

**DECISION RECORD**  
**Environmental Analysis (EA), WY-070-EA14-195**  
**Devon Energy Production Company, L.P. Geer Trust Fed 15-224774-3XPH**  
**Bureau of Land Management, Buffalo Field Office, Wyoming**

**DECISION:** The BLM approves the application for permit to drill (APD) from Devon Energy Production Company, L.P. (Devon) to drill 1 horizontal oil and gas well and Devon’s concept for additional wells and their infrastructure, all incorporated here by reference. Devon proposes to drill the well and construct associated infrastructure, at the location noted below.

**Compliance.** This decision complies with:

- Federal Land Policy and Management Act of 1976 (FLPMA) (43 USC 1701); DOI Order 3310.
- National Environmental Policy Act of 1969 (NEPA) (42 USC 4321).
- National Historic Preservation Act of 1966 (16 USC 470).
- Endangered Species Act of 1974 (16 USC 1531).
- Buffalo, Powder River Basin Final Environmental Impact Statement (FEISs), 1985, 2003 (2011).
- Buffalo Resource Management Plan (RMP) 1985, Amendments 2001, 2003, 2011.

**Consultation.** This decision considered:

- BLM Washington Office 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.
- Wyoming BLM State Director Review, SDR No. WY-2013-025, Yates Petroleum v. BLM, 2013.

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

BLM approves the following APD and support facilities:

#	Well Name/ Well #	Qtr	Sec	Twp	Rng	Lease
1	Geer Trust Fed 15-224774-3PXH	47N	74W	15	NWNE	WYW128086

**Limitations.** See the conditions of approval (COAs).

**THE FINDING OF NO SIGNIFICANT IMPACT (FONSI).** Analysis of Alternative B of the EA, WY-070-EA14-195, all incorporated here by reference, found Devon’s proposal for 1 APD will have no significant effects on the human environment, beyond those described in the PRB FEIS. There is no requirement for an EIS.

**COMMENT OR NEW INFORMATION SUMMARY.** Since receipt of the APD BLM received clarified policies: BLM Instruction Memorandum (IM)-2013-033, reducing wildlife mortality; IM-2013-104, on NOS and APD processing; IM-2013-144, on NEPA processing; Wyoming BLM IM-2013-005, on migratory bird conservation, IM-2013-14, on NEPA processing, and SDR-2014-005.

**DECISION RATIONALE.** The approval of this project is because:

1. Mitigation measures and COAs, analyzed in the EA, in environmental impact statements or environmental analysis to which the EA tiers or incorporates by reference, will reduce environmental impacts while meeting the BLM’s need. The intent of the analysis and this decision creates the

foundational analysis for future tiering of reasonably foreseeable activities defined in that subsection of the EA - similar to the site-specific circumstances for the Crazy Cat EA, WY-070-EA13-028.

2. The approved project conditioned by its design features and COAs, will not result in any undue or unnecessary environmental degradation.
  - A. The impact of this development cumulatively contributes to the potential for local Greater Sage Grouse (GSG) extirpation yet its effect is acceptable because it is outside priority habitats and is within the parameters of the PRB FEIS/ROD and current BLM and Wyoming GSG conservation strategies.
  - B. There are no conflicts anticipated or demonstrated with current uses in the area.
3. Approval of this project conforms to the terms and the conditions of the 1985 Buffalo RMP (BLM 1985) and subsequent update (BLM 2001) and amendments (BLM 2003, 2011).
4. The selected alternative will help meet the nation's energy need, revenues, and stimulate local economies by maintaining workforces.
5. The operator, in their APDs, shall:
  - Comply with all applicable federal, state, and local laws and regulations.
  - Offer water well agreements to the owners of record for permitted water wells within 0.5 mile of a federal producing well in the APD (PRB FEIS ROD, p. 7).
6. The project is clearly lacking in wilderness characteristics as there is no federal surface.
7. Devon certified there is a surface use access agreement with the landowners.
8. This approval is subject to adherence with all of the operating plans, design features, and mitigation measures contained in the master surface use plan of operations, drilling plan, water management plan, and information in the APD.

**ADMINISTRATIVE APPEAL:** This decision is subject to administrative appeal in accord with 43 CFR 3165. Request for administrative appeal 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. Any party who is 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: 4/3/14

**FINDING OF NO SIGNIFICANT IMPACT**  
**Environmental Analysis (EA), WY-070-EA14-195**  
**Devon Energy Production Company, L.P. Geer Trust Fed 15-224774-3XPH**  
**Bureau of Land Management, Buffalo Field Office, Wyoming**

**FINDING OF NO SIGNIFICANT IMPACT (FONSI).** Based on the information in the EA, WY-070-EA14-195, which BLM incorporates here by reference; I find that: (1) the implementation of Alternative B will not have significant environmental impacts beyond those addressed in the Buffalo Final Environmental Impact Statement (FEIS) 1985, and the Powder River Basin (PRB) FEIS, 2003, 2011; (2) Alternative B conforms to the Buffalo Field Office (BFO) Resource Management Plan (RMP) (1985, 2001, 2003, 2011); and (3) Alternative B does not constitute a major federal action having a significant effect on the human environment. Thus an EIS is not required. I base this finding on consideration of the Council on Environmental Quality's (CEQ) criteria for significance (40 CFR 1508.27), with regard to the context and to the intensity of the impacts described in the EA, and Interior Department Order 3310.

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

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



**Environmental Assessment (EA), WY-070-EA14-195**  
**Application for Permit to Drill (APD)**  
**Devon Energy Production Company, L.P. Geer Trust Fed 15-224774-3XPH**  
**Bureau of Land Management, Buffalo Field Office, Wyoming**

## **1. INTRODUCTION**

BLM provides an environmental assessment (EA) for a Devon Energy Production Company, L.P. (Devon) proposal for 1 oil and gas well application for permit to drill (APD) for the Geer Trust Fed 15-224774-3XPH well and Devon's concept for future wells and infrastructure. BLM has reduced jurisdiction for this proposal, fee (non-federal) surface overlying fee minerals then laterally draining federal minerals. This site-specific analysis tiers into and incorporates by reference the information and analysis in the Final Environmental Impact Statement and Proposed Plan Amendment for the Powder River Basin Oil and Gas Project (PRB FEIS), WY-070-02-065, 2003, 2011 and the PRB FEIS Record of Decision (ROD) per 40 CFR 1508.28 and 1502.21. One may review these documents at the BLM Buffalo Field Office (BFO) and on our website: [http://www.blm.gov/wy/st/en/field\\_offices/Buffalo.html](http://www.blm.gov/wy/st/en/field_offices/Buffalo.html). 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 no timely site-specific analysis adequately covered the project area.

### **1.1. Background**

Devon submitted the APD, incorporated here by reference, on December 20, 2013 to produce oil and natural gas from federally managed fluid mineral formations of the PRB, from fee surface.

- August 22, 2013 – November 6, 2013, BLM received 1 notice of staking, posted, assigned, and conducted onsite visits, evaluating and modifying the proposal to minimize environmental impacts.
- January 13, 2013- BFO sent Devon deficiencies
- February 25, 2013- BFO received deficiencies

### **1.2. Need for the Proposed Project**

The BLM's need for this project is to meet the management objectives of the Buffalo Resource Management Plan (RMP), 1985, 2001, 2003, and 2011 (to which this EA tiers). BLM must determine how and under what conditions to balance natural resource conservation with allowing Devon to exercise lease rights to develop fluid minerals, as described in their APD's associated plans. Conditional fluid mineral development supports the RMP, 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 Washington Office Instruction Memorandum (IM) No. 2009-078 established policy and procedures for processing APDs for horizontal drilling into federal mineral estate from well pads on non-federal locations. Drilling and producing the wells is a federal action. Construction, operation, and reclamation of infrastructure on non-federal land are not federal actions. Drilling and producing mitigation is in the Conditions of Approval for Conventional Application for Permit to Drill.

It is the BLM's responsibility and obligation to analyze the full effects of the federal 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, Council of Environmental Quality, Question 19b, Forty Most Asked Questions, 46 FR 18026, 1981, Connected Non-federal Actions). Identifying

mitigation outside of the BLM’s jurisdiction alerts other agencies and landowners that can implement the mitigation. The probability of the other agencies implementing the mitigation measures is likely to occur, although these agencies may vary specific parameters recommended by the BLM.

**1.4. Scoping and Issues**

BLM posted the proposed APD for 30 days and will timely publish the programmatic EA, any finding, and decision on the BFO website. This project is similar in scope to other fluid mineral development the BFO analyzed. External scoping is unlikely to identify new issues, as verified with recent fluid mineral EAs that BLM externally scoped. External scoping of the horizontal drilling in Crazy Cat East EA, WY-070-EA13-028, 2013, in the PRB area received 3 comments, revealing no new issues. The BFO interdisciplinary team (ID team) conducted internal scoping by reviewing the proposal, its location, and a resource list (see administrative record, AR) to identify potentially significantly affected resources, land uses, regulations, and site-specific circumstances not addressed in the tiered or incorporated analyses. This EA will not discuss resources and land uses that are not present, unlikely to receive significant or material affects, or that the PRB FEIS or other analyses adequately addressed. This EA addresses the project’s potentially significant site-specific impacts that were unknown and unavailable for review at the time of the PRB FEIS analysis to help the decision maker come to a reasoned decision. The project area is clearly lacking wilderness characteristics as there is no federal surface. Project issues include:

- Air quality
- Soils: 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

BLM analyzed the following issues in the PRB FEIS and they do not present a substantial environmental question of material significance to this proposal.

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

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

**2. PROPOSED PROJECT AND ALTERNATIVES**

**2.1. Alternative A – No Action**

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

**2.2. Alternative B Proposed Action (Proposal)**

**Overview.** Devon requests BLM’s approval for 1 APD, supporting infrastructure, and reasonably foreseeable activity; see, Table 2.1 and below. The proposals are to explore for, and possibly develop oil and gas reserves in the Parkman Formation (7000 ft.), and perhaps others. See the drilling program with each APD for details on targeted zones, legal descriptions, surface, and bottom holes – summarized at Table 2.1, below. The project area is 13 miles northeast of Savageton, Campbell County, Wyoming. Project elevations average 5000 feet. The topography has gently sloped draws rising to mixed sagebrush

and grassland uplands. The area climate is semi-arid, averaging 13 inches annual precipitation, about 60% of which occurs between April and September.

**Table 2.1. Well Name/#/Lease/Location:**

#	Well Name & #	TwN	Rng	Sec	Qtr	Lease #
1	Geer Trust 15-224774-3PXH	47N	74W	15	NWNE	WYW128086

The proposal involves:

Activity	Length (feet)	Width (feet)	Acres of Disturbance	Interim Disturbance
Geer Trust 15-224774-3PXH, constructed pad, including spoils/tank battery	510	350	6.5	3.0 acres
Access Road	1200	70	2.0	
*Surface pipeline	16,000	15		
<b>Total Disturbance for this location</b>			8.5	

NOTE: Length/Width represent working pad dimensions. Acres of disturbance represent the fenced in area of disturbance. For details pertaining to road type and pipeline placement see MSUP. \*Will be temporary placement for completion purposes.

Drilling, Construction & Production design features include:

**Access**

- Access is primarily via WY HWY 50
- A road network will consist of existing improved all-weather roads and newly constructed crown and ditch template roads.

**Well Locations**

- The well will use a semi-closed loop system. Lined pits at the pad will hold the cuttings.
- Up to 6 x 400 bbl tanks for oil and water will be placed on location for each well.
- No staging areas, man camps/housing facilities are anticipated to be used off-site. Working trailers and sleeping trailers will be placed on the well pad during the drilling and completion of the well.
- If the well becomes a producer, production facilities will be located at the well site and will include a pumping unit, storage tanks, buildings, oil-water separator (heater-treater). There will be no pits at this producing well location.

Dikes will be constructed completely around production facilities, i.e. production tanks, water tanks, and heater treater. The dikes will be constructed of corrugated steel, approximately 3 feet high, and hold capacity of the largest tank plus 10%. The load-out line will be outside of the dike area. A drip barrel or “Getty-Box” will be installed under the end of all load-out lines.

**Drilling and Completion Operations**

- Hydraulic fracturing (HF) operations are planned as a ‘plug & perf’ operation done in stages. All fresh water will be contained in approximately 12-20 500 bbl frac masters. No additional well pad disturbance is anticipated for HF operations. Completion flowback water will be held in tanks on location and trucked to a disposal facility permitted by Wyoming Department of Environmental Quality (WDEQ). See the AR for water sources.
- Water for drilling purposes will be via trucks from the City of Gillette, approximately 30,000 bbls.
- Water for completion purposes will arrive via surface line from an existing frac pit built for Fee mineral development, approximately 30,000 bbls to 60,000 bbls.
- A detailed completion operations plan is outlined in the surface use plan (SUP).
- During the drilling phase of each individual well (6 to 8 week period per well), the average daily

traffic to and from the location is approximately 2 large trucks (water hauler, cement trucks, etc.) and 6 personal pickup trucks per day. During the well completion process (3 to 4 week period per well), the average daily traffic increases to 4 to 6 large trucks and 6 personal pickup trucks per day. During the production phase, the average daily traffic will decrease to 1 to 2 pickup trucks per day.

- If the wells produce, produced water will be stored in tanks on the location and truck it off to a WDEQ approved Class I disposal well or evaporation facility. Specifics related to production and potential buried flow lines for produced water will be addressed by sundry action. Potential quantities of produced water are unknown at this time.

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

<b>Drilling and Completion Step</b>	<b>Approximate Duration</b>
Build Location (roads, pad, and other initial infrastructure)	30 days
Mob Rig	2-4 days <sup>1</sup>
Drilling (24/7)	30 days <sup>2</sup>
Schedule/logistics	30 days
Completion (setup, completion, demobilization)	5-8 days
<sup>1</sup> Depending on distance and needed to add supplemental drilling equipment, such as skidding plates.	
<sup>2</sup> By comparison, approximately 2 days are required to drill a CBM well. ICF 2012	

For a detailed description of design features and construction practices associated with the proposed project, refer to the MSUP and drilling plan included with the APD. Also see the subject APD for maps showing the proposed well locations and associated facilities described above. BLM incorporated and analyzed the implementation of committed mitigation measures in the MSUP 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 measures to alleviate resource impacts in their submitted surface use and drilling plans.
- Certify it has a surface access agreement with the landowners.

**Plan of Operations.**

The proposal conforms to all Bureau standards and incorporates appropriate best management practices, required and designed mitigation measures determined to reduce the effects on the environment. BLM reviewed and approved a surface use plan of operations describing all proposed surface-disturbing activities pursuant to Section 17 of the Mineral Leasing Act, as amended. This analysis also incorporates and analyzes the implementation of committed mitigation measures in the SUP, drilling plan, and the standard conditions of approval (COAs) found in the PRB FEIS ROD, Appendix A.

**Reasonably Foreseeable Activity.**

The reasonably foreseeable activity (RFA) for this and adjacent areas includes oil/gas exploration on 1280 acre spacing and possible 320 acre spacing. Devon’s RFA covered in this analysis then is from a potential of 36 to 72 foreseeable wells – based on the preceding spacing. (This does not preclude the RFA spacing analysis in the PRB FEIS or applying to drill multiple wells from this pad further reducing the surface disturbance per well). Devon’s oil and gas development could occur in the following areas, subject to this and future analyses;

	T48N R74W Sec 25-29, 31-36	T48N R73W Sec 30-32
T47N R75W Sec 1, 12, 13, 24, 25	T47N R74W Sec 1-36	T47N R73W Sec 5-8, 17-20, 29-31
	T46N R74W Sec 1-6	

(See Map E, in the MSUP, AR for details)

The project analysis area is defined as the area within 4 miles of the proposed well location. Well development could be 2 wells per section to the Parkman Formation, perhaps others. Future development may use existing well pads and infrastructure put in place for fee and/or federal mineral development. Potential APD submittals could also consist of multiple wells on an existing pad or tie into existing supporting infrastructure such as; tank batteries, pipelines, powerlines, and transportation networks.

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

This proposal does not diverge from the goals and objectives in the Buffalo Resource Management Plan (RMP), 1985, 2001, 2003, 2011, and generally conforms to the terms and conditions of that land use plan, its amendments, supporting FEISs, 1985, 2003 (2011), and laws including the Clean Air Act, 42 USC 7401-7671q (2006), the Clean Water Act, 33 USC 1251 et seq. (1972), etc.

## 3. AFFECTED ENVIRONMENT

This section briefly describes the physical and regulatory environment that may be significantly affected by the alternatives in Section 2, or where changes in circumstances or regulations occurred since the approval of analyses to which this EA incorporates by reference; see Appendix A, Table 3.1. The PRB FEIS considered a no action alternative (pp. 2-54 to 2-62) in evaluating a development of up to 54,200 fluid mineral wells. Nearly all of the PRB’s coalbed natural gas (CBNG) wells and over 60% of the deep oil and gas wells are hydraulically fractured; BLM and Goolsby 2012. The BLM uses the aggregated effects analysis approach - incorporating by reference the circumstances and developments approved via the subsequent NEPA analyses for adjacent and intermingled developments coincident to this proposal area to retain currency in the no action alternative. 615 F. 3d 1122 (9th Cir. 2010). There are about 28 producing oil and gas wells within 4 miles, and evidence of 115 wells or recent wells within 1 mile of this project area; Wyoming Oil and Gas Conservation Commission (WOGCC) 2014. The number of conventional wells in the Buffalo planning area is 1313, which includes 783 horizontal wells (federal, fee, and state) (as of April 2013). This represents 41% of the projected 3,200 in the 2003 PRB ROD. This agrees with the PRB FEIS which analyzed the reasonably foreseeable development rolling across the PRB of 51,000 CBNG and 3,200 natural gas and oil wells. BLM determined a minimum of 115 townships from the northern borders of Sheridan and Campbell Counties to the southern border of Campbell County are a developed field for fluid minerals because of the existing federal developments. In addition, other operators are likely to continue seeking permits to develop unconnected leases in or in the effects analysis areas near the project area; decisions to approve or deny future proposals will occur following APD submittal. Development occurring on non-federal surface and non-federal mineral estate would continue.

### 3.1. Air Quality

BLM incorporates by reference the updated air quality affected environment section from the nearby and upwind Porsche Wells EA, WY-070-EA14-85, Section 3.1. Campbell County received an air quality alert in 2014 for particulate matter, attributed to coal dust. Adgate, et al. advanced a hypothesis that air and water quality effects from HF may negatively impact human health but concluded that “major uncertainties” and a “paucity of baseline data” after the drilling of 153,260 wells since 2004. They called for more research funding.

### 3.2. Soils, Ecological Sites, and Vegetation

Ecological site descriptions provide soils and vegetation data for resource identification, management, and reclamation recommendations. Using the Natural Resource Conservation Service, (NRCS, USDA),

Technical Guides for the Major Land Resource Area 58B Northern Rolling High Plains, in the 10-14 inch Northern Plains precipitation zone, verified through onsite field reconnaissance, the project area consists of loamy and sandy ecological sites. Layers of the soil most influential to the plant community varies from 3 to 6 inches thick. These layers consist of the A horizon with very fine sandy loam, loam, or silt loam texture and may also include the upper few inches of the B horizon with sandy clay loam, silty clay loam or clay loam texture. Project area soils differ with topographic location, slope, and elevation. Erosion potential varies depending on the soil type, vegetative cover, and slope. Interpretations of soil modeling data show soils disturbed from construction of well pads, specifically cut and fill slopes, are highly susceptible to water and wind erosion. Reclamation potential of soils in the project area is fair.

Refer to the ecological site narrative section below for description of vegetation species observed during onsite inspections. Interpretations of soil modeling data show soils disturbed from construction of well pads, specifically cut and fill slopes, are highly susceptible to water and wind erosion. Reclamation potential of soils also varies in the project area. The area's main soil limitations include: depth to bedrock, low organic matter content, and high erosion potential, especially in areas of steep slopes.

*Loamy Sites:* This site occurs on gently undulating to rolling land on landforms which include hill sides, alluvial fans, ridges and stream terraces, in the 10 to 14 inch precipitation zone. The soils of this site are moderately deep to deep (greater than 20 inches to bedrock), well drained soils that formed in alluvium and residuum derived from sandstone and shale. These soils have moderate permeability.

*Sandy Sites:* This site occurs on nearly level to 50% slopes on landforms which include hillsides and ridges in the 10-14" precipitation zone. These soils are moderately deep to very deep (greater than 20" to bedrock), well drained soils that formed in eolian deposits, alluvium or residuum derived from unspecified sandstone. These soils have rapid permeability. The main soil limitations include low available water holding capacity, and high wind erosion potential – which may develop into active sand dunes, with the deterioration of cover.

Plant communities consisted of:

#### Rhizomatous Wheatgrasses, Needle and thread, Blue Grama Plant Community

This plant community is the interpretive plant community for this site and is considered to be the Historic Climax Plant Community (HCPC). This plant community evolved with grazing by large herbivores and is well suited for grazing by domestic livestock. This plant community can be found on areas that are properly managed with grazing and/or prescribed burning, and sometimes on areas receiving occasional short periods of rest. The potential vegetation is about 75% grasses or grass-like plants, 15% forbs, and 10% woody plants. This state is dominated by cool season mid-grasses. The major grasses include western wheatgrass, needle and thread, and green needlegrass. Other grasses occurring in this state include Cusick's and Sandberg bluegrass, bluebunch wheatgrass, and blue grama. A variety of forbs and half-shrubs also occur. Big sagebrush is a conspicuous element of this state, occurs in a mosaic pattern, and makes up 5 to 10% of the annual production. Plant diversity is high. This plant community is extremely stable and well adapted to the Northern Great Plains climate. The diversity in plant species allows for high drought tolerance. This is a sustainable plant community (site/soil stability, watershed function, and biologic integrity).

#### Threadleaf sedge/Needle and thread/Yucca Plant Community

Dominant vegetation includes needle and thread, threadleaf sedge, sand dropseed and yucca. Other vegetative species include prairie sandreed, Indian ricegrass, cheatgrass, and pricklypear.

#### Mixed Sagebrush/Grass Plant Community

Historically, this plant community evolved under grazing by bison and a low fire frequency. Currently, it is found under moderate, season-long grazing by livestock in the absence of fire or brush management. 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 are needle and thread, western wheatgrass, and green needlegrass. Secondary grasses are 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 is from 20% to 30%. Fringed sagewort and Plains pricklypear are common. When compared to the HCPC, sagebrush and blue grama have increased. Production of cool-season grasses, particularly green needlegrass, has been reduced. The sagebrush canopy protects the cool-season mid-grasses, but this protection makes them unavailable for grazing. Cheatgrass (downy brome) has invaded the site. The overstory of sagebrush and understory of grass and forbs provide a diverse plant community that will support domestic livestock and wildlife such as mule deer and antelope. This plant community is resistant to change. A significant reduction of big sagebrush can only be accomplished through fire or brush management. The herbaceous species present are well adapted to grazing; however, species composition can be altered through long-term overgrazing. If the herbaceous component is intact, it tends to be resilient if the disturbance is not long-term.

#### Western Wheatgrass/Cheatgrass Plant Community

This plant community is created when the Mixed Sagebrush/Grass Plant Community or the Heavy Sagebrush Plant Community is subjected to fire or brush management not followed by prescribed grazing. Rhizomatous wheatgrasses and annuals will eventually dominate the site. Compared to the HCPC, cheatgrass has invaded with western wheatgrass and thickspike wheatgrass maintaining at a similar or slightly higher level. Virtually all other cool-season mid-grasses are severely decreased. Blue grama is the same or slightly less than found in the HCPC. Plant diversity is low. This plant community is relatively stable with the rhizomatous wheatgrasses being somewhat resistant to overgrazing and the cheatgrass effectively competing against the establishment of perennial cool-season grasses. An increase in bare ground reduces water infiltration and increases soil erosion. The watershed is usually functioning. The biotic integrity is reduced by the lack of diversity in the plant community.

### **3.3. Water Resources**

WDEQ regulates Wyoming's water quality with EPA oversight. The Wyoming State Engineer's Office (WSEO) has authority for regulating water rights issues and permitting impoundments for the containment of the State's surface waters. The WOGCC has authority for permitting and bonding off channel pits located over state and fee minerals.

#### **3.3.1. Goundwater**

The areas historical use of groundwater was for stock or domestic water. A search of the WSEO Ground Water Rights Database showed 5 registered stock, 1 domestic water wells and 1 monitor well within 1 mile of the proposed well with depths from 320 to 1500 feet. The Fox Hills, the deepest penetrated fresh water zone in the PRB lies well above the target formation. Depth to the Fox Hills formation is 6,105 feet and 6,315 feet total vertical distance (TVD) respectively. Refer to the PRB FEIS for additional information on groundwater, pp. 3-1 to 3-36. The 2004 EPA study found it unlikely that hydraulically fractured CBNG wells would contaminate ground water. The EPA has an expansive, on-going study looking at more aspects of hydraulic fracturing and has yet to issue findings. A 2011-2012 Geological Survey study found no groundwater effects from thousands of deep horizontally fractured oil and gas wells. Adgate, 2014, warner 2012, and news sources reveal a minor controversy over a state's non-disclosure of proprietary HF fluids while release decisions receive administrative and court reviews.

#### **3.3.2. Surface Water**

The project area lies in the Hoe Creek drainage, tributary to the Upper Belle Fourche watershed. Most of the area drainages are ephemeral (flowing only in response to a precipitation event or snow melt). Some of the drainages, are intermittent (flowing only at certain times of the year when it receives water from alluvial groundwater, springs, or other surface source – PRB FEIS Chapter 9 Glossary). The channels range from steep gullies to gentle, well vegetated grassy swales, without defined beds and banks. See the

PRB FEIS for a surface water quality discussion, pp. 3-48 to 3-49, and for surface water, pp. 3-36 to 3-56. No further analysis of surface water will be discussed.

### **3.4. Wetlands/Riparian**

There are no wetlands or riparian areas near the proposed well pads or infrastructure, so the project should not impact wetlands or riparian areas.

### **3.5. Invasive or Noxious Species**

The following state-listed noxious weed and/or weed species of concern infestations were discovered by a search of inventory databases on the Wyoming Energy Resource Information Clearinghouse (WERIC) web site ([www.weric.info](http://www.weric.info)): Black Henbane and Buffalobur. The WERIC database was created cooperatively by the University of Wyoming, BLM and county weed and pest offices. Additionally, Devon inspected the project area for noxious weeds confirming isolated patches. The following is a list of state and county designated noxious weeds in the project area: Canada thistle (*Cirsium arvense* L.), Spotted knapweed (*Centaurea maculosa* Lam.), and Russian knapweed (*Centarurea repens*). Also, Campbell County Weed and Pest declared 5 species as weeds of concern in the project area: Black henbane (*Hyoscyarnus niger* L.), Buffalobur (*Solanum rostratum* Dun.), Common cocklebur (*Xanthium strumarium* L.), Salt cedar (*Tamarix ramosissima* Ledeb.), and Leafy spurge (*Euphorbia esula* L.). Cheatgrass is prevalent throughout the project area. The state-listed noxious weeds are in the PRB FEIS, Table 3-21, p. 3-104; and the Weed Species of Concern are in Table 3-22, p. 3-105.

### **3.6. Wildlife**

#### **3.6.1. Fish and Wildlife**

The PRB FEIS identified wildlife species occurring in the PRB, pp. 3-113 to 3-206. 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 for wildlife species known or likely to occur in the project area that are likely to be impacted by the action. Rationale for any species not discussed below is found in Appendix A.

#### **3.6.2. Threatened, Endangered, Candidate, Special Status (Sensitive) Species**

The Buffalo BLM receives a species list periodically from the US Fish and Wildlife Service (FWS) of threatened, endangered, proposed, and candidate species. Species included on that list that may be impacted by the proposed project will be discussed below.

##### **3.6.2.1. Ute Ladies'-Tresses Orchid (ULT)**

The FWS lists the Ute ladies'-tresses orchid (ULT) as threatened. The PRB FEIS discussed the affected environment for ULT, p. 3-175. The Wyoming Natural Diversity Database model predicts undocumented populations may be present in southern Campbell and northern Converse Counties. Scientists documented 4 orchid populations in Wyoming prior to 2005. Scientists found 5 additional sites 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. Repeated surveys conducted for coalbed natural gas projects in the PRB have not identified the plant in suitable habitat. The project disturbance will occur in upland habitats not suitable for ULTs.

##### **3.6.2.2. Northern Long-Eared Bat**

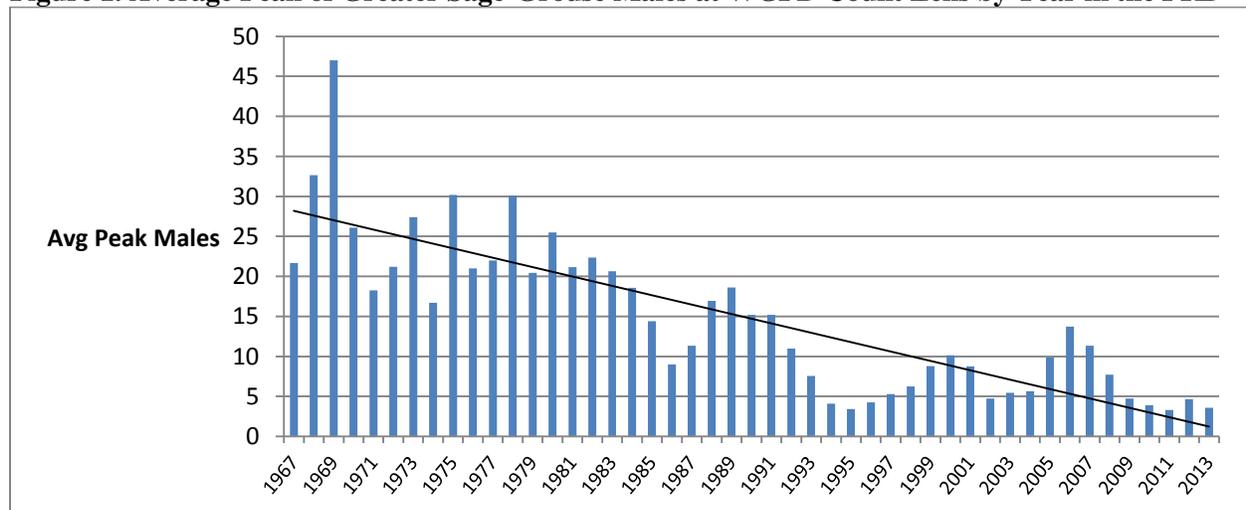
The Northern long-eared bat (*Myotis septentrionalis*) was proposed for listing under the ESA, October 2, 2013; 78 FR 61046. The bat is threatened by white-nose syndrome (WNS), a disease caused by the cold-

loving fungus, *Pseudogymnoascus (Geomyces) destructans*. First observed in New York in 2006, WNS spread across the Northeast and into the Midwest and Southeast. Throughout the range of WNS, up to 99% of infected bats die from the disease. Yet, other threats (the present or threatened destruction, modification, or curtailment of its habitat or range; overutilization for commercial, recreational, scientific, or educational purposes; other natural or manmade factors affecting its existence) when combined with white-nose syndrome heighten the risk to the species (FWS 2013b). The species occurs in northeastern Wyoming and is documented in Campbell, Crook, and Weston Counties; however, population information is limited, and the species is considered uncommon or rare outside of the Black Hills (FWS 2013b). Northern long-eared bats emerge at dusk to fly through the understory of forested hillsides and ridges feeding on moths, flies, leafhoppers, caddisflies, and beetles, which they catch in flight using echolocation, or by gleaning (picking) from vegetation. In the summer, male and reproductive female bats roost singly or in colonies in cracks, crevices, cavities, and under the bark of live and dead trees, while other males and non-reproductive females roost in cooler places like caves and mines (FWS 2013A, Adams 2003). Suitable habitat is not present, and the project area is outside the bat’s known range.

### 3.6.2.3. Greater Sage-Grouse (GSG)

PRB FEIS has a detailed discussion on GSG ecology and habitat, pp. 3-194 to 3-199. Subsequently the USFWS determined the Greater Sage-Grouse (GSG) warrants federal listing as threatened across its range, but precluded listing due to other higher priority listing actions, 75 Fed. Reg. 13910 to 14014, Mar. 23, 2010; 75 Fed. Reg. 69222 to 69294, Nov. 10, 2010. GSG are a WY BLM special status (sensitive) species (SSS) and a WGFD species of greatest conservation need because of population decline and ongoing habitat loss. The 2012 population viability analysis for the Northeast Wyoming GSG found there remains a viable population of GSG in the PRB (Taylor et al. 2012). However, threats from energy development and West Nile virus (WNV) are impacting future viability (Taylor et al. 2012). The BLM IM WY-2012-019 establishes interim management policies for proposed activities on BLM-administered lands, including federal mineral estate, until RMP updates are complete.

**Figure 1. Average Peak of Greater Sage-Grouse Males at WGFD Count Leks by Year in the PRB**



The GSG population in northeast Wyoming is exhibiting a steady long term downward trend, as measured by lek attendance (WGFD 2011). Figure 1 illustrates a 10-year cycle of periodic highs and lows. Each subsequent population peak is lower than the previous peak. Research suggests that the declines since 2001 are a result, in part, of energy development (FWS 2010, Taylor et. al. 2012). Within the 79 square mile reasonably foreseeable activity (RFA) analysis area, there are 4 known GSG leks, 2 of

which are unoccupied. Approximately 30 % of the RFA is modeled as “high quality nesting area. None of the area is within GSG core or connectivity designation.

The State Wildlife Agencies’ Ad Hoc Committee for Consideration of Oil and Gas Development Effects to Nesting Habitat (2008) implicates that impacts to leks occur within 4 miles of oil and gas developments. WGFD records indicate that no occupied GSG leks occur within 4 miles of the project area. One unoccupied lek, the Caballo West, is 3.0 miles northeast of the project area. The project area is not in a core or connectivity habitat 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) but actual observation at the onsite showed the area to be mostly grassland with a few patches of sage. No GSG sign was found during the onsite.

**3.6.2.4. Special Status (Sensitive) Species (SSS)**

The PRB FEIS discussed the affected environment for SSS, p. 3-174 to 201. Appendix A lists those SSS that may occur in the project area. The Table also includes a brief description of the habitat requirements for each species. BLM discusses those SSS impacted beyond the level analyzed in the PRB FEIS, below. Wyoming BLM updates SSS on its website: <http://www.blm.gov/wy/st/en/programs/Wildlife.html>.

**3.6.3. Big Game**

The big game species occurring in the project area are mule deer and pronghorn. The project is in yearlong mule deer range and winter/yearlong pronghorn range. The PRB FEIS discussed the affected environment for pronghorn and mule deer on pp. 3-117 to 3-122 and pp. 3-127 to 3-132 respectively. Table 3.2 below indicates the delineated seasonal ranges for each species 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 2012). This information is characteristic of big game throughout the RFA.

**Table 3.2 Big Game Species, Seasonal Ranges, Herd Units, Population Objectives, and Estimates for Big Game Species Likely to Occur in the Greer Trust Fed 15-224774-3XPH Project Area**

Species	Seasonal Range in Project Area	Herd Unit	WGFD Population Objective	% Above (+) or Below (-) Objective	WGFD Report Year
Mule Deer	Yearlong, winter yearlong	320 – Pumpkin Buttes	11,000	- 12.4%	2012
Pronghorn	Yearlong, winter yearlong	309 – Pumpkin Buttes	18,000	+ 97%	2012

**3.6.4. Plains Sharp tailed Grouse**

The PRB FEIS discussed the affected environment for plains sharp-tailed grouse on pp. 3-148 to 3-150. Sharp-tailed grouse inhabit short and mixed-grass prairie, sagebrush shrublands, woodland edges, and river canyons. This species is found where grasslands are intermixed with shrublands, wooded draws, shrubby riparian areas, and wet meadows. A lone sharp-tailed grouse was observed perched on a fence at the school approximately 6.7 miles south of the project area. Sharp-tailed grouse habitat is present in the project area. The nearest known plains sharp-tailed grouse lek is 17 miles from the project area.

**3.6.5. Raptors**

The PRB FEIS discussed the affected environment for raptors, pp. 3-141 to 3-148. According to the BLM raptor database, no raptor nests are within 0.5 miles of the project area. ICF International did not find any nests during their 2013 survey (ICF International 2013). The reasonably foreseeable activity analysis area contains 129 raptor buffers (0.5 miles from nests). Of these, ferruginous hawks are the most numerous. Other species nesting in the RFA area include red-tailed hawk, Swainson’s hawk and great-horned owl.

### 3.6.6. Migratory Birds

The PRB FEIS discussed the affected environment for migratory birds, pp. 3-150 to 3-153. A wide variety of migratory birds may occur in the proposed project area at some point during the year. Migratory birds are birds that migrate for breeding and foraging at some point in the year. The BLM-FWS Memorandum of Understanding (MOU) (2010) promotes the conservation of migratory birds, complying with Executive Order 13186 (Federal Register V. 66, No. 11). BLM encourages voluntary design features and conservation measures supporting migratory bird conservation, in addition to appropriate restrictions. Habitats occurring near the proposed well location and throughout the RFA include sage-brush steppe grasslands, mixed grass prairie. Many species that are of high management concern use these areas for their primary breeding habitats (Saab and Rich 1997). Nationally, grassland and shrubland birds declined more consistently than any other ecological association of birds over the last 30 years (WGFD 2009).

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

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

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

### 3.7. Cultural

Per Section 106 of the National Historic Preservation Act, BLM must consider impacts to historic properties (sites that are eligible for or listed on the National Register of Historic Places (NRHP)). For an overview of cultural resources found in the area, refer to the Draft Cultural Class I Regional Overview, Buffalo Field Office (BLM, 2010). A Class III (intensive) cultural resource inventory (BFO project no. 70140031 and 70140031.A) was performed to locate specific historic properties which may be impacted by the proposal. No cultural resources are in the proposal area.

## 4. ENVIRONMENTAL EFFECTS

**No Action Alternative.** BLM analyzed the no action alternative as Alternative 3 in the PRB FEIS and it subsequently received augmentation of the effects analysis in this EA through the analysis of mineral projects, their approval, and construction; and through the analysis and approval of other projects. BLM incorporates by reference these analyses in this EA; see Table 3.1. This updated the no action alternative and cumulative effects. The project area has surface disturbance from existing roads, well pads, and oil and gas facilities. Under the no action alternative, on-going well field operations would continue as would the development of approved single and multi-well pads, consisting of horizontal wells with approved APDs and other approved APDs. The production and the drilling and completion of these new wells would result in noise and human presence that could affect resources in the project area; these effects could include the disruption of wildlife, the dispersal of noxious and invasive weed species, and dust effects from traffic on unpaved roads. Present fluid mineral development in the PRB is under half of that envisioned and analyzed in the PRB FEIS. There is only a remote potential for significant effects above those identified in the PRB FEIS to resource issues as a result of implementing the no action alternative.

## **Alternative B, Proposed Action (Proposal)**

### **4.1. Air Quality**

BLM incorporates by reference the analysis found in the August 2012 Lease Sale EA, WY-070-EA12-44, pp. 45-51 (air quality, greenhouse gas emissions, and visibility). Air quality impacts modeled in the PRB FEIS and Cumulative Air Quality Effects, 2009 concluded that PRB projected fluid and solid development would not violate state, or federal air quality standards and this project is within the development parameters.

### **4.2. Soil, Ecological Sites, and Vegetation**

#### **4.2.1. Direct and Indirect Effects**

The effects to soils and vegetation resulting from well pad, access road and pipeline construction include:

- Mixing of horizons – occurs where construction on roads, or other activities take place. Mixing may result in removal or relocation of organic matter and nutrients to depths where it would be unavailable for vegetative use. Soils which are more susceptible to wind and water erosion may be moved to the surface. Soil structure may be destroyed, which may impact infiltration rates. Less desirable inorganic compounds such as carbonates, salts, or weathered materials may be relocated and have a negative impact on revegetation. This drastically disturbed site may change the ecological integrity of the site and the recommended seed mix.
- Loss of soil vegetation cover, biologic crusts, organic matter and productivity. With expedient reclamation, productivity and stability should be regained in the shortest time frame.
- Soil erosion would also affect soil health and productivity. Erosion rates are site specific and are dependent on soil, climate, topography, and cover.
- Soil compaction – the collapse of soil pores results in decreased infiltration and increased erosion potential. 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 may be remediated by plowing or ripping.
- Modification of hill slope hydrology.
- Direct effects (removal and/or compaction) to vegetation would occur from ground disturbance caused by drilling rig equipment and construction of a well pads, tank batteries, and roads. Short term effects would occur where vegetated areas are disturbed but later reclaimed within 1 to 3 years of the initial disturbance. Long-term effects would occur where well pads, roads, water-handling facilities or other semi-permanent facilities may result in loss of vegetation and affect reclamation success for the life of the project.
- Soils will be subjected to wind and water erosion.

The BLM will evaluate reclamation success using the requirements in the BLM State Wide Reclamation Policy found at: <http://www.blm.gov/wy/st/en/programs/reclamation>, incorporated here by reference.

#### **4.2.2. Cumulative Effects**

For details on expected cumulative impacts, refer to the PRB FEIS, pp. 4-151. The PRB FEIS defines the designation of the duration of disturbance (pp. 4-1 and 4-151). Most soil disturbances would be short term impacts with expedient interim reclamation and site stabilization. These impacts, singly or in combination, could increase the potential for valuable soil loss due to increased water and wind erosion, invasive/noxious/poisonous plant spread, invasion and establishment, and increased sedimentation and salt loads to the watershed system, if applicable mitigation measures are not used.

#### **4.2.3. Mitigation Measures**

Devon planned their project to maximize the fluid mineral drainage while avoiding areas with soil limitation where possible. Devon also designed the infrastructure requiring no engineered roads and using existing oil/gas roads as much as possible to access the proposed well. The constructed well pad was designed to minimize cut and fill slopes. The project designed features as outlined in the MSU, pad

design drawings, and road design will rectify impacted areas by repairing, rehabilitating and/or restoring the affected environment. Devon's design features will reduce or eliminate impacts over time by preservation and maintenance operations during the project's life. Refer to the MSUP and the APD for pad design drawings and a detailed description of design features and construction practices. Improved roads used in conjunction with accessing the well will be fully built (including all water control structures such as wing ditches, culverts, relief ditches, low water crossings, surfacing, etc.) and functional to BLM standards as outlined in the BLM Manual 9113 prior to drilling of the well. All erosion control products

will be applied according to manufacturer's specifications to reduce product failures. If the well is a producer, the site shall be put into interim reclamation as soon as possible after completing well.

#### **4.2.4. Residual Effects**

Residual effects would include a long-term loss of soil productivity associated with well pad and roads. The PRB FEIS identified residual effects (p. 4-408) such as the loss of vegetative cover, despite expedient reclamation, for several years until reclamation is successfully established. Due to the presence of erosive soils and the topography of the project area erosion will occur. Rilling and gulying of cut and fill slopes on, access/utility corridors, will take place. Impacts from livestock to stabilized cut and fill slopes will limit soils becoming stable and getting vegetation establish. The PRB FEIS defined the designation of the duration of disturbance, pp. 4-1 and 4-15. "For this EIS, short-term effects are defined as occurring during the construction and drilling/completion phases. Long-term effects are caused by construction and operations that would remain longer".

Impacts to vegetation and soils from surface disturbance will be reduced by following Devon's plans and BLM applied mitigation. Devon reduced construction of new access roads by using existing oil/gas roads where possible. This results in less surface disturbance and environmental impact. See Section 2.2 for a summary of the disturbance. All the proposal's disturbances are long term. With the reclamation status of the project area rated as fair and field observations showing areas of reclamation success expedient reclamation of disturbed land with stockpiled topsoil, proper seedbed preparation techniques, and appropriate seed mixes, along with use of erosion control measures (e.g., waterbars, water wings, culverts, rip-rap, etc.) would ensure land productivity/stability is regained and maximized. The BLM considers these residual effects from Alternative B are likely within the parameters for acceptable surface disturbance and its 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 minimize an adverse impact on ground water. The volume of water produced by this federal mineral development is unknowable at the time of permitting.

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

#### **4.3.1. Groundwater**

##### **4.3.1.1. Direct and Indirect Effects**

The cumulative industry and regulatory experience shows that thousands of wells pierce the nation's

largest aquifer in western Texas, Oklahoma, and Kansas with essentially no direct or indirect impact to that groundwater, see, <http://www.spe.org/jpt/print/archives/2010/12/10Hydraulic.pdf>. Lastly, the EPA 2004 study and its on-going, detailed study of HF yielded no immediate cautions, concerns, or warnings that present industry and regulatory practices endanger ground water or require immediate changes.

At the time of permitting, the volume of water that will be produced in association with these federal minerals is unknown. The operator will have to produce the wells for a time to be able to estimate the water production. In order to comply with the requirements of Onshore Oil and Gas Order #7, Disposal of Produced Water, the operator will submit a Sundry to the BLM within 90 days of first production which includes a representative water analysis as well as the proposal for water management. Historically, the quality of water produced in association with conventional oil and gas has been such that surface discharge would not be possible without treatment. Initial water production is quite low in most cases. There are 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. The APD's surface use and drilling plans show adequate protection of surface lands and ground water, including the Fox Hills Formation. The operator will verify that there is competent cement across the aquifer, from 100 feet above to 100 feet below the Fox Hills Formation. This ensures that ground water will not be adversely impacted by well drilling and completion operations.

#### **4.3.1.2. Cumulative Effects**

BLM foresees minimal cumulative effects either to or from the use of ground water for this 1 proposed well. BLM anticipates no need for mitigation measures beyond the design features and programmatic COAs. BLM anticipates no residual effects to ground water from this project.

#### **4.3.1.3. Mitigation Measures**

Adherence to the drilling COAs, the setting of casings at appropriate depths, following safe remedial procedures, and using proper cementing procedures should protect possible fresh water aquifers. The target formation is the Parkman formation with total vertical depths ranging from 7057 feet to 7325 feet. Specific to protection of the Fox Hills formation as described in the Drilling Plan the operator will run surface casing to 2,250 feet, total vertical depth and cement to surface to protect potential shallow aquifers. The Fox Hills formation occurs at a depth between 6105 feet and 6315 feet. The top of cement for the intermediate casing will be isolated from the intermediate casing shoe to 2000 feet to protect potential fresh water aquifers. This will ensure that ground water will not be adversely impacted by well drilling and completion operations. A gamma ray log will be run from TVD to surface. The gamma ray log will be run either with a wire line or LWD (logging while drilling) tools. The gamma ray log will indicate the top and bottom of Fox Hills Formation. Also as described in Appendix 1 of the Drilling Plans the operator will utilize one of the following techniques to properly identify the cement top is above the Fox Hills Formation: a) Radioactive Cement Tracer and associated tools, b) Cement Bond Log, or c) Temperature Survey. This will help ensure that ground water of the fox hills formation will not be adversely impacted by well drilling and completion operations.

### **4.4. Invasive Species**

#### **4.4.1. Direct and Indirect Effects**

The operator committed to the control of noxious weeds and species of concern using the following measures identified in their Integrated Pest Management Plan (IPMP): 1) Control Methods, including mowing and herbicide. 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 Canada thistle. However, applicant committed measures will reduce potential impacts from noxious weeds and invasive plants.

#### **4.4.2. Cumulative Effects**

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

#### **4.4.3. Mitigation Measures**

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

#### **4.4.4. Residual Effects**

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

### **4.5. Wildlife**

#### **4.5.1. Wildlife Threatened, Endangered, Proposed and Candidate Species**

##### **4.5.1.1. Ute Ladies'-Tresses Orchid**

Limited potential habitat is present in the project area. Implementation of the proposed project will have "no effect" on ULT. The PRB FEIS discussed the cumulative effects to ULT (p. 4-253 to 4-254). No mitigation is proposed with alternative B. No residual effects are anticipated.

##### **4.5.1.2. Northern Long-eared Bat**

###### **4.5.1.2.1. Direct and Indirect Effects**

Suitable roosting habitat for Northern long-eared bat is not present in the project area. Implementation of the proposed project will have "no effect" on the species.

###### **4.5.1.2.2. Cumulative Effects**

The Northern long-eared bat is not discussed in the PRB FEIS; however, the PRB FEIS discussed the cumulative effects to special status species (p. 4-272 to 4-273). Although there is uncertainty about the spread of WNS, experts agree that the fungus will likely spread throughout the US. The northern long-eared bat is also threatened by the loss and degradation of summer habitat caused by human development, and by collision with or barotrauma (injury to the lungs due to a change in air pressure) caused by wind turbines. Mine closures, vandalism of roosts, and hibernacula also threaten to this species (FWS 2013b).

###### **4.5.1.2.3. Mitigation Measures**

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

###### **4.5.1.2.4. Residual Effects**

No residual impacts are anticipated.

##### **4.5.1.3. Greater Sage-Grouse (GSG)**

###### **4.5.1.3.1. Direct and Indirect Effects**

The PRB FEIS discusses impacts to GSG on pp. 4-257 to 4-273. Implementation of this proposal will impact GSG habitat and individuals. Because of the limited amount of GSG habitat in the project area, impacts from this project to GSG will be minimal. 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 proposal area has some suitable GSG habitat. Construction of the well and associated infrastructure will cause a slight amount of fragmentation of sagebrush stands in approximately 8.5 acres disturbed by the project. Noise and human disturbance associated with roads, construction, drilling, and completion will be disruptive to any GSG that might use the area.

It is the policy of BLM WY to manage GSG habitats consistent with the provisions set forth by the State of Wyoming, and as described in Instruction Memorandum (IM) No. WY-2012-019, *Greater Sage-Grouse Habitat Management Policy on Wyoming Bureau of Land Management (BLM) Administered Public Lands Including the Federal Mineral Estate*. IM 2012-019 states that for areas outside of core and connectivity habitats, “Surface disturbing and/or disruptive activities are prohibited from March 15–June 30 to protect sage-grouse nesting and early brood rearing habitats within 2 miles of the lek or lek perimeter of any occupied lek located outside core or connectivity areas.” There are no known leks within 2 miles of the Geer Trust Fed 15-224774-3XPH well.

#### **4.5.1.3.2. Cumulative Effects**

The PRB FEIS (BLM 2003) states that “the synergistic effect of several impacts would likely result in a downward trend for the sage-grouse population, and may contribute to the array of cumulative effects that may lead to its federal listing. Local populations may be extirpated in areas of concentrated development, but viability across the Project Area [PRB] or the entire range of the species is not likely to be compromised (pg. 4-270).” Based on the impacts described in the PRB FEIS and the findings of recent research, this proposal may contribute to a decline in male attendance at leks that occur within 4 miles of the project. There are no occupied leks within 4 miles of the Geer Trust Fed 15-224774-3XPH well so the action should not contribute to the decline of any leks, but RFA might. Declines in lek attendance associated with oil and gas development may be a result of a suite of factors including avoidance (Holloran et al. 2005, Holloran et al. 2007, Aldridge and Boyce 2007, Walker et al. 2007, Doherty et al. 2008, WGFD 2009), loss and fragmentation of habitat (Connelly et al. 2000, Braun et al. 2002, Connelly et al. 2004, WGFD 2004, Rowland et al. 2005, WGFD 2005, Naugle et al. 2011), reductions in habitat quality (Braun et al. 2002, WGFD 2003, Connelly et al. 2004, Holloran et al. 2005) and changes in disease mechanisms (Naugle et al. 2004, WGFD 2004, Walker et al. 2007, Cornish pers. comm.).

The Buffalo Resource Management Plan (BLM 2001) and the PRB FEIS Record of Decision (BLM 2003) included a 2-mile timing limitation on surface-disturbing activities around GSG leks. The 2-mile measure originated with the Western Association of Fish and Wildlife Agencies (WAFWA) (BLM 2004). Wyoming BLM adopted the two-mile recommendation in 1990 (BLM 1990). The 2-mile recommendation was based on early research which indicated between 59% and 87% of GSG nests were located within 2 miles of a lek (BLM 2004). These studies were conducted in vast contiguous stands of sagebrush, such as those that occur in Idaho’s Snake River plain.

Additional research across more of the GSG’s range has since indicated that nesting may occur much farther than 2 miles from the breeding lek (BLM 2004). Holloran and Anderson (2005), in their Upper Green River Basin study area, reported that only 45% of their GSG hens nested within 1.9 miles of the capture lek. Moynahan and Lindberg (2004) found that only 36% of their GSG hens nested within 1.9 miles of the capture lek. Habitat conditions, and, thus, GSG biology, in the PRB area are more similar to Moynahan’s north-central Montana study area than the Upper Green River area. Moynahan’s study area occurred in mixed-grass prairie and sagebrush steppe, dominated by Wyoming big sagebrush (Moynahan

et al. 2007). Recent research in the PRB suggests that impacts to leks from energy development are discernible out to a minimum of 4 miles, and that some leks in this radius have been extirpated as a direct result of energy development (Walker et al. 2007, Walker 2008, Naugle et al. 2011). BLM determined, based on these studies, that a 2-mile timing limitation is insufficient to reverse the population decline.

The 2012 population viability analysis for the NE Wyoming GSG found there remains a viable population of GSG in the PRB (Taylor et al. 2012). Threats from energy development and West Nile Virus (WNV) are impacting future viability (Taylor et al. 2012). The study indicated that effects from energy development, as measured by male lek attendance, are discernible out to a distance of 12.4 miles. Studies document the additive impacts of energy development and WNV as a threat to GSG persistence in the PRB (Taylor et al. 2012, Garton et al. 2011). The cumulative and synergistic effects of CBNG development and WNV in the PRB area will continue to impact the local GSG population, causing further declines in lek attendance, and could result in local extirpation: “[f]indings reflect the status of a small remaining sage-grouse population that has already experienced an 82% decline within the expansive energy fields.” (Taylor et al. 2012).

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

#### **4.5.1.3.3. Mitigation Measures**

Because of the limited amount of habitat in the project area and distance to any known GSG leks, BLM is not recommending any mitigation for GSG in this project.

#### **4.5.1.3.4. Residual Effects**

Because there will be no mitigation for GSG, there are no residual impacts.

#### **4.5.2. Special Status (Sensitive) Species (SSS)**

The PRB FEIS discusses impacts to SSS on pp. 4-257 to 4-265. The effects to sensitive species resulting from implementation of the project are in Appendix A.

#### **4.5.3. Big Game**

##### **4.5.3.1. 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. Pronghorns and mule deer would be directly disturbed with the construction of the well, and associated infrastructure. Long term disturbance would be direct habitat loss. Short-term disturbances also result in direct habitat loss; however, they should provide some habitat value as these areas are reclaimed and native vegetation becomes established.

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

Big game animals are expected to return to the project area following construction; however, populations would likely be lower than prior to project implementation as the human activities associated with operation and maintenance continue to displace big game. 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). Mule deer have been shown to avoid all types of well pads but tended to select areas farther from well pads associated with higher levels of traffic (Sawyer et al. 2009). 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. Energy development activities that occur in 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.

#### **4.5.3.2. Cumulative Effects**

The cumulative effects associated with Alternative B are within the analysis parameters and impacts described in the PRB FEIS; p. 4-181 to 4-215.

#### **4.5.3.3. Mitigation Measures**

No mitigation is proposed with Alternative B.

#### **4.5.3.4. Residual Effects**

No residual impacts are anticipated.

### **4.5.4. Plains Sharp-tailed Grouse**

#### **4.5.4.1. Direct and Indirect Effects**

Direct and indirect effects to sharp-tailed grouse are described in the PRB FEIS pp. 4-221 to 4-226 and expected are similar to those described in the Greater Sage-Grouse section. Sharp-tailed grouse may avoid habitats adjacent to the project area. The nearest known lek is not expected to be impacted. Construction and maintenance activities associated with development of the proposed project will cause direct habitat loss and fragmentation.

#### **4.5.4.2. Cumulative Effects**

The PRB FEIS described the cumulative effects to sharp-tailed grouse, pp. 4-221 to 4-226.

#### **4.5.4.3. Mitigation Measures**

No mitigation for sharp-tailed grouse is recommended for this project.

#### **4.5.4.4. Residual Impacts**

Since there will be no mitigation, there will be no residual impacts.

### **4.5.5. Migratory Birds**

#### **4.5.5.1. Direct and Indirect Effects**

The PRB FEIS discussed direct and indirect effects to migratory birds on pp. 4-231 to 4-235. The PRB FEIS states on p. 4-231, “Surface disturbance associated with construction, operation, and abandonment

of facilities, including roads, has the potential to result in direct mortality of migratory birds. Most birds would be able to avoid construction equipment; however, nests in locations subject to disturbance would be lost, as would any eggs or nestlings.” Direct mortality of a bird or destruction of an active nest due to construction activities could result in a “take” as defined (and prohibited) by the MBTA, a nondiscretionary statute, and in turn a violation of the law. See also, FLPMA, Sec. 302(b) and Raptors – Direct and Indirect Effects (4.6.2.1.1).

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

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

During the onsite, the BLM biologist did not identify suitable nesting habitat present for any BLM sensitive sagebrush obligates. Construction of the well pad and associated infrastructure is not expected to impact BLM sensitive migratory birds. Heater treaters, and similar facilities with vertical open-topped stacks or pipes, can attract birds. Facilities without exclusionary devices pose a mortality risk. Once birds crawl into the stack, escape is difficult and the bird may become trapped (U.S. v. Apollo Energies Inc., 611 F.3d 679 (10th Cir. 2010); see also Colorado Oil and Gas Commission, Migratory Bird Policy, accessed February 13, 2012). To minimize these effects, BLM Recommends that the operator equip all open-top pits, tanks, and pipes containing hydrocarbons with nets, screens, or other avian exclusion devices to prevent injury or death to migratory birds.

#### **4.5.5.2. Cumulative Effects**

The cumulative effects associated with alternative B are within the analysis parameters and impacts described in the PRB FEIS; p. 4-235.

#### **4.5.5.3. Mitigation Measures**

Although the PRB FEIS ROD addressed the potential impacts from oil and gas development to migratory birds, it did not specifically identify activities to help mitigate those impacts. The RMP is currently under revision, and a change in management for migratory birds is being considered among the alternatives.

Until the revision is complete, the BFO will provide project level site-specific analysis of conservation measures implemented for migratory bird protection, and compliance with the MBTA. The BLM recommends that measures are taken to ensure that migratory birds are excluded from all facilities that pose a mortality risk, including, but not limited to, heater treaters, flare stacks, secondary containment, and standing water or chemicals where escape may be difficult or toxic substances are present.

#### **4.5.5.4. Residual Effects**

Suitability of the project area for migratory birds will be negatively affected due to habitat loss and fragmentation and proximity of human activities associated with oil and gas development.

### **4.5.6. Raptors**

#### **4.5.6.1. Direct and Indirect Effects**

The PRB FEIS discussed direct and indirect effects to raptors (pp. 4-216 to 4-221). Because there are no known raptor nests in the project area, there will be no impacts to nesting raptors. Impacts to raptors will be analyzed on a project specific basis for future development in the area. Human activities in close proximity to active raptor nests may interfere with nest productivity. Romin and Muck (1999) indicate that activities within 0.5 miles of a nest are prone to cause adverse impacts to nesting raptors. If mineral activities occur during nesting, they could be sufficient to cause adult birds to remain away from the nest and their chicks for the duration of the activities. This absence can lead to overheating or chilling of eggs or chicks. Prolonged disturbance can also lead to the abandonment of the nest by the adults. Both actions can result in egg or chick mortality. BLM recommends the location of all infrastructures requiring human visitation be designed to provide an adequate biologic buffer for nesting raptors. A biologic buffer is a combination of distance and visual screening that provides nesting raptors with security such that routine activities preclude flushing the raptors.

#### **4.5.6.2. Cumulative Effects**

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

#### **4.5.6.3. Mitigation Measures**

To reduce the risk of decreased productivity or nest failure, the BLM BFO requires a 0.5 mile radius timing limitation during the breeding season around active raptor nests. Because no raptor nests exist within 0.5 miles of the project area, no mitigation is recommended for this proposed well.

#### **4.5.6.4. Residual Impacts**

There will be no residual impacts to raptor caused by the Geer Trust Fed 15-224774-3XPH well.

### **4.6. Cultural Resources**

#### **4.6.1. Direct and Indirect Effects**

BLM policy states that a decision maker's first choice should be avoidance of historic properties (BLM Manual 8140.06(C)). If historic properties cannot be avoided, mitigation measures must be applied to resolve the adverse effect. No historic properties will be impacted by the proposal. Following the State Protocol Between the Wyoming Bureau of Land Management State Director and The Wyoming State Historic Preservation Officer, Section VI(A)(1), the BLM notified the Wyoming State Historic Preservation Officer (SHPO) on February 25 and March 14, 2014 that no historic properties exist in the area of potential effect (APE). If any cultural values (sites, features or artifacts) are observed during operation, they will be left intact and the Buffalo Field Manager notified. If human remains are noted, the procedures described in Appendix L of the PRB FEIS and ROD must be followed. Further discovery procedures are explained in Standard COA (General)(A)(1).

#### 4.6.2. Cumulative Effects

Construction and development of oil and gas resources impacts cultural resources through ground disturbance, unauthorized collection, and visual intrusion of the setting of historic properties. Destruction of any archeological resource results in fewer opportunities to study of past human life-ways, to study changes in human behavior through time, or to interpret the past to the public. Additionally, these impacts may compromise the aspects of integrity that make a historic property eligible for the National Register of Historic Places. Recording and archiving basic information about archaeological sites and the potential for subsurface cultural materials in the proposed project area may serve to partially mitigate potential cumulative effects to cultural resources. Fee actions constructed in support of federal actions can result in impacts to historic properties. Oil and gas development on split estate often includes construction of infrastructure that does not require permitting by BLM. Project applicants may integrate infrastructure associated with wells draining fee minerals with wells that require federal approval. BLM has no authority over fee actions, which can impact historic properties. BLM has the authority to modify or deny approval of federal undertakings on private surface, but that authority is limited to the extent of the federal approval. Historic properties on private surface belong to the surface owner and they are not obligated to preserve or protect them. The BLM may go to great lengths to protect a site on private surface from a federal undertaking, but the same site can be legally impacted by the landowner at any time. Archeological inventories reveal the location of sensitive sites and although the BLM is obligated to protect site location data, information can potentially get into the wrong hands resulting in unauthorized artifact collection or vandalism. BLM authorizations that result in new access can inadvertently lead to impacts to sites from increased visitation by the public.

#### 4.6.3. Mitigation Measures

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

#### 4.6.4. 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.

BLM used the aggregate effects method in updating the cumulative effects for this EA; see Table 3.1. Any and all foreseeable effects from not following the recommended mitigation measures will not rise to significance, though such omission(s) may cause a minor increase in erosion, runoff, or other impacts.

### 5. List of Preparers: Persons and Agencies Consulted (BFO unless otherwise noted)

Position/Organization	Name	Position/Organization	Name
NRS/Team Lead	Eric Holborn	Archeologist	G.L. "Buck" Damone III
Supr NRS	Casey Freise	Wildlife Biologist	Don Brewer
Petroleum Engineer	Will Robbie	Geologist	Kerry Aggen
LIE	Sharon Soule	Supr NRS	Bill Ostheimer
Assistant Field Manager	Clark Bennett	Assistant Field Manager	Chris Durham
NEPA Coordinator	John Kelley		

## **6. References and Authorities**

Adgate, J.L., Goldstein, B.D., and McKenzie, L.M., Potential Public Health Hazards, Exposures and Health Effects from Unconventional Natural Gas Development, Environ, Sci. and Tech., Am. Chem. Soc., 2014.

BLM incorporates by reference here the references from the Porsche 3H & 4H EA, pp. 29-33.

Appendix A. Tables

**Table 3.1. Overlapping NEPA Analyses Which BLM Incorporates by Reference either as similar deep drilling analyses or as substantially similar surface analyses in the semi-arid sage-brush, short grass prairie.**

#	POD / Project Name	NEPA Analysis	# Type Wells	Approved Mo/Yr/Update
1	Davis POD, consolidated	WY-070-390CX3-13-129 to -134	6 Oil	7/2013
2	BPH Gaither Draw Unit	WY-070-EA11-256	4 Oil	9/2011
3	SPC HCNU	WY-070-06-247	7 Oil	6/2006 & 7/2012
4	YPC Rooster Federal #2	WY-061-7-167	1 Oil	9/1997 & 7/2012
5	YPC Napier Road	WY-070-09EA-280	48 CBNG	7/2011
6	BBC Beaver Creek Add II BBC Beaver Creek	WY-070-390CX1-11-55	27 CBNG	12/2010 & 3/2013
		WY-070-08-03-010	158 CBNG	2/2008
		WY-070-09-065		5/2009
		WY-070-05-058		1/2005
7	YPC Rooster	WY-070-04EA-021	20 CBNG	10/2004
8	WPX N Pleasantville & II	WY-070-05EA-094	26 CBNG	1/2005
		WY-070-04EA-013 & -322	10 CBNG	10/2004
		WY-070-03EA-069 & -121		2 & 7/2003 & 2/2004
9	WPX S Pleasantville & II	WY-070-03-106	42 CBNG	3/2003 3/2004
		WY-070-03-105	17 CBNG	3/2003 & 11/2006
10	PE House Creek 10 PE House Creek 3	WY-070-03-003	18 CBNG	9/2003
		WY-070-03-019	6 CBNG	9/2003
11	Cameco N House Creek	WY-070-06-018	5 CBNG	11/2005 & 12/2008
		WY-070-03-133	51 CBNG	8/2003
		WY-070-02-293	1 CBNG	3/2002
12	WPX Hoe Creek Additions WPX Hoe Creek	WY-070-04EA-135	19 CBNG	3/2004
		WY-070-02EA-262 & -159	3 CBNG	3 & 8/2002
13	Coleman Blackbird POD	WY-070-00EA-018	58 CBNG	11/1999

See also: SDR WY-2013-005, particularly noting pp. 2-3, incorporating the entirety here by reference.

**Table A.1. Summary of Sensitive Species Habitat & Project Effects Associated with Alternative B.**

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
<i>Threatened</i>				
Ute ladies'-tresses orchid	Riparian areas with permanent water	NP	NE	Habitat not present
<i>Proposed</i>				
Northern Long-eared Bat	Conifer and deciduous forest, caves and mines	NP	NE	Habitat not present
<i>Candidate</i>				
Greater Sage-grouse	Basin-prairie shrub, mountain-foothill shrub	S	MIH	Patches of sage present. Known GSG occurrence nearby.
<b>Presence</b> NP - Habitat not present & species unlikely to occur in the area S - Habitat suitable & species suspected, to occur in the area.			<b>Project Effects</b> NE - No effect MIH - May impact individuals and habitat	

**Table A.2. Summary of Sensitive Species Habitat and Project Effects.**

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
<i>Amphibians</i>				
Northern leopard frog ( <i>Rana pipiens</i> )	Beaver ponds and cattail marshes from plains to montane zones.	NP	NI	Habitat not present.
Columbia spotted frog ( <i>Rana pretiosa</i> )	Ponds, sloughs, small streams, & cattails in foothills & montane zones. Confined to headwaters of the S Tongue R drainage	NP	NI	The project area is outside the species' range, and the species is not expected to occur.
<i>Fish</i>				
Yellowstone cutthroat trout ( <i>Oncorhynchus clarki bouvieri</i> )	Cold-water rivers, creeks, beaver ponds, & lakes in the Upper Tongue sub-watershed	NP	NI	The project area is outside the species' range, and the species is not expected to occur.
<i>Birds</i>				
Baird's sparrow ( <i>Ammodramus bairdii</i> )	Shortgrass prairie and basin-prairie shrubland habitats; plowed and stubble fields; grazed pastures; dry lakebeds; and other sparse, bare, dry ground.	S (possible)	NI	Habitat present. Migrants may "stopover". No nesting recorded in Campbell County.
Bald eagle ( <i>Haliaeetus leucocephalus</i> )	Mature forest cover often within 1 mile of large water body with reliable prey source	NP	NI	Habitat not present.
Brewer's sparrow ( <i>Spizella breweri</i> )	Sagebrush shrubland	S (possible)	NI	Mostly grassland with patches of sagebrush present.
Ferruginous hawk ( <i>Buteo regalis</i> )	Basin-prairie shrub, grasslands, rock outcrops	NS	MIH	No documented nests occur within 0.5 miles of the project area. Nesting & foraging habitat may be impacted by dust, noise, human activities, and direct loss. Species may avoid area.
Loggerhead shrike ( <i>Lanius ludovicianus</i> )	Basin-prairie shrub, mountain-foothill shrub	NS	MIH	Some mountain-foothill shrub adjacent to project location.
Long-billed curlew ( <i>Numenius americanus</i> )	Grasslands, plains, foothills, wet meadows	S	NI	"Migrants may stopover".
Mountain Plover	Short-grass prairie with slopes < 5%	NS	NI	Habitat not present
Northern goshawk ( <i>Accipiter gentilis</i> )	Conifer and deciduous forests	NP	NI	Habitat not present.
Peregrine falcon ( <i>Falco peregrinus</i> )	Cliffs	NP	NI	Habitat not present.
Sage sparrow ( <i>Amphispiza billineata</i> )	Basin-prairie shrub, mountain-foothill shrub	NS	NI	Small patches of sage.
Sage thrasher ( <i>Oreoscoptes montanus</i> )	Basin-prairie shrub, mountain-foothill shrub	NP	NI	Small patches of sage.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Trumpeter swan ( <i>Cygnus buccinator</i> )	Lakes, ponds, rivers	NP	NI	Habitat not present.
Western Burrowing owl ( <i>Athene cucicularia</i> )	Grasslands, basin-prairie shrub	NS	NI	No prairie colonies in area. No burrows observed during onsite.
White-faced ibis ( <i>Plegadis chihi</i> )	Marshes, wet meadows	NP	NI	Habitat not present.
Yellow-billed cuckoo ( <i>Coccyzus americanus</i> )	Open woodlands, streamside willow and alder groves	NP	NI	Habitat not present.
<b>Mammals</b>				
Black-tailed prairie dog ( <i>Cynomys ludovicianus</i> )	Prairie habitats with deep, firm soils and slopes less than 10 degrees.	NP	NI	No known colonies present.
Fringed myotis ( <i>Myotis thysanodes</i> )	Conifer forests, woodland chaparral, caves and mines	NP	NI	Habitat not present.
Long-eared myotis ( <i>Myotis evotis</i> )	Conifer and deciduous forest, caves and mines	NP	NI	Habitat not present.
Spotted Bat ( <i>Euderma maculatum</i> )	Prominent rock features in extreme, low desert habitats to high elevation forests.	NP	NI	Habitat not present.
Swift fox ( <i>Vulpes velox</i> )	Grasslands	S	MIIH	Habitat present.
Townsend's big-eared bat ( <i>Corynorhinus townsendii</i> )	Caves and mines.	NP	NI	Habitat not present.
<b>Plants</b>				
Limber Pine ( <i>Pinus flexilis</i> )	Mountains, associated with high elevation conifer species	NP	NI	Habitat not present.
Porter's sagebrush ( <i>Artemisia porteri</i> )	Sparsely vegetated badlands of ashy or tufaceous mudstone & clay slopes 5300-6500 ft.	NP	NI	Habitat not present.
William's wafer parsnip ( <i>Cymopterus williamsii</i> )	Open ridgetops & upper slopes with exposed limestone outcrops or rockslides, 6000-8300 ft.	NP	NI	Project area outside of species' range.
<b>Presence</b> <b>K</b> - Known, documented observation within project area. <b>S</b> - Habitat suitable and species suspected, to occur within the project area. <b>NS</b> - Habitat suitable but species is not suspected to occur within the project area. <b>NP</b> - Habitat not present and species unlikely to occur within the project area.		<b>Project Effects</b> <b>NI</b> - No Impact. <b>MIIH</b> - May impact individuals or habitat, but will not likely contribute to a trend towards federal listing or a loss of viability to the population or species. <b>WIPV</b> - Will impact individuals or habitat that may contribute to a trend towards federal listing or cause a loss of viability to the population or species. <b>BI</b> - Beneficial Impact		