Environmental Assessment

May 2013 Lease Parcels

WY-040-EA12-238

BLM

High Desert District Office

November 2012

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-12/026+1310

WY-040-EA12-238

Table of Contents

LIST OF TABLES

LIST OF FIGURES AND MAPS

ENVIRONMENTAL ASSESSMENT FOR THE
MAY 2013 COMPETITIVE OIL AND GAS LEASE SALE
WY-040-EA12-238

INTRODUCTION

The Bureau of Land Management's (BLM) policy derived from various laws, including the Mineral Leasing Act of 1920 (MLA), as amended [30 U.S.C. 181 *et seq*.] and the Federal Land Policy and Management Act of 1976 (FLPMA), is to make mineral resources available for disposal and to encourage development of mineral resources to meet national, regional, and local needs.

As required under the MLA, the Federal Onshore Oil and Gas Leasing Reform Act of 1987 (FOOGLRA), and Title 43 Code of Federal Regulations (CFR) 3120.1-2(a), the BLM Wyoming State Office (WSO) conducts a quarterly competitive lease sale for nominated oil and gas lease parcels. A Notice of Competitive Oil and Gas Lease Sale, which lists parcels to be offered at the auction, is published by the BLM WSO at least 90 days before the auction is held. Lease stipulations applicable to each parcel are specified in the Sale Notice. The decision as to which public lands and minerals are open for leasing and what leasing stipulations may be necessary is made during the land use planning process. Surface management/use for mineral extraction on non-BLM administered land overlaying federal minerals will be determined by BLM in consultation with the appropriate surface management agency or the private surface owner at the time such surface use is proposed by the leaseholder or designated agent. Under the Mineral Lease Act, issuing oil and gas leases is a discretionary authority conveyed to the Secretary of Interior. In accordance with this discretionary authority and as described in sections 1.3 and 2.0 below, certain parcels would be available for offer at the May 2013 lease sale and others would be deleted or deferred. In carrying out the mineral leasing authority conveyed through the Mineral Leasing Act, BLM must comply with other applicable federal laws and regulations, including, but not limited to the Endangered Species Act, the National Historic Preservation Act, the Clean Water Act, the Clean Air Act, and the Energy Policy Act.

As part of the May 2013 lease sale preparation process, the BLM WSO conducted screening for Greater Sage-Grouse per BLM WY guidance (IM WY-2012-019), consistent with national policy. The parcels meeting criteria for core habitat and manageability using the Fluid Mineral Leasing Screen were identified for deferral on this basis. Deferred parcel areas will remain deferred from leasing until conservation planning and management potential can be evaluated in the context of a Land Use Planning Action. As a result, some or all of 20 parcels, totaling 25,367.940 acres, were screened out from lease offering at this time and are not further analyzed in detail. Results of the Greater Sage-Grouse screen are located in Appendix C.

The BLM WSO submitted the draft list of the remaining parcels to the High Desert District (HDD), Kemmerer Field Office (KFO), Pinedale Field Office (PFO), Rawlins Field Office (RFO), and Rock Springs Field Office (RSFO) for review and processing. Interdisciplinary Teams (IDTs) in each Field Office, in coordination and consultation with the District Office, have reviewed the legal descriptions of the parcels to determine if they are in areas open to leasing; if appropriate stipulations have been included or additional stipulations are needed; whether or not new information is available since the land use plan

was approved; if appropriate consultations have been conducted or if additional consultations are needed; and if there are special resource conditions of which potential bidders should be made aware. This Environmental Assessment (EA) has been prepared by the HDD to document this review, as well as to disclose the affected environment, the anticipated impacts, and proposed mitigation of impacts.

This EA inclusively addresses 81 whole parcels and portions of 5 parcels (96,480.670 acres) located within the field offices in the High Desert District that have been nominated through "Expressions of Interest" for the May 2013 Competitive Oil and Gas Lease Sale, and remain partially or wholly available after running the Greater Sage-Grouse screen required by WY IM 2012-019. Three (3) of the nominated parcels containing 398.350 acres are located within the KFO; eight (8) parcels with 2,204.610 acres are located within the PFO, forty-one (41) parcels containing 45,652.870 acres are in the RFO; and twenty nine (29) parcels covering 43,456.430 acres are located within the RSFO.

1.0 Purpose and Need

The BLM's purpose for offering parcels and subsequent issuance of leases in the May 2013 lease sale is to provide for exploration and development of additional oil and gas resources to help meet the nation's need for energy sources, while protecting other resource values in accordance with guiding laws, regulations, and Land Use Planning decisions. 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 Kemmerer, Pinedale, Rawlins, and Green River Resource Management Plans (RMP). Oil and gas leasing provides 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, which parcels are not available for leasing, and what stipulations will be placed on the parcels that would be offered for lease at the May 2013 lease sale.

1.1 Conformance with Applicable Land Use Plan and Other Environmental Assessments

Pursuant to 40 CFR 1508.28 and 1502.21, this EA tiers to and conforms with the approved Kemmerer, Pinedale, Rawlins, and Green River RMPs and Final Environmental Impact Statements (FEIS) and to the associated Records of Decisions (ROD) for each Field Office. The impact analysis in the EISs for the effects from oil and gas development was based on and is commensurate with the Reasonably Foreseeable Development (RFD) scenario (i.e., the level of oil and gas development projected for the life of the plan based on historically and projected trends). The mitigation measures developed through the EISs reduce/minimize the anticipated impacts associated with the projected development to acceptable levels below the significance thresholds. The mitigation (i.e., stipulations and Best Management Practices (BMPs)) developed through the RMP/EIS process is carried into this EA, both through tiering and through actual application to individual parcels.

The Kemmerer, Pinedale, Rawlins, and Green River RMPs identify lands open, closed, and unavailable for leasing, and provide specific stipulations that would be attached to new leases offered in certain areas. Of the 86 (whole or partial) parcels reviewed for the May 2013 Lease Sale, none are located in areas designated unavailable for leasing based on decisions in their respective field office RMP/RODs.

The parcels listed in Appendix C, meeting criteria for Greater Sage-Grouse core habitat manageability using the Fluid Mineral Leasing Screen (IM WY-2012-019), are DEFERRED in whole or in part from this sale and are not addressed in detail in this analysis.

Total acreage deferred from the May 2013 lease parcel offering in accordance with WY IM 2012-019 is 25,367.940 acres.

1.2 Federal, State or Local Permits, Licenses or Other Consultation Requirements

Purchasers of oil and gas leases are required to obey all applicable federal, state, and local laws and regulations including obtaining all necessary permits required should lease development occur and are required to submit bonding in accordance with 43 CFR 3104.1.

Interdisciplinary teams from each Field Office reviewed their respective lease parcel lists for this environmental assessment. Among other resource values, individual parcels may contain threatened, endangered, candidate, and BLM sensitive species (see Section 3.0 and Appendix B). The administrative act of offering parcels and subsequent issuance of oil and gas leases is consistent with the decisions in the Kemmerer, Pinedale, Rawlins, and Green River RMPs, including decisions relating to threatened, endangered, candidate, and BLM sensitive species. Offering and subsequent issuance of oil and gas leases is also consistent with the Biological Assessment and Biological Opinion (BA/BO) for these RMPs. No further consultation with the U.S. Fish and Wildlife Service (USFWS) is required at this stage.

Compliance with Section 106 responsibilities of the National Historic Preservation Act (NHPA) can be achieved by following the BLM Wyoming-State Historic Preservation Officer (SHPO) protocol agreement, which is authorized by the National Programmatic Agreement between BLM, the Advisory Council on Historic Preservation, and the National Conference of SHPOs, and other applicable BLM handbooks.

1.3 Federal Leasing of Fluid Minerals

Analysis as required by the National Environmental Policy Act (NEPA) of 1969, as amended (Public Law 91-90, U.S.C. 4321 *et seq.*) was conducted by Field Office resource specialists who relied on personal knowledge of the areas involved and/or reviewed existing databases and file information to determine if appropriate stipulations had been attached to specific parcels before being made available for lease.

The offering and subsequent issuance of oil and gas leases is strictly an administrative action, which, in and of itself, does not cause or directly result in any surface disturbance. The issuance of an oil and gas lease, however, does convey to the lessee the rights to occupy, explore, and extract oil and gas resources from the lease with prior approval of the Authorized Officer. These post-leasing actions can result in surface impact.

As part of the lease issuance process, nominated parcels are reviewed against the appropriate land use plan, and stipulations are attached to mitigate any known environmental or resource conflicts that may occur on a given lease parcel. As stated above, on-the-ground impacts would potentially occur when a

lessee applies for and receives approval to explore, occupy and/or drill on the lease. The BLM cannot determine at the leasing stage whether or not a nominated parcel will actually be leased, or if it is leased, whether or not the lease would be explored or developed. Over time, some leases expire and then are re-leased. Based on data extracted from the BLM Wyoming Oil and Gas Leasing webpage, 88 percent of the parcels offered for lease over the past 10 years were leased.

According to the Tenth Circuit Court of Appeals, site-specific NEPA analysis at the leasing stage may not be possible absent concrete development proposals. Whether such site-specific analysis is required depends upon a fact-specific inquiry. Often, where environmental impacts remain unidentifiable until exploration narrows the range of likely drilling sites, filing of an Application for Permit to Drill (APD) may be the first useful point at which a site-specific environmental appraisal can be undertaken (Park County Resource Council, Inc. v. U.S. Department of Agriculture, 10th Cir., April 17, 1987). In addition, the Interior Board of Land Appeals (IBLA) has decided that "BLM is not required to undertake a site-specific environmental review before issuing an oil and gas lease when it previously analyzed the environmental consequences of leasing the land...." (Colorado Environmental Coalition, et al., IBLA 96-243, decided June 10, 1999). However, when site-specific impacts are reasonably foreseeable at the leasing stage, NEPA requires the analysis and disclosure of such reasonably foreseeable site specific impacts. (N.M ex rel. Richardson v. BLM, 565 F.3d 683, 718-19 (10th Cir. 2009). BLM has not received any specific development proposals concerning the proposed lease parcels addressed in this EA. This site-specific environmental documentation would provide specific analysis for the well pad location or locations. Additional mitigation and BMPs may be applied as conditions of approval (COA) at that time.

The Energy Policy Act of 2005 categorically excludes certain oil and gas development activities from further NEPA analysis. However, excluded projects must conform to the applicable Resource Management Plan, and includes any restrictions to development.

Offering, sale and issuance of leases with the application stipulations would not be in conflict with any local, county, or state plans.

Once a parcel is sold and the lease is issued, the lessee has the right to use as much of the leased lands as is reasonably necessary to explore and drill for all of the oil and gas within the lease boundaries, subject to the stipulations attached to the lease (43 CFR 3101.1-2 and 3101.1-3).

Oil and gas leases are issued for a 10-year period and continue for so long thereafter as oil or gas is produced in paying quantities. If a lessee fails to produce oil and/or gas, does not make annual rental payments, does not comply with the terms and conditions of the lease, or relinquishes the lease, then ownership of the minerals leased revert back to the federal government and may be offer for lease again.

Drilling wells on a lease is not permitted until the lessee or operator secures approval of a drilling permit and a surface use plan as specified in 43 CFR 3162.

1.4 Scoping and Public Involvement

1.4.1 Scoping

Internal BLM scoping determined the parcels individually or collectively contain one or more of the following resource issues or concerns:

- Crucial big game winter and parturition habitat
- Big Game Migration
- Sharp-tailed and Greater Sage-Grouse leks and nesting habitat
- Sharp-tailed and Greater Sage-Grouse key habitat areas
- Mountain plover nesting habitat
- Raptor nesting habitat
- Bald Eagle Roosts
- Sensitive Species
- Water depletion affects to downstream threatened and endangered fish species
- Sensitive soils
- Slopes greater than 25 percent
- Riparian and live water habitat
- Air quality, including greenhouse gases
- Surface and groundwater quality
- Wilderness characteristics
- Visual resource management (VRM)
- Recreation
- Socioeconomics
- Vegetation, including invasive non-native species
- Cultural and paleontological resources, including historic trails
- Leasable coal and sodium resources
- Proximity to residences
- Livestock grazing
- Watershed and hydrology
- Threatened/Endangered Species

1.4.2 Public Participation

Public participation was initiated when this EA was entered into the NEPA tracking database through the Rock Springs Field Office in August 2012. A news release was issued on November 2, 2012 notifying the public that the EA was posted on the BLM Wyoming website for a 30-day public comment period; X comment letters were received. Agency responses to public comments are located in Appendix G. As required by BLM leasing policy, where parcels are split estate, a notification letter soliciting EA review and comments were sent to the appropriate surface owner based on the surface owner information provided by the party submitting the Expressions of Interest (EOI).

PROPOSED ACTION AND ALTERNATIVES

2.0 Alternatives Including the Proposed Action

Ninety-seven (97) lease parcels (121,848.610 acres) were originally nominated and proposed for inclusion in the May 2013 Notice of Competitive Oil and Gas Lease Sale. All or part of 20 parcels, meeting criteria for Greater Sage-Grouse core habitat and manageability using the Fluid Mineral Leasing Screen in BLM guidance (WY-2012-019), in total 25,367.940 acres, are deferred from sale pending completion of ongoing planning efforts(Appendix C). These parcels are not analyzed in detail in this EA.

2.1 Alternative A -- No Action

Under the No Action Alternative BLM Wyoming would not offer 81 whole/5 partials parcels (96,480.670 acres) nominated for lease at the May 2013 lease sale. This would mean that the EOIs would be denied or rejected and no lease parcels would be offered at the May 2013 Oil and Gas Lease Sale. Choosing the No Action alternative would not prevent future leasing in these areas consistent with land use planning decisions and subject to appropriate stipulations, identified in the respective land use plans. Therefore, it is anticipated that these parcels, excluding those that fall within areas designated unavailable for leasing, would be re-nominated and considered for offer at a future date.

2.2 Alternative B -- Proposed Action

Under Alternative B, 74 whole parcels and portions of 7 parcels would be offered at the May 2013 Oil and Gas Lease Sale. The offered parcels contain 91,352.310 acres of federal minerals that are available for oil and gas leasing under the Kemmerer, Pinedale, Rawlins, and Green River RMPs/RODs. Standard terms and lease parcel specific stipulations would be applied. Lease stipulations (as required by 43 CFR 3101.1-3) are added to each parcel as identified by referenced RMPs to address site specific concerns. Refer to Appendix B for a list of the parcels and proposed stipulations attached to each.

The State Director has used his discretion to temporarily defer offering approximately 5,128.360 acres from parcels 0513-1, 48, 67, 68, 69, 70, and 71 in the interest of conservation of the Greater Sage Grouse; deferral is pending completion of the ongoing Greater Sage Grouse RMP amendment process in the Rock Springs, Kemmerer, Pinedale, and Rawlins field offices. Parcels 0513-069 and 084 are deferred in whole, while the remaining parcels are partially deferred. These deferrals can be found Appendix F.

Additionally, 15 whole parcels and five (5) partial parcels totaling 25,367.940 acres would be deferred from offer at the May 2013 oil and gas lease parcel sale, as noted above due to the Fluid Mineral Leasing Screen of IM WY-2012-019. These parcels, listed in Appendix C, are deferred pending completion of the ongoing RMP Amendments for the protection of Greater Sage-Grouse, after which time they could be nominated for future lease offerings.

Under alternative B, a total of 30,496.30 acres would be deferred from sale and 91,352.310 acres would be offered. All deferred parcels are located in Appendix A.

2.3 Alternatives Considered But Not Analyzed in Detail

An alternative was considered that would offer all 97 parcels with a no surface occupancy stipulation. This alternative was not carried forward into detailed analysis because it is not supported by the respective RMPs and would only prohibit surface occupancy for oil and gas development; whereas other

non-oil and gas occupancy may not be similarly constrained. Further, this alternative would unnecessarily constrain oil and gas occupancy in areas where the Kemmerer, Pinedale, Rawlins, and Green River RMPs have determined that less restrictive stipulations would adequately mitigate the anticipated impact.

An alternative was considered that would defer all remaining parcels that are located within Sage Grouse core areas. This alternative was not carried forward into detailed analysis because it is not supported by IM WY-2012-019, Greater Sage-Grouse Habitat Management Policy on Wyoming Bureau of Land Management (BLM) Administered Public Lands Including the Federal Mineral Estate and IM WO-2012-043, Greater Sage-Grouse Interim Management Policies and Procedures.

No other alternatives to the proposed action were identified that would meet the purpose and need of the proposed action.

AFFECTED ENVIRONMENT

3.0 DESCRIPTION OF AFFECTED ENVIRONMENT

This section describes the current environment and present conditions of various resources that would be affected by the project. Aspects of the affected environment described in this section focus on the relevant major resources or issues. Only those aspects of the affected environment that are potentially impacted are described in detail. Prime or Unique Farmlands are not present on any of the parcels or partial parcels available for offer. All parcels analyzed in this EA were reviewed against the lands with wilderness characteristics (LWC) requirements in BLM Washington Office (WO) IM 2011-154 and against the Master Leasing Plan (MLP) requirements in WO IM 2010-117 and the approved BLM Wyoming Leasing Reform Implementation Plan. See Appendix D and E for the LWC and MLP screens.

3.1 RESOURCE VALUES BY PARCEL

Table 3.1 provides a detailed listing of the resource values (including surface ownership, visual, riparian, soils, vegetation, slopes, livestock grazing, solid minerals, watershed, special management areas, cultural, paleontology, and wildlife) associated with each of the parcels available for offering through Alternative B at the May 2013 lease sale.

3.1.1 Site Visits

Site visits for the 86 whole or partial parcels were conducted by resource specialists in each of the four field offices. Resource values were identified for each parcel as presented in Table 3.1.

These site visits to the parcels revealed no substantial resource values or concerns other than those already identified through review of the parcels via the KFO, PFO, RFO, and RSFO Geographic Information System (GIS) data bases and National Agriculture Imagery Program (NAIP 2009) digital aerial imagery.

Table 3.1 Affected Environment

Parcel # WY-1305-	Field Office	Split Estate	VRM Class	Riparian Areas	Perennial Streams	Slopes Greater than 25%	Soils	Grazing Allotment	Vegetation	Sodium/ Coal Leasing Area	Major Watershed (Platte/ Colorado/Great Divide Basin/Bear)	Special Management Areas	Potential for Dwellings	Cultural Sites/ NHT	Paleo. PFYC Class 4 or 5 (Yes/ No)	Sage-Grouse Core Area (Yes/ No)	Sage-Grouse/ Sharp-tailed grouse Nesting Habitat (Yes/No)	Sage-Grouse Leks/Sharp-tailed Dancing Ground	Sage-Grouse/Sharp-tailed grouse winter concentration areas (Yes/No)	Other Special Status Species (T&E, Candidate, Sensitive Species)	Colorado or Bonneville Cutthroat Trout (CRCT/ BCT)	Big Game Crucial Winter Range (CWR)/ Parturition	Burrowing owl (BO)/ Raptor Nesting	Bald Eagle Roost	Big Game Migration Route
001	Rawlins	No	II & III	Yes	None	yes	mid-elevation upland soils that are moderate to deep, with a depth to bedrock of greater than 20 inches occurring in areas, can have a thick organic based surface horizon, moderately productive and are generally stable but do have areas with moderate or greater erosion potential.	North Walcott & Fort Steele Breaks	Sagebrush dominated shrublands with a variety of forbs and grasses	None	North Platte River	North Platte SRMA	No	None Identified	No	Yes	Yes	None	No	Platte River fishes, Mountain Plover, Wyoming Pocket Gopher , Beaver Rim Phlox, Persistent Sepal Yellowcress, White-tailed prarie dog, Potential habitat for sensitive reptilian and amphibian species,	None	CWR	No	No	Yes
002	Rawlins	No	III	Yes	None	Yes	Mid-elevation upland soils that are generally shallow, with a depth to bedrock of less than 20 inches occuring in areas. They have a thin organic based surface horizon. They are moderately productive and are generally stable but do have areas with moderate or greater erosion potential	South Flat Top & Oppenheimer	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Colorado River	None	No	None Identified	No	No	Yes	None	Yes	Colorado River fishes, Mountain Plover, Wyoming Pocket Gopher , Ownbey's Thistle, Gibben's beardtonge, Potential habitat for sensitive reptilian and amphibian species,	None	CWR	Yes	No	No
003	Rawlins	No	III	Yes	None	Yes	Mid-elevation upland soils that are generally shallow, with a depth to bedrock of less than 20 inches occuring in areas. They have a thin organic based surface horizon. They are moderately productive and are generally stable but do have areas with moderate or greater erosion potential	Oppenheimer & Red Creek	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Colorado River	None	No	None Identified	Yes	No	Yes	None	Yes	Colorado River fishes, Black footed ferret, Wyoming Pocket Gopher , Mountain Plover, Ownbey's Thistle, Gibben's beardtonge, Potential habitat for sensitive reptilian and amphibian species,	None	CWR	Yes	No	Yes
004	Rawlins	No	III	Yes	None	No	Mid-elevation upland soils that are generally shallow, with a depth to bedrock of less than 20 inches occuring in areas. They have a thin organic based surface horizon. They are moderately productive and are generally stable but do have areas with moderate or greater erosion potential	Red Creek	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Colorado River	None	No	None Identified	Yes	No	Yes	Lek	No	Colorado River fishes, Black footed ferret, Mountain Plover, Wyoming Pocket Gopher , Gibben's beardtonge, potential habitat for sensitive reptilian and amphibian species,	None	CWR	No	No	Yes
005	Rawlins	No	III	Yes	None	No	Mid-elevation upland soils that are generally shallow, with a depth to bedrock of less than 20 inches occuring in areas. They have a thin organic based surface horizon. They are moderately productive and are generally stable but do have areas with moderate or greater erosion potential	Powder Mountain Rotation	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Colorado River	None	No	Cherokee Trail	Yes	No	Yes	Lek	No	Colorado River fishes, Black footed ferret, Wyoming Pocket Gopher , Gibben's beardtonge, White-tailed prairie dog, Potential habitat for sensitive reptilian and amphibian species	None	No	No	No	Yes

Table 3.1 Affected Environment

Parcel # WY-1305-	Field Office	Split Estate	VRM Class	Riparian Areas	Perennial Streams	Slopes Greater than 25%	Soils	Grazing Allotment	Vegetation	Sodium/ Coal Leasing Area	Major Watershed (Platte/ Colorado/Great Divide Basin/Bear)	Special Management Areas	Potential for Dwellings	Cultural Sites/ NHT	Paleo. PFYC Class 4 or 5 (Yes/ No)	Sage-Grouse Core Area (Yes/ No)	Sage-Grouse/ Sharp-tailed grouse Nesting Habitat (Yes/No)	Sage-Grouse Leks/Sharp-tailed Dancing Ground	Sage-Grouse/Sharp-tailed grouse winter concentration areas (Yes/No)	Other Special Status Species (T&E, Candidate, Sensitive Species)	Colorado or Bonneville Cutthroat Trout (CRCT/ BCT)	Big Game Crucial Winter Range (CWR)/ Parturition	Burrowing owl (BO)/ Raptor Nesting	Bald Eagle Roost	Big Game Migration Route
006	Rawlins	No	III & IV	Yes	None	Yes	Mid-elevation upland soils that are generally shallow, with a depth to bedrock of less than 20 inches occuring in areas. They have a thin organic based surface horizon. They are moderately productive and are generally stable but do have areas with moderate or greater erosion potential	Continental	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Colorado River	None	No	Cherokee Trail	Yes	No	Yes	None	No	Colorado River fishes, Mountain Plover, Black footed ferret, White-tailed prairie dog, Wyoming Pocket Gopher , Gibben's beardtonge, Ownbey's Thistle, Potential habitat for sensitive reptilian and amphibian species,	None	No	No	No	No
007	Rawlins	No	III & IV	no	None	Yes	Mid-elevation upland soils that are generally shallow, with a depth to bedrock of less than 20 inches occuring in areas. They have a thin organic based surface horizon. They are moderately productive and are generally stable but do have areas with moderate or greater erosion potential	Mexican Graves & South Barrel	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Colorado River	None	No	None Identified	Yes	No	Yes	None	No	Colorado River fishes, Mountain Plover, White-tailed prairie dog, Black footed ferret, Wyoming Pocket Gopher ,	None	No	Yes	No	No
008	Rawlins	No	III	Yes	None	Yes	Mid-elevation upland soils that are generally shallow, with a depth to bedrock of less than 20 inches occuring in areas. They have a thin organic based surface horizon. They are moderately productive and are generally stable but do have areas with moderate or greater erosion potential	Sand Creek & Rotten Springs	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Colorado River	None	No	Cherokee Trail	Yes	No	Yes	None	No	Colorado River fishes, Black footed ferret, Wyoming Pocket Gopher , Ownbey's Thistle, Gibben's beardtonge, Potential habitat for sensitive reptilian and amphibian species,,	None	No	Yes	No	Yes
009	Rawlins	No	III	Yes	None	Yes	Mid-elevation upland soils that are generally shallow, with a depth to bedrock of less than 20 inches occuring in areas. They have a thin organic based surface horizon. They are moderately productive and are generally stable but do have areas with moderate or greater erosion potential	Powder Mountain Rotation & Rotten Springs	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Colorado River	Adobe Town DRUA	No	Cherokee Trail	Yes	No	Yes	None	No	Colorado River fishes, pygmy rabbit, Black footed ferret, White-tailed prairie dog, Gibben's beardtonge, Wyoming Pocket Gopher , Ownbey's Thistle, Potential habitat for sensitive reptilian and amphibian species,	None	No	Yes	No	Yes
010	Rawlins	No	III	Yes	None	Yes	Mid-elevation upland soils that are generally shallow, with a depth to bedrock of less than 20 inches occuring in areas. They have a thin organic based surface horizon. They are moderately productive and are generally stable but do have areas with moderate or greater erosion potential	Powder Mountain Rotation	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Colorado River	None	No	Cherokee Trail	Yes	No	Yes	None	No	Colorado River fishes, Black footed ferret, Wyoming Pocket Gopher , White-tailed prairie dog, Ownbey's Thistle, Gibben's beardtonge, Potential habitat for sensitive reptilian and amphibian species,	None	CWR	Yes	No	No

Table 3.1 Affected Environment

Parcel # WY-1305-	Field Office	Split Estate	VRM Class	Riparian Areas	Perennial Streams	Slopes Greater than 25%	Soils	Grazing Allotment	Vegetation	Sodium/ Coal Leasing Area	Major Watershed (Platte/ Colorado/Great Divide Basin/Bear)	Special Management Areas	Potential for Dwellings	Cultural Sites/ NHT	Paleo. PFYC Class 4 or 5 (Yes/ No)	Sage-Grouse Core Area (Yes/ No)	Sage-Grouse/ Sharp-tailed grouse Nesting Habitat (Yes/No)	Sage-Grouse Leks/Sharp-tailed Dancing Ground	Sage-Grouse/Sharp-tailed grouse winter concentration areas (Yes/No)	Other Special Status Species (T&E, Candidate, Sensitive Species)	Colorado or Bonneville Cutthroat Trout (CRCT/ BCT)	Big Game Crucial Winter Range (CWR)/ Parturition	Burrowing owl (BO)/ Raptor Nesting	Bald Eagle Roost	Big Game Migration Route
011	Rawlins	No	III	Yes	None	Yes	Mid-elevation upland soils that are generally shallow, with a depth to bedrock of less than 20 inches occuring in areas. They have a thin organic based surface horizon. They are moderately productive and are generally stable but do have areas with moderate or greater erosion potential	Sand Creek	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Colorado River	Adobe Town DRUA	No	None Identified	Yes	No	Yes	None	No	Colorado River fishes, Black footed ferret, Gibben's beardtonge, Wyoming Pocket Gopher , Potential habitat for sensitive reptilian and amphibian species,	None	No	No	No	No
012	Rawlins	No	III	Yes	None	Yes	Mid-elevation upland soils that are generally shallow, with a depth to bedrock of less than 20 inches occuring in areas. They have a thin organic based surface horizon. They are moderately productive and are generally stable but do have areas with moderate or greater erosion potential	Willow Creek, South Laclede & Continental	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Colorado River	None	No	None Identified	Yes	No	Yes	None	No	Colorado River fishes, Mountain Plover, Pygmy Rabbit, Black footed ferret, Wyoming Pocket Gopher , Ownbey's Thistle, Potential habitat for sensitive reptilian and amphibian species,	None	No	Yes	No	No
013	Rawlins	No	III & IV	Yes	None	No	Mid-elevation upland soils that are generally shallow, with a depth to bedrock of less than 20 inches occuring in areas. They have a thin organic based surface horizon. They are moderately productive and are generally stable but do have areas with moderate or greater erosion potential	Willow Creek & South Laclede	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Colorado River	None	No	None Identified	Yes	No	Yes	None	No	Colorado River fishes, Mountain Plover, Black footed ferret, Wyoming Pocket Gopher , White-tailed prairie dog, Potential habitat for sensitive reptilian and amphibian species,	None	No	Yes	No	No
014	Rawlins	No	III	Yes	None	No	Mid-elevation upland soils that are generally shallow, with a depth to bedrock of less than 20 inches occuring in areas. They have a thin organic based surface horizon. They are moderately productive and are generally stable but do have areas with moderate or greater erosion potential	Willow Creek	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Colorado River	Adobe Town DRUA	No	None Identified	Yes	No	Yes	None	No	Colorado River fishes, Black footed ferret, Wyoming Pocket Gopher , Potential habitat for sensitive reptilian and amphibian species,	None	No	No	No	No
015	Rawlins	No	III	No	None	Yes	Basin soils that are generally very shallow, with a depth to bedrock of less 20 inches occurring in areas, they have a very thin organic based surface horizon. Soil producitivy is low. Barren areas do occur. These soils have a moderate or greater erosion potential	Rotten Springs	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Colorado River	Adobe Town DRUA	No	None Identified	Yes	No	Yes	None	No	Colorado River fishes, Wyoming Pocket Gopher ,	None	No	Yes	No	No

Table 3.1 Affected Environment

Parcel # WY-1305-	Field Office	Split Estate	VRM Class	Riparian Areas	Perennial Streams	Slopes Greater than 25%	Soils	Grazing Allotment	Vegetation	Sodium/ Coal Leasing Area	Major Watershed (Platte/ Colorado/Great Divide Basin/Bear)	Special Management Areas	Potential for Dwellings	Cultural Sites/ NHT	Paleo. PFYC Class 4 or 5 (Yes/ No)	Sage-Grouse Core Area (Yes/ No)	Sage-Grouse/ Sharp-tailed grouse Nesting Habitat (Yes/No)	Sage-Grouse Leks/Sharp-tailed Dancing Ground	Sage-Grouse/Sharp-tailed grouse winter concentration areas (Yes/No)	Other Special Status Species (T&E, Candidate, Sensitive Species)	Colorado or Bonneville Cutthroat Trout (CRCT/ BCT)	Big Game Crucial Winter Range (CWR)/ Parturition	Burrowing owl (BO)/ Raptor Nesting	Bald Eagle Roost	Big Game Migration Route
016	Rawlins	No	III	No	None	Yes	Basin soils that are generally very shallow, with a depth to bedrock of less 20 inches occurring in areas, they have a very thin organic based surface horizon. Soil producitivy is low. Barren areas do occur. These soils have a moderate or greater erosion potential	Rotten Springs	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Colorado River	Adobe Town DRUA	No	None Identified	Yes	No	Yes	None	No	Colorado River fishes, Wyoming Pocket Gopher ,	None	No	No	No	No
017	Rawlins	No	III	Yes	None	Yes	Basin soils that are generally very shallow, with a depth to bedrock of less 20 inches occurring in areas, they have a very thin organic based surface horizon. Soil producitivy is low. Barren areas do occur. These soils have a moderate or greater erosion potential	Rotten Springs	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Colorado River	Adobe Town DRUA	No	None Identified	Yes	No	Yes	None	No	Colorado River fishes, Black footed ferret, Wyoming Pocket Gopher , Potential habitat for sensitive reptilian and amphibian species,	None	No	Yes	No	No
018	Rawlins	No	III	Yes	None	No	Mid-elevation upland soils that are generally shallow, with a depth to bedrock of less than 20 inches occuring in areas. They have a thin organic based surface horizon. They are moderately productive and are generally stable but do have areas with moderate or greater erosion potential	Willow Creek	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Colorado River	None	No	None Identified	Yes	No	Yes	None	No	Colorado River fishes, Mountain Plover, Black footed ferret, Wyoming Pocket Gopher , Potential habitat for sensitive reptilian and amphibian species,	None	No	No	No	No
019	Rawlins/ Rock Springs	No	II, III	Yes	None	No	Mid-elevation upland soils that are generally shallow, with a depth to bedrock of less than 20 inches occuring in areas. They have a thin organic based surface horizon. They are moderately productive and are generally stable but do have areas with moderate or greater erosion potential	Willow Creek/ Rock Springs	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Colorado River	Monument Valley SMA (Rock Springs only)	No	None Identified	Yes	No	Yes (Rawlins)	None	No	Colorado River fishes, Black footed ferret, Wyoming Pocket Gopher ,pygmy rabbit, sage sparrow, loggerhead shrike, sage thrasher, mountain plover Potential habitat for sensitive reptilian and amphibian species,	None	CWR	Yes (Rock Springs only)	Yes (Rock Springs only)	No
020	Rawlins/ Rock Springs	No	III, IV	No	None	No	Mid-elevation upland soils that are generally shallow, with a depth to bedrock of less than 20 inches occuring in areas. They have a thin organic based surface horizon. They are moderately productive and are generally stable but do have areas with moderate or greater erosion potential	Willow Creek & North Barrel/ Rock Springs	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Colorado River	Monument Valley SMA (Rock Springs only)	No	Overland Trail	Yes	No	Yes (Rawlins)	None	No	Colorado River fishes, Mountain Plover, White-tailed prairie dog, Black-footed ferret, Stemless beardtongue, Wyoming Pocket Gopher , Stemless Beardtounge,; pygmy rabbit, sage sparrow, loggerhead shrike, sage thrasher, white-faced Ibis	None	CWR (Rock Springs only)	Yes	No	No

Table 3.1 Affected Environment

Parcel # WY-1305-	Field Office	Split Estate	VRM Class	Riparian Areas	Perennial Streams	Slopes Greater than 25%	Soils	Grazing Allotment	Vegetation	Sodium/ Coal Leasing Area	Major Watershed (Platte/ Colorado/Great Divide Basin/Bear)	Special Management Areas	Potential for Dwellings	Cultural Sites/ NHT	Paleo. PFYC Class 4 or 5 (Yes/ No)	Sage-Grouse Core Area (Yes/ No)	Sage-Grouse/ Sharp-tailed grouse Nesting Habitat (Yes/No)	Sage-Grouse Leks/Sharp-tailed Dancing Ground	Sage-Grouse/Sharp-tailed grouse winter concentration areas (Yes/No)	Other Special Status Species (T&E, Candidate, Sensitive Species)	Colorado or Bonneville Cutthroat Trout (CRCT/ BCT)	Big Game Crucial Winter Range (CWR)/ Parturition	Burrowing owl (BO)/ Raptor Nesting	Bald Eagle Roost	Big Game Migration Route
021	Rawlins	Yes – Partially	III & IV on Federal surface	Yes	None	Yes	Mid-elevation upland soils that are generally shallow, with a depth to bedrock of less than 20 inches occuring in areas. They have a thin organic based surface horizon. They are moderately productive and are generally stable but do have areas with moderate or greater erosion potential	South Red Desert, North Wamsutter, & South Wamsutter	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Great Divide Closed Basin& Colorado River	None	Yes	None Identified	No	No	Yes	None	No	Colorado River fishes, Mountain Plover, Wyoming Pocket Gopher , White-tailed prairie dog, Black-footed ferret, Persistent Sepal Yellowcress, Trelease's Milkvetch, Tufted Twinpod, Cedar Rim thistle, Potential habitat for sensitive reptilian and amphibian species,	None	CWR	Yes	No	Yes
022	RSFO	N	II	N	N	N	Deep sand dunes with moderately deep to shallow well drained alkaline soils formed on rolling upland plains and fans. Included are some portions of badlands. Elevation 6300-7000 feet.	Rock Springs	Mixed plant community comprised of annual forbs, sagebrush, occasional grasslands, and bare-ground.	N	Colorado	Monument Valley SMA	N	None Identified	Y	N	N	N	N	Pygmy rabbit, Sage sparrow, Brewer's sparrow, loggerhead shrike, Sage thrasher, Mountain plover, Wyoming pocket gopher,	N	N	N	N	N
023	RSFO	N	IV	N	N	N	Deep sand dunes with moderately deep to shallow well drained alkaline soils formed on rolling upland plains and fans. Included are some portions of badlands. Elevation 6300-7000 feet.	Rock Springs	Mixed plant community comprised of annual forbs, sagebrush, occasional grasslands, and bare-ground.	N	Colorado	N	N	Entire parcel is within the viewshed of the Overland Trail.	Y	N	Y	N	N	Pygmy rabbit, Sage sparrow, Brewer's sparrow, loggerhead shrike, Sage thrasher, Mountain plover, Wyoming pocket gopher, Long-eared myotis,	N	N	Y	N	N
024	RSFO	N	IV	N	N	N	Deep sand dunes with moderately deep to shallow well drained alkaline soils formed on rolling upland plains and fans. Included are some portions of badlands. Elevation 6300-7000 feet.	Rock Springs	Mixed plant community comprised of annual forbs, sagebrush, occasional grasslands, and bare-ground.	N	Colorado	Monument Valley SMA	N	The portion of the parcel in sections 20 and 22 straddle the Overland Trail. The parcel in section 18 (southwest corner) is within ¼ mile of the Overland Trail. The entire parcel is within the viewshed of the Overland Trail.	Y	N	N	N	N	Pygmy rabbit, Sage sparrow, Brewer's sparrow, loggerhead shrike, Sage thrasher, Mountain plover, Wyoming pocket gopher, Golden eagle nesting, Ferruginous hawk nesting.	N	CWR	Y	N	N
025	RSFO	N	II, IV	N	N	N	Deep sand dunes with moderately deep to shallow well drained alkaline soils formed on rolling upland plains and fans. Included are some portions of badlands. Elevation 6300-7000 feet.	Rock Springs	Mixed plant community comprised of annual forbs, sagebrush, occasional grasslands, and bare-ground.	N	Colorado	Monument Valley SMA	N	Entire parcel is within viewshed of the Overland Trail	Y	N	N	N	N	Pygmy rabbit, Sage sparrow, Brewer's sparrow, loggerhead shrike, Sage thrasher, Mountain plover, Wyoming pocket gopher	N	CWR	N	N	N
026	RSFO	N	IV	N	N	N	Deep sand dunes with moderately deep to shallow well drained alkaline soils formed on rolling upland plains and fans. Included are some portions of badlands. Elevation 6300-7000 feet.	Rock Springs	Mixed plant community comprised of annual forbs, sagebrush, occasional grasslands, and bare-ground.	N	Colorado	Monument Valley SMA	N	Entire parcel is within viewshed of the Overland Trail	Y	N	N	N	N	Pygmy rabbit, Sage sparrow, Brewer's sparrow, loggerhead shrike, Sage thrasher, Mountain plover, Wyoming pocket gopher, Long-eared myotis	N	CWR	N	N	N

Table 3.1 Affected Environment

Parcel # WY-1305-	Field Office	Split Estate	VRM Class	Riparian Areas	Perennial Streams	Slopes Greater than 25%	Soils	Grazing Allotment	Vegetation	Sodium/ Coal Leasing Area	Major Watershed (Platte/ Colorado/Great Divide Basin/Bear)	Special Management Areas	Potential for Dwellings	Cultural Sites/ NHT	Paleo. PFYC Class 4 or 5 (Yes/ No)	Sage-Grouse Core Area (Yes/ No)	Sage-Grouse/ Sharp-tailed grouse Nesting Habitat (Yes/No)	Sage-Grouse Leks/Sharp-tailed Dancing Ground	Sage-Grouse/Sharp-tailed grouse winter concentration areas (Yes/No)	Other Special Status Species (T&E, Candidate, Sensitive Species)	Colorado or Bonneville Cutthroat Trout (CRCT/ BCT)	Big Game Crucial Winter Range (CWR)/ Parturition	Burrowing owl (BO)/ Raptor Nesting	Bald Eagle Roost	Big Game Migration Route
027	Rawlins	No	III	Yes	None	Yes	Mid-elevation upland soils that are generally shallow, with a depth to bedrock of less than 20 inches occuring in areas. They have a thin organic based surface horizon. They are moderately productive and are generally stable but do have areas with moderate or greater erosion potential	Tipton	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Great Divide Closed Basin & Colorado River	None	No	None Identified	No	No	Yes	None	No	Colorado River fishes, Mountain Plover, Black-footed ferret, Pygmy Rabbit, White-tailed prairie dog, Wyoming Pocket Gopher , Tufted Twinpod, Potential habitat for sensitive reptilian and amphibian species,	None	No	No	No	No
028	Rawlins	No	III	Yes	None	No	Mid-elevation upland soils that are generally shallow, with a depth to bedrock of less than 20 inches occuring in areas. They have a thin organic based surface horizon. They are moderately productive and are generally stable but do have areas with moderate or greater erosion potential	Tipton	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Upper Green River & Colorado River	None	No	None Identified	No	No	Yes	None	No	Colorado River fishes, Mountain Plover, Wyoming Pocket Gopher , Black-footed ferret, Potential habitat for sensitive reptilian and amphibian species,	None	No	No	No	No
029	Rawlins	Yes – Partially	III & IV on Federal surface	Yes	None	Yes	Mid-elevation upland soils that are generally shallow, with a depth to bedrock of less than 20 inches occuring in areas. They have a thin organic based surface horizon. They are moderately productive and are generally stable but do have areas with moderate or greater erosion potential	Tipton	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Great Divide Closed Basin & Colorado River	None	Yes	None Identified	No	No	Yes	None	No	Colorado River fishes, Mountain Plover, Black-footed ferret, Wyoming Pocket Gopher , White-tailed prairie dog, Cedar Rim Thistle, Potential habitat for sensitive reptilian and amphibian species,	None	CWR	Yes	No	Yes
030	Rawlins	Parcel was reviewed against the Greater Sage-Grouse key habitat requirements in BLM Wyoming IM WY-2012-019, reported in Appendix C, and deferred from leasing																							
031	Rawlins	No	III	Yes	None	Yes	mid-elevation sandy soils that are moderate to deep, with a depth to bedrock of greater than 20 inches occurring in areas, can have a thick organic based surface horizon, moderately productive and are generally stable but do have areas with moderate or greater erosion potential.	Cow Creek	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Upper Green River & Colorado River	Adobe Town DRUA	No	None Identified	Yes	No	Yes	None	No	Green River and Colorado River fishes, Mountain Plover, Wyoming Pocket Gopher , Potential habitat for sensitive reptilian and amphibian species,	None	No	No	No	No
032	Rawlins	No	III	Yes	None	Yes	mid-elevation sandy soils that are moderate to deep, with a depth to bedrock of greater than 20 inches occurring in areas, can have a thick organic based surface horizon, moderately productive and are generally stable but do have areas with moderate or greater erosion potential.	Cow Creek & Adobe Town	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Colorado River	Adobe Town DRUA	No	None Identified	Yes	No	Yes	None	No	Colorado River fishes, Mountain Plover, Wyoming Pocket Gopher , Potential habitat for sensitive reptilian and amphibian species,	None	No	No	No	No
033	Rawlins	No	III	Yes	None	Yes	mid-elevation sandy soils that are moderate to deep, with a depth to bedrock of greater than 20 inches occurring in areas, can have a thick organic based surface horizon, moderately productive and are generally stable but do have areas with moderate or greater erosion potential.	Cow Creek & Adobe Town	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Colorado River	Adobe Town DRUA	No	Cherokee Trail	Yes	No	Yes	None	No	Colorado River fishes, Wyoming Pocket Gopher , Potential habitat for sensitive reptilian and amphibian species,	None	CWR	No	No	No

Table 3.1 Affected Environment

Parcel # WY-1305-	Field Office	Split Estate	VRM Class	Riparian Areas	Perennial Streams	Slopes Greater than 25%	Soils	Grazing Allotment	Vegetation	Sodium/ Coal Leasing Area	Major Watershed (Platte/ Colorado/Great Divide Basin/Bear)	Special Management Areas	Potential for Dwellings	Cultural Sites/ NHT	Paleo. PFYC Class 4 or 5 (Yes/ No)	Sage-Grouse Core Area (Yes/ No)	Sage-Grouse/ Sharp-tailed grouse Nesting Habitat (Yes/No)	Sage-Grouse Leks/Sharp-tailed Dancing Ground	Sage-Grouse/Sharp-tailed grouse winter concentration areas (Yes/No)	Other Special Status Species (T&E, Candidate, Sensitive Species)	Colorado or Bonneville Cutthroat Trout (CRCT/ BCT)	Big Game Crucial Winter Range (CWR)/ Parturition	Burrowing owl (BO)/ Raptor Nesting	Bald Eagle Roost	Big Game Migration Route
034	Rawlins	No	III	Yes	None	Yes	mid-elevation sandy soils that are moderate to deep, with a depth to bedrock of greater than 20 inches occurring in areas, can have a thick organic based surface horizon, moderately productive and are generally stable but do have areas with moderate or greater erosion potential.	Cow Creek	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Colorado River	Adobe Town DRUA	No	None Identified	Yes	No	Yes	None	No	Colorado River fishes, Wyoming Pocket Gopher , Mountain Plover, Meadow Pussytoes, Potential habitat for sensitive reptilian and amphibian species,	None	CWR	No	No	No
035	Rawlins	No	III	No	None	No	mid-elevation sandy soils that are moderate to deep, with a depth to bedrock of greater than 20 inches occurring in areas, can have a thick organic based surface horizon, moderately productive and are generally stable but do have areas with moderate or greater erosion potential.	Cow Creek	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Upper Green River & Colorado River	Adobe Town DRUA	No	None Identified	Yes	No	Yes	None	No	Green River fishes, Mountain Plover, Wyoming Pocket Gopher, Persistent Sepal Yellowcress,	None	No	No	No	No
036	Rawlins	No	III	No	None	No	mid-elevation sandy soils that are moderate to deep, with a depth to bedrock of greater than 20 inches occurring in areas, can have a thick organic based surface horizon, moderately productive and are generally stable but do have areas with moderate or greater erosion potential.	Cow Creek	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Upper Green River & Colorado River	Adobe Town DRUA	No	None Identified	Yes	No	Yes	None	No	Green River fishes, Wyoming Pocket Gopher , Mountain Plover	None	No	No	No	No
037	Rawlins	No	III	No	None	No	mid-elevation sandy soils that are moderate to deep, with a depth to bedrock of greater than 20 inches occurring in areas, can have a thick organic based surface horizon, moderately productive and are generally stable but do have areas with moderate or greater erosion potential.	Cow Creek	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Upper Green River & Colorado River	Adobe Town DRUA	No	None Identified	Yes	No	Yes	None	No	Green River fishes, Wyoming Pocket Gopher ,	None	No	No	No	No
038	Rawlins	No	III	No	None	No	mid-elevation sandy soils that are moderate to deep, with a depth to bedrock of greater than 20 inches occurring in areas, can have a thick organic based surface horizon, moderately productive and are generally stable but do have areas with moderate or greater erosion potential.	Cow Creek	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Upper Green River & Colorado River	Adobe Town DRUA	No	None Identified	Yes	No	Yes	None	No	Green River fishes, Wyoming Pocket Gopher ,	None	No	No	No	No
039	Rawlins	No	III	No	None	No	mid-elevation sandy soils that are moderate to deep, with a depth to bedrock of greater than 20 inches occurring in areas, can have a thick organic based surface horizon, moderately productive and are generally stable but do have areas with moderate or greater erosion potential.	Cow Creek	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Upper Green River & Colorado River	Adobe Town DRUA	No	None Identified	Yes	No	Yes	None	No	Green River fishes, Wyoming Pocket Gopher ,	None	No	No	No	No

Table 3.1 Affected Environment

Parcel # WY-1305-	Field Office	Split Estate	VRM Class	Riparian Areas	Perennial Streams	Slopes Greater than 25%	Soils	Grazing Allotment	Vegetation	Sodium/ Coal Leasing Area	Major Watershed (Platte/ Colorado/Great Divide Basin/Bear)	Special Management Areas	Potential for Dwellings	Cultural Sites/ NHT	Paleo. PFYC Class 4 or 5 (Yes/ No)	Sage-Grouse Core Area (Yes/ No)	Sage-Grouse/ Sharp-tailed grouse Nesting Habitat (Yes/No)	Sage-Grouse Leks/Sharp-tailed Dancing Ground	Sage-Grouse/Sharp-tailed grouse winter concentration areas (Yes/No)	Other Special Status Species (T&E, Candidate, Sensitive Species)	Colorado or Bonneville Cutthroat Trout (CRCT/ BCT)	Big Game Crucial Winter Range (CWR)/ Parturition	Burrowing owl (BO)/ Raptor Nesting	Bald Eagle Roost	Big Game Migration Route
040	Rawlins	No	III	No	None	No	mid-elevation sandy soils that are moderate to deep, with a depth to bedrock of greater than 20 inches occurring in areas, can have a thick organic based surface horizon, moderately productive and are generally stable but do have areas with moderate or greater erosion potential.	Cow Creek	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Upper Green River & Colorado River	Adobe Town DRUA	No	None Identified	Yes	No	Yes	None	No	Green River fishes, Wyoming Pocket Gopher ,	None	No	No	No	No
041	Rawlins	No	III	No	None	No	mid-elevation sandy soils that are moderate to deep, with a depth to bedrock of greater than 20 inches occurring in areas, can have a thick organic based surface horizon, moderately productive and are generally stable but do have areas with moderate or greater erosion potential.	Cow Creek	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Upper Green River & Colorado River	Adobe Town DRUA	No	None Identified	Yes	No	Yes	None	No	Green River fishes, Wyoming Pocket Gopher ,	None	No	No	No	No
042	Rawlins	No	III	No	None	No	mid-elevation sandy soils that are moderate to deep, with a depth to bedrock of greater than 20 inches occurring in areas, can have a thick organic based surface horizon, moderately productive and are generally stable but do have areas with moderate or greater erosion potential.	Cow Creek	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Upper Green River & Colorado River	Adobe Town DRUA	No	None Identified	Yes	No	Yes	None	No	Green River fishes, Mountain Plover, Wyoming Pocket Gopher, Persistent sepal yellowcress	None	No	No	No	No
043	Rawlins	No	III	No	None	No	mid-elevation sandy soils that are moderate to deep, with a depth to bedrock of greater than 20 inches occurring in areas, can have a thick organic based surface horizon, moderately productive and are generally stable but do have areas with moderate or greater erosion potential.	Cow Creek	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Upper Green River & Colorado River	Adobe Town DRUA	No	None Identified	Yes	No	Yes	None	No	Green River fishes, Mountain Plover, Wyoming Pocket Gopher, Persistent Sepal Yellowcress,	None	No	No	No	No
044	Rawlins	No	III	Yes	None	No	mid-elevation sandy soils that are moderate to deep, with a depth to bedrock of greater than 20 inches occurring in areas, can have a thick organic based surface horizon, moderately productive and are generally stable but do have areas with moderate or greater erosion potential.	Cow Creek	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Upper Green River & Colorado River	Adobe Town DRUA	No	None Identified	Yes	No	Yes	None	No	Green River fishes, Wyoming Pocket Gopher , Mountain Plover, Persistent Sepal Yellowcress, Potential habitat for sensitive reptilian and amphibian species,	None	No	No	No	No
045	Rawlins	No	III	Yes	None	No	mid-elevation sandy soils that are moderate to deep, with a depth to bedrock of greater than 20 inches occurring in areas, can have a thick organic based surface horizon, moderately productive and are generally stable but do have areas with moderate or greater erosion potential.	Cow Creek	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Upper Green River & Colorado River	Adobe Town DRUA	No	None Identified	Yes	No	Yes	None	No	Green River fishes, Wyoming Pocket Gopher, Mountain Plover, Persistent Sepal Yellowcress, Potential habitat for sensitive reptilian and amphibian species,	None	No	No	No	No

Table 3.1 Affected Environment

Parcel # WY-1305-	Field Office	Split Estate	VRM Class	Riparian Areas	Perennial Streams	Slopes Greater than 25%	Soils	Grazing Allotment	Vegetation	Sodium/ Coal Leasing Area	Major Watershed (Platte/ Colorado/Great Divide Basin/Bear)	Special Management Areas	Potential for Dwellings	Cultural Sites/ NHT	Paleo. PFYC Class 4 or 5 (Yes/ No)	Sage-Grouse Core Area (Yes/ No)	Sage-Grouse/ Sharp-tailed grouse Nesting Habitat (Yes/No)	Sage-Grouse Leks/Sharp-tailed Dancing Ground	Sage-Grouse/Sharp-tailed grouse winter concentration areas (Yes/No)	Other Special Status Species (T&E, Candidate, Sensitive Species)	Colorado or Bonneville Cutthroat Trout (CRCT/ BCT)	Big Game Crucial Winter Range (CWR)/ Parturition	Burrowing owl (BO)/ Raptor Nesting	Bald Eagle Roost	Big Game Migration Route
046	RSFO	N	II, IV	N	N	N	Deep sand dunes with moderately deep to shallow well drained alkaline soils formed on rolling upland plains and fans. Included are some portions of badlands. Elevation 6300-7000 feet.	Rock Springs	Mixed plant community comprised of annual forbs, sagebrush, occasional grasslands, and bare-ground.	N	Colorado	Monument Valley SMA	N	The northern portion of section 2 is within viewshed of the Overland Trail.	Y	N	N	N	N	Pygmy rabbit, Sage sparrow, Brewer's sparrow, loggerhead shrike, Sage thrasher, Mountain plover, Wyoming pocket gopher,	N	CWR	Y	N	N
047	RSFO	N	IV	N	N	N	Shallow to moderately deep, well drained soils formed on sloping upland plains occasionally with steep sided ravines. Elevation 7000-7500 feet.	Rock Springs	Mixed plant community comprised of annual forbs, sagebrush, occasional grasslands, and bare-ground.	N	Colorado	N	N	All of section 2 and most of section 4 is within viewshed of the Overland Trail.	Y	Y	Y	N	N	Pygmy rabbit, Sage sparrow, Brewer's sparrow, loggerhead shrike, Sage thrasher, Mountain plover, Wyoming pocket gopher, Long-eared myotis,	N	N	N	N	N
048	RSFO	N	IV	N	N	N	Shallow to moderately deep, well drained soils formed on sloping upland plains occasionally with steep sided ravines. Elevation 7000-7500 feet.	Rock Springs	Mixed plant community comprised of annual forbs, sagebrush, occasional grasslands, and bare-ground.	N	Colorado	N	N	With the exception of a small part of section 8 the entire parcel is within the viewshed of the Overland Trail. A very small part in the SE corner of section 20 is within ¼ mile of the Overland Trail.	Y	Y	Y	N	N	Pygmy rabbit, Sage sparrow, Brewer's sparrow, loggerhead shrike, Sage thrasher, Mountain plover, Wyoming pocket gopher, Long-eared myotis,	N	N	Y	N	N
049	RSFO	N	IV	N	N	N	Deep sand dunes with moderately deep to shallow well drained alkaline soils formed on rolling upland plains and fans. Included are some portions of badlands. Elevation 6300-7000 feet.	Rock Springs	Mixed plant community comprised of annual forbs, sagebrush, occasional grasslands, and bare-ground.	N	Colorado	N	N	Section 30 straddles the Overland Trail. Entire parcel is within viewshed of the Overland Trail.	Y	Y	Y	N	N	Pygmy rabbit, Sage sparrow, Brewer's sparrow, loggerhead shrike, Sage thrasher, Mountain plover, Wyoming pocket gopher, Long-eared myotis, White-faced ibis,	N	N	Y	N	Y
050	RSFO	N	IV	N	N	N	Shallow to moderately deep, well drained soils formed on sloping upland plains occasionally with steep sided ravines. Elevation 7000-7500 feet.	Rock Springs	Mixed plant community comprised of annual forbs, sagebrush, occasional grasslands, and bare-ground.	N	Colorado	N	N	There is an unnamed wagon road running through sections 4 and 8. The wagon road's eligibility for the National Register of Historic Places has not been determined.	Y	N	N	N	N	Pygmy rabbit, Sage sparrow, Brewer's sparrow, loggerhead shrike, Sage thrasher, Mountain plover, Wyoming pocket gopher, Long-eared myotis, White-faced ibis,	N	N	Y	N	Y
051	RSFO	N	IV	N	N	N	Shallow to moderately deep, well drained soils formed on sloping upland plains occasionally with steep sided ravines. Elevation 7000-7500 feet.	Rock Springs	Mixed plant community comprised of annual forbs, sagebrush, occasional grasslands, and bare-ground.	N	Colorado	N	N	None Identified	Y	N	Y	N	N	Pygmy rabbit, Sage sparrow, Brewer's sparrow, loggerhead shrike, Sage thrasher, Mountain plover, Wyoming pocket gopher, Long-eared myotis, White-faced ibis,	N	N	Y	N	Y
052	RSFO	N	IV	N	N	Y	Shallow to moderately deep, well drained soils formed on sloping upland plains occasionally with steep sided ravines. Elevation 7000-7500 feet.	Rock Springs	Mixed plant community comprised of annual forbs, sagebrush, occasional grasslands, and bare-ground.	N	Colorado	N	N	The southeast corner of section 34 is within the viewshed of the Overland Trail.	Y	N	N	N	N	Pygmy rabbit, Sage sparrow, Brewer's sparrow, loggerhead shrike, Sage thrasher, Mountain plover, Wyoming pocket gopher, Long-eared myotis,	N	N	Y	N	N

Table 3.1 Affected Environment

Parcel # WY-1305-	Field Office	Split Estate	VRM Class	Riparian Areas	Perennial Streams	Slopes Greater than 25%	Soils	Grazing Allotment	Vegetation	Sodium/ Coal Leasing Area	Major Watershed (Platte/ Colorado/Great Divide Basin/Bear)	Special Management Areas	Potential for Dwellings	Cultural Sites/ NHT	Paleo. PFYC Class 4 or 5 (Yes/ No)	Sage-Grouse Core Area (Yes/ No)	Sage-Grouse/ Sharp-tailed grouse Nesting Habitat (Yes/No)	Sage-Grouse Leks/Sharp-tailed Dancing Ground	Sage-Grouse/Sharp-tailed grouse winter concentration areas (Yes/No)	Other Special Status Species (T&E, Candidate, Sensitive Species)	Colorado or Bonneville Cutthroat Trout (CRCT/ BCT)	Big Game Crucial Winter Range (CWR)/ Parturition	Burrowing owl (BO)/ Raptor Nesting	Bald Eagle Roost	Big Game Migration Route
053	Rawlins	No	III & IV	Yes	None	No	Mid-elevation upland soils that are generally shallow, with a depth to bedrock of less than 20 inches occuring in areas. They have a thin organic based surface horizon. They are moderately productive and are generally stable but do have areas with moderate or greater erosion potential	Tipton & G.L.	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Great Divide Closed Basin & Upper Green River & Colorado River	None	No	None Identified	No	No	Yes	None	No	Green River fishes, Mountain Plover, White-tailed prairie dog, Wyoming Pocket Gopher , Cedar Rim Thistle, Tufted Twinpod, Potential habitat for sensitive reptilian and amphibian species,	None	CWR	No	No	No
054	Rawlins	Parcel was reviewed against the Greater Sage-Grouse key habitat requirements in BLM Wyoming IM WY-2012-019, reported in Appendix C, and deferred from leasing																							
055	RSFO	N	IV	N	N	Y	Deep sand dunes with moderately deep to shallow well drained alkaline soils formed on rolling upland plains and fans. Included are some portions of badlands. Elevation 6300-7000 feet.	Rock Springs	Mixed plant community comprised of annual forbs, sagebrush, occasional grasslands, and bare-ground.	N	Colorado	N	N	N	Y	N	N	N	N	Sage sparrow, Brewer's sparrow, loggerhead shrike, Sage thrasher, Mountain plover, Wyoming pocket gopher	N	N	N	N	Y
056	RSFO	N	IV	N	N	Y	Deep sand dunes with moderately deep to shallow well drained alkaline soils formed on rolling upland plains and fans. Included are some portions of badlands. Elevation 6300-7000 feet.	Rock Springs	Mixed plant community comprised of annual forbs, sagebrush, occasional grasslands, and bare-ground.	N	Colorado	N	N	N	Y	Y	Y	N	N	Pygmy rabbit, Sage sparrow, Brewer's sparrow, loggerhead shrike, Sage thrasher, Mountain plover, Wyoming pocket gopher, Long-eared myotis, White-faced ibis,	N	N	Y	N	N
057	RSFO	N	IV	N	N	Y	Deep sand dunes with moderately deep to shallow well drained alkaline soils formed on rolling upland plains and fans. Included are some portions of badlands. Elevation 6300-7000 feet.	Rock Springs	Mixed plant community comprised of annual forbs, sagebrush, occasional grasslands, and bare-ground.	N	Colorado	N	N	N	Y	N	N	N	N	Pygmy rabbit, Sage sparrow, Brewer's sparrow, loggerhead shrike, Sage thrasher, Mountain plover, Wyoming pocket gopher,	N	N	Y	N	N
058	RSFO	N	IV	Y	Bitter Creek	N	Shallow to moderately deep, well drained soils formed on sloping upland plains occasionally with steep sided ravines. Elevation 7000-7500 feet.	Rock Springs	Mixed plant community comprised of annual forbs, sagebrush, occasional grasslands, and bare-ground.	N	Colorado	N	N	Section 8 straddles the Overland Trail. The entire parcel, except for part of section 2, is within viewshed of the Overland Trail.	Y	N	N	N	N	Pygmy rabbit, Sage sparrow, Brewer's sparrow, loggerhead shrike, Sage thrasher, Mountain plover, Wyoming pocket gopher, White-tailed prairie dog, Long-eared myotis, White-faced ibis,	N	N	Y	N	Y
059	RSFO	N	IV	N	N	N	Shallow to moderately deep, well drained soils formed on sloping upland plains occasionally with steep sided ravines. Elevation 7000-7500 feet.	Rock Springs	Mixed plant community comprised of annual forbs, sagebrush, occasional grasslands, and bare-ground.	N	Colorado	N	N	Entire parcel, except for part of section 12, is within viewshed of the Overland Trail and the LaClede stage station (listed on the National Register of Historic Places). The SW corner of section 22 is within ¼ mile of the Overland Trail.	Y	N	N	N	N	Pygmy rabbit, Sage sparrow, Brewer's sparrow, loggerhead shrike, Sage thrasher, Mountain plover, Wyoming pocket gopher, White-tailed prairie dog, White-faced ibis,	N	N	Y	N	N

Table 3.1 Affected Environment

Parcel # WY-1305-	Field Office	Split Estate	VRM Class	Riparian Areas	Perennial Streams	Slopes Greater than 25%	Soils	Grazing Allotment	Vegetation	Sodium/ Coal Leasing Area	Major Watershed (Platte/ Colorado/Great Divide Basin/Bear)	Special Management Areas	Potential for Dwellings	Cultural Sites/ NHT	Paleo. PFYC Class 4 or 5 (Yes/ No)	Sage-Grouse Core Area (Yes/ No)	Sage-Grouse/ Sharp-tailed grouse Nesting Habitat (Yes/No)	Sage-Grouse Leks/Sharp-tailed Dancing Ground	Sage-Grouse/Sharp-tailed grouse winter concentration areas (Yes/No)	Other Special Status Species (T&E, Candidate, Sensitive Species)	Colorado or Bonneville Cutthroat Trout (CRCT/ BCT)	Big Game Crucial Winter Range (CWR)/ Parturition	Burrowing owl (BO)/ Raptor Nesting	Bald Eagle Roost	Big Game Migration Route
060	RSFO	N	IV	N	N	N	Shallow to moderately deep, well drained soils formed on sloping upland plains occasionally with steep sided ravines. Elevation 7000-7500 feet.	Rock Springs	Mixed plant community comprised of annual forbs, sagebrush, occasional grasslands, and bare-ground.	N	Colorado	N	N	LaClede stage station is in section 26. The stage station is listed on the National Register of Historic Places. The RMP says LaClede stage station is an exclusion area and will be closed to surface disturbing activities that could adversely affect the site. The station is closed to exploration and development of locatable minerals and entry under the land laws. Section 26 straddles the Overland Trail. There is a historic ranch road in section 26 (not eligible for the NRHP).	Y	Y	Y	N	N	Pygmy rabbit, Sage sparrow, Brewer's sparrow, loggerhead shrike, Sage thrasher, Mountain plover, Wyoming pocket gopher, White-tailed prairie dog, White-faced ibis, Long-eared myotis,	N	N	Y	N	Y
061	RSFO	N	IV	N	N	N	Shallow to moderately deep, well drained soils formed on sloping upland plains occasionally with steep sided ravines. Elevation 7000-7500 feet.	Rock Springs	Mixed plant community comprised of annual forbs, sagebrush, occasional grasslands, and bare-ground.	N	Colorado	N	N	N	Y	Y	Y	N	N	Pygmy rabbit, Sage sparrow, Brewer's sparrow, loggerhead shrike, Sage thrasher, Mountain plover, Wyoming pocket gopher, White-tailed prairie dog, White-faced ibis, Long-eared myotis,	N	N	N	N	N
062	RSFO	N	IV	N	N	N	Shallow to moderately deep, well drained soils formed on sloping upland plains occasionally with steep sided ravines. Elevation 7000-7500 feet.	Rock Springs	Mixed plant community comprised of annual forbs, sagebrush, occasional grasslands, and bare-ground.	N	Colorado	N	N	N	Y	N	Y	N	N	Pygmy rabbit, Sage sparrow, Brewer's sparrow, loggerhead shrike, Sage thrasher, Mountain plover, Wyoming pocket gopher,	N	N	Y	N	N
063	Rock Springs	Parcel was reviewed against the Greater Sage-Grouse key habitat requirements in BLM Wyoming IM WY-2012-019, reported in Appendix C, and deferred from leasing																							
064	Rock Springs	Parcel was reviewed against the Greater Sage-Grouse key habitat requirements in BLM Wyoming IM WY-2012-019, reported in Appendix C, and deferred from leasing																							
065	Rock Springs	Parcel was reviewed against the Greater Sage-Grouse key habitat requirements in BLM Wyoming IM WY-2012-019, reported in Appendix C, and deferred from leasing																							
066	Rawlins	No	III	Yes	None	Yes	mid-elevation sandy soils that are moderate to deep, with a depth to bedrock of greater than 20 inches occurring in areas, can have a thick organic based surface horizon, moderately productive and are generally stable but do have areas with moderate or greater erosion potential.	Corson Springs	Sagebrush dominated shrublands with a variety of forbs and grasses	None	Upper Green River & Colorado River	Adobe Town DRUA	No	None Identified	Yes	No	Yes	None	No	Green River fishes, Wyoming Pocket Gopher, Mountain Plover, Boreal Toad, William's Waferparsnip, Meadow Pussytoes,Prostrate Bladderpod, Cedar Rim Thistle, Potential habitat for sensitive reptilian and amphibian species,	None	No	No	No	No

Table 3.1 Affected Environment

Parcel # WY-1305-	Field Office	Split Estate	VRM Class	Riparian Areas	Perennial Streams	Slopes Greater than 25%	Soils	Grazing Allotment	Vegetation	Sodium/ Coal Leasing Area	Major Watershed (Platte/ Colorado/Great Divide Basin/Bear)	Special Management Areas	Potential for Dwellings	Cultural Sites/ NHT	Paleo. PFYC Class 4 or 5 (Yes/ No)	Sage-Grouse Core Area (Yes/ No)	Sage-Grouse/ Sharp-tailed grouse Nesting Habitat (Yes/No)	Sage-Grouse Leks/Sharp-tailed Dancing Ground	Sage-Grouse/Sharp-tailed grouse winter concentration areas (Yes/No)	Other Special Status Species (T&E, Candidate, Sensitive Species)	Colorado or Bonneville Cutthroat Trout (CRCT/ BCT)	Big Game Crucial Winter Range (CWR)/ Parturition	Burrowing owl (BO)/ Raptor Nesting	Bald Eagle Roost	Big Game Migration Route
067	RSFO	N	IV	N	N	Y	Deep sand dunes with moderately deep to shallow well drained alkaline soils formed on rolling upland plains and fans. Included are some portions of badlands. Elevation 6300-7000 feet.	Rife	Mixed plant community comprised of annual forbs, sagebrush, occasional grasslands, and bare-ground.	N	Colorado	N	N	None identified	Y	Y	Y	N	N	Pygmy rabbit, Sage sparrow, Brewer's sparrow, loggerhead shrike, Sage thrasher, Mountain plover, Wyoming pocket gopher, Long-eared myotis,	N	N	N	N	N
068	RSFO	N	IV	N	N	N	Shallow to moderately deep, well drained soils formed on sloping upland plains occasionally with steep sided ravines. Elevation 7000-7500 feet.	Rock Springs	Mixed plant community comprised of annual forbs, sagebrush, occasional grasslands, and bare-ground.	N	Colorado	N	N	None Identified	Y	Y	Y	N	N	Pygmy rabbit, Sage sparrow, Brewer's sparrow, loggerhead shrike, Sage thrasher, Mountain plover, Wyoming pocket gopher, White-tailed prairie dog, White-faced ibis, Long-eared myotis,	N	CWR	Y	N	Y
069	RSFO	N	IV	N	N	N	Deep sand dunes with moderately deep to shallow well drained alkaline soils formed on rolling upland plains and fans. Included are some portions of badlands. Elevation 6300-7000 feet.	Rock Springs	Mixed plant community comprised of annual forbs, sagebrush, occasional grasslands, and bare-ground.	N	Colorado	N	N	None Identified	Y	Y	Y	N	N	Pygmy rabbit, Sage sparrow, Brewer's sparrow, loggerhead shrike, Sage thrasher, Mountain plover, Wyoming pocket gopher, Long-eared myotis,	N	N	N	N	N
070	RSFO	N	IV	N	N	N	Moderately deep to very shallow, well drained soils formed on rolling upland plains dissected by rock ravines, short escarpments, and draws. Elevation ranges from 6100 to 6700 ft.	Rock Springs	Mixed plant community comprised of annual forbs, sagebrush, occasional grasslands, and bare-ground.	N	Colorado	N	N	None Identified	Y	Y	Y	N	N	Pygmy rabbit, Sage sparrow, Brewer's sparrow, loggerhead shrike, Sage thrasher, Mountain plover, Wyoming pocket gopher, Long-eared myotis,	N	CWR	Y	N	N
071	RSFO	N	IV	Y	Bitter Creek	N	Deep sand dunes with moderately deep to shallow well drained alkaline soils formed on rolling upland plains and fans. Included are some portions of badlands. Elevation 6300-7000 feet.	Rock Springs	Mixed plant community comprised of annual forbs, sagebrush, occasional grasslands, and bare-ground.	N	Colorado	N	N	None Identified	Y	Y	Y	N	Y	Pygmy rabbit, Sage sparrow, Brewer's sparrow, loggerhead shrike, Sage thrasher, Mountain plover, Wyoming pocket gopher, Long-eared myotis,	N	CWR	N	N	Y
072	RSFO	N	IV	N	N	N	Shallow to moderately deep, well drained soils formed on sloping upland plains occasionally with steep sided ravines. Elevation 7000-7500 feet.	Rock Springs	Mixed plant community comprised of annual forbs, sagebrush, occasional grasslands, and bare-ground.	N	Colorado	N	N	Sections 4 and 6 are within viewshed of the Overland Trail.	Y	Y	Y	N	N	Pygmy rabbit, Sage sparrow, Brewer's sparrow, loggerhead shrike, Sage thrasher, Mountain plover, Wyoming pocket gopher, White-faced ibis, Long-eared myotis,	N	N	Y	N	N
073	RSFO	N	III, IV	N	N	N	Shallow to moderately deep, well drained soils formed on sloping upland plains occasionally with steep sided ravines. Elevation 7000-7500 feet.	Rock Springs	Mixed plant community comprised of annual forbs, sagebrush, occasional grasslands, and bare-ground.	N	Colorado	N	N	Section 4 and the northern portions of sections 8 and 12 are within the viewshed of the Overland Trail. The Bryan to Green River road (NRHP eligible) is located in section 4. The entire parcel is located in the viewshed of the Bryan to Green River road.	Y	N	N	N	N	Pygmy rabbit, Sage sparrow, Brewer's sparrow, loggerhead shrike, Sage thrasher, White-faced ibis, Long-eared myotis, Townsend's big-eared bat, Spotted bat, Thelesperma caespitosum	N	N	N	N	N
074	Rock Springs	Parcel was reviewed against the Greater Sage-Grouse key habitat requirements in BLM Wyoming IM WY-2012-019, reported in Appendix C, and deferred from leasing																							
075	Rock Springs	Parcel was reviewed against the Greater Sage-Grouse key habitat requirements in BLM Wyoming IM WY-2012-019, reported in Appendix C, and deferred from leasing																							

Table 3.1 Affected Environment

Parcel # WY-1305-	Field Office	Split Estate	VRM Class	Riparian Areas	Perennial Streams	Slopes Greater than 25%	Soils	Grazing Allotment	Vegetation	Sodium/ Coal Leasing Area	Major Watershed (Platte/ Colorado/Great Divide Basin/Bear)	Special Management Areas	Potential for Dwellings	Cultural Sites/ NHT	Paleo. PFYC Class 4 or 5 (Yes/ No)	Sage-Grouse Core Area (Yes/ No)	Sage-Grouse/ Sharp-tailed grouse Nesting Habitat (Yes/No)	Sage-Grouse Leks/Sharp-tailed Dancing Ground	Sage-Grouse/Sharp-tailed grouse winter concentration areas (Yes/No)	Other Special Status Species (T&E, Candidate, Sensitive Species)	Colorado or Bonneville Cutthroat Trout (CRCT/ BCT)	Big Game Crucial Winter Range (CWR)/ Parturition	Burrowing owl (BO)/ Raptor Nesting	Bald Eagle Roost	Big Game Migration Route
076	Rock Springs	Parcel was reviewed against the Greater Sage-Grouse key habitat requirements in BLM Wyoming IM WY-2012-019, reported in Appendix C, and deferred from leasing																							
077	Rock Springs	Parcel was reviewed against the Greater Sage-Grouse key habitat requirements in BLM Wyoming IM WY-2012-019, reported in Appendix C, and deferred from leasing																							
078	Rock Springs	Parcel was reviewed against the Greater Sage-Grouse key habitat requirements in BLM Wyoming IM WY-2012-019, reported in Appendix C, and deferred from leasing																							
079	Rock Springs	Parcel was reviewed against the Greater Sage-Grouse key habitat requirements in BLM Wyoming IM WY-2012-019, reported in Appendix C, and deferred from leasing																							
080	Rock Springs	Parcel was reviewed against the Greater Sage-Grouse key habitat requirements in BLM Wyoming IM WY-2012-019, reported in Appendix C, and deferred from leasing																							
081	Rock Springs	Parcel was reviewed against the Greater Sage-Grouse key habitat requirements in BLM Wyoming IM WY-2012-019, reported in Appendix C, and deferred from leasing																							
082	Pinedale	No	IV	No	No	No	Productive, shallow to very deep, well drained upland soils formed on hills, intermontane basins and pediments, with 0-15% slopes. Significant rock outcrops and badlands are not present. Considered highly erodible land due to wind. Elevation is approximately 7300 feet.	Stud Horse Common	Mixed plant community comprised of annual forbs, sagebrush, and grass, and bare-ground.	No	Upper Green River & Colorado River	No	No	The parcel contains 11 known cultural sites identified primarily during inventories related to the South Haystack Coal Mine, which examined the entire parcel.	No	Yes	Yes	Yes	No	Ferruginous Hawk, Pygmy rabbit,	No	CWR	Yes	No	No
083	Rock Springs	Parcel was reviewed against the Greater Sage-Grouse key habitat requirements in BLM Wyoming IM WY-2012-019, reported in Appendix C, and deferred from leasing																							
84	RSFO	N	IV	No	No	No	Moderately deep to very shallow, well drained soils formed on rolling upland plains dissected by rock ravines, short escarpments, and draws. Elevation ranges from 6100 to 6700 ft.	18 Mile	Mixed shrub community with grassland and bare-ground components.	No	Colorado	N	N	The part of the parcel in section 12 is within the viewshed of the Oregon Trail	Y	Y	Y	N	Y	Pygmy rabbit, White-faced ibis, Townsend's big-eared bat, Sage sparrow, Brewer's sparrow, loggerhead shrike, Sage thrasher, Mountain plover	N	N	N	N	N
085	RSFO	N	IV	No	No	No	Moderately deep to very shallow, well drained soils formed on rolling upland plains dissected by rock ravines, short escarpments, and draws. Elevation ranges from 6100 to 6700 ft.	18 Mile	Primarily bare-ground with mixed shrub community and grassland components.	No	Colorado	N	N	N	Y	N	Y	N	N	Pygmy rabbit, long-billed curlew, Townsend's big-eared bat, Long-eared myotis, Sage sparrow, Brewer's sparrow, loggerhead shrike, Sage thrasher, Mountain plover	N	N	N	N	N
086	Kemmerer	No	IV	No	No	No	Rock Outcrop and Lithic Torriorthents; loamy-skeletal; frigid	Cow Hollow	Desert Shrub; Greasewood Fans and Flats; Wyoming Big Sage Brush	No	Colorado River	None	No	No eligible sites identified.	Class 5	No	No	No	No	ferruginous hawk, black-footed ferret, pygmy rabbit	No	No	Yes	No	No
087	Kemmerer	No	IV	No	No	No	Typic Torrifluvents; fine-loamy over sandy or sandy-skeletal; mixed; frigid and Fluventic Haplaquolls; fine-loamy over sandy or sandy-skeletal; mixed; frigid	Slate Creek	Desert Shrub; Greasewood Fans and Flats; Wyoming Big Sage Brush	No	Colorado River	None	No	No eligible sites identified.	Class 5	No	Yes	No	No	Greater sage-grouse, black-footed ferret, pygmy rabbit	No	No	No	No	No
088	Kemmerer	No	IV	No	No	No	Rock Outcrop and Lithic Torriorthents; loamy-skeletal; frigid; AND Ustic Haplocambids; coarse-loamy; mixed; frigid and Ustic Torriorthents; coarse-loamy; mixed; frigid and Typic Torrifluvents; loamy-skeletal; frigid	Slate Creek	Wyoming big sage Mixed Grass Prairie	No	Colorado River	None	No	Within viewshed of the Slate Creek Cutoff National Historic Trail, a Class 2 eligible trail.	Class 5	No	No	No	No	black-footed ferret, pygmy rabbit, beaver rim phlox	No	CWR	No	No	No

Table 3.1 Affected Environment

Parcel # WY-1305-	Field Office	Split Estate	VRM Class	Riparian Areas	Perennial Streams	Slopes Greater than 25%	Soils	Grazing Allotment	Vegetation	Sodium/ Coal Leasing Area	Major Watershed (Platte/ Colorado/Great Divide Basin/Bear)	Special Management Areas	Potential for Dwellings	Cultural Sites/ NHT	Paleo. PFYC Class 4 or 5 (Yes/ No)	Sage-Grouse Core Area (Yes/ No)	Sage-Grouse/ Sharp-tailed grouse Nesting Habitat (Yes/No)	Sage-Grouse Leks/Sharp-tailed Dancing Ground	Sage-Grouse/Sharp-tailed grouse winter concentration areas (Yes/No)	Other Special Status Species (T&E, Candidate, Sensitive Species)	Colorado or Bonneville Cutthroat Trout (CRCT/ BCT)	Big Game Crucial Winter Range (CWR)/ Parturition	Burrowing owl (BO)/ Raptor Nesting	Bald Eagle Roost	Big Game Migration Route
089	RSFO	N	II, IV	N	N	N	Moderately deep to very shallow, well drained soils formed on rolling upland plains dissected by rock ravines, short escarpments, and draws. Elevation ranges from 6100 to 6700 ft.	18 Mile	Mixed shrub community with grassland and bare-ground components.	N	Colorado	N	N	N	Y	N	N	N	N	Pygmy rabbit, White-faced ibis, long-billed curlew, Townsend's big-eared bat, Sage sparrow, Brewer's sparrow, loggerhead shrike, Sage thrasher, Mountain plover	N	CWR	N	N	N
090	RSFO	N	II, IV	Y	N	N	Moderately deep to very shallow, well drained soils formed on rolling upland plains dissected by rock ravines, short escarpments, and draws. Elevation ranges from 6100 to 6700 ft. Some rock outcrop, limited badlands and steep mountain slopes with an elevation of 6000-8000 feet.	Figure Four	Mixed shrub community with grassland and bare-ground components.	N	Colorado	No	N	Entire parcel is within viewshed of the Sublette Cutoff of the Oregon trial. However, the parcel is within the Blue Forest MOA boundary.	Y	N	N	N	N	Pygmy rabbit, White-faced ibis, Long-eared myotis, Townsend's big-eared bat, Sage sparrow, Brewer's sparrow, loggerhead shrike, Sage thrasher, Mountain plover,	N	CWR	Y	N	No
091	Pinedale	Partial	Federal Surface is II	No	No	Yes	Productive, shallow to very deep, well drained to somewhat excessively drained soils (lowland and upland) formed on alluvial fans, drainageways, stream terraces, inset fans, hills, intermontane basins, pediments, ridges and escarpments with 1 to greater than 25% slopes. Significant rock outcrops are present. Significant badlands are not present. Considered highly erodible land due to wind except for the rock outcrops. Elevation is approximately 6800 feet.	Eubank S. LaBarge Ind	Mixed plant community comprised of annual forbs, sagebrush (Wyoming Big Sage and early sage) and grasses, some bare ground	No	Upper Green River & Colorado River	No	Yes	Unknown	Unknown	No	No	No	No	CO River Fishes	No	CWR	Yes	Yes	No
092	Pinedale	Yes	Private Surface	Yes	Dry Piney Ck	No	Productive, deep to very deep, well drained lowland and upland soils formed on alluvial fans and flats, terraces on intermontane basins, with 1-15% slopes. Significant rock outcrops and badlands are not present. Considered highly erodible land due to wind. Elevation is approximately 7000 feet.	Private	Mixed plant community comprised of annual forbs, sagebrush (Wyoming Big Sage and early sage) and grasses, some bare ground	No	Upper Green River & Colorado River	No	Yes	Unknown	Unknown	No	No	No	No	black-footed ferret, CO River Fishes	No	CWR	Yes	No	No
093	Pinedale	No	III	No	No	Yes	Productive (except for badlands and rock outcrops), very shallow to very deep, well drained to somewhat excessively drained soils (lowland and upland) formed on alluvial fans and flats, dunes, structural benches, hills, intermontane basins and pediments and escarpments with 1 to greater than 25% slopes. Significant rock outcrops and badlands are present in the most western parcell in the lease. Considered highly erodible land due to wind except for the badlands and rock outcrops.	N. LaBarge Common	Mixed plant community comprised of annual forbs, sagebrush (Wyoming Big Sage and early sage) and grasses, some bare ground	No	Upper Green River & Colorado River	No	No	Unknown	Yes	No	No	No	No	black-footed ferret, CO River Fishes	No	CWR	Yes	No	No

Table 3.1 Affected Environment

Parcel # WY-1305-	Field Office	Split Estate	VRM Class	Riparian Areas	Perennial Streams	Slopes Greater than 25%	Soils	Grazing Allotment	Vegetation	Sodium/ Coal Leasing Area	Major Watershed (Platte/ Colorado/Great Divide Basin/Bear)	Special Management Areas	Potential for Dwellings	Cultural Sites/ NHT	Paleo. PFYC Class 4 or 5 (Yes/ No)	Sage-Grouse Core Area (Yes/ No)	Sage-Grouse/ Sharp-tailed grouse Nesting Habitat (Yes/No)	Sage-Grouse Leks/Sharp-tailed Dancing Ground	Sage-Grouse/Sharp-tailed grouse winter concentration areas (Yes/No)	Other Special Status Species (T&E, Candidate, Sensitive Species)	Colorado or Bonneville Cutthroat Trout (CRCT/ BCT)	Big Game Crucial Winter Range (CWR)/ Parturition	Burrowing owl (BO)/ Raptor Nesting	Bald Eagle Roost	Big Game Migration Route
094	Pinedale	Yes	Private & II	Yes	LaBarge Ck	Yes	Productive (except for badlands and outcrops), shallow to very deep, well drained to somewhat excessively drained soils (lowland and upland) formed on alluvial fans and flats, inset fans, dunes, structural benches, hills, intermontane basins, basins and pediments and escarpments with 1 to greater than 25% slopes. Significant rock outcrops and badlands are present. Considered highly erodible land due to wind except for the badlands and rock outcrops. Elevation is approximately 6800 feet.	Private	mainly hay meadow; some sedges and willows	No	Upper Green River & Colorado River	No	Yes	Unknown	Unknown	No	No	No	No	CO River Fishes	CRCT	CWR	Yes	Yes	No
095	Pinedale	No	III, IV	No	No	Y	Productive (except for badland and rock outcrop), very deep, well drained upland soils formed on alluvial fans, drainageways and intermontane basins, with 1 to greater than 25% slopes. Significant rock outcrops and badlands are present. Considered highly erodible land due to wind, except for badlands and rock outcrops. Elevation is approximately 7100 to 7400 feet.	N. LaBarge Common	Mixed plant community comprised of annual forbs, sagebrush (Wyoming Big Sage and early sage) and grasses, some bare ground	No	Upper Green River & Colorado River	No	No	Unknown	Yes	No	Yes	No	Yes	CO River Fishes	No	CWR	Yes	No	No
096	Pinedale	Yes	Private	Yes	Hay meadow	No	Productive, very deep, moderately well drained to well drained upland soils formed on straem terraces, outwash terraces, fan remnants and intermontane basins, with 0-6% slopes. Significant rock outcrops and badlands are not present. Considered highly erodible land due to wind. Elevation is approximately 7400 feet.	Private	Mixed plant community comprised of annual forbs, sagebrush (Wyoming Big Sage and early sage) and grasses, some bare ground	No	Upper Green River & Colorado River	No	No	Oregon/ Mormon Trail	Unknown	No	No	No	No	CO River Fishes	No	CWR	Yes	No	No

Table 3.1 Affected Environment

Parcel # WY-1305-	Field Office	Split Estate	VRM Class	Riparian Areas	Perennial Streams	Slopes Greater than 25%	Soils	Grazing Allotment	Vegetation	Sodium/ Coal Leasing Area	Major Watershed (Platte/ Colorado/Great Divide Basin/Bear)	Special Management Areas	Potential for Dwellings	Cultural Sites/ NHT	Paleo. PFYC Class 4 or 5 (Yes/ No)	Sage-Grouse Core Area (Yes/ No)	Sage-Grouse/ Sharp-tailed grouse Nesting Habitat (Yes/No)	Sage-Grouse Leks/Sharp-tailed Dancing Ground	Sage-Grouse/Sharp-tailed grouse winter concentration areas (Yes/No)	Other Special Status Species (T&E, Candidate, Sensitive Species)	Colorado or Bonneville Cutthroat Trout (CRCT/ BCT)	Big Game Crucial Winter Range (CWR)/ Parturition	Burrowing owl (BO)/ Raptor Nesting	Bald Eagle Roost	Big Game Migration Route
097	Pinedale	Yes	III & Private	No	No	Yes	Productive (except for badlands), shallow to very deep, very poorly drained to well drained soils (lowland and upland) formed on floodplains, flood plain steps, stream terraces, river valleys, fan remnants, hills, intermontane basins, pediments and escarpments with 0 to rgeater than 25% slopes. Significant rock outcrops are not present. Badlands are present. Considered highly erodible land due to wind except for the badland and Chinatown soils series. Elevation is approximately 7500 and 7600 feet.	D. Budd Ind and Deer Hills Ind.	Mixed plant community comprised of annual forbs, sagebrush (Wyoming Big Sage and early sage) and grasses, some bare ground	No	Upper Green River & Colorado River	No	No	Unknown	Unknown	No	Yes	No	No	CO River Fishes	No	CWR	Yes	No	No

3.2 RESOURCE VALUES COMMON TO ALL PARCELS

3.2.1 Air Resources

In addition to the air quality information in the RMPs cited above, new information about greenhouse gases (GHGs) and their effects on national and global climate conditions has emerged since the RMPs were prepared. Ongoing scientific research has identified the potential impacts of GHG emissions such as carbon dioxide (CO2) methane (CH4); nitrous oxide (N2O); water vapor; and several trace gasses on global climate. Through complex interactions on a global scale, GHG emissions 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 (along with corresponding variations in climatic conditions), industrialization and burning of fossil carbon sources have caused GHG concentrations to increase measurably, and may contribute to overall climatic changes, typically referred to as global warming.

This EA incorporates an analysis of the contributions of the proposed action to GHG emissions and a general discussion of potential impacts to climate.

Air quality, climate, and visibility are the components of air resources which include applications, activities, and management of the air resource. BLM must consider and analyze the potential effects of authorized activities on air resources as part of the planning and decision making process. The Kemmerer, Pinedale, Rawlins, and Green River RMPs all address air quality issues, impacts, and potential mitigation. It is important to reiterate the offering and issuing leases is an administrative action, and the offering and the issuing of leases, in and of themselves, does not create air quality impacts.

3.2.1.1 Air Quality

Regional air quality is influenced by the interaction of meteorology, climate, the magnitude and spatial distribution of local and regional air pollutant sources, and the chemical properties of emitted air pollutants. The following sections summarize the existing climate and air quality within the area potentially affected by the parcels under consideration for leasing.

A variety of pollutants can affect air quality; these pollutants and their effects on health, visibility, and ecology are described in the following sections, along with data on existing air quality conditions found within the Kemmerer, Pinedale, Rawlins, and Rock Springs Field Office areas.

Monitoring and enforcement air quality standards are administered by the Wyoming Department of Environmental Quality-Air Quality Division (WDEQ-AQD). Wyoming Ambient Air Quality Standards (WAAQS) and National Ambient Air Quality Standards (NAAQS) identify maximum limits for concentrations of criteria air pollutants at all locations to which the public has access. The WAAQS and NAAQS are legally enforceable standards. Concentrations above the WAAQS and NAAQS represent a risk to human health that, by law, require public safeguards be implemented. State standards must be at least as protective of human health as federal standards, and may be more restrictive than federal standards, as allowed by the Clean Air Act (CAA). Currently, the WDEQ-AQD does not have regulations regarding greenhouse gas emissions, although these emissions are regulated indirectly by various other regulations.

Concentrations

Pollutant concentration can be defined as the mass of pollutant present in a volume of air and is reported in units of micrograms per cubic meter ($\mu g/m^3$), parts per million (ppm), or parts per billion (ppb). The State of Wyoming has used monitoring and modeling to determine that the Rock Springs, Rawlins and Kemmerer Field Office areas are currently in compliance with Wyoming and federal concentration standards; whereas the Pinedale Field Office has experienced exceedences of the ozone standard. In addition, non-reference method monitoring systems are operational, including the *Clean Air Status and Trends Network* (CASTNet) and *Wyoming Air Resources Monitoring System* (WARMS). Data from these systems have been determined to be representative of the area. There are two monitoring sites within the Kemmerer Field Office; four within the Pinedale FO; two in the Rock Springs FO; and two in the Rawlins FO.

Criteria air pollutants are those for which national concentration standards have been established; pollutant concentrations greater than the established standards represent a risk to human health or welfare. Table 3.2-2 presents background concentrations of criteria air pollutants as determined by the WDEQ-AQD.

Table 3.2-3 shows the Wyoming and national ambient air quality standards (WAAQS/NAAQS). Background concentrations are in compliance with applicable WAAQS/NAAQS. Also included in Table 3.2-3 are Prevention of Significant Deterioration (PSD) increments for Class I areas (wilderness areas with protected air quality status due to their pristine condition) and Class II areas (wilderness areas with protected air quality status due to their sensitive condition). All NEPA analysis comparisons to the PSD increments are intended to evaluate a threshold of concern and do not represent a regulatory PSD Increment Consumption Analysis. NAAQS/WAAQS have been established for the following criteria pollutants:

Carbon monoxide (CO) is an odorless, colorless gas formed during combustion of any carbon-based fuel, such as during operation of engines, fireplaces, furnaces, etc. Because carbon monoxide data are generally collected only in urban areas where automobile traffic levels are high, recent data are often unavailable for rural areas. Background carbon monoxide data were collected in Ryckman Creek in southwest Wyoming and in Rifle and Mack, Colorado during the late 1970s and the early 1980s.

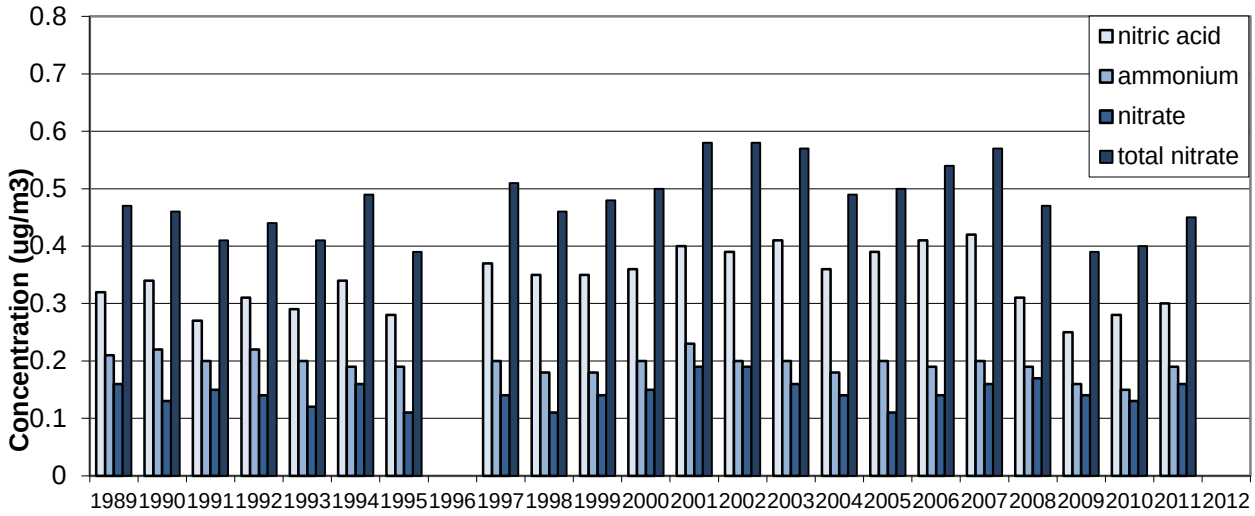
Nitrogen dioxide (NO_2) is a highly reactive compound formed at high temperatures during operation of fossil fuel combustion. At high concentrations, it can form a red-brown gas. At concentrations in excess of the EPA air quality standard, it is a respiratory irritant; however, all areas of the United States are in compliance with this air quality standard. During fossil fuel combustion, nitrogen oxide (NO) is released into the air which reacts in the atmosphere to form NO_2. NO plus NO_2 is a mixture of nitrogen gases, collectively called nitrogen oxides (NO_x). NO_x emissions can convert to ammonium nitrate particles and nitric acid which can cause visibility impairment and atmospheric deposition. Nitrogen dioxide can contribute to "brown cloud" conditions and ozone formation, and can convert to ammonium (NH_4), nitrate particles (NO_3), and nitric acid (HNO_3). Internal combustion engines are one source of NO_x. However, coal fired power plants often have the highest NO_x emissions although any combustion source

will produce NO_x. Figure 3.2-1 shows mean annual concentrations of nitrogen compounds at the Pinedale CASTNet site from 1989 through 2004.

Ozone (O_3) is a faint blue gas that is generally not emitted directly into the atmosphere but is formed in the atmosphere from complex photochemical reactions involving NO_2 and volatile reactive organic compounds (VOC). Sources of VOCs include automotive emissions, paint, varnish, oil and gas operations and some types of vegetation. The faint acrid smell common after thunderstorms is caused by ozone formation by lightning. Ozone is a strong oxidizing chemical that can burn lungs and eyes, and damage plants. Ozone is a severe respiratory irritant at concentrations in excess of the federal standards. On January 6, 2010, the EPA proposed that the primary ozone standard be set between 0.060 and 0.070 ppm. Sublette County has experienced exceedances of the current ozone standard on different occasions over recent years, which has resulted in the Governor of Wyoming nominating Sublette County as a non-attainment area.

In March 2008 the U.S. Environmental Protection Agency (EPA) promulgated the current National Ambient Air Quality Standard (NAAQS) for ozone. The ozone standard was lowered from 0.08 parts per million (ppm) to 0.075 ppm based on the fourth highest 8-hour average value per year at a site, averaged over three years. Based on monitoring results from 2006 through 2008, the entire state of Wyoming is in compliance with this standard except for at a single monitor, the Boulder monitor, in Sublette County. The WDEQ-AQD evaluated whether a nonattainment area should be designated due to the monitored results at the Boulder monitor. The WDEQ-AQD recommended that the Upper Green River Basin (UGRB) be designated as nonattainment for the 2008 ozone National Ambient Air Quality Standard (NAAQS). The WDEQ-AQD based this recommendation on a careful review of the circumstances surrounding the incidence of elevated ozone events. Elevated ozone in the UGRB is associated with distinct meteorological conditions. These conditions have occurred in February and March in some (but not all) of the years since monitoring stations began operation in the UGRB in 2005.

Figure 3.2-1. Mean Annual Concentrations of Nitrogen Compounds in Pinedale, Wyoming



Data taken from Clean Air Status & Trends Network
CASTNet Pinedale station: PND165
Typical concentrations for remote areas:
HNO3: .05 - 0.8 ug/m3
NH4: .2 ug/m3…

Table 3.2-2. Background Ambient Air Quality Concentrations
(Micrograms per Cubic Meter [µg/m3])

Pollutant	Averaging Period	Measured Background Concentration
CO[1]	1-hour	1,026
	8-hour	798
NO_2[2]	1-hour	75
	Annual	9.1
O_3[3]	8-hour	126.1
PM_{10}[4]	24-hour	56
	Annual	13.5
$PM_{2.5}$[5]	24-hour	9.2
	Annual	4.2
SO_2[6]	1-hour	19.7
	3-hour	11.5
	24-hour	4.2
	Annual	3.8

[1] Data collected during 2008 at Murphy Ridge, Wyoming, concentrations are maximum values.

[2] Data collected at Wamsutter, Wyoming: 1-hour concentration is the three year average (2008-2010) of daily maximum 98th percentile 1-hour concentrations, annual value is for 2010.

[3] Data collected at Wamsutter, Wyoming: 8-hour concentration is the three year average (2008-2010) of the fourth-highest daily maximum 8-hour concentrations.

[4] Data collected at Wamsutter, Wyoming during 2010, 24-hour value is maximum concentration.

[5] Data collected at Cheyenne, Wyoming: 24-hour value is the three year average (2008-2010) of daily maximum 98th percentile 24-hour concentrations, annual value is three year average of annual means (2008-2010).

[6] Data collected at Wamsutter, Wyoming: 1-hour value is the three year average (2007-2009) of daily maximum 98th percentile 1-hour concentrations, 3-hour, 24-hour and annual concentrations were collected during 2009, 3-hour and 24-hour data are maximum values.

Table 3.2-3 Ambient Air Quality Standards and PSD Increments (µg m^{-3})

Pollutant/Averaging Time	NAAQS	CAAQS	WAAQS	PSD Class I Increment[1]	PSD Class II Increment[1]
CO					
1-hour[2]	40,000	40,000	40,000	--[3]	--[3]
8-hour[2]	10,000	10,000	10,000	--	--
NO_2					
1-hour[8]	188				
Annual[4]	100	100	100	2.5	25
O_3					
8-hour[6]	147	147	157	--[3]	--[3]
PM_{10}					
24-hour[2]	150	150	150	8	30
Annual[4]	--[5]	50	50	4	17
$PM_{2.5}$					
24-hour[7]	35	35	35	2	9
Annual[4]	15	15	15	1	4
SO_2					
1-hour[9]	196				
3-hour[2]	1,300	700	1,300	25	512
24-hour[2]	365	365	260	5	91
Annual[4]	80	60	60	2	20

1 The PSD demonstrations serve information purposes only and do not constitute a regulatory PSD increment consumption analysis.
2 No more than one exceedance per year.
3 No PSD increments have been established for this pollutant.
4 Annual arithmetic mean.
5 The NAAQS for this averaging time for this pollutant has been revoked by EPA.
6 An area is in compliance with the standard if the fourth-highest daily maximum 8-hour ozone concentrations in a year, averaged over 3 years, is less than or equal to the level of the standard.
7 An area is in compliance with the standard if the highest 24-hour PM2.5 concentrations in a year, averaged over 3 years, is less than or equal to the level of the standard.
8 An area is in compliance with the standard if the 98th percentile of daily maximum 1-hour NO2 concentrations in a year, averaged over 3 years, is less than or equal to the level of the standard.
9 An area is in compliance with the standard if the 99th percentile of daily maximum 1-hour SO2 concentrations in a year, averaged over 3 years, is less than or equal to the level of the standard.

Effective July 2012 the EPA designated the UGRB as a nonattainment area with the lowest severity rating of "marginal." The UGRB includes all of Sublette County and the areas east and west of LaBarge in Lincoln and northern Sweetwater Counties. The UGRB does not include any lands within the Rawlins

Field Office, essentially excludes the Kemmerer Field Office, includes a portion of the Rock Springs Field Office roughly northwest of WY State Highway 28, and includes most of the Pinedale Field Office south of Jackson.

Particulate matter (PM) refers to the small particles (e.g., soil particles, pollen, etc.) suspended in the air that settle to the ground slowly and may be re-suspended if disturbed. Ambient air particulate matter standards are based on the size of the particle. The two types of particulate matter are:

- PM_{10} (particles with diameters less than 10 micrometers): small enough to be inhaled and capable of causing adverse health effects.
- PM2.5 (particles with diameters less than 2.5 micrometers): small enough to be drawn deeply into the lungs and cause serious health problems. These particles are also the main cause of visibility impairment.

Background concentrations of PM10 are 32-50% of the applicable WAAQS (Table 3.3-2).
Other regulatory monitoring of particulate matter showed that concentrations were in compliance with applicable WAAQS.

The WDEQ-AQD monitors particulate matter throughout the State of Wyoming with the State and Local Air Monitoring System (SLAMS). Table 3.2-4 summarizes particulate matter concentrations in Wyoming during 2001. Annual PM_{10} background concentrations for the MAA exceed the statewide average, while MAA $PM_{2.5}$ concentrations fall below the statewide average.

Table 3.2-4. Wyoming Particulate Summary for 2001 (µg/m3)

Pollutant	Annual Background for MAA	Annual Statewide Average
PM_{10}	33	22
$PM_{2.5}$	5	8

Sulfur dioxide (SO_2) and sulfates (SO_4) form during combustion from trace levels of sulfur in coal or diesel fuel. Sulfur dioxide also participates in chemical reactions and can form sulfates and sulfuric acid in the atmosphere.

Sulfur dioxide concentrations typically range from 1 to 10 ppb (2.6 to 26 µg/m^3) in remote areas, and from 20 to 200 ppb (52 to 520 µg/m^3) in polluted areas (Seinfeld 1986). Average weekly concentrations of sulfur dioxide at the Pinedale CASTNet site are 0.3 ppb (0.8 µg/m^3) and are typical of remote or unpolluted areas.

Mean annual sulfate concentrations are typically 0.6 ppb (2.5 µg/m^3) or less in remote areas, and 2.5 ppb (10 µg/m^3) or more in urban areas (Stern et al. 1973). Mean annual concentrations of sulfate are 0.5 ppb (2 µg/m^3) at the Pinedale CASTNet site and are typical of remote or unpolluted areas.

3.2.1.2 Visibility

The 1997 Clean Air Act (CAA) amendments declared "as a National Goal the prevention of any future, and the remedying of any existing, impairment of visibility in mandatory Class I Federal areas in which impairment results from manmade air pollution." The CAA gives federal managers the affirmative responsibility, but no regulatory authority, to protect air quality-related values, including visibility, from degradation.

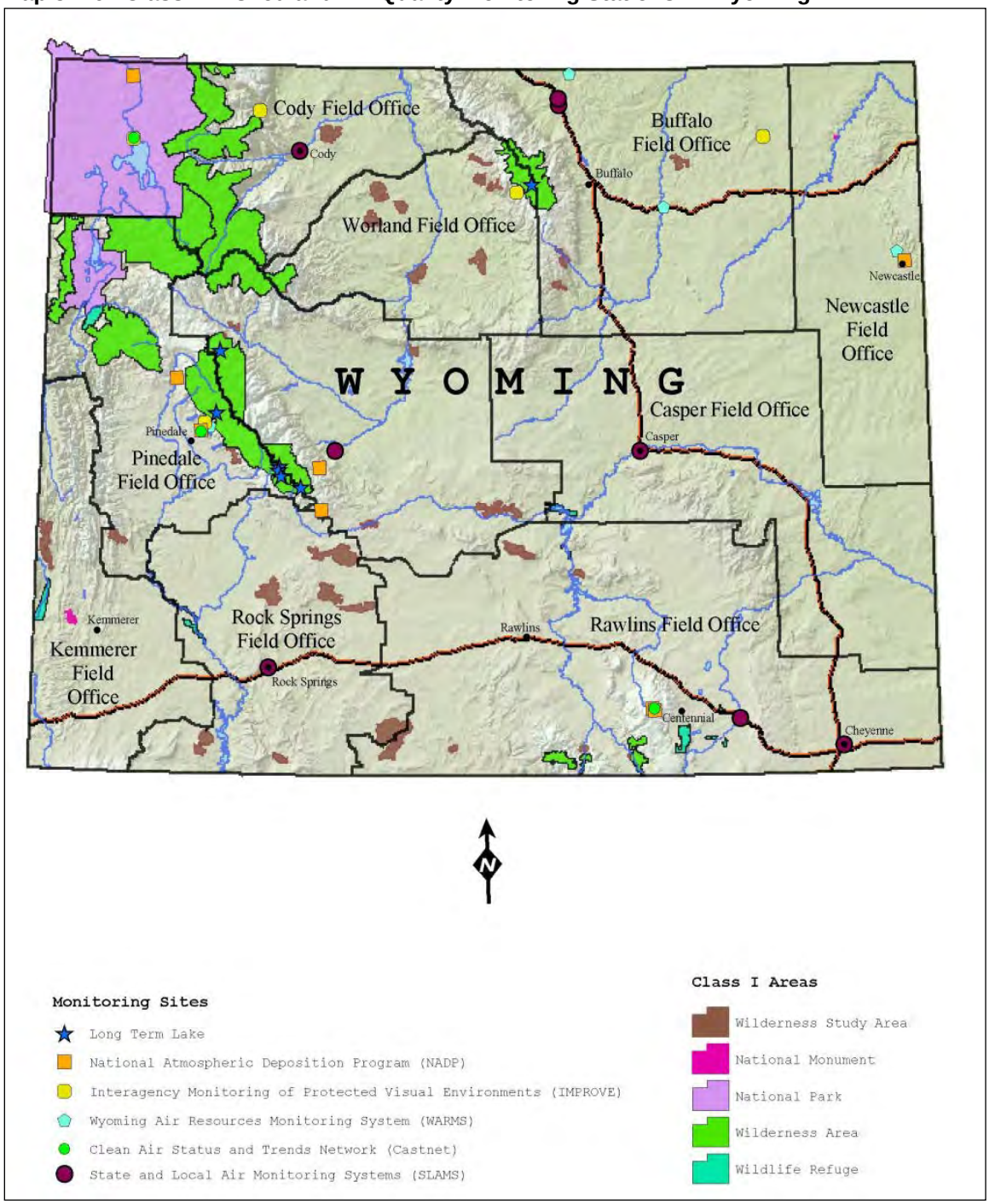
Prevention of Significant Deterioration (PSD) increments limit air quality degradation and ensure that areas with clean air continue to meet NAAQS, even during economic development. The PSD program goal is to maintain pristine air quality required to protect public health and welfare from air pollution effects and "to preserve, protect and enhance the air quality in national parks, national wilderness areas, national monuments, national seashores, and other areas of special national or regional natural, recreation, scenic or historic value."

PSD increments have been established for NO2, SO2, and PM10. Comparisons of potential PM10, NO2, and SO2 concentrations with PSD increments are intended only to evaluate a threshold of concern. The allowable PSD increment depends on an area's classification. Class I areas have lower increments, due to their protected status as pristine areas. PSD Class I and other sensitive areas located in close proximity to the Pinedale, Rawlins and Kemmerer Field Offices and the distance of each from the field office are shown on Map 3.2-6. Federal Class I areas are listed in Table 3.2-5.

Table 3.2-5. Distances and Direction to Class I Areas

Class I Area	Dist. From KFO (km)	Direction From KFO	Dist. From RFO (km)	Direction From RFO	Dist. From PFO (km)	Direction From PFO	Dist. From RSFO (km)	Direction From RSFO
Bridger Wilderness Area	>50 <100	North	>200 <250	Northwest	<50	East	>50 <100	North
Fitzpatrick Wilderness Area	>100 <150	North	>200 <250	Northwest	<50	East	>50 <100	North
Grand Teton National Park	>150 <200	North	>400 <450	Northwest	>50 <100	Northwest	>100 <150	Northwest
Mount Zirkel Wilderness Area	>250 <300	East	>100 <150	Southeast	>200 <250	Southeast	>150 <200	Southeast
Savage Run/Platte River Wilderness Area	>200 <250	Southeast	>50 <100	Southeast	>150 <200	Southeast	>100 <150	Southeast
Teton Wilderness Area	>100 <150	North	>400 <450	Northwest	>50 <100	Northwest	>100 <150	Northwest
Washakie Wilderness Area	> 150 <200	North	>300 <350	North	>100 <150	North	>250 <300	North

Map 3.2-6. Class I Airshed and Air Quality Monitoring Stations in Wyoming



Several additional areas are classified as PSD Class II, where lower incremental air quality limits are imposed due to less pristine background air quality. PSD Class II areas are listed in Table 3.2-7.

Table 3.2-7. Distances and Direction to Class II Sensitive Areas and other areas of concern in southern Wyoming

Sensitive Class II Areas	Dist. From KFO (km)	Direction From KFO	Dist. From RFO (km)	Direction From RFO	Dist. From PFO (km)	Direction From PFO	Dist. From RSFO (km)	Direction From RSFO
Fossil Butte National Monument	Within	N/A	>200 <250	West	>100 <150	Southwest	>100 <150	Northwest
Popo Agie Wilderness Area	108	Northeast	>150 <200	Northwest	>100 <150	East	>100 <150	North
Seedskadee NFR	Adjoins	East	>200 <250	West	>50 >100	South	Adjoins	West
Cokeville Meadows NFR	Within	N/A	>250 <300	West	>100 <150	Southwest	>150 <200	Northwest

A wide variety of pollutants can impact visibility, including particulate matter, nitrogen dioxide, nitrates (compounds containing NO_3), and sulfates (compounds containing SO_4). Fine particles suspended in the atmosphere decrease visibility by blocking, reflecting, or absorbing light.

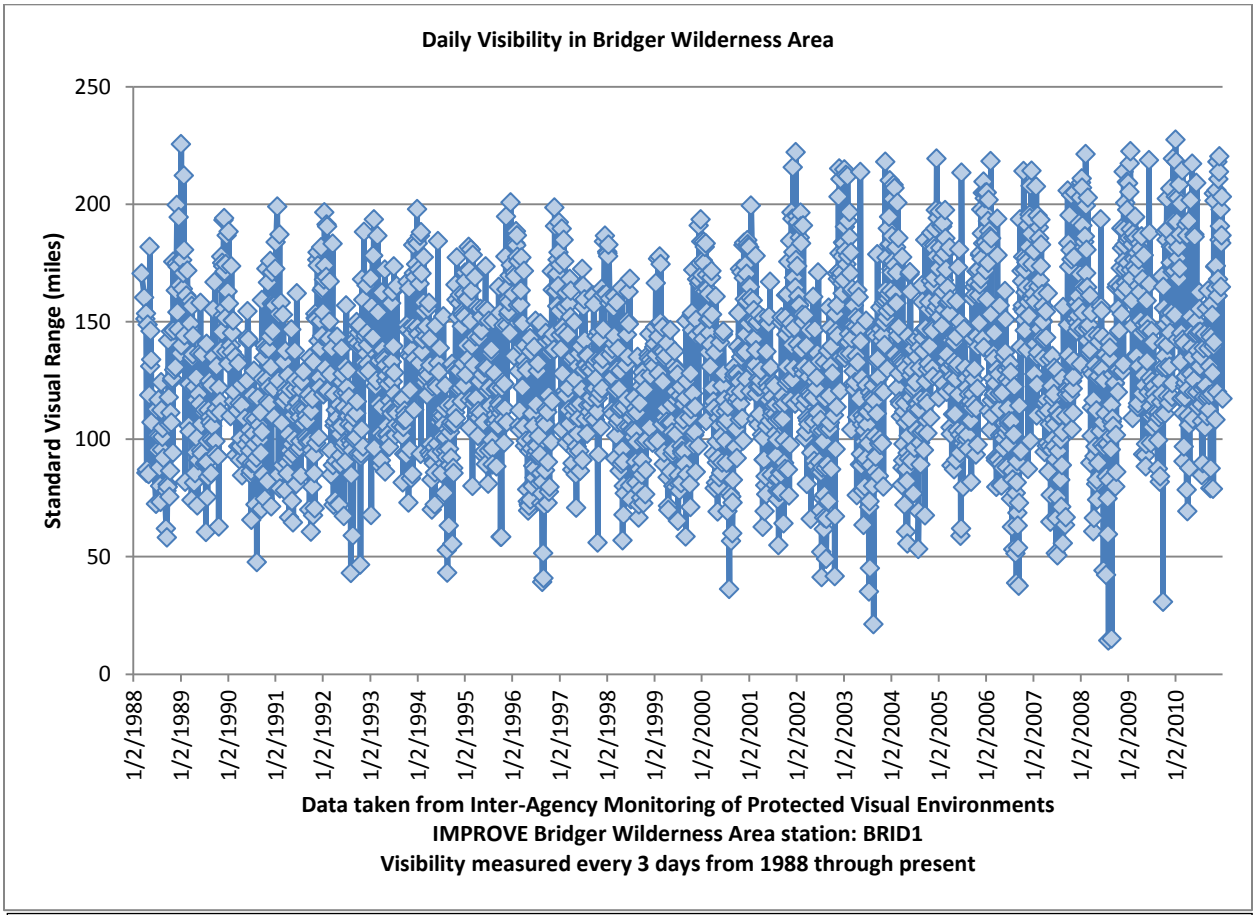
Two types of visible impairment can be caused by emission sources: plume impairment and regional haze. Plume impairment occurs when a section of the atmosphere becomes visible due to the contrast or color difference between a discrete pollutant plume and a viewed background, such as a landscape feature. Regional haze occurs when pollutants from widespread emission sources become mixed in the atmosphere and travel long distances.

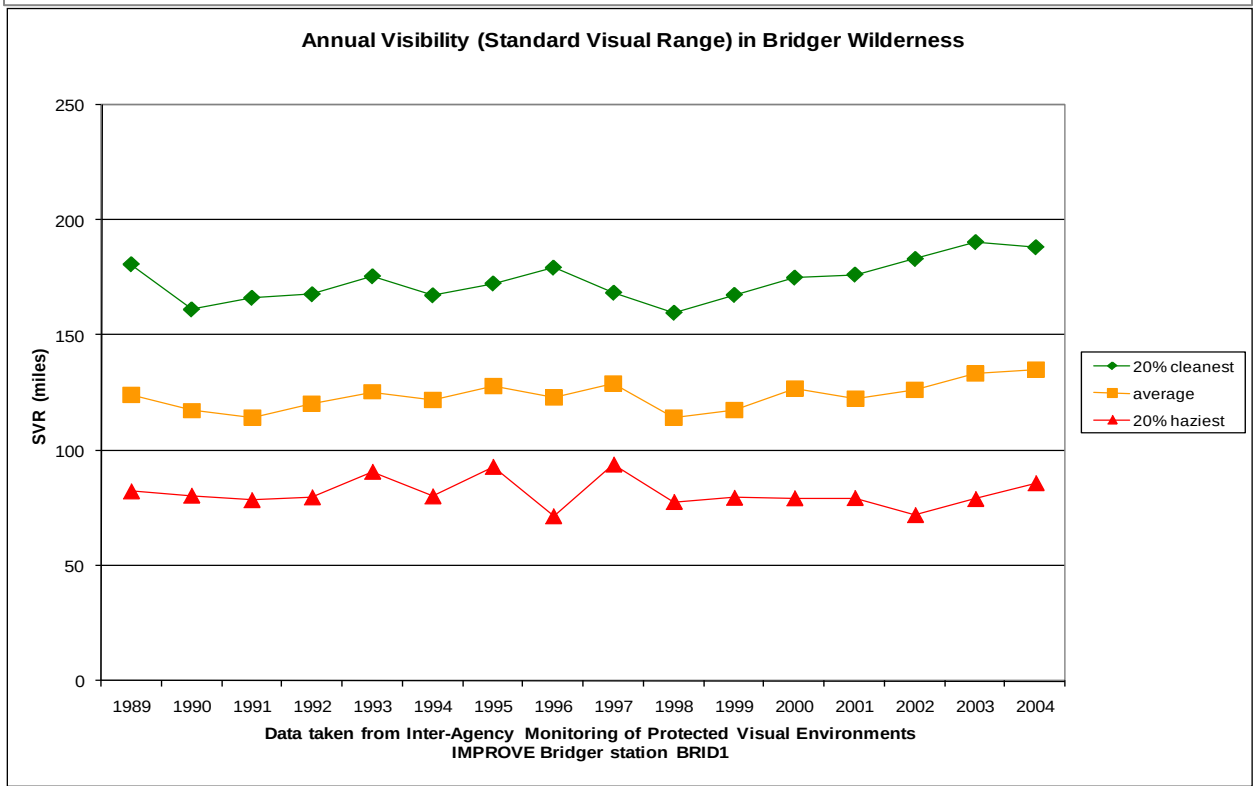
Visibility is quantified in terms of the deciview (dv), which is defined as a change in visibility that is perceptible to the average human, and in terms of the standard visible range (SVR), which is defined as the distance that an average human can see. Visibility data are calculated for each day, ranked from cleanest to haziest, and reported into three categories:

- 20% cleanest: mean visibility for the 20% of days with the best visibility
- Average: the annual mean visibility
- 20% haziest: mean visibility for the 20% of days with the poorest visibility

Visibility data were collected in the Bridger Wilderness from 1989 to 2003. The mean annual SVR varies from 198–162 miles (or 2–4 dv) on clear days, 133–109 miles (or 6–8 dv) on average days, and 12-10 miles (or 10–12 dv) on hazy days (Figure 3.2-8).

Figure 3.2-8. Visibility in the Bridger Wilderness





Deposition:
Through a process called atmospheric deposition, air pollutants fall out of the atmosphere and are deposited on terrestrial and aquatic ecosystems. These pollutants are deposited via wet deposition (precipitation) and dry deposition (gravitational settling of particles and gaseous pollutants that adhere to soil, water, and vegetation). Substances deposited include:

- Acids, such as sulfuric acid and nitric acid (HNO_3) (referred to as "acid rain")
- Air toxins, such as pesticides, herbicides, and VOCs
- Nutrients, such as nitrate and ammonium (NH_4^+)

Deposition is reported as the mass of material deposited on an area (kilogram per hectare per year). Total deposition refers to the sum of airborne material transferred to the Earth's surface by both wet and dry deposition.

A brief summary of current atmospheric deposition in the region is included in Table 3.2-9. These data represent several locations in the region, including Pinedale, Gypsum Creek, and Yellowstone National Park.

The natural acidity of rainwater is represented by pH values ranging from 5.0 to 5.6 (Seinfeld 1986). Precipitation pH values lower than 5.0 are considered acidified and may adversely affect plants and animals. A voluntary level of concern for a decrease in pH levels in rainwater has been estimated to be 0.1–0.2 (U.S. Department of Agriculture 1989).

Table 3.2-9. Summary of Current Atmospheric Deposition

Deposition Component	Description
Precipitation pH	Precipitation pH demonstrates some acidification • Pinedale (1982-2010): 4.8–5.4 • Gypsum Creek (1985-2010): 5.0–5.6 • Yellowstone National Park (1980-2010): 5.1–5.7
Total nitrogen deposition	Total nitrogen deposition is less than levels of concern • Pinedale (1990-2007): 12–2.0 kg/ha-year
Total sulfur deposition	Total sulfur deposition is less than levels of concern • Pinedale (1990-2009): 0.6–0.9 kg/ha-year

Total deposition voluntary levels of concern have been estimated for several areas (U.S. Department of Agriculture 1989). Estimated total deposition guidelines include the "red line" (defined as the total deposition that the area can tolerate) and the "green line" (defined as the acceptable level of total deposition).

Total nitrogen deposition guidelines for the Bridger Wilderness include the red line (set at 10 kg/ha-year) and the green line (set at 3–5 kg/ha-year). Actual mean annual total nitrogen deposition ranged from below 1.5 kg/ha-year to above 3.5 kg/ha-year (Figure 3.2-10). Total sulfur depositions guidelines for include the green line (set at 5 kg/ha-year) and the red line (set at 20 kg/ka-year). Mean annual total sulfur deposition ranged from 1 kg/ha-year to nearly 3 kg/ha-year (Figure 3.2-11). For sulfur, the

measured baseline deposition is well below the voluntary levels of concern (green line). For nitrogen, some deposition levels exceed the lower limits of the green line.

Figure 3.2-10. Mean Annual Nitrogen Deposition for Hobbs Lake and Black Joe Lake

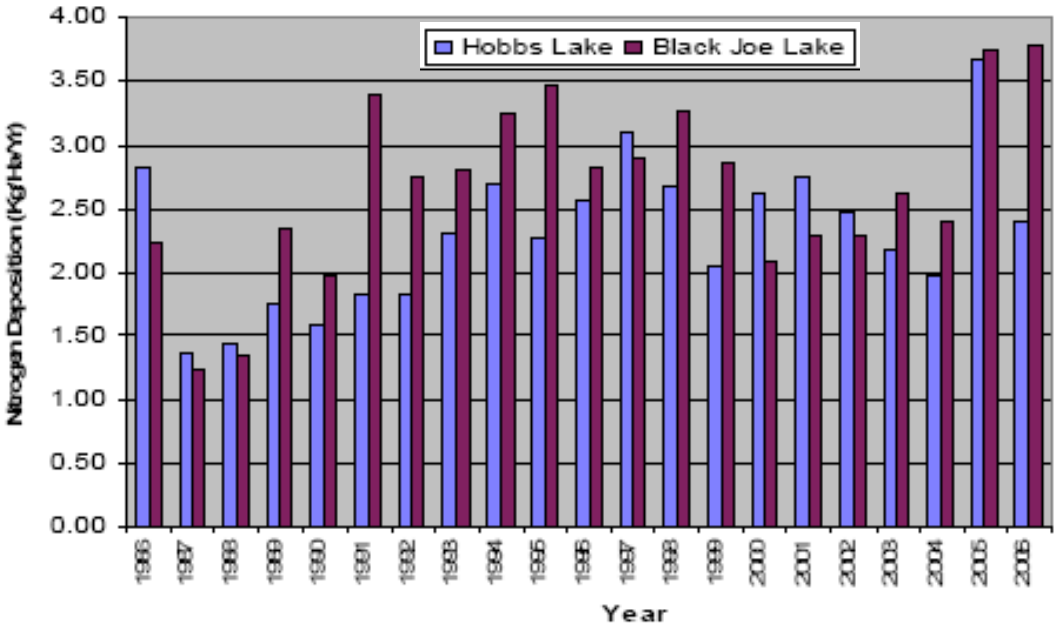
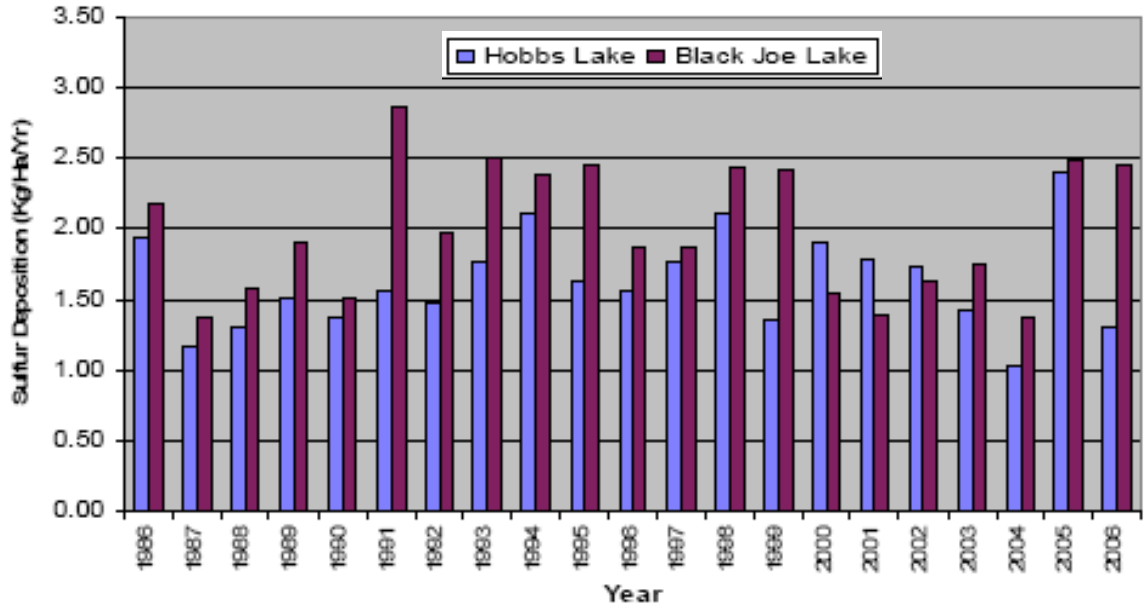


Figure 3.2-11. Mean Annual Sulfur Deposition for Hobbs Lake and Black Joe Lake



Atmospheric deposition of nitrogen and sulfur compounds can cause acidification of lakes and streams. One expression of lake acidification is a change in acid neutralizing capacity (ANC), which is a lake's ability to resist acidification from atmospheric deposition. ANC is expressed in units of micro-

equivalents per liter (μeq/l). Lakes with ANC values of 25 to 100 μeq/l are considered to be sensitive to atmospheric deposition; lakes with ANC values of 10 to 25 μeq/l are considered to be very sensitive; and lakes with ANC values of less than 10 are considered to be extremely sensitive. Table 3.2-12 summarizes distances and direction from RFO and KFO to sensitive lakes in the region.

Table 3.2-12. Distance and Direction to Sensitive Lakes

Sensitive Lake Receptors	Distance From KFO (km)	Direction from KFO	Distance From RFO (km)	Direction from RFO
Black Joe Lake, Bridger Wilderness Area	142	North	182	Northwest
Deep Lake, Bridger Wilderness Area	139	North	180	Northwest
Upper Frozen Lake, Bridger Wilderness Area	137	North	175	Northwest
Ross Lake, Fitzpatrick Wilderness Area	194	North	250	Northwest
Lower Saddlebag Lake, Popo Agie Wilderness Area	140	North	160	Northwest

Site-specific lake water chemistry background data (pH, ANC, total bulk deposition of nitrate, sulfate, etc.) have been collected by the USFS in several high mountain lakes in the nearby Wilderness Areas. Deposition data – total nitrogen and sulfur, nitrate and sulfate – from 1986 through 2006 are shown below.

Lake acidification is measured in terms of change in ANC, which is the lake's buffering capacity to resist acidification from atmospheric deposition of acid compounds such as sulfates and nitrates. Measured background ANC data for USFS identified sensitive lakes within the modeling domain are provided in Table 3.2-13. The 10th percentile lowest ANC values were calculated for each lake, following procedures provided by the USFS.

Table 3.2-13. Background ANC Values for Acid Sensitive Lakes[1]

Wilderness Area	Lake	Latitude (Deg-Min-Sec)	Longitude (Deg-Min-Sec)	10th Percentile Lowest ANC Value (μeq/l)[2]	Number of Samples	Monitoring Period
Bridger	Black Joe	42º44'22"	109º10'16"	69.7	78	1984-2009
Bridger	Deep	42º43'10"	109º10'15"	60.4	75	1984-2009
Bridger	Hobbs	43º02'08"	109º40'20"	70.1	85	1984-2009
Bridger	Lazy Boy	43º19'57"	109º43'47"	12.4	5	1997-2009
Bridger	Upper Frozen	42º41'13"	109º09'39"	7.4	12	1997-2009
Fitzpatrick	Ross	43º22'41"	109º39'30"	54.1	60	1988-2009
Mount Zirkel	Lake Elbert	40º38'3"	106º42'25"	53.6	67	1985-2007
Mount Zirkel	Seven Lakes	40º53'45"	106º40'55"	40.5	24	1985-2007
Mount Zirkel	Summit Lake	40º32'43"	106º40'55"	48.0	108	1985-2007
Popo Agie	Lower Saddlebag	42º37'24"	108º59'38"	55.6	59	1989-2009
Rawah	Island	40º37'38"	105º56'28"	71.4	21	1996-2009
Rawah	Rawah Lake #4	40º40'16"	105º57'28"	41.6	26	1996-2009

[1]From USFS (2010)

[2]10th Percentile Lowest ANC Values reported.

The USFS considers lakes with ANC values greater than 25 microequivalents per liter (μeq/l) to be sensitive to atmospheric deposition and lakes with ANC values less than or equal to 25 μeq/l are considered extremely sensitive. Of the lakes for which data is presented in the Table above, Upper Frozen and Lazy Boy lakes are considered extremely acid sensitive.

The USFS has identified a specific methodology to determine acceptable changes in ANC, which are used to evaluate potential air quality impacts from deposition at acid sensitive lakes. The USFS has established a level of acceptable change (LAC) of no greater than a 1 μeq/l change in ANC (from human causes) for lakes with existing ANC levels less than or equal to 25 μeq/l. A limit of 10 percent change in ANC reduction was adopted for lakes with an ANC greater than 25 μeq/l.

3.2.1.3 Climate and Climate Change

The Kemmerer, Pinedale, Rock Springs and Rawlins Field Offices are located in a semi-arid, mid-continental climate regime typified by dry, windy conditions, limited rainfall, and long, cold winters (Trewatha and Horn 1980). Table 3.2-14 summarizes potentially affected climate components in the area based on data collected at several long-term meteorological stations located in and near the Kemmerer, Pinedale, Rock Springs, and Rawlins Field Office areas.

Table 3.2-14. Summary of Climate

Wyoming Meteorological Station	Description
Kemmerer Water Treatment Station 1902 - 2011	Mean maxium temperature: 54 °F Mean minimum temperature: 24 °F Mean annual precipitation: 9.45 inches Mean annual snow depth: 2 inches Mean annual snowfall: 50.6 inches
Rock Springs FAA Airport 1948-2012	Mean maximum temperature: 55 °F Mean minimum temperature: 31 °F Mean annual precipitation: 8.68 inches Mean annual snow depth: 1 inch Mean annual snowfall: 43.6 inches
LaBarge 1958-2012	Mean maximum temperature: 56 °F Mean minimum temperature: 22 °F Mean annual precipitation: 7.96 inches Mean annual snow depth: 1 inch Mean annual snowfall: 31.9 inches
Rawlins FAA Airport 1951-2012	Mean maximum temperature: 55 °F Mean minimum temperature: 30 °F Mean annual precipitation: 9.04 inches Mean annual snow depth: 1 inches Mean annual snowfall: 51.9 inches
Source: (Western Regional Climate Center 2012)	

The region is subject to strong, gusty winds that are often accompanied by snow and blizzard conditions during the winter. Winds frequently originate from the west to northwest, and the mean annual wind speed is 9 miles per hour.

Wind strength and frequency affects dispersion of noises, odors, and transport of dust and other airborne elements. Therefore, the region's strong winds increase the potential for atmospheric dispersion of pollutants.

Climate change refers to any significant change in measures of climate (e.g., temperature or precipitation) lasting for an extended period (decades or longer). Global mean surface temperatures have increased nearly 1.8°F from 1890 to 2006. Models indicate that average temperature changes are likely to be greater in the Northern Hemisphere. Northern latitudes (above 24°N) have exhibited temperature increases of nearly 2.1° F since 1900, with nearly a 1.8°F increase since 1970 alone. Temperature in western Wyoming is expected to increase by 0.25 to 0.40 degrees Fahrenheit per decade while temperatures in surrounding locations in Utah, Wyoming, and Colorado are expected to increase by 0.40 to 1.2 degrees Fahrenheit per decade with the largest decrease expected in southwestern Wyoming (Figure 3.2-15). Precipitation across western Wyoming is expected to decrease by 0.1 to 0.6 inches per decade with the largest decrease expected in southwestern Wyoming 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). Several activities that occur in the Kemmerer, Pinedale, Rock Springs and Rawlins Field Office areas contribute to the phenomena of climate change, including large wildfires and activities using combustion engines; changes to the natural carbon cycle; changes to radioactive forces and reflectivity (albedo); and emissions of greenhouse gases (GHGs), especially carbon dioxide and methane, from fossil fuel development.

Greenhouse gases are composed of molecules that absorb and reradiate infrared electromagnetic radiation. When present in the atmosphere the gas contributes to the greenhouse effect. Some GHGs such as carbon dioxide occur naturally and are emitted to the atmosphere through natural processes and human activities. Other GHGs (e.g., fluorinated gases) are created and emitted solely through human activities. The primary GHGs that enter the atmosphere as a result of anthropogenic activities include carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_20), and fluorinated gases such as hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. Fluorinated gases are powerful GHGs that are emitted from a variety of industrial processes including production of refrigeration/cooling systems, foams and aerosols. Fluorinated gases are not primary to the activities authorized by the BLM and will not be discussed further in this document.

The Center for Climate Strategies (CCS) prepared the Wyoming Greenhouse Gas Inventory and Reference Case Projection 1990-2020 (Inventory) for the WDEQ through an effort of the Western Regional Air Partnership (WRAP). This inventory report presents a preliminary draft greenhouse gas (GHG) emissions inventory and forecast from 1990 to 2020 for Wyoming. This report provides an initial comprehensive understanding of Wyoming's current and possible future GHG emissions. The

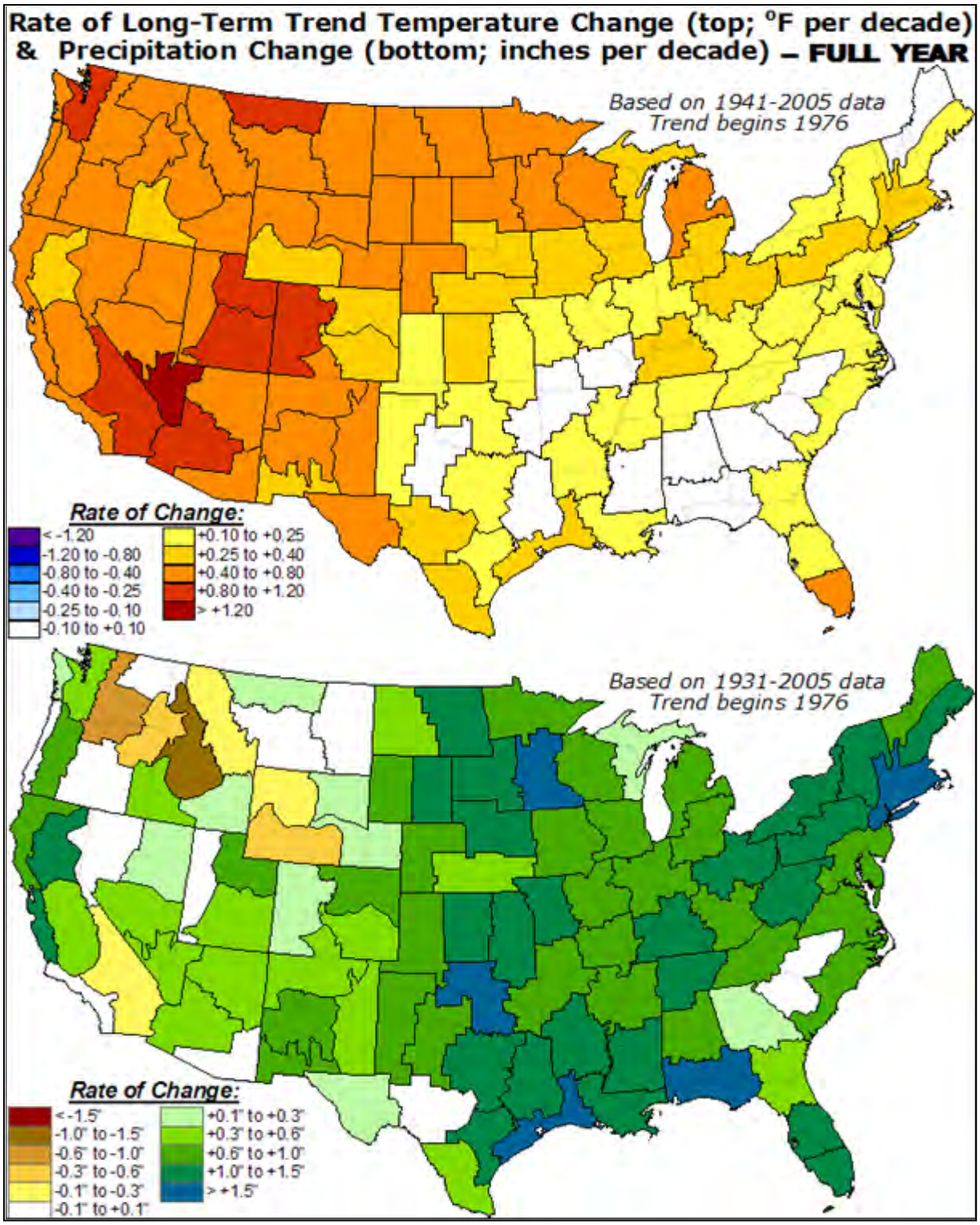
information presented provides the state with a starting point for revising the initial estimates as improvements to data sources and assumptions are identified.

The inventory report discloses that activities in Wyoming accounted for approximately 56 million metric tons (MMt) of *gross* carbon dioxide equivalent (CO2e) emissions in 2005, an amount equal to 0.8% of total U.S. gross GHG emissions. These emission estimates focus on activities in Wyoming and are *consumption-based;* they exclude emissions associated with electricity that is exported from the state. Wyoming's gross GHG emissions increased 25% from 1990 to 2005, while national emissions rose by only 16% from 1990 to 2004. Annual sequestration (removal) of GHG emissions due to forestry and other land-uses in Wyoming are estimated at 36 MMtCO2e in 2005. Wyoming's per capita emission rate is more than four times greater than the national average of 25 MtCO2e/yr. This large difference between national and state per capita emissions occurs in most of the sectors – Wyoming's emission per capita significantly exceed national emissions per capita for the following sectors: electricity, industrial, fossil fuel production, transportation, industrial process and agriculture. The reasons for the higher per capita intensity in Wyoming are varied but include the state's strong fossil fuel production industry and other industries with high fossil fuel consumption intensity, large agriculture industry, large distances, and low population base. Between 1990 and 2005, per capita emissions in Wyoming have increased, mostly due to increased activity in the fossil fuel industry, while national per capita emissions have changed relatively little.

Ongoing scientific research has identified the potential impacts of anthropogenic 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 carbon dioxide equivalent (CO2e) concentrations to increase dramatically, and are likely to contribute to overall global climatic changes. The Intergovernmental Panel on Climate Change (IPCC) recently concluded that "warming of the climate system is unequivocal" and "most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations" (IPCC 2007).

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 climate change behind CO_2 (Ramanathan and Carmichael 2008). Without additional meteorological monitoring systems, it is difficult to determine the spatial and temporal variability and change of climatic conditions, but increasing concentrations of GHGs are likely to accelerate the rate of climate change.

FIGURE 3.2-15. LONG-TERM TEMPERATURE (TOP) AND PRECIPITATION (BOTTOM) TRENDS IN THE UNITED STATES FROM NOAA CLIMATE PREDICTION CENTER (HTTP://WWW.CPC.NOAA.GOV)



Some authorized activities within the Kemmerer, Pinedale, Rock Springs and Rawlins Field Offices generate GHG emissions. Oil and gas development activities can generate CO2 and NH4 (during processing). Carbon dioxide emissions result from the use of combustion engines for OHV and other recreational activities. Wildland fires also are a source of CO2 and other GHG emissions, and livestock grazing is a potential source of methane. Other activities in the Kemmerer, Pinedale, Rock Springs and Rawlins Field Office areas 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 GHG emissions associated with the parcels proposed for leasing is included in Section 4.

3.2.2 Wildlife

Wildlife resources associated with each parcel/partial parcel available to offer for leasing are presented in Table 3.1. Studies conducted by Holloran for the Greater Sage-Grouse (Holloran 2005), Berger for pronghorn (Berger et al. 2008), and Sawyer for mule deer (Sawyer et al. 2010) demonstrate that intense oil and gas development such as that occurring on the Pinedale Anticline can affect these species and their use of the crucial winter habitat in close proximity to the development, as well as migration corridors. It is not possible to determine or even reasonably project at the leasing stage whether a parcel will be leased; and if it is leased whether or not it will be developed, or what the intensity level of that development may be. The EISs for the Kemmerer, Pinedale, Green River, and Rawlins RMPs evaluated affects to crucial big game winter and parturition ranges, including overlapping winter ranges of multiple species, and concluded that areas containing the parcels addressed in this EA would be satisfactorily mitigated through the timing limitation stipulations (TLS). Table 3.1 identifies parcels with Big Game Crucial Winter Range and Big Game Migration Corridors present.

3.2.2.1 Special Status Species

Section 7 of the Endangered Species Act (ESA) of 1973, as amended, requires that BLM land managers ensure that any action authorized, funded, or carried out by the BLM is not likely to jeopardize the continued existence of any Federally Designated Threatened or Endangered (T&E) species, and that the action avoids any appreciable reduction in the likelihood of recovery of affected species.

The BLM Special Status Species Policy outlined in BLM Manual 6840 and IM WY-2010-027 is to conserve listed species and the ecosystems on which they depend, while ensuring that actions authorized or carried out by BLM are consistent with the conservation needs of special status species and do not contribute to the need to list any of these species. The BLM policy is intended to contribute to the survival of those species that are rare or uncommon, either because they are restricted to specific uncommon habitat or because they may be in jeopardy due to human or other actions.

By BLM policy, species proposed for federal listing are to be managed with the same level of protection provided for threatened and endangered species. The policy for federal candidate species and BLM sensitive species is to ensure that no action that requires BLM approval should contribute to the need to list a species as threatened or endangered.

Other management direction is based on Kemmerer, Rawlins, Pinedale and Green River RMP management objectives, activity level plans, and other aquatic habitat and fisheries management direction, including 50 CFR 17, the Land Use Planning Handbook, Appendix C, Part E, Fish and Wildlife.

The Kemmerer, Rawlins, Pinedale, and Green River RMPs provide listings of sensitive species within the field office areas, and have evaluated the need to protect habitat necessary for the success of species identified through these regulations and policies. All of the parcels identified as available for lease under Alternative B contain habitat or potentially contain habitat for sensitive species. Refer to Table 3.1 for a listing of T&E, candidate, and sensitive species associated with or potentially associated with the individual proposed May 2013 lease parcels.

New information regarding the status of the Greater Sage-Grouse has elevated its status from a BLM sensitive species to a federal candidate species. The Greater sage-grouse is a candidate species for listing under provisions of the ESA as determined by the USFWS and documented in a March 5, 2010 *Federal Register* notice declaring that listing of the Greater Sage-Grouse was warranted but precluded. Greater sage-grouse are distributed in sagebrush habitat throughout the central and western portions of the High Desert District. Revised policy was issued by the BLM Wyoming in 2012 under IM WY-2012-019 (BLM 2012a). The results of the Fluid Minerals Leasing Screen for Greater Sage-Grouse for the parcels that are deferred from the May 2013 lease sale can be found in Appendix C. Numerous parcels on the May 2013 list may provide nesting and/or winter range, and/or breeding habitat for Greater Sage-Grouse (see Table 3-1). In addition, the State Director has used his discretion to temporarily defer offering approximately 5,128.360, acres from parcels 0513-1, 48, 67, 68, 69, 70, 71, and 84 in the interest of conservation of the Greater Sage Grouse; deferral is pending completion of the ongoing Greater Sage Grouse RMP amendment process in the Rock Springs, Kemmerer, Pinedale, and Rawlins field offices. Parcels 0513-069 and 084 are deferred in whole, while the remaining parcels are partially deferred. These deferrals can be found Appendix F**.**

Parcel 001 is located in the Platte River drainage which provides habitat for the threatened and endangered pallid sturgeon fish species. The remaining parcels are located in the Colorado River drainage which provides habitat for the threatened and endangered Colorado pikeminnow, razorback sucker, bonytail, and humpback chub fish species.

In 2006, USFWS, BLM, USFS, NPS, and fish and wildlife management agencies in Colorado, Wyoming, and Utah jointly developed a conservation agreement and strategy to "assure the long-term viability of Colorado River cutthroat trout (CRCT) throughout their historic range." Parcel 094, which has portions of LaBarge Creek, has the potential to contain CRCT. No other parcels have been identified as having CRCT.

Parcels containing streams will also have associated riparian habitat, as presented in Table 3.1. Some streams and riparian areas may provide habitat for special status amphibian and reptilian species. Semlitsch and Bodie (October 2003) state, "It is generally acknowledged that terrestrial buffers or riparian strips 30-60 m wide will effectively protect water resources." They further state the importance of amphibian and reptilian core habitat and suggest including "three terrestrial zones adjacent to core

aquatic and wetland habitats…(1) a first terrestrial zone immediately adjacent to the aquatic habitat, which is restricted from use and designed to buffer the core aquatic habitat and protect water resources; (2) starting again from the wetland edge and overlapping with the first zone, a second terrestrial zone that encompasses the core terrestrial habitat defined by semiaquatic focal-group use (e.g., amphibians...); and (3) a third zone, outside the second zone, that serves to buffer the core terrestrial habitat from edge effects from surrounding land use" and "Although wetlands vary in many characteristics related to type, region, topography, climate, and land-use surrounding them, the data we compiled suggest that a single all-encompassing value for the size of core habitats can be used effectively." Based on the definition for riparian habitat (i.e., areas adjacent to rivers and streams with a differing density, diversity, and productivity of plant and animal species relative to nearby uplands) is appears that the Semlitsch and Bodie core habitat zone would correlate with riparian areas. They recommend a minimum core zone of 142 meters (465 feet). The BLM 500-foot buffer from the edge of riparian habitat or surface water meets this minimum core zone width.

The Wyoming pocket gopher (*Thomomys clusius*), a species on the BLM Wyoming sensitive species list, was petitioned to be included on the threatened and endangered species list. The U.S. Fish and Service subsequently determined that listing was not warranted. The Wyoming pocket gopher is known to occur only in Sweetwater and Carbon counties in Wyoming. As its range is currently defined, the Wyoming pocket gopher appears to occur primarily on multiple-use lands managed by the BLM. These lands are extensively intermixed with parcels of private land. A variety of biological factors can make animals intrinsically susceptible to disturbance, including narrow distribution, habitat specificity, restrictive territoriality and area requirements, and susceptibility to disease, low dispersal capability, high site fidelity, and low reproductive capability.

3.2.3 Lands with Wilderness Characteristics

Wilderness characteristics are resource values that include naturalness, outstanding opportunities for solitude, or outstanding opportunities for primitive and unconfined recreation. Areas evaluated for wilderness characteristics generally occur in undeveloped locations of sufficient size (typically greater than 5,000 contiguous acres) 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. The BLM is still required under Section 201 of FLPMA to "...maintain on a continuing basis an inventory of all public lands and their resource and other values...." This includes reviewing lands, in this case lease parcels, to determine if they possess wilderness characteristics (refer to Appendix D).

A review of parcels indicates that 16 parcels and/or portions of parcels (009, 031, 032, 033, 034, 035, 036, 037, 038, 039, 040, 041, 042, 043, 044, and 045) have been determined to have lands with wilderness character (Appendix D). Additionally, 22 parcels and/or portions of parcels were identified as being within a Citizens' Proposed Wilderness Area (009, 011, 014, 015, 016, 017, 031, 032, 033, 034,

035, 036, 037, 038, 039, 040, 041, 042, 043, 044, 045, and 066). All of these 22 identified parcels are also located within the RFO's Adobe Town Dispersed Recreation Use Area (DRUA) and are subject to management decisions in the Rawlins RMP. The Rawlins RMP approved in December 2008 determined these "*lands to be unmanageable for wilderness character because of preexisting oil and gas leases, the BLM elected to manage lands with wilderness character for multiple use and not for protection of wilderness character.*"

The identified parcels containing lands with wilderness character also fall within the Adobe Town area lands designated by the State of Wyoming as a "very rare or uncommon" area. The designation of the Adobe Town Rare and Uncommon Area by the Wyoming Environmental Quality Council applies State of Wyoming protection only as related to non-coal mining operations and does not limit oil and gas leasing, exploration, drilling, production or related construction. BLM's management of the Adobe Town area, including the Adobe Town WSA and Adobe Town DRUA, meets or exceeds the management protections of the State of Wyoming "very rare or uncommon" designation (Rawlins RMP, 2008).

There are no congressionally designated wilderness areas on BLM-administered lands within the HDD, but there are five wilderness study areas located within the RFO, one in the KFO, two in PFO and 13 in the RSFO (Note: Adobe Town WSA occurs within portions of the Rawlins and Rock Springs Field Offices). They are:

Rawlins Field Office
Adobe Town WSA
Ferris Mountains WSA
Encampment River Canyon WSA
Prospect Mountain WSA
Bennett Mountains WSA

Kemmerer Field Office
Raymond Mountain WSA

Pinedale Field Office
Scab Creek WSA
Lake Mountain WSA

Rock Springs Field Office
Adobe Town WSA
Whitehorse Creek WSA
Honeycomb Buttes WSA
Oregon Buttes WSA
Alkali Draw WSA
South Pinnacles Buttes WSA
Alkali Basin/East Sand Dunes WSA
Sand Dunes WSA
Buffalo Hump WSA
Red Creek Badlands WSA

Devil's Playground WSA
Twin Buttes WSA
Red Lake WSA

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 Kemmerer, Pinedale, Rawlins, and Green River 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. None of the parcels on the May 2013 list are within any of the WSAs.

3.2.4 Cultural and Paleontological Resources

All parcels addressed in this EA have the potential to contain surface and buried archaeological materials. Once the decision is made by the lessee to develop a lease, an area specific cultural records review would be completed to determine if there is a need for a cultural inventory of the areas of proposed surface disturbance. Generally, a cultural inventory will be required before new surface disturbance and all historic and archaeological sites that are eligible for listing in the National Register of Historic Places would be either avoided by the undertaking or have the information in the sites extracted through archaeological data recovery. See Table 3.1 for individual parcels that have been identified as having known cultural sites and National Historic Trails.

The parcels addressed in the EA also have a potential to contain vertebrate and non-vertebrate fossils. Post-lease development proposals would be evaluated on a case-by-case basis to determine if paleontological surveys would be required prior to surface disturbance. Parcels that have a Potential Fossil Yield Class of Class 4 (High) or Class 5 (Very High) are identified in Table 3.1.

3.2.5 Invasive, Non-native Species

While there are no known populations of invasive or non-native species on the proposed parcels, infestations of noxious weeds can have a negative impact on biodiversity and natural ecosystems. Noxious weeds affect native plant species by out-competing native vegetation for light, water and soil nutrients. Locally, regionally, and nationally noxious weeds infestations cause decreased quality of agricultural products due to high levels of competition from noxious weeds; decreased quantity of agricultural products due to noxious weed infestations; and increased costs to control and/or prevent the noxious weeds.

Recent federal legislation has been enacted requiring state and county agencies to implement noxious weed control programs. Monies would be made available for these activities from the federal government, generated from the federal tax base. Therefore, all citizens and taxpayers of the United States are directly affected when noxious weed control/prevention is not exercised. The field offices work cooperatively with county and local weed control agencies to identify and manage noxious weeds.

3.2.6 Wastes, Hazardous or Solid

There are no identified hazardous or solid waste sites on the parcels addressed in this EA. Should a parcel be leased and developed, generation and temporary storage of waste materials (solid and liquid) would likely occur. Waste materials would be managed in accordance with Onshore Orders 1 & 7, Resource

Conservation and Recovery Act (RCRA), applicable Wyoming Department of Environmental Quality (WDEQ) regulations, and Wyoming Oil and Gas Conservation Commission (WOGCC) rules. Fluid handling would be evaluated at the development stage and fluids associated with any subsequent drilling and/or production would either be treated, evaporated, or transferred to an approved WDEQ treatment facility; solids would be treated on site or transferred to a WDEQ approved facility.

3.2.7 Water Resources: Surface and Groundwater

Surface water hydrology within the area is typically influenced by geology, soil characteristics, precipitation and vegetation. Anthropogenic factors that currently affect surface water resources include livestock grazing management, private, commercial and industrial development, recreational use, drought, and vegetation control treatments. Ephemeral drainages that discharge into perennial waters are located within the various parcels/partial parcels available for offer. Perennial streams with associated riparian habitat area are present for many parcels, as identified in Table 3.1.

Groundwater hydrology within the area is influenced by geology and recharge rates. Groundwater quality and quantity can be influenced by precipitation, water supply wells and various disposal activities. Groundwater quality across the Kemmerer, Pinedale, Rawlins, and Rock Springs Field Offices varies with depth from potable waters with low total dissolved solids (TDS) to highly saline, non-potable sources; additionally known areas of fluoride levels in exceedances of state water quality standards exist within all four field offices. Most of the groundwater in KFO, PFO, RFO, and RSFO area is used for industrial, domestic and livestock/irrigation purposes. Several parcels contain land with private surface overlying federal minerals (i.e., split-estate) and are identified in Table 3.1. The private surface lands have or have the potential to contain private residences and associate facilities such as domestic water supply wells. Otherwise, there are no known domestic water supply sources on or in the general vicinity of the available parcels/partial parcels.

3.2.8 Recreation

Recreational use of the available parcels and the surrounding areas is typically for hunting, fishing, camping, sightseeing, off-highway vehicle use, and other recreational activities. In the national survey of fishing, hunting and wildlife-associated recreation for activities in 2006, expenditures from fishing and hunting significantly increased. In Wyoming, more than 320,000 people participated in fishing and hunting in 2006. Additionally, 716,000 people participated in some form of wildlife watching (USFWS 2006 National Survey of Fishing, Hunting, and Wildlife Associated Recreation). The total number of hunting and fishing recreation use days in Wyoming in 2008 was 3,683,371. Based on the number of recreation days and average expenditure per day, hunters, anglers and trappers expended approximately $685 million in pursuit of their sport (WGFD Annual Report 2008). Non-consumptive users provided about $420 million through wildlife watching, wildlife photography, etc. In total, wildlife associated recreation accounted for over $1 billion dollars in income to the state for the year 2008 (WGFD Annual Report 2008).

For lands managed by the Department of the Interior (which include those BLM-administered lands within the May 2013 lease sale) more than 437 million recreational visits in 2010 supported more than 388,000 jobs nationwide and contributed over $44 billion in economic activity, including 14,000 jobs in Wyoming (USDI 2011). For Wyoming, the outdoor recreation experiences boost economic activity from hunting, angling, and tourism, supporting 52,000 jobs across the state, contributing more than $4.4 billion

annually to Wyoming's economy, generates $250 million annually in state tax revenue and produces $3.6 billion annually in retail sales and services across Wyoming (accounting for 17% of gross state product)(Outdoor Industry Foundation 2006.).

Trout are considered the most popular sport fish in the United States and in 2006, it was estimated that more than 6.8 million anglers fished for trout (U.S. Fish and Wildlife Service 2006.). In Wyoming, it is estimated that of the 203,000 freshwater anglers over the age of 16 who fish, more than 88 percent seek trout, making Wyoming the state with the second highest participation rate for trout fishing in the United States.

Parcels that have special management related to recreational values are identified in Table 3.1. Parcel 001 is located within the North Platte River Special Recreation Management Area (SRMA). Additionally, 22 parcels and/or portions of parcels (009, 011, 014, 015, 016, 017, 031, 032, 033, 034, 035, 036, 037, 038, 039, 040, 041, 042, 043, 044, 045, and 066) are located within the Adobe Town Dispersed Recreation Use Area (DRUA). All parcels are located within areas open to oil and gas leasing in accordance with the appropriate RMP.

3.2.9 Visual Resources

The BLM Visual Resource Management (VRM) Class objectives are as follows:

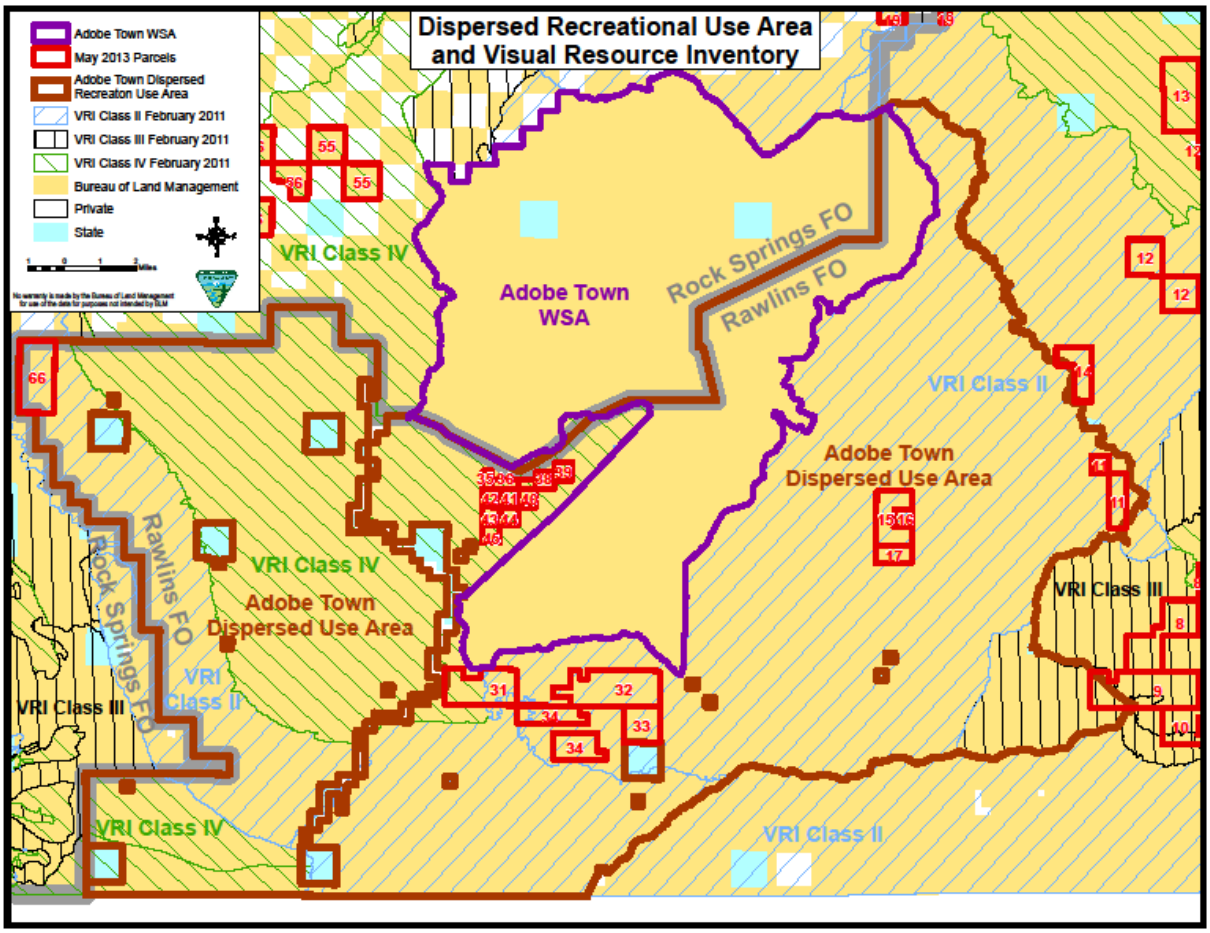
- Class I: to preserve the existing character of the landscape. The level of change to the characteristic landscape should be very low and must not attract attention.
- Class II: to retain the existing landscape character and the level of change to the characteristic landscape should be low. Management activities should not attract the attention of the casual observer. Changes would be required to repeat the basic elements of form, line, color, and texture found in the predominant natural features of the characteristic landscape. Modifications to a proposal would be required if the proposed change cannot be adequately mitigated to retain the character of the landscape.
- Class III: to partially retain existing landscape character. The level of change to the characteristic landscape should be moderate. Management activities may attract attention but should not dominate a casual observer's view. Changes should repeat the basic elements found in the predominant natural features of the characteristic landscape.
- Class IV: to provide for management activities which require major modification of the existing landscape character. Every attempt, however, should be made to reduce or eliminate activity impacts through careful location, minimal disturbance, and repeating the basic landscape elements.

All individual parcel VRM Class designations are identified in Table 3.1. VRM Classifications only apply to the BLM-administered surface estate and therefore do not apply to non-BLM checkerboard lands within the VRM classification areas, nor on private or State lands among the May 2013 lease parcels.

As previously stated, 22 parcels and/or portions of parcels are within the Adobe Town DRUA, which was designated VRM Class III in the December 2008 Rawlins RMP. During the preparation of the Rawlins RMP, the BLM had not updated its Visual Resource Inventory ("VRI") and the VRM portion of the RMP was remanded to the RFO in order to update the VRI and potentially revise the VRM classifications. Concerning visual resource management until the VRM land use planning amendment is completed, the

2008 RMP ROD states, "Until such time, the Approved RMP will utilize the VRM class designations as established and analyzed in the No Action Alternative, Alternative 1 in the Proposed RMP/Final EIS." The VRM designation under Alternative 1 of the Proposed RMP/Final EIS, dated January 2008, also classifies the Adobe Town DRUA as Class III, to partially retain existing landscape character. RFO has completed the required VRI and in February 2011 issued the updated VRI results. Parcels 011, 014, 015, 016, 017, 031, 032, 033, 034,and 066 have a VRI of Class II; parcel 009 has a VRI of Class III, and parcels 035, 036, 037, 038, 039, 040, 041, 042, 043, 044, and 045 have a VRI rating of Class IV. Refer to Map 3.2.9: Dispersed Recreational Use Area and Visual Resource Inventory for a location of the parcels and the February 2011 inventory results. The VRM classification will not be determined until the ROD for the RMP VRM amendment is approved and until that time, all of these parcels are managed according to the VRM Class III. VRI is not an equivalent of VRM classification.

Map 3.2.9: Dispersed Recreational Use Area and Visual Resource Inventory



3.2.10 Public Health and Safety

Oil and gas development, as well as other industrial uses, such as coal and trona mining, has been occurring in the HDD Field Offices for many decades. Due to the scattered nature and the small area encompassed by the respective parcels coupled with 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. Parcels that contain lands with private surface overlying federal

minerals (i.e., split-estate) are identified in Table 3.1. Other private surface lands have or have the potential to contain private residences and associate facilities such as domestic water supply wells.

3.2.11 Socio-Economics

The proposed lease parcels are located in Carbon, Lincoln, Sublette, and Sweetwater Counties, Wyoming. Table 3.17 shows changes in population for each county between 2000 and 2010. In terms of the actual number of people, Laramie County was the fastest growing county, increasing its population by a more than 10,000 individuals; Carbon County had the smallest population change which was closest to the national average. Sublette County had a 73.1 percent increase.

Social conditions in the Kemmerer, Rawlins, Pinedale and Rock Springs Field Office areas that concern human communities include towns, cities, rural areas, and the custom, culture, and history of the area as it relates to human settlement, as well as current social values. BLM management actions can impact social conditions in the area and in nearby communities. The area considered for this analysis is comprised of the counties of Albany, Carbon, Laramie, Lincoln, Sublette, Sweetwater, and Uinta.

The economy of the study area is based primarily on resource development (e.g., mining, agriculture) and services. Mining, including oil and gas, provides a large part of the employment and income of the communities in the area. Mining has been the key economic driver for development of the communities in southwestern Wyoming and continues to provide much of the economic base in terms of jobs, household incomes, and tax revenues that allow governments at the local, state, and national level to attempt to meet the demand for essential services that is being driven by the growth in the oil and gas sector.

Although the U.S. Census Bureau (2006) does not make available all data on employee counts and payrolls due to confidentiality requirements, the data that are provided help to show the economic importance of mineral commodities. The mining demographic statistics, which include oil and gas exploration, extraction, and associated operations, for 2006 show that mining and oil and gas development are a lesser component of the economic status in southeastern Wyoming (Albany and Laramie counties); whereas as it is a more important component of the economic employment base in south central and southwestern Wyoming. Mining or oil and gas related jobs in Albany County comprise 0.2 percent of the employment base; in Laramie County 0.4 percent; in Carbon County 3 percent; in Sweetwater County 20 percent; in Uinta County 8 percent; in Lincoln County 7 percent; and in Sublette County it comprises 25 percent.

Table 3.17 Population by County, 1980-2000

Area	Population in 2000	Population in 2010	Change 1980-2000	
			Total	Percent
Albany County	32,014	36,299	4,285	13.4
Carbon County	15,639	15,885	246	1.6
Laramie County	81,607	91,738	10,131	12.4
Lincoln County	14,573	18,106	3,533	24.2

Sublette County	5,920	10,247	4,327	73.1
Sweetwater County	37,613	43,806	6,193	16.5
Uinta County	19,742	21,118	1,376	7.0
Wyoming	206,608	237,199	30,591	14.8

Sources: U.S. Census Bureau

In general, resource development and protection are both important to sustaining the values within the area. However, the challenge is seeking an appropriate balance between resource development and protection, which is central to the BLM's mission and the RMP process.

3.2.12 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 disproportionately high or adverse impacts on minority and low-income populations.

ENVIRONMENTAL IMPACTS

4.0 Description of Impacts

As previously stated, the sale of parcels and issuance of oil and gas leases is strictly an administrative action. Nominated lease parcels are reviewed against the appropriate land use plan, and stipulations are attached to mitigate any known environmental or resource conflicts that may occur on a given lease parcel. On-the-ground impacts would not occur until a lessee applies for and receives approval to drill on the lease. The BLM cannot determine at the leasing stage whether or not a proposed parcel will actually be sold, or if it is sold and issued, whether or not the lease would be explored or developed. Consequently, the BLM cannot determine exactly where a well or wells may be drilled or what technology that may be used to drill and produce wells, so the impacts listed below are more generic, rather than site-specific. Additional NEPA analysis would be conducted prior to approval of an APD. This additional environmental documentation would provide site-specific analysis for the well location. Additional mitigation and BMPs may be applied as COAs at that time to mitigate identified impacts.

According to the Tenth Circuit Court of Appeals, site-specific NEPA analysis at the leasing stage may not be possible absent concrete development proposals. Whether such site-specific analysis is required depends upon a fact-specific inquiry. Often, where environmental impacts remain unidentifiable until exploration can narrow the range of likely drilling sites, filing of an APD to drill may be the first useful point at which a site-specific environmental appraisal can be undertaken (Park County Resource Council, Inc. v. U.S. Department of Agriculture, 10th Cir., April 17, 1987). In addition, the IBLA has decided that "BLM is not required to undertake a site-specific environmental review before issuing an oil and gas lease when it previously analyzed the environmental consequences of leasing the land..." (Colorado Environmental Coalition, et al, IBLA 96-243, decided June 10, 1999). However, when site-specific impacts are reasonably foreseeable at the leasing stage, NEPA requires the analysis and disclosure of such reasonably foreseeable site-specific impacts (N.M ex rel. Richardson v. BLM, 565 F.3d 683, 718-19 (10th Cir. 2009)).

4.1 Impacts of Alternative A (No Action)

Under this alternative none of the parcels designated as available would be offered for lease and there would be no subsequent physical impact to the existing environment caused by post-lease well development. The only impact resulting from the No Action Alternative would be to socioeconomics.

4.1.1 Socioeconomic Resource

Based on the assumption that 74 whole parcels and 7 portions of parcels (91,352.310 acres) identified in Alternative B would be sold and based on the minimum acceptable bid of $2.00 per acre, the government would lose the opportunity to collect a minimum of $182,704.62 under the No Action Alternative A, as well as any royalties that would be collected from any subsequent hydrocarbon production. Typically, lease bids are substantially higher than the $2.00 per acre minimum; consequently the economic loss would likely be much higher than that projected. For example, the four lease sales conducted in 2011 yielded $55,625,606.00 from 155,393 acres sold for an average of $357.97 per acre. Based on the 2011 average, implementing the No Action Alternative would potentially result in a loss of $32,701,386.41 more than the Proposed Action, Alternative B.

The State of Wyoming, as well as many counties and communities within, rely on oil and gas development for part of their economic base. The employment and purchasing opportunities associated with developing and producing wells on the leases is also foregone, as would the opportunity to provide oil and gas resources from these lease parcels to help meet the nation's energy needs. Refer to the Kemmerer, Pinedale, Rawlins, and Green River RMPs and FEISs for additional socioeconomic analysis.

4.2 Impacts of Alternative B (Proposed Action)

Alternative B would result in 81 parcels and/or portions of parcels being offered at the May 2013 BLM Wyoming oil and gas lease sale. Again the reader is reminded that at the leasing stage BLM cannot predict whether or not any of the parcels will actually be sold, if they are sold and a lease is issued whether or not they will actually be developed, and if development does occur what the development level would be. Table 4.0 displays the stipulations that would be applied to each parcel to mitigate anticipated impacts in accordance with the associated field office RMP.

Table 4.0
Lease Notices, Timing Limitation Stipulations (TLS) and No Surface Occupancy (NSO) Stipulations Applied to the Lease Parcels Based on Affected Resources Elements Identified In the Affected Environment Section

Parcel # WY-1305-	Lease Notice #1[1]	Lease Notice #2[2]	Lease Notice #3[3]	Big Game Winter TLS	Greater sage-grouse/ Sharp-tailed Nesting TLS	B. Owl/ Raptor Nesting TLS	Mountain Plover TLS	Bald Eagle Roost/ Nest TLS or NSO	Greater Sage-Grouse winter TLS	Airport NSO or CSU	Big Game Birthing TLS/ CSU	SG/ Sharp-Tailed Lek CSU	Raptor CSU	Amphib Species CSU	Cult. Res. CSU or NSO	Historic Trails/ CSU &/or NSO	Sensitive Species CSU	DRUA CSU	VRM II CSU	Coal/ Trona CSU	SRMA/ SMA/ WHMA CSU or NSO	Aquifer Recharge area
001	applied	applied	applied	applied	applied		applied							applied			applied		applied		applied	
002	applied	applied	applied	applied	applied	applied	applied		applied				applied	applied			applied					
003	applied	applied	applied	applied	applied	applied	applied		applied				applied	applied			applied					
004	applied	applied	applied		applied		applied					applied		applied			applied					
005	applied	applied	applied		applied							applied		applied		applied	applied					
006	applied	applied	applied		applied		applied							applied		applied	applied					
007	applied	applied	applied		applied	applied	applied						applied				applied					
008	applied	applied	applied		applied	applied							applied	applied		applied	applied					
009	applied	applied	applied		applied	applied							applied	applied		applied	applied	applied				
010	applied	applied	applied	applied	applied	applied							applied	applied		applied	applied					
011	applied	applied	applied		applied									applied			applied	applied				
012	applied	applied	applied		applied	applied	applied							applied			applied					
013	applied	applied	applied		applied	applied	applied							applied			applied					
014	applied	applied	applied		applied									applied			applied	applied				
015	applied	applied	applied		applied	applied											applied	applied				
016	applied	applied	applied		applied												applied	applied				
017	applied	applied	applied		applied	applied							applied				applied	applied				
018	applied	applied	applied		applied		applied							applied			applied					
019	applied	applied	applied	applied	applied	applied								applied			applied		applied		applied	
020	applied	applied	applied	applied	applied	applied	applied						applied			applied	applied				applied	
021	applied	applied	applied	applied	applied	applied	applied						applied	applied			applied					
022	applied	applied	applied														applied		applied		applied	
023	applied	applied	applied		applied	applied											applied					
024	applied	applied	applied	applied												applied	applied				applied	
025	applied	applied	applied	applied													applied		applied		applied	
026	applied	applied	applied	applied													applied				applied	
027	applied	applied	applied		applied		applied							applied			applied					
028	applied	applied	applied		applied		applied							applied			applied					
029	applied	applied	applied	applied	applied	applied	applied						applied	applied			applied					
030	Parcel Deferred, See Appendix C																					
031	applied	applied	applied		applied		applied							applied			applied	applied				
032	applied	applied	applied		applied		applied							applied			applied	applied				
033	applied	applied	applied	applied	applied									applied		applied	applied	applied				

Table 4 (Cont.)
Lease Notices, Timing Limitation Stipulations (TLS) and No Surface Occupancy (NSO) Stipulations
Applied to the Lease Parcels Based on Affected Resources Elements Identified In the Affected Environment Section

Parcel # WY-1211-	Lease Notice #1[1]	Lease Notice #2[2]	Lease Notice #3[3]	Big Game Winter TLS	Greater sage-grouse/ Sharp-tailed Nesting TLS	B. Owl/ Raptor Nesting TLS	Mountain Plover TLS	Bald Eagle Roost/ Nest TLS or NSO	Greater Sage-Grouse winter TLS	Airport NSO or CSU	Big Game Birthing TLS/ CSU	SG/ Sharp-Tailed Lek CSU	Raptor CSU	Amphib Species CSU	Cult. Res. CSU or NSO	Historic Trails/ CSU &/or NSO	Sensitive Species CSU	DRUA CSU	VRM II CSU	Coal/ Trona CSU	SRMA/ SMA/ WHMA CSU or NSO	Aquifer Recharge area
034	applied	applied	applied	applied	applied		applied							applied			applied	applied				
035	applied	applied	applied		applied		applied										applied	applied				
036	applied	applied	applied		applied		applied										applied	applied				
037	applied	applied	applied		applied												applied	applied				
038	applied	applied	applied		applied												applied	applied				
039	applied	applied	applied		applied												applied	applied				
040	applied	applied	applied		applied												applied	applied				
041	applied	applied	applied		applied												applied	applied				
042	applied	applied	applied		applied		applied										applied	applied				
043	applied	applied	applied		applied		applied										applied	applied				
044	applied	applied	applied		applied		applied							applied			applied	applied				
045	applied	applied	applied		applied		applied							applied			applied	applied				
046	applied	applied	applied	applied		applied											applied		applied		applied	
047	applied	applied	applied		applied												applied				applied	
048	applied	applied	applied		applied	applied										applied	applied					
049	applied	applied	applied		applied	applied										applied	applied					
050	applied	applied	applied			applied											applied					
051	applied	applied	applied		applied	applied											applied					
052	applied	applied	applied			applied											applied					
053	applied	applied	applied	applied	applied		applied							applied			applied					
054	Parcel Deferred, See Appendix C																					
055	applied	applied	applied														applied					
056	applied	applied	applied		applied	applied											applied					
057	applied	applied	applied			applied											applied					
058	applied	applied	applied			applied										applied	applied					
059	applied	applied	applied			applied										applied	applied					
060	applied	applied	applied		applied	applied										applied	applied					
061	applied	applied	applied		applied												applied					
062	applied	applied	applied		applied												applied					
063	Parcel Deferred, See Appendix C																					
064	Parcel Deferred, See Appendix C																					
065	Parcel Deferred, See Appendix C																					
066	applied	applied	applied		applied		applied							applied			applied	applied				

Table 4 (Cont.)
Lease Notices, Timing Limitation Stipulations (TLS) and No Surface Occupancy (NSO) Stipulations

Applied to the Lease Parcels Based on Affected Resources Elements Identified In the Affected Environment Section																						
arcel # WY-1211-	**Lease Notice #1[1]**	**Lease Notice #2[2]**	**Lease Notice #3[3]**	**Big Game Winter TLS**	**Greater sage-grouse/ Sharp-tailed Nesting TLS**	**B. Owl/ Raptor Nesting TLS**	**Mountain Plover TLS**	**Bald Eagle Roost/ Nest TLS or NSO**	**Greater Sage-Grouse winter TLS**	**Airport NSO or CSU**	**Big Game Birthing TLS/ CSU**	**SG/ Sharp-Tailed Lek CSU**	**Raptor CSU**	**Amphib Species CSU**	**Cult. Res. CSU or NSO**	**Historic Trails/ CSU &/or NSO**	**Sensitive Species CSU**	**DRUA CSU**	**VRM II CSU**	**Coal/ Trona CSU**	**SRMA/ SMA/ WHMA CSU or NSO**	**Aquifer Recharge area**
067	applied	applied	applied		applied												applied					
068	applied	applied	applied	applied	applied	applied											applied					
069	applied	applied	applied		applied												applied					
070	applied	applied	applied	applied	applied	applied																
071	applied	applied	applied	applied	applied				applied													
072	applied	applied	applied		applied	applied											applied					
073	applied	applied	applied														applied					
074	Parcel Deferred, See Appendix C																					
075	Parcel Deferred, See Appendix C																					
076	Parcel Deferred, See Appendix C																					
077	Parcel Deferred, See Appendix C																					
078	Parcel Deferred, See Appendix C																					
079	Parcel Deferred, See Appendix C																					
080	Parcel Deferred, See Appendix C																					
081	Parcel Deferred, See Appendix C																					
082	applied	applied	applied		applied	applied			applied			applied					applied					
083	Parcel Deferred, See Appendix C																					
084	applied	applied	applied		applied				applied								applied					
085	applied	applied	applied		applied												applied					
086	applied	applied	applied			applied											applied					
087	applied	applied	applied		applied												applied					
088	applied	applied	applied	applied												applied	applied					
089	applied	applied	applied	applied													applied		applied			
090	applied	applied	applied	applied		applied											applied		applied			
091	applied	applied	applied	applied		applied											applied		applied			
092	applied	applied	applied	applied		applied											applied					
093	applied	applied	applied	applied		applied											applied					
094	applied	applied	applied	applied		applied											applied		applied			
095	applied	applied	applied	applied	applied	applied			applied								applied					
096	applied	applied	applied			applied										applied	applied					
097	applied	applied	applied	applied	applied	applied											applied					

4.2.1 Air Resources

4.2.1.1 Air Quality

The administrative act of offering any of these parcels and the subsequent issuing of leases would have no direct impacts to air quality. Any potential effects to air quality would occur if and when the leases were developed. Any proposed development project would be subject to additional analysis of possible air effects before approval. The analysis may include air quality modeling for the activity. Over the last 10 years, the development on federal oil and gas mineral estate in the Kemmerer, Rawlins, Pinedale and Rock Springs Field Offices has resulted in an average of 690 wells being spudded annually (61 in KFO, 188 in RFO, 375 in PFO, and 66 in RSFO). These wells would incrementally contribute a small percentage of the total emissions (including GHGs) from oil and gas activities in Wyoming.

Potential impacts of development could include increased airborne 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.

The Reasonably Foreseeable Development (RFD) in the Rawlins RMP assumes that 3,711 federal wells would be drilled over a 20-year life of project assumption (LOP), which equates to approximately 186 wells drilled per year. The RFD was derived for analysis purposes on a field office-wide basis and is not intended to be a development cap. The RFD document for the Kemmerer RMP estimated that approximately 120 wells would be drilled annually for Federal minerals. The RFD for Pinedale RMP is 9150 wells (457/year) and the Green River RMP is 2400 (120/year). Drilling density (i.e., wells per square mile) and number of wells drilled annually depend on a number of variables including market trends, technology available (vertical, directional, or horizontal), and the geology of the hydrocarbon-bearing zone. As a result, the number of wells that could potentially be drilled under a full field development scenario as a result of offering the leases is unknown. Current APD permitting trends within the field offices confirm that these assumptions are still accurate.

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

Coal-bed natural gas (CBNG) development currently exists within the RFO. Approximately 8.5 percent of the active wells in the RFO are CBNG wells. The RFD grouped CBNG wells and conventional wells together in the scenario. RSFO also has existing CBNG development and has a coal-bed natural gas RFD of approximately 15 wells per year. Based on the existing development and the RFD for the Rawlins and Rock Springs Field Offices, CBNG-related emissions can be expected. Although the RFD for the Kemmerer RMP assumes a CBNG development rate of up to 15 wells per year, there currently is no active or proposed CBNG development in the Field Office; therefore, there are no expected emissions.

Several CBNG wells exist in the Pinedale field office, but have proven unproductive; therefore there are no expected emissions from this source.

There is a de minimis emission threshold for the UGRB ozone nonattainment area, below which a Conformity determination is not required. The threshold is 100 tons/year of NOx or VOCs. In accordance with 40 CFR 93.153, the Conformity requirement does not apply to actions where the emissions are not reasonably foreseeable such as lease sales made on a broad scale and are followed by exploration and development plans.

40 CFR 93.153 Applicability
(c) The requirements of the subpart shall not apply to the following Federal actions:
(3) Actions where the emissions are not reasonably foreseeable, such as the following:
(i) Initial Outer Continental Shelf lease sales which are made on a broad scale and are followed by exploration and development plans on a project level. (Note: this also applies to onshore lease sales that meet these parameters)
(4) Actions which implement a decision to conduct or carry out a conforming program such as prescribed burning actions which are consistent with a conforming land management plan.

The May lease sale meets this requirement, in that, the proposed lease parcels are scattered across southern Wyoming from near the Nebraska border to near the Utah border and from South Pass to the Colorado border. Additionally post lease exploration and/or development would require project level plans and NEPA analysis before implementation.

4.2.1.2 Visibility
Wyoming DEQ-AQD has developed two Regional Haze State Implementation Plans (SIP), identifying strategies, measures, and milestones to bring the area back into attainment. The 309 SIP optional measures, under the Regional Haze Rule (40 CFR 51.309), allows State-established milestones for voluntary sulfur dioxide (SO2) reductions to improve visibility. The 309(g) SIP focuses primarily on nitrogen oxides (NOx) and particulate matter (PM) emissions which are not covered by the 309 program. Emissions are addressed through controls known as Best Available Retrofit Technology (BART), for large emitters targeted by the 309(g) program. The State is conducting public meetings and awaiting final EPA review and approval of the Regional Haze SIPs. BLM projects proposed prior to the SIP being implemented will undergo Conformity reviews.

4.2.1.3 Greenhouse Gas Emissions and Climate Change
The administrative act of leasing all or part of 81 parcels covering 91,352.310 acres would not result in any direct GHG emissions. However, in regard to future development, the assessment of GHG emissions and climate change is in its formative phase. While it is not possible to accurately quantify potential GHG emissions in the affected areas as a result of making the proposed tracts available for leasing, some general assumptions can be made: offering the proposed parcels may contribute to drilling new wells.

Wyoming's gross GHG emissions are expected to continue to grow to 69 MMtCO2e by 2020, 56% above 1990 levels. As shown in Figure 6 of the inventory report, demand for electricity is projected to be the

largest contributor to future emissions growth, followed by emissions associated with transportation. Although GHG emissions from fossil fuel production had the greatest increase by sector in the period 1990 to 2005, the growth from this sector is projected to decline due to the assumption of decreased carbon dioxide emissions from venting at processing plants.

The Petroleum Association of Wyoming's website (http://www.pawyo.org/facts.html) reports there were 39,491 active gas and oil wells in the state, 44 operational gas processing plants, 6 oil refineries, and over 9,000 miles of gas pipelines. There are significant uncertainties associated with estimates of Wyoming's GHG emissions from this sector. This is compounded by the fact that there are no regulatory requirements to track CO2 or CH4 emissions. Therefore, estimates based on GHG emissions measurements in Wyoming are not possible at this time (Wyoming GHG Inventory and Reference Case Projection CCS, Spring 2007).

However, as reported by the same CCS inventory report, emissions from this (fossil fuel production) sector grew 101% from 1990 to 2005 and are projected to increase by a further 10% between 2005 and 2020. The natural gas industry is the major contributor to both GHG emissions and emissions growth, with CH4 emissions from coal mining second. That said, it is worth noting that a significant portion of the emissions attributed to the natural gas industry are due to vented gas from processing plants, many of which are used for injection in enhanced oil recovery operations. Additionally, many technological advances in emission control technology have been implemented by the oil and gas industry to reduce emission levels.

4.2.1.3 Climate

Some information and projections of impacts beyond the project scale are becoming increasingly available. Chapter 3 of the Climate Change Supplementary Information Report for Montana, North Dakota, and South Dakota (Climate Change SIR 2010) describes impacts of climate change in detail at various scales, including the state scale when appropriate. The following bullet points summarize potential changes identified by the EPA that are expected to occur at the regional scale, where the proposed action and its alternatives are to take place. The EPA identifies this area as part of the Mountain West and Great Plains region (http://www.epa.gov/Region8/climatechange/pdf/ClimateChange101FINAL.pdf):

- The region is expected to experience warmer temperatures with less snowfall.
- Temperatures are expected to increase more in winter than in summer, more at night than in the day, and more in the mountains than at lower elevations.
- Earlier snowmelt means that peak stream flow would be earlier, weeks before the peak needs of ranchers, farmers, recreationalist, and others. In late summer, rivers, lakes, and reservoirs would be drier.
- More frequent, more severe, and possibly longer-lasting droughts are expected to occur.
- Crop and livestock production patters could shift northward; less soil moisture due to increased evaporation may increase irrigation needs. Drier conditions would reduce the range and health of ponderosa and lodgepole pine forests, and increase the susceptibility to fire. Grasslands and rangelands could expand into previously forested areas.

- Ecosystems would be stressed and wildlife such as the mountain line, black bear, long-nose sucker, marten, and bald eagle could be further stressed.

Other impacts could include:

- Increased particulate matter in the air as drier, less vegetated soils experience wind erosion.
- Shifts in vegetative communities which could threaten plant and wildlife species.
- Changes in the timing and quantity of snowmelt which could affect both aquatic species and agricultural needs. Projected and documented broad-scale changes within ecosystems of the U.S. are summarized in the Climate Change SIR (2010). Some key aspects include:
- Large-scale shifts have already occurred in the ranges of species and the timing of the seasons and animal migrations. These shifts are likely to continue (Climate Change SIR 2010). Climate changes include warming temperatures throughout the year and the arrival of spring an average of 10 days to 2 weeks earlier through much of the U.S. compared to 20 years ago. Multiple bird species now migrate north earlier in the year.
- Fires, insect epidemics, disease pathogens, and invasive weed species have increased and these trends are likely to continue. Changes in timing of precipitation and earlier runoff increase fire risks.
- Insect epidemics and the amount of damage that they may inflict have also been on the rise. The combination of higher temperatures and dry conditions have increases insect populations such as pine beetles, which have killed trees on millions of acres in western U.S. and Canada. Warmer winters allow beetles to survive the cold season, which would normally limit populations; while concurrently, drought weakens trees, making them more susceptible to mortality due to insect attack.

While long-range regional changes might occur within this project area, it is impossible to predict precisely when they could occur. The following example summarizing climate data for the West North Central Region (MT, ND, SD, and WY) illustrates this point at the regional scale.

A potential regional effect of climate change is earlier snowmelt and associated runoff. This is directly related to spring-time temperatures. Over a 112-year period, overall warming is clearly evident with temperatures increasing 0.21 degrees per decade (Figure 6). This would suggest that runoff may be occurring earlier than in the past. However, data from 1991-2005 indicate a 0.45 degree per decade cooling trend (Figure 6). This example is not an anomaly, as several other 15-year windows can be selected to show either warming or cooling trends. Some of these year-to-year fluctuations in temperature are due to natural processes, such as the effects of El Niños, La Niñas, and the eruption of large volcanoes (summarized in the Climate Change SIR 2010). This information illustrates the difficulty of predicting actual regional or site specific changes or conditions which may be due to climate change during any specific time frame.

Figure 4.2-1. Methane and Fossil Fuel Emissions

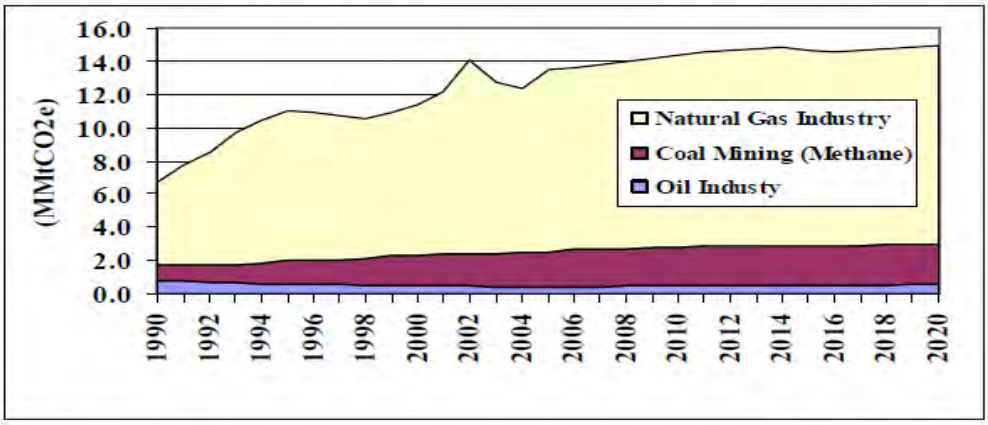
Table E2. Methane Emissions and Projections from the Fossil Fuel Industry

(Million Metric Tons CO2e)	1990	1995	2000	2005	2010	2015	2020
Fossil Fuel Industry	**6.7**	**11.0**	**11.4**	**13.5**	**14.4**	**14.7**	**14.9**
Natural Gas Industry	5.0	9.0	9.2	11.0	11.6	11.8	12.0
Production (CH_4)	0.2	0.3	0.8	1.6	2.3	2.5	2.6
Processing (CO_2 & CH_4)	4.1	7.9	7.7	8.2	7.6	7.6	7.5
Methane Emissions (CH_4)	*1.4*	*1.4*	*1.3*	*1.2*	*1.6*	*1.7*	*1.8*
Vented Gas (CO_2 & CH_4)	*2.6*	*6.5*	*6.4*	*6.9*	*6.0*	*5.9*	*5.7*
Transmission (CH_4)	0.6	0.7	0.6	1.1	1.6	1.6	1.7
Distribution (CH_4)	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Oil Industry	0.8	0.6	0.5	0.4	0.5	0.5	0.5
Production (CH_4)	0.7	0.6	0.5	0.4	0.5	0.5	0.5
Refineries (CH_4)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Coal Mining (CH_4)	1.0	1.4	1.8	2.1	2.3	2.4	2.4

The value 0.00 in the above table indicates emissions less than 0.005 MMtCO2e.

Figure E1 displays the CH_4 emissions from coal mining and natural gas and oil systems, on an $MMtCO_2e$ basis.

Figure E1. Fossil Fuel Industry Emission Trends ($MMtCO_2e$)



Source: CCS calculations based on approach described in text.

The assessment of GHG emissions and climate change is in its formative phase. It is currently not feasible to know with certainty the net impacts from the proposed action on climate. The inconsistency in results of scientific models used to predict climate change at the global scale coupled with the lack of scientific models designed to predict climate change on regional or local scales, limits the ability to quantify potential future impacts of decisions made at this level. When further information on the impacts to climate change is known, such information would be incorporated into the BLM planning and NEPA documents as appropriate.

4.2.1.4 Mitigation

The BLM holds regulatory jurisdiction over portions of natural gas and petroleum systems, identified in the EPA Inventory of U.S. Greenhouse Gas Emissions and Sinks document. Exercise of this regulatory jurisdiction has led to development of "Best Management Practices (BMPs)" designed to reduce emissions from field production and operations. Analysis and approval of future development on the lease parcels may include applicable BMPs as Conditions of Approval (COAs) in order to reduce or mitigate GHG emissions, if necessary and within the authority of the BLM to administer. Additional measures developed at the project development stage may be incorporated as applicant-committed measures by the project proponent, added to necessary State of Wyoming air quality permits, or as COAs in the approved APD or with a programmatic EIS.

Such mitigation measures may include, but are not limited to:

- Flare hydrocarbon and gases at high temperatures in order to reduce emissions of incomplete combustion through the use of multi-chamber combustors;
- "Green" (flareless) completions (required by 2015);
- Water dirt roads during periods of high use in order to reduce fugitive dust emissions;
- Require that vapor recovery systems be maintained and functional in areas where petroleum liquids are stored;
- Installation of liquids gathering facilities or central production facilities to reduce the total number of sources and minimize truck traffic;
- Use of natural gas fired or electric drill rig engines;
- The use of selective catalytic reducers on diesel-fired drilling engines; and,
- Re-vegetate areas of the pad not required for production facilities to reduce the amount of dust from the pads.

The EPA Inventory data show that adoption by industry of the BMPs proposed by the EPA's Natural Gas Energy Star program has reduced emissions from oil and gas exploration and development. The KFO, PFO, RFO, and RSFO would work with industry to facilitate the use of the relevant BMPs for operations proposed on federal mineral leases where such mitigation is consistent with agency policy.

4.2.2 Wildlife

As previously stated, it is not possible to predict whether or not a parcel would be sold and if it is sold, whether or not it would developed. Should a lease be developed and surface disturbing and/or disruptive activities occur on the parcels containing crucial big game winter range during the crucial wintering period, it could cause impacts to wintering moose, mule deer, pronghorn, and elk, such as causing animals to move to less suitable winter habitat and conceivably causing fetal abortion by pregnant females. 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. Activities associated with development of oil and gas resources, is highly likely to experience displacement of wildlife. As stated in Section 1.3, it is not possible at the lease offering stage to accurately predict whether a parcel would actually be leased; if it is leased, whether or not a given parcel would be explored or developed; and if explored or developed, what the development intensity (down-hole and surface well pad spacing) will be.

Surface disturbing or disruptive activities within big game migration routes during the migration period could result in animals altering their travel routes and expending energy needed during the winter season to avoid the activity.

4.2.2.1 Special Status Species

Under this alternative, 81 parcels and/or portions of parcels would be offered at the May 2013 oil and gas lease sale. All or part of 20 parcels are deferred from the May 2013 sale pending the Greater Sage-Grouse amendment to the Kemmerer, Pinedale, Rawlins, and Green River RMPs in accordance with WY-IM-2012-019. In addition, the State Director has used his discretion to temporarily defer offering approximately 5,128.36 acres from parcels 0513-1, 48, 67, 68, 69, 70, 71, and 84 in the interest of conservation of the Greater Sage Grouse; deferral is pending completion of the ongoing Greater Sage Grouse RMP amendment process in the Rock Springs, Kemmerer, Pinedale, and Rawlins field offices. Parcels 0513-069 and 084 are deferred in whole, while the remaining parcels are partially deferred. These deferrals can be found Appendix F.

Partial parcels to be offered inside SGCAs include 1, 48, 67, 68, 70, and 71. The remaining portions of these parcels are not part of an 11 square mile area of unleased federal minerals, do not intersect any occupied sage grouse 0.6 mile lek buffer, are not part of a federal unit, and are not subject to drainage. The State Director has elected to defer offering parcels less than 640 acres during the ongoing RMP amendment process for Greater Sage Grouse to avoid potential inconsistencies with WY Executive Order 2011-5 and the ongoing planning process.

Based on site-specific environmental analysis, the BLM may require additional avoidance and/or impact minimization measures in order to manage Greater Sage-Grouse habitat in support of management objectives. These measures may include, but are not limited to, disturbance density limitations or surface use and timing restrictions in proximity to certain habitats (e.g., severe winter relief habitat, Greater Sage-Grouse leks, etc.). Restrictions and prohibitions may be more restrictive than current RMP stipulation guidance if supported by site-specific NEPA analysis of a development proposal; the measures remain in conformance with the RMP, and are consistent with the existing lease rights granted.

In the event post-lease development were to occur on lease in Sage-Grouse habitat, it could potentially result in surface disturbing and/or disruptive activities within 2 miles or greater of a grouse lek or other known nesting habitats during the nesting period, within winter concentration areas, and/or within ¼ mile or greater of leks during the breeding season and could cause substantial impacts to Greater Sage-Grouse. Impacts could include reduced breeding success and/or nest abandonment as well as causing the Greater Sage-Grouse to move to less suitable winter habitat. Stipulations for the protection of leks have been added to specific parcels, as identified in Table 4.

All other impacts are the same as those described in the Kemmerer, Rawlins, Pinedale, and Green River RMPs as they relate to Greater Sage-Grouse.

4.2.2.2 Other wildlife (Avian, Aquatic, and Terrestrial)

Post-lease actions (construction and drilling) during the plover breeding and nesting period (April 10 to July 10) in the vicinity of plover nests (if plovers actually inhabit any of the parcels) may cause impacts to nesting birds, such as egg or hatchling abandonment. Operations during the breeding season could result in reduced breeding success.

Conservation recommendations under the required biological opinion written by the USFWS on behalf of the endangered and sensitive Bear River, Platte River, and Colorado River fishes shall be adhered to by all BLM actions.

Surface disturbing and/or disruptive activities from February 1 to July 31, or up to September 15th in the case of burrowing owls, may cause impacts to nesting raptors, including burrowing owls if they are present in the area. The primary impact would be from nesting disturbance which could result in nest abandonment, and/or increased egg and chick mortality. Site-specific wildlife surveys would be developed at the APD stage to determine the presence of nesting raptors.

Well-pad, road, and pipeline development into areas currently void of surface disturbance could result in habitat fragmentation, which depending on the intensity of the development, vegetative cover, and terrain could affect a variety of ground dwelling species, such as but not limited to, Greater Sage-Grouse, Wyoming pocket gopher, white-tailed prairie dog, mule deer, pronghorn, and elk. Should post-lease development actually occur on any of the parcels, the related surface disturbance could result in short- and long-term losses of wildlife habitat. Short-term habitat loss would include all initial surface disturbance associated with the project. This short-term disturbance typically would be ongoing until those portions of a well pad not needed for production operations, road disturbance outside the shoulders, and the pipeline disturbance are reclaimed. Long-term habitat loss would include those portions of the pad needed for production operations for the life of the well and travel path and shoulders of the access roads. Impacts of surface disturbing activities, such as oil and gas development to ground dwelling species including Wyoming pocket gopher and white-tailed prairie dog could include direct habitat loss from new construction, behavioral changes from increased human activity and associated noise, and direct mortality associated crushing due to vehicular movements and construction activities.

Water depletions for well pad and road construction, well drilling, well completion operations, pipeline hydrostatic testing, and dust abatement could potentially reduce stream flows in the Colorado and Platte River systems, which could affect threatened and endangered fish species in those river systems. The depletion quantities would vary depending on the number of wells being drilled and completed and whether or not non-contributing sources of water could be utilized. Currently, water use to drill one well varies between 1 and 6 million gallons. In fracturing a horizontal well, companies have estimated that generally they use a ratio of 0.5 percent hydraulic chemical fluid mix to 1.5 million gallons of water (Paschke, Dr. Suzanne. USGS, Denver, Colorado. September 2011). All depletions in these river systems are subject the USFWS mitigation requirements (depletion fund payments); specific project proposals resulting in a "*may affect, likely to adversely affect*" determination are required to undergo formal consultation with the USFWS before any project approval.

Surface disturbance resulting from oil and gas development in proximity to streams and rivers could result in increased siltation. Any increased siltation would depend on the amount of surface disturbance, its proximity to live water, and erosion control measures implemented. Any lease-related construction activities in or through the riparian/surface water areas within a parcel could affect amphibian and reptilian species using those resources.

4.2.2.3 Mitigation

As prescribed by the Kemmerer, Pinedale, Rawlins, and Green River RMPs, wildlife impacts at the leasing stage would be mitigated through seasonal restrictions and controlled surface use where applicable. See Table 4 for a reference to the stipulations to be applied and to Appendix B for the specific wildlife stipulations applied to each parcel. Based on these stipulations, the impacts to wildlife identified in the governing RMPs/FEISs were determined not to be significant. This EA identifies similar impacts; implementation and adherence to these stipulations as stated in this EA is expected to achieve analogous results. In the event lease development is proposed, BMPs such as directional drilling, multiple wells per pad, well pad siting, etc. could be implemented to mitigate site-specific impacts to wildlife throughout their habitats, including but not limited to birth and crucial winter habitat, as well migration routes. Additionally, BLM would implement the guidelines in Wyoming Game and Fish Department's (WGFD) "Recommendations for Development of Oil and Gas Resources within Crucial and Important Habitat" (2010) to the extent practicable.

Water depletions would be mitigated through the payment to the depletion funds with the USFWS at the time of extraction. Impacts to streams, fisheries, riparian habitat, and aquatic species would be mitigated through application of the requirements in Lease Notice No. 1 or special lease stipulations; such as the restriction on surface disturbing activities within 500' of riparian habitat. Spills would be mitigated through measures required through Spill Prevention Control and Countermeasure Plan should development occur within a parcel. A controlled surface use stipulation is applied to all offered parcels and provides protection for current and future threatened, endangered, and special status species.

4.2.3 Lands with Wilderness Characteristics

As previously stated, 16 parcels and/or portions of parcels (009, 031, 032, 033, 034, 035, 036, 037, 038, 039, 040, 041, 042, 043, 044, and 045) contain wilderness character (Appendix D). The Rawlins RMP approved in December 2008 determined these "*lands to be unmanageable for wilderness character because of preexisting oil and gas leases, the BLM elected to manage lands with wilderness character for multiple use and not for protection of wilderness character.*" Oil and gas development in these 16 parcels as authorized through the Rawlins RMP could degrade wilderness characteristics values and could result in the area containing these parcels being re-evaluated as no longer having conditions that meet the wilderness characteristics criteria.

Twenty two (22) parcels and/or portions of parcels were identified as being within a Citizens' Proposed Wilderness Area (009, 011, 014, 015, 016, 017, 031, 032, 033, 034, 035, 036, 037, 038, 039, 040, 041, 042, 043, 044, 045, and 066). All of these 22 identified parcels are also located within the RFO's Adobe Town DRUA. As stated, the Rawlins RMP makes the entire DRUA available for oil and gas leasing and development. Table 4 and Appendix B provide the stipulations based on the Rawlins RMP that would be applied to these parcels. One of those stipulations is a Controlled Surface Use stipulation that provides

for the protection of resource values within the Adobe Town DRUA by restricting or prohibiting surface occupancy unless the leaseholder and/or operator and the BLM agree to a plan to protect the recreational opportunity class setting within the DRUA. While as previously stated, the sale and issuance of oil and gas leases is strictly an administrative action and that at the leasing stage BLM cannot predict whether or not a lease parcel will be sold or developed, the attachment of the DRUA CSU stipulation provides a mechanism to impose measures on development proposals to protect DRUA values.

No other parcels were identified as having lands with wilderness characteristics. Offering parcels that have been determined to not contain wilderness characteristics would not impact wilderness characteristics or preclude the BLM's ability to determine manageability for lands with wilderness characteristics during a land use planning process.

4.2.3.1 Mitigation

Apply the Controlled Surface Use stipulation to the 22 identified parcels for protection of the Adobe Town Dispersed Recreation Use Area.

4.2.4 Cultural and Paleontological Resources

Once the decision is made by the lessee to develop a lease, area specific cultural records review would be completed to determine if there is a need for a detailed cultural inventory of those areas that could be affected by the subsequent surface disturbing activities. Generally, a cultural inventory will be required and all identified historic and archaeological sites that are eligible for listing in the National Register of Historic Places or potentially eligible to be listed would be either avoided by the undertaking or have the information in the sites extracted through archaeological data recovery before surface disturbance. Offering lease parcels for sale would not, in and of itself, impact historic or prehistoric resources. Development within the viewshed of contributing segments of National Historic Trails could impact the trail setting; however, the extent of potential impacts cannot be determined absent a specific surface use or occupancy proposal.

A site and resource inventory and mitigation process similar to that described for cultural resources also applies to paleontological resources.

4.2.4.1 Mitigation

Lease Notice No. 2 is applied to all parcels offered for leasing. Avoidance measures, including no surface occupancy and controlled surface use stipulations, would be imposed wherever eligible cultural and/or paleontological resources, including National Historic Trails, are potentially impacted (refer to Table 4 and Appendix B for the parcels with cultural and historic stipulations).

4.2.5 Soils

The act of offering, selling, and issuing federal oil and gas leases does not produce impacts to soils. Subsequent development of the lease would physically disturb the topsoil and would expose the substratum soil on subsequent project areas. Direct impacts resulting from the oil and gas construction of well pads, access roads, and reserve pits include removal of vegetation, exposure of the soil, mixing of horizons, compaction, loss of top soil productivity and susceptibility to wind and water erosion. Wind erosion could be a moderate contributor to soil erosion given the average wind speeds in the area. Indirect impacts such as runoff, erosion and off-site sedimentation could result from construction and operation of well sites, access roads, gas pipelines and facilities.

Contamination of soil from drilling and production wastes mixed into soil or spilled on the soil surfaces could cause a long-term reduction in site productivity. Some of these direct impacts can be reduced or avoided through proper design, construction and maintenance, and implementation of best management practices.

Based on the Kemmerer, Pinedale, Rawlins, and Green River RMPs, surface disturbance is restricted or prohibited on slopes over 25 percent and also within floodplains; consequently impacts to these resources/landforms are not anticipated from post-leasing development. The requirements in the BLM Wyoming Reclamation Policy would be implemented for all surface disturbing activities. In accordance with the policy, additional pre-disturbance and pre-reclamation data may be required when soils with a low potential for reclamation are impacted.

4.2.5.1 Mitigation

Leaseholders/operators would be required to adhere to BLM Wyoming's Reclamation Policy (BLM 2012b) which includes preparing and submitting for BLM approval a detailed reclamation plan. In accordance with the BLM Wyoming Reclamation Policy, the operator would stockpile the topsoil from the surface of well pads which would be used for surface reclamation of the well pads. The impact to the soil would be remedied upon reclamation of well pads when the stockpiled soil that was specifically conserved to establish a seed-bed is spread over well pads and vegetation re-establishes.

Reserve pits would be closed, re-contoured and reseeded as described in COAs attached to APDs. Upon abandonment of wells and/or when access roads are no longer in service the Authorized Officer would issue instructions and/or orders for surface reclamation/restoration of the disturbed areas.

Lease Notice No.1 restricts surface disturbance on slopes greater than 25 percent and is applied to all parcels.

4.2.6 Vegetation

The act of offering, selling, and issuing federal oil and gas leases does not produce impacts to vegetation. Impacts to vegetation, both direct and indirect, would occur when the lease is developed in the future. The potential impacts would be analyzed on a site specific basis before oil and gas development.

Should post-lease development actually occur on any of the parcels, the related surface disturbance would result in short- and long-term losses of vegetation. Short-term vegetation loss would include all initial surface disturbance associated with the project until those portions of a well pad not needed for production operations, road disturbance outside the shoulders, and the pipeline disturbance are reclaimed. Long-term habitat loss would include those portions of the pad needed for production operations for the life of the well and travel path and shoulders of the access roads. Both short- and long-terms losses of vegetation would result in a commensurate reduction foraging habitat available for wildlife and livestock. Vegetation loss could also potentially correlate to a reduction in nesting habitat for ground nesting avian species, as well as a loss of hiding cover for certain avian and mammalian species.

4.2.6.1 Mitigation

Leaseholders/operators would be required to adhere to BLM Wyoming's Reclamation Policy (BLM 2012b) which includes preparing and submitting for BLM approval a detailed reclamation plan.

4.2.7 Invasive, Non-native Species

The act of offering, selling, and issuing federal oil and gas leases does not produce invasive/non-native species impacts. Subsequent development produces impacts in the form of surface disturbance. The construction of an access road and well pad may unintentionally contribute to the establishment and spread of noxious weeds. Noxious weed seed could be carried to and from the project areas by numerous methods, including construction equipment, the drilling rig and transport vehicles. The main mechanism for seed dispersion on the road and well pad is by equipment and vehicles that were previously used and or driven across or through noxious weed infested areas. The potential for the dissemination of invasive and noxious weed seed may be elevated by the use of construction equipment typically contracted out to companies that may be from other areas.

4.2.7.1 Mitigation

In the event noxious weeds are discovered during construction of any access roads and well pads, measures will be taken to mitigate those impacts. Washing and decontaminating the equipment entering and exiting the construction areas would minimize this impact. Additionally, seed mixes used for reclamation are required to be certified weed-free and all Operators must have an approved Weed Management Plan.

4.2.8 Wastes, Hazardous or Solid

The lease parcels fall under environmental regulations that impact exploration and production waste management and disposal practices and impose responsibility and liability for protection of human health and the environment from harmful waste management practices or discharges.

Any potential for waste impact would not occur until post-lease development activities are initiated. Impacts could be in the form of drilling fluid spills, solid chemical spills, fuel spills, trash scatter on and off the well pads, and hydrocarbon or gas releases.

4.2.8.1 Mitigation

The lease sale parcels are regulated under the Resource Conservation and Recovery Act (RCRA), Subtitle C regulations. Additionally, waste management requirements are included in the 12 point surface use plan and the 9 point drilling plan required for all APDs. Leaseholders proposing development would be required to have approved Spill Prevention Control and Countermeasure Plans, if the applicable requirements of 40 CFR 112 are met, and comply with all requirements for reporting of undesirable events.

4.2.9 Water Quality: Surface and Groundwater

The act of offering, selling, and issuing federal oil and gas leases does not produce impacts to water quality. Subsequent development of the lease can lead to surface disturbance from the construction of well pads, access roads, pipelines, and powerlines, which can result in degradation of surface water quality and groundwater quality from point source pollution, nonpoint source pollution, increased surface water runoff and increased erosion. Alteration of natural drainage paths and channel morphology can also occur as a result of surface disturbance associated with well drilling. Natural drainage paths are often re-

routed around well pads; channel morphology is altered at road and pipeline crossings. Removal of vegetation and subsequent erosion can also cause rill and gully erosion leading to a loss of channel stability as well as an increase in sedimentation within drainages.

The magnitude of these 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 characteristics, duration and time within which construction activity would occur, and the timely implementation and success or failure of mitigation measures.

Direct impacts to surface water would likely be greatest shortly after the start of construction activities and would likely decrease in time due to natural stabilization, and reclamation efforts. Impacts to groundwater would be less evident and occur on a longer time scale. Construction activities would occur over a relatively short period (commonly less than a month); however, natural stabilization of the soil can sometimes takes years to establish to the degree that will adequately prevent accelerated erosion caused by compaction and removal of vegetation. Spills or produced fluids (e.g., saltwater, oil, fracking chemicals, and/or condensate in the event of a breech, overflow, or spill from storage tanks) could result in contamination of the soil onsite, or offsite, and may potentially impact surface and groundwater resources in the long term.

Petroleum products and other chemicals could result in groundwater contamination through a variety of operational sources including but not limited to pipeline and well casing failure, well (gas and water) construction, and spills. Similarly, improper construction and management of reserve and evaporation pits could degrade ground water quality through leakage and leaching. The potential for negative impacts to groundwater caused from hydraulic fracturing, a common practice used in the HDD, are currently being investigated by the Environmental Protection Agency. Authorization of the proposed projects would require full compliance with local, state, and federal directives and stipulations that relate to surface and groundwater protection. Currently, water use to drill one well ranges between 1 and 6 million gallons. In fracturing a well, companies have estimated that generally they use a ratio of 0.5 percent hydraulic chemical fluid mix to 1.5 million gallons of water. That translates to a minimum of 5,000 gallons of chemicals into one well for every 1.5 million gallons of water used to fracture a well (Paschke, Dr. Suzanne. USGS, Denver, Colorado. September 2011).

Oil and gas wells are cased and cemented at a depth below all usable water zones; consequently impacts to water quality at springs and residential wells are not expected. However, faulty cementing or well casing could result in methane migration to upper zones. Should hydrocarbon or associated chemicals for oil and gas development in excess of EPA/WDEQ standards for minimum concentration levels migrate into culinary water supply wells, springs, or systems, it could result in these water sources becoming non-potable.

4.2.9.1 Mitigation

Lease Notice No. 1 is applied to all lease parcels and restricts surface disturbing activities within 500 feet of surface water and/or riparian areas to protect the water and riparian resources and within ¼ mile of occupied residences.

All depletions would require consultation with USFWS and all water discharged would require State permits under the National Pollution Discharge Elimination System (NPDES) and approval by the BLM at the APD stage; potential impacts would be mitigated at that time.

The use of practices such as but not limited to closed-loop mud systems or plastic-lined reserve pits would reduce or eliminate seepage of drilling fluid into the soil and eventually reaching groundwater. The casing and cementing requirements imposed on proposed wells would reduce or eliminate the potential for groundwater contamination from drilling muds and other surface sources. Additional mitigation could include, but would not be limited to: the use of recycled water for drilling below the surface casing zone, installation of backflow preventers, drilling oil and gas related water wells to aquifers below those providing residential water and then cementing from the nearest shale/clay zone below the deepest culinary/livestock water well in the vicinity back to the surface, and insuring that access to water wells is only provided to authorized users. By using the lowest quality water necessary and cementing the water well to surface will reduce the chances that oil and gas related water wells are not drawing from the aquifers providing the residential water or allowing the mixing of lower quality waters with potable sources. Additionally, drilling with oil-base mud or in areas where shallow groundwater may be encountered, the use of closed-loop or semi-closed loop drilling systems may be required. Floodplains would be managed in accordance with Executive Order 11988.

4.2.10 Watershed – Hydrology

The act of offering, selling, and issuing federal oil and gas leases does not produce impacts watersheds. Subsequent development of a lease may result in long- and short term alterations to the hydrologic regime depending upon the intensity of development. Peak flow and low flow of perennial streams, ephemeral, intermittent rivers and streams and their associate would be directly affected in the short-term by an increase in impervious surfaces resulting from the construction of the well pad and road. The potential hydrologic effect to peak flow is reduced infiltration where surface flows can move more quickly to perennial or intermittent/ephemeral rivers and streams, causing peak flow to occur earlier, have a higher flow velocity and a larger volume. Increased velocity and volume of peak flow can cause bank erosion, channel widening, downward incision, and disconnection from the floodplain. The potential hydrologic effect to low flow is reduced surface storage and groundwater recharge, resulting in reduced base flow to perennial and intermittent/ephemeral rivers and streams. The direct impact would be that hydrologic processes may be altered where the perennial, ephemeral, and intermittent river and stream system responds by changing physical parameters, such as channel configuration. These changes may in turn impact chemical parameters and ultimately the aquatic ecosystem.

Minor long-term direct and indirect impacts to the watershed and hydrology could continue for the life of surface disturbance from water discharge from roads, road ditches, and well pads, but would decrease once all well pads and road surfacing material has been removed and reclamation of well pads, access roads, pipelines, and powerlines has taken place. Interim reclamation of the portion of the well pad not needed for production operation, as well as re-vegetating the portion of the pad that is needed for production operations, as well as re-vegetating road ditches would reduce this long-term impact. Short-term direct and indirect impacts to the watershed and hydrology from access roads that are not surfaced with impervious materials would occur and would likely decrease in time due to reclamation efforts.

4.2.10.1 Mitigation

Stormwater Pollution Prevention and Control Plans are required by the State of Wyoming before any surface disturbance associated with construction actions greater than 1 acre in size. On a case-by-case basis, the Authorized Officer may require additional erosion control measures to reduce the volume of surface runoff and subsequent sediment transport. The operator would stockpile the topsoil from the surface of well pads which would be used for surface reclamation of the well pads. Reserve pits would be re-contoured and reseeded as described in the APD COA. Upon abandonment of the wells and/or when access roads are no longer in service the Authorized Officer would issue instructions and/or orders for surface reclamation/restoration of the disturbed areas as described in the APD COA. Implement interim reclamation BMP measures.

4.2.11 Livestock Grazing

The act of offering, selling, and issuing federal oil and gas leases does not produce impacts to livestock grazing. Subsequent development of a lease may generate impacts to livestock.

Post-lease development could result in short-term and long-term losses of vegetation, which correlates to short-term and long-term losses of livestock forage. Short-term losses would occur until the portions of a well pad not needed for production operations, road disturbance outside the shoulders, and the pipeline disturbance, are reclaimed with established vegetation. Long-term losses would be the portions of the pad needed for production operations for the life of the well, as well as the maintained portions of the access roads. Increased traffic associated with well-field development increases the possibility of animals being injured or killed in collisions with vehicles.

4.2.11.1 Mitigation

Reclaim and revegetate all disturbed areas not needed for well production operations. Avoid range improvements by 500 feet (Standard Lease Notice No. 1). Avoid livestock trailing routes. Securing reserve pits and production facilities against livestock entry with cattleguards, fences and gates would reduce adverse effects to livestock.

4.2.12 Recreation

The act of offering, selling, and issuing federal oil and gas leases does not produce impacts to the recreational use of public land. Subsequent development of a lease may generate impacts to recreation activities. For public land areas that are small or land-locked by private or state land, recreation opportunities would be limited or non-existent due to land ownership or access restrictions. Recreational use on larger blocks of public land and on smaller blocks of public land where there is public access, including areas with citizen proposed wilderness could be impacted by post-lease oil and gas development. 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.

Construction and drilling operations would potentially cause game animals and birds to move away from the activity. Studies have shown that animals have moved 2 miles or more from logging operations and other similar activities. Studies also show that elk avoid areas within 1-2 miles of roads (Powell 2003). If post-lease development operations coincide with hunting season, it is expected that hunters would experience reduced success rates within a 2-mile area of the activity. It is also likely that some hunters

would experience a diminished quality in their hunting adventure. Hunting success could potentially increase in areas beyond the 2 miles. In addition to facilitating mineral extraction, new oil and gas roads would also provide better access to the lease areas for recreational opportunities but can also result in increased poaching activities. However, the presence of oil and gas facilities would likely diminish the recreational experience. A decline in recreational use of an area due to oil and gas development would potentially affect local, state, and regional revenues generated through recreation. The level of economic decline would depend on type and level of use and the level of decline.

4.2.12.1 Mitigation

Additional mitigation and/or COAs, such as seasonal restrictions or BMPs such as directional drilling, liquids gathering systems, pad drilling, etc. could be identified at the development stage to further reduce impacts associated with oil and gas development. A CSU stipulation will apply to all parcels within the Adobe Town DRUA and an NSO will apply to the parcel within the North Platte SRMA (See Table 4 and Appendix B).

4.2.13 Visual Resources

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 on in the viewshed of a town 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 re-evaluated and potentially downgraded to a lower classification.

As previously stated, 22 parcels and/or portions of parcels are within the Adobe Town DRUA, which was designated VRM Class III in the December 2008 Rawlins RMP. A 2011 VRI analysis indicates that Parcels 011, 014, 015, 016, 017, 031, 032, 033, 034,and 066 have a VRI rating for Class II; parcel 009 has a VRI rating for Class III, and parcels 035, 036, 037, 038, 039, 040, 041, 042, 043, 044, and 045 have a VRI rating for Class IV. The VRM classification through the pending RMP amendment to the 2008 Rawlins RMP may or may not correspond to the VRI classifications and will not be determined until the ROD for the RMP amendment is approved. Management objectives for other resource values can result in a VRM classification that varies from the VRI classification.

Offering the 22 parcels in the DRUA at the May 2013 lease sale would not compromise BLM's ability to select any of the alternatives being analyzed in the pending RMP Amendment. All of the Adobe Town DRUA has numerous existing oil and gas leases. Approximately 80 percent of the DRUA is currently occupied by existing leases. Adding these 22 leases will not substantially increase the percentage of the area leased. Because the leases would be offered under the existing VRM III Classification the standard Class II VRM CSU stipulations would not be applied. However, all 22 parcels would be stipulated with the DRUA CSU to protect the recreational opportunity setting. A "recreation opportunity class setting" is derived from the BLM planning policies and decisions for recreation on public lands. The BLM Manual Section 8320 provides (at Part 06.C.6, emphasis added): Recreation and visitor services planning requires coordination with other programs (including visual resource management) to ensure decisions are compatible across programs. To this end, the BLM retains the authority, through the DRUA CSU lease

stipulation, to ensure that lease development activities on these leases will comply with the applicable VRM requirements to the extent recreation settings and VRM objectives are compatible. This stipulation, along with the authority the BLM has to condition approval of lease development actions with reasonable measures to protect natural resources and environmental quality will ensure that by offering these lease parcels the BLM will not limit the choice of reasonable alternatives in the ongoing VRM amendment to the Rawlins RMP.

4.2.13.1 Mitigation

The flat colors Shale Green, Covert Green, or Shadow Gray 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 buildings, would be painted one of these colors as determined during a site-specific review, unless other colors more closely match the surrounding landscape. Facility painting schemes also may include camouflage patterns or other management practices to reduce facility visibility or visual contrast in particularly sensitive areas. 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. A CSU stipulation would be applied to all parcels in areas currently containing lands with a VRM Class II designation unless otherwise called for in the RMP; see Tables 3.1, 4, and Appendix B.

4.2.14 Public Health and Safety

The act of offering, selling, and issuing federal oil and gas leases does not produce impacts to public health and safety. Subsequent development of a lease may generate impacts. An explanation of the processes used to develop shale and conventional onshore oil and gas, using horizontal drilling and hydraulic fracturing as well as environmental and health risks, is discussed in the United States Government Accountability Office, September 2012 Oil and Gas report titled "Information on Shale Resources, Development, and Environmental and Public Health Risks." Vehicle and equipment operations associated with the subsequent construction, drilling, and production operations could affect members of the public using the same roads and general areas. Releases of gas from the well bore, production facilities and spills could potentially adversely affect members of the public in the vicinity. The level of affect would depend on the product released or spilled, level of activity, density of development, technological controls, and the receptors susceptibility.

Parcels containing lands with private surface overlying federal minerals (i.e., split-estate) are identified in Table 3.1. No existing residences are located on lands offered in the May 2013 Lease Sale. The private surface lands have or have the potential for future development of private residences and associate facilities such as domestic water supply wells. Residences along routes to, or in the vicinity of, active drilling and completion operations would likely experience increased traffic and noise, as well as night lighting. Traffic and drilling operations in close proximity to residences would increase the potential for collisions with the residents, pets, and livestock, as well as an increased potential for fire, hydrocarbon release, and explosion from well blow-out during drilling operations.

4.2.14.1 Mitigation

Prepare and implement safety contingency plans and comply with Onshore Order No. 6, 43 CFR 3162.5-1, and all requirements for reporting undesirable events under NTL 3A.

Lease Notice No. 1 restricts or prohibits surface disturbance within ¼ mile of occupied dwellings and is applied to all parcels to mitigate impacts to private residences.

4.2.15 Socio-economics

Under this alternative, 81 parcels and/or portions of parcels (91,352.310 acres) would be offered for sale. It is assumed that development of the offered leases would proceed at about the same rate of development that the Kemmerer, Pinedale, Rawlins, and Rock Springs Field Offices have experienced over the last ten years, (i.e., about 690 wells spudded per year). Specific economic impacts would be identified in the NEPA document supporting the APD, when a more accurate analysis is possible based on the speculative nature of leasing in relation to development. Based on the minimum bid rate of $2.00 per acres, the acreage withheld from leasing under Alternative A would potentially result in at least $182,704.62 fewer dollars in lease sale revenues than would potentially be attained through implementation of Alternative B. Based on the average sale rate of $357.97 per acre from the 2011 lease sales, Alternative B would yield $32,701,386.41 more than Alternative A.

4.2.15.1 Mitigation

None identified.

4.2.16 Environmental Justice

No minority or low income populations would be directly affected in the vicinity of the proposed actions from subsequent proposed oil or gas projects. Indirect impacts could include impacts due to overall employment opportunities related to the oil and gas and service support industry in the region, as well as the economic benefits to state and county governments related to royalty payments and severance taxes.

4.2.16.1 Mitigation

None identified.

4.2.17 Solid Leasables (Coal and Sodium)

There are no apparent conflicts with coal or Trona development from the offering and issuance of the lease parcels in the Proposed Action.

4.2.17.1 Mitigation

See Tables 3.1 and 4 and Appendix B. If a parcel had been identified as being within a Sodium or Coal leasing area, a stipulation would have been applied.

4.2.18 Other Considerations in accordance with IM 2010-117

A. There is a risk of drainage to Federal mineral resources due to development of nearby non-Federal parcels if the parcel is not leased.

None has been determined.

B. In undeveloped areas, are non-mineral resource values greater than potential mineral development values?

All of parcels addressed in this EA have multiple surface resource values (see the affected environment discussions above). Whether the surface resource values for a given parcel are greater or less than the potential oil and gas development potential is subjective. Persons interested in preserving the surface

resources would very likely say those values are greater than the potential mineral development value; whereas somebody interested in securing and developing one of the leases would likely say that the mineral value is greater. The Kemmerer, Pinedale, Rawlins, and Green River RMPs have addressed values of the lands containing the parcels in this EA and have made resource allocations. All parcels fall within areas that are available for oil and gas leasing as determined by the RMPs. All of the parcels have stipulations intended to mitigate impacts to the surface resource values.

C. Stipulation constraints in existing or proposed leases make access to and/or development of the parcel or adjacent parcels operationally infeasible, such as an NSO parcel blocking access to parcels beyond it or consecutive and overlapping timing restrictions that do not allow sufficient time to drill or produce the lease without harm to affected wildlife resources.

Most parcels have one or more timing limitation stipulations. The vast majority of the parcels have multiple timing limitation stipulations that restrict activity from November 15 through July 31. Oil and gas operators have successfully conducted operations within the portion of the year falling outside these restrictions for the past 2 to 3 decades.

D. Parcel configurations would lead to unacceptable impacts to resources on the parcels or on surrounding lands and cannot be remedied by reconfiguring.

While there are a number of parcels that have one or more disconnected components, accessing and developing would not result in any impacts beyond those addressed in this EA, The EA has not identified any unacceptable/un-mitigatable impacts from the configuration of those parcels with disconnected components, nor has it identified that there would be unacceptable/un-mitigatable from all or portions of a parcel.

E. The topographic, soils, and hydrologic properties of the surface will not allow successful final landform restoration and revegetation in conformance with the standards found in Chapter 6 of the Gold Book, as revised.

A number of the parcels have areas with slopes greater than 25 percent. Construction on such slopes would increase the difficulty of achieving successful reclamation and landform restoration; however, standard lease stipulations restrict or prohibit occupation on these slopes. Additionally, parcels with these slopes also have areas with lesser slopes that are suitable for construction where there would be a high potential for successful reclamation. Many of the parcels fall within the 7- to 9-inch annual precipitation range. These drier sites also hamper successful reclamation, but there are procedures, such as strategic irrigation, hydro-mulching, etc. available to assist with achieving the Gold Book reclamation standards. Lease Notice No. 1 restricts surface use or occupancy on slopes greater than 25 percent.

F. Construction and use of new access roads or upgrading existing access roads to an isolated parcel would have unacceptable impacts to important resource values.

As previously stated, at the leasing stage BLM does not have proposals for development; consequently, it is not possible to predict where or if oil or gas development would occur. Likewise BLM cannot predict where or if access roads for oil and gas development would be proposed. Without a concrete development access road proposal, BLM cannot determine whether or not road development to or within a given parcels would or would not have unacceptable impacts.

The majority of the parcels are located within areas of existing oil and gas development, with existing roads and infrastructure.

G. Leasing would result in unacceptable impacts to the resources or values of any unit of the National Park System or national wildlife refuge.
None of the parcels are within the proximity of a National Park or national wildlife refuge.

H. Leasing would result in unacceptable impacts to specially designated areas (whether Federal or non-Federal) and would be incompatible with the purpose of the designation.
Affected Environment Table 3.1 provides a listing of the parcels that contain ACECs, SMAs, and SRMAs. The Kemmerer, Pinedale, Rawlins, and Green River RMPs provide for oil and gas leasing in these areas with the appropriate stipulations and additional mitigation as required at the APD stage.

4.3 Cumulative Impacts

Offering the subject parcels for lease, and the subsequent issuance of leases, in and of itself, would not result in any cumulative impacts. The referenced RMPs/EISs provide cumulative affects analysis for oil and gas development based on the reasonable, foreseeable oil and gas development scenario. The offering of the proposed lease parcels is consistent with that analysis. As discussed in Section 1.3, it is assumed that any development on those leases would occur within the RFD level analyzed in the EISs for the governing RMPs and that the impacts would also be within the thresholds of identified in the EISs. And as stated in Section 1.1, "The mitigation measures developed through those EISs reduced/minimized the anticipated impacts associated with the projected development to acceptable levels below the significance threshold"; therefore, since the proposed parcels are within areas designated by the RMPs as available for oil and gas leasing and development and as such are a subset of the RMP, it is anticipated that this will also hold evident for the parcels. Again, it is important to emphasize that at the leasing stage is not possible to predict if a parcel would be leased; if it is leased whether or not it would be developed; and if it is developed at what intensity/spacing, which is why additional NEPA is required when a definitive development proposal is received.

Subsequent to the issuance of the RMPs, additional projects, such as the Gateway West, TransWest, and Gateway South transmission lines, as well as the Chokecherry-Sierra Madre, Sand Hills Ranch, and White Mountain Wind Energy Development Projects, and the Normally Pressured Lance Oil and Gas Development Project have arisen. The EISs/EAs prepared or being prepared for those projects address the cumulative effects of those individual projects in conjunction with each other and other ongoing projects. As stated Section 1.3, additional site-specific NEPA analysis will be conducted in the event a development proposal is submitted for one or more of the parcels addressed in this EA. This site-specific analysis will address the cumulative effects of that development in conjunction with other project within the cumulative affects area.

The following provides cumulative impacts information related to Air Quality/Green House Gases/Climate Change: There are approximately 13,300 federal producing wells in the High Desert District (5000 in Rawlins FO, 900 in Kemmerer FO, 2700 in Rock Springs FO, and 4700 in Pinedale FO). Of this number, approximately 424 wells (3.2%) are coal-bed methane wells. Analysis of cumulative impacts for RFD of oil and gas wells on public lands is included in the Kemmerer, Pinedale, Rawlins, and

Green River RMPs. Potential development of all available federal minerals in the field offices, including those in the proposed lease parcels, was included as part of the analysis.

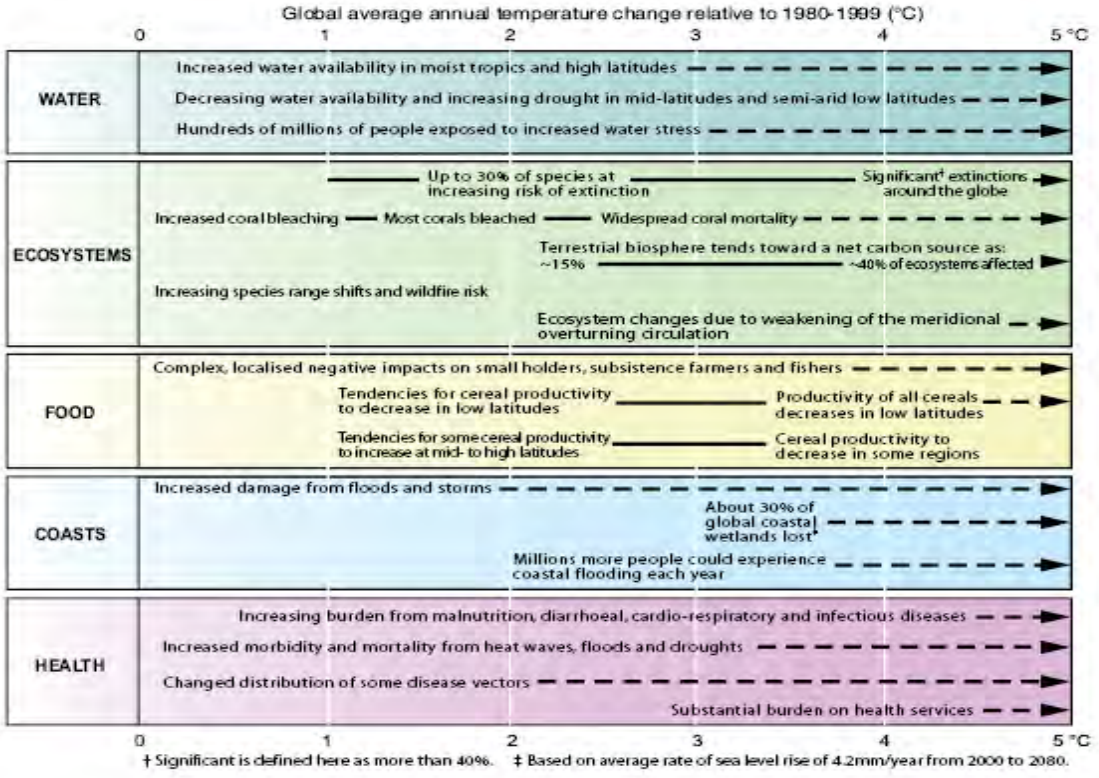
As described in the analysis of environmental consequences, the proposed action and/or the alternative may contribute to the effects of climate change through GHG emissions. However, it is not currently possible to associate any of these particular actions with the creation of any specific climate-related 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 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] GHG 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. Wildlife responses to such environmental changes, such as alteration of migration routes or timing, expansion or contraction of suitable habitat, changes in predatory or foraging habits, or changes in reproductive habits or fecundity may occur but cannot be predicted.

The average number of oil and gas wells drilled annually in the HDD 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.

Based on research compiled for the International Panel on Climate Change Fourth Assessment Report, 2007, potential effects of climate change on resources in the affected environment are likely to be varied. The Figure below, taken from the Fourth Assessment Report, indicates varying responses of the natural world to increasing temperatures as a result of increasing global temperatures.

Figure 4.2-2: Examples of Impacts Associated with Global Average Temperature Change
(Impacts will vary by extent of adaptation, rate of temperature change and socio-economic pathway).



Within North America, the report specifically forecasts that: Warming in western mountains is projected to cause decreased snowpack, more winter flooding and reduced summer flows, exacerbating competition for over-allocated water resources; in the early decades of the century, moderate climate change is projected to increase aggregate yields of rain-fed agriculture by 5 to 20%, but with important variability among regions; major challenges are projected for crops that are near the warm end of their suitable range or which depend on highly utilized water resources; cities that currently experience heat waves are expected to be further challenged by an increased number, intensity and duration of heat waves during the course of the century, with potential for adverse health impacts and coastal communities and habitats will be increasingly stressed by climate change impacts interacting with development and pollution. Specific modeling and/or assessments of the potential effects for the HDD and for the State of Wyoming currently do not exist.

In 2001, the Intergovernmental Panel on Climate Change (IPCC) pointed out that by the year 2100, global average surface temperatures would increase 2.5 to 10.4° F. above 1990 levels (IPCC 2007). 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 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.

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. 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.

IPCC also discloses that 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 AEO 2006 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.

The cumulative impacts related to ozone are the same as described in Section 4.2.1.1. This lease sale complies with 40 CFR 93.153 concerning ozone.

4.5 Irreversible and Irretrievable Commitments of Resources

An irreversible commitment of a resource is one that cannot be reversed (e.g., the extinction of a species, disturbance to protected cultural resources, or extraction of fossil fuels); irreversible commitments of resources are actions which disturb or remove either a non-renewable resource or a renewable resource to the point that it can only be renewed over a long period of time (centuries); a resource is irreversibly committed when a decision or action alters the resource so that it cannot be restored or returned to its original or pre-disturbance condition; and, the resource or its productivity or its utility would be consumed, committed, or lost forever. Definitions of an irretrievable commitment of resources include: An irretrievable commitment of a resource caused by a management action or land use decision is one that directly removes the resource from availability or that renders its productivity or utility lost for a period of time (e.g., closure of an area to resource extraction); an irretrievable commitment is the loss of opportunities for production or use of a renewable resource for a short to medium period of time (years); or, a resource is irretrievably committed when a decision results in the loss of production or future use of the resource.

The administrative action of offering and issuing an oil and gas lease does not, in and of itself, directly result in an irreversible or irretrievable commitment of resources; however, post-lease development could result in such commitment of resources. For example soil lost through wind or water erosion from construction activities for an oil and gas well pad, access road, or pipeline would be considered

irreversible and/or irretrievable. Irreversible and/or irretrievable commitment of resources that could potentially result from post-lease oil and gas development on the May 2013 lease parcels would be within the irreversible and irretrievable commitment of resources analyzed and disclosed in the EISs for the Pinedale, Rawlins, Kemmerer, and Green River RMPs.

5.0 Description of Mitigating Measures and Residual Impacts

The lease sale will be mitigated by attaching appropriate conditions of approval to any subsequent requests for lease development either on a case-by-case basis or upon receipt of a project proposal (see Table 4 and Appendix B). The KFO, PFO, RFO, and RSFO Surface Use and Occupancy Requirements, Conditions of Approval, and the Special Leasing Stipulations as specified in the respective RMPs provide adequate mitigation for issuance of all lease parcels under the Proposed Action.

Direct, indirect, cumulative and residual impacts of leasing and lease development are generally described in the Kemmerer, Pinedale, Rawlins, and Green River RMP FEISs and RODs. An environmental analysis will be prepared on a case-by-case basis upon receipt of future subsequent actions.

6.0 Consultation/Coordination

WYOMING GAME AND FISH DEPARTMENT (WGFD)
The Kemmerer Field Office submitted an email request to Mark Zornes at the Green River District Office for review of Parcels 086-088, but received no comments. The Rawlins Field Office submitted an email request to WGFD; the reply recommended further review of Parcel 001, as lease development could potentially compromise the ability of the area to support wildlife populations at current levels, and could exceed the recommended 5% disturbance calculation for Greater Sage-Grouse analysis due to incomplete reclamation east of the lease site. Additional WGFD review of the May 2013 Lease parcels was conducted through a list sent by the BLM Wyoming State Office to the WGFD headquarters in Cheyenne; no comments were received.

6.1 List of Preparers/Reviewers

KEMMERER FIELD OFFICE

Gary McNaughton	Geologist
Erik Norelius	Wildlife Biologist
Lynn Harrell	Archaeologist
Wally Mierzejewski	Outdoor Recreation Planner
Doug Kile	GIS Specialist
Scott Whitesides	Planning & Environmental Specialist

PINEDALE FIELD OFFICE

Greg Noble	Assistant Field Manager – Minerals and Lands
John Huston	Assistant Field Manager – Resources
Sheryl McCullough	Planning & Environmental Coordinator, Minerals and Lands
Kyle Schumacher	Natural Resource Specialist

ROCK SPRINGS FIELD OFFICE

Doug Linn	Supervisory NRS – Fluid Minerals
Scott Stadler	Supervisory Archeologist
David Brock	Supervisory NRS – Range
Mark Snyder	Wildlife Biologist
Chris Sheets	Wildlife Biologist
Jo Foster	Recreation/VRM/Wilderness
Jessey Dowdy	Archeologist
Gene Smith	Archeologist
Breelyn Van Fleet	Archeologist
Robert Price	NRS – Range
Jim Glennon	Botanist
John Henderson	Fisheries Biologist
Dennis Doncaster	Hydrologist
Douglas Kile	GIS Specialist
Steve Madden	Natural Resource Specialist – Recreation
Angela Kelley	Natural Resource Specialist – Fluid Minerals
Ted Inman	Natural Resource Specialist – Fluid Minerals
Nancy Favour	Planning & Environmental Coordinator

RAWLINS FIELD OFFICE

John Sjogren	Natural Resource Specialist
Patrick Walker	Archeologist
Frank Blomquist	Wildlife Biologist
Charlie Morton	Wildlife Biologist
Kelly Fischer	Wildlife Biologist
Mike Calton	Range Management Specialist
Robert Epp	Range Management Specialist
Mark Newman	Geologist
Lynn McCarthy	GIS Specialist
Annette Treat	Realty Specialist
Erica Pionke	Realty Specialist
Kelly Owens	Hydrologist
Jennifer Fleuret	Hydrologist
David Hullum	Outdoor Recreation Planner
Nancy Baker	Assistant Field Manager for Minerals and Lands

HIGH DESERT DISTRICT OFFICE

Kimberlee Foster	Resource Advisor
Thomas Foertsch	Resource Advisor

BLM WYOMING STATE OFFICE

Merry Gamper	Physical Scientist, Fluid Minerals
Julie Weaver	Supervisory Mineral Leasing Specialist

Chris Carlton Planning & Environmental Coordinator

7.0 References

Berger, Dr. Joel, et al. 2008. "Wildlife and Energy Development, Pronghorn of the Upper Green River Basin-Year 3 Summary," Wildlife Conservation Society, July 2008.

Climate Change SIR. 2010. Climate Change Supplementary Information Report for Montana, North Dakota, and South Dakota, Bureau of Land Management. Report on Greenhouse Gas Emissions and Climate Change for Montana, North Dakota, and South Dakota. Technical report prepared for the Montana/Dakotas Bureau of Land Management by URS Corporation. URS Project 22241790.

Colorado Environmental Coalition, et al., IBLA 96-243, decided June 10, 1999.

CRCT Conservation Team. 2006. Conservation agreement for Colorado River cutthroat trout (*Oncorhynchus clarkii pleuriticus*) in the States of Colorado, Utah, and Wyoming. Colorado Division of Wildlife, Fort Collins. 10pp.

EPA. 2006. Natural Gas Star Program (2006 data) at: http://www.epa.gov/gasstar/accomplish.htm. Environmental Protection Agency, Washington, D.C.

Executive Order 11988--Floodplain management. 1977. Source: The provisions of Executive Order 11988 of May 24, 1977, appear at 42 FR 26951, 3 CFR, 1977 Comp., p. 117, unless otherwise noted.

Feeney et al. 2004. "Big Game Migration Corridors in Wyoming,." Figure 1. University of Wyoming.

Goddard Institute for Space Studies. 2007. Annual Mean Temperature Change for Three Latitude Bands. Datasets and Images. GISS Surface Temperature Analysis, Analysis Graphs and Plots. New York, New York. (Available on the Internet: http://data.giss.nasa.gov/gistemp/graphs/Fig.B.lrg.gif).

Holloran, M. J. 2005. "Greater Sage-Grouse (*Centrocercus urophasianus*) population response to natural gas field development in western Wyoming." PhD Dissertation. University of Wyoming. Laramie, Wyoming. 211pp.

Intergovernmental Panel on Climate Change (IPCC). 2007. "Climate Change 2007: The Physical Basis (Summary for Policymakers)." Cambridge University Press. Cambridge, England and New York, New York. (Available on the Internet: http://www.ipcc.ch/pdf/assessment-report/ar4/wg1/ar4-wg1-spm.pdf).

IPCC. 2007. "*Climate Change 2007: Synthesis Report. Contribution of Working Groups I, II and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change"* [Core Writing Team, Pachauri, R.K and Reisinger, A. (eds.)]. Intergovernmental Panel on Climate Change, Geneva, Switzerland, 104 pp.

N.M ex rel. Richardson v. BLM, 565 F.3d 683, 718-19 (10th Cir. 2009).

National Academy of Sciences. 2006. Understanding and Responding to Climate Change: Highlights of National Academies Reports. Division on Earth and Life Studies. National Academy of Sciences. Washington, D.C. (Available on the Internet: http://dels.nas.edu/basc/Climate-HIGH.pdf).

Outdoor Industry Foundation. 2006. "The Active Outdoor Recreation Economy." www.outdoorindustryfoundation.org

Park County Resource Council, Inc. v. U.S. Department of Agriculture, 10th Cir., April 17, 1987.

Powell, Jacob. 2003. "Distribution, Habitat Use Patterns, and Elk Response to Human Disturbance in the Jack Morrow Hills, Wyoming". May 2003. M.S., Department of Zoology and Physiology, University of Wyoming).

Ramanthan V. and G. Carmichael. 2008. Global and regional climate changes due to black carbon. *Nature Geoscience.* 1, pp. 221-227.

Sawyer, Hall, et al. 2004. 2004 SUBLETTE MULE DEER STUDY (PHASE II): Long-term monitoring plan to assess potential impacts of energy development on mule deer in the Pinedale Anticline Project Area.

Sawyer, Hall, et al.. 2010. September 2010, Mule Deer Monitoring in the Pinedale Anticline Project Area: 2010 Annual Report.

Semlitsch, Raymond D. and Bodie, J. Russell. 2003. "Biological Criteria for Buffer Zones around Wetlands and Riparian Habitats for Amphibians and Reptiles," IN Conservation Biology Volume 17, No. 5, October 2003.

U.S. Department of the Interior. 2011. "Department of the Interior's Economic Contributions." June 2011.

U.S. Department of the Interior, Bureau of Land Management. 1996. Green River Proposed Resource Management Plan and Final Environmental Impact Statement.

U.S. Department of the Interior, Bureau of Land Management. 1997. "Green River Approved Resource Management Plan and Record of Decision." Rock Springs, Wyoming.

U.S. Department of the Interior, Bureau of Land Management. 2008. "Kemmerer Proposed Resource Management Plan and Final Environmental Impact Statement." Kemmerer, Wyoming.

U.S. Department of the Interior, Bureau of Land Management. 2008. "Pinedale Proposed Resource Management Plan and Final Environmental Impact Statement." Pinedale, Wyoming.

U.S. Department of the Interior, Bureau of Land Management. 2008. "Pinedale Approved Resource Management Plan and Record of Decision." Pinedale, Wyoming.

U.S. Department of the Interior, Bureau of Land Management. 2008. "Rawlins Proposed Resource Management Plan and Final Environmental Impact Statement." Rawlins, Wyoming.

U.S. Department of the Interior, Bureau of Land Management. 2008. "Rawlins Approved Resource Management Plan Record of Decision." Rawlins, Wyoming.

U.S. Department of the Interior, Bureau of Land Management. 2009a. Instruction Memorandum WY-2010-012, dated December 29, 2009, "Greater Sage-Grouse Habitat Management Policy on Wyoming Bureau of Land Management (BLM) Administered Public Lands including the Federal Mineral Estate." Cheyenne, Wyoming.

U.S. Department of the Interior, Bureau of Land Management. 2009b. Instruction Memorandum WY-2010-013, dated December 29, 2009, "Oil and Gas Leasing Screen for Greater Sage-Grouse." Cheyenne, Wyoming.

U.S. Department of the Interior, Bureau of Land Management. 2010a. Instruction Memorandum 2010-071, dated March 5, 2010. "Gunnison and Greater Sage-Grouse Management Considerations for Energy Development (Supplement to *National Sage-Grouse Habitat Conservation Strategy*)." Washington, D.C.

U.S. Department of the Interior, Bureau of Land Management. 2010b. Kemmerer Approved Resource Management Plan and Record of Decision. Kemmerer, Wyoming.

U.S. Department of the Interior, Bureau of Land Management. 2011. Instruction Memorandum 2012-044, dated December 27, 2011. "BLM National Greater Sage-Grouse Land Use Planning Strategy." Washington, D.C.

U.S. Department of the Interior, Bureau of Land Management. 2012a. Instruction Memorandum WY-2012-019, dated February 12, 2012, "Greater Sage-Grouse Habitat Management Policy on Wyoming BLM Administered Public Lands Including the Federal Mineral Estate." Cheyenne, Wyoming.

U.S. Department of the Interior, Bureau of Land Management. 2012b. Instruction Memorandum WY-2012-032, dated March 27, 2012, "Wyoming Bureau of Land Management (BLM) Reclamation Policy." Cheyenne, Wyoming.

U.S. Fish and Wildlife Service. 2006. *Trout Fishing in 2006: A Demographic Description and Economic Analysis.* Addendum to the 2006 National Survey of Fishing, Hunting, and Wildlife Associated Recreation. Report 2006-6.

United States Government Accountability Office. 2012. "OIL AND GAS, Information on Shale Resources, Development, and Environmental and Public Health Risks", GAO-12-732.

University of Wyoming. School of Energy Resources and Haub School & Ruckelshaus Institute 2012 Hydraulic Fracturing: A Wyoming Energy Forum Summary Report.

Wyoming Game and Fish Department. 2010. "Recommendations for Development of Oil and Gas Resources within Crucial and Important Habitat." Cheyenne, Wyoming.

7.1 Authorities

Code of Federal Regulations (CFR) 3100

40 CFR All Parts and Sections inclusive - Protection of Environment, Revised as of July 1, 2001.

43 CFR All Parts and Sections inclusive - Public Lands: Interior, Revised as of October 1, 2000.

U.S. Department of the Interior, Bureau of Land Management and Office of the Solicitor (editors). 2001. The Federal Land Policy and Management Act, as amended. Public Law 94-579.