DECISION RECORD
Lance Oil & Gas Co. Inc.
Kinney Divide Unit Epsilon Plan of Development (POD)
Environmental Assessment (EA), WY-070-12-148
Buffalo Field Office, Bureau of Land Management

DECISION. The BLM approves Lance Oil & Gas Co., Inc. Kinney Divide Unit Epsilon (KDUE) coalbed natural gas (CBNG) well applications for permit to drill (APD) as described in Alternative B of the environmental assessment (EA) WY-070-EA12-148. This approval includes support facilities.

Compliance. This decision complies with:

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

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

Well List. BLM approves the following APDs and their support facilities:

	Well Name	Well #	QTR	Sec	TWN	RNG	Lease
1	KDU EPSILON KDU	11/1/5077	NWNW	1	50N	77W	WYW149154
2	KDU EPSILON KDU	21-1-5077	NENW	1	50N	77W	WYW149154
3	KDU EPSILON KDU	22-1-5077	SENW	1	50N	77W	WYW149154
4	KDU EPSILON KDU	32-1-5077	SWNE	1	50N	77W	WYW146306
5	KDU EPSILON KDU	33-1-5077	NWSE	1	50N	77W	WYW146306
6	KDU EPSILON KDU	41-1-5077	NENE	1	50N	77W	WYW146306
7	KDU EPSILON KDU	42-1-5077	SENE	1	50N	77W	WYW146306
8	KDU EPSILON KDU	12-2-5077	SWNW	2	50N	77W	WYW149154
9	KDU EPSILON KDU	21-2-5077	NENW	2	50N	77W	WYW149154
10	KDU EPSILON KDU	31-2-5077	NWNE	2	50N	77W	WYW146851
11	KDU EPSILON KDU	32-2-5077	SWNE	2	50N	77W	WYW146851
12	KDU EPSILON KDU	41-2-5077	NENE	2	50N	77W	WYW146851
13	KDU EPSILON KDU	42-2-5077	SENE	2	50N	77W	WYW146851
14	KDU EPSILON KDU	23-19-5176	NESW	19	51N	76W	WYW137646
15	KDU EPSILON KDU	34-24-5177	SWSE	24	51N	77W	WYW146311
16	KDU EPSILON KDU	43-24-5177	NESE	24	51N	77W	WYW146311
17	KDU EPSILON KDU	44-24-5177	SESE	24	51N	77W	WYW146311
18	KDU EPSILON KDU	13-25-5177	NWSW	25	51N	77W	WYW138448
19	KDU EPSILON KDU	14-25-5177	SWSW	25	51N	77W	WYW138448
20	KDU EPSILON KDU	32-25-5177	SWNE	25	51N	77W	WYW138448
21	KDU EPSILON KDU	43-25-5177	NESE	25	51N	77W	WYW138448
22	KDU EPSILON KDU	51-25-5177	NENE	25	51N	77W	WYW138448
23	KDU EPSILON KDU	24-26-5177	SESW	26	51N	77W	WYW146314
24	KDU EPSILON KDU	24-35-5177	SESW	35	51N	77W	WYW146314
25	KDU EPSILON KDU	31-35-5177	NWNE	35	51N	77W	WYW114691

	Well Name	Well #	QTR	Sec	TWN	RNG	Lease
26	KDU EPSILON KDU	32-35-5177	SWNE	35	51N	77W	WYW146314
27	KDU EPSILON KDU	34-35-5177	SWSE	35	51N	77W	WYW146314
28	KDU EPSILON KDU	42-35-5177	SENE	35	51N	77W	WYW146314
29	KDU EPSILON KDU	43-35-5177	NESE	35	51N	77W	WYW146314

Water Management:
BFO approves the POD's WMP which included the following discharge point:
Lance Oil & Gas proposes to use the use of following water management infrastructure:
Existing Facilities.

	FACILITY Name / Number	Qtr/Qtr	Sec	TWP	RNG	Capacity (Acre Feet)	New Surface Disturbance	Lease #
1	Kinney Draw Treatment Facility	NE¼NE¼	20	51N	77W	NA	0 acres	None
2	Barber Creek Treatment Facility	NE¼NW¼	9	50N	77W	NA	0 acres	WYW149359
3	Outfall WY0056081-019	NW¼SE¼	20	51N	77W	NA	0 acres	None
4	Outfall WY0056081-012	SE¼NE¼	8	50N	77W	NA	0 acres	None
5	Outfall WY0056081-013	SW¼SW¼	4	50N	77W	NA	0 acres	WYW146307
6	Outfall WY0056081-014	SW¼SW¼	4	50N	77W	NA	0 acres	WYW146307
7	Outfall WY0056081-046	NE¼NW¼	9	50N	77W	NA	0 acres	WYW149359
8	Outfall WY0056081-016	NE¼SW¼	32	51N	77W	NA	0 acres	None

Proposed Facilities.

	FACILITY Name / Number	Qtr/Qtr	Sec	TWP	RNG	Capacity (Acre Feet)	Surface Disturbance	Lease #
1	Outfall 053	NE¼NW¼	28	51N	77W	NA	0.01 acres	WYW146315

Limitations. There are no denials or deferrals. Conditions of approval (COAs) have been applied.

THE FINDING OF NO SIGNIFICANT IMPACT (FONSI). Analysis of Alternative B of the EA, WY-070-EA12-148, and the FONSI found that the Lance Oil & Gas proposal for Kinney Divide Unit Epsilon will have no significant impacts on the human environment, beyond those described in the PRB FEIS, thus there is no requirement for an EIS.

DECISION RATIONALE. BLM bases its decision on:

1. BLM and Lance Oil & Gas included mitigation measures and design features to reduce environmental impacts while meeting the project's purpose. For a complete description of all site-specific COAs associated with this approval, see the project's COA list.

2. Lance Oil & Gas will conduct operations to minimize adverse effects to surface and subsurface resources, prevent unnecessary surface disturbance, and conform with currently available technology and practice.

3. The Operator committed to:
   - Comply with the approved APD, applicable laws, regulations, orders, and notices to lessees.
   - Obtain necessary permits from agencies.
   - Offer water well agreements to the owners of record for permitted wells.

- Provide water well analysis from a known reference point.
- Incorporate several measures to alleviate resource impacts into their submitted surface use plan and drilling plan.

4. The Operator certified it has a surface use agreement with the landowner(s) or bonded.

5. The project is clearly lacking in wilderness characteristics due to extensive oil & gas development and mechanically maintained roads supporting both Fee and Federal mineral lease development.

6. These APD(s) are pursuant to the Mineral Leasing Act for the purpose of exploring or developing oil or gas and do not satisfy the categorical exclusion directive of the Energy Policy Act of 2005, Section 390 because the project area has not been analyzed by previous NEPA documentation.

7. The selected project features will not result in any undue or unnecessary environmental degradation. The PRB FEIS analyzed and predicted that the PRB oil and gas development would have significant impacts to the region's sage-grouse population. The impact of the development cumulatively contributes to the potential for local lek extirpation yet the effects are within the parameters identified in the PRB FEIS/ROD. The project is consistent with current BLM and State of Wyoming sage-grouse conservation strategies.

ADMINISTRATIVE REVIEW AND APPEAL. This decision is subject to administrative review according to 43 CFR 3165. Request for administrative review of this decision must include information required under 43 CFR 3165.3(b) (State Director Review), including all supporting documentation. Such a request must be filed in writing with the State Director, Bureau of Land Management, P.O. Box 1828, Cheyenne, Wyoming 82003, no later than 20 business days after this Decision Record is received or considered to have been received. 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: 8/14/12

FINDING OF NO SIGNIFICANT IMPACT
Lance Oil & Gas Co. Inc.
Kinney Divide Unit Epsilon Plan of Development (POD)
Environmental Assessment (EA), WY-070-12-148
Buffalo Field Office, Bureau of Land Management

FINDING OF NO SIGNIFICANT IMPACT (FONSI). Based on the information in EA, WY-070-EA12-148, which is incorporated here by reference; I find that: (1) the implementation of Alternative B will not have significant environmental impacts beyond those already addressed in the Buffalo Resource Management Plan Final Environmental Impact Statement (FEIS) 1985, and the Powder River Basin Oil and Gas Project (PRB) FEIS, 2003, to which the EA tiers; (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. There is no requirement for an EIS. 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 in consideration of Interior Department Order 3310.

CONTEXT. Mineral development is a common land use in the PRB. The PRB FEIS reasonably foreseeable development analyzed building of 54,200 fluid mineral wells. The development described in Alternative B is insignificant in the national 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 identified in the 1985 RMP, 2003 PRB FEIS, or other legislative or regulatory processes.

BLM used relevant scientific literature and professional expertise in preparing the EA. The scientific community is reasonably consistent with their conclusions on environmental effects relative to oil and gas development. Research findings on the nature of the environmental effects are not highly controversial, highly uncertain, or involve unique or unknown risks. The PRB FEIS predicted and analyzed oil development of the nature proposed with this project and similar projects. The selected alternative does not establish a precedent for future actions with significant effects. 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 due to extensive oil & gas development and mechanically maintained roads. The project does not adversely affect any species listed under the Endangered Species Act or their designated critical habitat. 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. Any party who is 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: 8/14/12

ENVIRONMENTAL ASSESSMENT (EA), WY-070-12-148
Lance Oil & Gas Co. Inc.
Kinney Divide Unit Epsilon (KDUE) **Plan of Development (POD)**
Buffalo Field Office, Bureau of Land Management

1. INTRODUCTION

BLM provides an environmental assessment (EA) for Lance Oil & Gas Co. Inc. Kinney Divide Unit Epsilon (KDUE) coalbed natural gas (CBNG) well applications for permit to drill (APD). This site-specific analysis tiers into and incorporates by reference the information and analysis in the Final Environmental Impact Statement and Proposed Resource Management 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) pursuant to 40 CFR 1508.28 and 1502.21. One may review these documents at the BLM Buffalo Field Office (BFO) and on our website. These APDs are pursuant to the Mineral Leasing Act for the purpose of developing natural gas and do not satisfy the categorical exclusion directive of the Energy Policy Act of 2005, Section 390 because the project area has not been analyzed by previous NEPA documentation.

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

1.1. Background

Lance Oil & Gas Company INC. (LOG) submitted the Kinney Divide Unit Epsilon POD on March 28, 2011 to the BFO with 41 Federal APD's and 31 Notice of Stakings (NOS) to develop and produce natural gas resources within coal bearing formations of the Powder River Basin (PRB). The onsite visits were conducted in October 4,5,12,13,20,27, 2011 to evaluate the proposal and modify as necessary to alleviate environmental impacts. A series of discussions occurred between BLM and LOG based on the initial project and onsite visits. BLM sent a post-onsite deficiency on February 24, 2012. As a result of these discussions, the following adjustments were made to the proposed project:

- 23 NOSs did not have APDs submitted due to lack of access created by steep slopes with highly erosive soils and limited reclamation potential
- 17 wells and associated infrastructure were removed from the proposal and will be processed in a future proposal due to their proximity to the Fortification Creek Planning Area (FCPA), within 0.5 miles. The wells and their infrastructure would impact elk security habitat and other resources within the FCPA which has defined performance standards.
- A total of 9 well pads were adjusted to limit surface disturbance or maintain vegetative buffer from headcuts.
- 1 well was dropped due to steep slopes (>60%) and highly erosive soils; no alternative for the well location could be found
- 4 APDs were pulled from the proposal and were processed as a separate POD due to their not being in the area of the KDU Epsilon project.

The above changes as documented in the revised project description provided by LOG in response to BLM's deficiency letter, resulted in a refined proposed project, which is discussed in this document as Alternative B. The initial POD, the post-onsite deficiency letter, and the company's response to the

deficiency letter are included in the Project Administrative Record, available for review at the BLM Buffalo Field Office.

The final project proposal with 29 APDs were considered complete when the BLM received the operator's response to the post onsite deficiencies on May 10, 2012.

1.2. Purpose and Need for the Proposed Project

The purpose of the proposed action is to explore, develop, and produce oil and gas reserves conducted under the rights granted by a Federal oil and gas lease, as required in 43 CFR 3160, all Onshore Orders, and The Mineral Leasing Act, as amended and supplemented (30 U.S.C. 181 et seq.).

The need for the action is the requirement to obtain approval for the development of an Oil and Gas Lease through an APD on public lands managed by the Bureau of Land Management under Onshore Order No. 1, pursuant to the authority of the Mineral Leasing Act, as amended and supplemented, (30 U.S.C. 181 et seq.) and prescribed in 43 CFR Part 3160.

1.3. Decision to be Made

The BLM will decide whether or not to approve the proposed development of oil and gas resources on the federal leasehold, and if so, under what terms and conditions.

1.4. Scoping and Issues

BFO conducted extensive external scoping for the PRB FEIS - discussed on p. 2-1 of the PRB FEIS and on p. 15 of the PRB ROD. This project is similar in scope to other fluid mineral development analyzed by the BFO. External scoping would be unlikely to identify new issues, as verified by the few fluid mineral EAs that were externally scoped such as the Clabaugh (WY-070-EA08-134), and the Hollcroft/Stotts Draw (WY-070-EA07-021). In addition, external scoping in 2008 for the Fortification Creek RMP amendment revealed no new issues.

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

- Air quality
- Soils and vegetation: site stability, reclamation potential, riparian and wetland communities, invasive species
- Water: ground water depletion, quality, and quantity of produced water.
- Wildlife: raptor productivity, migratory birds, special status species including greater sage-grouse, elk security habitat loss, elk crucial and parturition range, sharp-tailed grouse breeding and nesting
- Cultural: National Register eligible sites

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

Geological Resources	Heritage & Visual Resources	Recreation
	Paleontological resources	Wilderness characteristics
Cave and karst resources	Visual resources	Livestock & grazing
Geological Resources	Heritage & Visual Resources	Recreation
Mineral resources: locatable, leasable-coal, salable	Forest products	Cave and karst resources
Fire, fuels management, and rehabilitation	Lands & realty	Areas of critical environmental concern
	Rights of way & corridors	Socio-economic resources
	Transportation & access	Environmental justice
		Tribal treaty rights

2. PROPOSED PROJECT AND ALTERNATIVES

2.1. Alternative A - No Action

The PRB FEIS considered a No Action Alternative, pp. 2-54 to 2-62. This alternative must also consider and combine the PRB FEIS analysis with the subsequent analysis and development from the adjacent and intermingled PODs (by approval date);
Williams Draw Unit Alpha WYW-070-05-134, approved 4/22/05
Augusta Unit Zeta WYW-070-08-154, approved 2/26/09
Kinney Divide Unit Gamma WYW-070-10-271, approved 8/26/10
Williams Draw Unit Gamma WYW-070-08-042, approved 11/5/10

The PRB FEIS analyzed the reasonably foreseeable development of over 51,000 CBNG and 3,200 conventional wells. The no action alternative would deny these APDs requiring the operator to resubmit APDs or a POD that complies with statutes and the reasonable measures in the PRB FEIS Record of Decision (ROD) in order to lawfully exercise conditional lease rights. This alternative could, through secretarial discretion suspend the senior leasehold, or could administratively cancel or withdraw the lease if improperly awarded, or seek to cancel the lease. It is not possible in the abstract to identify every interest and that is beyond the scope here.

2.2. Alternative B Proposed Action

Alternative B contains complete APDs and is based on the operator and BLM working to reduce environmental impacts. This alternative summarizes the POD submitted to the BLM by Lance after site visits.

Project Name: Kinney Divide Unit Epsilon

Well Name/#/Lease/Location/County:

	Well Name	Well #	QTR	Sec	TWN	RNG	Lease
1	KDU EPSILON KDU	11/1/5077	NWNW	1	50N	77W	WYW149154
2	KDU EPSILON KDU	21-1-5077	NENW	1	50N	77W	WYW149154
3	KDU EPSILON KDU	22-1-5077	SENW	1	50N	77W	WYW149154
4	KDU EPSILON KDU	32-1-5077	SWNE	1	50N	77W	WYW146306
5	KDU EPSILON KDU	33-1-5077	NWSE	1	50N	77W	WYW146306
6	KDU EPSILON KDU	41-1-5077	NENE	1	50N	77W	WYW146306
7	KDU EPSILON KDU	42-1-5077	SENE	1	50N	77W	WYW146306
8	KDU EPSILON KDU	12-2-5077	SWNW	2	50N	77W	WYW149154
9	KDU EPSILON KDU	21-2-5077	NENW	2	50N	77W	WYW149154

	Well Name	Well #	QTR	Sec	TWN	RNG	Lease
10	KDU EPSILON KDU	31-2-5077	NWNE	2	50N	77W	WYW146851
11	KDU EPSILON KDU	32-2-5077	SWNE	2	50N	77W	WYW146851
12	KDU EPSILON KDU	41-2-5077	NENE	2	50N	77W	WYW146851
13	KDU EPSILON KDU	42-2-5077	SENE	2	50N	77W	WYW146851
14	KDU EPSILON KDU	23-19-5176	NESW	19	51N	76W	WYW137646
15	KDU EPSILON KDU	34-24-5177	SWSE	24	51N	77W	WYW146311
16	KDU EPSILON KDU	43-24-5177	NESE	24	51N	77W	WYW146311
17	KDU EPSILON KDU	44-24-5177	SESE	24	51N	77W	WYW146311
18	KDU EPSILON KDU	13-25-5177	NWSW	25	51N	77W	WYW138448
19	KDU EPSILON KDU	14-25-5177	SWSW	25	51N	77W	WYW138448
20	KDU EPSILON KDU	32-25-5177	SWNE	25	51N	77W	WYW138448
21	KDU EPSILON KDU	43-25-5177	NESE	25	51N	77W	WYW138448
22	KDU EPSILON KDU	51-25-5177	NENE	25	51N	77W	WYW138448
23	KDU EPSILON KDU	24-26-5177	SESW	26	51N	77W	WYW146314
24	KDU EPSILON KDU	24-35-5177	SESW	35	51N	77W	WYW146314
25	KDU EPSILON KDU	31-35-5177	NWNE	35	51N	77W	WYW114691
26	KDU EPSILON KDU	32-35-5177	SWNE	35	51N	77W	WYW146314
27	KDU EPSILON KDU	34-35-5177	SWSE	35	51N	77W	WYW146314
28	KDU EPSILON KDU	42-35-5177	SENE	35	51N	77W	WYW146314
29	KDU EPSILON KDU	43-35-5177	NESE	35	51N	77W	WYW146314

Water Management Facilities:
Lance Oil & Gas proposes to use the use of following water management infrastructure:
Table Existing.

	FACILITY Name / Number	Qtr/Qtr	Sec	TWP	RNG	Capacity (Acre Feet)	New Surface Disturbance	Lease #
1	Kinney Draw Treatment Facility	NE¼NE¼	20	51N	77W	NA	0 acres	None
2	Barber Creek Treatment Facility	NE¼NW¼	9	50N	77W	NA	0 acres	WYW149359
3	Outfall WY0056081-019	NW¼SE¼	20	51N	77W	NA	0 acres	None
4	Outfall WY0056081-012	SE¼NE¼	8	50N	77W	NA	0 acres	None
5	Outfall WY0056081-013	SW¼SW¼	4	50N	77W	NA	0 acres	WYW146307
6	Outfall WY0056081-014	SW¼SW¼	4	50N	77W	NA	0 acres	WYW146307
7	Outfall WY0056081-046	NE¼NW¼	9	50N	77W	NA	0 acres	WYW149359
8	Outfall WY0056081-016	NE¼SW¼	32	51N	77W	NA	0 acres	None

Table Proposed.

	FACILITY Name / Number	Qtr/Qtr	Sec	TWP	RNG	Capacity (Acre Feet)	Surface Disturbance	Lease #
1	Outfall 053	NE¼NW¼	28	51N	77W	NA	0.01 acres	WYW146315

Operator/Applicant: Lance Oil & Gas

Surface Owners: Powder River Ranch, Inc., State of Wyoming, Bureau of Land Management

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

drilling plan, in addition to the COAs in the PRB FEIS ROD and site specifics developed in this alternative.

Drilling and Construction:

- The operator proposes to drill 29 wells to the Wall coal zone at the approximated depth, from ground surface, of 2500 ft.

- Lance Oil & Gas Company anticipates completing drilling and construction activities within 2 years, the term of an APD. Drilling and construction occurs year-round in the PRB. Weather may cause delays lasting several days but rarely do delays last multiple weeks. Timing limitations in the form of COAs and/or agreements with surface owners impose longer temporal restrictions on portions of this POD, but rarely do these restrictions affect an entire POD.

- The company's proposed wells are vertical bores on a generally 80 acre spacing pattern with 1 well per location. Proposed fenced well dimensions are 10 x 15 feet x 4 feet high. All production equipment will be skid mounted (~8'x8'x/8') with an insulated well house slightly larger and colored juniper green selected to blend with the vegetation.

- Lance Oil & Gas Company shall accomplish well metering by telemetry and well visitation. Metering would entail approximately 4 visits per month to each well for maintenance, calibration, sampling, etc. More frequent visits will likely occur during the first several months of operation.

- A water management plan (WMP) that involves the following infrastructure and strategy: The Kinney Divide Unit Epsilon POD will use direct discharge to the Upper Powder River and its tributaries to manage the produced water. Lance will use five existing outfall structures attached to two existing water treatment facilities (EMIT) that discharge treated water directly to the Upper Powder River under approved water discharge permits issued by the Wyoming Department of Environmental Quality. There is one additional proposed water discharge point.

- A road network consisting of existing and proposed improved (i.e., template or engineered) roads including appropriately designed drainage. The project will have 7.4 miles of improved roads the remainder of the roads to be used are existing and will not require improvements.

- Primary and/or secondary underground electrical distribution lines will be routed form central delivery points to supply electrical power to the equipment at each well. No overhead power or generators will be required for the proposed action.

- A buried gas, water and power line network

For a detailed description of design features, construction practices and water management strategies associated with the proposed action, refer to the Master Surface Use Plan (MSUP), KDU Epsilon POD. Also see the KDU Epsilon POD for maps showing the proposed well locations and associated facilities described above. More information on CBNG well drilling, production, and standard practices also is available in the PRB FEIS, pp. 2-9 to 2-40.

Additionally, the Operator, in their APD, committed to:

1. Comply with an approved APD, applicable laws, regulations, orders, and notices to lessees.
2. Obtain the necessary permits from other agencies for the drilling, completion and production of these wells including water rights appropriations, and relevant air quality permits.
3. The Operator certified they have a surface use agreement with the landowner(s) or bonded.

The Operator certified that a copy of the SUP was provided to the relevant landowner(s).

Table 2.1 - Summary of Disturbance

Acres or mileage in the action alternatives represent additional facilities and do not include the existing facilities.

Facility	Alternative A (No Action)	Alternative B (Operator Proposal) Proposed Number/ Acres/Miles
Total CBNG Wells	0	29
Well Locations Nonconstructed Constructed Slotted	200 200qty Avg.25ac =50ac	29 11 (11 acres) 15 (22.5 acres) 3 (0.75acres)
Conventional Wells	0	0 0
Gather/Metering Facilities Number of Facilities Acreage of Facilities	 0 0 0	0 0 0 0
Compressors Number of Compressors	0 0	0 0 0
Number of Ancillary Facilities (Staging/Storage Areas)	0	4- using existing well pads
Template No Corridor With Corridor	miles of improved rds 12.9, 78.4 acres.	 .3 miles (1.6 acres) 5.3 miles (28.9 acres)
Engineered Roads No Corridor With Corridor	Refer to above existing Template/Spot upgrade roads and corridors.	 .1 miles,.6 acres 1.7 miles, 6.4 acres
Primitive Roads No Corridor With Corridor	0	0
Miles of Buried Power No Corridor With Corridor	Same corridor as described in above existing Template/ and corridors.	 0 7.0 miles, 29.7 acres

Facility	Alternative A (No Action)	Alternative B (Operator Proposal) Proposed Number/ Acres/Miles
Miles of Pipeline No Corridor With Corridor	Same corridor as above.	2.4 miles, 10.3 acres 7.0 miles, 29.7 acres
Miles of Overhead Powerlines	8.0 miles,28.9 acres	0
Number of Communication Sites	0	0
Number of Monitor Wells	0	0
Acres of Land Application Disposal	0	0 0
Acres of Subsurface Drip Irrigation	0	0
Number of Treatment Facilities	2 (0 acres)	0 (0 acres)
Number of Impoundments	0	0
On-channel Off-channel Lined Unlined		
Water Discharge Points	5 (0 acres)	1 (0.01 acres)
Underground Injection Well	0	0 acres
TOTAL ACRES DISTURBANCE	**157.3 Acres**	**111.8 Acres**

2.3. Alternatives Considered but Eliminated from Detailed Analysis

Lance Oil & Gas Company INC. (LOG) originally submitted the Kinney Divide Unit Epsilon POD on March 28, 2011 to the BFO with 41 Federal APD's and 31 Notice of Stakings (NOS). A series of discussions and onsite visits occurred between BLM and Lance based on the initial project POD (see Sec 1.1). As a result of the onsites and discussions a combination of 43 APDs/NOSs were (wildlife and soils/topography and reclamation resource conflicts) and their associated infrastructure was removed from the POD and required no further analysis. Therefore an alternative consisting of 72 APDs was eliminated from consideration.

Conformance with the Land Use Plan and Other Program Guidance

The proposed action generally conforms to the 1985 Buffalo RMP, the 2001 and 2011 amendments, and the 2003 PRB FEIS and RMP Amendment and ROD. The proposed project generally conforms with federal laws, regulations, and policies including FLPMA, the National Historic Preservation Act, the Endangered Species Act, the Migratory Bird Treaty Act, the Clean Water Act, the Clean Air Act, the National Environmental Policy Act and DOI Order 3310.

3. AFFECTED ENVIRONMENT

This section briefly describes the physical and regulatory environment affected by implementation of the alternatives in Section 2. Aspects of the affected environment here focus on the major issues. A screening of all resources and land uses potentially affected is included in the administrative record. Resources unaffected, or not affected beyond the level analyzed in the PRB FEIS, are not analyzed in this EA.

Project Area Description

The project area is approximately 24 miles east of Buffalo, Wyoming. It covers an area of 3,244 acres with wells and infrastructure on the east of the Powder River. The Power River is surrounded by what is termed the "Power River Breaks". The Breaks were formed by ancient geological uplift, followed by an inland sea, which overtime eroded drainage pathways toward the Powder River. These geological processes left the Power River Breaks with rough topographic relief and highly erosive soils broken up by moving headcuts which lead into deeply incised drainages that cut sharply toward many tributaries that lead to the Powder River.

Other federal CBNG PODs in the project vicinity are listed in Table 3.

Table 3. Adjacent or Overlapping Development

POD Name	NEPA Document	# Well / Type	Approval
Williams Draw Unit Alpha	WYW-070-05-134	32/CBNG	4/22/05
Augusta Unit Zeta	WYW-070-08-154	134/CBNG	2/26/09
Kinney Divide Unit Gamma	WYW-070-10-271	39/CBNG	8/26/10
Williams Draw Unit Gamma	WYW-070-08-042	98/CBNG	11/5/10

Topography in the KDU Epsilon POD ranges from 3,700ft to 4,430ft above sea level. It is dissected and gullied with areas of active erosion and natural head-cutting (see Figure 3.2). On surfaces with steep topography vegetation is sparse, or even barren. Barren steep slopes experience higher velocity water movement during heavy storm events. As storm water moves down slope the velocity is reduced by the thicker vegetation found on slighter slopes. Due to rough topography and highly erosive soils, access roads and infrastructure were placed on the slighter slopes.

Climate in this region can be extreme. Average precipitation is 10-14 inches. Wide fluctuations can occur with years of drought and years of greater than average precipitation. Temperatures differ greatly between winter lows and summer highs. Winds average 7-10 mph but can be up to 75 mph during extreme storm events. Climate affects reclamation potential.

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. Existing air quality in the PRB is in attainment with all ambient air quality standards. It is also in an area that is in prevention of significant deterioration zone. Air quality is a rising concern due to ozone in the oil and gas producing Upper Green River Basin that exceeded EPA limits for 13 days in 2011 requiring 10 warnings to stay indoors; in addition to PRB-area air quality alerts issued in 2011 for particulate matter (PM), attributed to coal dust. Four sites monitor the air quality in the PRB: Cloud Peak in the Bighorn Mountains, Thunder Basin northeast of Gillette, Campbell County south of Gillette, and Gillette. In addition, the Wyoming Air Resource Monitoring System (WARMS) measures meteorological parameters from 6 sites, and particulate concentrations from 5 of those sites, monitors speciated aerosol (3 locations), and evapotranspiration rates (3 locations). These sites are at Sheridan, Taylor Reservoir, South Coal Reservoir, Buffalo, Juniper, and Newcastle. The northeast Wyoming visibility study is ongoing by the

Wyoming Department of Environmental Quality (WDEQ). Sites adjacent to the Wyoming PRB-area are at Birney on the Tongue River 24 miles north of the Wyoming-Montana border, Broadus on the Powder River in Montana, and Devils Tower.

Existing air pollutant emission sources in the region include:

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

3.2. Soils

The Powder River Basin is composed of relatively young soils which have developed in alluvium and residuum derived from the Wasatch Formation. Lithology consists of light to dark yellow and tan siltstone and sandstones with minor coal seams. Soils differ with topographic location, slope and elevation. Erosion potential varies from severe to moderate depending on the soil type, vegetative cover and slope. The soils in the KDU Epsilon POD vary from lowland, loamy, shallow clay, and bedrock, primarily loamy and clayey soil dominate the project area (see Figure 3.1: Dominant soils and Ecological Sites). Suitable soil for reclamation varies in depths ranging from near zero on ridges to twelve inches in bottomlands. Reclamation potential varies throughout the project area (see Maps 1 &2).

A tabulated summary of the dominant and important soil map units follows, along with their individual acreage and percentage of the area within the POD boundary.

Table 3.1 Dominant Soils & Ecological Sites

Map Unit Symbol	Map Unit Name	Ecological Site	Acres	Percent
684	Samday-Shingle-Badland complex, 10 to 45 percent slopes	Shallow Clayey (SwCy) 10-14 NP	2,347	49%
639	Forkwood-Cushman loams, 0 to 6 percent slopes	Loamy (Ly) 10-14 NP	1,792	38%
717	Vonalee-Terro fine sandy loams, 2 to 10 percent slopes	Sandy (Sy) 10-14 NP	514	11%
727	Haverdad, occasionally flooded-Kishona clay loams, 0 to 6 percent slopes	Lowland (LL) 10-14 NP	110	2%

Source: NRCS 2010.

See the NRCS Soil Survey Southern Cambell County (SSURGO) data. The Ecological Site interpretations include additional site-specific soil information.

Mapping a single taxonomic soil class without including areas of other taxonomic classes is rare. Consequently, every map unit comprises the soils of its name and some minor components that belong to other taxonomic classes. Most minor soils have properties similar to those of the dominant soils in the map unit, and thus they do not affect use and management. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different

management. These are contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Map unit descriptions mention the contrasting components. In complex soil patterns minor components may avoid observation and mention as it's impractical to identify all the soils and miscellaneous areas on the landscape. The presence of minor components in a map unit does not diminish the usefulness or accuracy of the data. The objective of mapping is to separate the landscape into landforms or landform segments that have similar use and management requirements, and to delineate pure taxonomic classes. The delineation of such segments on the map provides sufficient information for the development of resource plans. Onsite investigation defines and locates the soils and miscellaneous areas where plans call for intensive use of small areas.

3.2.1. Limited Reclamation Potential (LRP)

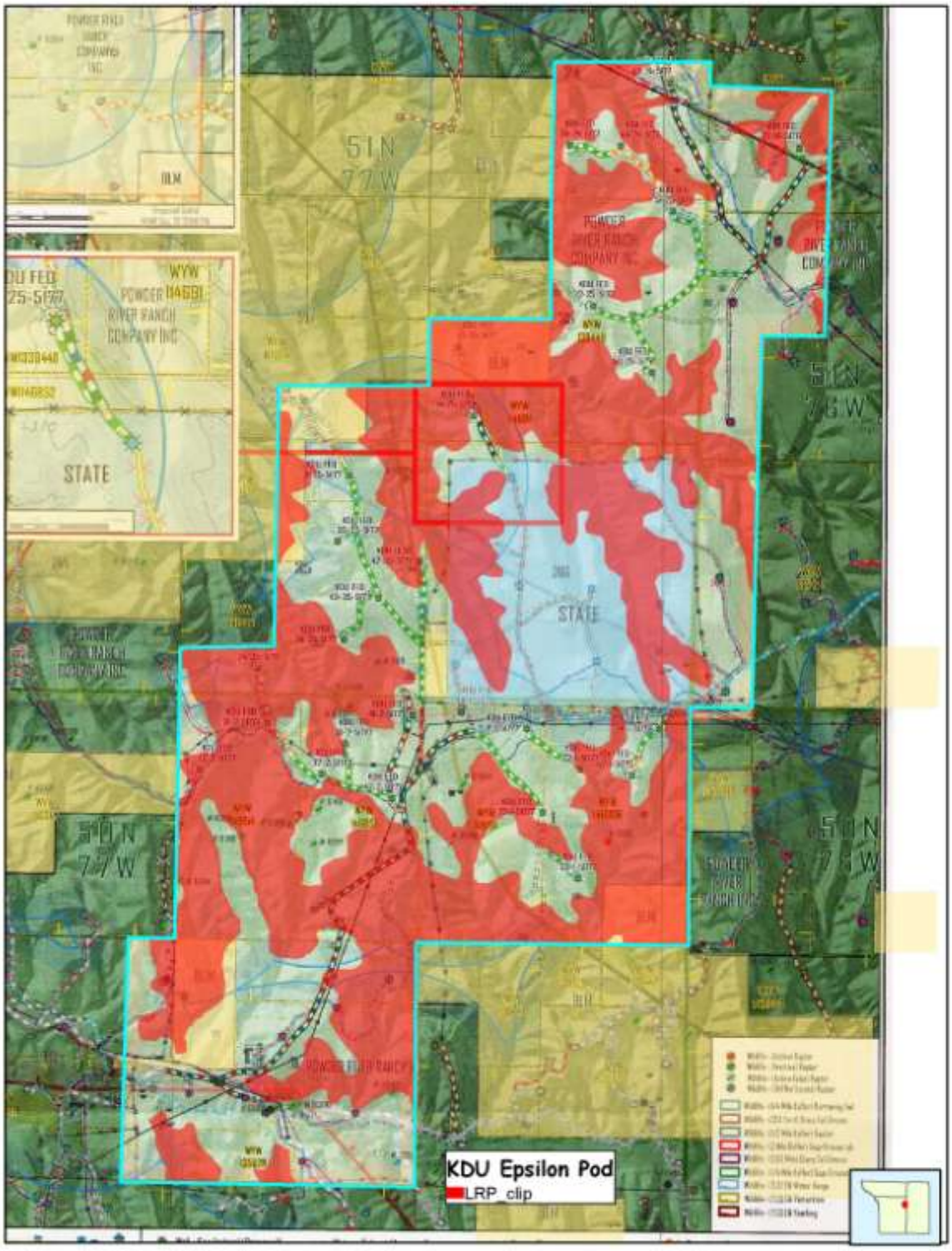
LRP areas were identified using NRCS SSURGO Data and onsite investigation. For preliminary analysis BLM filters the SSURGO data soil mapping units by the "most limiting" aggregation method. Thus any soil mapping unit containing a named component described as a miscellaneous area would be designated as a LRP area as would areas identified as badlands and rock outcrop. BLM used the SSURGO Data to determine that 49% of the project area soils contain LRP areas (see Map 1). The area consisting of the miscellaneous component (LRP area) would be substantially less; and then BLM verifies and describes these areas during the onsite investigation.

Miscellaneous areas: have essentially no soil and support little or no vegetation. They can result from active erosion, washing by water, unfavorable soil conditions, or human activities. Some miscellaneous areas can be made productive, but only after major reclamation efforts. (430-VI-NSSH, 1996)

Badlands: A landscape which is intricately dissected and characterized by a very fine drainage network with high drainage densities and short, steep slopes with narrow interfluves. Badlands develop on surfaces with little or no vegetative cover, overlying unconsolidated or poorly cemented materials (clays, silts, or in some cases sandstones) sometimes with soluble minerals such gypsum or halite. (430-VI-NSSH, 1996)

Rock outcrop: Consists of exposures of bare bedrock. Most rock outcrops are hard rock, but some are soft. (430-VI-NSSH, 1996)

Map 1 Low Reclamation Potential Areas

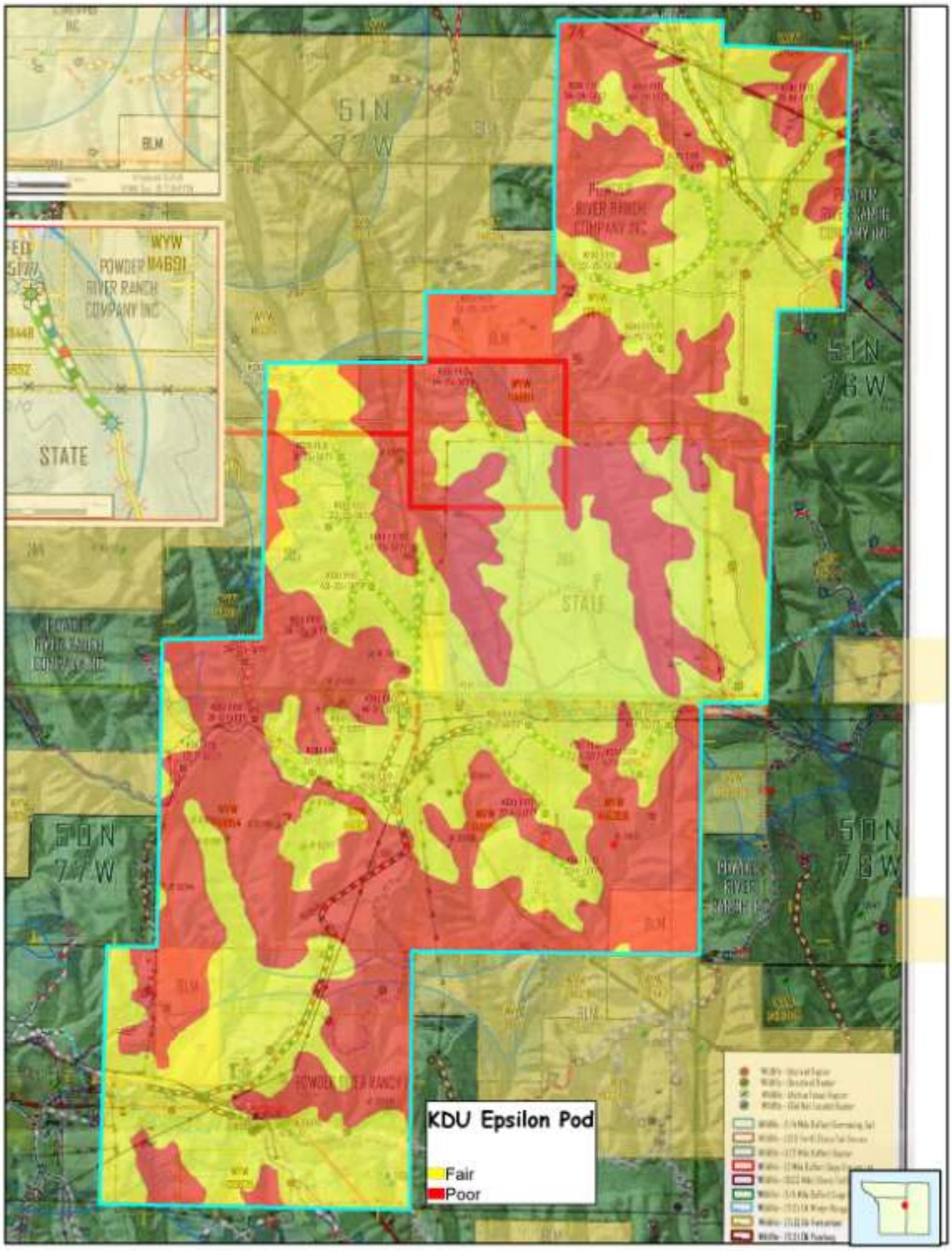


3.2.2. Reclamation Suitability (Source Material)

According to the NRCS, reclamation potential in the KDU POD is rated 51% fair and 49% poor. Soils with poor reclamation and re-vegetation potential occur throughout the project area as shown in Map 2 below. Currently, soil conditions in the project area are impacted by CBNG development as well as traditional activities, including livestock grazing and wildlife use. Much of the area is covered with clayey soils and steep slopes that are easily damaged by use or disturbance and are difficult to re-vegetate or otherwise reclaim.

Construction of well pads, impoundments, pipelines, and roads involves breaking through the topsoil, the physical and biological crust. Topsoil is the suitable growth medium salvaged and used in reclamation. It is the result of thousands of years of geological and climatic forces, and is the sum accumulation all organic matter available over time. Roads, linear pipeline scars, and artificial wet areas increase potential for soil erosion. This increased erosion potential can result in higher suspended sediment and turbidity levels in the Powder River. Avoiding areas with limited reclamation potential, minimizing surface disturbance and salvaging surface organic matter (in the form of vegetation, litter and biological crust) are critical to maintaining the integrity and viability of the soil.

Map 2 Reclamation Suitability



3.2.3. Vegetation and Ecological Sites

Soil types are used to provide ecological site descriptions (ESDs). ESDs provide vegetative information used for resource identification, management and reclamation recommendations. To determine the appropriate ESDs, BLM Specialists compared data from the NRCS published soil survey soils with information gathered by site on the field review. Dominant ecological sites (see Table 3.1) and plant communities identified in the KDU Epsilon POD are 49% loamy and 38% shallow clayey.

The on-site field review confirmed that there is not just one prominent plant community for each ecological site. Instead there are many plant communities and transitions (states) verified with the NRCS State and Transitional Model. Steeper slopes in this POD get less moisture and therefore have thinner layers of organic matter in upper layer soil (A horizon). Topsoil is used by plants as a growth medium. This is contrasted with areas in drainages and on slighter slopes which have slightly greater moisture accumulation that leads to deeper organics and a richer layer of nutrients for plants to establish. Loamy sites have slopes from zero to 30% with thicker topsoil and more vegetation. Shallow clayey sites have steeper slopes that range up to 60%, have thinner topsoil and sparse vegetation.

Plant Community- BLM staff identified the dominant vegetation community as; *mixed sagebrush/grass* plant communities and were identified/observed on both the loamy and clayey sites. Historically, the mixed sagebrush/grass 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 control. 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 rhizomatous wheatgrasses, and green needlegrass. Grasses of secondary importance include blue grama, prairie junegrass, and sandberg bluegrass. Forbs, commonly found in this plant community, include Louisiana sagewort (cudweed), plains wallflower, hairy goldaster, slimflower scurfpea, and scarlet globemallow. Sagebrush canopy ranges from 20% to 30%. Fringed sagewort is commonly found. Plains pricklypear and winterfat can also occur. When compared to the Historical Climax Plant Community, big sagebrush and blue grama have increased. Green needlegrass and bluebunch wheatgrass have decreased, often occurring only where protected from grazing by the big sagebrush canopy.

Loamy sites - Loamy soils are deep to moderately deep (greater than 20" to bedrock), well drained & moderately permeable. Layers of the soil most influential to the plant community vary from 3 to 6 inches thick. These layers consist of the A horizon with very fine sandy loam, loam, or silt loam texture and may also include the upper few inches of the B horizon with sandy clay loam, silty clay loam or clay loam texture. Major Soil Series correlated to this site includes: Bidman, Cambria, Cushman, Forkwood, Kishona, Parmleed, Theedle and Zigweid.

Shallow Clayey - The soils of this site are shallow (less than 20”to bedrock) well-drained soils formed in alluvium or residuum. These soils have moderate to slow permeability and may occur on all slopes. The bedrock is clay shale which is virtually impenetrable to plant roots. The soil textures included in this site are silty clay, clay, and the finer portions of sandy clay loam, clay loam, or silty clay loam. Thin ineffectual layers of other soil textures are disregarded. Layers of the soil most influential to the plant community vary from 3 to 6 inches thick.

Soil and vegetative communities, and ecological descriptions are compiled by the Natural Resources Conservation Service (NRCS). They are field reviewed at the on-site inspection for the purpose of resource identification, and to provide management and reclamation recommendations. Soils within the project area were identified from the South Campbell County Survey Area, Wyoming (WY605).

3.3. Water Resources

Kinney Divide Unit Epsilon POD is in the Barber Creek drainage - a tributary of the Upper Powder River. Ephemeral drainages, which flow into the intermittent Barber Creek, dissect the area. The ephemeral drainages have gentle slopes with well vegetated bottoms and numerous small head-cut features.

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

3.3.1. Groundwater

The historical use for groundwater in this project area was for stock water or domestic purposes. A search of the WSEO Ground Water Rights Database for this area showed 23 registered stock and domestic water wells within 1 mile of the POD with depths ranging from 10 to 1,500 feet. For additional information on water, refer to the PRB FEIS (2003), Chapter 3, Affected Environment pp. 3-1 to 3-36 (groundwater).

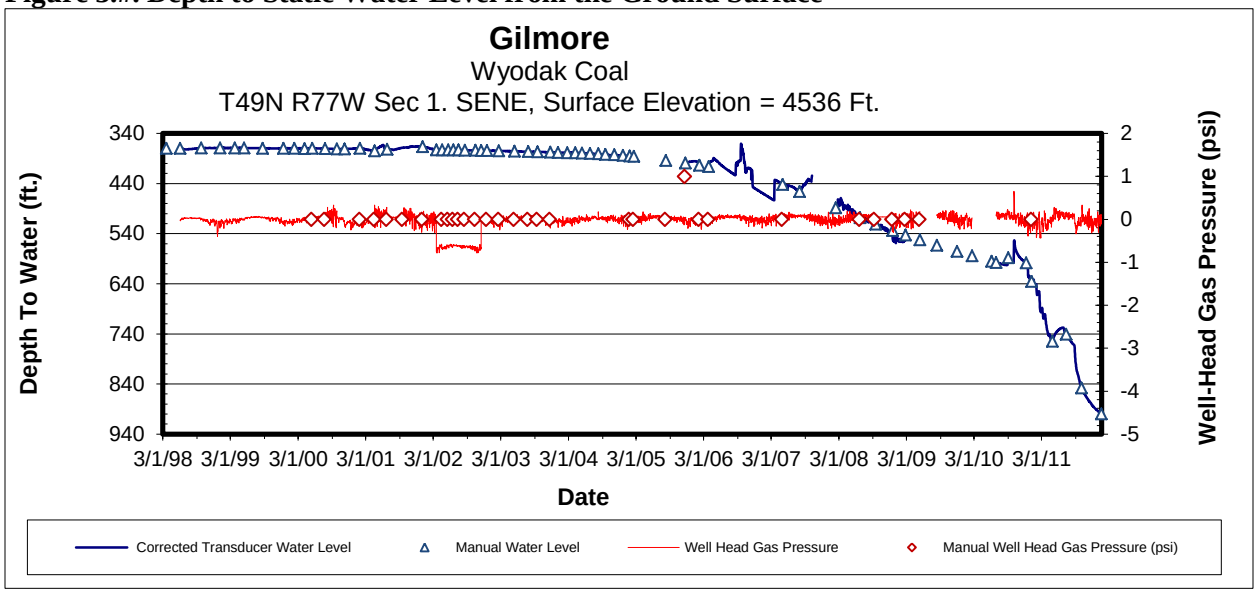
WDEQ water quality parameters for groundwater classifications (Chapter 8 – Quality Standards for Wyoming Groundwater) define the following general limits for total dissolved solids (TDS): 500 mg/l TDS for drinking water (Class I), 2000 mg/l for agricultural use (Class II) and 5000 mg/l for livestock use (Class III). For additional water quality limits for groundwater, please refer to the WDEQ web site.

The production of CBNG necessitates the removal of some degree of the water saturation in the coal zones to temporarily reduce the hydraulic head in the coal. BFO has been monitoring coal zone pressures and water levels since the early 1990s in the PRB.

The Kinney Divide Unit Epsilon POD is surrounded by numerous CBNG projects. The Gilmore groundwater monitoring well, found at T49N, R77W Section 1, is within 5.5 miles of the Kinney Divide Unit Epsilon POD boundary. The initial water level of the Wyodak coal seam at the Gilmore well, measured on 3/19/1998, which is indicative of the pressure in the target coal zone, was recorded at 369 feet below ground level. The most recent measurement, from 1/19/2010, recorded the water level at 899 feet below ground level, for a decline of 530 feet since the wells initial measurement.

This level of depressurization is within the potential predicted in the PRB FEIS; determined through the regional groundwater model for that document. Refer to the PRB FEIS, Chapter 4, Groundwater for further information and to the Wyoming State Geological Survey's Open File Report 2009-10 titled, "1993-2006 CBNG Regional Groundwater Monitoring Report: Powder River Basin, Wyoming," which is available at: http://www.wsgs.uwyo.edu.

Figure 3.#. Depth to Static Water Level from the Ground Surface



3.3.2. Surface Water

The project area is within the Barber Creek drainage which is tributary to the Upper Powder River. Most of the area drainages are ephemeral (flowing only in response to a precipitation event or snow melt) to intermittent (flowing only at certain times of the year when it receives water from alluvial groundwater, springs, or other surface source – PRB FEIS, Chapter 9, Glossary). The channels are primarily well vegetated grassy swales, without defined bed and bank.

The PRB FEIS presents the historic mean electrical conductivity (EC, in µmhos/cm) and sodium adsorption ratio (SAR) by watershed at selected USGS Gauging Stations in Table 3-11 (PRB FEIS, p. 3-49). These water quality parameters "illustrate the variability in ambient EC and SAR in streams in the project area. The representative stream water quality is used in the impact analysis presented in Section 4 as the baseline for evaluating potential impacts to water quality and existing uses from future discharges of CBM [CBNG] produced water of varying chemical composition to surface drainages within the project area" (PRB FEIS, p. 3-48). For the Upper Powder River, the EC ranges from 1,797 at maximum monthly flow to 3,400 at low monthly flow; and the SAR ranges from 4.76 at maximum monthly flow to 7.83 at low monthly flow. The USGS station at Powder River at Arvada, WY determined these values (PRB FEIS, p. 3-49).

Lance Oil & Gas identified 2 historic natural springs within a 1 mile radius of Kinney Divide Unit Epsilon POD. According to the landowners, both springs are no longer active, and therefore were not sampled. For more information on surface water refer to the PRB FEIS, pp. 3-36 to 3-56.

3.4. Wetlands/Riparian

The National Wetland Inventory (NWI) identifies approximately 9.9 acres of sporadic, isolated wetlands within the POD boundary. These wetlands have for the most part formed in low lying areas where surface water accumulates for extended periods of time. Some of the wetlands are adjacent to streams and others may be the result of leaking livestock water facilities. Identification and management of wetland resources is under the jurisdiction of the U.S. Army Corps of Engineers.

3.5. Invasive Species

A database containing invasive species locations is maintained by the Wyoming Energy Resource Information Clearinghouse (WERIC). The WERIC database was created cooperatively by the University of Wyoming, BLM and county Weed and Pest offices. The following state-listed noxious weeds and/or weed species of concern infestations were discovered by a search of the WERIC database (www.weric.info):

- Leafy spurge
- Russian knapweed
- Whitetop
- Scotch thistle
- Salt cedar
- Russian olive

The operator or BLM confirmed the following infestations and/or documented weed species during subsequent field investigations:

- Hoary cress
- Scotch thistle
- Canada thistle
- Common cocklebur
- Buffalo bur

The state-listed noxious weeds are listed in PRB FEIS Table 3-21 (p. 3-104) and the Weed Species of Concern are listed in Table 3-22 (p. 3-105).

3.6. Fish and Wildlife

The PRB FEIS identified wildlife species occurring in the PRB, pp. 3-113 to 3-206. Big Horn Environmental Consultants (BHEC) conducted wildlife surveys in the project area during 2010, 2011, and 2012. BLM wildlife biologists performed a habitat assessment in the project area on October 3, 4, 12, 13, 20, and 27, 2012. 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, Wyoming Game and Fish Department (WGFD) datasets, and the Wyoming Natural Diversity Database (WYNDD) to evaluate the affected environment for wildlife species that may occur in the project area. This section describes the affected environment and impacts to wildlife likely to occur from the proposed project.

3.6.1. Big Game

Big game species expected to occur within the KDUE project area consist of elk, mule deer, pronghorn, and white-tailed deer. The affected environment for pronghorn, mule deer, white-tailed deer, and elk is discussed in the PRB FEIS on pp. 3-117 to 3-122, pp. 3-127 to 3-132, 3-122 to 3-127, and 3-132 to 3-140, respectively. The affected environment for big game is incorporated here by reference from the Kinney Divide Unit Gamma POD (WY-070-EA10-271) environmental assessment. This project is located in the same geographic area as the KDUE project, with similar topography, soils, and ecological characteristics. Additional information not discussed in the previously listed EA or PRB FEIS and site-specific information regarding these species is discussed here.

Table 3.2 indicates the delineated seasonal ranges for each big game species that occur within the project area, the herd units affected by the project, the WGFD population objective, and the WGFD current population estimate for each species (WGFD 2011a).

Yearlong use is when a population of animals makes general use of suitable documented habitat sites within the range on a year-round basis. Animals may leave the area under severe conditions. Winter-yearlong use is when a population or a portion of a population of animals makes general use of the documented suitable habitat sites within this range on a year-round basis, but during the winter months there is a significant influx of additional animals into the area from other seasonal ranges. Crucial Range is any particular seasonal range or habitat component, but describes that component which has been documented as the determining factor in a population's ability to maintain and reproduce itself at a certain level. Parturition Areas are documented birthing areas commonly used by females. It includes calving areas, fawning areas, and lambing grounds. These areas may be used as nurseries by some big game species.

Table 3.2 Big Game species, seasonal ranges, herd units, population objectives, and population estimates for big game species likely to occur in the KDU Gamma Project Area

Species	Seasonal Range in Project Area	Herd Unit	WGFD Population Objective	Percentage Above (+) or Below (-) Objective	Year of WGFD Report
Mule Deer	Yearlong, winter yearlong	319 - Powder River	52,000	- 22.7%	2011
Pronghorn	Yearlong	351 - Gillette	11,000	+ 9%	2011
White-Tailed	Yearlong	303 - Powder River	8,000	+ 166%	2011
Elk	Yearlong, winter yearlong, crucial winter yearlong, parturition	320 - Fortification	150	+ 52%	2011

Elk

The project area contains crucial winter, and parturition range for the Fortification Creek elk herd. The affected environment for the Fortification Creek elk herd is discussed in the PRB FEIS, pp. 3-132 to 3-140 and in the Fortification Creek Planning Area Resource Management Plan Amendment (FCPA RMPA), pp. 3-27 to 3-32. The PRB FEIS generally considered cumulative impacts to elk but did not specifically address the geographically isolated Fortification Creek elk herd. The FCPA RMPA addresses cumulative impacts to the Fortification Creek elk herd

In 1992, a 2.5 year study of the Fortification Creek elk herd was initiated by the WGFD, in cooperation with the BLM and area landowners, with the collaring of 17 cows. Data from this study allowed the WGFD to delineate seasonal ranges (BLM 2006).

The WGFD defined two critical seasonal ranges; crucial winter range and parturition (calving) range (Figure 3.3). Both provide important seasonal habitat functions during sensitive periods for elk. These crucial ranges overlap on the landscape with the overlapping area referred to as "dual crucial" range. In March 2011, the BLM released a comprehensive Fortification Creek Planning Area RMPA/EA. Habitat for the Fortification Creek elk herd is described in detail in this document. Table 3.3 summarizes elk habitat by category for the Fortification Creek Study Area available within the KDU Epsilon project area.

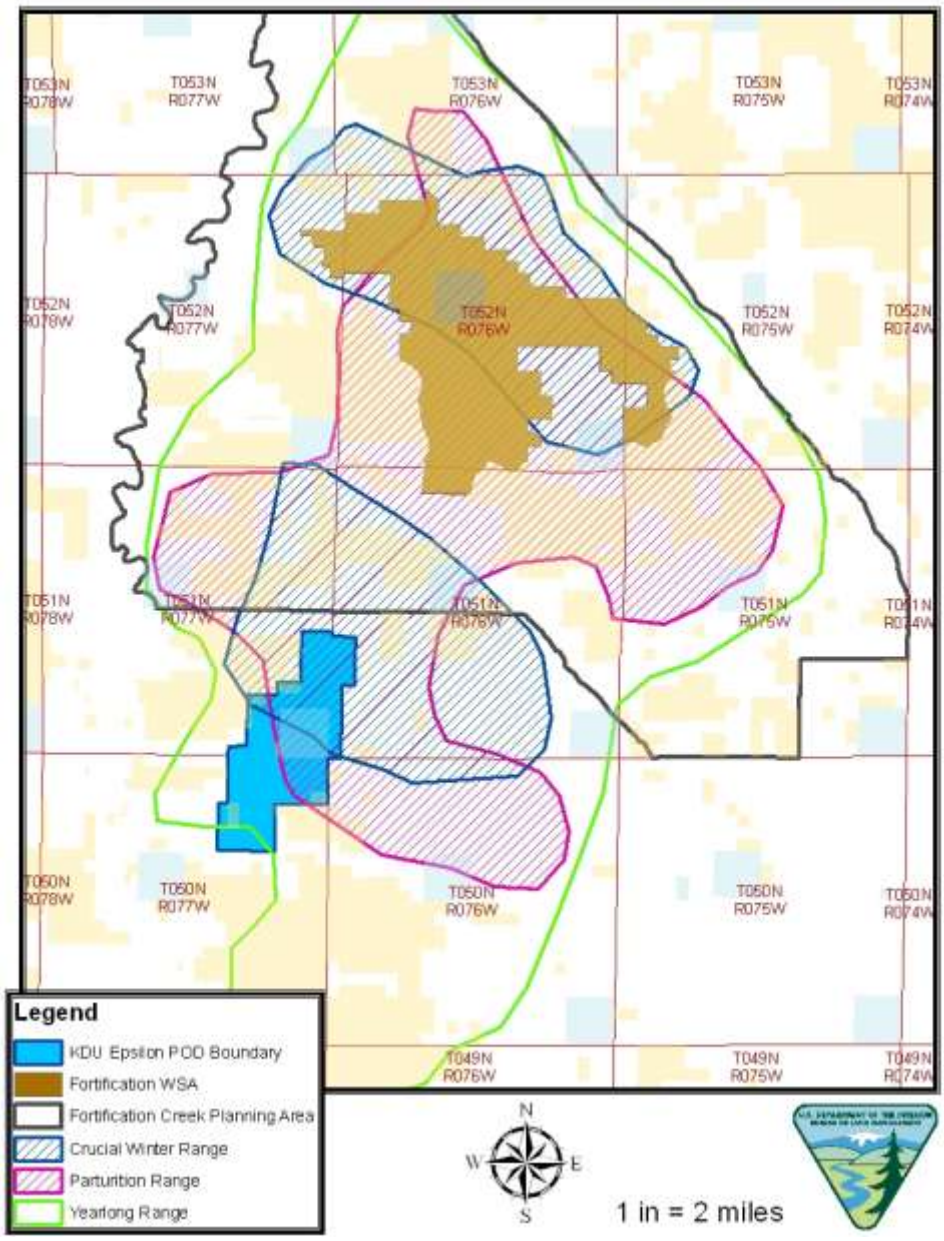
Table 3.3 Acres of Elk Ranges/Habitats within the Kinney Divide Unit Epsilon

Range/Habitat	Size (Acres)	Percent Area of the KDU Epsilon Project Area[1]
Yearlong	4,556	95.7%
Crucial Winter	2,638	55.4%
Parturition	4,763	37.6%
"Dual Crucial"	33	0.7%
Effective Habitat	2,007	42.1%
Security Habitat	1,640	34.4%

[1] Habitats may overlap and do not include all portions of the KDU Epsilon Project area. Therefore, totals do not reflect all portions of the proposed project.

Figure 3.2 displays the position of the KDU Epsilon project area and the Fortification elk herd ranges.

Figure 3.2 Affected Environment - Fortification Elk Herd Ranges

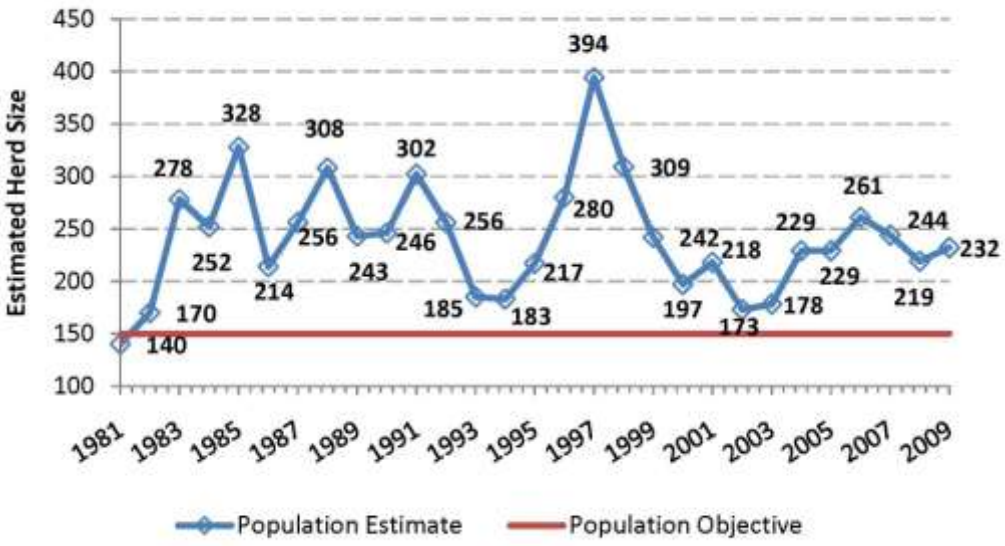


Population Demographics

The productivity of a big-game herd is often used as an indicator of the overall health and welfare of a population. Relatively high herd productivity is closely associated with good nutritional resources resulting from a desirable forage/range condition, as well as variables such as slope, aspect, elevation, distance to roads, distance to shrub cover, and habitat diversity (Sawyer et al. 2007). Pre-hunt productivity estimates indicate the Fortification Creek herd health is good to excellent (BLM 2007a). Blood samples taken from 36 adult cow elk in late March 2008 showed a greater than 90 percent pregnancy rate (BLM 2011a). The 2010 post hunt cow calf ratio is 100:45.5.

The WGFD 2010 Job Completion Report (JCR) provides a 2011 post-season population estimate for the Fortification Creek elk herd of 210, down from a 2010 post-season population estimate of 238 and the 9-year average (2000-2009) of 241. The population had increased in 2009 and 2010 as shown in Figure 3.3 below.

Figure 3.3 Fortification Elk Herd Population Trends 1981 to 2009



Range Fidelity
Fidelity to seasonal ranges (yearlong, calving, and crucial winter) remains greater than 80%. This means that currently 80% of collared elk locations are within the yearlong range for the entire year. Seasonal crucial range fidelity remains greater than 80%, meaning that collared elk use the appropriate seasonal ranges during the crucial seasons within 80% of the current use level and use pattern. See the figures 4.1, 4.2 and 4.3 of the Kernel Density Models in Section 4 below.

Habitat Effectiveness
In addition to parturition and crucial winter ranges, the KDU Epsilon POD contains effective and security habitats. Table 3.3 provides the areas and percent of these habitat types within the project area. Figure 3.4 displays elk security habitat and effective elk habitat in relation to the KDU Epsilon project area.

Habitat effectiveness is the degree to which habitat features fulfill specific functions (i.e. the degree to which a species or population is able use their habitat).

Security habitat is a subset of effective habitat. A security area is defined as "any area that will hold elk during periods of stress because of geography, topography, vegetation, or a combination of those features" (Lyon and Christensen 1992). Hillis et al. (1991) quantified security areas as nonlinear blocks of hiding cover greater than or equal to 250 acres in size and greater than or equal to 0.5 mile from any open road (Lyon and Canfield 1991, Hillis et al. 1991). WGFD also uses this definition (WGFD 2004). Descriptions of these habitats and the methods used to identify them are included in the FCPA RMPA, pp. 3-30 to 3-32, 4-39 to 4-77.

To model these habitat types for this analysis, effective habitat is considered as all areas within the elk yearlong and crucial ranges that are 0.5 miles from roads or less than 0.5 miles where visibility of the road is obscured by topography. It was assumed that by calculating the loss of effective

habitat around roads, the loss of effective habitat around wells would be accommodated. Security habitat was modeled as a contiguous block of effective habitat of 250 or more acres. Two hundred and fifty acres is a common minimum security patch size that has been used in other studies (Christensen et al. 1991, Leege 1984). The model does not account for vegetation.

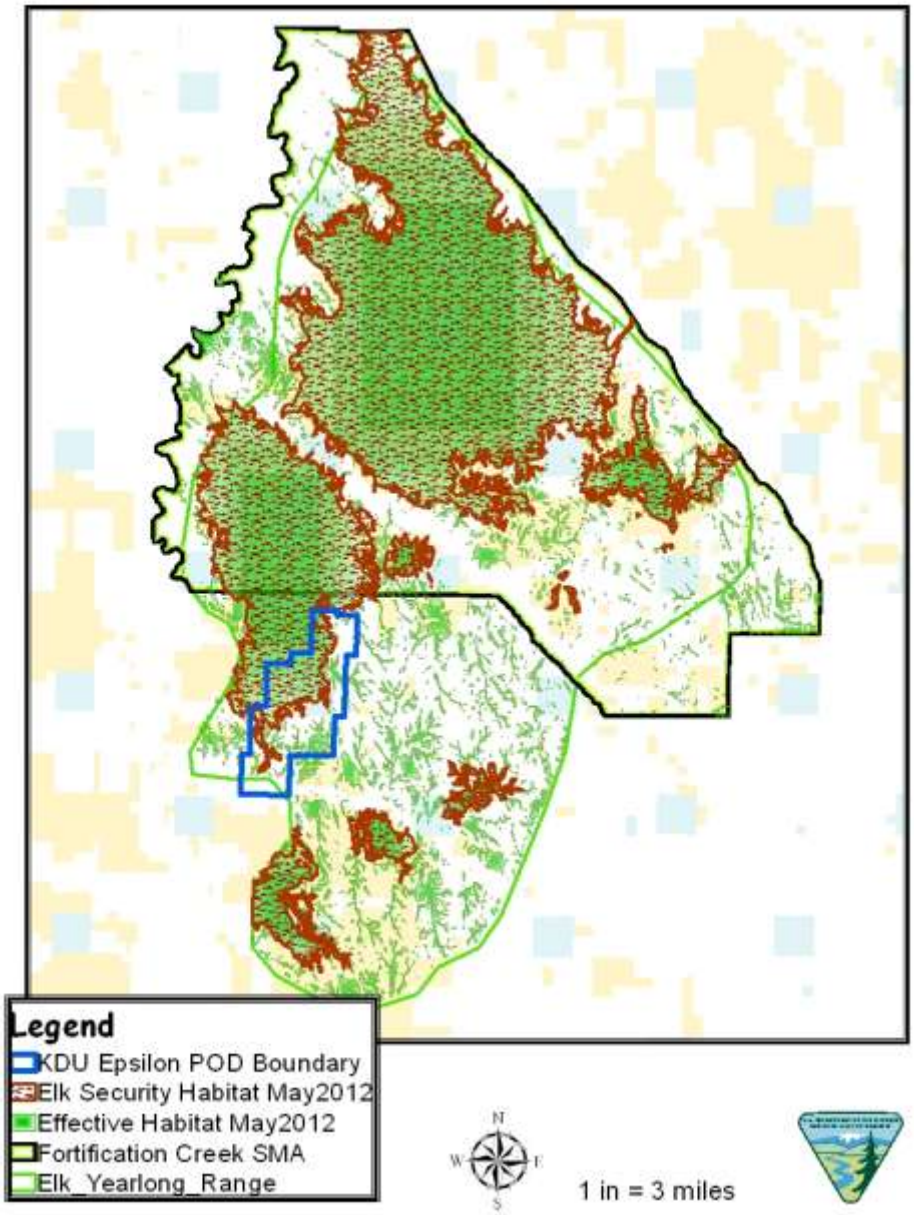
The visibility model used a 98-foot digital elevation model (DEM) to account for topography (U.S. Geological Survey National Elevation Database). Because no development will occur in the WSA, it was assumed that no roads occurred, were used, or would be added in the WSA. The model was run for the entire yearlong elk range (including the FCPA). This ensured that roads immediately outside of the yearlong range but within 0.5 mile would show the loss of effective habitat within the yearlong range. The same algorithm was used for the elk crucial range.

The baseline model was designed to show probable current elk habitats. Effective and security habitats were used as the baseline against which to measure changes in habitats.

The KDU Epsilon project lies southwest of the FCPA which is described in the FCPA-RMPA and is located in the west-central portion of the Fortification Creek elk yearlong range. The herd is subjected to the increased impacts (wells, roads, weeds, and human presence) associated with the energy development that has occurred within the yearlong range in the recent past. The habitat effectiveness adjacent to the project area (south, east and west of KDUE) has been compromised due to prior oil and gas development. Road density has been positively correlated with reduced habitat effectiveness (Lyon 1983). In July 2009, it was estimated that 60,000 acres of elk security habitat (ESH) remained within the elk's yearlong range. Based on development south of the FCPA to date and considering the July 2009 estimate as baseline elk security habitat, 34 percent has been lost due to CBNG development.

Availability of water from the existing free-flowing water wells could decrease because of CBNG drawdown. Because access to water is an important component of elk habitat, this decrease in well availability could lead to a downward trend in the elk population; however, additional water sources associated with CBNG water could increase water supply (BLM 2011a). There are 23 registered stock and domestic water wells, 2 natural springs and several stock tanks within a 1 mile radius of the POD but no registered stock reservoirs within the project area.

Figure 3.4 Elk Security Habitat and Effective Elk Habitat



Habitat Use

Studies of radio telemetry data from the Fortification Creek herd in the early 1990s showed elk ranging out of the Fortification Creek area as far north as Montana. Recent studies of elk radio telemetry from the Fortification Creek herd have shown that between 15 and 20 percent of the collared animals were observed, at least seasonally, in other locations including; east of Wild Horse Creek, on the west side of the Powder River, south along Kinney Divide, and occasionally as far north as Sonnette, Montana. Despite these movements, the elk yearlong range remains the core use area for the vast majority of this herd (Laird 2005).

A Kernel Density model is a tool used to calculate the density of data points within a defined area. The model generates an image based on specified density intervals. Section 4 below includes images of Kernel Density models using 2008-2011 data to identify the 50, 75, 90, and 95 percent densities of elk use within

the yearlong, parturition, and crucial winter ranges. Figures 4.1, 4.2 and 4.3 show the KDU Epsilon area to fall within the 75-95% level of yearlong, parturition and crucial winter collared elk use, meaning that 75-95% of all data points are within that contour interval. However since area increases with the percent use, it is actually the lower percentages (50%) that contain higher densities of elk use. In other words the 50% contour contains more elk use per acre than the 95% contour. Elk observations by the BLM biologist have also been more common during late fall, winter and early spring respectively.

In 2005, 26 elk (5 yearling bulls and 21 adult cows) from the Fortification Creek elk herd were fitted with VHF radio collars. One cow was fitted with a GPS collar. The collars transmit a signal that can be manually tracked with a VHF receiver or they can be tracked via satellite by the GPS receiver. Radio-telemetry (VHF) and GPS collaring data collected by BLM and WGFD since 2005 have shown that the Fortification elk tend to avoid oil and gas development by moving to less developed areas. Disruptive activity is usually temporary in nature, however, and some studies have shown that elk returned to the area of disturbance once the source of disturbance and human presence was gone (Gusey 1986, WGFD 2000), albeit at 50 percent or less of the previous levels in forested environments (Hayden-Wing Associates 1990). Sawyer et al. (2005) observed a similar response of elk within the more open terrain of the Jack Morrow Hills of Wyoming. The literature consistently shows a correlation between elk avoidance response and the level of human activity associated with roads, including those servicing oil and gas development. Radio-collared elk avoided available habitat that was within 1.7 miles of well sites and within 0.5 mile of roads (BLM 2011a).

Monitoring the movement patterns of the Fortification Creek elk continued with deployment of 38 additional VHF/GPS collars in March 2008 and 17 additional collars in December 2008. This effort was repeated in March 2011 when 35 new VHF/GPS collars were deployed. Data collected in 2008-2011 have shown similar trends as previously discussed with collared individuals from the Fortification Creek elk herd relocated outside of the herd unit for periods exceeding 6 months.

As of June 1, 2012, approximately 170,000 relocation data points have been recorded over the 50 months (March 2008 through May 2012) of monitoring with the GPS collars. Nineteen (19) of the GPS collars deployed have recorded 1,154 observations within the KDU Epsilon project boundary. During the span from March 2008 to May 2011, 187 of the data points were recorded by the initial GPS collars deployed while 967 points were recorded between June 2011 and May 2012 by those GPS collars deployed March 2011.

During field visits, elk sign was observed throughout the project area with the highest use observed late fall to early spring. Individuals are observed on rare occasion as they flee into thick juniper cover or over ridge tops.

3.6.2. Migratory Birds

The PRB FEIS discussed the affected environment for migratory birds on pp. 3-150 to 3-153. Migratory birds migrate for breeding at some point in the year. The BLM-Fish and Wildlife Service (FWS) Memorandum of Understanding (MOU) (2010) promotes the conservation of migratory birds, complying with Executive Order 13186 (Federal Register V. 66, No. 11). BLM must include migratory birds in every NEPA analysis of actions that have potential to affect migratory bird species of concern to fulfill obligations under the Migratory Bird Treaty Act (MBTA). The MBTA (and Bald and Golden Eagle Protection Act (BGEPA)) are strict liability statutes so require no intent to harm migratory birds through prosecuting a taking. Recent prosecutions or settlements, in Wyoming and the west, cost companies millions of dollars in fines and restitution (which was usually retrofitting powerlines to discourage perching to minimize electrocution or shielding ponds holding toxic substances). BLM encourages voluntary design features and conservation measures supporting migratory bird conservation, in addition to appropriate restrictions.

A wide variety of migratory birds may be found in the proposed project area at some time throughout the year. Many species that are of high management concern use shrub-steppe and shortgrass prairie areas for their primary breeding habitats (Saab and Rich 1997). Nationally, grassland and shrubland birds declined more consistently than any other ecological association of birds over the last 30 years (WGFD 2009).

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

Shrub-steppe, mixed grasslands, and woodland (ponderosa pine, juniper) vegetation types dominate the project area. Species that may occur in the shrub-steppe vegetation type in northeast Wyoming, according to the Wyoming Bird Conservation Plan, appear Table 3.4., grouped by level as identified in the plan.

Table 3.4 Migratory bird species occurring in shrub-steppe habitat, NE Wyoming (Nicholoff 2003)

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

Habitat requirements and foraging patterns for the species listed above were discussed in the PRB FEIS, with the exception of common poorwills and Say's phoebes. Common poorwills inhabit sparse rocky sagebrush, open prairies, mountain-foothills shrublands, juniper woodlands, brushy rocky canyons, and ponderosa pine woods. They prefer clearings, like grassy meadows, riparian zones, and forest edges for foraging. They lay eggs directly on gravelly ground, flat rock, or litter of woodland floor. Nests are often near logs, rocks, shrubs, or grass for some shade. They feed exclusively on insects.

Say's phoebes inhabit arid, open country with sparse vegetation, including shrub-steppe, grasslands, shrublands, and juniper woodlands. They nest on cliff ledges, banks, bridges, eaves, and road culverts and often reuse nests in successive years. They eat mostly insects and berries.

Several additional BLM sensitive species are also migratory bird species. Those suspected to occur in the project area include: Baird's sparrow, Brewer's sparrow, loggerhead shrike, long-billed curlew, sage sparrow, sage thrasher, and bald eagle.

3.6.3. Raptors

The PRB FEIS discussed the affected environment for raptors, pp. 3-141 to 3-148. According to the BLM raptor database, 26 nests occur within 0.5 miles of the project area. These nests are listed in Table 3.5 below. Of those, 5 were active in 2012 (BHEC 2012). Red-tailed hawks, golden eagles, long-eared owls, and American kestrels have all been documented nesting in the project area. Other species that have been

documented in the surrounding area, and are suspected to forage or nest in the project area, include: great horned owl, northern harrier, and prairie falcon.

Table 3.5 Survey results for nests within 0.5 miles of the KDUE project area. (BHEC 2012)

BLM ID	Legal	Substrate	Year	Status	Species
2349	S11 T50N R77W	Cottonwood - Live	2012	Inactive	n/a
3960	S1 T50N R77W	Ponderosa Pine - Live	2012	Active	Golden Eagle
5194	S2 T50N R77W	Cottonwood - Live	2012	Inactive	n/a
5198	S10 T50N R77W	Cottonwood - Live	2012	Active	Red-tailed Hawk
5201	S7 T50N R76W	Ponderosa Pine - Live	2012	Inactive	n/a
5202	S7 T50N R76W	Ponderosa Pine - Live	2012	Inactive	n/a
5850	S12 T50N R77W	Ponderosa Pine - Live	2012	Inactive	n/a
5851	S1 T50N R77W	Ponderosa Pine - Live	2012	Active	Red-tailed Hawk
6216	S2 T50N R77W	Ponderosa Pine - Live	2012	Inactive	n/a
6217	S2 T50N R77W	Cottonwood - Live	2012	Inactive	n/a
6218	S2 T50N R77W	Cliff	2012	Inactive	n/a
6219	S2 T50N R77W	Ponderosa Pine - Live	2012	Inactive	n/a
6430	S35 T51N R77W	Ponderosa Pine - Live	2012	Inactive	n/a
6449	S34 T51N R77W	Ponderosa Pine - Live	2012	Inactive	n/a
6451	S2 T50N R77W	Ponderosa Pine - Live	2012	Inactive	n/a
6452	S2 T50N R77W	Ponderosa Pine - Live	2012	Inactive	n/a
6506	S11 T50N R77W	Cottonwood - Live	2012	Inactive	n/a
6507	S11 T50N R77W	Cottonwood - Live	2012	Inactive	n/a
6508	S11 T50N R77W	Cottonwood - Live	2012	Inactive	n/a
6509	S11 T50N R77W	Cottonwood - Live	2012	Inactive	n/a
8035	S3 T50N R77W	Creek Bank	2012	Inactive	n/a
8371	S11 T50N R77W	Cottonwood - Live	2010	Unknown	n/a
11311	S35 T51N R77W	Ponderosa Pine - Live	2012	Active	Great Horned Owl
11312	S24 T51N R77W	Juniper	2012	Active	Red-tailed Hawk
12424	S35 T51N R77W	Ponderosa Pine - Live	2012	Inactive	n/a
12464	S1 T50N R77W	Ponderosa Pine - Live	2012	Inactive	n/a

Most raptor species nest in a variety of habitats including (but not limited to): grasslands, agricultural lands, live and dead trees, cliff faces, rock outcrops, and tree cavities. Suitable nesting habitat is present throughout the project area.

3.6.4. Plains Sharp-tailed Grouse

Plains sharp-tailed grouse are discussed in this document because specific concerns for this species were identified during the scoping process for the PRB FEIS. The affected environment for plains sharp-tailed grouse is discussed in the PRB FEIS on pp. 3-148 to 3-150.

Suitable habitat for sharp-tailed grouse is present in the KDUE project area. The BLM biologist observed individuals in the project area during the onsites in October 2011. BHEC observed sharp-tailed grouse dancing in NWNW S1 T50N R77W during April and May 2011 (BHEC 2011). Because more than one

male was observed displaying during the breeding season on more than one occasion in the same location, the WGFD considers the location a new lek (Personal Communication, Tim Thomas, October 7, 2011). The maximum number of males seen on any one day during 2011 surveys was 4. The results of the 2012 surveys are listed in Table 3.6 below. In January 2012, Powder River Energy Corporation (PREC) constructed a high-voltage power line (69 kV) through section 1, within 200 feet of the new lek.

Table 3.6 Survey results for new lek in the KDUE project area. (BHEC 2012)

Species	Date	Observer	Time	Males	Females	Displaying?
Sharp-tailed Grouse	18-Apr-12	BHEC	615	9	11	Y
Sharp-tailed Grouse	1-May-12	BHEC	530	6	3	Y
Sharp-tailed Grouse	9-May-12	BHEC	540	7	2	Y

Federally Listed Species

The Buffalo BLM received a species list on July 22, 2011 from the US Fish and Wildlife Service concerning Threatened, Endangered and Candidate species. The July 2011 list included Ute Ladies'-tresses orchid (Threatened) and Greater Sage-grouse (Candidate). In addition to the listed species, the USFWS letter also included migratory birds and wetland/riparian habitats.

3.6.5. Ute Ladies'-Tresses Orchid

The Ute ladies'-tresses orchid (ULT) is listed as threatened under the ESA. The affected environment for ULT is discussed in the PRB FEIS on p. 3-175.

This orchid occurs in moist, sub-irrigated or seasonally flooded soils at elevations between 1,780 and 6,800 feet above sea level. Habitat includes wet meadows, abandoned stream channels, valley bottoms, gravel bars, and near lakes or perennial streams that become inundated during large precipitation events. A Wyoming Natural Diversity Database model predicts undocumented populations may be present particularly within southern Campbell and northern Converse Counties. This model does not show any potential habitat within the KDUE project area.

Prior to 2005, only 4 orchid populations were documented in Wyoming. Five additional sites were found in 2005 and one in 2006. The new locations were in the same drainages as the original populations, with 2 on the same tributary and within a few miles of an original discovery. Drainages with documented orchid populations include Antelope Creek in northern Converse County, Bear Creek in northern Laramie and southern Goshen Counties, Horse Creek in Laramie County, and Niobrara River in Niobrara County. In Wyoming, *Spiranthes diluvialis* blooms from early August to early September,

The KDUE project area contains marginal potential habitat for ULT. Ephemeral draws in the project area are dominated by upland vegetation, with steep rising banks and heavy clay soils. Barber Creek does contain perennial water likely resulting from existing CBNG discharges in the area, and hydrophytic vegetation is present. However, heavy clay soils are predominant. Turner Draw did have areas of standing water during the October onsites. These areas contain mesic vegetation, restricted to the channel. Turner Draw is dominated by upland vegetation including Wyoming big sagebrush and silver sagebrush. BHEC has been conducting ULT presence surveys in suitable habitat, within portions of KDUE and the surrounding developments, for the last 5 consecutive years starting in 2006. No ULT individuals have been documented in the project area (BHEC 2011). The species is not suspected to occur.

Candidates for federal listing

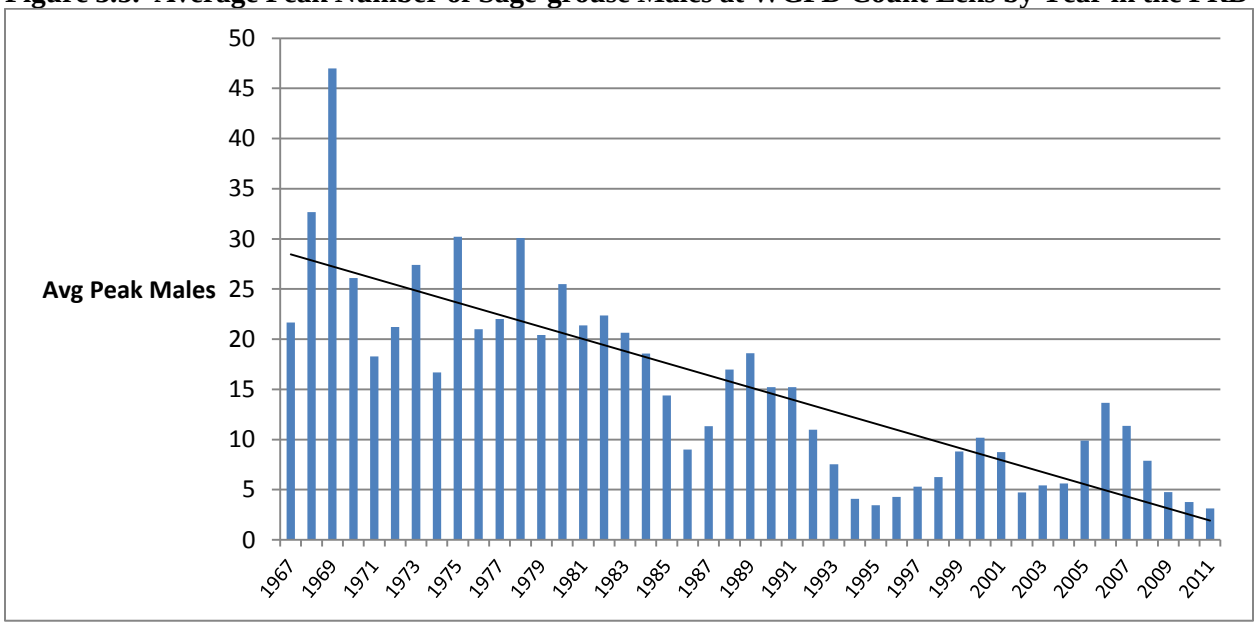
3.6.6. Greater Sage-Grouse

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

1. 2005-2007: The PRB FEIS predicted that a ¼ mile year-round controlled surface use lek buffer, and timing limitations restricting surface disturbance within 2 miles of leks, would be sufficient for protection of sage-grouse populations. Several recent studies and literature reviews indicate that the restrictions' spatial scale, and timing limitations, may not be large enough to alleviate impacts to sage-grouse (Holleran 2005, Walker et al 2007, Taylor et al 2012).
2. January, 2005: U.S. Fish and Wildlife Service (FWS) warranted that the sage-grouse was inappropriate for listing under the Endangered Species Act.
3. December, 2007: The U.S. District Court remanded the "not warranted" decision, finding a flawed decision-making process and ordered the FWS to conduct a new Status Review; Western Watersheds Project v. FWS, 535 F. Supp. 2d 1173 (D. Idaho 2007).
4. August, 2008: The WY BLM implemented management of identified connectivity habitats in support of the population management objectives set by the State of Wyoming (Wyoming Governor's Executive Order (EO) 2011-5), in accordance with the BLM Wyoming Instruction Memorandums (IM), most recently, IM- WY-2012-019.
5. January 2008: The State Wildlife Agencies' Ad Hoc Committee for Consideration of Oil and Gas Development Effects to Nesting Habitat recommended land managers consider impacts on leks within 4 miles of oil and gas developments.
6. September, 2009: In its Recommendations for Development of Oil and Gas Resources within Important Wildlife Habitats, WGFD categorized impacts to sage-grouse by number of well pad locations per square mile within 2 miles of a lek.
7. March, 2010: FWS warranted that the sage-grouse justified listing across its range, but precluded listing due to higher priorities (FWS 2010). The sage-grouse is a listing candidate.
8. March, 2012: WY BLM released the report, "Viability analyses for conservation of sage-grouse populations: Buffalo Field Office, Wyoming," indicating that a viable population of sage-grouse remains in the PRB, but the combined impacts of multiple stressors, including West Nile virus (WNv) and energy development, threaten that viability (Taylor et al 2012).

The sage-grouse population in northeast Wyoming is exhibiting a steady long term downward trend, as measured by lek attendance (WGFD 2011b). Figure 3.5 illustrates a 10-year cycle of periodic highs and lows. Each subsequent population peak is lower than the previous peak. Research suggests that the declines since 2001 are a result, in part, of energy development (FWS 2010, Taylor et. al. 2012).

Figure 3.5. Average Peak Number of Sage-grouse Males at WGFD Count Leks by Year in the PRB



Impacts from oil and gas development are most discernible at the spatial scale of 20 km (12.4 mi) (Taylor et al. 2012). These findings echo results from previous studies conducted in the basin, wherein biologists observed basin-wide population declines (Walker et al. 2007).

There are 26 documented leks within 12.4 miles of the KDUE project area. Currently there are 8,770 existing wells within 12.4 miles of the 26 leks, an area of 1,554 square miles.

Site Specific Habitat

WGFD records indicate that no sage-grouse leks occur within 4 miles of the project area. The project area is not in a core or connectivity area, as identified in EO 2011-5, Greater Sage-grouse Core Area Protection. Sage-grouse habitat models indicate that the project area contains high quality sage-grouse nesting and winter habitat (Walker et al. 2007). A BLM biologist confirmed suitable nesting, brood rearing, and winter habitat is present throughout the KDUE project area. The BLM biologist also observed sage-grouse individuals and sign during the onsites.

3.6.7. Special Status Species (SSS) – Plants, Fish, and Wildlife

Wyoming BLM maintains a list of SSS to focus management to preclude listing as a threatened or endangered species. The policy goals are:

- Maintaining vulnerable species and habitat components in functional BLM ecosystems;
- Ensuring sensitive species are considered in land management decisions;
- Preventing a need for species listing under the ESA; and
- Prioritizing needed conservation work with an emphasis on habitat.

Table 1 in Appendix B lists SSS that may occur in the project area. The Table also includes a brief description of the habitat requirements for each species. The authority for the SSS comes from the ESA, as amended; Title II of the Sikes Act, as amended; the FLPMA; Department Manual 235.1.1A, and BLM Manual 6840.

3.7. Aquatics

The PRB ecosystem and fishery is discussed in the PRB FEIS (pp. 3-153 to 3-166). The project area is in the Barber Creek watershed which is a tributary to the Powder River.

Table 3.7 lists the fish found in the Upper Powder River sub-basin and their WGFD NSS designation. Seven of the species that may occur in the Upper Powder River sub-basin have designations as either NSS 1, 2, or 3 species. Species in these designations are species of concern, in need of more immediate management attention, and more likely subject to future petitioning under the ESA. For these species WGFD recommends that no loss of habitat function occur.

Table 3.7 Fish Occurring in the Upper Powder River Sub-basin

Wyoming Native Species Status	Species	Wyoming BLM Sensitive
NSS1	Sturgeon chub	No
NSS2	Goldeye	No
	Sauger	No
NSS3	Black bullhead	No
	Flathead chub	No
	Mountain sucker	No
	Plains minnow	No
NSS4	Channel catfish	No
	Northern redhorse	No
	Quillback	No
	River carpsucker	No
	Stonecat	No
NSS6	Fathead minnow	No
	Plains killifish	No
NSS7	Longnose dace	No
	Sand shiner	No
	White sucker	No
None	Common carp	No
	Rock bass	No
	Shovelnose sturgeon	No

3.8. West Nile Virus

West Nile virus (WNv) is a mosquito-borne disease that can cause encephalitis or brain infection. Mosquitoes spread this virus after they feed on infected birds and then bite people, other birds, and animals. WNv is not spread by person-to-person contact, and there is no evidence that people can get the virus by handling infected animals.

Since its discovery in 1999 in New York, WNv has become established and spread across the United States. Birds are the natural vector host and serve not only to amplify the virus, but to spread it. *Culex tarsalis* appears to be the most common mosquito vector. Mosquitoes can hatch from standing water in as few as four days.

Data collected by the CDC and published by the USGS at www.westnilemaps.usgs.gov are summarized in Table 3.8. Reported data from the Powder River Basin (PRB) includes Campbell, Sheridan and Johnson counties.

Table 3.8 Historical West Nile Virus Information

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

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

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

The Wyoming State Vet Lab determined 22 sage-grouse in one study project (90% of the study birds), succumbed to WNv in the PRB in 2003. While birds infected with WNv have many of the same symptoms as infected humans, they appear to be more sensitive to the virus (Rinkes 2003). Current science suggests a synergy between West Nile virus and energy development that amplifies the negative impact sage-grouse (USFWS 2010 p. 13947).

In the PRB, there is increased surface water associated with CBNG development. This increase in potential mosquito breeding habitat provides opportunities for mosquito populations to increase. Preliminary research conducted in the PRB indicates WNv mosquito vectors were notably more abundant on a developed CBNG site than 2 similar undeveloped sites (Walker et al. 2003).

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

3.9. Cultural Resources

A class III cultural resource inventory was performed for the KDUE POD prior to on-the-ground project work (BFO project no. 70110043). A class III cultural resource inventory following the Archeology and Historic Preservation, Secretary of the Interior's Standards and Guidelines (48CFR190) and the *Wyoming State Historic Preservation Office Format, Guidelines, and Standards for Class II and III Reports* was provided to BFO by Lance Oil and Gas (operator). Seth Lambert, BLM Archaeologist, reviewed the report for technical adequacy and compliance with Bureau of Land Management (BLM) standards, and determined it to be adequate. The following resources are located in or near the project area.

Table 3.9 Cultural Resources Inventory Results

Site Number	Site Type	National Register Eligibility
48JO4120	Historic	Not Eligible
48JO4121	Historic	Not Eligible
48JO4122	Prehistoric	Not Eligible
48JO4123	Historic	Not Eligible
48JO4124	Historic	Not Eligible
48JO4125	Prehistoric	Not Eligible
48JO4126	Prehistoric	Not Eligible
48JO4127	Historic	Not Eligible
48JO3772	Prehistoric	Eligible
48JO3773	Prehistoric	Eligible
48JO3774	Historic	Not Eligible
48JO4038	Historic	Not Eligible
48JO4106	Historic	Not Eligible
48JO4264	Historic	Not Eligible
48JO4265	Historic	Not Eligible

4. ENVIRONMENTAL EFFECTS

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

4.1. Alternative A

The No Action Alternative was analyzed as Alternative 3 in the PRB FEIS, and is incorporated by reference into this EA. Information specific to resources for this alternative is included within the PRB Final EIS on pages listed in Table 4.1.

Table 4.1 Location of Discussion of the No Action Alternative in the PRB FEIS

Resource		Type of Effect	Page(s) of PRB FEIS
Project Area Description	Geologic Features and Mineral Resources	Direct and Indirect Effects	4-164 and 4-134
		Cumulative Effects	4-164 and 4-134
Resource		**Type of Effect**	**Page(s) of PRB FEIS**
Soils, Vegetation, and Ecological Sites	Soils	Direct and Indirect Effects	4-150
		Cumulative Effects	4-152
	Vegetation	Direct and Indirect Effects	4-163
		Cumulative Effects	4-164
	Wetlands/Riparian	Direct and Indirect Effects	4-178
		Cumulative Effects	4-178
Wildlife	Sensitive Species - Greater Sage-Grouse	Direct and Indirect Effects	4-271
		Cumulative Effects	4-271
	Aquatic Species	Direct and Indirect Effects	4-246
		Cumulative Effects	4-249
	Migratory Birds	Direct and Indirect Effects	4-234
		Cumulative Effects	4-235
	Waterfowl	Direct and Indirect Effects	4-230
		Cumulative Effects	4-230
	Big Game	Direct and Indirect Effects	4-186
		Cumulative Effects	4-211
	Raptors	Direct and Indirect Effects	4-224
		Cumulative Effects	4-225
Water	Ground Water	Direct and Indirect Effects	4-63
		Cumulative Effects	4-69
	Surface Water	Direct and Indirect Effects	4-77
		Cumulative Effects	4-69
Economics and Recovery of CBNG Resources		Direct and Indirect Effects	4-362
		Cumulative Effects	4-370
Cultural Resources		Direct and Indirect Effects	4-286
Air Quality		Direct and Indirect Effects	4-386
		Cumulative Effects	4-386
Visual Resources		Direct and Indirect Effects	4-313
		Cumulative Effects	4-314

4.2. Alternative B

4.2.1. 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 non-CBNG well production equipment, booster and pipeline compression engine exhaust). The amount of air pollutant emissions during construction would be controlled by watering disturbed soils, and by air pollutant emission limitations imposed by applicable air quality regulatory agencies. Air quality impacts modeled in the PRB FEIS concluded that projected oil or gas development would not violate any local, state, tribal, or federal air quality standards.

4.2.2. Soils

4.2.2.1. Direct and Indirect Effects

The proponent planned their project to maximize the fluid mineral drainage while avoiding areas with soil limitation where possible. The proponent also designed the infrastructure to minimize pad construction

and construction of engineered roads. BLM made further recommendations during the onsite to avoid areas with low reclamation potential and poor site suitability (see series of Maps regarding reclamation and proposed well and associated infrastructure locations in Sec. 3).

The impacts listed below, singly or in combination, would increase the potential for valuable soil loss due to increased water and wind erosion, invasive plant establishment, and increased sedimentation and salt loads to the watershed system.

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

- Mixing of horizons – occurs where construction on roads, pipelines 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.
- 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.
- Alteration of surface run off characteristics.
- An important component of soils in Wyoming's semiarid rangelands, especially in the Wyoming big sagebrush cover type, are biological soil crusts, or cryptogamic soils that occupy ground area not covered with vascular plants. Biological soil crusts are important in maintaining soil stability, controlling erosion, fixing nitrogen, providing nutrients to vascular plants, increasing precipitation infiltration rates, and providing suitable seed beds (BLM 2003). They are adapted to growing in severe climates; however, they take many years to develop (20 to 100) and can be easily disturbed or destroyed by surface disturbances associated with construction activities.

4.2.2.2. Cumulative Effects

The designation of the duration of disturbance is defined in the PRB FEIS, p 4-1 and 4-151. Most soil disturbances would be short term impacts with expedient interim reclamation and site stabilization, as committed to by the operator in their POD Surface Use Plan and as required by the BLM in COAs.

Geomorphic effects of roads and other surface disturbance range from chronic and long-term contributions of sediment into waters of the state to catastrophic effects associated with mass failures of road fill material during large storms. Roads can affect geomorphic processes primarily by: accelerating erosion from the road surface and prism itself through mass failures and surface erosion processes; directly affecting stream channel structure and geometry; altering surface flow paths, leading to diversion or extension of channels onto previously unchannelized portions of the landscape; and causing interactions among water, sediment, and debris at road-stream crossings.

4.2.2.3. Mitigation Measures

Disturbances approved within these areas require complimenting the programmatic/standard COAs with site specific performance based reclamation related COAs. For specifics regarding design features, operator committed measures and reclamation see submitted APD package. The following mitigation will be applied through COAs:

- LRP Areas: To control or reduce erosion, areas where wells and access/pipelines impact LRP areas namely badlands, blown-out lands, and rock outcrop components will be stabilized within 30 days of the start of construction.
- To protect erodible soils, all engineered road segments should be completed, including any culverts, low water crossings and required surfacing, before the drilling rig or other drilling equipment moves onto the pad.

4.2.2.4. Residual Effects

Erosion will occur in the POD area due to the presence of highly erosive soils and the topography. Rilling and gullying of cut and fill slopes on, access/utility corridors, will take place. Residual effects across the POD would also include a long-term loss of soil productivity associated with well pads and roads. Impacts from livestock to stabilized cut and fill slopes will limit soils becoming stable and getting vegetation establish. Residual effects were also identified in the PRB FEIS, p. 4-408, such as the loss of vegetative cover, despite expedient reclamation, for several years until reclamation is successfully established.

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

4.2.3. Vegetation & Ecological Sites

4.2.3.1. Direct & Indirect Effects

The PRB FEIS discussed direct and indirect effects to vegetation, pp. 4-153 to 4-164. Direct effects to vegetation would occur from ground disturbance caused by construction of well pads, ancillary facilities, associated pipelines, and roads. Vegetated areas disturbed and reclaimed within 1 to 3 years of the initial disturbance would suffer short-term effects. 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 where reclamation for the life of the project. Indirect effects, as described in the PRB FEIS, would include the spread and/or establishment of noxious weeds, the alteration in surface water flows affecting vegetation communities, alteration in ecosystem biodiversity, and changes in wildlife habitat.

Direct effects (removal and/or compaction) to vegetation would also occur from ground disturbance caused by drilling rig equipment and construction of associated pipelines and roads. Short term effects would occur where vegetated areas are disturbed but later reclaimed within 1 to 3 years of the initial disturbance. Long-term effects would occur where well pads, compressor stations, roads, water-handling facilities or other semi-permanent facilities may result in loss of vegetation and affect reclamation success for the life of the project.

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 soil composition and revegetation. Mixing of horizons occurs where construction on roads, pipelines 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.

Disturbance changes the chemical composition and the ecological integrity of the site. There will be shifts in the plant communities. This impacts ecological function and net primary production, effecting range and wildlife values through ecosystem degradation. Impacts to ecological sites and ecological function will be reduced by minimizing surface disturbance, following the master surface use plan and reclamation plan submitted by LOG, and with use of BLM applied mitigation.

4.2.3.2. Cumulative

The PRB FEIS discussed cumulative effects to vegetation, pp. 4-164 and 4-172. Most surface disturbances would result in short-term impacts to grasses and forbs related to construction activities that would be reclaimed through interim reclamation and site stabilization, as committed to by the operator and as required by the BLM in COAs and its associated plans including the Integrated Weed and Pest Management Plan, the MSUP (specifically Section 10, Plans for Reclamation of the Surface); see the administrative record.

Final reclamation would disturb all sites disturbed by construction and operation activities, including many of those previously reclaimed during interim reclamation. Disturbance associated with final reclamation activities would alter the composition of species in reclaimed areas relative to undisturbed areas by replacing diverse native communities with communities consisting of a few favored reclamation species.

4.2.3.3. Mitigation

Impacts to vegetation from surface disturbance will be reduced through the implementation of the mitigation measures found in the KDUE POD COAs.

BLM developed a seed mix (see COAs) to encompass the ecological sites identified in the project area based on the NRCS ecological site description, the reference plant communities and desired species richness with the intent of maximizing revegetation potential.

4.2.3.4. Residual Effects

Residual Effects were identified in the PRB FEIS at page 4-408 addressing the loss of vegetative cover, despite expedient reclamation, for several years until reclamation is successfully established.

4.3. Water Resources

The operator submitted a comprehensive WMP for this project. It is incorporated-by-reference into this EA pursuant to 40 CFR 1502.21. The WMP incorporates sound water management practices, monitoring of downstream impacts in the Upper Powder River watershed and commitment to comply with Wyoming State water laws/regulations. It also addresses potential impacts to the environment and landowner concerns. Adherence with the plan, in addition to BLM applied mitigation, would reduce project area and downstream impacts from proposed water management strategies. The Kinney Divide Unit Epsilon POD will use direct discharge to the Upper Powder River and its tributaries to manage the produced water. Lance will use five existing outfall structures attached to two existing water treatment facilities (EMIT) that discharge treated water directly to the Upper Powder River. These facilities were reviewed and approved for use under Lance's Kinney Divide Unit Additions POD and Williams Draw Delta and Gamma PODs. Alternately, Lance will use one proposed outfall structure to discharge untreated produced water to Barber Creek under authority of Wyoming Department of Environmental Quality issued Assimilative Capacity Credits.

The maximum water production is predicted to be 20 gpm per well or 580 gpm (1.29 cubic feet per second (cfs) or 935 acre-feet per year) for this POD. The PRB FEIS projected the total amount of water that anticipated from CBNG development per year, (Table 2-8, p. 2-26). For the Upper Powder River drainage, the projected volume produced in the watershed area was 23,697 acre-feet in 2012 (maximum production is estimated in 2006 at 171,423 acre-feet). As such, the volume of water resulting from the production of these wells is 3.9% of the total volume projected for 2012. This volume of produced water is within the predicted parameters of the PRB FEIS.

4.3.1. Groundwater

4.3.1.1. Direct and Indirect Effects

The PRB FEIS predicts an infiltration rate of 40% to groundwater aquifers and coal zones in the Upper Powder River drainage area (PRB FEIS, p. 4-5). For this project BLM assumes that a maximum of 232 gpm will infiltrate at or near the discharge points and impoundments (374 acre feet per year). This water will saturate the near surface alluvium and deeper formations prior to mixing with the groundwater used for stock and domestic purposes. According to the PRB FEIS, "the increased volume of water recharging the underlying aquifers of the Wasatch and Fort Union Formations would be chemically similar to alluvial groundwater." (PRB FEIS, p. 4-54) Therefore, the chemical nature and the volume of the discharged water would not degrade the groundwater quality.

The PRB FEIS predicts that one of the environmental consequences of CBNG production is possible impacts to the groundwater. "The effects of development of CBM[CBNG] on groundwater resources would be seen as a drop in the water level (drawdown) in nearby wells completed in the developed coal aquifers and underlying or overlying sand aquifers." (PRB FEIS, p. 4-1) In the process of dewatering the coal zone to increase natural gas recovery rates, this project may have some effect on the static water level of wells in the area. The permitted CBNG wells produce from depths which average 2,000-2,400 feet compared to 10 to 1,500 feet deep Wasatch sands in the water wells. The operator committed to offer water well agreements to holders of properly permitted domestic and stock wells in the circle of influence (0.5 mile of a federal CBNG producing well) of the proposed wells.

The PRB FEIS anticipated that recovery of the coal bed aquifer as follows: ". . . storage areas outside the areas of CBM[CBNG] development would resaturate and repressurize the areas that were partially depressurized during operations. The amount of groundwater stored within the coals and sands units above and below the coals is enormous. Almost 750 million acre-feet of recoverable groundwater are stored within the Wasatch-Tongue River sands and coals (Table 3-5). Redistribution is projected to result in a rapid initial recovery of water levels in the coal. The model projects that this initial recovery period would occur over 25 years." (PRB FEIS, p. 4-38)

4.3.1.2. Cumulative Effects

As stated in the PRB FEIS, "The aerial extent and magnitude of drawdown effects on coal zone aquifers and overlying and underlying sand units in the Wasatch Formation also would be limited by the discontinuous nature of the different coal zones within the Fort Union Formation and sandstone layers within the Wasatch Formation." (PRB FEIS, p. 4-64)

Development of CBNG through 2018 (and coal mining through 2033) would remove 4 million acre-feet of groundwater from the coal zone aquifer (PRB FEIS, p. 4-65). This volume of water ". . . cumulatively represents 0.5 percent of the recoverable groundwater stored in the Wasatch – Tongue River sands and coals (nearly 750 million acre-feet, from Table 3-5). All of the groundwater projected to be removed during reasonably foreseeable CBNG development and coal mining would represent less than 0.3 percent of the total recoverable groundwater in the Wasatch and Fort Union Formations within the PRB (nearly 1.4 billion acre-feet, from Table 3-5)." (PRB FEIS, p. 4-65)

4.3.1.3. Mitigation Measures

Adherence to the requirement in Onshore Order #2, the drilling COAs, setting casing at appropriate permitted depths, following safe remedial procedures in the event of casing failure, and using proper cementing procedures should protect any fresh water aquifers above the target coal zone. This will ensure that ground water will not be adversely impacted by well drilling and completion operations.

In order to address the potential impacts from infiltration on shallow ground water, the Wyoming DEQ has developed a guidance document, "Compliance Monitoring and Siting Requirements for Unlined

Impoundments Receiving Coalbed Methane Produced Water" (November, 2008). For all new WYPDES permits, the WDEQ requires that the proponent investigate the shallow groundwater at the proposed impoundment locations. Drilling at proposed impoundments began in the spring of 2004. Based on information received from the WDEQ, as of December, 2011, over 2017 impoundment sites have been investigated with more than 2306 borings. Of these impoundments, 237 met the criteria to require "compliance monitoring" if constructed and used for CBNG water containment. Only 125 impoundments requiring monitoring are presently being used. As of the fourth quarter of 2011, only 26 of those monitored impoundments (20.8%) caused a change in the "Class of Use" of any parameter in the underlying aquifer water.

4.3.1.4. Residual Effects

As described in Section 3.4.1, the production of CBNG in this project area may cause groundwater levels to drop due to the CBNG dewatering. The PRB FEIS analyzed groundwater recharge post-CBNG development. An estimated 40% of the groundwater removed would infiltrate the surface and recharge the shallow aquifers above the coal, PRB FEIS, p. 4-68.

4.3.2. Surface Water

4.3.2.1. Direct and Indirect Effects

Produced Water Quality

Average values of EC and SAR as measured at selected USGS stream gauging stations at high and low monthly flows as well as the Wyoming groundwater quality standards for TDS and SAR for Class I to Class III water (there is no current standard for EC) are in Table 4.1. It also shows constituent limits for TDS, SAR, and EC detailed in the project area WYPDES permit, and the concentrations in the POD's representative water sample.

Table 4.1 Comparison of Regulated Water Quality Parameters to Predicted Water Quality

Sample location or Standard	TDS mg/l	SAR	EC µmhos/cm
Primary Watershed at Powder River at Arvada, WY Gauging Station (PRB FEIS, p. 3-48)			
Historic Data Average at Maximum Flow		4.76	1,797
Historic Data Average at Minimum Flow		7.83	3,400
WDEQ Quality Standards for WY Groundwater (Chapter 8)			
Drinking Water (Class I)	500		
Agricultural Use (Class II)	2,000		
Livestock Use (Class III)	5,000		
WDEQ Water Quality Requirement for WYPDES Permit # WY0056081	Variable	Variable	Variable
Predicted Produced Water Quality from the Big George coal zone			
After Treatment	791	18.8	1320
Prior to Treatment	1200	50.9	1970

Lance intends to discharge untreated produced water via Outfall 053 into Barber Creek using their WDEQ assigned assimilative capacity credits. The total assimilative capacity allocated to the permittee is based on PRB lease holding information provided to the WYDEQ by the permittee. Ambient concentration values are set by the WDEQ using USGS data. It is expected TDS concentrations discharged to the Powder River be at their lowest in the months of May and June (956 mg/l, 860 mg/l

respectively) and at their highest in August and September (1,524 mg/l). For complete description of the calculations and parameters set by WDEQ see the individual WYPDES permits in the WMP.

BLM analyzed the results from a representative water sample from a well drilled to Big George coal zone near to the KDUE POD. BLM predicts the water quality for the water produced from the named target coal zone from these wells to be similar to the sample water quality collected. For complete analysis and results see the company laboratory analytical report in the WMP's Attachment H.

Based on the analysis performed in the PRB FEIS, the primary beneficial use of the surface water in the PRB is the irrigation of crops, (p. 4-69). However, irrigation use is not proposed in the WMP, rather the water will treated and discharged in the Upper Powder River, or discharged to Barber Creek using assimilative capacity credits.

Surface discharge of the produced water provides passive treatment through the aeration supplied by the energy dissipation configuration at each discharge point outfall. Aeration adds dissolved oxygen to the produced water which can oxidize susceptible ions, which may then precipitate. This is particularly true for dissolved iron. Because iron is one of the key parameters for monitoring water quality, the precipitation of iron oxide near the discharge point will improve water quality at downstream locations.

The operator has obtained WYPDES permit(s) (Permit WY0056081) from the WDEQ for the discharge of water produced from this project. The permits maximum effluent limits are described in Table 4.2. The WYPDES permit for Outfall 053 has not been approved by WDEQ. Therefore the operator will be required to submit a copy of the WYPDES permit for this outfall prior to its construction and use.

Table 4.2 Applicable WYPDES Permit Limits

Effluent Characteristic	Daily Maximum Permit WY0056081
pH	6.5 to 9.0
Specific Conductance (µS/cm)	7,500
Radium 226 + 228 (pCi/l)	1
Dissolved Iron (µg/l)	1000
Total Barium (µg/l)	1800
Total Arsenic (µg/l)	8.4
Chlorides (mg/l)	150

In order to determine the actual water quality of the producing formations in this POD and to verify the water analysis submitted for the pre-approval evaluation, the operator committed to designate a reference well to each coal zone within the POD boundary. The operator is required to sample the reference well at the wellhead for analysis within 60 days of initial production and submit a copy of the water analysis to the BLM Authorized Officer. For more information refer to this POD's WMP.

Produced Water Control

The majority of the water produced by the Kinney Divide Unit Epsilon POD will be treated in two existing water treatment facilities prior to discharge into the Upper Powder River. These treatment facilities were reviewed and approved for use under Lance's Kinney Divide Unit Additions POD and Williams Draw Delta and Gamma PODs. Alternately, Lance will use one proposed outfall structure to discharge untreated produced water to Barber Creek under authority of Wyoming Department of Environmental Quality issued Assimilative Capacity Credits

Produced Water Quantity

Alternative (2A) of the the PRB FEIS, reads that the peak production of water discharged to the surface

will occur in 2006 at a total contribution to the main-stem of the Upper Powder River of 68 cfs, p. 4-86). The predicted maximum discharge rate from these wells is anticipated to be a total of 580 gpm or 1.3 cfs discharged directly to the Upper Powder River. Therefore, this project may add 2% of the predicted total CBNG produced water contribution. For more information regarding the maximum predicted water impacts resulting from the discharge of produced water (PRB-FEIS, p. 4-85).

The Operator provided an analysis of the potential development in the watershed above the project area in the WMP, p. 5. Based on the area of the Barber Creek watershed above the POD (74.1 sq. mi) and an assumed density of 1 well per location every 80 acres, the potential exists for the development of 593 wells which could produce a maximum flow rate of 11,860 gpm (26 cfs) of water. The BLM agrees with the Operator that this is not expected to occur because:

1. Some of these wells are drilled and are producing.
2. The phasing in of new wells takes several years.
3. A decline in well water discharge generally occurs after several months of operation.

The potential maximum flow rate of produced water in the watershed upstream of the project area, 26 cfs, is much less than the volume of runoff estimated from the 2-year storm event in the Upper Powder River where the water is discharged.

Springs

There are 2 natural springs identified by the operator within 0.5 mile radius of the Kinney Divide Unit Epsilon POD boundary. However the landowner stated that the springs are no longer active. The operator will monitor the spring locations and assess water quality and quantity for the life of the project if the resume flowing.

4.3.2.2. Cumulative Effects

This analysis includes cumulative data from fee, state, and federal CBNG development in the named River watershed. BLM obtained these data from the WYOGCC.

As of March 2012, all producing CBNG wells in the Upper Powder River watershed discharged a cumulative volume of 342,027 acre-feet of water compared to the predicted 1,240,055 acre-feet disclosed in the PRB FEIS (Table 2-8, p. 2-26). The figures are in Table 4.3., below. This volume is 27.6% of the total predicted produced water analyzed in the PRB FEIS for the Upper Powder River watershed.

Table 4.3 Actual vs predicted water production in the Upper Powder River watershed *2011 Data Update 03-30-12*

Year	Upper Powder River Predicted (Annual acre-feet)	Upper Powder River Predicted (Cumulative acre-feet from 2002)	Upper Powder River Actual (Annual acre-feet)		Upper Powder River Actual (Cumulative acre-feet from 2002)	
			A-ft	% of Predicted	A-Ft	% of Predicted
2002	100,512	100,512	15,846	15.8	15,846	15.8
2003	137,942	238,454	18,578	13.5	34,424	14.4
2004	159,034	397,488	20,991	13.2	55,414	13.9
2005	167,608	565,096	27,640	16.5	83,054	14.7
2006	171,423	736,519	40,930	23.9	123,984	16.8
2007	163,521	900,040	42,112	25.8	166,096	18.5

Year	Upper Powder River Predicted (Annual acre-feet)	Upper Powder River Predicted (Cumulative acre-feet from 2002)	Upper Powder River Actual (Annual acre-feet)		Upper Powder River Actual (Cumulative acre-feet from 2002)	
			A-ft	% of Predicted	A-Ft	% of Predicted
2008	147,481	1,047,521	45,936	31.1	212,522	20.3
2009	88,046	1,135,567	43,079	48.9	255,601	22.5
2010	60,319	1,195,886	43,263	71.7	298,864	25.0
2011	44,169	1,240,055	43,163	97.7	342,027	27.6
2012	23,697	1,263,752				
2013	12,169	1,275,921				
2014	5,672	1,281,593				
2015	2,242	1,283,835				
2016	1,032	1,284,867				
2017	366	1,285,233				
Total	**1,285,233**		**342,027**			

The PRB FEIS identified downstream irrigation water quality as the primary issue for CBNG produced water. Electrical conductivity (EC) and SAR are the parameters of concern for suitability of irrigation water. The PRB FEIS water quality analysis used produced water quality data, where available, from existing wells within each of the 10 primary watersheds in the PRB. These predictions of EC and SAR can only be reevaluated when additional water quality sampling is available.

As referenced above, the PRB FEIS did disclose that cumulative impacts may occur as a result of discharged produced CBNG water. The cumulative effects relative to this project are within the analysis parameters and impacts described in the PRB FEIS for the following reasons:

1. They are proportional to the actual amount of cumulatively produced water in the Upper Powder River drainage, which is approximately 27.6% of the total predicted in the PRB FEIS.
2. The WDEQ enforcement of the WYPDES permit protects downstream irrigation.
3. The commitment by the operator to manage the volume of water discharged.

Refer to the PRB FEIS, pp. 4-115 – 117 and Table 4-13 for cumulative effects relative to the watershed and p. 117 for cumulative effects common to all sub-watersheds.

4.3.2.3. Mitigation Measures

Channel crossings by road and pipelines will be perpendicular to flow. Channel crossings by pipelines will be so that the pipe is buried at least 4 feet below the channel bottom.

The operator committed to monitor the water discharge points and the channels downstream for stability. If erosion is noted, the operator will be required to repair and stabilize the area using selected mitigation techniques. The operator also committed to expediently stabilize and revegetate disturbance within channel and floodplain associated with this project.

BLM requires the operator to sample the active spring(s) listed below once each in the spring and fall for the duration of production to ascertain changes in water quality or quantity. Analysis will follow the

WYPDES Permit initial quality criteria suite. The operator will send copies of water quality and quantity data to the BLM BFO.

List of Springs and locations.

Spring Name	Qtr/Qtr	Section	Township	Range
Christmas Spring #1	SW¼SW¼	32	51N	76W
Upper Spring	NW¼SW¼	13	51N	77W

4.3.2.4. Residual Effects

"Streams enhanced by large volumes of CBNG produced water may begin to establish meander patterns on longer wavelengths in response to increased flows. Stream drainages would readjust to their existing natural flows at the end of the project's life. Down cutting (stream erosion) and sediment deposition (aggradation) are natural processes that occur as stream drainages age through time. Down cutting occurs within the upper reaches of a drainage system as the stream channel becomes incised through erosion, until the slope of the stream and its velocity are reduced and further erosion is limited. Sediment is deposited within the lower, slower reaches of a stream. Surface drainages could be degraded from erosion caused by increased surface flow, unless rates of CBNG produced water discharge and outfall locations are carefully controlled. Increased flows could cause down cutting in fluvial environments, resulting in increased channel capacity over time within the upper and middle reaches of surface drainages." (PRB FEIS, p. 4-118)

The development of CBNG and the production and discharge of water in the area surrounding the existing natural springs may affect the flow rate or water quality of the spring.

4.4. Wetland/Riparian

The National Wetland Inventory identifies approximately 9.9 acres of sporadic isolated wetlands. None of the identified areas are near project facilities and it is unlikely that the project will affect the wetlands in any way.

4.4.1. Cumulative Effects

"Re-surfacing water from the impoundments will potentially allow for wetland-riparian species establishment. Continuous high stream flows into wetlands and riparian areas would change the composition of species and dynamics of the food web. The shallow groundwater table would rise closer to the surface with increased and continuous stream flows augmented by produced water discharges. Vegetation in riparian areas, such as cottonwood trees, that cannot tolerate year-round inundated root zones would die and would not be replaced. Other plant species in riparian areas and wetland edges that favor inundated root zones would flourish, thus changing the plant community composition and the associated animal species. A rise in the shallow ground groundwater table would also influence the hydrology of wetlands by reducing or eliminating the seasonal drying periods that affect recruitment of plant species and species composition of benthic and water column invertebrates. These changes to the aquatic food web base would affect the higher trophic levels of fish and waterfowl abundance and species richness for wetlands and riparian areas." (PRB FEIS, p. 4-175).

The cumulative impacts of the proposed action, when considered with other existing and proposed development in the project area are not expected to be significant. The application of mitigation measures will ensure that the incremental impacts of this well, when considered with any existing development are insignificant. For more information on cumulative impacts, please refer to the PRB FEIS.

4.5. Invasive Species

4.5.1. Direct and Indirect Effects

The use of existing facilities reduces the opportunity for spread of invasive species by minimizing

additional disturbance. New construction of proposed access roads, pipelines, and related facilities disturbs soil and presents opportunities for weed invasion and spread. Implementation of the proposed project would create a favorable environment for the establishment and spread of noxious weeds/invasive plants such as cheatgrass, salt cedar, Canada thistle, and perennial pepperweed.

Vectors (livestock, vehicles, recreationists, water, wind, wildlife) and disturbances (roads, natural gas development, grazing, interstate pipelines, fuel treatments, water developments, recreation developments, etc.) will continue to be present in the POD area. These factors have contributed in the past and currently to the establishment of cheatgrass and other invasive species populations. Project-specific mitigations, incorporated into all new projects help to reduce the risk of new infestations and the spread of invasives associated with new disturbance. Small acreage developments on adjacent lands, streams and watersheds that traverse differing lands owners and, interstate corridors can contribute to the introduction of invasives over time.

Treatment would have an insignificant biological effect as far as harming native plants and plant communities if the project is implemented as required by the BFO Invasive Species Management Environmental Assessment (ISM EA WYW070-09-099, 2010). Treatments could be expected to benefit native plants and plant communities and special status plants by restoring native habitats and plant communities.

4.5.2. Cumulative Effects

Treatment for persistent infestations that may require repetitive herbicide applications for 3 to 5 years which would increase the potential for non-target plants to be negatively affected (harmed, weakened, or killed). Many of the invasive plant populations in the treatment areas could require successive years of herbicide application to be effectively treated depending on the extent and severity of the infestation and how invasive plant populations respond to a given treatment. Refer to the ISM EA, p. 29 and the PRB FEIS, p.4-154 to 170 for additional information.

4.5.3. Mitigation Measures

The operator has submitted Integrated Pest Management Plan (IPMP). By applying the measures identified in the IPMP no mitigation measures are required.

4.5.4. Residual Effects

Possible adverse residual effects from invasive species and treatments are in Chapter 4 of the Vegetation Treatments Using Herbicides in 17 Western States, Programmatic Environmental Impact Statement, (BLM 2007).

4.6. Fish and Wildlife

4.6.1. Wildlife Threatened, Endangered, Proposed and Candidate Species

4.6.1.1. Threatened and Endangered Species

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

4.6.1.1.1. Ute Ladies'-Tresses Orchid

4.6.1.1.1.1. Direct and Indirect Effects

Marginal habitat is present in the project area, however, presence surveys in the area have never located any individuals, and no surface disturbance is planned in any areas with potential habitat. Implementation of the proposed project will have "***no effect***" on ULT.

4.6.1.1.1.2. Cumulative Effects

The cumulative effects to ULT are discussed in the PRD FEIS (p. 4-253 to 4-254).

4.6.1.1.1.3. Mitigation Measures

No mitigation is proposed with alternative B.

4.6.1.1.1.4. Residual Effects

No residual effects are anticipated.

4.6.1.2. Candidate Species

4.6.1.2.1. Greater Sage-grouse

4.6.1.2.1.1. Direct and Indirect Effects

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

Impacts to sage-grouse 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* (USFWS 2010) and chapters 15-21 of Greater Sage-grouse Ecology and Conservation of a Landscape Species and its Habitats (Knick and Connelly 2011).

The KDUE project area contains suitable nesting, brood-rearing, and winter habitat. Construction of the wells, access roads, utility corridors, and buried power will cause fragmentation of sagebrush stands and result in the direct loss of approximately 72 acres of sage-grouse habitat. Implementation of the project will adversely impact nesting habitat, both through direct loss and avoidance of the area by sage-grouse due to fragmentation and anthropogenic activity. Construction of 26 wells, and/or associated infrastructure, will result in sagebrush loss. A map showing wells and infrastructure occurring within sage-grouse nesting habitat can be found in the administrative record of the KDUE POD.

During onsite visits, the BLM biologist made specific recommendations to avoid placement of facilities in sagebrush to reduce direct loss of sage-grouse habitat. The landowner was not open to moving infrastructure in order to avoid sagebrush loss, and, in some cases, infrastructure could not be moved due to soil or topography issues. Lance did agree to limit the working area to 35ft and blading width to 20ft for the 31-2, 44-24, 32-35, 42-35, and 14-25 wells, in order to reduce sage-brush loss. Lance also moved the 41-1 well SE into a pipeline scar to reduce sagebrush loss, and to reduce loss from the access to 42-1. Well 34-35 was moved out of dense sagebrush approximately 350 feet to the SE, onto the ridgeline.

4.6.1.2.1.2. Cumulative Effects

Biologists expect the cumulative effects to sage-grouse to be similar to those described in the Kinney Divide Unit Gamma POD (WY-070-EA10-271) and Queen B POD (WY-070-EA11-226) environmental assessments, incorporated here by reference (Section 4.2.3.2.3.1.2, pp. 59-60, and Section 4.3.3.2, pp. 65-66, respectively). Additional information is discussed below. The PRB FEIS (BLM 2003) states that "the synergistic effect of several impacts would 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 (Powder River Basin) or the entire range of the species is not likely to be compromised (p. 4-270)."

The 2012 population viability analysis for the Northeast Wyoming sage-grouse found there remains a viable population of sage-grouse 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 sage-grouse 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 sage-grouse 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 (Walker et al. 2007a)." (Taylor et al. 2012).

Current well densities reduce the effectiveness of PRB core areas (Taylor et al. 2012). Continued energy development around the core areas will impact the core areas remaining value. WNv outbreaks and energy development reduce 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 sage-grouse, with an increased chance of extirpation with additional WNv outbreaks (Taylor et al. 2012).

4.6.1.2.1.3. Mitigation Measures

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

In order to reduce the likelihood that noise, construction, and human disturbance impact nesting sage-grouse, BLM will implement a timing limitation on all surface-disturbing activities within sage-grouse habitat during the construction phase. The intent of this timing restriction is to decrease the likelihood that grouse will avoid these areas and increase habitat quality by reducing noise and human activities during the breeding season.

4.6.1.2.1.4. Residual Effects

A timing limitation does nothing to mitigate loss and fragmentation of habitat or changes in disease mechanisms. Noise and human disturbance resulting from maintenance and production activities are likely to impact sage-grouse nesting in the area for the life of the project. Suitability of the project area for sage-grouse will be negatively affected due to habitat loss and fragmentation and proximity of human activities associated with CBNG development.

The PRB EIS analyzed the removal of all CBNG wells and most infrastructures at final well abandonment after the CBNG played out 7-10 years after drilling. Leaving infrastructure on the landscape will hamper restoration efforts (Taylor et al. 2012). The PRB FEIS predicted that the PRB oil and gas development would have significant impacts to the sage-grouse population. The impact of the KDUE development cumulatively contributes to the potential for local extirpation. The KDUE proposal and the COAs applied are consistent with current BLM and Wyoming sage-grouse conservation strategies and the anticipated effects are within the parameters of the PRB FEIS/ROD.

Current research does not identify specific components of energy development that measurably decrease impacts to sage-grouse or their habitats. Even in areas where a variety of mitigation measures were applied, negative population impacts were still measurable when well density exceeded 1 well per square mile. Management of energy development based on current core area configurations and associated lease stipulations, conditions of approval, and best management practices (BMPs), may not be sufficient to protect the population viability of PRB sage-grouse.

4.6.1.3. Migratory Birds

4.6.1.3.1. Direct and Indirect Effects

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

Disturbance of habitat in the project area is likely to impact migratory birds. Habitat will be lost directly with the construction of the wells, access roads, utility corridors, and buried power. Surface disturbing activities that occur in the nesting season may kill migratory birds. Prompt re-vegetation of short-term disturbance areas would reduce habitat loss impacts as the habitat recovers. Construction, drilling, and to a lesser degree production, will displace edge sensitive migratory birds from otherwise suitable habitat. Drilling and construction noise can be troublesome for songbirds by interfering with the males' ability to attract mates and defend territory, and the ability to recognize calls from conspecifics (BLM 2003).

Habitat fragmentation will result in more than just a quantitative loss in the total area of habitat available; the remaining habitat area will also be qualitatively altered (Temple and Wilcox 1986). Ingelfinger (2004) identified that the density of breeding Brewer's sparrows declined by 36% and breeding sage sparrows declined by 57% within 100 m of dirt roads in a natural gas field. Effects occurred along roads with light traffic volume (less than 12 vehicles per day). The increasing density of roads constructed in developing natural gas fields exacerbated the problem creating substantial areas of impact where indirect habitat losses through displacement were much greater than the direct physical habitat losses.

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

Lance has committed to completing construction of the project outside of the breeding season (May 1 – August 1), unless a pre-construction survey for nesting birds has been completed within 1 week of planned construction.

4.6.1.3.2. Cumulative Effects

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

4.6.1.3.3. Mitigation Measures

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

the KDUE project will have sage-grouse and raptor timing limitations applied, thereby providing protection to migratory birds until June 30. Lance has committed to ensuring that construction takes place outside of the migratory bird breeding season (May 1 – August 1), unless a survey for nesting birds has been completed within 1 week of the planned activities.

All stock tanks shall include a ramp to enable trapped small birds and mammals to escape.

4.6.1.3.4. Residual Effects

A timing limitation does not mitigate loss and fragmentation of habitat. Suitability of the project area for migratory birds will be negatively affected due to habitat loss and fragmentation and proximity of human activities associated with CBNG development.

Reclamation and other activities that occur in the spring may be detrimental to migratory bird survival.

4.6.2. Sensitive Species

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

The effects to sensitive species resulting from implementation of the project are in Table 1 in Appendix B.

4.6.2.1. Big Game

4.6.2.1.1. Direct and Indirect Effects

The PRB FEIS discusses impacts, including direct and indirect effects, cumulative effects, and residual effects to big game on pp. 4-181 to 4-215. The FCPA RMPA discusses impacts, including cumulative effects, to elk, pp. 4-49 to 4-53, 4-67 to 4-73, and 4-74 to 4-78.

Big game in the area including elk, mule deer, and pronghorn antelope are expected to respond in similar fashion. However, deer and pronghorn do not move as easily as elk through deep snow, so winter disturbance could impact these shorter legged species more severely. The most important difference between the elk herd and the deer and antelope herds is that the Fortification Creek elk herd resides within a 173,000 acre yearlong range isolated from other elk herds where the deer and antelope herds range over the Powder River Basin and intermix with neighboring herds.

Yearlong and crucial winter range for elk, winter range for pronghorn antelope, and winter yearlong range for mule deer would be directly disturbed by the construction of wells, pipelines, and roads resulting in habitat loss. Table 2.1 of this document summarizes the proposed activities associated with the development of the KDU Epsilon POD; items identified as long term disturbance would result in direct habitat loss. Short-term disturbances also would result in direct habitat loss as vegetative cover is removed. Short term disturbances may 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 greater

than 4 well pad locations per square mile creates an extreme level of impact for big game and that avoidance zones around mineral facilities overlap creating contiguous avoidance areas (WGFD 2010, page 39). The foreseeable development within the KDU Epsilon POD includes an additional 29 wells at 29 locations to an existing 30 wells (4 are plugged and abandoned) within the 7.4 square mile project area, resulting in a well density of approximately 7.4 active well locations per section.

Big game animals may return to the project area following drilling and construction activities if Lance practices a low number of well and facility visits; however, elk use would likely be lower than prior to project implementation as the human activities associated with operation and maintenance continue to displace big game. Elk and mule deer are more sensitive to operation and maintenance activities than pronghorn.

The Pinedale Anticline study (Sawyer et. al. 2006, 2010) suggests mule deer do not readily habituate. The 2010 mule deer monitoring report for the Pinedale Anticline indicate that this trend has not changed and the deer population has continued to decline. A study in North Dakota wrote, "Although the population (mule deer) had over seven years to habituate to oil and gas activities, avoidance of roads and facilities was determined to be long term and chronic," (Lustig 2003). Deer are 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 winter progresses. Survival below the maintenance level requires behavior emphasizing energy conservation. Canfield et al. (1999) wrote 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 death.

Reclamation activities that occur within big game habitats during the spring would likely displace does and fawns due to the human presence in the area. This may cause reduced survival rate of does and fawns that must expend increased energies to avoid such activities.

Elk

The KDU Epsilon POD is expected to affect the Fortification elk herd and their habitat. Habitat effectiveness will be reduced due to avoidance and displacement of animals and altered behavior from reactions to CBNG activities. Within the KDU Epsilon project boundary, approximately 29.6 acres (15 wells and 3.1 miles of access road) of direct disturbance would occur within elk effective habitat; which is less than 1.5 percent of the effective habitat within the project boundary. (See Figure 4.5 Elk Habitat and Proposed Project Components below.)

Within the KDU Epsilon project boundary, approximately 27.7 acres (14 wells and 2.9 miles of access road) of disturbance would occur within elk security habitat; which is approximately 1.7 percent of the security habitat within the project boundary.

No elk crucial winter range or dual crucial range would be lost due to project construction or operation however elk utilization of these crucial ranges is likely to be affected. It is likely that elk displacement in the KDU Epsilon project area would be similar to displacement seen in other areas with CBNG development such as the Kinney Divide Unit Delta and Augusta Unit Zeta POD's.

The KDU Epsilon POD is located in the southeastern corner of the FCPA with the Powder River to the west approximately 1.7 miles and Fortification Creek to the southwest 3.1 miles. Barber Creek runs through the southern edge of the POD and Turner Draw runs through the north half of the project area.

Movement patterns of elk captured north of Fortification Creek versus elk captured south of Fortification Creek were compared through December 2010. Typically, elk captured in the northern portion of the elk yearlong range stay north of Fortification Creek, but elk captured in the southern portion of the yearlong range tend to roam more between the north and south halves of the yearlong range. Nine (50 percent) of the 18 elk collared south of Fortification Creek spent considerable time north of Fortification Creek (April 1, 2008 - July 17, 2009); 37 percent of the locations from 'southern' elk were north of Fortification Creek.

While of 37 elk collared north of Fortification Creek only 3 (8 percent) spent much time south of Fortification Creek; only 4 percent of the locations from the 'northern elk were south of Fortification Creek. Effective elk habitat along the southern boundary of the Fortification Creek Planning Area (FCPA) provides connectivity for elk moving between the north and south halves of the elk yearlong range. The trend observed is habitat use decreases as the distance between effective habitat patches increases and the size of individual patches decrease.

Habitat effectiveness will be reduced due to avoidance and displacement of animals and altered behavior from reactions to CBNG activities. Following non-federal CBNG development initiated in May of 2008 within the Augusta Unit, more than half the collared elk that were within the Augusta Unit Zeta (AUZ) POD area were displaced. Following full development of the POD, virtually no security remains within that project area. Security habitat provides refuge for elk when stressed by human disturbance. Human disturbance would cause displacement for prolonged periods of time; such areas could be avoided altogether. Consistent with the literature, less than 50 percent of the collared elk have returned to the POD area to date. Only 6 of the original (March 2008) 25 GPS collared elk that used the AUZ area pre-development continued using the remaining effective habitat within the AUZ's western boundary in 2009. That use declined further with three collared elk using the effective habitat remaining within AUZ in 2010. The highest numbers of elk relocations were observed in February 2010; 79 of the total 695 data points (11 percent). It is likely that connectivity of the effective habitat within the AUZ POD has been compromised perhaps until that POD is reclaimed. Likewise, fewer elk relocations were recorded in the Carr Draw III West (CD3W) and Carr Draw IV (CDIV) project areas even though 720 acres of security habitat was maintained (over 9,000 acres lost from 2005-2009) within those PODs. Relatively few elk relocations have been recorded in AUZ in 2011 a decrease from 2010, but the number of relocations observed in the Carr Draw PODs have been increasing.

Figures 4.1, 4.2 and 4.3 below included Kernel Density Models of Seasonal Range Use by Collared Fortification Elk depicting the concentration of elk relocation data collected March 2008 through June 2012. The trend observed is that the elk relocation data density is greatest where the greatest area of un-impacted elk security habitat exists. The trend observed is that the elk use is greatest where the greatest area of elk security habitat exists.

Because of the affinity of elk for the FCPA and their wary nature, the most probable scenario for elk response to the proposed CBNG development is for the herd to seek out security patches within the Fortification herd unit and attempt to avoid the CBNG activities during project construction and other disruptive activities. During the peak of proposed development, road and facility construction, and human activity on most ridges and some drainages in the KDU Epsilon project area, the elk are expected to be stressed and impacted almost continuously during project construction.

While some habituation may occur over time, a reduction in local elk use through displacement should be expected. This displacement is usually temporary in nature, and some studies have shown that elk returned to the area of disturbance once the source of disturbance and human presence was gone (Gusey 1986, WGFD 2000). In forested environments, elk have returned at 50 percent or less of the previous levels (Hayden-Wing Associates 1990). Elk may also shift their centers of distribution to the least impacted sites, such as the WSA. This trend is supported by data collected on collared elk within the

Fortification Creek herd unit and the response to ongoing non-federal CBNG development. The impacts on the elk population from CBNG development of greatest concern are:

- The current population trend, about 3 percent population decrease per year, were to precipitously decline (i.e., rapid rate increase);
- The overall total herd population were to drop below an estimated 120 animals (about 52 percent of the current population);
- The rate of elk ventures outside the Fortification Creek area were to drastically increase above 15 percent of the herd;
- The nature (i.e., longevity) of elk ventures outside the Fortification Creek area were to shift from mostly seasonal to mostly permanent; or
- Degradation of security/effective habitat occurs due to elk concentrating within the remaining available habitat.

Figure 4.1 Kernel Density Models Yearlong Range Use by Collared Fortification Elk

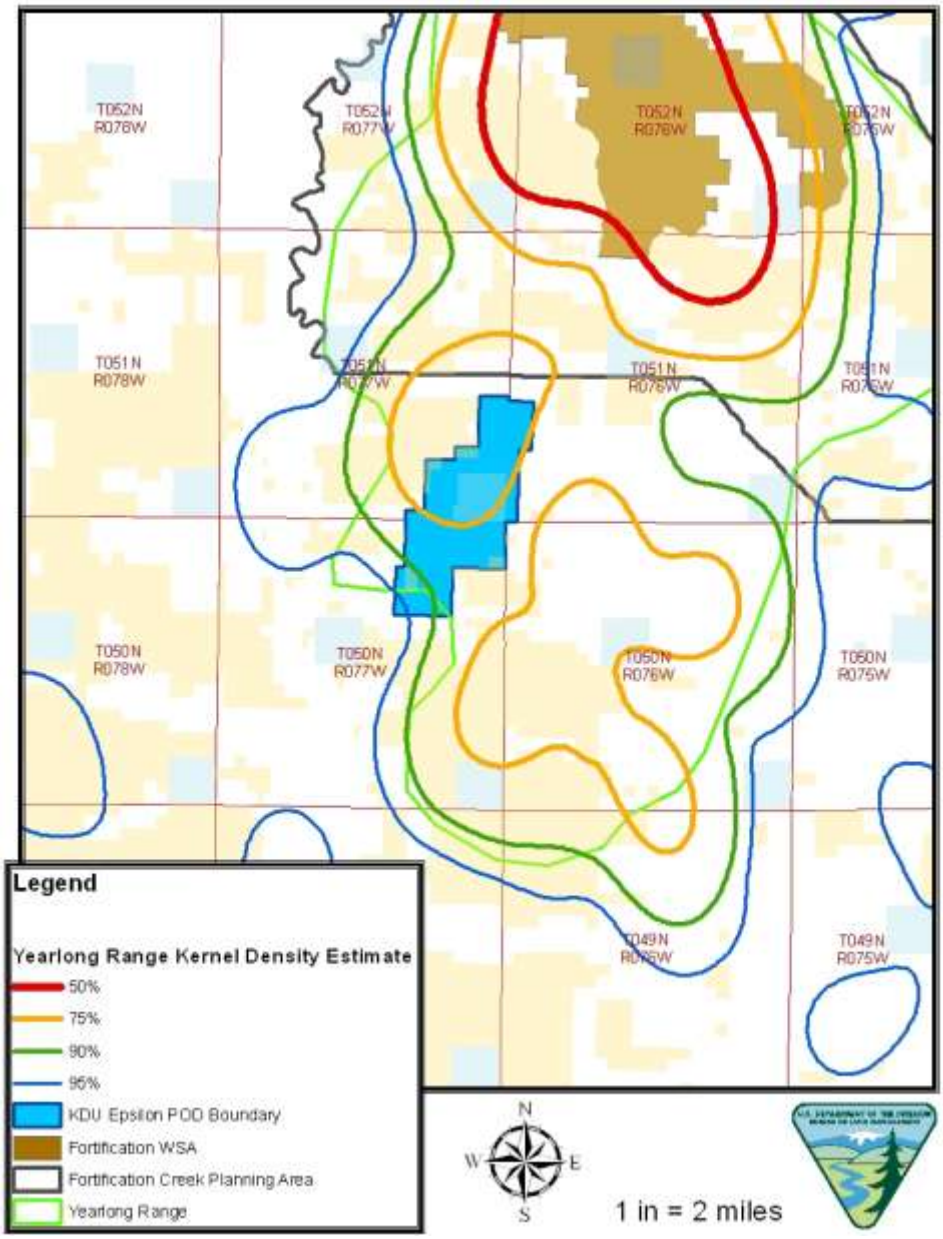


Figure 4.2 Kernel Density Models Parturition Range Use by Collared Fortification Elk

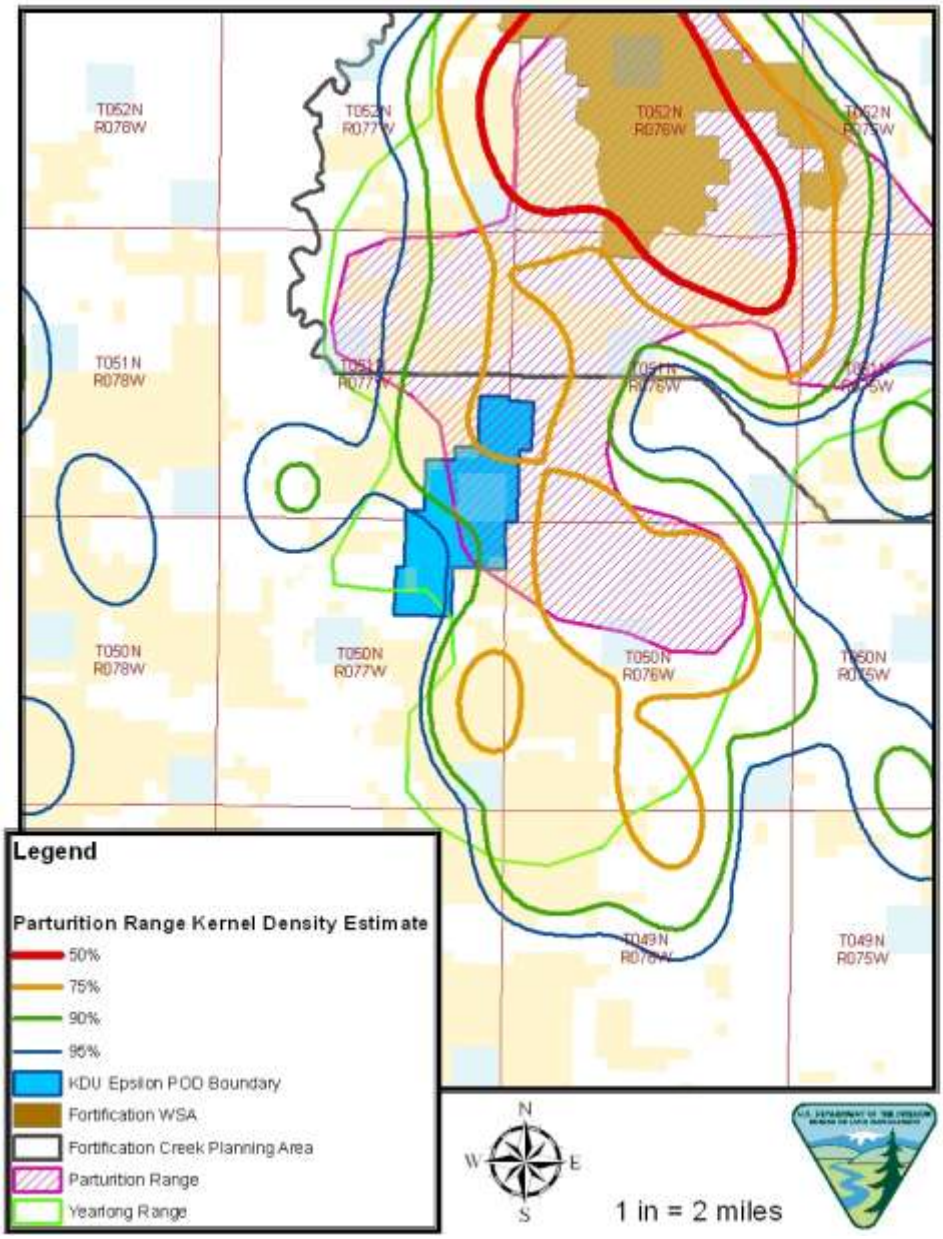
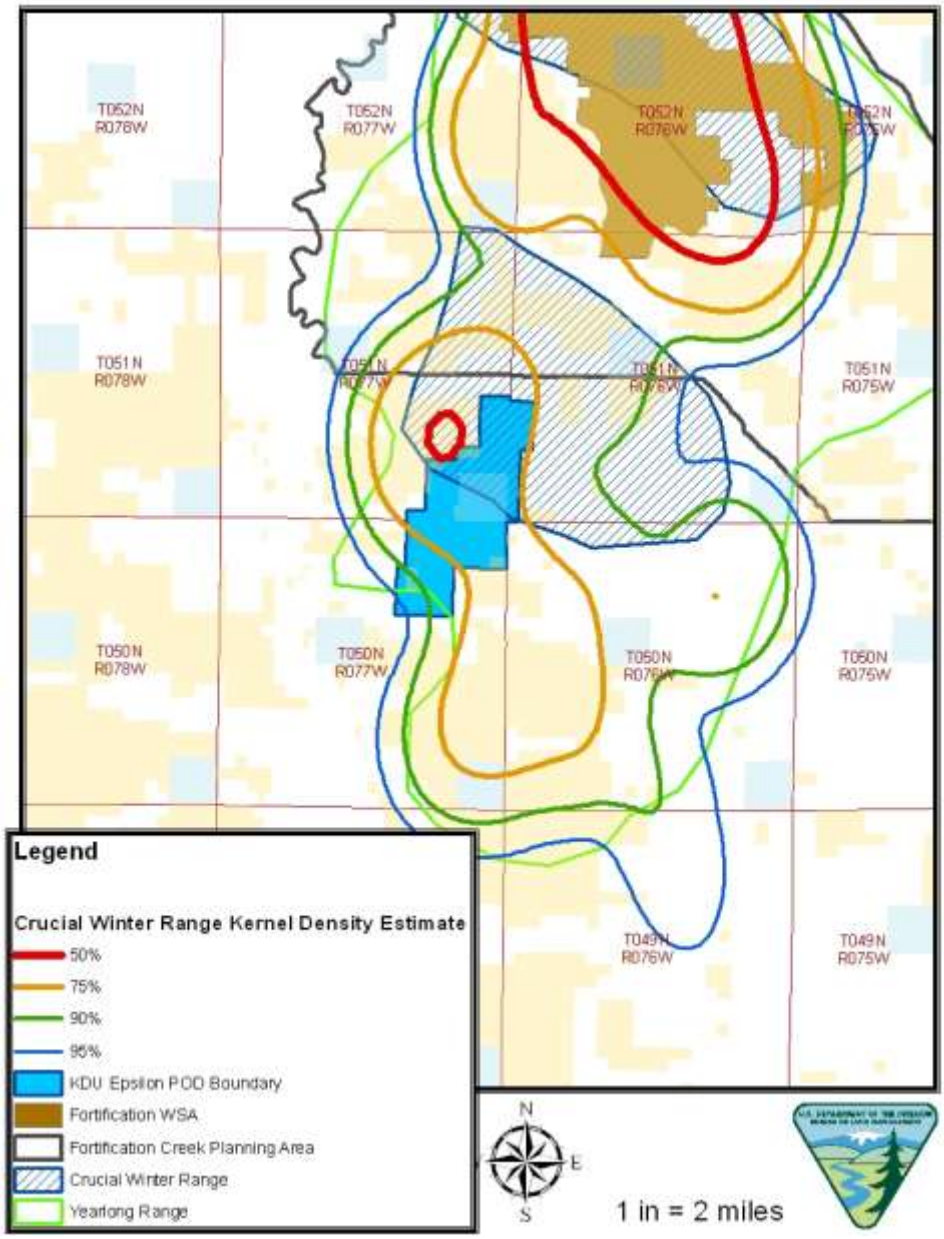


Figure 4.3 Kernel Density Models Crucial Winter Range Use by Collared Fortification Elk



Population Demographics

Reclamation activities that occur within big game habitats during the spring would likely displace cows and calves due to the human presence in the area. This may cause reduced survival rate of cows and calves that must expend increased energies to avoid such activities.

The FCPA RMPA discusses impacts specific to the elk population on pp. 4-67 to 4-73.

Range Fidelity

Following drilling within the FCPA, collared elk locations should remain within 80 percent of the current use within the yearlong range for the entire year and within the seasonal crucial ranges during the crucial seasons. The seasonal crucial range fidelity will be evaluated by monitoring the collared elk use within

the seasonal ranges (calving and crucial winter) during the crucial seasons. Calving range fidelity will be evaluated for the period May 15 through June 15. Crucial range fidelity will be evaluated for the period from December 1 through April 30. 78.7 percent of the collared elk locations within the herd unit from March 26, 2008 through June 15, 2011 were within the FCPA (103,838 of 131,846). 88.0 percent of the collared elk locations within the designated calving range from May 15 through June 15 (2008-2011) were within the FCPA designated calving range (10,035 of 11,409). 86.9 percent of the collared elk locations within the designated crucial winter range from December 1 through April 30 (2008-2011) were within the FCPA designated crucial winter range (23,765 of 27,356).

Habitat Effectiveness

Approximately 4,556 acres of elk yearlong range occur within the project area, containing all 29 well locations and associated infrastructure. See Figure 4.4 below. In addition, the project area includes approximately 1,793 acres of elk parturition habitat with 10 federal wells and 4.2 miles of access road (nearly 33 acres of surface disturbance) and approximately 2,638 acres of elk crucial winter habitat with 19 wells and 5.7 miles of access road (nearly 49 acres of surface disturbance). Activities within elk ranges are likely to increase impacts to elk habitat beyond the impacts already associated with the existing road oil and gas activities. The current monitoring data indicates that elk within the Fortification herd typically avoid oil and gas roads out to 0.5 miles or greater.

Figure 4.4 Elk Ranges and Project Components

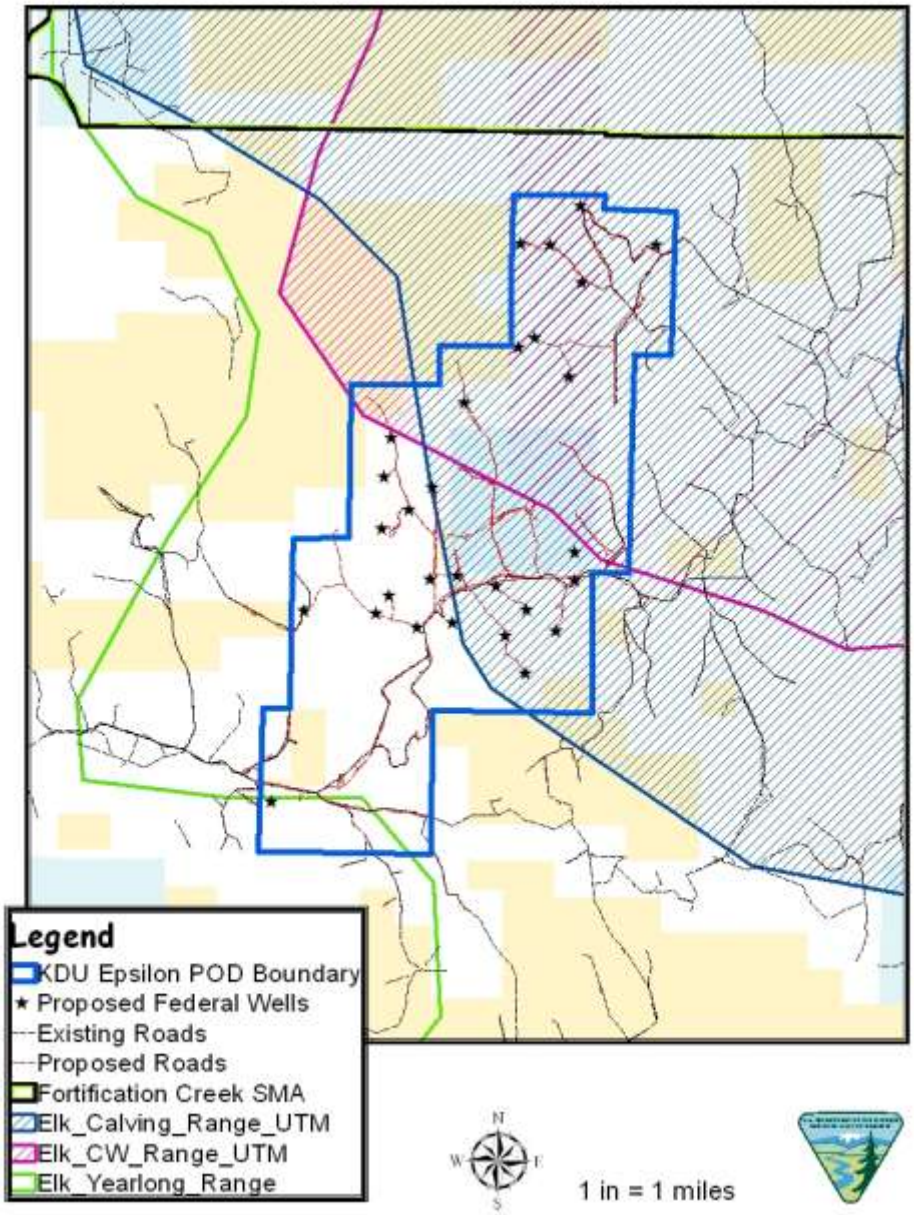
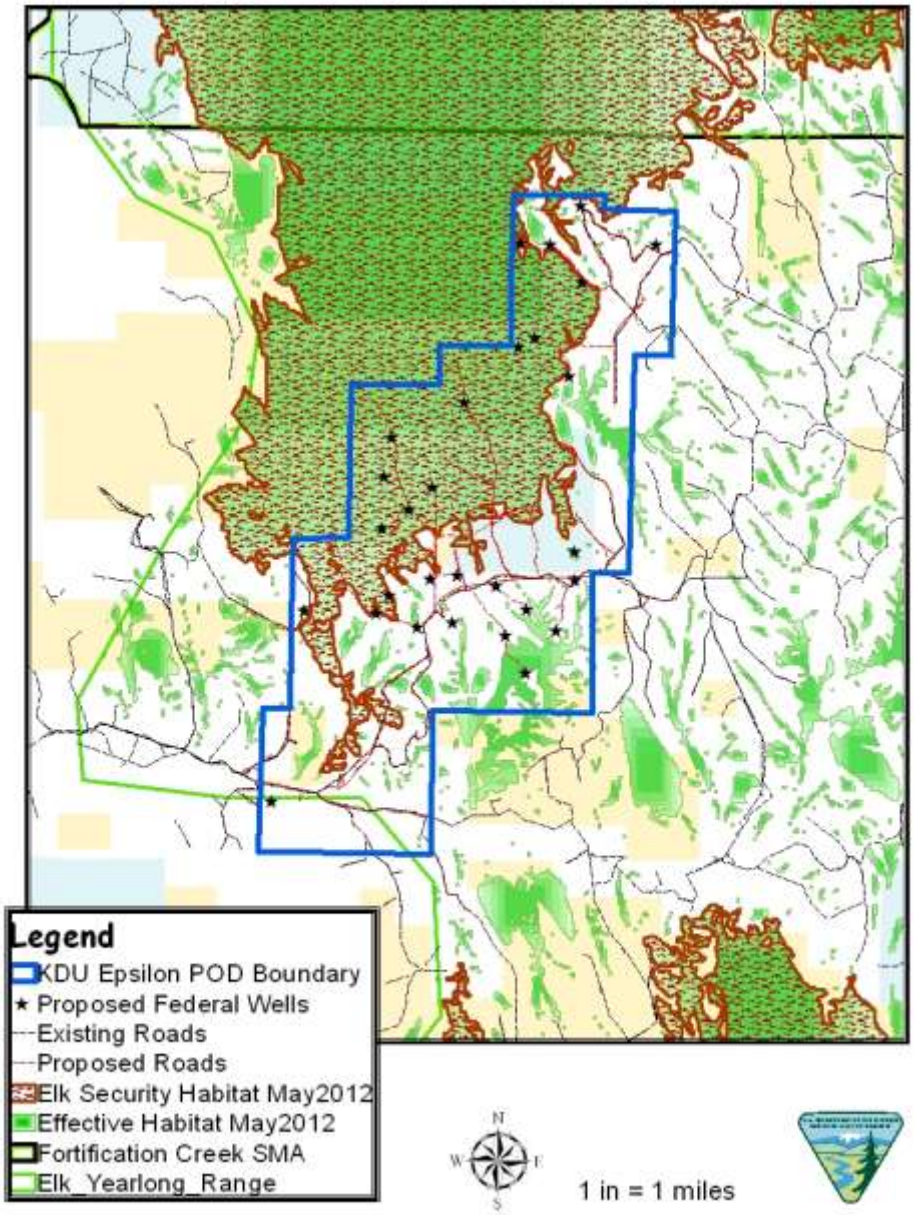


Figure 4.5 Elk Habitat and Proposed Project Components



Habitat Use

It is likely that elk will be displaced from the KDU Epsilon project area by human disturbance for prolonged periods of time as occurred in the AUZ and Carr Draw project areas.

Sawyer (2005) observed similar response of elk within the more open terrain of the Jack Morrow Hills of Wyoming. The literature consistently shows a correlation between elk avoidance response and the level of human activity associated with oil and gas development. In the absence of forest cover, elk seem to rely on a combination of shrubs, topography, and low human disturbance to meet their thermal and hiding cover requirements (Sawyer et al. 2007).

Since March 2008 when the first GPS collars were deployed on elk within the Fortification Creek elk, 1,154 observations from 19 individual elk have been recorded within the project. The previous data

showed a strong trend for elk to select habitat within the project area for seasonal use (i.e. calving or winter). The 2011-2012 elk relocation data show that the elk are trending to utilize the available habitat within the POD year-round.

Calving season elk use of the project area is light, accounting for less than one percent of all the elk data points during the 2008 through 2011 calving seasons. The displacement of elk during the calving season would be unlikely to affect calf production or survival.

These big game animals may return to the project area after drilling, construction, and reclamation activities have subsided if Lance practices a low number of well visits; however, populations would likely remain lower than prior to project implementation while human activities associated with operation and maintenance continue. The goal is to complete drilling and construction of the CBNG developments outside of the crucial timing periods (calving and crucial winter) then restore the habitat function through expedient reclamation to encourage the elk utilize the effective habitat once the PODs, including KDU Epsilon, are in production.

4.6.2.1.2. Cumulative Effects

The cumulative effects associated with Alternative B, are within the analysis parameters and impacts described in the PRB FEIS. Refer to the PRB FEIS, pp. 4-181 to 4-215, for details on expected cumulative impacts. Impacts relative to the Fortification elk herd are discussed below.

Impacts to elk and their habitat in the Fortification Creek area have occurred during prior construction and drilling activities. In addition to the direct habitat loss, big game would likely be further displaced from the project area during drilling and construction. Current well density is approximately 4.4 wells per square mile (Figure 4.3). This includes 8 new wells on lands owned by the State of Wyoming (Section 36, T51N/R77W) 4 of which lie within ESH. The effects to ESH related to these wells and access roads had not been analyzed previously as BLM was unaware of their status change.

The foreseeable development within the KDU Epsilon POD includes an additional 29 wells at 29 locations to an existing 26 active wells within 7.4 square miles, resulting in a well density of approximately 7.4 wells per square mile (See Figure 4.3 below). The WGFD indicates a well density of greater than 4 wells per section creates an extreme level of impact for big game and that avoidance zones around mineral facilities overlap creating contiguous avoidance areas (WGFD 2010). The result is that extensive areas will be avoided especially when avoidance zones don’t provide connectivity between areas of effective habitat.

In 2011 and 2012, the Wyoming Oil and Gas Conservation Commission (WOGCC) changed the status of 203 CBNG well permits from expired (EP) to approved (AP). These include 176 Federal well locations. There are 106 of these wells within the Southeast, 55 in the Southwest and 9 within the North development phases of the FCPA. The BLM approved 56 of the Federal well locations included in the Camp John Unit SMA Phase 1 Year 1 POD on November 4, 2011. The remaining 34 Federal well locations have not been processed by BLM. Fifteen (15) of the 60 non-federal well locations lie on Wyoming Land Trust Board surface and the other 45 are on privately owned surface. These 60 well locations are not drilled at this time but they may be drilled at any time without elk related mitigation.

Of the 60 non-federal locations, 3 lie within mapped and modeled elk security habitat and 31 lie within 0.5 miles of elk security habitat. BLM has estimated an additional 8 miles of new oil and gas roads will be needed to access these wells locations. An analysis was conducted using the likely routes to access these locations. The results show a loss of 622 acres of elk security habitat and 846 acres of effective habitat within the FCPA. Approximately 269 acres of this elk security habitat loss will occur within the Southeast, 154 acres in the Southwest, and 199 acres in the North development phases respectfully. With

a baseline of 5,593 acres of elk security habitat, 4.8 percent is compromised by these new wells and associated access roads. On November 4, 2011, the BLM-BFO approved the Camp John Unit SMA Phase 1 Year 1 project, which will effectively compromise approximately 443 acres or 7.9 percent of elk security habitat when fully developed. Cumulative impacts of the WOGCC approved permits and the 56 approved BLM permits results in a total loss of 712 acres or 12.7 percent of the elk security habitat available in the FCPA's Southeast Development Phase.

Additional impacts associated with the 29 wells at 29 locations and the associated roads and infrastructure included in the KDU Epsilon POD will result in further loss of approximately 2,008 acres of the ESH within the elk yearlong range including; 62% of the 2009 estimate. Approximately 1,200 and 1,155 acres of ESH will be lost from the elk parturition and crucial winter ranges respectively.

Figure 4.6 Elk Ranges, Project Components and Existing Disturbance

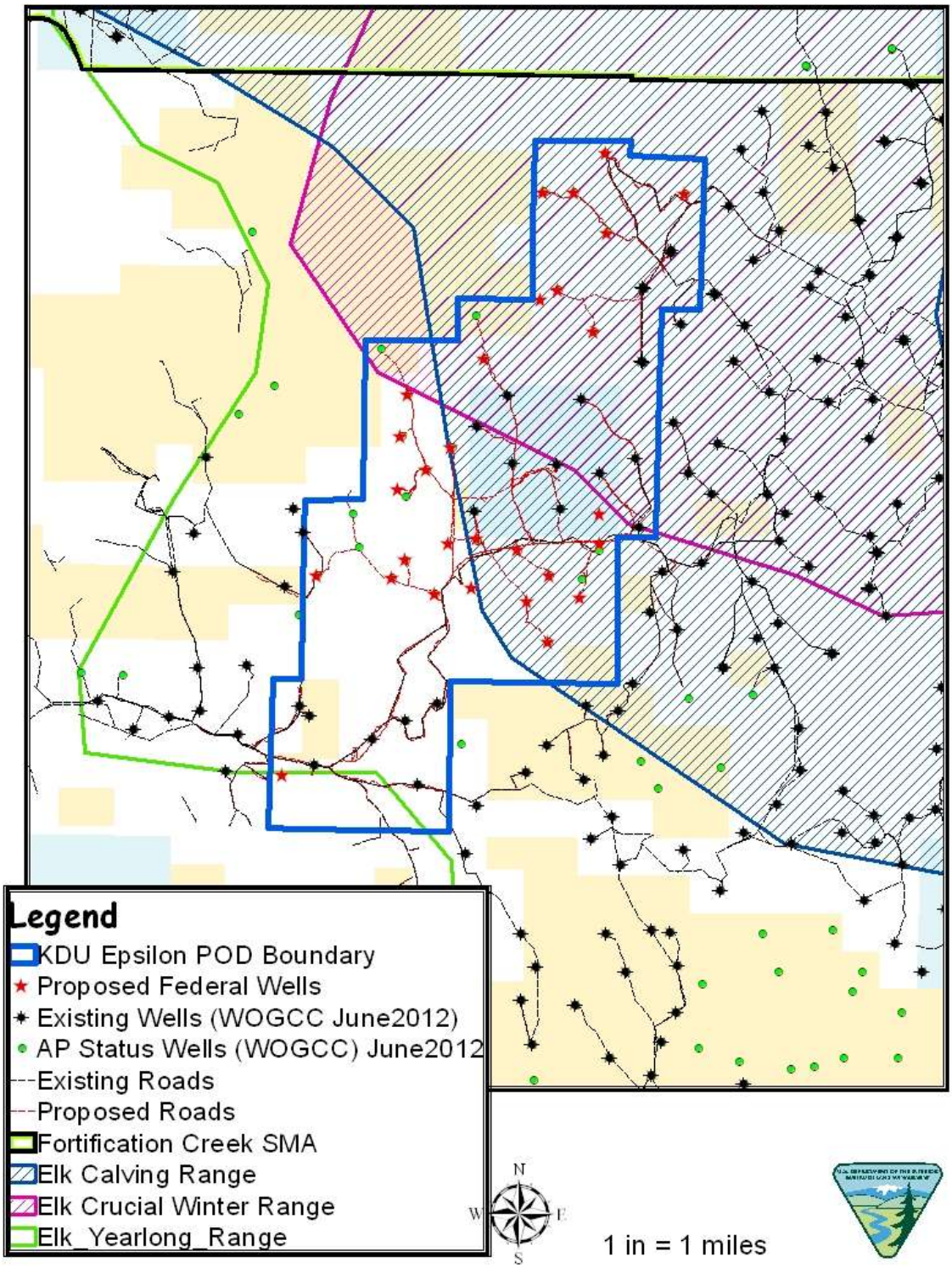
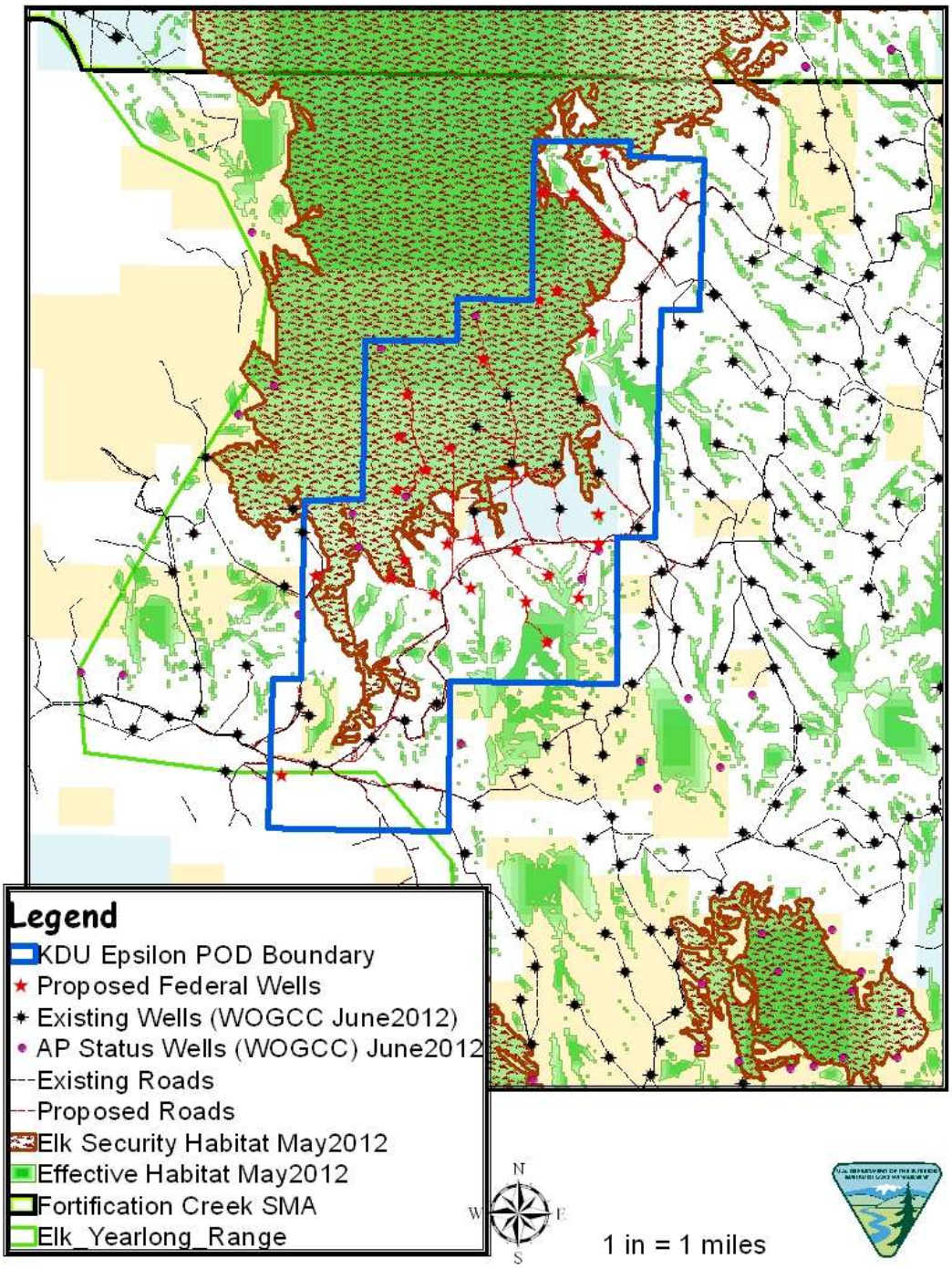


Figure 4.7 Elk Security Habitat, Project Components and Existing Disturbance



4.6.2.1.3. Mitigation Measures

Lance provided the details they would implement to minimize impacts to elk and restore elk habitat included in their Lance Oil and Gas Co. Inc.'s Commitment to Performance Recommendations from Fortification Creek Planning Area RMPA Appendix B.

Project design features, expedient reclamation and BLM applied COAs should minimize impacts to elk. Monitoring of the GPS collared elk will continue as CBNG development progresses.

No surface disturbing activity shall occur within identified elk crucial calving (parturition) range from May 1 to June 30. This timing stipulation will affect the following:

Township/Range	Section	Wells and Infrastructure
T51N R76W	19	Well location(s): 23-19-5176 All access roads and associated utility corridors within the SW of this section.
T51N R77W	24	Well location(s): 34-24-5177, 43-5177, 44-24-5177 All access roads and associated utility corridors within the SE of this section.
	25	Well location(s): 13-25-5177, 14-25-5177, 32-25-5177, 43-25-5177, 51-25-5177 All access roads and associated utility corridors within this ENTIRE section.
	26	Well location(s): 23-19-5177 All access roads and associated utility corridors within the SESW and SWSE of this section.

No surface disturbing activity shall occur within identified elk crucial winter range from November 15 to April 30. This timing stipulation will affect the following:

Township/Range	Section	Wells and Infrastructure
T51N R76W	19	Well location(s): 23-19-5176 All access roads and associated utility corridors within the SW of this section.
T51N R77W	24	Well location(s): 34-24-5177, 43-5177, 44-24-5177 All access roads and associated utility corridors within the SE of this section.
	25	Well location(s): 13-25-5177, 14-25-5177, 32-25-5177, 43-25-5177, 51-25-5177 All access roads and associated utility corridors within this ENTIRE section.
	26	Well location(s): 23-19-5177 All access roads and associated utility corridors within the SESW and SWSE of this section.
	35	Well location(s): 42-35-5177 All access roads and associated utility corridors within the SESW and SWSE of this section.
T50N R77W	1	Well location(s): 11-1-5077, 12-1-5077, 21-1-5077, 22-1-5077, 32-1-5077, 33-1-5077, 41-1-5077 42-1-5077 All access roads and associated utility corridors within this ENTIRE section ACCEPT the E2NWNW.

4.6.2.1.4. Residual Effects

The incorporated design features and mitigation will not eliminate all project effects. Habitat effectiveness and habitat use will likely be affected and possibly reduce the population. Based on analyses of road density, topography, and vegetation in combination with radio monitoring, it appears that the FCPA elk are choosing to occupy the WSA and other remote areas to avoid mineral development.

CBNG development in the southern yearlong range is likely to concentrate the elk herd within the WSA and undeveloped portions of the FCPA (BLM 2011a).

4.6.2.2. Raptors

4.6.2.2.1. Direct and Indirect Effects

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

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

Raptor nests in relation to placement of infrastructure are shown in Figure 1 in Appendix A. BLM recommends the location of all infrastructure 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.

During the onsite visits, the BLM biologist and Lance worked to try and reduce impacts to raptors from placement of wells and infrastructure. The following change was made as a result of the onsite:

- Well 42-1was moved approximately 900 feet N/NW to get further than 0.25 miles from red-tailed hawk nest 5851.

4.6.2.2.2. Cumulative Effects

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

4.6.2.2.3. Mitigation Measures

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

4.6.2.2.4. 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.

4.6.2.3. Plains Sharp-tailed Grouse

4.6.2.3.1. Direct and Indirect Effects

The PRB FEIS discusses impacts, including direct and indirect effects, and cumulative effects, to plains sharp-tailed grouse, pp. 4-221 to 4-226.

Impacts to sharp-tailed grouse are expected to be similar to those described in Section 4.8.1.2.1.1 (Greater Sage-grouse). Suitable habitat exists throughout the project area. Construction and maintenance activities associated with development of the KDUE POD will cause direct habitat loss and fragmentation.

Impacts to the sharp-tailed grouse lek in Section 1 will result from increased average daily traffic during the drilling and construction activities. Figure 2 in Appendix A shows the location of the lek in relation to proposed and existing infrastructure. The lek lies only 460 feet from the main access road into the POD and has likely been impacted from the present level of energy development in the area. The 11-1 well and staging area are approximately 280 feet from the lek. Attempts were made during onsites to remove all proposed infrastructure from the 250 yard buffer that the BLM typically applies to sharp-tailed grouse leks. Originally, Lance agreed to drop the 11-1 well, and to re-locate the staging area to another well. However, PRECorp began construction of a high-voltage transmission line in January 2012 within 200 feet of the lek. It was determined by the BLM biologist that the impacts from the overhead power line were likely to eventually cause the lek to be abandoned, and that it was unlikely that dropping the 11-1 well would provide any long-term mitigation to grouse in the area.

4.6.2.3.2. Cumulative Effects

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

4.6.2.3.3. Mitigation Measures

The BLM will apply a timing limitation during the breeding season to protect sharp-tailed grouse that use the area for nesting and breeding.

4.6.2.3.4. Residual Impacts

A timing limitation does not mitigate loss and fragmentation of habitat. Suitability of the project area for sharp-tailed grouse will be negatively affected due to habitat loss and fragmentation and proximity of human activities associated with CBNG development.

Grouse using the lek within 200 ft of the transmission line are anticipated to be impacted by increased predation from raptors, increased chance of collision with conductors and vehicles, and increased traffic, noise and human activities occurring from operation and maintenance of the project and surrounding existing development.

4.6.2.4. Aquatics

4.6.2.4.1. Direct and Indirect Effects

One proposed discharge will flow directly into Turner Draw. Additionally, Lance is proposing to use 5 existing outfalls tied to two existing treatment facilities that discharge into the Upper Powder River and Barber Creek. Recent research suggests a decline in biological condition in the middle reaches of the Powder River potentially due to CBNG water discharges (Peterson et al, 2011). Barber Creek is located in the reach identified in the report as having decreased biological condition compared to the upper and lower reaches of the River. The Powder River Basin Interagency Working Group's Aquatic Task Group is continuing to investigate the potential influence of produced water on the Powder River aquatic biota. In 2012, the same reaches that were sampled in the past 2 years will be sampled again in an attempt to refine our understanding of the influence of produced water.

4.6.2.4.2. Cumulative Effects

For details on expected cumulative impacts, refer to the PRB FEIS, (pp. 4-235 to 4-246). Additional discharged water from the KDUE project may continue to influence the biological condition in the middle reaches of the Powder River.

4.6.2.4.3. Mitigation Measures

No mitigation is proposed with alternative B.

4.6.2.4.4. Residual Effects

Biological condition in the middle reaches of the Powder River is anticipated to remain in decreased condition, or continue to degenerate.

4.6.3. West Nile Virus

4.6.3.1. Direct and Indirect Effects

This project is likely to result in standing surface water which would increase mosquito breeding habitat.

4.6.3.2. Cumulative Effects

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

There is little evidence that treatment, either through the use of larvicides or malithion, on a site specific or basin-wide scale will have any effect on the overall spread of the disease; however, one study, conducted by Big Horn Environmental Consultants in 2008, showed that landscape level larvacide applications can decrease the number of hatching mosquitoes in an area.

4.6.3.3. Mitigation Measures

None proposed with Alternative B.

4.6.3.4. Residual Effects

Mosquito breeding habitat will increase.

4.7. Cultural Resources

4.7.1. Direct and Indirect Effects

No cultural resources will be impacted by the proposed project. Following the Wyoming State Protocol Section VI(A)(1) the BLM electronically notified the Wyoming State Historic Preservation Officer (SHPO) on June 22, 2012 that no historic properties exist in the area of project effects.

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. This results in fewer archaeological resources available for study of past human life-ways, changes in human behavior through time, and interpreting the past to the public. Additionally, these impacts may compromise the aspects of integrity that make a historic property eligible for the National Register of Historic Places. Recording and archiving basic information about archaeological sites in the proposed project areas serve to partially mitigate potential cumulative effects to cultural resources.

Fee actions built in support of federal actions can result in impacts to historic properties. Construction of large plans of coalbed natural gas development on split estate often include associated infrastructure that is not permitted through BLM. Project applicants may connect wells draining fee minerals, or previously constructed pipelines on fee surface with a federal plan of development. BLM has no authority over such development which can impact historic properties. BLM has the authority to modify or deny approval of federal undertakings on private surface, but that authority is limited to the extent of the federal approval. Historic properties on private surface belong to the surface owner and they are not obligated to preserve or protect them. The BLM may go to great lengths to protect a site on private surface from a federal undertaking, but the same site can be legally impacted by the landowner at any time. The cumulative effect of numerous federal approvals can result in impacts to historic properties. Archeological inventories reveal the location of sites and although the BLM goes to great lengths to protect site location

data, which information can potentially get into the wrong hands. BLM authorizations that result in new access can inadvertently lead to site impacts from increased public visitation.

4.7.3. Mitigation Measures

If the company or its contractors observe any cultural values [sites, artifacts, human remains (Appendix L PRB FEIS and ROD)] during operation of this lease/permit/right-of-way, they will be left intact and the Buffalo Field Manager notified. Further discovery procedures are explained in the Standard COA (General)(A)(1).

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:

BLM consulted or coordinated with the following in drafting this EA:

Contact	Organization	Onsite Presence?
Mary Hopkins	WY SHPO	No
Pauline Schuette	US Fish & Wildlife Service	Yes
Tim Thomas	Wyoming Game and Fish Dept.	No

List of Preparers (BFO unless otherwise noted)

Position/Organization	Name
NRS/Team Lead	Eric Holborn
Supr NRS	Casey Freise
Petroleum Engineer	Matt Warren
LIE	Christine Tellock
Hydrologist	Brent Sabotka
Archaeologist	Seth Lambert
Wildlife Biologist	Darci Stafford

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

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Amphibians				
Northern leopard frog (*Rana pipiens*)	Beaver ponds and cattail marshes from plains to montane zones.	K	MIIH	No surface disturbance is planned in habitat. Increased water from discharge may increase habitat.
Columbia spotted frog (*R*anus pretiosa)	Ponds, sloughs, small streams, and cattails in foothills and montane zones. Confined to headwaters of the S Tongue R drainage and tributaries.	NP	NI	Habitat not present.
Fish				
Yellowstone cutthroat trout (*Oncoryhynchus clarki bouvieri*)	Cold-water rivers, creeks, beaver ponds, and large lakes in the Upper Tongue sub-watershed	NP	NI	Habitat not present.
Birds				
Baird's sparrow (*Ammodramus bairdii*)	Shortgrass prairie and basin-prairie shrubland habitats; plowed and stubble fields; grazed pastures; dry lakebeds; and other sparse, bare, dry ground.	S	MIIH	Nesting and foraging habitat may be impacted by dust, noise, human activities, and direct loss. Species may avoid area. Impacts to migratory birds during the breeding season will be mitigated by an operator committed timing limitation while the POD is under construction. No surface disturbing activities will take place during the breeding season prior to a nesting survey.
Bald eagle (*Haliaeetus leucocephalus*)	Mature forest cover often within one mile of large water body with reliable prey source nearby.	K	MIIH	No known nests or communal roosts are present in the project area. Surface disturbing and maintenance activities may impact foraging eagles and the species may avoid the area.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Brewer's sparrow (*Spizella breweri*)	Sagebrush shrubland	S	MIIH	Nesting and foraging habitat may be impacted by dust, noise, human activities, and direct loss. Species may avoid area. Impacts to migratory birds during the breeding season will be mitigated by an operator committed timing limitation while the POD is under construction. No surface disturbing activities will take place during the breeding season prior to a nesting survey.
Ferruginous hawk (*Buteo regalis*)	Basin-prairie shrub, grasslands, rock outcrops	NS	MIIH	No documented nests occur within 0.5 miles of the project area. Species may avoid area.
Loggerhead shrike (*Lanius ludovicianus*)	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Nesting and foraging habitat may be impacted by dust, noise, human activities, and direct loss. Species may avoid area. Impacts to migratory birds during the breeding season will be mitigated by an operator committed timing limitation while the POD is under construction.
Long-billed curlew (*Numenius americanus*)	Grasslands, plains, foothills, wet meadows	NS	NI	Habitat not present.
Mountain Plover	Short-grass prairie with slopes < 5%	NP	NI	Habitat not present.
Northern goshawk (*Accipiter gentilis*)	Conifer and deciduous forests	NP	NI	Habitat not present.
Peregrine falcon (*Falco peregrinus*)	Cliffs	NP	NI	Habitat not present.
Sage sparrow (*Amphispiza billneata*)	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Nesting and foraging habitat may be impacted by dust, noise, human activities, and direct loss. Species may avoid area. Impacts to migratory birds during the breeding season will be mitigated by an operator committed timing limitation while the POD is under construction. No surface disturbing activities will take place during the breeding season prior to a nesting survey.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Sage thrasher (*Oreoscoptes montanus*)	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Nesting and foraging habitat may be impacted by dust, noise, human activities, and direct loss. Species may avoid area. Impacts to migratory birds during the breeding season will be mitigated by an operator committed timing limitation while the POD is under construction. No surface disturbing activities will take place during the breeding season prior to a nesting survey.
Trumpeter swan (*Cygnus buccinator*)	Lakes, ponds, rivers	S	NI	No surface disturbance is planned in habitat.
Western Burrowing owl (*Athene cunicularia*)	Grasslands, basin-prairie shrub	NS	NI	Habitat not present.
White-faced ibis (*Plegadis chihi*)	Marshes, wet meadows	NS	NI	No surface disturbance is planned in habitat.
Yellow-billed cuckoo (*Coccyzus americanus*)	Open woodlands, streamside willow and alder groves	NP	NI	Habitat not present.
Mammals				
Black-tailed prairie dog (*Cynomys ludovicianus*)	Prairie habitats with deep, firm soils and slopes less than 10 degrees.	NS	NI	No known colonies present.
Fringed myotis (*Myotis thysanodes*)	Conifer forests, woodland chaparral, caves and mines	S	MIIH	Foraging habitat may be impacted by dust, noise, and human activities.
Long-eared myotis (*Myotis evotis*)	Conifer and deciduous forest, caves and mines	NS	NI	Habitat not present.
Swift fox (*Vulpes velox*)	Grasslands	NS	NI	Habitat not present.
Townsend's big-eared bat (*Corynorhinus townsendii*)	Caves and mines.	NP	NI	Habitat not present.
Plants				
Limber Pine (*Pinus flexilis*)	Mountains, associated with high elevation conifer species	NP	NI	Habitat not present.
Porter's sagebrush (*Artemisia porteri*)	Sparsely vegetated badlands of ashy or tufaceous mudstone and clay slopes 5300-6500 ft.	NP	NI	Habitat not present.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
William's wafer parsnip (*Cymopterus williamsii*)	Open ridgetops and upper slopes with exposed limestone outcrops or rockslides, 6000-8300 ft.	NP	NI	Habitat not present.

Presence

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

Project Effects

NI - No Impact.
MIIH - May Impact Individuals or Habitat, but will not likely contribute to a trend towards Federal listing or a loss of viability to the population or species.
WIPV - Will Impact Individuals or Habitat with a consequence that the action may contribute to a trend towards Federal listing or cause a loss of viability to the population or species.
BI -Beneficial Impact