

**DECISION RECORD**  
**Sheridan Production Co., LLC, SLPU Phase 2 POD**  
**Environmental Assessment (EA), WY-070-EA15-70**  
**Bureau of Land Management, Buffalo Field Office, Wyoming**

**DECISION.** The BLM approves **Sheridan Production Co. LLC’s** (Sheridan) SLPU Phase 2 POD gas and oil well applications for permit to drill (APD) described in Alternative B of the environmental assessment (EA) WY-070-EA70. This approval includes the wells support facilities.

**Compliance.** This decision complies with or supports:

- Federal Land Policy and Management Act of 1976 (FLPMA) (43 USC 1701); DOI Order 3310.
- Mineral Leasing Act of 1920 (MLA) (30 U.S.C. 181); including the Onshore Oil and Gas Orders.
- National Environmental Policy Act of 1969 (NEPA) (42 USC 4321).
- National Historic Preservation Act of 1966 (NHPA) (16 USC 470).
- Powder River Basin Oil and Gas Project Final Environmental Impact Statement (FEIS) (2003).
- Buffalo Resource Management Plan (RMP) (1985) and Amendments (2001, 2003, 2011).
- Greater Sage-Grouse Habitat Management Policy on Wyoming BLM Administered Public Lands (WY-IM-2012-019) and Greater Sage-Grouse Interim Management Policies and Procedures (WO-IM-2012-043).

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

**Well Sites.** BLM approves 6 APDs and support facilities at the following location:

#	Well Name	TwN	Rng	Sec	Qtr/Qtr	Surface Ownership	Surface Lease	Lateral Lease	Bottom Hole Lease
1	SLPU Phase 2 Fed 44-15H	45N	74W	15	SESE	Fee	Fee	Federal	Fee
2	SLPU Phase 2 Fed 42-22H	45N	74W	22	SENE	Fee	Federal	Fee	Federal
3	SLPU Phase 2 Fed 44-22H	45N	74W	22	SESE	Fee	Federal	Federal	Federal
4	SLPU Phase 2 Fed 42-27H	45N	74W	27	SENE	Fee	Federal	Mixed	Fee
5	SLPU Phase 2 Fed 44-27H	45N	74W	27	SESE	Fee	Federal	Fee	Federal
6	SLPU Phase 2 Fed 13-34H	45N	74W	34	NWSW	Fee	Fee	Federal	Fee

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

**THE FINDING OF NO SIGNIFICANT IMPACT (FONSI).** Analysis of Alternative B of the EA, WY-070-EA15-70, and the FONSI (incorporated here by reference) found Sheridan’s proposal for SLPU Phase 2 POD will have no significant impacts on the human environment, beyond those described in the PRB FEIS. There is no requirement for an EIS.

**COMMENT OR NEW INFORMATION SUMMARY.** BLM publically posted the APDs for 30 days, received no comments, and then internally scoped them. There are no new policies or information received post analysis that affects this project.

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

1. BLM and Sheridan included mitigation measures to reduce environmental impacts while meeting the BLM’s need. For a complete description of all site-specific COAs, see the COAs.
  - a. The impact of this development cumulatively contributes to the potential for local



**FINDING OF NO SIGNIFICANT IMPACT**  
**Sheridan Production Co., LLC, SLPU Phase 2 POD**  
**Environmental Assessment (EA), WY-070-EA15-70**  
**Bureau of Land Management, Buffalo Field Office, Wyoming**

**FINDING OF NO SIGNIFICANT IMPACT (FONSI).** Based on the information in the EA, WY-070-EA15-70, 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 Powder River Basin (PRB) Oil and Gas Project Final Environmental Impact Statement (FEIS) (2003), to which the EA tiers; (2) Alternative B conforms to the Buffalo Field Office (BFO) Resource Management Plan (RMP) (1985) and amendments (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 oil and gas 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 reduce 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 as identified in the 1985 RMP, the 2003 PRB FEIS, or other legislative or regulatory processes. BLM used relevant scientific literature and professional expertise in preparing the EA. The scientific community is reasonably consistent with their conclusions on environmental effects relative to oil and gas development. Research findings on the nature of the environmental effects 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 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. 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.

Field Manager: \_\_\_\_\_/s/ Duane W. Spencer\_\_\_\_\_

Date: \_\_\_\_\_3/24/15\_\_\_\_\_

**ENVIRONMENTAL ASSESSMENT (EA), WY-070-EA15-70**  
**Sheridan Production Co., LLC, SLPU Phase 2 POD**  
**Applications for Permit to Drill (APD)**  
**Bureau of Land Management, Buffalo Field Office, Wyoming**

**1. INTRODUCTION**

BLM provides an EA for Sheridan Production Co., LLC (Sheridan) SLPU Phase 2 POD, which includes 6 oil and gas well applications for permit to drill (APDs) located as follows:

#	Well Name	Tw	Rng	Sec	Qtr/Qtr	Surface Ownership	Surface Lease	Lateral Lease	Bottom Hole Lease
1	SLPU Phase 2 Fed 44-15H	45N	74W	15	SESE	Fee	Fee	Federal	Fee
2	SLPU Phase 2 Fed 42-22H	45N	74W	22	SENE	Fee	Federal	Fee	Federal
3	SLPU Phase 2 Fed 44-22H	45N	74W	22	SESE	Fee	Federal	Federal	Federal
4	SLPU Phase 2 Fed 42-27H	45N	74W	27	SENE	Fee	Federal	Mixed	Fee
5	SLPU Phase 2 Fed 44-27H	45N	74W	27	SESE	Fee	Federal	Fee	Federal
6	SLPU Phase 2 Fed 13-34H	45N	74W	34	NWSW	Fee	Fee	Federal	Fee

The proposal is to explore for, and possibly develop oil and gas reserves in the Lower Parkman Formation at an average depth of 7,662 feet of total vertical depth. The project area is 35 miles south of Gillette, Campbell County, Wyoming. BLM's jurisdiction for SLPU Phase 2 Fed 42-22H, 44-22H, 42-27H, and 44-27H is fee surface with underlying Federal minerals; produced from mixed fee and Federal minerals. The jurisdiction SLPU Phase 2 Fed 44-15H and 13-34H is fee surface with underlying fee minerals; producing from fee and Federal minerals. BLM consults Instruction Memorandum (IM) No. 2009-078 entitled *Processing Oil and Gas Applications for Permit to Drill for Directional Drilling into Federal Mineral Estate from Multiple-Well Pads on Non-Federal Surface and Mineral Estate Locations* for processing applied to the SLPU Phase 2 Fed 44-15H and 13-34H APDs. Appendix B contains required Conditions of Approval (COAs), and Appendix C contains Recommended Conditions of Approval (COAs) which apply as instructed in IM No. 2009-078 to Fed 44-15H and 13-34H APDs.

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, 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/Bufalo.html](http://www.blm.gov/wy/st/en/field_offices/Bufalo.html). These APDs are pursuant to the Mineral Leasing Act for the purpose of exploring or developing oil or gas.

Project area elevations average 4,999 feet above sea level. The area consists of flat to gentle rolling topography with ephemeral drainages. The climate is semi-arid, averaging 10-14 inches of precipitation annually, about 60% of which occurs between April and September. The SLPU Phase 2 POD wells and infrastructure are all located on private surface. Livestock grazing is the primary historic land use. There is existing conventional oil and coalbed natural gas (CBNG) development in and adjacent to the project area. Oil and gas development became the predominant land use in recent years. The proposed wells are in the Savageton Lower Parkman Oil & Gas Unit WYW177255X, which includes 28,330 acres of existing and proposed oil and gas development. A network of existing roads within the project area will be used to access wells in the SLPU Phase 2 POD. These roads were constructed or improved to accommodate the existing CBNG development.

### 1.1. Background

Sheridan submitted the SLPU Phase 2 POD Notices of Staking (NOSs) on August 28 and September 4, 2014, to the BFO to produce oil and gas from federally managed fluid mineral bearing formations of the PRB.

- On October 28 & 29, 2014, Sheridan, BLM BFO resource staff, and other stakeholders conducted a pre-approval onsite inspections for the proposed APD well locations, roads, utility corridors, and associated infrastructure. The proposal was evaluated and modified to minimize environmental impacts.
- APDs were submitted on November 26, 2014.
- On December 18, 2014, BLM sent a post-onsite deficiency letter to Sheridan.
- On February 3, 2015, BLM received deficiency responses from Sheridan.
- On March 12, 2015 BLM considered the APD package complete.

### 1.2. Need for the Proposed Project

BLM's need for this project is to determine whether, how, and under what conditions to support the Buffalo Resource Management Plan's (RMP) goals, objectives, and management actions with allowing the exercise of the operator's conditional lease rights to develop fluid minerals on federal leases. BLM incorporates by reference here, the APD information (40 CFR 1502.21). Conditional fluid mineral development supports the RMP and the Mineral Leasing Act of 1920, the Federal Land Policy Management Act (FLPMA), and other laws and regulations.

### 1.3. Decision to be Made

The BLM will decide whether to approve the proposed development, and if so, under what terms and conditions agreeing with the Bureau's multiple use mandate, environmental protection, and RMP.

### 1.4. Scoping and Issues

BLM posted the proposed APDs for 30 days and will timely publish the EA, any finding, and decision on the BFO website. This project is similar in scope to other fluid mineral development the BFO analyzed. External scoping is unlikely to identify new issues, as verified with recent fluid mineral EAs that BLM externally scoped. External scoping of the horizontal drilling in the Lance Oil and Gas Company's Crazy Cat East EA, WY-070-EA13-028, 2013, generated three comments, and revealed no new issues.

The BFO interdisciplinary team (ID team) conducted internal scoping by reviewing the proposal to identify potentially affected resources, land uses, resource issues, regulations, and site-specific circumstances not addressed in the tiered analysis or other analyses incorporated by reference. The APDs and associated plans as well as the AR are available for review at the BFO. This EA will not discuss resources and land uses that are not present, not affected, or that the PRB FEIS or other analyses adequately addressed. This EA addresses the project's site-specific impacts to help the decision maker come to a reasoned decision. Project issues include:

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

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

Wilderness characteristics	Paleontological resources	Wetlands/Riparian Areas
Forest Products	Transportation & Access	Socio-economic resources
Lands & Realty	Tribal Treaty Rights	Environmental justice
Fire, fuels management, and rehabilitation	Areas of critical environmental concern	

## 2. PROPOSED PROJECT AND ALTERNATIVES

### 2.1. Alternative A – No Action

The no action alternative would deny the APDs requiring the operator to resubmit APDs that comply with statutes and the reasonable measures in the PRB FEIS 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.

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

#### Overview

Sheridan Production Co., LLC (Sheridan) requests BLM’s approval for SLPU Phase 2 POD, which includes 6 oil and gas well applications for permit to drill (APDs). BLM incorporates the APDs here by reference; see the administrative record (AR). Sheridan proposes to drill 6 horizontal oil and gas wells located on 6 individual well pads, and construct associated infrastructure at the locations in Table 2.1. The wells will be drilled from non-federal surface into fee or Federal minerals as shown in Table 2.1. The proposal is to explore for, and possibly develop oil and gas reserves in the Lower Parkman Formation at an average depth of 7,662 feet of total vertical depth. The lateral portions of the well bores are various lengths and directions; see APDs for specifics.

**Table 2.1. Proposed Wells:**

#	Well Name	TwN	Rng	Sec	Qtr/Qtr	Surface Ownership	Surface Lease	Lateral Lease	Bottom Hole Lease
1	SLPU Phase 2 Fed 44-15H	45N	74W	15	SESE	Fee	Fee	Federal	Fee
2	SLPU Phase 2 Fed 42-22H	45N	74W	22	SENE	Fee	Federal	Fee	Federal
3	SLPU Phase 2 Fed 44-22H	45N	74W	22	SESE	Fee	Federal	Federal	Federal
4	SLPU Phase 2 Fed 42-27H	45N	74W	27	SENE	Fee	Federal	Mixed	Fee
5	SLPU Phase 2 Fed 44-27H	45N	74W	27	SESE	Fee	Federal	Fee	Federal
6	SLPU Phase 2 Fed 13-34H	45N	74W	34	NWSW	Fee	Fee	Federal	Fee

Located in the semiarid Belle Fourche River Basin, the project area is characterized by ephemeral stream bottoms that rise to sagebrush/grassland habitats with sloping ridgelines and draws. Tributaries of the Upper Belle Fourche River Basin drain the area. Unnamed tributaries to Mud Spring Creek and Greasewood Creek intermittent within the SLPU Phase 2 POD also drain the project. The climate is semi-arid, averaging 10-14 inches of precipitation annually, about 60% of which occurs between April and September. Livestock grazing is the primary historic land use. There is existing conventional oil and coalbed natural gas (CBNG) development in and adjacent to the project area. Oil and gas development became the predominant land use in recent years. Surface owners in the SLPU Phase 2 POD include Robert Geer Trust, Donna Kay Berens Trust, Scott Collinworth and Helen Jones, and Gilbertz LLC.

#### Drilling, Construction and Production Design Features Include:

##### Access Roads and Utilities

- A road network will consist of existing improved all-weather roads; proposed improved template roads, and proposed crown and ditch template roads. Sheridan will upgrade or construct 2.87 miles of roads to service SLPU Phase 2 POD wells as shown in Table 2.2.
- Refer to the SUP for a detailed description of the access roads and utilities.

- Flowlines installed from proposed well locations to existing centralized tank batteries located on existing oil well pads within the unit.
- Existing overhead power is in vicinity of the proposed wells. A third party operator such as Powder River Energy Corporation (PreCorp) will install approximately 0.33 miles of overhead power.
- A wheel trencher will be used to construct the pipeline right-of-way. Initial disturbance will be 20 feet wide; after interim reclamation, disturbance width will be 10 feet wide.
- Average Daily Traffic (ADT) per well as follows:

Activity	Duration	Heavy Duty Trucks <sup>1</sup>	Light Duty Trucks <sup>2</sup>
Rig Move	5 days per well	30	15
Drilling & Completion	2-4 weeks per well	15	10
Production	Completion to Abandonment	0-1 <sup>3</sup>	1

<sup>1</sup>Heavy duty trucks include water haulers, cement trucks, drilling rigs; oil tankers during production.

<sup>2</sup>Personal pickup trucks

<sup>3</sup>Once flowlines are installed and operational, tankers will collect oil at centralized tank batteries.

### Well Location

- Six (6) engineered well pads with cuts and fills constructed with a 1½:1 slopes initially. The backslope reduced to 2:1 and the foreslope to 3:1 during interim reclamation. Long term and short-term disturbance listed in Table 2.3.
- Six engineered wells pad accounting for 20.93 acres of disturbance during construction and drilling; reduced to 3.03 acres of disturbance during production (after interim reclamation).
- A lined cuttings pit to hold drill cuttings generated from closed-loop drilling.
- A lined oil-based mud (OBM) pit to store OBM used to drill the lateral portion of the wellbore.
- A lined reserve pit to store fresh water for drilling.
- Production facilities at each well site include a pumping unit, separator, treater and meter house, (1) 400 bbls water tank, (1) 400 bbls oil tank. After completion of flowlines, oil tankers will not visit locations; oil will be collected at centralized tank batteries
- Centralized existing tank batteries
- See SUPO for a detailed description of design features.

### Drilling and Completion Operations

- Approximately 10,000 bbls of water used for the drilling and completion of each SLPU Phase 2 POD well. The water source will be municipal water from the city of Gillette, which will be hauled by truck to the well sites and stored in tanks.
- Sheridan will not use Hydraulic Fracturing in completion of these wells.
- Drilling procedures for these wells employ closed-loop drilling. The vertical and lateral portions of the wellbore will be drilled with water-based and oil-based mud.
- A third party service company approved by the Wyoming Oil and Gas Conservation Commission (WOGCC) will be contracted to manage, treat, and dispose of all drilling related wastes associated with wells in the SLPU Phase 2 POD.
- Sheridan certified that all affected landowners within ½ mile have been offered a water well agreement.

For a detailed description of design features and construction practices associated with this proposal, refer to the surface use plan (SUP) and drilling plan included with the APDs. Also, see the subject APD for maps showing the proposed well location and associated facilities described above. Total surface disturbance for the proposed action is 63.26 acres, reduced to 28.70 acres during production (Interim Reclamation).

**Table 2.2. Disturbance Summary SLPU Phase 2 POD**

Facility	Construction Disturbance (Short Term)	Interim Disturbance (Long Term)
Number of Well Pads	6	6
Engineered Pads with fill slopes, topsoil, spoils	20.93 acres	3.03 acres
Upgrade Existing Template Roads	16.15 acres	16.15 acres
Upgrade Existing Primitive Roads	1.30 acres	1.30 acres
Proposed Template Roads	6.91 acres	6.91 acres
Proposed Turnouts	0.69 acres	0.69 acres
Proposed Pipelines	16.66 acres	0 acres
Proposed Overhead Power	0.62 acres	0.62 acres
<b>Total Acre Disturbance</b>	<b>63.26 Acres</b>	<b>28.70 Acres</b>

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

**Table 2.3. Anticipated Drilling and Completion Sequence and Timing**

Drilling and Completion Step	Approximate Duration
Build location (roads, pad, and other initial infrastructure)	30 days
Mobilize rig	2-5 days
Drilling (24/7)	30 days
Completion (Schedule, setup, completion, demobilization)	30 days

Additionally, the operator, in their APDs, committed to:

- Comply with the approved APDs, applicable laws, regulations, orders, and notices to lessees.
- Obtain necessary permits from agencies.
- Comply with water well agreements offered 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.

### Reasonably Foreseeable Activity

Reasonably foreseeable activity, pending confirmation of productivity of these wells, includes but is not limited to, production facilities and utilities (power, pipelines), and additional wells, either on these pads or adjacent to the pads yet in the analysis area of these APDs to develop the Lower Parkman Formation. Table 2.4 includes foreseeable wells Sheridan has currently submitted in the project area. They, along with well support infrastructure, are reasonable foreseeable activity in the project area.

**Table 2.4. Reasonably Foreseeable Federal Project Area Wells Cross-Reference by Location**

#	Well Name	Well #	TWP	RNG	SEC	QTR	Surface Over Lease
1	SLPU GEER FED 1	14-03-2H	44N	74W	3	SWSW	Fed/Federal
2	SLPU GEER FED 1	42-03H	44N	74W	3	SENE	Fee/Federal
3	SLPU GEER FED 1	44-03H	44N	74W	3	SESE	Fee/Federal
4	SLPU GEER FED 1	33-04H	44N	74W	4	SWSE	Fee/Fee*
5	SLPU GEER FED 1	22-09H	44N	74W	9	SENW	Fee/Federal
6	SLPU GEER FED 1	33-09H	44N	74W	9	NWSE	Fee/Federal
7	SLPU GEER FED 1	42-10H	44N	74W	10	SENE	Fee/Federal
8	SLPU GEER FED 1	44-28H	45N	74W	28	SESE	Fee/Fee*

#	Well Name	Well #	TWP	RNG	SEC	QTR	Surface Over Lease
9	SLPU GEER FED 1	44-34H	45N	74W	34	SESE	Fee/Fee*
10	SLPU GEER FED 1	42-18H	46N	74W	18	SENE	Fee/Fee*

\*Under jurisdiction of IM-2009-078: Fee surface over Fee Mineral producing from Federal Mineral estate

### 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, and generally conforms to the terms and conditions of that land use plan, and its amendments; (2001, 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 affected by the alternatives in Section 2, or where changes in circumstances or regulations occurred since adoption of analyses to which the EA tiers or incorporates by reference. The PRB FEIS considered a no action alternative (pp. 2-54 to 2-62) in evaluating a development of up to 54,200 fluid mineral wells.

There are 15,121 producing oil and gas wells in the SLP Phase 2 POD project area, Wyoming Oil and Gas Conservation Commission (WOGCC) December 2014. The total number of conventional wells in the Buffalo planning area is 2855, which includes 84 horizontal wells (federal, fee, and state) (as of December 2014. This represents 89% of the projected 3,200 in the 2003 PRB ROD. (See Table 2.2 for an approximation of the disturbance in the current situation.) This agrees with the PRB FEIS, which analyzed the reasonably foreseeable development of 51,000 CBNG and 3,200 natural gas and oil wells. The State of Wyoming and BLM have also approved wells in the project area that operators may develop in the near future. In addition, Sheridan and other operators are likely to continue seeking permits to develop unconnected leases within or near the project area.

### 3.1. Air Quality

Refer to the PRB FEIS pp. 3-291 to 3-299, for a 2003-era description of the air quality conditions. BLM incorporates by reference, Update of Task 3A Report for the Powder River Basin Coal Review Cumulative Air Quality Effects for 2020, BLM (AECOM), 2009, (Cumulative Air Quality Effects, 2009) (available at [http://www.blm.gov/wy/st/en/programs/energy/Coal\\_Resources/PRB\\_Coal/prbdocs.html](http://www.blm.gov/wy/st/en/programs/energy/Coal_Resources/PRB_Coal/prbdocs.html)) as it captures the cumulative air quality effects of present and projected PRB fluid and solid mineral development. Existing air quality in the PRB is “unclassified/attainment” with all ambient air quality standards. It is also in an area that is in prevention of significant deterioration zone. PRB air quality is a rising concern due to PRB-area air quality alerts issued in 2011-2014 for particulate matter (PM), attributed to coal dust.

Four sites monitor the air quality in the PRB: Cloud Peak in the Bighorn Mountains, Thunder Basin northeast of Gillette, Campbell County south of Gillette, and Gillette. In addition, the Wyoming Air Resource Monitoring System (WARMS) measures meteorological parameters from 9 sites throughout the State, and particulate concentrations from 5 of those sites, monitors speciated aerosol (3 locations), and evapotranspiration rates (1 location). The sites monitoring air quality for the Powder River Basin are located at Sheridan, South Coal Reservoir, Buffalo, Fortification Creek, and Newcastle. The northeast Wyoming visibility study is ongoing by the Wyoming Department of Environmental Quality (WDEQ). Sites adjacent to the Wyoming PRB-area are at Birney on the Tongue River 24 miles north of the Wyoming-Montana border, Broadus on the Powder River in Montana, and Devils Tower. Adgate, et

al.(2014) 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 drilling 153,260 wells since 2004. They called for more research funding.

Existing air pollutant emission sources in the region include:

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

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

Soil baseline characterization for the project area is based on SSURGO database review and analyses and site-specific onsite investigations. SSURGO is the most detailed level of soil mapping done by the USDA NRCS. Soils in the project area were identified from the South Campbell County Survey Area, Wyoming (WY605). The NRCS performed the survey using National Cooperative Soil Survey standards. The BLM uses SSURGO soil survey information to predict soil behavior, limitations, and suitability for a given action. The BLM’s long-term goal for soil resource management is to maintain, improve, or restore soil health and productivity, and to prevent or minimize soil erosion and compaction. Soil management objectives are to ensure that adequate soil protection is consistent with the resource capabilities.

Table 3.1 presents a tabulated summary of the soil map units impacted by the proposed well and infrastructure, ecological site, and predicted acres disturbed. The predominant ecological sites occurring in the area are found to be Loamy.

Other important though less visible soil characteristics were identified in the project area using SSURGO Data, onsite investigation, and project design review, these are listed below.

- Predicted disturbance would impact soils by exposing material deep within the soil material, which may have chemical and physical properties contributing to limited reclamation potential (LRP) properties.
- Amount of bare ground, physical and chemical properties, and site conditions create soils classified as highly erosive to wind and water erosion.
- Steep Slopes, proposed cut and fill slopes of 1½:1.

**Table 3.1. Dominant or Important Soils in SLPU Phase 2 POD**

Well	Map Unit Symbol	Map Unit Name	Ecological Site
SLPU Phase 2 Fed 44-15H	145	Forkwood-Cambria loams, 0-6% slope	Loamy 10-14 NP
SLPU Phase 2 Fed 42-22H	121	Cushman-Cambria loams, 0 to 6 % slopes	Loamy 10-14 NP
SLPU Phase 2 Fed 44-22H	146	Forkwood-Cushman loams, 0-6% slopes	Loamy 10-14 NP
SLPU Phase 2 Fed 42-27H	116	Cambria-Kishona-Zigweid loams, 0-6%	Loamy 10-14 NP
SLPU Phase 2 Fed 44-27H	121	Cushman-Cambria loams, 0 to 6 % slopes	Loamy 10-14 NP
SLPU Phase 2 Fed 13-34H	146	Forkwood-Cushman loams, 0-6% slopes	Loamy 10-14 NP

The agency’s long-term goal for soil resource management is to maintain, improve, or restore soil health and productivity, and to prevent or minimize soil erosion and compaction. Soil management objectives are to ensure that adequate soil protection is consistent with the resource capabilities.

Plant communities consist of: 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 include needle and thread, western wheatgrass, and green needlegrass. Grasses of secondary importance include blue grama, prairie junegrass, and Sandberg bluegrass. Forbs commonly found in this plant community include plains wallflower, hairy goldaster, slimflower scurfpea, and scarlet globemallow. Sagebrush canopy ranges from 20% to 30%. Fringed sagewort is commonly found. Plains pricklypear can also occur. When compared to the Historic Climax Plant Community, sagebrush and blue grama have increased. Production of cool-season grasses, particularly green needlegrass, has been reduced. The sagebrush canopy protects the cool-season mid-grasses, but this protection makes them unavailable for grazing. Cheatgrass (downy brome) has invaded the site. The overstory of sagebrush and understory of grass and forbs provide a diverse plant community that will support domestic livestock and wildlife such as mule deer and antelope. This plant community is resistant to change. A significant reduction of big sagebrush can only be accomplished through fire or brush management. The herbaceous species present are well adapted to grazing; however, species composition can be altered through long-term overgrazing. If the herbaceous component is intact, it tends to be resilient if the disturbance is not long-term. Vegetation observed at the onsite inspection is consistent with the description above with light to moderate sagebrush and a mixture of native grasses and forbs.

### **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.

#### **3.3.1. Groundwater**

The area's historical use of groundwater was for stock or domestic water. A search of the WSEO Ground Water Rights Database showed 5 registered stock and domestic water wells within 1 mile of the proposed wells with depths from 100 to 685 feet. Refer to the PRB FEIS for additional information on groundwater, pp. 3-1 to 3-36.

The Fox Hills, the deepest penetrated fresh water zone in the PRB lies well above the target formation, the Lower Parkman at an average of 7,662 feet total vertical distance. The operator will verify that there is competent cement across the aquifer, from 100 feet above to 100 feet below the Fox Hills formation. This will ensure that ground water will not be adversely impacted by well drilling and completion operations. The depth of the Fox Hills formation at the proposed well location averages 6,375 feet. Hydraulic Fracturing will not be used in the completion of SLPU Phase 2 POD wells.

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

The project area is drained by tributaries of the Upper Belle Fouche River Basin and by unnamed tributaries to Mud Spring Creek and Greasewood Creek intermittent within the SLPU Phase 2 POD. Most of the area drainages are ephemeral (flowing only in response to a precipitation event or snowmelt) to intermittent (flowing only at certain times of the year when it receives water from alluvial groundwater, springs, or other surface source – PRB FEIS, Glossary). The channels are primarily well-vegetated grassy swales, without defined bed and bank. See generally the PRB FEIS for a surface water quality discussion, pp. 3-48 to 3-49.

### **3.4. Invasive or Noxious Species**

The BLM's weed database showed the presence of no noxious or weeds of concern in areas around this

project. Scotch thistle was observed during BLM onsite inspection investigation. Gelbhard, 2003 and Duniway 2010, showed that surface disturbances increase the proliferation of invasive or noxious species out to 0.5 miles or more from the disturbance while correspondingly compromising native communities in the same footprint. Cheatgrass (*Bromus tectorum*) and to a lesser extent, Japanese brome (*B. japonicus*) exist in the affected environment. These species are found in high densities and numerous locations throughout NE Wyoming. Balch, 2013, linked the proliferation of cheatgrass in semi-arid environments to the increased frequency and severity of wildfire.

### **3.5. Fish and Wildlife**

The PRB FEIS identified wildlife species occurring in the PRB, pp. 3-113 to 3-206. BLM performed a habitat assessment in the project area on October 28 & 29, 2014. Grouse Mountain Environmental Consultants (GMEC 2014) performed a formal habitat assessment and biological survey. The biologist evaluated impacts to wildlife resources and recommended project modifications where wildlife issues arose. BLM wildlife biologists also consulted databases compiled and managed by BLM BFO wildlife staff, the PRB FEIS, WGFD datasets, 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 beyond the analysis of the PRB FEIS. Rationale for any species not discussed in detail below can be referenced in the AR.

The proposed SLPU Phase 2 Fed 44-15H and 13-34H is fee surface with underlying fee minerals; producing from fee and Federal minerals. Therefore, BLM's Instruction Memorandum (IM) No. 2009-078 entitled Processing Oil and Gas Applications for Permit to Drill for Directional Drilling into Federal Mineral Estate from Multiple-Well Pads on Non-Federal Surface and Mineral Estate Locations will apply to the SLPU Phase 2 Fed 44-15H and 13-34H well pads and their associated infrastructure (COA's are only recommended).

Land uses and other disturbances occurring within the proposed project area include, livestock grazing, ranching operations, overhead power lines, conventional oil and gas ( by several operators on both fee and federal leases), and improved and unimproved roads. Habitats within the proposal are comprised of sagebrush grassland and mixed-grass prairie. The dominant vegetation is Wyoming big sagebrush and the understory is a mix of pasture grasses (needleandthread, prairie junegrass, blue gramma, Sandberg bluegrass, threadleaf sedge, and cheatgrass). The habitat is similar in nature to the habitats (sagebrush obligate migratory birds and Greater sage-grouse habitat) discussed in the Lance Oil and Gas Company's Sahara POD EA, WY-070-EA13-72, incorporated here by reference.

#### **3.5.1. Candidate Species – Greater Sage-Grouse (GSG)**

Nesting GSG habitat exists within the proposal area. The majority of the sagebrush stands have been fragmented by oil and gas development. No leks are within two miles of the proposal. The affected environment for this proposal is similar to a recent approved project (Sahara POD) BLM analyzed. Therefore, the Sahara POD EA, WY-070-EA13-72 analysis is incorporated here by reference: Affected Environment (Section 3.7.4.1, p.18-19). 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.

#### **3.5.2. Raptors**

The PRB FEIS discussed the affected environment for raptors, pp. 3-141 to 3-148. Within 0.5 miles of the project boundary, GMEC identified five existing raptor nests (BLM # 1896, 2533, 2534, 2535, and 11238). All nests are located on the ground (top of hills or side of incised creek bank). These nests were built by ferruginous hawks (FEHA). The PRB FEIS discussed the affected environment for the Ferruginous Hawk, p. 3-183. This species is widely distributed; however, its population status and trends

are unknown but are suspected to be stable. Populations are experiencing habitat loss. Of all the hawk species in Wyoming, ferruginous hawks are most sensitive to human disturbance. This species typically nests on the ground in grass and sagebrush shrublands, increasing its exposure to ground predators. All of the nests are in poor (remnant) condition (mostly trampled by livestock) and have not been active recently (during surveys within the past three years). The proposed wells are located outside the biological buffer (a biologic buffer is a combination of distance and visual screening that provides nesting raptors with security such that they will not be flushed by routine activities).

### 3.5.3. Migratory Birds

The PRB FEIS discussed the affected environment for migratory birds, pp. 3-150 to 3-153. The Lance Sahara POD EA, WY-070-EA13-72, Section 3.7.2.2, p.16 is incorporated here by reference due to similar habitats and proposed action. Site-specific information follows:

Habitats occurring near the proposed well location include sagebrush steppe grasslands, mixed grass prairie, and mature deciduous trees. Many species that are of high management concern use these areas for their primary breeding habitats (Saab and Rich 1997). Sensitive species that have the potential to occur in the project area are Brewer’s sparrow, sage thrasher, loggerhead shrike, and grasshopper sparrow.

### 3.6. Cultural Resources

In accordance with section 106 of the National Historic Preservation Act, BLM must consider impacts to historic properties (sites that are eligible for or listed on the National Register of Historic Places (NRHP)). For an overview of cultural resources that are generally found within BFO the reader is referred to the *Draft Cultural Class I Regional Overview, Buffalo Field Office* (BLM, 2010). A Class III (intensive) cultural resource inventory (BFO project no. 70150047) was performed in order to locate specific historic properties which may be impacted by the proposed project. The following resources are located in or near the proposed project area.

#### Cultural Resources Located In or Near the Project Area

Site Number	Site Type	NRHP Eligibility
48CA4640	Historic Debris Scatter	Not Eligible
48CA4642	Historic Debris Scatter	Not Eligible
48CA4650	Prehistoric Lithic Scatter	Not Eligible
48CA4651	Historic Debris Scatter	Not Eligible
48CA4660	Prehistoric Isolated Artifact and Historic Debris Scatter	Not Eligible
48CA4671	Prehistoric Lithic Scatter	Not Eligible
48CA4976	Historic Debris Scatter	Not Eligible

## 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 2.4. This updated the no action alternative

and cumulative effects. The project area has surface disturbance from existing roads, well pads, and oil and gas facilities. Under the no action alternative, on-going well field operations would continue as would the development of approved single and multi-well pads, consisting of horizontal wells with approved APDs and other approved APDs. The production and the drilling and completion of these new wells would result in noise and human presence that could affect resources in the project area; these effects could include the disruption of wildlife, the dispersal of noxious and invasive weed species, and dust effects from traffic on unpaved roads. Present fluid mineral development in the PRB is under half of that envisioned and analyzed in the PRB FEIS. There is only a remote potential for significant effects above those identified in the PRB FEIS to resource issues as a result of implementing the no action alternative.

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

### **4.1. Air Quality**

In the project area, air quality impacts would occur during construction (due to surface disturbance by earth-moving equipment, vehicle traffic fugitive dust, well testing, as well as drilling rig and vehicle engine exhaust) and production (including well production equipment, booster and pipeline compression engine exhaust). The amount of air pollutant emissions during construction would be controlled by watering disturbed soils, and by air pollutant emission limitations imposed by applicable air quality regulatory agencies. BLM incorporates by reference the analysis found in the August 2012 Lease Sale EA, WY-070-EA12-44, pp. 45-51 (air quality, greenhouse gas emissions, and visibility). Air quality impacts modeled in the PRB FEIS and Cumulative Air Quality Effects, 2009 concluded that PRB projected fluid and solid development would not violate state, tribal, or federal air quality standards and this project is well within the projected development parameters.

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

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

The PRB FEIS discusses direct and indirect effects to ecological sites and vegetation (p. 4-153 to 4-164) and soils associated with fluid mineral development (p. 4-134 to 149). The proposed action would impact the existing plant communities, species richness, diversity, and structure that occur on the site and the transition between the communities. Direct effects to ecological sites would occur from ground disturbance caused by construction practices. Short-term effects would occur where vegetated areas are disturbed but later reclaimed within 1 to 3 years of initial disturbance. Long-term effects would occur where well pads, roads, and other semi-permanent facilities, resulting in loss of vegetation and prevent reclamation for the life of the project. Other impacts include a reduction in the utility of interim reclaimed areas because of reduced species and landscape diversity on reclaimed sites, increased soil erosion, and habitat loss for wildlife and livestock.

The proposed action would impact the common plant communities that occur on the site and the transition between the communities. Anticipated impacts to soils and vegetation from well pad, road, and utility construction include:

- Soil rutting and mixing, compaction, increased erosion potential, and loss of soil productivity.
- Construction activities mix the soil profiles with a corresponding loss of soil structure. Mixing may result in removal, dilution, or relocation of organic matter and nutrients to depths where it would be unavailable for vegetative use. Less desirable inorganic compounds such as carbonates, salts, or weathered materials could be relocated and have a negative impact on re-vegetation.
- Construction will result in slopes of 1 ½:1 which will be brought down to 2:1 and 3:1 during Interim Reclamation.
- Soils compaction results from the construction of wells and associated facilities, continued vehicle and foot traffic as well as operational activities. Factors affecting compaction include soil texture, moisture, organic matter, clay content and type, pressure exerted, and the number of passes by vehicle traffic or machinery. Compaction leads to a loss of soil structure; decreased infiltration, permeability,

- and soil aeration; as well as increased runoff and erosion.
- Increased erosion can lead to a decrease in soil fertility and an increase in sedimentation. The duration and intensity of these impacts would vary according to the type of construction activity to be completed and the inherent characteristics of the soils to be impacted.
  - The potential for erosion would increase through the loss of vegetation cover and soil structure as compared to an undisturbed state. Soil productivity would decrease, primarily as a result of profile mixing and compaction along with the loss in vegetative cover. These impacts would begin immediately as the soils would be subjected to grading and construction activities and impacts would continue for the term of operations. The impacts on soils would move to a steady state as construction activities were completed and well production/maintenance operations begin.
  - Loss of soil vegetation cover, biologic crusts, organic matter and productivity. With expedient reclamation, productivity and stability should be regained in the shortest time frame.

The BLM will evaluate reclamation success using the BLM State Wide Reclamation Policy found at: <http://www.blm.gov/wy/st/en/programs/reclamation>, incorporated here by reference. The PRB FEIS discusses direct and indirect effects to ecological sites and vegetation (p. 4-153 to 4-164). The proposal would impact the common plant communities that occur on the site and the transition between the communities. Other impacts anticipated occurring include those in the direct and indirect effects listed above. Direct effects to ecological sites would occur from ground disturbance caused by construction of well pads, ancillary facilities, associated pipelines, and roads. Long-term effects would occur where well pads, compressor stations, roads, water-handling facilities or other semi-permanent facilities would result in loss of vegetation and prevent reclamation for the life of the project.

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

For details on expected cumulative impacts, refer to the PRB FEIS, pp. 4-151. The PRB FEIS defines the designation of the duration of disturbance (pp. 4-1 and 4-151). Most soil disturbances would be short term impacts with expedient interim reclamation and site stabilization. These impacts, singly or in combination, could increase the potential for valuable soil loss due to increased water and wind erosion, invasive/noxious/poisonous plant spread, invasion and establishment, and increased sedimentation and salt loads to the watershed system, if applicable mitigation measures are not used. The PRB FEIS discusses the cumulative effects to ecological sites (pp. 4-153 to 4-172). Cumulative effects to ecological sites include the further alteration of disturbance regimes from the increased disturbance, increase in noxious weeds, and alterations in vegetation community's diversity and cover.

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

The operator will reduce impacts to soils, ecological sites, and vegetation from surface disturbance by following its plans (MSUP, and (design features, engineered designs), Storm Water Pollution Prevention Plan (SWPPP) requirements, reclamation plan and the BLM Wyoming Reclamation Policy). These practices, as well as other approved mitigation measures will result in less environmental impacts. In addition the following site specific COAs will be added as mitigation.

1. Improved roads used in conjunction with accessing federal wells must 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 prior to drilling of the well.
2. Within 180 days of completion of wells, the operator will reduce the well location to the interim well size and shape as described in the surface use plan of operations (SUP).
3. BLM approved fluids and drilling mud must be buried within the reserve pit. Subsoil must then be replaced in the reserve pit before topsoiling. Under no circumstances would any by-products from drilling or subsoil to be spread on top of topsoil.
4. Pits are to be dried within 6 months from the date the well is spud or the date of well completion and prior to any backfilling. Mechanical trenching or squeezing of pit fluids and cuttings is prohibited. Drying by any means other than natural (air) evaporation requires prior approval from the BLM. Pit

solids shall be buried at least 3 feet below recountoured grade. Soils that are moisture laden and saturated, partially or completely frozen shall not be used for backfill or cover. The pit area may require mounding to allow for settling. Before backfilling, synthetic liner portions remaining above the “mud line” shall be cut off as close to the top of the mud surface as possible and disposed of at an authorized commercial waste disposal facility. The pit bottom and remaining liner shall not be trenched, cut, punctured or perforated. Installation and operation of any sprinklers, pumps, and related equipment shall ensure that water spray or mist does not drift outside of pit boundaries

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

The PRB FEIS identified residual effects (p. 4-408). Residual effects across the project area would include a long-term loss of soil productivity associated with well pads and roads and a loss of vegetative cover, despite expedient reclamation, for several years until reclamation is successfully established. The alteration of biodiversity of ecological sites could result from disturbance, alterations in vegetation in reclaimed areas, and the spread and establishment of weed species. Due to the presence of erosive soils and the topography of the project area erosion will occur. Rilling and gullyng 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 established.

Impacts to vegetation and soils from surface disturbance will be reduced, by following the operator’s plans and BLM applied mitigation. This practice results in less surface disturbance and overall environmental impacts. See Section 2.2 for a summary of the disturbance. All disturbances associated with the proposed action are long term. With the reclamation status of the project area being rated as fair and field observations showing areas of reclamation success expedient reclamation of disturbed land with stockpiled topsoil, proper seedbed preparation techniques, and appropriate seed mixes, along with utilization of erosion control measures (e.g., waterbars, water wings, culverts, rip-rap, etc.) would ensure land productivity/stability is regained and maximized. The BLM considers these residual effects from Alternative B with the proposed wells are likely within the parameters for acceptable surface disturbance and surface disturbance reclamation in PRB FEIS ROD and Onshore Oil and Gas Order Number 1.

### **4.3. Water/Groundwater Resources**

Sheridan Production’s drilling program provides protection for the Fox Hill formation. The casing design and cement program includes centralizers on every joint of casing through the Fox Hills to facilitate adequate cement covering. The volume of cement pumped is calculated to provide cement across the Fox Hill from at a minimum, 100 feet above to 100 feet below the aquifer. 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. The operator will set surface casing on average to 7,053 total vertical depth to provide additional protection for shallow groundwater aquifers and coal zones. 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.

#### **4.3.1. Cumulative Effects**

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

alternatives would be protective of groundwater resources when performed in compliance with state and federal regulations.

#### **4.3.2. Mitigation Measures**

Adherence to the drilling COAs, the setting of casing at appropriate depths, following safe remedial procedures in the event of casing failure, and utilizing proper cementing procedures would protect fresh water aquifers above the target coal zone. Adherence to WDEQ permits and regulations will also mitigate impacts from produced water. This will ensure that groundwater will not be adversely impacted by well drilling and completion operations.

#### **4.3.3. Residual**

No residual effects are anticipated.

### **4.4. Surface Water**

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

Potential effects to surface water resources may include: (1) changes in surface water quality and suitability to meet designated uses; (2) changes in the quantity and distribution of surface flows; (3) erosion and degradation of the drainage network; and (4) increased sedimentation.

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

Refer to the PRB FEIS, p. 4-115 to 4-122 and Table 4-13 for cumulative effects relative to the watershed and p. 117 for cumulative effects common to all sub-watersheds. The designation of the duration of disturbance is defined in the PRB FEIS (pp. 4-1 and 4-151). Most soil disturbances would be short term impacts with expedient interim reclamation and site stabilization.

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

A WYPDES permit for construction activities would address potential surface water impacts from storm water runoff. The wells will be incorporated into Sheridan Production's discharge storm water associated with large construction activities as required by WYDEQ. Also, refer to the SUPs for operator committed BMPs for the project areas.

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

Turbidity and sediment loading in the streams would possibly increase due to erosion of project disturbed areas and sediment transport to the associated drainages due to storm water runoff. These impacts are mitigated by expediently stabilizing the disturbance and reducing the sediment reaching the streams.

### **4.5. Invasive Species**

#### **4.5.1. Direct and Indirect Effects**

Sheridan Production committed to the control of noxious weeds and species of concern using the following measures identified in their Integrated Pest Management Plan (IPMP): 1) Control Methods, including frequency; 2) Preventive practices; and 3) Education. Cheatgrass (*Bromus tectorum*) and to a lesser extent, Japanese brome (*B. japonicus*) exist in the affected environment. The use of existing facilities along with the surface disturbance associated with construction of proposed access roads, pipelines, and related facilities would present opportunities for weed invasion and spread. The activities related to the performance of the proposed project would create a favorable environment for the establishment and spread of noxious weeds/invasive plants such as Scotch thistle. However, applicant committed measures will reduce potential impacts from noxious weeds and invasive plants.

#### **4.5.2. Cumulative Effects**

Cumulative effects resulting from invasive species are discussed in the PRB FEIS, p. 4-171.

#### **4.5.3. Mitigation Measures**

The proponents operated committed measures and design features are sufficient to not warrant the application of site-specific conditions of approval. (COAs)

#### **4.5.4. Residual Effects**

Cheatgrass (*Bromus tectorum*) and to a lesser extent, Japanese brome (*B. japonicus*) exist in the affected environment. Required control efforts by the Operator would be limited to the surface disturbance associated with the construction and operation of the project. Cheatgrass and other weed species that are present within non-physically disturbed areas of the project area are anticipated to continue to spread unless control efforts are expanded. Efforts are being made by BLM, USDA, WGFD and other partners to treat infestations beyond physically disturbed areas.

### **4.6. Fish and Wildlife**

#### **4.6.1. Greater Sage-grouse**

Effects (Direct and indirect, Cumulative, Mitigation, and Residual) to GSG from surface disturbing and disruptive activities associated with development of horizontal oil wells were analyzed in the Sahara POD EA, WY-070-EA13-72, 2013, Section 4.6.4.1, pp. 34-37, incorporated here by reference. Activities associated with development of this project are anticipated to be similar in nature.

With application of Standard Operating Procedures (SOP's), applied mitigation, Required Design Features and Conditions of Approval identified for Greater Sage-Grouse under the proposed action, impacts caused by surface-disturbing and disruptive activities would be minimized

#### **4.6.2. Raptors**

##### **4.6.2.1. Direct and Indirect Effects**

The PRB FEIS discussed direct and indirect effects to raptors (pp. 4-216 to 4-221). This project could result in direct and indirect habitat losses associated with declines in habitat effectiveness. If nests are initiated in the future, then human activities in close proximity may interfere with 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 within the biological buffer of the active nests, 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.

Proposed well pad for the SLP Phase 2 Fed 44-22H well is within 0.5 mile and outside the biological buffer of existing FEHA nest #11238. To reduce the risk of decreased productivity or nest failure, the BLM BFO will apply a 0.5 mile radius timing limitation during the breeding season around active raptor nests. Proposed well pad for the SLP Phase 2 Fed 13-34H well is within 0.5 mile and outside the biological buffer of four existing FEHA nests # 1896, 2533, 2534, and 2535. To reduce the risk of decreased productivity or nest failure, the BLM BFO recommends a 0.5 mile radius timing limitation during the breeding season around active raptor nests.

##### **4.6.2.2. Cumulative Effects**

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

##### **4.6.2.3. Mitigation Measures**

To reduce the risk of decreased productivity or nest failure, the BLM BFO requires (where COA's can be applied per BLM IM No. 2009-078) a 0.5 mile radius timing limitation during the breeding season around active raptor nests.

#### **4.6.2.4. Residual Impacts**

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

#### **4.6.3. Migratory Birds**

##### **4.6.3.1. Direct and Indirect Effects**

The PRB FEIS discussed direct and indirect effects to migratory birds on pp. 4-231 to 4-235. BLM analyzed the effects to migratory birds from surface disturbing and disruptive activities associated with development of horizontal oil wells in the Sahara POD EA, WY-070-EA13-72, 2013, Section 4.6.2.2, pp. 31-33, incorporated here by reference. Effects and mitigation associated with this project are similar in nature, with the following additional site-specific information. During the onsite, the BLM biologist identified suitable nesting habitat present for several BLM sensitive sagebrush obligates. Construction of all of the well pads within the proposal and associated infrastructure will remove habitat and could kill BLM sensitive migratory birds, or destroy eggs, if the habitat is removed during the nesting season.

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

##### **4.6.3.2. Cumulative Effects**

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

##### **4.6.3.3. Mitigation Measures**

Migratory birds shall be effectively 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 wildlife toxicants are present.

BLM recommends no removal of occupied sagebrush obligate migratory bird habitat during the breeding season (May 1- July 31), unless a pre-construction nest survey (within approximately 10 days of construction planned May 1-July 31) is completed. If surveys will be conducted, the operator will follow the protocol found at the following web address:

[http://www.blm.gov/wy/st/en/field\\_offices/Bufalo/wildlife.html](http://www.blm.gov/wy/st/en/field_offices/Bufalo/wildlife.html)

##### **4.6.3.4. Residual Effects**

Nests initiated after the first week in July may be destroyed by construction after August 1st. Migratory birds nesting adjacent to the well pad or road may be disturbed by construction and production activities. 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.

#### **4.7. Cultural Resources**

##### **4.7.1. 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. Non eligible sites 48CA4640, 48CA4650, 48CA4671 and 48 CA4976 will be impacted by the proposed project. No historic properties will be impacted by the proposed project. Following the State Protocol Between the Wyoming Bureau of Land Management State Director and The Wyoming State Historic Preservation Officer 2006: VI(A)(1) the Bureau of Land Management electronically notified the Wyoming State Historic Preservation Officer (SHPO) on 3/13/2015 that no historic properties exist within 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 must be followed. Further discovery procedures are explained in Standard COA (General)(A)(1).

#### **4.7.2. 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.

#### **4.7.3. 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 must be followed. Further discovery procedures are explained in Standard COA (General)(A)(1) and Appendix K of the Wyoming Protocol.

#### **4.7.4. Residual Effects**

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

## 5. CONSULTATION/COORDINATION

The following participants were present at the onsites:

Date	Name	Title	Agency
10/28 & 10/29/14	Debby Green	NRS	BLM
10/28 & 10/29/14	Scott Jawors	WL Biologist	BLM
10/28 & 10/29/14	Jenna Foss	Permit Agent	GMEC
10/28 & 10/29/14	Allen Vestle	Foreman	Sheridan Production
10/29/14	Ron Schlautman	Surface owner	
10/28/14	Josh Johnson	Surveyor & Eng.	BHSE
10/28 & 10/29/14	Patrick Toomey	Project Manager	GMEC
10/29/14	Zach Byram	WL Biologist	GMEC
10/28 & 10/29/14	Kevin Nelson	Supervisor	Sheridan Production
10/28 & 10/29/14	Keith Segrest	Facilities Engineer	Sheridan Production
10/28 & 10/29/14	Joe Johnson	District Manager	Sheridan Production
10/29/14	William Boyd	Landman	Sheridan Production

### List of Preparers (BFO unless otherwise noted)

Position/Organization	Name	Position/Organization	Name
NRS/Team Lead	Debby Green	Archaeologist	Clint Crago
Supervisory NRS	Casey Freise	Wildlife Biologist	Scott Jawors
Petroleum Engineer	Will Robbie	Geologist	Kerry Aggen
LIE	Sharon Soule	Supervisory NRS	Kathy Brus
Acting Assistant Field Manager	Bill Ostheimer	Acting Field Manager	Chris Durham
NEPA Coordinator	Thomas Bills		

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