DECISION RECORD
Yates Petroleum Corporation, Labrador Plan of Development (POD)
ENVIRONMENTAL ASSESSMENT (EA) WY-070-EA11-289
Bureau of Land Management, Buffalo Field Office

DECISION:
BLM approves Yates Petroleum Corporation (YPC) Labrador POD coalbed natural gas (CBNG) as described in Alternative B of the EA WY-070-EA11-289. Alternative B is the result of collaboration between the Buffalo Field Office (BFO) and YPC. This POD includes: 10 (9 CBNG, 1 water injection) applications for permit to drill (APDs), a water management plan (WMP) for federal water, and associated infrastructure.

Compliance. This decision complies with:
- Federal Land Policy and Management Act of 1976 (FLPMA) (43 USC 1701); (Sections 201, 202).
- Mineral Leasing Act of 1920 (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).
- Native American Graves Protection and Repatriation Act (NAGPRA) (25 USC 3001).
- Buffalo Final Environmental Impact Statement (FEIS), 1985; Powder River Basin (PRB) FEIS, 2003.
- Buffalo Resource Management Plan (RMP) 1985, Amendments 2001, 2003, 2011.
- Greater Sage-Grouse Habitat Management Policy on WY Bureau of Land Management (BLM) Administered Public Lands including the Federal Mineral Estate, (WY-IM-2010-012), 2010.
- Department of Interior Order 3310.

The following summarizes details of the approval. The project description, including specific changes made at the onsites, and site-specific mitigation measures, are found in the EA, pp. 2-6.

Well Sites: BLM approves the following 9 CBNG APDs and associated infrastructure:

	Well Name	Well #	QTR	Sec	TWP	RNG	Lease #
1	LABRADOR CS FEDERAL	4	SWNW	34	50N	75W	WYW130084
2	LABRADOR CS FEDERAL COM	1	NENW	32	50N	75W	WYW130084
3	LABRADOR CS FEDERAL COM	2	SWSE	32	50N	75W	WYW130084
4	LABRADOR CS FEDERAL COM	3	NENW	34	50N	75W	WYW130084
5	LABRADOR ELKHOUND CS	1	NENW	4	49N	75W	WYW130083
6	LABRADOR ELKHOUND CS	2	SWNW	4	49N	75W	WYW130083
7	LABRADOR ELKHOUND CS	3	NENE	5	49N	75W	WYW130083
8	LABRADOR ELKHOUND CS	4	SWNE	5	49N	75W	WYW130083
9	LABRADOR MALAMUTE CS	1	SWSW	34	50N	75W	WYW134227

Water Management: BLM approves the water injection APD and the use of following water management infrastructure:

	FACILITY Name / Number	Qtr/Qtr	Sec	TWP	RNG	Capacity (Acre Feet)	Surface Disturbance	Lease #
1	Shuttle Pit	SWNE	6	49N	57W	3.8	2 acres	WYW130083
2	Elkhound S&R Federal 5 Injection Well	SWNW	5	49N	75W	NA	1.4 acres	WYW130083

Limitations: There are no denials and or deferrals, any Right of Ways (ROWs) are on private surface.

THE FINDING OF NO SIGNIFICANT IMPACT. Analysis of Alternative B of the EA, WY-070-11-289, and the FONSI found the POD will have no significant impacts on the human environment, beyond those described in the PPRB FEIS, thus an EIS is not required.

COMMENT OR NEW INFORMATION SUMMARY.
Scoping was discussed in the EA, Section 1.4, and is incorporated here by reference. Since early development of the Labrador POD proposal, BFO received a new policy on management of sage-grouse populations and habitats and then maintained that policy into its RMP, and received a new Interior Department policy on wilderness.

DECISION RATIONALE:
The BLM's approval of the project, summarized above, is for the following reasons.

1. BLM and YPC added design features and mitigation measures reduced environmental impacts while meeting the project's need.
2. The selected alternative will not result in any undue or unnecessary environmental degradation.
3. The selected alternative will help meet the nation's energy needs and help stimulate local economies by maintaining workforce stability.
4. The Operator, in their POD, committed to:
   - Be knowledgeable of all applicable federal, state, and local laws and regulations.
   - Offer water well agreements to the owners of record for permitted water wells within 0.5 mile of a federal CBNG producing wells in the POD.
   - Provide water analysis from a designated reference well in each coal zone.
5. The Operator certified it has a surface use agreement with the landowners or bonded.
6. The Labrador POD is clearly lacking in wilderness characteristics as it is smaller than 5,000 acres and offers no outstanding opportunities for solitude.

ADMINISTRATIVE REVIEW AND APPEAL: This decision is subject to administrative review in accordance with 43 CFR 3165. Any 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: 9/28/11

FINDING OF NO SIGNIFICANT IMPACT
Yates Petroleum Corporation, Labrador Plan of Development (POD)
ENVIRONMENTAL ASSESSMENT (EA) WY-070-EA11-289
Bureau of Land Management, Buffalo Field Office

FINDING OF NO SIGNIFICANT IMPACT: On the basis of the information in the EA, incorporated here by reference, and all other information available to me, I find that: (1) the implementation of Alternative B will not have significant environmental impacts beyond those addressed in Powder River Basin Final Environmental Impact Statement (PRB FEIS) 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. Thus BLM will not prepare an EIS. I base this finding on consideration of the Council on Environmental Quality's (CEQ) criteria for significance (40 CFR 1508.27), both with regard to the context and to the intensity of the impacts described in the EA, and Interior Department Order 3310.

CONTEXT: Mineral development is a long-standing land use in the PRB. Over 42% of the nation's coal comes from the PRB. The PRB FEIS reasonably foreseeable development predicted and analyzed the development of 51,000 coalbed natural gas (CBNG) wells and 3,200 oil wells (PRB FEIS ROD). The additional CBNG development described in Alternative B is insignificant in the national, regional, and local context.

INTENSITY: The implementation of Alternative B will result in beneficial effects 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 POD's geographic area does not contain unique characteristics identified in the Buffalo 1985 or PRB 2003 FEISs, 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. CBNG development of the nature proposed with this POD and similar PODs was predicted and analyzed in the PRB FEIS; 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. No species listed under the Endangered Species Act or their designated critical habitat will be adversely affected. The project area is clearly lacking in wilderness characteristics as it is smaller than 5,000 acres. 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 in accord with 43 CFR 3165. A request for administrative review of this finding must include information required under 43 CFR 3165.3(b) (State Director Review), including all supporting documentation. The 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 Office Manager: Duane Spencer Date: 9/28/11

ENVIRONMENTAL ASSESSMENT (EA) WY-070-EA11-289
Yates Petroleum Corporation, Labrador Plan of Development (POD)
Bureau of Land Management, Buffalo Field Office

1. INTRODUCTION

This site-specific analysis tiers into and incorporates by reference the information and analysis contained in the Powder River Basin Oil and Gas Project Environmental Impact Statement and Resource Management Plan Amendment (PRB FEIS), #WY-070-02-065 (2003), pursuant to 40 CFR 1508.28 and 1502.21. This document is available for review at the BLM Buffalo Field Office (BFO) and on our website. This EA addresses a new project and its site-specific impacts that were unknown thus unavailable for review at the time of the PRB FEIS analysis.

1.1. Background

Yates Petroleum Corporation (YPC) submitted the Labrador POD on January 13, 2010 to the Buffalo Field Office (BFO) with 9 applications for permit to drill (APDs) and 1 S&R (Storage and Retrieval 'injection') well, to produce natural gas from coal bearing formations of the PRB, covered by terrain with steep slopes.

- March 7, 2011: Project assigned; Andy Perez (NRS) contacted YPC and discussed onsite dates.
- March 30, 2011: BLM conducted onsite visits to evaluate the proposal and modify it as necessary to alleviate environmental impacts.
- April 15, 2011: BLM's BFO sent a post-onsite deficiency letter.
- June 1, 2011: The project proposal and APDs were complete when BLM received the operator's response to the post onsite deficiencies.
- August 18, 2011: BLM re-visited areas of concern specifically: cross country corridor with the proposed bore.
- September 13, 2011: BLM NRS (Andy Perez) via telephone discussed further detail and potential COA for the cross country corridor with the proposed bore with YPC's (Bob Irwin).
- September 26, 2011: BLM shared the proposed conditions of approval (COAs) with the operator.

1.2. Need for the Proposed Action

The need of the proposed action is to explore, develop and produce oil and gas reserves conducted in a manner supporting natural resource conservation while operating under the conditional rights granted by a federal oil and gas lease, as required in 43 CFR 3160, all onshore orders, the Mineral Leasing Act (MLA), the Federal Land Policy and Management Act (FLPMA), and other acts and regulations. The lessee must obtain approval for the development of an oil and gas lease through an APD on public lands managed by the BLM under Onshore Order No. 1, pursuant to the MLA, and other laws.

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

BLM conducted extensive external scoping for the PRB FEIS; see p. 15 of the ROD and p. 2-1 of the FEIS; but used internal scoping for this EA. This action is similar in scope to the numerous other CBNG PODs that BFO analyzed; external scoping would be unlikely to identify new issues as was verified by the few POD EAs that received external scoping such as the Clabaugh POD (WY-070-EA08-134) and Hollcroft/Stotts Draw POD (WY-070-EA07-021).

The BLM interdisciplinary team (ID team) conducted internal scoping by reviewing the proposed development and project location to identify potentially affected resource and land uses. Appendix A identifies those resources and land uses present and affected by the proposed action; those resources and land uses that are either not present, not affected, or were adequately covered by the PRB FEIS will not be discussed in this EA. The ID team identified significant issues for the affected resources to further focus the analysis. This EA addresses those site-specific impacts that were unknown at the time of the PRB FEIS analysis that would help in making a reasoned decision or may be related to a potentially significant effect. Issues for this project include:

- Soils and vegetation: site stability, reclamation potential, riparian and wetland communities, invasive species
- Wildlife: raptor productivity and greater sage-grouse lek occupancy and persistency
- Cultural: National Register eligible sites,
- Water: ground water depletion, quality and quantity of produced water

Items that did not rise to issues for analysis in this EA include:

- Air quality
- Fires and fuel management

2. ALTERNATIVES INCLUDING THE PROPOSED ACTION

BLM evaluated 2 alternatives, A and B. A brief description of each alternative is in the following sections. Programmatic Mitigation Measures, as determined in PRB FEIS Record of Decision (ROD) apply to all alternatives, including the No Action Alternative (Alternative A), and are in the Standard Mitigation Measures, Operator-committed Mitigation Measures, and site-specific COAs would apply only to action alternatives (Alternative B).

2.1. Alternative A - No Action

The PRB FEIS considered a no action alternative, Volume 1, 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: Carr Draw II, WY-070-EA05-092; Mallard, WY-070-EA07-078; Carr Draw II Add II, WY-070-EA07-023; Carr Draw III East, WY-070-EA09-078; Carr Draw II Add III, CX#s WY-070-CX10-298 to -303; CARU 12-29-5075GW, WY-070-390CXCX3-10-173 (see Table 3.2). (See Table 2.3 for an approximation of the disturbance in the current situation.) This comports to the PRB FEIS which analyzed the reasonably foreseeable development rolling across the PRB of over 51,000 CBNG and 3,200 oil wells. The no action alternative would consist of no new federal wells. This alternative would deny the APDs and /or POD requiring the operator to resubmit APDs or a POD that complies with statutes and the reasonable measures in the PRB RMP Record of Decision (ROD) in order to lawfully exercise conditional lease rights. This alternative also could, through secretarial discretion suspend the 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 - Operator 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 as it was finally, after site visits, submitted to the BLM by YPC on June 1, 2011.

Proposed Action Title/Type: Yates Petroleum Corporation‘s Labrador CBNG POD.

Proposed Well Information: There are 9 CBNG wells and 1 S&R (Storage and Retrieval ‘injection’) well proposed in this POD; the wells are vertical bores proposed on an 80 acre spacing pattern with 1 well per

location. Each well will produce from all 4 of the Fort Union coal seams: Felix, Big George, Anderson, and U. Canyon. Proposed well house dimensions are approximately 6 ft. wide x 7 ft. length x 6 ft. height. Well house color is covert green (environmental color #: 18-0617 TPX), selected to blend with the surrounding vegetation. A list of proposed CBNG wells is in Table 2.1.

Table 2.1. Proposed CBNGWells – Alternative B

	Well Name	Well #	QTR	Sec	TWP	RNG	Lease #
1	LABRADOR CS FEDERAL	4	SWNW	34	50N	75W	WYW130084
2	LABRADOR CS FEDERAL COM	1	NENW	32	50N	75W	WYW130084
3	LABRADOR CS FEDERAL COM	2	SWSE	32	50N	75W	WYW130084
4	LABRADOR CS FEDERAL COM	3	NENW	34	50N	75W	WYW130084
5	LABRADOR ELKHOUND CS	1	NENW	4	49N	75W	WYW130083
6	LABRADOR ELKHOUND CS	2	SWNW	4	49N	75W	WYW130083
7	LABRADOR ELKHOUND CS	3	NENE	5	49N	75W	WYW130083
8	LABRADOR ELKHOUND CS	4	SWNE	5	49N	75W	WYW130083
9	LABRADOR MALAMUTE CS	1	SWSW	34	50N	75W	WYW134227

Water Management Proposal: Table 2.2. includes the water management infrastructures proposed for use with this POD.

Table 2.2. Proposed Water Management Plan (WMP) Facilities – Alternative B

	FACILITY Name / Number	Qtr/Qtr	Sec	TWP	RNG	Capacity (Acre Feet)	Surface Disturbance (Acres)	Lease #
1	Shuttle Pit	SWNE	6	49N	57W	3.8	2	WYW130083
2	Elkhound S&R Federal 5 Injection Well	SWNW	5	49N	75W	NA	1.4	WYW130083

County: Campbell

Applicant: Yates Petroleum Corporation

Surface Owners: Mary Ellen Jones & Jerome E. Jones, Mitchel M. & Dixie Lea Maycock, Jerry Record TJ Ranch Limited Partnership, and BLM

Drilling and Construction:

- Drilling and construction activities are anticipated to be completed within two 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.

- Well metering shall be accomplished 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: One (1) proposed full containment, lined, and fenced off-channel reservoir with an outfall incorporated into

the facility, 1 proposed storage and retrieval underground injection well to inject produced water into the Fort Union geologic formation.

- A road network consisting of existing and proposed improved (i.e., template or engineered) roads and primitive roads, including use of appropriately sized culverts. The project will have 2.01 miles of improved road and 1.75 miles of primitive road, the remainder of the roads that are proposed to be used are already in place and are classified as existing.

- An above ground power line network to be constructed by Powder River Energy Corporation. If the proposed route is altered, then the new route will be proposed via sundry application and analyzed in a separate NEPA action. Power line construction is unscheduled and will not complete before the CBNG wells are producing. If the power line network is not completed before the wells are producing, then temporary diesel/gas generators shall be placed at the 3 power drops.

- The operator is proposing to use portable generators: A storage tank of 1000 gallon capacity shall be located with each diesel/gas generator. Generators are projected to be in operation for about 12 months. Fuel deliveries are anticipated to be about 1-2 times per week.

- A buried gas, water and power line network, metering facilities, and 1 water storage/injection facility. Any rights-of-way (ROWs) are on private surface.

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), Labrador POD: Appendix A (MSUP), Labrador POD: Construction Summary Table of Improved Roads and Well Locations, Drilling Plan and WMP in the POD and individual APDs. Also see the subject 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, Volume 1, pp. 2-9 to 2-40 (2003).

Implementation of committed mitigation measures contained in the MSUP, Drilling Program and WMP, in addition to the Standard COAs contained in the PRB FEIS ROD, are incorporated and analyzed in this alternative.

2.3. Alternatives Considered but Not Analyzed in Detail

The original proposal for the Labrador POD was submitted by YPC on January 13, 2010 with 9 federal applications for permit to drill (APDs) and 1 S&R (Storage and Retrieval 'injection') well. A series of discussions and onsite visits occurred between BLM and YPC based on the initial project POD:

The above changes as documented in a revised project description provided as YPC's 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 BFO.

2.4. Summary of Alternatives

A summary of the infrastructure currently existing in the POD area (Alternative A) and the infrastructure proposed by the operator (Alternative B) in in Table 2.3., below.

Table 2.3. Summary of Alternatives

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

Facility	Alternative A (No Action) Existing Number/ Acres/Miles	Alternative B (Operator Proposal) Proposed Number/ Acres/Miles
Total CBNG Wells	74	9 CBNG/1S&R well=10
Well Locations Nonconstructed Constructed Slotted	~7.4 +/- aces N/A N/A N/A	3.1 acres 2 (0.02 acres) 3 (2.6 acres) 5 (0.4acres)
Conventional Wells	0	0
Gather/Metering Facilities Number of Facilities Acreage of Facilities	 0 0 0	 0 0 0
Compressors Number of Compressors	0 0	0 0.0
Number of Ancillary Facilities (Staging/Storage Areas)	0	4 (3.7acres)
Acres (Miles) of Template/ Spot Upgrade Roads No Corridor With Corridor	5.1 miles (51.8 acres) 5.1 miles (51.8 acres)	1.6 miles (13.0 acres) 0.4 miles (2.4 acres) 1.2 miles (10.6 acres)
Acres (Miles) of Engineered Roads No Corridor With Corridor	Refer to above existing Template/Spot upgrade roads and corridors.	~0.4 miles (1.7 acres) 0 ~0.4 miles (1.7 acres)
Acres (Miles) of Primitive Roads No Corridor With Corridor	1.1 miles (4.2 acres) 0.6 miles (1.4 acres) 0.5 miles (2.8 acres)	1.7 miles (9.4 acres) 0.04 miles (0.1 acres) 1.7 miles (9.3 acres)
Miles of Buried Power No Corridor With Corridor	Same corridor as described in above existing Template/Spot upgrades roads and corridors. 5.1 miles (51.8 acres)	 0 3.3 miles
Miles of Pipeline No Corridor With Corridor	Same corridor as above. 5.1 miles (51.8 acres)	 1.5 miles (8.6acres) 3.3 miles
Miles of Overhead Powerlines	~0.4 miles (1.4 acres) of single phase.	~0.4 miles (1.4 acres) (Operator proposing to convert existing single phase into three phase).
Number of Communication Sites	0	0
Number of Monitor Wells	0	0
Acres of Land Application Disposal	0	0

Facility	Alternative A (No Action) Existing Number/ Acres/Miles	Alternative B (Operator Proposal) Proposed Number/ Acres/Miles
Acres of Subsurface Drip Irrigation	0	0
Number of Treatment Facilities	0	0
Number of Impoundments On-channel Off-channel Lined Unlined	0	1 (2.0 Acres - lined)
Water Discharge Points	0	1 Proposed (no additional disturbance included with impoundment)
Underground Injection Well	0	1 (1.4 acres)
TOTAL ACRES DISTURBANCE	**~ 64.7 Acres**	**42.9 Acres**

2.5. Conformance.

The proposed action conforms to the 1985 Buffalo RMP, the 2001, and the 2003 PRB FEIS & RMP Amendment. The proposed project is in compliance with all federal laws, regulations, and policies. This includes, but is not limited to: FLPMA (particularly Sections 201 and 202), the National Historic Preservation Act, Native American Graves Protection and Repatriation Act, the Endangered Species Act (1973), the Migratory Bird Treaty Act (1918), the Clean Water Act (1972), the Clean Air Act (1970), and the National Environmental Policy Act (1969). The BLM did not use the rebuttable presumption in the 2005 Energy Policy Act via a categorical exclusion to process these APDs to save time since this EA initiation pre-dated the August 12, 2011 decision by the Federal District Court of Wyoming.

3. DESCRIPTION OF AFFECTED ENVIRONMENT

This section describes the physical and regulatory environment that would be affected by implementation of the alternatives described in Section 2. Aspects of the affected environment described in this section focus on the relevant major issues. A screening of all resources and land uses potentially affected is included in Appendix A of this EA. Resources that would be unaffected, or not affected beyond the level analyzed within the PRB FEIS, are not discussed in the EA.

BLM received applications to drill on January 13, 2011. YPC and BLM conducted field inspections of the proposed Labrador POD CBNG project on March 30, 2011. Personnel attending the field inspections are identified in Section 5, Consultation and Coordination and in Table 3.1, below.

Table 3.1. Personnel Attending the Field Inspections

Date	Name	Title	Agency
3/30/2011 & 8/18/2011	Andy Perez	Natural Resource Specialist 307-684-1166	BLM
3/30/2011	Clint Crago	Archaeologist	BLM
3/30/2011	Buck Damone	Archaeologist	BLM
3/30/2011	Jenny Morton	Wildlife Biologist	BLM
3/30/2011	Darci Stafford	Wildlife Biologist	BLM
3/30/2011	J Bunderson	Civil Engineer	BLM

Date	Name	Title	Agency
3/30/2011	Brent Sobotka	Hydrologist	BLM
8/18/2011	Arnie Irwin	Soil Scientist	BLM
3/30/2011& 8/18/2011	Bob Irwin	POD Agent	Yates
3/30/2011	Mitch Maycock	Land Owner	
3/30/2011	Jerry Wyllo	Environmental Agent	Yates
3/30/2011	Brad Mackearny	Pipeline Construction Foreman	Yates

3.1. Project Area Description

YPC's Labrador POD is in Northwestern Campbell County. The project is accessed via Interstate 90; from Gillette the project lies approximately 18 miles W-WSW of Gillette, WY. Turnoff at the Kingsbury Exit #106 and head north on Kingsbury county road 1 mile to the south entry of the POD or 3 miles to the project's north side. The project area is generally rugged, featuring ridgelines and steep, eroded draws. There are several exposed sandstone and scoria cliffs and rock ledges. The area is in a 10-14 inch precipitation zone, with most of the precipitation falling during late winter and spring. Elevations range from 4,360 ft. to 4,780 ft. Within the project area there are numerous unnamed tributaries of Barber Creek that flow north and west through the area.

The Labrador POD project area is adjacent to or overlapping the boundaries of 6 approved federal CBNG PODs, see Table 3.2, below. Reasonably foreseeable development scenarios include but are not limited to filling in or developing in this, or overlapping or adjacent PODs - to 80-acre spacing.

Table 3.2 . CBNG POD Development Adjacent or Overlapping with the Labrador POD

POD Name	Approved Well #s	Decision Date	BLM BFO NEPA Document #
Carr Draw II	10	4/1/2005	WY-070-05-092
Mallard	50	3/9/2007	WY-070-07-078
Carr Draw II Add II	97	12/29/2006	WY-070-07-023
Carr Draw III East	82	7/1/2009	WY-070-09-078
Carr Draw II Add III	5	8/26/2010	WY-070-CX10-298 -to -303
CARU 12-29-5075GW	1	8/23/2010	WY-070-390CX3-10-173

3.2. Soils, Vegetation, and Ecological Sites

3.2.1. Soils

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

Soils differ with topographic location, slope and elevation. Topsoil depths to be salvaged for reclamation range from 0 to 4 inches on ridges to 8+ inches in bottomland. Erosion potential varies depending on the soil type, vegetative cover and slope. Reclamation potential of soils also varies throughout the project area. The main soil limitations in the project area include: depth to bedrock, low organic matter content, and high erosion potential especially in areas of steep slopes.

Detailed soils identification and data for the project area were obtained from the South Campbell County Survey Area, Wyoming Soil Survey Geographic (SSURGO) Database (WY605). The soil survey was

performed by the Natural Resources Conservation Service (NRCS) according to National Cooperative Soil Survey standards. The BLM uses county soil survey information to predict soil behavior, limitations, or suitability for a given activity or action. The agency's long term goal for soil resource management is to maintain, improve, or restore soil health and productivity, and to prevent or minimize soil erosion and compaction. Soil management objectives are to ensure that adequate soil protection is consistent with the resource capabilities. Many of the soils and landforms of this area present distinct challenges for development, and /or eventual site reclamation.

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 3.3. Dominant or Important Soils

Map Unit Symbol	Map Unit Name	Acres	Percent
233	Ustic Torriorthents, gullied	925.9	44%
217	Theedle-Shingle loams, 3 to 30 percent slopes	653.4	31%
117	Cambria-Kishona-Zigweid loams, 6 to 15 percent slopes	156.1	7%
147	Forkwood-Cushman loams, 6 to 15 percent slopes	87.1	4%
122	Cushman-Cambria loams, 6 to 15 percent slopes	72.0	3%
127	Cushman-Theedle loams, 6 to 15 percent slopes	69.2	3%
215	Theedle-Kishona loams, 6 to 20 percent slopes	60.8	3%

Source: NRCS 2010.

See the NRCS Soil Survey WY605 – South Campbell County (SSURGO) data. Additional site-specific soil information is included in the Ecological Site interpretations.

The soils section of this EA addresses the site-specific impacts that were not analyzed in the PRB FEIS and identifies potentially significant effects of the proposed project to help the decision maker come to a reasoned decision. Project issues related to soils and vegetation are further refined to address: soils susceptible to sever erosion, LRP areas (miscellaneous areas), slopes in excess of 25%.

3.2.1.1. Soils Susceptible to Erosion

Loss in productivity is likely to occur on most soils if erosion continues unchecked. Because soil formation is a very slow process, most soils cannot renew their eroded surface while erosion continues. The development of a favorable rooting zone by the weathering of parent rock is much slower than development of the surface horizon. One estimate of this renewal rate is 0.5 ton per acre per year for unconsolidated parent materials and much less for consolidated materials. These very slow renewal rates support the philosophy that any soil erosion is too much. Loss of organic matter, resulting from erosion and tillage, is one of the primary causes for reduction in production yields. When organic matter decreases, soil aggregate stability, the soil's ability to hold moisture, and the cation exchange capacity decline. (Soil Quality-Agronomy Technical Note #7, USDA, Aug 1998)

Soil scientists determined the project area soils are susceptible to erosion in varying degrees. A sandy ecological site has sand ranging from 52-80% in the top few inches and clays ranging from 10-18%. This sandy ecological site was found on a ridge top with topsoil depths averaging 2-4 inches and is susceptible to wind and water erosion due to relatively small amounts of clay and little water holding capacity. Table 3.4 shows the relative erosion potential.

Table 3.4. Relative Erosion Potential

Erosion Potential (wind & water)	Acres	% of Project Area
Slight/Moderate	1197	56%
Severe	926	44%

Source: NRCS 2010.

3.2.1.2. Limited Reclamation Potential (LRP)

Scientists identify LRP soils using NRCS SSURGO Data and onsite investigation. BLM onsite investigation identified LRP areas that would be avoided with the rerouting of the pipeline and adjusting ROW widths. The cross-country pipeline could avoid LRP areas by boring the south side of the drainage.

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) The areas identified at the onsite include the following miscellaneous areas:

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)

3.2.1.3. Slopes in Excess of 25 Percent

A soil's stability is greatly affected by the slope on which it occurs. Greater slopes usually increase the potential for slumping, landslides, and water erosion. Approximately 458 acres (22%) in the project area have slopes of 25% or more.

Soils with slopes of less than 25% may also be prone to high erosion because of the soil type, particle size, texture, or amount of organic matter. Soil types in the POD area with severe erosion potential and slopes 25% or greater, as defined by the NRCS; (USDA NRCS 2007), are in Table 3.5, along with the number of acres and percentage of the project area.

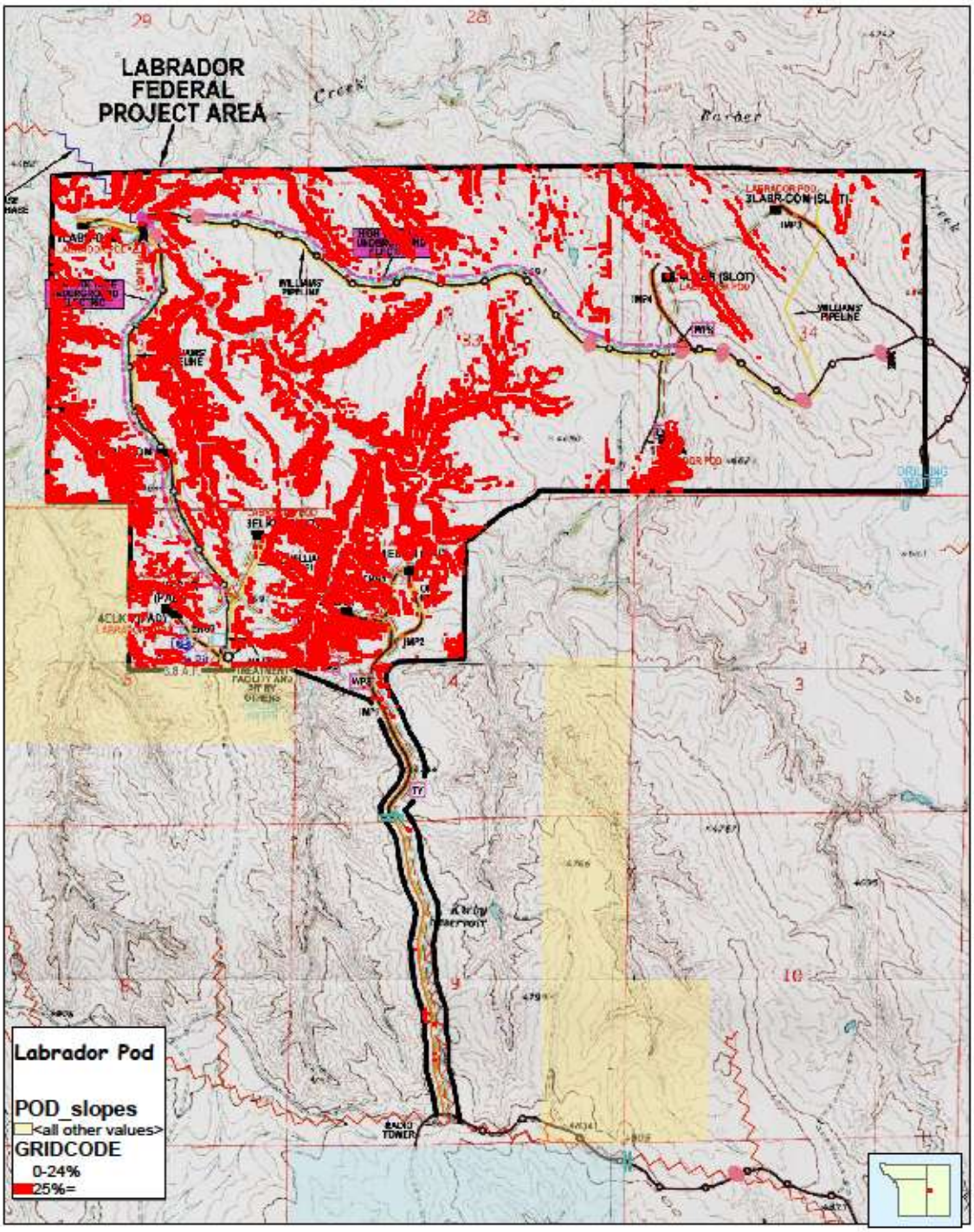
Other contributing factors to slope stability include slope length, slope aspect and colluvium. Slope length has considerable control over runoff and potential accelerated water erosion. Slope aspect is the direction which the surface of the soil faces. Slope aspect may affect soil temperature, evapotranspiration, wind contact and soil moisture. Colluvium is poorly sorted debris that has accumulated at the base of slopes, in depressions, or along small streams through gravity, soil creep, and local wash. It consists largely of material that rolled, slid or has fallen down the slope under the influence of gravity. The rock fragments in colluvium are usually angular, in contrast to the rounded, water-worn cobbles and stones in alluvium and glacial outwash. These factors in combination with slope determine soil stability and the potential for mass soil movement.

Current BLM policy is to avoid development on natural topography with 25% or greater slopes due to their limited reclamation potential, increased risk of soil slumping or mass failure, and high probability of irrecoverable soil losses. BLM's onsite reconnaissance found slopes exceeding 25% in the project area.

Table 3.5. Percent Slope

% Slope	Acres	% of Project Area
0-24%	1665	78%
Greater than or Equal to 25%	458	22%

Source: BLM 2010.



3.2.2. Vegetation and Ecological Sites

BLM staff identified the dominant vegetation community types in the project area are mixed grass prairie and sagebrush shrubland. Species typical of the mixed-grass prairie community type are western wheatgrass (Pascopyrum smithii), blue grama (Bouteloua gracilis), needle-and-thread (Hesperostipa comata), and Wyoming big sagebrush (Artemisia tridentate var. wyomingensis), while species typical of the sagebrush shrubland include Artemisia spp. (Chrysothamnus spp.), western wheatgrass, prairie junegrass (Koeleria macrantha), and plains pricklypear (Opuntia spp.)

In addition BLM observed, bluebunch wheatgrass (Pseudoroegneria spicata), green needlegrass (Nassella viridula). Additional forb and shrub species observed during the site visit included yucca (Yucca glauca), common yarrow (Achillea millefolium), penstemons (penstemon spp.), American vetch (Vicia americana), and milkvetch (Astragalus spp.). Non-native graminoids present included cheatgrass (Bromus tectorum), which is quite extensive in the project area. Cheatgrass is the dominant species present in some locations.

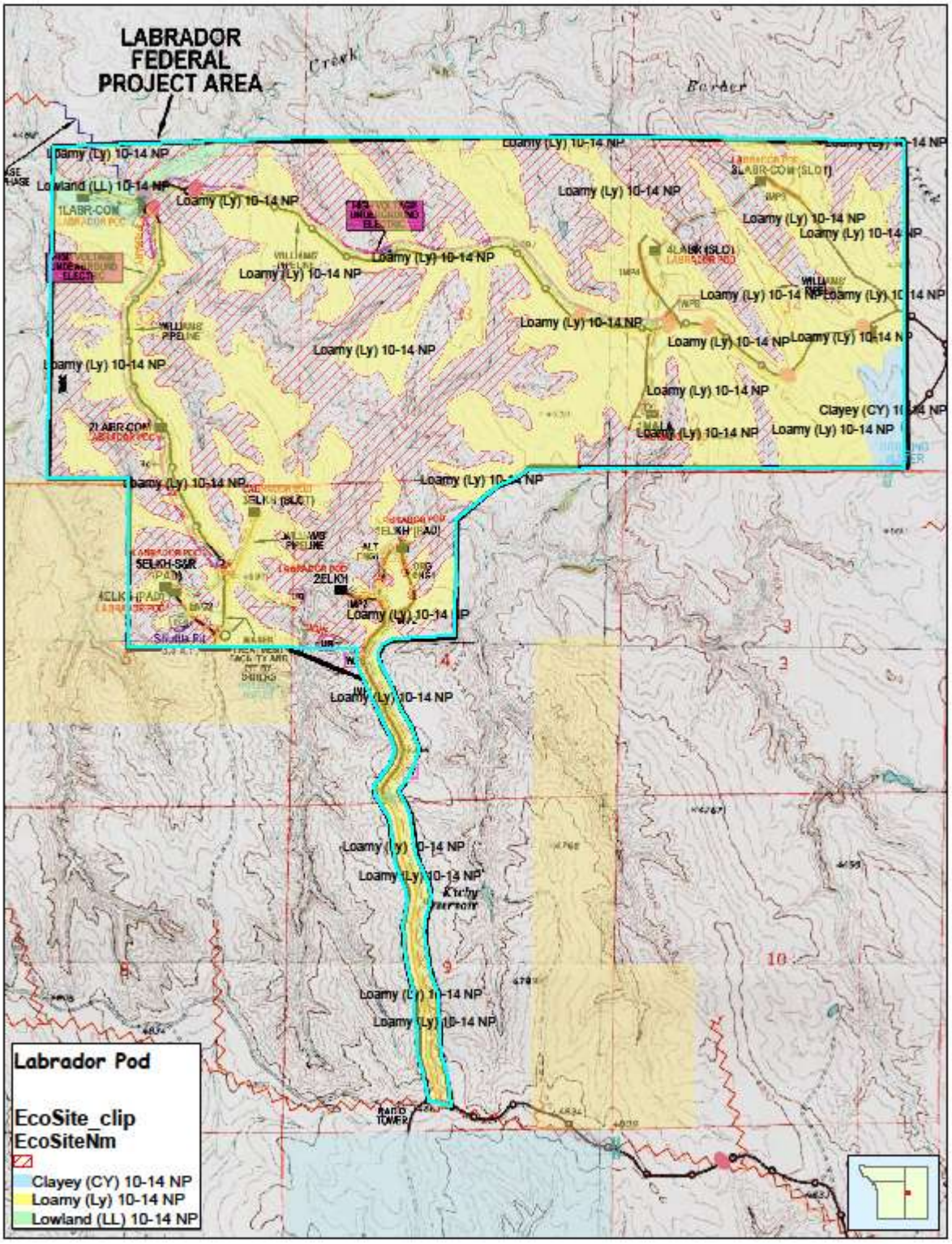
The site visits confirmed the presence of tree species in draws, along the creeks. Cottonwoods (Populus spp.) are present in many of the drainage bottoms.

Ecological site descriptions provide site and vegetation information needed for resource identification, management, and reclamation recommendations. BLM specialists used NRCS published soil survey information, verified through onsite field reconnaissance, to determine the appropriate ecological sites for this POD area. Table 3.6 summarizes the project area's ecological sites.

Table 3.6. Summary of Ecological Sites

Ecological Site	Approximate Acres	Project Area (%)
Loamy (Ly) 10-14 NP	1138.2	54%
Variable (Shallow Sandy & Shallow Loamy	925.9	44%
Lowland (LL) 10-14 NP	33.6	2%
Clayey (CY) 10-14 NP	25.1	1%

Source NRCS 2010



Dominant or important ecological sites and plant communities identified in the project area are Loamy and variable, which through onsite investigations determined shallow clayey would be the ecological sites most impacted by the proposed actions. Refer to ecological site narrative sections below for description of vegetation species observed during onsite field visits.

Loamy Sites occur on gently undulating to rolling land on landforms which include hill sides, alluvial fans, ridges and stream terraces, in the 10-14 inch precipitation zone. These soils are moderately deep to very deep (greater than 20 inches to bedrock), well drained soils that formed in alluvium and residuum derived from sandstone and shale. These soils have moderate permeability. The present plant community is a mixed sagebrush/grass. Wyoming big sagebrush is a significant component of this mixed sagebrush/grass plant community. Cool-season mid-grasses make up the majority of the understory with the balance made up of short warm-season grasses, annual cool-season grass, and miscellaneous forbs. Dominant vegetation includes needle and thread, western wheatgrass, green needlegrass, blue grama, prairie junegrass, Sandberg bluegrass, and Cusick's bluegrass. Cheatgrass invaded the state. Other vegetative species identified at onsite include prickly pear cactus and fringed sagewort.

The Shallow Clayey and Shallow Loamy (10-14NP) ecological sites generally occur on nearly level to steep slopes on landforms which include hill sides, ridges and escarpments in the 10-14 inch precipitation zone. The soils of this site are shallow (less than 20 inches to bedrock), well-drained soils that formed in alluvium or alluvium over residuum derived from unspecified shale and/or sandstone. These soils have moderate to slow permeability. The bedrock is clay shale, miscellaneous shale, or sandstone which is impermeable to plant roots. The main soil limitations include the depth to bedrock. The present plant community is the same as listed above in the Loamy ecological sites with the following exceptions: Sage brush is usually less dense and lower height structure on these shallow sites and shallow sites will possibly include the changes in species composition and changes in density of the following grass species bluebunch wheatgrass, blue grama, Sandberg bluegrass, needleandthread, blue grama and prairie junegrass.

Shallow Sandy sites are shallow (less than 20 feet to bedrock) well drained soils formed in eolian deposits or alluvium over residuum or residuum in the 10-14 inch precipitation zone. The bedrock may be of any kind except igneous or volcanic and is virtually impenetrable to plant roots. These soils have moderate, moderately rapid or rapid permeability. The main soil limitations include low available water holding capacity, and high wind erosion potential. The present plant community consists of threadleaf sedge, fringed sagewort, prairie sandreed and little bluestem.

3.2.2.1. Wetlands/Riparian

The National Wetland Inventory (NWI) identifies approximately 13.4 acres of paulustrine emergent wetlands around intermittent stream channels, and 0.7 acres of paulustrine aquatic wetlands around ponds 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. Thus these appear as isolated wetlands likely outside the jurisdiction of the U.S. Army Corps of Engineers, (Rapanos v. U.S. 547 U.S. 715 (2006)).

3.2.2.2. Invasive Species

A database containing invasive species locations and other data 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). Specific species of concern include:

- Leafy Spurge
- Canada Thistle
- Hounds Tongue
- Russian Knapweed
- Salt Cedar
- Scotch Thistle
- Cheat grass invaded the state of Wyoming, and occurs throughout the project area.

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

3.3. Wildlife

BLM consulted several sources to identify wildlife species that may occur in the proposed project area including: the wildlife database compiled and managed by the BLM BFO wildlife biologists, the PRB FEIS, the Wyoming Game and Fish Department (WGFD) big game and sage-grouse maps, and the Wyoming Natural Diversity Database (WYNDD).

ICF International (ICF) performed a habitat assessment and wildlife inventory surveys. ICF performed surveys for mountain plover, sharp-tailed grouse, greater sage-grouse, bald eagle and raptor nests, and prairie dog colonies according to Powder River Basin Interagency Working Group (PRBIWG) accepted protocol in 2008, 2010, and 2011. A habitat assessment for Ute ladies'-tresses orchid (ULT) and blowout penstemon were conducted on May 25 and June 8, 2008 and throughout 2010, respectively. No formal surveys were conducted for bald eagle roosts as habitat is not present. PRBIWG accepted protocol is available on the Wyoming Energy Resource Information Clearinghouse website (www.weric.info).

WGFD is the agency responsible for management of wildlife populations in the state of Wyoming. WGFD developed several guidance documents that BLM BFO wildlife staff relies upon in evaluating impacts to wildlife and wildlife habitats. WGFD documents used to analyze the proposed project under the current analysis are referenced in this section.

3.3.1. Habitat Types

The Labrador project area is comprised of approximately 60% grasslands, 38% sagebrush shrublands, 2% woodlands, and 1% other. Grasslands are dominant on the flat hilltops throughout the project area, especially Section 34, SE Section 35, and NE Section 4. Grasses ranged from 4 to 20 inches in height and included such species as cheatgrass, needle-and-thread, native wheat grasses and junegrass. Grasses in the prairie dog colonies were often much shorter and included blue gramma and field brome (ICF 2008).

The most abundant shrub in the project area is Wyoming big sagebrush. Sagebrush is typically 18 to 28 inches in height and occurred in a patchy mosaic of sparse to moderately dense stands. The greatest concentrations of sagebrush occurred along slopes and drainages throughout the project area. Stands of sagebrush were especially dense along Barber Creek (S 1/2 Section 27 and S1/2 Section 29) and its unnamed tributaries in the northwest (W 1/2 Section 32), but other dense patches were observed in SE Section 4 and NE Section 33. Less common shrubs recorded in the project area include chokecherry, rabbitbrush, and Great Plains yucca. Small thickets of chokecherry are present along drainages throughout the project area. Rabbitbrush and yucca are scattered throughout most upland areas (ICF 2008).

Trees in the project area are primarily limited to junipers which occur in large stands in most drainages throughout the project area. Small stands (2 to 15 individuals) of mature cottonwoods are present in a few deep draws, including stands in NWNW Section 32, NENW and SENW Section 3, and NWSE Section 28. Approximately 10 Russian olive trees were noted in a draw in NENW Section 3.

3.3.2. Threatened, Endangered, and Candidate Species

3.3.2.1. Threatened and Endangered Species

Threatened, endangered, and candidate species that will be impacted beyond the level analyzed in the PRB FEIS are described below.

3.3.2.1.1. Ute Ladies'-Tresses Orchid (ULT)

The ULT is threatened under the ESA. The PRB FEIS discussed the affected environment for ULT on p. 3-175. Prior to 2005, only 4 orchid populations had been documented in Wyoming. Five additional sites were located in 2005 and one in 2006 (Heidel pers. Comm.). The new locations were in the same drainages as the original populations, with two on the same tributary and within a few miles of an original location. 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, with fruits produced in mid August to September (Fertig 2000).

Bottomland habitats in the project area lack the potential to support ULT. The project area includes only dry ephemeral drainages and uplands that lack perennial or late-season historical water sources. All major drainages were dry during the spring of 2008. Barber Creek, though periodically containing small amounts of flowing water after precipitation events, does not typically hold water throughout the year. All drainages have steep, rugged banks that quickly transition to upland habitats. Dense upland vegetation is dominant in the drainages and includes several grasses, sagebrush, and juniper. Field tests of surface soil samples collected in the main drainages suggest the presence of loam and clay loam soils. Although soil types do not preclude the presence of the ULT, moisture conditions in drainages throughout the project area are largely unsuitable.

3.3.2.2. Candidate Species

3.3.2.2.1. Greater Sage-grouse

The U.S. Fish and Wildlife Service (USFWS) warranted the sage-grouse for federal listing across its range, but precluded the listing for other higher priority listing actions. In addition to being a Wyoming BLM sensitive species, sage-grouse are a WGFD species of greatest conservation need, because populations are declining and they are experiencing ongoing habitat loss. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also a USFWS bird of conservation concern (BCC) for Region 17.

The State Wildlife Agencies' Ad Hoc Committee for Consideration of Oil and Gas Development Effects to Nesting Habitat (2008) recommends that impacts be considered for leks within 4 miles of oil and gas developments. WGFD records indicate that 9 sage-grouse leks occur within 4 miles of the project area. These 9 lek sites are identified in Table 3.7.

Table 3.7. Sage-grouse Leks within 4 miles of the Labrador Project Area

Lek Name	Legal Location	Distance from Project Area (mi)	Occupied?
Barber Creek – South Prong	NWSE S1 T49NR76W	1.8	Yes
Hayden I	SWSE S17 T50NR75W	2.0	Yes
Hayden Satellite A	SWNE S22 T50NR75W	1.6	Yes
Hayden Satellite B	SWN1/2 S22 T50NR75W	0.6	Yes
Laskie Draw East	NEN1/2 S3 T49NR76W	3.8	Yes
Watsabaugh I	SWNE S36 T50NR75W	1.6	Yes
Watsabaugh II	NENE S1 T49NR75W	2.1	Yes
Watsabaugh III	NWN1/2 S12 T49NR75W	1.7	Yes
Watsabaugh IV	SENE S17 T49NR75W	1.9	Yes

In its *Recommendations for Development of Oil and Gas Resources within Important Wildlife Habitats* (2009), WGFD categorized impacts to sage-grouse by number of well pad locations per square mile within 2 miles of a lek and in identified nesting/brood-rearing habitats greater than 2 miles from a lek. Moderate impacts occur when well density is between 1 and 2 well pad locations per square mile or where there is less than 20 acres of disturbance per square mile. High impacts occur when well density is between 2 and 3 well pad locations per square mile or when there are between 20 and 60 acres of disturbance per square mile. Extreme impacts occur when well density exceeds 3 well pad locations per square mile or when there are greater than 60 acres of disturbance per square mile. All 9 of these leks have been exposed to extreme impacts as defined by WGFD (2009).

3.3.3. BLM Sensitive Species

Wyoming BLM sensitive species are those on which management efforts should be focused towards maintaining habitats under a multiple use mandate. The goals of the policy are to:

- Maintain vulnerable species and habitat components in functional BLM ecosystems
- Ensure sensitive species are considered in land management decisions
- Prevent a need for species listing under the ESA
- Prioritize needed conservation work with an emphasis on habitat

The authority for the sensitive species policy and guidance comes from the Endangered Species Act of 1973, as amended; Title II of the Sikes Act, as amended; the Federal Land Policy and Management Act (FLPMA) of 1976; Department Manual 235.1.1A; and WY BLM policy. BLM Wyoming sensitive species that will be impacted beyond the level analyzed in the PRB FEIS are described below.

3.3.3.1. Baird's Sparrow

The PRB FEIS discussed the affected environment for Baird's sparrow on p. 3-188. In addition to being listed as a Wyoming BLM sensitive species, Baird's sparrows are a USFWS BCC for Region 17. Suitable habitat for Baird's sparrows occurs (see Section 3.3.1 Habitat Types) and this species is suspected to occur in the project area.

3.3.3.2. Bald Eagle

The PRB FEIS discussed the affected environment for bald eagles on p. 3-175. At the time the PRB FEIS was written, the bald eagle was a threatened species under the ESA. Recovery prompted USFWS delisting in 2007. The bald eagle remains under the protection of the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. In addition to being a Wyoming BLM sensitive species, bald eagles are a WGFD SGCN with a NSS2 rating, due to populations being restricted in numbers and distribution, ongoing loss of habitat, and sensitivity to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also a USFWS BCC for Region17. Suitable habitat for foraging bald eagles is present throughout the project area (see Section 3.3.1 Habitat Types) and the species is suspected to occur.

3.3.3.3. Brewer's Sparrow

The PRB FEIS discussed the affected environment for Brewer's sparrow on p. 3-200. In addition to being a BLM Wyoming sensitive species, Brewer's sparrows are a WGFD SGCN, with a rating of NSS4 because populations are declining, habitat is vulnerable with no ongoing loss, and the species is not sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also a USFWS BCC for Region 17. Suitable habitat for Brewer's sparrows occurs (see Section 3.3.1 Habitat Types) and this species is suspected to occur in the project area.

3.3.3.4. Ferruginous Hawk

The PRB FEIS discussed the affected environment for ferruginous hawk on p. 3-183. In addition to being a Wyoming BLM sensitive species, ferruginous hawks are a WGFD SGCN, with a rating of NSS3 because the species is widely distributed, population status and trends are unknown but are suspected to be stable, they are experiencing ongoing loss of habitat, and they are sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also a USFWS BCC for Region 17. Suitable habitat for foraging ferruginous hawks is present throughout the project area (see Section 3.3.1 Habitat Types) and the species is suspected to occur.

3.3.3.5. Loggerhead Shrike

The PRB FEIS discussed the affected environment for loggerhead shrike on p. 3-187. In addition to being

a Wyoming BLM sensitive species, loggerhead shrikes are a USFWS BCC for Region 17. The Wyoming Bird Conservation Plan rates them as a Level II species, indicating they are in need of monitoring. Suitable habitat for loggerhead shrikes occurs (see Section 3.3.1 Habitat Types) and this species is suspected to occur in the project area.

3.3.3.6. Loggerhead Shrike

The PRB FEIS discussed the affected environment for loggerhead shrike on p. 3-187. In addition to being listed as a Wyoming BLM sensitive species, loggerhead shrikes are a USFWS BCC for Region 17. The Wyoming Bird Conservation Plan rates them as a Level II species, indicating they are in need of monitoring. Suitable habitat for loggerhead shrikes occurs (see Section 3.3.1 Habitat Types) and this species is suspected to occur in the project area.

3.3.3.7. Long-billed Curlew

The PRB FEIS discussed the affected environment for long-billed curlew on p. 3-184. In addition to being a Wyoming BLM sensitive species, long-billed curlews are a WGFD SGCN, with a rating of NSS3, because populations are restricted in distribution, and habitat is vulnerable but not undergoing loss. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also USFWS BCC for Region 17. Suitable habitat for long-billed curlews occurs (see Section 3.3.1 Habitat Types) and this species is suspected as to occur in the project area.

3.3.3.8. Mountain Plover

The PRB FEIS discussed the affected environment for mountain plover (plover), pp. 3-177 to 3-178. The USFWS proposed the mountain plover for listing as a threatened species under the ESA at the time of drafting the PRB FEIS in 2003. USFWS withdrew the proposal in 2007, finding that the population was larger than had been thought and was no longer declining. Subsequently USFWS again considered and removed the mountain plover from listing. The mountain plover is a Wyoming BLM sensitive species, a WGFD SGCN, with a rating of NSS4, because population status and trends are unknown but are suspected to be stable, habitat is vulnerable without ongoing loss, and the species is sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are a USFWS BCC for Region 17. Because of rough topography and dense sagebrush habitats, the majority of the project area is unsuitable for mountain plover nesting (ICF 2011). Suitable habitat is present in the form of a prairie dog colony in Sections 33 and 34, T50N, R75W (Refer to Section 3.3.3.11. Black-tailed Prairie Dog, below for habitat description). This and other surrounding prairie dog colonies were surveyed for mountain plovers over numerous years yielding no sightings.

3.3.3.9. Sage Sparrow

The PRB FEIS discussed the affected environment for sage sparrow on pp. 3-200 to 3-201. Sage sparrows are a WGFD SGCN, with a rating of NSS3, because populations are restricted in distribution, habitat is restricted but not undergoing substantial loss, and they are sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also a USFWS BCC for Region 17. Suitable habitat for sage sparrows occurs (see Section 3.3.1 Habitat Types) and this species is suspected as present in the project area.

3.3.3.10. Sage Thrasher

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

habitat for sage thrashers occurs (see Section 3.3.1 Habitat Types) and this species is suspected to occur in the project area.

3.3.3.11. Western Burrowing Owl

The PRB FEIS discussed the affected environment for western burrowing owl (burrowing owl) on p. 3-186. In addition to being a Wyoming BLM sensitive species, burrowing owls are a WGFD SGCN, with a rating of NSS4 because the species is widely distributed, population status and trends are unknown but are suspected to be stable, habitat is restricted or vulnerable without substantial recent or on-going loss, and it may be sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action, and they are also a USFWS BCC in Region 17. Suitable habitat for western burrowing owls occurs (see Section 3.3.3.11 Black-tailed Prairie Dog) and this species is suspected as present in the project area.

3.3.3.12. Black-tailed Prairie Dog

The PRB FEIS discussed the affected environment for black-tailed prairie dogs, (p. 3-179). When the PRB FEIS was written, the black-tailed prairie dog was on the list of candidate species for federal listing in 2000 (USFWS 2000). USFWS vacated the proposal in 2004. Wyoming BLM considers black-tailed prairie dogs a sensitive species and continues to afford this species the protections described in the PRB FEIS. The black-tailed prairie dog is a WGFD SGCN, with a rating of NSS3, because populations are declining, and habitat is vulnerable but not undergoing significant loss.

Four black-tailed prairie dog colonies (2 occupied and 2 abandoned), totaling 74 acres, exist in the project area (Table 3.8). In 2011, the most activity was observed in the towns in Sections 33 and 34, T50N, R75W and in Section 9, T49N, R75W.

Table 3.8. Prairie Dog Colonies within and Surrounding the Labrador Project Area.

Location	Size (acres)	Activity status
NESW Section 29, T50N, R75W	5.7	Abandoned
NENE Section 32, T50N, R75W	27.7	Abandoned
SE Section 33 & SW Section 34, T50N, R75W	31.8	Active
NESE Section 9, T49N, R75W	8.8	Active

3.3.3.13. Swift Fox

The PRB FEIS discussed the affected environment for swift fox on p. 3-189. In addition to being a BLM WY sensitive species, the swift fox is also a WGFD SGCN, with a rating of NSS4, because population status and trends are unknown but are suspected stable, and habitat is vulnerable but is not undergoing substantial loss. Swift fox was warranted for threatened species listing but precluded by higher priorities in 1994. Landowners and conservation agencies greatly increased species conservation and re-populated it in extirpated ranges. The USFWS removed swift fox from listing consideration in 2001. Suitable habitat for swift fox occurs (see Section 3.3.1 Habitat Types and Section 3.3.3.11 Black-tailed Prairie Dog) and this species is suspected to occur in the project area.

3.3.4. Big Game

BLM biologists observed pronghorn and mule deer during the field visit to the project area. WGFD data indicate that the project area contains yearlong and winter yearlong range for both of these species. Populations of pronghorn and mule deer in their respective hunt areas are above the WGFD population objectives (WGFD 2010). The most current big game range maps are available from WGFD. The affected environment for pronghorn is discussed in the PRB FEIS on pp. 3-117 to 3-122 and for mule deer on pp. 3-127 to 3-132.

3.3.5. Upland Game Birds

3.3.5.1. Plains Sharp-tailed Grouse

The PRB FEIS discussed the affected environment for plains sharp-tailed grouse on pp. 3-148 to 3-150. Suitable habitat for sharp-tailed grouse occurs (see Section 3.3.1 Habitat Types) and this species is suspected to occur in the project area.

3.3.6. Migratory Birds

The PRB FEIS discussed the affected environment for migratory birds, (pp. 3-150 to 3-153). Sagebrush communities are the primary vegetation type (migratory bird habitat) in the project area. Migratory birds most dependent on sagebrush ecosystems for survival are considered obligates (e.g., sage thrasher, Brewer's sparrow, sage sparrow) (Rowland et al. 2006). Many of these species are socially and/or ecologically important, including several Wyoming BLM sensitive species.

3.3.7. Raptors

The PRB FEIS discussed the affected environment for raptors on pp. 3-141 to 3-148. Nineteen known raptor nests occur within 0.5 miles of the Labrador project area, 3 of which supported a nesting pair in 2011 (BLM ID #s 12511, 12515 and a new red-tailed hawk nest in Section 3, T49N, R75W). BLM and ICF documented 6 species using these 19 nests in recent history: red-tailed hawks, golden eagles, great horned owls, Cooper's hawks, prairie falcons, and American kestrels (See BLM-generated Labrador Project Raptor Nest Report in the administrative record).

3.3.8. 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 firmly 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. Though less than 1% of mosquitoes are infected with WNv, they still are very effective in transmitting the virus to humans, horses, and wildlife. *Culex tarsalis* appears to be the most common mosquito to vector, WNv. The human health issues related to WNv are well documented and continue to escalate. Historic data collected by the CDC and published by the USGS at www.westnilemaps.usgs.gov are summarized in Table 3.9. Reported data from the PRB includes Campbell, Sheridan and Johnson counties.

Table 3.9. 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

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. There is some evidence that the incidence of WNv tapers off over several years after a peak following initial outbreak (Litzel and Mooney, personal conversations). If this is the case, occurrences in Wyoming are likely to increase over the next few years, followed by a gradual decline in the number of reported cases.

Although most of the attention focused on human health issues, WNv had an impact on vertebrate wildlife populations. At a conference at the Smithsonian Environmental Research Center, scientists disclosed WNv was detected in 157 bird species, horses, 16 other mammals, and alligators (Marra et al 2003). In the eastern US avian populations incurred very high mortality, particularly crows, jays and related species. 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). Actual mortality is likely greater. Population impacts of WNv on raptors are unknown at present. The Wyoming State Vet Lab determined 22 sage-grouse in one study (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 more sensitive to the virus (Rinkes 2003).

Mosquitoes can potentially breed in any standing water that lasts more than 4 days. In the PRB, there is generally increased surface water availability 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 two similar undeveloped sites (Walker et al. 2003). Reducing the population of mosquitoes, especially species that are apparently involved with bird-to-bird transmission of WNv, such as *Culex tarsalis*, can help to reduce or eliminate the presence of virus in a given geographical area (APHIS 2002). The most important step any property owner can take to control such mosquito populations is to remove all potential man-made sources of standing water in which mosquitoes might breed (APHIS 2002).

The most common pesticide treatment is to place larvicidal briquettes in small standing water pools along drainages or every 100 feet along the shoreline of reservoirs and ponds. It is generally accepted that it is not necessary to place the briquettes in the main water body because wave action prevents this environment from being optimum mosquito breeding habitat. Follow-up treatment of adult mosquitoes with malathion may be needed every 3 to 4 days to control adults following application of larvicide (Mooney, personal conversation). These treatment methods seem to be effective when focused on specific target areas, especially near communities, however they have not been applied over large areas nor have they been used to treat a wide range of potential mosquito breeding habitat such as that associated with CBNG development. 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. The letter encouraged companies to contact either local Weed and Pest Districts or the Wyoming Department of Health for surface water treatment options.

3.4. Water Resources

The project area is in the Upper Powder River drainage system. The Wyoming Department of Environmental Quality (WDEQ) assumed primacy from United States Environmental Protection Agency (EPA) for maintaining the water quality in the waters of the state of Wyoming. The Wyoming State Engineer's Office (WSEO) has authority for regulating water rights, and permitting reservoirs for impounding surface water in state. The Wyoming Oil and Gas Conservation Commission (WYOGCC) has authority for permitting and bonding off-channel impoundments that are located over State and fee minerals.

3.4.1. Groundwater

The groundwater in the project area is historically used for stock water or domestic purposes. A search of the WSEO groundwater rights database for this area showed 4 registered stock and domestic water wells within 1 mile of the POD boundary with depths ranging from 124 to 450 feet. For additional information on groundwater, please refer to the PRB FEIS (January 2003), Chapter 3, Affected Environment, pp. 3-1 through 3-36.

WDEQ Water Quality Rules and Regulations: Chapter 8. Quality Standards for Wyoming Groundwaters 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 internet site.

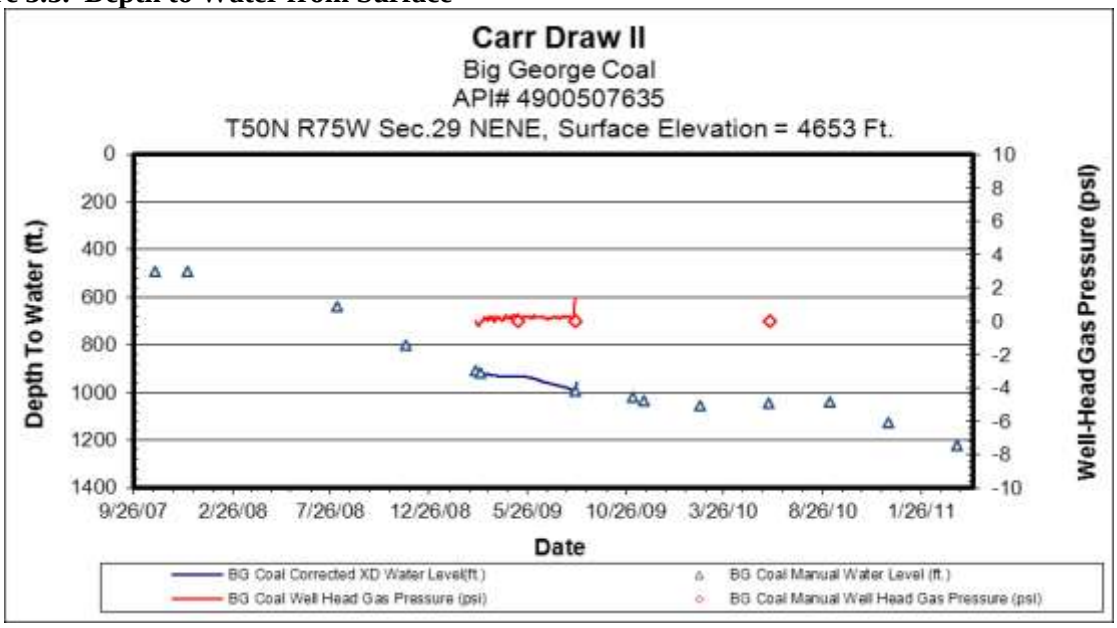
The ROD includes a Monitoring, Mitigation and Reporting Plan (MMRP). The objective of the MMRP is to monitor those elements of the analysis addressed in the ROD where there was limited information available during the preparation of the PRB FEIS. The MMRP called for the use of adaptive management to make management changes based on the results of monitoring data.

Specifically relative to groundwater, the MMRP identified the following (PRB ROD, p. E-4):

- The effects of infiltrated waters on the water quality of existing shallow groundwater aquifers are not well documented at this time [2003];
- Potential impacts will be highly variable depending upon local geologic and hydrologic conditions;
- It may be necessary to conduct investigations at representative sites around the basin to quantify these impacts;
- Provide site specific guidance on the placement and design of CBNG impoundments, and
- Shallow groundwater wells would be installed and monitored where necessary.

The production of CBNG requires the temporary reduction of the hydraulic head in the targeted saturated coal zones. The BFO has been monitoring coal zone water levels and gas pressures in the PRB since the early 1990s (Figure 3.3). The Labrador POD is surrounded by numerous approved federal, fee, and state CBNG projects. As a result, the target coal zone pressure may have been reduced through off set water production associated with those projects. The Carr Draw II Groundwater monitoring well was installed by Williams Production RMT Company as a part of the BFO's groundwater monitoring program. The well is located in the NENE of Section 29, Township 50 N, Range 75 W, and is located less than 1 mile north of the Labrador POD boundary. The initial water level in the Big George coal at this site was recorded at 492 feet below ground level on October 29, 2007. On June 21, 2011, the water level was 1261 feet below the ground surface, representing a decline of 769 feet since the well was completed. This level of drawdown is within the range predicted through the regional groundwater modeling conducted for the PRB FEIS. For additional information, please refer to the PRB FEIS. Chapter 4, Groundwater; and the Wyoming State Geological Survey's Open File Report 2009-10 titled "1993-2006 Coalbed Natural Gas (CBNG) Regional Groundwater Monitoring Report: Powder River Basin, Wyoming" which is available at: http://www.wsgs.uwyo.edu.

Figure 3.3. Depth to Water from Surface



3.4.2. Surface Water

The project area is in the Barber Creek drainage which is tributary to the Upper Powder River watershed. Most of the drainages in the area 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 and stable with mild incision and meandering.

The PRB FEIS presents the historic mean electrical conductivity (EC, in µmhos/cm) and sodium adsorption ratio (SAR) by watershed at selected United States Geological Survey (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 within the project area. The representative stream water quality is used in the impact analysis presented in Chapter 4 as the baseline for evaluating potential impacts to water quality and existing uses from future discharges of CB[NG] produced water of varying chemical composition to surface drainages within the project area" (PRB FEIS, p. 3-48). For the Upper Powder River Watershed, 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. These values were determined at the USGS station (Station ID 06317000) located on the Upper Powder River at Arvada, WY (PRB FEIS, p. 3-49).

During development of the project, the operator checked for natural springs within the POD boundary. No springs were observed.

Refer to the PRB FEIS, Chapter 3, Affected Environment pp. 3-36 to 3-56, for more information on surface water.

3.5. Cultural Resources

YPC performed a Class III cultural resource inventory for the Labrador project prior to on-the-ground project work (BFO project no. 70110028). YPC provided BLM with 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*. Clint Crago, BLM Archaeologist, reviewed the report for

technical adequacy and compliance with BLM standards, and determined it adequate. The following resources are in or near the project area.

Table 3.10. Cultural Resources Inventory Results

Site Number	Site Type	Eligibility
48CA163	Prehistoric Stone Circle Site	Not Eligible
48CA5367	Prehistoric Lithic Scatter	Not Eligible
48CA5762	Prehistoric Lithic Scatter	Not Eligible

3.5.1. Native American Religious Concerns

During numerous past tribal consultations, several Native American tribes indicated to BFO that some stone circle sites may retain cultural or religious significance. Site 48CA163 which contains stone circles was determined "not eligible", although it may be significant to some tribes. BFO initiated tribal consultation in order to determine if the stone circles in the site were significant Tribal consultation was initiated by letter, e-mails, and phone calls specifically in regard to identification of and potential impacts to 48CA163. BFO received an interest in consultation from the Eastern Shoshone, Fort Peck/Assiniboine, and Northern Cheyenne Tribes. Each tribe requested a field visit in order to identify the features. BLM could not facilitate the requests due to funding issues and field visits did not occur.

3.6. Air Quality

Existing air quality throughout most of the PRB is in attainment with all ambient air quality standards. Air quality conditions in rural areas are likely to be good, as characterized by limited air pollution emission sources (few industrial facilities and residential emissions in the relatively small communities and isolated ranches) and good atmospheric dispersion conditions, resulting in relatively low air pollutant concentrations. Existing air pollutant emission sources in the region include following:

- Exhaust emissions (primarily CO and nitrogen oxides [NO_X]) 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;
- Dust (particulate matter) 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;
- Dust (particulate matter) from coal mines;
- NO_X, particulate matter, and other emissions from diesel trains; and
- SO_2 and NO_X from power plants.

For a complete description of the existing air quality conditions [in 2003] in the PRB, refer to the PRB Final EIS Volume 1, Chapter 3, pp. 3-291 to 3-299.

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 PRB FEIS analyzed the No Action Alternative as Alternative 3 in the PRB FEIS, and is incorporated by reference into this EA, in addition to the 6 PODs in Table 3.2. Information specific to resources for this alternative is included in 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
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

Alternative B is the proposal for a POD with 10 APDs; see Section 2.2.

4.2.1. Soils, Vegetation, and Ecological Sites

4.2.1.1. Soils

4.2.1.1.1. Direct and Indirect Effects

Impacts anticipated to occur include soil rutting and mixing, compaction, increased erosion potential, and loss of soil productivity. The most notable impacts to soils would occur in association with the construction of well pads, staging areas, and roads. Grading and leveling would be required to construct these facilities with the greatest level of effort required on more steeply sloping areas. During construction, the soil profiles would be mixed with a corresponding loss of soil structure. Mixing may result in removal, dilution, or relocation of organic matter and nutrients to depths where it would be unavailable for vegetative use. Less desirable inorganic compounds such as carbonates, salts, or weathered materials could be relocated and have a negative impact on revegetation.

Soils compaction results the construction of wells and associated facilities, with compaction maintained, at least in part, by continued vehicle and foot traffic as well as operational activities. Factors affecting compaction include soil texture, moisture, organic matter, clay content and type, pressure exerted, and the number of passes by vehicle traffic or machinery. Compaction leads to a loss of soil structure; decreased infiltration, permeability, and soil aeration; as well as increased runoff and erosion.

Increased erosion can lead to a decrease in soil fertility and an increase in sedimentation. The duration and intensity of these impacts would vary according to the type of construction activity to be completed and the inherent characteristics of the soils to be impacted.

The potential for erosion would increase through the loss of vegetation cover and soil structure as compared to an undisturbed state. Soil productivity would decrease, primarily as a result of profile mixing and compaction along with the loss in vegetative cover. These impacts would begin immediately as the soils would be subjected to grading and construction activities and impacts would continue for the term of operations. The impacts on soils would move to a steady state as construction activities were completed and well production/maintenance operations begin.

An important component of soils in Wyoming's semiarid rangelands, especially in the Wyoming big sagebrush cover type, are biological soil crusts, or cryptogamic soils that occupy ground area not covered with vascular plants. Biological soil crusts are important in maintaining soil stability, controlling erosion, fixing nitrogen, providing nutrients to vascular plants, increasing precipitation infiltration rates, and providing suitable seed beds (Belnap et al. 2001). They adapted to growing in severe climates; however, they take many years to develop (20 to 100) and can be easily damaged or destroyed by surface disturbances associated with construction activities.

Rutting affects the surface hydrology of a site as well as the rooting environment. The process of rutting physically severs roots, thus reducing soil aeration and infiltration thereby degrading the rooting environment. Rutting may result in topsoil and subsoil mixing, reducing soil productivity. Rutting also disrupts natural surface water hydrology by diverting and concentrating water flow thus accelerating erosion. Soil mixing typically results in a decrease in soil fertility and a disruption of soil structure.

The operator proposed engineered sections of road to gain access to the wells due to steep slopes, with cuts/fills exceeding 5 feet. BLM will consider having the licensed professional engineer(s) certify that the construction of those roads meet the design criteria and are built to Bureau standards. These 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 in order to protect erodible soils.

Low water crossings (LWC) are a BLM approved construction technique to allow all weather access though drainages where culverts are not appropriate or desired. BLM recommends specific design criteria for a typical LWC and shown in Road Designs. This will mitigate the effects of inappropriately constructed structure in drainages. Construction completed to BLM approvable standards will reduce down drainage sedimentation, erosion, and scouring caused by frequent failure of in-channel structures.

Operator and BLM recommended a Loamy and Shallow Clayey seed mixes for the Labrador POD based on soil map unit types, the dominant ecological sites found in the project area, and the mixing of soil horizons in disturbed areas.

The BLM will evaluate reclamation success using the requirements set forth in Appendix B of this EA, Reclamation Policy, and the BLM State Wide Reclamation Policy revised 2011.

Expanded gas, water, and electric ROW infrastructure linking POD support facilities are part of

reasonably foreseeable development (RFD) additions to the proposed action (PRB ROD, p. 2). A foreseeable addition may be a request for a ROW to connect roads, gas and water utility lines.

4.2.1.1.2. Soils Susceptible to Erosion

Shallow Sandy and Shallow Loamy Ecological Sites Susceptible to Erosion: Engineered Road 2, to the Elkhound S&R Federal 5 Injection Well (T49N, R75W, Sec. 5, SWNW) and the Alt ENG 1Road going to Labrador Elkhound CS 1 Well (T49N, R75W, Sec. 4, NENW) will impact 0.4 miles or 2,126 feet of shallow ecological sites and will require expedient reclamation. This sandy soil was found on a ridge top with topsoil depths averaging 2-4 inches. The dominant vegetation included; big sagebrush, rubber rabbit brush, needle and thread, prairie sandreed, blue grama, and cheat grasses. Without proper and timely re-vegetation practices the shallow soils readily erode due to wind and water action. The invasion of prickly pear and cheat grass indicates some deterioration from identified transition state. Wind and water erosion could be high since there is little to no depth or organic matter in the soil. Reclamation will be difficult without extra mitigation. A COA will be applied to insure that the surface is stabilized to protect from wind/water erosion within 30 days of initiating construction.

Steep Sites Susceptible to Erosion: Labrador Elkhound CS 1 Well, Labrador Elkhound CS 4 Well, Elkhound S&R Federal 5 Injection Well, Engineered Road 2 to the Elkhound S&R Federal 5 Injection Well, the Alt ENG 1 Road going to Labrador Elkhound CS 1 Well, and cross-country utility corridor (Labrador POD: Appendix A (MSUP), Figure 2) are proposed in the steep slopes susceptible to erosion and low reclamation potential. A COA will be applied to insure that the surface is stabilized to protect from wind/water erosion within 30 days of initiating construction.

4.2.1.1.3. Limited Reclamation Potential (LRP)

4.2.1.1.3.1. Miscellaneous Areas

Badlands and Rock outcrops: The following wells and/or associated infrastructure will have impacts to LRP areas, namely badlands and rock outcrop components: Labrador Elkhound CS 1 Well, Engineered Road 2 to the Elkhound S&R Federal 5 Injection Well (T49N, R75W, Sec. 5, SWNW), the Alt ENG 1 Road going to Labrador Elkhound CS 1 Well (T49N, R75W, Sec. 4, NENW), and cross-country utility corridor (Labrador POD: Appendix A (MSUP), Figure 2. T49N, R75W, Sec. 4&5). A COA will be applied to insure that the surface is stabilized to protect from wind/water erosion within 30 days of initiating construction.

4.2.1.1.4. Slopes In Excess of 25 Percent

Slopes in Excess of 25 Percent: The following wells and/or associated infrastructure will have impacts to topography in excess of 25% slope: Labrador Elkhound CS 1 Well, Labrador Elkhound CS 4 Well, Elkhound S&R Federal 5 Injection Well, the Alt ENG 1 Road going to Labrador Elkhound CS 1 Well (T49N, R75W, Sec. 4, NENW), and cross-country utility corridor (Labrador POD: Appendix A (MSUP), Figure 2. T49N, R75W, Sec. 4&5). A COA will be applied to insure that the surface is stabilized to protect from wind/water erosion within 30 days of initiating construction.

4.2.1.1.5. Cumulative Effects

The cumulative effects associated with Alternative B are likely inside analysis parameters and impacts described in the PRB FEIS provided there is prompt site stabilization. Refer to the PRB FEIS, Volume 2, Chapter 4 for cumulative impacts.

The PRB FEIS defines the designation of the duration of disturbance (pp. 4-1 and 4-151). Most soil disturbances would be short term impacts with expedient interim reclamation and site stabilization.

4.2.1.1.6. Mitigation Measures

COAs, mitigation measures, surface upgrades, applicant committed measures, and Reclamation Policy in

Appendix B of this EA would help to mitigate or reduce the impacts described above. In areas of steep topography, erosive soils and/or poor reclamation potential, BLM will consider requesting a plan to stabilize topsoil within a 30 day period from the start of construction in those areas.

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

-LRP Areas: A 30 day stabilization requirement should apply to wells and access/pipelines which will have impacts to LRP areas namely badlands, blown-out lands, and rock outcrop components. The following wells and roads should be stabilized within 30 days of the start of construction: Labrador Elkhound CS 1 Well, Engineered Road 2 to the Elkhound S&R Federal 5 Injection Well (T49N, R75W, Sec. 5, SWNW), the Alt ENG 1 Road going to Labrador Elkhound CS 1 Well (T49N, R75W, Sec. 4, NENW), and cross-country utility corridor (Labrador POD: Appendix A (MSUP), Figure 2. T49N, R75W, Sec. 4&5).

-Slopes in excess of 25%: BLM will consider applying a 30 day stabilization requirement to wells and access/pipelines that were unable to be moved away from or off of slopes in excess of 25%. The following wells and roads may receive this measure within 30 days of the start of construction: Labrador Elkhound CS 1 Well, the Alt ENG 1Road going to Labrador Elkhound CS 1 Well (T49N, R75W, Sec. 4, NENW), and cross-country utility corridor (Labrador POD: Appendix A (MSUP), Figure 2. T49N, R75W, Sec. 4&5).

-A 30 day stabilization requirement is applied to wells and access/pipelines which impact shallow sandy and shallow loamy ecological sites for all locations discussed in the reclamation plan which include: cross country utility corridors called out within the POD specific reclamation plan (5 segments), and the well pads and engineered access roads listed below:

	Well # / Road Name	**Site Type**
1	Labrador Elkhound CS 1	Well Pad
2	Labrador Elkhound CS 4	Well Pad
3	Elkhound S&R Federal 5 Injection	Well Pad
4	Alt Road going to Labrador Elkhound CS 1 Well	Road
5	Engineered Road 2 to Elkhound S&R Federal 5 Injection Well	Road

-Place a minimum average of 4 inches of aggregate on road segments where grades exceed 8%.

-To protect erodible soils the following mitigation will be applied:

- The Engineered Road 2 to the Elkhound S&R Federal 5 Injection Well (T49N, R75W, Sec. 5, SWNW) and the Alt ENG 1 Road going to Labrador Elkhound CS 1 Well (T49N, R75W, Sec. 4, NENW) that are to be used in conjunction with accessing federal wells must be fully built (including all water control structures such as wingditches, culverts, relief ditches, low water crossings, surfacing etc.) and functional to BLM standards as outlined in the 9113 Manual prior to drilling of the wells.

- The proposed shuttle pit that is found along the Labrador Elkhound CS 4 Well access road (T49N, R75W, Section 15, SWNE) will need to be further analyzed at the pre-construction meeting with the operator. In addition, the operator will also need to provide the BLM with updated engineered designs due to the current designs stating “To be designed by others “, and will need to staked per

the design to illustrate the outer edge of disturbance for the pre-construction meeting. (PRB ROD and SDR # WY-2011-022, pp. 5-6).

- All engineered well pads and engineered roads will be fully slope staked prior to the pre-construction meeting.

- Upon completion and the reserve pits being reclaimed the following three (3) wells the well pads will be re-contoured and sloped to a 3:1 contour for interim reclamation as discussed at the onsite held with the operator (Yates) and BLM BFO on March 30, 2011.

	Well #/Road Name	**Site Type**
1	Labrador Elkhound CS 1	Well Pad
2	Labrador Elkhound CS 4	Well Pad
3	Elkhound S&R Federal 5 Injection	Well Pad

-Provide erosion control along all pipeline routes to help achieve successful reclamation. Erosion control is defined as water bars, mulching, straw crimping, or erosion blankets, etc. as specified in the operators POD Specific Reclamation Plan.

-Cross country pipeline routes will not become roads after construction is complete. All sections of pipeline will be fully reclaimed to blend with the surrounding topography. Pipeline inspections should be conducted by ATV, foot, or air.

-The BLM will consider evaluating reclamation success using the requirements set forth in the Statewide Reclamation Policy revised 2011, see Appendix B of this EA and incorporated herein.

-No soil shall be cast over the steep slopes present in that area. This will apply to the following: Labrador Elkhound CS 1 Well, Labrador Elkhound CS 4 Well, Elkhound S&R Federal 5 Injection Well, Engineered Road 2 to the Elkhound S&R Federal 5 Injection Well (T49N, R75W, Sec. 5, SWNW), Alt ENG 1 Road going to Labrador Elkhound CS 1 Well (T49N, R75W, Sec. 4, NENW), and cross-country utility corridor (Labrador POD: Appendix A (MSUP), Figure 2. T49N, R75W, Sec. 4&5). A 20 foot buffer will apply to all grade breaks as discussed during the onsite held with the operator (Yates) and BLM BFO on March 30, 2011, for the three (3) well pads, two (2) Engineered Roads, and cross-country utility corridor (Labrador POD: Appendix A (MSUP), Figure 2. T49N, R75W, Sec. 4&5) listed as follows:

	Well #/Road Name	**Site Type**
1	Labrador Elkhound CS 1 (*20 foot buffer will apply to the location on all surrounding grade breaks)*	Well Pad
2	Labrador Elkhound CS 4 (*20 foot buffer will apply to the location to the erosional features to the SE side of the location*)	Well Pad
3	Elkhound S&R Federal 5 Injection (*Refer to Labrador Elkhound CS 4 notes above*)	Well Pad
4	Alt Road going to Labrador Elkhound CS 1 Well(*20 foot buffer will apply to the location on all surrounding grade breaks)*	Road
5	Engineered Road 2 to Elkhound S&R Federal 5 Injection Well (*20 foot buffer will apply to the access road and surrounding grade break and or head cuts)*	Road

6	Cross-country utility corridor (Labrador POD: Appendix A (MSUP), Figure 2. T49N, R75W, Sec. 4&5): *20 foot buffer will apply to the utility corridor and surrounding grade breaks and or head cuts unless specified and addressed in the POD Specific Reclamation Plan*	Utility Corridor

4.2.1.1.7. Residual Effects

Residual effects across the POD would include a long-term loss of soil productivity associated with well pads and roads. The PRB FEIS identified residual effects (p. 4-408) such as the loss of vegetative cover, despite expedient reclamation, for several years until reclamation is successfully established.

Labrador Elkhound CS 1 Well, Labrador Elkhound CS 4 Well, Elkhound S&R Federal 5 Injection Well, Engineered Road 2 to the Elkhound S&R Federal 5 Injection Well, and the Alt ENG 1 Road going to Labrador Elkhound CS 1 Well: The identified residual effects associated with the approval of proposed constructed well locations and 2 engineered road segments are as follows:

1. The BLM ID Team considers this proposal to have somewhat limited reclamation potential with final reclamation bordering on difficult to achieve.

2. BLM also considered the following factors when considering the evaluation of proposed well/ and cross-country utility corridors: (1) The cross country pipeline is a critical piece of infrastructure desired by the landowner, (2) The access road to the Labrador Elkhound CS 1 Well is existing, actively eroding abandoned ranch road which would be stabilized by the proposal, (3) Operator was willing and committed to reroute the cross country pipeline away from LRP areas. (4) Operator was willing and committed to the items set forth in the Labrador POD: Appendix A (MSUP), Cross-country Utilities, site-specific Reclamation Plan and minimize disturbance where warranted.

With the combination of these residual effects (listed above) the BLM ID Team considers that Alternative B with proposed Labrador Elkhound CS 1 Well, Labrador Elkhound CS 4 Well, Elkhound S&R Federal 5 Injection Well, Engineered Road 2 to the Elkhound S&R Federal 5 Injection Well, and the Alt ENG 1 Road going to Labrador Elkhound CS 1 Well is likely within the parameters for surface disturbance and surface disturbance reclamation found in PRB ROD.

4.2.2. Vegetation and Ecological Sites

4.2.2.1. Direct and Indirect Effects

The PRB FEIS discusses most direct and indirect effects to ecological sites and vegetation (p. 4-153 to 4-164). The proposed action would impact the common plant communities that occur on the site and the transition between the communities.

Other impacts anticipated to occur include those in the direct and indirect effects listed above under soils section. Direct effects to ecological sites would occur from ground disturbance caused by construction of well pads, ancillary facilities, associated pipelines and roads. Short term effects would occur where vegetated areas are disturbed but later reclaimed within 1 to 3 years of the initial disturbance. Long-term effects would occur where well pads, compressor stations, roads, water-handling facilities or other semi-permanent facilities would result in loss of vegetation and prevent reclamation for the life of the project.

Cross country pipeline (Labrador POD: Appendix A (MSUP), Figure 2) crossing locations may have steep slopes, thin soils and limited reclamation potential (See Section 4, Soils Direct and Indirect LRP and Steep Slopes).

Sagebrush does not regenerate easily after human disturbance such as urban or agricultural development,

or even after natural occurrences such as wildfire. It takes years, even generations, for sagebrush to fully grow back. Sagebrush still has not returned to some areas of the Columbia Basin burned by a large fire 40 years ago (Pacific Northwest National Laboratory Shrub Steppe Ecology Series May 2010).

Vegetation will likely be impacted by the proposed 3 engineered well pads and 2 engineered road sections labeled ALT ENG 1 and ENG 2.The ALT ENG 1 road segment is 988 linear feet and will encompass a total foot print of 0.85 acres. This ALT ENG 1 road segment is preferred by the landowner (Mitch Maycock, split estate surface), BLM archaeologists, and Yates Petroleum as per their consensus at the BLM/Operator onsite held on March 30, 2011. By implementing the ALT ENG 1 road segment in comparison to the ORG ENG 1will reduce the overall ecological foot print by 414 linear feet of engineered road and 0.35 acres of disturbance, as well as avoid the cultural site identified and located at the original junction of the Labrador Elkhound CS 1 Well and Labrador Elkhound CS 2 Well. By implementing the ALT ENG 1 road segment it will eliminate the original proposed junction and thus placing the disturbance to the west side avoiding the known cultural site. The above mentioned engineered well locations and engineered road segments are proposed on soils which are thin and susceptible to wind and water erosion. This is primarily due to unstable soils and physical and chemical properties that limit plant growth along the access route. BLM evaluated the operator's proposal and determined the disturbance should be acceptable for the same reasons listed under Soils Residual Effects.

4.2.2.2. Cumulative Effects

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

4.2.2.3. Mitigation Measures

Impacts to ecological sites and vegetation from surface disturbance would be reduced through the implementation of the mitigation measures in the COAs, Labrador POD, and its associated plans including the Integrated Weed and Pest Management Plan, the WMP, and the MSUP (specifically Section 10, Plans for Reclamation of the Surface) and Labrador POD: Appendix A (MSUP), Cross-Country Utilities, site-specific Reclamation Plan. Some of these documents are in the administrative record for the Labrador POD at the BFO.

- If applied correctly, BLM selected seed mixes which contain native grasses and forbs could restore disturbed areas to properly functioning vegetation communities with the exception of sage-brush since it's not in the current seed mixes. BLM offers the same protections to privately owned surfaces as those administered by the BLM. These mitigation measures will be applied to cross-country utilities that cross shallow sandy/loam ecological sites, which will require expedient reclamation. BLM can only require their use on BLM surface. The seed mix for private land is selected by the surface owner and may be more beneficial to cattle grazing.

The operator will follow the proposed Reclamation Plan and adapt to changing conditions and technologies (Reclamation Plan submitted June 1, 2011 and amended on September 21, 2011).

The Operator should follow the reclamation requirements in Appendix B of this EA. See mitigation section in the soils section above for full description of the policy as it applies equally to ecological sites.

4.2.2.4. Residual Effects

Residual effects were also identified in the PRB FEIS, p. 4-408 such as the loss of vegetative cover, despite expedient reclamation, for several years until reclamation is successfully established. The alteration of biodiversity of ecological sites could result from changes in disturbance regimes, alterations in vegetation in reclaimed areas, and the spread and establishment of weed species.

BLM can only require use of specific seed mixes on BLM surface. The seed mix selected on private land is selected by the surface owner and may be more beneficial to cattle grazing than it is to soil stabilization. The result may be long term wind and water erosion on the shallow soils with little or no re-vegetation success.

Regarding Labrador Elkhound CS 1 Well, Labrador Elkhound CS 4 Well, Elkhound S&R Federal 5 Injection Well, Engineered Road 2 to the Elkhound S&R Federal 5 Injection Well, and the Alt ENG 1 Road going to Labrador Elkhound CS 1 Well: the identified residual effects associated with the approval of the Labrador POD are as follows:

1. The BLM ID Team considers this proposal to have somewhat limited reclamation potential with final reclamation bordering on difficult but not impossible to achieve.

2. The above proposed 3 well locations and 2 engineered access roads would impact thin minimally protective surface vegetation, biologic soil crusts, and physical soil crusts. This would likely result in a significant increase in soil erosion into surrounding ecosystems. This increased erosion would affect stability and functionality of these sites. However, the 2 engineered road sections combined total 2,126 linear feet of cuts and fills proposed in LRP areas and on steep slopes is short enough that, with timely (within 30 days) stabilization measures applied and strict adherence to WDEQ guidelines, this proposal is practical.

The combination of these residual effects (listed above) the BLM ID Team considers that Alternative B with proposed well(s): Labrador Elkhound CS 1 Well, Labrador Elkhound CS 4 Well, Elkhound S&R Federal 5 Injection Well, Engineered Road 2 to the Elkhound S&R Federal 5 Injection Well, and the Alt ENG 1 Road going to Labrador Elkhound CS 1 Well is likely within the parameters for surface disturbance and surface disturbance reclamation found in PRB FEIS ROD and Onshore Order Number 1.

4.2.3. Wetlands/Riparian

4.2.3.1. Direct and Indirect Effects

No proposed project infrastructure will directly impact any wetland areas, however, an existing road in the project boundary crossed one defined wetland area at an existing culverted road crossing. Additionally, since all of the produced water is being fully contained in a lined off-channel impoundment and subsequently injected into a deep geologic formation, there is little likelihood of any of the produced water resurfacing to impact any wetland areas.

4.2.3.2. Cumulative Effects

The PRB FEIS stated that cumulative impacts to soils could occur due to sedimentation from water erosion that could change water quality and fluvial characteristics of streams and rivers in the sub-watersheds of the POD area. SAR in water in the sub-watersheds could be altered by saline soils because disturbed soils with a conductivity of 16 mmhos/cm could release as much as 0.8 tons/acre/year of sodium (BLM 1999c). Soils in floodplains and streambeds may also be affected by produced water high in SAR and TDS. (PRB FEIS, p. 4-151).

4.2.3.3. Mitigation Measures

Mitigation measures are listed in the Standard Conditions of Approval.

4.2.3.4. Residual Effects

Turbidity and sediment deposition in the streams may increase due to erosion of project disturbed areas and sediment transport to the associated drainages. These impacts would be mitigated by expediently stabilizing the disturbance and reducing the amount of sediment reaching the streams.

4.2.4. Invasive Species

4.2.4.1. Direct and Indirect Effects

The use of existing facilities along with the surface disturbance associated with construction of proposed access roads, pipelines, water management infrastructure, produced water discharge points, and related facilities would present opportunities for weed invasion and spread.

4.2.4.2. Cumulative Effects

Produced CBNG water would likely continue to modify existing soil moisture and soil chemistry regimes in the areas of water release and storage. The activities related to the performance of the proposed project would create a favorable environment for the establishment and spread of noxious weeds/invasive plants such as salt cedar, Canada thistle, and perennial pepperweed.

4.2.4.3. Mitigation Measures

The operator committed to the control of noxious weeds and species of concern using the following measures identified in their Integrated Pest Management Plan (IPMP):

1. Control Methods include physical, biological, and chemical methods:
   Physical methods include mowing during the first season of establishment, prior to seed formation, and hand pulling of weeds (for small or new infestations). Biological methods include the use of domestic animals, or approved biological agents. Chemical methods include the use of herbicides, done in accordance with the existing Surface Use Agreement with the private surface owner.
2. Preventive practices: Certified weed-free seed mixtures will be used for re-seeding, and vehicles and equipment will be washed before leaving areas of known noxious weed infestations.
3. Education: The company will provide periodic weed education and awareness programs for its employees and contractors through the county weed districts and federal agencies. Field employees and contractors will be notified of known noxious weeds or weeds of concern in the project area.

4.2.4.4. Residual Effects

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

4.2.5. Wildlife

4.2.5.1. Habitat Types

4.2.5.1.1. Direct and Indirect Effects

The Labrador project will result in direct loss of sagebrush shrublands. Fragmentation would increase, as measured by smaller and more frequent patches with an increased amount of edge. Fragmentation of habitats is one of the primary threats to wildlife (USFWS 2010, Nicholoff 2003, Hebblewhite 2008). Fragmentation of shrubsteppe habitat is a major disruption that has consequences for sagebrush-obligate species (Braun et al. 1976; Rotenberry & Wiens 1980). In fragmented habitats, suitable habitat area remains only as remnants surrounded by unusable environments (Urban and Shugart 1984; Fahrig and Paloheimo 1988).

When there is loss or fragmentation of sagebrush habitats, sagebrush-obligate species decline through several mechanisms: areas of suitable habitat decrease (Temple & Cary 1988), lower reproduction rates ensue, and/or higher mortality occurs in remaining habitats (Robinson 1992; Porneluzi et al. 1993). Density of sagebrush-obligate birds within 100 meters (328 ft) of roads constructed for natural gas development in Wyoming was 50% lower than at greater distances (Ingelfinger 2001). Fragmentation of shrubsteppe has the further potential to affect the conservation of sagebrush-obligate species because of

the permanence of disturbance (Knick and Rotenberry 1995). Several decades are required to reestablish ecologically functioning, mature sagebrush communities. Thus sagebrush obligate species may not return for many years after completion of reclamation activities.

The majority of the Labrador project proposed infrastructure utilizes existing disturbances. The development of the CBNG well pads will remove approximately 3 acres of sagebrush habitat. The associated access roads to the wells will remove approximately 6 acres. Two cross-country utility pipelines will remove approximately 9 acres of sagebrush habitat. One proposed water impoundments and associated access roads will remove approximately 2 acres of sagebrush habitat.

4.2.5.1.1. Cumulative Effects

Cumulative effects would include impacts associated with additional fee development and ongoing livestock grazing. Fee development in the vicinity would further exacerbate loss of sagebrush habitat through direct loss and effects of additional fragmentation and degradation of habitat quality. Appropriate levels of livestock grazing would not contribute to loss of sagebrush habitat, but inappropriate grazing can cause detrimental impacts to sagebrush habitats through alterations in understory communities, relative abundance of species, and changes in structure of the sagebrush canopy. Areas treated to eliminate sagebrush in order to favor herbaceous growth for livestock can result in direct loss of sagebrush habitat.

4.2.5.1.2. Mitigation Measures

No mitigation measures are proposed.

4.2.5.1.3. Residual Effects

None identified.

4.2.6. Threatened, Endangered, Proposed, and Candidate Species

4.2.6.1. Threatened and Endangered Species

4.2.6.1.1. Ute Ladies'-Tresses Orchid

4.2.6.1.1.1. Direct and Indirect Effects

Implementation of the proposed CBNG project will have "***no effect***" on ULT as suitable habitat for this species is not present in the project area.

4.2.6.1.1.2. Cumulative Effects

Cumulative effects are discussed in the PRB FEIS on pg. 4-253.

4.2.6.1.1.3. Mitigation Measures

No mitigation measures are proposed.

4.2.6.1.1.4. Residual Effects

None identified.

4.2.6.2. Candidate Species

4.2.6.2.1. Greater Sage-grouse

4.2.6.2.1.1. Direct and Indirect Effects

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). 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.

Direct sage-grouse habitat loss in the project area will be minimal, totaling approximately 20 acres (See

Section 4.2.3.1.1 Direct and Indirect Effects under 4.2.1.3.1 Habitat Types for a more detailed description of direct). Indirect impacts, including such things as increased predation, decreased nest success, decreased brood survival that are often will occur from the inclusion of the cross country pipelines in Sections 4 and 5 T49N, R75W and in Section 34 T50N, R75W. This will create potential barriers to approximately 340 acres that would be otherwise accessible, unimpeded by disturbance.

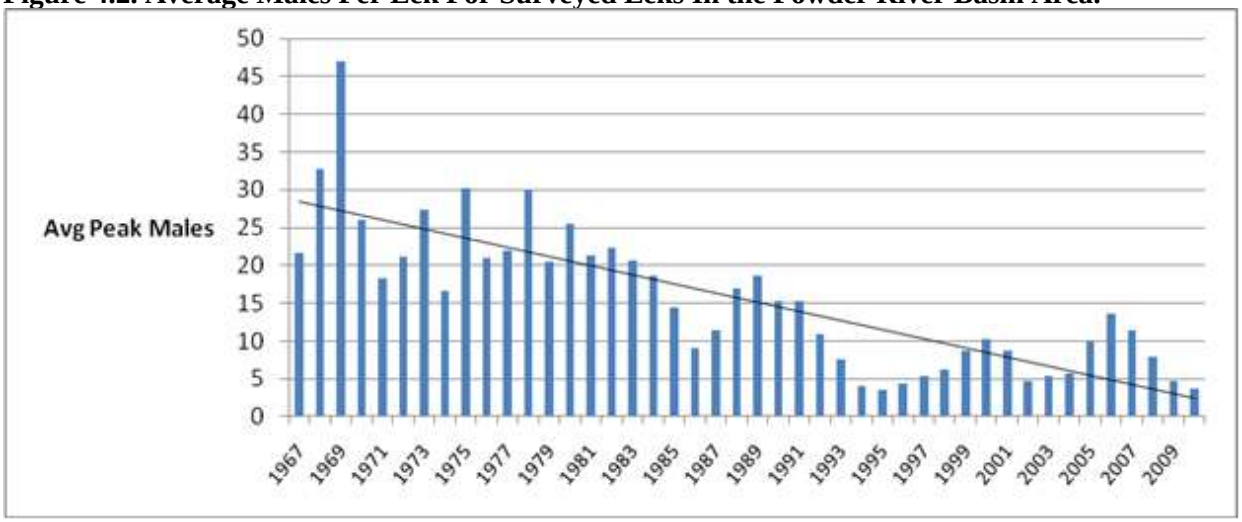
Impacts from the project to the local sage-grouse population may occur through a reduction of overall habitat quality, increased predation risk, and increased direct mortalities and will likely be manifested through declines in lek attendance as sage-grouse avoid these developed areas and seek out less disturbed leks. The additional infrastructure may impact sage-grouse through the addition of potential raptor perches, shelters and burrows for mammalian predators, and travel routes for predators, thereby increasing chances of sage-grouse mortalities caused by predation. Overhead powerlines and increased traffic will increase collision hazards for sage-grouse moving across the landscape. In addition, noise and human activities will further reduce habitat quality.

4.2.6.2.1.2. Cumulative Effects

Recent research suggests that the cumulative and synergistic effects of current and foreseeable CBNG development within the vicinity of the project area are likely to impact the local sage-grouse population, cause declines in lek attendance, and may result in local extirpation. The cumulative impact assessment area for this project encompasses the project area and the area that is encompassed by a 4 mile radius around the 9 sage-grouse leks that occur within 4 miles of the project boundary. Analysis of impacts up to 4 miles was recommended by the State Wildlife Agencies' Ad Hoc Committee for Consideration of Oil and Gas Development Effects to Nesting Habitat (2008).

The sage-grouse population within northeast Wyoming has been exhibiting a steady long term downward trend, as measured by lek attendance. Figure 3 illustrates a 10-year cycle of periodic highs and lows. Research suggests that these declines may be a result, in part, of CBNG development, as discussed in detail in USFWS (2010).

Figure 4.2. Average Males Per Lek For Surveyed Leks In the Powder River Basin Area.



Well densities within 4 miles of the 9 sage-grouse leks surrounding the project area are well above the 1 well per square mile recommendation by the State Wildlife Agencies' Ad Hoc Committee for Sage-Grouse and Oil and Gas Development. Excluding the Labrador project, there are approximately 1122 existing (Wyoming Oil and Gas Commission [WOGCC] July 15, 2011) and 1047 proposed wells (Automated Fluid Minerals Support System [AFMSS] June 22, 2011) within the cumulative effects

analysis area. With the addition of all of these proposed wells, well density would equal 7.2 wells per square mile, well above the 1 well per square mile recommendation by the State Wildlife Agencies' Ad Hoc Committee for Sage-Grouse and Oil and Gas Development. With approval of Alternative B (10 proposed well locations) well density would remain the same. All 9 leks have already exceeded the WGFD threshold category for extreme impacts. Implementation of the proposed CBNG project will not add substantial cumulative impacts to these leks.

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. Design features specifically included in the proposed action under Alternative B that minimize impacts to sage-grouse include corridoring proposed and existing infrastructure.

The PRB FEIS (BLM 2003) states that "the synergistic effect of several impacts would likely result in a downward trend for the sage-grouse population, and may contribute to the array of cumulative effects that may lead to its federal listing. Local populations may be extirpated in areas of concentrated development, but viability across the Project Area (Powder River Basin) or the entire range of the species is not likely to be compromised (pg. 4-270)." Based on the impacts described in the PRB FEIS and the findings of more recent research, the proposed action may contribute to further declines in male attendance at the nine leks that occur within 4 miles of the project area than have occurred, and, potentially, extirpation of the local grouse population.

The project area is not in key (core, focus or connectivity) habitats for sage-grouse, and is, with applied mitigation, consistent with the WY BLM Sage-grouse Policy (IM-2010-012) and the Buffalo RMP.

4.2.6.2.1.3. Mitigation Measures

In order to reduce the likelihood that activities associated with noise, construction, and human disturbance will impact nesting and brood-rearing sage-grouse, BLM will implement a timing limitation on all surface-disturbing activities within and adjacent to identified nesting habitat across the project area. 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.

4.2.6.2.1.4. Residual Effects

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 effectiveness of the mitigation measures are limited because the timing limitation stipulations (TLS) do not apply to well monitoring and maintenance while the wells are in the production phase. Impacts would span the life of the wells which is anticipated to be 10 years or more.

4.2.6.3. BLM-Sensitive Species

BLM will take necessary 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 PRB FEIS discusses impacts to sensitive species on pp. 4-257 to 4-265. Project specific effects to sensitive species are described in Table 4.2, and Section 4.2.3.2.1 (black-tailed prairie dog) below.

Table 4.2. BLM BFO Sensitive Species.

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.	NS	MIIH	Habitat may be impacted by increased traffic through the low water areas and habitat areas may be increased with the addition of impoundments.
Columbia spotted frog (*Ranus pretiosa*)	Ponds, sloughs, small streams, and cattails in foothills and montane zones. Confined to headwaters of the S Tongue R drainage and tributaries.	NP	NI	The project area is outside the species' range, and the species is not expected to occur .
Fish				
Yellowstone cutthroat trout (*Oncoryhynchus clarki bouvieri*)	Cold-water rivers, creeks, beaver ponds, and large lakes in the Upper Tongue sub-watershed	NP	NI	The project area is outside the species' range, and the species is not expected to occur.
Birds				
Baird's sparrow (*Ammodramus bairdii*)	Shortgrass prairie and basin-prairie shrubland habitats; plowed and stubble fields; grazed pastures; dry lakebeds; and other sparse, bare, dry ground.	S	MIIH	Nesting and foraging habitat may be impacted by dust, noise, human activities, and direct loss. Species may avoid area. Impacts will be mitigated by limitation on timing of activities for sage-grouse breeding and nesting and raptor nesting protection.
Bald eagle (*Haliaeetus leucocephalus*)	Mature forest cover often within one mile of large water body with reliable prey source nearby.	S	MIIH	Surface disturbing and maintenance activities may impact foraging eagles and the species may avoid the area.
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 will be mitigated by limitation on timing of activities for sage-grouse breeding and nesting protection.
Ferruginous hawk (*Buteo regalis*)	Basin-prairie shrub, grasslands, rock outcrops	NS	NI	Nesting and foraging habitat may be impacted and human activities will increase.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
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 will be mitigated by limitation on timing of activities for sage-grouse breeding and nesting protection.
Long-billed curlew (*Numenius americanus*)	Grasslands, plains, foothills, wet meadows	S	MIIH	Nesting and foraging habitat may be impacted by dust, noise, human activities, and direct loss. Species may avoid area. Impacts will be mitigated by limitation on timing of activities for sage-grouse breeding and nesting protection.
Mountain Plover	Short-grass prairie with slopes < 5%	S	MIIH	Increased use of infrastructure currently existing in prairie dog colonies. If mountain plover nest in this area, there will be an increased risk of mortality.
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 will be mitigated by limitation on timing of activities for sage-grouse breeding and nesting protection.
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 will be mitigated by limitation on timing of activities for sage-grouse breeding and nesting protection.
Trumpeter swan (*Cygnus buccinator*)	Lakes, ponds, rivers	S	MIIH	Reservoirs may provide migratory habitat..

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Western Burrowing owl (*Athene cunicularia*)	Grasslands, basin-prairie shrub	S	MIIH	Nesting and foraging habitat may be impacted as human activities increase prairie dog mortalities.
White-faced ibis (*Plegadis chihi*)	Marshes, wet meadows	NP	NI	Habitat not present.
Yellow-billed cuckoo (*Coccyzus americanus*)	Open woodlands, streamside willow and alder groves	NP	NI	Habitat not present.
Mammals				
Black-tailed prairie dog (*Cynomys ludovicianus*)	Prairie habitats with deep, firm soils and slopes less than 10 degrees.	K	MIIH	Human activities and increased traffic may cause increased mortalities of prairie dogs.
Fringed myotis (*Myotis thysanodes*)	Conifer forests, woodland chaparral, caves and mines	NS	NI	Habitat not present.
Long-eared myotis (*Myotis evotis*)	Conifer and deciduous forest, caves and mines	NS	NI	Habitat not present.
Swift fox (*Vulpes velox*)	Grasslands	S	MIIH	Dust, noise, and human activities may cause the species to avoid the area.
Townsend's big-eared bat (*Corynorhinus townsendii*)	Caves and mines.	NS	NI	Habitat not present.
Plants				
Porter's sagebrush (*Artemisia porteri*)	Sparsely vegetated badlands of ashy or tufaceous mudstone and clay slopes 5300-6500 ft.	NP	NI	Habitat not present.
William's wafer parsnip (*Cymopterus williamsii*)	Open ridgetops and upper slopes with exposed limestone outcrops or rockslides, 6000-8300 ft.	NP	NI	Project area outside of species' range.
Limber pine (*Pinus flexilis*)	Timberline and at lower elevation with sagebrush. Associated species are Rocky Mountain lodgepole pine, Engelmann spruce, whitebark pine, Rocky Mountain Douglas-fir, subalpine fir, Rocky Mountain juniper, Mountain mahogany, and common juniper.	NP	NI	Habitat not present

Presence	Project Effects
K - Known, documented observation within project area. S - Habitat suitable and species suspected, to occur within the project area.	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.

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.	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

4.2.6.3.1. Black-tailed Prairie Dog

4.2.6.3.1.1. Direct and Indirect Effects

Within the project area, an existing two-track road proposed for improvement passes through the prairie dog colonies in Sections 32, 33, and 34, T50N, R75W. Because it is an existing road on private surface, and re-routing would cause greater resource impacts, no attempt was made to re-route the road. There will be direct habitat loss associated with the improvement of the road, and vehicle traffic will increase prairie dog mortality along approximately 0.65 miles of road. Further impacts to black-tailed prairie dogs are discussed in the PRB FEIS on pp. 4-255 to 4-256.

4.2.6.3.1.2. Cumulative Effects

The black-tailed prairie dog is considered common in Wyoming, although its abundance fluctuates with activity levels of Sylvatic plague and the extent of control efforts by landowners. Comparisons with 1994 aerial imagery indicated that black-tailed prairie dog acreage remained stable from 1994 through 2001, but aerial surveys conducted in 2003 indicated that approximately 47% of the prairie dog acreage was impacted by Sylvatic plague and/or control efforts (Grenier et al. 2004). Due to human-caused factors, black-tailed prairie dog populations are now highly fragmented and isolated (Miller 1994). Most colonies are small and subject to potential extirpation due to inbreeding, population fluctuations, and other problems that affect long term population viability, such as landowner poisoning and disease (Primack 1993, Meffe and Carroll 1994, Noss and Cooperrider 1994). The PRB FEIS discusses cumulative impacts to black-tailed prairie dog on pp. 4-255 - 4-256.

4.2.6.3.1.3. Mitigation Measures

No mitigation is proposed with alternative B.

4.2.6.3.1.4. Residual Impacts

No residual effects are anticipated.

4.2.6.4. Big Game

4.2.6.4.1. Direct and Indirect Effects

Under the environmentally preferred alternative, yearlong and winter range for pronghorn and mule deer would be directly disturbed with the construction of wells, pipelines, and roads. Long term disturbance would be direct habitat loss. Short-term disturbances also result in direct habitat loss; however, they should provide some habitat value as these areas are reclaimed and native vegetation becomes established. In addition to the direct habitat loss, big game would likely be displaced from the project area during drilling and construction. A study in central Wyoming reported that mineral drilling activities displaced mule deer by more than 0.5 miles (Hiatt and Baker 1981). The WGFD indicates a well density of 8 wells per section creates a high level of impact for big game and that avoidance zones around mineral facilities overlap creating contiguous avoidance areas (WGFD 2004). A multi-year study on the Pinedale Anticline suggests not only do mule deer avoid mineral activities, but after 3 years of drilling activity the deer have not become accustomed to the disturbance.

Big game animals are expected to return to the project area following construction; however, populations will likely be lower than prior to project implementation as the human activities associated with operation and maintenance continue to displace big game. Mule deer are more sensitive to operation and maintenance activities than pronghorn, and, as the Pinedale Anticline study suggests, mule deer do not

readily habituate. A study in North Dakota stated, "although the population (mule deer) had over 7 years to habituate to oil and gas activities, avoidance of roads and facilities was determined to be long term and chronic" (Lustig 2003). Deer have even been documented to avoid dirt roads that were used only by 4-wheel drive vehicles, trail bikes, and hikers (Jalkotzy et al. 1997). Winter big game diets are sub-maintenance, meaning they lose weight and body condition as the winter progresses. Survival below the maintenance level requires behavior that emphasizes energy conservation. Canfield et al. (1999) pointed out that forced activity caused by human disturbance exacts an energetic disadvantage, while inactivity provides an energetic advantage for animals. Geist (1978) further defined effects of human disturbance in terms of increased metabolism, which could result in illness, decreased reproduction, and even death. CBNG activities that occur in big game habitats during the spring will likely displace adult females and juveniles due to the human presence in the area. This may cause reduced survival rate of individuals that must expend increased energies to avoid such activities.

4.2.6.4.2. 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 cumulative impacts

4.2.6.4.3. Mitigation Measures

No mitigation is proposed with alternative B.

4.2.6.4.4. Residual Impacts

No residual effects are anticipated.

4.2.6.5. Migratory Birds

4.2.6.5.1. Direct and Indirect Effects

Direct and indirect effects to migratory birds are discussed in the PRB FEIS (pp. 4-231 to 4-235).

Disturbance of habitat n the project area is likely to impact migratory birds. Native habitats will be lost directly with the construction of wells, roads, and pipelines. Reclamation and other activities that occur in the spring may be detrimental to migratory bird survival. Prompt re-vegetation of short-term disturbance areas should reduce habitat loss impacts. Activities will likely displace migratory birds farther than the immediate area of physical disturbance. 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 (328 feet) of dirt roads within a natural gas field. Effects occurred along roads with light traffic volume (less than 12 vehicles per day). The increasing density of roads constructed in developing natural gas fields exacerbated the problem creating substantial areas of impact where indirect habitat losses through displacement were much greater than the direct physical habitat losses.

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

Migratory bird species in the PRB nest in the spring and early 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.

4.2.6.5.2. Cumulative Effects

The cumulative effects associated with Alternative B are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, refer to the PRB FEIS, p. 4-235. No additional mitigation measures are required.

4.2.6.5.3. Mitigation Measures

No timing limitations on surface disturbing activities are proposed specifically for migratory birds. However, raptor and sage-grouse timing limitations on surface disturbing activities will also serve to mitigate impacts to nesting migratory birds.

4.2.6.5.4. Residual Effects

Sage-grouse timing limitations will apply to the entire POD. Those migratory bird species and individuals that are still nesting when the sage-grouse timing limitations are over (June 30) though may have nests destroyed, or be disturbed, by construction activities. Protections around active raptor nests (February 1-July 31) extend past most migratory bird nesting seasons. Only a percentage of known nests are active any given year, so the protections for migratory birds from June 30 - July 31 will depend on how many raptor nests are active.

4.2.6.6. Raptors

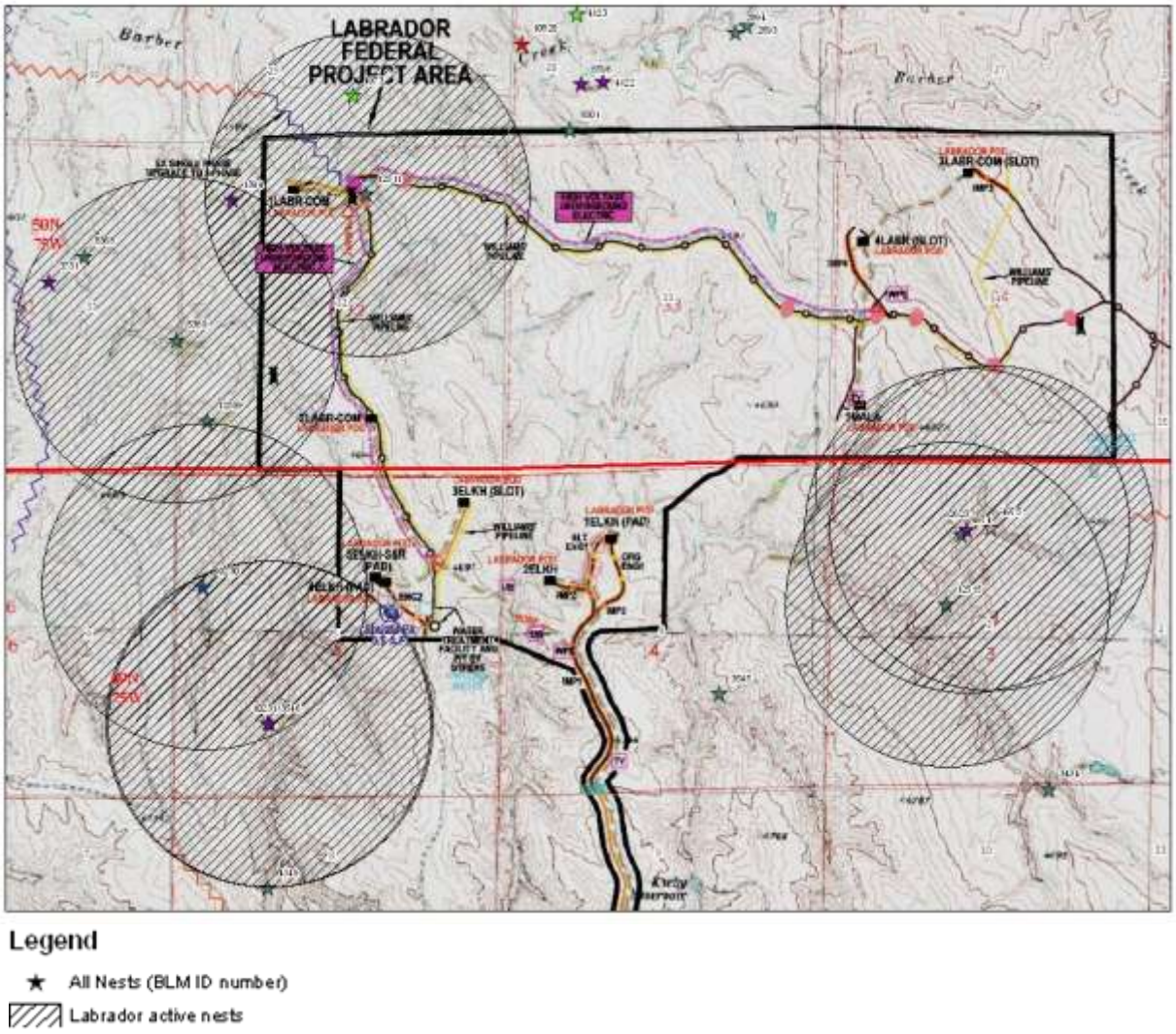
4.2.6.6.1. Direct and Indirect Effects

This project will result in disturbance in proximity of nesting raptors, including direct loss of foraging habitats and indirect losses associated with declines in habitat effectiveness. All raptors using nests in the vicinity of the Labrador project will likely be impacted to some extent by the human disturbance associated with operation and maintenance. Additional information and site-specific impacts are discussed here.

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 (see Figure 4.3). 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 and can result in egg or chick mortality. Prolonged disturbance can also lead to the abandonment of the nest by the adults. Routine human activities near these nests can also draw increased predator activity to the area and resulting in increased nest predation.

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 and recommends all infrastructure requiring human visitation be located in such a way as 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 they will not be flushed by routine activities. Additional direct and indirect impacts to raptors, from oil and gas development, are analyzed in the PRB FEIS (pp. 4-216 to 4-221).

Figure 4.3. All Active Raptor Nests within Approximately 0.5 Mile of Infrastructure.



4.2.6.6.2. Cumulative Effects

The cumulative effects associated with Alternatives 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.

4.2.6.6.3. Mitigation Measures

The BLM BFO requires a 0.5 mile radius timing limitation during the breeding season around active raptor nests to reduce the risk of decreased productivity or nest failure, (PRB ROD and SDR # WY-2011-029).

4.2.6.6.4. Residual Impacts

Even with a timing limitation, raptors may abandon nests due to alteration in foraging habitats associated with development or because of sensitivity to well or infrastructure placement. Declines in breeding populations of some species that are more sensitive to human activities may occur.

4.2.6.7. West Nile Virus

4.2.6.7.1. Direct and Indirect Effects

This project is likely to result in standing surface water which may potentially increase mosquito breeding

habitat. BLM has consulted with applicable state agencies, County Weed and Pest and the State Health Department, per above mitigation in the PRB ROD, p. 18, regarding the disease and the need to treat. BLM has also consulted with the researchers that are studying the dynamics of WNv species and its effects in Wyoming.

4.2.6.8. West Nile Virus

4.2.6.8.1. Direct and Indirect Effects

This project is likely to result in standing surface water which may potentially increase mosquito breeding habitat. BLM has consulted with applicable state agencies, County Weed and Pest and the State Health Department, per above mitigation in the PRB ROD, p. 18, regarding the disease and the need to treat. BLM has also consulted with the researchers that are studying the dynamics of WNv species and its effects in Wyoming.

4.2.6.8.2. Cumulative Effects

There are many sources of standing water, beyond CBNG discharge, throughout the PRB that would add to the potential for mosquito habitat. Sources include; natural flows, livestock watering facilities, coal mining operations, and outdoor water use and features in and around communities.

4.2.6.8.3. Mitigation Measures

There is no 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. The State agencies have not instituted state-wide treatment for mosquitoes due to WNv, nor are they requiring any mitigation specific to permitting for CBNG operations. BLM will keep monitoring this issue by continuing to consult with the State agencies and the researchers working in the area in order to stay abreast of the most current developments and any need to apply mitigation.

4.2.6.8.4. Residual Effects

There are no residual effects.

4.2.7. 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. Qualified hydrologists, in consultation with the BLM, developed the WMP that proposes to discharge the produced water into a lined and fenced off-channel impoundment, and subsequently inject that produced water into the Fort Union geologic formation. Adherence with the plan, in addition to BLM applied mitigation (in the form of COAs), would reduce project area impacts from proposed water management strategies.

The maximum water production for the Labrador POD is predicted to be 9 gpm per well, or 81 gpm for the POD as approved under this alternative (0.2 cubic feet per second (cfs) or 130 acre-feet per year). The PRB FEIS projected the total amount of water that was anticipated to be produced from CBNG development per year (Table 2-8, Projected Amount of Water Produced from CBM Wells. Under Alternatives 1, 2A and 2B, p. 2-26), for the Upper Powder River drainage, the volume projected to be produced in the watershed in 2011 was 44,169 acre-feet (maximum production was estimated to be 171,423 acre-feet in 2006). As such, the volume of water from these wells is 0.3% of the total volume projected for 2011. This volume of produced water is also within the predicted parameters of the PRB FEIS.

4.2.7.1. Groundwater

The operator proposes to discharge the produced water to a lined impoundment and then inject it to the Fort Union formation produced water from this project should not infiltrate into near surface aquifers.

The PRB FEIS predicts that one of the possible environmental consequences of CBNG production is impacts to the groundwater. "The effects of development of CB[NG] 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 zones to increase natural gas recovery rates, this project may have some effect on the static water level of wells in the area. The permitted stock and domestic water wells produce from depths which range from 124 to 450 feet compared to 1833-4500 feet to the Felix, Big George, Anderson, and Upper Canyon coals. The Operator committed to offer water well agreements to holders of properly permitted domestic and stock wells within the circle of influence (0.5 mile of a federal CBNG producing well) of the proposed wells.

Recovery of the coal bed aquifer was predicted in the PRB FEIS to "…resaturate and repressurize the areas that were partially depressurized during operations. The amount of groundwater stored within the Wasatch - Tongue River sand and coals, and sands units above and below the coals is almost 750 million acre-feet of recoverable groundwater are (PRB FEIS, 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).

4.2.7.1.1. 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 page 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).

4.2.7.1.2. Mitigation Measures

Adherence to the drilling COAs, the setting of casing at appropriate depths, following safe remedial procedures in the event of casing failure, and utilizing proper cementing procedures 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, 2010, over 2016 impoundment sites have been investigated with more than 2305 borings. Of these impoundments, 257 met the criteria to require "compliance monitoring" if constructed and used for CBNG water containment. Only 132 impoundments requiring monitoring are presently being used. As of the fourth quarter of 2010, only 24 of those

monitored impoundments (13.6%) caused a change in the "Class of Use" of any parameter in the underlying aquifer water.

4.2.7.1.3. Residual Effects

As described in Section 3.4.1, the production of CBNG in this project area has already reduced the saturation level in some of the coal zones targeted for CBNG production.

4.2.7.2. Surface Water

4.2.7.2.1. Direct and Indirect Effects

Produced Water Quality

Table 4.4 shows the average values of EC and SAR as measured at selected USGS 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). Many limits are established by project specific WYPDES permits which are often variable according to time of year and other parameters. However, no WYPDES permit is required for this project because the water will be fully contained in a lined impoundment and subsequently injected to a deep geologic formation. The table shows concentrations found in the POD's representative water sample.

Table 4.3. 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 Gauging station			
Historic Data Average at Maximum Flow		4.76	1,797
Historic Data Average at Minimum Flow		7.83	3,400
WDEQ Quality Standards for Wyoming Groundwater (Chapter 8)			
Drinking Water (Class I)	500		
Agricultural Use (Class II)	2,000	8	
Livestock Use (Class III)	5,000		
Predicted produced water quality from the Felix, Big George, Anderson, and Upper Canyon coal zones	1160	13.7	1820

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 (PRB FEIS, p. 4-69). The water quality projected for this POD is 1820 mg/l TDS which is within the WDEQ criteria for agricultural use (2000 mg/l TDS). However direct land application is not included in this proposal. If at any future time the operator entertains the possibility of irrigation or land application with the water produced from these wells, the proposal must be submitted as a sundry notice for separate environmental analysis and approval by the BLM.

The quality for the water produced from the Felix, Big George, Anderson, and Upper Canyon target coal zones wells is predicted to be similar to the sample water quality collected from a location near the POD. A maximum of 9 gallons per minute (gpm) is projected is to be produced from each of the 9 wells, for a total of 81 gpm for the POD.

Since all of the produced water will be discharged into a lined off-channel impoundment and then injected into a subsurface geologic formation, no WYPDES permit will be required by WDEQ. However, WDEQ does require that the operator obtain coverage under the General Permit 5C5-1 underground injection permit for the Elkhound Federal S&R 5 Injection Well facility (Permit # WYS-005-00570). The permit establishes monitoring, maintenance, and operating parameters under the authority of WDEQ. As part of the monitoring requirements, the operator will provide WDEQ with water quality analyses of the injectate

on a quarterly basis. As part of the WMP, the operator has committed to comply with the terms of all associated permits.

The outfall design proposed for use in this project is incorporated into the structure of the lined impoundment. Because of this design, erosion and aeration concerns will be negligible.

All water management facilities were evaluated for compliance during the onsite.

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 has committed to designate a reference well to each coal zone in the POD boundary. The reference well will be sampled at the wellhead for analysis within 60 days of initial production. A copy of the water analysis will be submitted to the BLM Authorized Officer. For more information refer to the WMP included in this POD.

Produced Water Control and Quantity

The operator proposes to discharge all of the water produced by the project to a lined and fenced off-channel impoundment, then subsequently injecting the water to the Fort Union geologic formation. Consequently, no produced water should be introduced into surface waters near the project area. Reclamation plans for the impoundment will be submitted for approval when it is no longer needed for disposal of CBNG water, as required by BLM applied COAs.

In the WMP portion of the POD, an analysis of the potential development in the watersheds above the project area was conducted. Based on the area of the drainage area above the POD (9792 acres), which is an unnamed tributary of Barber Creek, and an assumed density of one well per location, every 80 acres, the potential exists for the development of 116 wells which could produce a maximum flow rate of 1044 gpm (2.3 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. New wells will be phased in over several years, and
3. A decline in well discharge generally occurs after several months of operation.

The potential maximum flow rate of produced water in the watersheds upstream of the project area, 2.3 cfs in the unnamed tributary to Barber Creek, is much less than the flow rate of runoff estimated from the 2-year storm event (275 cfs), (WMP Attachment B). However, it is unlikely that the Labrador POD will contribute to these flows given that the operator proposes to fully contain and inject all of the produced water.

Springs

The development of CBNG, and the production and discharge of water in the area surrounding any natural springs may affect the flow rate or water quality of the spring. However during the development of the POD, no natural springs were observed. Therefore any impacts to springs will be negligible.

Due to Yates' commitment to fully contain and inject all of their produced water, in-channel downstream impacts are expected to be negligible.

4.2.7.2.2. Cumulative Effects

The analysis in this section includes cumulative data from fee, state and federal CBNG development in the Upper Powder River watershed. These data were obtained from the Wyoming Oil and Gas Conservation Commission (WOGCC).

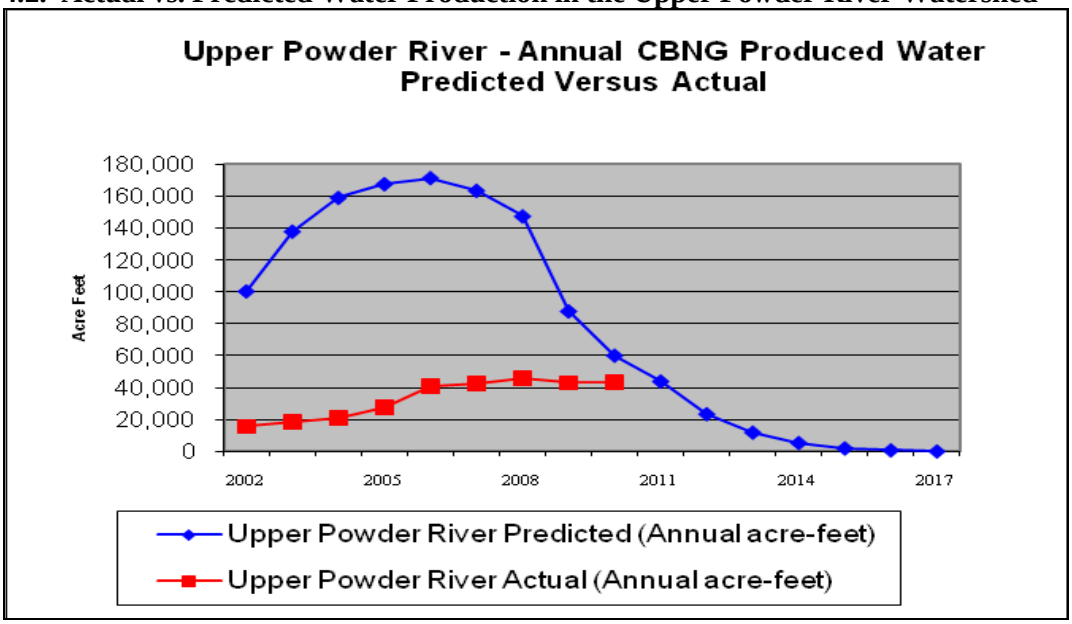
As of December 2010, all producing CBNG wells in the Upper Powder River watershed discharged a cumulative volume of 298,864 acre-feet of water compared to the 1,135,567 acre-feet predicted in the

PRB FEIS (Table 2-8, p. 2-26). These figures are presented graphically in Figure 4.2 and Table 4.4 following. This volume is 25.0 % of the total predicted produced water analyzed in the PRB FEIS for the Upper Powder River watershed.

Table 4.4. Actual vs Predicted Water Production in the Upper Powder River Watershed
2010 Data Update 04-06-11

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
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				
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**		**298,864**			

Figure 4.2. Actual vs. Predicted Water Production in the Upper Powder River Watershed



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 water quality analysis in the PRB FEIS was conducted using 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 disclosed 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 25% of the total predicted in the PRB FEIS.
2. The operator committed to fully contain and re-inject the water produced with this project.

Refer to the PRB FEIS, Volume 2, 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.

4.2.7.2.3. Mitigation Measures

Channel crossings by roads and pipelines will be constructed perpendicular to flow. Culverts will be installed at appropriate locations for streams and channels crossed by roads as specified in the BLM Manual 9112-Bridges and Major Culverts and Manual 9113-Roads. Streams will be crossed perpendicular to flow, where possible, and all stream crossing structures will be designed to carry the 25-year discharge event or other capacities as directed by the BLM. Channel crossings by pipelines will be constructed so that the pipe is buried at least 4 feet below the channel bottom. The operator has committed to expediently stabilize and revegetate disturbance within channels and floodplains associated with this project.

4.2.7.2.4. Residual Effects

"Streams enhanced by large volumes of CBM[NG] 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. Downcutting (stream erosion) and sediment deposition (aggradation) are natural processes that occur as stream drainages age through time. Downcutting occurs in 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 in the lower, slower reaches of a stream.

Surface drainages could be degraded from erosion caused by increased surface flow, unless rates of CBM[NG] discharge and outfall locations are carefully controlled. Increased flows could cause downcutting in fluvial environments, resulting in increased channel capacity over time in the upper and middle reaches of surface drainages." (PRB FEIS, p. 4-118).

4.2.8. Cultural Resources

4.2.8.1. Direct and Indirect Effects

Non eligible site 48CA5367 and 48CA5762 will be impacted by the proposed project. No historic properties will be impacted by the proposed project. Following the Wyoming State Protocol Section VI(A)(1) the BLM electronically notified the Wyoming State Historic Preservation Officer (SHPO) on September 19, 2011 that no historic properties exist in the area of project effects. If any cultural values [sites, artifacts, human remains (Appendix L PRB FEIS and ROD)] are observed during operation of this lease/permit/right-of-way, they will be left intact and the Buffalo Field Manager notified. Further discovery procedures are explained in the Standard COA (General)(A)(1).

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

4.2.8.3. Mitigation Measures

If any cultural values [sites, artifacts, human remains (Appendix L PRB FEIS and ROD)] are observed during operation of this lease/permit/right-of-way, they will be left intact and the Buffalo Field Manager notified. Further discovery procedures are explained in the Standard COA (General)(A)(1). See also, Native American Religious Concerns, below.

4.2.8.4. 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.

4.2.9. Native America Religious Concerns

Tribal consultation with interested Native American tribes was not completed in relation to the identification of stone circle features in site 48CA163. Although it is still undetermined if the site is significant to any tribes, the project was modified to avoid the site and the stone circle features. Based on previous consultations, it is assumed by BFO that the Eastern Shoshone, Fort Peck/Assiniboine, and Northern Cheyenne Tribes would have recommended protection of the stone circles. A pipeline and access road will be constructed over 100 feet from the features, but the stone circles will not be physically impacted. A temporary fence (to be removed at the completion of construction activities) will be placed between the site and construction activities.

4.2.10. Air Quality

4.2.10.1. Direct and Indirect Effects

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-CBM 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 & gas development would not violate any local, state, tribal or federal air quality standards.

4.3. Summary of Effects

Table 4.5. provides a comparison of the cumulative effects on wildlife associated with the alternatives.

Table 4.5. Summary of Wildlife Effects for Labrador POD by Alternative

Resource/Species	Alternative A	Alternative B
Wetlands/Riparian Areas	No existing wetlands/riparian areas would be disturbed.	
Wildlife		
Big Game	No habitat loss or fragmentation. Would likely see increased traffic passing through due to surrounding mineral development	Greatest habitat loss.
		Greatest habitat fragmentation.
Raptors	No habitat loss.	Greatest foraging habitat fragmentation. Overhead electricity increasing mortality risk from electrocution.
	No wells authorized near nests.	
Migratory Birds	No habitat loss.	Greatest habitat loss.
		Greatest habitat fragmentation.
	No habitat fragmentation.	
		Overhead electric poses predation & collision risk.

Resource/Species	Alternative A	Alternative B
Threatened and Endangered Species		
Bald eagle	No habitat loss	Overhead electricity increasing mortality risk from electrocution.
Sensitive Species		
Greater Sage Grouse	No habitat loss.	Greatest habitat loss.
	Grouse may avoid overhead power lines.	Greatest predation and collision risk associated with overhead power lines.
West Nile Virus	No Impact	Likely to have effect on the overall spread of WNV.

5. CONSULTATION & COORDINATION

Agencies summarized in Table 5.1. were consulted on the proposed project to confirm compliance with applicable laws and regulations.

Table 5.1. Consultations

Contact	Title	Organization	Present at Onsite
Mary Hopkins	Wyoming SHPO	Wyoming SHPO	No
Mitch Maycock	Land Owner		Yes
Pauline Schuette	Wildlife Biologist	USFWS	No

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Appendix A: Resource and Species Worksheets

Resource	Resource Present	Resource Affected	PRB FEIS Sufficient	Notes
Air quality				PRB FEIS: 3-291-298, 4-404-406, 4-377-386
Noise				
Cultural	Yes	No	No	PRB FEIS: 3-206-228, 4-273-288, 4-394
Native American religious concerns	Yes	No	No	PRB FEIS: 3-218-219, 3-228, 4-277-278
Traditional Cultural Properties	No	No	No	PRB FEIS: 3-218-219, 4-277-278
Mineral Potential				PRB FEIS: 3-66-70, 3-230, 4-127-129
Coal				PRB FEIS: 3-66
Fluid Minerals				PRB FEIS: 3-68-69
Locatable Minerals				Add in EA
Other leasables				
Salable minerals				
Paleontology				PRB FEIS: 3-65-66, 4-125-127
PFYC 3				PRB FEIS: 3-65-66, 4-125-127
PFYC 5				PRB FEIS: 3-65-66, 4-125-127
Rangeland management				Not in PRB FEIS
Existing range improvements				
Proposed range improvements				
Recreation				PRB FEIS: 3-263-273, 4-319-328
Developed site				PRB FEIS: 3-266, 4-326
Walk-in-Area				
Social & Economic				PRB FEIS: 3-275-289, 4-336-370
Environmental Justice				
Transportation				
Soils & Vegetation				PRB FEIS: 3-78-107, 4-134-152, 4-153-164, 4-393-394, 4-406
Erosion Hazard				PRB FEIS: 3-82, 4-135
Poor Reclamation Potential				PRB FEIS: 3-86, 4-149-152
Slope hazard				PRB FEIS: 3-81, 4-135
Forest products				
Prime and Unique Farmland				
Invasive Species				PRB FEIS: 3-103-108, 4-153-172
Wetlands/Riparian				PRB FEIS: 4-117-124, 3-108-113, 4-172-178, 4-406
Special Designations				
Proposed ACEC				
Wild & Scenic River				PRB FEIS: 3-273
Wilderness				DOI 3310

Resource	Resource Present	Resource Affected	PRB FEIS Sufficient	Notes
Characteristics/Citizen Proposed				
WSA				
Visual Resources				PRB FEIS: 3-252-263, 4-302-314, 4-403
Class II				
Class III				
Water				PRB FEIS: 3-1-56, 4-1-122, 4-135, 4-33, 4-405
Floodplains				
Ground water				PRB FEIS: 3-1-30, 4-1-69, 4-392, 4-405
Surface water				PRB FEIS: 4-85-86, 4-117-124, 3-36-56. 4-69-122, 4-393, 4-405
Drinking water				PRB FEIS: 3-52, 4-50-52
Wildland Urban Interface				
Waste Management				
Wildlife				PRB FEIS: 3-113-153, 4-179, 4-247, 4-397
ESA listed, proposed, or candidate species	Yes	Yes	No	
BLM sensitive species	Yes	Yes	Yes	
General wildlife	Yes	Yes	Yes	
West Nile virus potential				

Appendix B: RECLAMATION REQUIREMENTS, WY BLM

The following Reclamation Requirements apply to all surface disturbing activities, including BLM initiated activities, and must be addressed in each reclamation plan. These requirements also must be met prior to release of the bond and/or the reclamation liability. Where these Reclamation Requirements differ from other applicable federal, laws, rules, and regulations, those requirements supersede this policy. State and/or local statutes or regulations may also apply.

1. **Manage all waste materials:**
   a. Segregate, treat, and/or bio-remediate contaminated soil material.
   b. Bury only authorized waste materials on site. Buried material must be covered with a minimum of three feet of suitable material or meet other program standards.
   c. Ensure all waste materials moved off-site are transported to an authorized disposal facility.

2. **Ensure subsurface integrity, and eliminate sources of ground and surface water contamination.**
   a. Properly plug all drill holes and other subsurface openings (mine shafts, adits etc.).
   b. Stabilize, properly back fill, cap, and/or restrict from entry all open shafts, underground workings, and other openings.
   c. Control sources of contamination and implement best management practices to protect surface and ground water quality.

3. **Re-establish slope stability, surface stability, and desired topographic diversity.**
   a. Reconstruct the landscape to the approximate original contour or consistent with the land use plan.
   b. Maximize geomorphic stability and topographic diversity of the reclaimed topography.
   c. Eliminate highwalls, cut slopes, and/or topographic depressions on site, unless otherwise approved.
   d. Minimize sheet and rill erosion on/or adjacent to the reclaimed area. There shall be no evidence of mass wasting, head cutting, large rills or gullies, down cutting in drainages, or overall slope instability on/or adjacent to the reclaimed area.

4. **Reconstruct and stabilize water courses and drainage features.**
   a. Reconstruct drainage basins and reclaim impoundments to maintain the drainage pattern, profile, and dimension to approximate the natural features found in nearby naturally functioning basins.
   b. Reconstruct and stabilize stream channels, drainages, and impoundments to exhibit similar hydrologic characteristics found in stable naturally functioning systems.

5. **Maintain the biological, chemical, and physical integrity of** the **topsoil and subsoil** (where appropriate).
   a. Identify, delineate, and segregate all salvaged topsoil and subsoil based on a site specific soil evaluation, including depth, chemical, and physical characteristics.
   b. Protect all stored soil material from erosion, degradation, and contamination.
   c. Incorporate stored soil material into the disturbed landscape.
   d. Seed soils to be stored beyond one growing season, with desired vegetation.
   e. Identify stockpiles with appropriate signage.

6. **Prepare site for revegetation.**
   a. Redistribute soil materials in a manner similar to the original vertical profile.
   b. Reduce compaction to an appropriate depth (generally below the root zone) prior to redistribution of topsoil, to accommodate desired plant species.

c. Provide suitable surface and subsurface physical, chemical, and biological properties to support the long term establishment and viability of the desired plant community.
d. Protect seed and seedling establishment (e.g. erosion control matting, mulching, hydro-seeding, surface roughening, fencing, etc.)

7. **Establish a desired self-perpetuating native plant community.**
   a. Establish species composition, diversity, structure, and total ground cover appropriate for the desired plant community.
   b. Enhance critical resource values (e.g. wildlife, range, recreation, etc.), where appropriate, by augmenting plant community composition, diversity, and/or structure.
   c. Select genetically appropriate and locally adapted native plant materials based on the site characteristics and ecological setting.
   d. Select non-native plants only as an approved short term and non-persistent alternative to native plant materials. Ensure the non-natives will not hybridize, displace, or offer long-term competition to the endemic plants, and are designed to aid in the re-establishment of native plant communities.

8. **Reestablish complementary visual composition**
   a. Ensure the reclaimed landscape features blend into the adjacent area and conform to the land use plan decisions.
   b. Ensure the reclaimed landscape does not result in a long term change to the scenic quality of the area.

9. **Manage Invasive Plants**
   a. Assess for invasive plants before initiating surface disturbing activities.
   b. Develop an invasive plant management plan.
   c. Control invasive plants utilizing an integrated pest management approach.
   d. Monitor invasive plant treatments.

10. **Develop and implement a reclamation monitoring and reporting strategy.**
    a. Conduct compliance and effectiveness monitoring in accordance with a BLM (or other surface management agency) approved monitoring protocol.
    b. Evaluate monitoring data for compliance with the reclamation plan.
    c. Document and report monitoring data and recommend revised reclamation strategies.
    d. Implement revised reclamation strategies as needed.
    e. Repeat the process of monitoring, evaluating, documenting/reporting, and implementing, until reclamation goals are achieved.