DECISION RECORD
Roff Operating Company, LLC, Boardman Ranch Federal #1-30 Project
Environmental Assessment (EA), WY-070-EA14-60
Bureau of Land Management, Buffalo Field Office, Wyoming

DECISION. BLM approves Roff Operating Company, LLC (Roff), Boardman Ranch Federal #1-30 gas and oil well application for permit to drill (APD) as described in Alternative B of the environmental assessment, (EA) WY-070-EA14-60, incorporated here by reference. This approval includes the well's support facilities.

Compliance. This decision complies with or supports:

- Federal Land Policy and Management Act of 1976 (FLPMA) (43 USC 1701); DOI Order 3310.
- Mineral Leasing Act of 1920 (MLA) (30 U.S.C. 181); to include Onshore Order No. 1.
- National Environmental Policy Act of 1969 (NEPA) (42 USC 4321).
- National Historic Preservation Act of 1966 (NHPA) (16 USC 470).
- Buffalo Resource Management Plan (RMP) 1985, Amendments 2001, 2003, 2011.
- Buffalo and Powder River Basin Final Environmental Impact Statements (FEISs) 1985, 2003 (2011)

BLM summarizes the details of the approval of Alternative B, below. The EA includes the project description, including specific changes made at the onsites, and site-specific mitigation measures.

Well Site. BLM approves the following APD and support facilities:

	Well Name	Well #	Qtr/Qtr	Section	Twp	Rng	Lease #
1	Boardman Ranch Federal	#1-30	SESW	30	57	70	WYW181742

List of Approved Rights-of Way.

ROW Grant	ROW Action	Section.	Twp	Rng	Lengths	Width
WYW-168432	Road	30	57N	70W	.3 mile	NTE 42'
					Acres of Disturbance	
					1.527	

Limitations. There are no denials or deferrals. Also see the conditions of approval (COAs).

THE FINDING OF NO SIGNIFICANT IMPACT (FONSI). Analysis of Alternative B of the EA, WY-070-EA14-60, and the FONSI (incorporated here by reference) found Roff's proposal for Boardman Ranch Federal #1-30 will have no significant impacts on the human environment, beyond those described in the PRB FEIS. There is no requirement for an EIS.

COMMENT OR NEW INFORMATION SUMMARY. BLM publically posted the proposed APD for 30 days, received no comments, and then internally scoped it. BLM experience in the PRB (outside of the Fortification Creek Planning Area) revealed little public input or new issue discovery other than those revealed after public scoping during development of the PRB FEIS. BLM received no new policies or clarifications since receipt of this APD.

DECISION RATIONALE. BLM bases the decision authorizing the selected project on:

1. BLM and Roff included mitigation measures to reduce environmental impacts while meeting the BLM's need. For a complete description of all site-specific COAs see the COAs. The PRB FEIS analyzed and predicted that the PRB oil and gas development would have significant impacts to the

contributes to the potential for local GSG extirpation yet its effect is acceptable because it is outside priority habitats and is within the parameters of the PRB FEIS and ROD and current BLM and Wyoming GSG conservation strategies.

2. Roff will conduct operations to minimize adverse effects to surface and subsurface resources, prevent unnecessary surface disturbance, and conform to currently available technology and practice.

3. The selected alternative will help meet the nation's energy needs, and help stimulate local economies by maintaining workforce stability.

4. The Operator committed to:
   - Comply with the approved APD, applicable laws, regulations, orders, and notices to lessees.
   - Obtain necessary permits from agencies.
   - Offer water well agreements to the owners of record for permitted wells.
   - Incorporate several measures to alleviate resource impacts into their submitted surface use plan and drilling plan.

5. The Operator certified that a surface access agreement is in place.

6. The project is clearly lacking in wilderness characteristics as it is amidst development.

7. This APD is pursuant to the Mineral Leasing Act for the purpose of exploring or developing oil or gas and does not satisfy the categorical exclusion directive of the Energy Policy Act of 2005, Section 390 because the proposal is at a site where drilling occurred more than 5 years from spudding this well.

ADMINISTRATIVE REVIEW AND APPEAL. This decision is subject to administrative review according to 43 CFR 3165. Request for administrative review of this decision must include information required under 43 CFR 3165.3(b) (State Director Review), including all supporting documentation. Such a request must be filed in writing with the State Director, Bureau of Land Management, P.O. Box 1828, Cheyenne, Wyoming 82003, no later than 20 business days after this Decision Record is received or considered to have been received. Parties adversely affected by the State Director's decision may appeal that decision to the Interior Board of Land Appeals, as provided in 43 CFR 3165.4.

Field Manager: _____ Date: 12/20/13

FINDING OF NO SIGNIFICANT IMPACT
Roff Operating Company, LLC, Boardman Ranch Federal #1-30 Project
Environmental Assessment (EA), WY-070-EA14-60
Bureau of Land Management, Buffalo Field Office, Wyoming

FINDING OF NO SIGNIFICANT IMPACT (FONSI). Based on the information in the EA, WY-070-EA14-60, which BLM incorporates here by reference; I find that: (1) the implementation of Alternative B will not have significant environmental impacts beyond those addressed in the Buffalo Final Environmental Impact Statement (FEIS) 1985, and the Powder River Basin (PRB) FEIS, 2003 (2011). Alternative B conforms to the Buffalo Field Office (BFO) Resource Management Plan (RMP) (1985, 2001, 2003, 2011); and (3) Alternative B does not constitute a major federal action having a significant effect on the human environment. Thus an EIS is not required. I base this finding on consideration of the Council on Environmental Quality's (CEQ) criteria for significance (40 CFR 1508.27), with regard to the context and to the intensity of the impacts described in the EA, and Interior Department Order 3310.

CONTEXT: Mineral development is a common PRB land use, sourcing over 42% of the nation's coal. The PRB FEIS foreseeable development analyzed the development of 54,200 wells. The additional development analyzed in Alternative B is insignificant in the national, regional, and local context.

INTENSITY: The implementation of Alternative B will result in beneficial effects in the forms of energy and revenue production however; there will also be adverse effects to the environment. Design features and mitigation measures included in Alternative B will minimize adverse environmental effects. The preferred alternative does not pose a significant risk to public health and safety. The geographic area of project does not contain unique characteristics identified in the 1985 RMP, PRB FEIS, or other legislative or regulatory processes. BLM used relevant scientific literature and professional expertise in preparing the EA. The scientific community is reasonably consistent with their conclusions on environmental effects relative to oil and gas development. Research findings on the nature of the environmental effects are not highly controversial, highly uncertain, or involve unique or unknown risks. The PRB FEIS predicted and analyzed oil development of the nature proposed with this project and similar projects. The selected alternative does not establish a precedent for future actions with significant effects. The proposal may relate to the PRB Greater Sage-Grouse and its habitat decline having cumulative significant impacts; yet the small size of this project is within the parameters of the impacts in the PRB FEIS. There are no cultural or historical resources present that will be adversely affected by the selected alternative. The project area is clearly lacking in wilderness characteristics as it is amidst development. No species listed under the Endangered Species Act or their designated critical habitat will be adversely affected. The selected alternative will not have any anticipated effects that would threaten a violation of federal, state, or local law or requirements imposed for the protection of the environment.

ADMINISTRATIVE REVIEW AND APPEAL. This finding is subject to administrative review according to 43 CFR 3165. Request for administrative review of this finding must include information required under 43 CFR 3165.3(b) (State Director Review), including all supporting documentation. Such a request must be filed in writing with the State Director, Bureau of Land Management, P.O. Box 1828, Cheyenne, Wyoming 82003, no later than 20 business days after this FONSI is received or considered to have been received. Parties adversely affected by the State Director's finding may appeal that finding to the Interior Board of Land Appeals, as provided in 43 CFR 3165.4.

Field Manager: _____ Date: 12/20/13

ENVIRONMENTAL ASSESSMENT (EA), WY-070-EA14-60
Roff Operating Company, LLC, Boardman Ranch Federal #1-30 Project
Bureau of Land Management, Buffalo Field Office, Wyoming

1. INTRODUCTION

BLM provides an EA for Roff Operating Company, LLC (Roff), Boardman Ranch Federal #1-30 oil and natural gas well application for permit to drill (APD). This site-specific analysis tiers to and incorporates by reference the analysis in the Final Environmental Impact Statement and Proposed Plan Amendment for the Powder River Basin Oil and Gas Project (PRB FEIS), WY-070-02-065, 2003 (2011) and the PRB FEIS Record of Decision (ROD) pursuant to 40 CFR 1508.28 and 1502.21. One may review these documents at the BLM Buffalo Field Office (BFO) and on our website.

This APD is pursuant to the Mineral Leasing Act for the purpose of exploring or developing oil or gas and does not satisfy the categorical exclusion directive of the Energy Policy Act of 2005, Section 390 because the proposal is at a site where drilling occurred more than 5 years from spudding this well. Congress made a 4-part process for federal fluid mineral decisions under the long-term needs of multiple-use. First is the land use / resource management plan (RMP); here the PRB FEIS and ROD amendment to the BFO RMP. Second are the decisions of whether and, if so, under what conditions, to lease lands for fluid mineral development. Courts held leasing decisions are an almost irrevocable resource commitment. Third, (this phase) is deciding on the proposed POD or APD, or both: the site-specific analysis, and mitigation. Fourth is the monitoring and reclamation of wells and their features. (Pendery 2010)

1.1. Background

Standard split estate jurisdictional rules apply to this APD. BLM and Roff conducted a pre-approval notice of staking (NOS) onsite on June 18, and July 29, 2013. BLM received the Boardman Ranch Federal #1-30 APD on August 7, 2013. BLM mailed the post-APD deficiency letter on September 6, 2013. On October 1, 2013 Roff submitted deficiencies for the Boardman Ranch Federal #1-30 project; however BLM did not process them until October 18, 2013 due to the government shutdown. Additional project deficiencies in a 2nd post-APD deficiency letter were sent to Roff on November 12, 2013. Roff responded to the 2nd post APD deficiency letter on November 18, 2013. On December 6, 2010 BLM asked the operator to revise the SUDS form, the operator responded and revised the SUDS form on the same day for the Boardman Ranch Federal #1-30 project. BLM shared the proposed COAs with the operator in December 20, 2013.

1.2. Need for the Proposed Project

The need for this project is to determine whether, how, and under what conditions to support the Buffalo Resource Management Plan's (RMP) goals, objectives, and management actions with allowing the exercise of the operator's conditional lease rights to develop fluid minerals on federal leases. APD information is an integral part of this EA, which BLM incorporates here by reference. Conditional fluid mineral development supports the RMP and the Mineral Leasing Act of 1920, the Federal Land Policy Management Act (FLPMA), and other laws and regulations.

1.3. Decision to be Made

The BLM will decide whether or not to approve the proposed development, and if so, under what terms and conditions agreeing with the Bureau's multiple use mandate, environmental protection, and RMP.

1.4. Scoping and Issues

BFO external scoping included a 30 day posting of proposed APD. Previously BFO conducted extensive external scoping for the PRB FEIS - discussed on p. 2-1 of the PRB FEIS and on p. 15 of the PRB ROD.

This project is similar in scope to other fluid mineral development the BFO analyzed. External scoping is unlikely to identify new issues, as verified with recent fluid mineral EAs BLM recently externally scoped. External scoping of the horizontal drilling in the Crazy Cat East EA, WY-070-EA13-028, 2013, in the PRB area received 3 comments, revealing no new issues. External scoping in 2008 to 2011 for a proposed RMP amendment revealed no new issues outside of geographically-specific ones.

The BFO interdisciplinary team (ID team) conducted internal scoping by reviewing the proposed development and project location to identify potentially affected resources and land uses. This EA will not discuss resources and land uses that are either not present, not affected, or that the PRB FEIS adequately addressed. The ID team identified important issues for the affected resources to focus the analysis. This EA addresses the project and its site-specific impacts that were unknown and unavailable for review at the time of the PRB FEIS analysis to help the decision maker come to a reasoned decision. Project issues are: air quality; soils and vegetation: site stability, reclamation potential, water resources, riparian / wetland communities, invasive species; wildlife: raptor productivity, migratory birds, and special status species.

These issues are not present, or minimally so. BLM analyzed them in the PRB FEIS and not in this EA:

Geological resources	Forest lands	Realty, Rights-of-way
Cave and karst resources		Rights-of-way
Wilderness characteristics	Visual resources	Transportation
Areas of critical environmental concern (ACEC)	Tribal Treaty rights	Livestock grazing
Social and economic resources	Paleontology	Wild and scenic rivers
Environmental justice	Wilderness study areas	
Fire fuels management and rehabilitation	Minerals (locatable, leasable-coal, salable)	

2. PROPOSED PROJECT AND ALTERNATIVES

2.1. Alternative A – No Action

The no action alternative would deny these APDs requiring the operator to resubmit APDs that complies with statutes and the reasonable measures in the PRB RMP Record of Decision (ROD) in order to lawfully exercise conditional lease rights. The PRB FEIS considered a no action alternative, pp. 2-54 to 2-62. The BLM keeps the no action alternative current using the aggregated effects analysis approach – tiering to or incorporating by reference the analyses and developments approved by the subsequent NEPA analyses for adjacent and intermingled developments to the proposal area.

2.2. Alternative B Proposed Action

Project Name: Boardman Ranch Federal 1-30

Roff Operating Company, LLC (Roff) proposes drilling and developing 1 vertical oil well into federal mineral estate from a proposed fee surface location in Campbell County, WY. The project would be subject to the conditions-of-approval (COAs) for drilling of a split estate oil well in the BFO jurisdiction. For a detailed description of design features and construction practices associated with the proposed project, refer to the APD's surface use plan (SUP) and drilling plan. Also see the subject APD for maps showing the proposed well location and associated facilities for the Boardman Ranch Federal #1-30. The proposed well is north out of Gillette, Wyoming on US Highway 14-16 for approximately 4.1 miles. Turn right and travel Northeasterly on Highway #59 for 45.5 miles. Turn right and travel easterly on existing gravel road for 2.6 miles. Turn right onto new access to the location. The primary objective is to drill to the Minnelusa Formation at 7,085 feet total vertical distance. The surface location is as follows: 755 feet FSL and 2,179 feet FWL, with a bottom hole location as follows: 660 feet FSL and 2,169 feet FWL; SE¼SW¼ - Section 30, T57N, R70W. See Appendix A, Table 2.1, Surface Disturbance, below, and Figure 2.1 Project Map, for further detail. Earl Boardman (Boardman Ranch) and BLM own the surface.

The project is clearly lacking in wilderness characteristics as is in the midst of development.

Well Name/#/Lease/Location:

	Well Name	Well #	Qtr/Qtr	Section	Twp	Rng	Lease #
1	Boardman Ranch Federal	#1-30	SESW	30	57	70	WYW181742

Approved Rights-of-Way:

ROW Grant	ROW Action	Section	Twp	Rng	Lengths	Width
WYW-168432	Road	30	57N	70W	0.3 mile	NTE 42’
					Acres of Disturbance	
					1.527	

Drilling, Construction and Production Design Features Include:

- Roff Operating Company, LLC (Roff) anticipates completing drilling and construction in 2 years. Drilling and construction is year-round in the region. Weather may cause delays but delays rarely last multiple weeks. Timing limitations in the form of COAs and/or agreements with surface owners may impose longer temporal restrictions.
- The well is expected to be drilled in late fall/winter of 2013 and will take approximately 7-10 days to drill, including rigging up and rigging down.
- Operator does not anticipate a hydraulic fracturing (HF) in the Minnelusa Formation.
- During drilling an impervious liner will be installed in the reserve pit in order to avoid drilling water loss through seepage.
- A 20 foot vegetative border will be maintained between toe-of-fill and/or pit areas and the edge of adjacent drainages. The location will be parallel to an existing shallow drainage and if necessary, the side of the pad will be armored with 6 inch rock rip rap to prevent erosion. In addition, Pad Corner D will be rounded to avoid placing fill material in the adjacent drainage. Refer to the well pad design (Specifically Corner D) of the Boardman Federal #1-30 APD for further detail.
- Potential production facilities including a pumping unit, a 2 tank battery, and heater treater located on the well pad and placed on the cut portion of the location, a minimum of 15 feet from the toe of the back cut.
- During the production phase it is anticipated that the total disturbance of the location will be 0.83 acres. During the drilling phase the total disturbance is expected to be 2.25 acres. Operator anticipates reclaiming 1.42 acres or 63.11% of total disturbance for the interim reclamation phase.
- All engines will be equipped with a muffler system, decibel level not to exceed 70 decibels at a distance of 200 feet from the exhaust of any muffler.
- There will be no pits at the producing oil well location.

Drilling and Completion Water Sources and Amounts

The proposed Boardman Federal #1-30 project is to drill and develop an oil/gas well into the Minnelusa formation. The operator plans no HF for this well’s completion (see administrative record (AR) and drilling plan. The project would be subject to the COAs for drilling of an oil/gas well in the BFO jurisdiction. Operator plans obtaining fresh water from the City of Gillette, Wyoming or the water will be purchased from Earl Boardman, the landowner, and will be hauled from the Little Powder River in the NE¼SE¼, SE¼NE¼ of Section 26, T57N-R71W.

For a detailed description of design features and construction practices associated with the proposed project, refer to the surface use plan (SUP) and drilling plan included with the APD. Also see the APD, AR, for maps showing the proposed well location and associated facilities described above.

BLM incorporated and analyzed the implementation of committed mitigation measures in the SUP and

drilling plan, in addition to the COAs in the PRB FEIS ROD, as well as changes made at the onsite. Additionally, Roff, in their APD, committed to:

1. Comply with the approved APD, applicable laws, regulations, orders, and notices to lessees.
2. Obtain necessary permits from agencies.
3. Offer water well agreements to the owners of record for permitted wells.
4. Incorporate measures to alleviate resource impacts in their surface use plan and drilling plan.

Average Daily Traffic (ADT):

The operator estimates that during the drilling phase of the well the ADT to and from the location is approximately 10 large trucks (water haulers, cement trucks, etc.) and 10 personal pickup trucks per day. The operator does not plan to horizontally frac the well. Finally, during the production phase the ADT will decrease to 1 large truck and ~1 pickup truck per day.

Reasonably Foreseeable Activities:

The reasonably foreseeable activities for this and adjacent areas includes the operator (Roff) potentially permitting up to 3 more APDs listed below. The following analysis generally includes this foreseeable activity, to the extent capable while lacking site-specific proposals. The possible locations are near:

1. Township 56 North, Range 70 West, Section 11: NW¼NE¼ or NE¼NW¼
2. Township 56 North, Range 70 West, Section 9: NE¼
3. Township 56 North, Range 70 West, Section 8: NW¼

There is also the potential for other operators to develop lease (s) in the area on 40 acre spacing dependent upon lease sales and existing lease rights in the immediate and surrounding area. Expanded gas and electric ROW infrastructure linking potential future wells are part of reasonably foreseeable activity addition to this proposal (PRB ROD, p. 2). A foreseeable addition may be a request for a ROW to connect roads, gas and utility lines.

2.3. Conformance to the Land Use Plan and Other Environmental Assessments

This proposal does not diverge from the goals and objectives in the Buffalo Resource Management Plan (RMP), 1985, 2001, 2003, 2011, and generally conforms to the terms and conditions of that land use plan, its amendments, and supporting FEISs, 1985, 2003 (2011).

3. AFFECTED ENVIRONMENT

This section briefly describes the physical and regulatory environment that may be significantly affected by the alternatives in Section 2, or where changes in circumstances or regulations occurred since adoption of analyses to which the EA tiers or incorporates by reference. The PRB FEIS considered a no action alternative (pp. 2-54 to 2-62) in evaluating a development of up to 54,200 fluid mineral wells. Nearly all of the PRB's coalbed natural gas (CBNG) wells and over 60% of the deep oil and gas wells are hydraulically fractured; BLM and Goolsby 2012. The BLM uses the aggregated effects analysis approach incorporating by reference the circumstances and developments approved via the subsequent NEPA analyses for adjacent and intermingled developments coincident to proposal area to retain currency in the no action alternative. 615 F. 3d 1122 (9th Cir. 2010). There are 7 permitted oil and gas wells in the project area, Wyoming Oil and Gas Conservation Commission (WOGCC) 2013. The total number of conventional wells in the Buffalo planning area is 1313, which includes 783 horizontal wells (federal, fee, and state) (as of April 2013). This represents 41% of the projected 3,200 in the 2003 PRB ROD. This agrees with the PRB FEIS which analyzed the reasonably foreseeable development rolling across the PRB of 51,000 CBNG and 3,200 natural gas and oil wells. The State of Wyoming and BLM also approved wells that operators may develop in the near future. In addition, and other operators are likely to continue seeking permits to develop unconnected leases in or in the affects analysis areas near the project area; decisions to approve or deny future proposals will occur following APD submittal. Development occurring on non-federal surface and non-federal mineral estate would continue. BLM's position is there

is a rare lack of surface disturbance impacts attributable to well type, subject to showing a distinction, not a mere difference. See, State Director Reviews WY-2010-023, Part 2, p. 3, and fn. 7, and 2013-005, pp. 2-3. This supports BLM and national policy in 43 CFR 3160 et seq, leasing, APD Form 3160-3, and 2005's Energy Policy Act (Kreckel 2007). The US Geological Survey noted there is only a remote chance of induced seismic activity from the nations hydraulic fracturing and water injection at volumes contemplated in the PRB; see WY BLM's HF White Paper, 2013, incorporated here by reference.

Project Area Description

The proposed project is about 8.8 acres. The majority of the project disturbance is on split estate except for 0.47 miles of existing and proposed access road found federal surface. Elevations average 3,600 feet above sea level. Topography is characterized by rolling ridgelines and shallow arroyos along ephemeral drainages. The area where the operator is proposing to build a culvert crossing the Little Powder River has sparse cottonwood trees, dense sage brush, and hay meadows. The climate is semi-arid, averaging 15-20.21 inches of precipitation annually. The mean annual air temperature is 48.5 degrees Fahrenheit. Residents manage this area as rangeland with livestock grazing, recreational hunting, improved roads and historical oil and gas development is also prevalent, see Appendix A, Table 3.1 below.

3.1. Air Quality

Refer to the PRB FEIS pp. 3-291 to 3-299, for a 2003-era description of the air quality conditions. BLM incorporates by reference, Update of Task 3A Report for the Powder River Basin Coal Review Cumulative Air Quality Effects for 2020, BLM (AECOM), 2009, (Cumulative Air Quality Effects, 2009) as it captures the cumulative air quality effects of present and projected PRB fluid and solid mineral development. The Environmental Protection Agency (EPA) established ozone standards in 2008, finalizing them in 2011. Existing air quality in the PRB is "unclassified/attainment" with all ambient air quality standards. It is also in an area that is in prevention of significant deterioration zone. PRB air quality is a rising concern due to ozone in the oil and gas producing Upper Green River Basin that became 1 of the nation's 40 "nonattainment" zones for ozone in 2012; in addition to PRB-area air quality alerts issued in 2011-2013 for particulate matter (PM), attributed to coal dust. Four sites monitor the air quality in the PRB: Cloud Peak in the Bighorn Mountains, Thunder Basin northeast of Gillette, Campbell County south of Gillette, and Gillette. In addition, the Wyoming Air Resource Monitoring System (WARMS) measures meteorological parameters from 6 sites, and particulate concentrations from 5 of those sites, monitors speciated aerosol (3 locations), and evapotranspiration rates (3 locations). These sites are at Sheridan, Taylor Reservoir, South Coal Reservoir, Buffalo, Juniper, and Newcastle. The northeast Wyoming visibility study is ongoing by the Wyoming Department of Environmental Quality (WDEQ). Sites adjacent to the Wyoming PRB-area are at Birney on the Tongue River 24 miles north of the Wyoming-Montana border, Broadus on the Powder River in Montana, and Devils Tower.

Existing air pollutant emission sources in the region include:

- Exhaust emissions (primarily CO and nitrogen oxides (NOx)) from existing natural gas fired compressor engines used in production of natural gas and CBNG; and, gasoline and diesel vehicle tailpipe emissions of combustion pollutants;
- PM (dust) generated by vehicle travel on unpaved roads, windblown dust from neighboring areas, road sanding during the winter months, coal mines, and trains;
- Transport of air pollutants from emission sources located outside the region;
- NOx, PM, and other emissions from diesel trains and,
- SO2 and NOx from power plants.

3.2. Soils and Vegetation

Project area soils developed in alluvium and residuum derived mainly from the Wasatch Formation. Lithology consists of light to dark yellow and tan siltstone and sandstones with minor coal seams resulting in a wide variety of surface and subsurface textures. Soil depths vary from deep on lesser slopes

to shallow and very shallow on steeper slopes. Differences in lithology produced topographic and geomorphic variations in the area. An erosion resistant cap of clinker, terrace gravels, or sandstone often protects ridges and hills. Parent material chemistry may result in local concentration of salts. Soils differ with topographic location, slope and elevation. Topsoil depths to be salvaged for reclamation range from 0 to 4 inches on ridges to 12+ inches in bottomland. Erosion potential varies depending on the soil type, vegetative cover and slope. Reclamation potential of soils also varies throughout the project area. Soil limitations in the project area include: depth to bedrock, low organic matter content, and high erosion potential especially in areas of steep slopes.

The Campbell County North 705 Survey Area, Wyoming Soil Survey Geographic (SSURGO) Database (WY705) provides detailed soils identification and data. NRCS performed the soil survey per the National Cooperative Soil Survey standards. BLM uses county soil survey information to predict soil behavior, limitations, or suitability for a given activity or action. Soil management objectives are to ensure that adequate soil protection is consistent with the resource capabilities. Many of the soils and landforms of this area present distinct challenges for development, and /or eventual site reclamation. A tabulated summary of the dominant and important soil map units follows, along with their individual acreage and percentage of the area in the POD boundary. See the NRCS Soil Survey Campbell County North 705 (SSURGO) data. The Ecological Site interpretations include additional site-specific soil information.

Table 3.2. Dominant or Important Soils by Map Unit Symbol (MUS)

MUS	Map Unit Name	Ecological Site	Acres	Percent
225	Ucross-Iwait-Fairburn loams, 3 to 30% slopes	Loamy (Ly) 15-17 NP	627.64	52%
299	Oldwolf-Fairburn loams, 3 to 15% slopes	Loamy (Ly) 15-17 NP	263.74	23%
318	Sodawells-Pathfinder-Boruff complex, 0 to 6% slopes	Lowland (LL) 15-17 NP	165.63	14%
334	Vonalf-Xema-Mittenbutte fine sandy loams, 3 to 30% slopes	Sandy (Sy) 15-17 NP	130.54	11%

Source: NRCS 2010. The total project disturbance consists of 8.81 acres of that only 3.77acres is new disturbance. The majority of the 3.77 acres of new disturbance falls within Loamy (Ly). The figures shown for acreages are representations illustrated by soil polygons that are part of the proponents proposal.

Mapping a single taxonomic soil class is rare without including areas of other taxonomic classes. Consequently, every map unit comprises the soils or miscellaneous areas for of its name and some minor components that belong to taxonomic classes other than those of the major soils. Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are non-contrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Map unit descriptions mention the contrasting components. In complex soil patterns minor components may avoid observation and mention as it's impractical to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit does not diminish the usefulness or accuracy of the data. The objective of mapping is to separate the landscape into landforms or landform segments that have similar use and management requirements, and to delineate pure taxonomic classes. The delineation of such segments on the map provides sufficient information for the development of resource plans. Onsite investigation defines and locates the soils and miscellaneous areas where plans call for intensive use of small areas.

3.3. Soils Susceptible to Erosion

Soil formation is a very slow process. Most soils cannot renew their eroded surface and productivity while erosion continues. The development of a favorable rooting zone by the weathering of parent rock is

much slower than development of the surface horizon. One estimate of this renewal rate is 0.5 ton per acre per year for unconsolidated parent materials and much less for consolidated materials. Slow renewal rates support the philosophy that any soil erosion is too much. Loss of organic matter, resulting from erosion and tillage, is one of the primary causes for reduction in production yields. When organic matter decreases, soil aggregate stability, the soil's ability to hold moisture, and the cation exchange capacity decline. (Soil Quality-Agronomy Technical Note #7, USDA, Aug 1998) Concerns with soils susceptible to erosion are limited reclamation potential (LRP) areas and highly erosive soils.

- **Limited Reclamation Potential (LRP):**
  Areas possessing unique landscape characteristics (e.g., sensitive geologic formations, extremely limiting soil conditions, biological soil crusts, badlands, rock-outcrops, etc.) often make reclamation success impractical and/or unrealistic due to physical, biological, and/or chemical challenges.
- **Highly erosive soils:**
  Usually can be mitigated through best management practices (BMPs) and design features. Highly erosive sites with our construction practice ie 2:1 slopes (50%), etc. Slope is a major factor in determining water erosion. Water erosion is a function of soil erodibility and percent slope. Soil erodibility factor (Kw) quantifies soil detachment by runoff and raindrop impact. Factor Kw applies to the whole soil, which includes rock fragments. Kw is based primarily on percentage of silt, sand, and organic matter, soil structure, saturated hydraulic conductivity, and rock fragments. Values of Kw range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water (USDA-NRCS, 2007). Highly erosive soils can also be susceptible to wind erosion. The soil wind erosion hazard is estimated by the using the soil Wind Erosion Index (WEI). WEI is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion (USDA-NRCS, 2007).

The Boardman Federal #1-30 project has no proposed disturbance that falls under the category of soils susceptible to erosion by wind and or water. There are areas adjacent to this area that due fall under the category of soils susceptible to erosion – so the description is supporting the foreseeable activity. However, the project mitigated these areas by avoiding placing infrastructure on these sites. Refer to Appendix A, Figure 3.1. Boardman Federal #1-30 Soils Map shows the relative erosion potential.

3.4. Slopes in Excess of 25 Percent

The slope greatly affects a soil's stability. Greater slopes increase the potential for slumping, landslides, and water erosion. BLM used the SSURGO Data and onsite investigation to determine that percentage of the project area soils that contain LRP areas. None of the proposed proponent's project is within an slopes greater than 25% - though these slopes exist in the areas of foreseeable activity. Refer to Appendix A, Figure 3.1. Boardman Federal #1-30 Soils Map which illustrates clearly that the proponent will not impact any slopes greater than 25%. BLM incorporates by reference here the analysis of LRPs, slopes in excess of 25%, and reclamation suitability found in Crazy Cat East EA, WY-070-EA13-028.

3.5. Reclamation Suitability (Source Material)

Oil and gas development and traditional activities including livestock grazing and wildlife use impact current soil conditions in the project area. Area soils are easily damaged by use or disturbance or are difficult to re-vegetate or otherwise reclaim. Soil impacts (e.g., roads, linear pipeline scars, and artificial wet areas) can be readily observed in the area. In the absence of recoverable topsoil as is common in the project area, the surface organic matter in the form of vegetation, litter and biological crust are critical to maintaining the integrity and viability of the soil. Reclamation potential of soils varies in the project area. The main project area soil limitations include: depth to bedrock, low organic matter content, and high erosion potential especially in areas of steep slopes. Many of the area soils and landforms present distinct

challenges for development. The entire proposed project falls under the category of fair for reclamation potential. Refer to Appendix A, Figure 3.1. Boardman Federal #1-30 Soils Map which illustrates that the entire project falls under fair reclamation potential.

3.6. Vegetation and Ecological Sites

BLM staff identified the dominant vegetation community types in the foreseeable activity and project areas are mixed-grass prairie and sagebrush shrubland. During the BLM, operator, and landowner NOS onsite BLM found the following species: western wheatgrass (Pascopyrum smithii), blue grama (Bouteloua gracilis), needle-and-thread (Hesperostipa comata), wyoming big sagebrush (Artemisia tridentate var. wyomingensis), prairie junegrass (Koeleria macrantha), plains pricklypear (Opuntia spp.), bluebunch wheatgrass (Pseudoroegneria spicata), green needlegrass (Nassella viridula), yucca (Yucca glauca), and common yarrow (Achillea millefolium). Non-native graminoids present included cheatgrass (Bromus tectorum) and crested wheatgrass -which are quite extensive in the PRB.

Dominant or important ecological sites and plant communities identified in the project area are Loamy, Lowland, and Sandy. Refer to ecological site narrative sections below for description and detail of vegetation species observed during onsite field visits. Ecological site descriptions provide site and vegetation information needed for resource identification, management and reclamation recommendations. BLM specialists used NRCS published soil survey information, verified through onsite field reconnaissance, to determine the appropriate ecological sites for this area. Dominant or important ecological sites and plant communities identified in the project area are listed below. Refer to ecological site narrative sections below for description of vegetation species observed during onsite field visits. The ecological sites identified were variable and consisted of both loam, lowland, and sandy sites in 15-17 inch precipitation zone of the Northern Plains, the shallow counterpart to these sites were also present. Site specific topsoil salvage depths and seed mixes are included in the conditions of approval.

Loamy 15-17 inch PZ NP:

This site occurs on land nearly level up to 50% slopes. Landform: Hill slopes with assoc. alluvial fans & stream terraces. The soils of this site are deep to moderately deep (greater than 20 inch to bedrock), well-drained and moderately permeable. Layers of the soil most influential to the plant community vary from 3 to 6 inches thick. These layers consist of the A horizon with very fine sandy loam, loam, or silt loam texture and may also include the upper few inches of the B horizon with sandy clay loam, silty clay loam or clay loam texture. For more detailed soil information, see the NRCS Soil Survey WY705.

Mixed Sagebrush/Grass Plant Community:

Historically, this plant community evolved under grazing by bison and a low fire frequency. Currently, it is found under moderate, season-long grazing by livestock in the absence of fire or brush management. Big sagebrush is a significant component of this plant community. A mix of warm and cool-season grasses make up the majority of the understory with the balance made up of annual cool-season grasses, and miscellaneous forbs. Dominant grasses include needleandthread, western wheatgrass, little bluestem and green needlegrass. Grasses of secondary importance include blue grama, prairie junegrass, and Sandberg bluegrass. Forbs commonly found in this plant community include plains wallflower, hairy goldaster, slimflower scurfpea, and scarlet globemallow. Sagebrush canopy ranges from 20% to 30%. Fringed sagewort is commonly found. Plains pricklypear can also occur. When compared to the Historic Climax Plant Community, sagebrush and blue grama have increased. Production of cool-season grasses, particularly green needlegrass, has been reduced. The cool-season mid-grasses are protected by the sagebrush canopy, but this protection makes them unavailable for grazing. Cheatgrass (downy brome) has invaded the site. The overstory of sagebrush and understory of grass and forbs provide a diverse plant community that will support domestic livestock and wildlife such as mule deer and antelope. This plant community is resistant to change. A significant reduction of big sagebrush can only be accomplished through fire or brush management. The herbaceous species present are well adapted to grazing; however,

species composition can be altered through long-term overgrazing. If the herbaceous component is intact, it tends to be resilient if the disturbance is not long-term.

Lowland 15-17 inch PZ NP:
This site is on nearly level land adjacent to some streams - here it is about 0.61 acres at the proposed crossing of the Little Powder River. Landform: alluvial fans, drainage ways & stream terraces. The soils of this site are deep and very deep well drained soils formed in mixed alluvium. These soils have moderate permeability. The surface soil will be highly variable and vary from 2 to 8 inches in thickness. Layers of the soil most influential to the plant community vary from 3 to 6 inches thick. The surface soil will be one or more of the following textures: very fine sandy loam, fine sandy loam, sandy loam, loam, silt loam, clay loam, clay, or silty clay. A fluctuating water table occurs in these areas and ranges from 1 to 5 feet but is usually deeper than 3 feet. The main soil limitations include: depth to water table. For more detailed soil information, see the NRCS Soil Survey WY705.

Rhizomatous Wheatgrass Plant Community:
This plant community is the result of haying. The site is dominated by western wheatgrass with some green needlegrass. The overstory is mature cottonwoods. When compared to the Historic Climax Plant Community this site has lost much of its diversity. Woody vegetation is mainly mature cottonwoods. There are few forbs. The soil is protected by western wheatgrass sod. The soil of this site is protected from erosion. The biotic community is restricted by the lack of diversity. Watershed values are protected due to the lack of steep slopes on this site.

Sandy 15-17 inch PZ NP:
This site occurs on nearly level to 50% slopes. Landform: Alluvial fans, hillsides, plateau, ridges & stream terraces. The soils of this site are moderately deep (greater than 20 inches to bedrock) to very deep, well-drained soils that formed in alluvium or alluvium over residuum. These soils have moderate, moderately rapid, or rapid permeability. The surface soil will vary from 3 to 6 inches deep and have one of the following textures: fine sandy loam, sandy loam, or loamy very fine sand. Coarser top soils may be included if underlain by finer textured subsoils. Layers of the soil most influential to the plant community vary from 3 to 6 inches thick. The main soil limitations include: low water holding capacity and high wind erosion potential. For more detailed soil information, see the NRCS Soil Survey WY705.

Needleandthread, Prairie sandreed Plant Community:
The interpretive plant community is the Historic Climax Plant Community. This site evolved with grazing by large herbivores and is well suited for grazing by domestic livestock. Potential vegetation is about 80% grasses or grass-like plants, 10% forbs, and 10% woody plants. The site is a mix of warm and cool season midgrasses. The major grasses include needleandthread, prairie sandreed, little bluestem, and Indian ricegrass. Other grasses occurring on the site include rhizomatous wheatgrasses, Sandberg bluegrass, blue grama, and threadleaf sedge. Silver sagebrush is a conspicuous element here; it occurs in a mosaic pattern, and makes up 5-10% of the annual production. The site is stable and well adapted to the Northern Great Plains climatic conditions. The diversity in plant species allow for high drought resistance. This is a sustainable plant community (site/soil stability, watershed function, and biologic integrity).

3.7. Water Resources

3.7.1. Groundwater

The historical use for groundwater in this area was for stock or domestic water. A search of the WSEO Ground Water Rights Database showed 5 water wells that are designated as stock water wells ranging in depth from 605 to 1160 feet and an additional well that has a designation of miscellaneous (MIS) within 1 mile of the Boardman Federal #1-30 location. For additional information on groundwater, refer to the PRB FEIS, pp. 3-1 to 3-36. WDEQ assumed primacy from U.S. Environmental Protection Agency for maintaining Wyoming's water quality. The Wyoming State Engineer's Office (WSEO) has authority for

regulating water rights issues and permitting impoundments for the containment of the State's surface waters. The Wyoming Oil and Gas Conservation Commission (WYOGCC) has authority for permitting and bonding off channel pits located over state and fee minerals.

3.7.2. Surface Water

The Boardman Federal #1-30 project area is adjacent to an intermittent drainage - a tributary to the Little Powder River. Most of the project and foreseeable activity area drainages are ephemeral (flowing only in response to a precipitation event or snow melt) to intermittent (flowing only at certain times of the year when it receives water from alluvial groundwater, springs, or other surface source – PRB FEIS, Glossary). The channels are primarily well vegetated grassy swales, without defined bed and bank. See generally the PRB FEIS for a surface water quality discussion, pp. 3-48 to 3-49. The onsite inspection and a search using geographic information systems (GIS) and did not find any natural springs within a 1 mile radius of the proposed well. For information on surface water refer to the PRB FEIS, pp. 3-36 to 3-56.

3.8. Minerals – Leasables; Locatables; Salables

The area has had historic conventional oil and gas exploration and production. CBNG development has not occurred within 1 mile of the project area. There are 7 wells within the 1 mile-consideration of cumulative effects area for this proposal. All 7 wells are plugged and abandoned; refer above to Appendix A, Table 3.1. Gravel is likely the only other mineral resource present.

3.9. Wetlands/Riparian

Boardman Federal #1-30 project and the foreseeable activity areas are adjacent to an intermittent drainage - tributary to the Little Powder River. The ephemeral drainages have gentle slope, with well vegetated bottoms and small head-cut features. The well location is approximately 1.54 miles from the Little Powder River. The existing bridge over the Little Powder River is inadequately built to accommodate the rig and ADT due to age and weight limitations. The PRB FEIS discussed the affected environment for the Little Powder River Basin, on pp. 3-166 and 3-167. Species of fish known to occur in the Little Powder River is discussed in the PRB FEIS affected environment section, on pp. 3-156 to 3-158.

3.10. Invasive and Noxious Species

Roff discovered the following state-listed noxious weeds and invasive plant infestations from an inventory of maps and/or databases or during field investigation as follows:

- Canada Thistle
- Russian Knapweed
- Buffalobur
- Common Cocklebur
- Leafy Spurge
- Whitetop
- Bindweed

Cheatgrass or downy brome (*Bromus tectorum*) and to a lesser extent, Japanese brome (*B. japonicus*) are known to exist in forseeable activity and project areas. These species are found in high densities and numerous locations in NE Wyoming.

3.11. Fish and Wildlife

The PRB FEIS identified wildlife species occurring in the PRB, pp. 3-113 to 3-206. BLM performed a habitat assessment in the project area on July 29, 2013. The biologist evaluated impacts to wildlife resources and recommended project modifications where wildlife issues arose. BLM also consulted databases compiled and managed by BLM BFO wildlife staff, the PRB FEIS, WGFD datasets, and the Wyoming Natural Diversity Database (WYNDD) to evaluate the affected environment for wildlife species that may occur in the foreseeable activity and project areas. Western Land Services (WLS)

provided a wildlife and habitat report (2013). Site specific information is described below for known species suspected to occur in the areas as depicted in Appendix A, Table W.1, and Table W.2. They also describe the site specific affected environment.

3.11.1. Big Game

The big game species occurring in the project area are pronghorn (*Antilocapra americana*), white-tailed deer (*Odocoileus virginianus*), and mule deer (*Odocoileus hemionus*). The PRB FEIS discussed the affected environment for pronghorn, mule deer, and white-tailed deer, on pp. 3-117 to 3-122, pp. 3-127 to 3-132, 3-122 to 3-127, and 3-132 to 3-140, respectively.

3.11.2. Raptors

The PRB FEIS discussed the affected environment for raptors, pp. 3-141 to 3-148. Most raptor species nest in a variety of habitats including (but not limited to): native and non-native grasslands, agricultural lands, live and dead trees, cliff faces, rock outcrops, and tree cavities. Suitable nesting habitat is present in the project area. No raptor nests are located within 0.5 mile from the proposed project (WLS 2013).

3.11.3. Migratory Birds

Migratory birds are birds that migrate for breeding and foraging at some point in the year. The BLM-Fish and Wildlife Service (FWS) Memorandum of Understanding (MOU) (2010) promotes the conservation of migratory birds, complying with Executive Order 13186 (Federal Register V. 66, No. 11). BLM must include migratory birds in every NEPA analysis of actions that have potential to affect migratory bird species of concern to fulfill obligations under the Migratory Bird Treaty Act (MBTA). The MBTA (and Bald and Golden Eagle Protection Act (BGEPA)) are strict liability statutes so require no intent to harm migratory birds through prosecuting a taking. Recent prosecutions or settlements in Wyoming and the West cost companies millions of dollars in fines and restitution (which was usually retrofitting powerlines to discourage perching to minimize electrocution or shielding ponds holding toxic substances). BLM encourages voluntary design features and conservation measures supporting migratory bird conservation, in addition to appropriate restrictions.

A wide variety of migratory birds occur in the forseeable activity and project areas at some time in the year. Many species that are of high management concern use shrub-steppe and shortgrass prairie areas for their primary breeding habitats (Saab and Rich 1997). Nationally, grassland and shrubland birds declined more consistently than any other ecological association of birds in the last 30 years (WGFD 2009). The WGFD Wyoming Bird Conservation Plan (Nicholoff 2003) identified 3 groups of high-priority bird species in Wyoming: Level I – those that clearly need conservation action, Level II – species where the focus is on monitoring, rather than active conservation, and Level III – species that are not a high priority but are of local interest. (Shrub-steppe vegetation dominates the areas. Species that may occur in these vegetation types in northeast Wyoming, according to the Wyoming Bird Conservation Plan, appear Table 3.1., grouped by level as identified in the plan.

Some migratory species are also BLM special status (sensitive) species. Those suspected occurring in the areas are: *Baird's sparrow, Brewer's sparrow, loggerhead shrike, long-billed curlew, sage sparrow, and sage thrasher*. The PRB FEIS discussed the affected environment for migratory birds, pp. 3-150 to 3-153.

Table 3.1. Migratory Birds in Shrub-steppe Habitat, NE Wyoming (Nicholoff 2003)

Level	Species	WY BLM Sensitive	Species	WY BLM Sensitive
Level I	Brewer's sparrow	Yes	McCown's longspur	No
	Ferruginous hawk	Yes	Sage sparrow	Yes

Level	Species	WY BLM Sensitive	Species	WY BLM Sensitive
Level II	Lark bunting	No	Sage thrasher	Yes
	Lark sparrow	No	Vesper sparrow	No
	Loggerhead shrike	Yes		
Level III	Common poorwill	No	Say's phoebe	No

3.11.4. Threatened, Endangered, Candidate, Special Status (Sensitive) Species

The Buffalo BLM receives a species list periodically from the FWS concerning threatened, endangered, proposed, and candidate species. The 2013 list included Ute Ladies'-tresses orchid (threatened) and Greater Sage-Grouse (candidate). In addition to the listed species, the FWS letter also included migratory birds and wetland/riparian habitats. Habitat for Ute Ladies'-tresses orchid does not occur within the project area and the species not likely to occur.

3.11.5. Candidate Species - Greater Sage-Grouse (GSG)

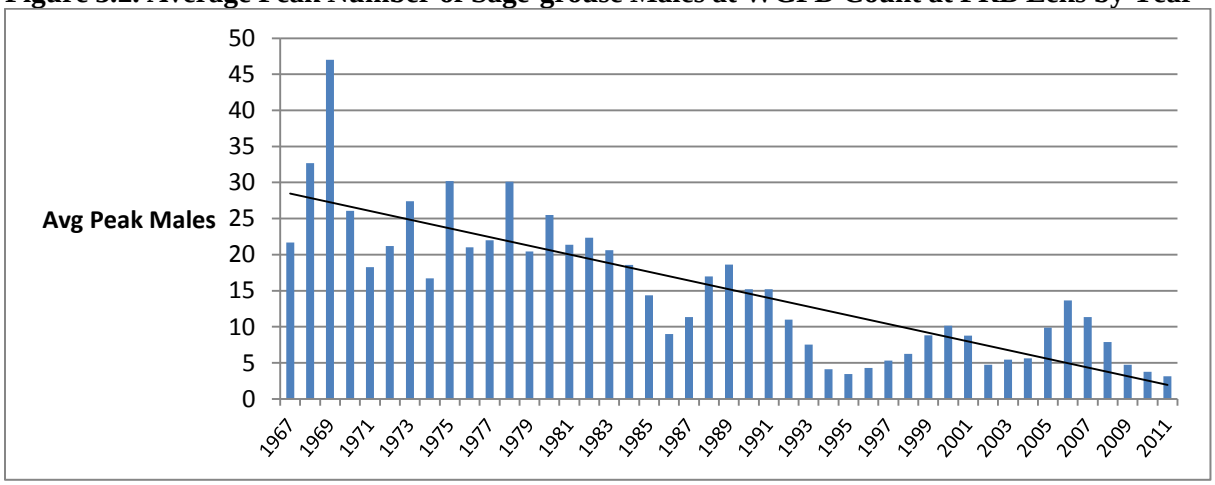
Suitable GSG habitat (as defined in Soehn, et al., 2001), is present in the proposed disturbance area. No leks are within 2 miles of the foreseeable activity and proposed project areas. The PRB FEIS has a detailed discussion on GSG ecology and habitat, pp. 3-194 to 3-199. Subsequently the FWS determined the GSG warrants federal listing as threatened across its range, but precluded listing due to other higher priority listing actions, 75 Fed. Reg. 13910 to 14014, Mar. 23, 2010; 75 Fed. Reg. 69222 to 69294, Nov. 10, 2010. GSG are a WY BLM special status (sensitive) species (SSS) and a WGFD species of greatest conservation need because of population decline and ongoing habitat loss. The 2012 population viability analysis for the Northeast Wyoming GSG found there remains a viable population of GSG in the PRB (Taylor et al. 2012). However, threats from energy development and West Nile virus (WNv) are impacting future viability (Taylor et al. 2012). The BLM IM WY-2012-019 establishes interim management policies for proposed activities on BLM-administered lands, including federal mineral estate, until RMP updates are complete.

In its *Recommendations for Development of Oil and Gas Resources within Important Wildlife Habitats* (2009), WGFD categorized impacts to GSG by number of well pad locations per square mile within 2 miles of a lek and within identified nesting/brood-rearing habitats greater than 2 miles from a lek. Moderate impacts occur when well density is between 1 and 2 well pad locations per square mile or where there is less than 20 acres of disturbance per square mile. High impacts occur when well density is between 2 and 3 well pad locations per square mile or when there are between 20 and 60 acres of disturbance per square mile. Extreme impacts occur when well density exceeds 3 well pad locations per square mile or when there are greater than 60 acres of disturbance per square mile.

The GSG population in northeast Wyoming exhibited a steady long term downward trend, as measured by lek attendance (WGFD 2008b). Figure 3.1, below illustrates a 10-year cycle of periodic highs and lows. Each subsequent population peak is lower than the previous peak. The research described below suggests that these declines may be a result, in part, of CBNG development in this region of Wyoming and that the leks in the cumulative impact assessment area are experiencing similar declines.

Research shows that declines in lek attendance correlate with oil and gas development. Projections show in a typical PRB landscape that energy development within 2 miles of leks reduces the average probability of lek persistence from 87% to 5% percent (Walker et al. 2007). Several studies showed that well density is a useful metric for evaluating impacts to GSG, as measured by declines in lek attendance (Braun et al. 2002, Holloran et al. 2005, and Walker et al. 2007). These studies indicated that oil or gas development exceeding approximately 1 well pad per square mile, resulted in calculable impacts on breeding populations, as measured by the number of male GSG attending leks (State Wildlife Agencies' Ad Hoc Committee for Sage-Grouse and Oil and Gas Development 2008).

Figure 3.2. Average Peak Number of Sage-grouse Males at WGFD Count at PRB Leks by Year



3.11.6. Special Status (Sensitive) Species (SSS)

The PRB FEIS discussed the affected environment for SSS, p. 3-174 to 201. The authority for the SSS comes from the ESA, as amended; Title II of the Sikes Act, as amended; the FLPMA; Department Manual 235.1.1A and BLM Manual 6840. Table W in Appendix A, lists those SSS that may occur in the project area. The Table also includes a brief description of the habitat requirements for each species. Wyoming BLM annually updates its list of SSS to focus management to maintain habitats to preclude listing as a threatened or endangered species. The policy goals are: maintaining vulnerable species and habitat components in functional BLM ecosystems; ensuring sensitive species are considered in land management decisions; preventing a need for species listing under the Endangered Species Act (ESA); and prioritizing needed conservation work with an emphasis on habitat. Wyoming BLM updates SSS on its website: http://www.blm.gov/wy/st/en/programs/Wildlife.html. BLM discusses those SSS impacted beyond the level analyzed in the PRB FEIS, below.

3.11.6.1. Loggerhead Shrike

The PRB FEIS discussed the affected environment for loggerhead shrike, p. 3-187. Sagebrush grasslands and juniper in the project area provide suitable nesting habitat for loggerhead shrikes. Biologists suspect the species occurs in the PRB.

3.11.6.2. Sage Thrasher

The PRB FEIS discussed the affected environment for sage thrasher, pp. 3-199 to 3-200. Sagebrush grasslands in the project area provide suitable nesting habitat for sage thrasher.

3.11.6.3. Brewer's Sparrow

The PRB FEIS discussed the affected environment for Brewer's sparrow, p. 3-200. Sagebrush grassland areas in the foreseeable activity and project areas provide suitable nesting habitat for Brewer's sparrows, and the species is suspected to occur.

3.11.6.4. Baird's Sparrow

The PRB FEIS discussed the affected environment for Baird's sparrow, p. 3-188. Grassland areas in the foreseeable activity and project areas may provide suitable nesting habitat for Baird's sparrows.

3.12. Cultural Resources

In accordance with section 106 of the National Historic Preservation Act, BLM must consider impacts to historic properties (sites that are eligible for or listed on the National Register of Historic Places (NRHP)). For an overview of cultural resources that are found in the planning area, refer to the Draft Cultural Class

I Regional Overview, Buffalo Field Office (BLM, 2010). A Class III (intensive) cultural resource inventory (BFO project no. 70130113) was performed to locate specific historic properties which may be impacted by the foreseeable activity and proposal. No cultural resources in the area.

3.13. Rights-of-Way, Corridors, Transportation, and Access

There is an existing right-of-way for this oil and gas road issued to Ranch Oil Company for the Dove Federal Well Site. BLM analyzed the existing main road access in 1985. BLM will require a joint maintenance agreement between Ranch Oil Company and Roff to maintain the road.

4. ENVIRONMENTAL EFFECTS

No Action Alternative. BLM analyzed the no action alternative as Alternative 3 in the PRB FEIS and it finds that its descriptions and analysis remain valid for the foreseeable activity and project areas. The areas have about 45 acres of surface disturbance from existing roads, well pads, and oil and gas facilities. Under the no action alternative, on-going well field operations would continue as would the development of any approved single and multi-well pads. The production and the drilling and completion of any new wells would result in noise and human presence that could affect resources in the areas; these effects could include the disruption of wildlife, the dispersal of noxious and invasive weed species, and dust effects from traffic on unpaved roads. Present fluid mineral development in the PRB is under half of that envisioned and analyzed in the PRB FEIS. There is only a remote potential for significant effects above those identified in the PRB FEIS to resource issues as a result of implementing the no action alternative.

4.1. Alternative B

This section describes the environmental effects of the proposal, alternative B. The effects analysis addresses the direct and indirect effects of implementing the proposed well, the cumulative effects of the proposed well combined with reasonably foreseeable federal and non-federal activities, identifies and analyzes mitigation measures (COAs), and discloses any residual effects remaining following mitigation.

4.2. Air Quality

In the project area, air quality impacts would occur during construction (due to surface disturbance by earth-moving equipment, vehicle traffic fugitive dust, well testing, as well as drilling rig and vehicle engine exhaust) and production (including well production equipment, booster and pipeline compression engine exhaust). The amount of air pollutant emissions during construction would be controlled by watering disturbed soils, and by air pollutant emission limitations imposed by applicable air quality regulatory agencies. Air quality impacts modeled in the PRB FEIS and Cumulative Air Quality Effects, 2009 concluded that PRB projected fluid and solid development would not violate state, tribal, or federal air quality standards and this project is well within the projected development parameters.

4.3. Soils and Vegetation

4.3.1. Direct and Indirect Effects

Anticipated impacts occurring include soil rutting and mixing, compaction, increased erosion potential, and loss of soil productivity. The most notable impacts would occur in association with the construction of well pad and road. Construction of these facilities requires grading and leveling, with the greatest level of effort required on more steeply sloping areas. Construction activities mix the soil profiles with a corresponding loss of soil structure. Mixing may result in removal, dilution, or relocation of organic matter and nutrients to depths where it would be unavailable for vegetative use. Less desirable inorganic compounds such as carbonates, salts, or weathered materials could be relocated and have a negative impact on revegetation.

Soils compaction results from the construction of wells and associated facilities, continued vehicle and foot traffic as well as operational activities. Factors affecting compaction include soil texture, moisture,

organic matter, clay content and type, pressure exerted, and the number of passes by vehicle traffic or machinery. Compaction leads to a loss of soil structure; decreased infiltration, permeability, and soil aeration; as well as increased runoff and erosion. Increased erosion can lead to a decrease in soil fertility and an increase in sedimentation. The duration and intensity of these impacts would vary according to the type of construction activity to be completed and the inherent characteristics of the soils to be impacted. The potential for erosion would increase through the loss of vegetation cover and soil structure as compared to an undisturbed state. Soil productivity would decrease, primarily as a result of profile mixing and compaction along with the loss in vegetative cover. These impacts would begin immediately as the soils would be subjected to grading and construction activities and impacts would continue for the term of operations. The impacts on soils would move to a steady state as construction activities were completed and well production/maintenance operations begin.

Roff proposed an engineered section of road to gain access to the well due to having to construct a culvert crossing to gain access over the Little Powder River. Roff is responsible for having a licensed professional engineer certify that the construction of culvert crossing meets the design criteria and are built to Bureau standards. These engineered segment should be completed, including all site specific design criteria identified within the engineered design, before the drilling rig or other drilling equipment moves onto the pad in order to protect soils, river, and for safety. Construction completed to BLM approvable standards will reduce down drainage sedimentation, erosion, and scouring caused by frequent failure of in-channel structures.

Roff and BLM recommended a Shallow/ Loamy/Clayey seed mix for the Boardman Federal #1-30 project based on soil map unit types, the dominant ecological sites found in the foreseeable activity and project area, landowner input, and the mixing of soil horizons in disturbed areas.

Sandy/Loamy/Clayey Ecological Site Seed Mix Species	% in Mix	Lbs PLS*
Thickspike Wheatgrass (Elymus lanceolatus ssp. lanceolatus)	25	3.0
Prairie sandreed (Calamovilfa longifolia)	35	4.2
Indian ricegrass (Achnatherum hymenoides)	25	3.0
Prairie coneflower (Ratibida columnifera)	5	0.6
Green needlegrass (Nassella viridula)	5	0.6
Blue flax (Linum lewisii)	5	0.6
Totals	**100%**	**12 lbs/acre**

*PLS = pure live seed (This seeding rate has not been doubled)

Double if broadcast seeding. This is a recommended seed mix based on the native plant species listed in the NRCS Ecological Site descriptions, U.W. College of Ag., and seed market availability. A site-specific inventory will allow the resource specialist to suggest the most appropriate species, percent composition, and seeding rate for reclamation purposes.

The BLM will evaluate reclamation success using the requirements in the BLM State Wide Reclamation Policy found at: http://www.blm.gov/wy/st/en/programs/reclamation.

4.3.2. Soils Susceptible to Erosion

Loamy and Sandy Ecological Sites Susceptible to Erosion: Boardman Federal #1-30 well pad/access road (T57N, R70W, Sec. 30 SESW) will impact 2.41 acres, during drilling and construction, of loamy and sandy ecological sites and will require expedient reclamation. This soil was found at the NOS onsite inspection on portions of the foreseeable activity and proposal areas, and access. Topsoil depths averaged 3-6 inches. Without proper and timely re-vegetation practices the soils readily erode due to wind and water action. The invasion of prickly pear and cheat grass indicates some deterioration from identified

transition state. Wind and water erosion could be high since there is approximately as little as 3-6 inches organic matter in the soil. Reclamation could be difficult without extra mitigation. A COA will be applied to insure that the surface is stabilized to protect from wind/water erosion within 30 days of initial construction.

4.3.3. Limited Reclamation Potential (LRP)

4.3.3.1. Miscellaneous Areas

None of the proposal is within a defined LRP. Refer to Appendix A, Figure 3.1. Boardman Federal #1-30 Soils Map - illustrating clearly that the proponent will not impact any LRP sites. (Later site specific determinations are necessary to address the specifics in the foreseeable activity area.)

4.3.3.2. Slopes in Excess of 25 Percent

BLM's onsite reconnaissance found no slopes exceeding 25% will be impacted by the proposal. Refer to Appendix A, Figure 3.1. Boardman Federal #1-30 Soils Map - illustrating clearly that the proponent will not impact any slopes greater than 25%. (Later site specific determinations are necessary to address the specifics in the foreseeable activity area.)

4.3.3.3. Cumulative Effects

For details on expected cumulative impacts, refer to the referenced PRB FEIS, Chapter 4. The PRB FEIS defines the designation of the duration of disturbance (pp. 4-1 and 4-151). Most soil disturbances would be short term impacts with expedient interim reclamation and site stabilization. (Later site specific determinations are necessary to address the specifics in the foreseeable activity area.)

4.3.3.4. Mitigation Measures

Mitigation measures, surface upgrades, applicant committed measures, and adherence to COAs and the WY Reclamation Policy would help to mitigate or reduce the impacts described above. In areas of erosive soils BLM will consider requesting a plan to stabilize topsoil within a 30 day period from the start of construction in those areas. Roff and BLM should apply the following mitigation to reduce impacts to soils and vegetation from surface disturbance.

The Boardman Federal #1-30 well and access route may impact sandy ecological site (soil map unit symbol 334). The operator will be required to stabilize the impacted surface area within 30 days of the beginning of construction. The areas identified are as follows:

- Roff worked closely with the BLM and landowner to develop a seed mix that will fit the needs for the sandy ecological site (map unit symbol 334 map name Sandy (Sy) 15-17 NP).
- For safety of travel, to reduce rutting and increase traction, place a minimum average of 4 inches of aggregate on road segments where grades exceed 8%.
- To protect erodible soils, all engineered/template road segments should be completed, including any culverts, low water crossings and required surfacing, before the drilling rig or other drilling equipment moves onto the pad.
- A company licensed professional engineer will certify that the construction of engineered roads meet the design criteria and are built Bureau standards.
- No fill material shall impede the flow to the drainage adjacent to the Boardman Federal #1-30 well pad.
- The BLM will evaluate reclamation success using the requirements set forth in the WY BLM State Wide Reclamation Policy, revised 2011, and incorporated herein.
- Culverts will be at the appropriate locations for streams and channels crossed by roads specified in the BLM Manual 9112, Bridges and Major Culverts and Manual 9113, Roads. Streams will be perpendicular to flow, where possible, and all design of stream crossing structures will carry the 25-year discharge event or other capacities as directed by the BLM.

4.3.3.5. Residual Effects

Residual effects across the POD would include a long-term loss of soil productivity associated with well pad and road. The PRB FEIS identified residual effects (p. 4-408) such as the loss of vegetative cover, despite expedient reclamation, for several years until reclamation is successfully established.

4.3.4. Vegetation and Ecological Sites

4.3.4.1. Direct and Indirect Effects

The PRB FEIS discusses most direct and indirect effects to ecological sites and vegetation (p. 4-153 to 4-164). The foreseeable activity and proposed action would impact the common plant communities that occur on the site and the transition between the communities. Other impacts anticipated to occur include those in the direct and indirect effects listed above under soils section. Direct effects to ecological sites would occur from ground disturbance caused by construction of well pad and road. Short term effects would occur where vegetated areas are disturbed but later reclaimed within 1 to 3 years of the initial disturbance. Long-term effects would occur where well pad and road, or other semi-permanent facilities would result in loss of vegetation and prevent reclamation for the life of the project.

4.3.4.2. Cumulative Effects

The PRB FEIS discusses the cumulative effects to ecological sites (pp. 4-153 to 4-172). Cumulative effects to ecological sites include the further alteration of disturbance regimes from the increased disturbance, increase in noxious weeds, and alterations in vegetation community's diversity and cover.

4.3.4.3. Mitigation Measures

Implementation of the mitigation measures in the COAs for the Boardman Federal #1-30 well and its infrastructure, and operator initiated measures including the Integrated Weed and Pest Management Plan and the SUP (specifically Plans for Reclamation of the Surface) will reduce surface disturbance impacts to ecological sites and vegetation. See the AR. BLM, Roff, and landowner selected a seed mix which contains native grasses and forbs could restore disturbed areas to properly functioning vegetation communities with the exception of sage-brush since it's not in the current seed mixes. BLM offers the same protections to privately owned surfaces that are disturbed as a result of federal mineral development as those administered by the BLM. Therefore BLM developed a site specific seed mix for the access corridor for the proposal. Roff will apply these mitigation measures to entire project including the sandy ecological site (map unit symbol 334, map name Sandy (Sy) 15-17 NP) which will require expedient reclamation. BLM can only require their use on BLM surface. The surface owner selects the seed mix for private land that may be more beneficial for grazing, however the landowner worked with BLM and the operator to develop a seed mix that benefits both wildlife and grazing. The operator will follow the proposed Reclamation Plan and adapt to changing conditions and technologies (Section 10 of the SUP).

4.3.4.4. Residual Effects

Residual effects were also identified in the PRB FEIS, p. 4-408 such as the loss of vegetative cover, despite expedient reclamation, for several years until reclamation is successfully established. The alteration of biodiversity of ecological sites could result from disturbance, alterations in vegetation in reclaimed areas, and the spread and establishment of weed species.

4.4. Water Resources

Adherence to the drilling COAs, the setting of casing at appropriate depths, following safe remedial procedures in the event of casing failure, and using proper cementing procedures should protect fresh water aquifers above the drilling target zone. Compliance with the drilling and completion plans and Onshore Oil and Gas Orders Nos. 2 and 7 will ensure there is no adverse impact on ground water. The volume of water produced by this federal mineral development is unknowable at the time of permitting.

The depth to the Fox Hills formation, the deepest penetrated fresh water zone in the PRB is estimated to be 1,515 feet. This aquifer lies well above the target formation. Surface casing will be set at 800feet and cemented back to surface. The operator will verify that there is competent cement across the aquifer, from 100 feet above to 100 feet below the Fox Hills formation. This will ensure that ground water will not be adversely impacted by well drilling and completion operations.

Roff will have to produce the well for a time to be able to estimate the volume and quantity of water production. To comply with Onshore Order Oil and Gas Order No. 7 Disposal of Produced Water, Roff will submit a Sundry to the BLM within 90 days of first production which includes a representative water analysis and the final proposal for water management. The quality of water produced in association with conventional oil and gas historically was such that surface discharge would not be possible without treatment. Initial water production is quite low in most cases. There are 3 common alternatives for water management: re-injection, deep disposal, or disposal into pits. All alternatives would be protective of groundwater resources when performed in compliance with state and federal regulations.

4.5. Minerals – Leasables; Locatables; Salables

No impact.

4.6. Vegetation

(See, Soils, 4.2, above)

4.7. Wetland/Riparian

The operator will build a culvert crossing adjacent to the existing bridge crossing on the Little Powder River (per landowner request and for safety). The existing bridge is inadequately built to accommodate the rig and ADT due to age and weight limitations. The area that will be disturbed during construction has a defined channel with hay meadows adjacent on either side. Roff committed to expedient stabilization and reclamation of the new culvert crossing. Roff has designs made for the crossing that meet BLM standards and insure the culvert crossing will meet safety requirements. The existing bridge is not adequately built to accommodate the rig and associated traffic due to age and weight limitations. The area that will be disturbed during construction has a defined channel with hay meadows adjacent on either side. The operator has committed to expedient stabilization and reclamation of the new culvert crossing. Roff has had designs made for the crossing that meet BLM standards and insure the culvert crossing will meet all safety requirements. Fish may not be able to move throughout the water shed if the culvert should fail or erosion occurs on the downstream side of the culvert. BLM recommends the operator tocoordinate with WGFD to insure proper function of the culvert for fish passage.

Watershed values, including natural drainages, would not be adversely impacted by the proposal with properly applied mitigation. Other water resources will not be adversely impacted by the proposal. Possible contamination effects of fresh water aquifers will be reduced through the use of tested casing, by setting casing at appropriate depths and by following safe repair procedures in the event of casing failure. Other downhole well operations are expected to cause minimal impacts using standard engineering practices.

The cumulative impacts of the foreseeable activity and proposal, when considered with other existing and development in the areas are not expected to be significant. The application of mitigation measures will ensure that the incremental impacts of this well, when considered with any existing development are insignificant. For more information on cumulative impacts, please refer to the PRB FEIS pp 4-172 and 4-173. Produced oil will be stored on location and hauled off by trucks on existing road networks. This proposal impacts no wetland areas.

4.8. Invasive Species

4.8.1. Direct and Indirect Effects

Roff committed to the control of noxious weeds and species of concern using the following measures identified in their Integrated Pest Management Plan (IPMP): control methods, including frequency; preventive practices; and education. Cheatgrass or downy brome (*Bromus tectorum*) and to a lesser extent, Japanese brome (*B. japonicus*) exist in such high densities and numerous locations throughout NE Wyoming that a control program is not presently feasible. The use of existing facilities along with the surface disturbance associated with construction of proposed access roads, pipelines, and related facilities would present opportunities for weed invasion and spread. The activities related to the performance of the proposal would create a favorable environment for the establishment and spread of noxious weeds/invasive plants such as salt cedar, Canada thistle, and perennial pepperweed. However, mitigation as required by BLM applied COAs will reduce potential impacts from noxious weeds and invasive plants.

4.8.2. Cumulative Effects

The activities related to the performance of the foreseeable activity or the proposed project would create a favorable environment for the establishment and spread of noxious weeds/invasive plants.

4.8.3. Mitigation Measures

The operator committed to the control of noxious weeds and species of concern using the following measures identified in their Integrated Pest Management Plan (IPMP):

1. Control Methods include cultural, physical, chemical, and biological methods:
   Cultural methods include prompt reseeding and revegetation of areas of disturbed soils with certified weed free seed mix, minimizing soil disturbance, weed free mulch for erosion control and favored growth of grasses and alfalfa through good management. Physical methods include hand pulling, digging or root cutting if areas are small or infestations are new, prescribed burning in conjunction with herbicides may also be effective for Canada Thistle and Leafy Spurge. Chemical methods include the use of herbicides, done in accordance with the existing Surface Use Agreement with the private surface owner. Biological methods include the use of stem and root boring beetle, four root mining beetles and a shoot tip gall midge have shown impressive results on Leafy Spurge.
2. Preventive practices: Certified weed-free seed mixtures will be used for re-seeding.
3. Education: True Oil will provide periodic weed education and awareness programs for its employees and contractors through the county weed districts and federal agencies. Field employees and contractors will be notified of known noxious weeds or weeds of concern in the project area.

4.8.4. Residual Effects

Control efforts by the operator are limited to the surface disturbance associated the implementation of the project. Cheat grass and other invasive species that are present within non-physically disturbed areas of the project area are anticipated to continue to spread unless control efforts are expanded. Cheatgrass and to a lesser extent, Japanese brome (B. japonicus) are found in such high densities and numerous locations throughout NE Wyoming that a control program is not considered feasible at this time; these annual bromes would continue to be found within the project area.

4.9. Fish and Wildlife

4.9.1. Big Game

4.9.1.1. Direct and Indirect Effects

The PRB FEIS analyzed impacts to big game, pp. 4-181 to 4-210. As discussed in that document, impacts to mule deer may occur through alterations in hunting and/or poaching, increased vehicle collisions, harassment and displacement, increased noise, increased dust, alterations in nutritional status and reproductive success, increased fragmentation, loss or degradation of habitats, reduction in habitat effectiveness, and declines in populations. The current populations for pronghorn, white-tailed deer, mule deer, and elk are above, above, below, and above WGFD goals, respectively.

4.9.1.2. Cumulative Effects

Refer to the PRB FEIS for big game cumulative impacts, p. 4-211.

4.9.2. Non-Game

4.9.2.1. Raptors

4.9.2.1.1. Direct and Indirect Effects

The PRB FEIS analyzed direct and indirect effects to raptors, pp. 4-216 to 4-221.

4.9.2.1.2. Cumulative Effects

The cumulative effects associated with Alternative B are within the analysis parameters and impacts described in the PRB FEIS. Refer to the PRB FEIS for details on expected cumulative impacts, p. 4-221.

4.9.2.1.3. Mitigation Measures

BLM proposes no mitigation measures for raptors.

4.9.2.1.4. Residual Effects

BLM finds no residual effects to raptors.

4.9.2.2. Migratory Birds

4.9.2.2.1. Direct and Indirect Effects

The PRB FEIS discussed the direct and indirect effect to migratory birds, pp. 4-231 to 4-235. Disturbance of habitat in the project area is likely to impact migratory birds. Native habitats will be lost directly with the construction of wells, roads, and pipelines. The proposed project will remove approximately 4 acres of native habitat for sagebrush-obligate species. Activities will likely displace migratory birds farther than the immediate area of physical disturbance.

4.9.2.2.2. Cumulative Effects

The cumulative effects associated with alternative B (including the foreseeable activity) are within the analysis parameters and impacts described in the PRB FEIS. Refer to the PRB FEIS, p. 4-235, for details on expected cumulative impacts.

4.9.2.2.3. Mitigation Measures

Specific conservation measures to protect migratory birds are not included in the current land use plan, as updated and amended. Although the PRB FEIS ROD addressed the potential impacts from oil and gas development to migratory birds, it did not specifically identify activities to help mitigate those impacts. The RMP is currently under revision, and a change in management for migratory birds is being considered among the alternatives. Until the revision is complete, the BFO will provide project level site-specific analysis of conservation measures implemented for migratory bird protection, and compliance with the MBTA.

BLM provided some level of protection for migratory bird nesting through timing limitations applied to CBNG plans of development for GSG and raptor nesting. Many CBNG projects (consisting of multiple wells) covered large areas that either encompassed GSG nesting habitat or raptor nests. Timing limitations applied as COAs for those projects were likely to also protect migratory birds during the nesting season by effectively limiting the development in a project area during grouse and raptor breeding seasons. Operators were likely to wait to construct facilities until limitations had been lifted for the entire area, in order to cut down on labor costs and difficulties from completing only small portions of the project at a time. With conventional oil projects, where less wells are proposed and development is more complicated, operators will most likely start construction as soon as possible, which could be during the migratory bird nesting season if the proposed area is not within 2 miles of a GSG lek or no active raptor nests are located. The shift in proposed projects from multi-well CBNG projects to single conventional

wells, and in turn reducing secondary protections to migratory birds, constitutes a "change in circumstances" (43 CFR 1610.5-6) that should be addressed at the project level until issues can be resolved in a land use plan.

Nesting in Brewer's sparrows (a BLM SSS) typically occurs mid-May to mid-July. Some young fledge in late July. Sage thrashers (BLM sensitive species) may lay a second clutch of eggs as late as mid-July. Lark sparrows in northern latitudes lay eggs from early May to mid-July (information on breeding habits available on the Birds of North America Online website: http://bna.birds.cornell.edu/bna). GSG timing limitations on surface disturbing activities will mitigate impacts to nesting migratory birds from March 15 to June 30. However, several species of birds, listed above, are likely to still have eggs or nestlings into July. BLM biologists have observed active Brewer's sparrow nests containing eggs during the last week of June. Only a percentage of known nests are active any given year, so the protections for migratory birds from June 30 to July 31 will depend on how many raptor and mountain plover nests are active. The least restrictive measures (in this case only applying GSG timing limitations) are inadequate to protect all nesting migratory birds that may inhabit the project area.

To reduce the likelihood of a "take" under the MBTA, the BLM biologist recommends that pad construction (vegetation removal) occur outside of the breeding season for the greatest quantity of BLM sensitive passerines (May 1- July 31) where suitable nesting habitat for sagebrush obligates is present. This restriction would apply to habitat removal, unless a pre-construction nest search (within approximately 10 days of construction planned May 1-July 31) is completed. If surveys will be conducted, the operator will coordinate with BLM biologists to determine protocol. The nest search will consist of in areas where vegetation will be removed or destroyed. The BLM recommends the Boardman Federal 1-30 well pad and associated infrastructure have timing limitations applied for habitat removal during the nesting season for sagebrush obligate passerines (May 1 to July 31).

The BLM also recommends that measures are taken to ensure that migratory birds are excluded from all facilities that pose a mortality risk, including, but not limited to, heater treaters, flare stacks, secondary containment, and standing water or chemicals where escape may be difficult or hydrocarbons or toxic substances are present.

4.9.2.2.4. Residual Effects

If restrictions on habitat removal, or clearance surveys, are not applied, the BLM would not be in conformance with the MBTA, the BLM-FWS MOU, or BLM IM No. 2013-005. If the restriction on habitat removal is applied, it is unlikely that active nests will be destroyed, as most nestlings will have fledged by August 1. Nests initiated after the first week in July may be destroyed by construction after August 1st. Migratory birds nesting adjacent to the well pad or road may be disturbed by construction and production activities. A timing limitation does nothing to mitigate loss and fragmentation of habitat. Suitability of the project area for migratory birds will be negatively affected due to habitat loss and fragmentation and proximity of human activities associated with oil and gas development.

4.10. Threatened, Endangered, Candidate, Special Status (Sensitive) Species

Based on the last species list for the Buffalo Field Office, dated July 22, 2011, the Ute Ladies'-tresses Orchid is the only listed species requiring an effects determination (ESA Section 7 (2)).

4.10.1. Threatened and Endangered Species

4.10.1.1. Ute Ladies'-Tresses Orchid (ULT)

Based on the last species list for the Buffalo Field Office, dated July 22, 2011, the Ute Ladies'-tresses Orchid is the only listed species requiring an effects determination, ESA Section 7 (2).

4.10.1.1.1. Direct and Indirect Effects

Suitable habitat is not present in the project area and implementation of the proposed project will have "***no effect***" on ULT.

4.10.1.1.2. Cumulative Effects

The PRB FEIS discussed the cumulative effects to ULT, pp. 4-253 to 4-254).

4.10.1.1.3. Mitigation Measures

BLM proposes no mitigation with Alternative B.

4.10.1.1.4. Residual Effects

BLM anticipates no residual effects.

4.10.2. Candidate Species Greater Sage-Grouse (GSG)

4.10.2.2. Direct and Indirect Effects

Implementation of the proposed project or foreseeable activity will impact GSG habitat and individuals. Approximately 4 acres of nesting habitat will be removed from the proposed project. Impacts to GSG are generally a result of loss and fragmentation of sagebrush habitats associated with roads and infrastructure. The *12-Month Findings for Petitions to List the Greater Sage-Grouse (Centrocercus urophasianus) as Threatened or Endangered* (FWS 2010) and chapters 15-21 of Greater Sage-Grouse Ecology and Conservation of a Landscape Species and its Habitats (Knick and Connelly 2011) – both discuss impacts to GSG associated with energy development in detail. Implementation of the project will adversely impact nesting habitat, both through direct loss and avoidance of the area by GSG.

It is the policy of BLM WY to manage GSG habitats consistent with the provisions set forth by the State of Wyoming, and as described in Instruction Memorandum (IM) No. WY-2012-019, Greater Sage-Grouse Habitat Management Policy on Wyoming Bureau of Land Management (BLM) Administered Public Lands Including the Federal Mineral Estate. IM 2012-019 states that for areas outside of core and connectivity habitats, "Surface disturbing and/or disruptive activities are prohibited from March 15–June 30 to protect sage-grouse nesting and early brood rearing habitats within 2 miles of the lek or lek perimeter of any occupied lek located outside core or connectivity areas." The PRB FEIS discussed direct and indirect impacts to GSG in more detail, pp. 4-257 to 4-273.

4.10.2.3. Cumulative Effects

In its *Recommendations for Development of Oil and Gas Resources within Important Wildlife Habitats* (2009), WGFD categorized levels of oil and gas development into thresholds that correspond to moderate, high, and extreme impacts to habitat effectiveness for various species of wildlife, based on well pad densities and acreages of disturbance. All 3 levels of impact result in a loss of habitat function by directly eliminating habitat; disrupting wildlife access to, or use of habitat; or causing avoidance and stress to wildlife. Impacts to GSG are categorized by number of well pad locations per square mile within 2 miles of a lek and within identified nesting/brood-rearing habitats greater than 2 miles from a lek. Moderate impacts occur when well density is between 1 and 2 well pad locations per square mile or where there is less than 20 acres of disturbance per square mile. High impacts occur when well density is between 2 and 3 well pad locations per square mile or when there are between 20 and 60 acres of disturbance per square mile. Extreme impacts occur when well density exceeds 3 well pad locations per square mile or when there are greater than 60 acres of disturbance per square mile. Extreme impacts mean those where the function of an important wildlife habitat is substantially impaired or lost.

Declines in lek attendance associated with oil and gas development may be a result of a suite of factors including avoidance (Holloran et al. 2005, Holloran et al. 2007, Aldridge and Boyce 2007, Walker et al. 2007, Doherty et al. 2008, WGFD 2009), loss and fragmentation of habitat (Connelly et al. 2000, Braun et

al. 2002, Connelly et al. 2004, WGFD 2004a, Rowland et al. 2005, WGFD 2005, Naugle et al. in press), reductions in habitat quality (Braun et al. 2002, WGFD 2003, Connelly et al. 2004, Holloran et al. 2005) and changes in disease mechanisms (Naugle et al. 2004, WGFD 2004b, Walker et al. 2007, Cornish pers. comm.). The BFO Resource Management Plan (BLM 2001) and the PRB FEIS Record of Decision (BLM 2003) included a 2-mile timing limitation on surface-disturbing activities around GSG leks. The 2-mile measure originated with the Western Association of Fish and Wildlife Agencies (WAFWA) (BLM 2004). Wyoming BLM adopted the 2-mile recommendation in 1990 (BLM 1990). The 2-mile recommendation was based on early research which indicated between 59% and 87% of GSG nests were within 2 miles of a lek (BLM 2004). These studies occurred in vast contiguous stands of sagebrush, such as those that occur in Idaho's Snake River plain.

Additional research across more of the GSG's range indicated that nesting may occur much farther than 2 miles from the breeding lek (BLM 2004). Holloran and Anderson (2005), in their Upper Green River Basin study area, reported that only 45% of their GSG hens nested within 1.9 miles of the capture lek. Moynahan and Lindberg (2004) found that only 36% of their GSG hens nested within 1.9 miles of the capture lek. Habitat conditions, and, thus, GSG biology, in the BFO are more similar to Moynahan's north-central Montana study area than the Upper Green River area. Moynahan's study area occurred in mixed-grass prairie and sagebrush steppe, dominated by Wyoming big sagebrush (Moynahan et al. 2007). Recent research in the PRB suggests that impacts to leks from energy development are discernible out to a minimum of 4 miles, and that some leks in this radius were extirpated as a direct result of energy development (Walker et al. 2007, Walker 2008, Naugle et al. *In press*). Based on these studies, the BLM determined that a 2-mile timing limitation is insufficient to reverse the population decline.

A timing limitation does nothing to mitigate loss and fragmentation of habitat and changes in disease mechanisms. Rather than limiting mitigation to only timing restrictions, more effective mitigation strategies may include, at a minimum, burying power lines (Connelly et al. 2000b); minimizing road and well pad construction, vehicle traffic, and industrial noise (Lyon and Anderson 2003, Holloran 2005); and managing produced water to prevent the spread of mosquitoes with the potential to vector West Nile Virus in GSG habitat (Walker et al 2007). Walker et al. (2007) recommend maintaining extensive stands of sagebrush habitat over large areas (at least one mile in size) around leks to ensure GSG persistence. The size of such a no-development buffer would depend on the amount of suitable habitat around the lek and the population impact deemed acceptable. Connelly et al. (2000) recommended locating all energy-related facilities at least 2 miles from active leks.

Several guidance documents are available that recommend practices that would reduce impacts of development on GSG. These include *Northeast Wyoming Sage-Grouse Conservation Plan* (Northeast Wyoming Sage-grouse Working Group 2006), *Sage-Grouse Habitat Management Guidelines for Wyoming* (Bohne et al. 2007), *Recommendations for Development of Oil and Gas Resources within Important Wildlife Habitats* (WGFD 2009), *Bureau of Land Management National Sage-Grouse Habitat Conservation Strategy* (USDI 2004), and *Greater Sage-Grouse Comprehensive Conservation Strategy* (Stiver et al. 2006).

The PRB FEIS (BLM 2003) states that "the synergistic effect of several impacts would likely result in a downward trend for the sage-grouse population, and may contribute to the array of cumulative effects that may lead to its federal listing. Local populations may be extirpated in areas of concentrated development, but viability across the Project Area [PRB] or the entire range of the species is not likely to be compromised (p. 4-270)."

4.10.2.4. Mitigation Effects

BLM proposes no mitigation.

4.10.2.5. Residual Effects

Suitability of the foreseeable activity and project areas for GSG will be negatively affected due to habitat loss and fragmentation and proximity of human activities associated with fluid mineral development.

4.10.3. Special Status (Sensitive) Species (SSS)

BLM supports the policies set forth in sensitive species policy (BLM Manual 6840). BLM Manual 6840.22A states that "The BLM should obtain and use the best available information deemed necessary to evaluate the status of special status species in areas affected by land use plans or other proposed actions and to develop sound conservation practices. Implementation-level planning should consider all site-specific methods and procedures which are needed to bring the species and their habitats to the condition under which the provisions of the ESA are not necessary, current listings under special status species categories are no longer necessary, and future listings under special status species categories would not be necessary." The PRB FEIS discusses impacts to sensitive species on pp. 4-257 to 4-265. BLM analyzed site specific effects to sensitive species below in Sections 4.8.2.2 (migratory birds).

4.11. Cultural Resources

4.11.1. Direct and Indirect Effects

BLM policy states that a decision maker's first choice should be avoidance of historic properties (BLM Manual 8140.06(C)). If historic properties cannot be avoided, mitigation measures must be applied to resolve the adverse effect. No historic properties will be impacted by the foreseeable activity or proposal. Following the State Protocol Between the Wyoming Bureau of Land Management State Director and The Wyoming State Historic Preservation Officer, Section VI(A)(1), the BLM electronically notified the Wyoming State Historic Preservation Officer (SHPO) on September 30, 2013 that no historic properties exist in the area of potential effect (APE). If any cultural values (sites, features or artifacts) are observed during operation, they will be left intact and the Buffalo Field Manager notified. If human remains are noted, the procedures described in Appendix L of the PRB FEIS and ROD must be followed. Further discovery procedures are explained in Standard COA (General)(A)(1).

4.11.2. Cumulative Effects

Construction and development of oil and gas resources impacts cultural resources through ground disturbance, unauthorized collection, and visual intrusion of the setting of historic properties. Destruction of any archeological resource results in fewer opportunities to study of past human life-ways, to study changes in human behavior through time, or to interpret the past to the public. Additionally, these impacts may compromise the aspects of integrity that make a historic property eligible for the National Register of Historic Places. Recording and archiving basic information about archaeological sites and the potential for subsurface cultural materials in the proposed project area may serve to partially mitigate potential cumulative effects to cultural resources.

Fee actions constructed in support of federal actions can result in impacts to historic properties. Oil and gas development on split estate often includes construction of infrastructure that does not require permitting by BLM. Project applicants may integrate infrastructure associated with wells draining fee minerals with wells that require federal approval. BLM has no authority over fee actions, which can impact historic properties. BLM has the authority to modify or deny approval of federal undertakings on private surface, but that authority is limited to the extent of the federal approval. Historic properties on private surface belong to the surface owner and they are not obligated to preserve or protect them. The BLM may go to great lengths to protect a site on private surface from a federal undertaking, but the same site can be legally impacted by the landowner at any time. Archeological inventories reveal the location of sensitive sites and although the BLM is obligated to protect site location data, information can potentially get into the wrong hands resulting in unauthorized artifact collection or vandalism. BLM authorizations that result in new access can inadvertently lead to impacts to sites from increased visitation by the public.

4.11.3. Mitigation Measures

If any cultural values (sites, features or artifacts) are observed during operation, they will be left intact and the Buffalo Field Manager notified. If human remains are noted, the procedures described in Appendix L of the PRB FEIS and ROD must be followed. Further discovery procedures are explained in Standard COA (General)(A)(1).

4.11.4. Residual Effects

During the construction phase, there will be numerous crews working across the project area using heavy construction equipment without the presence of archaeological monitors. Due to the extent of work and the surface disturbance caused by large vehicles, it is possible that unidentified cultural resources can be damaged by construction activities. The increased human presence associated with the construction phase can also lead to unauthorized collection of artifacts or vandalism of historic properties.

5. CONSULTATION/COORDINATION:

BLM consulted or coordinated with the following on this project:

Contact	Organization	Onsite Presence?
Mary Hopkins	WY SHPO	No
Pauline Hope	FWS	No

List of Preparers (BFO unless otherwise noted)

Position/Organization	Name	Position/Organization	Name
NRS/Team Lead	Andy Perez	Archaeologist	Clinton Crago
Supr NRS	Casey Freise	Wildlife Biologist	Scott Jawors
Petroleum Engineer	Mark Thomason	Geologist	Kerry Aggen
LIE	Christine Tellock	Assistant Field Manager	Clark Bennet
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Realty	Amber Haverlock	NEPA Coordinator	John Kelley

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Appendix A. Supporting Tables and Map

Table 2.1. Surface Disturbance

Facility	Construction/Drilling				Interim/Production			
	New Construction		Existing		Interim		Existing	
	Length (mi) width (ft)	Acres	Length (mi) width (ft)	Acres	Length (mi) width (ft)	Acres	Length (mi) width (ft)	Acres
Existing Crowned & Ditched Access Road			2.6 x 16	5.04			2.6 x 16	5.04
New Access Road Construction Parameters	0.16 x40	0.78			0.16 x 16	0.31		
River Crossing	0.10 x 50	0.60			0.10 x 16	0.20		
Well Pad		2.25				0.83		
Power Drop Construction	0.04 x 30	0.14			0.04 x 30	0.14		
Totals		3.77		5.04		1.48		5.04

*This only allocates for proposed new disturbance. The 5.04 acres from the existing road is not included in the acreage totals as no new disturbance will be necessary.

Table 3.1. Permitted wells within 1 mile of the Boardman Federal 1-30 (NEPA is older than 5 years)

#	Twp	Rng	Sec	Qtr	Well Name #	Company	Lease	Status	Formation
1	57N	70W	30	NWSW	DOVE W-80521 1-30	Ranch Oil Co.	WYW80521	P+A:1993	Minnelusa
2	57N	70W	30	NWNW	KIRBY 1	Davis Oil Co.	WYW0309228	P+A:1969	Dakota
3	57N	70W	30	SESE	MARSHALL 14-30	Conquest Exploration	WYW72030	P+A:1984	Amsden
4	57N	70W	30	SENW	DOVE W-80521 4-30	H & H Star Energy Inc.	WYW80521	UAPD:1986	N/A
5	57N	70W	30	NWSE	DOVE W-72030 3-30	H & H Star Energy Inc	WYW72030	P+A:1986	Minnelusa
6	57N	70W	30	NESW	DOVE W-79723 2-30	Ranch Oil Co.	WYW79723	P+A:2012	Minnelusa
7	57N	70W	31	NENW	9208 CRK JV-P 1	Lance Oil & Gas Co Inc	WYW126293	P+A:1992	Minnelusa

Figure 3.1. Boardman Federal 1-30 Soils Map Source: NRCS 2010

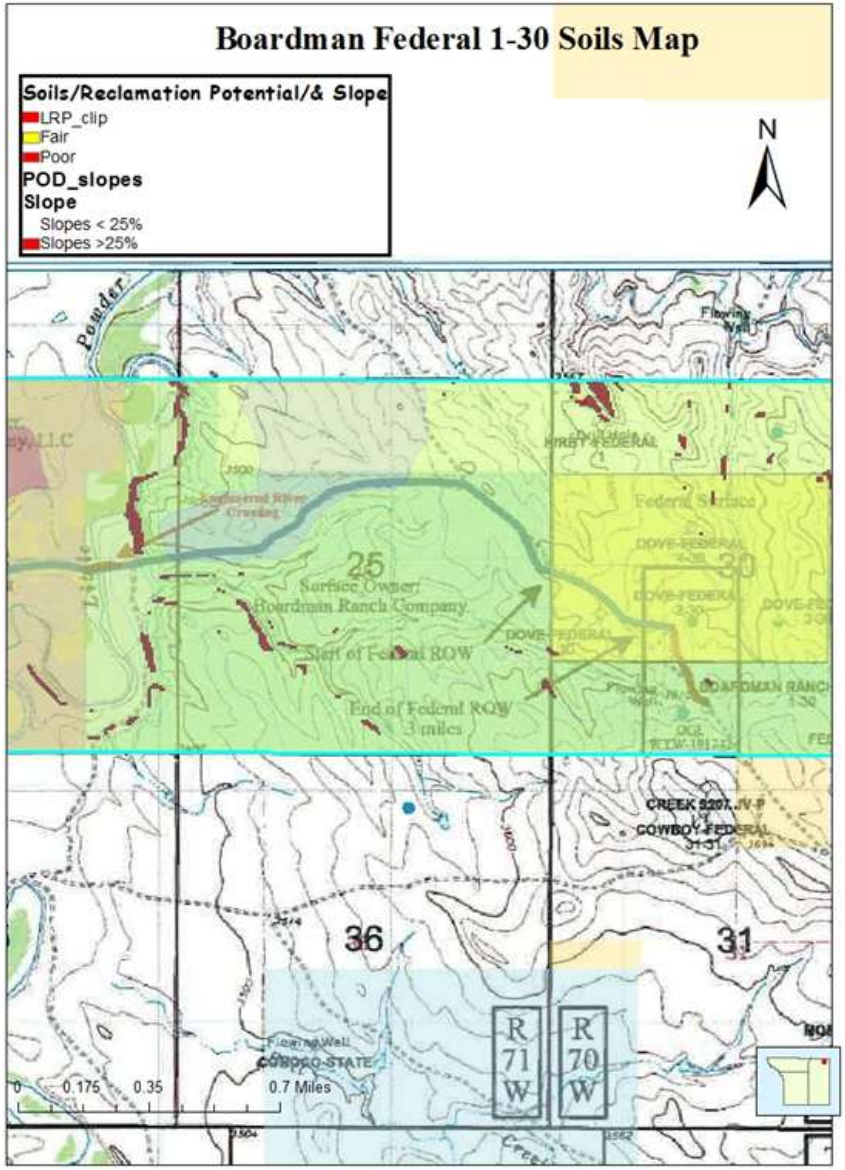

Table W.1. Summary of Sensitive Species Habitat and Project Effects Associated with Alternative B.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Amphibians				
Northern leopard frog (*Rana pipiens*)	Beaver ponds and cattail marshes from plains to montane zones.	NS	NI	Habitat is not present.
Columbia spotted frog (*R*anus pretiosa)	Ponds, sloughs, small streams, and cattails in foothills and montane zones. Confined to headwaters of the S Tongue R drainage and tributaries.	NP	NI	The project area is outside the species' range, and the species is not expected to occur .
Fish				
Yellowstone cutthroat trout (*Oncoryhynchus clarki bouvieri*)	Cold-water rivers, creeks, beaver ponds, and large lakes in the Upper Tongue sub-watershed	NP	NI	The project area is outside the species' range, and the species is not expected to occur.
Birds				
Baird's sparrow (*Ammodramus bairdii*)	Shortgrass prairie and basin-prairie shrubland habitats; plowed and stubble fields; grazed pastures; dry lakebeds; and other sparse, bare, dry ground.	S	MIIH	Nesting and foraging habitat may be impacted by dust, noise, human activities, and direct loss. Species may avoid area.
Bald eagle (*Haliaeetus leucocephalus*)	Mature forest cover often within one mile of large water body with reliable prey source nearby.	NP	NI	Bald eagles are not likely to use the few mature trees in the project area for nesting or winter roosting.
Brewer's sparrow (*Spizella breweri*)	Sagebrush shrubland	S	MIIH	Nesting and foraging habitat may be impacted by dust, noise, human activities, and direct loss. Species may avoid area.
Ferruginous hawk (*Buteo regalis*)	Basin-prairie shrub, grasslands, rock outcrops	NP	NI	No documented nests occur within 0.5 miles of the project area
Loggerhead shrike (*Lanius ludovicianus*)	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Nesting and foraging habitat may be impacted by dust, noise, human activities, and direct loss. Species may avoid area.
Long-billed curlew (*Numenius americanus*)	Grasslands, plains, foothills, wet meadows	NP	NI	Habitat not present.
Mountain Plover	Short-grass prairie with slopes < 5%	NP	NI	A small prairie dog town is located within 0.25 miles of the project. However, the town is inactive and vegetation height and topography in the area preclude use by plovers.
Northern goshawk (*Accipiter gentilis*)	Conifer and deciduous forests	NP	NI	Habitat not present.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Peregrine falcon (*Falco peregrinus*)	Cliffs	NP	NI	Habitat not present.
Sage sparrow (*Amphispiza billneata*)	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Nesting and foraging habitat may be impacted by dust, noise, human activities, and direct loss. Species may avoid area.
Sage thrasher (*Oreoscoptes montanus*)	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Nesting and foraging habitat may be impacted by dust, noise, human activities, and direct loss. Species may avoid area.
Trumpeter swan (*Cygnus buccinator*)	Lakes, ponds, rivers	NP	NI	Habitat not present.
Western Burrowing owl (*Athene cunicularia*)	Grasslands, basin-prairie shrub	NP	NI	Habitat not present.
White-faced ibis (*Plegadis chihi*)	Marshes, wet meadows	NP	NI	Habitat not present.
Yellow-billed cuckoo (*Coccyzus americanus*)	Open woodlands, streamside willow and alder groves	NP	NI	Habitat not present.
Mammals				
Black-tailed prairie dog (*Cynomys ludovicianus*)	Prairie habitats with deep, firm soils and slopes less than 10 degrees.	NP	NI	Habitat not present.
Fringed myotis (*Myotis thysanodes*)	Conifer forests, woodland chaparral, caves and mines	NP	NI	Habitat not present.
Long-eared myotis (*Myotis evotis*)	Conifer and deciduous forest, caves and mines	NP	NI	Habitat not present.
Swift fox (*Vulpes velox*)	Grasslands	NP	NI	Habitat not present.
Townsend's big-eared bat (*Corynorhinus townsendii*)	Caves and mines.	NP	NI	Habitat not present.
Plants				
Limber Pine (*Pinus flexilis*)	Mountains, associated with high elevation conifer species	NP	NI	Habitat not present.
Porter's sagebrush (*Artemisia porteri*)	Sparsely vegetated badlands of ashy or tufaceous mudstone and clay slopes 5300-6500 ft.	NP	NI	Habitat not present.
William's wafer parsnip (*Cymopterus williamsii*)	Open ridgetops and upper slopes with exposed limestone outcrops or rockslides, 6000-8300 ft.	NP	NI	Project area outside of species' range.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Presence **K -** Known, documented observation within project area. **S -** Habitat suitable and species suspected, to occur within the project area. **NS -** Habitat suitable but species is not suspected to occur within the project area. **NP -** Habitat not present and species unlikely to occur within the project area.			**Project Effects** **NI** - No Impact. **MIIH -** May Impact Individuals or Habitat, but will not likely contribute to a trend towards Federal listing or a loss of viability to the population or species. **WIPV** - Will Impact Individuals or Habitat with a consequence that the action may contribute to a trend towards Federal listing or cause a loss of viability to the population or species. **BI -**Beneficial Impact	

Table W.2. Summary of Threatened and Endangered Species Habitat and Project Effects

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Endangered				
Black-footed ferret	Black-tailed prairie dog colonies or complexes > 1,000 acres.	NP	NE	No known colonies present.
Blowout penstemon	Sparsely vegetated, shifting sand dunes	NP	NE	Habitat not present
Threatened				
Ute ladies'-tresses orchid	Riparian areas with permanent water	NP	NE	Habitat not present
Proposed				
Northern Long-eared Bat	Conifer and deciduous forest, caves and mines	NP	NE	The project area is outside the species' range, and the species is not expected to occur. Only known to occur in extreme Northeast WY (mainly Crook and Weston counties, very limited in northern Campbell county.)
Candidate				
Greater Sage-grouse	Basin-prairie shrub, mountain-foothill shrub	NP	NE	Habitat not present

Project Effects
LAA - Likely to adversely affect
NE - No Effect
NLAA - May Affect, not likely to adversely affect individuals or habitat.
NLJ – Not likely to jeopardize the continued existence of the species
MIIH – May impact individuals and habitat
NP - Habitat not present and species unlikely to occur within the project area.