

**DECISION RECORD
FOR
Williams Production RMT Company
South Bear
ENVIRONMENTAL ASSESSMENT –WY-070-11-151**

DECISION:

The BLM approves Williams Production Company’s (Williams) South Bear coalbed natural gas (CBNG) plan of development (POD) as described in Alternative B of the environmental assessment (EA) WY-070-11-151. This POD includes: 30 applications for permit to drill (APDs), a water management plan (WMP) for the use of federal water, 2 rights-of-way (ROW), and associated infrastructure.

Compliance. This decision complies with:

- Federal Land Policy and Management Act of 1976 (FLPMA) (43 USC 1701).
- 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).
- Powder River Basin Final Environmental Impact Statement (PRB FEIS ROD), April 2003.
- Buffalo Resource Management Plan (RMP) 1985, Amendments 2001, 2003.
- DOI Order 3310.

Details of the approval of Alternative B are summarized below. The project description, including specific changes made at the onsites, and site-specific mitigation measures, is included in the EA, p. 39.

Well Sites:

The following 29 applications for permit to drill (APDs) and associated infrastructure are authorized:

#	Well Name	Well #	TWP	RNG	Sec	Qtr/Qtr	Lease #
1	South Bear	12-12BG	49N	79W	12	SWNW	WYW140575
2	South Bear	14-12BG	49N	79W	12	SWSW	WYW140575
3	South Bear	21-12BG	49N	79W	12	NENW	WYW140575
4	South Bear	23-12BG	49N	79W	12	NESW	WYW140575
5	South Bear	32-12BG	49N	79W	12	SWNE	WYW140575
6	South Bear	34-12BG	49N	79W	12	SWSE	WYW140575
7	South Bear	41-12BG	49N	79W	12	NENE	WYW140575
8	South Bear	43-12BG	49N	79W	12	NESE	WYW140575
9	South Bear	14-13BG	49N	79W	13	SWSW	WYW140575
10	South Bear	23-13BG	49N	79W	13	NESW	WYW140575
11	South Bear	32-13BG	49N	79W	13	SWNE	WYW140575
12	South Bear	34-13BG	49N	79W	13	SWSE	WYW140575
13	South Bear	41-13BG	49N	79W	13	NENE	WYW140575
14	South Bear	43-13BG	49N	79W	13	NESE	WYW140575
15	South Bear Tear Drop	32-11BG	49N	79W	11	SWNE	WYW140575
16	South Bear Tear Drop	34-11BG	49N	79W	11	SWSE	WYW140575
17	South Bear Tear Drop	43-11BG	49N	79W	11	NESE	WYW140575
18	South Bear Tear Drop	12-14BG	49N	79W	14	SWNW	WYW140575
19	South Bear Tear Drop	14-14BG	49N	79W	14	SWSW	WYW140575

#	Well Name	Well #	TWP	RNG	Sec	Qtr/Qtr	Lease #
20	South Bear Tear Drop	21-14BG	49N	79W	14	NENW	WYW140575
21	South Bear Tear Drop	23-14BG	49N	79W	14	NESW	WYW140575
22	South Bear Tear Drop	32-14BG	49N	79W	14	SWNE	WYW140575
23	South Bear Tear Drop	34-14BG	49N	79W	14	SWSE	WYW140575
24	South Bear Tear Drop	41-14BG	49N	79W	14	NENE	WYW140575
25	South Bear Tear Drop	43-14BG	49N	79W	14	NESE	WYW140575
26	South Bear Tear Drop	12-24BG	49N	79W	24	SWNW	WYW140575
27	South Bear Tear Drop	21-24BG	49N	79W	24	NENW	WYW140575
28	South Bear Tear Drop	32-24BG	49N	79W	24	SWNE	WYW140575
29	South Bear Tear Drop	41-24BG	49N	79W	24	NENE	WYW140575

Water Management:

BLM approves use of federal water in the following approved water management infrastructure:

Facility Name	NEPA Document	WYPDES	Qtr/Qtr	Section	Township	Range	Lease	Water Discharge Points	Qtr/Qtr	Section	Township	Range
River Road CBM Facility	Powder Valley Unit POD WY-070-04-072	WY 00560 81	SENW	11	50	77	Fee	Various (See pg 18 of WMP Appendix B)	Various (See pg 18 of WMP Appendix B)	Various	48 49 50 51 52	77
South Bear 23-7-4978 Pump Station	South Bear EA WY-070-111-51	NA	Center SW1/4	7	49	78	Fed	Emergency	Center SW1/4	7	49	78

Rights-of-Way:

Williams requested 2 ROW grants for South Bear POD. BLM approves ROW WYW-170232 under the Mineral Leasing Act for conveyance of gas. BLM approves ROW WYW-170233 under the Federal Land Policy and Management Act for road, water, and electric corridors. These ROWs are within the constraints of the POD's stipulations and conditions of approval (COAs). Table 2.3 shows ROW details:

ROW Grant	ROW Action	Township	Range	Section	Length (ft)	Width (ft)
WYW-170232	Gas	48N	78W	18	1,702	10
WYW-170233	Road, Water, Electric	49N	78W	18,28	3,037	40,30,20

Limitations: There are no denials. There is one requested deferral. Also see the COAs.

Deferral:

March 7, 2011 an email from Joe Olson (a Williams Development Manager) read that Williams wants BFO to defer making a decision on the 42-11 4979 APD due to proximity to the Flying E lek. BLM accepted the deferral request, which reduced the number of APDs in the plan from 30 to 29 APDs.

The following 1 APD and associated infrastructure are deferred:

#	Well Name	Well #	Environmental Issue/Justification
1	South Bear Tear Drop	42-11 4979	Operator request due to its proximity to the Flying E lek in order to give the operator and BLM time to refine the well location to extract fluid minerals in manners minimizing impacts on the lek.

THE FINDING OF NO SIGNIFICANT ACTION. Analysis of Alternative B of the EA, WY-070-11-151, 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 1.5, and is incorporated here by reference. Since early development of the South Bear proposal BFO received a new policy on management of sage-grouse populations and habitats and then maintained that policy into its RMP (see decision rationale, below), and received a new Interior Department policy on wilderness.

DECISION RATIONALE:

The decision to authorize the selected project, as summarized above, is based on the following:

1. Mitigation measures were included to reduce environmental impacts while meeting the project’s purpose and need. Mitigation is discussed in the environmental effects section (4.2.2.1 thru 4.2.5.3) of the EA. For a complete description of all site-specific COA’s associated with this approval, see Appendix B, COAs, in the EA.
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:
 - Comply with all applicable federal, state, and local laws and regulations (Operator Certification and WMP p. 2).
 - 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 (WMP p. 2).
 - Provide water analysis from a designated reference well in each coal zone (WMP p. 3).
 - The operator incorporated several measures to alleviate resource impacts into their Master Surface Use Plan (MSUP), submitted on January 11, 2011. Refer to the MSUP Appendix 5, for complete details of operator committed measures.
5. The Operator certified it has a Surface Use Agreement with the Landowners (MSUP p. Land Owner Certification tab).
6. The South Bear POD is clearly lacking in wilderness characteristics as it is smaller than 5,000 acres and contains numerous gas wells with their roads and infrastructure.
7. The selected alternative incorporates components of the BLM Instruction Memorandum Number WY-2010-12, Wyoming Governor's Sage Grouse Implementation Team’s “core population area” strategy, the Governor’s executive order, and local research to provide mitigation for sage-grouse- as adopted into the BFO RMP via a maintenance action, while meeting the purpose and need for the South Bear Project.
 - a) BLM Instruction Memorandum Number WY-2010-12 the BLM agreed to coordinate with the Wyoming Game and Fish Department (WGFD) for projects that may be important to connectivity sage-grouse habitat.
 - b) As a result of BLM coordination with the WGFD, on March 15, 2010 WGFD informed the BLM that “impacts to breeding grouse will be minimal.” for the proposed POD. They also

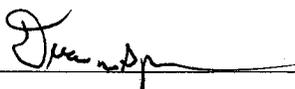
recommended BLM apply the mitigation measures in the WGFD Recommendations for Development of Oil and Gas within Important Wildlife Habitats.

- c) On May 7, 2010, the BLM received a letter from Governor Freudenthal requesting that the BFO only process applications for permits to drill outside of areas that may be important to sage-grouse connectivity.
- d) On May 10, 2010, the BFO sent a letter to operators with APD's potentially inside connectivity areas informing them that those projects would be temporarily delayed until the governor's Sage Grouse Implementation Team (Team), and the local working group, made recommendations as to what constitutes "connectivity" and what should be done in terms of management to protect these areas.
- e) On June 28, 2010 the Wyoming Sage-grouse Implementation Team consolidated the recommendations from the 8-statewide local working groups to adjust core habitat area boundaries, connectivity habitat boundaries, recommended procedures and guidelines for development, and identified research, inventory and habitat needs. Outside core and connectivity habitats, which represents the project area, the Implementation Team recommended less restrictions and greater flexibility; a 0.25 mile no surface occupancy and 2-mile timing limitation for leks, with the intention that those restrictions would not prevent population declines, but would allow some level of sage-grouse persistence. The Implementation Team also recommended stipulation waivers and enhanced permitting to encourage development outside core and connectivity areas.

The South Bear POD was one of the very few PODs that the BFO temporarily put on hold. After the June 28, 2010 Implementation Team recommendations were complete, the BFO determined that this project falls outside core and connectivity areas and can be processed in accordance with the Implementation Team recommendations. The US Fish and Wildlife Service was deciding whether a listing of the sage-grouse as a threatened or endangered species had merit during this timeframe. The listing decision was "warranted but precluded by higher priorities."

ADMINISTRATIVE REVIEW AND APPEAL: Under BLM regulations, 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: 3/3/11

**FINDING OF NO SIGNIFICANT IMPACT
FOR
Williams Production RMT Company
South Bear
ENVIRONMENTAL ASSESSMENT –WY-070-11-151**

FINDING OF NO SIGNIFICANT IMPACT:

On the basis of the information contained in the environmental assessment (EA) (WY-070-11-151), and all other information available to me, it is my determination that:

- 1) the approval of Alternative B will not have significant environmental impacts beyond those already addressed in Powder River Basin Environmental Impact Statement (PRB EIS) to which the EA is tiered;
- 2) Alternative B is in conformance with the Buffalo Field Office Resource Management Plan (RMP) (1985, 2001, 2003); and
- 3) Alternative B does not constitute a major federal action having a significant effect on the human environment. Therefore an environmental impact statement is not necessary and will not be prepared.

This finding is based on my 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 EA WY-070-11-151, which is incorporated here by reference.

CONTEXT:

Mineral development (coal, oil and gas, bentonite, and uranium) is a long-standing and common land use within the PRB. About 40% of the nation's coal production comes from the PRB. The PRB FEIS reasonably foreseeable development predicted and analyzed the development of 51,000 CBNG wells and 3,200 oil wells (PRB FEIS ROD pg. 2). The additional CBNG development described in Alternative B is insignificant within the national, regional, and local context.

INTENSITY:

The implementation of Alternative B will result in beneficial effects in the forms of energy and revenue production however; there will also be adverse effects to the environment (EA Sec. 4). Design features and mitigation measures were included within Alternative B to prevent significant adverse environmental effects (EA sec. 2.2.).

The preferred alternative does not pose a significant risk to public health and safety. The geographic area of the POD does not contain unique characteristics identified within the 1985 RMP, 2003 PRB FEIS, or other legislative or regulatory processes.

Relevant scientific literature and professional expertise were used 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 (EA, Sec. 4.2.6). The project area is clearly lacking in wilderness characteristics as it is smaller than 5,000 acres and contains gas wells with their roads and infrastructure. No species listed under the Endangered Species Act or their designated critical habitat will be adversely affected (EA, Sec. 4.2.3.1). The selected alternative will not have any anticipated effects that would threaten a violation of federal, state, or local law or requirements imposed for the protection of the environment.

Field Office Manager: Juan Sp

Date: 3/31/11

**BUREAU OF LAND MANAGEMENT
BUFFALO FIELD OFFICE
ENVIRONMENTAL ASSESSMENT (EA)
FOR
Williams Production RMT Company
South Bear
COALBED NATURAL GAS PLAN OF DEVELOPMENT
WY-070-11-151**

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) or on the website. This project environmental assessment (EA) addresses site-specific resources and impacts that evaded review in the PRB FEIS.

1.1. Background

Much of the proposed project is located in suitable sage-grouse nesting and wintering habitat, as verified at the onsite. Suitable habitat is defined in the Framework to Assist in Making Greater Sage-grouse Habitat Assessments for BLM-Administered Public Lands in Wyoming (Soehn, et al. 2001). Abundant sage-grouse sign was noted throughout much of the project area.

Williams Production RMT Company (Williams) submitted the South Bear plan of development (POD) on December 15, 2008 to the BFO with 30 federal applications for permit to drill (APDs) to develop and produce natural gas within coal bearing formations of the Powder River Basin (PRB).

A preplanning meeting with Williams and Anadarko Petroleum was conducted for South Bear on March 29, 2010 at BFO.

The BFO took several steps to consider the evolving information on impacts to sage-grouse which could result from development activities on federal lands. These steps are outlined in Lazurite EA # WY-070-09-095 under sage-grouse section in Chapter 3.

The South Bear POD was one of the very few PODs that the BFO temporarily put on hold while the U.S., Wyoming, and BLM settled on a policy for sage-grouse population and habitat management. After the June 28, 2010 Implementation Team recommendations were complete, the BFO determined that this project falls outside sage-grouse habitat key, core, and connectivity areas and can be processed in accordance with the Implementation Team recommendations.

Onsite visits were conducted in 2010 on November 3, and 4, to evaluate the proposal and modify as necessary to alleviate environmental impacts. BLM sent a post-onsite deficiency on November 23, 2010.

On December 12, 2010 Williams submitted deficiencies for the South Bear POD.

On January 14, 2011 Williams was informed by BLM to use the more robust perimeter for the Flying E lek perimeter which is in conformance for perimeter mapping protocols established by Wyoming Game and Fish Department (WGFD). BLM provided Williams with a map of the affected South Bear POD vicinity as well as a shape-file on compact disk. The Flying E lek perimeter that will be carried forward in

the NEPA analysis for the South Bear POD is shown on the attached map with a 0.25 mile buffer applied. A second deficiency letter was sent to Williams by BLM on January 21, 2011 via email.

A meeting with Williams and contractors was held at BFO to address some of the outstanding deficiencies on February 4, 2011.

On March 7, 2011 in an email from Joe Olson, Williams stated they want BFO to defer making a decision on 1 APD due to proximity to the lek. BLM accepted the request for deferral which reduced the number of APDs in the plan from 30 to 29 APDs.

A third deficiency letter was sent to Williams by BLM on March 8, 2011 via email.

A fourth deficiency letter was sent to Williams by BLM on March 15, 2011 via email.

Williams continued to submit revisions/deficiencies as they were finalized through the month of March, 2011.

South Bear proposed COAs were shared with the operator on March 24, 2010.

1.2. Purpose and Need for the Proposed Action

The purpose and need of the proposed POD is to develop and produce coalbed natural gas (CBNG) in a manner providing environmental protection and natural resource conservation while executing a federal oil and gas lease, per 43 CFR 3160, all Onshore Orders, the Mineral Leasing Act (MLA) (1920), the Federal Land Policy and Management Act (FLPMA) (1976), and other laws, statutes, and regulations.

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. Conformance with Land Use Plan and Other Applicable Laws, Regulations, and Policies

The proposed project conforms to the terms and the conditions of the 1985 BFO Resource Management Plan (RMP) (BLM 1985), the 2001 BFO RMP Update (BLM 2001), Amendment (BLM 2003), and the PRB FEIS (including the PRB ROD) (BLM 2003a, b). The Proposed Action complies with all federal laws, regulations, and policies, including USDI Order 3310. This includes, but is not limited to, the following Acts and Orders, as amended: FLPMA, MLA, National Historic Preservation Act (1966), Endangered Species Act (ESA) (1973), Migratory Bird Treaty Act (MBTA) (1918), Bald and Golden Eagle Protection Act (BGEPA) (1940), Clean Water Act (1972), Clean Air Act (1970), and National Environmental Policy Act (NEPA) (1969).

1.5. Scoping and Issues

External scoping was not conducted for this EA. Extensive external scoping was conducted for the PRB FEIS and is discussed on p. 2-1 of the PRB FEIS and on p. 15 of the PRB ROD. This project is similar in scope to other CBNG PODs that the BFO analyzed.

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 project. 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 important issues for the affected resources to further focus the analysis. This EA addresses the site-specific impacts that were not analyzed within the PRB FEIS and

identifies potentially significant effects of the proposed project to help the decision maker come to a reasoned decision. Project issues include:

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

2. ALTERNATIVES INCLUDING THE PROPOSED ACTION

BFO analyzed two alternatives: the No Action Alternative (Alternative A) and the Action Alternative (Alternative B). The following sections include a brief description of each alternative. Programmatic mitigation measures from the PRB FEIS apply to both alternatives. Site-specific conditions of approval (COAs), programmatic COAs, drilling and production COAs, and standard COAs would apply only to Alternative B and are included in the COAs.

2.1. Alternative A - No Action

A No Action Alternative was considered in the PRB FEIS, Volume 1, pp. 2-54 to 2-62. This alternative would consist of no new federal wells. An oil and gas lease grants the lessee the conditional right and privilege to drill for, extract, remove, and dispose of all oil and gas deposits in the lease lands, subject to the terms and conditions incorporated in the lease, other laws, regulations, and natural resource conservation measures. Thus, under this alternative, the operator’s proposal would be denied.

2.2. Alternative B - Operator Proposed Action

Alternative B contains complete APDs with original signatures and is based on the operator and BLM working to reduce environmental impacts. This alternative summarizes the POD as it was, after site visits, submitted to the BLM by Williams on January 11, 2011.

Proposed Action Title/Type: Williams Production RMT Company’s South Bear CBNG POD.

Proposed Well Information: There are 30 wells proposed within this POD; the wells are vertical bores proposed on an 80 acre spacing pattern with 1 well per location. Each well will produce from 1 coal seam: Big George. Proposed well house dimensions are 6 ft wide x 8 ft length x 6 ft height. A list of proposed wells is included in Table 2.1.

Table 2.1 Proposed Wells – Alternative B

#	Well Name	Well #	TWP	RNG	Sec	Qtr/Qtr	Lease #
1	South Bear	12-12BG	49N	79W	12	SWNW	WYW140575
2	South Bear	14-12BG	49N	79W	12	SWSW	WYW140575
3	South Bear	21-12BG	49N	79W	12	NENW	WYW140575
4	South Bear	23-12BG	49N	79W	12	NESW	WYW140575
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18	South Bear Tear Drop	43-11BG	49N	79W	11	NESE	WYW140575
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28	South Bear Tear Drop	21-24BG	49N	79W	24	NENW	WYW140575
29	South Bear Tear Drop	32-24BG	49N	79W	24	SWNE	WYW140575
30	South Bear Tear Drop	41-24BG	49N	79W	24	NENE	WYW140575

Water Management Proposal: The Water Management Plan (WMP) for this POD describes the primary method for disposal of CBNG produced water as conveyance via an existing pipeline to an existing water treatment facility prior to discharge to Powder River. Water may also be discharged directly to Dead Horse Creek or Flying E Creek near the confluence of these tributaries with the Powder River using existing Wyoming Department of Environmental Quality (WDEQ) permitted outfalls. For this conveyance, pressure would be supplied by a proposed pump station located in the Center of SW1/4 of Section 7, T 49N, R 87W. The following water treatment facilities and associated existing infrastructure (Table 2.2) were inspected and approved for use in association with the preferred water management strategy for the POD.

Table 2.2 Proposed Water Management Facilities

Facility Name	NEPA Document	WYPDES	Qtr/Qtr	Section	Township	Range	Lease	Water Discharge Points	Qtr/Qtr	Section	Township	Range
River Road CBM Facility	Powder Valley Unit POD WY-070-04-072	WY 0056081	SENW	11	50	77	Fee	Various (See pg 18 of WMP Appendix B)	Various (See pg 18 of WMP Appendix B)	Various	48 49 50 51 52	77
South Bear 23-7-4978 Pump Station	NA	NA	Center SW1/4	7	49	78	Fed	Emergency	Center SW1/4	7	49	78

County: Johnson

Applicant: Williams Production RMT Company

Surface Owners: Tear Drop Cattle Co. LLC, Bureau of Land Management, State of Wyoming

Drilling and Construction:

- Wells will be to Big George coal zone to an average depth of approximately 2,205 feet.
- Drilling and construction activities are anticipated to be completed within 2 years, the term of an APD. Drilling and construction occurs year-round in the PRB. Weather may cause delays lasting several days but rarely do delays last multiple weeks. Timing limitations in the form of COAs and/or agreements with surface owners impose longer temporal restrictions on portions of this POD, but rarely do these restrictions affect an entire POD.
- Well metering shall be accomplished by telemetry/central metering facility/well visitation. Metering would entail 30 visits per month to each well/central metering facility.
- A road network consisting of 7.6 miles of improved road and 3.2 miles of primitive road..
- If the buried power line network is not completed before the wells are in production, then temporary diesel generators shall be placed at the 9 power drops.
- Fuel storage tanks of 500 gallon capacity may be located with each diesel generator. Generators are projected to be in operation for 24 months. Fuel deliveries are anticipated to be 2-3 times per week during the summer months and 4 times per week during the winter. Duration of a fuel delivery is expected to take between 30 and 60 minutes. Noise level is expected to be 100.5 decibels at 1 meter distance.
- A buried gas, water and power line network, and 6 central gathering/metering facilities.

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), 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 (January 2003).

Right-of-Way Grants:

Williams requested 2 right-of-way grants for South Bear POD. Authorization of right-of-way (ROW) WYW-170232 is under the MLA and is for conveyance of gas. Authorization of ROW WYW-170233 is under the FLPMA and is for road, water, and electric. These ROWs will fall within the constraints of the appropriate stipulations and conditions of approval of the POD. Table 2.3 includes the ROW grants proposed for use with this POD.

Table 2.3 Right-of-Way Grants

ROW Grant	ROW Action	Township	Range	Section	Length (ft)	Width (ft)
WYW-170232	Gas	48N	78W	18	1,702	10
WYW-170233	Road, Water, Electric	49N	78W	18,28	3,037	40,30,20

2.3. Alternatives Considered but Not Analyzed in Detail

Williams proposed to convey water off the project with construction of a parallel water line along the existing Lance operated Tear Drop Lateral. Williams agreed to forgo construction of the parallel line and use Tear Drop lateral. This decision eliminated approximately 3.5 miles of pipeline construction.

2.4. Design Features

The original plan for the South Bear POD was submitted on December 15, 2008 with 30 federal APDs, and then subsequently revised to include 29 APDs. The original POD submittal is not analyzed in detail

in this EA. Discussions and onsite visits occurred between the BFO and Williams between November 2010 and March 2011 based on the initial project description. As a result of these discussions, adjustments were made to the initially proposed project as summarized in the following text.

- Williams agreed to pay particular attention to and provide expedient reclamation for the following wells which are visible from Interstate 90: 23-14, 43-14, 23-13, and 43-13. The overall goal is to reduce the impacts to the soils thereby increasing the success of reclamation. In the MSUP and POD correspondence Williams stated: The drilling pits will be vacated of drilling fluids upon completion of the well with the use of Vac-truck, during pit closure attention will be paid to ensure spoils are placed in the pits first and only topsoil spread on pit disturbance, seeding for stabilization will capitalize on weather opportunities and will occur when conditions are favorable, compaction of the location will be limited by Williams commitment not use these locations as staging areas or storage facilities (including drilling pipe, spools of wire and unused equipment), garbage and trash will be immediately removed.
- The designs of 5 engineered well pads were modified to best fit the topography with rounded corners and innovative shapes.
- Five well locations (32-14, 21-2, 41-24, 21-12, and 43-13) were reduced to a slot design.
- Nineteen well locations will not require earth work preparation (no engineered pad/no slot) other than digging of drilling pits and digging in wheels to level the drilling rig. Construction of wells with no pad and no slot would result in less soil disturbance to the soil resource. No soil would be removed or graded. Where reserve pits are constructed for these wells, soil productivity and soil quality will be maintained when top soil is segregated and saved for distribution on pit disturbances.
- The majority of single well locations will use primitive access roads. The use of primitive roads would result in less soil disturbance to the soil resource.
- The access road to well 12-24 required the addition of 240 linear feet of template road design to the proposed unimproved road where slopes exceeded 25%. Drainage control was added in the form of ditches, wing ditches and riprap to control surface flow and limit water erosion on this 25% slope. The engineered pad was reshaped and designed such that rock rip-rap was added where water erosion on steep slopes may be an issue. Silt fence was added around the perimeter of the fill slope to contain erosion.
- In an attempt to corridor disturbances Williams routed the access road to the 14-13 parallel and within 50 feet of Interstate 90 right-of-way. 1,000 feet of engineered road is required and will impact slopes greater than 25%. The engineered road is considered mitigation as it professionally designed by a civil engineer and meets all BLM 9113 regulation and standards for BLM roads. Additionally, Williams added approximately 400 feet of rip-rap (50% of the aggregate 6 inches or larger) with 8 ounce Geo-textile fabric underlayment on the fill slope to a height 2 feet above the toe of slope and 4 feet above the toe of slope in the main drainage. Approximately 400 feet of silt fence will be placed on the fill slope on the downstream side of the road to contain soil erosion.
- The engineered pad for well 21-24 was reshaped to avoid 25% slopes as much as possible. Silt fence was added around the entire fill slope perimeter to contain soil erosion.
- A total of 10 well locations were moved to reduce surface disturbance or reduce impacts to wildlife.
- Design of all well pads was adjusted to include a 1 to 2 percent slope for drainage.

- Five staging areas will not receive blade work to level the area for equipment.
- Williams asked BLM to defer 1 well (42-11) and access road to give Williams and BLM time to investigate a better location for the well to secure fluid minerals while reducing disturbance within 0.25 mile of the lek.
- Template designs with gravel surfacing were added to provide all weather access to central metering locations near the 34-11, and before the 43-11.
- 7 low water crossings and 12 culverts are included in the proposal to control surface run-off.
- 1 engineered road was removed due to conflicts with the landowner's buried stock water line.
- A total of 5 roads were relocated, upgraded, and/or engineered to:
 - Provide surfacing and drainage relief;
 - Limit soil erosion; and
 - Avoid existing infrastructure (e.g., pipelines).
- Over head power was reduced from 2.92 miles to 0.35 mile to reduce impacts to sage-grouse habitat.

The above changes as documented in a revised project description provided as William'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 the BFO.

3. DESCRIPTION OF AFFECTED ENVIRONMENT

This section describes the environment 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 B. Resources that would be unaffected, or not affected beyond the level analyzed within the PRB FEIS, are not discussed within the EA.

3.1. Project Area Description

The POD would be developed within an area of approximately 3,487 acres in Johnson County. The topography in the project area is relatively rugged terrain, with more moderate to level topography located along between numerous ridges. Elevations are about 4,429 to 4,757 feet above sea level.

Topography ranges from moderately to rugged with steep ridgelines and deeply incised draws. Much of the project area consists of dissected uplands with steep down-cut channels, created predominately by summer thunderstorms and spring runoff in ephemeral drainages with steep gradients and fine sediment substrate, which lead to Powder River. The project area is drained by Flying E Creek and Timber Draw tributaries of the Powder River to the east and Crazy Woman Creek to the west. The riparian areas are dominated by tree and shrub species which consist mainly of sparse cottonwood trees with scattered juniper and dense sage brush. This area is managed as rangeland with livestock grazing and recreational hunting as the main uses. The area experienced some historic conventional oil and gas exploration and production, and more recently CBNG development.

The South Bear project area is adjacent to the boundaries of 4 approved CBNG PODs that include 126 wells, 2 of which are within the South Bear POD boundary, see Table 3.1. There are 882 wells within the 4 mile-consideration of cumulative effects area for this proposal (WOGCC) as of 3/11/2011.

Table 3.1 Adjacent or Overlapping CBNG POD Development

POD Name	Environmental Assessment #	Decision Date
Nemesis	WY-070-05-157	9/13/2005
West Bear Draw	WY-070-06-292	9/20/2006
Tear Drop	WY-070-08-72	4/4/2008
Lazurite	WY-070-09-095	10/2/2009

The existing main access road and utility corridor travels north south through Section 11 and 14 of Township 49 North (T49N), Range 79 West (R79W) was analyzed in part under the Ruby POD and Ruby POD Extension in 2004. The existing main access road and utility corridor travels north south through Section 7 and 18 of T49N, R78W and was analyzed in part under the Nemesis POD EA.

3.1.1. Transportation

There are 2.75 miles of existing roads in the POD boundary that are used for ranching, recreation, and oil and gas development. The 2 existing road types are primitive and crown and ditch roads. The primitive roads were created by the vehicle operator's direct vehicle use; the average travel width is less than 10' without surfacing, and without drainage control. These roads are used primarily by the local rancher. The crown and ditch roads were mechanically constructed and have some level of maintenance associated with them. The crown and ditch roads have a 12'-14' travel way width with a sub-grade of 14'-16'; some with and some without surfacing material. The ditches are approximately 1 foot deep and have some visible scouring. There are several spots where rutting occurred due to minimal compaction and minimal drainage control. A majority of the existing culverts are 18" corrugated metal and are generally in good condition and functioning properly. The maximum grade on both road types is between 10%-12%.

3.1.2. Soils, Vegetation, and Ecological Sites

3.1.2.1. Soils

Soils have 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 have 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 within the project area were obtained from the North Johnson County Survey Area, Wyoming (WY719). The soil survey was performed by the Natural Resource Conservation Service 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.

For more detailed soil information, see the NRCS Soil Survey 719 – North Johnson County. Additional site-specific soil information is included in the Ecological Site interpretations.

Table 3.2 Dominant Soils within the Proposed Action Project Boundary

Map Unit Symbol	Map Unit	Acres	Percent
623	Parmleed-Bidman fine sandy loams, 3 to 15 percent slopes	846	24%
709	Theedle-Shingle loams, 3 to 30 percent slopes	554	16%
687	Savageton-Samday clay loams, 3 to 15 percent slopes	442	13%
701	Shingle-Worf loams, 3 to 30 percent slopes	287	8%
667	Renohill-Savageton clay loams, 3 to 15 percent slopes	246	7%
708	Theedle-Kishona-Shingle loams, 3 to 30 percent slopes	234	7%
715	Ulm-Renohill clay loams, 6 to 15 percent slopes	232	7%
640	Forkwood-Cushman loams, 6 to 15 percent slopes	224	6%
684	Samday-Shingle-Badland complex, 10 to 45 percent slopes	150	4%
632	Cushman-Shingle loams, 6 to 15 percent slopes	106	3%
608	Bidman-Parmleed loams, 0 to 6 percent slopes	73	2%
615	Cambria-Kishona loams, 6 to 15 percent slopes	48	1%
686	Savageton-Silhouette clay loams, 0 to 6 percent slopes	45	1%

Source: NRCS 2010.

Soils within the project area were identified from the North Johnson County Survey Area, Wyoming (WY719).

The soil survey was performed by the Natural Resource Conservation Service according to National Cooperative Soil Survey standards. Pertinent information for analysis was obtained from the published soil survey and the National Soils Information System (NASIS) database for the area.

3.1.2.2. Slope Hazard

A soil's stability is greatly affected by the slope on which it occurs. In general, the greater the slope, the greater the potential for slumping, landslides and water erosion. Approximately 213 acres (6%) 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 Natural Resources Conservation Service (NRCS; USDA NRCS 2007), are listed in Tables 3.2 and 3.3, respectively 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 has rolled, slid or 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 and high probability of irrecoverable soil losses.

Through the onsite investigation slopes exceeding 25% were determined be within the project area. When avoidance was not possible and project components would impact slopes which are 25% or greater those areas were assigned a site specific reclamation plan.

Table 3.3 Percent Slope within the South Bear Project Area

% Slope	Acres	% of Project Area
0-24%	3,276	94
Greater than or Equal to 25%	213	6

3.1.2.3. Reclamation Suitability

Soils with poor reclamation and re-vegetation suitability occur throughout the project area. Currently soil conditions in the project area are being impacted traditional activities, including livestock grazing and wildlife use. Much of the area is covered with soils that are easily damaged by use or disturbance or are difficult to re-vegetate or otherwise reclaim. Soil impacts (e.g., roads, linear pipeline scars) can be readily observed in the area.

In the absence of recoverable topsoil as is common throughout the project area, the surface organic matter in the form of vegetation, litter and biological crust are critical to maintaining the integrity and viability of the soil.

Table 3.4 Reclamation Suitability within the South Bear Project Area

Reclamation Potential		
	Fair	Poor
Total Acres	1,644	1,843
Percent of Project Area	47	53

Reclamation suitability varies throughout the project area. The main soil limitations in the project area include: high clay content, depth to bedrock.

Reclamation potential of soils 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. Many of the soils and landforms of this area present distinct challenges for development. Approximately 4% of the area within the boundary of the proposed action contains soil mapping units with a named component identified as being a highly susceptible water erosion and 6% of the area has slopes greater than 25% making stabilization of disturbance and reclamation challenging and possibly unachievable.

Through onsite investigations soils were determined to have fair to poor reclamation suitability. Where project components would have impacted soils with poor reclamation suitability those areas were re-routed to avoid them. If avoidance was not possible they were mitigated.

3.1.3. Ecological Sites and Vegetation

Visits to the project area were conducted by BLM staff, Williams, and Grouse Mountain Environmental Consultants for onsites in November 2010. Onsites revealed the following vegetation community based on ecological site descriptions.

Ecological site descriptions provide site and vegetation information needed for resource identification, management, and reclamation recommendations. To determine the appropriate ecological sites for the area contained within this proposed POD, BLM specialists analyzed data from onsite field reconnaissance and from Natural Resources Conservation Service published soil survey soils information. The map unit

symbols for the soils identified in Section 3.2.1 of this document and the associated ecological sites for the identified soil map unit symbols found in the POD boundary are summarized in Table 3.5, below.

Table 3.5 Dominant Ecological Sites and Dominant Soils Map Units within South Bear POD

Map Unit	Ecological Site	Percent of Project Area
667	Clayey (CY) 10-14 NP	28
686	Clayey (CY) 10-14 NP	
687	Clayey (CY) 10-14 NP	
715	Clayey (CY) 10-14 NP	
608	Loamy (Ly) 10-14 NP	60
615	Loamy (Ly) 10-14 NP	
623	Loamy (Ly) 10-14 NP	
632	Loamy (Ly) 10-14 NP	
640	Loamy (Ly) 10-14 NP	
708	Loamy (Ly) 10-14 NP	
709	Loamy (Ly) 10-14 NP	
684	Shallow Clayey (SwCy) 10-14 NP	4
701	Shallow Loamy (SwLy) 10-14 NP	8

Source: NRCS 2010.

Dominant ecological sites and plant communities identified in this POD and its infrastructure are Clayey (10-14NP), Loamy (10-14NP), Shallow Clayey (10-14NP), and Shallow Loamy (10-14NP) sites. Refer to Section 3.2.2 Vegetation, for a description of vegetation species observed during onsite field visits. A summary of the project’s ecological sites are included in Table 3.6.

Table 3.6 Summary of Ecological Sites within the South Bear POD

Ecological Site	Approximate Acres	Percent of the Project Area
Clayey (10-14NP)	695	28
Loamy (10-14NP)	2,086	60
Shallow Clayey (10-14NP)	150	4
Shallow Loamy (10-14NP)	287	8

Source: NRCS 2010.

The Clayey (10-14NP) ecological site (covering approximately 28 percent of the POD) is a rangeland site type, found in the Southern part of the Northern Rolling High Plains. Clayey Sites occur on nearly level to steep slopes on landforms which include hill sides, alluvial fans and stream terraces in the 10-14”precipitation zone. The soils of this site are moderately deep to very deep (greater than 20” to bedrock), well-drained soils that formed in alluvium or alluvium over residuum derived calcareous shale. These soils have slow permeability. The bedrock is clay shale which is virtually impenetrable to plant roots. 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 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 grasses include rhizomatous wheatgrasses, green needlegrass, blue grama, and prairie junegrass. Forbs include Louisiana sagewort (cudweed), plains wallflower, hairy goldaster, and scarlet globemallow. Fringed sagewort and plains pricklypear and also occur. Cheatgrass, an invasive species, invaded the state and PRB.

The Loamy (10-14NP) ecological site (covering approximately 60 percent of the POD) is a rangeland site type, found in the southern part of the Northern rolling high plains. This site occurs 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" 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. Dominate vegetation include needleandthread, western wheatgrass, green needlegrass, blue grama, prairie junegrass and Sandberg bluegrass. Other grasses occurring on the state include Cusick's and Sandberg bluegrass, and prairie junegrass. Other vegetative species identified at onsite include: pricklypear and fringed sagewort.

The Shallow Clayey and Shallow Loamy (10-14NP) ecological sites represent approximately 12 percent of the POD area. These sites generally occur on nearly level to steep slopes on landforms which include hill sides, ridges and escarpments in the 10-14" precipitation zone. The soils of this site are shallow (less than 20" 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 Loamy and Clayey ecological sites with the following exceptions: Sage brush is usually less dense and lower height structure on these shallow sites and shallow site will possibly include the changes in species composition and changes in density of the following grass species bluebunch wheatgrass, blue grama, Sandberg bluegrass, and prairie junegrass.

3.1.3.1. Wetlands/Riparian

The project area has numerous ephemeral draws and gullies. Based on National Wetland Inventory data available for the project area (U.S. Fish and Wildlife Service [USFWS] 2009), 0.15 percent of the project area is herbaceous wetlands (Table 3.7). For more information regarding wetland and riparian refer to the PRB FEIS, pp. 3-36 to 3-56.

Table 3.7 Wetlands and Riparian Areas within the South Bear POD

Wetland Type	Approximate Acres	Percent of Project Area
Herbaceous wetlands	5.38	< 1

Source: USFWS 2009

3.1.3.1.1. Invasive Species

Noxious weeds remain a concern in the western U.S. based on their ability to increase in cover relative to surrounding vegetation and exclude native plants from an area. Wyoming defines noxious weeds as weeds, seeds, or other plant parts that are considered detrimental, destructive, injurious or poisonous, either by virtue of their direct effect or as carriers of diseases or parasites that exist within the state, and are on the designated list by the Wyoming Statutes (Title 11, Chapter 5, Section 102.a.xi). Johnson County also identified weeds of concern specific to the county under the authority of the Wyoming Weed and Pest Control Act. The state-listed noxious weeds are listed in PRB FEIS Table 3-21 (p. 3-104) and the Weed Species of Concern are listed in PRB FEIS Table 3-22 (p. 3-105). Since publication of the PRB FEIS Russian Olive (*Elaeagnus angustifolia*), Common St. Johnswort (*Hypericum perforatum*), and Common Tansy (*Tanacetum vulgare*) were added to the State of Wyoming noxious weed list.

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):

- Spotted Knapweed along Interstate 90

Additionally, the operator or BLM confirmed the following infestations and/or documented additional weed species during field investigations:

- Buffalobur along Interstate 90

3.2. Wildlife

A discussion of wildlife species that occur in the PRB is provided in the PRB FEIS (pp. 3-113 to 3-206). Information specific to the South Bear POD and/or information not discussed in the PRB FEIS is provided in this section.

A habitat assessment and wildlife inventory surveys of the South Bear POD area were performed over several years by Arcadis (2008, 2009, 2010). Arcadis performed surveys for bald eagle winter roosts, sage-grouse, sharp-tailed grouse, raptor nesting, mountain plover, black-tailed prairie dogs, and habitat for Ute ladies'-tresses orchid. All surveys were conducted according to the PRB Interagency Working Group's protocols, available at: http://www.blm.gov/wy/st/en/field_offices/Bufalo/wildlife.html.

A BLM biologist conducted field visits on November 3 and 4, 2010. During those visits, the biologist verified the wildlife survey information, evaluated impacts to wildlife resources, and compiled a list of recommended changes in project design features to reduce impacts to wildlife.

In addition to the surveys submitted by Arcadis and the onsite evaluation, the wildlife biologist also consulted databases compiled and managed by BLM BFO wildlife staff, the PRB FEIS, Wyoming Game and Fish Department (WGFD) datasets, and the Wyoming Natural Diversity Database (WYNDD) to evaluate the affected environment for wildlife species that may occur in the project area.

3.2.1. Habitat Types

Habitats present within the South Bear project area include mostly sagebrush shrubland and grassland. Limited single cottonwood, box elder, and juniper trees (perching/nesting habitat) are present throughout the bottom of various draws within the project area as well.

Sagebrush shrublands and grasslands are considered one of the most imperiled ecosystems in North America (Samson and Knopf 1996, Knick et al. 2003, USFWS 2010). Expansive grasslands occur throughout the rolling hills and bottomlands in portions of the project (Sections 13, 14, and NW Section of 24 T 49N, R79W). Elsewhere, grasslands occur on ridge tops and along drainage bottoms particularly in bottomlands such as Flying E Creek, located in Section 12 and North ½ of Section 13 T49N, R78W, as well as, Indian Creek, located in SE Section 13 and west ½ Section 24 T49N, R78W. Grasses are generally tall (6 to 24 inches) and dense (usually less than 25% bare ground).

Wyoming big sagebrush is the most abundant shrub in the area. It occurs in a patchy mosaic of sparse to moderately dense stands throughout the project area and averages 12 to 24 inches in height. Silver sage is also present within Flying E Creek, Indian Creek, and nearly all of the minor drainages throughout the project area. The greatest concentrations of sagebrush occur along the north and south side of Interstate 90 which travels east and west through the south-half of Sections 13 and 14 T49 N, R78W. Several Wyoming BLM sensitive species (described in Section **Error! Reference source not found.**) are associated with sagebrush ecosystems.

For a detailed description of the habitat type (soil, vegetation, and ecological site) within the POD, see the following sections above: project area description 3.1 and Soils, Vegetation, and Ecological sites 3.2.

3.2.2. Threatened, Endangered, Proposed, and Candidate Species

3.2.2.1. Threatened and Endangered Species

Threatened, Endangered, Candidate and Proposed species that will be impacted beyond the level analyzed within the PRB FEIS are described below.

3.2.2.1.1. Black-footed ferret

The black-footed ferret is listed as Endangered under the ESA. The affected environment for black-footed ferrets is discussed in the PRB FEIS on p. 3-175. Additional information regarding the affected environment for black-footed ferret is discussed here.

Active reintroduction efforts reestablished populations in Mexico, Arizona, Colorado, Montana, South Dakota, Utah, and Wyoming. In 2004, the WGFD identified six prairie dog complexes (Arvada, Sheridan, Pleasantdale, Four Corners, Linch, Kaycee, and Thunder Basin National Grasslands) partially or wholly within the BFO administrative area as potential black-footed ferret reintroduction sites (Grenier et al. 2004). The project area is located approximately 14 miles west of the Pleasantdale complex. USFWS has determined that black-footed ferrets do not occur in Wyoming outside of the Shirley Basin, and the species was block cleared for the rest of the state.

Current science indicates that a black-footed ferret population requires at least 1,000 acres of black-tailed prairie dog colonies for survival (USFWS 1989). Two black –tailed prairie dog colonies exist within the POD. One active black-tailed prairie dog colony exists within Sections 2 and 11, T49N, R79W and spans 39.6 acres (Arcadis 2008). The second colony is abandoned and lies within Section 24, T49N, R79W. Black-footed ferret habitat is not present within the South Bear POD project area.

3.2.2.1.2. Blowout Penstemon

Blowout penstemon is listed as Endangered under the ESA. It is a regional endemic species with documented populations in the Sand Hills of west-central Nebraska and the northeastern Great Divide Basin of Carbon County, Wyoming. Suitable blowout penstemon habitat consists of sparsely vegetated, early successional, shifting sand dunes and blowout depressions created by wind. In Wyoming, the habitat is typically found on sandy aprons or the lower half of steep sandy slopes deposited at the base of granitic or sedimentary mountains or ridges. The BLM biologist verified during onsite visits that the South Bear POD project area does not contain areas with these characteristics, and blowout penstemon is not expected to occur.

3.2.2.1.3. Ute Ladies'-Tresses Orchid

Ute ladies'-tresses orchid (ULT) is listed as Threatened under the ESA. It is extremely rare and occurs in moist, sub-irrigated or seasonally flooded soils at elevations between 1,780 and 6,800 feet above sea level. Habitat includes wet meadows, abandoned stream channels, valley bottoms, gravel bars, and near lakes or perennial streams that become inundated during large precipitation events. Wyoming Natural Diversity Database model predicts undocumented populations may be present particularly within southern Campbell and northern Converse Counties. In Wyoming, ULT blooms from early August to early September, with fruits produced in mid August to September (Fertig 2000).

Prior to 2005, only four orchid populations were documented within 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 Wind Creek and 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.

No springs, wet meadows or perennial water sources occur within the project area (Arcadis 2008). Based

on National Wetland Inventory data available for the project area (U.S. Fish and Wildlife Service [USFWS] 2009), herbaceous wetlands are located throughout the project area (Table 3.3 below). Most of these wetlands are not sub irrigated, however the water source is supplied by ephemeral drainages and intermittent creeks. All ephemeral drainages are moderately to severely steep and did not contain standing or running water during the spring months (Arcadis 2008). Arcadis did not do surveys for Ute ladies'-tresses during the flowering period, because of the lack of perennial streams and soil characteristics are not conducive of ULT habitat (see 3.2.3 Ecological Sites for a detailed description). It is highly unlikely the Ute ladies'-tresses orchid exists within the South Bear project POD.

Table 3.8 Herbaceous Wetlands

Herbaceous wetlands within South Bear POD			
¼ , ¼	Section	Township/ Range	Water Source
NW,NW	11	T49N R79W	Ephemeral drainage
NW,NE	11	T49N R79W	Ephemeral drainage
NE,SE	12	T49N R79W	Ephemeral drainage
NW,NW	14	T49N R79W	Ephemeral drainage
NE,NW	13	T49N R79W	Flying E Creek (Intermittent)
SE,NW	23	T49N R79W	Indian Creek (Intermittent)
SW,NE	23	T49N R79W	Ephemeral drainage
SW,NW	24	T49N R79W	North Fork of Indian Creek (Intermittent)

3.2.2.2. Proposed Species

3.2.2.2.1. Mountain Plover

The affected environment for mountain plover is discussed in the PRB FEIS on pp. 3-177 to 3-178. Additional information regarding the affected environment for mountain plover is discussed here.

At the time the PRB FEIS was written, the mountain plover was proposed for listing as a threatened species under the ESA. USFWS withdrew the proposal in 2003 but reinstated it again in 2010. USFWS will submit a final listing determination in 2011. Mountain plover is a WGF D Species of Greatest Conservation Need (SGCN), because population status and trends are unknown but are suspected to be stable, habitat is vulnerable without ongoing significant loss, and the species is sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a species with highest conservation priority, indicating they are clearly in need of conservation action. They are also listed by USFWS as a Bird of Conservation Concern (BCC) for Region 17, which includes the project area. BCCs are those species that represent USFWS's highest conservation priorities, outside of those that are already listed under ESA. The goal of identifying BCCs is to identify "species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing: under ESA.

Two prairie dog colonies are located in the project area. One prairie dog colony is located on a slope greater than 8%, which is not ideal mountain plover habitat. The other prairie dog colony exists within Sections 2 and 11, T49N, R79W and provides suitable habitat for mountain plover because the topography consists of gentle slopes (less than 4%) covered with grazed (less than 14 inches) prairie grasses. Since 2008, Arcadis had surveyed this prairie dog colony. The dates of the surveys are as follows: May 6, June 1, and June 13, 2008; May 13, May 26, June 10, 2009; and May 9, May 26, June 6, 2010. No mountain plover were observed in all three years of the surveys within the South Bear project POD.

3.2.2.3. Candidate Species

3.2.2.3.1. Greater Sage-grouse

In 2010, USFWS determined that the sage-grouse is warranted for federal listing across its range, but listing is precluded by other higher priority listing actions. In addition to being listed as a Wyoming BLM sensitive species, sage-grouse are listed as 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 listed by USFWS as a BCC for Region 17.

Although the South Bear POD project area met the criteria based on habitat qualities and population density to be included in an interim management area for the PRB, the habitat area is fragmented (Naugle, 2006). Fragmentation is, and has been, caused by the area being bisected by Interstate 90 and by an extensive road network consisting of improved and un-improved roads supporting fee and federal mineral development. The western edge of the project area borders a focus area and is within a high sage-grouse population density area (Doherty 2008). High density sagebrush is present in patches throughout the project area. Much of the project area contains large stands of sagebrush and moderate topography. All of the project area meets seasonal habitat requirements and is large enough to meet the landscape scale requirements of the bird (BLM 2008).

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 10 sage-grouse leks occur within 4 miles of the South Bear project POD. These 10 lek sites are identified in Table 3.9.

Table 3.9 Sage-grouse leks within 4 miles of the South Bear project POD.

Lek Name	Legal Location	Distance from Project Area (mi)	Occupied?	WGFD Category of Impact
38-Indian Creek II	Sec 32 T49N R78W	3.2	Yes	Extreme
38-Indian Creek IV	Sec 1 T48N R79W	3.3	Yes	Extreme
38-Ploessers Dry Lake	Sec 35 T49N R79W	2.1	Yes	Extreme
41-BLM	Sec 36 T50N R79W	1.1	Yes	High
41-Flying E Creek	Sec 11 T49N R79W	Within project POD	Yes	High
41-North Grub Draw	Sec 29 T50N R79W	3.2	Yes	Moderate
41-South Grub Draw	Sec 29 T50N R79W	3.1	Yes	Moderate
41-Tear Drop	Sec 33 T50N R78W	2.4	Yes	Extreme
41-Tear Drop II	Sec 32 T50N R78W	1.9	Yes	Extreme
41-Upper Dry Creek Road I	Sec 27 T50N R79W	3.8	Yes	High

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 within 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.

3.2.3. BLM Sensitive Species

Wyoming BLM has prepared a list of sensitive species 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; FLPMA; Department Manual 235.1.1A., and BLM Manual 6840. BLM Wyoming sensitive species that will be impacted beyond the level analyzed within the PRB FEIS are described below.

3.2.3.1. Bald Eagle

The affected environment for bald eagles is described in the PRB FEIS on p. 3-175. At the time the PRB FEIS was written, the bald eagle was listed as a threatened species under the ESA. Due to successful recovery efforts, it was removed from the ESA on 8 August 2007. The bald eagle remains under the protection of the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act.

Limited single cottonwood trees (perching/nesting habitat) are present throughout the bottom of various draws within the project area. Open water during winter months is limited within the project area, however, foraging opportunities are available from carrion (road-killed animals) along the edge of Interstate 90. Bald eagle surveys were conducted during the 2007/2008 roosting season. No eagles were seen and no suitable roosting habitat was identified. Bald eagle nests surveys were also done during raptor surveys in 2008, 2009, and in 2010. No known bald eagle winter roost or nests occur within the South Bear project POD.

3.2.3.2. Brewer's Sparrow

The affected environment for Brewer's sparrow is discussed in the PRB FEIS on p. 3-200. In addition to being listed as 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 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 listed by USFWS as a BCC for Region 17.

The Brewer's sparrow is dependent on shrub-dominated plant communities that provide protective cover, song perches, and nest sites. The Brewer's sparrow nests in sagebrush throughout the species' range. It is expected for Brewer's sparrow to be common within the project because habitat is present throughout the project area as described in the following two sections; Habitat Types 3.3.1 and Greater sage grouse 3.3.2.2.

3.2.3.3. Loggerhead Shrike

In addition to being listed as a Wyoming BLM sensitive species, loggerhead shrikes are listed by USFWS as a BCC for Region 17. The Wyoming Bird Conservation Plan rates them as a Level II species, indicating they are in need of monitoring. Loggerhead shrike habitat, open prairies with brush and trees, is present throughout the project area, and the species is suspected to occur. The affected environment for loggerhead shrike is discussed further in the PRB FEIS on pg. 3-187.

3.2.3.4. Sage Sparrow

Sage sparrows are a WGFD SGCN, with a rating of NSS3, because populations are restricted in distribution, habitat is restricted but not undergoing significant 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 listed by USFWS as a Bird of Conservation Concern (BCC) for Region 17. Considered a sagebrush-obligate, the sage sparrow inhabits prairie and foothills shrub habitat where sagebrush is present. It prefers tall shrubs and low grass cover, where sagebrush is clumped in a patchy landscape. Also, it is area-sensitive requiring large blocks of unfragmented habitat to successfully breed and survive. The project area supports sage sparrow habitat as described in the following two sections; Habitat Types 3.3.1 and Greater sage grouse 3.3.2.2.2. The species is suspected to occur within the project area.. The affected environment for sage sparrow is discussed further in the PRB FEIS on pp. 3-200 to 3-201.

3.2.3.5. Sage Thrasher

In addition to being listed as 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 listed by USFWS as a BCC for Region 17. This species is considered a sagebrush-obligate. Sage thrasher abundance is generally positively correlated with the amount of sage cover and negatively correlated with grass cover. The project area supports sage thrasher habitat as described in the following two sections Habitat Types 3.3.1 and Greater sage grouse 3.3.2.2.2. The species is suspected to occur within the project area. The affected environment for sage thrasher is discussed further in the PRB FEIS on pp. 3-199 to 3-200.

3.2.3.5.1. Black-tailed prairie dogs

At the time the PRB FEIS was written, the black-tailed prairie dog was added to the list of candidate species for federal listing in 2000 (USFWS 2000). It was removed from the list in 2004. BLM Wyoming 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.

Two black –tailed prairie dog colonies exist within the South Bear project POD. One active black-tailed prairie dog colony exists within Sections 2 and 11, T49N, R79W and spans 39.6 acres (Arcadis 2008). The second colony is abandoned and lies within Section 24 T49N, R79W.

3.2.3.5.2. Swift Fox

The affected environment for swift fox is discussed in the PRB FEIS on p. 3-189. In addition to the information presented in the PRB FEIS, swift fox is also listed as a WGFD SGCN, with a rating of NSS4, because population status and trends are unknown but are suspected to be stable, and habitat is vulnerable but is not undergoing substantial loss. Swift foxes prefer flat, shortgrass habitats and are often associated with black-tailed prairie dog colonies.

Suitable swift fox habitat exists throughout the South Bear project POD (see 3.3.1 Habitat Types for a more descriptive location) and is associated with the prairie grasslands, as well as the active prairie dog colony in Sections 2 and 11, T49N, R79W. While swift fox may not prefer the taller grass currently present in the POD, varying climatic conditions, increased black-tailed prairie dog activity (see 3.3.3.1.1. Black-tailed prairie dogs for location of active colony), or wildfire might favor shorter grass cover in some years.

3.2.3.5.3. Western Burrowing Owl

The affected environment for western burrowing owl (burrowing owl) is discussed in the PRB FEIS on p. 3-186. In addition to being listed as 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.

Two prairie dog colonies are documented within the South Bear project POD (Sections 2 and 11, and Section 24 T49N, R79W). The BFO raptor database indicates that one burrowing owl nest (#10717) existed within an inactive prairie dog colony located in Section 24 T49N, R79W, however the burrow has been surveyed since 2008 and no nesting pairs of burrowing owls have used burrow # 10717 during the past three breeding/nesting seasons.

3.2.4. Big Game

Both pronghorn and mule deer were observed during field visits to the project area. WGFD data indicate that the South Bear project POD contains yearlong for both species. 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. The project area intersects two hunt areas for pronghorn (318 & 353) and mule deer (319 & 320). Populations of pronghorn antelope and mule deer within their respective hunt areas are above WGFD objectives.

Yearlong use is when a population of animals makes general use of suitable documented habitat sites within the range on a year round basis. Animals may leave the area under severe conditions. Big game range maps are available in the PRB FEIS (pp. 3-119 to 3-143), the project file, and from the WGFD. The most current big game range maps are available from WGFD.

3.2.5. Upland Game Birds

3.2.5.1. Plains Sharp-tailed Grouse

The affected environment for plains sharp-tailed grouse is discussed in the PRB FEIS on pp. 3-148 to 3-150. Sharp-tailed grouse inhabit short and mixed-grass prairie, sagebrush shrublands, woodland edges, and river canyons. In Wyoming, this species is found where grasslands are intermixed with shrublands, especially wooded draws, shrubby riparian area, and wet meadows (see 3.3.1 Habitat Types for a description of habitats within the South Bear POD project).

Habitats within the South Bear POD project have some potential to support sharp-tailed grouse during most of the year. The mosaic pattern of grasslands and sagebrush-grassland could provide habitat from April through October. While some of the woody vegetation located in Flying E Creek (Section 12 and North ½ of Section 13 T49N, R78W), as well as, Indian Creek, (SE Section 13 and west ½ Section 24 T49N, R78W) have potential to support sharp-tailed grouse throughout winter months.

During an onsite on November 4, 2010 a covey of sharp-tailed grouse flushed near NENW Section 12 T49N R79W. Arcadis did conduct four surveys (from April 1 to May 7, 2008) for sharp-tailed grouse to identify locations of breeding/dancing grounds (leks) and did not observe any grouse during each survey (Arcadis 2008). The most recent WGFD records do not reveal any sharp-tailed leks on or within 1 mile of the South Bear POD. The nearest known sharp-tailed lek is the 41- Bear Draw (SESW Section 12 T50N R79W) located 5 miles north of the South Bear POD.

3.2.6. Aquatic Species

The Powder River Basin ecosystem and fishery is discussed in further detail in the PRB FEIS, pp. 3-153 to 3-166. Two major ephemeral drainages, Flying E Creek and Indian Creek are within the South Bear POD project. Perennial streams within northeastern Wyoming were sampled by U.S. Geological Survey (USGS) between 1980 and 1981, and generally supported invertebrate communities that included taxa adapted to flowing water. Ephemeral stream communities generally were composed of taxa adapted to standing water (Peterson 1990).

Table 3.10 lists the fish that occur in the Upper Powder River sub-basin and their WGFD NSS designation, if applicable. WGFD has identified SGCN within the state, all of which are given NSS designations. Seven of the species that may occur in the Upper Powder River sub-basin are designated as either NSS 1, 2, or 3 species. Species in these designations are considered to be species of concern, in need of more immediate management attention, and more likely to be petitioned for listing under the ESA. For these species, WGFD recommends that no loss of habitat function occur. WGFD allows for some modification of the habitat, provided that habitat function is maintained (i.e., the location, essential features, and species supported are unchanged). NSS 4-7 refers to populations that are widely distributed throughout their native range and are stable or expanding. Habitats also are stable. There is no special concern for these species.

Table 3.10 Fish Occurring in the Upper Powder River Sub-basin

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

Source: BLM 2010c.

Amphibian and reptile species (herpetiles) occur throughout the Basin. WGFD conducted a baseline inventory of herpetiles along the Powder River and its major tributaries from 2004-2006 (Turner 2007). WYNDD completed the first year of a 3-year herpetile study in the Power River Basin in order to detect impacts from CBNG development (Griscom et al. 2009). Herpetiles expected to occur in the PRB, according to these studies, are listed in Table 3.19 (Turner 2007; Griscom et al. 2009). Eight of the species listed are classified by WGFD as SGCNs, all with a rating of NSS4, indicating that they are widely distributed throughout their native ranges, and populations are stable. Of the species listed in Table 3.19, WYNDD reported that, for 2008 surveys, boreal chorus frogs were the most abundant amphibian in the PRB and were located in a variety of habitats. The second most abundant amphibian was Woodhouse's toad, which occurred along rivers, temporary ponds, and in CBNG reservoirs. Plains spadefoot and Great Basin toads were the least common species, occurring primarily in temporary ponds fed by rainstorms. Relatively few observations were made for reptile species. Bullsnares and sagebrush

lizards were most commonly seen. Turtles were rarely observed, due to their almost exclusive occurrence in deep backwaters.

Two of the herpetiles listed in Table 3.11, northern leopard frog and Columbia spotted frog, are Wyoming BLM sensitive species. In 2008, the Wyoming Natural Diversity Database (WYNDD) began a 3-year study of amphibians and reptiles in the PRB under the guidance of the ATG. The ATG is an inter-agency and inter-state working group focused on studying and mitigating impacts of energy development on aquatic ecosystems in northeastern Wyoming and southeastern Montana. Northern Leopard Frogs were estimated to occupy 42% of water bodies surveyed in 2010 within the PRB.

Table 3.11 Herpetile Species Expected to Occur in the Powder River Basin

Species	Verified by Survey ¹	WGFD Status	Wyoming BLM Sensitive?
Tiger salamander	Yes	NSS4	No
Northern leopard frog	Yes	NSS4	Yes
Milk Snake	No	NA	No
Columbia spotted frog	Yes	NSS4	Yes
Bullfrog	Maybe	NSS4	No
Spiny softshell	Yes	NA	No
Northern prairie lizard	No	NA	No
Boreal chorus frog	Yes	NSS4	No
Great plains toad	Yes	NSS4	No
Woodhouse's toad	Yes	NSS4	No
Plains spadefoot toad	Yes	NSS4	No
Short-horned lizard	Yes	NA	No
Sagebrush lizard	Yes	NA	No
Eastern yellowbelly racer	Yes	NA	No
Prairie rattlesnake	Yes	NA	No
Western hog-nosed snake	Yes	NA	No
Bullsnake	Yes	NA	No
Terrestrial garter snake	Yes	NA	No
Plains garter snake	Yes	NA	No
Common garter snake	Yes	NA	No
Snapping turtle	Yes	NA	No
Painted turtle	Yes	NA	No

¹ As reported in Turner (2007) and Griscom et al. (2009).

Source: BLM 2010c.

3.2.7. Migratory Birds

The affected environment for migratory birds is discussed in the PRB FEIS (pp. 3-150 to 3-153). On April 12, 2010, the BLM and USFWS signed a Memorandum of Understanding (MBTA MOU) to promote the conservation of migratory birds. The MBTA MOU strengthens migratory bird conservation by identifying and implementing strategies that promote conservation and avoid or minimize adverse impacts on migratory birds through enhanced collaboration between the parties, in coordination with state, tribal, and local governments.

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.

3.2.8. Raptors

The affected environment for raptors is discussed in the PRB FEIS on pp. 3-141 to 3-148. Additional information not discussed in the PRB FEIS and site-specific information regarding raptor species is provided here.

Five raptor species are known to have used nests within 0.5 miles of the South Bear project POD: red-tailed hawks, prairie falcons, northern harriers, burrowing owls and great-horned owls. During the onsite on November 4, 2010, a golden eagle was observed foraging near NWNE section 11, T49N R78W. Seven raptor nest sites occur within 0.5 mile of the South Bear project POD boundary, those nests are in Table 3.12. Two of these nests are considered active (3841 and 10716).

Table 3.12 Known raptor nests within the South Bear project POD

BLM Nest ID #	Species/Condition of nest	Location
3015	Great horned owl, nest is slumping	T49N R79W S23
3841 (2009*)	Prairie falcon, nest is in good condition	T49N R78W S18
3827	Unknown raptor, nest reported gone in 2008	T48N R76W S13
3022	Black-billed magpie nest, collapsed in 2010	T49N R79W S24
10715	Unknown raptor, majority of nest material on ground below	T49N R79W S12
10716 (2008*)	Red-tailed hawk, large nest is slumping	T49N R79W S12
12259	Northern harrier, nest reported gone in 2009	T49N R79W S12

* The Buffalo Field Office 1985 (Revised December 13, 2001) Resource Management Plan (RMP) defines an active nest as “one that has been used at least once during the previous three years.”

3.3. Water Resources

The project area is within the Upper Powder River drainage system (Hydrologic Unit Code 10090202), and is located primarily within the Flying E Creek and Indian Creek sub-watershed. The region is characterized by un-glaciated semi-arid rolling plains and dissected river breaks, with soils derived mainly from shale, sandstone, or related alluvium, valley fills, or fan remnants (Chapman et. al. 2004). The project area reflects this regional setting, and has numerous ephemeral draws and gullies dissecting the upland surface. Regionally, the vegetation is dominated by mixed-grass prairie and sagebrush steppe (Chapman et al. 2004).

The WDEQ assumed primacy from the United States Environmental Protection Agency (USEPA) for maintaining the water quality in the waters of the state. The Wyoming State Engineer’s Office (WSEO) has authority for regulating water rights issues and permitting impoundments for the containment of surface waters of the state. The WOGCC have authority for permitting and bonding off channel pits that are located over State and fee minerals.

3.3.1. Groundwater

The groundwater in this project area was historically used for stock water or domestic purposes. A search of the Wyoming State Engineer Office (WSEO) Ground Water Rights Database for this area showed 3 registered stock and domestic water wells within 1 mile of the South Bear POD’s proposed POD boundary (permitted CBNG and monitoring wells along with the miscellaneous wells associated with CBNG were not included in this search) with depths ranging from 25 to 180 feet. For additional information on water, please refer to the PRB FEIS (January 2003), Chapter 3, Affected Environment pp. 3-1 to 3-36 (groundwater).

WDEQ water quality parameters for groundwater classifications (Chapter 8, Quality Standards for Wyoming Groundwater, WDEQ 2005) define the following general limits for Total Dissolved Solids (TDS): 500 milligrams per liter (mg/l) TDS for Drinking Water (Class I), 2,000 mg/l for Agricultural Use (Class II) and 5,000 mg/l for Livestock Use (Class III). For additional water quality limits for groundwater, please refer to the WDEQ web site.

The PRB ROD (2003b) includes a Monitoring, Mitigation, and Reporting Plan (MMRP). The objective of the plan is to monitor those elements of the analysis where there was limited information available during the preparation of the EIS. The MMRP called for the use of adaptive management where changes could be made based on monitoring data collected during implementation.

Specifically relative to groundwater, the plan 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;
- Potential impacts would 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 CBM impoundments; and
- Shallow groundwater wells would be installed and monitored where necessary.

The production of CBNG necessitates the removal of some degree of the water saturation in the coal zones to temporarily reduce the hydraulic head in the coal. According to WOGCC, 3 CBNG wells currently exist within the POD boundary on the eastern edge.

The BFO has monitored coal zone pressures as expressed in depth to water from surface since the early 1990s in the PRB. The Juniper Draw groundwater monitoring well was installed by Devon as a part of the BLM deep groundwater monitoring program. The initial water level of the Big George Coal, measured in March 2001, which is indicative of the pressure in the target coal zone, was recorded at 168 feet below ground level. The most recent measurement, from March 2011, recorded the water level at 1,614 feet (which represents the bottom of the hole and well is dry) below ground level, for a decline of 1,446 feet since the well was completed.

3.3.2. Surface Water

The project area is within the Flying E Creek drainage and Indian Creek both of which are tributaries to the Upper Powder River watershed. Most of the area drainages are ephemeral (flowing only in response to a precipitation event or snow melt) to intermittent (flowing only at certain times of the year when it receives water from alluvial groundwater, springs, or other surface source – PRB FEIS Chapter 9, Glossary). Drainage features consist of narrow ephemeral draws, steep-sided gullies in various stages of stability or active erosion, and broader meandering streams in alluvial valleys. The latter include Flying E Creek and its major tributaries, which may have intermittent flows supported by groundwater contributions for part of the summer. Stratified alluvial deposits of silts and sands occur along the major streams, supporting sagebrush and grasses. Vegetation contributes to stabilizing the drainage network in many parts of the project area and surrounding locale.

The PRB FEIS presents the historic mean electrical conductivity (EC) in microSiemens per centimeter ($\mu\text{S}/\text{cm}$) and sodium adsorption ratio (SAR) by watershed at selected USGS Gauging Stations in Table 3-11 (PRB FEIS, p. 3-49). These water quality parameters “illustrate the variability in ambient EC and SAR in streams within the project area. The representative stream water quality is used in the impact analysis

presented in Section 4 as the baseline for evaluating potential impacts to water quality and existing uses from future discharges of CBM produced water of varying chemical composition to surface drainages within the Project Area,” PRB FEIS, p. 3-48. For the Upper Powder River, the EC ranges from 1,797 $\mu\text{S}/\text{cm}$ at maximum monthly flow to 3,400 $\mu\text{S}/\text{cm}$ 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 “Powder River at Arvada, WY,” PRB FEIS, p. 3-49.

There are no permitted springs within 1 mile of the POD boundary.

For more information regarding surface water, please refer to the PRB FEIS Chapter 3, Affected Environment, pp. 3-36 to 3-56.

3.4. Cultural Resources

Class III cultural resource inventory was performed for the South Bear POD prior to on-the-ground project work (BFO project nos. 70090043 & 70090043A). ACR Consultants, Inc. conducted a combination block and linear 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*. Ardeth Hahn, BLM Archaeologist, reviewed the report for technical adequacy and compliance with Bureau of Land Management (BLM) standards, and determined it to be adequate. The following resources are located in or near the project area.

Table 3.13 Cultural Resources Inventory Results

Site Number	Site Type	National Register Eligibility
48JO2943	Historic Road	Not Eligible
48JO3937	Prehistoric Site	Not Eligible
48JO3938	Prehistoric & Historic Site	Eligible
48JO3939	Prehistoric Site	Not Eligible
48JO4111	Prehistoric & Historic Site	Unevaluated
48JO4112	Prehistoric & Historic Site	Unevaluated
48JO4113	Prehistoric & Historic Site	Unevaluated
48JO4114	Prehistoric Site	Unevaluated
48JO4115	Historic Site	Not Eligible
48JO4117	Prehistoric Site	Not Eligible
48JO4118	Prehistoric Site	Unevaluated
48JO4119	Prehistoric Site	Unevaluated

Some of the project area analyzed in this EA occurs on deep alluvial deposits. Alluvial deposits typically have a high potential for buried cultural resources, which are nearly impossible to locate during a Class III inventory (Ebert & Kohler 1988:123; Eckerle 2005:43).

4. ENVIRONMENTAL EFFECTS

This section describes the environmental effects of the No Action Alternative (Alternative A), and 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.

Design changes to the original proposed project, described in Section 2.3 of this document, resulted in the development of Alternative B, Proposed Action. These changes mitigated some impacts to the environment that would result from adopting the proposed project; therefore, only the environmental consequences of Alternative B are described below.

4.1. Alternative A

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

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

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

4.2. Alternative B

4.2.1. Transportation

4.2.1.1. Direct and Indirect Effects

The South Bear plan of development proposes an additional 11 miles of proposed primitive, in sloped, out

sloped, and crown and ditch roads. The main access to South Bear POD is off of Ruby Road with the majority of the road network to the east. There are three engineered sections provided by Bighorn Surveying and Engineering, LLC with an average travel way surface of 14'-18'. The lowest design speed for the POD is 15mph with an average daily traffic (ADT) ranging from 1 to 20 trips per day. The primitive roads have road grades less than 6%, the in-sloped and out-sloped roads have road grades less than 8%, and the crown and ditch roads have grades less than 16%. The maximum road grade proposed is 15.77%. There are an additional 12 proposed CMP culverts that have a minimum diameter of 18" and an additional 7 low water crossings that will follow the typical installation details provided in the engineered diagrams. Additional culverts and wing ditches may be needed through the life of the project and will be addressed via the sundry process. Surfacing to gain traction on all roads (including primitive roads) can be added at the discretion of the operator.

4.2.1.2. Cumulative Effects

Land use within the project area would be affected on both a short-term and long-term basis. The proposed development will increase the average daily traffic on all of the roads within the POD boundary for the duration of the wells production. This is considered short term, for the life of the well-10 to 20 years. During this period both the proposed and existing roads will have additional traffic, additional dust, dust abatement, accelerated erosion and sedimentation, and higher anticipated accidents. The roads will mostly be used by the local ranchers, oil and gas personnel, federal government personnel, and to a lesser extent, the general public for recreational purposes. Long term impacts would be if the private land owners wish to keep the roads when the wells are no longer in production for their ranching operation.

4.2.1.3. Mitigation Measures

The typical engineering notes require that 4 inches of surfacing material be used when specified. It is important to use a surfacing material that is hard and durable so that it can be compacted, minimizes dust, and minimizes maintenance. The BFO has the authority to require site specific use of gravel aggregate on federal surface and recommends it on private and state, specifically gravel that meets the requirements of Gradation W as outlined in the WY Highway Department specifications for road and bridge construction per the BLM Manual Supplement WYSO for 9113. Conversations with the Dave Belus (Lessee) of Tear Drop Cattle Co. LLC and Jason Crowder, State of Wyoming Principal Lands Management Representative, have both expressed a preference for gravel surfacing material that meet BLM specifications Grade W on roads rather than clinker rock (aka: scoria). (See Conversation Record contained in the South Bear POD)

The two main surfacing materials used in the PRB are gravel or clinker rock (sometimes referenced as scoria). Gravel is a hard durable material and by definition it is loose rock that has a particle distribution from 1/12" to 2.5" in diameter. One cubic yard of gravel typically weighs around 3000 pounds. Clinker rock is a red-brown shale that has been baked and fused by in situ burning of underlying coal. Clinker rock found in the PRB (called porcelanite) has similar properties to ceramic; it readily breaks down into smaller fragments and has sharp edges when broken. Its weight varies depending upon the parent material but it usually is fairly light and has a specific gravity greater than one.

Vehicles have better traction with a road when the surfacing material is compacted, creating a safer driving surface. Because clinker rock is a soft, non-durable, material, during compaction it breaks down into dust rather than being compacted. It typically lacks a distribution of particle sizes. Regular gravel without gradation parameters is a hard durable material but lacks the distribution of particle sizes required for compaction. Whereas gravel, that meets Gradation W parameters, is a hard durable material that has a distribution of particle sizes that are designed to interlock when compacted - creating a solid driving surface. A solid driving surface also promotes sheet flow of surface run-off directing water away from the road; whereas clinker rock tends to promote infiltration into the road bed due to the porosity of burnt shale. The benefit of keeping water off or away from the road is to lessen maintenance costs.

The benefit of clinker rock is that it is readily available and more economical. The adverse consequence of gravel is that there are fewer gravel sources and gravel is more costly due to the gradation requirements.

The BLM requires the following roads be surfaced with a minimum of 4" of Gradation W gravel due to the higher anticipated ADT: TEM 3 that parallels Interstate 90 to the north; beginning in Section 14 and ending in Section 18. TEM 7 that heads north-south along the west side of the Flying E drainage; beginning in Section 13 and ending at the proposed well 21-12 in Section 12. TEM 5 that runs north-south under Interstate 90; beginning in Section 13 and ending at the proposed well 34-13.

The operator is responsible for having the licensed professional engineer(s) certify that the actual construction of the road meets the design criteria and is constructed to Bureau standards.

4.2.1.4. Residual Effects

Land use along the roads would be converted either permanently or for the duration of the well operation to a mineral development use. During this timeframe, the proposed lands would no longer offer wildlife habitat or grazing potential. If roads are constructed as proposed, stabilized, and maintained the residual effects associated with road construction should be minimal. However, primitive roads may present the BLM and the operator with distinct challenges in the form of reducing soil compaction.

4.2.2. Soils

4.2.2.1. Direct and Indirect Effects

Impacts anticipated to occur include rutting, mixing, compaction, increased erosion potential, spread of invasive weeds and degradation of soil quality. The most notable impacts to soils would occur in association with the construction of well pads and roads.

- Rutting affects the surface hydrology of a site as well as the rooting environment. The process of rutting physically severs roots and reduces the aeration and infiltration of the soil, thereby degrading the rooting environment. Rutting may result in mixing of topsoil and subsoil, thereby reducing soil productivity. Rutting also disrupts natural surface water hydrology by diverting and concentrating water flows creating accelerated erosion.
- Mixing may result in removal, dilution, or relocation of organic matter and nutrients to depths where it would be unavailable for vegetative use. Less desirable inorganic compounds such as carbonates, salts, or weathered materials could be relocated and have a negative impact on re-vegetation. 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.
- Soils would be compacted as a result of the construction of well 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.
- Potential for erosion would increase through the loss of vegetation cover and soil structure as compared to an undisturbed state.
- Spread of noxious weeds would increase through the loss of native vegetation compared to an undisturbed state.
- Soil quality would decrease, primarily as a result of profile mixing and compaction along with the loss in vegetative cover. A decrease in soil quality can result from and of increased erosion and

sedimentation. A decrease in soil quality also would occur in association with soil stockpiling activities at the 12-12 well location as microbial action is curtailed, at least to some degree, in long-term stockpiles.

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.

During initial site visits to the well sites, BLM staff observed site conditions for well pads and access roads. As stated in Section 2.3 of this document well sites were adjusted or moved to minimize locating wells and roads on: Soils Susceptible to Erosion; Slope Hazards; Soils with Poor Reclamation Suitability.

Slope Hazard

Onsite investigation revealed topography with the POD boundary does exceed 25% with approximately 213 acres or 6% in the project area having slopes of 25% or more. BLM and Williams tried to avoid soils that have a slope hazard. South Bear POD will impact approximately 2 acres of soils on slopes 25 % or greater.

Poor Reclamation Suitability

Onsite investigation revealed soils within the POD boundary are nearly equally divided between fair (47%) and poor (53%) reclamation suitability. BLM standard, programmatic COAs and Williams BMPs address and mitigate impacts to soils rated as fair reclamation suitability. However, soils with poor reclamation suitability have a combination of limiting factors; most predominately high clay content and shallow depth (< 20 inches) to bedrock. BLM and Williams tried to avoid soils rated as poor reclamation suitability; however avoidance was not always possible. South Bear POD will impact approximately 48 acres of surface disturbance on soils rated as having poor reclamation suitability.

4.2.2.2. Cumulative Effects

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

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

4.2.2.3. Mitigation Measures

Williams would take a number of actions to lessen the impacts to soils and maintain soil quality. Applicant-committed measures and BLM COAs would be implemented to mitigate or reduce the impacts associated with construction and operation.

- A Wyoming Pollutant Discharge Elimination System (WYPDES) permit is required for construction activities, and would address runoff and erosion leading to sedimentation impacts.
- Culverts and low water crossings would be installed to control storm-water runoff associated with construction within the South Bear POD.
- A site-specific reclamation assessment for well 14-13 was prepared for the access road to provide base line data and a plan for stabilization of the access road which impacts slopes > 25%.

- The operator will follow the guidance provided in the Wyoming Policy on Reclamation (IM WY-2009-022); See <http://www.blm.gov/wy/st/en/programs/reclamation.html> for details.
- Sub-soil piles stored on location of the 12-12 for a period greater than 90 days will require the stripping of topsoil above the cut slope; spoil piles stored above the cut slope will not exceed 3 feet in depth and will be spread with topsoil and seeded with a BLM approved seed mix to prevent wind and water erosion.
- BLM approved fluids and drilling mud must be buried within the reserve pit. Subsoil must then be replaced in the reserve pit before top soil is re-spread. Under no circumstances would any by-products from drilling or subsoil to be spread on top of topsoil.
- The operator is responsible for having the licensed professional engineer(s) certify that the actual construction of the road meets the design criteria and is constructed to Bureau standards.
- The newly constructed roads shall be thoroughly compacted to 90% standard maximum dry density.
- Surfacing material on this portion of road will meet the grading requirements for “Grading W” as outlined in the Wyoming Highway Department’s Standard Specification for Road and Bridge Construction due to the high anticipated levels of Average Daily Traffic (ADT).
- Turn-outs will be provided on single lane engineered and template resource roads where appropriate unless a BLM waiver is granted by a BLM Civil Engineer.
- The produced CBNG water from the proposed project would be disposed of off-site at an existing treatment facility permitted through WDEQ. No impacts associated with CBNG produced water discharge are anticipated.
- South Bear MSUP does not contain a final reclamation plan: South Bear MSUP does not address interim reclamation on areas not needed for production operations. Therefore, the operator shall be required to submit a new reclamation plan with the Notice of Intent to Abandon (NIA) or Subsequent Report Plug and Abandon (SRA) using the Sundry Notices and Reports on Well Form 3160-5 when abandoning wells and other facilities that do not have an approved reclamation plan.

Slope Hazard

Approximately 2 acres of surface disturbance will occur on soils with slopes exceeding 25%. In all cases disturbances were required to contain sufficient drainage control and stabilization measures.

Poor Reclamation Suitability

Approximately 48 acres of surface disturbance will occur on soils rated as having poor reclamation. In all cases and where appropriate disturbances were kept to a minimum by following existing ranch roads and utilizing primitive roads to access single well locations and utilizing well locations that did require engineering.

4.2.2.4. Residual Effects

Residual effects would include a long-term loss of soil quality associated with well pads and roads. Residual effects were identified in the PRB FEIS, page 4-408, such as the loss of vegetative cover, despite expedient reclamation, for several years until reclamation is successfully established.

Construction of wells with no pad and no slot and the use of primitive roads to single well locations would result in less soil disturbance to the soil resource as no soil would be removed or graded. However, final reclamation of the project may present distinct challenges to BLM and Williams in the form of reducing soil compaction.

4.2.3. Ecological Sites

4.2.3.1. Direct and Indirect Effects

Direct and indirect effects to ecological sites and biological diversity are discussed in the PRB FEIS, pp. 4-153 to 4-164. As proposed, the project would potentially alter the disturbance regimes in the project area, especially the frequency of fire due to increased activity in the project area. Additional effects include the increase in noxious weeds and alterations in vegetation community diversity and cover.

Direct effects to ecological sites would occur from ground disturbance caused by construction of well pads, ancillary facilities, associated pipelines, and roads. Indirect effects, as described in the PRB FEIS, would include the spread and/or establishment of noxious weeds, the alteration in surface water flows affecting vegetation communities, alteration in ecosystem biodiversity, and changes in wildlife habitat. These impacts would be mitigated by expediently stabilizing the disturbance through interim stabilization, and the implementation of erosion control measures.

The South Bear site specific reclamation assessment includes measures for interim stabilization of the access route to the 14-13. Interim and final reclamation are not addressed in the MSUP or the site specific reclamation assessment. Interim reclamation consists of minimizing the footprint of disturbance by reclaiming all portions of construction disturbance no longer needed for production operations. Typically, the portions of the cleared well sited not needed for operational and safety purposes are recontoured to a final or intermediate contour that blends with the surrounding topography as much as possible. Sufficient level area remains for setup of a work-over rig and to park equipment. However, since interim reclamation plans are not provided in this POD the disturbance figures for this project are expected to remain until the final reclamation is completed. Final reclamation would meet the guidelines outlined in the statewide reclamation policy, and would be evaluated by the BFO's standards. These actions would notably reduce intensity of the impacts to soils as well as the estimated time it would take to return the disturbed soils to a stable and productive state.

Long-term impacts to sagebrush are anticipated due to slow recovery rates and the duration between construction and re-disturbance during final reclamation. Complete restoration of sagebrush shrubland after disturbance can often take decades. Studies of Wyoming big sagebrush post fire recovery intervals indicated that post-fire regeneration of this species can take 50 to 120 years to regenerate naturally (Cooper et al. 2007; Baker 2006). Wyoming big sagebrush took approximately 17 years to re-establish after chemical removal in Wyoming (Johnson 1969) and sagebrush species can take 3 to 7 years to begin to spread in locations where seed drilling or transplant of seedlings occurred (Tirmenstein 1999).

The proposed off-site options for the discharge of produced water for the project would avoid the direct and indirect impacts to ecological sites from discharged produced water in the project area.

4.2.3.2. Cumulative Effects

Cumulative effects to ecological sites and biological diversity are discussed in the PRB FEIS, pp. 4-153 to 4-172. Cumulative effects to ecological sites include the further alteration of disturbance regimes from the increased activity, increase in noxious weeds, and alterations in vegetation community's diversity and cover.

Surface disturbances would result in impacts to grasses and forbs related to construction activities. Disturbed areas would be seeded with seed mixes which provide site stabilization and introduce forbs which are easy to establish such as Fourwing saltbush (*Atriplex canescens*).

Final reclamation would re-disturb all sites disturbed by construction and operation activities, including those previously stabilized when wells were in production. Disturbance associated with final reclamation activities would reintroduce native plant to mimic species composition in adjacent undisturbed areas.

Cumulative effects from the discharged produced CBNG water from the POD would be avoided through the proposed off-site options for the discharge of produced CBNG water for the project.

4.2.3.3. Mitigation Measures

Impacts to ecological sites from surface disturbance will be reduced through the implementation of the mitigation measures in the COAs; the South Bear POD, and its associated plans including the Integrated Weed and Pest Management Plan, the WMP and the MSUP. These documents are included in the Administrative Record for the South Bear POD at the BFO.

In addition, the operator will follow the guidance provided in the Wyoming Policy on Reclamation (Instruction Memorandum WY-90-231). The Wyoming Reclamation Policy applies to all surface-disturbing activities. Authorizations for surface-disturbing actions are based upon the assumptions that an area can and ultimately will be successfully reclaimed. Final reclamation measures will be used to achieve this goal. BLM reclamation goals also include the short-term goal of quickly stabilizing disturbed areas to protect both disturbed and adjacent undisturbed areas from unnecessary degradation. Interim reclamation measures will be used to achieve this short-term goal.

The site-specific reclamation assessment for well 14-13 and access road, as well as COAs provide additional mitigation for impacts identified in those areas.

In addition to those COAs listed in Section 4.2.2.1 of this document for soils, the following resource and site-specific BLM COAs will be implemented: BLM has developed seed mixes for each ecological site identified within the project area based on the NRCS ecological site description, the reference plant community and desired species richness with the intent of maximizing revegetation potential.

If applied correctly, BLM selected seed mixes which contain native grasses and forbs could restore disturbed areas to properly functioning vegetation communities. BLM can only require their use on BLM surface. The seed mix selected on private land is selected solely by the surface owner and may be more beneficial to cattle grazing.

4.2.3.4. Residual Effects

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

4.2.4. Wetlands/Riparian

4.2.4.1. Direct and Indirect Effects

Effects to wetland and riparian areas from CBNG development are disclosed in the PRB FEIS, pp. 4-173 to 4-179; these include analysis of direct and indirect impacts, cumulative impacts, and residual impacts. Direct and indirect impacts to herbaceous wetlands in Section 12 and 24 of T49N, R79W could result from the construction of the access road, utility corridor to well 12-24 and 21-24 which are directly above an herbaceous wetland in Section 24. Direct and indirect impacts to a freshwater emergent wetlands and riparian area could result from the construction of the access road, utility corridor and well 43-12 which is directly above the head waters of the Flying E drainage. The herbaceous wetland in Section 24 is likely anthropogenically created due to storm water back up against a stock water reservoir. The herbaceous wetland in Section 12 is naturally occurring at the headwaters of the Flying E Creek drainage. There would not be additional impacts to the wetlands beyond potential sedimentation.

The produced CBNG water from the proposed POD would be disposed of off-site at an existing treatment facility permitted through WDEQ and will not have impacts to herbaceous wetlands in the POD boundary.

4.2.4.2. Cumulative Effects

Changes in surface water flow due to project disturbances associated with construction and operation activities could lead to increased erosion, increased sediment in streams, and changes in water levels in channels located within and near the project site. These impacts would be mitigated by expediently stabilizing the disturbance and reducing the amount of sediment reaching the streams.

4.2.4.3. Mitigation Measures

Impacts to herbaceous wetlands will be reduced through the implementation of the mitigation measures in the COAs; the South Bear POD, and its associated plans including the Integrated Weed and Pest Management Plan, the WMP and the MSUP. These documents are included in the administrative record for the South Bear POD at the BFO.

In addition, the operator will apply the following design features to reduce water velocity and reduce sediment transport into herbaceous wetlands in Section 12 and 24 of T49N, R79W. The pad design for well 12-24 has rip rap installed in areas which will receive storm water run-off, and a silt fence is applied at the toe of the fill slope. The 21-24 has silt fence is applied at the toe of the fill slope. The 43-12 well is a no pad no slot pad location: Construction of wells with no pad and no slot would result in less disturbance to the soil resource as no soil would be removed or graded. This innovative practice will provide the least potential for sediment transport into the herbaceous wetlands.

The produced CBNG water from the proposed POD would be disposed of off-site at an existing treatment facility permitted through WDEQ.

4.2.4.4. Residual Effects

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

4.2.5. Invasive Species

4.2.5.1. Direct and Indirect Effects

Direct and indirect effects resulting from invasive and/or noxious species are discussed in the PRB FEIS, pp. 4-158 to 4-162. The use of existing facilities along with the surface disturbance associated with construction of proposed wells, access roads, pipelines, water management infrastructure, and related facilities will present opportunities for weed invasion and spread. Following surface disturbance activities, weeds may readily colonize areas that typically lack or have minimal vegetation cover. As stated in the PRB FEIS, weeds have the ability to displace native vegetation, can reduce the carry capacity for livestock, reduce available forage and habitat for wildlife, and hinder reclamation efforts.

4.2.5.2. Cumulative Effects

Cumulative effects resulting from weed species are discussed in the PRB FEIS, p. 4-171. Species of concern identified in the PRB FEIS for the PRB are Canada thistle (*Cirsium arvense*), Scotch thistle (*Onopordum acanthium*), salt-cedar (*Tamarix ramosissima*), leafy spurge (*Euphorbia esula*), Russian knapweed (*Centaurea repens*), and hoary cress (*Cardaria draba*). None of these species were identified in the project area.

4.2.5.3. Mitigation Measures

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

Prevention: Williams will implement strategies aimed at preventing the introduction of weed species that are not currently established in the project area.

Treatment: Treatment methods will be applied to individual infestations as necessary to achieve the desired management goal. Control methods include physical, biological, and chemical methods.

Revegetation: Weed-free seed and seed mulch will be used to prevent the introduction of weeds by contaminated seed lots and mulch.

Monitoring: Williams will monitor for noxious weeds throughout the project life span.

Compliance: Williams will comply with all county/state weed laws and noxious weed control programs.

4.2.5.4. 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 within the project area.

4.2.6. Wildlife

4.2.6.1. Habitat Types

4.2.6.1.1. Direct and Indirect Effects

Large-scale development of energy reserves underlying sagebrush ecosystems is placing sagebrush communities and wildlife increasingly at risk (WGFD 2009a). The South Bear 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 sagebrush habitats are lost or fragmented, 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 100m (328 feet) 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. Due to this, sagebrush obligate species may not return for many years after reclamation activities are completed. The following 8 wells and their associated infrastructure are proposed within an unfragmented sagebrush community (no existing roads or overhead power): 32-11, 12-12, 23-12, 43-12, 14-13, 23-13, 41-13, and 21-14.

Impacts to sagebrush habitats were mitigated with the inclusion of several design features:

Prior to the onsite:

- The operator committed to removing all produced water off location via buried pipeline to a water treatment plant, unlike the neighboring developed project from which produced water will be contained within 15 impoundments on location within sagebrush ecosystem (for further details see WY-070-EA09-095).
- To reduce fragmentation within the sagebrush community, the operator committed to bury 4.9 miles of utilities (power, water, and gas), of which only 0.03 miles (204 ft) will not be within an existing corridor.

During the onsite:

- The designs of all well pads were modified to best fit the topography with rounded corners and innovative shapes. A total of 4 well pads (43-11, 21-12, 32-12, 32-11) were adjusted (e.g., from constructed pads to slots or to a reduced pad size) to limit surface disturbance of sagebrush and improve reclamation.
- A total of 9 well locations were moved to reduce 2.2 acres surface disturbance (32-11: moved 350 ft south, 43-11: moved 150ft east, 21-12: moved 135ft west, 32-12: moved 51ft west, 41-12: moved 380ft east to an existing road, 14-13: moved 445ft north, 23-13: moved 175ft south, 34-14: moved 190ft north toward existing road, and 41-24: moved 37ft west – which cumulatively totals 1,913ft (all 9 well moves) x 50ft (width of a primitive road) /43,560 sq ft/acre = 2.2 acres).
- 1 well and 1 well pad (42-11) was deferred per operator request due to its proximity to the Flying E lek.
- Overhead power was reduced from 2.9 miles to 0.35 mile to reduce impacts to sage-grouse habitat, migratory bird habitat, and collision/electrocution hazard to avian creatures (Important Note: Powerline routes are proposed. public utility companies may change proposed route without notification to Williams at anytime (Map D South Bear POD project map D 2011))
- Access road to the 43-12 well was moved toward an existing fence to corridor the disturbance to reduce fragmentation on the landscape.

Direct impacts will also occur to grasslands, but grasslands are generally easier to reclaim and re-establishment would occur more quickly. The following 4 wells and their associated infrastructure are proposed in tall (greater than 3 ft) grasses: 21-12, 32-12, 34-13, and 32-14.

Direct loss of sagebrush and grassland habitats from the development of wells mentioned above are quantified in Table 4.2 below.

Table 4.2 Sagebrush and Grassland Habitat

Well #	Access road (length ft X width 50ft) acres	Well pad(0.53)/slot(0.3) acres
<i>Wells and infrastructure located in grassland habitat 43,560 sq ft/acre</i>		
21-12	$500 \times 50 / 43,560 = 0.6$	0.3
32-12	$1,550 \times 50 / 43,560 = 1.8$	0.3
34-13	Existing	0.3
32-14	$600 \times 50 / 43,560 = 0.7$	0.3
<i>Wells and infrastructure located in sagebrush habitat</i>		
32-11	$1,400 \times 50 / 43,560 = 1.6$	0.3
12-12	$550 \times 50 / 43,560 = 0.6$	0.3
23-12	$950 \times 50 / 43,560 = 1.1$	0.3
43-12	$1,575 \times 50 / 43,560 = 1.8$	0.3

Well #	Access road (length ft X width 50ft) acres	Well pad(0.53)/slot(0.3) acres
14-13	1,300 x 50 / 43,560 = 1.5	0.5
23-13	400 x 50 / 43,560 = 0.5	0.3
41-13	2,000 x 50 / 43,560 = 2.3	0.3
21-14	800 x 50 / 43,560 = 0.9	0.3
Utility Pipeline Sec 13&14(between wells (14-13 & 34-14)	2,500 x 30 / 43,560 = 1.7	This space left blank intentionally.
Utility Pipeline Sec 14 (between wells 21-14 &32-14)	2,600 x 30 / 43,560 = 1.8	This space left blank intentionally.
Utility Pipeline SW Sec 14	1,800 x 30 / 43,560 = 1.2	This space left blank intentionally.
Staging areas= 5 total	This space left blank intentionally	200X200/4,3560(x5)=4.6
	Sum = 18.1	Sum = 8.4
		Total = 26.5 acres

4.2.6.1.2. Cumulative Effects

Sagebrush recovery after disturbance depends on the availability of an adjacent seed source and may take decades to occur (USFWS 2010). 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. Livestock grazing can imperil riparian habitats if not managed properly.

4.2.6.1.3. Mitigation Measures

No additional mitigation measures are proposed.

4.2.6.1.4. Residual Effects

No residual effects identified.

4.2.6.2. Threatened, Endangered, Proposed, and Candidate Species

4.2.6.2.1. Threatened and Endangered Species

Potential project effects on Threatened and Endangered Species were analyzed and a summary is provided in 4.3.

Table 4.3 Summary of Threatened and Endangered Species Habitat and Project Effects

Common Name (scientific name)	Habitat	Project Effects	Rationale
<i>Endangered</i>			
Black-footed ferret	Black-tailed prairie dog colonies or complexes > 1,000 acres.	NE	No suitable habitat present.
Blowout penstemon	Sparsely vegetated, shifting sand dunes	NE	No suitable habitat present.

Common Name (scientific name)	Habitat	Project Effects	Rationale
<i>Threatened</i>			
Ute ladies'-tresses orchid	Riparian areas with permanent water	NE	No suitable habitat present.
<i>Proposed</i>			
Mountain Plover	Short-grass prairie with slopes < 5%	NLJ	Habitat not likely impacted.
<i>Candidate</i>			
Greater Sage-grouse	Basin-prairie shrub, mountain-foothill shrub	MIH	Sagebrush cover will be affected.
Project Effects LAA - Likely to adversely affect NE - No Effect NLAA - May Affect, not likely to adversely affect individuals or habitat. NLJ - Not likely to jeopardize MIH - May impact individuals and health			

4.2.6.2.1.1. Black-Footed Ferret

4.2.6.2.1.1.1. Direct and Indirect Effects

Direct and indirect effects to black-footed ferret are discussed in the PRB FEIS. Implementation of the proposed development will have no effect to black-footed ferret.

4.2.6.2.1.1.2. Cumulative Effects

The cumulative effects to black-footed ferrets are discussed in the PRB FEIS (pg. 4-251).

4.2.6.2.1.1.3. Mitigation Measures

No mitigation measures are proposed.

4.2.6.2.1.1.4. Residual Effects

No residual effects identified.

4.2.6.2.1.2. Blowout Penstemon

4.2.6.2.1.2.1. Direct and Indirect Effects

Suitable habitat is not present within the project area. Implementation of the proposed development will have no effect on blowout penstemon.

4.2.6.2.1.2.2. Cumulative Effects

The proposed project will have no effect on blowout penstemon.

4.2.6.2.1.2.3. Mitigation Measures

No mitigation measures are proposed.

4.2.6.2.1.2.4. Residual Effects

No residual effects identified.

4.2.6.2.1.3. Ute Ladies'-Tresses Orchid

4.2.6.2.1.3.1. Direct and Indirect Effects

Suitable habitat is not present within the project area. Implementation of the proposed development will have no effect on Ute ladies'-tresses.

4.2.6.2.1.3.2. Cumulative Effects

The proposed project will have no effect on ULT.

4.2.6.2.1.3.3. Mitigation Measures

No mitigation measures are proposed.

4.2.6.2.1.3.4. Residual Effects

No residual effects identified.

4.2.6.2.2. Proposed Species

4.2.6.2.2.1. Mountain Plover

4.2.6.2.2.1.1. Direct and Indirect Effects

Impacts to mountain plover are discussed in the PRB FEIS (pp. 4-254 to 4-255). Mineral development has mixed effects on mountain plovers. Disturbed ground, such as buried pipeline corridors and roads, may provide suitable nesting habitat for plovers. On the other hand, increased traffic, construction, and human activities within one-quarter mile may be disruptive to nesting behaviors. Expected project impacts to mountain plover habitat would be the same as those discussed in the black-tailed prairie dog section (see below).

4.2.6.2.2.1.2. Cumulative Effects

The cumulative impacts to mountain plovers are discussed in the PRB FEIS.

4.2.6.2.2.1.3. Mitigation Measures

To reduce impacts to nesting mountain plovers, BFO will require a 0.25 mile timing limitation on surface-disturbing activities for potential nesting habitat during the nesting season. The company should limit vehicle traffic from a half hour after sunrise and a half hour before sunset when animals are most active.

4.2.6.2.2.1.4. Residual Effects

Even with timing limitations on surface-disturbing activities, mountain plovers may be displaced by other activities associated with development. Traffic and construction activities that are not prohibited by the timing limitations may degrade habitat quality sufficiently to render the area unsuitable for some mountain plovers. Timing limitations do nothing to mitigate habitat loss, therefore drilling and construction that takes place outside of nesting season will still result in habitat loss for this species. The timing limitation will result in some decrease in direct mortalities that would occur with increased drilling traffic during the breeding season. Mortalities associated with maintenance and non-surface-disturbing activities will still occur.

4.2.6.2.3. Candidate Species

4.2.6.2.3.1. Greater Sage-grouse

4.2.6.2.3.1.1. Direct and Indirect Effects

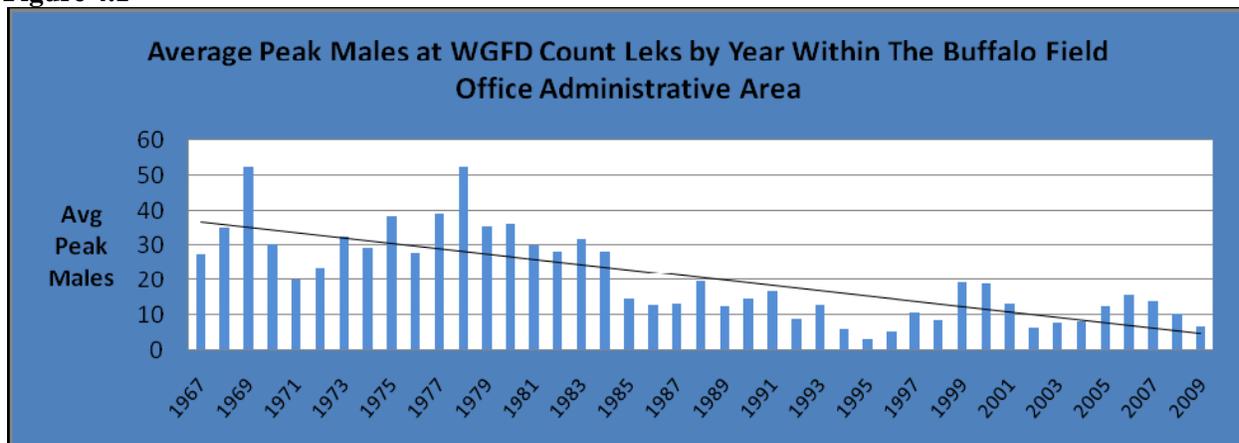
Impacts to sage-grouse associated with energy development are discussed in detail in the *12-Month Findings for Petitions to List the Greater Sage-Grouse (Centrocercus urophasianus) as Threatened or Endangered* (USFWS 2010). Impacts to sage-grouse are generally a result of loss and fragmentation of sagebrush habitats associated with roads and infrastructure. Research indicates that sage-grouse hens also avoid nesting in developed areas. The best available science describing both the range-wide and Powder River Basin current status, habitat needs, threats, and projections for the species can be found in the USFWS Proposed Rule (USFWS 2010). Of particular interest for the current status of greater sage-grouse as related to the project area are those sections of the Proposed Rule that address habitat characteristics (p. 13917), connectivity (p. 13923 to 41392), energy development (p. 13942 to 13949), and projections of future populations (p. 13958 to 13961).

Impacts to sage-grouse habitat were mitigated with the inclusion of several design features, some of which were already listed as mitigation to sagebrush shrublands, see Habitat Types Direct /Indirect and Soils Direct/Indirect section for details. A seed mix (page 35 under the Soils section) has been developed by BLM and Williams to include forbs. Forbs are a good component of summer habitat and late brood rearing habitat.

4.2.6.2.3.1.2. Cumulative Effects

Recent research suggests that the cumulative and synergistic effects of current and foreseeable CBNG development within the vicinity of the project area will be likely to extremely 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 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). Furthermore, the multi-state recommendations presented to the WGFD for identification of core sage-grouse areas acknowledges there may be times when development in important sage-grouse breeding, summer, and winter habitats cannot be avoided. In those instances they recommend, “...infrastructure should be minimized and the area should be managed in a manner that effectively conserves sagebrush habitats” (State Wildlife Agencies’ Ad Hoc Committee for Sage-grouse and Oil and Gas Development 2008). The sage-grouse population within northeast Wyoming showed a steady long term downward trend, as measured by lek attendance (WGFD 2008). Figure 4.1 illustrates a ten-year cycle of periodic highs and lows. Each subsequent population peak is lower than the previous peak. Research suggests that these declines may be a result, in part, of CBNG development, as discussed in detail in USFWS (2010).

Figure 4.1



Currently within the 4 miles analysis area (an area of 181 square miles 4 miles from 10 leks that are within 4 mile of the South Bear POD) there are 964 existing wells (964 / 181 = 5.3 wells per square mile). Excluding the South Bear project, there are approximately 373 proposed federal wells (Automated Fluid Minerals Support System [AFMSS] 03/2011) within the cumulative effects analysis area. With the addition of all of the proposed wells within the cumulative effects area, well density would increase to 7.3 wells per square mile. With approval of the South Bear project, an additional 29 wells would be drilled within 4 miles of these leks well density would increase to 7.5 wells per square mile, well above the one well per square mile recommendation by the State Wildlife Agencies’ Ad Hoc Committee for Sage-Grouse and Oil and Gas Development. With the approval of the South Bear project, all 10 leks would exceed the WGFD threshold category for extreme impacts.

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 Powder River Basin Oil and Gas Project FEIS and the findings of more recent research, the proposed action may contribute to a decline in male attendance at the ten leks that occur within four miles of the project area and, potentially, extirpation of the local grouse population.

4.2.6.2.3.1.3. Mitigation Measures

In order to reduce the likelihood that activities associated with noise, construction, and human disturbance, BLM will implement a timing limitation on all surface-disturbing activities within and adjacent to identified nesting habitat across the project area. Because nesting grouse have been shown to avoid infrastructure by up to 0.6 miles, 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.

4.2.6.2.3.1.4. Residual Effects

A timing limitation does nothing to mitigate loss and fragmentation of habitat or changes in disease mechanisms. 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.

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.

4.2.6.3.1. Bald Eagle

4.2.6.3.1.1. Direct and Indirect Effects

Impacts to bald eagles are discussed in the PRB FEIS on pp. 4-251 to 4-253.

4.2.6.3.1.2. Cumulative Effects

The cumulative effects for bald eagles are described in the PRB FEIS (pp. 4-251 to 4-253). Carrion (road kill) from Interstate 90 occurs in the area, which may provide some of the prey base for bald eagles that winter in the area. If bald eagles rely on the prairie dog colonies for prey, practices such as poisoning or shooting of prairie dogs or other intentional methods of extermination in order to increase forage for livestock can potentially harm bald eagles through a reduction in their prey base.

4.2.6.3.1.3. Mitigation Measures

No known nests or winter roost occur within the South Bear POD project.

4.2.6.3.1.4. Residual Effects

No residual effects identified.

4.2.6.3.2. Brewer's Sparrow

4.2.6.3.2.1. Direct and Indirect Effects

The PRB FEIS discusses impacts to sensitive species on pp. 4-257 to 4-273. Expected project impacts to Brewer's sparrows would be the same as those discussed in the greater sage-grouse section and Habitat types section.

4.2.6.3.2.2. Cumulative Effects

The PRB FEIS discusses impacts to sensitive species on pp. 4-257 to 4-273.

4.2.6.3.2.3. Mitigation Measures

No further mitigation measure applied.

4.2.6.3.2.4. Residual Effects

No residual effects identified.

4.2.6.3.3. Loggerhead Shrike

4.2.6.3.3.1. Direct and Indirect Effects

The PRB FEIS discusses impacts to sensitive species on pp. 4-257 to 4-273. Expected project impacts to loggerhead shrikes would be the same as those discussed in the greater sage-grouse and habitat types section.

4.2.6.3.3.2. Cumulative Effects

The PRB FEIS discusses impacts to sensitive species on pp. 4-257 to 4-273.

4.2.6.3.3.3. Mitigation Measures

No further mitigation measure applied.

4.2.6.3.3.4. Residual Effects

No residual effects identified.

4.2.6.3.4. Sage Sparrow

4.2.6.3.4.1. Direct and Indirect Effects

The PRB FEIS discusses impacts to sensitive species on pp. 4-257 to 4-273. Expected project impacts to sage sparrow would be the same as those discussed in the greater sage-grouse section and habitat types section.

4.2.6.3.4.2. Cumulative Effects

The PRB FEIS discusses impacts to sensitive species on pp. 4-257 to 4-273.

4.2.6.3.4.3. Mitigation Measures

No further mitigation measure applied.

4.2.6.3.4.4. Residual Effects

No residual effects identified.

4.2.6.3.5. Sage Thrasher

4.2.6.3.5.1. Direct and Indirect Effects

The PRB FEIS discusses impacts to sensitive species on pp. 4-257 to 4-273. Expected project impacts to sage thrasher would be the same as those discussed in the greater sage-grouse section and habitat types section.

4.2.6.3.5.2. Cumulative Effects

The PRB FEIS discusses impacts to sensitive species on pp. 4-257 to 4-273.

4.2.6.3.5.3. Mitigation Measures

No further mitigation measure applied.

4.2.6.3.5.4. Residual Effects

No residual effects identified.

4.2.6.3.6. Western Burrowing Owl

4.2.6.3.6.1. Direct and Indirect Effects

Impacts to burrowing owls are discussed in the PRB FEIS on pg. 4-263. Burrow owl nest #10710 has not been active since surveys had been conducted (2008) and the prairie dog colony in which the burrow is located has not been active in recent years. The location of the 32-24 well is proposed within 100ft burrow # 10710 and will preclude the nesting pair from utilizing their burrow in the future. Expected project impacts to western burrowing owl habitat would be the same as those discussed in the black-tailed prairie dog section (see below).

4.2.6.3.6.2. Cumulative Effects

In addition to the federal development, there will be fee development associated with the project that will have similar impacts on burrowing owls as those discussed in the PRB FEIS. Activities associated with livestock grazing may harass or disturb burrowing owls, but these activities are often transient in nature and occur at low enough frequencies that disturbance will be minimal. Practices such as poisoning or shooting of prairie dogs or other intentional methods of extermination in order to increase forage for livestock can potentially affect burrowing owl productivity through a reduction in nest site availability.

4.2.6.3.6.3. Mitigation Measures

The Thunder Basin National Grasslands in Campbell County, WY, who cooperated with the BLM in the creation of the 2003 PRB EIS, recommends a 0.25 mile timing restriction buffer zone for burrowing nest locations during their nesting season (April 15 to August 31). Instruction Memorandum No. 2006-197, directs the field offices to “use the least restrictive stipulations that effectively accomplish the resource objectives or uses.” Alteration of the general raptor nest timing limitation (Feb 1 to July 31) to a more specific burrowing owl nesting season timing limitation will effectively reduce the vulnerability of owls to collision while shortening the timing restriction period to four and one half months (See Chapter 3 for breeding, nesting, and migration chronology) from six and one half months and from 0.5 mile to 0.25 mile.

4.2.6.3.6.4. Residual Effects

The timing limitation will do nothing to mitigate loss of nesting habitat. Wells, pipelines, and roads that are built in prairie dog colonies will directly impact nesting habitat and may reduce the quality of adjacent habitats for burrowing owls, regardless of the timing of their construction.

4.2.6.3.7. Black-tailed prairie dogs

4.2.6.3.7.1. Direct and Indirect Effects

The affected environment for black-tailed prairie dogs is discussed in the PRB FEIS (p. 3-179). Well #12-12 is proposed approximately 1,000 ft from an active black-tailed prairie colony, which is located within the 41-Flying E lek. Therefore, the colony will receive the same protective (mitigation) measures as the 41-Flying E lek (see greater sage grouse direct/indirect effects section for description of mitigation measures). No direct impacts are anticipated to occur from the development of the South Bear POD.

4.2.6.3.7.2. Cumulative Effects

The cumulative effects for black-tailed prairie dogs associated with Alternative B are described in the PRB FEIS (pp. 4-255 to 4-256).

4.2.6.3.7.3. Mitigation Measures

No mitigation measures are required.

4.2.6.3.7.4. Residual Effects

No residual effects identified.

4.2.6.3.8. Swift Fox

4.2.6.3.8.1. Direct and Indirect Effects

Impacts to swift fox are discussed in the PRB FEIS on p. 4-265. Additional information is provided here. The project will impact swift foxes or their habitat. The construction of well pads, roads, and pipelines in prairie dog colonies and grasslands will cause direct habitat loss. During construction of these facilities, there is the possibility that swift foxes may be killed as a direct result of the earth moving equipment. Constant noise and movement of equipment and the destruction of burrows puts considerable stress on the animals and is likely to cause an increase in swift fox mortalities. During the construction of these facilities individuals are exposed more frequently to predators and have less protective cover. Mineral related traffic on the adjacent roads may result in swift fox road mortalities.

4.2.6.3.8.2. Cumulative Effects

In addition to the federal development, there will be fee development associated with the project that will have similar impacts on swift fox. Activities associated with livestock grazing may harass or disturb swift fox, but these activities are often transient in nature and occur at low enough frequencies that disturbance will be minimal. Practices such as poisoning or shooting of prairie dogs or other intentional methods of extermination in order to increase forage for livestock can potentially affect swift fox through a reduction in prey availability.

4.2.6.3.8.3. Mitigation Measures

The Thunder Basin National Grasslands (TBNG) in Campbell County, WY, cooperated with the BLM in the creation of the 2003 PRB EIS and has applied a standard condition to oil and gas activities in association with swift fox dens. Therefore, in order to protect the species, the BLM BFO incorporated the following condition from the TBNG Land Resource Management Plan into this project: "To reduce disturbances to swift fox during the breeding and whelping seasons, prohibit the following activities within 0.25 miles of their dens from March 1 to August 31: Construction (e.g. roads, water impoundments, oil and gas facilities), reclamation, gravel mining operations, drilling of water wells, and oil and gas drilling." This timing restriction, based on the best available science, will reduce direct impacts to swift foxes within the project area.

4.2.6.3.8.4. Residual Effects

A timing limitation will not mitigate habitat loss. Swift fox dens and prey availability will still be impacted through loss of prairie dog colonies, despite the restriction on the timing of construction.

4.2.6.4. Big Game

4.2.6.4.1. Direct and Indirect Effects

Under the environmentally preferred alternative, winter-yearlong and yearlong range for pronghorn and mule deer would be directly disturbed with the construction of wells, reservoirs, pipelines and roads. Table 4.2 summarizes the proposed activities. Items identified as long term disturbance would cause direct habitat loss. Short-term disturbances also result in direct habitat loss; however, they may provide some habitat value as they 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 2004a). A multi-year study on the Pinedale Anticline suggests that, not only do mule deer avoid mineral activities, but, after 3 years of drilling activity, they had not become accustomed to the disturbance (Madson 2005).

Big game animals are expected to return to the project area following construction; however, populations will likely be reduced 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 seven years to habituate to oil and gas activities, avoidance of roads and facilities was determined to be long term and chronic” (Lustig 2003). Deer 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.

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

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. For details on expected cumulative impacts, refer to the PRB FEIS, pp. 4-181 to 4-215.

4.2.6.4.3. Mitigation Measures

No further mitigation measure applied.

4.2.6.4.4. Residual Impacts

While big game animals are expected to return to the project area following construction, continued human-caused disturbance associated with operation and maintenance may result in reduced local populations because big game may fail to habituate to the new disturbances (Lustig 2003). Habitat effectiveness for big game is anticipated to be reduced in the project area.

4.2.6.5. Upland Game Birds

4.2.6.5.1. Plains Sharp-tailed Grouse

4.2.6.5.1.1. Direct and Indirect Effects

Increase traffic from this project may cause mortality along access roads and increase predation. Surveys will identify known leks, however activity outside of leks will not have stipulations that will reduce human activity, ground disturbing activity (plowing and mowing), and design feature that reduce predation. Expected project impacts to sharp-tailed grouse would be the same as those discussed in the greater sage-grouse section and habitat types section.

4.2.6.5.1.2. 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, pp. 4-221 to 4-226.

4.2.6.5.1.3. Mitigation Measures

Williams will survey the project area annually for sharp-tailed grouse activity. If an active lek is identified during the survey, the 0.64 mile timing restriction (March 1-June 15) will be applied and surface disturbing activities will not be permitted until after the nesting season. If surveys indicate that the identified lek is inactive during the current breeding season, surface disturbing activities may be permitted within the 0.5 mile buffer until the following breeding season (April 1).

4.2.6.5.1.4. Residual Impacts

Surveys will identify known leks, however activity outside of lek buffers will not have stipulations that will reduce human activity, ground disturbing activity (plowing and mowing), and design feature that reduce predation.

4.2.6.6. Aquatic Species

4.2.6.6.1. Direct and Indirect Effects

The PRB FEIS discusses impacts, including direct and indirect effects, to aquatic species, pp. 4-235 to 4-247.

4.2.6.6.2. Cumulative Effects

The cumulative effects associated with Alternative B are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, refer to the PRB FEIS, (pp. 4-247 to 4-249).

4.2.6.6.3. Mitigation Measures

No mitigation measures are required.

4.2.6.6.4. Residual Impacts

No residual effects identified.

4.2.6.7. Migratory Birds

4.2.6.7.1. 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 within the project area is likely to impact migratory birds. Native habitats will be lost directly with the construction of wells, roads, and pipelines (see Habitat Types section under Direct and Indirect Effects for description/quantification of habitat loss). 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 of dirt roads within a natural gas field. Effects occurred along roads with light traffic volume (<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 utilize the disturbed areas for nesting may be disrupted by the human activity, and nests may be destroyed by equipment.

Migratory bird species within the Powder River Basin 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.

4.2.6.7.2. Cumulative Effects

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

4.2.6.7.3. Mitigation Measures

A Condition of Approval requiring all stock tanks to be equipped and maintained with effective wildlife escape devices will reduce potential bird mortality from drowning.

4.2.6.7.4. Residual Effects

Those species and individuals that are nesting in areas not protected by sage-grouse timing limitations or raptor timing limitations may have nests destroyed, or be disturbed, by construction activities. This is also the case for migratory birds that are still nesting after sage-grouse timing limitations are over (after 15 June). Protections around active raptor nests (Feb 1- July 31) extend past most migratory bird nesting seasons, but only a small portion of known nests are active in any given year, so the protections for migratory birds from June 15 - July 31 will only be in place for those that are nesting within 0.5 miles of that small portion of active nests.

4.2.6.8. Raptors

4.2.6.8.1. Direct and Indirect Effects

Direct and indirect effects to raptors are described in the PRB FEIS (pp. 4-216 to 4-220). The South Bear POD 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 South Bear 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. 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.

In addition, the construction of overhead power will pose an electrocution and collision risk to raptors. From May 2003, through December 28, 2006, Service Law Enforcement salvage records for northeast Wyoming identified that 156 raptors, including 1 bald eagle, 93 golden eagles, 1 unidentified eagle, 27 hawks, 30 owls and 4 unidentified raptors were electrocuted on power poles within the Powder River Basin Oil and Gas Project area (USFWS 2006a). Of the 156 raptors electrocuted 31 were at power poles that are considered new construction (post 1996 construction standards). Additionally, 2 golden eagles and a Cooper's hawk were killed in apparent mid span collisions with powerlines (USFWS 2006a).

The distance from wells, topography providing cover, and timing restrictions will reduce the impact project activities will have on nesting raptors on some nests. Several nests are in close proximity to wells and infrastructure but are out of line of sight of those activities, thereby affording a visual buffer for incubating adults and growing chicks. Table 4.4 lists raptor nests that are located within 0.5 miles of the South Bear project, the infrastructure within 0.5 miles of the nest and any design features incorporated by Williams to mitigate impacts.

Table 4.4 Proposed and Existing Infrastructure within 0.5 mile of Documented Raptor Nests with the South Bear Project Area

BLM ID	Infrastructure
2827	Existing access road utilized by other approved PODs, and proposed buried utility pipeline next to access road.
3015	None
3841(Active during 2009)	Existing access road utilized by other approved PODs, and proposed buried utility pipeline next to access road. Proposed staging area.
3022	3 wells: 12- 24, 21-24, and 32- 24. Existing access road utilized by other approved PODs, and proposed buried utility pipeline next to access road.
10715	7 wells: 43-11, 12-12, 14-12, 21-12, 23-12, 32-12, 34-12, and access roads/buried utility corridor.
10716 (Active during 2008)	7 wells: 12-12, 14-12, 21-12, 23-12, 32-12, 34-12, 43-12, and access roads/buried utility corridor.
12259	4 wells: 12-12, 21-12, 32-12, 41-12, and access roads/buried utility corridor.

Impacts to raptors are difficult to predict, because different species and even different individual birds show varying levels of tolerance to disturbance. Red-tailed hawks and great-horned owls are often more tolerant of disturbance and may continue to use nests, or their populations may increase within the project area at the expense of other species that may have used the area in the past.

Nest # 2827 has been surveyed since 2004. BLM database indicate the breeding pair has not used the nest since surveys began and the nest was reported gone in 2010.

Nest #3841 was reported active with 2 chicks by a nesting pair of prairie falcons. The nest is located out of line of sight from existing oil and gas road, therefore additional traffic associated with the South Bear POD is not likely to disrupt the nesting pair.

Nest #3022 was utilized by a nesting pair of great-horned owls during the 2008 nesting season. USFWS recommends a 0.125 (660 ft) mile spatial buffer around great-horned owl nests. The proposed well within the South Bear POD are 700ft from the nest and out of line of sight, therefore project related activities should not disrupt the breeding/nesting pair.

Nest # 10715 was reported inactive since 2008. The majority of the nesting material has fallen to the ground since 2008. A pair of black-billed magpies used the nesting tree during the 2010 nesting season. Williams located the 32-24 well and access road out of line of sight from the nest. South of the nest foraging opportunity is available for the nesting pair and the nest is out of line of sight from development, therefore the nesting pair may return to the nest in the future.

Nest #10716 was reported active with 2 chicks by a nesting pair of red-tailed hawks during the 2008 nesting season. Williams re-routed the access road to the 32-12 well and utilized an alternative route to avoid disruptive impacts toward the nesting pair of hawks. The nest is located out of line of sight from proposed wells. It is more than likely the nesting/breeding pair will utilize the nest in the future.

Nest #12259 was reported gone in 2008. During 2009 and 2010 surveys, the nest was not found; therefore the breeding pair will not likely be impacted by the South Bear POD project.

Additional direct and indirect impacts to raptors, from oil and gas development, are analyzed in the PRB FEIS (pp. 4-216 to 4-221).

4.2.6.8.2. Cumulative Effects

The cumulative effects associated with Alternatives C 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.

4.2.6.8.3. Mitigation Measures

To reduce the risk of decreased productivity or nest failure, the BLM BFO requires a 0.5 mile radius timing limitation during the breeding season around active raptor nests and recommends all infrastructure requiring human visitation be located in such a way as to provide adequate biologic buffer for nesting raptors. A list of documented raptor nests within 0.5 mile of project components is shown in Table 4.2.

4.2.6.8.4. 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.

4.2.7. Water Resources

The operator has 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 within the Upper Powder River watershed and the Flying E Creek and Indian Creek watershed and commitment to comply with Wyoming State water laws/regulations. The WMP also addresses potential impacts to the environment and landowner concerns. Qualified hydrologists, in consultation with the BLM, developed the water management plan. Adherence with the plan, in addition to BLM applied mitigation (in the form of COAs), would reduce project area and downstream impacts from proposed water management strategies.

The WMP involves the following infrastructure and strategy: The South Bear POD will use a WDEQ permitted water treatment facility, the River Road CBM Facility (Permit WY0056081) located on the Powder River, to manage produced water. For conveyance to the treatment facility Williams will construct a lined pond and a pump facility in the Center of SW1/4 of Section 7, T 49N, R 87W. This pump will provide water pressure to convey CBNG to the treatment facility on the Powder River. (See WMP and p. 4 of this EA for a complete description and legal location of facilities)

4.2.7.1. Groundwater

4.2.7.1.1. Direct and Indirect Effects

The PRB FEIS predicts that one of the environmental consequences of coal bed natural gas production is possible impacts to the groundwater. “The effects of development of CBM 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 page 4-1). In the process of dewatering the coal zone to increase natural gas recovery rates, this project may have some effect on the static water level of wells in the area. There are three WYDEQ permitted stock water wells within 1 mile of the POD boundary; these stock wells produce from depths which range from 25 feet to 180 feet compared to 2,205 feet for the permitted oil and gas wells in the Big George coal seam. The operator has committed to offer water well agreements to holders of properly permitted domestic and stock wells within the circle of influence (½ 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). A pump facility with a lined emergency pit will be constructed outside the POD boundary near the center of the SW ¼ of Section 7 T49N R78W. See engineer drawing South Bear 23-7-4978 Pump Station in the POD book Engineer tab. The emergency pit is lined and not expected to contain water unless pump failure occurs.

4.2.7.1.2. Cumulative Effects

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

Development of CBNG through 2018 (and coal mining through 2033) would remove 4 million acre-feet of groundwater from the coal zone aquifer (PRB FEIS page 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).

4.2.7.1.3. 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.

The produced CBNG water from the proposed POD would be disposed of off-site at an existing treatment facility permitted through WDEQ. To convey CBNG to the treatment facility a project a pump facility with a lined emergency pit will be constructed outside the POD boundary near the center of the SW ¼ of Section 7 T49N R78W. Water will only flow to the emergency pit in the case of pump failure. The emergency pit will require bonding prior to construction as it overlies Federal mineral. No additional mitigation measures were identified.

4.2.7.1.4. Residual Effects

As described in Section 3.3.1, the production of CBNG in this project area may cause groundwater levels to drop due to the CBNG dewatering action. Groundwater recharge post-CBNG development was analyzed within the PRB FEIS. An estimated 40 percent of the groundwater removed would infiltrate the surface and recharge the shallow aquifers above the coal, PRB FEIS ROD, p. 4-68.

4.2.7.2. Surface Water

4.2.7.2.1. Direct and Indirect Effects

The WYPDES permits also address existing downstream concerns, such as irrigation use, in the COA’s for the permit. Neither of these permits requires compliance with downstream irrigation standards due to the lack of irrigation prior to the time of permitting. Tributary upstream and downstream sampling is required under WY0056081.

Quantity

The maximum water production is predicted to be 13 gallons per minute (gpm) per well. For the 29 wells proposed under this POD, the total maximum water production is 377 gpm (0.84 cfs or 608 acre-feet per year). The PRB FEIS projected the total amount of water that was anticipated to be produced from CBNG development per year (PRB FEIS, Table 2-8, p. 2-26). For the Upper Powder River drainage, the projected volume produced within the watershed area was approximately 44,169 acre-feet in 2011 (maximum production is estimated to be 171,423 acre-feet in 2006). The volume of water resulting from the production of these wells is 1.4 percent of the total volume projected for 2010. This volume of produced water is within the predicted parameters of the PRB FEIS.

Quality

Based on representative data provided in the WMP, the water quality of produced water for this POD is projected to be 1,960 mg/l TDS, pH of 6.89, SAR of 28.9, and EC of 3100 umhos/cm (Williams 2011). Additional water quality data are presented in the WMP and are incorporated by reference.

A comparison of produced water quality is shown in **Table 4.5**. The table 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). It also shows constituent limits for TDS, SAR and EC detailed in the project area WYPDES permit, and the concentrations found in the POD’s representative water sample.

Table 4.5 Comparison of Regulated Water Quality Parameters to Predicted Water Quality

Sample location or Standard	TDS mg/l	SAR	EC µmhos/cm
Upper Powder River Watershed at Arvada, WY Gauging Station Historic Data Average at Maximum Flow Historic Data Average at Minimum Flow		4.76 7.83	1,797 3,400
WDEQ Quality Standards for Wyoming Groundwater (Chapter 8) Drinking Water (Class I) Agricultural Use (Class II) Livestock Use (Class III)	500 2,000 5,000	8	
WDEQ Water Quality Requirement for WYPDES Permit # WY0056081 to Upper Powder River Watershed At discharge points	AC*	AC*	7,500
Predicted Produced Water Quality Big George Coal Zone	1,960	28.9	3,100

AC* = Assimilative Capacity values vary per month

The quality for the water produced from the Big George target coal zone from these wells is predicted to be similar to the sample water quality collected from a location near the POD. A maximum of 13.0 gallons per minute (gpm) is projected is to be produced from these 29 wells, for a total of 377 gpm for the POD.

The operator proposes existing WYPDES permits (WY0056081) for the discharge of water produced from this project from the WDEQ. Those permits' maximum effluent limits are described in Table 4.6.

Table 4.6 Applicable WYPDES Permit Limits

Effluent Characteristic	Daily Maximum
	WY0056081
pH	6.5 to 9.0
Specific Conductance ($\mu\text{S}/\text{cm}$)	7,500
Sulfates (mg/l)	3,000
Radium 226 + 228 (pCi/l)	1
Dissolved Iron ($\mu\text{g}/\text{l}$)	300
Dissolved Copper ($\mu\text{g}/\text{l}$)	6
Total Barium ($\mu\text{g}/\text{l}$)	1,800
Total Arsenic ($\mu\text{g}/\text{l}$)	8.4
Chlorides (mg/l)	150

Source: WYPDES Permit WY0056081

Limits on TDS and dissolved sodium are based on the capacity of the Powder River to assimilate concentrations below existing standards. Permit WY0056081 monthly outfall load limits range from over 17,000,000 lbs TDS and 2,200,000 lbs dissolved sodium in May and June to 0 lbs TDS and dissolved sodium in August and September. No direct, indirect, cumulative, or residual impacts beyond those permitted are anticipated from surface discharge of CBNG-produced water.

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 within the POD boundary. The reference well will be sampled at the wellhead for analysis within sixty days of initial production. A copy of the water analysis will be submitted to the BLM Authorized Officer.

For more information, please refer to the WMP included in this POD.

Storm Water Control

A WYPDES permit WYR10-3910 for construction activities would address potential surface water impacts from storm water runoff. Williams proposes to install 12 culverts and 7 LWCs. Additional relief and minor culverts serving smaller drainage areas also could be placed. All culverts and LWCs would be designed and installed in accordance with BLM guidelines. Based on the project proposal, including the WMP and operator-committed mitigation measures, negligible impacts to stream channels or banks would result from the project proposal.

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 WOGCC.

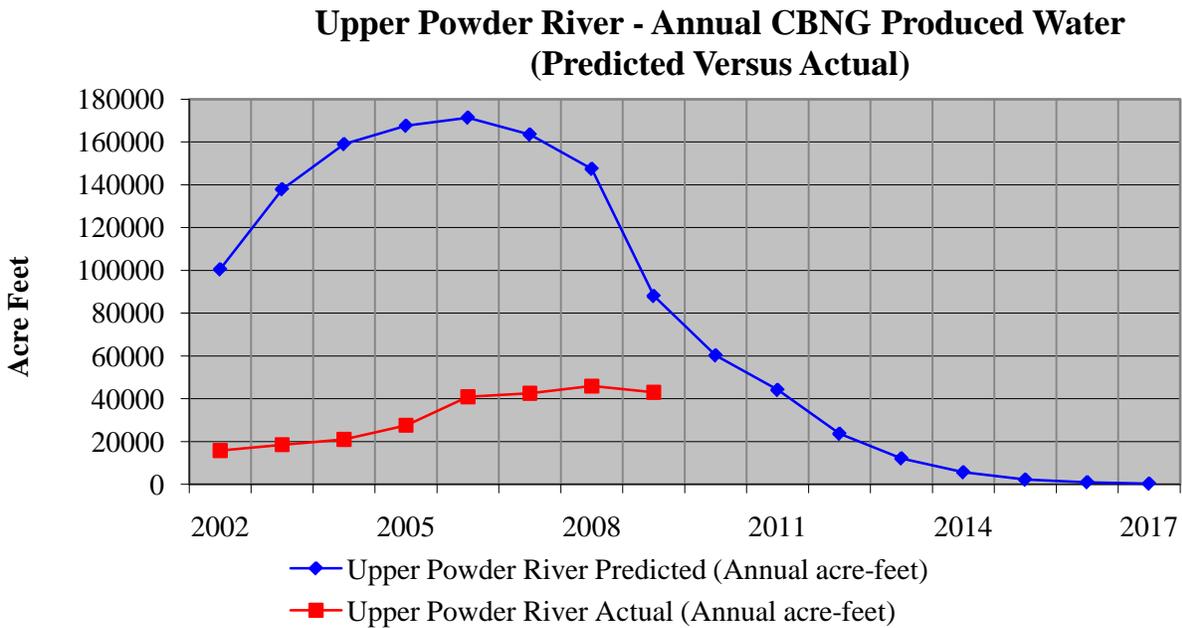
As of December 2009, all producing CBNG wells in the Upper Powder River watershed have discharged a cumulative volume of 255,531 acre-feet of water compared to the predicted 1,135,567 acre-feet disclosed in the PRB FEIS (Table 2-8, page 2-26). These figures are presented graphically in Figure 4.2 and numerically in Table 4.7. This volume is 22.5 percent of the total predicted produced water analyzed in the PRB FEIS for the Upper Powder River watershed.

Table 4.7 CBNG Produced Water Comparisons

Year	Upper Powder River Predicted (Annual acre-feet)	Upper Powder River Predicted (Cumulative acre-feet from 2002)	Upper Powder River Actual (Annual acre-feet) ¹	Percent of Predicted	Upper Powder River Actual (Cumulative acre-feet from 2002)	Percent 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	42,602	26.1	166,586	18.5
2008	147,481	1,047,521	45,936	31.1	212,522	20.3
2009	88,046	1,135,567	43,009	48.8	255,531	22.5
2010	60,319	1,195,886				
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		255,531			

¹ WOGCC 2010.

Figure 4.2 Annual CBNG Water Production Comparisons



The PRB FEIS identified downstream irrigation water quality as the primary issue for CBNG produced water. 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 ten primary watersheds in the Powder River Basin. These predictions of EC and SAR can only be reevaluated when additional water quality sampling is available.

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

1. They are proportional to the actual amount of cumulatively produced water in the Upper Powder River drainage, which is approximately 22.5 percent of the total predicted in the PRB FEIS.
2. The WDEQ enforcement of the terms and conditions of the WYPDES permit that are designed to protect existing water quality.
3. The commitment by the operator to manage the volume of water discharged.

Refer to the PRB FEIS, Volume 2, pp. 4-115 to 4-117 and Table 4-13 for cumulative effects relative to the watershed, and p. 4-117 for cumulative effects common to all sub-watersheds.

4.2.7.2.3. Mitigation Measures

Channel crossings by road 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.

A WYPDES permit WYR10-3910 for construction activities would address potential surface water impacts from storm water runoff.

The operator has also committed to monitor erosion stabilization measures for stability (WMP p. 21). If erosion is noted, the operator will be required to repair and stabilize the area using selected mitigation techniques.

The operator prepared a site specific reclamation assessment to address disturbances an in channel crossing associated with engineered access road to 14-13 well location. (MSUP, p. 6)

4.2.7.2.4. Residual Effects

Produced water discharge to Flying E Creek and the Powder River will have the following potential impacts, as discussed in the PRB FEIS, p. 4-118; “[s]treams enhanced by large volumes of CBM 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 within the upper reaches of a drainage system as the stream channel becomes incised through erosion, until the slope of the stream and its velocity are reduced and further erosion is limited. Sediment is deposited within the lower, slower reaches of a stream.

Surface drainages could be degraded from erosion caused by increased surface flow, unless rates of CBM discharge and outfall locations are carefully controlled. Increased flows could cause downcutting in fluvial environments, resulting in increased channel capacity over time within the upper and middle reaches of surface drainages.”

These potential impacts would be regulated through existing discharge permits for the River Road CBM Facility.

4.2.8. Cultural Resources

4.2.8.1. Direct and Indirect Effects

Non eligible sites 48JO2943, 48JO3939, and 48JO4117 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 3/11/2011 and 3/25/2011 that no historic properties exist within the APE. If any cultural values [sites, artifacts, human remains (Appendix L PRB FEIS)] 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 and the potential for subsurface cultural materials in the proposed project area serve to partially mitigate potential cumulative effects to cultural resources.

Fee actions constructed in support of federal actions can result in impacts to historic properties. Construction of large plans of coalbed natural gas development on split estate often include associated infrastructure that is not permitted through BLM. Project applicants may connect wells draining fee minerals, or previously constructed pipelines on fee surface with a federal plan of development. BLM has no authority over such development which can impact historic properties. BLM has the authority to modify or deny approval of federal undertakings on private surface, but that authority is limited to the

extent of the federal approval. Historic properties on private surface belong to the surface owner and they are not obligated to preserve or protect them. The BLM may go to great lengths to protect a site on private surface from a federal undertaking, but the same site can be legally impacted by the landowner at any time. The cumulative effect of numerous federal approvals can result in impacts to historic properties. Archeological inventories reveal the location of sites and although the BLM goes to great lengths to protect site location data, information can potentially get into the wrong hands. BLM authorizations that result in new access can inadvertently lead to impacts to sites from increased visitation by the public.

4.2.8.3. Mitigation Measures

If any cultural values [sites, artifacts, human remains (Appendix L PRB FEIS)] 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).

When a project is constructed in an area with a high potential for buried cultural material, archaeological monitoring is often included as a condition of approval. Construction monitoring is performed by a qualified archeologist working in unison with construction crews. If buried cultural resources are located by the archeologist, construction is halted and the BLM consults with the State Historic Preservation Office (SHPO) on mitigation or avoidance. Due to the presence of alluvial deposits identified by the NRCS soil survey (NRCS n.d.), and areas of Very High Sensitivity Zones per the PUMP III Model (Eckerle 2005), the operator will be required to have an archeologist monitor all earth moving activities associated with certain construction, as described in the site specific COA’s.

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.

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
Brad Rogers	Biologist	US Fish and Wildlife Service	No
Jenna Foss	Designated Agent	Grouse Mountain	Yes
Duane Stranahan	Land Owner	Tear Drop Cattle Co., LLC	No
Allan Neilson	Lessee	Tear Drop Cattle Co., LLC	Yes
Mary Hopkins	State Historic Preservation Officer	State Historic Preservation Office	No

6. OTHER PERMITS REQUIRED

A number of other permits are required from Wyoming State and other Federal agencies. These permits are identified in Table A-1 in the PRB FEIS Record of Decision.

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APPENDIX A: RESOURCE AND SPECIES WORKSHEETS

Table A.1 Affected Resources Worksheet

Resource	Resource Present	Resource Affected	PRB FEIS Sufficient	Notes
Air quality	Yes	Yes	Yes	See PRB FEIS 3-291, 3-298, 4-404-4-406, 4-377, 4-386.
Cultural	Yes	Yes	No	Analyze in EA.
Native American religious concerns	No	No	No	Analyze in EA.
Traditional Cultural Properties	No	No	No	Analyze in EA.
Mineral Potential	-	-	-	See PRB FEIS 3-66, 3-70, 3-230, 4-127 through 4-129.
Coal	Yes	No	Yes	See PRB FEIS 3-66.
Fluid Minerals	Yes	Yes	Yes	See PRB FEIS 3-68, 3-69.
Locatable Minerals	Yes	No	Yes	Analyze in EA.
Other leasables	Yes	No	Yes	
Salable minerals	Yes	Yes	Yes	
Paleontology				See PRB FEIS 3-65-66, 4-125-127.
PFYC 3	-	-	-	
PFYC 5	-	-	-	
Rangeland management	Yes	Yes	Yes	
Existing range improvements	NA	NA	NA	
Proposed range improvements	NA	NA	NA	
Realty	No	No	NA	
Recreation	Yes	Yes	Yes	See PRB FEIS 3-263, 3-273, 4-319 -4-328.
Developed site	No	No	NA	See PRB FEIS 3-266, 4-326.
Walk-in-Area (2009 data)	No	No	NA	
Social & Economic	Yes	Yes	No	Analyze in EA. See PRB FEIS 3-275-3-289, 4-336-4-370.
Soils & Vegetation	Yes	Yes	No	Analyze in EA. See PRB FEIS 3-80-3-107, 4-134-4-152, 4-153-4-164, 4-343-4-391, 4-406.
Erosion Hazard	Yes	Yes	No	Analyze in EA. See PRB FEIS 3-82, 4-35.
Poor Reclamation Potential	Yes	Yes	No	Analyze in EA.
Slope hazard	Yes	Yes	No	Analyze in EA. See PRB FEIS 3-81, 4-135.
Forest products	Yes	Yes	Yes	

Table A.1 Affected Resources Worksheet

Resource	Resource Present	Resource Affected	PRB FEIS Sufficient	Notes
Invasive Species	Yes	Yes	No	Analyze in EA. See PRB FEIS 3-103-3-108, 4-153.
Wetlands/Riparian	Yes	Yes	No	Analyze in EA. See PRB FEIS 3-108-3-111, 4-172-4-178, 4-406, 4-395-4-396.
Special Designations	No	NA	NA	
Proposed ACEC	No	NA	NA	
Wild & Scenic River	No	NA	NA	
Wild Lands/Wilderness	No	No	No	USDI Order 3310, BLM 6301 & 6302
WSA	No	NA	NA	
Visual Resources	Yes	No	Yes	See PRB FEIS 3-252-3-263, 4-302-4-314, 4-403.
Class II	No			
Class III	Yes	Yes	Yes	Class IV bordered by Class III.
Water	Yes			
Floodplains	Yes	Yes	Yes	See PRB FEIS 3-1-3-56, 4-1-4-122, 4-135, 4-393, 4-405; ROD (A32), Vol. 1 (3-108 to 113).
Groundwater	Yes	Yes	No	Analyze in EA. See PRB FEIS 3-1-3-30, 4-1-4-69, 4-392, 4-405; ROD pg 7&8 (App. D), Vol.1 (3-1 to 36).
Surface water	Yes	Yes	No	Analyze in EA. See PRB FEIS 3-36-3-56, 4-69-4-122, 4-393, 4-405; ROD pg 7&8 (App. D) (App. A pg 30 to 310, Vol.1 (3-36 to 56).
Drinking water	Yes	Yes	Yes	PRB ROD pg 7&8 (App. D), Vol. 1 (3-1 to 56).
Wildland Urban Interface	No			
Wildlife	Yes	Yes	No	
ESA listed, proposed, or candidate species	Yes	Yes	No	Analyze in EA. Sage-grouse would be affected by this proposal and would require thorough analysis of effects including cumulative effects.
BLM sensitive species	Yes	Yes	No	Analyze in EA. See attached sensitive species wildlife checklist.
General wildlife	Yes	Yes	No	Analyze in EA
West Nile virus potential	Yes	Yes	Yes	

Table A.2 Threatened, Endangered, Proposed, and Candidate Species Worksheet

Common Name	Habitat	Habitat Present?	Individual Presence	Project Effects	Impacts anticipated beyond the level analyzed within the PRB FEIS?
Endangered					
Black-footed ferret	Black-tailed prairie dog colonies or complexes >1,000 acres	No	NP	NE	4-251 & BA
Blowout penstemon	Sparsely vegetated, shifting sand dunes	No	NP	NE	Not in FEIS; brief EA treatment required
Threatened					
Ute ladies'-tresses orchid	Riparian areas with permanent water	No	NP	NE	4-253 & BA; brief EA treatment required
Proposed					
Candidate					
Greater sage-grouse	Basin-prairie shrub, mountain-foothill shrub	Yes	K	NJ	4-257 to 4-273; required treatment in EA relative to 12-month finding (USFWS) and recent PRB research

Presence

K Known, documented observation within project area.

S Habitat suitable and species suspected, to occur within the project area.

NS Habitat suitable but species is not suspected to occur within the project area.

NP Habitat not present and species unlikely to occur within the project area.

Effect Determinations

Listed Species

LAA Likely to adversely affect

NE No Effect.

NLAA May Affect, not likely to adversely affect individuals or habitat.

Candidate Species

J Is likely to jeopardize candidate.

NJ Is not likely to jeopardize candidate species.

Table A.3 Sensitive Species Worksheet

Common Name	Habitat	Habitat Present?	Individual Presence	Project Effects	Direct, Indirect, and/or Cumulative Impacts Anticipated Beyond the Level Analyzed within the PRB FEIS?
Amphibians					4-258
Northern leopard frog	Beaver ponds and cattail marshes from plains to montane zones.	Yes	S	MIIH	No
Columbia spotted frog	Ponds, sloughs, small streams, and cattails in foothills and montane zones. Confined to headwaters of the S Tongue R drainage and tributaries.	No	NP	NI	No
Fish					4-259 & 4-260
Yellowstone cutthroat trout	Cold-water rivers, creeks, beaver ponds, and large lakes in the Upper Tongue sub-watershed	No	NP	NI	No
Birds					4-260 to 4-264
Baird's sparrow	Shortgrass prairie and basin-prairie shrubland habitats; plowed and stubble fields; grazed pastures; dry lakebeds; and other sparse, bare, dry ground.	No	NS	MIIH	No
Bald eagle	Mature forest cover often within one mile of large water body with reliable prey source nearby.	NO	NP	NI	No 4-251 to 4-253 & BA
Brewer's sparrow	Sagebrush shrubland	Yes	NS	MIIH	No
Ferruginous hawk	Basin-prairie shrub, grasslands, rock outcrops	No	NP	NI	No
Loggerhead shrike	Basin-prairie shrub, mountain-foothill shrub	Yes	NS	MIIH	No

Table A.3 Sensitive Species Worksheet

Common Name	Habitat	Habitat Present?	Individual Presence	Project Effects	Direct, Indirect, and/or Cumulative Impacts Anticipated Beyond the Level Analyzed within the PRB FEIS?
Long-billed curlew	Grasslands, plains, foothills, wet meadows	Yes	NS	MIIH	No
Mountain plover	Short-grass prairie with slopes < 5 percent	Yes	NS	MIIH	4-254, 4-255 & BA; EA treatment required
Northern goshawk	Conifer and deciduous forests	No	NP	NI	No
Peregrine falcon	Cliffs	No	NP	NI	No
Sage sparrow	Basin-prairie shrub, mountain-foothill shrub	Yes	NS	MIIH	No
Sage thrasher	Basin-prairie shrub, mountain-foothill shrub	Yes	NS	MIIH	EA treatment required
Trumpeter swan	Lakes, ponds, rivers	No	NP	NI	No
Western Burrowing owl	Grasslands, basin-prairie shrub	Yes	NS	MIIH	No
White-faced ibis	Marshes, wet meadows	No	NP	NI	No
Yellow-billed cuckoo	Open woodlands, streamside willow and alder groves	No	NP	NI	No
Mammals					4-264 &4-265
Black-tailed prairie dog	Prairie habitats with deep, firm soils and slopes less than 10 degrees.	Yes	K	MIIH	4-255, 4-256; EA treatment required
Fringed myotis	Conifer forests, woodland chaparral, caves and mines	No	NP	NI	No
Long-eared myotis	Conifer and deciduous forest, caves and mines	No	NP	NI	No
Spotted bat	Cliffs over perennial water.	No	NP	NI	No
Swift fox	Grasslands	YES	S	MIIH	No

Table A.3 Sensitive Species Worksheet

Common Name	Habitat	Habitat Present?	Individual Presence	Project Effects	Direct, Indirect, and/or Cumulative Impacts Anticipated Beyond the Level Analyzed within the PRB FEIS?
Townsend's big-eared bat	Caves and mines.	No	NP	NI	No
Plants					4-258
Limber pine	Mountains, associated with high elevation conifer species	No	NP	NI	No
Porter's sagebrush	Sparsely vegetated badlands of ashy or tuffaceous mudstone and clay slopes 5,300-6,500 ft.	No	NP	NI	No
William's wafer parsnip	Open ridgetops and upper slopes with exposed limestone outcrops or rockslides, 6,000-8,300 ft.	No	NP	NI	No

Presence

K Known, documented observation within project area.

S Habitat suitable and species suspected, to occur within the project area.

NS Habitat suitable but species is not suspected to occur within the project area.

NP Habitat not present and species unlikely to occur within the project area.

Effect Determinations

Sensitive Species

NI - No Impact.

MIH - May Impact Individuals or Habitat, but will not likely contribute to a trend towards Federal listing or a loss of viability to the population or species.

WIPV - Will Impact Individuals or Habitat with a consequence that the action may contribute to a trend towards Federal listing or cause a loss of viability to the population or species.

BI - Beneficial Impact

Appendix B: Resource and Species Worksheets Affected Resources Worksheet

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	Yes	No	
Native American religious concerns	No	No	No	
Traditional Cultural Properties	No	No	No	
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 Characteristics/Citizen			No	USDI Order 3310 & BLM 6301 & 6302

Resource	Resource Present	Resource Affected	PRB FEIS Sufficient	Notes
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				
BLM sensitive species				
General wildlife				
West Nile virus potential				

Threatened, Endangered, Proposed, and Candidate Species Worksheet

Common Name	Habitat	Presence? (NP, NS, S, K)	Direct Impacts Anticipated?	Intend to apply COA?	Direct, indirect, and/or cumulative impacts anticipated beyond the level analyzed within the PRB FEIS?
<i>Endangered</i>					
Black-footed ferret	Black-tailed prairie dog colonies or complexes > 1,000 acres.				4-251, BA & BO
Blowout penstemon	Sparsely vegetated, shifting sand dunes				Not in FEIS
<i>Threatened</i>					
Ute ladies' - tresses orchid	Areas with appropriate hydrology				4-253, BA & BO
<i>Proposed</i>					
<i>Candidate</i>					
Greater sage-grouse	Basin-prairie shrub, mountain-foothill shrub				4-257 to 4-273

Sensitive Species worksheet

Common Name	Habitat	Presence? (NP, NS, S, K)	Direct Impacts Anticipated ?	Intend to apply COA?	Direct, indirect, and/or cumulative impacts anticipated beyond the level analyzed within the PRB FEIS?
<i>Amphibians</i>					4-258
Northern leopard frog	Beaver ponds and cattail marshes from plains to montane zones.				
Columbia spotted frog	Ponds, sloughs, small streams, and cattails in foothills and montane zones. Confined to headwaters of the S Tongue R drainage and tributaries.				
<i>Fish</i>					4-259 & 4-260
Yellowstone cutthroat trout	Cold-water rivers, creeks, beaver ponds, and large lakes in the Upper Tongue sub-watershed				
<i>Birds</i>					4-260 to 4-264
Baird's sparrow	Shortgrass prairie and basin-prairie shrubland habitats; plowed and stubble fields; grazed pastures; dry lakebeds; and other sparse, bare, dry ground.				
Bald eagle	Mature forest cover often within one mile of large water body with reliable prey source nearby.				4-251 to 4-253 & BA
Brewer's sparrow	Sagebrush shrubland				
Ferruginous hawk	Basin-prairie shrub, grasslands, rock outcrops				
Loggerhead shrike	Basin-prairie shrub, mountain-foothill shrub				
Long-billed curlew	Grasslands, plains, foothills, wet meadows				
Mountain plover	Short-grass prairie with slopes < 5%				4-254, 4-255 & BA
Northern goshawk	Conifer and deciduous forests				
Peregrine falcon	Cliffs				
Sage sparrow	Basin-prairie shrub, mountain-foothill shrub				
Sage thrasher	Basin-prairie shrub, mountain-foothill shrub				
Trumpeter swan	Lakes, ponds, rivers				

Common Name	Habitat	Presence? (NP, NS, S, K)	Direct Impacts Anticipated ?	Intend to apply COA?	Direct, indirect, and/or cumulative impacts anticipated beyond the level analyzed within the PRB FEIS?
Western Burrowing owl	Grasslands, basin-prairie shrub				
White-faced ibis	Marshes, wet meadows				
Yellow-billed cuckoo	Open woodlands, streamside willow and alder groves				
<i>Mammals</i>					4-264 &4-265
Black-tailed prairie dog	Prairie habitats with deep, firm soils and slopes less than 10 degrees.				4-255, 4-256
Fringed myotis	Conifer forests, woodland chaparral, caves and mines				
Long-eared myotis	Conifer and deciduous forest, caves and mines				
Spotted bat	Cliffs over perennial water.				
Swift fox	Grasslands				
Townsend's big-eared bat	Caves and mines.				
<i>Plants</i>					4-258
Limber pine	Mountains, associated with high elevation conifer species				
Porter's sagebrush	Sparsely vegetated badlands of ashy or tufaceous mudstone and clay slopes 5300-6500 ft.				
William's wafer parsnip	Open ridgetops and upper slopes with exposed limestone outcrops or rockslides, 6000-8300 ft.				

Non-designated wildlife worksheet

Common Name / Group	Presence? (NP, NS, S, K)	Direct Impacts Anticipated?	Intend to apply COA?	Direct, indirect, and/or cumulative impacts anticipated beyond the level analyzed within the PRB FEIS?
Big Game				4-181 to 4-215
Aquatics				4-235 to 4-249
Migratory Birds				4-231 to 4-235
Raptors				4-216 to 4-221
Plains Sharp-tailed Grouse				4-221 to 4-226