and Canada thistle are also present.

3.3.5.2 Lander

The major vegetation communities in the parcel areas are mapped as Wyoming Big sagebrush, and Desert shrub, followed by Juniper woodland, Limber pine woodland and scrub, lodgepole pine, saltbrush fans and flats, Shrub dominated riparian type with some Graminoid / forb riparian and Greasewood fans and flats.

The majority of the proposed parcels are located in the southern portion of the LFO. The parcels occupy predominantly Wyoming big sagebrush bunchgrass communities including shrubland steppe types on uplands and slopes. Topography is variable and ranges from gentle rolling uplands, broken and hilly terrain and badlands dissected by drainages.

BLM Sensitive plant species habitat is found on nearly all of the parcels with the exception of parcels WY-1202-256, 257, 258 and 260, 261, 262. The two most common sensitive plant species are Persistent Sepal Yellowcress (*Rorippa calycina*) and Owl Creek Miner's Candle (*Cryptantha subcapitata*). A few of the other sensitive species that could occur in this area include Porter's Sagebrush (*Artemisia porteri*), Cedar Rim Thistle (*Cirsium aridum*), Beaver Rim Phox (*Phox pungens*) and Meadow pussytoes (*Antennaria arcuata*).

The LFO contains habitat for three threatened or endangered plant species including; the Blowout Penstemon (*Penstemon haydenii*), Ute's ladies-tresses (*Spiranthes diluvialis*) and Yermo (*Yermo xanthocephalus*). Parcels WY-1208- 133, 139, 141, 146, and 155 contain habitat that may support the endangered Blowout Penstemon. Parcels WY-1208-094 and 095 contain habitat that may support the threatened Ute's ladies-tresses. Parcels WY-1208-252, 282 and 283 contain populations of or critical habitat for the threatened Yermo.

3.3.5.3 Worland

The primary native vegetation communities in the parcel areas are mapped as Dryland Crops, Irrigated Crops, Forest dominated riparian, Limber pine woodland and scrub, Mountain big sagebrush, Douglas Fir, Aspen Forest, Wyoming Big Sagebrush, Juniper Woodland, Annual Brome/Exotic Brome, Saltbush Fans and Flats, Shrub dominated riparian, and Desert Shrub. Vegetation associated with these communities was identified during site visits to the parcels. This vegetation includes Western wheatgrass, Bluebunch wheatgrass, Sandberg bluegrass, Green needlegrass, Indian ricegrass, needleandthread, Phlox, Woody aster, Wyoming big sagebrush, Rubber rabbitbrush, saltbush, Greasewood and Juniper. Blue gramma and Prickly pear cactus was also documented. Downy brome was documented on the sites at various levels of dominance.

Several species of noxious weeds have been documented within the lease area. Currently inventoried species include Spotted and Russian knapweed, hoary cress, Russian olive, Canada thistle, tamarisk, perennial pepperweed, and musk thistle. Although noxious weed inventory and treatment has occurred in portions of the lease area, it is likely that additional infestations exist that have yet to be discovered.

No threatened, endangered, or BLM Sensitive plant species occur within these areas.

3.3.6 Paleontology and Geology

The BLM utilizes the Potential Fossil Yield Classification (PFYC) system to classify the potential to discover or affect important paleontological resources. The PFYC system is intended to help determine proper mitigation approaches for surface-disturbing activities, disposal or acquisition actions, recreation possibilities or limitations, and other BLM-approved activities. The PFYC system also highlights areas likely to be a focus of paleontological research efforts or illegal collecting. There are five classes of potential fossil yield, ranging from Class 1, “No Potential,” to Class 5, “Very High Potential,” for vertebrate or scientifically important paleontological resources.

3.3.6.1 Cody

The 12 parcels nominated for the August 2012 sale within the CYFO are situated on outcrops of geologic formations such as the Paleocene Fort Union (PFYC3-5), Eocene Willwood (PFYC=5), and Cretaceous Lance (PFYC=5), Meeteetse (PFYC=4-5), and Mesa Verde (PFYC=3-5) formations, as well as on alluvial and terrace deposits (PFYC = 2). Each of the parcels nominated for this sale contain some areas of PFYC 5 (very high potential for vertebrate or scientifically significant paleontological resources) within their boundaries.

Parcel numbers 268, 325, 389, 390, 391, 392, 393 and 394 all contain areas where the Willwood Formation crops out. Parcel 390 is situated on areas of the Paleocene-Eocene Thermal Maximum (PETM) zone/ACEC, further discussed below. Parcels numbers 268 and 388 both contain areas of Fort Union Formation; and Parcel numbers 385 and 386 contain areas of Lance Formation. Parcel number 387 is situated on the Mesa Verde Formation.

Parcel WY-1208-390

Current scientific research is focused on the PETM stratigraphic zone, which provides important data about paleoclimate in the Big Horn Basin. This zone is located at the geologic contact between the Paleocene Fort Union and Eocene Willwood formations.

The PETM Area of Critical Environmental Concern (ACEC) is being evaluated in the BB RMP Draft EIS under Alternative D – the Preferred Alternative.

This parcel is located within the proposed PETM ACEC and covers a portion of the surface expression of the contact between the two formations of the PETM boundary. The beds in the lower Willwood Formation are known as “Wasatchian-zero” or Wa-0. This contact and adjacent area is considered internationally important to geologists, paleo-climatologists and paleontologists studying this time period.

In addition, the colorful badlands and erosional forms representative of this zone provide scenic values and natural systems that coupled with the paleontological and geochemical values, considered as “rare geologic features”.

3.3.6.2 Lander

The lease parcels within the Lander FO contain 17 surface formations (Bridger, Cloverly, Cody Shale, Crooks Gap Conglomerate, Fort Union, Frontier, Gallatin Limestone, Green River, Lance, Meeteetse, Mesaverde, Morrison, Mowry Shale, Sundance, Wagon Bed, Wasatch, White River, Wind River, alluvium and colluvium, dune sand and loess, Granitic rocks, and Miocene rocks).

These formations have PFYC (Potential Fossil Yield Classification) ratings ranging from 1 (very low) to 5 (very high), meaning the formations have a very low to very high potential for containing vertebrate fossils and/or scientifically significant nonvertebrate fossils. 122 of Lander FO's parcels contain formations with PFYC ratings of 5, and several additional parcels contain formations with PFYC ratings of 3 (moderate). One significant fossil locality is currently known in parcels 280, 281, 320, and 322 within the Wagon Bed, White River, and Wind River Formations. Although no other fossil localities are currently known within the parcels, significant fossils are known to occur within the majority of the formations.

3.3.6.3 Worland

Five surface formations are present within the lease parcels in the Worland FO. The formations have a PFYC (Potential Fossil Yield Classification) rating ranging from 2 or low to 5 or very high, meaning the formations have a low to very high sensitivity for paleontological resources. Significant fossil localities for plants, invertebrates, and vertebrates are known within many of these formations. The lease parcels within the Worland FO contain one hundred eighty-three (183) recorded paleontological localities.

3.3.7 Recreation, Visual Resources, Lands with Wilderness Characteristics, and Special Designations

The parcels are located on BLM-administered public lands managed under Special Recreation Management Area (SRMA) and Extensive Recreation Management Area (ERMA) objectives. BLM management within a SRMA elevates recreational related resources and associated uses and opportunities to a high priority to meet the objectives to maintain and enhance the desired recreational settings, opportunities, experiences, and beneficial outcomes.

Visual Resource Management objectives (VRM Class) are determined during the land use period, which analyzes the visual resource inventory (VRI) classes derived from inventorying and rating the scenic quality, sensitivity levels, and distance zones against all BLM management actions.

VRM Class II objectives are to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

VRM Class III objectives are to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

VRM Class IV objectives are to provide for management activities which require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

Wilderness Characteristics are resource values that include naturalness, outstanding opportunities for solitude, and outstanding opportunities for primitive and unconfined recreation. Areas evaluated for wilderness characteristics generally occur in undeveloped locations 5,000

contiguous acres and greater, or of sufficient size to be practical to manage for these characteristics.

The BLM Land Use Planning Handbook (H.1601-1) states that the BLM must consider the management of lands with wilderness characteristics during the land use planning process. The criteria used to identify these lands are essentially the same criteria used for determining wilderness characteristics for wilderness study areas (WSA). However, the authority set forth in Section 603(a) of FLPMA to complete the three part wilderness review process (inventory, study, and report to Congress) expired on October 21, 1993; therefore, FLPMA does not apply to new WSA proposals and consideration of new WSA proposals on BLM-administered public lands is no longer valid. As mandated by FLPMA, Section 201, the BLM is still required to maintain and inventory of BLM-administered public lands to determine whether they possess wilderness characteristics, and analyzed for wilderness management as per FLPMA Section 202.

3.3.7.1 Cody

WY-1208- – 268, 325, 385, 386, 387, 388, 389, 390

These parcels are located within the general Extensive Recreation Management Area (ERMA) for the CyFO area. VRM is Class III and IV. Vehicles are limited to existing roads and trails. General recreational uses include hunting, driving for pleasure, sightseeing, and wildlife viewing. A portion of parcels 268 and 325 lie within the Little Dry Creek LWC.

WY-1208-391, 392

The parcels are located within the general ERMA for the CYFO area. VRM is Class II. Vehicles are limited to existing roads and trails. General recreational uses include hunting, driving for pleasure, sightseeing, wildlife viewing. The checkerboard land pattern and limited legal public access routes limit the availability of the land to the general public unless they have obtained permission to cross private lands to access public lands.

WY-1208-393

The parcel is located within the general ERMA for the CYFO area. VRM is Class II. Vehicles are limited to existing roads and trails. General recreational uses include hunting, driving for pleasure, sightseeing, and wildlife viewing.

WY-1208-394

The parcel is located within the Rivers SRMA. It is a river tract parcel which has an NSO requirement. VRM is Class II. Vehicles are limited to existing roads and trails until an activity plan is done which would limit vehicles to designated roads and trails. The parcel also contains a segment that is considered to be eligible under Wild-and-Scenic-River criteria that is currently being evaluated in the Bighorn Basin RMP revision, however, the segment in question is preliminarily found to be not suitable. General recreational uses include hunting, driving for pleasure, sightseeing, wildlife viewing, fishing and floating.

3.3.7.2 Lander

For purpose of this environmental assessment the key issues associated with the alternatives are 1) ensuring compliance with existing VRM classes by placing adequate leasing stipulations on parcels within VRM classes 1 and 2, and 2) Identifying the impact of lease(s) that intersect areas

identified as Visual Resource Management Class I or II in the preferred alternative of the LFO Draft RMP and EIS.

The table below shows the varying visual resource classes and the acreage of the class within existing management and the preferred alternative.

Class	Acres of VRM Class	
	Existing Management	Preferred Alternative
VRM I	57376	59716
VRM II	202284	743836
VRM III	221896	893910
VRM IV	1,910,475	694568

3.3.7.3 Worland

Recreation

Nearly all of the lease parcels are located within BLM-administered public lands that are not designated as recreation management area (RMA). Public lands that are not designated as RMAs are managed to meet basic recreation and visitor services and resource stewardship needs. Although recreation is not emphasized within these areas, activities and opportunities are recognized and occur, primarily hunting, fishing, 4-wheel and ATV use, driving for pleasure, hiking, rock hounding, sightseeing, wildlife viewing, and general dispersed recreation. The recreation settings character range from middle country to rural.

Seven lease parcels are located within BLM-administered public lands managed as a Special Recreation Management Area (SRMA), where the existing or proposed recreation opportunities and recreation setting characteristics are recognized for their unique value, importance and/or distinctiveness, especially as compared to other areas used for recreation. SRMAs are managed to protect and enhance a targeted set of identified desired activities, experiences, benefits, and recreation setting characteristics. Within SRMAs, recreation management is recognized as the predominant management focus, where specific recreation opportunities and recreation setting characteristics are managed and protected on a long-term basis. Two SRMAs are identified that intersect with the lease parcels.

Badlands SRMA

Lease parcels WY-1208-230 and WY-1208-267 are located within the Badlands SRMA. The Badlands SRMA contains a highly scenic and erratic landscape composed of deep drainages, dominant mesas, and rugged, multi-banded colored hoodoos, complimented by thousands of acres of public accessible lands and three Wilderness Study Areas. This area is popular for dispersed wildland recreational opportunities such as hunting, hiking, sightseeing, wildlife viewing, nature study, touring for pleasure, ATV and 4-wheel drive touring, rock hounding, and camping. SRMA management is primarily to enhance access into the Badlands to meet the desired goals, experiences, and beneficial outcomes, and to maintain or enhance the desired back to middle country settings. The Gooseberry Interpretive Trail, located off of State Highway 431, is a developed interpretive trail which allows users to explore the dramatic landscape and introduces recreation users to this highly interesting landscape.

The area's natural resource recreation settings have been identified as semi-primitive motorized (middle country), with some areas containing back country settings. The following table describes the physical, social, and operational settings observed within the SRMA.

	Back Country	Middle Country Settings
Physical - Qualities of the Landscape		
Remoteness		Within ½ mile of four-wheel drive vehicle, ATV and motorcycles routes.
Naturalness		Character of the natural landscape retained. A few modifications contrast with character of the landscape (e.g. fences, primitive roads).
Visitor Facilities		Maintained and marked trails, simple trailhead developments and basic toilets.
Social - Qualities Associated with Use		
Contacts	3-6 encounters/day off travel routes (e.g., campsites) and 7-15 encounters/day on travel routes.	
Group Size	4-6 people per group.	
Evidence of Use	Areas of alteration uncommon. Little surface vegetation wear observed. Sounds of people infrequent.	
Operational - Conditions Created by Management and Controls over Recreation Use		
Access		Four-wheel drives, all-terrain vehicles, dirt bikes, or snowmobiles in addition to non-motorized, mechanized use
Visitor Services	Basic maps, staff infrequently present (e.g. seasonally, high use periods) to provide on-site assistance	
Management Controls	Basic user regulations at key access points. Minimum use restrictions.	Some regulatory and ethics signing. Moderate use restrictions. (e.g. camping, human waste).

The desired settings for this area as analyzed in the Draft EIS RMP's preferred alternative are prescribed as middle to front country physical settings, back country social settings, and middle and front country operational settings. The desired settings are prescribed so users can safely tour the area, while enjoying the naturalness and unique character of the area.

Bighorn River SRMA

Five lease parcels, WY-1208-177, WY-1208-219, WY-1208-221, WY-1208-289, and WY-1208-396, are located on BLM-administered public lands managed under Bighorn River SRMA objectives. Such tracts located within the Bighorn River SRMA include Duck Swamp Environmental Education Area, Gooseberry Island Interpretive site, and Eggert Tract. The area provides for many different types of recreational opportunities, including hiking, wildlife viewing, sightseeing, fishing, boating, and hunting. The BLM has boat ramps available for public use on some of these tracts, including Eggert and Durkee tracts. The BLM Worland Field Office administers and maintains SRPs specific for the Bighorn River. SRP permittees include guides from within the Bighorn Basin, and other areas such as Casper, Lander, and Jackson, Wyoming. Although most of the Bighorn River is private surface and put in/take outs are managed by the Wyoming Game and Fish, the BLM manages tracts and islands that are desirable for and used by the fishing guides. The Bighorn River is a very popular recreation area for the local public as well, who use the islands and tracts as part of their float trips, hunting (water fowl and big game), and fishing excursions.

The area's natural resource recreation settings have been identified as ranging from semi-primitive non-motorized (back country) to rural. The following table describes the physical, social, and operational settings observed within the SRMA.

	Back Country (semi-primitive non-motorized)	Middle Country Settings (semi-primitive motorized)	Front Country Setting (Roaded Natural)	Rural
Physical - Qualities of the Landscape				
Remoteness	Within ½ mile of mechanized routes.	Within ½ mile of four-wheel drive vehicle, ATV and motorcycles routes.	Within ½ mile of low-clearance or passenger vehicle routes (includes unpaved County roads and private land routes).	Within ½ mile of paved/primary roads and highways.
Naturalness	Natural landscape with any modifications in harmony with surroundings and not visually obvious or evident (e.g. stock ponds, trails).	Character of the natural landscape retained. A few modifications contrast with character of the landscape (e.g. fences, primitive roads).	Character of the natural landscape partially modified but none overpower natural landscape (e.g. roads, structures, utilities).	Character of the natural landscape considerably modified (agriculture, residential or industrial).
Visitor	Developed	Maintained and	Rustic facilities	Modern

Facilities	trails made mostly of native materials such as log bridges. Structures are rare and isolated.	marked trails, simple trailhead developments and basic toilets.	such as campsites, restrooms, trailheads, and interpretive displays.	facilities such as campgrounds, group shelters, boat launches, and occasional exhibits.
Social - Qualities Associated with Use				
Contacts	3-6 encounters/day off travel routes (e.g., campsites) and 7-15 encounters/day on travel routes.	7-14 encounters/day off travel routes (e.g., staging areas) and 15-29 encounters/day on travel routes.		
Group Size	4-6 people per group.	7-12 people per group.		
Evidence of Use	Areas of alteration uncommon. Little surface vegetation wear observed. Sounds of people infrequent.	Small areas of alteration. Surface vegetation showing wear with some bare soils. Sounds of people occasionally heard.		
Operational - Conditions Created by Management and Controls over Recreation Use				
Access	Mountain bikes and perhaps other mechanized use, but all is non-motorized.	Four-wheel drives, all-terrain vehicles, dirt bikes, or snowmobiles in addition to non-motorized, mechanized use	Two-wheel drive vehicles predominant, but also four wheel drives and non-motorized, mechanized use.	Ordinary highway auto and truck traffic is characteristic.
Visitor Services	Basic maps, staff infrequently present (e.g. seasonally, high use periods) to provide on-site	Area brochures and maps, staff occasionally (e.g. most weekends) present to provide on-site assistance.	Information materials describe recreation areas & activities, staff periodically present (e.g. weekdays & weekends).	Information described to the left, plus experience and benefit descriptions, staff regularly

	assistance			present (e.g. almost daily).
Management Controls	Basic user regulations at key access points. Minimum use restrictions.	Some regulatory and ethics signing. Moderate use restrictions. (e.g. camping, human waste).	Rules, regulations and ethics clearly posted. Use restrictions, limitations and/or closures.	Regulations strict and ethics prominent. Use may be limited by permit, reservation, etc.

The desired recreational settings prescribed in the Draft EIS RMP for the Bighorn River are back country naturalness, social settings, and management controls; front country remoteness, facilities and structures, and mechanized use.

Travel and transportation management limits motorized use to designated roads and trails. Because the area has not been analyzed under a travel management plan, motorized use is limited to interim existing roads and trails until designated as either open or closed.

VRM

The lease parcels are located in scenic quality rating units (SQRU) inventoried as visual resource inventory (VRI) Class II, III, IV. Visual management of the lease parcels range from Class II objectives to Class IV objectives. Approximately 473 acres of the lease parcels (WY-1208-221 and WY-1208-396) are located within BLM-administered public lands managed under Class II objectives, 19,681 acres under Class III objectives and 38,792 acres under VRM Class IV objectives. The scenic quality rating units contain different landscapes exhibiting high and low degrees of natural elements of form, line, color, and texture; all of the rating units are inventories as front country, and rated as low to high sensitivity levels. All rating units contain landscape modifications that impair the natural scenic quality. Such modifications include power lines, roads, and structures. The Class II area is located directly west of Cedar Mountain WSA and along portions of the Bighorn River, and Class III along the major transportation corridors and west of U.S. Highway 20. VRI Class IV encompasses all remaining lease parcels under review.

Class II objectives are to retain the existing character of the landscape. The level of change to the characteristic landscape should be low. Management activities may be seen, but should not attract the attention of the casual observer. Any changes must repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape.

Class III objectives are to partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate the view of the casual observer. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.

Class IV objectives are to provide for management activities which require major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. These management activities may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic elements.

Wilderness Characteristics

Wilderness Characteristics are resource values that include naturalness, outstanding opportunities for solitude, and outstanding opportunities for primitive and unconfined recreation. Areas evaluated for wilderness characteristics generally occur in undeveloped locations 5,000 contiguous acres and greater, or of sufficient size to be practical to manage for these characteristics.

The BLM Land Use Planning Handbook (H.1601-1) states that the BLM must consider the management of lands with wilderness characteristics during the land use planning process. The criteria used to identify these lands are essentially the same criteria used for determining wilderness characteristics for wilderness study areas (WSA). However, the authority set forth in Section 603(a) of FLPMA to complete the three part wilderness review process (inventory, study, and report to Congress) expired on October 21, 1993; therefore, FLPMA does not apply to new WSA proposals and consideration of new WSA proposals on BLM-administered public lands is no longer valid. As mandated by FLPMA, Section 201, the BLM is still required to maintain and inventory of BLM-administered public lands to determine whether they possess wilderness characteristics, and analyzed for wilderness management as per FLPMA Section 202.

There are twelve lease parcels located within lands inventoried as containing wilderness characteristics (LWC). Please refer to the following table (Table 3-1) for more information regarding these areas. Refer to Appendix C for a complete inventory list of parcels and wilderness characteristics.

Table 3-1 August 2012, Worland Parcels containing LWC

Lease Parcel	5000 of roadless land or sufficient size¹ (yes/no)	Imprint of man's work substantially unnoticeable² (yes/no)	Outstanding opportunity for solitude or primitive recreation (yes/no)	Contains natural features of scientific, educational, scenic, or historical value (yes/no)	In Citizen Proposed Wilderness Area (yes/no. If yes but dropped during RMP process, state why)
WY-1208-259, WY-1208-260, WY-1208-261, WY-1208-262, WY-1208-263 (509 TriState Gooseberry N Platte)	Yes (13,449 acres)	Yes	Yes	Yes (Scenic, fossils, paleontology)	No
WY-1208-267 (577 AK)	Yes (7,107) (dropped out)	Yes	Outstanding solitude – No Primitive Recreation - Yes	Yes (Archaeological and paleo resources)	No
WY-1208-285, WY-1208-286,	Yes	Yes	Yes	Yes	No

WY-1208-287, WY-1208-288, WY-1208-289, WY-1208-290 (665 CW)	(11,833 acres) (acreages changed)			(Unique topography; Scenic; abundant and outstanding hiking opportunities)	
Lease Parcel	LWC	Acres within LWC	Percentage within LWC		
WY-1208-259	509 TriState Gooseberry N Platte	1,232	57%		
WY-1208-260	509 TriState Gooseberry N Platte	2,275	89%		
WY-1208-261	509 TriState Gooseberry N Platte	64	3%		
WY-1208-262	509 TriState Gooseberry N Platte	116	32%		
WY-1208-263	509 TriState Gooseberry N Platte	1.17	0.05%		
WY-1208-267	577 AK	520	100%		
WY-1208-285	665 CW	470	19%		
WY-1208-286	665 CW	1,945	91%		
WY-1208-287	665 CW	2,460	99%		
WY-1208-288	665 CW	2478	100%		
WY-1208-289	665 CW	1,998	80%		
WY-1208-290	665 CW	1,639	66%		

There are no congressionally designated wilderness areas on BLM-administered lands within the Worland Field Office, but there are nine wilderness study areas located within the WFO. They are as follows:

- Alkali Creek WSA
- Bobcat Draw Badlands WSA
- Cedar Mountain WSA
- Honeycombs WSA
- Medicine Lodge WSA
- Owl Creek WSA
- Red Butte WSA
- Sheep Mountain WSA
- Trapper Creek WSA

Cedar Mountain WSA is located within proximity to lease parcels WY-1208-396 and WY-1208-221. The WSA includes 21,560 acres of BLM-administered public lands with no private or state inholdings. The WSA is located in Washakie County, 2 miles east of Kirby along the east side

of the Bighorn River. Part of the eastern boundary is located along a natural gas pipeline ROW, roads and state lands property lines. The southern boundary is located mainly along a road and private property boundary.

The Cedar Mountain WSA is an area of rugged topography characterized by deep, steep-sided drainages flowing north or west toward the Bighorn River. Cedar Mountain is the dominant visual feature of the unit. It is unusual in the vicinity because of its elevation, the vegetation growing on it, and the imposing rock escarpment which forms its southern side. Visual, paleontological, and geographic resource values enhance the wilderness characteristics of Cedar Mountain WSA. The soil, rock, and vegetation colors and the area's topography are major visual features. The abrupt topographic changes characteristic of badlands add to the visual interest of the area. Petrified wood and reptilian fossils are found in the Lance and Meeteetse formations in the southern portion of the area. Mammalian fossils are found in the Fort Union Formation north of Cedar Mountain. BLM recommend 10,223 acres for wilderness designation.

WSAs are managed according to the non-impairment standard. Under this standard, these lands are managed in a manner so as not to impair the suitability of such areas for preservation as wilderness. At present, the BLM manages these lands in accordance with the Grass Creek and Washakie RMPs, and the Interim Management Policy for Lands Under Wilderness Review until Congress either designates each WSA as "wilderness" or releases it from consideration and the land reverts to multiple-use management.

See Appendix C for a complete listing of parcels and wilderness characteristics.

3.3.8 Wildlife

3.3.8.1 Cody

Fisheries

Parcel WY-1208-268 & 325

Aquatic habitat is present within the parcel along Dry Creek and downstream of the parcel along Dry Creek and the Bighorn River. The lower end of Dry Creek supports a small population of stonecat, which is a warm-water game fish species, and several other native and non-native, non-game fish species. The Bighorn River, which is situated several miles downstream of this parcel, supports a cold/warm-water game fish fishery of Local Importance and also supports some WG&FD fish species of concern including the western silvery minnow, shovelnose sturgeon, sauger, plains minnow, and burbot.

Parcel WY-1208-385 & 386

Aquatic habitat is present downstream of the parcel along Polecat Creek, Little Polecat Creek, the Frannie Canal, and the Shoshone River. The Shoshone River and Polecat Creek support cold and/or warm-water game fish fisheries of Local Importance. The Shoshone River also supports some WG&FD fish species of concern including the western silvery minnow, plains minnow, and burbot.

Parcel WY-1208-387

Aquatic habitat is present downstream of the parcel along Mantua Creek and the Shoshone River. The Shoshone River, which lays about two miles downstream of this parcel, has a cold and warm-water game fish fishery of Local Importance. The Shoshone River also supports some WG&FD fish species of concern including the western silvery minnow, plains minnow, and burbot. The Wyoming Game & Fish Department also classifies lower end of Mantua Creek as a cold-water game fish fishery of Local Importance.

Parcel WY-1208-388 & 389

Aquatic habitat is present downstream of the parcel in Bitter Creek. Bitter Creek supports a cold-water game fish fishery of Regional Importance. The Shoshone River, which lies several miles downstream of this parcel, has a cold and warm-water game fish fishery of Local Importance. Both Bitter Creek and the Shoshone River support some WG&FD fish species of concern including western silvery minnow, plains minnow, and burbot. The Clarks Fork of the Yellowstone River supports a cold-water game fish fishery of Regional Importance that includes Yellowstone cutthroat trout, a BLM Sensitive Species.

Parcel WY-1208-390

Aquatic habitat is present downstream of the parcel in Big Sand Coulee and the Clarks Fork of the Yellowstone River. The Clarks Fork of the Yellowstone River supports a cold-water game fish fishery of Regional Importance that includes Yellowstone cutthroat trout, a BLM Sensitive Species.

Parcel WY-1208-391

Aquatic habitat is present within the parcel in the Kelly Irrigation Ditch. Aquatic habitat is also present downstream of the parcel in the Clarks Fork of the Yellowstone River and Bennett Creek. The Clarks Fork of the Yellowstone River supports a cold-water game fish fishery of Regional Importance that includes Yellowstone cutthroat trout, a BLM Sensitive Species. A cold-water game fish fishery of Local Importance is present in Bennett Creek.

Parcel WY-1208-392

Aquatic habitat is limited within the parcel to irrigation ditches and is present downstream of the parcel in the Clarks Fork of the Yellowstone River and Line Creek. Both these waters support cold-water game fish fisheries of Regional Importance that include Yellowstone cutthroat trout, a BLM Sensitive Species.

Parcel WY-1208-393

Aquatic habitat that supports supports a cold-water game fish fishery of Local Importance is present within the parcel in Little Rock Creek. Cold-water game fish fisheries of Regional and Local Importance are present downstream of the parcel in the Clarks Fork of the Yellowstone River and Bennett Creek respectively. Yellowstone cutthroat trout, a BLM Sensitive Species, is present downstream of the parcel in the Clarks Fork of the Yellowstone River.

Parcel WY-1208-394

Aquatic habitat that supports a cold-water game fish fishery of Regional Importance that includes Yellowstone cutthroat trout, a BLM Sensitive Species, is present within and downstream of the parcel along the Clarks Fork of the Yellowstone River.

Wildlife, Migratory birds, Threatened & Endangered Species; including Sensitive Species (All Parcels)

All the parcels for the CYFO have similar affected environments. Habitats for these are a mix of Wyoming sagebrush community, forbs, salt desert shrub community, cool season bunchgrasses, and short grass warm season grasses. Wildlife which use this habitat type include migratory birds, raptors, pronghorn, deer, elk, small mammals, amphibians, reptiles, carnivores etc.

Wyoming BLM Sensitive Species

The habitat that would be directly impacted by the proposed leases are in sagebrush-steppe, and desert salt shrub communities, which provides nesting and brood-rearing habitat for WY BLM Sensitive migratory birds including Brewer's sparrow, sage thrasher, and sage sparrow. Greater sage-grouse, which are a Candidate Threatened or Endangered Species and a BLM Sensitive Species, also use the area for nesting. There are parcels nominated in the Greater sage-grouse Core Area and the proposed Absaroka Front Management Area in the Draft RMP, which is important winter range. Other sensitive bird species that may potentially use the area include peregrine falcons and bald/golden eagles.

Yellowstone cutthroat trout are present in the Clark's Fork River. Other moist habitat areas in and near this river may provide habitat for northern leopard frogs.

3.3.8.2 Lander

Parcels WY-1208-094 and 095.

The proposed parcels are located in the eastern portion of the LFO in Natrona County. The parcels occupy predominantly Wyoming big sagebrush bunchgrass communities. Topography is variable and is primarily gentle rolling uplands on the northern portion with some broken and hilly terrain toward the south and west.

These two parcels are within Greater Sage-Grouse Core Area. Unless determined otherwise, all Greater sage-grouse habitat within the Core Area is considered breeding and/or nesting/early brood rearing habitat. The LFO evaluated mineral parcels within Core Area using the Greater sage-grouse screen for oil and gas leasing. In accordance with IM No WY-2010- 013, all oil and gas parcels within Core Area will be evaluated using this screen. Those parcels that are wholly inside of Core Area within suitable habitat and with a part of at least eleven square miles of contiguous, manageable, and unleased Federal minerals were mapped and screened using GIS. Those parcels listed above did not meet the minimum area criteria (i.e. eleven square miles) outlined in the IM.

There are no known threatened or endangered species that occur within the proposed parcels listed above, nor are there any BLM sensitive plant species located on these two parcels. As mentioned above, these parcels lie within Greater sage-grouse nesting and brood rearing habitat. The sagebrush communities that are providing Greater sage-grouse habitat are providing habitat for mule deer and pronghorn. However, there is no big game crucial winter range located in

either of these two proposed parcels, nor are there any raptor nests within 0.75 mile of these parcels. These parcels also provide habitat for a variety of non-game birds, small mammals, predators and a few reptiles and amphibians.

The parcels listed above are all within the big sagebrush-mixed grass steppe habitat type and are likely providing nesting and foraging habitat for several other sagebrush obligate passerine species like the sage thrasher, sage sparrow, and Brewer's sparrow. These species, along with the Greater sage-grouse are all on the Wyoming BLM's sensitive Species list.

Parcels WY-1208-103

The proposed parcel is located in the south east portion of the LFO in Fremont CO. The parcel occupies predominantly Wyoming big sagebrush bunchgrass communities. Topography is variable and ranges from gentle rolling uplands to more broken and hilly terrain.

The parcel is partially located within mapped Greater Sage Grouse Core Area and is within breeding and/or nesting/early brood rearing habitat. There are no known threatened or endangered species that occur within this proposed parcel but there are several plant and animal species on the Wyoming BLM's sensitive Species list that could occur here. The parcel falls within the big sagebrush-mixed grass steppe habitat type and is likely providing nesting and foraging habitat for several other sagebrush obligate passerine species like the sage thrasher, sage sparrow, and Brewer's sparrow. In addition, Cedar Rim thistle and Beaver Rim phlox may occur on this site.

The proposed parcel provides crucial winter range for mule deer and elk and is within 0.75 mile of a known raptor nest. This parcel provides habitat for a variety of non-game birds, small mammals, predators and a few reptiles and amphibians.

Parcels WY-1208-104,105,146,152 and 154

Most of the proposed parcels are located in the south east portion of the LFO. The parcels occupy Wyoming big sagebrush bunchgrass communities, big sagebrush shrubland, scattered limber pine and juniper woodland habitat types and Douglas fir and lodgepole pine and limber pine forest habitat types. Topography is variable and ranges from gentle rolling uplands on the Southern portion to more hilly and mountainous terrain toward the north.

Parcel 146 is located in the north eastern portion of the LFO, east of Shoshoni, WY and occupies predominantly big sagebrush Shrubland and inter-mountain basin mixed salt desert scrubland. Topography is mostly gentle to some rolling uplands bounded by broken and incised drainages. This parcel likely contains some habitat for mountain plover and white-tailed prairie dogs.

All of the proposed parcels listed above are outside of Greater sage-grouse Core Area. None of the parcels listed above lie within 0.6 mile of a lek but are likely to contain some habitat for mountain plover and white-tailed prairie dogs.

There are no known threatened or endangered species that occur within these proposed parcels but there are several plant and animal species on the Wyoming BLM's sensitive Species list that could occur on any of these parcels. The parcels lie within the big sagebrush-mixed grass steppe habitat type and are likely providing nesting and foraging habitat for several other sagebrush obligate passerine species like the sage thrasher, sage sparrow, and Brewer's sparrow. Three parcels, WY-1208-104,105,146, may contain plant species on the BLM sensitive species list which could include Persistent Sepal Yellowcress, Cedar Rim thistle, and Beaver Rim phlox.

With the exception of parcel WY-1208-154, all of the parcels listed above contain some portion of big game crucial winter range for mule deer and/or elk. All of the parcels are located within 0.75 mile of a known raptor nest and all of these parcels provide habitat for a variety of non-game birds, small mammals, predators and a few reptiles and amphibians.

Parcels WY-1208- 112, 122, and 129-132.

The parcels listed above are located in the south east portion of the LFO. The parcels occupy Wyoming big sagebrush bunchgrass communities, big sagebrush shrubland, scattered limber pine and juniper woodland habitat types and Douglas fir and lodgepole pine and limber pine forest habitat types. Topography is variable and ranges from gentle rolling uplands on the Southern portion to more hilly and mountainous terrain toward the north.

All of these parcels are outside of Greater sage-grouse Core Area but may contain nesting/early brood rearing habitat. Parcels 112,122,129,130 and 131 lie at least partially within the expanded Sage-grouse ACEC and all of these parcels are at least partially within the expanded Green Mountain ACEC. None of the parcels listed above lie within 0.6 mile of a lek. All of the parcels listed above likely contain some habitat for mountain plover and white-tailed prairie dogs.

There are no known threatened or endangered species that occur within these proposed parcels but there are several plant and animal species on the Wyoming BLM's sensitive Species list that could occur on any of these parcels. The parcels lie within the big sagebrush-mixed grass steppe habitat type and are likely providing nesting and foraging habitat for several other sagebrush obligate passerine species like the sage thrasher, sage sparrow, and Brewer's sparrow. Parcels WY-1208-122 and 129 may contain Cedar Rim thistle, and Beaver Rim phlox.

All of the parcels listed above contain some portion of big game crucial winter range for mule deer and/or elk. Parcels 122, 129 and 130 contain habitat for elk parturition. Parcel 122 is located within 0.75 mile of a known raptor nest. All of these parcels provide habitat for a variety of non-game birds, small mammals, predators and a few reptiles and amphibians.

Parcels WY-1208-102,123,124,128,151,153, and 187

The proposed parcels are located in the central and south central portion of the LFO. The parcels occupy predominantly Wyoming big sagebrush bunchgrass communities but include other plant communities such as Inter-mountain basin mixed salt desert scrubland, sagebrush mixed grass steppe and woodland habitat types. Topography is variable and ranges from gentle rolling uplands to more broken and hilly terrain including mountainous terrain in the Green Mountain areas. Parcels 151,153 and 187 are located on Crooks Mountain. These parcels are comprised of big sagebrush mixed grass steppe with some scattered limber pine and juniper woodland habitat types.

These parcels are partially within Greater Sage-grouse Core Area. The LFO evaluated mineral parcels within Core Area using the Greater sage-grouse screen for oil and gas leasing. In accordance with IM No.WY-2010-013, all oil and gas parcels within Core Area will be evaluated using this screen. Those parcels that are wholly inside of Core Area within suitable habitat and with a part of at least eleven square miles of contiguous, manageable, and unleased Federal minerals were mapped and screened using GIS. The parcels listed above meet those criteria outlined in the IM and were referred to the Wyoming State Office Reservoir Management Group for preliminary review for potential drainage. With the exception of parcel 102, the parcels listed

above are at least partially within the expanded sage-grouse ACEC currently being analyzed in the Lander RMP revision.

With the exception of parcel 153, all of the parcels listed above contain some portion of big game crucial winter range for antelope, mule deer and/or elk. Parcel 102 overlaps areas identified for elk parturition. All of the parcels listed above, except parcel 128, are located within 0.75 mile of a known raptor nest. All of these parcels provide habitat for a variety of non-game birds, small mammals, predators and a few reptiles and amphibians.

There are no known threatened or endangered species that occur within these proposed parcels but there are several plant and animal species on the Wyoming BLM's sensitive Species list that could occur on any of these parcels. The parcels lie within the big sagebrush-mixed grass steppe habitat type and are likely providing nesting and foraging habitat for several other sagebrush obligate passerine species like the sage thrasher, sage sparrow, and Brewer's sparrow. Parcels WY-1208-102, 123, 124 187 may contain Cedar Rim thistle and/or Beaver Rim phlox. Parcel 151 may contain Rocky Mountain twinpod and Porter's sage.

Parcels WY-1208-106-111, 113-121, 125-127, 133-145, 149, 150, 155-174, 183-218, 231-252, 254-258, 269-283, 293-323, and 326-384.

The proposed parcels are located in the central and south central portion of the LFO extending from the Lander slope southward to the Rawlins Field Office boundary and eastward to the Natrona CO. boundary. The parcels occupy predominantly Wyoming big sagebrush bunchgrass communities but include other plant communities such as Inter-mountain basin mixed salt desert scrubland, sagebrush mixed grass steppe and woodland habitat types. Topography is variable and ranges from gentle rolling uplands to more broken and hilly terrain including mountainous terrain in the Green Mountain area.

The parcels listed above are wholly within Greater Sage Grouse Core Area and are within breeding and/or nesting/early brood rearing habitat. The LFO evaluated mineral parcels within Core Area using the Greater sage-grouse screen for oil and gas leasing. In accordance with IM No.WY-2010-013, all oil and gas parcels within Core Area will be evaluated using this screen. Those parcels that are wholly inside of Core Area within suitable habitat and with a part of at least eleven square miles of contiguous, manageable, and unleased Federal minerals were mapped and screened using GIS. The parcels listed above meet those criteria outlined in the IM and were referred to the Wyoming State Office Reservoir Management Group for preliminary review for potential drainage which was determined to be negative. All of the parcels listed above, except 253 and 258, fall within the expanded sage-grouse ACEC being evaluated in the Lander RMP revision.

Most of the parcels listed above contain some portion of big game crucial winter range for antelope, mule deer and/or elk. Forty-six parcels do not include crucial winter range for big game including: 120, 121, 137, 138, 142-150, 159, 160, 167-169, 172, 174, 184-186, 200, 217, 231, 232, 237, 239, 241, 251, 254, 255, 258, 269, 274, 276, 282, 283, 292, 295-298, 315, 338, 356, 371-373.

Of the parcels listed above, over 80 percent contain some portion of big game crucial winter range (CWR), including 67 parcels within pronghorn CWR, 52 parcels within mule deer CWR, 102 parcels within elk CWR, and 52 parcels within moose CWR. Big game could be expected on these parcels at any time of year, with larger concentrations during harsh winter conditions.

Parcel 121 contains habitat for elk parturition. All of these parcels provide habitat for a variety of non-game birds, small mammals, predators and a few reptiles and amphibians.

Parcels WY-1208-254, 282 and 283 contain either threatened Desert Yellowhead (*Yermo xanthocephalus*) populations or critical habitat for Desert Yellowhead. There are no known threatened or endangered species that occur within the remaining proposed parcels but there are several plant and animal species on the Wyoming BLM's sensitive Species list that could occur on any of these parcels.

Parcels WY-1208-106-108, 111, 117, 125, 127, 139, 142-144, 150, 160-164, 168, 170, 183-186, 188, 193-196, 198-200, 210, 212-215, 231, 236, 238, 240, 241, 249, 252, 253-258, 271-273, 294, 301, 302, 314, 316, 319-321, 326, 327, 330, 332, 333, 336-339, 345, 350, 356, 359, 362, 363, 365, 366, 374-377, and 382-384 are within 0.60 mile of the perimeter of a sage-grouse lek or breeding habitat. As mentioned above, all of the parcels lie within Greater sage-grouse nesting and brood rearing habitat.

3.3.8.3 Worland

West Side of Worland FO (Grass Creek RMP area)

Parcels 219, 284, 285, 286 – 290, and 324

The proposed lease parcels are all located in the central portion of the Bighorn basin, and occupy predominantly Wyoming sagebrush bunch grass communities. Topography is gentle to rolling uplands bounded by broken drainages. All of these parcels, with the exception of parcel 324, involve some portion of mule deer crucial winter range, and all of 324 and a portion of parcel 290 are mapped as antelope crucial winter range as well. Parcel 219, west of the Bighorn River, is predominantly a Wyoming sagebrush bunch grass community, and primarily agricultural private surface, east of the Bighorn River. The portion of parcel 219 east of the Bighorn is within core sage-grouse habitat. Parcels 286 and 287 are also within core habitat, but are predominantly a small patch of juniper breaks and not sage-grouse habitat. For most of these parcels both mule deer and antelope could be expected at any time of the year, with larger concentrations during harsh winter weather conditions. These parcels or portion thereof also provide habitat for chukar, Hungarian partridge, and a variety of non-game birds, small mammals, predators, and a few reptiles and amphibians.

There are no known threatened or endangered species that occur within these proposed parcels, but there are several on the Wyoming BLM's Sensitive Species list. All of the above proposed parcels or portions thereof, are within sage-grouse core habitat, and all or portions of parcels 219, 284 and 285 are within the 4 mile nesting/early brood rearing buffer for sage-grouse. Parcel 324 is within sage-grouse wintering, breeding, nesting/brood rearing, and within .6 mile of a lek as well. The same sagebrush communities that are providing sage-grouse habitat, mule deer and/or antelope crucial winter range, in the lease parcels above, are likely providing nesting and foraging habitat for several other sagebrush obligate passerine species like the Sage thrasher, Sage sparrow and Brewer's sparrow as well. All of these sagebrush obligate avian species, the sage-grouse, Sage thrasher, Sage sparrow and Brewer's sparrow are all on the Wyoming BLM's Sensitive Species list. And parcels 219 and 284 are within proximity to a raptor nest that might be active.

Parcels # 177, 181, 182, 222-230, 259-267, 291, 292, and 396

The proposed lease parcels are all located in the central portion of the Bighorn basin, and most all are predominantly a mix of saline upland and badlands habitat, with minor components of Wyoming sagebrush bunch grass communities, with the exception of 6 parcels. Parcels 267, 291 and 292 are predominantly Wyoming sagebrush bunch grass communities. Parcel 177 is a small private surface parcel within the Bighorn River riparian corridor with typical Russian olive/Cottonwood woodlands, and saline upland grasses. Parcel 181 is a private surface rural subdivision with the remaining vegetation being primarily Wyoming sagebrush bunch grass community. For the majority of the upland parcels topography ranges from gentle and rolling terrain to broken with incised drainages and extensive areas of badlands. Many of these proposed parcels involve some portion of big game winter range, either crucial mule deer or antelope winter range. Parcels 181, 225, 226, 230, 260-264, 266, 291 and 292 contain all or portions of crucial antelope winter range, and parcels 177, 222, 230, 263, 264, 266, 267 and 291 involve crucial mule deer winter range. Both mule deer and antelope could be expected at any time of the year, with larger concentrations during harsh winter weather conditions. These parcels or portion thereof also provide habitat for chukar, Hungarian partridge, and a variety of non-game birds, small mammals, predators, and a few reptiles and amphibians.

There are no known threatened or endangered species that occur within these proposed parcels, but all of the following species are on the Wyoming BLM's Sensitive Species list. The same sagebrush communities that are providing mule deer and/or antelope crucial winter range within many of the lease parcels above are likely providing nesting and foraging habitat for several sagebrush obligate passerine species like the Sage thrasher, Sage sparrow and Brewer's sparrow as well. Parcels 267, 291 and 292 are outside of core sage-grouse habitat but do provide nesting/early brood rearing and/or wintering habitat for the sage-grouse. Portions of parcels 224-227, 264 and 291 provide habitat for several small white-tailed prairie dog colonies, as well as potential nesting and/or foraging habitat for the borrowing owl, and the Ferruginous hawk. And all of these proposed parcels, with the exception of parcels 177, 181, 182 and 229, within saline uplands with rolling to flat topography, are likely providing nesting and foraging habitat for the Mountain plover. And parcel 291 is within proximity to a known raptor nest that might be active.

Eastside of Worland FO (Washakie RMP area)

Parcels 178, 179, and 180

These three proposed parcels are all located in the central Big Horn Basin and occupy predominantly saline uplands with small patches of Wyoming sagebrush and bunch grass communities. The topography ranges from gentle slopes to rolling uplands with broken and incised drainages and sections of badlands. These proposed parcels are not in a sage grouse core area, and none of these proposed parcels involve protected wildlife habitat types. Mule deer and antelope may be using the habitat at any time of the year, with with potentially larger concentrations during the winter season. These parcels also provide habitat for chukar and Hungarian partridge, as well as a variety of passerines, small mammals, predators, and raptors. The entire area covered by these parcels has been designated as potential habitat for mountain plover. No known threatened or endangered wildlife species have been observed utilizing habitat in this area.

Parcels 147, and 177

These parcels are located in an area where there is extensive pre-existing oil and gas development. These areas are generally characterized as saline uplands that are gently sloping and sparsely vegetated with Wyoming big sage brush, numerous native perennial grasses, prickly pear cactus, various forbs, and cheatgrass. There is habitat suitable for pronghorn antelope on a year round basis and for mule deer mainly during the winter season. The habitat is also capable of supporting chukar partridge, Hungarian partridge, and a variety of passerines, small mammals, predators, and raptors. Large portions of these areas have been designated as suitable for mountain plover, although none of the birds have been observed in the proposed project area. Neither of these parcels is within a Greater Sage-Grouse core area and no threatened or endangered wildlife species are known to utilize habitat within the proposed project area.

Parcel 175, 176, and 219 (East of Bighorn River)

Wildlife habitat in the area covered by these parcels is characterized by rolling to steeply sloped sage brush steppe which is dominated by Wyoming big sage brush, various perennial grasses and forbs, prickly pear cactus, and cheat grass. The habitat is suitable for pronghorn antelope and mule deer on a year-round basis, and a large portion of the area covered by these parcels is included in an area designated by WGFD as crucial big game wintering habitat. The habitat is also capable of sustaining numerous additional wildlife species such as chukars, Hungarian partridge, and a variety of grassland passerines, small mammals, predators, and raptors. No known threatened or endangered wildlife species have been observed utilizing habitat on this parcel.

Parcel 221

Wildlife habitat in the area covered by this parcel is characterized by rolling to steeply sloped sage brush steppe with vegetation dominated primarily by Wyoming big sage brush along with a component of various perennial grasses and forbs, prickly pear cactus, and cheat grass. The habitat is suitable for pronghorn antelope and mule deer on a year-round basis, and may be used extensively by wintering mule deer. Nearly the entire area covered by this parcels is included in an area designated by WGFD as crucial big game wintering habitat. The parcel also lies within a designated Greater Sage Grouse core area. The habitat is capable of sustaining numerous additional wildlife species such as chukars, Hungarian partridge, and a variety of grassland passerines, small mammals, predators, and raptors. No known threatened or endangered wildlife species have been observed utilizing habitat on this parcel.

Parcel 396

This parcel lies entirely within the flood plain of the Bighorn River. The wildlife habitat can be characterized generally as riparian and mostly level with an abundance of brush, Russian Olive, Wyoming big sage brush, various perennial and annual grasses, forbes, as well as cheat grass. Habitat exists in the area that will support numerous wildlife species such chukars, a variety of passerines and waterfowl, small mammals, predators, and raptors. The area is inhabited by white-tail deer on a year round basis and lies within an area designated by Wyoming Department of Game and Fish as crucial big game wintering habitat.

3.3.9 Soils

3.3.9.1 Cody, Lander, and Worland

The soils on the proposed lease parcels are varied and complex, reflecting differences in geology, geomorphology, position on the landscape, and elevation. Soil properties often have restrictive features for oil and gas exploration, development, and production. Restrictive features include shallow soils, steep slopes, alkalinity, salinity, exchangeable sodium, low water holding capacity, fine or course textures and low precipitation. Restrictive features place limitations on the soil resource for reclamation and the control of runoff and erosion. Soil textures can create blowing hazards, dust hazards and excessive damage during wet conditions.

Given the wide range of soil properties that occur across the landscape, the lease parcels were analyzed at the HUC 10 watershed level. The table below (Soil Restrictive Features and Limitations) summarizes the soil properties for the lease parcels by watershed. These restrictive features and limitations reflect the dominant components (soil series) occurring on the lease parcels and may not necessarily extend across the entirety of the lease unit.

The soil and vegetation communities that extend across the lease parcels are not generally susceptible to runoff and erosion as long as the vegetative component is intact. Based on calculations generated by the U.S. Forest Service web-based Water Erosion Prediction Project (WEPP) model, runoff and erosion is minimal when the native vegetation has not been disturbed.

In the Bighorn Basin WEPP predicts a 4 percent probability of runoff and a 2 percent probability of erosion on a Saline Upland 5-9 in. pz. ecological site with an average erosion rate of 0.004 tons per acre per year. Contrasted with a Loamy 15-19 in. pz ecological site, WEPP predicts no probability of runoff and erosion. East of Shoshoni in the Poison Creek watershed, WEPP predicts a 4 percent chance of runoff with a 2 percent probability of erosion with virtually no erosion when averaged over 50 years. In the extreme eastern portion of the lease area in the Poison Spider Creek watershed, WEPP predicts a 6 percent probability of runoff with a 2 percent probability of erosion with virtually no erosion when averaged over 50 years.

Many of the lease parcels in the Lander Field Office are susceptible to wind erosion following disturbance. The Soil Restrictive Features and Limitations table denotes this as a blowing hazard limitation. The sandier soils are generally favorable for reclamation.

<i>HUC 10 Number</i>	<i>Watershed Name</i>	<i>Lease Numbers</i>	<i>Slope Range</i>	<i>Precip Zone</i>	<i>Restrictive Features</i>	<i>Limitations</i>
1007000605	Clarks Fork Yellowstone River – Bennett Creek	391, 392, 393, 394	0-80	5-10	shallow soils, steep slopes, low precip, low water holding capacity, fine soils, seasonal high water table	reclamation potential, runoff & erosion, rutting/mud hazard, blowing hazard, construction & trafficability
1007000606	Clarks Fork Yellowstone River – Bear Creek	390, 392	0-70	5-9	shallow soils, steep slopes, low precip, low water holding capacity, sodic soils, alkalinity, fine soils, seasonal high water table	reclamation potential, runoff & erosion, rutting/mud hazard, blowing hazard, construction & trafficability

1007000607	Clarks Fork Yellowstone River – Silver Tip Creek	388, 389	0-10	5-9	low precip	reclamation potential
1008000203	Beaver Creek	280, 281, 306, 307, 312, ,313, 314, 316, 317, 319, 320, 321, 322, 323, 335, 336, 337, 338, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 368, 369, 370, 371, 372, 373, 377, 378, 379	0-70	10-14	moderately deep soils, moderate precip, moderate slopes	fair to good reclamation potential, runoff & erosion, blowing hazard,
1008000301	Little Popo Agie River	343, 344, 345, 349, 350, 351, 353, 354, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384	0-70	10-14	moderately deep soils, moderate precip, moderate slopes	fair to good reclamation potential, runoff & erosion, blowing hazard
1008000401	Upper Muskrat Creek	142, 143, 144, 167, 169, 170	0-70	10-14	moderately deep soils, moderate precip, moderate slopes	fair to good reclamation potential, runoff & erosion, blowing hazard
1008000504	Lower Poison Creek	146	0-3	10-14	seasonal high water table	construction & trafficability
1008000603	Alkali Creek	183, 231, 135, 269, 273, 293, 294, 395, 296, 397, 398, 299, 300, 301, 302, 303, 304, 308, 309, 311, 326, 327, 328, 329, 330, 331, 332, 333, 355, 356, 357, 358, 359, 360, 361, 364, 365, 366, 367	0-70	7-19	moderately deep soils, areas of shallow soils, moderate slopes, moderate precip, areas of sodic soils and saline soils	reclamation potential, runoff & erosion, blowing hazard
1008000704	Bighorn River – Coal Draw	219, 221, 222, 286, 287, 288, 289, 290, 324, 396	3-60	5-14	shallow soils, steep slopes, low precip, low water holding capacity, sodic soils, alkalinity, fine soils, sandy soils, seasonal high water table	reclamation potential, runoff & erosion, rutting/mud hazard

1008000706	Cottonwood Creek	284, 285, 286, 287, 288, 289, 290	15-70	5-14	shallow soils, steep slopes, low precip, low water holding capacity, sodic soils, alkalinity, fine soils	reclamation potential, runoff & erosion, blowing hazard
1008000707	Gooseberry Creek	219, 324	0-40	5-9	shallow soils, moderately steep slopes, low precip, low water holding capacity, sodic soils, alkalinity, fine soils, sandy soils, seasonal high water table	reclamation potential, runoff & erosion, rutting/mud hazard, construction & trafficability
1008000708	Nowater Creek	175, 176, 219, 221	0-45	5-9	shallow soils, moderately steep slopes, low precip, low water holding capacity, sodic soils, alkalinity, fine soils, seasonal high water table	reclamation potential, runoff & erosion, rutting/mud hazard, construction & trafficability
1008000711	Lower Fifteenmile Creek	227, 228, 259, 260, 261, 262, 263, 264, 265, 266, 291, 292	0-70	5-9	shallow soils, steep slopes, low precip, low water holding capacity, sodic soils, alkalinity, fine soils	reclamation potential, runoff & erosion, rutting/mud hazard
1008000712	Bighorn River - Elk Creek	175, 177, 181, 182, 223, 224, 225, 226, 227, 228, 229, 230, 259, 261, 263, 265, 267	0-70	5-9	shallow soils, steep slopes, low precip, low water holding capacity, sodic soils, alkalinity, fine soils, sandy soils, seasonal high water table	reclamation potential, runoff & erosion, rutting/mud hazard, construction & trafficability
1008000807	Nowood River – Sand Creek	147, 177, 180	0-60	5-9	shallow soils, steep slopes, low precip, low water holding capacity, sodic soils, alkalinity, fine soils	reclamation potential, runoff & erosion, rutting/mud hazard
1008001002	Lower Shell Creek	178, 179, 180	0-60	5-9	shallow soils, steep slopes, low precip, low water holding capacity, sodic soils, alkalinity, fine soils	reclamation potential, runoff & erosion, rutting/mud hazard
1008001102	Dry Creek	268,325	0-60	5-9	shallow soils, steep slopes, low precip, low water holding capacity, sodic soils, alkalinity, fine soils, sandy	reclamation potential, runoff & erosion, rutting/mud hazard, blowing hazard, construction &

					soils, seasonal high water table	trafficability
1008001402	Shoshone River – Bitter Creek	385, 386	0-70	5-9	shallow soils, steep slopes, limited badland topography, low water holding capacity, low precip	reclamation potential, runoff & erosion, rutting/mud hazard
1008001403	Shoshone River – Coon Creek	387	0-30	5-9	shallow soils, moderately steep slopes, low water holding capacity, low precip	reclamation potential, runoff & erosion
1008001404	Sage Creek	385,386	0-70	5-9	shallow soils, steep slopes, low precip, low water holding capacity, badland topography	reclamation potential, runoff & erosion, rutting/mud hazard
1018000602	Sweetwater River-Strawberry Creek	299, 300, 301, 305, 306, 307, 308, 309, 310, 311, 317, 329, 330, 331, 332, 333, 334, 336, 337, 338, 339, 340, 341, 356, 362, 363, 364, 365, 366, 370, 371, 372, 373, 374	0-70	10-14	moderately deep soils, moderate slopes, moderate precip, areas of sodic soils	fair to good reclamation potential, blowing hazard runoff & erosion,
1018000604	Sweetwater River-Long Creek check	280, 281, 306, 307, 312, 313, 314, 316, 317, 319, 320, 321, 322, 323, 335, 336, 337, 338, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 368, 370, 371, 372, 373, 377, 378, 379	0-70	10-14	moderately deep soils, areas of shallow soils, moderate slopes, moderate precip, areas of sodic soils	fair to good reclamation potential, limited areas of poor reclamation potential, runoff & erosion, blowing hazard
1018000605	Sweetwater River-Buffalo Creek	133, 139, 141, 144, 155, 156, 157, 159, 160, 161, 162, 163, 164, 165, 167, 168, 169, 170, 171, 172, 173, 174, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197,	0-70	10-19	moderately deep soils, areas of shallow soils, moderate slopes, moderate precip, areas of sodic and salt affected soils	fair to good reclamation potential, limited areas of poor reclamation potential, runoff & erosion, blowing hazard

		198, 199, 200, 201, 203, 204, 205, 206, 207, 208, 209, 210, 212, 213, 215, 216, 233, 23, 235, 236, 237, 238, 239, 240, 241, 242, 246, 248, 249, 250, 251, 252, 270, 271, 272, 273, 279				
1018000606	Sweetwater River-Crooks Creek	113, 118, 119, 120, 121, 123, 124, 125, 126, 133, 135, 136, 137, 139, 140, 141, 142, 143, 144, 145, 149, 150, 151, 152, 153, 154, 155, 156, 162, 164, 172, 183, 185, 187	0-70	10-19	moderately deep soils, areas of shallow soils, moderate slopes, moderate precip	fair to good reclamation potential, limited areas of poor reclamation potential, runoff & erosion, blowing hazard
1018000607	Sage Hen Creek	118, 119	0-45	10-14	moderately deep soils, areas of shallow soils, moderate slopes	severe blowing hazard, reclamation potential, runoff hazard
1018000608	Sweetwater River Willow Creek	102, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 119, 122, 123, 125, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138	0-70	10-19	moderately deep soils, areas of shallow soils, moderate slopes, moderate precip, areas of sodic and salt affected soils, areas of seasonal high water table	reclamation potential, runoff hazard, areas of sodic and salt affected soils
1018000609	Sweetwater River-Muddy Creek	102, 103, 104	0-45	10-19	moderately deep soils, areas of shallow soils, moderate slopes, moderate precip, areas of sodic and salt affected soils	reclamation potential, moderate precip, blowing hazard, runoff hazard
1018000611	Sweetwater River-Horse Creek	94	0-70	10-14	moderately deep soils, moderate slopes, moderate precip	reclamation potential, runoff & erosion, rutting/mud hazard
1018000704	Poison Spider Creek	94, 95	0-45	10-14	moderately deep soils, moderate slopes, moderate precip	Good reclamation potential, rutting/mud hazard

1404020001	Lost Creek	123, 124, 150, 183, 184, 185, 186, 231, 232, 269, 296	0-70	10-14	moderately deep soils, moderate slopes, moderate precip	fair to good reclamation potential, limited areas of poor reclamation potential, runoff & erosion, blowing hazard
1404020015	Boggy Meadows	103, 104, 105, 123, 124	0-70	15-19	areas of shallow soil, steep slopes, sodic soils	poor to fair reclamation potential, runoff & erosion, blowing hazard

3.3.10 Water Resources

3.3.10.1 Cody, Lander, and Worland

Surface Water Hydrology:

The available lease parcels have been subdivided for the district to a HUC 8 and a HUC 10 level as shown in Table 3-2 below. All of the lease parcels in the Worland and Cody Field Office areas are found in the Bighorn River (10080007), Nowood River (10080008), Shell Creek (10080010) or Clarksfork of Yellowstone River watersheds (10070006). Within the Lander field office area are the Wind River and other tributaries (10080002), Continental Divide Closed Basin (14040200) and Sweetwater (10180006) watersheds and their associated sub-watersheds. The Wind River and Big Horn Basins are part of the Upper Yellowstone River Basin. The Clarksfork of Yellowstone is in the northwest corner of the Cody Field office area and drains directly into the Yellowstone River in Montana. The Sweetwater River flows from west to east into Alcova reservoir in the southern portions of the Lander field office area. The Continental Divide Closed Basin is in the center of the state with no major outlets from the watershed.

The affected watersheds vary greatly depending on watershed size, topography, climate, soils, flow patterns, and existing land uses. The precipitation amounts vary, with the majority of the parcels occurring within 5-9 inches of precipitation per year annually. Other parcels are within 10-14 inches or 15-19 inches per year along higher elevations.

The Watershed Table identifies the amount of lease acres in each HUC 10 watershed, the total number or acres for the HUC 10 watershed, and each lease parcel within the potentially affected HUC 10 watershed if leasing of the parcels occurs. Other factors such as existing development, historic impacts, and other uses within the watershed contribute to the health of the surface water hydrology of the watershed.

Groundwater:

The groundwater resources in the lease area are dependent upon the geologic outcrops that are present in each watershed. The groundwater resources and their protection are administered by the Wyoming Department of Environmental Quality under authority from the US Environmental Protection Agency. The shallow unconfined surficial aquifers are those regionally that are the most susceptible to surface contamination. These aquifers are generally located within alluvial deposits along the major tributaries and rivers in each watershed. Other confined aquifers that are

encountered are from various sandstone and limestone formations of the Tertiary, Cretaceous, and Paleozoic periods.

Riparian/Floodplains: (WFO)

There are nine lease parcels within the Worland Field Office that lie within a 1000 foot buffer from riparian areas on public lands (Table 3-3). These parcels would be subject to conditions of approval that would be applied at the APD stage. The following table is a list of the segments and their current condition using the BLM Technical Reference Manual 1737-17 for the Assessment of Proper Functioning Condition for Lotic Riparian Areas. These riparian areas consist of sedges, rushes, with cottonwood canopy with occasional Tamarisk and Russian Olives in various segments. The flow regimes are intermittent and perennial lotic systems.

3-3 Affect Environment – Watersheds

2012 Oil Gas Parcel WY- 2012-	HUC 10	HU 10 Name	seg code	PFC Rating	riparian_area	seg_len (mi)
219	1008000707	Gooseberry Creek	P0400X	PFC	GOOSEBERRY CK	1.96
229	1008000712	Bighorn River-Elk Creek	P0376X	PFC	TEN MILE CK	0.66
266	1008000711	Lower Fifteenmile Creek	I0603X	NF	FIFTEENMILE CK	4.29
284	1008000706	Cottonwood Creek	P0039X	FAR Downward	COTTONWOOD CK	0.11
285	1008000706	Cottonwood Creek	P0402X	NF	Cottonwood Creek	0.82
285	1008000706	Cottonwood Creek	P0415X	NF	Cottonwood Creek	0.63
286,287	1008000706	Cottonwood Creek	P0401X	NF	Cottonwood Creek	1.43
286	1008000706	Cottonwood Creek	P0051X	FAR	Cottonwood Creek	0.13
287	1008000706	Cottonwood Creek	P0403X	FAR	Cottonwood Creek	3.07
290	1008000704	Bighorn River-Coal Draw	T0005X	FAR	Little Sand Draw	0.39
290	1008000704	Bighorn River-Coal Draw	P0458X	FAR Downward	Sand Draw	3.26
396	1008000704	Bighorn River-Coal Draw	P4519A	FAR	Bighorn River	0.2
396	1008000704	Bighorn River-Coal Draw	P4519B	FAR	Bighorn River	0.2
					Total:	17.15
PFC= Proper Functioning Condition FAR= Functioning at Risk NF= Non Functioning						

3-2 Affect Environment – Watersheds

2012 Oil Gas Parcel WY-2012-	HUC 10	HU 10 Name	seg code	PFC Rating	riparian_area	seg_len (mi)
219	1008000707	Gooseberry Creek	P0400X	PFC	GOOSEBERRY CK	1.96
229	1008000712	Bighorn River-Elk Creek	P0376X	PFC	TEN MILE CK	0.66
266	1008000711	Lower Fifteenmile Creek	I0603X	NF	FIFTEENMILE CK	4.29
284	1008000706	Cottonwood Creek	P0039X	FAR Downward	COTTONWOOD CK	0.11
285	1008000706	Cottonwood Creek	P0402X	NF	Cottonwood Creek	0.82
285	1008000706	Cottonwood Creek	P0415X	NF	Cottonwood Creek	0.63
286,287	1008000706	Cottonwood Creek	P0401X	NF	Cottonwood Creek	1.43
286	1008000706	Cottonwood Creek	P0051X	FAR	Cottonwood Creek	0.13
287	1008000706	Cottonwood Creek	P0403X	FAR	Cottonwood Creek	3.07
290	1008000704	Bighorn River-Coal Draw	T0005X	FAR	Little Sand Draw	0.39
290	1008000704	Bighorn River-Coal Draw	P0458X	FAR Downward	Sand Draw	3.26
396	1008000704	Bighorn River-Coal Draw	P4519A	FAR	Bighorn River	0.2
396	1008000704	Bighorn River-Coal Draw	P4519B	FAR	Bighorn River	0.2
					Total:	17.15
PFC= Proper Functioning Condition FAR= Functioning at Risk NF= Non Functioning						

HUC 8	HU 8 Name	HUC 10	HU 10 Name	2012 Lease Parcel Acres (US)	Total Watershed Acres (US)	Percent of watershed of leased parcels	Lease Parcel #'s
WORLAND							
10080007	Upper Bighorn	1008000704	Bighorn River-Coal Draw	9693	194763	5.0%	219, 221 222,286-290,324,396
10080007	Upper Bighorn	1008000712	Bighorn River-Elk Creek	18999	267564	7.1%	175,177,181,182,223-230,259,261,263,265,267
10080007	Upper Bighorn	1008000706	Cottonwood Creek	9542	267992	3.6%	284-290
10080007	Upper Bighorn	1008000707	Gooseberry Creek	358	230183	0.2%	219,324
10080007	Upper Bighorn	1008000711	Lower Fifteenmile Creek	15979	157938	10.1%	227,228,259-266,291,292
10080007	Upper Bighorn	1008000708	Nowater Creek	1664	170963	1.0%	175,176,219,221
10080008	Nowood	1008000807	Nowood River-Sand Creek	1451	181101	0.8%	147,177,180
10080010	Big Horn Lake	1008001002	Lower Shell Creek	1261	173084	0.7%	178-180
			TOTAL:	58947	1643588		
CODY							
10080011	Dry Creek	1008001102	Dry Creek	3089	129540	2.4%	268,325
10070006	Clarks Fork Yellowstone	1007000607	Clarks Fork Yellowstone River-Silver Tip Creek	226	241755	0.1%	388,389
10080014	Shoshone River	1008001402	Shoshone River-Bitter Creek	1229	174973	0.7%	386,388,389
10080014	Shoshone River	1008001403	Shoshone River-Coon Creek	40	201782	0.0%	387
10070006	Clarks Fork Yellowstone	1007000606	Clarks Fork Yellowstone River-Bear Creek	1208	268976	0.4%	390,392
10070006	Clarks Fork Yellowstone	1007000605	Clarks Fork Yellowstone River-Bennett Creek	2786	227743	1.2%	391-394
			TOTAL:	8578	1244769		
LANDER							
10080003	Popo Agie	1008000301	Little Popo Agie River	23438	248000	9.5%	343-345,349-351,353,354,376,384
10080002	Little Wind	1008000203	Beaver Creek	53119	264478	20.1%	280,281,306,307,312-314,316,317,319-323,335-338,342-354,368-373, 377-379

10180006	Sweetwater	1018000605	Sweetwater River-Buffalo Creek	105368	175870	59.9%	133,139,141,144,155-157,159-174,187-201,203-210,212,213,215,216,218,233-242,246,248-252,270-273,279
10180006	Sweetwater	1018000605	Sweetwater River- Strawberry Creek	41905	227162	18.4%	299-301,305-311,317,329-334,336-341,356,362-366,370-374
10180006	Sweetwater	1018000604	Sweetwater River-Long Creek	72728	156222	46.6%	168,201-205,210-218,243-251,253-258,270,271,273-283,305,306,308,314-318
14040200	Closed Basin	1404020001	Lost Creek	10204	143360	7.1%	123,124,150,183-186,231,232,269,296
10180006	Sweetwater	1018000606	Sweetwater River- Crooks Creek	35425	166400	21.3%	113,118-121,123-126,133-145,149-159, 162,164,172,183,185,187
10180006	Sweetwater	1018000608	Sweetwater River- Willow Creek	41230	165760	24.9%	102,106-119,122,123,125-138
14040200	Closed Basin	1404020015	Boggy Meadows	1276	8546	14.9%	103-105,123,124
10080004	Muskrat	1008000401	Upper Muskrat Creek	4043	191243	2.1%	142-144,167,169,170
10180006	Sweetwater	1018000609	Sweetwater River- Muddy Creek	4980	100480	5.0%	102,103,104
10180006	Sweetwater	1018000607	Sage Hen Creek	1654	109966	1.5%	118,119
10180007	Sweetwater	1018000704	Poison Spider Creek	597	165760	0.4%	94,95
10180006	Sweetwater	1018000611	Sweetwater River- Horse Creek	77	76131	0.1%	94
10080005	Sweetwater	1008000504	Lower Poison Creek	1498	95097	1.6%	146
10180006	Sweetwater	1018000603	Alkali Creek	52505	181669	28.9%	Various
			TOTAL:	450047	2476144		

4 Environmental Impacts

4.1 Introduction

This chapter describes the environmental effects (direct, indirect and cumulative) that would result from the alternatives. This analysis is tiered to the environmental impact statements for the Cody RMP, the Washakie RMP, Grass Creek RMP and Lander RMP. The analysis contained within those environmental impact statements remains adequate, except for those issues disclosed in the following analysis. These RMPs determine which areas are available for oil and gas leasing and under what conditions those leases are to be offered and sold.

4.2 General Analysis Assumptions and Data Limitations

4.2.1 Assumptions

Direct effects of leasing are the creation of a valid existing right and those related to the revenue generated by the lease sale receipts. All other effects would only occur if and when the leases were developed. Such development requires additional analysis and decision making.

For purposes of impact analysis, BLM assumes each parcel would be sold and development of the lease would occur.

4.2.2 Data Limitations

The level of development that might occur is unknown. Knowing the level of development that would occur would enable more precise description of environmental effects. However, any estimation of development is determined by BLM to be too speculative for this environmental assessment. Such information would likely not change BLM's decision as adequate information is available to make a reasoned choice between the alternatives.

Existing data is used to determine resource presence on each parcel. Resource presence may change after this analysis and prior to development. Such information would likely not change BLM's decision as site specific surveys and data gathering would occur prior to development and conditions of approval are added as necessary to protect resources.

4.3 Direct and Indirect Impacts

Direct effects are caused by the action and occur at the same time and place.

Indirect effects are caused by the action and occur later in time or farther removed in distance.

Cumulative effects are those which result from incremental impact of the of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such actions.

4.3.1 Alternative1 - No Action Alternative

4.3.1.1 *Common to all Resources*

Due to demand for oil and gas, it is expected that these parcels may be re-nominated in the future consistent with appropriate land use planning decisions and may be offered for sale with additional stipulations. There is no way to accurately predict what level of restrictions future

leasing may require, but it can be assumed that a substantial portion of the development that would occur under Alternative 1 would still be permitted under future leases. Future nominations for lease would be screened for consistency with the land use plan in effect at the time, and the appropriate environmental review would be conducted to determine associated impacts. Effects from leases issued from any future sales would be analyzed in the appropriate environmental documents for those sales.

4.3.1.2 Air Quality and Climate Change

Development of oil and gas resources cannot occur without a lease. Under this alternative a lease would not be offered for sale, so no development would occur. No impacts to air quality or climate change would result from this alternative.

4.3.1.3 Socioeconomics

Under this alternative, no leases would be issued and no development under those leases would occur. As primarily rural communities that rely heavily on energy development revenue and agricultural uses, the communities in the leasing areas are likely to be negatively impacted by loss of potential revenue from subsequent development of these parcels. 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, and the potential for Federal land to be drained by wells on adjacent private or state land.

4.3.1.4 Cultural Resources

Under the No Action Alternative, the Proposed Action would not occur. No resulting effects on cultural resources would be expected to occur beyond the current situation.

4.3.1.5 Livestock Grazing Management

Under the No Action Alternative, the Proposed Action would not occur. No impact to livestock grazing management under this alternative is expected.

4.3.1.6 Vegetation

No change from current existing probability for new invasive/noxious weed infestations to occur, or for increase of existing populations. No resulting effects vegetation would be expected to occur beyond the current situation.

4.3.1.7 Paleontology and Geology

Under the No Action Alternative, the Proposed Action would not occur. No resulting effects on paleontological and geological resources would be expected to occur beyond the current situation.

4.3.1.8 Recreation, Visual Resources and Special Designations

Under this alternative, an expression of interest to lease (parcel nomination) would be denied or rejected, and a lease would not be offered for that parcel. No resulting effects on recreation, visual resources, LWCs or special designations would be expected to occur beyond the current situation.

4.3.1.9 Wildlife

Under this alternative, these parcels would not be leased. There would be no resulting surface disturbing or disruptive activities to the wildlife or their habitats.

4.3.1.10 Soils

No parcels would be leased under this alternative. There would be no impacts to the soil beyond the current situation.

4.3.1.11 Water Resources

No parcels would be leased under this alternative. There would be no impacts to the water resources beyond the current situation.

4.3.2 Alternative 2 - Proposed Action

4.3.2.1 Air Quality and Climate Change

Air Quality

Issuing leases for the subject tracts would have no direct impacts to air quality. Any potential effects to air quality would occur if and when the leases were developed. Potential impacts of development could include increased air borne soil particles associated with the construction of new well pads, pipelines, or roads, exhaust emissions from drilling equipment, compressors, vehicles, and dehydration and separation facilities, as well as potential releases of GHG and volatile organic compounds during drilling or production activities. The amount of increased emissions cannot be quantified at this time since it is unknown how many wells might be drilled, the types of equipment needed if a well were to be completed successfully (e.g. compressor, separator, dehydrator), or what technologies may be employed by a given company for drilling any new wells. The degree of impact will also vary according to the characteristics of the geologic formations from which production occurs. Emissions of all regulated pollutants (including GHGs) and their impacts will be quantified and evaluated at the time that a specific development project is proposed.

For impact analysis, acreage is used as the impact indicator. Alternative 2 proposes the most amount of land available for leasing and subsequent exploration and development and would therefore have the greatest impact to air resources among the three alternatives.

Climate Change

Subsequent development of any leases issued, would contribute a small incremental increase in overall hydrocarbon emissions, including GHGs. When compared to total national or global emissions, the amount released as a result of potential production from the proposed lease tracts would not have a measurable effect.

Previous environmental analysis (BLM 2011) estimated each well that may be drilled on these parcels, if issued, could emit approximately 0.00059 mt of CO₂. It is unknown what the drilling density may be for these parcels, if they were developed; therefore, it is not possible to predict at this stage what level of emissions would occur.

4.3.2.2 Socioeconomics

Under this alternative all parcels would be offered for lease. This would allow the most revenue for the Federal and State government. In addition, subsequent development and production is anticipated to be highest under this alternative. This would result in the greatest amount of royalties among the three alternatives.

4.3.2.3 Cultural Resources

Cultural resource sites are known to occur within the parcels. Sale of the lease will have no effect on known or unknown cultural properties. However, construction as a result of the lease sale could damage or destroy surface and buried cultural sites. A Class III cultural resource inventory would be completed prior to surface disturbance at the APD or right-of-way application stage. Avoidance/mitigation measures would be developed once the site-specific inventory is completed.

4.3.2.4 Livestock Grazing Management

At the lease stage there are no impacts to livestock grazing. Indirect impacts to grazing would occur through development-related vegetative disturbance with construction of access roads, well sites or pipelines. However, should development occur, impacts associated with surface disturbance would be monitored and adjustments to allotment management would be considered on a case-by-case basis.

4.3.2.5 Vegetation

Native Vegetation – There are no direct impacts from leasing parcels. Indirect impacts would be associated with any future development occurring should the proposed leases be issued. Leasing Terms and Conditions; in addition to laws, regulations, and policy, require that reclamation be completed in a timely manner that best represents pre-disturbance conditions. Best Management Practices would be implemented upon site-specific development to ensure proper reclamation is occurring that supports land management goals and objectives.

Invasive Species – Any surface disturbance can increase the probability of establishment of new populations of invasive non-native species, or increase of an existing weed population. At the APD stage, BLM requirements for use of weed control strategies would minimize the potential for spread of these species.

Threatened, Endangered, and BLM Sensitive Species – There are no direct impacts from leasing parcels. Indirect impacts would be associated with any future development occurring should the proposed leases be issued.

Stipulations and site-specific COAs requiring avoidance would minimize any impacts to those habitats. Parcels WY-1208- 133, 139, 141, 146, and 155 contain habitat that may support the endangered Blowout Penstemon. Parcel WY-1208-254,282 and 283 contains Yermo (*Yermo xanthocephalus*) habitat. A NSO restriction is added to these parcels, therefore no impact is anticipated.

4.3.2.6 Paleontology and Geology

Effects on paleontological and geological resources would be minimal to moderate, as this alternative would lead to leasing of the parcel, with potential for future surface disturbance if an

APD was submitted for development of the parcel. Potential effects are reduced through BLM's requirement for additional analysis, which may include prework paleontological resource surveys prior to approval of surface disturbing activities and/or paleontological monitoring during construction of roads, well pads, and other proposed activities.

Lease Parcel Number 390 Partial Deferral: Development on the northern portion of lease parcel WY-1208-390 in Sections 8 (Tract 44H Resurvey), and 9 (Tracts 45M, 45N and 45O Resurvey), T. 56 N., R. 101 W., would directly interfere with future scientific data research/collection associated with the PETM contact. These specific tracts should be deferred from the lease parcel to avoid adverse direct impacts. The remaining portions of the lease parcel, located in Sections 17 (SW¹/₄), 19 (NE¹/₄) and 20 (N¹/₂, SW¹/₄ and SW¹/₄SE¹/₄), would not be so similarly impacted, as they are located southwest of the PETM ACEC area. Those portions of the parcel could move forward for leasing with all three paleontological stipulations applied to the lease.

4.3.2.7 Recreation, Visual Resource, Lands with Wilderness Characteristic, and Special Designations

Leasing the Federal minerals will not impact visual resources, but the subsequent development of the leases would generate impacts to visual resources. Development of the leases will introduce contrasting elements of line, form, color, and texture against the surrounding natural elements. Contrasting linear elements will be observed in the distinct lines generated by facilities, powerpoles, well pads, and access routes. Contrasting elements of form, color, and texture will be observed in the ancillary facilities, access routes, and the well pads. These contrasting elements could interfere with the casual observer and take the attention away from the natural elements.

While the act of leasing Federal minerals produces no direct impacts; subsequent development of a lease could generate impacts to recreation activities. Recreational use could be impacted by post-lease oil and gas development activities. The quality of the recreational experience would likely be altered by oil and gas development operations. Recreation on split estate lands would be at the discretion of the private landowner.

Alternative 2 will have more potential to impact the visual resources if the lease is developed. Mitigation measures may reduce visual impacts on a project by project basis. However, the multiple low-level contrast facilities that cause a low level of contrast with the characteristic environment may result in more visual impact than documented for Alternative 1. Development in VRM Class I and Class II would be mitigated to meet VRM objectives.

4.3.2.7.1 Cody

Parcel WY-1208- 394 is located within a Wild-and Scenic River eligible segment. Should development in that area occur, this segment may no longer be eligible. Portions of parcels WY-1208 - 268 and 325 lie within the Little Dry Creek LWC. Should development in those areas occur, portions of the LWC may no longer meet the criteria to be included in an LWC.

4.3.2.7.2 Lander

The following parcels will be leased under this alternative and stand to conflict with the management identified for important recreation areas: WY-1208 - 102-105, 106-117, 122-131, 133-138, 141, 149, 151-158, 164-166, 183, 187-193, 206-209, 233-238,242,251, 252, 270-273, 276-279, 294-311, 314-318, 326,327, 329-334, 336-341,355-357,362-367, 370- 374, 380.

Leasing these parcels will limit the effectiveness of the preferred alternative of the Lander Field Office RMP Draft EIS, because doing so allows the lease holder to develop the lease without restrictions to protect high value recreational resources. Under such a lease and if development were to occur limited mitigation measures may be imposed, and therefore developments would stand to conflict with recreational use of the area.

Alternative 2 will require VRM leasing stipulations on the following parcels: 102,103,110-118, 122,123, 127-134, 140,141, 155,164-166, 188-192, 195, 202,204-209, 243-248, 251, 270,271, 276-281, 303, 305, 307-311, 326, 329-335, 340-345, 347, 352-355, 362-364, 367-369, 378, 379, and 382-383.

However, the following parcels that intersect a VRM I or II in the preferred alternative of the LFO Draft RMP will be leased without VRM stipulations: 104-109, 119, 124-126, 135-139, 149, 156-163, 174, 187, 193,194, 196-201, 203, 214-218, 236-242, 249, 250, 252-258, 272-275, 282, 283, 294-296, 298-302,304,306,312-323, 327, 336-339,346,348-351,356-358, 365, 370-377, 380,381,384. Leasing these parcels will limit the effectiveness of designating these areas as VRM I or II in the preferred alternative, because doing so allows the lease holder to develop the lease without restrictions to protect high value visual resources. Under such a lease and if development were to occur limited visual mitigation measures may be imposed, and therefore developments would stand to introduce contrast into the characteristic visual environment that would be more accustomed to VRM classes III and IV.

None of the lease parcels in the Lander Field Office intersect areas found to have wilderness character, citizens proposed wilderness areas, and/or areas proposed to be managed for wilderness character in the LFO Draft RMP EIS. As such, none of the alternatives proposed here stand to impact wilderness character.

4.3.2.7.3 Worland

Recreation

While the act of leasing Federal minerals produces no impacts, subsequent development of a lease would generate impacts to recreation activities. Recreational use could be impacted by post-lease oil and gas development activities. The quality of the recreational experience would likely be diminished by oil and gas development operations. Recreation on split estate lands would be at the discretion of the private landowner.

Oil and gas development in areas providing for exceptional semi-primitive recreational opportunities, such as the lease parcels identified within the Badlands SRMA, will compromise these experiences, and interfere with those desiring such experiences. Altering the settings will introduce goal interference, which may increase the amount of conflicts (from industry vs. recreationists, and recreation uses vs. recreation uses), reduce user satisfaction levels, diminish experiences, and result in non-beneficial outcomes. Impacts from oil and gas development in the Bighorn River SRMA will be minimal because of the NSO stipulation attached to the lease parcels. The NSO stipulation will minimize disturbances to the naturalness, user conflicts, public health and safety, minimize visual contrasts and, and maintain the desired settings prescribed for the Bighorn River SRMA, and developed recreation sites within the Bighorn River SRMA, most notably the site found within Eggert Tract.

Impacts to other resources would also impact recreational opportunities and associated recreational resources. Construction and drilling operations may displace wildlife resources away from areas they have historically occupied. If such post-lease development operations would coincide with hunting season, it is expected that hunters may experience reduced success rates within proximity to the developing areas, and could potentially increase in alternative areas beyond those areas.

In addition to facilitating mineral extraction, new oil and gas roads would also provide better access to the lease areas for recreational opportunities. However, the presence of oil and gas facilities would likely diminish the recreational experience.

Recreation Mitigation

Under Alternative 2, three lease parcels are located within BLM-administered public lands managed under the Bighorn River SRMA objectives, which includes an NSO stipulation.

Table 4-1 – Parcels within the Bighorn River SRMA under NSO stipulations

Parcel	Township	Range	Section	Survey	Aliquot
WY-1208-221	046N	093W	33	A	;NESE, SESE, SWSE
WY-1208-221	046N	093W	34	A	;All
WY-1208-221	046N	093W	35	A	;SENW, SWNW, NESW, SWSW, NWSW, NWNE
WY-1208-289	045N	095W	24	A	;SENE, NESE, SESE
WY-1208-396	045N	094W	19	A	;SWSE, SESW

Visual Resource Management

Leasing the Federal minerals will not impact visual resources, but the subsequent development of the leases will generate impacts to visual resources. Development of the leases will introduce contrasting elements of line, form, color, and texture against the surrounding natural elements. Contrasting linear elements will be observed in the distinct lines generated by facilities, power poles, well pads, and access routes. Contrasting elements of form, color, and texture will be observed in the ancillary facilities, access routes, and the well pads. These contrasting elements will interfere with the casual observer and take the attention away from the natural elements, as well as compromise the local VRI ratings, subsequently rating those areas as lower visual inventory classes. Most of the BLM-administered public lands within the lease parcels are managed as VRM Class IV, which allows for a high degree of change in the elements in the landscape. Mitigation will need to be applied to development within the Class II areas in order

to maintain the Class II objectives. Mitigation may also need to be applied to Class III and IV areas, although these areas allow for more visible intrusions on the landscape.

Since well locations cannot be accurately determined at the leasing stage, it is not possible to accurately predict the visual impacts. Development intensity, terrain, and proximity to visual receptors (e.g., main travel corridors, towns, recreation facilities, etc.) will greatly influence the VRM impacts. For example, a single well pad screened by terrain at an area absent of visual receptors would have low to negligible impacts in Class III or IV areas; whereas well pads developed next to a major travel route or in the viewshed of a community or recreation facility may have substantial impact. It is possible that post-lease industrial development could result in portions or all of a VRM area to be downgraded to a lower classification.

VRM Mitigation

Parcels 221 and 396 are located within BLM-administered public lands managed under VRM Class II objectives. The CSU stipulation has been applied for this alternative and site specific mitigation would be developed should the parcel be sold and developed. Flat colors from the Standard Environmental Colors Chart would be used on all facilities to closely approximate the vegetation within the setting. All facilities, including the meter building, would be painted one of these colors as determined during a site-specific review. If the proposed area is in a scenic corridor use of landscape features for screening, use of low profile tanks, and/or offsite production may be recommended. Other effective VRM mitigation measures may be used to minimize the rate of contrast, such as relocating well sites, realigning or relocating access routes, or manipulating production designs.

Wilderness Characteristics

Leasing all parcels, including those within the areas inventoried as containing wilderness characteristics and analyzed in the Bighorn Basin RMP revision, will not impact wilderness characteristics, but subsequent development of the leases with these areas will impact the characteristics of naturalness, size, solitude and recreation. Access routes to proposed oil and gas projects will dissect through the areas and will dramatically decrease the 5,000 acre or sufficient size criteria, which may ultimately eliminate the area from future wilderness characteristics inventory maintenance. The access roads, facilities, and oil and gas activities will eliminate the characteristics of naturalness, and outstanding opportunities for solitude and primitive recreation. The facilities, routes, and activities will introduce unnatural and contrasting elements to the surrounding environment, which will severely compromise these characteristics. Mitigation measures from other resources will maintain a more subordinate presence, but will not eliminate these contrasting elements, thus compromising the wilderness characteristics' integrity.

Lease parcels WY-1208-396 and WY-1208-221 are located within proximity to Cedar Mountain WSA. Direct impacts to the WSA from the sale of the lease will be negligible. Development of the parcels may have the potential to negatively impact the wilderness characteristics of naturalness and solitude within the WSA.

Wilderness Characteristics Mitigation

Should the parcels found within lands with wilderness characteristics be leased, the leases would be managed in accordance with mitigations in the Grass Creek and Washakie Resource Areas RMPs.

4.3.2.8 Wildlife

Stipulations attached to the leases would minimize impacts to wintering big game, raptor nesting, and give the BLM flexibility to apply stipulations as necessary for any species which are covered under the ESA through consultation with USFWS and through environmental analyses at the APD stage.

These stipulations would reduce most direct short-term impacts on the resource and may minimize long-term impacts depending on the environmental analysis at the APD stage. Wildlife would generally be negatively affected by oil and gas development resulting from these lease sales and subsequent development through habitat fragmentation, degradation, and reduction. Sources of mortality would be developed from operational activity and infrastructure like power lines, settling ponds, and roads etc. As more areas are leased and developed, Sensitive Species populations are likely to decline further.

There would be no effect on ESA listed species. Since there would be a mountain plover stipulation applied to the leases, selling these leases with the stipulations would result in mitigation during the APD stage resulting from the sale of these leases and therefore would not likely jeopardize the continued existence of the mountain plover.

Since there will be a migratory bird stipulation applied to these leases, there would be no take on migratory birds and this stipulation would result in mitigation during the APD stage resulting from these leases being sold.

Current science indicates the restrictions under Alternative 2 do not provide the level of protection desired for Greater sage-grouse habitat within Greater Sage-grouse Core Habitat Areas (also known as BLM's Key Habitat Areas). The BB RMP and Draft EIS analyze the restrictions of current management. The Preferred Alternative in the Draft EIS incorporates restrictions that science indicates to be necessary (Management Action 4120). In the event these parcels are leased and APDs are pursued, Instruction Memorandum WY-2010-012 (BLM 2010), or similar guidance updated and modified over time, would apply to reduce surface disturbing and disruptive APD activities.

Screening of parcels for Greater Sage-grouse Core Areas is contained in Appendix D.

4.3.2.8.1 Cody

Stipulations attached to the leases would minimize impacts to wintering big game, raptor nesting, and give the BLM flexibility to apply stipulations as necessary for any species which are covered under the ESA through consultation with USFWS and through environmental analyses at the APD stage.

These stipulations would reduce most direct short-term impacts on the resource and may minimize long-term impacts depending on the environmental analysis at the APD stage. Wildlife would generally be negatively affected by oil and gas development resulting from these lease sales and subsequent development through habitat fragmentation, degradation, and reduction.

Sources of mortality would be developed from operational activity and infrastructure like power lines, settling ponds, and roads etc. As more areas are leased and developed, Sensitive Species populations are likely to decline further.

There would be no effect on ESA listed species.

Current science indicates the restrictions under Alternative 2 do not provide the level of protection desired for Greater sage-grouse habitat within Greater Sage-grouse Core Habitat Areas (also known as BLM's Key Habitat Areas). The BB RMP and Draft EIS analyze the restrictions of current management. The Preferred Alternative in the Draft EIS incorporates restrictions that science indicates to be necessary (Management Action 4120). In the event these parcels are leased and APDs are pursued, Instruction Memorandum WY-2010-012 (BLM 2010), or similar guidance updated and modified over time, would apply to reduce surface disturbing and disruptive APD activities.

Screening of parcels for Greater Sage-grouse Core Areas is contained in Appendix D.

The Absaroka Front Management Area in the Draft EIS BB RMP may also address winter range and parturition range management and parcels may be affected by the preferred alternative.

All lease development activities must comply with applicable specific, nondiscretionary statutes such as the Migratory Bird Treaty Act (MBTA) and Bald and Golden Eagle Protection Act (BGEA).

4.3.2.8.2 Lander

Parcels WY-1208-094 and 095.

Should the parcels be leased, post-lease APD development activities including road construction, pad development and drilling would likely cause temporary disruption and potential displacement of wildlife in the area for a variety of sage obligate species. For avian species including raptors, these development activities may cause disruption of breeding activities, and impacts to nests, eggs or newly hatched chicks. All lease development activities must comply with applicable specific, nondiscretionary statutes such as the Migratory Bird Treaty Act (MBTA) and Bald and Golden Eagle Protection Act (BGEA). The BLM would modify or condition a proposal to comply with these laws.

Disturbance to Greater sage-grouse due to drilling and other oil/ gas development activities would most likely occur within those parcels nearest a lek perimeter. To reduce the potential impacts and comply with the applicable RMP we recommend the standard TLS for Greater sage-grouse breeding and nesting /early brood rearing habitat.

Parcels WY-1208-103

Should this parcel be leased, post-lease APD development activities including road construction, pad development and drilling would likely cause temporary disruption and potential displacement of wildlife in the area for a variety of sage obligate species. For avian species including raptors, these development activities may cause disruption of breeding activities, and

impacts to nests, eggs or newly hatched chicks. All lease development activities must comply with applicable specific, nondiscretionary statutes such as the MBTA and BGEA. The BLM would modify or condition a proposal to comply with these laws. Disturbance to Greater sage-grouse due to drilling and other oil/ gas development activities could occur within nesting/brood rearing habitat within Core Area and the expanded sage-grouse ACEC.

Surface disturbing and disruptive activities on this parcel during the crucial big game wintering period could impact wintering mule deer and elk, such as displacing animals to less suitable winter habitat, causing stress to animals and ultimately decreasing the reproductive rates of females or causing individual mortality through malnutrition. To reduce these potential impacts and comply with the applicable RMP, stipulations for big game winter range, Greater sage-grouse breeding and nesting/early brood rearing habitat as well as for nesting raptors would be applied.

Parcels WY-1208-104,105,146,152 and 154

Should the parcels be leased, post-lease APD development activities including road construction, pad development and drilling would likely cause temporary disruption and potential displacement of wildlife in the area for a variety of sage obligate species. For avian species including raptors, these development activities may cause disruption of breeding activities, and impacts to nests, eggs or newly hatched chicks. All lease development activities must comply with applicable specific, nondiscretionary statutes such as the MBTA and BGEA. The BLM would modify or condition a proposal to comply with these laws. Disturbance to Greater sage-grouse due to drilling and other oil/ gas development activities could occur within nesting/brood rearing habitat.

Surface disturbing and disruptive activities on parcels during the crucial big game wintering period could impact wintering mule deer and elk, such as displacing animals to less suitable winter habitat, causing stress to animals and ultimately decreasing the reproductive rates of females or causing individual mortality through malnutrition. To reduce these potential impacts and comply with the applicable RMP, stipulations for big game winter range, Greater sage-grouse breeding and nesting/early brood rearing habitat as well as for nesting raptors would be applied.

Parcels WY-1208- 112, 122, 129-132.

Should the parcels be leased, post-lease APD development activities including road construction, pad development and drilling would likely cause temporary disruption and potential displacement of wildlife in the area for a variety of sage obligate species. For avian species including raptors, these development activities may cause disruption of breeding activities, and impacts to nests, eggs or newly hatched chicks. All lease development activities must comply with applicable specific, nondiscretionary statutes such as the MBTA and BGEA. The BLM would modify or condition a proposal to comply with these laws. Disturbance to Greater sage-grouse due to drilling and other oil/ gas development activities would most likely occur within those parcels nearest a lek perimeter and/or within the expanded sage-grouse ACEC.

Surface disturbing and disruptive activities on parcels during the crucial big game wintering period could impact wintering mule deer and pronghorn, such as displacing animals to less suitable winter habitat, causing stress to animals and ultimately decreasing the reproductive rates of females or causing individual mortality through malnutrition. To reduce these potential impacts and comply with the applicable RMP, stipulations for big game winter range, Greater sage-grouse breeding and nesting/early brood rearing habitat as well as for nesting raptors would be applied.

Parcels WY-1208-102, 123, 124, 128, 151, 153, and 187

Should the parcels be leased, post-lease APD development activities including road construction, pad development and drilling would likely cause temporary disruption and potential displacement of wildlife in the area for a variety of sage obligate species. For avian species including raptors, these development activities may cause disruption of breeding activities, and impacts to nests, eggs or newly hatched chicks. All lease development activities must comply with applicable specific, nondiscretionary statutes such as the MBTA and BGEA. The BLM would modify or condition a proposal to comply with these laws. Disturbance to Greater sage-grouse due to drilling and other oil/ gas development activities would most likely occur within those parcels nearest a lek perimeter.

Surface disturbing and disruptive activities on parcels during the crucial big game wintering period could impact wintering mule deer and pronghorn antelope, such as displacing animals to less suitable winter habitat, causing stress to animals and ultimately decreasing the reproductive rates of females or causing individual mortality through malnutrition. To reduce these potential impacts and comply with the applicable RMP, stipulations for big game winter range, Greater sage-grouse breeding and nesting/early brood rearing habitat as well as for nesting raptors would be applied.

Parcels WY-1208-106-111, 113-121, 125-127, 133-145, 149, 150, 155-174, 183-218, 231-252, 253-258, 269-283, 293-323, and 326-384.

Should the parcels be leased, post-lease APD development activities including road construction, pad development and drilling would likely cause temporary disruption and potential displacement of wildlife in the area for a variety of sage obligate species. For avian species including raptors, these development activities may cause disruption of breeding activities, and impacts to nests, eggs or newly hatched chicks. All lease development activities must comply with applicable specific, nondiscretionary statutes such as the MBTA and BGEA. The BLM would modify or condition a proposal to comply with these laws. Disturbance to Greater sage-grouse due to drilling and other oil/ gas development activities would most likely occur within those parcels nearest a lek perimeter.

Surface disturbing and disruptive activities on parcels during the crucial big game wintering period could impact wintering pronghorn antelope, mule deer, elk and moose such as displacing animals to less suitable winter habitat, causing stress to animals and ultimately decreasing the reproductive rates of females or causing individual mortality through malnutrition. To reduce these potential impacts and comply with the applicable RMP, stipulations for big game winter

range, Greater sage-grouse breeding and nesting/early brood rearing habitat as well as for nesting raptors would be applied.

4.3.2.8.3 Worland

West Side of Worland FO (Grass Creek RMP area)

Parcels 219, 284, 285, 286 – 290, 324

Should the parcels be leased, post-lease development activities (road/pad/well drilling activities) would likely cause temporary disruption and potential displacement of wildlife in the area. These activities mentioned above, during wintering, breeding, nesting and early brood rearing periods for sage-grouse, raptors, and the sagebrush obligates mentioned above, may cause disruption of these activities and unnecessary impacts to nesting birds, such as egg or hatchling abandonment, or actual nest destruction for those species nesting on or near the ground. Surface disturbing and disruptive activities on the parcels during the crucial big game wintering period could cause unnecessary impacts to wintering mule deer and antelope, such as displacing animals to less suitable winter habitat and conceivably the displacement could result in increased stress and predation levels and decreased pregnancy rates and therefore population levels. To minimize and mitigate these potential impacts, we recommend the standard TLS for big game winter range, sage-grouse nesting/early brood rearing as well as for nesting raptors, if any known nests are found to be active or any new nests are located. And for parcel 324, within .6 mile of active sage-grouse leks, we recommend the CSU stipulation to mitigate potential impacts to the sage-grouse lek and breeding activity. A CSU is also recommended during the nesting period to help mitigate potential impacts to the sagebrush obligate species mentioned above as well. For all of the nesting avian species mentioned above, inventories for active nests will be required before any APD activity is to be authorized during the nesting season. And subsequently if no nesting activity is documented, then the TLS and CSU protection for nesting will not be needed.

Well-pad, road, and pipeline development into areas currently void of surface disturbing or disruptive activities would result in habitat fragmentation, which, depending on the intensity of the development, vegetative cover and terrain, could affect the habitat viability for all species mentioned above.

In the event these parcels are leased and APDs are pursued, unless otherwise stated above, as prescribed by the Grass Creek RMP and IM No. WY-2010-012, the potential wildlife impacts identified above would be mitigated through the application of TLS and CSU restrictions to the potential surface disturbing and disruptive APD activities. See Appendix A for the specific wildlife stipulations applied to each parcel.

Parcels # 177, 181, 182, 222-230, 259-267, 291, 292, and 396

Should the parcels be leased, post-lease oil and gas development activities (road/pad/well drilling activities) would likely cause temporary disruption and potential displacement of wildlife in the area. These activities mentioned above, during breeding and nesting periods for raptors, and the sagebrush obligates mentioned above, may cause disruption of breeding activities and unnecessary impacts to nesting birds, such as egg or hatchling abandonment, or actual nest destruction for those species nesting on or near the ground. Depending on when surface disturbing and disruptive activities associated with potential development occurs, there could be

potential impacts to Mountain plover, burrowing owl and white-tailed prairie dog. Surface disturbing activities and associated motor vehicle traffic from April through June could potentially destroy and or disturb Mountain plovers and their nests. This same disturbance later in the summer could potentially result in displacement of, or increased road collision mortality to white-tailed prairie dogs and borrowing owls as well. Any new above ground structures constructed or installed, associated with this potential development, could potentially result in increased predation rates on these species by providing artificial raptor perches and enhanced foraging opportunities. Surface disturbing and disruptive activities on the parcels during the crucial big game wintering period could cause unnecessary impacts to wintering mule deer and antelope, such as displacing animals to less suitable winter habitat and conceivably the displacement could result in increased stress and predation levels and decreased pregnancy rates and therefore population levels.

To minimize and mitigate these potential impacts, we recommend the standard TLS for crucial big game winter range, sage-grouse wintering and nesting/early brood rearing, as well as for nesting raptors, if any known nests are found to be active or any new nests are identified. To reduce impacts to White-tailed prairie dogs and burrowing owls from potential development, burrows should be avoided where ever possible when laying out well locations and access roads. And to reduce raptor predation on these species as well as on the Mountain plovers, all above ground structures constructed or installed associated with any new development should be as low profile as possible and be fitted with anti-raptor perch devices. And we recommend the CSU stipulation during the breeding and nesting period for the Mountain plover, burrowing owl, and sagebrush obligate species mentioned above. For all of the nesting avian species mentioned above, inventories for active nests will be required before any APD activity is to be authorized during the nesting season. And subsequently if no nesting activity is documented, then the TLS and CSU protection for nesting will be lifted

Well-pad, road, and pipeline development into areas currently void of surface disturbing or disruptive activities would result in habitat fragmentation, which, depending on the intensity of the development, vegetative cover and terrain, could affect the habitat viability for all species mentioned above.

In the event these parcels are leased and APDs are pursued, unless otherwise stated above, as prescribed by the Grass Creek RMP, the potential wildlife impacts identified above would be mitigated through the application of TLS and CSU restrictions to the potential surface disturbing and disruptive APD activities. See Appendix A for the specific wildlife stipulations applied to each parcel.

East Side of Worland FO (Washakie RMP area)

Parcels 147, 175, 176, 177, 178, 179, 180, 220, 219, 221, 396

Under the proposed action these parcels would be leased and the activity associated with development of oil & gas resources could take place. There is potential for the temporary displacement of wildlife species that may be utilizing habitat in the immediate vicinity of the proposed activity, however due to existing activity associated with ongoing oil & gas development in the area of several of these parcels, there would not likely be significant additional disturbance to wildlife resources and no long term degradation of habitat or permanent displacement of wildlife species is anticipated as a result of the proposed activity. The

application of the seasonal stipulation protecting big game winter habitat is not recommended for these parcels. A portion of parcel 219 and the entire area of parcel 221 lie within a sage grouse core breeding area, however neither parcel is within a two-mile radius of an active sage grouse lek, therefore the stipulation protecting sage grouse nesting and early brood-rearing habitat is not recommended for that portion of parcel 219 that is within the core breeding area or parcel 221.

4.3.2.9 Soils

The act of leasing these parcels would have no impacts to the soil resource. Assuming exploration and development was to occur, surface disturbance would not be allowed on slopes greater than 25 percent without extensive mitigation requirements. Geophysical traffic and well pad construction would be prohibited on saturated or frozen soils, or when watershed damage would be likely to occur. Where development and production does occur, the impacts to the soil resource cannot be predicted until the site-specific APD development stage. Soils vary in their suitability for cross country travel associated with geophysical activities, for well pad and road development, and following disturbance, in their reclamation potential. Subsequent development of the lease would physically disturb the soil. The direct impact from the construction of well pads, access roads, and reserve pits, includes the removal of vegetation, exposing the soil to the erosive forces of rain drop impact and overland flow, mixing of horizons, compaction, loss of topsoil productivity and increased susceptibility to runoff and erosion. Indirect impacts could include off-site sedimentation and blowing sands or dust. Contamination of the soil from drilling and production chemicals, wastes or petroleum products, either spilled or mixed into the soil, could cause short-term or long-term reduction in site productivity. Some impacts can be avoided or reduced through proper design, construction techniques, maintenance, and implementation of Best Management Practices (BMPs), or required site specific Conditions of Approval (COAs). Upon abandonment of wells, pads or when access roads are no longer in service, the Authorized Officer would issue instructions for the surface reclamation and restoration of the disturbed areas as described in the COA.

4.3.2.10 Water Resources

Hydrology

While the act of leasing a parcel would produce no impacts, subsequent development of the lease would result in long term and short term changes to the hydrologic regime. Because of reduced water infiltration rates on well pads and roads, surface flows would move more quickly to stream channels, causing peak flow to occur earlier and to be higher than normal. Such an increase in runoff volumes and magnitude of the peak flow has the potential cause bank erosion, channel widening, downward incision, and disconnection from the floodplain. These potential effects would be dependent on the density of pad and road development within a watershed. Low density development may only affect the smaller tributary streams but not the larger ones, whereas more concentrated development within a watershed or catchment would tend to create potential effects further downstream to larger channels. Increased runoff volumes of water to streams and washes may actually increase groundwater recharge volumes. Long-term direct and indirect impacts to the watershed and hydrology would continue for the life of wells and would decrease once all well pads and road surfacing material has been removed and reclamation of well pads, access roads, pipelines, and power lines has taken place. Short-term direct and indirect

impacts to the watershed and hydrology from access roads that are not surfaced with material would occur and would likely decrease in time due to reclamation efforts.

The direct impacts would be analyzed and mitigated at the APD level on a site specific basis. BLM specialists would verify the presence/absence of surface water and/or riparian habitat within 500 feet of any proposed oil or gas well location(s) and would determine the need for any location adjustments or additional stipulations/BMPs if and when APDs are submitted. The presence of surface water and/or riparian habitat will be considered by the BLM when reviewing proposals for lease development.

The parcels may have existing ground water rights in the vicinity that are used for municipal purposes, including drinking water. Any development and subsequent operation of oil or gas wells within any of these parcels would be done in as responsible a manner as possible to minimize potential impacts to drinking water sources, surface and ground water resources, riparian-wetland habitat, and other associated resources.

Watershed

Site specific watershed analysis has not been analyzed at this stage however; the environmental effects to hydrology are from surface disturbance from well pads, constructed roads, placement of culverts, and produced discharge water from facilities. The amounts of bare ground are increased along with compaction and re-routing of storm water around facilities. Effects generally include changes to runoff timing and increased peak runoff following storm events. Increased sedimentation likely occurs from disturbed areas. Higher velocity and sediment loads from developed areas likely will occur.

The general impacts to hydrology are from surface disturbance from well pads, constructed roads, placement of culverts, and produced discharge water from facilities. The amounts of bare ground are increased along with compaction and re-routing of storm water around facilities.

Water Quality

In the WRBBDO there is commonly produced water in association with oil and gas development. All produced water from federal leases must be disposed of in accordance with Onshore Oil and Gas Order Number 7 utilizing injection into the subsurface, into pits, or other acceptable methods approved by the authorized officer, including surface discharge under Natural Pollutant Discharge Elimination System (NPDES) permit. Injection is generally the preferred method of disposal. No surface water or ground water problems have been identified on the proposed leased parcels.

While the act of leasing the parcels would produce no impacts, subsequent development of the lease could lead to surface disturbance from the construction of well pads, access roads, pipelines, and power lines and could result in degradation of surface water quality and groundwater quality from non-point source pollution, especially from potentially increased soil erosion and sedimentation. Potential direct impacts could be brought about by soil disturbance due to construction of well pads, access roads, pipelines, and power lines, and may include increased surface water runoff, erosion, and off-site sedimentation and dissolved constituents (salt loading) to downstream waters. Such hydrologic effects may cause changes in downstream channel morphology such as bed and bank erosion or accretion. The magnitude of these potential impacts to water resources would depend on the proximity of the disturbance to the drainage channel, slope aspect and gradient, degree and area of soil disturbance, soil character, duration

and time within which construction activity would occur, and the timely implementation and success or failure of mitigation measures. Direct impacts would likely be greatest shortly after the start of construction activities and would decrease in time due to proper implementation of Best Management Practices (BMP's) that would include proper design of facilities along with effective temporary stabilization measures that would promote permanent natural vegetative stabilization and reclamation of disturbed areas. Construction activities would occur over a relatively short period, and therefore the majority of the disturbance would be evident but short lived. Impacts to surface water quality could be managed (minimized) through the implementation, monitoring, and necessary adjustment of BMP's prescribed. However, short-term and minor impacts may occur during storm flow events. Petroleum products and other chemicals, accidentally spilled, could result in surface and groundwater contamination. Similarly, possible leaks from reserve and evaporation pits could degrade surface and ground water quality. Authorization of development projects would require compliance with BLM directives and stipulations that relate to surface and groundwater protection.

Groundwater

Any development and subsequent operation of oil or gas wells within any of these parcels would be done in as responsible a manner as possible to minimize potential impacts to drinking water sources, surface and ground water resources, riparian-wetland habitat, and other associated resources. Other groundwater and aquifer protection measures would be implemented following Wyoming Oil and Gas Commission, WYDEQ and EPA requirements as applicable.

Riparian/Floodplains

The direct impacts would be analyzed and mitigated at the APD level on a site specific basis. BLM specialists would verify the presence/absence of surface water and/or riparian habitat within 500 feet of any proposed oil or gas well location(s) and would determine the need for any location adjustments or additional stipulations/BMPs if and when APDs are submitted. Construction or development within a designated 100 year floodplain area will also be analyzed and mitigated appropriately. The presence of surface water and/or riparian habitat will be considered by the BLM when reviewing proposals for lease development.

4.3.3 Alternative 3- Modified and Deferred

4.3.3.1 Common to all Resources

Areas deferred may be offered for lease in the future. Should they be offered and sold, a lease would be issued. This would have the effect of creating smaller leases, which may increase the level of surface disturbance.

4.3.3.2 Air Quality and Climate Change

Air Quality

Under this alternative, fewer acres would be offered for lease and thereby few acres available for oil and gas development, than Alternative 2. Therefore, fewer impacts to air quality would result. However, since the level of development is unknown, the reduction in effects be quantified.

Climate Change

As fewer acreage is available for oil and gas development, fewer wells are anticipated, therefore, less greenhouse gas emissions are expected than under Alternative 2. However, since the level of development is unknown, the reduction in greenhouse gas emissions cannot be quantified.

4.3.3.3 Socioeconomics

Under this alternative, not all parcels would be offered for lease. This would result in a reduction in revenue compared to Alternative 1 for the Federal and State government. The actual amount of the reduction is not known. Development and production would result in fewer royalties than Alternative 1.

4.3.3.4 Cultural Resources

Cultural resource sites are known to occur within the parcels. Sale of the parcels would have no effect on known or unknown historic properties. However, construction as a result of the lease issuance could damage or destroy surface and buried cultural sites, as well as cause visual impacts to sites where setting is an important aspect of integrity. A Class III cultural resource inventory would be completed prior to surface disturbance at the APD or right-of-way application stage. Avoidance or mitigation measures would be developed once the site specific inventory is completed.

Cody

Due to potential conflicts with Alternative D of the Bighorn Basin RMP revision, Record #5020, #5021, and #7188; the following parcels will be deferred or partially deferred under Alternative 3: WY-1208-385, WY-1208-386, WY-1208-387, WY-1208-390, WY-1208-391, WY-1208-392, WY-1208-393, and WY-1208-394. Recent BLM analysis (BLM 2011b) includes different constraints for protection of cultural resources. These parcels would be deferred until these various protections can be analyzed. Therefore, impacts to cultural resources would be less than Alternative 2 but more than the no action alternative.

Lander

To avoid precluding Lander's preferred alternative in the RMP revision, one portion of parcel 146 is recommended for deferral. This portion of the parcel is within an area considered for protection of Indian Sacred Sites. Tribal consultation for the RMP revision emphasized the need to protect this prehistoric burial site. In addition, several tribes have repeatedly told the BLM that burial sites need a protection zone of at least one (1) mile with no exceptions. Parcel 146 should be deferred at this time because the site cannot be adequately protected until the decision has been issued for the RMP revision.

A majority of the parcels in the present lease sale list are near the Oregon, Mormon Pioneer, California, and Pony Express National Historic Trails, which are also part of the National Landscape Conservation System (NLCS). In order to avoid precluding the preferred alternative for protection of the National Historic Trails in Lander's RMP revision, these parcels are recommended for deferral. Stipulations have been applied to some of the parcels according to the 1987 Lander Resource Management Plan (RMP). All of the following parcels are recommended for deferral because there is not adequate protection for the National Trails until the decision has been issued for the RMP revision. The parcels are: 106, 107, 109, 113-117, 119,

133-136, 139-141, 155-158, 162-166, 188-198, 204-209, 236-240, 248-252, 270-273, 276-279, 291, 299-311, 315-318, 329, 330, 332, 333, 335-337, 340, 108, 110, 111, 118, 124-127, 137, 138, 149, 151, 159-161, 187, 199-203, 231, 233-235, 241-247, 275, 294-296, 313, 314, 326, 327, 338, 341, and 346-348.

In addition, many of the parcels in the present lease sale list are within the South Pass Historical Landscape ACEC, which is proposed in Lander's preferred alternative in the RMP revision. This proposed historical landscape includes the ruts and intact settings around the Oregon, Mormon Pioneer, California, and Pony Express National Historic Trails, and the Continental Divide National Scenic Trail, which are also part of the National Landscape Conservation System (NLCS). In order to avoid precluding the preferred alternative for protection of the National Scenic and Historic Trails in Lander's RMP revision, these parcels are recommended for deferral. Stipulations have been applied to some of the parcels according to the 1987 Lander Resource Management Plan (RMP). All of the following parcels are recommended for deferral because there is not adequate protection for the proposed ACEC area until the decision has been issued for the RMP revision. The parcels are: 326, 327, 329-334, 336-341, 355-359, and 362-374.

To provide protection to a significant regional historic trail (i.e., the Rawlins to Fort Washakie Stage Road), a Controlled Surface Use stipulation is added to parcels 124, 149, 152, 155, 157, 188, 194, 204, 205, 246, 248, 249, 250, 276, 277, 312, 313, 314, 315, 322, and 323 within a ¼ mile of the trail. In addition, in order to avoid precluding the preferred alternative for Lander FO's RMP revision, the following parcels are to be deferred at this time for protection of the significant regional historic trails: 123, 124, 149-157, 165, 166, 183, 185, 187, 188, 193-195, 198, 202-207, 209, 237, 243-252, 271, 274-279, 312-316, 318, 321-323, 352, and 354.

Several parcels contain or are near sites known to be of interest to Native American tribes. Some of these sites are of high tribal interest, including possible prehistoric burials, prehistoric medicine wheels, major rock art sites, battlefields, and unique stone alignments. Other sites, while still of interest, have a lower level of significance to tribes (e.g., prehistoric vision quest features, prayer circles, stone alignments, rock shelters, hunting blinds, cairns, and stone circles for habitation). Before approving any action that could affect such sites, the BLM is required to complete tribal consultation under the National Historic Preservation Act and the American Indian Religious Freedom Act. All of the following parcels are recommended for deferral because there is not adequate protection of high Native American tribal interest until the decision has been issued for the RMP revision. The parcels are: 106, 117, 123, 124, 296, 297, 298, 321, 322, 327, 350, 351, 353, 354, 368, 379, and 380.

Worland

Due to potential conflicts with Alternative D of the Draft Bighorn Basin RMP, Record #5020 and 5021, the following parcels will be completely or partially deferred under alternative 3: 177, 181-182, 219, 221-222, 225-226, 229, 286-290, and 396. These fifteen (15) parcels contain or are potentially within the foreground (3 miles) of historic properties eligible under criteria A or C where setting is an important aspect of integrity.

4.3.3.5 Livestock Grazing Management

Under this alternative, fewer acres would be offered for lease and thereby fewer acres available for oil and gas development, than Alternative 2. However, since the level of development is unknown, the reduction in effects cannot be quantified.

4.3.3.6 Vegetation

Native Vegetation and Invasive Species

For those areas offered for sale, there would be no additional effects beyond those discussed in Alternative 2. For those areas to be deferred there would be no change from current probability for new invasive/noxious weed infestations to occur or for existing populations to increase.

Threatened, Endangered, and BLM Sensitive Species

No effects beyond those identified in Alternative 2 would be associated with Threatened, Endangered, and BLM Sensitive Species. However, a CSU would be added to identify that the parcel may contain BLM sensitive species and special site specific mitigation may be required for future development. Parcels WY-1208- 133, 139, 141, 146, and 155 contain habitat that may support the endangered Blowout Penstemon (*Penstemon haydenii*). This alternative would apply a NOS to the portion of the parcels WY-1208- 254, 282, and 283 which contain Yermo (*Yermo xanthocephalus*) habitat.

4.3.3.7 Paleontology and Geology

4.3.3.7.1 Cody

Lease Parcel Number 390 Partial Deferral: Development on the northern portion of lease parcel WY-1208-390 in Sections 8 (Tract 44H Resurvey), and 9 (Tracts 45M, 45N and 45O Resurvey), T. 56 N., R. 101 W., would directly interfere with future scientific data research/collection associated with the PETM contact. These specific tracts are deferred from offering for sale until such time the Bighorn Basin RMP is completed. The remaining portions of the lease parcel, located in Sections 17 (SW $\frac{1}{4}$), 19 (NE $\frac{1}{4}$) and 20 (N $\frac{1}{2}$, SW $\frac{1}{4}$ and SW $\frac{1}{4}$ SE $\frac{1}{4}$), would not be so similarly impacted, as they are located southwest of the PETM ACEC area. Those portions of the parcel could move forward for leasing with all three paleontological stipulations applied to the lease.

With the exception of not offering for lease the portions of parcel WY-1208-390 described above, anticipated affects would be similar to Alternative 2 – The Proposed Action.

4.3.3.7.2 Lander

The surface formations within the lease parcels in the Lander FO have produced significant paleontological localities. Sale of the parcels will have no effect on paleontological resources. However, construction activities associated with lease hold development could damage or destroy surface or buried paleontological resources; likewise, construction activities could reveal potentially significant finds not previously known adding greatly to paleontological knowledge. One hundred twenty two (122) parcels in the Lander FO include surface formations of a PFYC “5” rating and quite a few more have PFYC ratings of “3”. Mitigation measures would be developed at the site specific APD application stage. Although the amount and location of direct

and indirect effects cannot be predicted until the site specific APD stage of development, an inventory or monitoring may be necessary prior to surface disturbing activities.

4.3.3.7.3 Worland

Surface formations within the lease parcels in the Worland FO have produced paleontological localities. Sale of the lease will have no effect on paleontological or geological resources. However, construction as a result of the lease sale could damage or destroy surface and buried paleontological resources. As all parcels include surface outcrops of a minimum of a PFYC 3 rating, stipulations to mitigate the effects of such leasing would be added to each lease parcel that is recommended to the State Director for sale. Mitigation measures would be developed at the site specific APD or right-of-way application stage. Although the amount and location of direct and indirect effects cannot be predicted until the site-specific APD stage of development, an inventory may be necessary prior to construction. The exposure of previously unknown paleontological finds of scientific significant could be a positive impact contributing to the knowledge base of the Worland Field Office.

4.3.3.8 Recreation, Visual Resources, and Special Designations

4.3.3.8.1 Cody

Recreation

Impacts to recreation will be the same as those analyzed in Alternative 2, with the exception of the deferral of parcel WY-1208 – 394 found within the Rivers SRMA:

Deferring this parcel will result in negligible impacts to recreation because the parcel will not be developed. Deferring the parcel will allow the BLM to continue to manage for the desired settings, opportunities, experiences, and beneficial outcomes attained in this area as expressed by the public until the completion of the Bighorn Basin RMP.

The deferral of other parcels from the other renewable resources' management actions, such as from VRM, LWCs, and wildlife will not impact recreation or associated uses. Impacts to these areas will be the same as those in Alternative 1.

Visual Resource Management

Impacts to the VRI classes will be the same as those analyzed in Alternative 2, with the exception of the deferral of the following parcel found within an area that is analyzed to be managed as VRM Class II:

WY-1208 – 394.

The deferral of this parcel will result in negligible impacts to the visual inventory class because this area will not be developed. Lack of development within this area will result in no contrasting elements introduced to the surrounding natural elements. Impacts in this area will be the same as those analyzed in Alternative 1.

Lands with Wilderness Characteristics

All parcels were screened for resource values potentially containing wilderness characteristics. Under this alternative, lands within the 2 parcels would be partially deferred from the August 2012 sale (refer to Appendix C) since portions of these parcels were inventoried as containing wilderness characteristics. Impacts to these areas will be the same as those in Alternative 1. For

the Cody FO area, defer portions of parcels 268 and 325 as they lie within the Little Dry Creek LWC. Parcel 268 – defer lots 1 (50.13 acres), 2 (50.03 acres), 3 (49.93 acres), 6 (37.01 acres), 7 (32.94 acres), 8 (32.93 acres), 9 (47.06 acres), 46A (40.85 acres), 46B (40.81 acres), 46C (40.77 acres), 46D (40.76 acres), 46E (40.79 acres), 46F (40.83 acres), 46G (40.87 acres). Parcel 325 – defer Tract 107 B (40.61 acres).

Wild and Scenic Rivers

If parcel 394 is deferred under Alternative 3, the potential for future impacts are temporarily diminished as the parcel could be renominated once the Bighorn Basin RMP is completed.

4.3.3.8.2 Lander

Recreation

Alternative 3 will not impact important recreation areas, nor will the alternative cause conflict with the preferred alternative of the Draft RMP EIS.

Visual Resource Management

Overall, Alternative 3 will have similar impact to visual resources as identified for Alternative 1. Due to the very restrictive leasing strategy of Alternative 3 there will be no impact to important Visual Resources. All areas currently managed as class I and II will receive leasing stipulations as denoted under Alternative 2: additionally those leases that intersect VRM I and II areas (as identified under the impact analysis for Alternative 2) of the preferred alternative of the LFO Draft RMP EIS will be deferred. Alternative 3 does not result in actions that would cause BLM to forgo the preferred alternative of the LFO Draft RMP EIS.

Lands with Wilderness Characteristics

None of the lease parcels intersect areas found to have wilderness character, citizens proposed wilderness areas, and/or areas proposed to be managed for wilderness character in the LFO Draft RMP EIS. As such, none of the alternatives proposed here stand to impact wilderness character.

4.3.3.8.3 Worland

Recreation

Impacts to recreation will be the same as those analyzed in Alternative 2, with the exception of the deferral of other lease parcels from the other renewable resources' management actions, such as from VRM, LWCs, and wildlife, which will not impact recreation or associated uses. Impacts to these areas will be the same as those in Alternative 2.

Deferring lease parcels will result in negligible impacts to recreation because these parcels will not be developed. Deferring the lease parcels will allow the BLM to continue to manage for the desired settings, opportunities, experiences, and beneficial outcomes attained in this area as expressed by the public.

The deferral of other lease parcels from the other renewable resources' management actions, such as from VRM, LWCs, and wildlife will not impact recreation or associated uses. Impacts to these areas will be the same as those in Alternative 3.

Recreation Mitigation

Mitigation measures applied to lease parcels from the Bighorn River SRMA are the same as those in Alternative 2.

Visual Resource Management

Impacts to the visual resource inventory classes will be the same as those analyzed in Alternative 2, with the exception of the deferral of 2 partial lease parcels found within areas that are analyzed to be managed as VRM Class II:

Table 4-2 - Lease Parcels to be deferred

Parcel	Township	Range	Section	Survey Type	Aliquot
WY-1208-221	046N	093W	33	L	;1,2,3
WY-1208-221	046N	093W	33	A	;NESE, SESE, SWSE
WY-1208-221	046N	093W	34	L	;1
WY-1208-221	046N	093W	34	A	;NENW, SENW,SWNW
WY-1208-221	046N	093W	34	A	;SWNE, NWSW
WY-1208-396	045N	094W	19	A	;SESW

The partial deferral of these lease parcels, in addition to the deferral of other lease parcels from the other renewable resources' management actions, will result in negligible impacts to the visual inventory classes because these areas will not be developed. Lack of development within these areas will result in no contrasting elements introduced to the surrounding natural elements. Impacts in these areas will be the same as those analyzed in alternative 2.

Lands with Wilderness Characteristics

Under this alternative, 29 parcels and nine partial parcels would be offered. The nine partial lease parcels would be deferred from the August 2012 sale (refer to Table 4-3) because the parcels are within areas identified as containing wilderness characteristics that are currently being analyzed in the Bighorn Basin Resource Management Plan revision. Table 4-3 displays the nine parcels proposed for partial deferral because of conflicts with the draft Bighorn Basin RMP revision.

Table 4-3 - Lease Parcels to be deferred

Parcel	Township	Range	Section	Survey Type	Aliquot
WY-1208-259	0480N	0940W	2	A	;NWSW, SWNW, NWNW
WY-1208-259	0480N	0940W	3	A	;All
WY-1208-259	0480N	0940W	4	A	;All
WY-1208-260	0480N	0940W	5	A	;All
WY-1208-260	0480N	0940W	6	A	;All
WY-1208-260	0480N	0940W	7	A	;All
WY-1208-260	0480N	0940W	8	A	;N1/2, NESE, NWSE, SWSW, NWSW, NESW

WY-1208-261	0480N	0940W	9	A	;NENE, NWNE
WY-1208-262	0480N	0940W	9	A	;NENW, SENW, SWNW, NWNW, SWNE
WY-1208-263	0480N	0940W	18	A	;NENW
WY-1208-267	0490N	0940W	1	A	;S2
WY-1208-267	0490N	0940W	2	L	;4
WY-1208-267	0490N	0940W	2	A	SWNW, W2SE, SESE
WY-1208-285	0440N	0950W	7	A	;SWSE, SESW
WY-1208-285	0440N	0950W	8	A	;SESE, SWSE, SESW
WY-1208-285	0440N	0950W	9	A	;SENE, S 1/2
WY-1208-286	0450N	0950W	10	A	;All
WY-1208-286	0450N	0950W	11	A	;All
WY-1208-286	0450N	0950W	12	A	;All
WY-1208-286	0450N	0950W	13	A	;N ½, SWSE, NWSE, NESW, SESW, SWSW, NWSW
WY-1208-287	0450N	0950W	14	A	;All
WY-1208-287	0450N	0950W	15	A	;All
WY-1208-287	0450N	0950W	17	A	;All
WY-1208-287	0450N	0950W	18	A	;All
WY-1208-288	0450N	0950W	19	L	;5-20
WY-1208-288	0450N	0950W	20	L	;1-16
WY-1208-288	0450N	0950W	21	L	;1-16
WY-1208-288	0450N	0950W	22	L	;1-16
WY-1208-289	0450N	0950W	23	A	;All
WY-1208-289	0450N	0950W	24	A	;NENW, SENW, SWNW, NWNW
WY-1208-289	0450N	0950W	28	A	;All
WY-1208-289	0450N	0950W	29	A	;All
WY-1208-290	0450N	0950W	30	A	;All
WY-1208-290	0450N	0950W	31	A	;N ½
WY-1208-290	0450N	0950W	32	A	;N ½ NESE, SESE, SWSE, NWSE, NESW, NWSW
WY-1208-290	0450N	0950W	33	A	;N ½, NESE, SWSE (very tiny bit), NWSE, NESW, SESW, SWSW, NWSW

Lease parcels WY-1208-396 and WY-1208-221 are located within proximity to Cedar Mountain WSA. Direct impacts to the WSA from the sale of the lease will be negligible. Development of the lease will influence the wilderness characteristics of naturalness and solitude within the WSA.

Wilderness Characteristics Mitigation

Should the parcels identified within the lands with wilderness characteristics be leased, the leases would be managed in accordance with the multiple use lands with wilderness characteristics guidelines in the anticipated Bighorn Basin RMP.

4.3.3.9 Wildlife

Cody

Any parcel deferred from leasing under Alternative 3 would result in the same impacts to wildlife and wildlife habitats as those described under Alternative 1. For those remaining parcels to be offered for sale and subsequent lease issuance, impacts to wildlife and stipulations would be the same as described in Alternative 2.

Effects would be the same as Alternative 2 except that a portion of lease parcel 388 would be deferred and is the only parcel in the CYFO which is in a Greater sage-grouse core area. The parcel is within Core Area and was evaluated using the Greater sage-grouse screen for oil and gas leasing per IM-No WY-2010-013. Therefore since this lease parcel would be deferred there would be less impact on Greater sage-grouse and all other wildlife equal to removing this area from the lease sale and this lease parcel would then in the future apply the most up to date science and conservation compatible with Greater sage-grouse Core Area direction.

The proposed Absaroka Front Management Area as identified in the draft Bighorn Basin RMP EIS contains two parcels which are deferred (391 and 393). This area would be maintained and the wildlife values not compromised through the deferral of these leases until the draft EIS BHB RMP revision is complete.

Lander

Any parcel deferred from leasing under Alternative 3 would result in the same impacts to wildlife and wildlife habitats as those described under Alternative 1. For those remaining parcels to be offered for sale and subsequent lease issuance, impacts to wildlife and stipulations would be the same as described in Alternative 2.

Parcels WY-1208-094 and 095.

The parcels listed above are within mapped Greater Sage-Grouse Core Areas and were evaluated per IM-No WY-2010-013. Deferral of these parcels was not recommended because those parcels did not meet the minimum area criteria (i.e. eleven square miles) outlined in the IM. The revised LFO RMP will guide the implementation of conservation strategies for Greater Sage-Grouse.

Parcels WY-1208-103.

The parcel listed above is partially within mapped Greater Sage-Grouse Core Area and was evaluated per IM-No. WY-2010-013. That portion of the parcel which met the minimum area criteria outlined in the IM is recommended for deferral; the portion of the parcel recommended for deferral is also located in an areathe the LFO RMP amendment is considering for ACEC expansion. For the remainder of the parcel, impacts to wildlife and stipulations would be the same as described in Alternative 2.

Parcels WY-1208-104, 105, 146, 152 and 154.

The parcels listed above are outside Greater sage-grouse Core Area and the expanded sage-grouse ACEC. Should the parcels be leased the impacts to wildlife and stipulations would be the same as described in Alternative 2.

Parcels WY-1208-112, 122, 129-132.

All of the parcels listed above are being recommended for deferral. All of these parcels are outside of Greater sage-grouse Core Area but may contain nesting/early brood rearing habitat. Parcels 112,122,129,130 and 131 are being recommended for deferral because they are located at least partially within the expanded Sage-grouse ACEC. In addition, all of the parcels listed above are located at least partially within the expanded Green Mountain ACEC. Both the expanded Sage-grouse ACEC and the expanded Green Mountain ACEC are currently being analyzed in the LFO-RMP.

Parcels WY-1208-102, 123, 124, 128, 151, 153, and 187.

The parcels listed above are partially within Greater Sage-Grouse Core Area and were evaluated per IM-No. WY-2010-013. Should the parcels be leased the impacts to wildlife and stipulations would be the same as described in Alternative 2.

Parcels WY-1208-106-111, 113-121, 125-127, 133-145, 149, 150, 155-174, 183-218, 231-252, 253-258, 269-283, 293-323, 326-384.

The parcels listed above are within mapped Greater Sage-Grouse Core Area and were evaluated per BLM-IM 2010-013. Under Alternative 3, these parcels would be deferred in whole until they can be evaluated for Sage-Grouse management in the revised RMP.

Worland

West Side of Worland FO (Grass Creek RMP area)

Parcels 219, 284, 285, 286 – 290, 324

Deferral of these parcels is recommended until the new Bighorn Basin Resource Management Plan is finalized and management actions, (Draft BBRMP Record # 4082, 4120 and 4121) can be implemented and the above mentioned wildlife resources receive adequate protection from these potential oil and gas development impacts, if allowed at all.

Parcels 177, 181, 222, 225, 226, 230, 260-264, 266, 267, and 292

Because under Alternative 2 the big game crucial winter range resources described above are not adequately protected under the existing Grass Creek RMP, we recommend the deferral of those parcels listed above with all or portions of crucial big game winter range, until the new Bighorn Basin Resource Management Plan is finalized and the following management actions, (Draft BBRMP Record # 4082) can be implemented and the above mentioned wildlife resources receive adequate protection from these potential oil and gas development impacts, if allowed at all.

For the remaining lease parcels within this group that do not involve big game crucial winter range, none are recommended for deferral from leasing, and no additional stipulations or mitigations are recommended beyond those recommended for Alternative 2. Depending on the parcel and related wildlife habitats of concern, should parcels be deferred from leasing for other resource concerns, those impacts to wildlife and wildlife habitats described in Alternative 2 would not occur, and therefore no environmental consequences can be identified, analyzed or mitigated. For those remaining parcels to be leased, impacts to wildlife and recommended mitigations would be the same as described in Alternative 2.

East Side of Worland FO (Washakie RMP area)

Parcels 147, 175, 176, 177, 178, 179, 180, 220, 219, 221, 396

Parcel 220 is to be deferred until the new Bighorn Basin Resource Management Plan is finalized and the following management actions, (Draft BBRMP Record # 4082) can be implemented. The other parcels listed are not recommended for modification or deferral in Alternative 3.

4.3.3.10 Soils

Parcels deferred from leasing under Alternative 3 for other resource concerns, those impacts to soils described in Alternative 2 would not occur, and therefore on those parcels, the impacts would be the same as those described under Alternative 1.

4.3.3.11 Water Resources

Parcels deferred from leasing under Alternative 3 for other resource concerns, those impacts to water resources described in Alternative 2 would not occur, and therefore on those parcels, the impacts would be the same as those described under Alternative 1.

4.4 Cumulative Impact Analysis

There are approximately 887 Federal wells in the Lander Field Office (15 of which are coalbed natural gas), 2,237 wells in the Cody Field Office, and 2,688 Federal wells in the Worland Field Office; there are no producing coalbed methane production wells in Cody nor Worland Field Offices.

Analysis of cumulative impacts for reasonably foreseeable development (RFD) of oil and gas wells on public lands in the Worland Field Office is presented in the 1988 Draft Grass Creek and 1998 Washakie Resource Management Plans (RMP). Potential development of all available federal minerals in the field office, including those in the proposed lease parcels, was included as part of the analysis.

As described in the analysis of environmental consequences, the proposed action and/or the alternative may contribute to the effects of climate change to some extent through GHG emissions. However, it is not currently possible to associate any of these particular actions with the creation of any specific climate-related environmental effects. The lack of scientific tools designed to predict climate change at regional or local scales limits the ability to quantify potential future impacts.

The assessment of greenhouse gas (GHG) emissions and climate change is still in its formative phase; therefore, it is not yet possible to know with confidence the net impact on climate. However, the Intergovernmental Panel on Climate Change (IPCC 2007) recently concluded that “warming of the climate system is unequivocal” and “most of the observed increase in globally average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic [man-made] greenhouse gas concentrations.” As the temperatures of the land and sea change, environmental factors such as weather patterns, sea levels, precipitation rates, the timing of the seasons, desert distribution, forest cover, and ocean salinity will also change. These changes influence the world’s climate systems and will have different impacts to different

areas. Some agricultural regions may become more arid while others become wetter; some mountainous areas will experience greater summer precipitation, yet experience disappearing snowpack.

The average number of oil and gas wells drilled annually in the Field Office and probable GHG emission levels, when compared to the total GHG emission estimates from the total number of Federal oil and gas wells in the State, represent an incremental contribution to the total regional and global GHG emission levels. This incremental contribution to global GHG gases cannot be translated into incremental effects on climate change globally or in the area of these site-specific actions. As oil and gas and natural gas production technology continues to improve in the future, one assumption is that it may be feasible to further reduce GHG emissions.

Regarding the linkage between climate change related warming and associated impacts, an assessment of the IPCC states that difficulties remain in attributing observed temperature changes at smaller than continental scales. Therefore, it is currently beyond the scope of existing science to predict climate change on regional or local scales resulting from specific sources of GHG emissions.

Significant uncertainties remain with respect to the estimates of the current level of emissions and projections of future production of fossil fuels as the oil and gas industry is difficult to forecast with the mix of drivers: economics, resource supply, demand, and regulatory procedures. The assumptions used for the projections, based on recent trends or State production trends in the near-term, and AEO2006 growth rates through 2020, do not include any significant changes in energy prices, relative to today's prices. Large price swings, resource limitations, or changes in regulations could significantly change future production and the associated GHG emissions. Other uncertainties include the volume of GHGs vented from gas processing facilities in the future, any commercial oil shale or coal-to-liquids production, and potential emissions-reducing improvements in oil and gas production, processing, and pipeline technologies.

There are currently no proposals for renewable energy projects in the Cody, Lander, and Worland Field Office.

5 Consultation and Coordination

Parcels that fall within Bureau of Reclamation (BOR) lands are sent to the BOR for review. Where federal minerals have been nominated for leasing underlying private surface, the private land owners have been notified. The BLM also coordinated with the WGFD.

A BLM interdisciplinary team reviewed all parcels in accordance with Washington Office Instruction Memorandum 2010-117. Table 5-1 lists the members of the BLM interdisciplinary team.

Table 5-1 Interdisciplinary Team

Name	Title	BLM Office	Responsible for the Following Section(s) of this Document
Gretchen Hurley	Geologist	CYFO	Geology and Paleontology
Shirley Bye-Jech	Outdoor Recreation Planner	CYFO	Rec, VRM
Kierson Crume	Archeologist	CYFO	Cultural
Jerry Jech	NRS	CYFO	Hydrology, Aquatic Resources
Criss Whalley	Range Mgmt Spec.	CYFO	Range
Destin Harrell	Biologist	CYFO	Wildlife
David Seward	NRS	CYFO	All
Fred McDonald	AFM	CYFO	All
Ann Perkins	Planning & Environmental Coordinator	CYFO	All
Jared Oakleaf	Outdoor Recreation Specialist	LFO	Wilderness and Recreation
Tim Vosburgh	Wildlife Biologist	LFO	Wildlife, T&E and Sensitive Species
Sue Oberlie	Wildlife Biologist	LFO	Wildlife, T&E and Sensitive Species
Jared Dalebout	Hydrologist	WFO	Water Resources
Sydney Thielke	GIS Specialist	LFO	GIS data
Karina Bryan	Archaeologist	LFO	Cultural Resources/Paleontological Resources
Kristin Yannone	Planning & Environmental Coordinator	LFO	All
Debra Larsen	Land Law Examiner	LFO	All
Marit Bovee	Archaeologist	WFO	Cultural Resources/Paleontological Resources
Ted Igleheart	Wildlife Biologist	WFO	Wildlife/T&E Washakie Resource Area
Tim Stephens	Wildlife Biologist	WFO	Wildlife/T&E Grass Creek Resource Area
Paul Rau	Recreation Specialist	WFO	Recreation/VRM/Special Designations
CJ Grimes	NRS	WFO	Invasive Plant Species

Name	Title	BLM Office	Responsible for the Following Section(s) of this Document
Karen Hepp	Range Management Specialist	WFO	T&E Plants
Steve Kiracofe	NRS	WFO	Soils
Mike Tietmeyer	Supervisory Range Management Specialist	WFO	Grazing
Caleb Hiner	District Planning & Environmental Center	WRBBDO	Technical Review
Stuart Cerovski	District Resource Advisor	WRBBDO	Preparer
Jim Wolf	District Resource Advisor	WRBBDO	Technical Review

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