DECISION RECORD
Yates Petroleum Corporation (Yates), Porsche 3H and 4H Applications for Permit to Drill (APD)
Environmental Assessment (EA), WY-070-EA14-85
Bureau of Land Management, Buffalo Field Office, Wyoming

DECISION. The BLM approves Yates Petroleum Corporation (Yates) Porsche 3H and Porsche 4H gas and oil well application for permit to drill (APD) described in Alternative B of the environmental assessment (EA) WY-070-EA14-85. This approval includes the wells' 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); including the Onshore Oil and Gas Orders.
- National Environmental Policy Act of 1969 (NEPA) (42 USC 4321).
- National Historic Preservation Act of 1966 (NHPA) (16 USC 470).
- Buffalo and Powder River Basin Final Environmental Impact Statements (FEISs), 1985, 2003, 2011.
- Buffalo Resource Management Plan (RMP) 1985 and Amendments.

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 2 APDs and support facilities:

	Well Name & #	Twp	Rng	Sec	Qtr	Lease #
1	Porsche Com 3H	43N	72W	30	NENW	WYW124459
2	Porsche Com 4H	43N	72W	30	NENE	WYW107251

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-EA114-85 and the FONSI (incorporated here by reference) found Yates proposal for the Porsche 3H and Porsche 4H 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 APDs for 30 days, received no comments, and then internally scoped them. BLM received new information on Greater Sage-Grouse (GSG) including the 2012 population viability analysis for the Northeast Wyoming, and BLM Instruction Memorandum-2013-033, on reducing direct wildlife mortalities.

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

1. BLM and Yates 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 region's GSG population. The impact of this development cumulatively contributes to the potential for local 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. Yates will conduct operations to minimize adverse effects to surface and subsurface resources, prevent unnecessary surface disturbance, and conform with 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 it has a surface access agreement.

6. The project is clearly lacking in wilderness characteristics as there is no federal surface and is amidst mineral development.

7. These APDs are pursuant to the Mineral Leasing Act for developing oil or gas and do not satisfy the categorical exclusion directive of the Energy Policy Act of 2005, Section 390 because the site-specific analyses covering the project area required updating.

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: 2/3/14

FINDING OF NO SIGNIFICANT IMPACT
Yates Petroleum Corporation, Porsche 3H and Porsche 4H Applications for Permit to Drill (APDs)
Environmental Assessment (EA), WY-070-EA14-85
Bureau of Land Management, Buffalo Field Office, Wyoming

FINDING OF NO SIGNIFICANT IMPACT (FONSI). Based on the information in the EA, WY-070-EA14-85, 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; (2) 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 there is no federal surface and is amidst mineral 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: 2/3/14

ENVIRONMENTAL ASSESSMENT (EA), WY-070-EA14-85
Yates Petroleum Corporation, Porsche 3H and 4H Applications for Permit to Drill (APD)
Bureau of Land Management, Buffalo Field Office, Wyoming

1. INTRODUCTION

BLM provides an EA for Yates Petroleum Corporation (Yates) Porsche 3H and 4H oil and gas well applications for permit to drill (APD). BLM's jurisdiction for these proposals is split estate. Fee (non-federal) surface overlies federal minerals. The horizontal bores end in fee minerals. This site-specific analysis tiers into and incorporates by reference the information and 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) per 40 CFR 1508.28 and 1502.21. One may review these documents at the BLM Buffalo Field Office (BFO) and on our website: http://www.blm.gov/wy/st/en/field_offices/Buffalo.html. These APDs are pursuant to the Mineral Leasing Act for the purpose of exploring or developing oil or gas and do not satisfy the categorical exclusion directive of the Energy Policy Act of 2005, Section 390 because no timely site-specific analysis adequately covered the project area.

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 APD: the site-specific analysis, and mitigation. Fourth is the monitoring and reclamation of wells and their features. (Pendery 2010)

1.1. Background

Yates submitted the Porsche Com #3H on July 22, 2013 and the Porsche Com #4H on July 1, 2013 to the BFO to produce oil and gas from federally managed fluid mineral bearing formations of the PRB.

- October 10, 2013- Yates, BLM BFO resource staff, and other stakeholders conducted a pre-approval onsite inspection for the proposed APD well locations, roads, utility corridors, and associated infrastructure. The proposal was evaluated and modified to minimize environmental impacts.
- November 14, 2013-BLM sent a post-onsite deficiency letter to Yates.
- December 5, 2013-BLM received deficiency responses from Yates.
- December 20, 2013-BLM considered the APD package complete.

1.2. Need for the Proposed Project

BLM's 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. BLM incorporates by reference here, the APD information (40 CFR 1502.21). 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

BLM posted the proposed APDs for 30 days and will timely publish the EA, any finding, and decision on the BFO website. 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 that BLM externally scoped. External scoping of the horizontal drilling in Crazy Cat East EA, WY-070-EA13-028, 2013, in the PRB area received 3 comments, revealing no new issues.

The BFO interdisciplinary team (ID team) conducted internal scoping by reviewing the proposal, its location, and a resource (issue) list (see administrative record, AR), to identify potentially significantly affected resources, land uses, resource issues, regulations, and site-specific circumstances not addressed in the tiered analysis or other analyses incorporated by reference. This EA will not discuss resources and land uses that are not present, unlikely to receive significant or material affects, or that the PRB FEIS or other analyses adequately addressed. This EA addresses the project's potentially significant 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. The project area is clearly lacking wilderness characteristics as it lacks federal surface and is amidst mineral development. Project issues include:

- Air quality
- Soils and vegetation: site stability, reclamation potential, invasive species.
- Water: ground water, quality and quantity of produced water.
- Wildlife: raptor productivity, migratory birds, special status species.

BLM analyzed the following issues in the PRB FEIS and they do not present a substantial environmental question of material significance to this proposal. These issues are not present, or minimally so. BLM analyzed them in the PRB FEIS and not in this EA:

Geological resources	Recreation	Wilderness characteristics
Cave and karst resources	Heritage & Visual Resources	Livestock & grazing
Mineral resources: locatable, leasable-coal, salable	Paleontological resources	Areas of critical environmental concern
Fire, fuels management, and rehabilitation	Transportation & Access	Socio-economic resources
Forest Products	Tribal Treaty Rights	Environmental justice
Lands & Realty	Wilderness characteristics	Wetlands/Riparian Areas

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. See Table 3.1 and Table 3.2.

2.2. Alternative B Proposed Action (Proposal)

Overview. Yates Petroleum Corporation (Yates) requests BLM's approval for 2 applications for permit to drill (APD). BLM incorporates the APDs here by reference; see the administrative record (AR). Yates proposes to drill the horizontal oil and gas wells and construct associated infrastructure at the locations in Table 1.1. The wells will be drilled from a non-federal surface into underlying federal and fee minerals on lease numbers listed below in Table 1.1. The proposal is to explore for, and possibly develop oil and gas reserves in the Turner Formation at depths found in the AR.

The project area is approximately 10 miles Southwest of Wright, Campbell County, Wyoming. The proposed surface holes (drill sites) are in Table 1.1. Well elevations are 5,022 feet and 5,039 feet, respectively. The topography has gently sloped draws rising to mixed sagebrush and grassland uplands. Ephemeral tributaries of the Lower Antelope Creek and Upper Porcupine Creek drain the area. The area climate is semi-arid, averaging 10-14 inches of precipitation annually, about 60% of which occurs between April and September. Richard W. Leavitt Trust is the surface owner of the majority of the project area. Parts of the existing and proposed access roads are located on Ted R. Cosner Revocable Trust and a potential water source is located on Bernice Groves Revocable Trust land.

Table 2.1. Well, Pad, and Lease List – Surfacehole (SHL) and Bottomhole (BHL)

#	Name and #	Twp	Rng	Sec	Qtr	SHL	BHL
1	Porsche Com 3H	43N	72W	30	NENW	WYW124459	Fee
2	Porsche Com 4H	43N	72W	30	NENE	WYW107251	Fee

Drilling, Construction and Production Design Features Include:

Access Roads and Utilities

- Primary access for the proposed well is provided by Cosner Road via HWY 59.
- A road network will consist of existing improved all-weather roads; and proposed crown and ditch template roads. A road maintenance agreement will be ratified on shared roads to maintain existing roads in a condition the same as or better than before operations began.
- Newly constructed access and utility corridors will be built to the approach of the wells; disturbances are listed in Table 2.2 and Table 2.3.

Well Locations

- The wells pad cuts and fills will be constructed with 1½:1 slopes initially and reduced as much as possible during interim reclamation.
- Well pad disturbances are outlined in Table 2.2 and Table 2.3.
- There will be a reserve pit at the oil well locations during drilling and completion operations.
- The pits will be lined with an impervious synthetic liner.
- Dikes will be constructed completely around production facilities, i.e. production tanks, water tanks, and heater treater. The dikes will be constructed of corrugated steel, approximately 3 feet high, and hold capacity of the largest tank plus 10%. The load-out line will be outside of the dike area.
- No off-site ancillary facilities are planned for this project. No staging areas, man camps/housing facilities are anticipated to be used off-site. Working trailers and sleeping trailers will be placed on the well pad during the drilling and completion of the well.

Drilling and Completion Operations

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.

- Hydraulic fracturing (HF) operations are planned as a 'plug & perf' operation done in stages. The process is anticipated to require 14 days. Water used for HF will come from municipal water supplies from Wright or Gillette, Wyoming or permitted wells listed in the SUP. All fresh water will be contained in 400-500 bbl rental HF tanks and no surface pits will be used to hold this water. No additional well pad disturbance is anticipated for HF operations. Completion flowback water will be held in tanks on location and trucked offsite to a disposal facility permitted by Wyoming Department of Environmental Quality (WDEQ).
- If the well becomes a producer, production facilities will be located at the well site and will include a pumping unit, storage tanks, buildings, oil-water separator (heater-treater). There will be no pits at the producing oil well locations.
- It is anticipated that 40,000 bbls of water will be needed for drilling and completion operations. The

fresh water for drilling operations will be trucked from multiple permitted sources; p. 3 of the respective SUP the for listed water sources.

- For completion (HF) phase, the operator intends use above ground tanks for onsite water storage at the pad. The above-ground tanks do not require a separate location or additional disturbance.
- Typically 170 500-bbl fracturing tanks are spotted, taking 2 weeks to fill, prior to pumping the stimulation. All fracturing water, including excess, is present before starting.
- Produced water during the production phase will be stored in a permanent storage tank. A third party will haul the flowback water, produced water, and oil from the reserve pit (if any) to permitted disposal facilities: one of 6 permitted facilities which are outlined in the SUP.
- Peak truck traffic to fill HF tanks during completion operations is estimated to be approximately 700 roundtrips per well.

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.

Table 2.2. Anticipated Drilling and Completion Sequence and Timing (per well)

Drilling and Completion Step	Approximate Duration
Build location (roads, pad, and other initial infrastructure)	30 days
Mob rig	2-4 days[1]
Drilling (24/7)	30-45 days[2]
Schedule/logistics for completion	2-60 days
Completion (setup, completion, demobilization)	35-45 days

[1] Depending on distance and need to add supplemental drilling equipment, such as skidding plates.
[2] By comparison, approximately 2 days are required to drill a CBNG well. Source: ICF 2012

Additionally, the operator, in their APDs, 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 measures to alleviate resource impacts in their submitted surface use and drilling plans.
- Certify it has a surface access agreement with the landowners.

Table 2.3. Disturbance Summary for Porsche Com 3H well:

Facility	Number or Miles	Factor	Disturbance
Engineered Pad (with topsoil/spoil piles)	1 (400 ft x 400 ft)	160,000 sq ft	3.67 acres (pad only) ~7.00 acres (total)
Proposed Template Road	450 ft x 65 ft	29,250 sq ft	0.67 acres
Proposed Template Road with Utility Corridor	2,795 ft x 90 ft	251,550 sq ft	5.77 acres
Total Surface Disturbance			**13.44 acres**

Table 2.4. Disturbance Summary for Porsche Com 4H well:

Facility	Number or Miles	Factor	Disturbance
Engineered Pad (with topsoil/spoil piles)	1 (400 ft x 400 ft)	160,000 sq ft	3.67 acres (pad only) ~7.00 acres (total)
Proposed Template Road	160 ft x 65 ft	10,400 sq ft	0.24 acres
Proposed Utility Corridor	100 ft x 25 ft	2,500 sq ft	0.06 acres
Total Surface Disturbance			**7.30 acres**

Reasonably Foreseeable Activity:
The reasonably foreseeable activity (RFA) for this and adjacent areas includes oil/gas exploration on 640 acre spacing and possible 320 acre spacing for horizontal wells and 80 acre spacing for vertical wells. (This does not preclude the RFA spacing analysis in the PRB FEIS or applying to drill multiple wells from this pad further reducing the surface disturbance per well.) RFA may use existing well pads and infrastructure put in place for fee and/or federal mineral development. The proposed RFA in the project area consists of 78 oil and gas leases, which have foreseeable potential for activity and 84 proposed notices of staking (NOSs) and APDs. The project analysis area is defined as the area within 5 miles of the proposed Porsche 3H and Porsche 4H wells. Potential APD submittals or reasonably foreseeable activity included in this analysis could consist of multiple wells on an existing pad or tie into existing supporting infrastructure; tank batteries, pipelines, power lines, and transportation networks.

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, supporting FEISs, 1985, 2003 (2011), and laws including the Clean Air Act, 42 USC 7401-7671q (2006), the Clean Water Act, 33 USC 1251 et seq. (1972), etc.

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 92 producing oil and gas wells within five miles of 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. (See Table 2.2 and 2.3 for an approximation of the disturbance in the current situation.) 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 approximately 29 wells within five miles of the project area 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.

Table 3.1. Adjacent or Overlapping Analysis

#	POD Name	NEPA Document	Well #/ Type	Decision Date
1	Quill Federal 5H	WY-070-EA13-003	1 Oil	12/21/2012
2	Wilkinson	WY-070-EA11-034	28 CBNG	11/12/2010
3	Verde	WY-070-EA08-177	11 CBNG	9/30/3008
4	Leavitt	WY-070-EA08-170	18 CBNG	9/19/2008
5	Tuit Draw	WY-070-EA04-260	26 CBNG	11/23/2004
6	House Creek K	WY-070-EA04-138	21 CBNG	6/9/2004
7	Tuit	WY-070-EA04-098	36 CBNG	2/17/2004

Table 3.2. This EA analysis also tiers to and incorporated by reference the following – either as senior NEPA analysis or as substantially similar analysis in the semi-arid sage-brush, short grass prairie:

#	POD Name	NEPA Document	Well # / Type	Decision Date
1[a]	Mufasa Fed 11-31H Well	WY-070-EA12-062	1 Oil	3/2012
2	Spruce 1 POD	WY-070-CX3-12-95 & -107	2 Oil	5/2012
3[b]	Samson's Hornbuckle Field	WY-060-EA11-1181	48 Oil Well Pads	8/2011
4	Sahara POD	WY-070-EA13-072	21 Oil	3/2013

a. Those sections describing and analyzing hydraulic fracturing, its supporting analysis, and the Greater Sage-grouse Section 3.7.12 and 4.8.2.

b. Those sections describing and analyzing hydraulic fracturing and its supporting analysis to include but not limited to traffic, water, and air quality.

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 9 sites throughout the State, and particulate concentrations from 5 of those sites, monitors speciated aerosol (3 locations), and evapotranspiration rates (1 location). The sites monitoring air quality for the Powder River Basin are located at Sheridan, South Coal Reservoir, Buffalo, Fortification Creek, 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, Ecological Sites, and Vegetation

Within the PRB's Northern Rolling High Plains-Southern Part major land resource area (USDA Handbook 296, 2006) are numerous ecological sites - a distinctive kind of land with specific characteristics differing from other kinds of land in its ability to produce a distinctive kind and amount of vegetation. Different soil compositions support an ecological site. BLM obtained detailed soils identification and data for the project area from the South Campbell County Survey Area, Wyoming Soil Survey Geographic (SSURGO) Database (WY605). The Natural Resource Conservation Service (NRCS) performed the soil survey according to National Cooperative Soil Survey standards. The BLM uses county soil survey information to predict soil behavior, limitations, or suitability for a given proposal.

Using the Natural Resource Conservation Service, (NRCS, USDA), Technical Guides for the Major Land Resource Area 58B Northern Rolling High Plains, in the 10-14" Northern Plains precipitation zone, the landforms and the soils of this site are deep to moderately deep (greater than 20" to bedrock), well drained & moderately permeable. Layers of the soil most influential to the plant community varies 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. The main soil limitations include: low organic matter content and soil droughtiness. The low annual precipitation should be considered when planning a seeding. The predominant ecological site (or sites) occurring within the proposed POD is (are) found to be Loamy and the plant community (communities) consisted of:

<u>Rhizomatous Wheatgrasses, Needle and thread, Blue Grama Plant Community</u>

This plant community is the interpretive plant community for this site and is considered to be the Historic Climax Plant Community (HCPC). This plant community evolved with grazing by large herbivores and is well suited for grazing by domestic livestock. This plant community can be found on areas that are properly managed with grazing and/or prescribed burning, and sometimes on areas receiving occasional short periods of rest. The potential vegetation is about 75% grasses or grass-like plants, 15% forbs, and 10% woody plants. This state is dominated by cool season mid-grasses.

The major grasses include western wheatgrass, needleandthread, and green needlegrass. Other grasses occurring in this state include Cusick's and Sandberg's bluegrass, bluebunch wheatgrass, and blue grama. A variety of forbs and half-shrubs also occur. Big sagebrush is a conspicuous element of this state, occurs in a mosaic pattern, and makes up 5 to 10% of the annual production. Plant diversity is high.

This plant community is extremely stable and well adapted to the Northern Great Plains climatic conditions. The diversity in plant species allows for high drought tolerance. This is a sustainable plant community (site/soil stability, watershed function, and biologic integrity).

<u>Mixed Sagebrush/Grass Plant Community</u>

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. Wyoming big sagebrush is a significant component of this plant community. Cool-season grasses make up the majority of the understory with the balance made up of short warm-season grasses, annual cool-season grasses, and miscellaneous forbs.

Dominant grasses include needleandthread, western wheatgrass, 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 sagebrush canopy protects the cool-season mid-grasses, 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.

Western Wheatgrass/Cheatgrass Plant Community

This plant community is created when the Mixed Sagebrush/Grass Plant Community or the Heavy Sagebrush Plant Community is subjected to fire or brush management not followed by prescribed grazing. Rhizomatous wheatgrasses and annuals will eventually dominate the site.

Compared to the HCPC, cheatgrass has invaded with western wheatgrass and thickspike wheatgrass maintaining at a similar or slightly higher level. Virtually all other cool-season mid-grasses are severely decreased. Blue grama is the same or slightly less than found in the HCPC. Plant diversity is low.

This plant community is relatively stable with the rhizomatous wheatgrasses being somewhat resistant to overgrazing and the cheatgrass effectively competing against the establishment of perennial cool-season grasses.

An increase in bare ground reduces water infiltration and increases soil erosion. The watershed is usually functioning. The biotic integrity is reduced by the lack of diversity in the plant community.

3.3. Water Resources

WDEQ regulates Wyoming's water quality with EPA oversight. 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 WOGCC has authority for permitting and bonding off channel pits located over state and fee minerals.

3.3.1. Groundwater

The areas historical use of groundwater was for stock or domestic water. A search of the WSEO Ground Water Rights Database showed 14 registered stock and domestic water wells within 1 mile of the proposed well(s) with depths from 30 to 350 feet. Refer to the PRB FEIS for additional information on groundwater, pp. 3-1 to 3-36. The 2004 EPA study found it unlikely that hydraulically fractured CBNG wells would contaminate ground water. The EPA has an expansive, on-going study looking at more aspects of hydraulic fracturing and has yet to issue findings. A 2011-2012 Geological Survey study found

no groundwater effects from thousands of deep horizontally fractured oil and gas wells. Another study found no direct link between hydraulic fracturing and studied aquifers, Warner, 2012.

The Fox Hills, the deepest penetrated fresh water zone in the PRB lies well above the target formation. Depth to the Fox Hills formation is 6,024 feet and 6,085 feet total vertical distance (TVD) respectively.

3.3.2. Surface Water

The project area is in the Lower Antelope Creek and Upper Porcupine Creek drainages which are tributaries to the Cheyenne River drainage. Most of the 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.

3.4. Invasive or Noxious Species

The BLM's weed database showed the presence of scotch thistle and black henbane in areas in or around the areas of this project. During the onsite inspections no populations of scotch thistle or black henbane were observed. Canada thistle was observed during the onsite inspections. Cheatgrass or downy brome (Bromus tectorum) and to a lesser extent, Japanese brome (B. japonicus) exist in the affected environment. These species are found in high densities and numerous locations in NE Wyoming. Gelbhard, 2003 and Duniway 2010, showed that surface disturbances increase the proliferation of invasive or noxious species out to 0.5 miles or more from the disturbance while correspondingly compromising native communities in the same footprint. Cheatgrass (*Bromus tectorum*) and to a lesser extent, Japanese brome (*B. japonicus*) exist in the affected environment. These species are found in high densities and numerous locations throughout NE Wyoming. Balch, 2013, linked the proliferation of cheatgrass in semi-arid environments to the increased frequency and severity of wildfire.

3.5. 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 October 30, 2013. The biologist evaluated impacts to wildlife resources and recommended project modifications where wildlife issues arose. BLM wildlife biologists also consulted databases compiled and managed by BLM BFO wildlife staff, the PRB FEIS, WGFD datasets, the Wyoming Natural Diversity Database (WYNDD), and a wildlife report submitted by Tony Wyllie (Wyllie, 2013) in order to evaluate the affected environment for wildlife species that may occur in the project area. This section describes the affected environment for wildlife species known or likely to occur in the project area that are likely to be impacted by the action. Rationale for any specie or species not discussed in detail below can be referenced in Appendix A.

3.6. 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. Species included on that list that would be impacted by the proposed project will be discussed below.

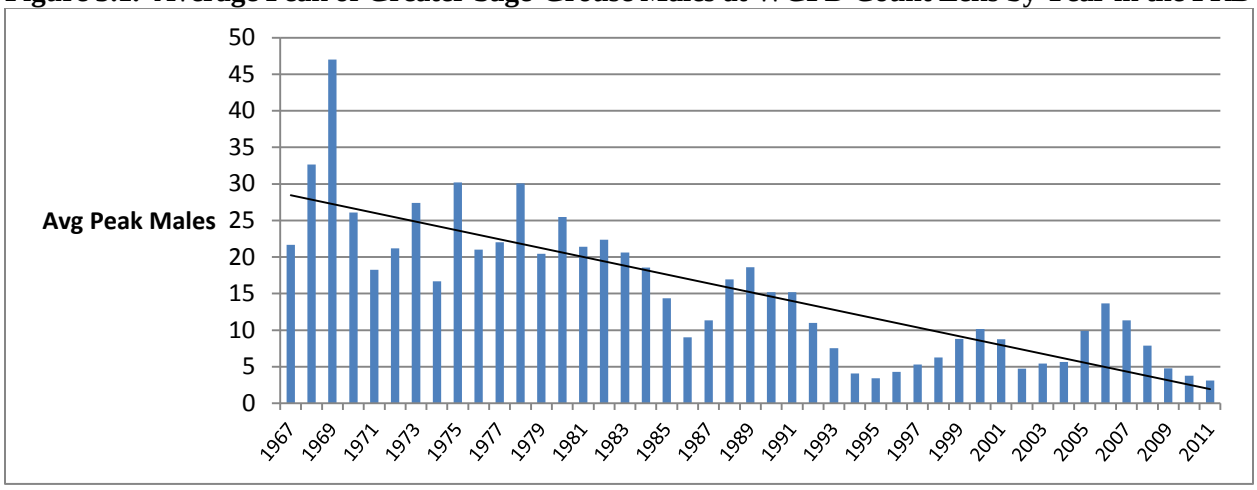
3.6.1. Greater Sage-Grouse (GSG)

The PRB FEIS has a detailed discussion on GSG ecology and habitat, pp. 3-194 to 3-199. Subsequently the USFWS determined the Greater Sage-Grouse (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.

The GSG population in northeast Wyoming is exhibiting a steady long term downward trend, as measured by lek attendance (WGFD 2011b). Figure 3.1 illustrates a 10-year cycle of periodic highs and

lows. Each subsequent population peak is lower than the previous peak. Research suggests that the declines since 2001 are a result, in part, of energy development (FWS 2010, Taylor et. al. 2012).

Figure 3.1. Average Peak of Greater Sage-Grouse Males at WGFD Count Leks by Year in the PRB



The State Wildlife Agencies' Ad Hoc Committee for Consideration of Oil and Gas Development Effects to Nesting Habitat (2008) recommends that impacts to leks occur within 4 miles of oil and gas developments. WGFD records show that 2 GSG leks occur within 4 miles of the nearest infrastructure within the project area. The two associated leks area as follows: 1.) Spring Creek lek (approx. 2.69 miles) and the 2.) Porcupine Creek lek (approx. 1.48 miles); both of which are considered to be occupied by the WGFD in 2013. The area has also been determined to be occupied by GSG throughout the year, this is due to the number of birds documented on the Porcupine Creek lek in 2013 and amount of sign (scat) noted throughout the project area (Wyllie, 2013). Suitable habitat exists throughout the project area, although due to historical land practices both of the proposed well pads have only a marginal shrub component with the areas of proposed surface disturbance.

The proposed project area resides outside designated Wyoming Core and connectivity areas. The nearest identified core area (Thunder Basin) is approximately 17 miles to the northeast.

3.6.2. 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. 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.

3.6.2.1. Brewer's Sparrow

The affected environment for Brewer's sparrow is discussed in the PRB FEIS on pg. 3-200. In addition to being listed as a BLM Wyoming sensitive species, Brewer's sparrows are a WGFD SGCN, with a rating

of NSS4. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also listed by USFWS as a BCC for Region 17.
Suitable habitat is present throughout the project area.

3.6.2.2. Ferruginous Hawk

The affected environment for ferruginous hawk is discussed in the PRB FEIS on pg. 3-183. In addition to being listed as a Wyoming BLM sensitive species, ferruginous hawks are a WGFD SGCN, with a rating of NSS3 because the species is widely distributed, population status and trends are unknown but are suspected to be stable, they are experiencing ongoing loss of habitat, and they are sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also listed by USFWS as a BCC for Region 17.

Suitable nesting habitat is present, and one newly identified ferruginous hawk nest (BLM ID: 13503) within 0.5 miles of the proposed project and was verified in the field during field visit on October 30, 2013. The nest has only one year of survey history and was determined to be inactive during 2013. Due to the lack of history on the nest it is assumed that it may have been or will be active in the future; this warrants mitigation for nesting raptors.

3.6.2.3. Mountain Plover

The PRB FEIS discussed the affected environment for mountain plover on pp. 3-177 to 3-178. When BLM wrote the PRB FEIS, the mountain plover was proposed for listing as a threatened species under the ESA. In 2003, FWS withdrew the proposal, finding that the population was larger than had been thought and was no longer declining. On June 29, 2010 the FWS reinstated a December 5, 2002 proposed rule (67 FR 72396) to list the mountain plover as a threatened species. On May 12, 2011, the FWS withdrew the proposal to list the mountain plover as a threatened species.

Potential mountain plover habitat is present in the proposed project area. While the height of current grass and forb cover in potential habitat is likely to preclude mountain plover from using these areas, disturbances such as intensive grazing, drought, or wildfire would make these areas suitable for mountain plover in the future. No mountain plover were observed during 2013 surveys (Wyllie, 2013) or in the immediate area during survey efforts in the past.

3.6.2.4. Sage Thrasher

The affected environment for sage thrasher is discussed in the PRB FEIS on pg. 3-199 to 3-200. In addition to being listed as a Wyoming BLM sensitive species, sage thrashers are a WGFD SGCN, with a rating of NSS4, because populations are declining, habitat is vulnerable, and the species is not sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level II species, indicating the action and focus should be on monitoring and because Wyoming has a high percentage of and responsibility for the breeding population. They are also listed by USFWS as a BCC for Region 17.

Suitable habitat is present within the proposed project area for the specie.

3.7. Big Game

The big game species occurring in the project area are mule deer and pronghorn. The area is classified by the WGFD as year-long habitat for both species (WGFD 2011a). The PRB FEIS discussed the affected environment for pronghorn, and mule deer on pp. 3-117 to 3-122, pp. 3-127 to 3-132 respectively.
Both mule deer and pronghorn were seen during the onsite visit.

3.7.1. Raptors

The PRB FEIS discussed the affected environment for raptors, pp. 3-141 to 3-148. According to the BLM

raptor database, only one documented ferruginous hawk nest (BLM ID: 13503) was identified within 0.5 miles of the project boundary (Wyllie, 2013).

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. While only one documented nest is within 0.5 miles of the proposed project numerous raptor species are known or suspected to occur in the area include golden eagle, northern harrier, Swainson's hawk, American kestrel, short-eared owl, great horned owl, red-tailed hawk, western burrowing owl (SSS), ferruginous hawk (SSS), and rough-legged hawk (winter resident).

3.7.2. Migratory Birds

The PRB FEIS discussed the affected environment for migratory birds, pp. 3-150 to 3-153. A wide variety of migratory birds may occur in the proposed project area at some point during the year. 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 power lines 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.

Habitats occurring near the proposed well locations include sage-brush steppe grasslands, mixed grass prairie, and mature deciduous trees. Many species that are of high management concern use these 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 over the last 30 years (WGFD 2009). The FWS's Birds of Conservation Concern (BCC 2008) report identifies species of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the Endangered Species Act.

The WGFD Wyoming Bird Conservation Plan (Nicholoff 2003) identified 3 groups of Wyoming's high-priority bird species: Level I – those that clearly need conservation action, Level II – species where the focus should be on monitoring, rather than active conservation, and Level III – species that are not of high priority but are of local interest. Species likely occurring in the project area are in Table 3.3.

Table 3.3. Migratory Birds Occurring in Shrub-steppe Habitat, NE Wyoming (Nicholoff 2003)

Level	Species	WY BLM SSS	Species	WY BLM SSS
Level I	Brewer's sparrow	Yes	McCown's longspur	No
	Ferruginous hawk	Yes	Mountain Plover	Yes
Level II	Grasshopper Sparrow	No	Loggerhead shrike	Yes
	Lark bunting	No	Sage thrasher	Yes
	Lark sparrow	No	Vesper sparrow	No
Level III	Common poorwill	No	Say's phoebe	No

3.8. 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 found in the 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. 70130112) was performed to locate specific historic properties which may be impacted by the proposal. No cultural resources are in the proposal area.

4. ENVIRONMENTAL EFFECTS

No Action Alternative. BLM analyzed the no action alternative as Alternative 3 in the PRB FEIS and it subsequently received augmentation of the effects analysis in this EA through the analysis of mineral projects, their approval, and construction; and through the analysis and approval of other projects. BLM incorporates by reference these analyses in this EA; see Table 3.1 and Table 3.2. This updated the no action alternative and cumulative effects. The project area has 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 approved single and multi-well pads, consisting of horizontal wells with approved APDs and other approved APDs. The production and the drilling and completion of these new wells would result in noise and human presence that could affect resources in the project area; 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.

Alternative B, Proposed Action (Proposal)

4.1. 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. BLM incorporates by reference the analysis found in the August 2012 Lease Sale EA, WY-070-EA12-44, pp. 45-51 (air quality, greenhouse gas emissions, and visibility). 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.

4.2. Soils, Ecological Sites, and Vegetation

4.2.1. Direct and Indirect Effects

Anticipated impacts to soils and vegetation from well pad, road, and utility construction include:

- Soil rutting and mixing, compaction, increased erosion potential, and loss of soil productivity.
- 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 re-vegetation.
- 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.
- Loss of soil vegetation cover, biologic crusts, organic matter and productivity. With expedient reclamation, productivity and stability should be regained in the shortest time frame.
- Direct effects (removal and/or compaction) to vegetation would occur from ground disturbance caused by drilling rig equipment and construction of a well pads, tank batteries, and roads. 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 pads, compressor stations, roads, water-handling facilities or other semi-permanent facilities may result in loss of vegetation and affect reclamation success for the life of the project.
- Large cuts and fills on well pad and road construction could lead to increased soil erosion from water or wind. Expedient stabilization and interim reclamation will decrease the potential for erosion from the disturbed lands as outlined in the SUP.

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, incorporated here by reference.

The PRB FEIS discusses most direct and indirect effects to ecological sites and vegetation (p. 4-153 to 4-164). The 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. Direct effects to ecological sites would occur from ground disturbance caused by construction of well pads, ancillary facilities, associated pipelines, and roads. 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 pads, compressor stations, roads, water-handling facilities or other semi-permanent facilities would result in loss of vegetation and prevent reclamation for the life of the project.

4.2.2. Cumulative Effects

For details on expected cumulative impacts, refer to the PRB FEIS, pp. 4-151. 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. These impacts, singly or in combination, could increase the potential for valuable soil loss due to increased water and wind erosion, invasive/noxious/poisonous plant spread, invasion and establishment, and increased sedimentation and salt loads to the watershed system, if applicable mitigation measures are not used.

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.

4.2.3. Mitigation Measures

Company and BLM should apply the following mitigation to reduce impacts to soils and vegetation from surface disturbance.

The proponent planned their project to maximize the fluid mineral drainage while avoiding areas with soil

limitation where possible. The proponent also designed the infrastructure such that no engineering roads will be required and uses existing oil/gas roads as possible to access the proposed well. The constructed well pads were designed to minimize cut and fill slopes. Operator committed measures committed to in the MSUP, Reclamation Plan, and pad design drawings, and road deigns will rectify impacted areas by repairing, rehabilitating and/or restoring the affected environment. The operator's design features will reduce or eliminate impacts over time by preservation and maintenance operations during the project's life. Refer to the surface use plan (SUP), Reclamation Plan, and the APD for pad design drawings and a detailed description of design features, operator committed measures and construction practices.

Improved roads used in conjunction with accessing the well will be fully built (including all water control structures such as wing ditches, culverts, relief ditches, low water crossings, surfacing, etc.) and functional to BLM standards as outlined in the BLM Manual 9113 prior to drilling of the well. All erosion control products will be applied according to manufacturer's specifications to reduce product failures.

A 30 day stabilization requirement from initial disturbance is applied to all wells and access/pipelines for the entire project. Stabilization BMPs include, but are not limited to; straw waddles, rock check dams, surface roughening, ditch and berms, erosion matting/blankets, seeding and mulching, and spraying tackifier on cut/fill slopes and topsoil/spoil piles.

If the well is a producer, the location shall be put into interim reclamation as soon as possible after completing well. Yates shall locate the facilities in a way that will facilitate maximum interim reclamation; all areas not needed for production shall be put into interim reclamation.

4.2.4. Residual Effects

Residual effects across the POD would include a long-term loss of soil productivity associated with well pad and roads. 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. Due to the presence of erosive soils and the topography of the project area erosion will occur. Rilling and gullying of cut and fill slopes on, access/utility corridors, will take place. Impacts from livestock to stabilized cut and fill slopes will limit soils becoming stable and getting vegetation establish. The PRB FEIS defined the designation of the duration of disturbance, pp. 4-1 and 4-15. "For this EIS, short-term effects are defined as occurring during the construction and drilling/completion phases. Long-term effects are caused by construction and operations that would remain longer".

Impacts to vegetation and soils from surface disturbance will be reduced, by following the operator's plans and BLM applied mitigation. Construction of new access roads has been reduced by placing the well locations such that existing oil/gas access roads are used and one existing fee mineral pad location is being used for federal mineral development. This practice results in less surface disturbance and overall environmental impacts. See Section 2.2 for a summary of the disturbance. All disturbances associated with the proposed action are long term. With the reclamation status of the project area being rated as fair and field observations showing areas of reclamation success expedient reclamation of disturbed land with stockpiled topsoil, proper seedbed preparation techniques, and appropriate seed mixes, along with utilization of erosion control measures (e.g., waterbars, water wings, culverts, rip-rap, etc.) would ensure land productivity/stability is regained and maximized.

The BLM considers these residual effects from Alternative B with the proposed wells are likely within the parameters for acceptable surface disturbance and surface disturbance reclamation in PRB FEIS ROD and Onshore Order Number 1.

4.3. 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 minimize an adverse impact on ground water. The volume of water produced by this federal mineral development is unknowable at the time of permitting.

"BLM may rely on the actions of state regulators. The IBLA and federal courts recognized it is appropriate for BLM to assume a proposed action complies with state permitting requirements, and rely on state analysis when evaluating the significance of effects. Wyo. Outdoor Council v. U.S. Army Corps of Eng'rs, 351 F. Supp. 2d 1232, 1244 (D. Wyo. 2005); PRBRC, 180 IBLA 32, 57 (2010); Bristlecone Alliance, 179 IBLA 51, 74-77 (2010)." In Wyoming Outdoor Council, the District Court held the Corps may rely on the WDEQ permitting process to "ameliorate any concerns that impacts to water quality will be significant." Id.

4.3.1. Groundwater

4.3.1.1. Direct and Indirect Effects

The cumulative industry and regulatory experience shows that thousands of wells pierce the nation's largest aquifer in western Texas, Oklahoma, and Kansas with essentially no direct or indirect impact to that groundwater, see, http://www.spe.org/jpt/print/archives/2010/12/10Hydraulic.pdf. Lastly, the EPA 2004 study and its on-going, detailed study of hydraulic fracturing yielded, thus far, no immediate cautions, concerns, or warnings that present industry and regulatory practices endanger ground water or require immediate changes.

At the time of permitting, the volume of water that will be produced in association with these federal minerals is unknown. The operator will have to produce the wells for a time to be able to estimate the water production. In order to comply with the requirements of Onshore Oil and Gas Order #7, Disposal of Produced Water, the operator will submit a Sundry to the BLM within 90 days of first production which includes a representative water analysis as well as the proposal for water management. Historically, the quality of water produced in association with conventional oil and gas has been such that surface discharge would not be possible without treatment. Initial water production is quite low in most cases. There are three 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.

The APD's surface use and drilling plans show adequate protection of surface lands and ground water, including the Fox Hills Formation, located at 6,024 feet and 6,085 (TVD) respectively for the Porsche wells. 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.

4.3.1.2. Cumulative Effects

BLM foresees minimal cumulative effects either to or from the use of ground water for these 2 proposed wells. BLM anticipates no need for mitigation measures beyond the design features and programmatic COAs. BLM anticipates no residual effects to ground water from this project.

4.3.1.3. Mitigation Measures

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 any fresh water aquifers above the target coal zone. This will ensure that ground water will not be adversely impacted by well drilling and completion operations.

4.4. Invasive Species

4.4.1. Direct and Indirect Effects

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, including frequency; 2) Preventive practices; and 3) Education. Cheatgrass (*Bromus tectorum*) and to a lesser extent, Japanese brome (*B. japonicus*) exist in the affected environment. 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 proposed project 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, applicant committed measures will reduce potential impacts from noxious weeds and invasive plants.

4.4.2. Cumulative Effects

Cumulative effects across the project area would include a long-term loss of soil productivity associated with well pads and road construction. The activities related to the performance of the proposed project would create a favorable environment for the establishment and spread of noxious weeds/invasive plants.

4.4.3. Mitigation Measures

Yates submitted applicant committed measures in the SUP to identify, reduce opportunities to spread, and treat infestation of noxious weeds and invasive plants, listed in the Porsche Wells Weed Control Program, will reduce potential impacts from these species. Refer to the Weed Control Program in the SUP for a complete listing of general and species-specific applicant committed measures to address this issue.

4.4.4. Residual Effects

Yates's control efforts are limited to the surface disturbance associated the project's implementation. Cheat grass and other invasive species that are present in non-physically disturbed project areas are anticipated to continue to spread unless control efforts are expanded. Cheatgrass and to a lesser extent, Japanese brome are found in such high densities 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.

4.5. Fish and Wildlife

No Action Alternative

The no action alternative would have no direct impacts to any of the following identified wildlife resources due the fact that the project would not be implemented.

Alternative B – the Proposal

The impacts associated with alternative B will be discussed below.

4.6. Fish and Wildlife

4.6.1. Wildlife Threatened, Endangered, Proposed and Candidate Species

4.6.1.1. Greater Sage-Grouse

4.6.1.1.1. Direct and Indirect Effects

Implementation of the proposed project will impact GSG habitat and individuals. Impacts to GSG are generally a result of loss and fragmentation of sagebrush habitats associated with roads and infrastructure. Research indicates that GSG hens also avoid nesting in developed areas.

Impacts to GSG associated with energy development are discussed in detail in the 12-Month Findings for Petitions to List the GSG as Threatened or Endangered (USFWS 2010) and chapters 15-21 of Greater Sage-grouse Ecology and Conservation of a Landscape Species and its Habitats (Knick and Connelly 2011).

The proposed project area contains suitable nesting, brood-rearing, and winter habitat. Construction of wells and the associated infrastructure will cause fragmentation of sagebrush stands and result in the direct loss of approximately 20 acres of GSG habitat. Noise and human disturbance associated with roads, construction, drilling, and completion will be disruptive to GSG. Implementation of the project will adversely impact nesting habitat, both through direct loss of suitable habitats and avoidance of the area by GSG due to fragmentation and anthropogenic activity.

Allowing disruptive activities (such as those associated with well completion) to occur during the breeding/nesting season (March 15 – June 30) is not in compliance with WY BLM policy or the State of Wyoming's GSG conservation strategy (Executive Order (EO) 2011-5 Greater Sage-grouse Core Area Protection). In order to be in compliance with EO 2011-5, "a 2 mile seasonal buffer should be applied to occupied leks." The intent of EO 2011-5 management in non-core areas is to maintain populations and habitats where possible.

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."

During onsite visits, the BLM made specific recommendations to avoid placement of facilities in sagebrush to reduce direct loss of GSG habitat. This included recommendations to consolidate infrastructure where feasible. In some cases, infrastructure could not be moved due to soil or topography issues.

4.6.1.1.2. Cumulative Effects

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 (pg. 4-270)." Based on the impacts described in the PRB FEIS and the findings of more recent research, the proposed action may contribute to a decline in male attendance at the two that occur within four miles of the project area, and, potentially, extirpation of the local grouse population. Authorization of surface occupancy within 0.25 miles of a non-core habitat lek, or disruptive activities (such as completion activities) within 2 miles of an occupied lek during the breeding/nesting season, is inconsistent with the WY BLM and State of Wyoming GSG policies, and would set a precedent that these policies do not require compliance outside of GSG priority habitats.

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. Extreme impacts mean those where the function of an important wildlife habitat is substantially impaired or lost.

The proposed project is within 2 miles of 2 GSG leks. These leks are therefore are experiencing high impacts according to the WGFD recommendations. Implementation of the proposed project will not alter those categorizations.

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 2004, Rowland et al. 2005, WGFD 2005, Naugle et al. 2011), 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 2004, Walker et al. 2007, Cornish pers. comm.).

The Buffalo 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 two-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 located within 2 miles of a lek (BLM 2004). These studies were conducted 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 has since 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 PRB area 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 have been extirpated as a direct result of energy development (Walker et al. 2007, Walker 2008, Naugle et al. 2011). BLM determined, based on these studies, that a 2-mile timing limitation is insufficient to reverse the population decline.

The 2012 population viability analysis for the NE Wyoming GSG found there remains a viable population of GSG in the PRB (Taylor et al. 2012). Threats from energy development and West Nile Virus (WNv) are impacting future viability (Taylor et al. 2012). The study indicated that effects from energy development, as measured by male lek attendance, are discernible out to a distance of 12.4 miles.

Studies document the additive impacts of energy development and WNv as a threat to GSG persistence in the PRB (Taylor et al. 2012, Garton et al. 2011). The cumulative and synergistic effects of CBNG development and WNv in the PRB area will continue to impact the local GSG population, causing further declines in lek attendance, and could result in local extirpation: "[f]indings reflect the status of a small remaining sage-grouse population that has already experienced an 82% decline within the expansive energy fields." (Taylor et al. 2012).

Current well densities reduce the effectiveness of PRB core areas (Taylor et al. 2012). Continued energy development around the core areas will reduce PRB core areas remaining value. WNv outbreaks combined with energy development reduce sage-grouse populations and interact to exacerbate population declines. The effects of one WNv outbreak year could cut a population in half. Absent a WNv outbreak, or another stochastic event of similar magnitude, immediate extirpation is unlikely. Results suggest that if current oil and gas development rates continue, they may compromise future viability of NE Wyoming GSG, with an increased chance of extirpation with additional WNv outbreaks (Taylor et al. 2012).

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 WNv in GSG habitat (Walker et al 2007). Walker et al. (2007) recommend maintaining extensive stands of sagebrush habitat over large areas (at least 1 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), Greater Sage-Grouse Comprehensive Conservation Strategy (Stiver et al. 2006), and BLM National Greater Sage-Grouse Land Use Planning Strategy (USDI 2011).

4.6.1.1.3. Mitigation Measures

Based on the summary of research describing the impacts of energy development on GSG, efforts to reduce habitat loss and fragmentation are likely to be the most effective in ensuring long-term lek persistence.

In order to reduce the likelihood that noise, construction, and human disturbance impact nesting GSG, BLM will implement a timing limitation on all surface-disturbing activities within GSG habitat during the construction phase. The intent of this timing restriction is to decrease the likelihood that GSG will avoid these areas and increase habitat quality by reducing noise and human activities during the breeding season. The BLM would also implement a limitation on noise levels at the edge of occupied leks in the project area.

4.6.1.1.4. Residual Effects

A timing limitation restricting surface disturbance does not mitigate habitat loss, fragmentation or changes in disease mechanisms. Noise and human disturbance resulting from hydraulic fracturing, maintenance and production activities are likely to impact GSG nesting in the area for the life of the project. Suitability of the project area for GSG will be negatively affected due to habitat loss, fragmentation, and proximity of human activities associated with oil and gas development.

The BLM made a commitment to support the management objectives set by the State of Wyoming, to maintain populations and habitats. In addition, the BFO identified the following objectives in the current RMP: maintain a biological diversity of animal species, support the WGFD population objectives, maintain or improve quality of wildlife habitat, and provide habitat for special status habitat species (BLM 2001).

The PRB FEIS predicted that the PRB oil and gas development would have significant impacts to the GSG population. The impact of the proposed project development cumulatively contributes to the potential for local extirpation. Alternative B and the COAs applied are consistent with current BLM and Wyoming GSG conservation strategies and the anticipated effects are within the parameters of the PRB FEIS/ROD.

Current research does not identify specific components of energy development that measurably decrease impacts to GSG or their habitats. Even in areas where a variety of mitigation measures were applied, negative population impacts were still measurable when well density exceeded 1 well per square mile. Management of energy development based on current core area configurations and associated lease

stipulations, conditions of approval, and best management practices (BMPs), may not be sufficient to protect the population viability of PRB GSG.

4.6.2. Special Status (Sensitive) Species (SSS)

BLM supports the policies set forth in SSS 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 SSS on pp. 4-257 to 4-265. The effects to sensitive species resulting from implementation of the project are in Appendix D. Site specific effects to SSS are described below.

4.6.2.1. Brewer's Sparrow

4.6.2.1.1. Direct and Indirect Effects

The PRB FEIS discusses impacts to sensitive species on pp. 4-257 to 4-265. Additional impacts are described in the Migratory Birds section below.

Suitable habitat does not exist on the proposed pad locations, although it is present immediacy adjacent to both locations.

4.6.2.1.2. Cumulative Effects

Cumulative impacts to sensitive species are discussed in the PRB FEIS on pp. 4-273.

4.6.2.1.3. Mitigation Measures

Raptor and GSG timing limitations on surface disturbing activities would also serve to mitigate some impacts to nesting Brewer's sparrows. To ensure compliance with the MBTA, the BLM 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, and secondary containment where escape may be difficult or hydrocarbons or toxic substances are present.

4.6.2.1.4. Residual Effects

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 Brewer's sparrows will be negatively affected due to habitat loss and fragmentation and proximity of human activities associated with oil and gas development.

4.6.2.2. Ferruginous Hawk

4.6.2.2.1. Direct and Indirect Effects

Impacts to ferruginous hawks are discussed in the PRB FEIS on pg. 4-262. Additional information is provided here and in the Raptors section below.

Research suggests that ferruginous hawks are sensitive to disturbance during the breeding season (Olendorff 1973, Gilmer and Stewart 1983, Schmutz 1984, White and Thurow 1985, Bechard et al. 1990). Ferruginous hawks have been shown to select nest sites that avoid human habitation or disturbance (Lokemoen and Duebbert 1976, Schmutz 1984). Once a nest site has been selected, ferruginous hawks have been shown to abandon nest sites that are subject to disturbance (Snow 1974, White and Thurow 1985). When abandonment does occur, it tends to happen prior to hatching, so incubation represents a critically important time for reduced disturbance (Snow 1974, White and Thurow 1985). Sensitivity to disturbance may be inversely related to prey availability (White and Thurow 1985). Nests in proximity to

disturbance have been shown to produce fewer young (Olendorff 1973, Blair 1978, White and Thurow 1985). Ferruginous hawks tend not to return to breed in territories where breeding attempts in previous years failed as a result of disturbance (White and Thurow 1985).

The USFWS Ecological Services Office issued recommendations for species specific spatial and seasonal buffers for breeding raptors in January 2013. That office recommends implementing a 1.0 mile -buffer around ferruginous hawk nests in which would ban long-term land-use activities. They go on to state that these buffers can be modified based on local conditions, such as topography.

The Porsche Com 3 H well location is approximately 0.44 miles from the only documented ferruginous hawk nest and is in line of sight, and the Porsche 4 H location is approximately 0.21 miles from the same nest and is out of line of sight. Local topography should provide adequate biological buffering.

4.6.2.2.2. Cumulative Effects

Cumulative impacts to sensitive species are discussed in the PRB FEIS on pp. 4-273. Even without federal development, the extent of existing and/or future fee development alone may surpass a threshold that makes the area unsuitable for ferruginous hawks through avoidance and degradation of habitat quality.

Activities associated with livestock grazing may disturb ferruginous hawks, but these activities are often transient in nature and occur at low enough frequencies that disturbance to breeding ferruginous hawk pairs is likely minimal. If ferruginous hawks rely on the abundant prairie dog colonies for prey, practices such as poisoning or shooting of prairie dogs or other intentional methods of extermination in order to increase forage for livestock can affect ferruginous hawk productivity through a reduction in prey availability.

4.6.2.2.3. Mitigation Measures

To reduce the risk of decreased productivity or nest failure, BFO would implement a 0.5 mile radius timing limitation on surface disturbance during the breeding season around documented ferruginous hawk nests. This radius is not consistent with USFWS Ecological Services Field Office recommendations (1.0 mile for ferruginous hawks).

4.6.2.2.4. Residual Effects

Even with a timing limitation, ferruginous hawks may abandon nests due to alterations in foraging habitats associated with development or because of sensitivity to well or infrastructure placement. Even with timing limitations on surface-disturbing activities, ferruginous hawks may be displaced by other development activities. Traffic and construction activities that are not prohibited by the timing limitations may degrade habitat quality sufficiently to render the area unsuitable for some ferruginous hawks. Timing limitations do nothing to mitigate habitat loss, therefore drilling and construction that takes place outside of nesting season will still result in net habitat loss for this species. The timing limitation would result in some decrease in direct mortalities that would occur with increased drilling/production traffic during the breeding season. Mortalities associated with maintenance and non-surface-disturbing activities will still occur. Collisions with or electrocutions from power lines will still occur. Harassment or displacement of nesting individuals will still occur during the production and abandonment phases of the project.

4.6.2.3. Mountain Plover

4.6.2.3.1. Direct and Indirect Effects

An analysis of direct and indirect impacts to mountain plover due to oil and gas development is included in the PRB FEIS (4-254-255).

Development of the proposed project may impact mountain plovers. The area may provide suitable

mountain plover habitat in some years, depending on precipitation and grazing pressure. Both of the proposed locations meet all of the habitat requirements except that the residual grass and forb cover were too high to be preferred by mountain plovers at the time of the onsites; although this could change based on the rationale above.

Mineral development has mixed effects on mountain plovers. Disturbed ground, such as buried pipeline corridors and roads, may be attractive to plovers, while human activities within one-quarter mile may be disruptive. Use of roads and pipeline corridors by mountain plovers may increase their vulnerability to vehicle collision. Limiting travel speed to 25mph provides drivers an opportunity to notice and avoid mountain plovers and allows the birds sufficient time to escape from approaching vehicles. Even if a nesting plover flushes in time, the nest would likely still be destroyed. Overhead power lines provide perch sites for raptors that could result in increased mountain plover predation. Infrastructure such as treaters, tanks, and nearby metering facilities may provide shelter and den sites for ground predators such as skunks and foxes. Displaced mountain plovers may choose to nest in poor quality habitat when loss or alteration of their natural breeding habitat (predominantly prairie dog colonies) occurs, such as heavily grazed land, burned fields, fallow agriculture lands, roads, oil and gas well pads, and pipelines. These areas could become reproductive sinks. Adult mountain plovers may breed there, lay eggs and hatch chicks; however, the young may not reach fledging age due to the poor quality of the habitat.

4.6.2.3.2. Cumulative Effects

The PRB FEIS discussed the cumulative effects to mountain plover (pp. 4-245 to 4-255).

4.6.2.3.3. Mitigation Measures

Raptor and GSG timing limitations on surface disturbing activities would serve to mitigate some impacts to nesting mountain plover. To ensure compliance with the MBTA, the BLM 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, and secondary containment where escape may be difficult or hydrocarbons or toxic substances are present.

4.6.2.3.4. Residual Effects

Even with timing limitations on surface-disturbing activities for raptors and GSG, mountain plovers may be displaced by other activities associated with development. Traffic and construction activities that are not prohibited by the timing limitations may degrade habitat quality sufficiently to render the area unsuitable for some mountain plovers. Timing limitations do not reduce impacts to habitat: drilling and construction outside the nesting season will result in habitat loss for this species. Mortalities associated with maintenance and non-surface-disturbing activities may still occur.

4.6.2.4. Sage Thrasher

4.6.2.4.1. Direct and Indirect Effects

The PRB FEIS discusses impacts to sensitive species on pp. 4-257 to 4-265. Additional impacts are described in the Migratory Birds section below.

4.6.2.4.2. Cumulative Effects

Cumulative impacts to sensitive species are discussed in the PRB FEIS on pp. 4-273.

4.6.2.4.3. Mitigation Measures

Raptor and Greater Sage-Grouse timing limitations on surface disturbing activities would also serve to mitigate some impacts to nesting sage thrashers. If construction does not occur during May 1- July 31 it is unlikely that active nests will be destroyed by construction activities, as most nestlings will have already fledged. 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, and

secondary containment where escape may be difficult or hydrocarbons or toxic substances are present.

4.6.2.4.4. Residual Effects

If construction does not occur during May 1- July 31 it is unlikely that active nests will be destroyed by construction activities, as most nestlings will have already fledged. 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 sage thrashers will be negatively affected due to habitat loss and fragmentation and proximity of human activities associated with oil and gas development.

4.6.2.5. Big Game

4.6.2.5.1. Direct and Indirect Effects

The PRB FEIS discusses impacts, including direct and indirect effects, cumulative effects, and residual effects to big game on pp. 4-181 to 4-215. Year-long habitat for both pronghorn antelope and mule deer, would be directly disturbed with the construction of wells, and associated infrastructure. Long term disturbance would be direct habitat loss. Short-term disturbances also result in direct habitat loss; however, they should provide some habitat value as these areas are reclaimed and native vegetation becomes established.

In addition to the direct habitat loss, big game would likely be displaced from the project area during drilling and construction. A study in central Wyoming reported that mineral drilling activities displaced mule deer by more than 0.5 miles (Hiatt and Baker 1981). The WGFD indicates a well density of 8 wells per section creates a high level of impact for big game and that avoidance zones around mineral facilities overlap creating contiguous avoidance areas (WGFD 2004). A multi-year study on the Pinedale Anticline suggests not only do mule deer avoid mineral activities, but after 3 years of drilling activity the deer have not become accustomed to the disturbance (Madson 2005, Sawyer et al. 2006).

Big game animals are expected to return to the project area following construction; however, populations would likely be lower than prior to project implementation as the human activities associated with operation and maintenance continue to displace big game. (Jalkotzy et al. 1997, Lustig 2003, Sawyer et al. 2009).

Winter big game diets are sub-maintenance, meaning they lose weight and body condition as the winter progresses. Survival below the maintenance level requires behavior that emphasizes energy conservation. Canfield et al. (1999) pointed out that forced activity caused by human disturbance exacts an energetic disadvantage, while inactivity provides an energetic advantage for animals. Geist (1978) further defined effects of human disturbance in terms of increased metabolism, which could result in illness, decreased reproduction, and even death.

Energy development activities that occur within big game habitats during the spring will likely displace adult females and juveniles due to the human presence in the area. This may cause reduced survival rate of individuals that must expend increased energies to avoid such activities.

4.6.2.5.2. Cumulative Effects

The cumulative effects associated with Alternative B are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, refer to the PRB FEIS, p. 4-181 to 4-215.

4.6.2.5.3. Mitigation Measures

No mitigation is proposed with Alternative B.

4.6.2.5.4. Residual Effects

No residual impacts are anticipated.

4.6.2.6. Migratory Birds

4.6.2.6.1. Direct and Indirect Effects

The PRB FEIS discussed direct and indirect effects to migratory birds on pp. 4-231 to 4-235. The PRB FEIS states on p. 4-231, "Surface disturbance associated with construction, operation, and abandonment of facilities, including roads, has the potential to result in direct mortality of migratory birds. Most birds would be able to avoid construction equipment; however, nests in locations subject to disturbance would be lost, as would any eggs or nestlings." Direct mortality of a bird or destruction of an active nest due to construction activities could result in a "take" as defined (and prohibited) by the MBTA, a nondiscretionary statute, and in turn a violation of the law. See also, FLPMA, Sec. 302(b) and Raptors – Direct and Indirect Effects (4.6.2.1.1).

Habitat disturbance and disruptive activities (i.e. drilling, construction, completion, operations, and maintenance) resulting from implementation of the project is likely to affect migratory birds in the entire area. Native habitats would be lost directly with the construction of well pads, access roads, and overhead power lines. Surface disturbing activities that occur in the nesting season may kill migratory birds. Prompt re-vegetation of short-term disturbance areas should reduce habitat loss impacts. Pad construction, drilling, and to a lesser degree production, would displace edge-sensitive migratory birds from otherwise suitable habitat adjacent to the well pad. Drilling and construction noise can be troublesome for songbirds by interfering with the males' ability to attract mates and defend territory, and the ability to recognize calls from conspecifics (BLM 2003). Habitat fragmentation would result in more than just a quantitative loss in the total area of habitat available; the remaining habitat area would also be qualitatively altered (Temple and Wilcox 1986). Ingelfinger and Anderson (2004) identified that the density of breeding Brewer's sparrows declined by 36% and breeding sage sparrows declined by 57% within 100 meters of dirt roads in a natural gas field. Effects occurred along roads with light traffic volume (less than 12 vehicles per day). The increasing density of roads constructed in developing natural gas fields exacerbated the problem creating substantial areas of impact where indirect habitat losses through displacement were much greater than the direct physical habitat losses.

Those species that are edge-sensitive will be displaced further away from vegetative edges due to increased human activity, causing otherwise suitable habitat to be abandoned. If the interior habitat is at carrying capacity, then birds displaced from the edges will have no place to relocate. One consequence of habitat fragmentation is a geometric increase in the proportion of the remaining habitat that is near edges (Temple 1986). In severely fragmented habitats, all of the remaining habitat may be so close to edges that no interior habitat remains (Temple and Cary 1988). Over time, this leads to a loss of interior habitat species in favor of edge habitat species. Other migratory bird species that use the disturbed areas for nesting may be disrupted by the human activity, and nests may be destroyed by equipment.

During the onsites, the BLM biologist identified suitable nesting habitat present for several BLM sensitive sagebrush obligates. Construction of both well pads and their associated infrastructures will remove habitat and could kill BLM sensitive migratory birds, or destroy eggs.

Migratory bird species in the PRB nest in the spring and summer and are vulnerable to the same effects as GSG and raptor species. Though no timing restrictions are typically applied specifically to protect migratory bird breeding or nesting, where GSG or raptor nesting timing limitations are applied, nesting migratory birds are also protected. Where these timing limitations are not applied and migratory bird species are nesting, migratory birds remain vulnerable. Surface disturbing activities associated with the proposed project will have GSG and raptor timing limitations applied, thereby providing protection to

migratory birds until June 30. Whether migratory birds still receive protection until July 31 is dependent on whether an active raptor nest is located within 0.5 miles of the project area.

Heater treaters, and similar facilities with vertical open-topped stacks or pipes, can attract birds. Facilities without exclusionary devices pose a mortality risk. Once birds crawl into the stack, escape is difficult and the bird may become trapped (U.S. v. Apollo Energies Inc., 611 F.3d 679 (10th Cir. 2010); see also Colorado Oil and Gas Commission, Migratory Bird Policy, accessed February 13, 2012). To minimize these effects, the operator will equip all open-top pits, tanks, and pipes containing hydrocarbons with nets, screens, or other avian exclusion devices to prevent injury or death to migratory birds (SUPO, p. ??).

4.6.2.6.2. Cumulative Effects

The cumulative effects associated with alternative B are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, refer to the PRB FEIS, p. 4-235.

4.6.2.6.3. Mitigation Measures

GSG and raptor timing limitations on surface disturbing activities would also serve to mitigate impacts to nesting migratory birds. Raptor protections are put in place to avoid potential violations of the MBTA, making the guidance for seasonal timing relevant to the migratory bird issue as well. 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 recommendation 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.

Timing limitations for GSG (Porsche 3 H well pad; March 15 to June 30), and active raptor nests (Porsche 3 H, and the Porsche 4 H well pads; Feb 1 to July 31) all begin prior to nesting periods for sagebrush obligates, and thus may provide additional protection where migratory bird nesting periods and habitats overlap.

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.

4.6.2.6.4. 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. 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.

4.6.2.7. Raptors

4.6.2.7.1. Direct and Indirect Effects

The PRB FEIS discussed direct and indirect effects to raptors (pp. 4-216 to 4-221). This project would result in disturbance in proximity of nesting raptors, including direct and indirect habitat losses associated with declines in habitat effectiveness.

Human activities in close proximity to active raptor nests may interfere with nest productivity. Romin and Muck (1999) indicate that activities within 0.5 miles of a nest are prone to cause adverse impacts to nesting raptors. If mineral activities occur during nesting, they could be sufficient to cause adult birds to remain away from the nest and their chicks for the duration of the activities. This absence can lead to overheating or chilling of eggs or chicks. Prolonged disturbance can also lead to the abandonment of the nest by the adults. Both actions can result in egg or chick mortality.

BLM recommends the location of all infrastructures requiring human visitation be designed to provide an adequate biologic buffer for nesting raptors. A biologic buffer is a combination of distance and visual screening that provides nesting raptors with security such that routine activities preclude flushing the raptors. Reference the Ferruginous hawk section above for the sight specifics concerning distance and biological buffering for the only associated nest (BLM ID: 13503) within 0.5 miles of the project.

4.6.2.7.2. Cumulative Effects

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

4.6.2.7.3. Mitigation Measures

To reduce the risk of decreased productivity or nest failure, the BLM BFO requires a 0.5 mile radius timing limitation during the breeding season around active raptor nests.

4.6.2.7.4. Residual Impacts

Even with timing restrictions, raptors may abandon nests due to foraging habitat alteration associated with development or sensitivity to well or infrastructure placement. All raptors using nests in the vicinity of the project would likely be impacted to some extent by the human disturbance associated with operation and maintenance of the project. Routine human activities near these nests can draw increased predator activity to the area and increase nest predation. Declines in breeding populations of some species that are more sensitive to human activities may occur.

4.7. Cultural Resources

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 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 BLMy notified the Wyoming State Historic Preservation Officer (SHPO) on January 29, 2014, 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).

4.7.1. 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. This results in fewer archaeological resources available for study of past human life-ways, changes in human behavior through time, and interpreting 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 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. Construction of large plans of coalbed natural gas development on split estate often include associated infrastructure that is not permitted through BLM. Project applicants may connect wells draining fee minerals, or previously constructed pipelines on fee surface with a federal plan of development. BLM has no authority over such development 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. The cumulative effect of numerous federal approvals can result in impacts to historic properties. Archeological inventories reveal the location of sites and although the BLM goes to great lengths to protect site location data, information can potentially get into the wrong hands. BLM authorizations that result in new access can inadvertently lead to impacts to sites from increased visitation by the public.

4.7.2. Mitigation Measures

If operators observe any cultural values [sites, artifacts, human remains (Appendix L PRB FEIS and

ROD)] during operation of this lease/permit/right-of-way, they will be left intact and the Buffalo Field Manager notified. Standard COA (General)(A)(1) further explains discovery procedures.

4.7.3. 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 Analysis; OSP (Onsite Presence):

Contact	Organization	OSP?
Mary Hopkins	WY SHPO	No

List of Preparers (BFO unless otherwise noted)

Position/Organization	Name	Position/Organization	Name
NRS/Team Lead	Dustin Hill	Archaeologist	Ardeth Hahn
Supr NRS	Casey Freise	Wildlife Biologist	Christopher Sheets
Petroleum Engineer	Will Robbie	Geologist	Kerry Aggen
LIE	Karen Klaahsen	Assistant Field Manager	Chris Durham
Supr NRS	Kathy Brus	NEPA Coordinator	John Kelley
Assistant Field Manager	Clark Bennett		

6. References and Authorities

AHPIS, Animal and Plant Health Inspection Service. 2002. General information available online at http://www.aphis.usda.gov/lpa/issues/wnv/wnv.html.

Aldridge, C. L., and M. S. Boyce. 2007. Linking occurrence and fitness to persistence: a habitat-based approach for endangered greater sage-grouse. Ecological Applications 17:508-526.

American Water Works Association. 2013. Water and Hydraulic Fracturing, a White Paper. www.awwa.org/fracturing. Denver, CO. 17pp.

Balch, J.K, B.A. Bradley C.M D'Antonio, and J. Gomez-Dans. 2013. Introduced Annual Grass Increases Annual Fire Activity Across the Arid West (1980-2009). Global Change Biology. 19-1, pp. 173-183. http://onlinelibrary.wiley.com/doi/10.1111/gcb.12046/abstract.

Bechard, M. J., R. L. Knight, D. G. Smith, and R. E. Fitzner. 1990. Nest sites and habitats of sympatric hawks (*Buteo* spp.) in Washington. Journal of Field Ornithology 61:159-170.

Blair, C. L. 1978. Breeding biology and prey selection of Ferruginous Hawks in northwestern South Dakota. M.S. thesis. South Dakota State University, Brookings, South Dakota. 60 pages.

Blickley, J. L. & Patricelli, G. L. 2010 Impacts of Anthropogenic Noise on Wildlife: Research Priorities for the Development of Standards and Mitigation. *Journal of International Wildlife Law and Policy* 13, 274-292.

Blickley, J. L. & Patricelli, G. L. 2012 Potential acoustic masking of greater sage-grouse display components by chronic industrial noise. *Ornithological Monographs* 74, 23-35.

Blickley, J. L., Blackwood, D. & Patricelli, G. L. 2012 Experimental Evidence for the Effects of Chronic Anthropogenic Noise on Abundance of Greater Sage-Grouse at Leks. *Conservation Biology* 26, 461-471.

Blickley, J. L., Blackwood, D. L., Hardy, E. L. & Patricelli, G. L. in prep. Temporal flexibility in greater sage-grouse (Centrocercus urophasianus) signaling behavior in response to chronic industrial noise playback.

Blickley, J. L., Word, K. R., Krakauer, A. H., Phillips, J. L., Sells, S. N., Wingfield, J. C. & Patricelli, G. L. In review. Experimental chronic noise exposure is related to elevated fecal corticosteroid metabolites in lekking male greater sage-grouse (*Centrocercus urophasianus*). *PloS ONE*.

Bohne, J., T. Rinkes, and S. Kilpatrick. 2007. Sage-Grouse Habitat Management Guidelines for Wyoming. Wyoming Game and Fish Department. Cheyenne, Wyoming.

Bradley, B. A., J. F. Mustard. 2006. Characterizing the Landscape Dynamics of an Invasive Plant and Risk of Invasion Using Remote Sensing. Ecological Applications, 16(3), pp. 1132-1147.

Braun, C.E., O.O. Oedekoven, and C.L. Aldridge. 2002. Oil and Gas Development in Western North America: Effects on Sagebrush Steppe Avifauna with Particular Emphasis on Sage Grouse. In: Transactions of the 67th North American Wildlife and Natural Resources Conference. pp337-349.

Canfield, J. E., L. J. Lyon, J. M. Hillis, and M. J. Thompson. 1999. Ungulates. Chapter 6 in Effects of Recreation on Rocky Mountain Wildlife: A Review for Montana, coordinated by G. Joslin and H. Youmans. Committee on Effects of Recreation on Wildlife, Montana Chapter of The Wildlife

Chapman, S.S., Bryce, S.A., Omernik, J.M., Despain, D.G., ZumBerge, J., and Conrad, M. 2004. Ecoregions of Wyoming (color poster with map, descriptive text, summary tables, and photographs). Reston, Virginia, U.S. Geological Survey (map scale 1:1,400,000).

Connelly, J. W., S. T. Knick, M. A. Schroeder, and S. J. Stiver. 2004. Conservation Assessment of Greater Sage-grouse and Sagebrush Habitats. Western Association of Fish and Wildlife Agencies. Unpublished Report. Cheyenne, Wyoming.

Cornish, Todd; Terry Creekmore; Walter Cook; and Elizabeth Williams. 2003. "West Nile Virus - Wildlife Mortality in Wyoming 2002-2003". In: The Wildlife Society Wyoming Chapter Program and Abstracts for the Annual Meeting at the Inn in Lander, WY November 18-21, 2003. Wildlife Society Wyoming Chapter. 17pp.

Curtis, Jan and K. Grimes. 2004. Wyoming Climate Atlas. Wyoming Water Research Program, University of Wyoming; the U.S. Geological Survey; and the Wyoming Water Development Commission. 328 pp. http://www.wrds.uwyo.edu/sco/climateatlas/toc.html.

Doherty, K.E., D.E. Naugle, B.L. Walker, J.M. Graham. 2008. Greater sage-grouse winter habitat selection and energy development. Journal of Wildlife Management 72:187-195.

Duniway, M.C. J. E. Herrick, D. A. Pyke, and D. P. Toledo. 2010. Assessing Transportation Infrastructure Impacts on Rangelands: Test of a Standard Rangeland Assessment Protocol. Rangeland Ecol Manage 63:524-536.

Ebert, Jamies I., and Timothy A. Kohler. 1988. The Theoretical Basis of Archaeological Predictive Modeling and a Consideration of Appropriate Data-Collection Methods, in *Quantifying the Present and Predicting the Past: Theory, Method, and Application of Archaeological Predictive Modeling* edited by W. James Judge and Lynne Sebastian, pp. 97-171. U.S. Department of the Interior, BLM Service Center, Denver, CO.

Eckerle, William. 2005. Experimental: Archaeological Burial Model for Powder River and Tongue River Hydrological Basins, Wyoming. In *Adaptive Management and Planning Models for Cultural Resource in Oil and Gas Fields in New Mexico and Wyoming*, by Eric Ingbar, Lynne Sebastian, Jeffrey Altschul, Mary Hopkins, William Eckerle, Peggy Robinson, Judson Finley, Stephen A. Hall, William E. Hayden, Chris M. Rohe, Tim Seaman, Sasha Taddie, and Scott Thompson, pp. 39-102. Prepared for the Department of Energy, National Energy Technology Laboratory by Gnomon, Inc. Electronic Document, http://www.gnomon.com/DOEPumpIII/FinalCombinedReport.pdf, accessed August and September 2010.

Garton, E.O., J.W. Connelly, C.A. Hagen, J.S. Horne, A. Moser, and M.A. Schroeder. 2011. Greater Sage-grouse Population Dynamics and Probability of Persistence. Pages 293-381 in Greater sage-grouse: ecology and conservation of a landscape species and its habitats, S. T. Knick, J. W. Connelly, C. E. Braun (editors). Studies in Avian Biology, Number 38, University of California Press, Berkeley, CA, USA.

Geist, V. 1978. Behavior. Big Game of North America; ecology and management. Stackpole Books, Harrisburg, Pennsylvania.

Gelbard J. L., and J. Belnap. 2003. Roads as conduits for exotic plant invasions in a semiarid landscape. Conservation Biology. 17:420–432.

Gilmer, D.S. and R.E. Stewart. 1983. Ferruginous hawk populations and habitat use in North Dakota. J. Wildl. Manage. 47:146-157.

Goolsby, J. 2012. Evolution & Revolution of Drilling Technologies & the Impact on Wyoming. Goolsby, Finley, and Associates, LLC. Presentation.

Hiat, G.S. and D. Baker. 1981. Effects of oil/gas drilling on elk and mule deer winter distributions on Crooks Mountain, Wyoming. Wyoming Game and Fish Department.

Holloran, M J.; B. J. Heath; A. G. Lyon; S. J. Slater; J. L. Kuppiers; and S. H. Anderson. 2005. Greater sage-grouse nesting habitat selection and success in Wyoming. J. Wildl. Manage. 69(2):638-649.

Holloran, M. J, and S. H. Anderson. 2005. Spatial distribution of Greater Sage-Grouse nests in relatively contiguous sagebrush habitats. Condor 107:742-752.

Holloran, M. J. 2005. Greater sage-grouse (Centrocercus urophasianus) population response to natural gas field development in western Wyoming. Dissertation, University of Wyoming, Laramie.

Holloran, M. J., R. C. Kaiser, and W. A. Hubert. 2007. Population Response of yearling greater sage-grouse to the infrastructure of natural gas fields in southwestern Wyoming. Completion report. Wyoming Cooperative Fish and Wildlife Research Unit, Laramie, WY, USA. 34pp.

Ingelfinger, F., and S. Anderson. 2004. Passerine response to roads associated with natural gas extraction in a sagebrush steppe habitat. Western North American Naturalist 64:385-395.

Jalkotzy, M.G., P.I. Ross, and M.D. Nasserden. 1997. The Effects of Linear Developments on Wildlife: A Review of Selected Scientific Literature. Arc Wildlife Services Ltd., Calgary, Alberta, Canada.

Ken Kreckel. 2007. Direction Drilling: The Key to Smart Growth of Oil and Gas Development in the Rocky Mountain Region. The Wilderness Society, http://wilderness.org/files/Directional-Drilling.pdf .

Knick, S. T., and J. W. Connelly. 2011. Greater Sage-grouse: Ecology and Conservation of a Landscape Species and Its Habitats. University of California Press, Berkeley, California.

Lokemoen, J.T. and H.F. Duebbert. 1976. Ferruginous hawk nesting ecology and raptor populations in northern South Dakota. The Condor 78:464-470.

Lustig, Thomas D., March. 2003. Where Would You Like the Holes Drilled into Your Crucial Winter Range? Transactions of the 67th North American Wildlife and Natural Resources Conference.

Lyon, A.G. and S.H. Anderson. 2003. Potential Gas Development Impacts on Sage Grouse Nest Initiation and Movement. *Wildlife Society Bulletin* 31:486-91.

Madson, Chris. 2005, March. Deer on the Anticline. Wyoming Wildlife, 69(3), 10-15.

Moynahan, B. J. and M. S. Lindberg. 2004. *Nest Locations of Greater Sage-Grouse in Relation to Leks in North-Central Montana*. *Presented at* Montana Sage-Grouse Workshop, Montana Chapter of The Wildlife Society, Billings.

Naugle, D. E. K. E. Doherty, B. L. Walker, M. J. Holloran, and H. E. Copeland. 2011. Energy Development and Greater Sage-Grouse. Pp. 489-529 in Greater Sage-Grouse: ecology and conservation of a landscape species and its habitats, S. T. Knick, J. W. Connelly, C. E. Braun (eds.) Studies in Avian Biology, Number 38, University of California Press, Berkley.

Naugle, D. E.; C. L. Aldridge; B. L. Walker; T. E. Cornish; B. J. Moynahan; M. J. Holloran; K. Brown; G. D. Johnson; E. T. Schmidtmann; R. T. Mayer; C. Y. Kato; M. R. Matchett; T. J. Christiansen; W. E. Cook; T. Creekmore; R. D. Falise; E. T. Rinkes; and M. S. Boyce. 2004. West Nile virus: Pending Crisis of Greater Sage-grouse. Ecology Letters. 7:704-713.

Naugle, David E.; Brett L. Walker; and Kevin E. Doherty. 2006. Sage Grouse Population Response to Coal-bed Natural Gas Development in the Powder River Basin: Interim Progress Report on Region-wide Lek Analyses. May 26, 2006. University of Montana. Missoula, MT. 10pp

Nicholoff, S. H., compiler. 2003. Wyoming Bird Conservation Plan, Version 2.0. Wyoming Partners in Flight. Wyoming Game and Fish Department, Lander, WY.

North Dakota Industrial Commission Oil and Gas Research Program. 2011. Investigation of Methodologies to Control Dust on County Roads in Western North Dakota. Grant Applicants: Dunn and Mckenzie County.

Northeast Wyoming Sage-grouse Working Group. 2006. Northeast Wyoming Sage-Grouse Conservation Plan.

Olendorff, R.R. 1973. The ecology of the nesting birds of prey of northeastern Colorado. U.S.I.B.P. Tech. Rept. No. 211. Colorado State Univ., Fort Collins, Colorado.

Patricelli, G. L., J. L. Blickley, and S. L. Hooper. 2012. The impacts of noise on greater sage-grouse: A discussion of current management strategies in Wyoming with recommendations for further research and interim protections. University of California, Davis, CA. 25pp.

Pendery, Bruce M. 2010, BLM's Retained Rights: How Requiring Environmental Protection Fulfills Oil and Gas Lease Obligations, 40 Environmental Law, 599-685.

Romin, Laura A., and Muck, James A. May 1999. Utah Field Office Guidelines For Raptor Protection From Human And Land Use Disturbances. U.S. Fish and Wildlife Service, Salt Lake City, Utah.

Rowland, M. M., M. Leu, , S. P. Finn, S. Hanser, L. H. Suring, J. M. Boyd, C. W. Meinke, S. T. Knick, and M. J. Wisdom. 2005. Assessment of threats to sagebrush habitats and associated species of concern in the Wyoming Basins. Version 1.1, June 2005, unpublished report on file at USGS Biological Resources Discipline, Snake River Field Station, 970 Lusk St., Boise, ID 83706.

Saab, V., and T. Rich. 1997. Large-scale conservation assessment for neotropical migratory landbirds in the Interior Columbia River Basin. USDA Forest Service General Technical Report PNW-GTR-399, Portland, Oregon.

Sawyer, H., M.J. Kauffman, and R.M. Nielson. 2009. Influence of Well Pad Activity on Winter Habitat Selection Patterns of Mule Deer. Journal of Wildlife Managament 73(7):1052–1061.

Sawyer, H., R.M. Nielson, F. Lindzey, and L.L. McDonald. 2006. Winter Habitat Selection of Mule Deer Before and During Development of a Natural Gas Field. Journal of Wildlife Management 70 (2):396–403.

Schmutz, J.K. 1984. Ferruginous and Swainson's hawk abundance and distribution in relation to land use in southeastern Alberta. J. Wildl. Manage. 48(4):1180-1187.
Snow, C. 1974. Habitat management series for unique or endangered species. Ferruginous Hawk Rept. No. 13. Bureau of Land Management.
State wildlife agencies' ad hoc committee for sage-grouse and oil and gas development. 2008. Using the best available science to coordinate conservation actions that benefit greater sage-grouse across states affected by oil and gas development in Management Zones I-II (Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming). Unpublished report. Colorado Division of Wildlife, Denver; Montana Fish, Wildlife and Parks, Helena; North Dakota Game and Fish Department, Bismarck; Utah Division of Wildlife Resources, Salt Lake City; Wyoming Game and Fish Department, Cheyenne.
Stiver, S. J., A. D. Apa, J. R. Bohne, S. D. Bunnell, P. A. Deibert, S. C. Gardner, M. A. Hilliard, C. W. McCarthy, and M. A. Schroeder. 2006. Greater Sage-grouse comprehensive conservation strategy. WAFWA, Cheyenne, WY. 21 August 2009.
Taylor, R. L., D. E. Naugle, L. S. Mills. 2012. Viability analyses for conservation of sage-grouse populations: Buffalo Field Office, Wyoming. Final Report. February 27, 2012. Univ. of MT.
Taylor, R. L., D. E. Naugle, L. S. Mills. 2012. Viability analyses for conservation of sage-grouse populations: Buffalo Field Office, Wyoming. Final Report. February 27, 2012. University of Montana, Missoula, MT.
Temple S. A. 1986. Predicting impacts of habitat fragmentation on forest birds: A comparison of two models. Pages 301-304 in Wildlife 2000 (J. Verner, C. J. Ralph, and M. L. Morrison, Eds.). Univ. Wisconsin Press, Madison.
Temple S.A., and J. R. Cary. 1988. Modeling dynamics of habitat-interior bird populations in fragmented landscapes Conserv. Biol.2 :340-347.
Temple, S.A., and B.A. Wilcox. 1986. Introduction: Predicting effects of habitat patchiness and fragmentation. In *Wildlife 2000: Modeling Habitat Relationships of Terrestrial Vertebrates*, ed. J. Verner, M.L. Morrison, and C.J. Ralph, 261-62. Madison: University of Wisconsin Press.
U.S. Department of Interior. Fish and Wildlife Service (FWS). 2013. Recommended Seasonal and Spatial Buffers to Protect Nesting Raptors. Wyoming Ecological Services Office, Cheyenne, WY. Updated January 30, 2013. http://www.fws.gov/wyominges/Pages/Species/Species_SpeciesConcern/Raptors.html.
U.S. Department of the Interior 2003, Bureau of Land Management. Powder River Oil and Gas Project Environmental Impact Statement and Resource Management Plan Amendment. April 30, 2003.
U.S. Department of the Interior 2011, Bureau of Land Management. BLM National Greater Sage-Grouse Land Use Planning Strategy. IM 2012-044. December 27, 2011. 2 Attachments.
U.S. Department of the Interior 2012, Bureau of Land Management, Buffalo Field Office, Viability Analysis for Conservation of Sage-grouse Populations, R. L. Taylor, D. E. Naugle, and L. S. Mills, Univ. of MT.
U.S. Department of the Interior, Fish and Wildlife Service (FWS). 2010. Endangered and Threatened Wildlife and Plants; 12-Month Findings for Petitions to List the Greater Sage-Grouse (Centrocercus urophasianus) as Threatened or Endangered. 50 CFR Part 17.
U.S. Department of the Interior, Fish and Wildlife Service (FWS). 2010. Endangered and Threatened Wildlife and Plants; 12-Month Findings for Petitions to List the Greater Sage-Grouse (*Centrocercus urophasianus*) as Threatened or Endangered. 50 CFR Part 17.
University of Wyoming, Norton, J., Strom, C., Reclamation Considerations for Oil and Gas Lease Contracts on Private Lands, Bulletin B-1242, Apr. 2013.
US Department of Agriculture, 2006, Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin, Handbook 296, Washington, DC.
US Department of the Interior 2009, Bureau of Land Management, High Plains District, Update of Task 3A Report for the Powder River Basin Coal Review Cumulative Air Quality Effects for 2020, (AECOM).
US Department of the Interior 2009, Bureau of Land Management, Instruction Memorandum 2009-078. Processing Oil and Gas Applications for Permit to Drill for Directional Drilling into Federal Mineral Estate from Multiple-Well Pads on Non-Federal Surface and Mineral Estate Locations.
US Department of the Interior 2011, Bureau of Land Management. State Director Review, SDR WY-2011-010.
US Department of the Interior, Geological Survey. 2007. Organic Compounds in Produced Waters from Coalbed Natural Gas Wells in the Powder River Basin, Wyoming. Applied Geochemistry 22, 2240–2256.
US Department of the Interior, Geological Survey. 2010. Assessment of Potential Effects of Water Produced from Coalbed Methane Natural Gas Development on Macroinvertebrate and Algal Communities in the Powder River and Tongue River, Wyoming and Montana.

US Department of the Interior, Geological Survey. 2012. Hydraulic Fracturing – The State of the Science. Induced Seismicity. Leith, B. http://www.usgs.gov/solutions/ppt/2012june08_leith.pptx. Congressional Briefing hosted by the Honorable Gerry Connelly (D-VA). June 8, 2012. View at: http://www.youtube.com/watch?v=XnRH9i8hpbo&feature=youtu.be See, Earthquakes Induced by Fluid Injection. http://www.usgs.gov/faq/index.php?sid=54684&lang=en&action=show&cat=125

US Department of the Interior, Geological Survey. 2012. Kresse, T.M., Warner, N.R., Hays, P.D., Down, A., Vengosh, A., and Jackson, R.B., 2012, Shallow groundwater quality and geochemistry in the Fayetteville Shale gas-production area, north-central Arkansas, 2011: Investigations Report 2012–5273, 31 p.

US Environmental Protection Agency, 2012, Oil and Natural Gas Sector: New Source Performance Standards and National Emission Standards for Hazardous Air Pollutants Reviews, 77 FR 49490.

US Environmental Protection Agency. 2004. Evaluation of Impacts to Underground Sources of Drinking Water by Hydraulic Fracturing of Coalbed Methane Reservoirs Study, EPA 816-R-04-003, http://water.epa.gov/type/groundwater/uic/upload/completestudy.zip .

US National Academy of Sciences, 2012. Induced Seismicity Potential in Energy Technologies. Washington, D.C.

Walker B, Naugle D, Rinkes T. 2003. The Response of Sage Grouse to Coal-bed Methane Development and West Nile virus in the Powder River Basin: Is There a Link ? Page 6 in: Program and Abstracts for the Annual Wildlife Society Meeting, Wyoming Chapter.

Walker, B. L., and D. E. Naugle. 2011.West Nile virus ecology in sagebrush habitats and impacts on greater sage-grouse populations. Pages 127-142 in Greater sage-grouse: ecology and conservation of a landscape species and its habitats, S. T. Knick, J. W. Connelly, C. E. Braun (eds). Studies in Avian Biology, Number 38, University of California Press, Berkley.

Walker, B. L., D. E. Naugle, K. E. Doherty, and T. E. Cornish. 2007. West Nile virus and greater sage-grouse; estimating infection rate in a wild bird population. Avian Diseases 51:691-696.

Walker, B.L., D. E. Naugle, and K.E. Doherty. 2007. Greater sage-grouse population response to energy development and habitat loss. Journal of Wildlife Management 71:2644-2654.

Walker, B.L., D. E. Naugle, and K.E. Doherty. 2007. Greater sage-grouse population response to energy development and habitat loss. Journal of Wildlife Management 71:2644-2654.

Walker, B.L., D. E. Naugle, and K.E. Doherty. 2007. Greater sage-grouse population response to energy development and habitat loss. Journal of Wildlife Management 71:2644-2654.

Warner, N.R., Jackson, R.B., Darraha, T.H., Osbornc, S.G., Downb, A., Zhaob, K., Whitea, A. and Vengosha, A., 2012, Geochemical evidence for possible natural migration of Marcellus Formation brine to shallow aquifers in Pennsylvania, Proceedings Natl Acad Sciences

WGFD. 2003. Wyoming Greater Sage-Grouse Conservation Plan. WGFD. Cheyenne, WY.

WGFD. 2005. Northeast Wyoming Local Working Group Area: Annual Sage-Grouse Completion Report for 2005. Wyoming Game and Fish Department. Buffalo, WY. 42pp.

WGFD. 2009. Minimum Recommendations for Development of Oil and Gas Resources within Crucial and Important Wildlife Habitats on BLM Lands. WGFD. Cheyenne, WY

WGFD. 2009. Minimum Recommendations for Development of Oil and Gas Resources within Crucial and Important Wildlife Habitats on BLM Lands. WGFD. Cheyenne, WY.

WGFD. 2011a. 2011 Sheridan Region Annual Big Game Herd Unit Reports. WGFD. Cheyenne, WY.

WGFD. 2011b. 2011 Sheridan Region Lek Monitoring Results.

White, C.M. and T.L. Thurow. 1985. Reproduction of ferruginous hawks exposed to controlled disturbance. The Condor 87:14-22.

Wyoming Department of Environmental Quality, June 14, 2004. Compliance Monitoring for Ground Water Protection Beneath Unlined Coalbed Methane Produced Water Impoundments

Wyoming Game and Fish Department (WGFD). 2004. Minimum Recommendations for Development of Oil and Gas Resources within Crucial and Important Wildlife Habitats on BLM Lands. WGFD. Cheyenne, WY.

Wyoming Game and Fish Department (WGFD). 2004. Minimum Recommendations for Development of Oil and Gas Resources within Crucial and Important Wildlife Habitats on BLM Lands. WGFD. Cheyenne, WY.

Wyoming Oil and Gas Conservation Commission. 2013. Well Files, http://wogcc.state.wy.us/ .

APPENDIX A. Wildlife Tables

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	Block Cleared
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	K	MIHH	Habitat present

Presence
K - Known, documented in project area.
S - Habitat suitable and species suspected in the project area.
NS - Habitat suitable but species is not suspected in the project area.
NP - Habitat not present and species unlikely to occur in the project area.

Project Effects
LAA - Likely to adversely affect
NE - No Effect
NLAA - May Affect, not likely to adversely affect individuals or habitat.
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 (candidate).
WIPV - Will Impact Individuals or Habitat and may contribute to a trend towards federal listing or cause a loss of viability to the population or species (candidate).

Summary of Sensitive Species Habitat and Project Effects.

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.	NP	NI	Habitat 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				

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
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.	NP	NI	Habitat not present.
Bald eagle (*Haliaeetus leucocephalus*)	Mature forest cover often within one mile of large water body with reliable prey source nearby.	NP	NI	Habitat not present.
Brewer's sparrow (*Spizella breweri*)	Sagebrush shrubland	S	MIHH	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	K	MIIH	Documented nests occur within 0.5 miles of the project area.
Loggerhead shrike (*Lanius ludovicianus*)	Basin-prairie shrub, mountain-foothill shrub	NP	NI	Habitat not present.
Long-billed curlew (*Numenius americanus*)	Grasslands, plains, foothills, wet meadows	NP	NI	Habitat not present.
Mountain Plover	Short-grass prairie with slopes < 5%	S	MIIH	Habitat not present
Northern goshawk (*Accipiter gentilis*)	Conifer and deciduous forests	NP	NI	Habitat not present.
Peregrine falcon (*Falco peregrinus*)	Cliffs	NP	NI	Habitat not present.
Sage sparrow (*Amphispiza billneata*)	Basin-prairie shrub, mountain-foothill shrub	NP	NI	Outside documented species range.
Sage thrasher (*Oreoscoptes montanus*)	Basin-prairie shrub, mountain-foothill shrub	S	MIHH	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.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Mammals				
Black-tailed prairie dog (*Cynomys ludovicianus*)	Prairie habitats with deep, firm soils and slopes less than 10 degrees.	NP	NI	No known colonies 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.
Spotted Bat (*Euderma maculatum*)	Prominent rock features in extreme, low desert habitats to high elevation forests.	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.

Presence
K - Known, documented observation in project area.
S - Habitat suitable and species suspected, to occur in the project area.
NS - Habitat suitable but species is not suspected to occur in the project area.
NP - Habitat not present and species unlikely to occur in 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