DECISION RECORD
Yates Petroleum Corporation, Raging Bull Com 2H, Plan of Development (POD)
Environmental Assessment (EA), WY-070-EA12-207
Bureau of Land Management, Buffalo Field Office, Wyoming

DECISION. The BLM approves Yates Petroleum Corporation's (Yates) Raging Bull Com 2H gas and oil well application for permit to drill (APD) as described in Alternative B of the EA, WY-070-EA12-207, incorporated here by reference. This approval includes the well's support facilities. The surface location and mineral ownership of this well is fee/fee (private surface/private mineral). The bottom hole for this well is federal mineral, accessed by drilling horizontally, approximately 0.9 miles SW of the surface location, to a depth of approximately 10,900 ft. Therefore BLM has jurisdiction on the drilling, well-bore, and down-hole aspects.

Compliance. This decision complies with:

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

Consultation. This decision considered:

- BLM Instruction Memorandum No. 2009-078, Processing Oil and Gas Application for Permit to Drill for Directional Drilling into Federal Mineral Estate from Multiple-Well Pads on Non-Federal Surface and Mineral Locations, 2009.
- Wyoming BLM State Director Review, SDR No. WY-2011-010, EOG Resources, Inc. v. Pinedale Field Office, 2011.

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

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

	Well Name	Well #	Qtr/Qtr	Section	TWP	RNG	Lease #
1	Raging Bull Com	2H	NENW	19	43N	73W	WYW152835

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-EA12-207, and the FONSI (incorporated here by reference) found Yates proposal for this well, will have no significant impacts on the human environment, beyond those described in the PRB FEIS. This project tiers to or incorporates by reference the following analyses which found no significant impact to the environment. There is no requirement for an EIS.

This Project Tiers to or Incorporates by Reference this Analysis, in Addition to the PRB FEIS.

POD Name	NEPA Document	Well Type & #	Approval
Yates: Sunrise Federal 32	WY-070-EA11-287	Oil / 1	8/12/2011#
Samson: Hornbuckle	WY-060-EA11-181	Oil/48 pads	8/26/2011
Yates: Verde	WY-070-08-177	CBNG / 11	9/12/2008

COMMENT OR NEW INFORMATION SUMMARY, BLM publically posted the proposed APD for

30 days, received no comments, and then internally scoped the APD. BLM experience in the PRB (outside of the Fortification Creek Planning Area) revealed little public input or new issue discovery other than those revealed after public scoping during development of the PRB FEIS.

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 project's need. For a complete description of all mitigation measures and COAs, see the approved POD and COA section. The PRB FEIS analyzed and predicted that the PRB oil and gas development would have significant impacts to the region's Greater Sage-Grouse (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. The operator will conduct operations to minimize adverse effects to surface and subsurface resources, prevent unnecessary surface disturbance, and conform to currently available technology and practice.

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

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

5. The operator certified it has a surface access agreement or posted a 43 CFR 3814.1 bond.

6. The operator provided the BLM a true and complete copy of a document in which the owner of the surface authorizes the operator to drill a federal well from non-federal lands, and in which the surface owner or representative guarantees the Department of the Interior (Department), including BLM, access to the non-federal lands to perform all necessary surveys and inspections. (See BLM WO Instruction Memorandum No. 2009-078, p. 2, para 6).

7. The project is clearly lacking in wilderness characteristics as there is no federal surface.

8. This APD is 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 surface disturbance is more than 5 acres.

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: 4/27/12

FINDING OF NO SIGNIFICANT IMPACT
Yates Petroleum Corporation, Raging Bull Com 2H, Plan of Development (POD)
Environmental Assessment (EA), WY-070-EA12-207
Bureau of Land Management, Buffalo Field Office, Wyoming

FINDING OF NO SIGNIFICANT IMPACT (FONSI). Based on the information in the EA, WY-070-EA12-207, 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, the Verde EA, WY-070-08-177, Hornbuckle EA, WY-060-EA11-181, and Sunrise Federal 32 EA, WY-070-EA11-287 to which the EA incorporates by reference or tiers to; (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, 2003 PRB FEIS, or other legislative or regulatory processes. BLM used relevant scientific literature and professional expertise in preparing the EA. The scientific community is reasonably consistent with their conclusions on environmental effects relative to oil and gas development. Research findings on the nature of the environmental effects are not highly controversial, highly uncertain, or involve unique or unknown risks. The PRB FEIS predicted and analyzed oil development of the nature proposed with this project and similar projects. The selected alternative does not establish a precedent for future actions with significant effects. The proposal may relate to the PRB Greater Sage-Grouse and its habitat decline having cumulative significant impacts; yet the small size of this project is within the parameters of the impacts in the PRB FEIS. There are no cultural or historical resources present that will be adversely affected by the selected alternative. The project area is clearly lacking in wilderness characteristics as it has no federal surface. 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: 9/27/12

ENVIRONMENTAL ASSESSMENT (EA), WY-070-EA12-207
Yates Petroleum Corporation, Raging Bull Com 2H, Plan of Development (POD)
Bureau of Land Management, Buffalo Field Office, Wyoming

1. INTRODUCTION

BLM provides an EA for Yates Petroleum Corporation's (Yates), Ragging Bull 2H horizontal oil and gas well application for permit to drill (APD). 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, Verde EA, WY-070-08-177, Hornbuckle EA, WY-060-EA11-181, Sunrise Federal 32 EA, WY-070-EA11-287 and the PRB FEIS Record of Decision (ROD) pursuant to 40 CFR 1508.28 and 1502.21. One may review these documents at the BLM Buffalo Field Office (BFO) and on our website. This APD is pursuant to the Mineral Leasing Act for exploring or developing oil or gas and do not satisfy the categorical exclusion directive of the Energy Policy Act of 2005, Section 390 because individual surface disturbances are greater than 5 acres. The surface location and mineral ownership of this well is fee/fee (private surface/private mineral). The bottom hole for this well is federal mineral, accessed by drilling horizontally, approximately 0.9 miles SW of the surface location, to a depth of approximately 10,900 ft. BLM has jurisdiction on the drilling, well-bore, and down hole aspects.

Congress made a 4-part process for federal fluid mineral decisions under the long-term needs of multiple-use. First is the land use / resource management plan (RMP); here the PRB FEIS and ROD amendment to the BFO RMP. Second are the decisions of whether and, if so, under what conditions, to lease lands for fluid mineral development. Courts held leasing decisions are an almost irrevocable resource commitment. Third, (this phase) is deciding on the proposed POD or APD, or both: the site-specific analysis, and mitigation. Fourth is the monitoring and reclamation of wells and their features. (Pendery 2010)

1.1. Background

Yates submitted the APD on June 14, 2012, after a State Director Review, SDR WY-2012-22 addressed the drilling plan's pressure control; see also WY BLM Instruction Memorandum, IM-WY-2012-037.
The operator and BLM conducted onsite visits on May 4, 2011.

1.2. Need for the Proposed Project

The need for this project is to determine whether, how, and under what conditions to support the Buffalo Resource Management Plan's (RMP) goals, objectives, and management actions (2003 Amendment) with allowing the exercise of the operator's conditional lease rights to develop fluid minerals on federal leases.

APD information is an integral part of this EA, which BLM incorporates here by reference (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.

BLM Instruction Memorandum (IM) No. 2009-078 established policy and procedures for processing APDs for directional drilling into federal mineral estate from multiple well pads on non-federal locations. Drilling and producing the subject well is a federal action per IM No. 2009-078. Construction, some operation, and reclamation of infrastructure on non-federal land are not federal actions. Drilling and producing mitigation is in Conditions of Approval for Conventional Application for Permit to Drill.

The approval of an APD is a federal undertaking under section 106 of NHPA, even when the resulting impacts are non-federal land, per IM No. 2009-078. Actions that intentionally, significantly, and adversely affect a historic property with the intent to avoid the requirements of NHPA Section 106 are in violation of NHPA Section 110(k) and require the field office to deny the APD. The BLM's inspection and enforcement authority and responsibility would include compliance with any mitigation or other conditions established for approval of the APD as a result of the NHPA and ESA consultation process. Cultural mitigation is found in Conditions of Approval for Conventional Application for Permit to Drill.

BLM has responsibility and obligation to analyze the full effects of the action, and identify mitigation measures, regardless of the BLM's authority to enforce the mitigation. The BLM needs to identify mitigation measures that would reduce or eliminate the effects of a non-federal action when it is a connected action to the BLM proposed action (see the NEPA handbook, section 6.8.2.1.1, connected Non-federal Actions). Identifying mitigation outside of the BLM's jurisdiction alerts the other agencies that can implement the mitigation. The probability of the other agencies implementing the mitigation measures is likely to occur, though such agencies may vary specific parameters the BLM recommended.

Proposal effects and recommended mitigation measures are found in the Raging Bull 2H Surface Use Plan, WY-070-EA12-207 and BLM Recommended Conditions of Approval for Conventional Application for Permit to Drill.

1.4. Scoping and Issues

BFO external scoping included a 30 day posting of the proposed APD and the EA's timely publication on the BFO website. Previously BFO conducted extensive external scoping for the PRB FEIS - discussed on p. 2-1 of the PRB FEIS and on p. 15 of the PRB ROD. This project is similar in scope to other fluid mineral development the BFO analyzed. External scoping of the horizontal drilling in Samson Resources EA, WY-060-EA11-181, 2011, in the PRB area received 2 comments, revealing no new issues. External scoping in 2010 and 2011 for a proposed RMP amendment revealed no new issues outside of geographically-specific ones.

The BFO interdisciplinary team (ID team) conducted internal scoping by reviewing the proposed development and project location to identify potentially affected resources and land uses. This EA will not discuss resources and land uses that are either not present, not affected, or that the PRB FEIS adequately addressed. The ID team identified important issues for the affected resources to focus the analysis. This EA addresses the project and its site-specific impacts that were unknown and unavailable for review at the time of the PRB FEIS analysis to help the decision maker come to a reasoned decision. Project issues include:

- Air quality
- Soils and vegetation: site stability, reclamation potential, riparian and wetland communities, invasive species
- Water: ground water, quality, and quantity of produced water.
- Wildlife: raptor productivity, migratory birds, special status species
- Cultural: National Register eligible sites

2. PROPOSED PROJECT AND ALTERNATIVES

2.1. Alternative A – No Action

The PRB FEIS considered a No Action Alternative, pp. 2-54 to 2-62. This alternative must also consider and aggregate the effects analyzed in the PRB FEIS analysis with incorporating by reference the subsequent analysis and development from the adjacent and intermingled projects (by approval date): Verde POD WY-070-EA08-177, 2008, Hornbuckle EA, WY-060EA11-181, 2011, and the Sunrise

Federal 32 POD EA, WY-070-EA11-287, 2011. The total number of conventional wells approved by BFO is 359, which includes 193 horizontal wells (as of March 2012). The WOGCC permitted 103 wells. The total is 453, which represents 14% of the projected 3,200 in the 2003 PRB ROD. (See Table 2.3 below 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 over 51,000 coal bed natural gas (CBNG) and 3,200 natural gas and oil wells. The no action alternative would consist of no new federal wells. This alternative would deny this APD and /or POD requiring the operator to resubmit a APD or a POD that complies with statutes and the reasonable measures in the PRB RMP Record of Decision (ROD) in order to lawfully exercise conditional lease rights. This alternative could, through secretarial discretion suspend the senior leasehold, or could administratively cancel or withdraw the lease if improperly awarded, or seek to cancel the lease. It is not possible in the abstract to identify every interest and that is beyond the scope here.

2.2. Alternative B Proposed Action

Project Name: Surface location:

Well Name & Number	QTR	SEC	TWN	RNG	Lease #	Status
Raging Bull Com #2H	NENW/Lot 7	19	43N	73W	WYW152835	APD

Operator/Applicant: Yates Petroleum Corporation (Yates)

Surface Owners: James and Edra Drake/Bernice Groves. The proposal's area is approximately 8 acres, all private surfaces. The proposal clearly lacks wilderness characteristics as it has is no federal surface.

Overview: Company proposes drilling and developing 1 horizontal oil well, into federal mineral estate from a well pad on a non-federal location. The proposed well is 43 miles south of Gillette, Wyoming, in Campbell County. The area has historic and current ranching, farming and oil and gas production. The site where the well is to be drilled is fairly level, as is most of the surrounding area and vegetated with a big sagebrush/grassland habitat. There are scattered, small buttes in the area and the Belle Fourche River is about ¼ mile the NE of the well. The primary objective is to horizontally drill to the Turner Formation at 10,810 feet total vertical distance. The bottom hole location is in SWSW, Section 19, T43N, R73W.

Drilling, Construction and Production Design Features Include:

- The operator anticipates completing drilling and construction within 2 years. Once drilling and construction starts, it requires 1 to 2 months to complete the well. Drilling and construction is year-round in the region. Weather may cause delays but delays rarely last multiple weeks. Timing limitations in the form of conditions of approval (COAs) and/or agreements with surface owners may impose longer temporal restrictions.
- Hydraulic fracturing will be used to complete the well. The potential permitted water sources for drilling and completion of this well are identified in the MSUP Point 5. Water transport to the location will be via water tanker truck or a temporary surface water line. The operator estimates that a total of 40,000 barrels of water will be used to drill and complete this well. The water will be stored on location in the drilling pit and temporary tanks. Flow back water from the completion phase will be disposed in a properly permitted disposal well located in Section 8 T43N R73W or a properly permitted alternative.
- A road network consisting of existing and proposed improved roads.
- Generators, until permanent power is supplied by a third party.
- An existing above ground power line network.
- Potential production facilities including a pumping unit, a 6 tank battery, and 2 heater treaters and a flare stack.

- All engines will be equipped with an adequate muffler system, decibel level not to exceed 70 decibels at a distance of 200 feet from the exhaust of any muffler.
- No pits at the producing oil well location.
- An existing water supply well and hydraulic fracturing pit, connected by a proposed water pipeline (3 to 4 inches in diameter), approximately 2.3 miles long, that will be laid on the surface to transport water from an existing water well in Section 6 T43N 73W. The water pipeline will be removed within 3 months after the well is completed.

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

Table 2.1 Disturbance Summary:

Facility	Number or Miles	Factor	Disturbance
Engineered Pad & disturbed Pad Area	1	510’ x 510’	6 acres
Production Pad Size		460’ x 460’	4.9 acres
Proposed Improved Roads With water and buried electric Corridor	0.17 miles	75’ wide	1.54 acres
Proposed Overhead Power	0	0	0
Proposed Surface Waterline	2.3 miles	3” to 4” wide (0.4’)	0.1 acres
Total Surface Disturbance			**7.55 acres**

BLM incorporated and analyzed the implementation of committed mitigation measures in the SUP and drilling plan, in addition to the COAs in the PRB FEIS ROD, as well as changes made at the onsite.
Additionally, the operator, in their APD, 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.

Certify it has a surface access agreement with the landowner or posted a 43 CFR 3814.1 bond.

BLM estimates that during the drilling phase of an individual well (about a 4 week period per well) the average daily truck traffic to and from the location is approximately 10 large trucks (water haulers, cement trucks, etc.) and1 personal pickup trucks per day. During the well completion process, up to a 30 day period, the average daily traffic increases to 15 large trucks and 6 personal pickup trucks per day. Finally, during the production phase the average daily traffic will decrease to 1 to 2 pickup trucks per day.

The reasonably foreseeable development for this and adjacent areas includes additional private, state and/or federal oil/gas/CBNG wells will likely be drilled in the near future.

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

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

3. AFFECTED ENVIRONMENT

This section briefly describes the physical and regulatory environment affected by the alternatives in Section 2. Aspects of the affected environment here focus on the major issues. Find a screening of all resources and land uses potentially affected in administrative record. Resources unaffected, or not affected beyond the level analyzed in the PRB FEIS, are outside this EA's scope**.** The Wyoming Game and Fish Department's (WGFD's) Recommendations for Development of Oil and Gas Resources within Important Wildlife Habitats (2009), make no distinction between surface disturbance impacts per well type or drilling technology. BLM's position is there is a rare lack of distinction in surface disturbance impacts attributable to well type, subject to showing a distinction, not a mere difference, and this tracks to surface disturbance issues as with soils, vegetation, invasive species, wetlands, cultural resources, etc. See, State Director Review, SDR-WY-2010-023, Part 2, p. 3, and fn. 7. This supports national policy where no distinction exists in 43 CFR 3160 et. seq, leasing, and 2005's Energy Policy Act. (Kreckel 2007). Stanolind Oil and Gas Corporation developed hydraulic fracturing in 1947. The industry improved the process, along with drilling and completion technologies to where hydraulic fracturing is economical and developed about 1 million wells in the US.

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 for particulate matter (PM), attributed to coal dust. Four sites monitor the air quality in the PRB: Cloud Peak in the Bighorn Mountains, Thunder Basin northeast of Gillette, Campbell County south of Gillette, and Gillette. In addition, the Wyoming Air Resource Monitoring System (WARMS) measures meteorological parameters from 6 sites, and particulate concentrations from 5 of those sites, monitors speciated aerosol (3 locations), and evapotranspiration rates (3 locations). These sites are at Sheridan, Taylor Reservoir, South Coal Reservoir, Buffalo, Juniper, and Newcastle. The northeast Wyoming visibility study is ongoing by the Wyoming Department of Environmental Quality (WDEQ). The U.S. Energy Information Administration reported that US carbon emissions dropped 8% in the first quarter of 2012, http://www.eia.gov/todayinenergy/detail.cfm?id=7350; and it bears watching whether this continues.

Sites adjacent to the Wyoming PRB-area are at Birney on the Tongue River 24 miles north of the Wyoming-Montana border, Broadus on the Powder River in Montana, and Devils Tower.
Existing air pollutant emission sources in the region include:

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

3.2. Soils and Vegetation

Project area soils developed in alluvium and residuum derived mainly from the Wasatch Formation. Lithology consists of light to dark yellow and tan siltstone and sandstones with minor coal seams resulting in a wide variety of surface and subsurface textures. Soil depths vary from deep on lesser slopes to shallow and very shallow on steeper slopes. Differences in lithology produced topographic and geomorphic variations in the area. An erosion resistant cap of clinker, terrace gravels, or sandstone often protects ridges and hills. Parent material chemistry may result in local concentration of salts.

The Campbell County Survey Area, Wyoming Soil Survey Geographic (SSURGO) Database (WY605), provide detailed soils identification and data. 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 activity or action. The agency's long term goal for soil resource management is to maintain, improve, or restore soil health and productivity, and to prevent or minimize soil erosion and compaction. Soil management objectives are to ensure that adequate soil protection is consistent with the resource capabilities. Many of the soils and landforms of this area present distinct challenges for development, and /or eventual site reclamation. Successful reclamation is expected with adequate moisture, sound range management, applying mitigation measures and time. Evidence of successful interim and final reclamation is evident throughout the area.

The dominant Ecological Site for the disturbance area is Sandy 10 to 14 NP. The soil is mostly a fine sandy loam. Clayey and Loamy Ecological sites are nearby the project area. These three ecological sites are the most common in the NE Wyoming area. See the NRCS Soil Survey (SSURGO) data. The Ecological Site interpretations include additional site-specific soil information.

3.3. Soils Susceptible to Erosion

A sandy ecological site has sand ranging from 52-80% in the top few inches and clays ranging from 10-18%. This sandy ecological site was found on well vegetated, fairly level ground, with topsoil 6 inches or more deep. Wind and water erosion should be slight to moderate, due to flatness of the surface and applied stabilization mitigation.

3.4. Reclamation Suitability (Source Material)

Oil and gas development along with traditional activities including livestock grazing and wildlife use impact current soil conditions in the project area. Area soils can be easily damaged by use or disturbance or may be difficult to re-vegetate or otherwise reclaim. Soil impacts (e.g., roads, linear pipeline scars, and artificial wet areas) can be readily observed in the area, along with areas of successful reclamation. Reclamation potential is fair throughout the project area. The main project area soil limitations include: depth to bedrock, low organic matter content, and low moisture content (10 to 14 inch NP zone). Some of the area soils and landforms present distinct challenges for development. These areas will be avoided as much as possible. None of the proposal area has soil mapping units having poor reclamation suitability.

3.5. Vegetation and Ecological Sites

BLM staff identified the dominant vegetation community types in the project area are mixed-grass prairie and sagebrush shrubland. Species typical of the mixed-grass prairie community type are:

- Big sagebrush, western wheatgrass, green needlegrass, needle & thread, blue grama, threadleaf sedge, sandberg bluegrass and a mustard sp.

The dominant ecological site in the project area is Sandy. Refer to ecological site narrative sections below for description of vegetation species observed during onsite field visits. This mixed sagebrush/grass plant community 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) can 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.

3.6. Water Resources

WDEQ assumed primacy from U.S. Environmental Protection Agency for maintaining Wyoming's water quality. The Wyoming State Engineer's Office (WSEO) has authority for regulating water rights issues and permitting impoundments for the containment of the State's surface waters. The Wyoming Oil and Gas Conservation Commission (WYOGCC) has authority for permitting and bonding off channel pits located over state and fee minerals.

3.6.1. Groundwater

The historical use for groundwater in this area was for stock water or domestic purposes. There are 83 CBNG, 12 conventional oil and no water injection wells (WIW) in and within the surrounding 8 sections of the project area. A search of the WSEO Ground Water Rights Database showed no registered stock and domestic water wells and 1 spring within 1 mile of the proposed well in the project area. Refer to the PRB FEIS for additional information on groundwater, pp. 3-1 to 3-36.

3.6.2. Surface Water

The project area is in the Belle Fourche River drainage. With the exception of All Night Creek, 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. Yates identified 1 natural spring within a 1 mile radius of Raging Bull Com 2H well. Baker Spring #2 is at NWNW Sec 24 T43N, R73W. The permitted flow of the spring is 25 gallons per minute (gpm). For more information on surface water refer to the PRB FEIS, pp. 3-36 to 3-56.

3.7. Wetlands/Riparian

The Raging Bull Com 2H is approximately 0.5 miles from All Night Creek to the north and 0.6 miles to the Belle Fourche River to the east. Ephemeral drainages dissect the area. The ephemeral drainages have gentle slope with well vegetated bottoms with small head-cut features.

3.8. Invasive Species

The project proponent discovered 4 state-listed noxious weeds and invasive/exotic plant infestations by a search of inventory maps and/or databases or during subsequent field investigation. The weeds found were Canada thistle, skeletonleaf bursage, black henbane and field bindweed. Cheatgrass or downy brome (*Bromus tectorum*) and to a lesser extent, Japanese brome (*B. japonicus*) are known to exist in the affected environment. These 2 species are found in high densities and numerous locations throughout NE Wyoming although none was obvious at the onsite.

3.9. Fish and Wildlife

The PRB FEIS identified wildlife species occurring in the PRB, pp. 3-113 to 3-206. ICF International (ICF) conducted wildlife surveys in the project area in 2011 and 2012. BLM performed a habitat assessment in the project area on May 4, 2011. The biologist evaluated impacts to wildlife resources and recommended project modifications where wildlife issues arose. BLM also consulted databases compiled and managed by BLM BFO wildlife staff, the PRB FEIS, WGFD datasets, and the Wyoming Natural Diversity Database (WYNDD) to evaluate the affected environment for wildlife species that may occur in the project area. This section describes the affected environment and impacts to wildlife known or likely to occur in the area of the proposed project.

3.9.1. Big Game

The big game species expected to occur in the project area are mule deer and pronghorn. The PRB FEIS discussed the affected environment for pronghorn and mule deer on pages pp. 3-117 to 3-122 and pp. 3-127 to 3-132, respectively. Table 3.1 below indicates the delineated seasonal ranges for each big game species that occur in the project area, the herd units affected by the project, the WGFD population objective, and the WGFD current population estimate for each species (WGFD 2011a). Yearlong use is when a population of animals makes general use of suitable documented habitat sites within the range on a year-round basis. Animals may leave the area under severe conditions. Winter-yearlong use is when a population or a portion of a population of animals makes general use of the documented suitable habitat sites within this range on a year-round basis, but during the winter months there is a significant influx of additional animals into the area from other seasonal ranges.

Table 3.1 Big Game Species Habitat and Population Information in the Raging Bull Project Area

Species	Seasonal Range in Project Area	Herd Unit	WGFD Population Objective	% Above (+) or Below (-) Objective	WGFD Report Year
Mule Deer	Yearlong	320 – Pumpkin Buttes	11,000	- 12.7%	2011
Pronghorn	Winter yearlong	309 – Pumpkin Buttes	18,000	+ 46%	2011

3.9.2. Non-Game

3.9.2.1. Raptors

The PRB FEIS discussed the affected environment for raptors, pp. 3-141 to 3-148. According to the BLM raptor database, 6 nests occur within 0.5 miles of the project area. These nests are in Table 3.2 below, with the last known status available. Of those, only 3 were surveyed by ICF in 2012 (ICF 2012). All of the 6 nests listed in the table are located on the ground and have the characteristics typical of ferruginous hawk nests, a BLM sensitive species. In addition, 12 documented or potential ferruginous hawk nests occur within 1 mile of proposal. Other species t documented in the surrounding area, and are suspected to forage in the project area include: golden eagles and Swainson's hawks. Most raptor species nest in a variety of habitats including (but not limited to): grasslands, agricultural lands, live and dead trees, cliff faces, rock outcrops, and tree cavities. Suitable nesting habitat is present throughout the project area.

Table 3.2 Raptor Survey Results for Nests within 0.5 miles of the Raging Bull Proposal.

BLM ID	Year	Species	Status
2427	2012	n/a	Inactive
2428	2012	n/a	Inactive
2429	2006	n/a	Inactive
2430	2004	n/a	Inactive
2431	2004	n/a	Inactive
2436	2012	n/a	Inactive

3.9.2.2. Migratory Birds

The PRB FEIS discussed the affected environment for migratory birds on pp. 3-150 to 3-153. Migratory birds migrate for breeding at some point in the year. The BLM-Fish and Wildlife Service (FWS) Memorandum of Understanding (MOU) (2010) promotes the conservation of migratory birds, complying with Executive Order 13186 (Federal Register V. 66, No. 11). BLM must include migratory birds in every NEPA analysis of actions that have potential to affect migratory bird species of concern to fulfill obligations under the Migratory Bird Treaty Act (MBTA). The MBTA (and Bald and Golden Eagle Protection Act (BGEPA)) are strict liability statutes so require no intent to harm migratory birds through prosecuting a taking. Recent prosecutions or settlements, in Wyoming and the west, cost companies millions of dollars in fines and restitution (which was usually retrofitting powerlines to discourage perching to minimize electrocution or shielding ponds holding toxic substances). BLM encourages voluntary design features and conservation measures supporting migratory bird conservation, in addition to appropriate restrictions. A wide variety of migratory birds may be found in the proposed project area at some time throughout the year. Many species that are of high management concern use shrub-steppe and shortgrass prairie areas for their primary breeding habitats (Saab and Rich 1997). Nationally, grassland and shrubland birds declined more consistently than any other ecological association of birds over the last 30 years (WGFD 2009).

The WGFD Wyoming Bird Conservation Plan (Nicholoff 2003) identified 3 groups of high-priority bird species in Wyoming: Level I – those that clearly need conservation action, Level II – species where the focus should be on monitoring, rather than active conservation, and Level III – species that are not otherwise of high priority but are of local interest. Shrub-steppe and mixed grasslands vegetation types dominate the project area. Species that may occur in the shrub-steppe vegetation type in northeast Wyoming, according to the Wyoming Bird Conservation Plan, appear Table 3.3, grouped by level as identified in the plan.

Table 3.3 Migratory Bird Species Found in Shrub-steppe Habitat, NE Wyoming (Nicholoff 2003)

Level	Species	Wyoming BLM Sensitive
Level I	Brewer's sparrow	Yes
	Ferruginous hawk	Yes
	Greater sage-grouse	Yes
	McCown's longspur	No
	Sage sparrow	Yes
Level II	Lark bunting	No
	Lark sparrow	No
	Loggerhead shrike	Yes
	Sage thrasher	Yes
	Vesper sparrow	No
Level III	Common poorwill	No
	Say's phoebe	No

The PRB FESIs discussed the habitat requirements and foraging patterns for the species listed with the exception of common poorwills and Say's phoebes. Common poorwills inhabit sparse rocky sagebrush, open prairies, mountain-foothills shrublands, juniper woodlands, brushy rocky canyons, and ponderosa pine woods. They prefer clearings, like grassy meadows, riparian zones, and forest edges for foraging. They lay eggs directly on gravelly ground, flat rock, or litter of woodland floor. Nests are often near logs, rocks, shrubs, or grass for some shade. They feed exclusively on insects. Say's phoebes inhabit arid, open country with sparse vegetation, including shrub-steppe, grasslands, shrublands, and juniper woodlands. They nest on cliff ledges, banks, bridges, eaves, and road culverts and often reuse nests in successive years. They eat mostly insects and berries. Several BLM sensitive species are also migratory bird species.

Those suspected to occur in the project area include: Baird's sparrow, Brewer's sparrow, ferruginous hawk, loggerhead shrike, sage sparrow, sage thrasher, and bald eagle.

3.9.3. Threatened, Endangered, Candidate, Special Status (Sensitive) Species (SSS)

The Buffalo BLM received a species list on July 22, 2011 from the U.S. Fish and Wildlife Service (FWS) concerning threatened, endangered, and candidate species. The list included Ute Ladies'-tresses orchid (threatened), Greater Sage-Grouse (GSG) (candidate). In addition to the listed species, the FWS letter also included migratory birds and wetland/riparian habitats.

3.9.4. Ute Ladies'-Tresses Orchid (ULT)

The Ute ladies'-tresses orchid (ULT) is listed as threatened under the ESA. The affected environment for ULT is discussed in the PRB FEIS on p. 3-175. This orchid occurs in moist, sub-irrigated or seasonally flooded soils at elevations between 1,780 and 6,800 feet above sea level. Habitat includes wet meadows, abandoned stream channels, valley bottoms, gravel bars, and near lakes or perennial streams that become inundated during large precipitation events. A Wyoming Natural Diversity Database model predicts undocumented populations may be present particularly within southern Campbell and northern Converse Counties. This model does not show any potential habitat in the Raging Bull project area. Prior to 2005, only 4 orchid populations were documented in Wyoming. Five additional sites were found in 2005 and 1 in 2006. The new locations were in the same drainages as the original populations, with 2 on the same tributary and within a few miles of an original discovery. Drainages with documented orchid populations include Antelope Creek in northern Converse County, Bear Creek in northern Laramie and southern Goshen Counties, Horse Creek in Laramie County, and Niobrara River in Niobrara County. In Wyoming, *Spiranthes diluvialis* blooms from early August to early September. The Raging Bull project area contains marginal potential habitat for ULT. All Night Creek contained some mesic vegetation and frozen pools of surface water in January 2011, but is mostly dominated by upland grasses (ICF 2011). The nearest known population of ULT occurs approximately 20 miles south of the project area. The species is not suspected to occur in the project area.

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

The PRB FEIS addressed the affected environment for GSG, pp. 3-194 to 3-199. The GSG's regulatory and biologic status changed since issuance of the FEIS:

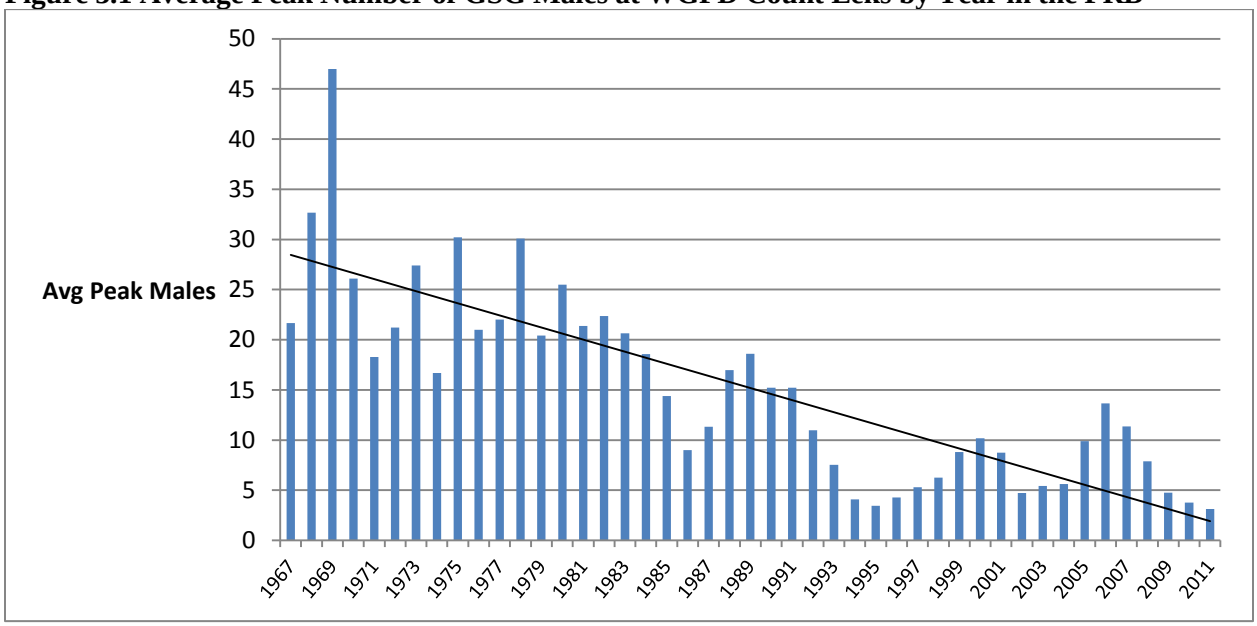
1. 2005-2007: The PRB FEIS predicted that a ¼ mile year-round controlled surface use lek buffer, and timing limitations restricting surface disturbance within 2 miles of leks, would be sufficient for protection of GSG populations. Several recent studies and literature reviews indicate that the restrictions' spatial scale, and timing limitations, may not be large enough to alleviate impacts to sage-grouse (Holleran 2005, Walker et al 2007, Taylor et al 2012).
2. January, 2005: U.S. Fish and Wildlife Service (FWS) warranted that the GSG was inappropriate for listing under the Endangered Species Act.
3. December, 2007: The U.S. District Court remanded the "not warranted" decision, finding a flawed decision-making process and ordered the FWS to conduct a new Status Review; Western Watersheds Project v. FWS, 535 F. Supp. 2d 1173 (D. Idaho 2007).
4. August, 2008: The WY BLM implemented management of identified connectivity habitats in support of the population management objectives set by the State of Wyoming (Wyoming Governor's Executive Order (EO) 2011-5), in accordance with the BLM Wyoming Instruction Memorandums (IM), most recently, IM- WY-2012-019.
5. January 2008: The State Wildlife Agencies' Ad Hoc Committee for Consideration of Oil and Gas Development Effects to Nesting Habitat recommended land managers consider impacts on leks within 4 miles of oil and gas developments.
6. September, 2009: In its Recommendations for Development of Oil and Gas Resources within Important Wildlife Habitats, WGFD categorized impacts to GSG by number of well pad locations per square mile within 2 miles of a lek.

7. March, 2010: FWS warranted that the GSG justified listing across its range, but precluded listing due to higher priorities (FWS 2010). The GSG is a listing candidate.
8. March, 2012: WY BLM released the report, "Viability analyses for conservation of sage-grouse [GSG] populations: Buffalo Field Office, Wyoming," indicating that a viable population of GSG remains in the PRB, but the combined impacts of multiple stressors, including West Nile virus (WNv) and energy development, threaten that viability (Taylor et al 2012).

The GSG population in northeast Wyoming is exhibiting a steady long term downward trend, as measured by lek attendance (WGFD 2011b). Figure 3.5 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). Impacts from oil and gas development are discernible at the spatial scale of 20 km (12.4 mi) (Taylor et al. 2012). These findings echo results from previous studies conducted in the basin, wherein biologists observed basin-wide population declines (Walker et al. 2007).

There are 21 documented leks within 12.4 miles of the Raging Bull project area, 15 of which are occupied or undetermined. Currently there are 7,276 existing wells within 12.4 miles of the 15 leks, an area of 1,481 square miles.

Figure 3.1 Average Peak Number of GSG Males at WGFD Count Leks by Year in the PRB



Site Specific Habitat

WGFD records indicate that no occupied GSG leks occur within 4 miles of the project area. The project area is not in a core or connectivity area, as identified in EO 2011-5, Greater Sage-Grouse Core Area Protection. GSG habitat models indicate that the project area contains high quality GSG nesting and winter habitat (Walker et al. 2007). A BLM biologist confirmed suitable nesting, brood rearing, and winter habitat is present in the Raging Bull project area in the form of moderately dense sagebrush stands.

3.9.6. Special Status (Sensitive) Species (SSS)

The PRB FEIS discussed the affected environment for SSS, p. 3-174 to 201. BLM maintains a list of SSS to focus management 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 ESA; and
- Prioritizing needed conservation work with an emphasis on habitat.

A list of the SSS occurring in the project area, along with a brief description of the habitat requirements for each species, is in the administrative record. The authority for the SSS comes from the ESA, as amended; Title II of the Sikes Act, FLPMA; Department Manual 235.1.1A, and BLM Manual 6840.

3.9.6.1. Ferruginous Hawk

The PRB FEIS discussed the affected environment for ferruginous hawk, p. 3-183. In addition to being 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 a FWS BCC for Region 17. All 6 nests in Table 3.2 under the raptors section are on the ground and likely to be ferruginous hawk nests. Additionally, 12 more suspected or known ferruginous nests are within 1 mile of project features.

3.10. West Nile Virus

West Nile virus (WNv) is a mosquito-borne disease that can cause encephalitis or brain infection. Mosquitoes spread this virus after feeding on infected birds and then bite people, other birds, and animals. WNv is not spread by person-to-person contact, and there is no evidence that people can get the virus by handling infected animals. Since its discovery in 1999 in New York, WNv established and spread across the United States. Birds are the natural vector host and serve not only to amplify the virus, but to spread it. *Culex tarsalis* appears to be the most common mosquito vector. Mosquitoes can hatch from standing water in as few as 4days. BLM summarized USGS data found at www.westnilemaps.usgs.gov in Table 3.4. Reported data from the PRB includes Campbell, Sheridan, and Johnson Counties.

Table 3.4 Historical West Nile Virus Information

Year	Total WY Human Cases	Human Cases PRB	Equine Cases PRB	Bird Cases PRB
2001	0	0	0	0
2002	2	0	15	3
2003	392	85	46	25
2004	10	3	3	5
2005	12	4	6	3
2006	65	0	2	2
2007	155	22	Unknown	1
2008	10	0	0	0
2009	10	1	1	No record
2010	6	0	0	0
2011	3	0	Unknown	No record

Source: Wyoming Department of Health, http://diseasemaps.usgs.gov/wnv_wy_human.html

Human cases of WNv in Wyoming occur primarily in the late summer or early fall. Scientists found WNv in 157 bird species, horses, 16 other mammals, and alligators (Marra et al 2003). In the eastern US, avian populations incurred very high mortality, particularly corvids (crows, jays). Raptor species also appear to be highly susceptible to WNv. Wyoming scientists documented in 2003 that 36 raptors died from WNv in Wyoming, including golden eagle, red - tailed hawk, ferruginous hawk, American kestrel, Cooper ’s hawk, northern goshawk, great-horned owl, prairie falcon, and Swainson ’s hawk (Cornish et al. 2003).

The Wyoming State Vet Lab determined 22 GSG in one study project (90% of the study birds), succumbed to WNv in the PRB in 2003. While birds infected with WNv have many of the same symptoms as infected humans, they appear to be more sensitive to the virus (Rinkes 2003). Current science suggests a synergy between WNv and energy development amplifying the negative impact GSG (FWS 2010 p. 13947). There is usually increased surface water in the PRB associated with energy development. This increase in potential mosquito breeding habitat provides opportunities for mosquito populations to increase. Preliminary research conducted in the PRB indicates WNv mosquito vectors were notably more abundant on a developed CBNG site than 2 similar undeveloped sites (Walker et al. 2003).

The WDEQ and the Wyoming Department of Health sent a letter to CBNG operators on June 30, 2004. The letter encouraged people employed in occupations that require extended periods of outdoor labor, be provided educational material by their employers about WNv to reduce the risk of WNv transmission.

3.11. Cultural Resources

A Class III cultural resource inventory existed for the Raging Bull Com 2H well prior to on-the-ground project work (BFO project no. 70120103). A Class III cultural resource inventory following the Archeology and Historic Preservation, Secretary of the Interior's Standards and Guidelines (48CFR190) and the *Wyoming State Historic Preservation Office Format, Guidelines, and Standards for Class II and III Reports* was performed by the BLM. Seth Lambert, BLM Archaeologist, reviewed the report for technical adequacy, compliance with BLM standards, and determined it to be adequate. BLM identified no eligible sites for the National Register of Historic Places in the area of potential effect (APE).

4. ENVIRONMENTAL EFFECTS

This section describes the environmental effects of Alternative B, the preferred alternative. BLM evaluated the effects of the no action alternative, Alternative A, through an aggregation of the effects noted in Section 2.1.

4.1. Air Quality

Air quality direct, indirect, cumulative, and residual effects 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 (mitigated) by watering disturbed soils, and by air pollutant emission limitations imposed by air quality regulatory agencies. Air quality impacts modeled in the PRB FEIS and Cumulative Air Quality Effects, 2009 concluded that PRB projected fluid and solid development would not violate state, tribal, or federal air quality standards and this project is well within the projected development parameters.

4.2. Soils and Vegetation

4.2.1. Direct and Indirect Effects

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

An important component of soils in Wyoming's semiarid rangelands, especially in the Wyoming big sagebrush cover type, are biological soil crusts, or cryptogamic soils that occupy ground area not covered with vascular plants. Biological soil crusts are important in maintaining soil stability, controlling erosion, fixing nitrogen, providing nutrients to vascular plants, increasing precipitation infiltration rates, and providing suitable seed beds (Belnap et al. 2001). They adapted to growing in severe climates; however, they take many years to develop (20 to 100) and can be easily damaged or destroyed by surface disturbances associated with construction activities. Rutting affects the surface hydrology of a site as well as the rooting environment. The process of rutting physically severs roots, thus reducing soil aeration and infiltration thereby degrading the rooting environment. Rutting may result in topsoil and subsoil mixing, thereby reducing soil productivity. Rutting also disrupts natural surface water hydrology by diverting and concentrating water flow thus accelerating erosion. Soil mixing may results in a decrease or increase in soil fertility, depending on the site and a change soil structure.

Low water crossings (LWC) are a BLM approved construction technique to allow all weather access though drainages where culverts are not appropriate or desired. BLM recommends specific design criteria for a typical LWC which must be shown in proposed road designs. Construction completed to BLM approvable standards will reduce down drainage sedimentation, erosion, and scouring caused by frequent failure of in-channel structures.

The operator recommended a seed mix for this POD. The BLM would evaluate reclamation success using the BLM State Wide Reclamation Policy found at: http://www.blm.gov/wy/st/en/programs/reclamation. Expanded gas, water, and electric ROW infrastructure linking POD support facilities are part of reasonably foreseeable development (RFD) additions to the proposed action (PRB ROD, p. 2). A foreseeable addition may be a request for a ROW to connect roads, gas, and water utility lines.

4.2.2. Soils Susceptible to Erosion

Sandy Ecological Site Susceptible to Erosion: will impact approximately 1/4 mile of access corridor and well pad and will require expedient reclamation. This sandy/loamy soil, without proper and timely re-vegetation practices may readily erode due to wind and water action. Reclamation may be difficult without extra mitigation. A site specific seed mix was chosen for these locations to expedite re-vegetation.

4.2.2.1. Cumulative Effects

For details on expected cumulative impacts, refer to the referenced PRB FEIS, Chapter 4. The PRB FEIS defines the designation of the duration of disturbance (pp. 4-1 and 4-151). Most soil disturbances would be short term impacts with expedient interim reclamation and site stabilization.

4.2.2.2. Mitigation Measures

Mitigation measures, surface upgrades, applicant committed measures, adherence to the recommended COAs, and the WY Reclamation Policy would help to mitigate or reduce the impacts described above. In areas of steep topography, erosive soils, and/or poor reclamation potential, BLM will consider requesting a plan to stabilize topsoil within a 30 day period from the start of construction in those areas.

BLM will recommend the following mitigation to reduce impacts to soils and vegetation from surface disturbance.

This project is in a Sandy/Loamy ecological site. All areas of disturbance should be stabilized as soon as possible.

To protect erodible soils, road segments should be surfaced with gravel, including any culverts, low water crossings, before the drilling rig or other drilling equipment moves onto the pad.

Normal design features, industry practices, and mitigation measures include interim reclamation to minimize long-term soil erosion or disturbance. Such interim reclamation also serves to reduce the surface disturbance footprint, which, if undertaken as recommended, should reduce the surface disturbance footprint to 5 acres or less, as per the analysis found in the PRB FEIS.

If needed, culverts will be at the appropriate locations for streams and channels crossed by roads specified in the BLM Manual 9112, Bridges and Major Culverts and Manual 9113, Roads. Streams will be perpendicular to flow, where possible, and all design of stream crossing structures will carry the 25-year discharge event or other capacities as directed by the BLM.

4.2.2.3. Residual Effects

Residual effects across the POD would include a long-term loss of soil productivity associated with well pads 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. Inspite of the above residual effects, the BLM considers that Alternative B is within the parameters for surface disturbance and surface disturbance reclamation in PRB FEIS ROD**.**

4.2.3. Vegetation and Ecological Sites

4.2.3.1. Direct and Indirect Effects

The PRB FEIS discusses most direct and indirect effects to ecological sites and vegetation (p. 4-153 to 4-164). The proposed action would impact the common plant communities that occur on the site and the transition between the communities. Other impacts anticipated to occur include those in the direct and indirect effects listed above under soils section. Direct effects to ecological sites would occur from ground disturbance caused by construction of well 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.

Sagebrush may or may not regenerate easily after human disturbance such as mineral, urban or agricultural development, or even after natural occurrences such as wildfire. It may take years, even generations, if conditions are not favorable, for sagebrush to fully grow back. Sagebrush still has not returned to some areas of the Columbia Basin burned by a large fire 40 years ago (Pacific Northwest National Laboratory Shrub Steppe Ecology Series May 2010). Successful reclamation is expected with this project with applied mitigation measures from the operator and BLM.

4.2.3.2. Cumulative Effects

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

4.2.3.3. Mitigation Measures

Implementation of the recommended mitigation measures in the COAs of this POD, and its associated plans including the Integrated Weed and Pest Management Plan, the WMP, and the MSUP (specifically Plans for Reclamation of the Surface) will reduce surface disturbance impacts to ecological sites and vegetation. See the administrative record for some of these documents. The operator/landowner selected a seed mix which contains native grasses and introduced nurse crop, which could restore disturbed areas to properly functioning vegetation communities. The surface owner, with consultation of the operator, BLM, and or NRCS or other land management agencies selects the seed mix for private land that may be more beneficial for grazing.

4.2.3.4. Residual Effects

Residual effects were also identified in the PRB FEIS, p. 4-408 such as the loss of vegetative cover, despite expedient reclamation, for several years until reclamation is successfully established. The alteration of biodiversity of ecological sites could result from disturbance, alterations in vegetation in reclaimed areas, and the spread and establishment of weed species. The operator/landowner developed a site specific seed mix for the proposed disturbance area. This seed mix will fit well with the surrounding environment. The BLM considers these residual effects from Alternative B to be within the parameters for acceptable surface disturbance and surface disturbance reclamation in PRB FEIS ROD and Onshore Oil and Gas 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 will ensure there is no adverse impact on ground water. The drilling plan identifies that the surface casing will be cemented in place to a depth of 2300 feet across shallow aquifers. The operator has also proposed to cement casing across the Fox Hills formation at depth. These measures will ensure the protection of groundwater resources from wellbore activities.

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

As part of the completion process for this well, Yates may choose to acid stimulate or hydraulically fracture the formation to promote oil production. Water from identified sources will be used for the stimulation. The procedures will be isolated from shallow zones to focus the process energy in the productive formation. Flow back or return water will be transported off site and disposed at a permitted disposal facility. The WOGCC monitor and regulate the chemicals for drilling and completion.

"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.

The operator included in their MSUP the possibility of installing a production or emergency pit when the well site facilities are installed. Due to issues of potential groundwater contamination from produced water infiltration and hazard to wildlife if oil is present in the pit, BLM recommends to all operators that existing pits be reclaimed and replaced with enclosed above ground receptacles. The pit installation proposal included in the MSUP does not provide adequate information for environmental analysis. Yates will be required to submit a Sundry notice for water disposal which would include additional information regarding the installation of a production or emergency pit, as specified in Onshore Oil and Gas Order No. 7 Disposal of Produced Water.

During construction and subsequent production of this well, Yates committed to stabilize the constructed area to reduce the risk of sediment transport due to erosion. This and compliance with WDEQ Storm Water Pollution Prevention criteria will minimize the impacts to surface water resources in the area.

4.3.1.1. 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. Wetland/Riparian

Watershed values, including natural drainages, would not be adversely impacted by the proposal with properly applied mitigation. Other water resources will not be adversely directly or indirectly effected by the proposal. Possible contamination effects of fresh water aquifers will be reduced through the use of tested casing, by setting casing at appropriate depths and by following safe repair procedures in the event of casing failure. Other downhole well operations are expected to cause minimal impacts using standard engineering practices. The cumulative impacts of the proposed action, when considered with other existing and proposed development in the project area are not expected to be significant. Application of mitigation measures will ensure that the incremental impacts of this well are insignificant. Refer to the PRB FEIS for more information on cumulative effects.

4.5. Invasive Species

4.5.1. Direct and Indirect Effects

Cheatgrass or downy brome (*Bromus tectorum*) and to a lesser extent, Japanese brome (*B. japonicus*) exist in the affected environment. These 2 species are found in such high densities and numerous locations throughout NE Wyoming that a control program is not presently feasible. The use of existing facilities along with the surface disturbance associated with construction of proposed access roads, pipelines, and related facilities would present opportunities for weed invasion and spread. The activities related to the performance of the 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, mitigation as required by BLM applied COAs will reduce potential impacts from noxious weeds and invasive plants.

4.5.2. Cumulative Effects

Activities related to the development of the proposed project would create a favorable environment to the establishment and spread of noxious weeds/invasive plants if adequate control measures are not used.

4.5.3. Mitigation Measures

The operator committed to the control of noxious weeds and species of concern using the following measure identified in their Integrated Pest Management Plan (IPMP): chemical (main control measure), biological and physical. Controls would be applied as recommended by chemical manufacturers and/or land management agencies. Control would usually take place in the spring and fall of the year.

4.5.4. Residual Effects

Control efforts by the operator are limited to the disturbance associated with the project. Cheatgrass and/or downy brome (bromus tectorum) and to a lesser extent, Japanese brome (bromus japonicas) exist in the affected environment. These species are found in such high densities and numerous locations throughout NE Wyoming that a control program is not considered feasible at this time. These annual weeds would continue to exist in the project area.

4.6. Fish and Wildlife

4.6.1. Big Game

4.6.1.1. 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. Winter yearlong range for pronghorn antelope and yearlong range for mule deer would be directly disturbed with the construction of the well pad and access road. 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).

Big game animals are expected to return to the project area following construction; however, populations will likely be lower than prior to project implementation as the human activities associated with operation and maintenance continue to displace big game. Mule deer are more sensitive to operation and maintenance activities than pronghorn, and, as the Pinedale Anticline study suggests, mule deer do not readily habituate. A study in North Dakota stated, “although the population (mule deer) had over 7 years to habituate to oil and gas activities, avoidance of roads and facilities was determined to be long term and chronic” (Lustig 2003). Deer have even been documented to avoid dirt roads that were used only by 4-wheel drive vehicles, trail bikes, and hikers (Jalkotzy et al. 1997).

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.

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.

4.6.1.2. Cumulative Effects

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

4.6.1.3. Mitigation Measures

No mitigation is proposed with Alternative B.

4.6.1.4. Residual Effects

No residual impacts are anticipated.

4.6.2. Non-Game

4.6.2.1. Raptors

4.6.2.1.1. Direct and Indirect Effects

The PRB FEIS analyzed direct and indirect effects to raptors, pp. 4-216 to 4-221. This project will result in disturbance in proximity of nesting raptors, including direct loss of foraging habitats and indirect losses associated with declines in habitat effectiveness. All raptors using nests in the vicinity of the project will likely be impacted to some extent by the human disturbance associated with operation and maintenance. 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 disruptive activities occur during nesting, they could be sufficient to cause adult birds to remain away from eggs or chicks causing overheating or chilling. This can result in egg or chick death. Prolonged disturbance can also lead to the abandonment of the nest by the adults.

Although raptor surveys within 0.5 miles of the well site were conducted, surveys within 0.5 miles of the water line that will be used for drilling were not. It is unknown if more nests will actually be affected by activities associated with drilling and completion of the well. To reduce the risk of decreased productivity or nest failure, the BLM BFO recommends a 0.5 mile radius timing limitation during the breeding season around active raptor nests and recommends all infrastructures requiring human visitation be located to provide 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 they will not be flushed by routine activities. Six ferruginous hawk nests occur within 0.5 miles of the Raging Bull Com 2H well, access road, and surface water line proposed for drilling. The FWS recommends a 1 mile spatial buffer for ferruginous hawk nest sites. Construction and maintenance activities occurring during the nesting season may cause nest failure or abandonment.

4.6.2.1.2. Cumulative Effects

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

4.6.2.1.3. Mitigation Measures

The BLM BFO recommends a 0.5 mile radius timing limitation during the breeding season around active raptor nests to reduce the risk of decreased productivity or nest failure. To ensure compliance with the MBTA, the FWS biologist also recommended that construction of the well pad, access road, and water line occur outside of the migratory bird breeding season (February 1- August 31) (Brad Rogers, Personal Communication, September 12, 2012). Timing limitations will be a recommended COA.

4.6.2.1.4. Residual Impacts

Even with timing restrictions on surface disturbance, 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 will 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.

4.6.2.2. Migratory Birds

4.6.2.2.1. Direct and Indirect Effects

The PRB FEIS discussed direct and indirect effects to migratory birds, pp. 4-231 to 4-235. The PRB FEIS states on page 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 would result in a "take" as defined (and prohibited) by the MBTA, a non-discretionary statute, and in turn a violation of the law. See also, FLPMA, Sec. 302(b).

Disturbance of habitat in the project area is likely to impact migratory birds. Native habitats will be lost directly with the construction of the well and access road. 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, will 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 will result in more than just a quantitative loss in the total area of habitat available; the remaining habitat area will also be qualitatively altered (Temple and Wilcox 1986). Ingelfinger (2004) identified that the density of breeding Brewer's sparrows declined by 36% and breeding sage sparrows declined by 57% within 100 m 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.

Migratory bird species in the PRB nest in the spring and summer and are vulnerable to the same effects as GSG and raptor species. Construction and maintenance activities occurring during the nesting season may cause nest destruction, failure, or abandonment.

Yates proposes using a heater treater during the production of the Raging Bull project. Heater treaters, and similar facilities, having vertical open-topped stacks or pipes can attract birds. Those facilities without exclusionary devices can pose a mortality risk. Once birds crawl into the stack, escape can become 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).

4.6.2.2.2. 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.

4.6.2.2.3. Mitigation Measures

Specific conservation measures to protect migratory birds are not included in the current RMP, 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 timing limitations on surface disturbing 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 RMP 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 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, such as the Raging Bull Com 2H well, where only 1 well is proposed, operators will most likely start construction as soon as possible, which in this case could be during the migratory bird nesting season. 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.

To ensure compliance with the MBTA, the FWS recommended that construction of the well pad, access road, and water line occur outside of the migratory bird breeding season (February 1- August 31)[1] (Brad Rogers, Personal Communication, September 12, 2012). Because most early nesters are raptors, the BLM biologist is recommending that the timing limitation be shortened to a time frame that will encompass the breeding season for the greatest quantity of passerines (May 1 – August 1). The timing limitation should apply to all surface disturbing activities, unless a pre-construction clearance survey (within approximately 10 days of construction planned May 1-August 1) is completed, to reduce the likelihood of a "take" under the MBTA. The BLM include this as a recommended COA. The BLM also recommends 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.

4.6.2.2.4. Residual Effects

Timing limitations are recommended, but are voluntary, for the entire project. If no construction occurs during the breeding season, it is unlikely that active nests will be destroyed by construction activities, as most nestlings will have fledged by the beginning of August. Nests initiated after the first week in July may be destroyed by construction after August 1st. Migratory birds nesting adjacent to the well pad or road may be disturbed by construction and production activities. A timing limitation does nothing to mitigate loss and fragmentation of habitat. Suitability of the project area for migratory birds will be

1 Nest initiation and egg laying in Brewer's sparrows (BLM sensitive species) 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).

negatively affected due to habitat loss and fragmentation and proximity of human activities associated with oil and gas development.

4.7. Threatened, Endangered, Candidate, Special Status (Sensitive) Species (SSS)

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

4.7.1. Threatened and Endangered Species

4.7.1.1. Ute Ladies'-Tresses Orchid (ULT)

4.7.1.1.1. Direct and Indirect Effects

No surface disturbing activities are proposed in potential habitat and implementation of the proposed project will have "***no effect***" on ULT.

4.7.1.1.2. Cumulative Effects

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

4.7.1.1.3. Mitigation Measures

BLM proposes no mitigation with Alternative B.

4.7.1.1.4. Residual Effects

BLM anticipates no residual effects.

4.7.2. Candidate Species

4.7.2.1. Greater Sage-Grouse (GSG)

4.7.2.1.1. 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 Greater Sage-Grouse (Centrocercus urophasianus) as Threatened or Endangered* (FWS 2010) and chapters 15-21 of Greater Sage-Grouse Ecology and Conservation of a Landscape Species and its Habitats (Knick and Connelly 2011).

The Raging Bull project area contains suitable nesting, brood-rearing, and winter habitat. Construction of the well, access road, and overhead power will cause fragmentation of sagebrush stands and result in the direct loss of approximately 7.5 acres of GSG habitat. Implementation of the project will adversely impact nesting habitat, both through direct loss and avoidance of the area by GSG due to fragmentation and anthropogenic activity. Construction of the well and access road will result in sagebrush loss. Yates proposes to utilize a 3 to 4 inch surface water line during drilling and completion of the Raging Bull com 2H well. The size of the line will be difficult for young GSG chicks to move across, and could impede movement by broods to food and water resources or escape from predators.

4.7.2.1.2. Cumulative Effects

The PRB FEIS (BLM 2003) states that "the synergistic effect of several impacts would likely result in a downward trend for the GSG 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 potentially contribute to extirpation of the local GSG population.

Declines in lek attendance associated with oil and gas development may be a result of a suite of factors

including avoidance (Holloran et al. 2005, Holloran et al. 2007, Aldridge and Boyce 2007, Walker et al. 2007, Doherty et al. 2008, WGFD 2009), loss and fragmentation of habitat (Connelly et al. 2000, Braun et al. 2002, Connelly et al. 2004, WGFD 2004a, Rowland et al. 2005, WGFD 2005, Naugle et al. 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 2004b, Walker et al. 2007, Cornish pers. comm.).

The BFO Resource Management Plan (2001) and the PRB FEIS Record of Decision (2003) included a 2-mile timing limitation on surface-disturbing activities around GSG leks. The 2-mile measure originated with the Western Association of Fish and Wildlife Agencies (WAFWA) (BLM 2004). Wyoming BLM adopted the 2-mile recommendation in 1990 (BLM 1990).

The 2-mile recommendation was based on early research which indicated between 59% and 87% of GSG nests were 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 Northeast 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 [GSG] population that has already experienced an 82% decline within the expansive energy fields (Walker et al. 2007a)." (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 impact the core areas remaining value. WNv outbreaks and energy development reduce GSG 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).

Timing limitations do nothing to mitigate loss and fragmentation of habitat and changes in disease mechanisms. Rather than limiting mitigation to only timing restrictions, more effective mitigation strategies may include, at a minimum, burying power lines (Connelly et al. 2000b); minimizing road and

well pad construction, vehicle traffic, and industrial noise (Lyon and Anderson 2003, Holloran 2005); and managing produced water to prevent the spread of mosquitoes with the potential to vector West Nile Virus in GSG habitat (Walker et al 2007). Walker et al. (2007) recommend maintaining extensive stands of sagebrush habitat over large areas (at least 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), and Greater Sage-Grouse Comprehensive Conservation Strategy (Stiver et al. 2006).

4.7.2.1.3. Mitigation Effects

In order to reduce the impacts to GSG associated with noise, construction, and human disturbance resulting from implementation of the proposed project, BLM recommends a timing limitation on all surface-disturbing and disruptive activities within and adjacent to identified nesting habitat across the project area. Because nesting GSG have been shown to avoid infrastructure by up to 0.6 miles, 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.

If Yates chooses to construct the surface water line during the nesting/brood rearing season, the BLM recommends that the line be placed in such a way as to facilitate movement of young GSG chicks by constructing ramps over or lifting the line every 200 feet.

4.7.2.1.4. Residual Effects

If Yates chooses to commence with surface disturbing activities during the recommended timing limitations, GSG will remain vulnerable during the breeding and nesting season. A timing limitation does nothing to mitigate loss and fragmentation of habitat or changes in disease mechanisms. Suitability of the project area for GSG will be negatively affected due to habitat loss and fragmentation and proximity of human activities associated with oil and gas development.

4.7.3. Special Status (Sensitive) Species (SSS)

BLM supports the 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 Table 1 in Appendix B. Additional site specific effects to SSS are described in sections 4.9.3.1 (Ferruginous Hawk), 4.9.2 (GSG), and 4.8.2.2 (Migratory Birds).

4.7.3.1. Ferruginous Hawk

4.7.3.1.1. Direct and Indirect Effects

The PRB FEIS discussed impacts to ferruginous hawks, p. 4-262. 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 are shown to select nest sites that avoid human habitation or disturbance (Lokemoen and Duebbert 1976, Schmutz 1984). Once a nest site is selected, ferruginous hawks 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 Raging Bull Com 2H well is proposed within 0.5 miles of nest #s 2427 and 2428. Nest #s 2429 and 2430 are approximately 0.6 miles from the well site. Yates also proposes to use a surface water line to transport water to the well site for drilling purposes. The line bisects the nests listed above, anticipated to be laid within approximately 400 feet of nests #s 2428 and 2429, and within 600 feet of nest #2430.

FWS Wyoming Ecoregional Services Field Office recommends that a 1 mile seasonal buffer be implemented around ferruginous hawk nests, within which long-term land-use activities would be prohibited. They state that these buffers can be modified based on local conditions, such as topography. The Raging Bull Com 2H well and associated infrastructure was proposed within the FWS recommended 1 mile buffer of 19 ferruginous hawk nests. The FWS continues to recommend that no infrastructure is constructed within 1 mile of these nests, suggesting that the top and bottom hole locations are switched, avoiding all nests (Brad Rogers, Personal Communication, September 12, 2012). Activities associated with construction and maintenance activities for the Raging Bull project may cause failure or abandonment of nests.

4.7.3.1.2. Cumulative Effects

Even without federal development, the extent of fee development in the area 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 potentially affect ferruginous hawk productivity through a reduction in prey availability.

Because raptor surveys were only conducted for 3 of the nests in 2011 and 2012, it is not possible to determine the relative value of certain nests or areas to ferruginous hawks, and it must be assumed that all areas around nests are equally important to the species. It is possible that ferruginous hawks have already abandoned the area because of current land use activities and that additional disturbance would not have any impact on the species, because the habitat has lost its value for breeding pairs.

4.7.3.1.3. Mitigation Measures

The BLM recommends a 0.5 mile radius timing limitation during the breeding season around active ferruginous hawk nests to reduce the risk of decreased productivity or nest failure. This radius is not consistent with FWS Ecological Services Field Office recommendations that afford greater protection to ferruginous hawks than other raptors, which are particularly sensitive to disturbance. To ensure compliance with the MBTA, the FWS also recommended that construction of the well pad, access road, and water line occur outside of the migratory bird breeding season (February 1- August 31) (Brad Rogers, Personal Communication, September 12, 2012). The timing limitation will be a recommended COA.

4.7.3.1.4. Residual Effects

Even with a timing limitation, ferruginous hawks may abandon nests due to alteration 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 activities associated with development. Traffic and construction occurring in the area 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 habitat loss for this species. The timing limitation will result in some decrease in direct mortalities that would occur with increased drilling 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. Unoccupied nesting habitats will still be physically disturbed or destroyed. Preliminary analysis of data collected from consultants in the PRB and incorporated in the BLM BFO Raptor database clearly illustrate that nests (ferruginous hawks in particular (14%)) have become active after 3 years of no activity.

4.8. West Nile Virus

4.8.1. Direct and Indirect Effects

Yates is planning to hold water for drilling in a hydraulic fracturing pit in NW Section 7 T43N R73W, which may increase mosquito breeding habitat.

4.8.2. Cumulative Effects

There are many sources of native standing water throughout the PRB that add mosquito habitat. Summer thunderstorms, that pool water for more than 4 days in hot weather, can result in large Culex mosquito hatches. Other sources of water include; natural flows, livestock watering facilities, coal mining operations, and human outdoor water use and features in and around communities.

4.8.3. Mitigation Measures

No mitigation is proposed with Alternative B.

4.8.4. Residual Effects

No residual effects are anticipated.

4.9. Cultural Resources

4.9.1. Direct and Indirect Effect

No historic properties will be impacted by the proposed project. Following the Wyoming State Protocol Section VI(A)(1) the BLM electronically notified the Wyoming State Historic Preservation Officer (SHPO) on September 25,09 2012 that no historic properties exist within the APE. If any cultural values [sites, artifacts, human remains (Appendix L PRB FEIS and ROD)] are observed during operation of this lease/permit/right-of-way, they will be left intact and the Buffalo Field Manager notified. Further discovery procedures are explained in the Standard COA (General)(A)(1).

4.9.2. Cumulative Effects

Construction and development of oil and gas resources impacts cultural resources through ground disturbance, unauthorized collection, and visual intrusion of the setting of historic properties. 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.

4.9.3. 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.

4.9.4. Residual Effects

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

5. CONSULTATION/COORDINATION:

BLM consulted or coordinated with the following on this project:

Contact	Organization	Onsite Presence?
Jeb TaChick	Yates Petroleum	Yes
Trent Knez	Yates Petroleum	Yes
Tim Barber	Yates Petroleum	Yes
Terry Matchin	Yates Petroleum	Yes
John Kelley	BLM	Yes
Dan Sellers	BLM	Yes
Darci Stafford	BLM	Yes
Matt Warren	BLM	Yes
Bud Stewart	WY Game and Fish Dept.	Yes
Brad Rogers	USFWS	Yes

List of Preparers (BFO unless otherwise noted)

Position/Organization	Name	Position/Organization	Name
NRS/Team Lead	Dan Sellers	Archaeologist	Seth Lambert
Supr NRS	Casey Freise	Wildlife Biologist	Darci Stafford
Petroleum Engineer	Matt Warren	Geologist	Kerry Aggen
LIE	Kristine Philips	Supr NRS	Bill Ostheimer
Associate Field Manager, Resources	Chris Durham	Associate Field Manager	Clark Bennett
Hydrologist	Kathy Brus	NEPA Coordinator	John Kelley
Field Manager	Duane Spencer	Energy Program Asst.	Shirley Green

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