

**DECISION RECORD
FOR
Williams Production RMT Company
Carr Draw Federal POD IV
ENVIRONMENTAL ASSESSMENT –WY-070-09-128**

DECISION: BLM’s decision is to approve Williams Production RMT Company’s Carr Draw Federal POD IV Coal Bed Natural Gas (CBNG) POD under Alternative C. Alternative C is the Modified Proposed Action, and is the result of collaboration between the Bureau of Land Management and Williams Production RMT Company. This action has been analyzed in the attached EA and found to have no significant impacts, thus an Environmental Impact Statement is not required.

The details of this approval are summarized below. For a complete description of the project, including specific changes made at the onsites, and site-specific mitigation measures, see the attached EA, pp 7-16.

The following 35 Applications for Permit to Drill (APDs) and associated infrastructure are authorized:

	Well Name	Well #	Qtr/Qtr	Section	TWP	RNG	Lease #
1	CARR DRAW IV CARU	21-21GW	NENW	21	50N	76W	WYW137645
2	CARR DRAW IV CARU	23-21GW	NESW	21	50N	76W	WYW147335
3	CARR DRAW IV CARU	14-21GW	SWSW	21	50N	76W	WYW147335
4	CARR DRAW IV CARU	14-25GW	SWSW	25	50N	76W	WYW146290
5	CARR DRAW IV CARU	14-27GW	SWSW	27	50N	76W	WYW33138
6	CARR DRAW IV CARU	34-27GW	SWSE	27	50N	76W	WYW33138
7	CARR DRAW IV CARU	24-28GW	SESW	28	50N	76W	WYW149969
8	CARR DRAW IV CARU	33-28GW	NWSE	28	50N	76W	WYW147335
9	CARR DRAW IV CARU	13-28GW	NWSW	28	50N	76W	WYW149969
10	CARR DRAW IV CARU	43-28GW	NESE	28	50N	76W	WYW147335
11	CARR DRAW IV CARU	23-33GW	NESW	33	50N	76W	WYW147335
12	CARR DRAW IV CARU	43-33GW	NESE	33	50N	76W	WYW147335
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14	CARR DRAW IV CARU	12-33GW	SWNW	33	50N	76W	WYW147335
15	CARR DRAW IV CARU	14-33GW	SWSW	33	50N	76W	WYW149152
16	CARR DRAW IV CARU	21-33GW	NENW	33	50N	76W	WYW147335
17	CARR DRAW IV CARU	34-33GW	SWSE	33	50N	76W	WYW147335
18	CARR DRAW IV CARU	21-34GW	NENW	34	50N	76W	WYW33138
19	CARR DRAW IV CARU	34-34GW	SWSE	34	50N	76W	WYW33138
20	CARR DRAW IV CARU	12-34GW	SWNW	34	50N	76W	WYW33138
21	CARR DRAW IV CARU	14-34GW	SWSW	34	50N	76W	WYW135624

	Well Name	Well #	Qtr/Qtr	Section	TWP	RNG	Lease #
22	CARR DRAW IV CARU	23-34GW	NESW	34	50N	76W	WYW33138
23	CARR DRAW IV CARU	32-34GW	SWNE	34	50N	76W	WYW33138
24	CARR DRAW IV CARU	43-34GW	NESE	34	50N	76W	WYW33138
25	CARR DRAW IV CARU	12-35GW	SWNW	35	50N	76W	WYW040444A
26	CARR DRAW IV CARU	13-35GW	NWSW	35	50N	76W	WYW040444A
27	CARR DRAW IV CARU	14-35GW	SWSW	35	50N	76W	WYW040444A
28	CARR DRAW IV CARU	32-35GW	SWNE	35	50N	76W	WYW040444A
29	CARR DRAW IV CARU	34-35GW	SWSE	35	50N	76W	WYW040444
30	CARR DRAW IV CARU	41-35GW	NENE	35	50N	76W	WYW040444A
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32	CARR DRAW IV CARU	11-35GW	NWNW	35	50N	76W	WYW040444A
33	CARR DRAW IV CARU	21-35GW	NENW	35	50N	76W	WYW040444
34	CARR DRAW IV SPU	11-4GW*	NWNW	4	49N	76W	WYW33136
35	CARR DRAW IV SPU	21-4LW	NENW	4	49N	76W	WYW33136

The following wells and associated infrastructure are not authorized:

Well Name	Well #	Qtr/Qtr	Section	TWP	RNG	Lease #
CARR DRAW IV CARU	32-33 BG/GW	SWNE	33	50N	76W	WYW147335
CARR DRAW IV CARU	12-21 BG/GW	SWNW	21	50N	76W	WYW137645

The operator agreed at the onsite to drop these wells, and incorporated this change into a new Master Surface Use Plan (MSUP), submitted December 17, 2009. The wells were dropped for the following reasons:

1. The 32-33BG/GW was dropped due the proximity to two raptor nests; it was also within the year long elk range.
2. The 12-21 BG/GW was dropped due to the combination of steep slopes >25% and shallow soil. These limitations indicate that there is no reclamation potential, as well as the potential for road failure.

The following well was removed from the POD and resubmitted as a separate project:

Well Name	Well #	Qtr/Qtr	Section	TWP	RNG	Lease #
CARR DRAW IV CARU	12-29 BG/GW	SWNW	29	50N	75W	WYW129538

1. This well and infrastructure do not tie into the proposed POD, but can be directly tied into the previously approved Carr Draw III East Federal POD. The APD was resubmitted November 17, 2009, and is being processed independently of the Carr Draw IV POD.

The following Lands and Realty ROW's are authorized:

ROW Grant	ROW Action	SEC.	T.	R.	Lengths	Width
WYW-170188	Road, Water & Electric	4,20,29,32	49/50	76	20,446',19,936'	40',30' & 20'

ROW Grant	ROW Action	SEC.	T.	R.	Lengths	Width
WYW-170189	Gas	4,20,29,32	49/50	76	19,936'	30'

Operator Committed Measures:

As a result of the onsite, several mitigation measures proposed by the BLM were incorporated by the operator into the Carr Draw IV POD plan. These changes were submitted as Operator Committed Measures on December 17, 2009, in an attachment to the MSUP labeled “Carr Draw IV Federal POD Mitigation”. The mitigation plan includes specific details on locating wells and infrastructure to reduce impacts to soils and wildlife, including planning of overhead and buried power.

Site-Specific Mitigation Measures:

Conditions of Approval have been applied to this project to mitigate resources impacts. For a complete description of all COA’s associated with this approval, see section 2.4 in the attached EA. COA’s for the Carr Draw IV POD have been applied to reduce or mitigate impacts to the following resources:

- Highly erosive soils and steep slopes
- Wildlife, including burrowing owls, mountain plover, raptors, sage-grouse, and sharp-tailed grouse
- Cultural resources
- Hydrologic resources

The recommendations made and analyzed in Alternative D, sage-grouse/elk emphasis, to not approve the drilling of up to 8 wells, were not incorporated into this decision. The impacts of approving these 8 wells, in the context of mitigation applied, do not rise to a significant level as described by CEQ.

This approval is in compliance with all federal laws, regulations, and policies pertaining to the affected environment. This includes, but is not limited to, the National Environmental Policy Act, the Federal Land Policy and Management Act, the National Historic Preservation Act, the Threatened and Endangered Species Act, the Migratory Bird Treaty Act, and the Resource Conservation and Recovery Act.

Approval of this alternative is in conformance with the *Powder River Basin Oil and Gas Project Environmental Impact Statement and Proposed Plan Amendment (PRB FEIS), Record of Decision and Resource Management Plan Amendments for the Powder River Basin Oil and Gas Project (PRB FEIS ROD)*, ((refer to Appendix E of that document relative to adaptive management), and the Approved Resource Management Plan (RMP) for the Public Lands Administered by the Bureau of Land Management, Buffalo Field Office (BFO), April 2001.

This approval is subject to adherence with all of the operating plans and mitigation measures contained in the Master Surface Use Plan of Operations, Drilling Plan, Water Management Plan, and information in individual APDs as well as site-specific mitigation measures identified during the analysis. This approval is also subject to operator compliance with all mitigation and monitoring requirements contained within the Powder River Oil and Gas Project Final Environmental Impact Statement and Resource Management Plan Amendment (PRB FEIS) approved April 30, 2003.

RATIONALE

The rationale for this decision to authorize alternative C, as summarized above, is based on the following:

1. It best meets the purpose and need to exercise lease rights granted by the United States to develop the oil and gas resources on federal leaseholds. Furthermore, approval of this development will help meet the nation’s future needs for energy reserves, and will help to stimulate local economies by maintaining stability for the workforce.

2. The Operator, in their POD, has committed to:
 - Comply with all applicable Federal, State and Local laws, policies, and regulations.
 - Obtain the necessary permits from other agencies for the drilling, completion and production of these wells including water rights appropriations, the installation of water management facilities, water discharge permits, and relevant air quality permits.
 - Offer water well agreements to the owners of record for permitted water wells within ½ mile of a federal CBNG producing well in the POD.
 - Provide water analysis from a designated reference well in each coal zone.
3. The Operator has secured a 3814 Bond that was analyzed in the previously approved Carr Draw III West Federal POD (CDIIIW POD) for portions of the Carr Draw IV Federal POD (CDIV POD) crossing William P. Maycock. The Operator has certified that a Surface Use Agreement has been reached with all other Landowners within the CDIV POD boundaries.
4. The selected alternative will not result in any undue or unnecessary environmental degradation.
5. The selected alternative incorporates appropriate local greater sage-grouse research and the best available science from across the species' range in development of the attached conditions of approval.
6. Mitigation measures from the range of alternatives were selected to best meet the purpose and need, and will be applied by the BLM to alleviate environmental impacts.
7. The selected alternative incorporates components of the 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, while meeting the purpose and need for the Carr Draw Federal POD IV Project.

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.

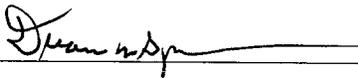
Field Manager: *Jean A. Sp* Date: 7/16/2010

**FINDING OF NO SIGNIFICANT IMPACT
FOR
Williams Production RMT Company
Carr Draw Federal POD IV
ENVIRONMENTAL ASSESSMENT -WY-070-09-128**

FINDING OF NO SIGNIFICANT IMPACT

On the basis of the information contained in the EA, and all other information available to me, it is my determination that: (1) the implementation of the Proposed Action will not have significant environmental impacts beyond those already addressed in PRB EIS to which the EA is tiered; (2) the Proposed Action is in conformance with the Buffalo Field Office Resource Management Plan; and (3) the Proposed Action does not constitute a major federal action having a significant effect on the human environment. Therefore, an environmental impact statement or a supplement to the existing 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 the EA.

Field Manager:  Date: 7/16/2010

**BUREAU OF LAND MANAGEMENT
BUFFALO FIELD OFFICE
ENVIRONMENTAL ASSESSMENT (EA)
FOR
Williams Production RMT Company
Carr Draw Federal POD IV
PLAN OF DEVELOPMENT
WY-070-09-128**

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 (approved April 30, 2003), pursuant to 40 CFR 1508.28 and 1502.21. This document is available for review at the BLM Buffalo Field Office (BFO). This project environmental assessment (EA) addresses site-specific resources and impacts that were not covered within the PRB FEIS.

1.1. Background

Williams Production RMT Company submitted the Carr Draw Federal POD IV on September 5, 2008 with a total of 76 APD's. Due to the complexity of the issues presented by this project, there were several stages of onsites and negotiation between the BLM and Williams:

- February 6, 11, 20, 26, and March 5, 2009: Initial project onsites.
- May 4, 2009: Additional on-site of the Barber Creek line to review re-route options to tie into proposed Anadarko Petroleum Corporation (APC) infrastructure.
- November 17, 2009: Onsite for mitigating elk habitat impacts on the western side of the project. As a result of this on-site, Williams agreed to reduce all the proposed double well locations in the Carr Draw Federal POD IV to single wells, bringing the total APD count down to 36.
- December 17, 2009: Williams submits complete wildlife mitigation packet which addresses mitigation for both elk and sage grouse throughout the entire project.

There is a direct relationship between the Carr Draw Federal POD IV (CDIV) and the Carr Draw Federal POD III West (CDIIIW). CDIIIW was approved on September 4, 2009. The majority of the infrastructure for the wells in section 27 T50N R76W in CDIIIW is routed through the center the CDIV.

Both PODs will utilize the existing CDIIIW utility corridor and access coming out of section 27. Proposed infrastructure in CDIV which overlaps CDIIIW includes the access and utility corridor for the 23-21-5076 well location, and the proposed Barber Creek pipeline, located in section 21 SENW, T50N R76W.

Williams has secured a 3814 Bond, and a Determination of Bond Adequacy was analyzed within the CDIIIW EA. Williams submitted a Bond, designated 6577809, in the amount of \$30,000.00 for CDIIIW. The 3814 Bond has been found adequate and encompasses the following area: T50N R76W Sections 2, 3, 9-11, 14, 15, 21-24, 26, and 27.

1.2. Purpose and Need for the Proposed Action

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

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

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 referred to as Carr Draw Federal POD IV, and if so, under what terms and conditions.

1.3. Conformance with Applicable Land Use Plan and Other Environmental Assessments:

The proposed action conforms to the terms and the conditions of the 1985 Buffalo RMP and the 2003 PRB FEIS. The BFO RMP revision began in December of 2008 and is expected to be completed in 2012.

1.4. Issues

As stated above, this (EA) addresses site-specific resources and impacts that were not covered within the PRB FEIS. Resources potentially affected by this project include several wildlife species, cultural resources, soils and vegetation, and water management, but only those resource issues that are of particular importance because of public interest and controversy, or that resulted in major changes at the onsite and/or mitigation measures in the form of COA's are described below.

Western Burrowing Owl and Mountain Plover

Habitat for both of these species is present in the project area, and both are considered Level I species under the WGFYD Wyoming Bird Conservation Plan (Nicholoff 2003). The plan identified three groups of high-priority bird species in Wyoming: Level I – those that clearly need conservation action, Level II – species where the focus should be on monitoring, rather than active conservation, and Level III – species that are not otherwise of high priority but are of local interest.

Raptors

Four raptor species are known to have used nests within 0.5 miles of the project area: golden eagles, red-tailed hawks, great-horned owls, and American kestrels. Golden eagles are listed as a Bird of Conservation Concern (BCC) by USFWS for Region 17, which encompasses 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 prevent or remove the need for additional ESA bird listings by implementing proactive management and conservation actions. Golden eagles were also identified as a Level III species in the Wyoming Bird Conservation Plan.

Sage-Grouse

On March 23, 2010, the US Fish and Wildlife Service (USFWS) issued a decision that sage-grouse are warranted for listing under the Endangered Species Act. The proposed action has the potential to impact sage-grouse habitat.

Plains Sharp-Tailed Grouse

Plains sharp-tailed grouse are discussed in this document because specific concerns for this species were identified during the scoping process for the PRB FEIS, and habitats within the Carr Draw Federal POD IV project area have potential to support sharp-tailed grouse.

Fortification Creek Elk

The affected environment for the Fortification Creek elk herd is discussed in the PRB FEIS (pg. 3-132 to 3-140). The PRB FEIS considered cumulative impacts to elk within the Buffalo Field Office, but did not specifically address the isolated Fortification Creek elk herd with CBNG development forecasted

throughout and completely surrounding the herd's seasonal ranges. The proposed action has the potential to impact elk habitat, habitat use, and population.

Alternative D was developed by BFO to provide another alternative to reduce direct as well as indirect impacts to elk and sage-grouse habitat on a project level basis.

Steep Slopes/ Highly Erosive Soils

Many of the soils and landforms in the project area present distinct challenges for development, and/or eventual site reclamation. Approximately 86 percent of the area within the boundary of the proposed action contains soils identified as having poor reclamation potential, and 31% of the area has slopes greater than 25%; these areas were avoided as per FEIS-ROD due to difficult to impossible reclamation. Overcoming the unfavorable soil/site properties or limitations requires special design, extra maintenance, and costly alteration.

Buffalo Field Office experience with CBNG development over the past several years has shown that the Programmatic COA's from the PRB FEIS do not address the problem of fragile soils disturbances that can last from several months to one or two years. When these soils are disturbed, and immediate stabilization does not occur, wind and water erosion of topsoil piles can result in no viable topsoil available when reclamation begins at the conclusion of the project. To address this problem, BFO has developed a 30-day stabilization COA, which is applied in portions of this project.

Cultural Resources

This project contains areas that were identified as either having poor surface visibility during the class III inventory by Western Land Services, Inc, or are areas having a high potential for buried cultural deposits (areas containing alluvial deposits along Barber Creek). Some portions of the monitoring areas as described may lie outside alluvial deposits and exact monitoring areas are left to the discretion of the archeological monitor.

Water Management

A large stand of mature cottonwoods, which provides habitat for many wildlife species, is present along Barber Creek in the project area. The water management plan for this project includes the construction of channel crossings associated with the Barber Creek waterline, which has the potential to impact this stand of cottonwoods.

2. ALTERNATIVES INCLUDING THE PROPOSED ACTION

Four alternatives, A, B, C, and D, were evaluated in determining how to best meet the stated purpose and need of the proposed action. A brief description of each alternative follows.

Alternative A is the No Action Alternative. Alternative B is the project as proposed by the operator. Alternative C is the result of collaboration between the operator and BLM to mitigate project impacts. Alternative D incorporates the analysis of additional mitigation measures identified by the BLM to address the issues identified in Section 1.4.

2.1. Alternative A - No Action

A No Action Alternative was considered in the PRB FEIS, Volume 1, pages 2-54 through 2-62. This alternative would consist of no new federal wells. An oil and gas lease grants the lessee the "right and privilege to drill for, mine, extract, remove, and dispose of all oil and gas deposits" in the lease lands, "subject to the terms and conditions incorporated in the lease." Thus, under this alternative, the operator's proposal would be denied.

2.2. Alternative B Proposed Action

Alternative B, the “proposed action” alternative, summarizes the Carr Draw Federal POD IV Project as originally submitted to the BLM by Williams Production RMT Company, prior to any BLM review or modifications.

Proposed Action Title/Type: Williams Production RMT Company’s Carr Draw Federal POD IV Plan of Development (POD) for 76 coal bed natural gas well APD’s and associated infrastructure.

Proposed Well Information: There were 76 wells proposed within this POD; the wells are vertical bores proposed on an 80 acre spacing pattern with 2 wells per location. Each well will produce from one coal seam, the Big George or the Wall coal seam. Proposed well house dimensions are 6’ x 8’ x 6’ in height.

The well house color will be determined by the surrounding vegetation. The proposed wells are located as follows:

	Well Name	Well #	Qtr/Qtr	Sec.	TWP	RNG	Lease #
1	CARR DRAW IV CARU	12-29BG	SWNW	29	50N	75W	WYW129538
2	CARR DRAW IV CARU	12-29GW	SWNW	29	50N	75W	WYW129538
3	CARR DRAW IV CARU	12-21BG	SWNW	21	50N	76W	WYW147335
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64	CARR DRAW IV CARU	21-35GW	NENW	35	50N	76W	WYW040444
65	CARR DRAW IV CARU	32-35BG	SWNE	35	50N	76W	WYW040444A
66	CARR DRAW IV CARU	32-35GW	SWNE	35	50N	76W	WYW040444A
67	CARR DRAW IV CARU	34-35BG	SWSE	35	50N	76W	WYW040444
68	CARR DRAW IV CARU	34-35GW	SWSE	35	50N	76W	WYW040444
69	CARR DRAW IV CARU	41-35BG	NENE	35	50N	76W	WYW040444A
70	CARR DRAW IV CARU	41-35GW	NENE	35	50N	76W	WYW040444A
71	CARR DRAW IV CARU	43-35BG	NESE	35	50N	76W	WYW040444A
72	CARR DRAW IV CARU	43-35GW	NESE	35	50N	76W	WYW040444A
73	CARR DRAW IV SPU	11-4BG*	NWNW	4	49N	76W	WYW33136
74	CARR DRAW IV SPU	11-4GW	NWNW	4	49N	76W	WYW33136
75	CARR DRAW IV SPU	21-4BG	NENW	4	49N	76W	WYW33136
76	CARR DRAW IV SPU	21-4LW	NENW	4	49N	76W	WYW33136

County: Campbell

Applicant: Williams Production RMT Company

Surface Owners: Record TJ Ranch:Jerry Record, BLM, Mitchel Maycock, William P. Maycock

Project Description:

The proposed action involves the following:

- Drilling of 76 total federal CBM wells in Big George and Wall Coal zones to depths of 1,137 feet to 2,395 feet. Multiple seams will be produced by co-locating wells (multiple wells at a single location each targeting a single formation).
- Drilling and construction activities are anticipated to be completed within two years, the term of an APD. Drilling and construction occurs year-round in the PRB. Weather may cause delays lasting several days but rarely do delays last multiple weeks. Timing limitations in the form of COAs and/or agreements with surface owners may impose longer temporal restrictions on portions of this POD, but rarely do these restrictions affect an entire POD.
- Williams plans to install electronic natural gas flow measurement equipment utilizing telecommunications data gathering or chart recorders. Williams's gas measurement will occur at the individual wellhead. Well metering shall be accomplished by telemetry. Well metering by telemetry will require multiple visits per month to each well.
- Williams proposes an integrated water management system to manage effluents produced from the Carr Draw Federal POD IV project. This system includes existing and proposed water management infrastructure with BLM approved Federal PODs, including four approved waterline sundries (Waterline Sundry "Black Bullet", Somerville Waterline Sundry 1, Somerville Waterline Sundry 2, and the proposed Barber Creek waterline associated with this Carr Draw Federal POD IV). All effluent produced from the proposed 76 federal wells and within the Carr Draw Federal POD IV project will be transported by common waterline systems to off-project facilities associated with these PODs and waterline sundries that are adjacent the project. The existing off-project infrastructure that will be utilized for water management includes: Williams BLM approved Schoonover Road Unit 1&2, Schoonover Road Unit 3, Schoonover Road Unit 5, South Prong Unit 3, and South Prong Unit 1 and 2. The information pertaining to the specific water management infrastructure for these projects can be reviewed in their respective POD Water Management Plans (WMP's).
- An unimproved and improved road network.
- An above ground power line network to be constructed by a combination of a private contractor and the Public Utility Company. Power line construction has not yet been scheduled and will not be completed before the wells are in production. Temporary diesel generators shall be placed at all indicated power drops. Williams will determine any changes to the power drop locations, and these changes will be permitted via sundry application and analyzed in a separate NEPA action.
- A storage tank of 1000 gallon capacity shall be located with each temporary diesel generator. Generators are projected to be in operation for up to 12 months. Fuel deliveries are anticipated to be 2 times per week. Please refer to the Carr Draw POD IV in the Master Surface Use Plan (MSUP) for further detail on noise level of the possible generators to be used, measured at 50 and 100 feet at the end of the MSUP.
- There are no proposed central gathering/metering facilities or compression 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 is also available in the PRB FEIS, Volume 1, pages 2-9 through 2-40 (January 2003).

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

Additionally, the Operator, in their POD, has committed to:

1. Comply with all applicable Federal, State and Local laws and regulations.
2. Obtain the necessary permits for the drilling, completion and production of these wells including water rights appropriations, the installation of water management facilities, water discharge permits, and relevant air quality permits.
3. Offer water well agreements to the owners of record for permitted water wells within 0.5 mile of a federal CBNG producing well in the POD
4. Provide water analysis from a designated reference well in each coal zone.

The Operator has secured a 3814 Bond that was analyzed in the previously approved Carr Draw III West Federal POD (CDIIIW POD) for portions of the Carr Draw IV Federal POD (CDIV POD) crossing William P. Maycock. The Operator has certified that a Surface Use Agreement has been reached with all other Landowners within the CDIV POD boundaries.

2.3. Alternative C – Modified Proposed Action

Alternative C represents a modification of Alternative B based on the operator and BLM working cooperatively to reduce environmental impacts. The description of Alternative C is the same as Alternative B, with the addition of the project modifications of the initial project proposal (Alternative B) identified by BLM and the operator. At the on-sites, all areas of proposed surface disturbance were inspected to insure that the project would meet BLM multiple use objectives to conserve natural resources while allowing for the extraction of Federal minerals. In some cases, access roads were re-routed, and well locations, pipelines, discharge points and other water management control structures were moved, modified, or dropped from further consideration to alleviate environmental impacts.

Alternatives to the different aspects of the proposed action are always considered, and can be applied as pre-approval changes, site specific mitigation, and/or Conditions of Approval (COAs), if they will alleviate environmental effects of the operator's proposal.

Alternative C also incorporates the results of sage-grouse and elk habitat mapping efforts in the project area and on-site verification of habitat suitability. This alternative represents BFO efforts to reduce direct impacts to sage-grouse and elk habitat on a site specific level, while maintaining proposed spacing and infrastructure requirements consistent with the purpose and need of the proposed action. Alternative C will not reduce overall indirect impacts to sage-grouse and elk habitat.

2.3.1. Changes as a result of the on-sites

The operator has listed the changes as an attachment to the MSUP labeled Carr Draw IV Federal POD Mitigation under the section titled Well Specific Information, submitted December 17, 2009. This portion of the mitigation plan addresses items such as dirt work, wildlife, reclamation, and any other pertinent information and changes by well. Please refer to this section for further detail as a result of the on-sites. A brief summary of changes follows:

1. To reduce pad size and overall surface disturbance, as well as impacts to elk habitat, all double well locations were changed to single well locations. This reduced the project from 76 wells to 36 wells.

The following wells were dropped as a result of the on-site:

The 32-33BG/GW and 12-21 BG/GW:

1. The 32-33BG/GW, TWP50N RNG76W section 33 SWNE, Lease # WYW147335, was dropped due the proximity to two raptor nests and being within the year long elk range.
2. The 12-21 BG/GW, TWP50N RNG76W section 21 SWNW, Lease # WYW147335 was dropped due to the combination of steep slopes >25% and shallow soil. These limitations indicate that the reclamation potential is low to nonexistent, and that there is potential for road failure.

The following well was withdrawn from the POD as a result of the on-site:

1. The 12-29BG/GW, TWP50N RNG75W section 29 SWNW, Lease # WYW129538. This well and infrastructure do not tie into the proposed POD, but can be directly tied into the previously approved Carr Draw III East Federal POD. The APD was resubmitted November 17, 2009, and is being processed independently of the Carr Draw IV POD.

Lands and Realty Row's:

Use and maintenance of the following rights-of-ways will be authorized with the approved POD.

ROW Grant	ROW Action	SEC.	T.	R.	Length	Width
WYW-170188	Road, Water & Electric	4,20,29,32	49/50	76	20,446',19,936'	40',30' & 20'
WYW-170189	Gas	4,20,29,32	49/50	76	19,936'	30'

2.3.2. Operator Committed Measures

Please refer to the supplemental information submitted by the operator as an attachment to the MSUP labeled Carr Draw IV Federal POD Mitigation for further detail. The mitigation plan provides information about the POD's general history, project wildlife mitigation planning, over head and buried power planning, and well specific information.

2.4. Alternative C Site-Specific Conditions of Approval

2.4.1. Surface Use

1. A 30 Day Stabilization COA will apply to both the road and the location for the following due to highly erosive soils: 12-21, 14-21, 12-33, 21-33, 14-34, 32-34, 41-34, and the 21-35.
2. A 30 Day Stabilization COA will apply to only the access road for the following due to highly erosive soils: 14-25, 24-28, 41-33, 43-33, 12-34, and the 34-35.
3. A 30 Day Stabilization COA will apply only to the location for the following due to highly erosive soils: 23-21, 43-28, and the 21-4.
4. A 30 Day Stabilization COA will apply on entire utility corridor for the Barber Creek line due to highly erosive soils and slope.
5. A 20' foot vegetated buffer must be maintained on the locations for the following due to slope and the proximity to adjacent drainages: 43-28, 21-33, and 23-34 the location.
6. Covert Green will be implemented as the color scheme for the entire POD, this is attributed to the fact that covert green is best suited to match the vegetation within the POD.
7. Complete slope staking shall be required prior to construction. Staking shall be completed on 100 foot intervals on tangent sections for through cuts and/or fills less than 5 feet. Staking shall be completed on 50 foot intervals for horizontal and vertical curves, balanced tangent sections, and road sections

requiring more than 5 feet of cut and/or fill. This condition of approval will be implemented for the entire POD for all engineered roads and locations.

8. All low water crossing's and culverts will be staked prior to the pre-construct for the entire POD.
9. Prior to construction the operator will provide the following: A seed mix for the Barber Creek Line to be used on the Powder River Ranch property. The operator will specify the areas that will implement the use of the Powder River Ranch seed mix within the reclamation plan. This condition of approval will apply to any portions of the Carr Draw IV Federal POD that include the Powder River Ranch property.
10. Williams Production Company will coordinate with Lance Oil & Gas Company to construct Road Q, identified in the Lance Oil & Gas Company for the Williams Draw Unit Delta POD Access Road Plan. Road Q is located within the east half of Sections 21, 28 and 33, T50N/R76W and applies to the following locations: 14-21-5076, 13-28-5076, 24-28-5076, 12-33-5076 & 21-33-5076. Furthermore, Williams Production Company will coordinate the installation of infrastructure coinciding with the construction and utilizing a shared corridor following the alignment of Road Q. No construction or drilling operations are authorized for the following locations until these conditions are met for the following locations: 14-21-5076, 13-28-5076, 24-28-5076, 12-33-5076 and 21-33-5076.
11. 14-21-5076, 32-35-5076 and 21-33-5076: The access roads will be signed informing travelers of the reduced stopping sight distance and reduced meeting sight distance where appropriate.
12. All 12" relief culverts will either be increased to a minimum of 18" or have a debris barrier incorporated at the inlet of each culvert. A trash rack is an example of an adequate debris barrier. This COA applies to the entire POD.
13. 14-21 location: A reclamation plan addressing the interim and final reclamation for access road and location will need to be submitted to the BLM Authorized Officer prior to construction.
14. The access road for the 21-21 and 43-28 will remain primitive and will be surfaced with road base gravel to minimize the overall surface disturbance.
15. 23-21 location: The road will come from the north along coldwater drainage and will not follow the Barber Creek Line to the south due to topography and slope. The road will remain primitive with road base gravel and will require a number of LWC's due to the surrounding drainage and defined channel.
16. 14-27 location: Extra room for a POD building will be needed, approximately 1.5 acres total and will be incorporated into the well location for the POD building.
17. 34-27 location: The location sits on knoll adjacent to a playa. No infrastructure including the utility corridor or access road will go through or in the playa.
18. 21-33 location: The drainage prior to the well pad will have a culvert installed through it vs. disturbing the draw more by trying to go around the drainage. The well will be oriented north to south to minimize surface disturbance.
19. 34-33 location: The operator will be required to reclaim the un-used portion of the existing road not being utilized for the federal action. The portion of the un-used road being reclaimed will need to be

signed accordingly and blocked off. The well location will incorporate the access road and will be a drive through location.

20. 41-34 location: Silt fencing will be utilized on the SE corner of the old plugged and abandoned pad. The location will be an eyebrow location. The access road is an existing road and will need to be brought up to improved template design. Any additional dirt work outside of the existing road and old plugged and abandoned location will need to be staked prior to the pre-construction meeting.
21. 43-35 and 32-35 location: The running surface for the access road will be 10'-12' feet.
22. 34-35 location: The portion of the road prior to the wells will need to be altered due to the orientation of the proposed wells and the location of the old plugged and abandoned well constraints.
23. 34-35 location: The operator will be required to reclaim the un-used portion of the road not being utilized for the federal action. The portion of the un-used road being reclaimed will need to be signed accordingly and blocked off. A reclamation plan describing the extent and mitigation that will be applied will be required prior to construction.
24. 21-4 location: The cattle guard on the main entrance will be offset for site visibility purposes and safety.

2.4.2. Wildlife

All wildlife survey protocol for the following COA's is as per the PRB EIS.

Burrowing Owls

The following conditions will alleviate impacts to burrowing owls:

1. No surface disturbing activity shall occur within 0.25 miles of all identified prairie dog colonies from April 15 to August 31, annually, prior to a burrowing owl nest occupancy survey for the current breeding season. A 0.25 mile buffer will be applied if a burrowing owl nest is identified. This condition will be implemented on an annual basis for the duration of surface disturbing activities within the prairie dog town(s). This timing limitation will be in effect unless surveys determine the nest(s) to be inactive. This timing limitation will affect the following:

Township/Range	Section	Wells and Infrastructure
T50N/R76W	21	All utility corridor and Barber Creek water pipeline within the mapped prairie dog colony within the NENE of this section.
T50N/R76W	26	All utility corridor within the mapped prairie dog colony within the NESW of this section.
T50N/R76W	27	Well locations: 14-27-5076 All access road and associated utility corridor within the mapped prairie dog colony within the SWSW and NWSW of this section.

Mountain Plover

The following conditions will alleviate impacts to mountain plovers:

1. A mountain plover nesting survey is required in suitable habitat prior to commencement of surface disturbing activities in the following areas:
Mountain plover nesting surveys shall be conducted by a biologist following the most current USFWS Mountain Plover Survey Guidelines (the survey period is May 1-June 15). All survey results must be submitted in writing to the BFO and approved prior to initiation of surface disturbing activities.

- a. No surface disturbing activities are permitted in the suitable habitat area listed above, from March 15-July 31, unless a mountain plover nesting survey has been conducted during the current breeding season. This timing limitation will be in effect unless surveys determine no plovers are present. This timing limitation will affect the following:

Township/Range	Section	Wells and Infrastructure
T50N/R76W	21	All utility corridor and Barber Creek water pipeline within the mapped prairie dog colony within the NENE of this section.
T50N/R76W	26	All utility corridor within the mapped prairie dog colony within the NESW of this section.
T50N/R76W	27	Well locations: 14-27-5076 All access road and associated utility corridor within the mapped prairie dog colony within the SWSW and NWSW of this section.

- b. If occupied mountain plover habitat is identified, then a seasonal disturbance-free buffer of ¼ mile shall be maintained between March 15 and July 31. If no mountain plover observations are identified, then surface disturbing activities may be permitted within suitable habitat until the following breeding season (March 15).
- c. No dogs will be permitted at work sites to reduce the potential for harassment of mountain plovers.

Raptors

The following conditions will alleviate impacts to raptors:

1. No surface disturbing activity shall occur within 0.5 mile of all identified raptor nests from February 1 through July 31, annually, prior to a raptor nest occupancy survey for the current breeding season. This timing limitation will affect the following:

Township/Range	Section	Wells and Infrastructure
T49N/R75W	2	
T49N/R75W	3	Proposed pump station within the NWSW of this section. Proposed overhead powerline within the SENW of this section.
T49N/R75W	4	All access road and associated utility corridor within the NWNE of this section.
T50N/R76W	7	Proposed Barber Creek water pipeline within the SWSW and SESW of this section.
T50N/R76W	16	Proposed Barber Creek water pipeline within this ENTIRE section except the SESE.
T50N/R76W	17	Proposed Barber Creek water pipeline within this ENTIRE section.
T50N/R76W	18	Proposed Barber Creek water pipeline within the NENW and NWNE of this section.
T50N/R76W	20	All associated infrastructure within the NENE of this section.
T50N/R76W	21	Wells locations: 21-21-5076, 12-21-, 23-21-5076, 14-21-5076 All associated infrastructure within the ENTIRE section except the NENE and SWSW.
T50N/R76W	22	All utility corridors within this section.
T50N/R76W	25	Well locations: 14-27-5076 All utility corridor within the NE, SE of this section.
T50N/R76W	26	

Township/Range	Section	Wells and Infrastructure
T50N/R76W	27	Wells locations: 14-27-5076 and 34-27-5076 All proposed access road and utility corridor within the NE, SE and SWSW of this section. The proposed POD building and staging area within the SWSW of this section.
T50N/R76W	28	Well locations: 13-28-5076, 24-28-5076, 33-28-5076 and 43-28-5076 All access road and associated utility corridor within the south half of this section.
T50N/R76W	33	Well locations: 12-33-5076, 21-33-5076, 23-33-5076, 24-33-5076, 34-33-5076, 41-33-5076 and 43-33-5076 All access road and associated utility corridor within this ENTIRE section except the SWSW.
T50N/R76W	34	Well locations: 12-34-5076, 21-34-5076 All access road and associated utility corridor within the NW and SWSW of this section.
T50N/R76W	36	Overhead Power within the NENE and NENW of this section.
T50N/R77W	9	Proposed Barber Creek water pipeline within the NENE and NWNE of this section.
T50N/R77W	10	Proposed Barber Creek water pipeline within the north half and NESE of this section.
T50N/R77W	11	Proposed Barber Creek water pipeline within the south half of this section.
T50N/R77W	12	Proposed Barber Creek water pipeline within the south half of this section.
T50N/R77W	13	Proposed Barber Creek water pipeline within the NE of this section.

- a. Surveys to document nest occupancy shall be conducted by a biologist following BLM protocol, between April 15 and June 30. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities. Surveys outside this window may not depict nesting activity. If a survey identifies active raptor nests, a 0.5 mile timing buffer will be implemented. The timing buffer restricts surface disturbing activities within 0.5 mile of occupied raptor nests from February 1 to July 31.
 - b. Nest occupancy and productivity checks shall be completed for nests within a 0.5 mile of any surface disturbing activities across the entire POD for as long as the POD is under construction. Once construction of the POD has ceased, nest occupancy and productivity checks shall continue for the first five years on all nests that are within a 0.5 mile of locations where any surface-disturbing activities took place. Productivity checks shall be completed only on those nests that were verified to be occupied during the initial occupancy check of that year. The productivity checks shall be conducted no earlier than June 1 or later than June 30, and any evidence of nesting success or production shall be recorded. Survey results will be submitted to a Buffalo BLM biologist in writing no later than July 31 of each survey year. The nests that are checked each year is subject to change, pending surveys.
2. If an undocumented raptor nest is located during project construction or operation, the Buffalo Field Office (307-684-1100) shall be notified within 24 hours.
 3. Well metering, maintenance and other site visits within 0.5 miles of raptor nests should be minimized as much as possible during the breeding season (February 1 – July 31).

Sage-Grouse

The following conditions will alleviate impacts to sage-grouse:

1. No surface disturbing activities are permitted from March 1 to June 15. This condition will be implemented on an annual basis for the life of the project. This condition affects the following locations:

Township/Range	Section	Wells and Infrastructure
T49N/R76W	2	Proposed overhead powerline within the NWNW of this section.
T49N/R76W	3	Proposed overhead powerline within the north half of this section. Proposed pump station within the NWSW of this section. Proposed utility corridor within the NENE of this section. Proposed staging area within the NESE of this section.
T49N/R76W	4	Well locations: 11-4-5076 and 21-4-5076. All access road and associated utility corridor within this ENTIRE section.
T50N/R76W	7	Proposed Barber Creek water pipeline within the SWSW and SESW of this section.
T50N/R76W	16	Proposed Barber Creek water pipeline within the SWSE this of section. All access road and associated utility corridor within the NWSE, SWSE, SESE and SESW of this section.
T50N/R76W	17	Proposed Barber Creek water pipeline within the NWNW of this section. All access road and associated utility corridor within the SESE of this section.
T50N/R76W	18	All access road and associated utility corridor within the NENW of this section.
T50N/R76W	20	All access road and associated utility corridor within the NENE of this section.
T50N/R76W	21	Well locations: 21-21-5076 and 23-21-5076 All access road and associated utility corridor within the NENW, SENW and NESW of this section.
T50N/R76W	22	All proposed utility corridor within this ENTIRE section.
T50N/R76W	25	Well locations: 14-25-5076 All access road and associated utility corridor within the SWSW of this section.
T50N/R76W	26	All utility corridor within the N1/2SWNW, NESW and SESW of this section. Proposed overhead powerline within the SESW of this section.
T50N/R76W	27	Well locations: 14-27-5076 and 34-27-5076 Proposed staging area within the SWSW of this section. Proposed POD building within the SWSW of this section. All access road and associated utility corridor within the SWSW, and SWSE of this section.
T50N/R76W	28	All access road and associated utility corridor within the SESE, NESE and NWNW of this section.
T50N/R76W	29	All access road and associated utility corridor within the NESE and SESE of this section.
T50N/R76W	32	All access road and associated utility corridor within the NESE and NENE of this section.

Township/Range	Section	Wells and Infrastructure
T50N/R76W	33	Well locations: 14-33-5076, 23-33-5076, 34-33-5076, 41-33-5076 and 43-33-5076 All access road and associated utility corridor within this ENTIRE section.
T50N/R76W	34	Wells locations: 12-34-5076, 14-34-5076, 21-34-5076, 32-34-5076, 34-34-5076 and 43-34-5076 All access road and associated utility corridor within this ENTIRE section.
T50N/R76W	35	Well locations: 11-35-5076, 12-35-5076, 13-35-5076, 14-35-5076, 21-35-5076, 32-35-5076, 34-5076, 41-35-5076 and 43-35-5076 Proposed overhead powerline within this ENTIRE section. All access road and associated utility corridor within this ENTIRE section.
T50N/R76W	36	All access road and associated utility corridor within this ENTIRE section. Proposed overhead powerline within this ENTIRE section.
T50N/R77W	9	Proposed Barber Creek water pipeline within the NENE and NENE of this section.
T50N/R77W	10	Proposed Barber Creek water pipeline within the NESE, SWNE and SENW of this section.
T50N/R77W	11	Proposed Barber Creek water pipeline within this ENTIRE section.
T50N/R77W	12	Proposed Barber Creek water pipeline within the SWSE and SESW of this section.
T50N/R77W	13	Proposed Barber Creek water pipeline within the NWNE of this section.

- a. A sage-grouse survey will be conducted by a biologist following the most current WGFD protocol. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities.
- b. Maximum design speed on all operator-constructed and maintained roads (except county roads) will not exceed 25 miles per hour except travel along roads within 1/2 mile of the Laskie Draw or Laskie Draw East sage grouse lek. These roads will be posted at 10 mph. This will affect the all roads located within Sections 3 and T50N/R76W.

Sharp-tailed Grouse

The following conditions will minimize impacts to sharp-tail-grouse:

1. A survey is required for sharp-tailed grouse between April 1 and May 7, annually, within the project area for the life of the project and results shall be submitted to a BLM biologist.
 - a. 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. The required sharp-tailed grouse survey will be conducted by a biologist following WGFD protocol. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities.
 - b. 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).
 - c. Creation of raptor hunting perches will be avoided within 0.64 miles of documented sharp-tailed grouse lek sites. Perch inhibitors will be installed to deter avian predators from preying on grouse.

2.4.3. Water Management

1. All channel crossings associated with the Barber Creek waterline must be stabilized and re-vegetated immediately after construction is completed.
2. Channel crossings by the Barber Creek waterline will be constructed perpendicular to flow.
3. Channel crossings by the Barber Creek waterline will be constructed so that the pipe is buried at least four feet below the channel bottom.
4. The removal of Cottonwood trees is not authorized during the construction of the Barber Creek water line.

2.4.4. Cultural

All surface disturbing activity in the following areas will be monitored by a BLM cultural resource user permit (CRUP) holder or permitted crew chief. These areas were identified as either having poor surface visibility during the class III inventory by Western Land Services, Inc, or are areas having a high potential for buried cultural deposits (areas containing alluvial deposits along Barber Creek). Some portions of the monitoring areas as described may lie outside alluvial deposits and exact monitoring areas are left to the discretion of the archeological monitor. All monitored areas must be plotted on the map provided with the monitoring report. The submission of two copies of a monitoring report to BFO is required within 30 days of the completion of all monitoring work.

1. All surface disturbing activity along corridors in T50N R76W Sections 16 and 21, delineated on the cultural inventory map as "Areas of Low Visibility".
2. All surface disturbing activity along the Barber Creek water line delineated on the cultural inventory map as "Areas of Low Visibility and Dense Vegetation" as well as areas of alluvial deposits (T50N R77W Sections 9, 10, 11, 12, and 13; T50N R76W Sections 7, 17, and 18).

2.5. Programmatic mitigation measures identified in the PRB FEIS ROD

Programmatic mitigation measures are those, determined through analysis, which may be appropriate to apply at the time of APD approval if site specific conditions warrant. For a complete list of Programmatic COA's, see the PRB FEIS Record of Decision.

Wildlife:

1. For any surface-disturbing activities proposed in sagebrush shrublands, the Companies will conduct clearance surveys for sage grouse breeding activity during the sage grouse's breeding season before initiating the activities. The surveys must encompass all sagebrush shrublands within 0.5 mile of the proposed activities.
2. All stock tanks shall include a ramp to enable trapped small birds and mammals to escape. See Idaho BLM Technical Bulletin 89-4 entitled Wildlife Watering and Escape Ramps on Livestock Water Developments: Suggestions and Recommendations.
3. The Companies will locate facilities so that noise from the facilities at any nearby sage grouse or sharp-tailed grouse display grounds does not exceed 49 decibels (10 dBA above background noise) at the display ground.

Threatened, Endangered, or Sensitive Species

The companies will conduct clearance surveys for threatened, endangered or other special-concern species at the optimum time, as per the survey protocol described in the PRB FEIS. Inventory for special concern species, other than federally listed species below, is contingent upon landowner concurrence. This will require coordination with the BLM before November 1 annually to review the potential for disturbance and to agree on inventory parameters.

Black-footed Ferret

1. If any black-footed ferrets are located, the USFWS will be consulted. Absolutely no disturbance will be allowed within prairie dog colonies inhabited by black-footed ferrets.

Mountain Plover

1. Creation of hunting perches or nest sites for avian predators within 0.5 mile of identified nesting areas will be avoided by burying power lines, using the lowest possible structures for fences and other structures and by incorporating perch-inhibiting devices into their design.
2. When above ground markers are used on capped and abandoned wells, they will be identified with markers no taller than four feet with perch inhibiting devices on the top to avoid creation of raptor hunting perches within 0.5 mile of nesting areas.

Ute Ladies'-tresses Orchid

1. Moist soils near wetlands, streams, lakes, or springs in the project area will be promptly revegetated if construction activities impact the vegetation in these areas. Revegetation will be designed to avoid the establishment of noxious weeds.

2.5.1. Alternative D - Sage Grouse/Elk Emphasis

Alternative D represents a modification of Alternative C based on the application of mitigation measures designed to reduce impacts to sage-grouse and sage-grouse habitat, guided by seven years of sage-grouse research within the Powder River Basin and additional studies from across the species' range.

The BLM-BFO initiated coordination with the WGFD on the Carr Draw Federal POD IV on February 19, 2010. On March 15, 2010, the BLM received a letter by WGFD Deputy Director John Emmerich that included recommendations for mitigation. WGFD recommendations were considered during the analysis of the Carr Draw IV Federal POD proposal.

The southern end of the project area contains portions of the 2-mile buffers for the Laskie Draw, Laskie Draw East and Barber Creek/South Prong Leks. The vast majority of proposed well locations inside these lek buffers are within high quality nesting and brood rearing habitat. Sage brush stands and habitat to the north and west of the leks provide good rearing and wintering habitat for sage-grouse and recommended to be maintained in their current, contiguous state without further fragmentation.

The following 5 wells would be dropped under this alternative.

	Well Name	Well #	Qtr/Qtr	Sec.	TWP	RNG	Lease #
1	CARR DRAW IV CARU	14-21GW	SWSW	21	50N	76W	WYW147335
2	CARR DRAW IV CARU	13-28GW	NWSW	28	50N	76W	WYW149969
3	CARR DRAW IV CARU	24-28GW	SESW	28	50N	76W	WYW149969
4	CARR DRAW IV CARU	21-33GW	NENW	33	50N	76W	WYW147335
5	CARR DRAW IV CARU	12-33GW	SWNW	33	50N	76W	WYW147335

Alternative D represents BFO efforts to reduce project-specific impacts to elk security habitat, while maintaining proposed spacing and infrastructure requirements consistent with the purpose and need of the proposed action.

As mitigation to reduce the impacts of habitat loss and habitat fragmentation within the Carr Draw Federal IV POD: 8 wells at 8 locations (listed below), 2.2 miles water pipeline (Barber Cr. pipeline) and associated 6 miles of new oil and gas access roads with utility corridor would be dropped.

The following three additional wells would be dropped to reduce impacts to elk habitat.

	Well Name	Well #	Qtr/Qtr	Section	TWP	RNG	Lease #
1	CARR DRAW IV CARU	12-21GW	SWNW	21	0500N	0760W	WYW147335
2	CARR DRAW IV CARU	21-21GW	NENW	21	0500N	0760W	WYW137645
3	CARR DRAW IV CARU	23-21GW	NESW	21	0500N	0760W	WYW147335

2.6. Alternatives considered but not analyzed in detail

No additional alternatives were considered for this project.

2.7. Summary of Acres of Disturbance by Alternative

TOTAL ACRES DISTURBANCE				
Facility	Alternative A (No Action) Existing Number or Miles	Alternative B (Original Proposal) Proposed Number or Miles	Alternative C (Modified Proposed Action) Revised Number or Miles	Alternative D See Below Tables
Total CBNG Wells:	0	76	36	
Well Locations:	0	38	36	
Non-constructed	0	20 (2.00 acres)	11 (1.10acres)	
Constructed	0	18 (18.00acres)	14 (11.10acres)	
Slotted	0	0 (0.10acre ea.)	11 (1.10acres)	
Conventional Wells	0	0	0	
Gather/Metering Facilities	0 (acres)	0 (acres)	4 (0.02 acres)	
Compressors	0	0	0	
Ancillary (Staging/Storage Areas)	0	# Pending Onsite (0.00 acres)	5 (10.00 acres)	
Template/Spot Upgrade Roads	2.98 mi	13.27 mi	11.03 mi	
No Corridor	0.00 mi	0.00 mi	0.00 mi	
With Corridor	2.98 mi	13.27 mi	11.03mi	
Engineered Roads	0.00 mi	1.95 mi	2.31 mi	
No Corridor	0.00 mi	0.00 mi	0.00 mi	
With Corridor	0.00 mi	1.95 mi	2.31 mi	
Primitive Roads	1.57 mi	0.89 mi	2.29 mi	
No Corridor	0.70 mi	0.89 mi	0.00 mi	
With Corridor	0.87 mi	0.00 mi	2.29 mi	
Buried Utilities	2.62 mi	15.15 mi	17.62 mi	
No Corridor	2.62 mi	0.00 mi	1.72 mi	
With Corridor	0.00 mi	15.15 mi	15.90 mi	

Facility	Alternative A (No Action) Existing Number or Miles	Alternative B (Original Proposal) Proposed Number or Miles	Alternative C (Modified Proposed Action) Revised Number or Miles	Alternative D See Below Tables
Power Drops	2 (0.32 acres)	12 (1.68 acres)	4 (0.56 acres)	
Distribution Panels	0	0	5	
Buried Power	0.00 mi	0.00 mi	0.00 mi	
Buried electrical with Corridor	0.00 mi	15.15 mi	15.90 mi	
Buried electrical without Corridor	0.00 mi	0.00 mi	0.00 mi	
Proposed Overhead Power lines in long term	1.45 mi	0.00 mi	3.80 mi	
Pump Stations	1 (3.5 acres)	2 (7.28 acres)	1 (1.36 acres)	
Channel Disturbance: Culverts(as needed within permitted corridor) Low Water Crossings	4 (0.02a)	14 (0.07acres)	13 (0.06a)	
TOTAL ACRES DISTURBANCE	Approx. 46.40 acres	Approx. 130.91 acres	Approx. 132.95 acres	

Figures within alternatives B-C represent the proposed facilities and do not include the existing facilities from Alternative A.

Alternative D - Sage-Grouse Dropped Wells and Infrastructure

Well/Facility	Qtr/Qtr	Sec	TWP	RNG	Surface Disturbance (Acres)	Surface disturbance of access road & utility corridor (Acres)
14-21GW	SWSW	21	50N	76W	0.8	12
13-28GW	NWSW	28	50N	76W	0.5	0.8
24-28GW	SESW	28	50N	76W	0.1	4.0
21-33GW	NENW	33	50N	76W	1.0	0.5
12-33GW	SWNW	33	50N	76W	1.0	1.5
Staging Area	SESE	29	50N	76W	2.0	None
Power Distribution Point	SESE	29	50N	76W	0.14	None
Power Distribution Point	SWNW	28	50N	76W	0.14	None
Total Acreage					5.68	18.8

Alternative D - Elk Dropped Wells and Infrastructure

Well/Facility	Qtr/Qtr	Sec	TWP	RNG	Surface Disturbance (Acres)	Surface disturbance of access road & utility corridor (Acres)
12-21 GW	SWNW	21	50N	76W	0.7	6.2
21-21 GW	NENW	21	50N	76W	0.1	1.9
14-21GW	SWSW	21	50N	76W	0.8	12
23-21 GW	NESW	21	50N	76W	0.8	5.7
13-28GW	NWSW	28	50N	76W	0.5	0.8
24-28GW	SESW	28	50N	76W	0.1	4.0
21-33GW	NENW	33	50N	76W	1.0	0.5
12-33GW	SWNW	33	50N	76W	1.0	1.5
Barber Creek waterline	-	21,28	50N	76W	-	10.7
Staging Area	SESE	29	50N	76W	2.0	-
Power Distribution Point	SESE	29	50N	76W	0.14	-
Power Distribution Point	SWNW	28	50N	76W	0.14	-
Total Acreage					7.28	43.3

3. DESCRIPTION OF AFFECTED ENVIRONMENT

This section describes the environment that would be affected by implementation of the Alternatives described in Section 2. Aspects of the affected environment described in this section focus on the relevant major issues.

The following are not present in the project area and will not be further analyzed:

- Areas of Critical Environmental Concern (ACECs)
- Environmental Justice
- Prime or Unique Farmlands
- Hazardous or Solid Wastes
- Native American Religious Concerns
- Paleontology
- Recreation
- Traditional Cultural Properties
- Visual Resource Management
- Wild and Scenic Rivers
- Wilderness Values

Applications to drill were received on September 5, 2008. The pre-approval onsite was conducted on February 6, 11, 20, 2009 & March 5, 2009, by the following personnel:

DATE	NAME	AGENCY	TITLE
2/6,11,20/2009,3/5/2009,& 4/21/2009	Allen Aksamit	Western Land Services	Wildlife Biologist
2/6,11,20/2009,3/5/2009,& 4/21/2009	Patrick Barker	Western Land Services	Project Manager
2/6,11,20/2009	Chris Crow	MC2	PE
2/6,11,20/2009 & 3/5/2009	Duane Joslyn	Williams Production RMT CO	Construction Manager

DATE	NAME	AGENCY	TITLE
2/6,11/2009& 4/21/2009	Justin Clyde	Williams Production RMT CO	Construction Supervisor
2/6,11,20/2009	Randee Jespersen	Williams Production RMT CO	Landman
2/6,11,20/2009, & 4/21/2009	Dan King	Western Land Services	Operations
2/6,11/2009,& 4/21/2009	Mike Lindsley	Western Land Services	Operations
2/6,20/2009	Scott Mortens	Williams Production RMT CO	Operations
2/6,20/2009	Rex Lynde	Williams Production RMT CO	Drilling Supervisor
2/20/2009	Richard VanCampen	Williams Production RMT CO	Landman
2/6,20/2009	Kelsy Gonzales	Western Land Services	Natural Resource Specialists
2/11/2009	Steve Record	Landowner	
2/11/2009	Mike Record	Landowner	
2/6,11,20/2009 & 3/5/2009	Jenny Morton	BLM	Wildlife Biologist
3/5/2009	Casey Freise	BLM	NRS
2/6,11,20/2009,3/5/2 009,& 4/21/2009	Andy Perez	BLM	NRS
2/6/2009	Pat Cole	BLM	Wildlife Biologist
2/6,11/2009	Arnie Irwin	BLM	Soil Scientist
2/6,11/2009& 3/5/2009	Jerry Means	Magna	Dirt Work Contractor
2/6/2009	Ted Hamersma	BLM	Civil/Road Tech
2/11/2009	Tom Bills	BLM	NEPA Coordinator
2/11/2009	Brian Cox	BLM	Associate Field Manager
2/11/2009	Clint Crago	BLM	Archaeologist

3.1. Topographic Characteristics of Project Area

Williams Production RMT's Carr Draw Federal POD IV is located approximately 20 miles west of Gillette, Wyoming on Interstate 90 in west central Campbell County. The topography consists of rugged and moderately rugged terrain with ridges, deep draws, and rough breaks. The elevation within the project area ranges from approximately 4200 to 4621 feet above sea level. Livestock grazing has been the primary historic land use within the project area as well as oil development, existing fee developments, and ranching operations are the current land uses.

3.2. Vegetation & Soils

Species typical of short grass prairie comprise the project area flora. Four major vegetation and habitat types occur within the project area including Mixed-grass prairie, Sagebrush steppe, and Juniper woodland mixed with Ponderosa. Differences in dominant species within the project area vary with soil type, aspect and topography. The dominate species include Wyoming big sagebrush (*Artemisia tridentate* var. *wyomingensis*) and big sagebrush (*Artemisia tridentate*) mixed with various types of grasses as well as some rocky mountain juniper (*Juniperus scopulorum*). Ponderosa pine (*Pinus ponderosa*) and cedar also occur throughout the project area. Plains cottonwoods (*Populus deltoids*) are also evident in some of the draw bottoms.

3.2.1. Soils

Approximately 86 percent of the area within the boundary of the proposed action contains soils identified as having poor reclamation potential, and 31% of the area has slopes greater than 25%; as per FEIS-ROD, these areas are to be avoided due to difficult to impossible reclamation. Many of the soils and landforms of this area present distinct challenges for development, and /or eventual site reclamation. Overcoming the unfavorable soil/site properties or limitations requires special design, extra maintenance, and costly alteration.

Generally, soils in the project area differ with topographic location, slope and elevation, and topsoil depths to be salvaged for reclamation range from 0 to 4 inches on ridges and miscellaneous areas such as “badlands” to 8+ inches in bottomland. Erosion potential in the project area varies from moderate to severe depending on the soil type, vegetative cover and slope, but is severe for most of 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.

Soils within the project area were identified from the *South Campbell County Survey Area, Wyoming (WY605)*. The soil survey was performed by the Natural Resource Conservation Service according to National Cooperative Soil Survey standards. Soil management objectives are to ensure that adequate soil protection is consistent with the resource capabilities.

The map unit symbols within this project area were filtered and map units representing 6.0% or greater in extent within the pod boundary are displayed. Dominate soil map units are listed in Table 3.2 with their individual acreage and percentage of the area within the POD boundary.

Table 3.1 Dominate soils affected by the proposed action include:

Map unit	Map Unit Name	Acres	Percent
204	SAMDAY-SAMDAY, COOL-SHINGLE CLAY LOAMS, 6 TO 40 PERCENT SLOPES	1183.3	31%
206	SAMDAY-SHINGLE-BADLAND COMPLEX, 10 TO 45 PERCENT SLOPES	894.0	23%
233	USTIC TORRIORTHENTS, GULLIED	728.7	19%
217	THEEDLE-SHINGLE LOAMS, 3 TO 30 PERCENT SLOPES	507.8	13%
147	FORKWOOD-CUSHMAN LOAMS, 6 TO 15 PERCENT SLOPES	229.2	6%

For more detailed soil information, see the NRCS Soil Survey 605 – South Campbell County. Additional site specific soil information is included in the Ecological Site interpretations.

3.2.2. Vegetation

Ecological Site Descriptions are used to 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 action, BLM specialists analyzed data from onsite field reconnaissance and Natural Resources Conservation Service published soil survey soils information.

The map unit symbols for the soils identified above and the associated ecological sites for the identified soil map unit symbols found within the POD boundary are listed in the table below.

Table 3.2 Map Units and Ecological Sites

Map Unit Symbol	Ecological Site
204	SHALLOW CLAYEY (10-14 NP)

Map Unit Symbol	Ecological Site
206	SHALLOW CLAYEY (10-14 NP)
233	BADLANDS AREA
217	LOAMY (10-14 NP)
147	LOAMY (10-14 NP)

Dominate Ecological Sites and Plant Communities identified in this POD and its infrastructure are Shallow Clayey, Badlands and Loamy sites.

Shallow Clayey Sites 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. These soils have moderate to 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 major component of this Mixed Sagebrush/Grass plant community. Big sagebrush is a large component of this plant community. Cool-season grasses make up the majority of the understory with the balance made up of short warm-season grasses, annual cool-season grass, and miscellaneous forbs. Dominant grasses include rhizomatous wheatgrasses, and green needlegrass. Other grasses include blue grama, prairie junegrass, and Sandberg bluegrass. Forbs, commonly found in this plant community, include Louisiana sagewort (cudweed), plains wallflower, hairy goldaster, slimflower scurfpea, and scarlet globemallow. Fringed sagewort is commonly found. Plains pricklypear and winterfat can also occur. Cheatgrass has invaded the site.

“*Miscellaneous Areas*”, *Badlands* sites occurs on steep slopes and ridge tops, but may occur on all slopes which include landforms such as hillsides, ridges and escarpments. Badland have essentially no soil and support little or no vegetation. Steep or very steep, commonly nonstony, barren land dissected by many intermittent drainage channels. Badland is most common in semiarid and arid regions where streams are entrenched in soft geologic material. Local relief generally ranges from 25 to 500 feet. Runoff potential is very high, and geologic erosion is active. The proposed action was designed to avoid these highly erosive areas which have a low potential for successful reclamation. Other areas identified as having a low reclamation potential were identified at the onsite and avoided in the permitting process.

Loamy Sites occur on gently undulating to rolling land on landforms which include hill sides, alluvial fans, ridges and stream terraces, in the 10-14 inch precipitation zone. These soils are moderately deep to very deep (greater than 20" 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 major 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 needle and thread, 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. Cheatgrass has invaded the state. Other vegetative species identified at onsite include pricklypear and fringed sagewort.

A summary of the ecological sites within the project area are listed in the table below along with the individual acreage and the percentage of the total area identified within the POD boundary.

Table 3.3 Summary of Ecological Sites

Ecological Site	Acres	Percent
SHALLOW CLAYEY (10-14 NP)	2077.3	54%
LOAMY(10-14 NP)	969.4	25%
Badlands	728.7	19%
LOWLAND (10-14 NP)	74.5	2%
SANDY (10-14 NP)	12.9	0%

3.2.3. Invasive Species

State-listed noxious weeds and invasive/exotic plant infestations were discovered by a search of inventory maps and/or databases or during subsequent field investigation by the proposed project proponent and the BLM.

Specific species of concern include:

- Canada thistle, which was found and identified in channel bottoms throughout the entire POD.
- Scotch thistle, which was identified and found near existing roads and oil infrastructure throughout the POD.
- Leafy spurge was found and identified within the channel bottom in SENW section 21.
- Cheat grass has invaded the state of Wyoming, and has been identified occurring throughout the project area.

The operator has developed an Integrated Weed and Pest Management Plan.

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

3.3. Wildlife

Several resources were consulted to identify wildlife species that may occur in the proposed project area. Resources that were consulted include the wildlife database compiled and managed by the BLM Buffalo Field Office (BFO) wildlife biologists, the PRB FEIS, the Wyoming Game and Fish Department (WGFD) big game and sage-grouse maps, and the Wyoming Natural Diversity Database (WYNDD).

A habitat assessment and wildlife inventory surveys were performed by Western Land Services (WLS) (2008, 2009). WLS performed surveys for big game, mountain plover, sharp-tailed grouse, greater sage-grouse, raptor nests, and prairie dog colonies according to Powder River Basin Interagency Working Group (PRBIWG) accepted protocol in 2008 and 2009. Surveys were conducted for Ute ladies'-tresses orchid. No formal surveys were conducted for Blowout penstemon. PRBIWG accepted protocol is available on the CBM Clearinghouse website (www.cbmclearinghouse.info).

A BLM biologist conducted field visits specific to this project on February 5, 6, 11, 20, and March 5, 2009. During this time, the biologist reviewed the wildlife survey information for accuracy, evaluated impacts to wildlife resources, and provided project modification recommendations where wildlife issues arose. Other field visits to assess the habitat were made on May 12 & 19, 2009 and again on January 15, 2010.

Wildlife species common to the habitat types present are identified in the PRB FEIS (pg. 3-114). Species that have been identified in the project area or that have been noted as being of special importance are described below.

3.3.1. Big Game

Big game species expected to be within the Carr Draw Federal POD IV project area include pronghorn

antelope, mule deer, and elk. The WGFD has determined that the project area contains a small portion of winter yearlong range for pronghorn antelope, yearlong and winter yearlong range for mule deer, and yearlong and parturition range for elk.

Winter-Yearlong use is when a population or a portion of a population of animals makes general use of the documented suitable habitat sites within this range on a year-round basis. During the winter months there is an influx of additional animals into the area from other seasonal ranges. 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. Parturition Areas are documented birthing areas commonly used by females. It includes calving areas, fawning areas, and lambing grounds. These areas may be used as nurseries by some big game species.

Populations of pronghorn antelope, mule deer, and elk within their respective hunt areas are above WGFD objectives. Big game range maps are available in the PRB FEIS (3-119-143), the project file, and from the WGFD. The affected environment for pronghorn is discussed in the PRB FEIS on pp. 3-117 to 3-122 and for mule deer on pp. 3-127 to 3-132.

3.3.1.1. Elk

The affected environment for the Fortification Creek elk herd is discussed in the PRB FEIS (pg. 3-132 to 3-140). The PRB FEIS considered cumulative impacts to elk within the Buffalo Field Office, but did not address the isolated Fortification Creek elk herd with CBNG development forecasted throughout and completely surrounding the herd’s seasonal ranges.

For the purposes of this analysis, the BLM selected three factors and corresponding metrics to evaluate cumulative effects upon elk. These factors (and metrics) are (1) habitat condition and availability (security habitat and connectivity), (2) pattern of elk use (collaring data), and (3) population objectives (number of elk).

3.3.1.1.1. Elk Habitat and Availability

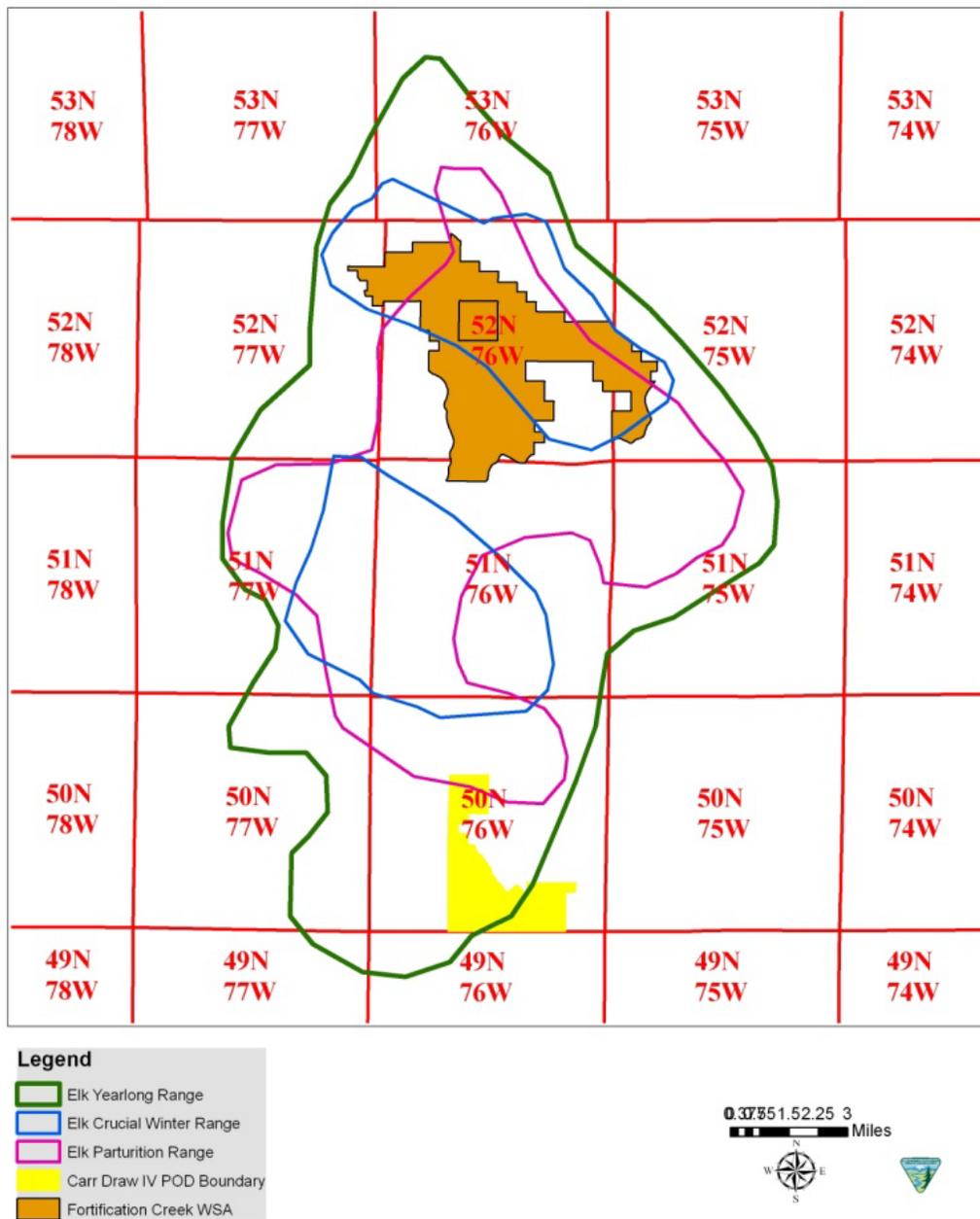
In 1992, a 2.5 year study of the Fortification elk herd was initiated by the WGFD in cooperation with the Bureau of Land Management and area landowners, with the collaring of 17 cow elk. Data from this study allowed the Wyoming Game and Fish Department to better delineate crucial elk winter range, elk summer/yearlong range and elk parturition range (BLM 2006).

The WGFD defined two types of important elk habitats that are located within the yearlong range and crucial range which includes the identified crucial winter range (CWR) and parturition range (PR) within the greater Fortification Creek area. Both provide important seasonal habitat functions during sensitive periods for elk (Table 3.4). It is important to note that these crucial ranges overlap each other on the landscape and these areas are commonly referred to as “dual crucial” range.

Table 3.4 Fortification Creek Elk Ranges

Range	Size (Acres)
Yearlong	122,930
Crucial Winter	38,233 (31% of Yearlong Range)
Parturition	59,291 (48% of Yearlong Range)
“Dual Crucial”	25,770 (21% of Yearlong Range)

Figure 3.1 Affected Environment - Fortification Creek Elk Ranges



3.3.1.1.1. Habitat Effectiveness

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

WGFD 2009 Strategic Habitat Plan defines elk security habitat areas as any areas that, because of geography, topography, vegetation, or a combination of these features, will hold elk during periods of stress, especially during hunting season. Security habitat is typically further defined as nonlinear blocks of hiding cover greater than a minimum size (250 acres for elk) and a specific distance from disturbance sources (½ mile from any open road). An individual parcel of security habitat is referred to as a security

patch. Effective habitat is the same as security habitat with the exception that it is less the 250 contiguous acres. Effective habitat provides connectivity between security patches.

Wyoming Game & Fish Dept. submitted a letter to BLM-BFO dated December 29, 2009 as a public comment on a modification to the Augusta Unit Zeta Environmental Assessment (WY-070-08-154), Fortification Elk Cumulative Impact Assessment. Statements from the letter are as follows:

“Relocation data retrieved from radio-collared elk from the ongoing Fortification Elk study confirm the importance of the crucial winter range and parturition ranges during those seasons. Furthermore, the relocation data shows that elk select the “security habitat” within those season al birthing time periods were within the delineated seasonal ranges. During the parturition season more than 70% and during the winter more that 80% of those relocations were found to be within the security habitat contained in the seasonal habitats. Although the 2010 winter season has just begun, relocations are again showing frequent use of both seasonal ranges and security habitat with the crucial winter range.

CBNG development that has taken place in the southern portion of the Fortification Elk Herd Unit has reduced the amount of available security habitat has resulted in “high” or “extreme” impacts based on number of well sites, to parts of delineated crucial ranges. Taking into consideration the current level of impacts to the southern portion of the herd unit, we recommend that BLM make additional efforts to reduce negative impacts to elk habitats as development proceeds. We believe it is appropriate to employ an approach that gives the greatest consideration to areas that as within both crucial winter and parturition seasonal ranges and also overlap with identified security habitat. We recommend that within these “dual crucial” overlap areas the BLM strive to retain all identified remaining security habitat. For security habitats which overlap with only one delineated crucial range (winter or Parturition) we recommend the BLM strive to retain 75% of the remaining security habitat. Finally, within the yearlong range, we recommend the BLM strive to retain at least 50% of the remaining security habitat. When planning for development that could impact security habitat, we recommend using the elk relocation data to further identify portions of security habitat that receive heavy versus light use by elk and focus on retaining the functionality of heavy use areas.

We want to reiterate the importance of maintaining habitat function in crucial seasonal ranges. Under extreme impacts of more than 4 well sites per square mile habitat function is substantially impaired of lost. We recommend the BLM take a thorough look at managing the number of operating well sites to avoid an extreme impact scenario in crucial ranges and particularly dual crucial ranges. To reduce disturbance of elk, visits to well sites should be restricted at night, dawn and dusk (e.g. allow only daylight visits except in the case of emergency situations and repair. We also want to emphasize the need to not only require but monitor the success of reclamation to assume it occurs in a timely manner. Recognizing that efforts to stabilize and successfully reclaim slopes of greater that 25% are problematic. We reiterate our position that development on steep slopes should be avoided.” (John Emmerich, WGFD Deputy Director, to Duane Spencer, BFO Field Manager, 2009).

Table 3.5 Elk Habitats within the Carr Draw Federal IV POD

Range/Habitat	Size (Acres)	Percent Area of the Carr Draw Federal IV POD
Yearlong	2,788	71.5%
Parturition	210	5.4%
Security Habitat	777	19.9%

3.3.1.1.2. Pattern of Habitat Use

In April 2005, 26 elk (5 yearling bulls and 21 adult cows) were captured and fitted with VHF radio collars and one cow elk was fitted with a GPS collar in February 2005. Radio-telemetry (VHS) and GPS

collaring data collected by BLM and WGFD since 2005 have shown that the Fortification elk tend to avoid oil and gas development by moving to less developed areas. Disruptive activity is usually temporary in nature, however, and some studies have shown that elk returned to the area of disturbance once the source of disturbance and human presence was gone (Gussey 1986, WGFD 2000), albeit at 50% or less of the previous levels in forested environments (Hayden-Wing Associates 1990).

Sawyer (2005) observed similar response of elk within the more open terrain of the Jack Morrow Hills of Wyoming. The literature consistently shows a correlation between elk avoidance response and the level of human activity associated with roads including those servicing oil and gas development.

Studies of radio telemetered elk from the Fortification Creek herd in the early 1990's showed some elk ranging out of the Fortification Creek elk herd unit as far north as Montana. More recent studies of radio telemetered elk (26 of a herd roughly 230) from the Fortification Creek herd have shown that some animals (between 15-20% of the collared animals) have been at least seasonally observed east of Wild Horse Creek and the Fortification Creek area, on the west side of the Powder River, south along the Kinney Divide, and occasionally as far north as Sonnette, Montana, although the Fortification Creek Planning Area itself remains the core use area for the vast majority of this herd (Laird 2005). Some elk from this population have moved out of the Fortification Creek herd unit and pioneered new, small, local populations in surrounding areas in recent years, although these bands are currently not officially recognized as "herds" by the Wyoming Game and Fish Department. The long distance range use extensions to Montana in the north are probably reflective of relative habitat continuity along the Powder River Breaks. All of these observations support the fact that elk are a wide ranging species, and will naturally move around to some degree from their core habitat at least seasonally, and in some instances, on a permanent basis (BLM 2006).

Efforts to monitor the movement patterns of the Fortification Creek elk have continued with 38 VHS/GPS collars being deployed in March 2008 and 17 additional collars were deployed in December 2008 for a total of 55 VHS/GPS collared elk. The collars transmit a VHS signal that can be manually tracked with a VHS receiver or they can be tracked via satellite by the GPS receiver. The VHS/GPS collars are susceptible to moisture resulting in the loss of GPS function for 30 of the collars as of March 2010.

Each VHS/GPS collar represents at least 2 elk (cow with calf at side) as blood drawn from each collared elk tested positive for pregnancy.

Data collected in 2008-2010 have shown similar trends as observed in previous studies with 6 of 55 VHS/GPS collared elk from the Fortification Creek herd being relocated outside of the herd unit for periods of exceeding 5 months (See Table 3.6). Three of these elk left the herd unit by May 2008. Return has been confirmed; two of these elk have returned to the herd while the one of the three collars failed and the current location of this animal is unknown. Two other collared elk left the herd in April 2009. They have not returned to the herd as of March 1, 2010 and have been relocated north of Fortification Creek elk herd unit, the near the Montana border.

Table 3.6 Fortification Creek Elk with GPS Collars

	Elk GPS/VHS Collar #	Date Deployed	Status	Movement patterns Observed
1	216228	3/26/2008	Failed 9/12/09	Within the Fortification Cr. Herd
2	315311	3/26/2008	Active	Within the Fortification Cr. Herd
3	315495	3/26/2008	Failed 8/13/08	Within the Fortification Cr. Herd
4	317530	3/26/2008	Failed 12/6/2008	Within the Fortification Cr. Herd

	Elk GPS/VHS Collar #	Date Deployed	Status	Movement patterns Observed
5	319130	3/26/2008	Active	Within the Fortification Cr. Herd
6	319176	3/26/2008	Active	Within the Fortification Cr. Herd
7	323407	3/26/2008	Active	Within the Fortification Cr. Herd
8	323491	3/26/2008	Failed 6/11/2008	Within the Fortification Cr. Herd
9	324155	3/26/2008	Failed 6/4/2008	Within the Fortification Cr. Herd
10	324395	3/26/2008	Active	Within the Fortification Cr. Herd
11	326171	3/26/2008	Active	Within the Fortification Cr. Herd
12	335184	3/26/2008	Failed 9/14/2009	Within the Fortification Cr. Herd
13	335286	3/26/2008	Failed 5/24/2009	Within the Fortification Cr. Herd
14	335291	3/26/2008	Failed 6/6/2008	Within the Fortification Cr. Herd
15	335293	3/26/2008	Active	Within the Fortification Cr. Herd
16	335296	3/26/2008	Active	Within the Fortification Cr. Herd
17	335300	3/26/2008	Failed 4/19/2008	Within the Fortification Cr. Herd
18	335327	3/26/2008	Failed 5/23/2008	Within the Fortification Cr. Herd
19	335328	3/26/2008	Active	Within the Fortification Cr. Herd
20	335342	3/26/2008	Failed 6/14/2008	Within the Fortification Cr. Herd
21	335346	3/26/2008	Failed 5/23/2008	Within the Fortification Cr. Herd
22	335353	3/26/2008	Failed 5/23/2008	Within the Fortification Cr. Herd
23	335355	3/26/2008	Active	Within the Fortification Cr. Herd
24	335358	3/26/2008	Active	Within the Fortification Cr. Herd
25	335359	3/26/2008	Failed 4/22/2009	Within the Fortification Cr. Herd
26	335360	3/26/2008	Failed 1/4/2009	Left the Herd Unit 4/25/08-6/1/09
27	335367	3/26/2008	Failed 6/10/2008	Within the Fortification Cr. Herd
28	335398	3/26/2008	Failed 5/30/2008	Within the Fortification Cr. Herd
29	335401	3/26/2008	Failed 5/10/2009	Within the Fortification Cr. Herd
30	335663	3/26/2008	Failed 5/18/2008	Within the Fortification Cr. Herd
31	335664	3/26/2008	Failed 5/4/2008	Within the Fortification Cr. Herd
32	335666	3/26/2008	Failed 7/7/2009	Within the Fortification Cr. Herd
33	335672	3/26/2008	Failed 5/2/2009	Within the Fortification Cr. Herd
34	335673	3/26/2008	Failed 4/29/2009	Within the Fortification Cr. Herd
35	335698	3/26/2008	Failed 2/28/2010	Within the Fortification Cr. Herd
36	335714	3/26/2008	Active	Within the Fortification Cr. Herd
37	335399	3/27/2008	Failed 5/7/2009	Within the Fortification Cr. Herd
38	330469	12/6/2008	Active	Within the Fortification Cr. Herd
39	330485	12/6/2008	Active	Within the Fortification Cr. Herd
40	330510	12/6/2008	Active	Left the Herd Unit 12/12/2008-10/30/09
41	330523	12/6/2008	Active;	Left the Herd Unit 7/22/09; Last located NE of the Herd Unit

	Elk GPS/VHS Collar #	Date Deployed	Status	Movement patterns Observed
42	330978	12/6/2008	Active	Within the Fortification Cr. Herd
43	330988	12/6/2008	Failed 9/8/2009	Left the Herd Unit 5/24/09; Last located south of the Herd Unit
44	331020	12/6/2008	Failed 3/5/2009	Within the Fortification Cr. Herd
45	332416	12/6/2008	Active	Within the Fortification Cr. Herd
46	332435	12/6/2008	Active	Within the Fortification Cr. Herd
47	350470	12/6/2008	Active	Within the Fortification Cr. Herd
48	350472	12/6/2008	Active	Within the Fortification Cr. Herd
49	356905	12/6/2008	Active	Within the Fortification Cr. Herd
50	330488	12/7/2008	Failed 7/4/2009	Within the Fortification Cr. Herd
51	330465	12/7/2008	Active	Within the Fortification Cr. Herd
52	330479	12/7/2008	Failed 1/7/2010	Left the Herd Unit 4/15/2009- 7/22/09
53	330524	12/7/2008	Active	Within the Fortification Cr. Herd
54	332422	12/7/2008	Active	Left the Herd Unit 4/29/09; Last located NE of the Herd Unit near the MT border
55	330973	12/8/2008	Failed 2/13/2010	Within the Fortification Cr. Herd

Data from 15 GPS collars recorded 928 elk observations within the Carr Draw Federal POD IV project area over an 18 month window from March 2008 to August 2009. Eight of these collars were deployed during the collaring operation conducted March 2008 and the other seven collars were deployed December 2008.

Data points from 15 of the 55 collared elk cows are located within the project area. Though the data points indicate usage of the project area year-round, intensity increases within the northern portion of the (north half section 16; T50N, R76W) of the project area, inside WGF D designated parturition range, throughout the spring months (April through June), indicating a likely reliance on this area for calving. Approximately 210 acres (5.4%) of the 3,897 acre project area falls within the Parturition range. The data points from the 15 collared elk located within the project area represents (1,686) 1.9% of all data points collected from all 38 of the collared elk (89,119) as of February 1, 2010. Table 3.7 indicates the percentage of data points collected inside the project area in relation to all data points collected from each of the individual 15 elk that have spent some time within the project area boundaries.

Table 3.7 Percent data points collected from inside the project area.

	Elk collar number	Percent data points from inside project area
1	315311	16.4%
2	319130	<1%
3	319176	1.8%
4	323407	1.9%
5	324395	7.1%
6	326171	1.7%
7	330448 (failed 7/4/2009)	12.6%

	Elk collar number	Percent data points from inside project area
8	330465	10.0%
9	330485	2.3%
10	330988	8.5%
11	331020 (failed 3/5/2008)	<1%
12	332416	2.9%
13	335367 (failed 6/10/2008)	4.6%
14	335399 (failed 5/7/2009)	<1%
15	350470	20.3%

3.3.1.1.3. Population

The WGFD 2008 job Completion Report indicates that the 2008 post-season population estimate for the Fortification Creek elk herd is 219, down from 272 in 2002. The current WYGF objective for the herd is 150 (BLM 2006).

The elk population occupying the Fortification Creek area is both locally and regionally important (Jahnke, 2006). As measured by hunting use, elk hunts in this area are destination hunts and this area is a highly sought after elk hunting area with relatively few licenses issued annually, although access is largely limited by the land ownership pattern. The effect of CBNG development on elk in the Fortification Creek area has a high public interest as gauged by the response to recent Resource Management Plan amendment scoping sessions (BLM, 2006).

Prairie elk herds, such as the Fortification Creek herd, while not uncommon, are somewhat unique in the sense that this type of non-mountainous range does not provide a great deal of security for the animals, and these populations are generally quite vulnerable to disturbance. There are other prairie elk herds in this region (e.g., Tisdale Mtn. portion of the Powder River herd, Pine Ridge herd, Rochelle Hills herd, Custer N.F. herd across the Montana border, etc.), but wherever these prairie elk herds are found they are usually locally prized and often protected by the local and regional residents (BLM, 2006).

3.3.2. Aquatics

The project area is drained by ephemeral tributaries of Barber Creek, an intermittent stream of the Powder River. Fish that have been identified in the Powder River watershed are listed in the PRB FEIS (3-156-159).

Aquatic invertebrate communities, which can be indicators of the quality of aquatic environments (Peterson 1990), are discussed in the PRB FEIS (pp. 3-153 to 3-154). Perennial streams within northeastern Wyoming were sampled by 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 3.8 lists the fish that occur in the Upper Powder River subbasin and their WGFD Native Species Status (NSS) designation, if applicable. WGFD has identified Species of Greatest Conservation Need (SGCN) within the state, all of which are given NSS designations. Seven of the species that may occur in the Upper Powder River subbasin 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 Endangered Species Act (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 are also stable. There is no special concern for these species.

The Powder River Basin ecosystem and fishery is discussed in further detail in the PRB FEIS (pp. 3-155 to 3-166). The sturgeon chub is considered a Wyoming BLM sensitive species, according to Wyoming BLM Sensitive Species Policy, and will be discussed in more detail later in this document.

Table 3.8 Fish that occur in the Upper Powder River Subbasin

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

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).

3.3.3. Migratory Birds

Migratory birds are those that migrate for the purpose of breeding and foraging at some point in the year. According to Instruction Memorandum No. 2008-050, BLM must include migratory birds in every NEPA analysis of actions that have the potential to affect migratory bird species of concern in order to fulfill its obligations under the Migratory Bird Treaty Act.

The WGFD Wyoming Bird Conservation Plan (Nicholoff 2003) identified three groups of high-priority bird species in Wyoming: Level I – those that clearly need conservation action, Level II – species where the focus should be on monitoring, rather than active conservation, and Level III – species that are not otherwise of high priority but are of local interest. Vegetation types that occur in the project area include shortgrass prairie and shrub-steppe. Many species that are of high management concern use these areas for their primary breeding habitats (Saab and Rich 1997). Nationally, grassland and shrubland birds have declined more consistently in the last 30 years than any other ecological association of birds (WY 2009).

Species that may occur in these vegetation types, according to the Wyoming Bird Conservation Plan, are listed in Table 3.9 and are grouped by Level as identified in the Plan.

Table 3.9 High Priority Bird Species

Level	Species	Wyoming BLM Sensitive
Level I	Brewer's sparrow	Yes
	Ferruginous hawk	Yes
	Greater sage-grouse	Yes
	Long-billed curlew	Yes
	McCown's longspur	No
	Mountain plover	Yes
	Sage sparrow	Yes
	Short-eared owl	No
	Upland sandpiper	No
	Western burrowing owl	Yes
Level II	Black-chinned hummingbird	No
	Bobolink	No
	Chestnut-collared longspur	No
	Dickcissel	No
	Grasshopper sparrow	No
	Lark bunting	No
	Lark sparrow	No
	Loggerhead shrike	Yes
	Sage thrasher	Yes
	Vesper sparrow	No
Level III	Common poorwill	No
	Say's phoebe	No

The affected environment for migratory birds is discussed in the PRB FEIS (pp. 3-150 to 3-153). This discussion includes a list of habitat requirements and foraging patterns for the species listed above, with the exception of upland sandpipers, common poorwills, and Say's phoebes, which are discussed here. Upland sandpipers prefer Great Plains grasslands, dryland grass pastures, hayfields, and alfalfa fields.

They nest in grass-lined depressions in the ground and feed on insects and seeds on the ground where grasses are low and open. Common poorwills inhabit sparse, rocky sagebrush; open prairies; mountain-foothills shrublands; juniper woodlands; brushy, rocky canyons; and ponderosa pine woodlands. They prefer clearings, such as grassy meadows, riparian zones, and forest edges for foraging. They lay eggs directly on gravelly ground, flat rock, or litter of woodland floor. Nests are often placed near logs, rocks, shrubs, or grass for some shade. They feed exclusively on insects, catching them by leaping from the ground or a perch, or picking them up from the ground. Say's phoebes inhabit arid, open country with sparse vegetation, including shrub-steppe, grasslands, shrublands, and juniper woodlands. They nest on a variety of substrates such as cliff ledges, banks, bridges, eaves, and road culverts and often reuse nests in successive years. They eat mostly insects and berries.

3.3.4. Raptors

The affected environment for raptors is discussed in the PRB FEIS on pp. 3-141 to 3-148. Four raptor species are known to have used nests within 0.5 miles of the project area: golden eagles, red-tailed hawks, great-horned owls, and American kestrels.

The affected environment for golden eagles is discussed in the PRB FEIS on pp. 3-145 to 3-146. Golden eagles are listed as a Bird of Conservation Concern (BCC) by USFWS for Region 17, which encompasses 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 prevent or remove the need

for additional ESA bird listings by implementing proactive management and conservation actions. Golden eagles were also identified as a Level III species in the Wyoming Bird Conservation Plan. Golden eagles are sensitive to extensive human activity around nest sites and are threatened by loss of nesting habitat to industrial development, powerline executions, and other factors (Nicholoff 2003). The WGF D Wyoming Bird Conservation Plan habitat objectives for golden eagles include maintaining open country to provide habitat for small mammals as a food source. Recommendations for management include restricting human activities near nests during peak breeding season; protecting, enhancing, and restoring prey populations; and protecting known nesting territories. The affected environment for red-tailed hawks, great-horned owls, and American kestrels are discussed in the PRB FEIS (pp. 3-146 to 3-148).

Thirty raptor nest sites were identified by WLS (WLS 2008, 2009) and BLM within 0.5 mile of the project boundary and the proposed Barber Creek water pipeline. These are listed in the table below. Of the nests listed, two were active in 2009. One nest (5544) was active with red-tailed hawks in 2008 and 2009.

Nest 2352 was active with great horned owls in 2009. This nest has been active with great horned owls since its discovery in 2004. Nest 2349 was active with golden eagles in 2004, was inactive for the following three years, inhabited by red-tailed hawks in 2008, and inactive again in 2009. American kestrels occupied a tree cavity at the location for nest 2350 in 2004 and have not returned to this location since that time. Several nests (2348, 3716, 3721, 3732, 4585, 5197, 6162, 6167, 6342, 6344, 6345, 6346, 6347, and 6348) have never been actively attended by any raptor species. Three nests, newly discovered in 2009, were documented as inactive.

Table 3.10 Documented raptor nests within the Carr Draw Federal IV project area.

BLM ID	UTMS	LEGAL	SUBSTRATE	YEAR	CONDITION	STATUS	SPECIES
637	421490E 4904301N	S22 T50N R76W	Cottonwood, live	2009	Gone	Inactive	n/a
				2008	Unknown	Active	Black-billed magpie
2348	411058E 4908312N	S10 T50N R77W	Cottonwood, live	2009	Good	Inactive	n/a
				2008	Good	Inactive	n/a
				2006	Good	Inactive	n/a
				2005	Fair	Inactive	n/a
				2004	Good	Inactive	n/a
2349	413708E 4908015N	S11 T50N R77W	Cottonwood, live	2009	Good	Inactive	n/a
				2008	Good	Active	Red-tailed hawk
				2007	Good	Inactive	n/a
				2006	Good	Inactive	n/a
				2005	Good	Inactive	n/a
				2004	Good	Active	Golden eagle

BLM ID	UTMS	LEGAL	SUBSTRATE	YEAR	CONDITION	STATUS	SPECIES
2350	413737E 4907551N	S11 T50N R77W	Cottonwood, live	2009	Good	Inactive	n/a
				2008	Unknown	UNK	n/a
				2007	Gone	Inactive	n/a
				2006	Unknown	Inactive	n/a
				2005	Unknown	Inactive	n/a
				2004	Good	Active	American kestrel
2352	414763E 4907619N	S12 T50N R77W	Creek bank	2009	Excellent	Active	Great horned owl
				2008	Good	Active	Great horned owl
				2007	Good	Active	Great horned owl
				2006	Good	Active	Great horned owl
				2005	Good	Active	Great horned owl
				2004	Good	Active	Great horned owl
3715	421725E 4904359N	S22 T50N R76W	Creek bank	2009	Good	Inactive	n/a
				2008	Excellent	Inactive	n/a
				2007	Excellent	Inactive	n/a
				2006	Gone	Inactive	n/a
				2005	Excellent	Active	Great horned owl
				2004	Gone	Inactive	n/a
3716	421544E 4904327N	S22 T50N R76W	Cottonwood, live	2009	Good	Inactive	n/a
				2008	Good	Inactive	n/a
				2007	Good	Inactive	n/a
				2006	Unknown	Inactive	n/a
				2005	Good	Inactive	n/a
				2004	Gone	Inactive	n/a

BLM ID	UTMS	LEGAL	SUBSTRATE	YEAR	CONDITION	STATUS	SPECIES
3721	420733E 4902188N	S34 T50N R76W	Cottonwood, live	2009	Fair	Inactive	n/a
				2008	Gone	Inactive	n/a
				2006	Gone	Inactive	n/a
				2005	Fair	Inactive	n/a
				2004	Gone	Inactive	n/a
3726	420856E 4902414N	S34 T50N R76W	Ponderosa	2009	Good	Inactive	n/a
				2007	Excellent	Inactive	n/a
				2006	Unknown	Active	Red-tailed hawk
				2005	Excellent	Active	Red-tailed hawk
				2004	Gone	Inactive	n/a
3732	419624E 4904960N	S21 T50N R76W	Ponderosa	2009	Fair	Inactive	n/a
				2008	Good	Inactive	n/a
				2007	Unknown	Inactive	n/a
				2006	Gone	Inactive	n/a
				2005	Fair	Inactive	n/a
				2004	Gone	Inactive	n/a
4125	420693E 4905169N	S22 T50N R76W	UNK	2009	Fair	Inactive	n/a
				2008	Good	Active	Red-tailed hawk
				2007	Fair	Inactive	n/a
				2006	Gone	Inactive	n/a
4585	421417E 4903169N	S27 T50N R76W	Ponderosa	2009	Fair	Inactive	n/a
				2008	Unknown	Inactive	n/a
				2007	Fair	Inactive	n/a
5093	410176E 4908258N	S9 T50N R77W	Creek bank	2009	Good	Inactive	n/a
				2008	Good	Inactive	n/a
				2007	Good	Active	Red-tailed hawk
				2006	Good	Active	Red-tailed hawk

BLM ID	UTMS	LEGAL	SUBSTRATE	YEAR	CONDITION	STATUS	SPECIES
5165	415846E 4899892N	S6 T49N R76W	Ponderosa	2009	Good	Inactive	n/a
				2008	Good	Inactive	n/a
				2007	Good	Active	Red-tailed hawk
5166	415745E 4899772N	S6 T49N R76W	Ponderosa	2009	Excellent	Inactive	n/a
				2009	Good	Inactive	n/a
				2008	Good	Inactive	n/a
				2007	Good	Active	American kestrel
5197	416050E 4907218N	S18 T50N R76W	Cottonwood, live	2009	Good	Inactive	n/a
				2008	Good	UNK	n/a
				2007	Good	Inactive	n/a
5198	411647E 4908157N	S10 T50N R77W	Cottonwood, live	2009	Good	Inactive	n/a
				2008	Good	Active	Red-tailed hawk
				2007	Good	Active, failed	Red-tailed hawk
5544	419870E 4901280N	S33 T50N R76W	Cottonwood, live	2009	Good	Active	Red-tailed hawk
				2008	Unknown	UNK	n/a
				2008	Good	Active	Red-tailed hawk
5848	418117E 4907042N	S17 T50N R76W	Cottonwood, live	2009	Good	Inactive	n/a
				2008	Good	Active	Red-tailed hawk
6100	417214E 4901996N	S31 T50N R76W	Cottonwood, live	2009	Good	Inactive	n/a
				2008	Good	Active	Red-tailed hawk
6107	415943E 4907514N	S7 T50N R76W	Creek bank	2009	Good	Inactive	n/a
				2008	Good	Active	American kestrel
6108	416048E 4907530N	S7 T50N R76W	Creek bank	2009	Good	Inactive	n/a
				2008	Good	Active	Red-tailed hawk
6162	418031E 4903022N	S29 T50N R76W	Ponderosa	2009	Good	Inactive	n/a
				2007	Good	Inactive	n/a

BLM ID	UTMS	LEGAL	SUBSTRATE	YEAR	CONDITION	STATUS	SPECIES
6166	417959E 4902504N	S29 T50N R76W	Creek bank	2009	Fair	Inactive	n/a
				2008	Good	Active	Great horned owl
				2007	Good	Active	Great horned owl
6167	417910E 4902569N	S29 T50N R76W	Cottonwood, live	2009	Good	Inactive	n/a
				2007	Good	Inactive	n/a
6168	418031E 4903152N	S29 T50N R76W	ROC	2009	Good	Inactive	n/a
				2008	Good	Active	Prairie falcon
				2007	Good	Active	Prairie falcon
6171	417175E 4906988N	S18 T50N R76W	Creek bank	2009	Unknown	Inactive	n/a
				2007	Good	Active	American kestrel
6341	419531E 4902826N	S28 T50N R76W	Ponderosa	2009	Good	Inactive	n/a
				2008	Good	Active	Golden eagle
6342	419557E 4902749N	S28 T50N R76W	Ponderosa	2009	Good	Inactive	n/a
				2008	Good	Inactive	n/a
6343	419658E 4902139N	S33 T50N R76W	Cottonwood, live	2009	Good	Inactive	n/a
				2008	Good	Active	Red-tailed hawk
6344	419914E 4901898N	S33 T50N R76W	Ponderosa	2009	Good	Inactive	n/a
				2008	Good	Inactive	n/a
6345	419505E 4904990N	S21 T50N R76W	JUN	2009	Fair	Inactive	n/a
				2008	Fair	Inactive	n/a
6346	417950E 4902596N	S29 T50N R76W	Creek bank	2009	Good	Inactive	n/a
				2008	Good	Active	Red-tailed hawk
6347	418400E 4904604N	S20 T50N R76W	Ponderosa	2009	Good	Inactive	n/a
				2008	Fair	Inactive	n/a

BLM ID	UTMS	LEGAL	SUBSTRATE	YEAR	CONDITION	STATUS	SPECIES
6348	419335E 4906024N	S16 T50N R76W	Creek bank	2009	Fair	Inactive	n/a
				2008	Unknown	Inactive	n/a
8370	418923E 4906231N	S16 T50N R76W	Cottonwood, live	2009	Good	Inactive	n/a
8371	413007E 4907911N	S11 T50N R77W	Cottonwood, live	2009	Good	Inactive	n/a
8372	412947E 4907916N	S11 T50N R77W	Cottonwood, live	2009	Good	Inactive	n/a

3.3.5. Plains Sharp-tailed Grouse

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

Habitats within the Carr Draw Federal POD IV project area have potential to support sharp-tailed grouse. The mosaic of grasslands and sagebrush-grasslands, wooded draws, shrubby riparian areas, and wet meadows that occur in the area may provide nesting and brood-rearing habitat. The nearest known plains sharp-tailed grouse lek is approximately six miles to the northeast of the project area. Plains sharp-tailed grouse were noted in SENE Section 32, T50N, R77W during the onsite visit to the project area by WLS and the BLM biologist. Follow-up surveys to search for sharp-tailed grouse leks revealed no displaying birds or undocumented leks (WLS 2009).

3.3.6. Sagebrush Obligates

Sagebrush communities are the most common habitat type in the project area. Large-scale development of energy reserves underlying sagebrush ecosystems is placing sagebrush communities and wildlife increasingly at risk (WY 2009). Sagebrush ecosystems support a variety of species, including migratory birds, raptors, big game, reptiles, and small mammals. Several Wyoming BLM sensitive species are associated with sagebrush ecosystems. These include ferruginous hawk, loggerhead shrike, Townsend's big-eared bat, and western burrowing owl.

Sagebrush obligates are species that require sagebrush for some part of their life cycle and cannot survive without it. Sagebrush obligate species within the Powder River Basin that are listed as sensitive species by Wyoming BLM include Brewer's sparrow, sage thrasher, sage sparrow, and greater sage-grouse. All of these bird species require sagebrush for nesting, with nests typically located within or under the sagebrush canopy.

3.3.7. Threatened and Endangered and Sensitive Species

3.3.7.1. Threatened and Endangered Species

Within the BLM Buffalo Field Office there are three species that are Threatened or Endangered under the Endangered Species Act.

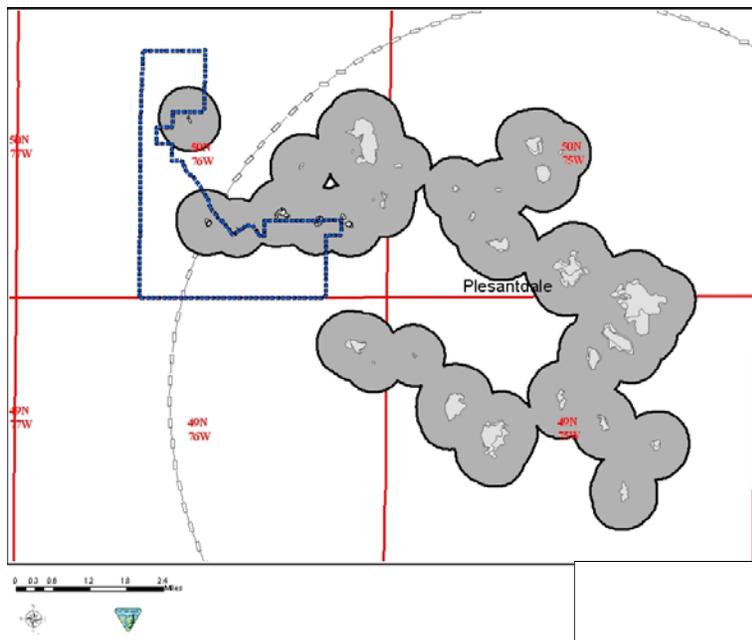
3.3.7.1.1. Black-footed ferret

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 pg. 3-175.

A black-footed ferret population requires at least 1,000 acres of prairie dog colonies, separated by no more than 1.5 km, for survival (USFWS 1989). Seven small (< 12 acres) black-tailed prairie dog colonies

exist within 0.25 miles of the project boundary in S25, S26, S27, S28 T50N R76W. These colonies have been mapped by several different consultants and WGFD over a range of years. Most recently, WLS reported two active colonies in 2009 within 0.25 miles of the project boundary. The individual mapped colonies were <11 acres, combined. These colonies, when linked with thirty additional colonies separated by no more than 1.5km, cover an area of approximately 24 square miles within the Pleasantville potential reintroduction site. In 2004, WGFD identified seven prairie dog complexes, located partially or wholly within the BFO administrative area, as potential black-footed ferret reintroduction sites (Grenier et al. 2004). The Carr Draw Federal POD IV project area is located within the Pleasantdale complex, a potential reintroduction area. Because there is a group of black-tailed prairie dog colonies separated by less than 1.5 km and totaling greater than 1,000 acres that intersects the project area, black-footed ferret habitat is present within the Carr Draw Federal POD IV project area.

Figure 3.2. Prairie-dog colonies within 1.5 km of each other that intersect the Carr Draw IV project area



3.3.7.1.2. Blowout penstemon

Blowout penstemon is a regional endemic species of the Sand Hills of west-central Nebraska and the northeastern Great Divide Basin in 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. Associated vegetation includes blowout grass (*Redfieldia flexuosa*), thickspike wheatgrass (*Elymus lanceolatus*), lemon scurfpea (*Psoralidium lanceolatum*), Indian ricegrass (*Achnatherum hymenoides*) and western wheatgrass (*Pascopyrum smithii*). The flowering period for the plant is typically between April and July.

WLS conducted a habitat suitability survey within the Carr Draw IV project area and submitted a report of their findings to the BFO in May 2009. Seven blowouts were identified within areas of proposed well sites and access roads. These seven features fell within one of four specific soils types which can generally be described as silt-loams to clay-loams. All identified blowout features are static in nature with little to no movement due to surrounding stabilized soil and vegetation and were primarily located on

south and west facing slopes. The majority of the blowouts reviewed within the Carr Draw IV POD are associated with highly erodible exposed coal and shale seams that have been exposed by the forces of wind erosion over time. Based on existing natural environmental factors, the seven erosional features identified within the Carr Draw IV project area cannot be considered suitable blowout penstemon habitat (WLS 2009a).

3.3.7.1.3. Ute Ladies'-Tresses Orchid

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

The PRB FEIS reported that only four orchid populations had been documented within Wyoming, but since the writing of that document, 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.

All of the proposed and/or existing water and gas pipeline crossings and proposed waterline crossings did not exhibit characteristics similar to that of ULT habitat. No flowing water was present at any of the crossings. The locations are surrounded by rugged terrain and the vegetation consisted primarily of upland species dominated by Japanese brome, silver sagebrush, and western wheatgrass within and outside of the channels. The soils were not saturated and did not exhibit ULT habitat characteristics (WLS 2008). There are no proposed actions associated with the Carr Draw IV project that have not been analyzed under NEPA that will impact perennial systems. Water discharge will occur at outfalls already analyzed and approved in the Waterline Sundry, Somerville Waterline Sundry 1, and Somerville Waterline Sundry 2.

3.3.7.2. 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

This section lists those species on the Wyoming BLM sensitive species list that, according to the PRB FEIS, may occur in the Powder River Basin Oil and Gas Project Area, which includes the Carr Draw 4 project area. The following discussion for each of those sensitive species includes an analysis of whether the species is likely to occur in or be affected by the proposed Carr Draw IV POD. According to the PRB FEIS, spotted bats were not likely to be affected by the Powder River Basin Oil and Gas Project, and are therefore not discussed in this section. The authority for the sensitive species policy and guidance comes from the Endangered Species Act of 1973, as amended; Title II of the Sikes Act, as amended; the Federal Land Policy and Management Act (FLPMA) of 1976; and the Department Manual 235.1.1A.

3.3.7.2.1. Sturgeon Chub

The sturgeon chub was petitioned for listing under the ESA in 2000, but, in 2001, it was determined that the listing was not warranted, due to the population being more abundant and better distributed throughout its range than previously believed. According to Wyoming BLM Sensitive Species policy, because this species has been petitioned for listing, it remains on the sensitive species list. The affected

environment for this species is discussed in the PRB FEIS on pg. 3-165. Sturgeon chub is listed by WGFD as a SGCN with a rating of NSS1, indicating that the species is rare (populations are physically isolated and/or it occurs in extremely low densities throughout its historic range and that extirpation appears possible), and habitat is declining or vulnerable. Discharge from the proposed project will flow into the Powder River, where this species is known to occur. Suitable habitat for the sturgeon chub will be impacted by the Carr Draw Federal POD IV project.

3.3.7.2.2. Baird's Sparrow

The affected environment for Baird's sparrow is discussed in the PRB FEIS on pg. 3-188. In addition to being listed as a Wyoming BLM sensitive species, Baird's sparrows are listed by USFWS as a BCC for Region 17. Suitable habitat is present in the project area in the shortgrass prairie that occurs in S26, S33, and S34 T50N R76W, and this species may occur.

3.3.7.2.3. Bald Eagle

The affected environment for bald eagles is described in the PRB FEIS on pg. 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. In order to avoid violation of these laws and uphold the BLM's commitment to avoid any future listing of this species, the BLM shall continue to comply with all conservation measures and terms and conditions identified in the Powder River Basin Oil and Gas Project Biological Opinion (PRB Oil & Gas Project BO), #WY07F0075) (USFWS 2007) shall continue to be complied with.

In addition to being listed as a Wyoming BLM sensitive species, bald eagles are a WGFD SGCN with a NSS2 rating, due to populations being restricted in numbers and distribution, ongoing significant loss of habitat, and sensitivity to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also listed by USFWS as a BCC for Region 17.

Bald eagle nesting and roosting habitat is present within one mile of the Carr Draw IV project area. A large stand of mature cottonwoods is present along Barber Creek in NESE S17, T50N, R76W. Numerous prairie dog colonies provide reliable prey sources. Seven bald eagles were observed at two locations along Barber Creek within one mile of the project area in on two consecutive days in December of 2007. The observers (Big Horn Environmental Consultants) also reported a deer carcass within Barber Creek. It is likely that bald eagles do not use this stand of trees on a regular basis for winter roosting, but, in this case, were gathered at a concentrated food source.

3.3.7.2.4. Brewer's Sparrow

The affected environment for Brewer's sparrow is discussed in the PRB FEIS on pg. 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 not sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also listed by USFWS as a BCC for Region 17. Brewer's sparrow habitat is present throughout the project area and this species is suspected to occur.

3.3.7.2.5. Ferruginous Hawk

The affected environment for ferruginous hawk is discussed in the PRB FEIS on pg. 3-183. In addition to being listed as a Wyoming BLM sensitive species, ferruginous hawks are a WGFD SGCN, with a rating of NSS3 because the species is widely distributed, population status and trends are unknown but are suspected to be stable, they are experiencing ongoing loss of habitat, and they are sensitive to human

disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also listed by USFWS as a BCC for Region 17. The nearest known ferruginous hawk nest is approximately 2.5 miles to the east of the project area. BLM has three years of survey results for this nest. It was active with ferruginous hawks in 2005 and subsequently active with red-tailed hawks in 2007 and 2008. Ferruginous hawk nests are located throughout the Powder River Basin. Foraging habitat and prey is available throughout the project area, and ferruginous hawks may occur.

3.3.7.2.6. Greater Sage-Grouse

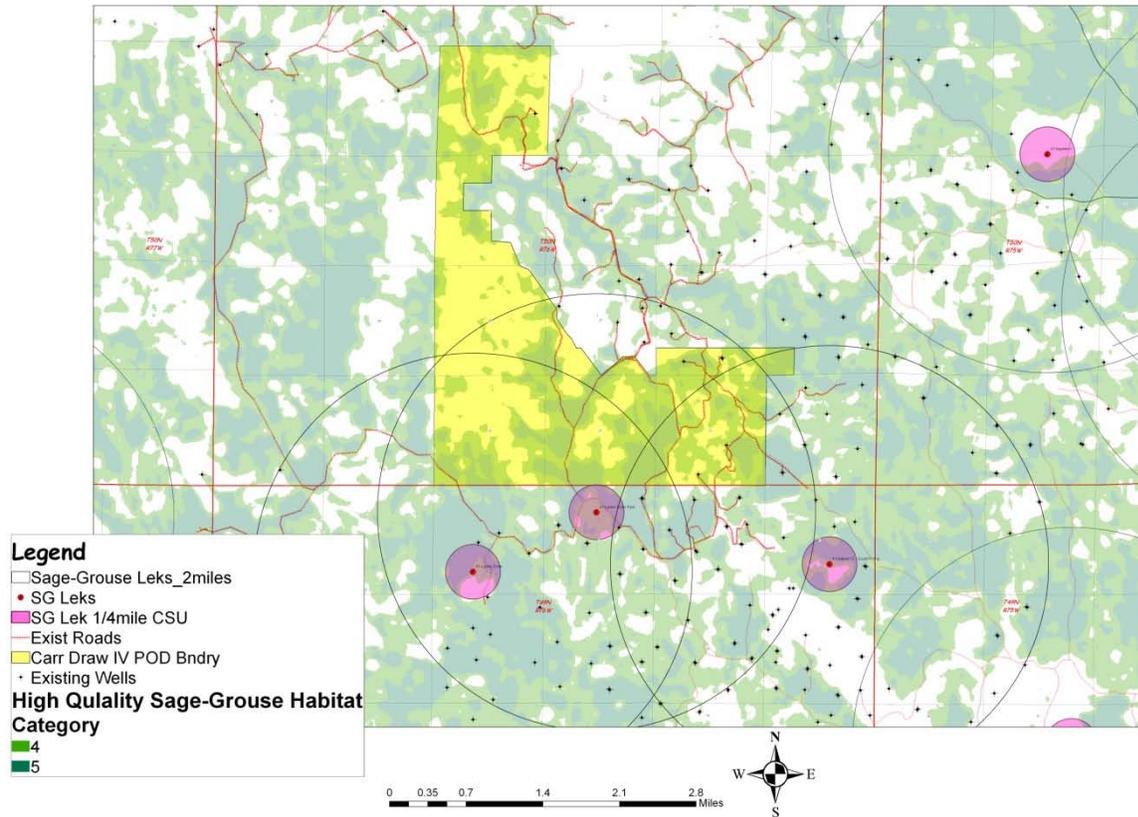
The affected environment for greater sage-grouse (herein referred to as sage-grouse) is discussed in the PRB FEIS (pg. 3-194 to 3-199). In addition to being listed as a Wyoming BLM sensitive species, sage-grouse are listed as a WGFD SGCN, with a rating of NSS2, because populations are declining, and they are experiencing ongoing significant loss of habitat. 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 2003 PRB EIS significance threshold and population viability assumptions are based on the analysis that sufficient functioning habitat for sage grouse will remain to support population viability within the project area. The seven areas identified as BFO sage-grouse Focus Areas assume that sufficient amounts of sage-grouse habitat remain unfragmented by energy or other man-made infrastructure. It is also assumed that the fragmented portions in the energy areas of sage-grouse habitat provide for the necessary breeding, feeding, and sheltering components to sustain sage-grouse habitat connectivity between the seven Focus Areas.

Sagebrush communities occur throughout and surrounding the Carr Draw Federal POD IV project area (WLS 2008). Continuous stands of sparsely to moderately dense sagebrush are present throughout the project area. Section 34 and S35 T50N R76W inside the project area and S29 and S32 T50N R76W west of the project area contain the largest and most contiguous stands of sagebrush on moderate topography.

Old and fresh sign was observed in these areas (WLS 2008). Stands of sagebrush located near moist draws throughout the project area provide brood rearing and late summer habitat. Sage-grouse habitat models indicate that approximately 56% of the project area contains high quality sage-grouse nesting habitat (Doherty 2008). According to a statewide population density model that was developed based on lek attendance (Doherty 2008), the portions of the project area in S21, S26, S27, S32, S33, and S34, T50N R76W are partially contained in an area, that when combined with other similar areas, is predicted to contain 80% of the state's sage-grouse population. The portions of the project in S27, S32 and S34 T50N R76W, when combined with other similar areas, are predicted to contain 75% of the state's sage-grouse population. The portions of the project in S26, S32, S34 and S35 T50N R76W, when combined with other similar areas, are predicted to contain 65% of the state's sage-grouse population.

Figure 3.3 High Quality Sage-Grouse Habitat within the Carr Draw Federal IV POD



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 four miles of oil and gas developments. WGFD records indicate that six sage-grouse leks occur within four miles of the project area. These six lek sites are identified in Table 3.11.

Table 3.11 Sage-grouse leks within 4 miles of the Carr Draw IV project area

Lek Name	Legal Location	Distance from Project Area (mi)	Occupied?
Laskie Draw East	NWNE S03 49/76	Project infrastructure proposed within 0.25 mile of this lek	Yes
Laskie Draw	SWSE S04 49/76	0.8	Yes
Barber Creek – South Prong	SENE S01 49/76	0.9	Yes
Hayden I	SESW S17 50/75	2.9	Yes
Watsabaugh IV	NESE S17 49/75	3.7	Yes
Fortification	SWNW S25 51/76	3.9	Yes

Table 3.12 displays the peak male sage-grouse counts observed during the sage-grouse survey season (April 1-May 7) from 2000 to 2009 for the 6 lek located within 4 miles of the Carr Draw Federal IV project area.

Table 3.12 Peak Males Sage-Grouse Counts of Leks within 4 miles of the POD

Lek Name	2009	2008	2007	2006	2005	2004	2003	2002	2001	2000
Laskie Draw East	9	11	24	20	20	-	-	-	-	-
Laskie Draw	1	0	19	3	6	3	-	-	-	-
Barber Creek – South Prong	2	4	0	8	-	-	-	-	-	-
Hayden I	15	19	19	27	16	17	21	17	32	Not Checked
Watsabaugh IV	42	44	45	46	26	7	-	-	-	-
Fortification	0	0	0	0	-	-	-	-	-	-

3.3.7.2.7. Loggerhead Shrike

The affected environment for loggerhead shrike is discussed in the PRB FEIS on pg. 3-187. 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 is present throughout the project area, and the species is suspected to occur.

3.3.7.2.8. Long-billed Curlew

The affected environment for long-billed curlew is discussed in the PRB FEIS on pg. 3-184. In addition to being listed as a Wyoming BLM sensitive species, long-billed curlews are a WGFD SGCN, with a rating of NSS3, because populations are restricted in distribution, and habitat is vulnerable but not undergoing significant 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. Long-billed curlew habitat is present throughout the project area, and the species may occur.

3.3.7.2.9. Sage Sparrow

The affected environment for sage sparrow is discussed in the PRB FEIS on pg. 3-200 to 3-201. Sage sparrows are a WGFD SGCN, with a rating of NSS3, because populations are restricted in distribution, habitat is restricted but not undergoing 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 BCC for Region 17. The areas of dense shrub cover that occur throughout the project area may be selected for nesting habitat.

3.3.7.2.10. Sage Thrasher

The affected environment for sage thrasher is discussed in the PRB FEIS on pg. 3-199 to 3-200. 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. The project area contains habitat for sage thrashers, due to the presence of dense sagebrush stands. Sage thrashers may occur throughout the project area.

3.3.7.2.11. Western Burrowing Owl

The affected environment for western burrowing owl (burrowing owl) is discussed in the PRB FEIS on pg. 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 recent or on-going

significant 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.

Current population estimates for the United States are not well known but trend data suggest declines throughout the burrowing owls' North American range (McDonald et al. 2004). Primary threats are habitat loss and fragmentation, mostly due to intensive agricultural and urban development and habitat degradation, due to declines in populations of colonial burrowing mammals (Klute et al. 2003).

The BFO database indicates no burrowing owl nests within 0.25 mile of the Carr Draw Federal POD IV project area. Prairie dog colonies are present within 0.25 miles of the project area in S27 T50N R76W and S3 T49N, R76W, and this species may occur in those areas (See Figure 3.2).

3.3.7.2.12. Black-tailed Prairie Dog

The affected environment for black-tailed prairie dogs is discussed in the PRB FEIS (pg 3-179). 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. Wyoming BLM considers black-tailed prairie dogs a sensitive species and continues to afford this species the protections described in the PRB FEIS. The black-tailed prairie dog is a WGFD SGCN, with a rating of NSS3, because populations are declining, and habitat is vulnerable but not undergoing significant loss.

The black-tailed prairie dog is considered common in Wyoming, although its abundance fluctuates with activity levels of Sylvatic plague and the extent of control efforts by landowners. Comparisons with 1994 aerial imagery indicated that black-tailed prairie dog acreage remained stable from 1994 through 2001, but aerial surveys conducted in 2003 indicated that approximately 47% of the prairie dog acreage was impacted by Sylvatic plague and/or control efforts (Grenier et al. 2004). Due to human-caused factors, black-tailed prairie dog populations are now highly fragmented and isolated (Miller 1994). Most colonies are small and subject to potential extirpation due to inbreeding, population fluctuations, and other problems that affect long term population viability, such as landowner poisoning and disease (Primack 1993, Meffe and Carroll 1994, Noss and Cooperrider 1994). Two prairie dog colonies are located within the Carr Draw Federal POD IV project (Figure 3.2).

3.3.7.2.13. Fringed Myotis

The affected environment for fringed myotis is discussed in the PRB FEIS on pg. 3-188 to 3-189. In addition to being listed as a BLM WY sensitive species, the fringed myotis is a WGFD SGCN, with a rating of NSS2, because populations are restricted in distribution, they are experiencing ongoing significant loss of habitat, and they are sensitive to human disturbance. The fringed myotis occupies a variety of habitats, including grasslands and basin-prairie shrublands, usually in proximity of drinking water (Hester and Grenier 2005). After feeding, it uses night roosts, which may include buildings, rock crevices, and bridges (Hester and Grenier 2005), all of which occur in the vicinity of the project area. Fringed myotis may occur in the project area, due to availability of roost sites.

3.3.7.2.14. Long-eared Myotis

The affected environment for long-eared myotis is discussed in the PRB FEIS on pg. 3-201. In addition to being listed as a BLM WY sensitive species, the long-eared myotis is a WGFD SGCN, with a rating of NSS2, because populations are restricted in distribution, they are experiencing ongoing significant loss of habitat, and they are sensitive to human disturbance. Although long-eared myotis primarily inhabit coniferous forest and woodland, they are occasionally found in cottonwood riparian areas and sagebrush grasslands where roost sites are available (Hester and Grenier 2005). Roosts include cavities in snags, under loose bark, stumps, buildings, and rock crevices (Hester and Grenier 2005), all of which may occur

in the vicinity of the project area. Because of the potential for available roost sites, long-eared myotis may occur in the Carr Draw Federal POD IV project area.

3.4. West Nile Virus

West Nile Virus is included in this EA because of its potential to impact sage-grouse and other bird species.

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

Although most of the attention has been focused on human health issues, WNV has had an impact on vertebrate wildlife populations. At a recent conference at the Smithsonian Environmental Research Center, scientists disclosed WNV had been detected in 157 bird species, horses, 16 other mammals, and alligators (Marra et al 2003). In the eastern US, avian populations have incurred very high mortality, particularly crows, jays and related species. Raptor species also appear to be highly susceptible to WNV.

During 2003, 36 raptors were documented to have died from WNV in Wyoming including golden eagle, red-tailed hawk, ferruginous hawk, American kestrel, Cooper's hawk, northern goshawk, great-horned owl, prairie falcon, and Swainson's hawk (Cornish et al. 2003). Actual mortality is likely to be greater.

Population impacts of WNV on raptors are unknown at present. The Wyoming State Vet Lab determined 22 sage-grouse in one study project (90% of the study birds), succumbed to WNV in the PRB in 2003. While birds infected with WNV have many of the same symptoms as infected humans, they appear to be more sensitive to the virus (Rinkes 2003).

Mosquitoes can potentially breed in any standing water that lasts more than four days. In the Powder River Basin, there is generally increased surface water availability associated with CBNG development.

This increase in potential mosquito breeding habitat provides opportunities for mosquito populations to increase. Preliminary research conducted in the Powder River Basin indicates WNV mosquito vectors were notably more abundant on a developed CBNG site than two similar undeveloped sites (Walker et al. 2003). Reducing the population of mosquitoes, especially species that are apparently involved with bird-to-bird transmission of WNV, such as *Culex tarsalis*, can help to reduce or eliminate the presence of virus in a given geographical area (APHIS 2002). The most important step any property owner can take to control such mosquito populations is to remove all potential man-made sources of standing water in which mosquitoes might breed (APHIS 2002).

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

3.5. Water Resources

The project area is within Barber Creek drainage in the Upper Powder River watershed.

3.5.1. Groundwater

WDEQ water quality parameters for groundwater classifications (Chapter 8 – Quality Standards for Wyoming Groundwater) define the following limits for TDS: 500 mg/l TDS for Drinking Water (Class I), 2000 mg/l for Agricultural Use (Class II) and 5000 mg/l for Livestock Use (Class III).

A search of the Wyoming State Engineer Office (WSEO) Ground Water Rights Database for this area showed 9 registered stock and domestic water wells within ½ mile of a federal CBNG producing well in the POD with depths ranging from 60 to 460 feet. For additional information on water, please refer to the PRB FEIS (January 2003), Chapter 3, Affected Environment pages 3-1 through 3-36 (groundwater).

The ROD 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 FEIS ROD page 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 will be highly variable depending upon local geologic and hydrologic conditions;
- It may be necessary to conduct investigations at representative sites around the basin to quantify these impacts;
- Provide site specific guidance on the placement and design of CBM impoundments, and;
- Shallow groundwater wells would be installed and monitored where necessary.

3.5.2. Surface Water/Wetlands/Riparian

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

Development within the proposed Carr Draw IV plan of development will occur in the ephemeral drainages of the Barber Creek watershed north and south of the Barber Creek channel. Barber Creek, under natural conditions, qualifies as an ephemeral stream. Very little riparian vegetation exists adjacent the stream channel or in the floodplain in this area. Sparse populations of cottonwood trees can be found along Barber Creek in the lower reaches.

The PRB FEIS presents the historic mean Electrical Conductivity (EC, in $\mu\text{mhos/cm}$) and Sodium Adsorption Ratio (SAR) by watershed at selected United States Geological Survey (USGS) Gauging Stations in Table 3-11 (PRB FEIS page 3-49). These water quality parameters “illustrate the variability in ambient EC and SAR in streams within the Project Area. The representative stream water quality is used in the impact analysis presented in Chapter 4 as the baseline for evaluating potential impacts to water quality and existing uses from future discharges of CBM produced water of varying chemical composition to surface drainages within the Project Area” (PRB FEIS page 3-48). For the Upper Powder River, the EC ranges from 1,797 at Maximum monthly flow to 3,400 at Low monthly flow and the SAR ranges from 4.76 at Maximum monthly flow to 7.83 at Low monthly flow. These values were determined at the USGS station located at Arvada, WY PRB FEIS page 3-49).

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

3.6. Economics and Recovery of CBNG Resources

Development of this project would have effects on the local, state, and national economies. Based on the estimates in the PRBEIS, the drilling of the 36 proposed wells in the Carr Draw Federal POD IV will generate approximately 0.23 billion cubic feet of gas (BCFG) per well, over the life of the well. Actual revenue from this amount of gas is difficult to calculate, as there are several variables contributing to the price of gas at any given time. Regardless of the actual dollar amount, the royalties from the gas produced in the Carr Draw Federal POD IV would have several benefits. The federal government collects 12.5% of the royalties from all federal wells, which helps offset the costs of maintaining the federal agencies that oversee permitting. In addition to generating federal income, approximately 49% of the royalties from the Carr Draw Federal POD IV wells would return to the State of Wyoming. This revenue from mineral development contributes to Wyoming’s economy, and allows for improvements in state funded programs such as infrastructure and education. The development of the Carr Draw Federal POD IV project would also provide local revenue by employing workers in the area to build the roads and project infrastructure, drill the wells, and maintain and monitor the project area. This pool of individuals employed to work on the Carr Draw Federal POD IV project would also result in an increase in demand for goods and services from nearby communities, primarily those of NE, Wyoming.

3.7. Cultural Resources

Class III cultural resource inventories were performed for the Carr Draw IV POD prior to on-the-ground project work (BFO project no. 70080207, 70080207A, 70090128). Western Land Services, Inc. conducted a block class III cultural resource inventory following the Archeology and Historic Preservation, Secretary of the Interior’s Standards and Guidelines (48CFR190) and the *Wyoming State Historic Preservation Office Format, Guidelines, and Standards for Class II and III Reports*. Clint Crago, BLM Archaeologist, reviewed the report for technical adequacy and compliance with 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	Eligibility
48CA157	Prehistoric Stone Circle and Artifact Scatter	Eligible
48CA2101	Historic Homestead	Not Eligible
48CA5123	Prehistoric Lithic Scatter	Not Eligible
48CA5124	Prehistoric Lithic Scatter	Not Eligible
48CA5125	Prehistoric Lithic Scatter	Not Eligible
48CA5126	Prehistoric Lithic Scatter	Not Eligible
48CA5127	Prehistoric Lithic Scatter	Not Eligible
48CA5128	Historic Dugout Features	Not Eligible
48CA5129	Prehistoric Artifact Scatter and Historic Feature	Not Eligible
48CA5130	Prehistoric Lithic Procurement Area	Not Eligible

Site Number	Site Type	Eligibility
48CA5131	Prehistoric Lithic Scatter	Not Eligible
48CA5132	Prehistoric Lithic Scatter	Not Eligible
48CA6113	Historic Collapsed Structure	Not Eligible
48JO2721	Historic Cabins, Dugouts, Corral	Not Eligible
48JO2722	Historic Foundation, Debris	Not Eligible
48JO2723	Hearth	Eligible
48JO2724	Prehistoric Open Camp	Not Eligible
48JO2725	Prehistoric Lithic Scatter	Not Eligible
48JO2726	Historic Ranch Site	Not Eligible
48JO2728	Historic Cabin, Dugouts, Corral	Not Eligible
48JO3766	Prehistoric Lithic Scatter and Hearth	Eligible
48JO3997	Prehistoric Hearths and Lithics	Not Eligible
48JO3998	Historic Artifact Scatter	Not Eligible
48JO4039	Hearth	Eligible
48JO4040	Prehistoric Lithic Scatter	Not Eligible
48JO4041	Prehistoric Lithic Scatter	Not Eligible
48JO4042	Prehistoric Lithic Scatter	Not Eligible
48JO4043	Prehistoric Open Camp	Eligible
48JO4046	Historic Homestead	Not Eligible

3.8. Air Quality

Existing air quality throughout most of the Powder River Basin is in attainment with all ambient air quality standards. Although specific air quality monitoring is not conducted throughout most of the Powder River Basin, air quality conditions in rural areas are likely to be very good, as characterized by limited air pollution emission sources (few industrial facilities and residential emissions in the relatively small communities and isolated ranches) and good atmospheric dispersion conditions, resulting in relatively low air pollutant concentrations.

Existing air pollutant emission sources within the region include following:

- Exhaust emissions (primarily CO and nitrogen oxides [NO_x]) from existing natural gas fired compressor engines used in production of natural gas and CBNG; and, gasoline and diesel vehicle tailpipe emissions of combustion pollutants;
- Dust (particulate matter) generated by vehicle travel on unpaved roads, windblown dust from neighboring areas and road sanding during the winter months;
- Transport of air pollutants from emission sources located outside the region;
- Dust (particulate matter) from coal mines;

- NOx, particulate matter, and other emissions from diesel trains and,
- SO2 and NOx from power plants.

For a complete description of the existing air quality conditions in the Powder River Basin, please refer to the PRB Final EIS Volume 1, Chapter 3, pages 3-291 through 3-299.

4. ENVIRONMENTAL CONSEQUENCES

The changes to the proposed action (Alternative B) resulted in development of Alternatives C and D. These changes have reduced impacts to the environment which will result from this action, therefore only the environmental consequences of Alternative C and Alternative D are described below. For a full analysis of Alternatives A and B, see the PRB EIS.

Cumulative Impacts

The cumulative effects associated with Alternative C that are within the analysis parameters and impacts described in the PRB FEIS are not covered within the CDIV EA. For further details on expected cumulative impacts, please refer to the referenced PRB FEIS. Cumulative impacts that are not addressed within the PRB FEIS are disclosed below in detail.

4.1. Alternative C

4.1.1. Vegetation & Soils

4.1.1.1. Direct and Indirect Effects

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

- Mixing of horizons – occurs where construction on roads, pipelines or other activities take place. Mixing may result in removal or relocation of organic matter and nutrients to depths where it would be unavailable for vegetative use. Soils which are more susceptible to wind and water erosion may be moved to the surface. Soil structure may be destroyed, which may impact infiltration rates. Less desirable inorganic compounds such as carbonates, salts or weathered materials may be relocated and have a negative impact on re-vegetation. This drastically disturbed site may change the ecological integrity of the site and the recommended seed mix.
- Loss of soil vegetation cover, biologic crusts, organic matter and productivity.
- Soil erosion would also affect soil health and productivity. Erosion rates are site specific and are dependent on soil, climate, topography and cover.
- Soil compaction – the collapse of soil pores results in decreased infiltration and increased erosion potential. Factors affecting compaction include soil texture, moisture, organic matter, clay content and type, pressure exerted, and the number of passes by vehicle traffic or machinery.
- Modification of hill slope hydrology.
An important component of soils in Wyoming’s semiarid rangelands, especially in the Wyoming big sagebrush cover type, are biological soil crusts, or cryptogamic soils that occupy ground area not covered with vascular plants. Biological soil crusts are important in maintaining soil stability, controlling erosion, fixing nitrogen, providing nutrients to vascular plants, increasing precipitation infiltration rates, and providing suitable seed beds (BLM 2003). They are adapted to growing in severe climates; however, they take many years to develop (20 to 100) and can be easily disturbed or destroyed by surface disturbances associated with construction activities.

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

4.1.1.2. Cumulative Effects

The designation of the duration of disturbance is defined in the PRB FEIS (pg 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.

4.1.1.3. Mitigation Measures

- Impacts to vegetation and soils from surface disturbance will be reduced by following the operator's plans and BLM applied mitigation.
- The operator has committed to the following mitigation measures for the Carr Draw Federal POD IV. Please refer to the supplemental information submitted by the operator as an attachment to the MSUP labeled Carr Draw IV Federal POD Mitigation for further detail. The mitigation plan provides information about the POD's general history, project wildlife mitigation planning, overhead and buried power planning, and well specific information.
- Please refer to the Carr Draw Federal POD IV Reclamation Management Plan and site specific conditions of approval for the Carr Draw Federal POD IV for further detail on the mitigation that will be applied to the project to lessen the impacts to vegetation and soils.
- The operator will follow the guidance provided in the Wyoming Policy on Reclamation (IM 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. BLM reclamation goals emphasize eventual ecosystem reconstruction, which means returning the land to a condition approximate to an approved "Reference Site" or NRCS Ecological Site Transition State. Final reclamation measures are 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 are used to achieve this short-term goal.
- With expedient reclamation, productivity and stability should be regained in the shortest time frame.
- Compaction may be remediated by plowing or ripping.

4.1.2. Invasive Species

4.1.2.1. Direct and Indirect Effects

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

4.1.2.2. Cumulative Effects

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

4.1.2.3. 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):

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) for the Carr Draw Federal POD IV:

- **Workplace cultural**
Methods of control and prevention will be re-seeding, mulching, vehicle and equipment maintenance, and surface disturbance as detailed in the IPMP.
- **Physical**
Methods of control and prevention include physically mowing and hand pulling weeds (for small or new infestations).
- **Biological**
Biological methods of control and prevention such as domestic animal use and approved biological control agents will be used.
- **Chemical**
Herbicides are another method of control and prevention that may be used to treat weeds. The use of herbicides must be done in accordance with the existing Surface Use Agreement with the private surface owner.
- **Education**
Weed education awareness programs include; identifying weeds and reporting weed infestations to the project manager.

Preventive practices:

Certified weed-free seed mixtures will be used for re-seeding, and vehicles and equipment will be washed before leaving areas of known noxious weed infestations.

4.1.2.4. Residual Effects

Cheatgrass or downy brome (*Bromus tectorum*) and to a lesser extent, Japanese brome (*B. japonicus*) are known to exist in the affected environment. These two species are found in such high densities and numerous locations throughout NE Wyoming that a control program is not considered feasible at this time.

4.1.3. Wildlife

4.1.3.1. Big Game Direct and Indirect Effects

Big game in the area including elk, mule deer, and pronghorn antelope, can be expected to respond in similar fashion. However, deer and pronghorn do not move as easily as elk through deep snow, so winter disturbance could impact these smaller individuals more severely. Under the environmentally preferred alternative, Yearlong range for elk and pronghorn antelope and Winter/Yearlong range for mule deer, will be directly disturbed by the construction of wells, pipelines, and roads resulting in habitat loss. The most important difference between the elk herd and deer or antelope herds is that the Fortification Creek elk are a relatively isolated herd.

Table 3.5 summarized the proposed activities associated with the development of the Carr Draw IV POD; items identified as long term disturbance would result in direct habitat loss. Short-term disturbances will also result in direct habitat loss as vegetative cover is removed. Short term disturbances may provide

some habitat value as these areas are reclaimed and native vegetation becomes established. However, they may also increase vehicular collision when adjacent to roads.

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 eight wells per section creates a high level of impact for big game and that avoidance zones around mineral facilities overlap creating contiguous avoidance areas (WGFD 2004).

Big game animals are expected to return to the project area following drilling and construction activities; however, populations will likely be lower than prior to project implementation as the human activities associated with operation and maintenance continue to displace big game. Elk and mule deer are more sensitive to operation and maintenance activities than pronghorn.

The Pinedale Anticline study (Sawyer, H., R. Nielson, D. Strickland and L. McDonald. 2005) 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.

No timing limitation stipulations for drilling, construction and other activities will be applied to protect elk during critical winter and calving periods as there are no project elements of the project area within

the identified ranges that fall under the federal action. It is anticipated that big game will avoid those areas frequented by human disturbance during the production phase of the non-federal CBNG development.

4.1.3.2. Elk Effects

To disclose the past and present actions within the Cumulative Impacts Analysis Area (CIAA) (1) Wyoming Oil and Gas Conservation Commission (WOGCC) well data were obtained, (2) Federal wells were verified with Automated Fluid Minerals Support System (AFMSS), and (3) an updated GIS layer displaying existing oil and gas access roads¹ were used. The CIAA provides a reasonably complete assessment of current oil and gas development on fee, state, and federal lands including the recently approved Augusta Unit Zeta (AUZ), the Carr Draw III West (CD3W) and Carr Draw V Add II (CD5a2) PODs.

Impacts to elk habitat and elk have already occurred during construction and drilling activities related to federal and non-federal wells. This analysis considers cumulative impacts to elk within the entire yearlong range, or other appropriate CIAA boundaries.

4.1.3.2.1. Habitat and Availability

CBNG development fragments habitats through placement of linear facilities such as roads and pipelines. The impacts from fragmentation can vary depending on the use of the feature. For example, a road used daily would displace elk by reducing habitat effectiveness as well as fragmenting habitat. The placement of linear elements can also act as vectors routes for the establishment of invasive plant species (e.g., Japanese brome and leafy spurge) that can reduce the forage value of the area by out competing native plants, and in the case of brome, increase the potential for wildfire (BLM 2006).

The foreseeable development within the Carr Draw Federal IV project area includes an additional 36 federal and 13 non-federal wells, for a total of 49 locations, resulting in an average well density throughout the entire project area of 8.0 wells per section. Proposed project elements associated with the 36 federal CNBG wells that are anticipated to impact the Fortification elk herd are: 36 locations, 23.5 miles of new roads, 1.7 miles utility corridor, 6.4 miles of water pipeline and increased vehicle traffic on established roads and increased noise from compressor stations.

There are two non-federal well locations proposed within Parturition range. These two wells are located within 0.5 miles and within line-of-sight of an existing improved road. At least one of the proposed non-federal wells is also within line of sight of elk security habitat and is likely to increase impacts to elk habitat beyond the impacts already associated with the existing road.

Approximately 210 acres of parturition range occurs throughout the northern half of the project area. Existing and proposed well locations throughout the entire parturition range is shown in Figure 4.3. There are currently 65 well locations within the entire parturition range, an area of 92.6 square miles. Sixty-one of these well locations are within the eastern portions of the parturition range in area approximately 34.3 square miles. The existing well density within this area is 2 wells per square mile. There are no existing well locations within the parturition range within the project area. The WGFD has developed criteria for evaluating impacts to habitat based on well density (WGFD 2009). With the addition of the 34 well locations associated with the Carr Draw Federal POD IV, well density within the project area would instantly become 6.9 well locations per square mile, well above the threshold of 4 wells per square mile for extreme impacts.

Indirect disturbance from human activity is probably the largest potential impact from the proposed action. The PRB FEIS used “habitat effectiveness” - the degree to which habitat features fulfill specific habitat functions; the degree to which a species or population is able to continue using a habitat for a specific function, to assess the effect of human disturbance on elk populations. For elk, the habitat effectiveness of areas within 0.5 miles of an active area such as a road or well would be reduced. In Powell's study on elk response to oil and gas development in the Jack Morrow Hills area of southwestern Wyoming, elk avoided areas within 2 kilometers (1.25 miles) of active roads (Powell, 2003).

In an attempt to quantify the loss, both actual and functional, of crucial elk habitat (i.e., crucial winter range and parturition areas) in the Fortification Creek area resulting from CBNG development, a geographic information system (GIS) model was prepared to portray the physiographic and elk habitat data. Key assumptions were used in the development of the model:

- The ability of elk to see CBNG development activities within a 0.5 mile resulted in the non-use/lost functionality (i.e., lack of security) of the intervening habitat;

¹During the 2009 field season, BLM BFO staff conducted field verification of “existing oil and gas roads” within the CIAA. View shed analysis, utilizing GIS models and the best available data, continue to be utilized by the BFO to determine security habitat effectiveness within the CIAA. The results of the most current analysis reflect statistics that differ from those documented in the original environmental analyses.

- Secure elk habitat was defined as those blocks of contiguous habitat >250 acres in size that would be unaffected by CBNG activities (Christensen et al. 1991, Leege 1984); and
- The presence of gas field roads and well pads (excluding the WSA) would be the parameter of measurement for development.

It is estimated that there would be 88 acres of direct habitat loss and 1760 acres of indirect habitat loss.

4.1.3.2.1.1. Habitat Effectiveness

Security habitat occurs throughout the yearlong range and, subsequently, throughout the crucial winter and parturition ranges (Figure 4.2). Elk security habitat areas are important to minimize stress to elk related to human disturbance as well as providing fair chase during recreation big game hunting recreation. The most common impact to security cover is open roads. Effective habitat are those habitat areas that provide connectivity between security habitats but are smaller than 250 acres.

The Carr Draw Federal POD IV lies between Barber Creek and a large expanse of elk security habitat that also encompasses portions of the western half of the project area. Based on data from the Wyoming Oil and Gas Commission, as of March 1, 2010, there are 6 existing wells at 5 locations and associated infrastructure within the Carr Draw Federal POD IV project area of 6.1 square miles.

An analysis of elk habitat indicates that prior to federal CBNG development in 2009, approximately 60,000 acres of security habitat existed within the elk Yearlong range; 7,882 contiguous acres within the vicinity of the Carr Draw Federal POD IV and 1,820 acres within the project area boundary. Population monitoring conducted by WGFD as disclosed in the annual Job Completion Reports suggests connectivity between remaining security patches was relatively unimpeded prior to 2009 (WGFD 2008).

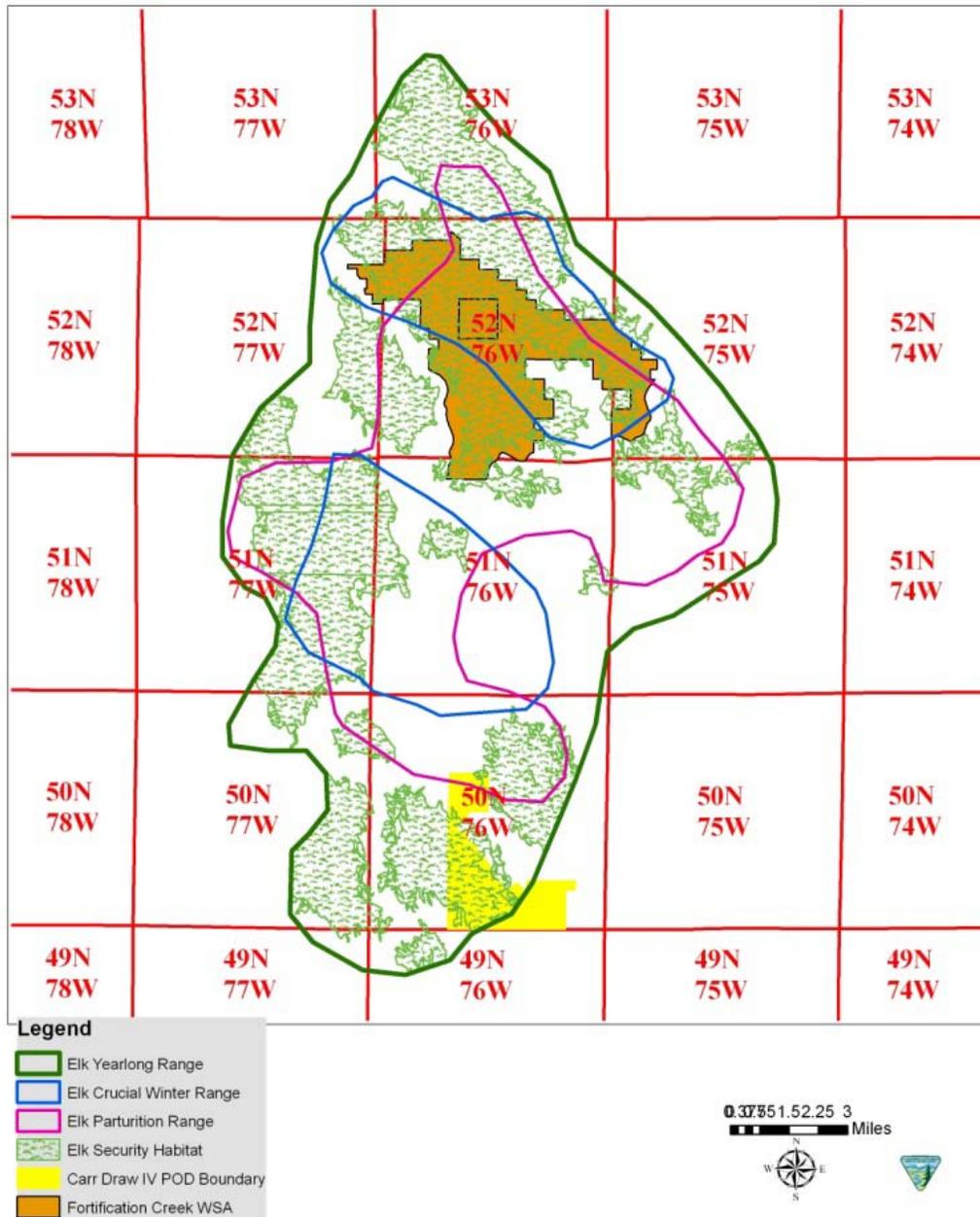
Table 4.1 Elk Security Habitat within the Fortification Creek Elk Ranges

Range	Security Habitat (Acres)
Yearlong	60,000
Crucial Winter	23,150 (39% of security habitat)
Parturition	33,770 (56% of security habitat)
“Dual Crucial”	17,957 (30% of security habitat)

A view shed analysis utilizing the geographic information system (GIS) model was conducted to determine habitat effectiveness within the Carr Draw Federal POD IV project boundary following the field visits confirming the existing oil and gas roads. The following statistics summarize the outcome of the habitat effectiveness analysis:

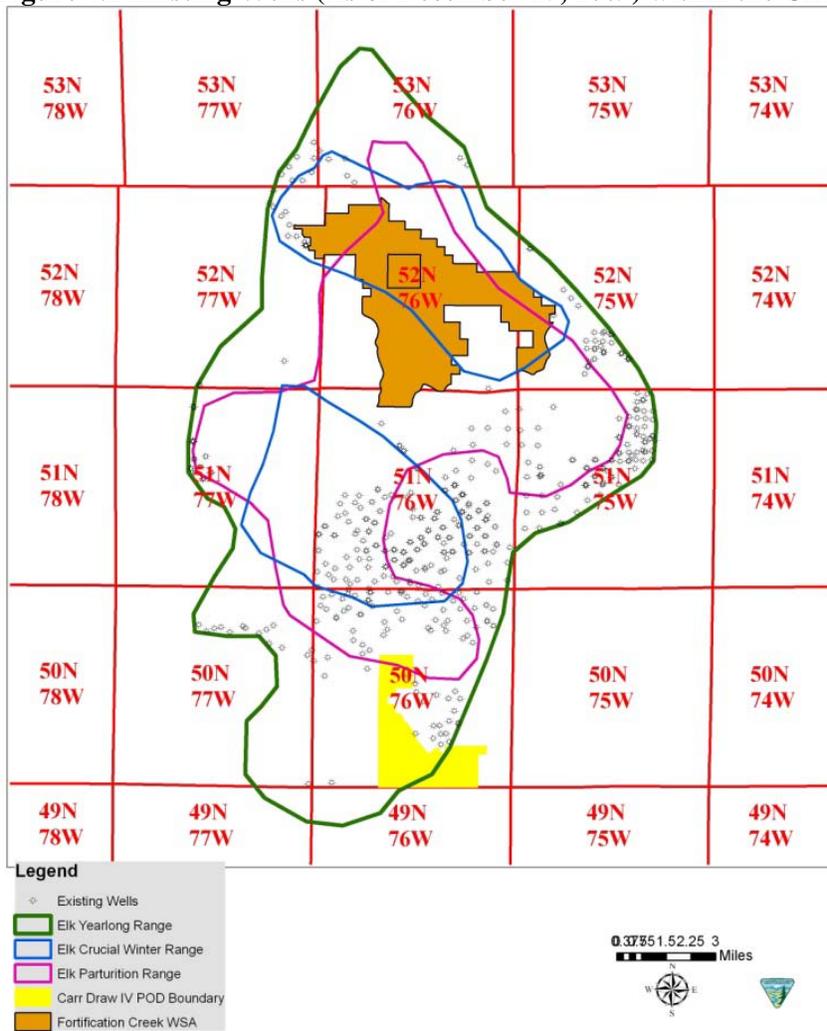
1. 39% of the Carr Draw Federal POD IV project area is effective habitat.
2. 24.2% of the project area is security habitat.
3. With the adoption of Alternative C 100% of effective habitat and security habitat would be compromised.

Figure 4.1 Elk Security Habitat Remaining within the CIAA (as of December 2009)



As of December 15, 2009, WOGCC reports 493 existing federal and nonfederal oil and gas wells (including 10 oil, 55 conventional gas, and 428 CBNG wells) at 346 locations within the entire yearlong range, distributed in a non-uniform manner (Figure 4.3). The majority of these existing wells are concentrated in developed CBNG and conventional oil and gas fields across roughly 48,000 acres within the elk Yearlong range. This includes 122 existing well locations within the CWR and 139 existing well locations within the PR. The proportion of existing federal well locations that are within the CWR and PR are 90% and 62% respectively.

Figure 4.2 Existing Wells (As of December 15, 2009) within the CIAA



Pattern of Elk Use

Radio-telemetry (VHS) and GPS collaring data collected by BLM and WGFD since 2005 have shown that the Fortification elk tend to avoid oil and gas development by moving to less developed areas. Disruptive activity is usually temporary in nature, however, and some studies have shown that elk returned to the area of disturbance once the source of disturbance and human presence was gone (Gussey 1986, WGFD 2000), albeit at 50% or less of the previous levels in forested environments (Hayden-Wing Associates 1990).

Table 4.2 details the percentage of documented elk collar locations in each of the defined ranges within the CIAA. Elk use of the identified range focused on the time period when the elk are most apt to be utilizing the given range. BLM and WGFD assume a period of two weeks for elk to acclimate to reduced oil and gas activity during the timing limitation stipulations periods. Therefore Table 4.2 observations within the Parturition range occurred May 15-June 30. Observations within the Crucial Winter range were recorded December 1-April 30 of the corresponding year.

Table 4.2 Percent of documented elk collar locations in each of the defined ranges within the CIAA.

Year / Range	Total observation points	Total observation points within respective range	% use of respective range
2008 Yearlong	32,709	28,257	86%
2009 Yearlong	49,604	43,839	88%
2008 Crucial Winter Season	6,203	4,615	74%
2009 Crucial Winter Season	27,125	19,119	71%
2008 Parturition Season	7,626	5,594	73%
2009 Parturition Season	8,955	5,948	66%

¹Timing Limitation Stipulation (TLS) for elk Parturition range is May 1 – June 30

²Timing Limitation Stipulation (TLS) for elk Crucial Winter range is November 15 to April 30.

Currently there are an estimated 219 elk in the Fortification herd, down from an estimated 272 in 2002. The current WYGF objective for the herd is 150 (BLM 2006).

Approximately 2,788 acres and 210 acres of the Carr Draw Federal POD IV lie within the elk Yearlong and Parturition ranges respectively (See Table 3.5). None of the project area lies within the elk Crucial Winter range.

Figure 4.3. Existing and proposed well locations within and surrounding elk security habitat (as of March 2010) within the Carr Draw Federal POD IV.

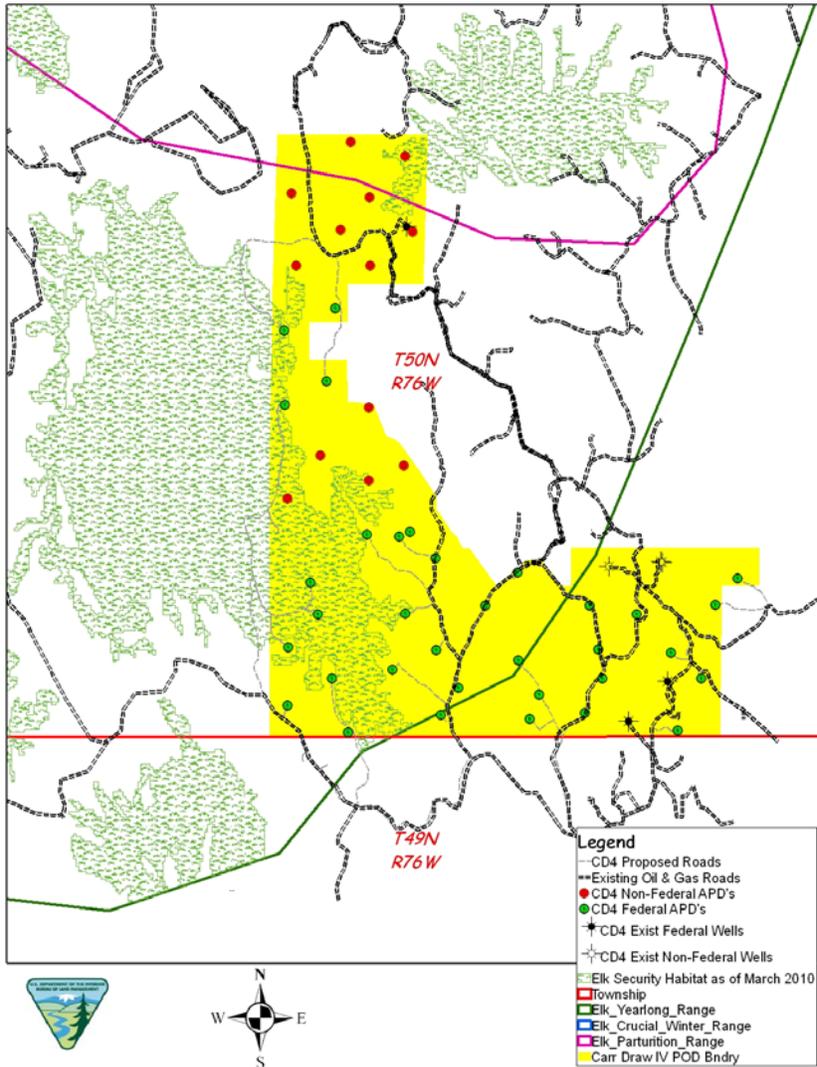
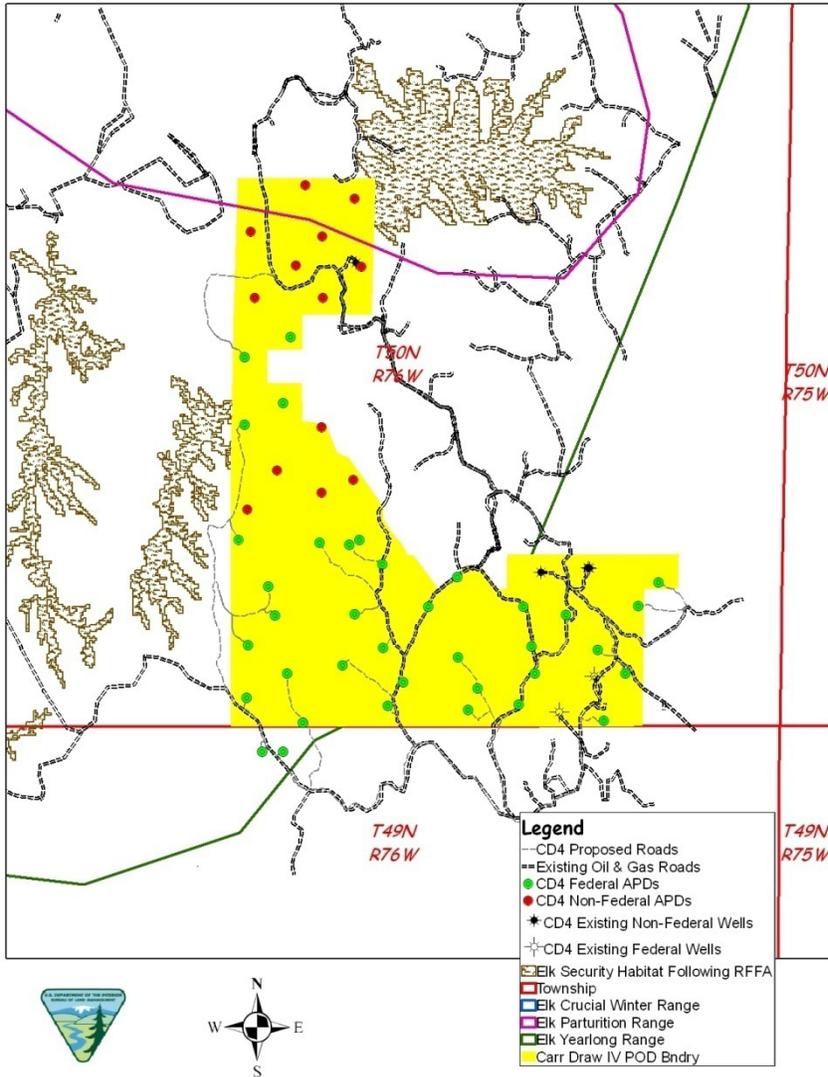


Figure 4.4. Carr Draw Federal IV Elk Security Remaining Post Reasonably Foreseeable Future Actions (RFFA).



The Carr Draw Federal POD IV is expected to affect elk occupying the Fortification Creek area and the immediate surrounding habitat. There is likely to be a larger amount of habitat effectiveness loss due to avoidance and displacement of animals and their altered behavior reacting to the CBNG activities with most of this occurring during the actual development stages.

Movement patterns of the elk differ for those elk captured north of Fortification Creek versus those elk captured south of Fortification Creek. Typically, those elk captured in the northern portion of the elk Yearlong range stay north of Fortification Creek whereas the elk captured in the southern portion of the Yearlong range tend to roam more between the north and south halves of the Yearlong range. Nine (50%) of the 18 elk collared south of Fortification Creek spent considerable time north of Fortification Creek (April 1, 2008 - July 17, 2009), with 37% of the locations from these 'southern' elk being north of Fortification Creek. While of 37 elk collared north of Fortification Creek only three (8%) spent much time south of Fortification Creek; only 4% of the locations from the 'northern' elk were south of Fortification Creek. Effective elk habitat along the southern boundary of the FCPA provides connectivity for these elk between the north and south halves of the elk Yearlong range. The Carr Draw Federal IV

project area lies south of the FCPA near the southern boundary of the elk Yearlong range. Following nonfederal CBNG development initiated within the Augusta Unit in May of 2008, more than half the collared elk that had been located within the AUZ project areas left the area. As is consistent with the literature, less than 50% of the collared elk have returned to the project area to date. Only 6 of the 25 GPS collared elk have been relocated utilizing the remnants of security habitat within the AUZ's western boundary in the past 4 months (November 2009 to March 2010). February had the highest number of elk relocations observed; 79 of a total 695 or 11%. It is likely that connectivity of the effective habitat within the AUZ POD has been compromised. In contrast, no elk relocations have been recorded within the CD3W or CD5a2 project areas even though a 720 acre security patch has been maintained within those PODs. Security habitat provides refuge for elk when stressed by human disturbance. It is likely that elk will also be displaced and connectivity compromised in the Carr Draw Federal POD IV project area by human disturbance for prolonged periods of time or avoided altogether with loss of security areas as occurred in the AUZ project area.

Population

The effects of the proposed project on elk populations are difficult to predict because of the many unknown factors associated with each of the potential effects and the potential for a synergistic or countervailing relationship among the individual effects. Because determining the reaction of elk in the Fortification Creek area is difficult, it may be more appropriate to frame the potential cumulative effects of CBNG development to this species in terms of a likelihood, or probability. In September 2007, the BLM-BFO issued the Environmental Report: Coalbed Natural Gas Effects on the Fortification Creek Area Elk Herd to identify potential impacts to the elk and their habitats. This report identified 3 scenarios; 1) mass abandonment of the entire Fortification Creek area (least probable), 2) complete habituation of CBNG activities (possible, but unlikely) and 3) reduced herd residing in Fortification Creek (most probable).

Because of their affinity for the Fortification Creek area and their wary nature, the most probable scenario for elk response to the proposed CBNG development is for the herd to seek out security patches within the Fortification Creek herd unit and attempt to avoid the CBNG activities, at least during the development stage. During the peak of development as proposed, road and facility construction and human activity is apt to be taking place on most of the ridges and in most of the drainages in the Carr Draw Federal POD IV. The elk population is expected to be stressed and impacted almost continuously during the development phase.

While some habituation may occur over time, regardless, a reduction in the elk population through displacement should be expected. This disturbance is usually temporary in nature, however, and some studies have shown that elk returned to the area of disturbance once the source of disturbance and human presence was gone (Gussey 1986, WGF 2000), albeit at 50% or less of the previous levels in forested environments (Hayden-Wing Associates 1990). It is also very likely the elk will shift their centers of distribution to the least impacted sites, such as the Wilderness Study Area (WSA). This trend is supported by data collected from 55 GPS collared elk within the Fortification Creek herd unit and the response to ongoing non-federal CBNG development. When monitoring the impacts of development on the elk population, it would be a concern if:

1. The current population trend, about 3% population decrease per year, were to precipitously decline (i.e., rapid rate increase)
2. The overall total herd population were to drop below an estimated 120 animals (about 52% of the current population)
3. The rate of elk ventures outside the Fortification Creek area were to drastically increase above 15% of the herd, and/or ...

4. The nature (i.e., longevity) of elk ventures outside the Fortification Creek area were to shift from mostly seasonal to mostly permanent, and/or ...
5. Degradation of security/effective habitat occurs due to elk concentrating within the remaining available habitat.

Another factor must be considered - when populations are reduced to near viability threshold levels, their small size can be an impact in itself. Small populations are subject to genetic inbreeding, and stochastic events such as fires, severe winter, disease, drought, etc. that make them intrinsically more vulnerable to extirpation (Soule 1986). Populations that are isolated, like the Fortification elk herd, are more sensitive to these internal (genetic) and external (stochastic) elements. In isolated populations, due to a closed gene pool with no gene immigration, deleterious genes can become more prevalent through time. While gene pool isolation may be a possibility in the Fortification Creek herd, it is currently thought that there is enough interbreeding and genetic interchange with surrounding elk herds that this occurrence is a low likelihood (Jahnke, 2006). Stochastic events such as fires or severe winter storms can remove individuals from populations. In populations that are small in number and isolated, such events are magnified because there are proportionally fewer animals left with no potential for immigration into the population (BLM 2006).

There will be some additional mortality due to vehicular collisions and poaching (Jahnke, 2006), as has already been seen in other parts of the Powder River Basin (BLM 2006).

4.1.3.3. Elk Cumulative effects

Reasonably Foreseeable Future Actions (RFFA) Resulting In Effects to the Fortification Elk Herd

Virtually 100% of the federal mineral estate within the CIAA, excluding the Wilderness Study Area (WSA), has been leased, therefore additional APD filings are expected in the future. WOGCC and BLM data were used to predict the RFFA within the CIAA. Oil and gas wells were considered reasonably foreseeable if the WOGCC data showed the locations as AP status (Approved Permit) for state & fee locations, or if the BLM had received an APD. Access roads to Federal locations have been submitted with the APDs, and these alignments were used to predict future disturbance (assuming an average short-term disturbance width of 50 feet) and arrangement of disruptive activities within the CIAA. BLM has utilized the best available data collected in the field as well as data received from various operators that includes road alignments to both federal and non-federal locations. However access road alignments to all non-federal locations are not known, and so not all are included in this analysis. The reasonably foreseeable future development within the CIAA as proposed within these parameters consists of 520 CBNG additional well locations, 436.2 miles of new roads resulting in approximately 2,644 acres of surface disturbance (Figure 7).

4.1.3.3.1. Elk Habitat

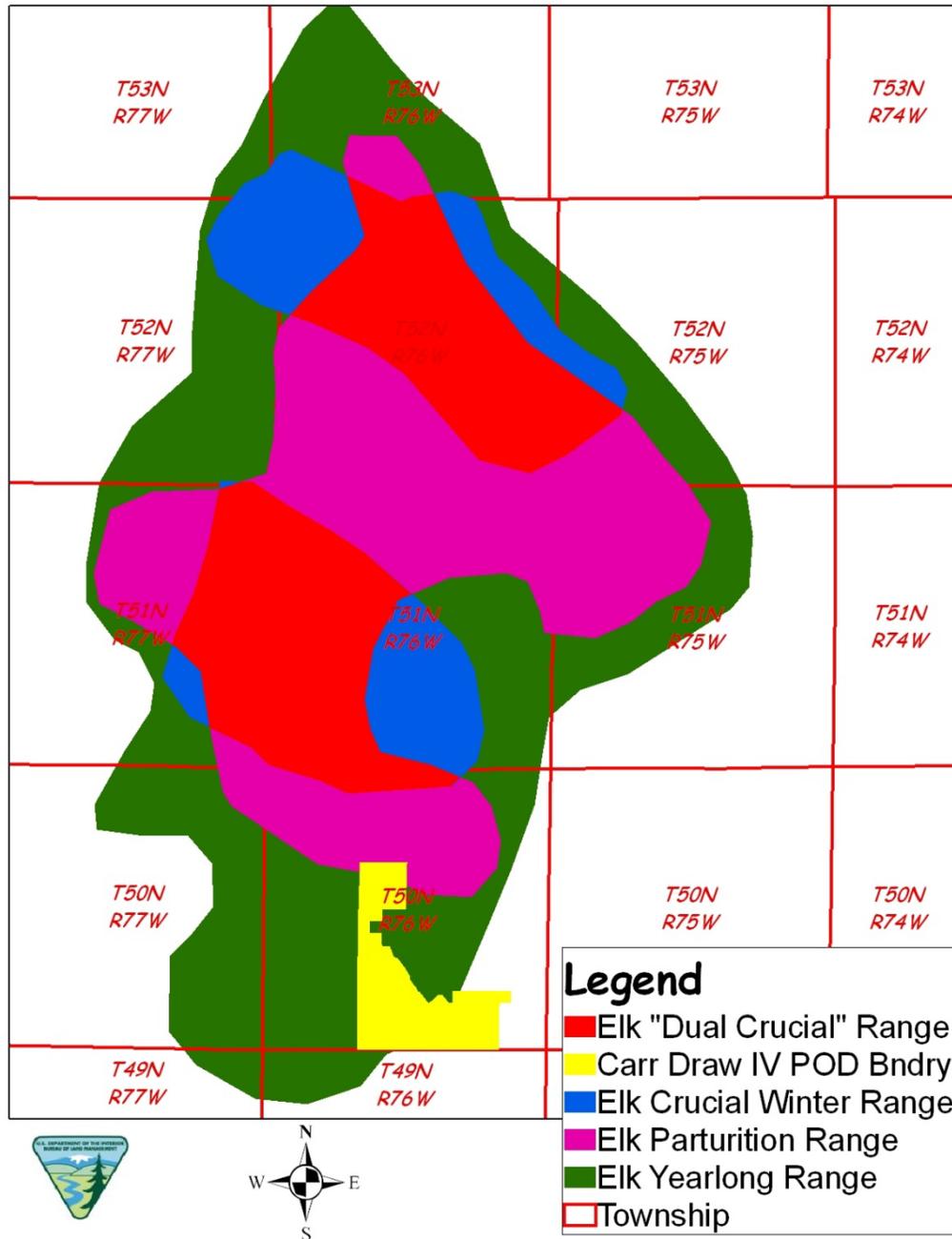
4.1.3.3.1.1. Habitat Effectiveness

As stated, the reasonably foreseeable future actions within the CIAA as proposed within the parameters above consists of 520 CBNG additional well locations, 436.2 miles of new roads resulting in approximately 2,644 acres of surface disturbance. Of those 520 proposed well locations 70 are within elk CWR resulting in approximately 199.8 miles of new roads and 1,211 acres of surface disturbance and 145 are within PR, resulting in approximately 146.1 miles of new roads and 885 acres of surface disturbance (Figure 7). The Carr Draw Federal IV POD proposes 7% of the wells, 4% of the new roads and 5% of the total surface disturbance within the CIAA for the RFFA. The distance between the 2 security patches within the vicinity of the Carr Draw Federal IV POD increases from 0.7 miles to 1.6 miles and their total security habitat is reduced 68%. The Carr Draw Federal IV project adds one additional main oil and gas road between the 2 security patches.

The total loss of elk security habitat as a result of the implementation of preceding CBNG development is

approximately 12,017 acres. Elk security habitat remaining within the “dual crucial” overlap areas was reduced to 84% of that prior to the CIAA analysis. Likewise, elk security habitat remaining within the delineated crucial ranges (Parturition & Crucial Winter ranges) and the Yearlong range has been reduced to 86% and 90% respectively.

Figure 4.5 Fortification Creek Elk Ranges



Ranching, hunting and various other recreational activities are also expected to occur within the CIAA, but are not anticipated to differ from historic levels previously identified in 2003 PRB EIS and 1985 RMP. Large expanses of yearlong range containing security habitat without any oil and gas development

will still remain following the foreseeable development (Figure 7) but development plans are ongoing for all leased parcels.

Table 4.3 summarized the security habitat projected to remain following reasonably foreseeable future actions within the elk yearlong range.

Table 4.3 Elk Security Habitat Remaining Post RFFA

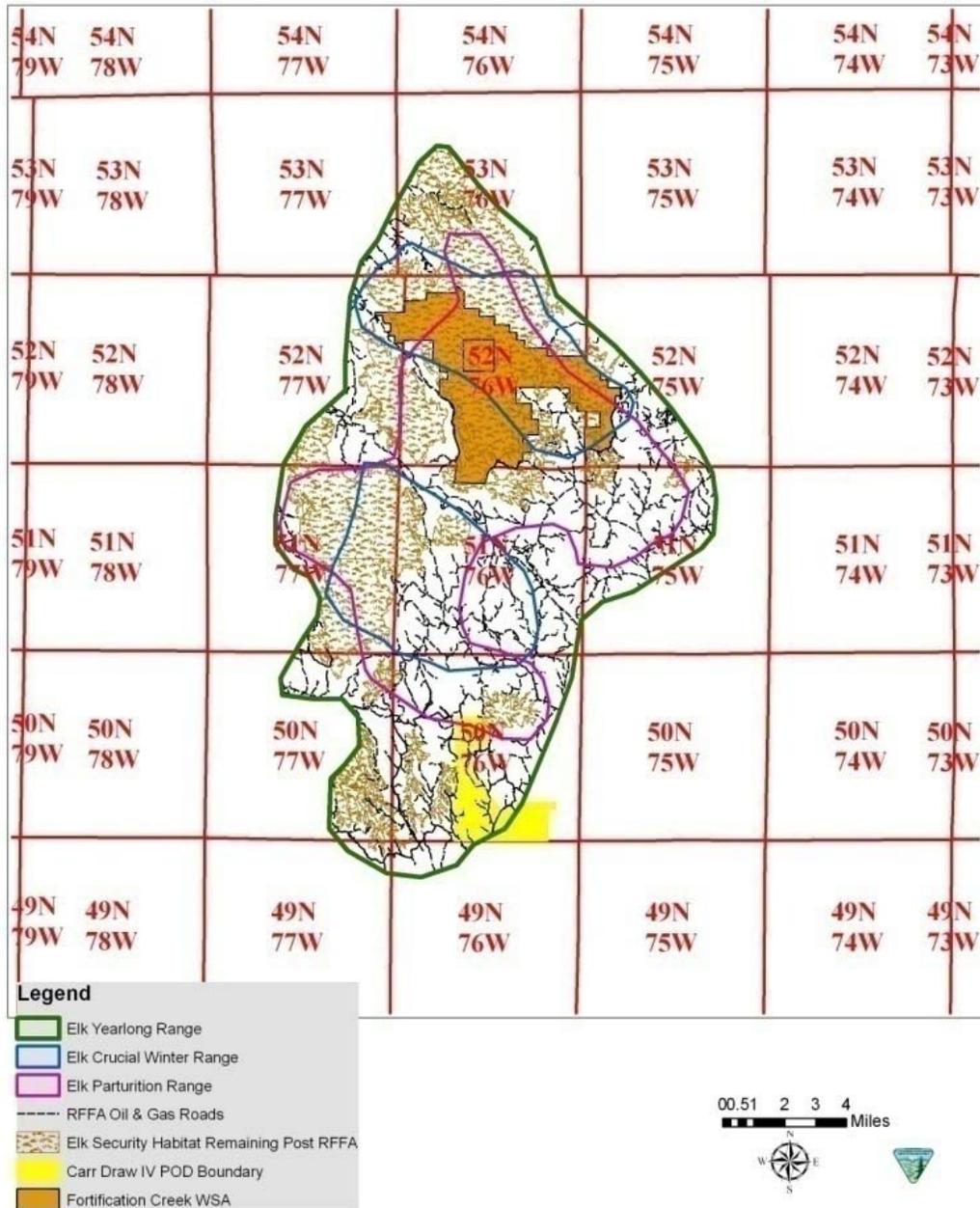
Range	Security Habitat (Acres)
Yearlong	44,484 (74% of 2009 security habitat)
Crucial Winter	20,533 (89% of 2009 security habitat)
Parturition	27,295 (81% of 2009 security habitat)
“Dual Crucial”	15,033 (25% of 2009 security habitat)

The total loss of elk security habitat predicted as a result of the implementation of alternative C is approximately 1,760 acres. Elk security habitat remaining within the “dual crucial” overlap areas will be reduce to 84% of that prior to the CIAA analysis. Likewise, elk security habitat remaining within the delineated crucial ranges (Parturition & Crucial Winter ranges) and the Yearlong range will be reduce to 85% and 69% respectively.

Table 4.4 Loss of Elk Security Habitat within Identified Elk Ranges Over Time

Time Line	Elk Range	Acres	Total acres ESH lost	% Total EHS Remaining
Start: Dec. 2008	All-ESH remaining	64102	0.0%	100.0%
	Yearlong	25139	0.0%	100.0%
	Parturition & Crucial Winter	21008	0.0%	100.0%
	Dual Crucial	17957	0.0%	100.0%
2009: AUZ(July 2009) CD3W(Sept. 2009) CD5a2 (Sept. 2009)	All-ESH remaining	56017	12.6%	87.4%
	Yearlong	18902	24.8%	75.2%
	Parturition & Crucial Winter	18151	13.6%	86.4%
	Dual Crucial	15032	16.3%	83.7%
2010: Carr Draw IV POD	All-ESH remaining	50325	21.5%	78.5%
	Yearlong	17372	30.9%	69.1%
	Parturition & Crucial Winter	17921	14.7%	85.3%
	Dual Crucial	15032	16.3%	83.7%

Figure 4.6 Elk Security Habitat Remaining Post RFFA



4.1.3.3.2. Pattern of Habitat Use

Fortification Creek radio-telemetry and GPS collaring data collected since 2005, have shown elk avoid oil and gas development by moving to less developed areas. Disruptive activity is usually temporary in nature, however, and some studies have shown that elk returned to the area of disturbance once the source of disturbance and human presence was gone (Gussey 1986, WGFD 2000), albeit at 50% or less of the previous levels in forested environments (Hayden-Wing Associates 1990).

Continued use of radio-telemetry and GPS collaring data will show changes to the pattern of elk use arising from oil and gas development, natural causes, and from other land uses within the Fortification elk herd yearlong range. Projected loss of habitat and connectivity will affect past patterns of use, however due to the projected amounts of remaining security habitat and the imposed timing limitation stipulations

(TLS), it is anticipated that the elk usage patterns will decrease initially in areas of development and then gradually return to 50% or less pre-disturbance levels after the facilities are constructed. However, since it is anticipated that big game will avoid those areas frequented by human activity during the production phase of the CBNG development; the level of human activity will determine the level of elk return.

As more information is gathered about the foreseeable future development (new APDs not received to date or permits relinquished etc), it is likely the foreseeable future development could change. As additional data is collected with the continued use of radio-telemetry and GPS collaring data, future site specific analysis will need to be done.

Figure 4.7 represents yearlong use, Figure 4.8 represents winter use, and Figure 4.9 represents parturition use as captured from the radio-telemetry and GPS collaring data.

Figure 4.7 Fortification Creek Elk Yearlong Range Use.

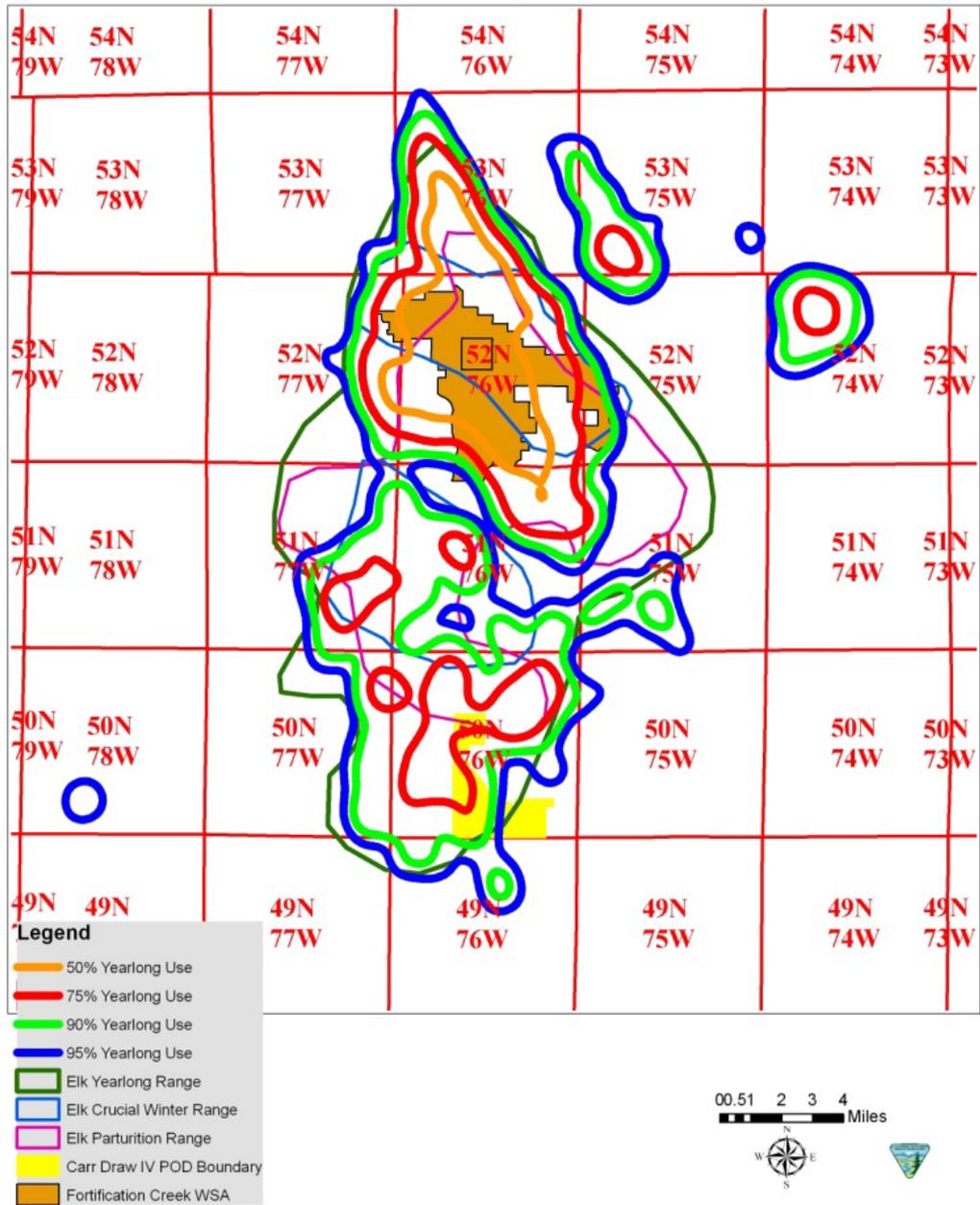


Figure 4.8 Fortification Creek Elk Crucial Winter Range Use.

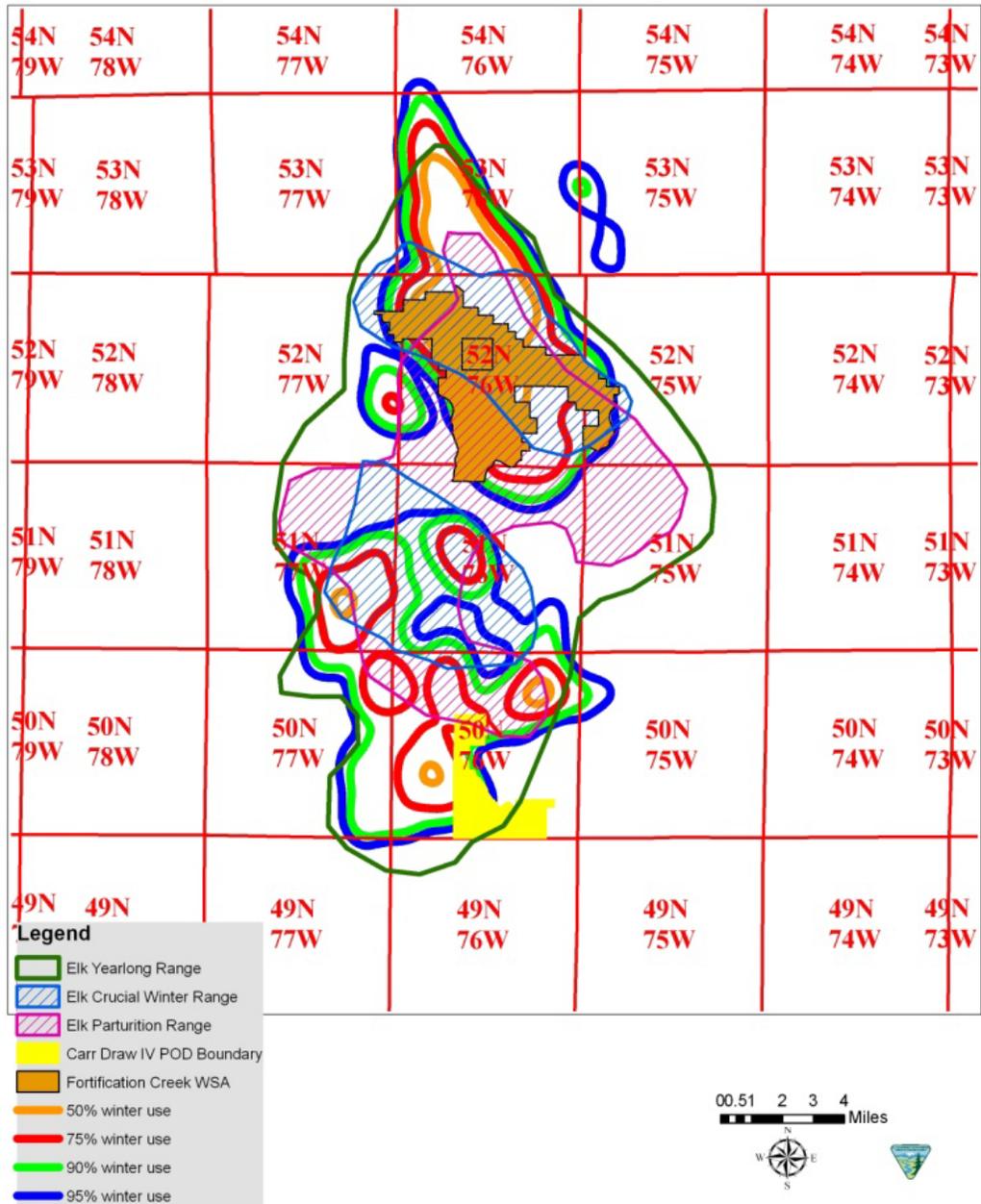
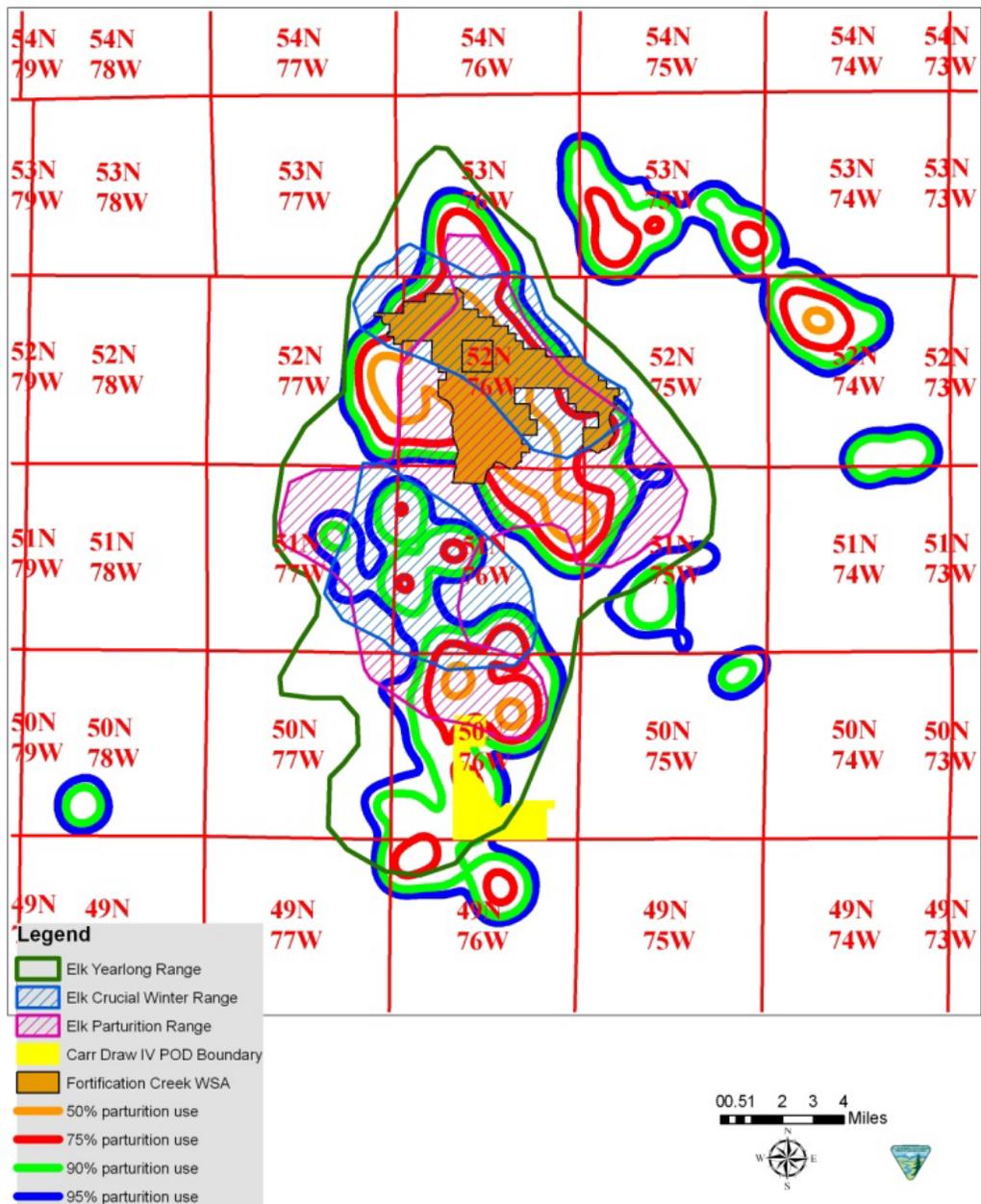


Figure 4.9 Fortification Creek Elk Parturition Range Use.



4.1.3.3.3. Population

Through on-going research with BLM’s partners (WGFD and University of Wyoming); the impacts of development on the Fortification elk population will continue to be monitored. Response of elk to development will be evaluated and BLM will coordinate with WGFD to identify objectives for future live

Due to the loss of habitat effectiveness within and adjacent to the project area, the population is likely to be effected.

4.1.3.3.4. Mitigation

In a letter dated August 31, 2009, WGFD commented to the BLM: “Efforts should be made to decrease

disturbance on crucial winter and parturition ranges by implementing seasonal stipulations and/or limiting visits. Design of the gas field should be to avoid or reduce miles of roads and numbers of well pad sites within existing security habitat areas and/or remove unneeded roads to create security patches” (John Emmerich, WGFDD Deputy Director, to Duane Spencer, BFO Field Manager, 2009).

No timing limitation stipulations for drilling, construction and other activities will be applied to protect elk during critical winter and calving periods as there are no project elements of the project area within the identified ranges that fall under the federal action. It is anticipated that big game will avoid those areas frequented by human disturbance during the production phase of the non-federal CBNG development.

BLM’s goal is to minimize impacts to wildlife and their habitat. Through management decisions we become more conscious of the mechanisms driving shifts in wildlife behavior and habitat selection, and further understand the resulting effects of these behavioral shifts on fitness. Consequently, to properly mitigate the impacts of energy development on wildlife we must accrue knowledge of direct and indirect disturbances associated with energy development. These understandings will assist in creating more efficient conservation and management plans while still meeting energy demands. Beginning June 2009, the BLM in conjunction with the University of Wyoming has initiated a study to identify levels of direct and indirect disturbances that influence habitat selection by elk in the Fortification Creek Area (FCA).

These findings will be documented in quarterly reports and along with the monthly work reports will facilitate adaptive management to minimize direct and indirect impacts on elk.

4.1.3.4. Aquatics Direct and Indirect Effects

Impacts to aquatics are discussed in the PRB FEIS on pp. 4-235 to 4-247. Produced water will be treated and piped to the Powder River and at outfalls previously approved under various sundry notices, i.e. Waterline Sundry, Somerville Waterline Sundry 1 and Somerville Waterline Sundry 2. The Carr Draw Federal POD IV includes one additional change to existing or approved water management. A new water pipeline of approximately 6.4 miles is proposed as the Barber Creek water pipeline and will discharge at existing or approved outfalls. No additional impacts to aquatic communities are expected to occur as a result of implementation of the Carr Draw Federal POD IV.

4.1.3.5. Migratory Birds

4.1.3.5.1. Direct and Indirect Effects

Direct and indirect effects to migratory birds are discussed in the PRB FEIS (pp. 4-231 to 4-235). Disturbance of habitat within the project area is likely to impact migratory birds. Native habitats will be lost directly with the construction of wells, roads, and pipelines. Reclamation and other activities that occur in the spring may be detrimental to migratory bird survival. Prompt re-vegetation of short-term disturbance areas should reduce habitat loss impacts. Activities will likely displace migratory birds farther than the immediate area of physical disturbance. Drilling and construction noise can be troublesome for songbirds by interfering with the males’ ability to attract mates and defend territory, and the ability to recognize calls from conspecifics (BLM 2003).

Habitat fragmentation will result in more than just a quantitative loss in the total area of habitat available; the remaining habitat area will also be qualitatively altered (Temple and Wilcox 1986). Ingelfinger (2004) identified that the density of breeding Brewer’s sparrows declined by 36% and breeding sage sparrows declined by 57% within 100 m 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.

4.1.3.6. Raptors

4.1.3.6.1. Direct and Indirect Effects

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.

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 biologic buffer is a combination of distance and visual screening that provides nesting raptors with security such that they will not be flushed by routine activities.

Well 34-28 was relocated approximately 0.15 mile north to a dry hole location. The original location was proposed in direct line of site of golden eagle nest 6341. The new location, although no further from this nest, is behind a ridge and in an area of previous disturbance. This move will also minimize noise disturbance associated with construction and maintenance, as the topography will create a natural sound barrier between the well and the nest. Well 32-33 was removed from the project plan due as it was proposed within line of sight and close proximity to two red-tailed hawk nests (6343 and 6344) and no alternative location was evident at the onsite visit.

Table 4.5 Proposed and existing infrastructure within 0.5 mile of documented raptor nests within the Carr Draw Federal POD IV project area.

BLM ID	Infrastructure
8370	<ul style="list-style-type: none"> • 1 proposed waterline segment • 1 proposed primitive road / proposed corridor • 1 proposed pump station • 1 proposed power drop • 1 proposed POD building • 1 existing primitive road segment

BLM ID	Infrastructure
6348	<ul style="list-style-type: none"> • Wells: 21-21-5076 BG and GW • 1 proposed waterline segment • 1 proposed primitive road / proposed corridor segment • 1 proposed improved road / proposed corridor segment • 1 proposed pump station • 1 proposed power drop • 1 proposed POD building • 1 existing primitive road segment
6345	<ul style="list-style-type: none"> • Wells: 21-21-5076 BG and GW; 12-21-5076 BG and GW; 23-21-5076 BG and GW; 14-21-5076 BG and GW • 1 proposed waterline segment • 2 proposed primitive road / proposed corridor segments
3732	<ul style="list-style-type: none"> • Wells: 21-21-5076 BG and GW; 12-21-5076 BG and GW; 23-21-5076 BG and GW • 1 proposed waterline segment • 2 proposed primitive road / proposed corridor segments
6347	<ul style="list-style-type: none"> • Wells: 14-21-5076 BG and GW • 1 proposed improved road / proposed corridor segment
4125	<ul style="list-style-type: none"> • 1 existing primitive road / proposed corridor segment • 1 existing improved road / proposed corridor segment • 1 existing primitive road segment • 3 existing oil wells
6168	<ul style="list-style-type: none"> • 1 proposed improved road / proposed corridor
6162	<ul style="list-style-type: none"> • 1 proposed improved road / proposed corridor • 1 proposed staging area • 1 proposed POD building • 1 proposed power drop
6167	<ul style="list-style-type: none"> • 2 proposed improved road / proposed corridor • 1 proposed staging area • 1 proposed POD building • 1 proposed power drop
6346	<ul style="list-style-type: none"> • 2 proposed improved road / proposed corridor • 1 proposed staging area • 1 proposed POD building • 1 proposed power drop
6166	<ul style="list-style-type: none"> • 2 proposed improved road / proposed corridor • 1 proposed staging area • 1 proposed POD building • 1 proposed power drop
6341	<ul style="list-style-type: none"> • Wells: 13-28-5076 BG and GW; 21-28-5076 BG and GW; 24-28-5076 BG and GW; 33-28-5076 BG and GW; 43-28-5076 BG and GW • 5 proposed improved road / proposed corridor segments
6342	<ul style="list-style-type: none"> • Wells: 13-28-5076 BG and GW; 21-28-5076 BG and GW; 24-28-5076 BG and GW; 33-28-5076 BG and GW; 43-28-5076 BG and GW • 5 proposed improved road / proposed corridor segments

BLM ID	Infrastructure
6343	<ul style="list-style-type: none"> • Wells: 24-28-5076 BG and GW; 12-33-5076 BG and GW; 21-33-5076 BG and GW; 23-33-5076 BG and GW; 41-33-5076 BG and GW; 43-33-5076 BG and GW • 7 proposed improved road / proposed corridor segments
6344	<ul style="list-style-type: none"> • Wells: 21-33-5076 BG and GW; 23-33-5076 BG and GW; 41-33-5076 BG and GW; 43-33-5076 BG and GW • 5 proposed improved road / proposed corridor segments
5587/5544	<ul style="list-style-type: none"> • Wells: 43-33-5076 BG and GW; 34-33-5076 BG and GW; 12-34-5076 BG and GW • 3 proposed improved road / proposed corridor segments • 1 proposed power drop
3726	<ul style="list-style-type: none"> • Wells: 14-27-5076 BG and GW; 34-27-5076 BG and GW; 41-33-5076 BG and GW; 12-34-5076 BG and GW; 21-34-5076 BG and GW • 5 proposed improved road / proposed corridor segments • 1 proposed staging area • 1 proposed POD building
4585	<ul style="list-style-type: none"> • Wells: 34-27-5076 BG and GW • 1 proposed improved road / proposed corridor segment • 1 existing improved road / proposed corridor segment • 2 existing oil wells

Use of nest 4125 will likely continue to occur, because traffic associated with the Carr Draw Federal POD IV project will not increase to levels greater than existing levels on the main access road to the oil development already in the area. The red-tailed hawks that occupied this nest in 2008 are likely accustomed to the disturbance associated with this main travel road and may still return.

All remaining nests are or have been occupied by red-tailed hawks, great horned owls, or American kestrels, all of these species being less sensitive to human disturbance, and infrastructure was either not proposed within or removed from a distance considered potentially disturbing to these species.

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

4.1.3.7. Plains Sharp-tailed Grouse Effects

Impacts to sharp-tailed grouse from the project are expected to be similar to impacts to greater sage-grouse.

4.1.3.8. Sagebrush Obligates

4.1.3.8.1. Direct and Indirect Effects

Construction and maintenance activities associated with development of the Carr Draw Federal POD IV project are likely to cause a decline in sagebrush obligate species. In Wyoming, existing oil and gas wells are located primarily in landscapes dominated by sagebrush, causing direct loss of this habitat. Associated road networks, pipelines, and powerline transmission corridors also influence vegetation dynamics by fragmenting habitats or by creating soil conditions facilitating the spread of invasive species (Braun 1998, Gelbard and Belnap 2003). Density of sagebrush-obligate birds within 100m of roads constructed for natural gas development in Wyoming was 50% lower than at greater distances (Ingelfinger 2001).

4.1.3.8.2. Sagebrush Obligates Cumulative Effects

Fragmentation of shrubsteppe habitat is a major disruption that has consequences for sagebrush-obligate species (Braun et al. 1976; Rotenberry & Wiens 1980a). In fragmented habitats, suitable habitat area

remains only as remnants surrounded by unusable environments (Urban and Shugart 1984; Fahrig & Paloheimo 1988). Sagebrush-obligate species decline because areas of suitable habitat decrease (Temple & Cary 1988), because of lower reproduction, and/or because of higher mortality in remaining habitats (Robinson 1992; Porneluzi et al. 1993). 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.

4.1.3.9. Threatened and Endangered Species

Potential project effects on Threatened and Endangered Species were analyzed and a summary is provided in Table 4.6.

Table 4.6 Summary of Threatened and Endangered Species Habitat and Project Effects.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
<i>Endangered</i>				
Black-footed ferret (Mustela nigripes)	Black-tailed prairie dog colonies or complexes > 1,000 acres.	NS	NLAA	Suitable habitat will be directly impacted.
<i>Threatened</i>				
Blowout penstemon	Unstable, sandy blow-outs and active sand dunes	NP	NE	Depositional sands/dunes not present.
Ute ladies'-tresses orchid (Spiranthes diluvialis)	Riparian areas with permanent water	NP	NE	No suitable habitat present.
<p>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.</p> <p>Project Effects LAA - Likely to adversely affect NE - No Effect NLAA - May Affect, not likely to adversely affect individuals or habitat.</p>				

4.1.3.9.1. Black-Footed Ferret Direct and Indirect Effects

Direct and indirect effects to black-footed ferret are discussed in the PRB FEIS (pg. 4-251). Suitable habitat is of sufficient size to support a black-footed ferret population. The project area is 13 miles from the Pleasantdale reintroduction area. No surveys for ferrets were required or conducted. It is extremely unlikely that any black-footed ferret is present in the project area. However, if any black-footed ferret became present, the proposed action would likely make portions of the project area unsuitable for ferret inhabitation because it would further fragment existing colonies and impose permanent barriers between prairie dog towns. Implementation of the proposed development will have "*no effect*" on the black-footed ferret because the species is not likely to occur.

4.1.3.9.2. Blowout penstemon

Suitable habitat is not present within the proposed Carr Draw Federal POD IV project area. No historic

seed source is present within the project area. Implementation of the proposed coal bed natural gas project will have “no effect” on the blowout penstemon.

4.1.3.9.3. Ute Ladies’-Tresses Orchid Direct and Indirect Effects

Suitable habitat is not present within the proposed Carr Draw Federal POD IV project area. Reservoir seepage may create suitable habitat if historically ephemeral drainages become perennial; however, no historic seed source is present within the project area. Implementation of the proposed coal bed natural gas project will have “no effect” on the Ute ladies’ - tresses orchid.

4.1.3.9.4. Threatened and Endangered Species Cumulative Effects

The cumulative effects associated with Alternative C and D are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, refer to the PRB FEIS, pp. 4-250 to 4-257. No additional mitigation measures are required.

4.1.3.10. 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 4-273. Table 4.7 summarizes the habitat requirements and potential impacts of the Carr Draw 4 project on all Wyoming BLM sensitive species that occur in the BFO administrative area. Some sensitive species are of particular concern in the project area, due to their demonstrated or suspected sensitivity to CBNG development or because they were recently considered for listing under the ESA. These species include bald eagle, black-tailed prairie dog, greater sage-grouse, mountain plover, and western burrowing owl and are discussed in further detail in this section.

Table 4.7 Summary of Sensitive Species Habitat and Project Effects.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Amphibians				
Northern leopard frog (<i>Rana pipiens</i>)	Beaver ponds and cattail marshes from plains to montane zones.	NP	NI	No beaver ponds or marshes are present.
Columbia spotted frog (<i>Ranus pretiosa</i>)	Ponds, sloughs, small streams, and cattails in foothills and montane zones. Confined to headwaters of the S Tongue R drainage and tributaries.	NP	NI	The project area is outside the species' range, and the species is not expected to occur .
Fish				
Sturgeon chub (<i>Macrhybopsis gelida</i>)	Swift, rocky riffles throughout the Powder River.	S	NI	Amount of water discharged to the Powder River not of sufficient magnitude to have impacts to this species. Changes in water quality not expected to have an impact.
Yellowstone cutthroat trout (<i>Oncoryhynchus clarki bouvieri</i>)	Cold-water rivers, creeks, beaver ponds, and large lakes in the Upper Tongue sub-watershed	NP	NI	The project area is outside the species' range, and the species is not expected to occur .
Birds				
Baird's sparrow (<i>Ammodramus bairdii</i>)	Shortgrass prairie and basin-prairie shrubland habitats; plowed and stubble fields; grazed pastures; dry lakebeds; and other sparse, bare, dry ground.	S	MIIH	Shortgrass prairie and sagebrush cover will be affected.
Bald eagle (<i>Haliaeetus leucocephalus</i>)	Mature forest cover often within one mile of large water body with reliable prey source nearby.	S	MIIH	Infrastructure within one mile of occupied habitat.
Brewer's sparrow (<i>Spizella breweri</i>)	Sagebrush shrubland	S	MIIH	Sagebrush cover will be affected.
Ferruginous hawk (<i>Buteo regalis</i>)	Basin-prairie shrub, grasslands, rock outcrops	S	MIIH	Nesting habitat will be impacted and human activities will increase
Greater sage-grouse (<i>Centrocercus urophasianus</i>)	Basin-prairie shrub, mountain-foothill shrub	K	WIPV	Sagebrush cover will be affected.
Loggerhead shrike (<i>Lanius ludovicianus</i>)	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Sagebrush cover will be affected.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Long-billed curlew (<i>Numenius americanus</i>)	Grasslands, plains, foothills, wet meadows	S	MIIH	Grasslands, meadows will be impacted
Mountain plover (<i>Charadrius montanus</i>)	Short-grass prairie with slopes < 5%	NP	NI	Suitable habitat is not present.
Northern goshawk (<i>Accipiter gentilis</i>)	Conifer and deciduous forests	NS	NI	Forest habitat will be impacted.
Peregrine falcon (<i>Falco peregrinus</i>)	Cliffs	NP	NI	No nesting habitat present.
Sage sparrow (<i>Amphispiza billneata</i>)	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Sagebrush cover will be affected.
Sage thrasher (<i>Oreoscoptes montanus</i>)	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Sagebrush cover will be affected.
Trumpeter swan (<i>Cygnus buccinator</i>)	Lakes, ponds, rivers	NP	NI	Habitat not present.
Western Burrowing owl (<i>Athene cunicularia</i>)	Grasslands, basin-prairie shrub	S	MIIH	Infrastructure within 0.25 miles of prairie dog colonies, thus may impact nesting individuals or selection of nest sites.
White-faced ibis (<i>Plegadis chihi</i>)	Marshes, wet meadows	NP	NI	Permanently wet meadows not present.
Yellow-billed cuckoo (<i>Coccyzus americanus</i>)	Open woodlands, streamside willow and alder groves	NP	NI	Streamside habitats not present.
Mammals				
Black-tailed prairie dog (<i>Cynomys ludovicianus</i>)	Prairie habitats with deep, firm soils and slopes less than 10 degrees.	K	MIIH	Prairie dog towns will be impacted.
Fringed myotis (<i>Myotis thysanodes</i>)	Conifer forests, woodland chaparral, caves and mines	NS	MIIH	Habitat not present.
Long-eared myotis (<i>Myotis evotis</i>)	Conifer and deciduous forest, caves and mines	NS	MIIH	Habitat not present.
Spotted bat (<i>Euderma maculatum</i>)	Cliffs over perennial water.	NP	NI	Cliffs & perennial water not present.
Swift fox (<i>Vulpes velox</i>)	Grasslands	NP	NI	Habitat not present.
Townsend's big-eared bat (<i>Corynorhinus townsendii</i>)	Caves and mines.	NP	NI	Habitat not present.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Plants				
Porter's sagebrush (<i>Artemisia porteri</i>)	Sparsely vegetated badlands of ashy or tufaceous mudstone and clay slopes 5300-6500 ft.	NP	NI	Habitat not present.
William's wafer parsnip (<i>Cymopterus williamsii</i>)	Open ridgetops and upper slopes with exposed limestone outcrops or rockslides, 6000-8300 ft.	NP	NI	Project area outside of species' range.
<p>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.</p> <p>Project Effects 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</p>				

4.1.3.10.1. Bald Eagle Direct and Indirect Effects

Though roosting habitat does exist within and surrounding the project area, no bald eagle winter roost areas or bald eagle nests are present. The project is not likely to impact bald eagle roosting or nesting.

Impacts to bald eagles are discussed in the PRB FEIS on pg. 4-251 to 4-253. A more recent study completed in 2004 suggests that two-tracks and improved project roads pose minimal collision risk to bald eagles. In one year of monitoring road-side carcasses the BLM BFO reported 439 carcasses, 226 along Interstates (51%), 193 along paved highways (44%), 19 along gravel county roads (4%), and 1 along an improved CBNG road (<1%) (Bills 2004). No road-killed eagles were reported; bald and golden eagles were observed feeding on 16 of the reported road-side carcasses (<4%). The risk of big-game vehicle-related mortality along CBNG project roads is so insignificant or discountable that when combined with the lack of bald eagle mortalities associated with highway foraging leads to the conclusion that CBNG project roads do not affect bald eagles.

4.1.3.10.2. Black-tailed Prairie Dog Direct and Indirect Effects

One proposed corridor, a POD building and well 14-27 are proposed within the small prairie dog colony located in SWSW Section 27, T50N, R76W. During construction of the wells, dispersal of prairie dogs may be affected. As prairie dog colonies grow in size, prairie dogs may disperse to new colonies, preferring to move into an existing colony or one that has been abandoned, rather than start a completely new colony (Hoogland 1995). Construction may cause increased stress on prairie dogs as they attempt to disperse and may result in avoidance of colonies in close proximity to such activities. Additional impacts to black-tailed prairie dogs are discussed in the PRB FEIS on pg. 4-255 to 4-256.

4.1.3.10.3. Greater Sage-grouse Direct and Indirect Effects

The proposed action will impact nesting, brood rearing, late summer, and winter habitat, both through loss of habitat and avoidance of habitat in proximity to the development. Proposed project elements that are anticipated to negatively impact grouse include 36 CBNG wells on 36 locations, 15.6 miles (17) new oil and gas access roads with utility corridor, increased vehicle traffic on established roads, 2 water pump stations, 6.4 miles water pipeline, 4 gas metering facilities, 5 staging areas and 3.8 miles of cross country overhead powerlines. Thirty of 36 locations and approximately 30 new proposed roads (7.4 miles) are located within identified high quality sage-grouse habitat however studies indicate that sage-grouse will avoid oil and gas wells and associated roads and infrastructure out to 0.6 mile radius. Therefore the footprint of impact from each well, each facility and associated road and infrastructure overlaps identified high quality habitat within and surrounding the Carr Draw Federal IV POD. When considering a 0.6 mile radius of avoidance of existing oil and gas wells and roads, most all the high quality sage-grouse habitat with the project area identified on page 33 (S21, S26, S27, S33 and S34) has been impacted. Only the high quality sage-grouse habitat immediately to the west (S29 & S32) of the POD remains uncompromised.

Direct impacts to high quality sage-grouse habitat resulting from 30 well locations and associated road and infrastructure proposed within identified habitat is listed in Table 4.8 below.

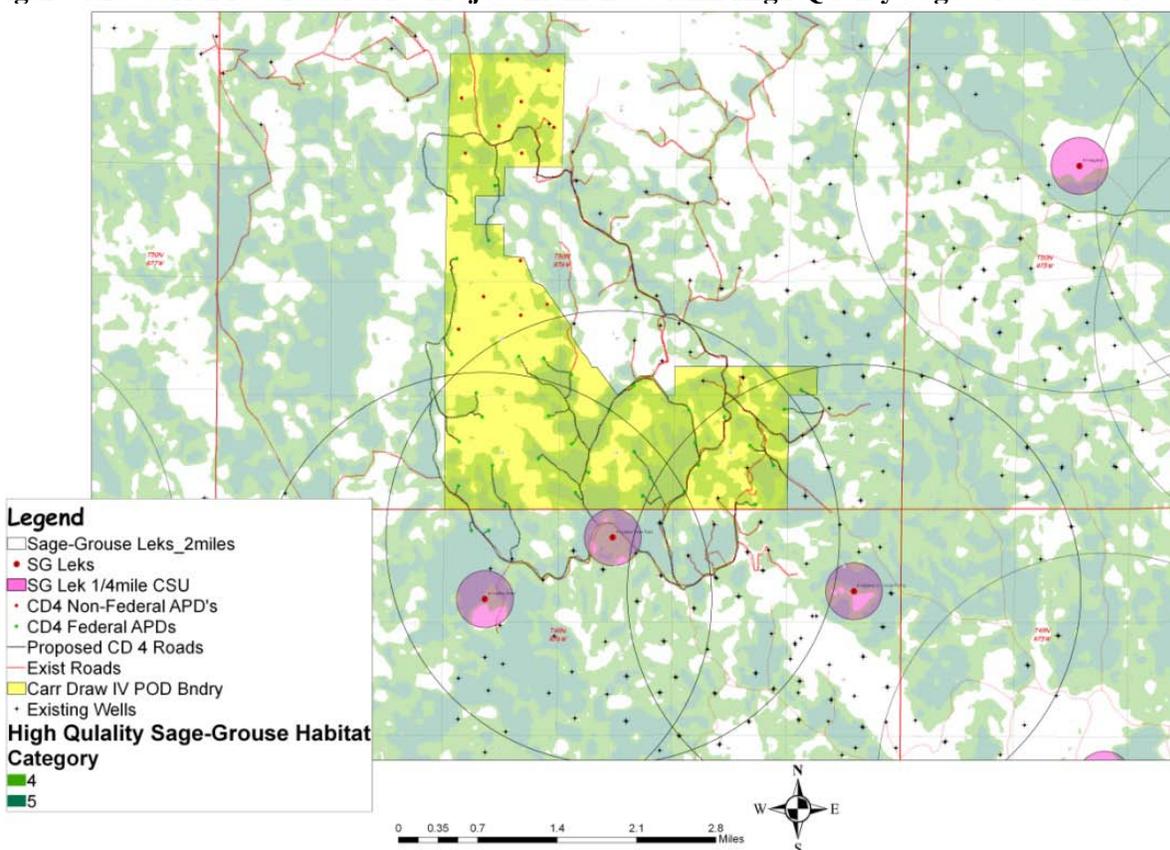
Table 4.8 Direct Impacts to High Quality Sage-Grouse Habitat

Proposed Project element	Number or Miles	Direct Impact – Approximate Acres of High Quality Sage-Grouse Habitat Loss
Well Locations	30	10.2
Access road	7.4	40.4
Pump Station	2	7.3
Water Pipeline (Barber Cr. water pipeline)	6.4	31.0

Proposed Project element	Number or Miles	Direct Impact – Approximate Acres of High Quality Sage-Grouse Habitat Loss
Gas Metering Facilities	4	4.0
Staging Areas	5	10.0
Power Lines	3.8	13.8
	Total	116.7

Approximately 2,457 acres of seasonal sage-grouse habitat has been identified within the 3,897 acre Carr Draw Federal IV project area. This includes 2,191 acres of nesting and brood rearing habitat overlapping 1,366 acres of winter habitat. Approximately 5% of the available habitat within the Carr Draw Federal IV POD will be directly impacted. Indirect impacts under alternative C will compromise 100% of the seasonal habitat within the project area boundary. Proposed project elements beyond the project boundary (roads, overhead powerline and water pipeline) will indirectly impact an additional 7,450 acres of seasonal sage-grouse habitat. Total indirect impacts to sage-grouse habitat exceeds 9,900 acres through fragmentation of seasonal habitats within and adjacent to the project area.

Figure 4.10 Carr Draw Federal IV Project Elements within High Quality Sage-Grouse Habitat



Direct and indirect impacts to sage-grouse are discussed in more detail in the PRB FEIS on pg. 4-257 to 4-273.

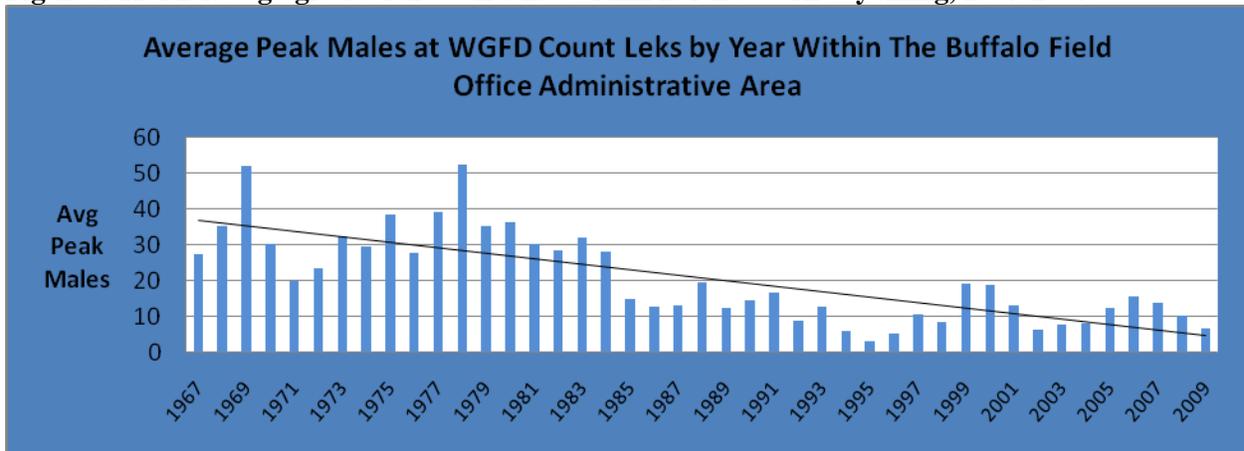
To minimize impacts to sage-grouse utilizing habitat affected by the proposed action, surface disturbing activities will be restricted within identified nesting habitat within the project area during sage-grouse breeding and nesting periods (March 1 – June 15) for project components located in sage-grouse habitat for the life of the project.

4.1.3.10.4. Greater Sage-grouse Cumulative Effects

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

The sage-grouse population within northeast Wyoming has been exhibiting a steady long term downward trend, as measured by lek attendance (Figure 4.) (WGFD 2005). The figure illustrates a ten-year cycle of periodic highs and lows. Each subsequent population peak is lower than the previous peak. Long-term harvest trends are similar to that of lek attendance (WGFD 2005). The research described below suggests that these declines may be a result, in part, of CBNG development in this region of Wyoming and that the leks within the cumulative impact assessment area may experience similar declines.

Figure 4.11 Male sage-grouse lek attendance within northeastern Wyoming, 1967-2007.



Research has shown that declines in lek attendance are correlated with oil and gas development. Several studies have shown that well density can be used as a metric for evaluating impacts to sage-grouse, as measured by declines in lek attendance (Braun et al. 2002, Holloran et al. 2005, and Walker et al. 2007).

These studies indicated that oil or gas development exceeding approximately one well pad per square mile, resulted in calculable impacts on breeding populations, as measured by the number of male sage-grouse attending leks (State Wildlife Agencies' Ad Hoc Committee for Sage-Grouse and Oil and Gas Development 2008). For example, 12 years of coal-bed methane gas development in the Powder River Basin of Wyoming has coincided with 79 percent decline in the sage-grouse population (Emmerich 2009, pers. Comm.)⁴

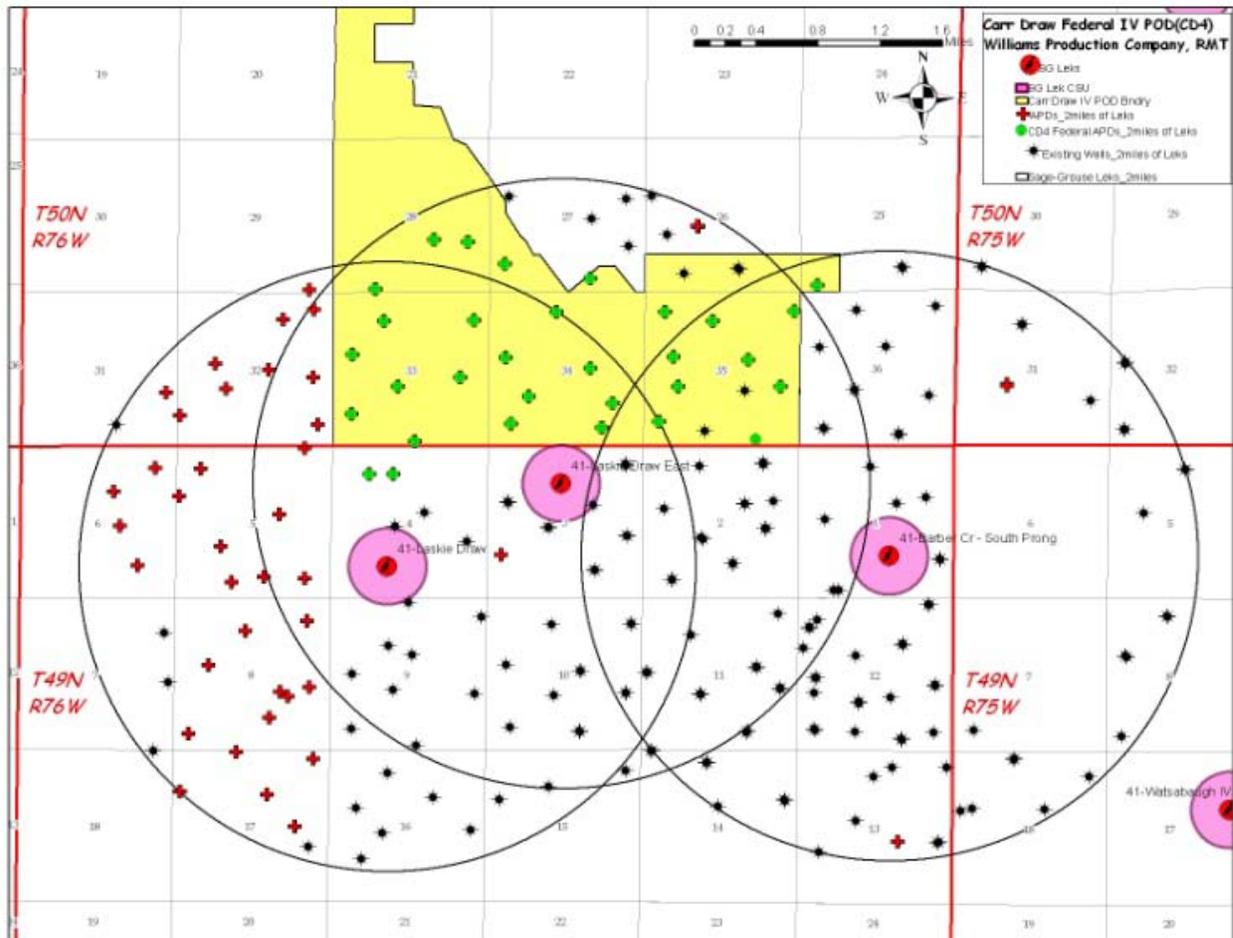
The Laskie Draw East, Laskie Draw and Barber Creek-South Prong leks are the sage-grouse leks within two miles of the project boundary. There are currently 218 existing wells within two miles of these leks, an area of 25.7 square miles, for a total well density of 8.5 wells per square mile, indicating that impacts to this lek as a result of existing oil and gas development are considered by WGFD to be extreme.

According to WOGCC data (March 1, 2010), 169 of these wells are active. There are 71 additional wells proposed within two miles of the three leks. Thirty-one are from this project. If only the 31 Carr Draw Federal IV wells were to be drilled, well density would increase to 9.7 wells per square mile within two

miles of the three leks. With the addition of the 40 wells not associated with the Carr Draw Federal IV project, well density within two miles of this lek would increase to 11.2 wells per square mile, well above the threshold of 3 wells per square mile for extreme impacts.

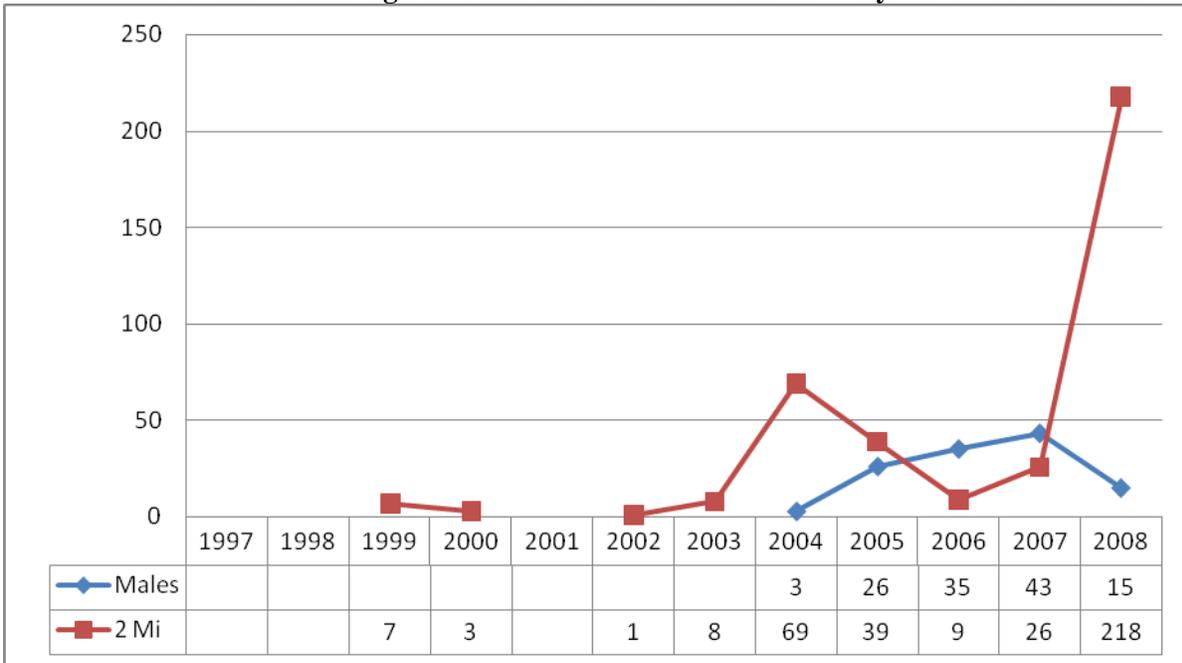
U.S. Department of the Interior 2010, US Fish and Wildlife Service. Endangered and Threatened Wildlife and Plants: 12-month Findings for Petitions to List the Greater Sage-Grouse (*Centrocercus urophasianus*) as Threatened and Endangered. March 4, 2010.

Figure 4.12 Existing and proposed wells within 2 miles of the Laskie Draw East, Laskie Draw & Barber Creek-South Prong leks



According to lek counts maintained by WGFD, the number of males attending the three leks increased between 2004 and 2007. The WOGCC data shows that the number of wells drilled within two miles of the lek increased between 2002 and 2004, decreased from 2004 to 2006, then drastically increased between 2007 and 2008. The peak number of males observed at the lek declined from 43 in 2007 to 15 in 2008. This is consistent with patterns described in Walker et al. (2007) where lek attendance initially increased as development encroached, to account for displaced birds, but then declined rapidly as development continued to move through an area.

Figure 4.13 Combined Peak Male attendance at the Laskie Draw East, Laskie Draw & Barber Creek-South Prong leks and number of wells drilled each year between 1997 and 2008



Declines in lek attendance associated with oil and gas development may be a result of a suite of factors including avoidance (Holloran et al. 2005, Holloran et al. 2007, Aldridge and Boyce 2007, Walker et al. 2007, Doherty et al. 2008, WGFD 2009), loss and fragmentation of habitat (Connelly et al. 2000, Braun et al. 2002, Connelly et al. 2004, WGFD 2004a, Rowland et al. 2005, WGFD 2005, Naugle et al. in press), reductions in habitat quality (Braun et al. 2002, WGFD 2003, Connelly et al. 2004, Holloran et al. 2005) and changes in disease mechanisms (Naugle et al. 2004, WGFD 2004b, Walker et al. 2007, Cornish pers. comm.).

In its *Recommendations for Development of Oil and Gas Resources within Important Wildlife Habitats* (2009), WGFD categorized levels of oil and gas development into thresholds that correspond to moderate, high, and extreme impacts to habitat effectiveness for various species of wildlife, based on well pad densities and acreages of disturbance. All three levels of impact result in a loss of habitat function by directly eliminating habitat; disrupting wildlife access to, or use of habitat; or causing avoidance and stress to wildlife. Impacts to sage-grouse are categorized by number of well pad locations per square mile within two miles of a lek and within identified nesting/brood-rearing habitats greater than two miles from a lek. Moderate impacts occur when well density is between one and two 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 two and three 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 three well pad locations per square mile or when there are greater than 60 acres of disturbance per square mile. Extreme impacts mean those where the function of an important wildlife habitat is substantially impaired or lost.

The BFO Resource Management Plan (BLM 2001) and the PRB FEIS Record of Decision (BLM 2003) included a two-mile timing limitation on surface-disturbing activities around sage-grouse leks. The two-mile measure originated with the Western Association of Fish and Wildlife Agencies (WAFWA) (BLM 2004). Wyoming BLM adopted the two-mile recommendation in 1990 (BLM 1990).

The two-mile recommendation was based on early research which indicated between 59% and 87% of sage-grouse nests were located within two miles of a lek (BLM 2004). These studies were conducted within vast contiguous stands of sagebrush, such as those that occur in Idaho's Snake River plain.

Additional research across more of the sage-grouse's range have since indicated that nesting may occur much farther than two miles from the breeding lek (BLM 2004). Holloran and Anderson (2005), in their Upper Green River Basin study area, reported that only 45% of their sage-grouse hens nested within 1.9 miles of the capture lek. Moynahan and Lindberg (2004) found that only 36% of their sage-grouse hens nested within 1.9 miles of the capture lek. Habitat conditions, and, thus, sage-grouse biology, within the BFO are more similar to Moynahan's north-central Montana study area than the Upper Green River area.

Moynahan's study area occurred in mixed-grass prairie and sagebrush steppe, dominated by Wyoming big sagebrush (Moynahan et al. 2007). In a typical landscape in the Powder River Basin, energy development within two miles of leks is projected to reduce the average probability of lek persistence from 87% to 5% percent (Walker et al. 2007). Recent research in the Powder River Basin suggests that impacts to leks from energy development are discernable out to a minimum of four miles, and that some leks within this radius have been extirpated as a direct result of energy development (Walker et al. 2007, Walker 2008, Naugle et al. *In press*). Based on these studies, the BLM has determined that a two-mile timing limitation is insufficient to reverse the population decline.

Even with a timing limitation on construction activities, sage-grouse may avoid nesting within CBNG fields because of the activities associated with operation and production. A timing limitation does nothing to mitigate loss and fragmentation of habitat and changes in disease mechanisms. Rather than limiting mitigation to only timing restrictions, more effective mitigation strategies may include, at a minimum, burying power lines (Connelly et al. 2000b); minimizing road and well pad construction, vehicle traffic, and industrial noise (Lyon and Anderson 2003, Holloran 2005); and managing produced water to prevent the spread of mosquitoes with the potential to vector West Nile Virus in sage grouse habitat (Walker et al 2007). Walker et al. (2007) recommend maintaining extensive stands of sagebrush habitat over large areas (at least one mile in size) around leks to ensure sage-grouse persistence. The size of such a no-development buffer would depend on the amount of suitable habitat around the lek and the population impact deemed acceptable. Connelly et al. (2000) recommended locating all energy-related facilities at least two miles from active leks. Other researchers have recommended avoiding areas within four miles of a lek and within areas of mapped nesting and brood-rearing habitat outside the four-mile perimeter (Walker et al. 2007, Walker 2008, Naugle et al. *In press*).

Several guidance documents are available that recommend practices that would reduce impacts of development on greater sage-grouse. These include Northeast Wyoming Sage-Grouse Conservation Plan (Northeast Wyoming Sage-grouse Working Group 2006), Sage-Grouse Habitat Management Guidelines for Wyoming (Bohne et al. 2007), Recommendations for Development of Oil and Gas Resources within Important Wildlife Habitats (WGFD 2009), Bureau of Land Management National Sage-Grouse Habitat Conservation Strategy (USDI 2004), and Greater Sage-Grouse Comprehensive Conservation Strategy (Stiver et al. 2006). Most recently, Wyoming BLM issued Instruction Memorandum No. WY-2010- 012; Greater Sage-Grouse Habitat Management Policy on Wyoming Bureau of Land Management (BLM) Administered Public Lands including the Federal Mineral Estate which establishes.

The Powder River Basin Oil and Gas Project 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 six leks (Laskie Draw East, Laskie Draw, Barber Creek-South Prong, Hayden I, Fortification and Watsabaugh IV) that occur within four miles of the project area, and, potentially, extirpation of the local grouse population.

4.1.3.10.5. Mountain Plover Direct and Indirect Effects

Suitable mountain plover habitat is not present within or surrounding the project area. An analysis of direct and indirect impacts to mountain plover due to oil and gas development is included in the PRB FEIS (pp. 4-254 to 4-255). No surface disturbing activities are permitted within 0.25 miles of the identified (sections 21, 26, 27; T50N/R76W) black-tailed prairie dog colonies, from March 15-July 31, unless a mountain plover nesting survey has been conducted during the current breeding season. This timing limitation will be in effect annually to determine the present or absence of plovers.

4.1.3.10.6. Western Burrowing Owl Direct and Indirect Effects

Use of roads and pipeline corridors may increase owl vulnerability to vehicle collision. CBNG infrastructure such as well houses, compressors, and nearby metering facilities may provide shelter and den sites for ground predators such as skunks and foxes.

The USFS Thunder Basin National Grasslands in Campbell County, WY, (who cooperated with the BLM in the creation of the PRB FEIS), recommends a 0.25 mile timing restriction buffer zone for burrowing owl 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 from six and one half months and from 0.5 mile to 0.25 mile.

4.1.4. West Nile Virus

4.1.4.1. Direct and Indirect Effects

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

4.1.4.2. Cumulative Effects

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

4.1.4.3. Mitigation Measures

There is no evidence that treatment, either through the use of larvicides or malithion, on a site specific or basin-wide scale will have any effect on the overall spread of the disease. The State agencies have not instituted state-wide treatment for mosquitoes due to WNV, nor are they requiring any mitigation specific to permitting for CBM operations.

BLM will keep monitoring this issue by continuing to consult with the State agencies and the researchers working in the area in order to stay abreast of the most current developments and any need to apply mitigation.

4.1.5. 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 watershed and the operator’s commitment to comply with Wyoming State water laws/regulations. It also addresses potential impacts to the environment and landowner concerns. Qualified hydrologists, in consultation with the BLM, developed the 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.

All effluent produced from the proposed 36 wells within the Carr Draw IV project will be transported by common waterline systems to off-project facilities located to the south, southeast, and west of the project area. The existing off-project infrastructure that will be utilized to manage Carr Draw IV effluents is listed in a table below. These existing plans incorporate water management strategies that vary from discharge to impoundments to Emits treatment and direct discharge to Beaver Creek or the Powder River. Information pertaining to the specific water management infrastructure for these projects can be reviewed in the respective POD water management plans.

Table 4.9 Previously Approved Water Management Strategies

Approval Date	POD/Sundry Name	EA Number
4/26/2003	Schoonover Road Unit I & II	WY-070-04-018
4/29/2005	Schoonover Road Unit III	WY-070-05-156
9/28/2006	Schoonover Road Unit IV	WY-070-06-295
7/25/2008	South Prong Unit 1 & 2	WY-070-08-142
6/19/2007	South Pong Unit 3	WY-070-07-070
10/17/2008	Somerville Waterline Sundry #1	WY-070-08-196
12/31/2008	Somerville Waterline Sundry #2	WY-070-09-018
10/19/2007	"Black Bullett" Sundry	WY-070-08-013

The WDEQ has assumed primacy from United States Environmental Protection Agency for maintaining the water quality in the waters of the state. The WSEO has authority for regulating water rights issues and permitting impoundments for the containment of surface waters of the state.

The maximum water production is predicted to be 20 gpm per well or 720 gpm (1.6 cfs or 1,161 acre-feet per year) for this POD. The PRB FEIS projected the total amount of water that was anticipated to be produced from CBNG development per year (Table 2-8 Projected Amount of Water Produced from CBM Wells Under Alternatives 1, 2A and 2B pg 2-26). For the Upper Powder River drainage, the projected volume produced within the watershed area was 88,046 acre-feet in 2009 (maximum production was estimated in 2006 at 171,423acre-feet). As such, the volume of water resulting from the production of these wells is 1.3% of the total volume projected for 2009. This volume of produced water is also within the predicted parameters of the PRB FEIS.

4.1.5.1. Groundwater

4.1.5.1.1. Direct and Indirect Effects

The PRB FEIS predicts an infiltration rate of 40 % to groundwater aquifers and coal zones in the drainage area (PRB FEIS pg 4-5). For this action, it may be assumed that a maximum of 288 gpm will infiltrate at or near the discharge points and impoundments (464 acre feet per year). This water will saturate the near surface alluvium and deeper formations prior to mixing with the groundwater used for stock and domestic purposes. According to the PRB FEIS, “the increased volume of water recharging the underlying aquifers of the Wasatch and Fort Union Formations would be chemically similar to alluvial

groundwater.” (PRB FEIS pg 4-54). Therefore, the chemical nature and the volume of the discharged water may not degrade the groundwater quality.

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. The permitted water wells produce from depths which range from 60 to 460 feet compared to 1,131 feet to the Big George coal and 2,376 to the Wall coal . As mitigation, 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 storage within the coals and sands units above and below the coals is enormous. Almost 750 million acre-feet of recoverable groundwater are stored within the Wasatch - Tongue River sand and coals (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 page 4-38).

4.1.5.1.2. 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 page 4-64).

Development of CBNG through 2018 (and coal mining through 2033) would remove 4 million acre-feet of groundwater from the coal zone aquifer (PRB FEIS 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 page 4-65).

4.1.5.1.3. Mitigation Measures

Adherence to the drilling plan, the setting of casing at appropriate depths, following safe remedial procedures in the event of casing failure, and utilizing proper cementing procedures will protect any potential 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.

Shallow ground water monitoring is ongoing at impoundment sites across the basin. Due to the limited data available from these sites, the still uncertain overall fate or extent of change that is occurring due to infiltration at those sites, and the extensive variable site characteristics both surface and subsurface, it is not reliable at this time to infer that findings from these monitoring wells should be directly applied to other impoundment locations across the basin.

In order to address the potential impacts from infiltration on shallow ground water, the Wyoming DEQ has developed a guidance document, “Compliance Monitoring for Ground Water Protection Beneath Unlined Coalbed Methane Produced Water Impoundments” (June 14, 2004) which can be accessed on their website. This guidance document became effective August 1, 2004, and was revised as the

“Compliance Monitoring and Siting Requirements for Unlined Coalbed Methane Produced Water Impoundments” which was approved in June, 2006. The Wyoming DEQ established an Impoundment Task Force which drafted an “Impoundment Monitoring Plan” to investigate the potential for existing impoundments to have impacted shallow groundwater. Drilling at selected existing impoundments began in the spring of 2006.

Based on information received from the WDEQ, as of September 2009, approximately 2010 impoundment sites have been investigated with more than 2290 borings. Of these impoundments, 272 met the criteria to require “compliance monitoring” if constructed and used for CBNG water containment. Only 133 impoundments requiring monitoring are presently being used. As of the third quarter of 2009, only 21 of those monitored impoundments caused a change in the “Class of Use” of any parameter in the underlying aquifer water.

4.1.5.2. Surface Water/Wetland/Riparian

4.1.5.2.1. Direct and Indirect Effects

No CBNG produced water will be discharged within the POD boundary. All effluent will be transported to off-project facilities, therefore no impacts to the watersheds within the plan of development are anticipated. The areas receiving the water from this action have been previously analyzed for compliance to BLM and WDEQ requirements. Most of the PODs have been in production for some time and produced water quantity has declined, therefore the addition of the water to the existing water management systems should not increase the water volume nor change water quality from that which was previously analyzed and approved. The WDEQ permits water discharge point water quantity as well as water quality and the addition of the produced water from this project will not exceed the approved maximum volumes permitted.

The following table shows Wyoming proposed numeric limits for the watershed for SAR, and EC, the average value measured at selected USGS gauging stations at high and low monthly flows, and Wyoming groundwater quality standards for TDS and SAR for Class I to Class III water. It also shows pollutant limits for TDS, SAR and EC detailed in the WDEQ’s WYPDES permit, and the levels found in the POD’s representative water sample.

Table 4.10 Comparison of Regulated Water Quality Parameters to Predicted Water Quality

Predicted Values	TDS, mg/l	SAR	EC, µmhos/cm
Most Restrictive Proposed Limit –		2	1000
Least Restrictive Proposed Limit		10	3200
Primary Watershed at Arvada, WY Gauging station			
Historic Data Average at Maximum Flow		4.76	1,797
Historic Data Average at Minimum Flow		7.83	3,400
WDEQ Quality Standards for Wyoming Groundwater (Chapter 8)			
Drinking Water (Class I)	500		
Agricultural Use (Class II)	2,000	8	
Livestock Use (Class III)	5,000		

Predicted Values	TDS, mg/l	SAR	EC, µmhos/cm
WDEQ Water Quality Requirement for WYPDES Permit # WY0038733, # WY0048321, # WY0046922, # WY0050709, # WY0051462, #WY0050857	5000	6	7500
Predicted Produced Water Quality			
Big George Coal	1,150	18.8	2,650
Wall Coal	1,270	16.3	2,010

Based on the analysis performed in the PRB FEIS, the primary beneficial use of the surface water in the Powder River Basin is the irrigation of crops (PRB FEIS pg 4-69). The water quality projected for this POD is 1,150 – 1,270 mg/l TDS which is within the WDEQ criteria for agricultural use (2000 mg/l TDS).

The quality for the water produced from the 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 20 gallons per minute (gpm) is projected to be produced from these 36 wells, for a total of 720 gpm for the POD. See Table 4.4. For more information, please refer to the WMP included in this POD.

A portion of the produced water in the Carr Draw IV POD will be transferred into existing pipelines to two different Emit treatment facilities located on the Powder River and Barber Creek. This strategy will result in less water infiltration below impoundments. Therefore, the actual infiltration and evapotranspiration calculations and resulting impacts will be less than those predicted below. However, due to direct discharge from the EMITs water treatment facilities, larger volumes of CBNG water will potentially reach the Upper Powder River.

The PRB FEIS assumes that 15% of the impounded water will re-surface as channel flow (PRB FEIS pg 4-74). Consequently, the volume of water produced from these wells may result in the addition of 0.24 cfs below the lowest reservoir (after infiltration and evapotranspiration losses). The operator has committed to monitor the condition of channels and address any problems resulting from discharge. Discharge from the impoundments will potentially allow for streambed enhancement through wetland-riparian species establishment. Sedimentation will occur in the impoundments, but would be controlled through a concerted monitoring and maintenance program. Phased reclamation plans for the impoundments will be submitted and approved on a site-specific; case-by-case basis as they are no longer needed for disposal of CBNG water, as required by BLM applied COAs.

Alternative (2A), the approved alternative in the Record of Decision for the PRB FEIS, states that the peak production of water discharged to the surface will occur in 2006 at a total contribution to the mainstream of 68 cfs (PRB FEIS pg 4-86). The predicted maximum discharge rate from these 36 wells is anticipated to be a total of 720 gpm or 1.6 cfs to impoundments. Using an assumed conveyance loss of 20% (PRB FEIS pg 4-74) and full containment of the produced water re-surfacing in Upper Powder River from this action (.24 cfs) may add a maximum 0.19 cfs to the flows, or 0.3% of the predicted total CBNG produced water contribution. This incremental volume is statistically below the measurement capabilities for the volume of flow of the Upper Powder River (refer to Statistical Methods in Water Resources U.S.

Geological Survey, Techniques of Water-Resources Investigations Book 4, Chapter A3 2002, D.R. Helsel and R.M. Hirsch authors). For more information regarding the maximum predicted water impacts resulting from the discharge of produced water, see Table 4-6 (PRB-FEIS pg 4-85).

The operator has obtained numerous Wyoming Pollutant Discharge Elimination System (WYPDES) permit for the discharge of water produced from this project from the WDEQ. See the water management plans associated with PODs outlined in table 4.2. See table 4.9 for the specific WYPDES numbers. Many of the WYPDES permits include irrigation compliance points at which the operator will be required to monitor flow rate and water quality on a regular basis

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.

As stated previously, the operator has committed to offer water well agreements to properly permitted domestic and stock water wells within the circle of influence of the proposed CBNG wells.

4.1.5.2.2. Cumulative Effects

The analysis in this section includes cumulative data from Fee, State and Federal CBNG development in the watershed. These data were obtained from the Wyoming Oil and Gas Conservation Commission (WOGCC).

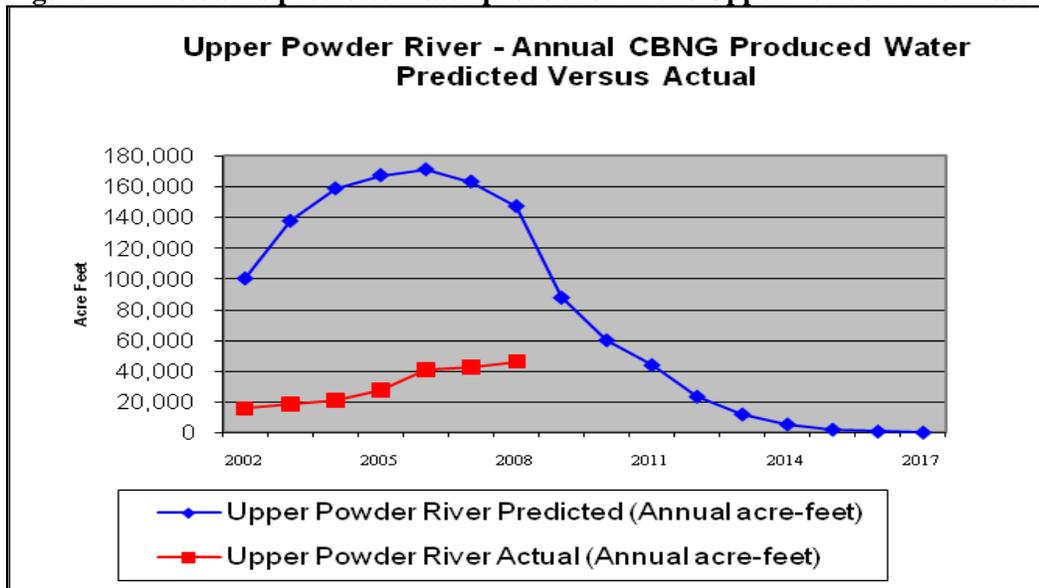
As of December 2008, all producing CBNG wells in the watershed have discharged a cumulative volume of 212,522 acre-ft of water compared to the predicted 1,047,521 acre-ft disclosed in the PRB FEIS (Table 2-8 page 2-26). These figures are presented graphically in Figure 4.14 and Table 4.11 following. This volume is 20.3% of the total predicted produced water analyzed in the PRB FEIS for the watershed.

Table 4.11 Actual vs predicted water production in the Upper Powder River watershed 2008 Data Update 06-08-09

Year	Upper Powder River Predicted (Annual acre-feet)	Upper Powder River Predicted (Cumulative acre-feet from 2002)	Upper Powder River Actual (Annual acre-feet)		Upper Powder River Actual (Cumulative acre-feet from 2002)	
			A-ft	% of Predicted	A-Ft	% of Predicted
2002	100,512	100,512	15,846	15.8	15,846	15.8
2003	137,942	238,454	18,578	13.5	34,424	14.4
2004	159,034	397,488	20,991	13.2	55,414	13.9
2005	167,608	565,096	27,640	16.5	83,054	14.7
2006	171,423	736,519	40,930	23.9	123,984	16.8
2007	163,521	900,040	42,112	25.8	166,096	18.5
2008	147,481	1,047,521	45,936	31.1	212,522	20.3
2009	88,046	1,135,567				
2010	60,319	1,195,886				
2011	44,169	1,240,055				

Year	Upper Powder River Predicted (Annual acre-feet)	Upper Powder River Predicted (Cumulative acre-feet from 2002)	Upper Powder River Actual (Annual acre-feet)		Upper Powder River Actual (Cumulative acre-feet from 2002)	
			A-ft	% of Predicted	A-Ft	% of Predicted
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		212,522			

Figure 4.14 Actual vs predicted water production in the Upper Powder River watershed



The PRB FEIS made predictions regarding the potential impact of produced water to the various soil types found throughout the Basin, in addition to physical disturbance effects. “Government soil experts state that SAR values of 13 or more cause potentially irreversible changes to soil structure, especially in clayey soil types, that reduce permeability for infiltration of rainfall and surface water flows, restrict root growth, limit permeability of gases and moisture, and make tillage difficult.” (PRB FEIS page 4-144).

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

As referenced above, the PRB FEIS did disclose that cumulative impacts may occur to soils and

vegetation as a result of discharged produced CBNG water. The cumulative effects on vegetation and soils are within the analysis parameters and impacts described in the PRB FEIS for the following reasons:

- They are proportional to the actual amount of cumulatively produced water in the drainage, which is approximately 20.3% of the total predicted in the PRB FEIS.
- The WDEQ enforcement of the terms and conditions of the WYPDES permit that are designed to protect irrigation downstream.

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.

The PRB FEIS states, “Cumulative effects to the suitability for irrigation of the Powder River would be minimized through the interim Memorandum of Cooperation (MOC) that the Montana and Wyoming DEQ’s (Departments of Environmental Quality) have signed. This MOC was developed to ensure that designated uses downstream in Montana would be protected while CBM development in both states continued. However, this MOC has expired and has not been renewed. The EPA has approved the Montana Surface Water Standards for EC and SAR and as such the WDEQ is responsible for ensuring that the Montana standards are met at the state line under the Clean Water Act (CWA). Thus, through the implementation of in-stream monitoring and adaptive management, water quality standards and interstate agreements can be met.” (PRB FEIS page 4-117)

4.1.5.2.3. Mitigation Measures

No additional mitigation measures are required.

4.1.6. Wetland/Riparian

A proposed waterline will parallel the Barber Creek flood plain from the POD boundary to a water treatment facility located near the Powder River. This water line extends approximately 6 miles and will cross Barber Creek 11 separate times. Proper construction practices and applied mitigation will eliminate effects to wetland/riparian areas in this POD. No produced water will be discharged into Barber Creek or associated tributaries for this proposal. All water will be transferred into water management infrastructure that is outside the POD boundary.

4.1.7. Fluid Minerals

Assuming these wells are not drilled and there are no offsetting wells							
Twp	Rng	Sec	Qtr/Qtr	Lease	Well Name	Unrecovered CBM	
						High	Low
49N	76W	4	NWNW	WYW33136	SPU 11-4-4976GW	1135	
49N	76W	4	NWNW	WYW33136	SPU 21-4-4976LW	1135	
50N	76W	21	NENW	WYW137645	CARU 21-21-5076GW	1414	
50N	76W	21	NESW	WYW147335	CARU 23-21-5076GW	1414	
50N	76W	21	SWSW	WYW147335	CARU 14-21-5076GW	1414	
50N	76W	25	SWSW	WYW146290	CARU 14-25-5076GW	1312	
50N	76W	27	SWSW	WYW33138	CARU 14-27-5076GW	1573	
50N	76W	27	SWSW	WYW33138	CARU 34-27-5076GW	1573	
50N	76W	28	SESW	WYW149969	CARU 24-28-5076GW	1573	
50N	76W	28	NWSE	WYW147335	CARU 33-28-5076GW	1573	
50N	76W	28	NWSW	WYW149969	CARU 13-28-5076GW	1573	
50N	76W	28	NESE	WYW147335	CARU 43-28-5076GW	1573	

Assuming these wells are not drilled and there are no offsetting wells							
Twp	Rng	Sec	Qtr/Qtr	Lease	Well Name	Unrecovered CBM	
						High	Low
50N	76W	33	NESW	WYW147335	CARU 23-33-5076GW	1573	
50N	76W	33	NESE	WYW147335	CARU 43-33-5076GW	1573	
50N	76W	33	NENE	WYW147335	CARU 41-33-5076GW	1573	
50N	76W	33	SWNW	WYW147335	CARU 12-33-5076GW	1573	
50N	76W	33	SWSW	WYW149152	CARU 14-33-5076GW	1573	
50N	76W	33	NENW	WYW147335	CARU 21-33-5076GW	1573	
50N	76W	33	SWSE	WYW147335	CARU 34-33-5076GW	1573	
50N	76W	34	NENW	WYW33138	CARU 21-34-5076GW	1312	
50N	76W	34	SWSE	WYW33138	CARU 34-34-5076GW	1312	
50N	76W	34	SWNW	WYW33138	CARU 12-34-5076GW	1312	
50N	76W	34	SWSW	WYW135624	CARU 14-34-5076GW	1312	
50N	76W	34	NESW	WYW33138	CARU 23-34-5076GW	1312	
50N	76W	34	SWNE	WYW33138	CARU 43-34-5076GW	1312	
50N	76W	34	SWNE	WYW33138	CARU 32-34-5076GW	1312	
50N	76W	35	NWNW	WYW040444A	CARU 11-35-5076GW	1312	
50N	76W	35	SWNW	WYW040444A	CARU 12-35-5076GW	1312	
50N	76W	35	NESW	WYW040444A	CARU 13-35-5076GW	1312	
50N	76W	35	SWSW	WYW040444A	CARU 14-35-5076GW	1312	
50N	76W	35	SWNE	WYW040444A	CARU 32-35-5076GW	1312	
50N	76W	35	SWSE	WYW040444	CARU 34-35-5076GW	1312	
50N	76W	35	NENE	WYW040444A	CARU 41-35-5076GW	1312	
50N	76W	35	NESE	WYW040444A	CARU 43-35-5076GW	1312	
50N	76W	35	NENW	WYW040444	CARU 21-35-5076GW	1312	
All numbers are in thousands of MCF, Low numbers were not used since there is no production surrounding these wells.							

Assuming these wells are not drilled but all surrounding 80s are							
Twp	Rng	Sec	Qtr/Qtr	Lease	Well Name	Unrecovered CBM	
						High	Low
49N	76W	4	NWNW	WYW33136	SPU 11-4-4976GW	125	
49N	76W	4	NENW	WYW33136	SPU 21-4-4976LW	125	
50N	76W	21	NENW	WYW137645	CARU 21-21-5076GW	156	
50N	76W	21	NESW	WYW147335	CARU 23-21-5076GW	156	
50N	76W	21	SWSW	WYW147335	CARU 14-21-5076GW	156	
50N	76W	25	SWSW	WYW146290	CARU 14-25-5076GW	144	
50N	76W	27	SWSW	WYW33138	CARU 34-27-5076GW	173	
50N	76W	27	SWSE	WYW33138	CARU 34-27-5076GW	173	
50N	76W	28	SESW	WYW149969	CARU 24-28-5076GW	173	
50N	76W	28	NWSE	WYW147335	CARU 33-28-5076GW	173	
50N	76W	28	NWSW	WYW149969	CARU 13-28-5076GW	173	
50N	76W	28	NESE	WYW147335	CARU 43-28-5076GW	173	

50N	76W	33	NESW	WYW147335	CARU 23-33-5076GW	173	
50N	76W	33	NESE	WYW147335	CARU 43-33-5076GW	173	
50N	76W	33	NENE	WYW147335	CARU 41-33-5076GW	173	
50N	76W	33	SWNW	WYW147335	CARU 12-33-5076GW	173	
50N	76W	33	SWSW	WYW149152	CARU 14-33-5076GW	173	
50N	76W	33	NENW	WYW147335	CARU 21-33-5076GW	173	
50N	76W	33	SWSE	WYW147335	CARU 34-33-5076GW	173	
50N	76W	34	NENW	WYW33138	CARU 21-34-5076GW	144	
50N	76W	34	SWSE	WYW33138	CARU 34-34-5076GW	144	
50N	76W	34	SWNW	WYW33138	CARU 12-34-5076GW	144	
50N	76W	34	SWSW	WYW135624	CARU 14-34-5076GW	144	
50N	76W	34	NESW	WYW33138	CARU 23-34-5076GW	144	
50N	76W	34	SWNE	WYW33138	CARU 43-34-5076GW	144	
50N	76W	34	SWNE	WYW33138	CARU 32-34-5076GW	144	
50N	76W	35	NWNW	WYW040444A	CARU 11-35-5076GW	144	
50N	76W	35	SWNW	WYW040444A	CARU 12-35-5076GW	144	
50N	76W	35	NESW	WYW040444A	CARU 13-35-5076GW	144	
50N	76W	35	SWSW	WYW040444A	CARU 14-35-5076GW	144	
50N	76W	35	SWNE	WYW040444A	CARU 32-35-5076GW	144	
50N	76W	35	SWSE	WYW040444	CARU 34-35-5076GW	144	
50N	76W	35	NENE	WYW040444A	CARU 41-35-5076GW	144	
50N	76W	35	NESE	WYW040444A	CARU 43-35-5076GW	144	
50N	76W	35	NENW	WYW040444	CARU 21-35-5076GW	144	

4.1.8. Cultural Resources

4.1.8.1. Direct and Indirect Effects

Non eligible sites 48CA5123, 48CA5125, 48CA5129, 48CA5131, 48JO2721, 48JO2722, and 48JO2724 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 Bureau of Land Management electronically notified the Wyoming State Historic Preservation Officer (SHPO) on 3/1/2010 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).

4.1.8.2. 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).

4.1.9. Air Quality

4.1.9.1. Direct and Indirect Effects

In the project area, air quality impacts would occur during construction (due to surface disturbance by earth-moving equipment, vehicle traffic fugitive dust, well testing, as well as drilling rig and vehicle engine exhaust) and production (including non-CBM well production equipment, booster and pipeline compression engine exhaust). The amount of air pollutant emissions during construction would be controlled by watering disturbed soils, and by air pollutant emission limitations imposed by applicable air quality regulatory agencies. Air quality impacts modeled in the PRB FEIS concluded that projected oil & gas development would not violate any local, state, tribal or federal air quality standards.

4.2. ALTERNATIVE D

4.2.1. Sage-Grouse Emphasis

Only specific differences from alternative C will be discussed. Alternatives D was not explored during the onsite, however following the onsite inspection, the BLM Interdisciplinary Team (IDT) reviewed the surface use and wildlife data with the changes agreed to in the field. The BLM-IDT identified that further mitigation to reduce the loss of sage-grouse habitat within the project area was warranted. BLM determined that the greatest impact to the habitat from the proposed action is the fragmentation of sage-grouse habitat on a landscape scale, specifically the proposed road segments to various well locations, vertical intrusion from over head power, an increase risk of West Nile virus, and an increase of predators due to travel corridors, increase in habitat edge, and introduction of new raptor nesting substrate proposed in Alternative C. Thirty of 36 locations and approximately 30 new of proposed roads (7.4 miles) are located within identified high quality sage-grouse habitat. Studies indicate that sage-grouse will avoid oil and gas wells and associated roads and infrastructure out to 0.6 mile radius. Under Alternative C – Sage-Grouse, the 5 wells at 5 locations listed below and associated 3.5 miles of new oil and gas access roads with utility corridor, 2 power distribution points and 1 staging area will not be authorized. This alternative conserves approximately 1,171 contiguous acres of high quality sage-grouse habitat within and adjacent to the Carr Draw Federal IV project area that is presently not impacted by existing oil and gas development.

Table 4.12 Wells Removed Under Alternative D – Sage-Grouse

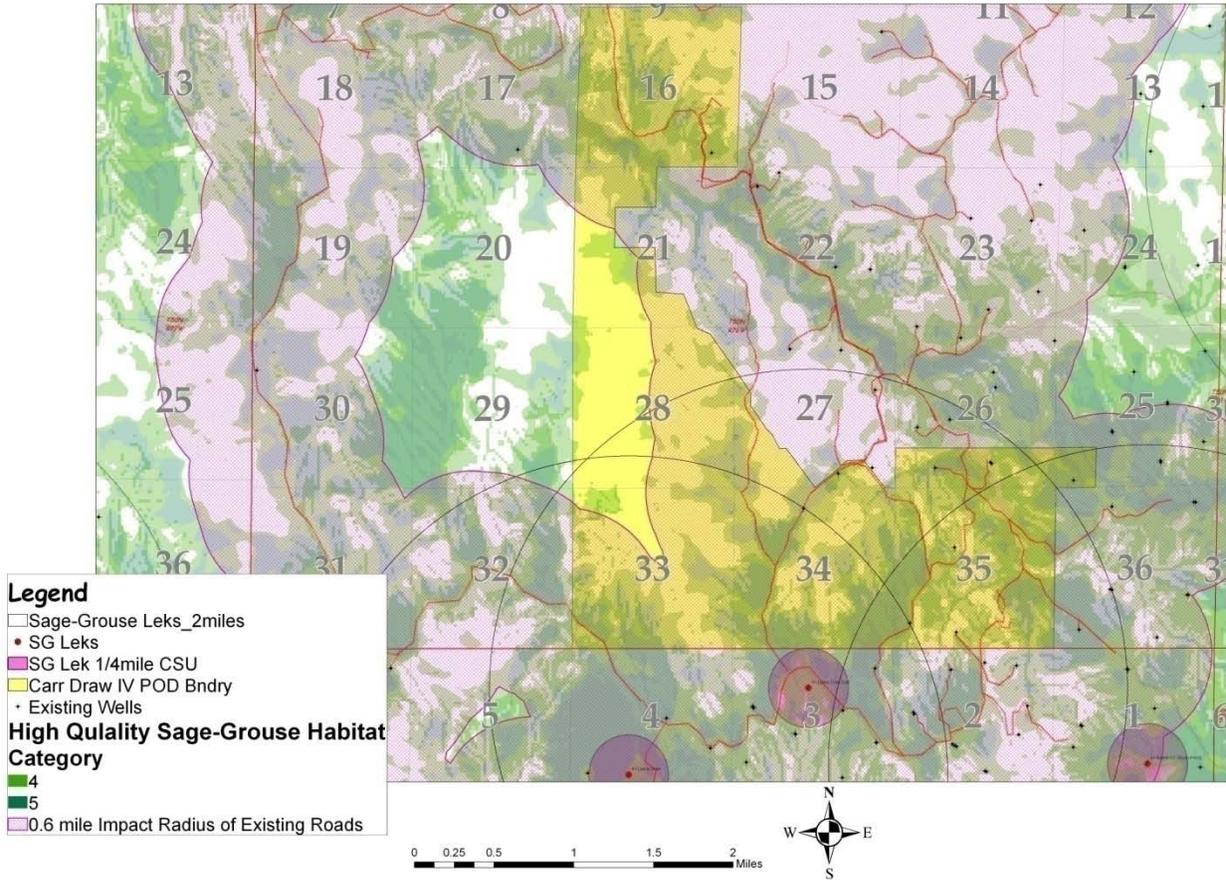
	Well Name	Well #	Qtr/Qtr	Sec.	TWP	RNG	Lease #
1	CARR DRAW IV CARU	14-21GW	SWSW	21	50N	76W	WYW147335
2	CARR DRAW IV CARU	13-28GW	NWSW	28	50N	76W	WYW149969
3	CARR DRAW IV CARU	24-28GW	SESW	28	50N	76W	WYW149969
4	CARR DRAW IV CARU	21-33GW	NENW	33	50N	76W	WYW147335
5	CARR DRAW IV CARU	12-33GW	SWNW	33	50N	76W	WYW147335

It is the main access road associated with these 5 wells which poses the greatest threat to the sage-grouse habitat. Since the majority of the road's alignment falls over BLM surface (Sections 29 and 32; T50N/R76W), the BLM-IDT also recommends that associated Rights of Ways not be authorized. The proposed well locations are within sage-grouse habitat identified in the South Prong Unit 1 & 2 and Laskie Draw POD Environmental Assessment WY-070-08-142 which states: "Protection of the Laskie Draw lek and seasonal habitats in the Sections to the north and west of this lek provide the best opportunity for sage-grouse to persist (nest, raise young, and winter) in the project area." The BLM-IDT recommends that these 5 locations and associated road and infrastructure not be authorized in order to minimize loss of quality sage-grouse nesting/brood rearing habitat and ensure the persistence of the Laskie Draw lek.

As per BLM Instruction Memorandum WY-2010-012, the BLM-BFO has coordinated with the WFGD for recommendations on management of sage-grouse habitat in the project area.

The 860 acres of high quality sage-grouse habitat that WGFID identifies within the southern end of the Carr Draw Federal IV POD (Section 33 and 34, T50NR77W) is presently void of existing well locations, however, a 0.6 mile radius of existing access roads authorized under the Carr Draw III West POD within section 34 have compromised that habitat. It is anticipated that sage-grouse will avoid the habitat within 0.6 mile of the Carr Draw III West roads within sections 33 and 34 for the life to the CBNG development.

Figure 4.15 0.6 mile Impact Radius of Existing Oil & Gas Roads within the Carr Draw Federal IV POD Area.



The habitat the BLM IDT recommends to conserve is approximately 1,171 acres of mapped high quality sage-grouse habitat (Sections 19, 20, 29, 30 and 33, T50N/R76W) that sage-grouse sign was observed May 2009 indicating nesting behavior.

To complement the recommendations from WGFD and reduce the impacts of the existing oil and gas roads within 0.6 miles high quality sage-grouse habitat, alternative D expands on the timing limitation stipulation for sage-grouse to preclude all disruptive activities from March 1 to June 15 as described below.

- No surface disturbing **or disruptive activities including “maintenance”** are permitted from March 1 to June 15. This condition will be implemented on an annual basis for the life of the project. This condition affects the following locations:

Township/Range	Section	Wells and Infrastructure
T49N/R76W	2	Proposed overhead powerline within the NWNW of this section.
T49N/R76W	3	Proposed overhead powerline within the north half of this section. Proposed pump station within the NWSW of this section. Proposed utility corridor within the NENE of this section. Proposed staging area within the NESE of this section.
T49N/R76W	4	Well locations: 11-4-5076 and 21-4-5076. All access road and associated utility corridor within this ENTIRE section.

Township/Range	Section	Wells and Infrastructure
T50N/R76W	7	Proposed Baber Creek water pipeline within the SWSW and SESW of this section.
T50N/R76W	16	Proposed Baber Creek water pipeline within the SWSE this of section. All access road and associated utility corridor within the NWSE, SWSE, SESE and SESW of this section.
T50N/R76W	17	Proposed Baber Creek water pipeline within the NWNW of this section. All access road and associated utility corridor within the SESE of this section.
T50N/R76W	18	All access road and associated utility corridor within the NENW of this section.
T50N/R76W	20	All access road and associated utility corridor within the NENE of this section.
T50N/R76W	21	Well locations: 21-21-5076 and 23-21-5076 All access road and associated utility corridor within the NENW, SENW and NESW of this section.
T50N/R76W	22	All proposed utility corridor within this ENTIRE section.
T50N/R76W	25	Well locations: 14-25-5076 All access road and associated utility corridor within the SWSW of this section.
T50N/R76W	26	All utility corridor within the N1/2SWNW, NESW and SESW of this section. Proposed overhead powerline within the SESW of this section.
T50N/R76W	27	Well locations: 14-27-5076 and 34-27-5076 Proposed staging area within the SWSW of this section. Proposed POD building within the SWSW of this section. All access road and associated utility corridor within the SWSW, and SWSE of this section.
T50N/R76W	28	All access road and associated utility corridor within the SESE, NESE and NWNW of this section.
T50N/R76W	29	All access road and associated utility corridor within the NESE and SESE of this section.
T50N/R76W	32	All access road and associated utility corridor within the NESE and NENE of this section.
T50N/R76W	33	Well locations: 14-33-5076, 23-33-5076, 34-33-5076, 41-33-5076 and 43-33-5076 All access road and associated utility corridor within this ENTIRE section.
T50N/R76W	34	Wells locations: 12-34-5076, 14-34-5076, 21-34-5076, 32-34-5076, 34-34-5076 and 43-34-5076 All access road and associated utility corridor within this ENTIRE section.
T50N/R76W	35	Well locations: 11-35-5076, 12-35-5076, 13-35-5076, 14-35-5076, 21-35-5076, 32-35-5076, 34-5076, 41-35-5076 and 43-35-5076 Proposed overhead powerline within this ENTIRE section. All access road and associated utility corridor within this ENTIRE section.

Township/Range	Section	Wells and Infrastructure
T50N/R76W	36	All access road and associated utility corridor within this ENTIRE section. Proposed overhead powerline within this ENTIRE section.
T50N/R77W	9	Proposed Baber Creek water pipeline within the NENE and NENE of this section.
T50N/R77W	10	Proposed Baber Creek water pipeline within the NESE, SWNE and SENW of this section.
T50N/R77W	11	Proposed Baber Creek water pipeline within this ENTIRE section.
T50N/R77W	12	Proposed Baber Creek water pipeline within the SWSE and SESW of this section.
T50N/R77W	13	Proposed Baber Creek water pipeline within the NWNE of this section.

- c. A sage-grouse survey will be conducted by a biologist following the most current WGFD protocol. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities.
- d. Maximum design speed on all operator-constructed and maintained roads (except county roads) will not exceed 25 miles per hour except travel along roads within 1/2 mile of the Laskie Draw or Laskie Draw East sage grouse lek. These roads will be posted at 10 mph. This will affect the all roads located within Sections 3 and t T50N/R76W.

4.2.2. Elk Emphasis

Only specific differences from alternative C will be discussed. Alternatives D – Elk Emphasis was not explored during the onsite, however following the onsite inspection, the BLM Interdisciplinary Team (IDT) reviewed the surface use and wildlife data with the changes agreed to in the field. The BLM-IDT identified that further mitigation to reduce the loss of security habitat within the project area was warranted. BLM determined that the greatest impact to the habitat from the proposed action is the fragmentation of elk security habitat within the elk Yearlong range (resulting in loss of habitat effectiveness), specifically the proposed wells, road segments to various well locations, and associated facilities and infrastructure associated with alternative C. Under alternative D-Elk Emphasis, 8 wells at 8 locations (listed below), 2.2 miles water pipeline (Barber Cr. pipeline) and associated 6 miles of new oil and gas access roads with utility corridor. This alternative reduces the impacts to habitat effectiveness and loss of elk security habitat loss within and adjacent to the Carr Draw Federal IV POD.

Table 4.13 Wells removed under Alternative D – Elk Emphasis

	Well Name	Well #	Qtr/Qtr	Section	TWP	RNG	Lease #
1	CARR DRAW IV CARU	12-21GW	SWNW	21	0500N	0760W	WYW147335
2	CARR DRAW IV CARU	21-21GW	NENW	21	0500N	0760W	WYW137645
3	CARR DRAW IV CARU	14-21GW	SWSW	21	0500N	0760W	WYW147335
4	CARR DRAW IV CARU	23-21GW	NESW	21	0500N	0760W	WYW147335
5	CARR DRAW IV CARU	13-28GW	NWSW	28	50N	76W	WYW149969
6	CARR DRAW IV CARU	24-28GW	SESW	28	0500N	0760W	WYW149969
7	CARR DRAW IV CARU	12-33GW	SWNW	33	0500N	0760W	WYW147335
8	CARR DRAW IV CARU	21-33GW	NENW	33	0500N	0760W	WYW147335

Similar recommendations were not implemented in 3 prior decisions in 2009 where elk security habitats within the elk ranges, i.e. Augusta Unit Zeta, Carr Draw III West and Carr Draw V additions II PODs.

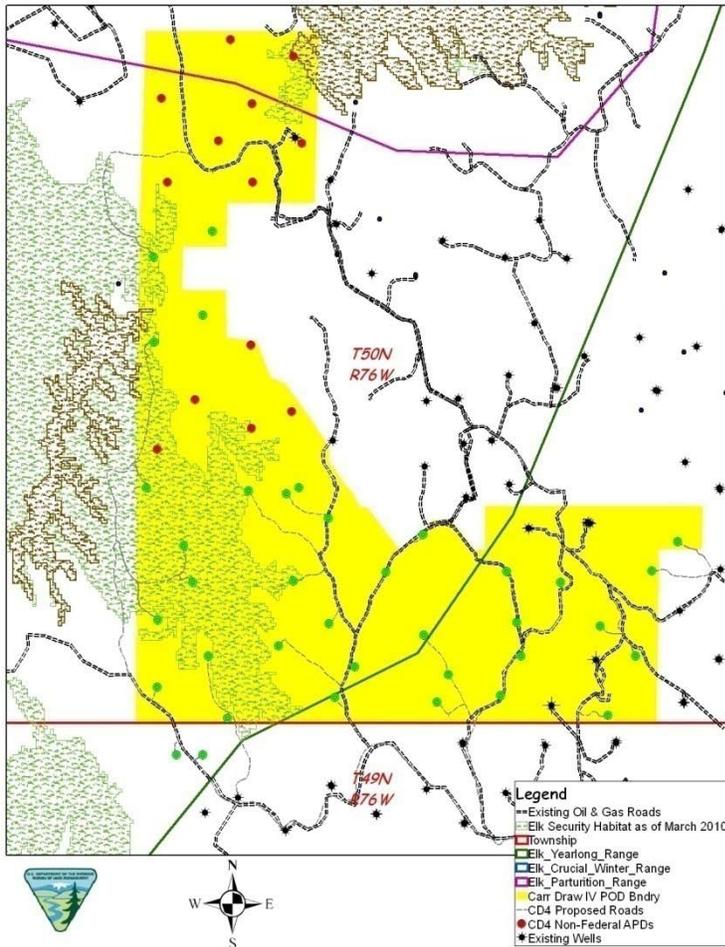
BLM's rationale in issuing those decisions was under the assumption that 50% or less of the elk displaced from these project areas would return following drilling and construction activities. However, not a single GPS collared elk (2008 study) has been observed within these project areas in past 4 months (November 2009 through February 2010) when the only disruptive activity in the area has been well monitoring with the exception of emergency maintenance to protect the environment. A total of 16 GPS collared elk occupied these project areas prior to BLM issuing these 3 past decisions. The ID team recommends postponing further CBNG development within the elk yearlong range until the objective of 50% or less return of elk in developed areas is observed.

The scientific literature concludes that big game and particularly elk are displaced by oil and gas development and that 50% or less of the population may reoccupy the disturbance area once the wells are in the production phase (Powell 2003, Sawyer et al. 2005, Sawyer et al. 2008). It is difficult to estimate the timeframe that elk will be displaced from traditional habitat as this has not been extensively studied for elk. Sawyer et al. 2008 concluded that the level of human disruption that persists particularly average daily traffic (ADT) while monitoring oil and gas wells is directly correlated to mule deer avoidance of producing wells and that indirect habitat loss will remain as high as 63% when the ADT is greater than 2.

The BLM ID-Team recommends monitoring human activity related to oil and gas within the CBNG development. In the spring of 2009 a 3 year study was initiated by the University of Wyoming to measure elk avoidance of oil and gas activity, however it is too early in the study to draw conclusions. A recent decision issued by the BLM Wyoming State Director, SDR (WY-2009-17) states that BLM-BFO cannot require oil and gas operators to submit reports that summarize the work activities. Likewise, requirements that would restrict well site visitation were found to be ineffective and un-implementable by the Wyoming State Director, SDR (WY-2009-17). This is due in part to the overlapping non-federal development in the area. Therefore no restrictions are recommended to restrict well site visitation or for the operator to submit work activity reports. No timing limitation stipulations are recommended since the federally proposed actions fall outside of the designated elk crucial ranges (Parturition and Crucial Winter ranges).

Removing these 8 wells at 8 locations (listed below), 1.8 miles water pipeline (Barber Cr. pipeline) and associated 6 miles of new oil and gas access roads with utility corridor conserves 1,050 acres (60%) of elk security habitat within and adjacent to the Carr Draw Federal IV project area. This is consistent with the WGFD recommendations to minimize impacts to the Fortification Creek elk habitat.

Figure 4.16 Elk Security Habitat Differences Between Alternatives C & D



The added benefits of these recommendation is that impacts to mapped and field confirmed high quality sage-grouse habitat (nesting and brood rearing) are avoided as well.

An alternative to removing these 8 wells would be to postpone further CBNG development within the elk yearlong range until monitoring of the collared elk showed a return of elk to the effected habitat within developed areas. Construction and drilling of these 8 wells could be contingent on elk returning to previously developed areas (i.e. AUZ, CD3W and CD5a2) and utilizing the effective habitat that remains.

Methodology for Analysis of Cumulative Impacts Under Each Alternative

For each alternative, the BLM considered anticipated changes to the elk population, pattern of elk use, and conducted a view shed analysis utilizing the geographic information system (GIS) model to evaluate impacts to elk within the CIAA. The direct and indirect impacts for each alternative, together with impacts from past, present, and reasonably foreseeable future actions, with avoidance and mitigation measures are described and compared below. In making these determinations, the BLM also relied upon the reasoned expert opinion of staff biologists, being informed with a firsthand knowledge of the wildlife resources in the project area.

Table 4.14 Cumulative Impacts Analysis by Alternative for Past, Present, and Reasonably Foreseeable Future Actions.

Issues/ Metrics	Alt A (No Action)	Alt B (Proposed Action)	Alt C (Modification at onsites)	Alt D – Elk Emphasis (Modification at onsite, and deny federal wells that would impact security habitat)
<i>Habitat and availability</i>	<p>1. Security habitat within the CIAA would be reduced by 12,727 acres (19.9%).</p> <p>2. 51,375 acres would remain. (80.1%)</p> <p>3. Connectivity between security patches will be compromised due to loss 710 acres of security habitat resulting from non-federal development. Security habitat from 2 adjacent patches will be removed, leaving a much greater distance between remaining patches.</p>	<p>1. Security habitat within the CIAA would be reduced by 13,777 acres (21.5%).</p> <p>2. 50,325 acres would remain. (78.5%)</p> <p>3. Connectivity between security patches will be compromised due to loss of 1760 acres of security habitat resulting from federal and non-federal development. Security habitat from 2 adjacent patches will be removed, leaving a much greater distance between remaining patches</p>	<p>1. Impacts under Alternative C are identical to those under alternative B.</p>	<p>1. Impacts under Alternative D are similar to those under alternative A.</p> <p>2. Approximately 51, 375 acres of security would be maintained with all but 8 of the 35 CDIV APD's being authorized.</p> <p>3. Connectivity between security patches will be compromised due to loss of approximately 710 acres of security habitat resulting from federal and non-federal development. Security habitat from 2 adjacent patches will be removed, leaving a greater distance between remaining patches.</p>

Issues/ Metrics	Alt A (No Action)	Alt B (Proposed Action)	Alt C (Modification at onsites)	Alt D – Elk Emphasis (Modification at onsite, and deny federal wells that would impact security habitat)
<i>Pattern of elk use</i>	<p>1. Elk are likely to seek refuge on undeveloped federal leases and remaining security patches.</p> <p>2. A 50% or less return rate is anticipated following the completion of well drilling, construction and implementation of interim reclamation for the non-federal development.</p>	<p>1. Elk are likely to seek refuge on undeveloped federal leases and remaining security patches.</p> <p>2. A 50% or less return rate is anticipated following the completion of well drilling, construction and implementation of interim reclamation for the non-federal and federal development.</p> <p>3. Elk will avoid the project area and concentrate use in remaining security patches within the CIAA and/or may leave the herd unit during construction.</p>	<p>1. Impacts under Alternative C are similar to those under alternative B.</p>	<p>1. Elk are likely to seek refuge on undeveloped federal leases and remaining security patches.</p> <p>2. A 50% or less return rate is anticipated following the completion of well drilling, construction and implementation of interim reclamation for the non-federal and federal development.</p> <p>3. Although elk may be displaced during drilling and construction, it is likely that elk would reoccupy the elk security habitat that is maintained within and adjacent to the project area once the POD is in the production phased.</p>
<i>Population</i>	<p>1. The elk population would likely remain stable or decrease within the current trend of 3% decline annually.</p>	<p>1. Due to the loss of security habitat and, therefore connectivity between patches, and a likely change in pattern of use, the population is likely to decrease.</p>	<p>1. Impacts under Alternative C are similar to those under alternative B.</p>	<p>1. Due to the loss of security habitat and, therefore connectivity between patches, and a likely change in pattern of use, the population is likely to decrease, but less than under Alternative B & C as approximately 1,050 acres of security habitat is maintain.</p>

4.2.2.1. Vegetation & Soils Direct and Indirect Effects

Trenching construction will remove vegetation while burying proposed and existing overhead power until reclamation restores native habitat. Consolidated linear infrastructure will maintain native soil and vegetation (see below). Removal of the 5 well locations and associated access road and infrastructure under alternative D – Sage-Grouse Emphasis, will retain native soil and vegetation across approximately 24.5 acres. Removal of the 8 well locations and associated access road and infrastructure under alternative D – Elk Emphasis, will retain native soil and vegetation across approximately 50.6 acres.

4.2.2.2. Cumulative effects for Vegetation and Soils

No additional mitigation measures are required.

4.2.3. Fluid Minerals

Assuming these wells are not drilled and there are no offsetting wells							
TWP	RNG	Sec	Qtr/Qtr	Lease	Well Name	Unrecovered CBM High	Low
50N	76W	21	SWNW	WYW147335	CARU 12-21-5076GW	1414	
50N	76W	21	NENW	WYW137645	CARU 21-21-5076GW	1414	
50N	76W	21	SWSW	WYW147335	CARU 14-21-5076GW	1414	
50N	76W	21	NESW	WYW147335	CARU 23-21-5076GW	1414	
50N	76W	28	NWSW	WYW149969	CARU 13-28-5076GW	1573	
50N	76W	28	SESW	WYW149969	CARU 24-28-5076GW	1573	
50N	76W	33	SWNW	WYW147335	CARU 12-33-5076GW	1573	
50N	76W	33	NENW	WYW147335	CARU 21-33-5076GW	1573	

Unrecovered CBM numbers are in thousands of MCF, low numbers were not used since there is no production surrounding these wells.

Assuming these wells are not drilled but all surrounding 80s are							
TWP	RNG	Sec	Qtr/Qtr	Lease	Well Name	Unrecovered CBM High	Low
50N	76W	21	SWNW	WYW147335	CARU 12-21-5076GW	156	
50N	76W	21	NENW	WYW137645	CARU 21-21-5076GW	156	
50N	76W	21	SWSW	WYW147335	CARU 14-21-5076GW	156	
50N	76W	21	NESW	WYW147335	CARU 23-21-5076GW	156	
50N	76W	28	NWSW	WYW149969	CARU 13-28-5076GW	173	
50N	76W	28	SESW	WYW149969	CARU 24-28-5076GW	173	
50N	76W	33	SWNW	WYW147335	CARU 12-33-5076GW	173	
50N	76W	33	NENW	WYW147335	CARU 21-33-5076GW	173	

Unrecovered CBM numbers are in thousands of MCF, low numbers were not used since there is no production surrounding these wells.

4.2.4. Wildlife

4.2.4.1. Big Game Direct and Indirect Effects

Short-term disturbances associated with burying existing and proposed overhead power will result in 50.6 acres of direct habitat loss until reclamation accelerates return to habitat effectiveness. Alternative D – Elk Emphasis will reduce habitat disturbance and eliminate habitat fragmentation by the removal 8 wells at 8 locations, 1.8 miles water pipeline (Barber Cr. pipeline) and associated 6 miles of new oil and gas access roads with utility corridor.

4.2.4.2. Migratory Birds Direct and Indirect Effects

Alternative D contains the least habitat impact to migratory birds.

4.2.4.3. Raptors Direct and Indirect Effects

Alternative D contains the least habitat impact to raptors.

4.2.4.4. Threatened and Endangered and Sensitive Species

4.2.4.4.1. Threatened and Endangered Species Direct and Indirect Effects

4.2.4.4.1.1. Bald eagle

The overall vertical intrusion within the project would be reduced with implementation of Alternative D. With a decreased amount of overhead power there would be a decreased likelihood of power line mortalities.

4.2.4.4.2. Sensitive Species Direct and Indirect Effects

4.2.4.4.2.1. Greater sage-grouse

Alternative D would reduce the negative impact to sage-grouse and habitat fragmentation of habitat as well as accelerate return to habitat effectiveness at reclamation.

Trenching construction would remove habitat while burying proposed and existing overhead power outside of existing corridors. This will cause a short-term disturbance and direct habitat loss; however, effective reclamation should provide some habitat value as these areas are reclaimed and native vegetation becomes established. This alternative would improve sage grouse habitat by removing vertical intrusions and consolidating most linear infrastructure with access roads.

The removal of 5 wells at 5 locations listed below and associated 3.5 miles of new oil and gas access roads with utility corridor, 2 power distribution points and 1 staging area would reduce direct loss of approximately 24.5 acres of sage-grouse habitat while retaining habitat connectivity between leks by decreasing multifaceted impacts.

According to the Wyoming Game and Fish Department's "*Recommendations for Development of Oil and Gas Resources Within Important Wildlife Habitats*", "in CBM fields, treat, remove, or re-inject produced water to reduce habitat for mosquitoes that vector West Nile virus (Walker et al. 2007b)."

The Wyoming Game & Fish Department Recommendations cite a study indicating that coal-bed natural gas (CBNG) ponds significantly increased the overall population of West Nile virus (WNV) vector mosquitoes in the Powder River Basin, and added to the duration of larval habitats that would normally be ephemeral. The author concluded CBNG ponds and associated habitats may serve to increase pathogen transmission in an otherwise arid ecosystem. (Doherty, M. K. 2007. Mosquito populations in the Powder River Basin, Wyoming: a comparison of natural, agricultural and effluent coal-bed natural gas aquatic habitats. M. S. Thesis. Montana State University, Bozeman, MT, USA.) Larval habitats of the West Nile virus vector mosquito *Culex tarsalis* were identified via remote sensing and GIS analyses. Result showed a 75% increase in potential larval habitats from 1999 to 2004 primarily because of the large increase in coalbed methane discharge ponds. (Zou, L.S.N Miller and E.T. Schmidtman. 2006 . Mosquito larval habitat mapping using remote sensing and GIS: implications of coalbedmethane development and West Nile Virus. Journal of Medical Entomology 43:1034-1041.)

4.2.4.4.2.2. Sharp-tailed grouse

Impacts to sharp-tailed grouse are similar to that of sage-grouse.

Table 4.15 Cumulative Effects

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

Resource/Species	Alternative A	Alternative B & C	Alternative D Sage-Grouse	Alternative D Elk
Threatened and Endangered Species				
Bald eagle	No habitat loss	Overhead electricity increasing mortality risk from electrocution.	Removal of overhead electricity will eliminate risk from electrocution. Removal of proposed impoundments will reduce West Nile virus impacts to eagles and retain foraging in areas where impoundments will impact prairie dogs.	Removal of overhead electricity will eliminate risk from electrocution. Removal of proposed impoundments will reduce West Nile virus impacts to eagles and retain foraging in areas where impoundments will impact prairie dogs.
Sensitive Species				
Greater Sage Grouse	No habitat loss.	Greatest habitat loss.	Less habitat loss.	Least habitat loss.
	No decision on overhead electricity. Overhead power could be routed through project area on private surface without BLM discretion increasing predation and collision risk. Grouse may avoid overhead power lines.	Greatest predation and collision risk associated with overhead power lines.	Less habitat fragmentation. Increase habitat connectivity. Reduce predators in nesting habitat with eliminating water impoundments. Eliminate collision and vertical intrusion from burying overhead power.	Least habitat fragmentation. Increase habitat connectivity. Reduce predators in nesting habitat with eliminating water impoundments. Eliminate collision and vertical intrusion from burying overhead power.
West Nile Virus	No Impact	Likely to contribute to the overall spread of WNV.	Likely to contribute less to the overall spread of WNV.	Likely to contribute least to the overall spread of WNV.

Resource/Species	Alternative A	Alternative B & C	Alternative D Sage-Grouse	Alternative D Elk
Water Resources				
CBNG Produced Water	0 gpm water produced	720 gpm	620 gpm	560 gpm
Groundwater	No Impact	Draw down from 36 wells	Draw down would be less from 31 wells.	Draw down would be less from 28 wells.
Surface Water	No Impact	720 gpm	620 gpm	560 gpm
Total Surface Disturbance	No Impact	138.9 acres	114.4 acres	88.3 acres

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.

5. CONSULTATION/COORDINATION

Contact	Title	Organization	Present at Onsite
Mary Hopkins	Interim WY SHPO	Wyoming State Historic Preservation Office	No
Bud Stewart	Energy Development Biologist	Wyoming Game & Fish Dept.	No
Lynn Jahnke	Wildlife Management Coordinator	Wyoming Game & Fish Dept.	No
Heather O'Brien	Wildlife Biologist	Wyoming Game & Fish Dept.	No
John Emmerich	Deputy Director	Wyoming Game & Fish Dept.	No
Brad Rogers	Wildlife Biologist	US Fish & Wildlife Service	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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