DECISION RECORD
FOR
Williams Production RMT Company
Culp Draw Federal POD/Hartzog Draw Federal POD
ENVIRONMENTAL ASSESSMENT –WY-070-10-121

DECISION: BLM's decision is to approve Williams Production RMT Company's Culp Draw Federal /Hartzog Draw Federal Coal Bed Natural Gas Plans of Development (PODs) 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.

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.

The following 53 Applications for Permit to Drill (APDs) and associated infrastructure are authorized:

Culp Draw Federal POD Wells

	Well Name	Well #	QTR/QTR	Sec	TWP	RNG	Lease
1	CULP DRAW R CHRISTENSEN	23-4*	NESW	4	45N	76W	WYW89855
2	CULP DRAW R CHRISTENSEN	34-4	SWSE	4	45N	76W	WYW145593
3	CULP DRAW R CHRISTENSEN	23-7	NESW	7	45N	76W	WYW145594
4	CULP DRAW R CHRISTENSEN	12-9	SWNW	9	45N	76W	WYW21220
5	CULP DRAW R CHRISTENSEN	13-9	NWSW	9	45N	76W	WYW21220
6	CULP DRAW R CHRISTENSEN	21-9	NENW	9	45N	76W	WYW21220
7	CULP DRAW R CHRISTENSEN	32-9	SWNE	9	45N	76W	WYW145594
8	CULP DRAW R CHRISTENSEN	34-9	SWSE	9	45N	76W	WYW89855
9	CULP DRAW R CHRISTENSEN	43-9	NESE	9	45N	76W	WYW89855
10	CULP DRAW R CHRISTENSEN	24-9	SESW	9	45N	76W	WYW21220
11	CULP DRAW R CHRISTENSEN	14-10	SWSW	10	45N	76W	WYW72484
12	CULP DRAW R CHRISTENSEN	12-15	SWNW	15	45N	76W	WYW89855
13	CULP DRAW R CHRISTENSEN	34-18	SWSE	18	45N	76W	WYW147322
14	CULP DRAW R CHRISTENSEN	31-18	NWNE	18	45N	76W	WYW147322
15	CULP DRAW R CHRISTENSEN	42-18	SENE	18	45N	76W	WYW147322
16	CULP DRAW R CHRISTENSEN	43-18	NESE	18	45N	76W	WYW147322
17	CULP DRAW R CHRISTENSEN	12-19	SWNW	19	45N	76W	WYW147322
18	CULP DRAW R CHRISTENSEN	41-19	NENE	19	45N	76W	WYW147322
19	CULP DRAW R CHRISTENSEN	34-21	SWSE	21	45N	76W	WYW41473
20	CULP DRAW R CHRISTENSEN	43-21	NESE	21	45N	76W	WYW41473
21	CULP DRAW R CHRISTENSEN	43-28	NESE	28	45N	76W	WYW0266653
22	CULP DRAW R CHRISTENSEN	21-28	NENW	28	45N	76W	WYW89852
23	CULP DRAW R CHRISTENSEN	34-12	SWSE	12	45N	77W	WYW146848
24	CULP DRAW R CHRISTENSEN	43-12	NESE	12	45N	77W	WYW146848

Hartzog Draw Federal POD Wells

	Well Name	Well #	QTR/QTR	Sec	TWP	RNG	Lease
1	HARTZOG DRAW R CHRISTENSEN	43-4*	NESE	4	45N	76W	WYW145593
2	HARTZOG DRAW R CHRISTENSEN	41-9	NENE	9	45N	76W	WYW145594
3	HARTZOG DRAW R CHRISTENSEN	12-10	SWNW	10	45N	76W	WYW72484
4	HARTZOG DRAW R CHRISTENSEN	21-10	NENW	10	45N	76W	WYW72484
5	HARTZOG DRAW R CHRISTENSEN	23-10	NESW	10	45N	76W	WYW72484
6	HARTZOG DRAW R CHRISTENSEN	32-10	SWNE	10	45N	76W	WYW72484
7	HARTZOG DRAW R CHRISTENSEN	34-10	SWSE	10	45N	76W	WYW72484
8	HARTZOG DRAW R CHRISTENSEN	41-10	NENE	10	45N	76W	WYW51703
9	HARTZOG DRAW R CHRISTENSEN	12-14	SWNW	14	45N	76W	WYW72484
10	HARTZOG DRAW R CHRISTENSEN	14-15	SWSW	15	45N	76W	WYW21220
11	HARTZOG DRAW R CHRISTENSEN	32-15	SWNE	15	45N	76W	WYW89855
12	HARTZOG DRAW R CHRISTENSEN	21-15	NENW	15	45N	76W	WYW89855
13	HARTZOG DRAW R CHRISTENSEN	23-15	NESW	15	45N	76W	WYW21220
14	HARTZOG DRAW R CHRISTENSEN	41-15	NENE	15	45N	76W	WYW89855
15	HARTZOG DRAW R CHRISTENSEN	43-15	NESE	15	45N	76W	WYW89855
16	HARTZOG DRAW R CHRISTENSEN	34-15	SWSE	15	45N	76W	WYW89855
17	HARTZOG DRAW R CHRISTENSEN	32-22	SWNE	22	45N	76W	WYW89855
18	HARTZOG DRAW R CHRISTENSEN	43-22	NESE	22	45N	76W	WYW89859
19	HARTZOG DRAW R CHRISTENSEN	34-22	SWSE	22	45N	76W	WYW89859
20	HARTZOG DRAW R CHRISTENSEN	11-23	NWNW	23	45N	76W	WYW147322
21	HARTZOG DRAW R CHRISTENSEN	21-23	NENW	23	45N	76W	WYW147322
22	HARTZOG DRAW R CHRISTENSEN	24-23	SESW	23	45N	76W	WYW147322
23	HARTZOG DRAW R CHRISTENSEN	12-27	SWNW	27	45N	76W	WYW41473
24	HARTZOG DRAW R CHRISTENSEN	21-27	NENW	27	45N	76W	WYW41473
25	HARTZOG DRAW R CHRISTENSEN	43-27	NESE	27	45N	76W	WYW41473
26	HARTZOG DRAW R CHRISTENSEN	32-32	SWNE	32	46N	76W	WYW18925
27	HARTZOG DRAW R CHRISTENSEN	41-32	NENE	32	46N	76W	WYW18925
28	HARTZOG DRAW R CHRISTENSEN	34-33	SWSE	33	46N	76W	WYW41488
29	HARTZOG DRAW R CHRISTENSEN	43-33	NESE	33	46N	76W	WYW41488

The following wells and associated gas lines, waterlines, power and access roads listed below are deferred until the operator can demonstrate that a surface use agreement has been reached with John Christensen to the BLM. Upon the operator demonstrating that a surface use agreement has been reached the wells will be approved accordingly:

Culp Draw Federal POD

	Well Name	Well #	QTR/QTR	Sec	TWP	RNG	Lease
1	CULP DRAW J CHRISTENSEN	14-19	SWSW	19	45N	76W	WYW147322
2	CULP DRAW J CHRISTENSEN	34-19	SWSE	19	45N	76W	WYW147322
3	CULP DRAW J CHRISTENSEN	43-19	NESE	19	45N	76W	WYW147322
4	CULP DRAW J CHRISTENSEN	14-20	SWSW	20	45N	76W	WYW147322
5	CULP DRAW R CHRISTENSEN	23-20	NESW	20	45N	76W	WYW147322
6	CULP DRAW R CHRISTENSEN	12-28	SWNW	28	45N	76W	WYW89852
7	CULP DRAW R CHRISTENSEN	34-28	SWSE	28	45N	76W	WYW0266653

Hartzog Draw Federal POD

	Well Name	Well #	QTR/QTR	Sec	TWP	RNG	Lease
1	HARTZOG DRAW R CHRISTENSEN	34-27	SWSE	27	45N	76W	WYW41473
2	Pump Station 27	PS 27	SESE	27	45N	76W	WYW41473
3	Access Road in Sec. 26		SW Corner	26	45N	76W	WYW41473

The following Conditions of Approval listed below will apply upon approval of the deferred wells for the Hartzog Draw Federal POD and the Culp Draw Federal POD:

Hartzog Draw Federal POD Surface Use Site-Specific Conditions of Approval

1. A 20' foot vegetated buffer must be maintained on the location for the following well due to slope and the proximity to adjacent drainages: 34-27.

2. 34-27: The access road will be surfaced with road base gravel and will remain primitive with spot upgrade as needed to minimize overall surface disturbance and maintain the integrity of the road.

Culp Draw Federal POD Surface Use Site-Specific Conditions of Approval

1. A 30 Day Stabilization COA will apply to both the road and the location for the following well due to poor reclamation potential: 23-20. ***** *The disturbance areas identified have poor reclamation suitability that shall be stabilized in a manner which eliminates accelerated erosion until a self-perpetuating native plant community has stabilized the site in accordance with the Wyoming Reclamation Policy. Stabilization efforts shall be finished within 30 days of the initiation of construction activities. Stabilization efforts include mulching, matting, soil amendments, etc. (For further detail reference the Reclamation Management Plan April 30, 2010).*

2. A 30 Day Stabilization COA will apply to only the access road for the following well due to poor reclamation potential: 14-20.

3. A 20' foot vegetated buffer must be maintained on the locations for the following wells due to slope and the proximity to adjacent drainages: 23-20, 34-19, and 14-19.

4. A 20' foot vegetated buffer must be maintained on the access road for the following well due to slope and the proximity to adjacent drainages: 43-19.

5. 12-28: The sandstone outcropping on the east side of the location will serve as the edge of disturbance on the cut side of the pad to minimize overall surface disturbance, avoid poor reclamation, and steep slopes.

6. 43-19: Dirt work will occur on the east side of the location to create a safer approach, the dirt that will be removed will be utilized to enhance the drainage crossing to the NE (Segment 1, attachment H, within the Culp Draw Federal POD Reclamation Management Plan).

7. 14-20: The junction at the beginning of the access road will have a 20’ feet cattle guard and will be offset per landowner request and safety purposes.

8. 23-20: No fill material will placed south of the access road per landowner request to avoid snow drifting across his fence that runs parallel to the location/access road.

9. 14-19: The pit spoils will be stock piled to the south side of the location due to the drainage on the west side of the location. The flow for the drainage on the west side of the location will not be altered.

Lands and Realty Row's:
The following right-of-way locations were identified with the Culp Draw POD for road, water, buried power and gas. Use and maintenance of these locations are prohibited until authorized right-of-ways have been issued.

1. T. 45 N., R. 77 W., section 12, lot 7 for the road, gas, water and power leaving the 34-12-4577 well. An amendment to two existing rights-of-ways WYW159912 & WYW170042 will tie into this proposed location.

The following right-of-way locations were identified with the Hartzog Draw POD for 3-Phase Overhead Power. Use and maintenance of these locations are prohibited until authorized right-of-ways have been issued.

2. T. 45 N., R. 77 W., section 17.

The following well was dropped as a result of the on-site, and this change has been incorporated into the operator's POD:

1. The 13-23BG, TWP 45N., RNG 76 W. section 33 NWSW, Lease # WYW147322 was dropped due to the proximity to the Willow Creek Lek. This change was submitted by the operator on March 19, 2010.

2. For further detail in regards to wells that were moved or dropped in the Hartzog Draw Federal POD please refer to the letter dated May 10, 2010 within the Hartzog Draw Federal POD under the Correspondence section of the POD book. The letter addresses the drainage, landowner consensus, and well moves.

Operator Committed Measures:
As a result of the onsites, several mitigation measures proposed by the BLM were incorporated by the operator into the Culp Draw and Hartzog Draw plan. These changes were submitted as Operator Committed Measures on March 19, 2010, in an attachment to the MSUP labeled "Reclamation Management Plan" (attachment H) and "Location Information" (attachment I). The mitigation plan includes specific details on locating wells and infrastructure to reduce impacts to soils and wildlife.

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 Culp Draw Federal POD/Hartzog Draw Federal 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 Emphasis, to not approve the drilling of up to 2 wells (11-23-4577 and 21-23-4577), were not incorporated into this decision. The impacts of approving these 2 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 certified that a Surface Use Agreement has been reached with all other Landowners within the Culp Draw Federal POD/Hartzog Draw Federal 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 Culp Draw Federal POD/Hartzog Draw Federal POD 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.

ACTING Field Manager: Paul Beels Date: 5/27/2010

FINDING OF NO SIGNIFICANT IMPACT
FOR
Williams Production RMT Company
Culp Draw Federal POD/Hartzog Draw Federal POD
ENVIRONMENTAL ASSESSMENT –WY-070-10-121

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.

ACTING Field Manager: Paul Beels Date: 5/27/2010

BUREAU OF LAND MANAGEMENT
BUFFALO FIELD OFFICE
ENVIRONMENTAL ASSESSMENT (EA)
FOR
Williams Production RMT Company
Culp Draw Federal POD/Hartzog Draw Federal POD
PLAN OF DEVELOPMENT
WY-070-10-121

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 Hartzog Draw Federal POD on October 23, 2009 with a total of 31 APD's. On December 1, 2009 Williams submitted the Culp Draw Federal POD, also with a total of 31 APD's. The BLM and Williams agreed to process these two projects together, due to proximity and amount of shared infrastructure.

- December 22, 2009: The Operator Information Meeting (OIM) was conducted, and the decision was made to map both projects together to show common infrastructure such as access roads, pipelines, and pump stations.
- January 5, 2009 and January 12, 2010 Initial project onsites for Hartzog Draw Federal POD.
- January 13, 14, 15, and 22, 2010: Initial project onsites for Culp Draw Federal POD.
- February 3, 2010: Post onsite deficiency letter sent out by BLM for both Culp Draw and Hartzog Federal POD's.
- March 4, 2010: Additional on-site of some additional landowner changes in regards to the placement of the access road for the 34-28 as well pump station 8.
- March 19, 2010: The deficiencies for both projects were submitted to the BLM by the operator.

These two Federal POD's share a main access route/utility corridor that serves as a main artery to both Pods'. This primary access route/utility corridor splits the two PODs down the center serves as an integral component of the travel management plan and as a primary utility corridor. Once the project is developed, the access route will be a shared corridor route for Yates Petroleum, Williams, and Anadarko Petroleum Corporation. In addition, the water management for the two projects is tied together and will utilize common water lines and water handling facilities.

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 Culp Draw/Hartzog Draw 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 1985/2001 Buffalo RMP and the 2003 PRB FEIS. The BFO RMP revision began in December of 2008 and is expected to be completed in 2012.

The proposed action is in conformance with Instruction Memorandum No. WY-2010-012, "Greater Sage-Grouse Habitat Management Policy on Wyoming Bureau of Land Management Administered Public Lands including the Federal Mineral Estate".

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.

Sage-Grouse Habitat

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.

Alternative D represents BFO efforts to reduce direct as well as indirect impacts to sage-grouse habitat on a project level basis.

The **Culp Draw Federal POD/Hartzog Draw Federal POD** does not occur within a focus area. However, high quality sage-grouse habitat, as indicated by the University of Montana model, occurs throughout the project area.

Steep Slopes/ Erosive Soils

Many of the soils and landforms in the project area present distinct challenges for development, and/or eventual site reclamation.

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 having a high potential for buried cultural deposits: areas containing alluvial deposits along Hartzog Draw.

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.

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 Culp Draw Federal POD/Hartzog Draw Federal POD 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 Culp Draw Federal POD/Hartzog Draw Federal POD Plan of Development (POD) for 62 coal bed natural gas well APD`s and associated infrastructure.

Proposed Well Information: There are 62 wells proposed within these Pods; the wells are vertical bores proposed on an 80-acre spacing pattern with 1 well per location. Each well will produce from the Big George coal seam. Proposed well house dimensions are 6 ft wide x 6 ft length x 8 ft height. The well house color will be covert green, selected to blend with the surrounding vegetation. Proposed wells are located as follows:

Culp Draw Federal POD Wells

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1	CULP DRAW J CHRISTENSEN	14-19	SWSW	19	45N	76W	WYW147322
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Hartzog Draw Federal POD Wells

	Well Name	Well #	QTR/QTR	Sec	TWP	RNG	Lease
1	HARTZOG DRAW R CHRISTENSEN	43-4*	NESE	4	45N	76W	WYW145593
2	HARTZOG DRAW R CHRISTENSEN	41-9	NENE	9	45N	76W	WYW145594
3	HARTZOG DRAW R CHRISTENSEN	12-10	SWNW	10	45N	76W	WYW72484
4	HARTZOG DRAW R CHRISTENSEN	21-10	NENW	10	45N	76W	WYW72484
5	HARTZOG DRAW R CHRISTENSEN	23-10	NESW	10	45N	76W	WYW72484
6	HARTZOG DRAW R CHRISTENSEN	32-10	SWNE	10	45N	76W	WYW72484
7	HARTZOG DRAW R CHRISTENSEN	34-10	SWSE	10	45N	76W	WYW72484
8	HARTZOG DRAW R CHRISTENSEN	41-10	NENE	10	45N	76W	WYW51703
9	HARTZOG DRAW R CHRISTENSEN	12-14	SWNW	14	45N	76W	WYW72484
10	HARTZOG DRAW R CHRISTENSEN	14-15	SWSW	15	45N	76W	WYW21220
11	HARTZOG DRAW R CHRISTENSEN	21-15	NENW	15	45N	76W	WYW89855
12	HARTZOG DRAW R CHRISTENSEN	23-15	NESW	15	45N	76W	WYW21220
13	HARTZOG DRAW R CHRISTENSEN	32-15	SWNE	15	45N	76W	WYW89855
14	HARTZOG DRAW R CHRISTENSEN	34-15	SWSE	15	45N	76W	WYW89855
15	HARTZOG DRAW R CHRISTENSEN	41-15	NENE	15	45N	76W	WYW89855
16	HARTZOG DRAW R CHRISTENSEN	43-15	NESE	15	45N	76W	WYW89855
17	HARTZOG DRAW R CHRISTENSEN	32-22	SWNE	22	45N	76W	WYW89855
18	HARTZOG DRAW R CHRISTENSEN	34-22	SWSE	22	45N	76W	WYW89859
19	HARTZOG DRAW R CHRISTENSEN	43-22	NESE	22	45N	76W	WYW89859
20	HARTZOG DRAW R CHRISTENSEN	12-23	SWNW	23	45N	76W	WYW147322
21	HARTZOG DRAW R CHRISTENSEN	13-23	NWSW	23	45N	76W	WYW147322
22	HARTZOG DRAW R CHRISTENSEN	21-23	NENW	23	45N	76W	WYW147322
23	HARTZOG DRAW R CHRISTENSEN	24-23	SESW	23	45N	76W	WYW147322
24	HARTZOG DRAW R CHRISTENSEN	12-27	SWNW	27	45N	76W	WYW41473
25	HARTZOG DRAW R CHRISTENSEN	21-27	NENW	27	45N	76W	WYW41473
26	HARTZOG DRAW R CHRISTENSEN	34-27	SWSE	27	45N	76W	WYW41473
27	HARTZOG DRAW R CHRISTENSEN	43-27	NESE	27	45N	76W	WYW41473
28	HARTZOG DRAW R CHRISTENSEN	32-32	SWNE	32	46N	76W	WYW18925
29	HARTZOG DRAW R CHRISTENSEN	41-32	NENE	32	46N	76W	WYW18925
30	HARTZOG DRAW R CHRISTENSEN	34-33	SWSE	33	46N	76W	WYW41488
31	HARTZOG DRAW R CHRISTENSEN	43-33	NESE	33	46N	76W	WYW41488

County: Johnson and Campbell County

Applicant: Williams Production RMT Company

Surface Owners: Robert and Janet Christensen, John Christensen, BLM

Project Description:
The proposed action involves the following:

- Drilling of 62 total federal CBM wells in the Big George, to depths of approximately 1130-1770 feet.

- 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. William'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.

- A Water Management Plan (WMP) that involves the following infrastructure and strategy: There are no new discharge points or stock water reservoirs proposed within the Culp Draw Federal POD/Hartzog Draw Federal POD boundaries. Effluent produced from the development of coal bed natural gas (CBNG) wells is proposed to be transported, via common waterlines and proposed pump stations, to approved water management infrastructure within approved POD's located adjacent to the Culp Draw Federal/Hartzog Draw Federal POD's. The approved PODs that will be receiving CBNG effluent from this proposed action are the Kingwood 1, Kingwood 2, Kingwood 3, Wormwood 1 and Wormwood 3 POD's. When approved, the proposed Wormwood 2 POD will also be part of the water management strategy. The approved POD's have a combined 41 outfalls and associated impoundments, 4 direct discharges on Pumpkin Creek, land application and injection as alternatives for approved water management strategy options.

- 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. If the power line network is not completed before the wells are in production, then temporary diesel generators shall be placed at the 13 power drops.

– A storage tank of 1000 gallon capacity shall be located with each diesel generator. Generators are projected to be in operation for 12 months. Fuel deliveries are anticipated to be 2 times per week. Please refer to the Culp Draw Federal POD/Hartzog Draw Federal POD in the Master Surface Use Plan (MSUP) for further detail at the end of the MSUP, on noise level of the possible generators to be used; measured at 50 and 100 feet.

- A buried gas, water and power line network, and 5 central gathering/metering

- There are no proposed 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 certified that a Surface Use Agreement has been reached with the Landowners.

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 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 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 habitat.

2.3.1. Changes as a result of the on-sites

The operator has listed the changes as an attachment to the Master Surface Use Plan (MSUP), labeled attachment I labeled Culp Draw and Hartzog Draw Location Information. This portion of the mitigation plan addresses items such as dirt work, wildlife, reclamation, POD pre-planning and any other pertinent information and changes by well. Please refer to this section for further detail as a result of the on-sites for well moves and well specific information regarding the onsites. For further detail in regards to wells that were moved or dropped in the Hartzog Draw Federal POD please refer to the letter dated May 10, 2010 within the Hartzog Draw Federal POD under the Correspondence section of the POD book. The letter addresses the drainage, landowner consensus, and well moves.

The following well was dropped as a result of the on-site:

1. The 13-23BG, TWP 45N., RNG 76 W. section 33 NWSW, Lease # WYW147322 was dropped due to its proximity to the Willow Creek sage-grouse lek.

Lands and Realty Row's:
The following right-of-way locations were identified with the Culp Draw POD for road, water, power and gas. Use and maintenance of these locations are prohibited until authorized right-of-ways have been issued.

1. TWP 45 N., RNG 77 W., section 12, lot 7 for the road, gas, water and power leaving the 34-12-4577 well. An amendment to two existing rights-of-ways WYW159912 & WYW170042 will tie into this proposed location.

The following right-of-way locations were identified with the Hartzog Draw POD for 3-Phase Overhead Power. Use and maintenance of these locations are prohibited until authorized right-of-ways have been issued.

1. T. 45 N., R. 77 W., section 17.

2.3.2. Operator Committed Measures

Please refer to the supplemental information submitted by the operator as attachment I to the MSUP labeled Culp Draw and Hartzog Draw Location Information.

2.4. Alternative C Site-Specific Conditions of Approval

2.4.1. Surface Use

Hartzog Draw Federal POD Surface Use Site-Specific Conditions of Approval

1. A 30 Day Stabilization COA will apply to both the road and the location for the following wells due to poor reclamation potential: 43-27. ***** *The disturbance areas identified have poor reclamation suitability that shall be stabilized in a manner which eliminates accelerated erosion until a self-perpetuating native plant community has stabilized the site in accordance with the Wyoming Reclamation Policy. Stabilization efforts shall be finished within 30 days of the initiation of construction activities. Stabilization efforts include mulching, matting, soil amendments, etc. (For further detail reference the Reclamation Management Plan April 30, 2010).*

2. A 20' foot vegetated buffer must be maintained on the locations for the following wells due to slope and the proximity to adjacent drainages: 41-15, 32-22, 34-22, 34-27, 21-10, 32-32, and 34-33.

3. 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.

4. 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.

5. An agreement for the main access road that is proposed through sections 22, 26, and 27 will need to be submitted to the BLM Authorized Officer prior to construction. The agreement will need to demonstrate that the operators that will be using the shared access road and utility corridor are all in

agreement for construction and maintenance of the shared road. This agreement will include Yates Petroleum, Williams, and Anadarko Petroleum.

6. 24-23: A 30 Day Stabilization COA will apply to only the access road due to poor reclamation potential.

7. 21-27: A 30 Day Stabilization COA will apply only to the location due to poor reclamation potential.

8. 43-27: The cattle guard on Robert Christensen will utilize a swing gate per landowner request.

9. 12-27: 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 operator will provide a reclamation plan prior to construction of the 12-27 location and access road addressing the reclamation of the un-used existing road; due to sandy soils.

10. 34-15: There will be no loop access road crossing the drainage to the east; i.e. surface occupation, approved through the drainage to the west of the location due to poor reclamation potential, erosive soils, and side slope in excess of 60% that would be impacted. Pipeline installation will still be authorized as this is a temporary surface disturbing activity and not surface occupancy.

11. 34-27: The access road will be surfaced with road base gravel and will remain primitive with spot upgrade as needed to minimize overall surface disturbance and maintain the integrity of the road.

12. 43-4: The operator will utilize the existing access road, road base gravel, and will incorporate a template design to minimize overall surface disturbance and maintain the integrity of the road.

13. 21-10: As agreed upon at the onsite the pipeline will go NW to the main access road/utility corridor and will corridor with existing Bell Fouche line to minimize overall surface disturbance.

14. 21-10: The location is a dead end and will need to be signed accordingly in order to keep personnel from using the pipeline corridor as an access road and enhance the reclamation of the pipeline.

15. 32-10: Two cattle guards will need to be installed with swing gates to the east and south of the location per landowner request.

16. 41-10: The access road will need to incorporate a spot upgrade where the access road crosses the existing pipeline to mitigate for pipeline subsidence.

Culp Draw Federal POD Surface Use Site-Specific Conditions of Approval

1. A 30 Day Stabilization COA will apply to both the road and the location for the following wells due to poor reclamation potential: 23-20, 12-19, and 41-19. ***** *The disturbance areas identified have poor reclamation suitability that shall be stabilized in a manner which eliminates accelerated erosion until a self-perpetuating native plant community has stabilized the site in accordance with the Wyoming Reclamation Policy. Stabilization efforts shall be finished within 30 days of the initiation of construction activities. Stabilization efforts include mulching, matting, soil amendments, etc. (For further detail reference the Reclamation Management Plan April 30, 2010).*

2. A 30 Day Stabilization COA will apply to only the access road for the following wells due to poor reclamation potential: 14-20, 34-21, 21-28, and 13-9.

3. A 30 Day Stabilization COA will apply only to the location for the following wells due to poor reclamation potential: 23-7.

4. A 20' foot vegetated buffer must be maintained on the locations for the following wells due to slope and the proximity to adjacent drainages: 12-15, 43-9, 23-7, 23-20, 34-19, 14-19, 12-19, 41-19, and 21-28.

5. A 20' foot vegetated buffer must be maintained on the access road for the following wells due to slope and the proximity to adjacent drainages: 43-19 and 13-9.

6. A 20' foot vegetated buffer must be maintained on the locations/access roads for the following wells due to slope and the proximity to adjacent drainages: 14-10 and 31-18.

7. 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.

8. 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.

9. 31-18: As agreed upon at the onsite the operator will maintain the integrity of the ridge to the south and to the east to insure drainage and water dissipation on the well location.

10. 31-18: The operator will place the proposed pipeline within the engineered road segment to minimize overall surface disturbance, avoid impacting the surrounding topography, and altering the drainage to the west. This will need to be illustrated within the engineered drawings prior to construction.

11. 34-12: The operator will be required to mitigate and avoid any impacts to the head cut at the beginning of the access road within the reclamation plan prior to construction.

12. 43-12: The operator will be required to mitigate and avoid any impacts to the head cut south of the location. This will need to be addressed within the reclamation plan prior to construction.

13. 43-21: The operator will corridor there access/utility corridor as close as feasible from the centerline of the existing pipeline to further reduce surface disturbance as discussed at the onsite.

14. 12-28: The sandstone outcropping on the east side of the location will serve as the edge of disturbance on the cut side of the pad to minimize overall surface disturbance, avoid poor reclamation, and steep slopes.

15. 43-19: Dirt work will occur on the east side of the location to create a safer approach, the dirt that will be removed will be utilized to enhance the drainage crossing to the NE (Segment 1, attachment H, within the Culp Draw Federal POD Reclamation Management Plan).

16. 14-20: The junction at the beginning of the access road will have a 20’ feet cattle guard and will be offset per landowner request and safety purposes.

17. 23-20: No fill material will placed south of the access road per landowner request to avoid snow

drifting across his fence that runs parallel to the location/access road.

18. 14-19: The pit spoils will be stock piled to the south side of the location due to the drainage on the west side of the location. The flow for the drainage on the west side of the location will not be altered.

19. 12-19: The cattle guard on the fence between Robert and John Christensen will utilize a swing gate per landowner request.

2.4.2. Wildlife

2.4.2.1. 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
45N, 76W	4	Wells 23-4, 34-4, their access corridors, pump station, power drop, and metering facility
	7	Well 23-7, access corridors, and utility crossing
	8	Pump station
	9	Wells 12-9, 13-9, 21-9, 24-9, 32-9, 34-9, 41-9, access corridors
	10	Wells 12-10, 21-10, 32-10, 41-10, access corridors
	14	Well 12-14, and its access corridor
	15	Wells 21-15, 23-15, 32-15, 41-15, 43-15, access corridors, utility crossing, tire tank, and overhead power.
	17	overhead power
	19	Wells 12-19, 14-19, 34-19, 41-19, 43-19, their access corridors
	20	Wells 14-20, 23-20, their access corridors, power drop, pod building, and overhead power
	21	Well 34-21, and access corridors
	22	Well 34-22, 43-22, their access corridors, tire tank, and staging area
	27	Well 12-27, 21-27, 34-27, tire their access corridors, tire tanks, pod building, and pump station
	28	Well 12-28, 21-28, 34-28, 43-28, their access corridors
45N, 75W	12	Wells 34-12, 43-12, their access corridors
46N, 76W	32	metering facility, power drop, and access corridor to well 2-32

2. Surveys for new raptor nests shall be conducted, annually, within 0.5 miles of the POD boundary on or after 15 April, and prior to or during the first nest occupancy check.
3. Nest occupancy checks shall be completed for all raptor nests identified within a 0.5 mile of any infrastructure associated with the POD for as long as the POD is under construction. Once construction of the POD has ceased, nest occupancy checks shall continue for the first five years on all identified nests within a 0.5 mile of the POD boundary. Survey results will be submitted to a Buffalo BLM biologist in writing no later than 31 July of each survey year.
4. Well metering, maintenance and other site visits within 0.5 miles of raptor nests should be minimized during the breeding season (February 1 – July 31).

2.4.2.2. Sage-Grouse:

The following conditions will reduce impacts to sage-grouse:

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
45N, 76W	14	Well 12-14, its access corridor, and staging area
	15	Wells 12-15, 14-15, 21-15, 23-15, 32-15, 34-15, 41-15, 43-15, access corridors, and utility crossing
	17	overhead power
	18	Wells 31-18, 34-18, 42-18, 43-18, their access corridors, tire tank, pod building, overhead power, and staging area
	19	Wells 12-19, 14-19, 34-19, 41-19, 43-19, their access corridors, and staging area
	20	Wells 14-20, 23-20, their access corridors, and overhead power.
	21	Wells 34-21, 43-21, their access corridors, and pod building.
	22	Wells 32-22, 34-22, 43-22, their access corridors, staging area, and pod building
	23	Wells 11-23, 21-23, 24-23, their access corridors
	27	Wells 12-27, 21-27, 34-27, 43-27, their access corridors, and tire tank
	28	Wells 12-28, 21-28, 34-28, 43-28, their access corridors

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 the authorized officer and approved prior to surface disturbing activities.
b. Maximum 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 Willow Creek or Christensen Ranch 4 sage grouse leks. These roads will be posted at 10 mph. This will affect all roads located within Sections 19 and 23 T45N/R76W.
c. Disruptive activity is restricted on or within a 0.25 mile radius of the perimeter of occupied or undetermined sage-grouse leks from 6:00 pm to 8:00 am from March 15-May15. "Disruptive activities are those that "…require people and/or activity to be in nesting habitats for a duration of 1 hour or more during a 24 hour period…" (BLM 2009). This condition applies to the Willow Creek and Christiansen Ranch 4 sage-grouse leks located within 0.25 mile of the access road passing through T45N, R76W, sections 19 and 23.

2.4.3. Water Management

1. All channel crossings must be stabilized and re-vegetated immediately after construction is completed.
2. The operator will be responsible for monitoring springs located within ½ mile of the project boundary. The springs listed below will be sampled twice each year (spring and fall) to determine water quality and discharge rates for the duration of the associated CBNG development or until data trends indicates otherwise. The sample will be analyzed for the suite of parameters required by the WDEQ for the initial WYPDES permit application. Copies of water quality and quantity results will be submitted to the BLM BFO.

2.4.4. Cultural

1. Infrastructure construction within the vicinity of cultural resource sites 48JO1431 and 48JO1480 – T45N R76W Section 6, must be confined to existing disturbance along the road.
2. All surface disturbing activity in the following areas will be monitored by a BLM cultural resource use permit (CRUP) holder or permitted crew chief. The Bureau has identified these areas as having a high potential for buried cultural deposits (areas containing alluvial deposits along Hartzog Draw). 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.

-All surface disturbing activity associated with the construction of the following wells and associated infrastructure: 34-15-4576, 41-15-4576, 32-22-4576, 34-22-4576, 21-27-4576, 24-23-4576, 43-27-4576.

-All surface disturbing activity associated with access road upgrade in T45N R76W Section 23.

2.5. Programmatic mitigation measures identified in the PRB FEIS ROD

Programmatic mitigation measures were developed in the PRB FEIS ROD (see Appendix A of PRB FEIS ROD) are those, determined through analysis, which may be appropriate to apply at the time of APD approval if site specific conditions warrant. These mitigation measures can be applied by BLM, as determined necessary at the site-specific NEPA APD stage, as COAs and will be in addition to stipulations applied at the time of lease issuance and any standard COA.

Channel Crossings:

1. Channel crossings by road and pipelines will be constructed perpendicular to flow. Culverts will be installed at appropriate locations for streams and channels crossed by roads as specified in the BLM Manual 9112-Bridges and Major Culverts and Manual 9113-Roads. Streams will be crossed perpendicular to flow, where possible, and all stream crossing structures will be designed to carry the 25-year discharge event or other capacities as directed by the BLM.
2. Channel crossings by pipelines will be constructed so that the pipe is buried at least four feet below the channel bottom.

Wildlife:

1. All power lines will be built to protect raptors, including wintering bald eagles, from accidental electrocution using methods detailed by the Avian Power Line Interaction Committee (1996).

2. If any dead or injured threatened, endangered, proposed, or candidate species is located during construction or operation, the U.S. Fish and Wildlife Service's Wyoming Field Office (307-772-2374), their law enforcement office (307-261-6365), and the BLM Buffalo Field Office (307-684-1100) shall be notified within 24 hours. If any dead or injured sensitive species is located during construction or operation, the BLM Buffalo Field Office (307-684-1100) shall be notified within 24 hours.

3. 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.

4. 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.

5. Containment impoundments will be fenced to exclude wildlife and livestock. If they are not fenced, they will be designed and constructed to prevent entrapment and drowning.

6. All stock tanks shall include a ramp to enable trapped small birds and mammals to escape. See Idaho BLM Technical Bulletin 89-1 entitled Wildlife Watering and Escape Ramps on Livestock Water Developments: Suggestions and Recommendations.

2.6. Alternative D - Sage Grouse 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. Alternative D is the same as Alternative C with the addition of the project-level modifications identified by BLM, guided by seven years of sage-grouse research within the Powder River Basin and additional studies from across the species' range. Alternative D represents BFO efforts to reduce project-specific impacts to sage-grouse habitat, while maintaining drainage requirements consistent with the purpose and need of the proposed action. The following wells and infrastructure for the 11-23 and 21-23 would not be constructed under Alternative D.

2.7. Alternative D Site-Specific Conditions of Approval

2.7.1. Surface Use

No additional mitigation is required.

2.7.2. Wildlife

No additional mitigation is required.

2.8. Alternatives considered but not analyzed in detail

1. No additional alternatives were looked at for the Culp Draw/Hartzog Draw WMP strategies because it is the intent to utilize the strategies discussed within adjacent approved PODs. **No additional alternatives were considered for this project.**

2.9. Summary of Alternatives

A summary of the infrastructure currently existing within the POD area (Alternative A), the infrastructure originally proposed by the operator (Alternative B), and the infrastructure within the BLM/operator modified proposals (Alternative C and Alternative D) are presented below.

Summary of Alternatives

Facility	Alternative A (No Action) Existing Number or Miles	Alternative B (Original Proposal) Proposed Number or Miles	Alternative C (Modified Proposal Action) Revised Number or Miles	Alternative D See Tables Below
Total CBNG Wells: **Well Locations:** **Non-constructed** **Constructed** **Slotted**	~10 (1.0a) 0 0 0 0	62 62 38 (3.8 a) 20 (10 a) 4 (0.40 a)	61 61 34 (3.4 a) 22(13.59 a) 5 (0.48 a)	Reference Alternative D Table below
Conventional Wells	-12 (12 a)	0	0	No Change from Alternative C
Gather/Metering Facilities	1 (2 acres)	5 (10 acres)	8 (0.04 acres)	No Change from Alternative C
Compressors	0	0	0	No Change from Alternative C
Ancillary (Staging/Storage Areas)	# (0.00 acres)	5 (10 acres)	6 (12.00 acres)	No Change from Alternative C

Template/Spot Upgrade Roads **No Corridor** **With Corridor**	2.19 mi	2.88 mi	22.35 mi 1.15 mi 21.20 mi	No Change from Alternative C
Engineered Roads **No Corridor** **With Corridor**	0.00 mi	41.5 mi	5.51 mi 0.17 mi 5.34 mi	No Change from Alternative C
Primitive Roads **No Corridor** **With Corridor**	0.59 mi 0.59 mi 0.00 mi	8.75 mi 1.81 mi 6.94 mi	10.13 mi 0.05 mi 10.08 mi	Reference Alternative D table below
Buried Utilities **No Corridor** **With Corridor**	1.80 mi 1.80 mi 0.00 mi	16.85 mi 8.96 mi 7.89 mi	42.15 mi 4.03 mi 38.12 mi	Reference Alternative D table below
Power Drops **Distribution Panels** **Buried Power** **Buried Electrical With Corridor** **Buried Electrical Without Corridor**	# (0.00 acres) 0 0.00 mi 0.00 mi 0.00 mi	13 (1.82 acres) 0 82.73 mi 0.00 mi 0.00 mi	11 (1.54 acres) 0 38.53 mi 38.12 mi 0.41 mi	Reference Alternative D table below
Proposed Overhead Power lines in long term	15.69 mi	0.00 mi	2.80 mi	No Change from Alternative C
Pump Stations	# (0.00)	2 (4.5a)	3 (6.87a)	No Change from Alternative C
Breakout Stations	# (0.00)	2 (1.64a)	2 (1.64a)	No Change from Alternative C
Channel Disturbance: Culverts/Low Water Crossings (outside of the corridor)	# (0.00a)	# (0.0 acres)	# (0.00a)	No Change from Alternative C
TOTAL ACRES DISTURBANCE	**Approx. 93.00 acres**	**Approx. 279.00 acres**	**Approx. 287.67 acres**	**Approx. 284.67**

*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)
11-23 BG	NWNW	23	45N	76W	0.1acres	0.31 acres
21-23 BG	NENW	23	45N	76W	0.1 acres	2.78 acres
Acreage					**0.2 acres**	**2.98 acres**

Explanation of the variation of acreage between alternative B and C:

Alternative B:

- Added and reduced engineering in both PODs for safety and to minimize overall surface disturbance.
- Overhead power was not determined at the time of original proposal.

Alternative C:

- The pump station in section 27 was moved from the North Butte Obligation 2 POD per landowner request and placed in the Hartzog Draw Federal POD. John Christensen is the same landowner in both PODS.
- The engineered road in sec 26 and 27 in the Hartzog Draw Federal POD will be utilized by three operators. BLM requested it be upgraded prior approval for safety and reclamation purposes.
- Many of the primitive roads were increased to template design for drainage, safety, and wildlife concerns.
- The crossing in section 18 in Culp Draw was upgraded to an engineered crossing due to slope, safety, and reclamation; as well as to avoid the lek to the south.

*This is a highly developed area, both PODs were able to utilize existing structure, but due to engineering requirements, upgrades had to be made for safety, drainage, and reclamation.

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
Flood Plains
Hazardous or Solid Wastes
Native American Religious Concerns
Paleontology
Recreation
Traditional Cultural Properties
Visual Resource Management
Water Quality and Prime or Sole Source of Drinking Water
Wild and Scenic Rivers
Wilderness Values

Applications to drill were received on October 23, 2009 for the Hartzog Draw Federal POD and December 1, 2009 for the Culp Draw Federal POD. Field inspections of the proposed Culp Draw Federal POD/Hartzog Draw Federal POD CBNG project were conducted on 1/5,12,13,14, & 21/2010 and 3/16/2010 by the following:

NAME	AGENCY	TITLE
Allen Aksamit	Western Land Services	Wildlife Biologist
Patrick Barker	Western Land Services	Project Manager
Ralph Demel	Williams Production RMT CO	Construction Supervisor
Mike Lindsley	Western Land Services	Operations
Nate Lopez	Williams Production RMT CO	Drilling Supervisor
Randy Jesperson	Williams Production RMT CO	Land man
Charles Belyist	Williams Production RMT CO	Operations
Greg Tracy	Western Land Services	Natural Resource Specialists
Brad Rogers	U.S. Wildlife Service	Wildlife Biologist
Donald Brewer	BLM	Wildlife Biologist
Andy Perez	BLM	NRS
Ray Stott	BLM	NRS/Hydrologist
Kathy Brus	BLM	NRS/Hydrologist
Stacy Gunderson	BLM	Civil Engineer
Jerry Means	Magna	Dirt Work Contractor

3.1. Topographic Characteristics of Project Area

Williams Production RMT's Culp Draw and Hartzog Draw Federal PODs are located in western Johnson County and eastern Campbell County, 34 miles south of Gillette, Wyoming on US Highway 50. The two PODs lie approximately 11 miles southwest of Savageton, WY, on the Black and Yellow Road. The topography consists of moderately rough terrain with many ridges and deep draws. The elevation within the project area ranges from approximately 4700 to 5240 feet above sea level. Livestock grazing has been the primary historic land use within the project area. 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. Three major vegetation and habitat types occur within the project area including Mixed-grass prairie, Sagebrush grassland, and Junipers. 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), big sagebrush (Artemisia tridentate), and silver sagebrush (Artemisia cana) mixed with various types of grasses. Some rocky mountain juniper (Juniperus sp.) is evident. However, Junipers are not found in large numbers and are only found in some draws on north facing aspects. Plains cottonwoods (Populus deltoids) are also evident in some of the draw bottoms throughout the project area.

3.2.1. Soils

Soils within the project area were identified from the *South Johnson and South Campbell county Survey Areas, Wyoming (WY719, WY 705).* The soil survey was performed by the Natural Resource Conservation Service according to National Cooperative Soil Survey standards. The BLM uses county soil survey information to predict soil behavior, limitations, or suitability for a given activity or action. The agencies long term goal for soil resource management is to maintain, improve, or restore soil health and productivity, and to prevent or minimize soil erosion and compaction. Soil management objectives are to ensure that adequate soil protection is consistent with the resource capabilities. Many of the soils and landforms of this area present distinct challenges for development, and /or eventual site reclamation.

Areas within the pod boundary is comprised of soils having poor reclamation suitability, the proponent planned their project and the BLM made further recommendations on the onsite to avoid those areas where possible, but disturbances within these areas will require the programmatic/standard COA's be complimented with a site specific performance based stabilization/reclamation COA. Overcoming the unfavorable properties or limitations requires special design, extra maintenance, and costly alteration.

Table 3.1 Dominant soils affected by the proposed action include:

Map Unit	Map Unit Name	Acres	Percent
233	Ustic Torriorthents, gullied	1952.3304	17%
SNe	Shingle-Tassel association	1657.6651	14%
210	Shingle-Taluce complex, 3 to 30 percent slopes	914.3305	8%
217	Theedle-Shingle loams, 3 to 30 percent slopes	628.0327	5%
218	Theedle-Turnercrest-Kishona complex, 3 to 15 percent slopes	551.3374	5%

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	Ecological Site
233	Shallow Clayey (10-14 NP)
SNe	Loamy (10-14 NP)
210	Loamy (10-14 NP)
217	Loamy (10-14 NP)
218	Loamy (10-14 NP)

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. Many of the well locations and access roads exhibit characteristics of sandy soils, shallow loams, and shallow clayey.

These soil types are distributed throughout the project area and can pose reclamation challenges due to poor reclamation potential and their erosive nature. A large portion of the proponent's proposal infrastructure lies within and or crosses a sandy ecological site.

Table 3.3 Summary of Ecological Sites

Ecological site	Acres	Percent
Loamy (10-14 NP)	8077.8716	70%
Shallow Clayey (10-14NP)	1952.3304	17%
Sandy (10-14 NP)	1516.693	11%
Badlands (10-14NP)	96.5003	1%
Lowlands (10-14NP)	70.7282	1%

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 is found throughout both PODs.
- Scotch thistle was identified and found near existing roads and oil infrastructure throughout the both PODs.
- 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, the U.S. Wildlife Service, and the Wyoming Natural Diversity Database (WYNDD).

Habitat assessment and wildlife inventory surveys of the Hartzog/Culp Draw project area were performed by Western Land Services in 2009. Western Lands Services performed surveys for bald eagle nesting and roosting habitat, raptor nest occupancy and productivity, greater sage-grouse and sharp-tailed grouse lek and nesting habitat, black-tailed prairie dog colony delineation, mountain plover breeding and nesting habitat and activity. Western Lands Services also conducted suitability surveys for Blowout Penstemon and Ute ladies'-tresses orchid habitat in 2009. All surveys were conducted according to the Powder River Basin Interagency Working Group's protocols (available on the BFO internet website at http://www.blm.gov/wy/st/en/field_offices/Buffalo/wildlife.html).

The BLM biologist conducted field visits on January 5, 12, 13, 14, and 21, all in 2010. During that time, the biologists verified the wildlife survey information, evaluated impacts to wildlife resources, and recommended project modifications where wildlife issues arose. 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. Threatened and Endangered and Sensitive Species

3.3.1.1. Threatened and Endangered Species

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

3.3.1.1.1. 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. WGFD has 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 Hartzog/Culp Draw project area is located approximately nine miles north of the Linch complex, the nearest potential reintroduction area.

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). Eight black-tailed prairie dog colonies were identified within 0.75 miles of the project boundary by Western Lands Services covering approximately 100 acres. Black-footed ferret habitat is not present within the project area.

3.3.1.1.2. Blowout Penstemon

Blowout penstemon is listed as Endangered under the ESA. It is a regional endemic species with documented populations in the Sand Hills of west-central Nebraska and the northeastern Great Divide Basin of Carbon County, Wyoming. Suitable blowout penstemon habitat consists of sparsely vegetated, early successional, shifting sand dunes and blowout depressions created by wind. In Wyoming, the habitat is typically found on sandy aprons or the lower half of steep sandy slopes deposited at the base of granitic or sedimentary mountains or ridges.

The Hartzog/Culp Draw project area does not contain areas with these characteristics. Blowout penstemon does not occur.

3.3.1.1.3. 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. A WYNDD model predicts undocumented populations may be present particularly within southern Campbell and northern Converse Counties.

Western Lands Services surveyed for potential Ute ladies'-tresses habitat in the project area and concluded that the area has limited potential to support the species. No perennial streams were located and the ephemeral drainages did not possess the hydrology necessary to propagate the orchid. Three springs occur in the project area but the effect of heavy livestock use, the presence of upland vegetation and alkaline soils indicate their unsuitability as ULT habitat.

3.3.1.2. 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 Hartzog/Culp Draw POD 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 Hartzog/Culp Draw 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.

Table 3.4 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 and then indicates whether the species is likely to occur in the Hartzog/Culp Draw POD project area or not.

Table 3.4 Summary of Sensitive Species Habitat.

Common Name (scientific name)	Habitat	Presence	Rationale
Amphibians			
Northern leopard frog (*Rana pipiens*)	Beaver ponds and cattail marshes from plains to montane zones.	NP	No habitat present.
Spotted frog (*R*anus pretiosa)	Ponds, sloughs, small streams, and cattails in foothills and montane zones. Confined to headwaters of the S Tongue R drainage and tributaries.	NP	The project area is outside the species' range, and the species is not expected to occur.
Fish			
Yellowstone cutthroat trout (*Oncoryhynchus clarki bouvieri*)	Cold-water rivers, creeks, beaver ponds, and large lakes in the Upper Tongue sub-watershed	NP	The project area is outside the species' range, and the species is not expected to occur.
Birds			
Baird's sparrow (*Ammodramus bairdii*)	Shortgrass prairie and basin-prairie shrubland habitats; plowed and stubble fields; grazed pastures; dry lakebeds; and other sparse, bare, dry ground.	S	Shortgrass prairie and sagebrush cover is present
Bald eagle (*Haliaeetus leucocephalus*)	Mature forest cover often within one mile of large water body with reliable prey source nearby.	K	Bald eagles forage in area.
Brewer's sparrow (*Spizella breweri*)	Sagebrush shrubland	S	Sagebrush cover is present.
Ferruginous hawk (*Buteo regalis*)	Basin-prairie shrub, grasslands, rock outcrops	K	Ferruginous hawk nesting has been documented in the project area.
Greater sage-grouse (*Centrocercus urophasianus*)	Basin-prairie shrub, mountain-foothill shrub	K	Sagebrush cover is present.
Loggerhead shrike (*Lanius ludovicianus*)	Basin-prairie shrub, mountain-foothill shrub	S	Sagebrush cover is present.
Long-billed curlew (*Numenius americanus*)	Grasslands, plains, foothills, wet meadows	NP	Suitable habitat not present.
Mountain plover (*Charadrius montanus*)	Short-grass prairie with slopes < 5%	S	Prairie dog colonies with <5% slope present

Common Name (scientific name)	Habitat	Presence	Rationale
Northern goshawk (*Accipiter gentilis*)	Conifer and deciduous forests	NP	Suitable habitat not present.
Peregrine falcon (*Falco peregrinus*)	Cliffs	NP	Nesting habitat not present
Sage sparrow (*Amphispiza billneata*)	Basin-prairie shrub, mountain-foothill shrub	S	Sagebrush cover is present.
Sage thrasher (*Oreoscoptes montanus*)	Basin-prairie shrub, mountain-foothill shrub	S	Sagebrush cover is present.
Trumpeter swan (*Cygnus buccinator*)	Lakes, ponds, rivers	NP	Suitable habitat not present.
Western Burrowing owl (*Athene cunicularia*)	Grasslands, basin-prairie shrub	S	Prairie dog colonies present
White-faced ibis (*Plegadis chihi*)	Marshes, wet meadows	NP	Permanently wet meadows not present.
Yellow-billed cuckoo (*Coccyzus americanus*)	Open woodlands, streamside willow and alder groves	NP	Streamside habitats not present.
Mammals			
Black-tailed prairie dog (*Cynomys ludovicianus*)	Prairie habitats with deep, firm soils and slopes less than 10 degrees.	K	Prairie dog colonies are present
Fringed myotis (*Myotis thysanodes*)	Conifer forests, woodland chaparral, caves and mines	S	Habitat is present
Long-eared myotis (*Myotis evotis*)	Conifer and deciduous forest, caves and mines	S	Habitat is present
Swift fox (*Vulpes velox*)	Grasslands	S	Prairie dog colonies are present
Townsend's big-eared bat (*Corynorhinus townsendii*)	Caves and mines.	NP	Habitat is not present
Plants			
Porter's sagebrush (*Artemisia porteri*)	Sparsely vegetated badlands of ashy or tufaceous mudstone and clay slopes 5300-6500 ft.	NP	Habitat not present.
William's wafer parsnip (*Cymopterus williamsii*)	Open ridgetops and upper slopes with exposed limestone outcrops or rockslides, 6000-8300 ft.	NP	Project area outside of species' range.

Common Name (scientific name)	Habitat	Presence	Rationale
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. **Those species for which presence has been determined as not suspected (NS) or not present (NP) within this table will not be discussed further in this document.**			

3.3.1.2.1. 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. Baird's sparrows nest in extensive grasslands and mesic-meadow areas that support dense residual vegetation and litter accumulation. Habitat is present in the project area.

3.3.1.2.2. 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 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 Region17.

Habitat for bald eagles to nest or roost in winter not present within the project area due to the lack of suitable trees and water sources the bald eagle typically frequent. Bald eagle use within the project area is limited to a minimal amount of daytime foraging and roosting.

3.3.1.2.3. 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.

The Brewer's sparrow is dependent on shrub-dominated plant communities that provide protective cover, song perches, and nest sites. The Brewer's sparrow nests in sagebrush throughout the species' range. Brewer's sparrow habitat is present in the project area.

3.3.1.2.4. 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.

According to the BLM data base, ferruginous hawk populations within the Powder River Basin have declined in recent years. Ferruginous hawks are sensitive to human disturbance; pairs may abandon nests even when mildly disturbed during nest building or incubation (Smith and Murphy 1978, White and Thurow 1985, Olendorff 1993, Washington Department of Fish and Wildlife 1996). Furthermore, disturbed nests fledge fewer young, and they often are not reoccupied the year following disturbances

(White and Thurow 1985). Rather than becoming acclimated to repeated disturbance, ferruginous hawks become sensitized and flush at greater distances (White and Thurow 1985), which may result in increased clutch or brood mortality due to exposure, predation, starvation, or nest desertion.

The BLM raptor database indicates five documented ferruginous hawk nests within the project area (See Table 3.7).

3.3.1.2.5. 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 Species of Great Concern (SGCN), with a rating of NSS2, which means Wyoming populations are declining or restricted in numbers or distribution, extirpation not imminent; ongoing significant loss of habitat. This is 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 species is considered a candidate for listing under the Endangered Species Act (USFWS 2010).

- On January 4, 2010, 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.

- The BLM-BFO initiated coordination with the WGFD on the Hartzog/Culp Draw POD on March 8.

There are 11,711 acres within the Hartzog/Culp Draw POD boundary of which approximately 10,657 acres (91%) are modeled as high quality nesting habitat and 11,612 acres (99%) are high quality winter habitat. Field surveys of the project area indicate that sagebrush cover ranges from sparse to moderately dense in rough to moderately rough terrain with ridges and draws or in rolling hills and flats cut by moderately steep draws. During the onsite visits, the BLM biologist noted that sagebrush stands near much of the proposed project elements were sparse with sage plants in poor vigor, rendering the habitat less suitable for sage-grouse than indicated by the models. No sage-grouse or their sign were seen by the BLM biologist during the onsite visit, however, much of the habitat in the project area can be described as suitable for sage-grouse.

Impacts to sage-grouse leks due to oil and gas development are discernible to a distance of four miles, and some leks may be extirpated within this distance (Walker et al. 2007, Walker 2008). WGFD records indicate that nine sage-grouse leks occur within four miles of the project area, all are classified as occupied (Table 3.5) Wyoming BLM policy guidelines for sage-grouse requires effects analysis of 11 miles to include impacts on all seasonal habitats from energy projects (BLM 2009). There are 37 occupied leks within 11 miles of the project area. None of these leks are within Wyoming Governors' Core areas or BFO sage-grouse Focus Areas.

Table 3.5 Sage-grouse leks within 4 miles of the Hartzog/Culp Draw POD boundary.

Lek Name	Legal Location (Township, Range, Section ¼ ¼)	Distance from Project Area	Management Status
Christensen Ranch 3	T44N, R77W S12 NENE	3.1 miles south	occupied
Christensen Ranch 4	T45N, R76W S19 NESE	within the POD	occupied
Christensen Ranch 5	T45N, R76W S32 NWNE	0.6 miles south	occupied
Christensen Ranch 7	T44N, R77W S11 NWSW	3.7 miles south	occupied

Lek Name	Legal Location (Township, Range, Section ¼ ¼)	Distance from Project Area	Management Status
County Line	T46N, R76W S16 SENW	2.5 miles north	occupied
Innes	T46N, R75W S30 NENW	2.7 miles northeast	occupied
Irigaray	T45N, R77W S29 SENE	3.9 miles west	occupied
Irigaray II	T45N, R77W S28 SESW	3.4 miles west	occupied
Willow Creek	T45N, R76W S23 SWNE	Within the POD	occupied

3.3.1.2.6. Loggerhead Shrike

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

3.3.1.2.7. Mountain Plover

Mountain plovers are a BLM sensitive species typically associated with high, dry, short grass prairies (BLM 2003). Mountain plover nesting habitat is often associated with heavily grazed areas such as prairie dog colonies and livestock pastures. The affected environment for mountain plover is discussed further in the PRB FEIS on pg. 3-177 to 3-178.

Small, isolated patches of suitable mountain plover habitat are present within the project area. However, the rolling terrain and height of vegetation in the project area limits its suitability for mountain plover.

3.3.1.2.8. Sage Sparrow

Sage sparrows are a WGFD SGCN, with a rating of NSS3, because populations are restricted in distribution, habitat is restricted but not undergoing significant loss, and they are sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also listed by USFWS as a Bird of Conservation Concern (BCC) for Region 17. Considered a sagebrush obligate, the sage sparrow inhabits prairie and foothills shrub habitat where sagebrush is present. It prefers tall shrubs and low grass cover, where sagebrush is clumped in a patchy landscape. Also, it is area-sensitive requiring large blocks of unfragmented habitat to successfully breed and survive. The project area supports sage sparrow habitat, and the species may occur. The affected environment for sage sparrow is discussed further in the PRB FEIS on pg. 3-200 to 3-201.

3.3.1.2.9. Sage Thrasher

In addition to being listed as a Wyoming BLM sensitive species, sage thrashers are a WGFD SGCN, with a rating of NSS4, because populations are declining, habitat is vulnerable but not undergoing loss, and the species is not sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level II species, indicating the action and focus should be on monitoring and because Wyoming has a high percentage of and responsibility for the breeding population. They are also listed by USFWS as a BCC for Region 17. This species is considered a sagebrush obligate. Sage thrasher abundance is generally positively correlated with the amount of sage cover and negatively correlated with grass cover.

Suitable sage thrasher habitat occurs throughout the project area, and the species may occur. The affected environment for sage thrasher is discussed further in the PRB FEIS on pg. 3-199 to 3-200.

3.3.1.2.10. Western Burrowing Owl

In addition to being listed as a Wyoming BLM sensitive species, burrowing owls are a WGFD SGCN,

with a rating of NSS4. 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.

Additional information regarding western burrowing owl (herein after referred to as burrowing owl) is available in the PRB FEIS on pg. 3-186.

The burrowing owl is a small, long-legged owl found throughout open landscapes of North and South America. Burrowing owls can be found in grasslands, rangelands, agricultural areas, deserts, or any dry open area with low vegetation where abandoned burrows dug by mammals such as ground squirrels (*Spermophilus spp*.), prairie dogs (*Cynomys spp.),* and badgers (*Taxidea taxus*) are available. Black-tailed prairie dog colonies provide the primary habitat for burrowing owls (Klute et al. 2003).

Current population estimates for the United States are not well known but trend data suggest declines throughout the burrowing owl 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 that no burrowing owl nests have been reported within 0.5 mile of the Hartzog/Culp Draw project area. However, eight prairie dog colonies are documented to occur within the project boundary. Burrowing owl nesting is possible within the Hartzog/Culp Draw POD boundary.

3.3.1.2.11. 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 et al. 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).

Eight black-tailed prairie dog colonies totaling approximately 100 acres were identified by Western Lands Services in the Hartzog/Culp Draw project area. Of the eight identified colonies, four were deemed to be active but with small numbers of prairie dogs being observed.

3.3.1.2.12. 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.

3.3.1.2.13. 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. Long-eared myotis may occur in the Hartzog/Culp Draw POD project area.

3.3.1.2.14. Swift Fox

The affected environment for swift fox is discussed in the PRB FEIS on pg. 3-189. In addition to being listed as a BLM WY sensitive species, swift fox is also listed as a WGFD SGCN, with a rating of NSS4, because population status and trends are unknown but are suspected to be stable, and habitat is vulnerable but is not undergoing significant loss.

Swift foxes prefer flat, shortgrass habitats which do occur within the project boundary. Swift fox may occur in the project area. The nearest recently documented swift fox den is 14 miles to the southwest of the Culp/Hartzog Draw project area

3.3.1.2.15. Townsend's Big-eared Bat

The affected environment for Townsend's big-eared bat is discussed in the PRB FEIS on pg. 3-189. In addition to being listed as a BLM WY sensitive species, Townsend's big-eared bat is listed as 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. Townsend's big-eared bats occur in sagebrush and other shrublands, and roosts include rock outcrops and buildings, which occur in the vicinity of the project area. It may be limited to areas with reliable, accessible sources of drinking water (Hester and Grenier 2005). Foraging areas include riparian corridors (Hester and Grenier 2005). Townsend's big-eared bat may occur in the project area.

3.3.2. Big Game

Both pronghorn and mule deer were observed during field visits to the project area. WGFD data indicate that the project area contains yearlong and winter yearlong range for mule deer and pronghorn. Winter-yearlong use occurs when animals make general use of habitat on a year-round basis. However, there is a significant influx of additional animals into the area from other seasonal ranges during the winter months.

Yearlong use is when a population of animals make general use of habitat within the range on a year-round basis. Animals may leave the area under severe conditions. No crucial big game habitat is known to occur in the area. 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.

Populations of pronghorn and mule deer within their respective hunt areas are above WGFD objectives. The most current big game range maps are available from WGFD.

3.3.3. Aquatics

The project area is drained by ephemeral tributaries 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 have been sampled regularly by USGS and WGFD, and generally support invertebrate communities that included taxa adapted to flowing water. Ephemeral stream communities generally were composed of taxa adapted to standing water (Peterson 1990).

3.3.4. Migratory Birds

Migratory birds are those that migrate for the purpose of breeding and foraging at some point in the year.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. Habitat that occurs in the project area include rough to moderately rough terrain with numerous ridges and deep draws, with the remaining consisting of rolling hills and flats cut by steep to moderately steep draws (Western Lands Services 2009). The primary vegetation throughout the project area is sagebrush grassland with a few juniper cottonwood trees in draws. 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 (WGFD 2009). Species that may occur in these vegetation types in northeast Wyoming, according to the Wyoming Bird Conservation Plan, are listed in Table 3.6 and are grouped by Level as identified in the Plan.

Table 3.6 High priority bird species that occur in the major vegetation type within the Hartzog/ Culp Draw POD project area

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	
	Mountain plover	Yes
	Sage sparrow	Yes
	Short-eared owl	
	Upland sandpiper	
	Western burrowing owl	Yes
Level II	Black-chinned hummingbird	
	Bobolink	
	Chestnut-collared longspur	
	Dickcissel	
	Grasshopper sparrow	
	Lark bunting	
	Lark sparrow	
	Loggerhead shrike	Yes
	Sage thrasher	Yes
	Vesper sparrow	
Level III	Common poorwill	
	Say's phoebe	

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.

3.3.5. Raptors

The affected environment for raptors is discussed in the PRB FEIS on pp. 3-141 to 3-148. Five raptor species are known to have used nests within 0.5 miles of the project area: golden eagle, red-tailed hawk, great-horned owl, long-eared owl and Swainson's hawk.

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 Bird Conservation Region (BCR) 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 WGFD 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.

Seventy-two raptor nest sites have been documented to occur within 0.5 mile of the project boundary. These are listed in the Table 3.7. Of the nests listed, nine were active in 2009. Six of the 2009 active nests were occupied by red-tailed hawks, two by great-horned owls, and one was occupied by Swainson's hawks.

Table 3.7 Documented raptor nests within the Hartzog/Culp Draw project area[1].

BLM ID	UTMs	Legal (Section/Township/Range)	Substrate	Year	Condition	Status	Species
634	421591E 4855940N	S22 T45N R76W	CTL	2009	Excellent	INAC	n/a
				2009	Fair	INAC	n/a
				2006	Unknown	INAC	n/a
647	424118E 4855569N	S25 T45N R76W	CTL	2009	Excellent	ACTI	RETA
				2009	Good	ACTI	RETA
				2009	Nest Gone	INAC	n/a
				2006	Nest Gone	INAC	n/a

BLM ID	UTMs	Legal (Section/Township/Range)	Substrate	Year	Condition	Status	Species
3137	424056E 4855790N	S25 T45N R76W	CTL	2009	Good	ACTF	RETA
				2009	Unknown	DNLO	n/a
				2009	Substrate Gone	DNLO	n/a
				2008	Good	INAC	n/a
				2006	Unknown	ACTI	RETA
				2004	Good	INAC	n/a
3367	423832E 4859359N	S12 T45N R76W	CTL	2009	Good	INAC	n/a
				2006	Good	ACTI	RETA
				2005	Good	ACTI	RETA
				2004	Nest Gone	INAC	n/a
3571	417840E 4859337N	S8 T45N R76W	CTL	2009	Good	INAC	n/a
				2008	Good	INAC	n/a
				2007	Good	ACTF	RETA
				2006	Good	ACTI	RETA
				2005	Good	INAC	n/a
				2004	Nest Gone	INAC	n/a
3572	417920E 4859603N	S8 T45N R76W	CTL	2009	Good	INAC	n/a
				2008	Poor	INAC	n/a
				2007	Fair	ACTI	GRHO
				2006	Fair	INAC	n/a
				2005	Good	INAC	n/a
3709	421591E 4855939N	S22 T45N R76W	CTL	2009	Excellent	INAC	n/a
				2009	Fair	INAC	n/a
				2005	Good	ACTI	RETA
				2004	Nest Gone	INAC	n/a
3927	414675E 4858361N	S13 T45N R77W	CTL	2009	Poor	INAC	n/a
				2009	Remnants	INAC	n/a
				2008	Remnants	INAC	n/a
				2007	Nest Gone	INAC	n/a
				2006	Poor	INAC	n/a
3932	420746E 4854890N	S27 T45N R76W	CTL	2009	Unknown	DNLO	n/a
				2008	Nest Gone	INAC	n/a
				2007	Unknown	ACTF	GOEA
				2006	Good	ACTI	GOEA

BLM ID	UTMs	Legal (Section/Township/Range)	Substrate	Year	Condition	Status	Species
3972	418730E 4858800N	S17 T45N R76W	CTL	2009	Good	INAC	n/a
				2009	Fair	INAC	n/a
				2008	Fair	INAC	n/a
				2007	Fair	INAC	n/a
				2006	Fair	INAC	n/a
3973	418709E 4858762N	S17 T45N R76W	CLF	2009	Fair	INAC	n/a
				2009	Good	INAC	n/a
				2008	Good	ACTI	GOEA
				2007	Good	ACTI	GOEA
				2006	Good	ACTI	GOEA
3974	418705E 4858835N	S17 T45N R76W	CLF	2009	Good	INAC	n/a
				2009	Poor	INAC	n/a
				2008	Fair	INAC	n/a
				2007	Poor	INAC	n/a
				2006	Poor	INAC	n/a
3983	415603E 4858355N	S13 T45N R77W	CTL	2009	Fair	INAC	n/a
				2009	Good	INAC	n/a
				2008	Good	ACTI	RETA
				2007	Good	ACTI	RETA
				2006	Good	ACTI	RETA
3984	415467E 4858526N	S13 T45N R77W	CKB	2009	Nest Gone	INAC	n/a
				2009	Unknown	ACTI	GRHO
				2008	Unknown	ACTI	GRHO
				2007	Unknown	ACTI	GRHO
				2006	Good	ACTI	GRHO
3985	415438E 4859982N	S12 T45N R77W	CTL	2009	Poor	INAC	n/a
				2009	Remnants	INAC	n/a
				2008	Poor	INAC	n/a
				2007	Fair	INAC	n/a
				2006	Poor	ACTI	LOOW
3986	415423E 4859716N	S12 T45N R77W	JUN	2009	Good	INAC	n/a
				2009	Poor	INAC	n/a
				2008	Poor	INAC	n/a
				2007	Good	ACTI	BBMA
				2006	Good	ACTI	LOOW

BLM ID	UTMs	Legal (Section/Township/Range)	Substrate	Year	Condition	Status	Species
3989	416508E 4856808N	S19 T45N R76W	CTL	2009	Nest Gone	INAC	n/a
				2008	Poor	INAC	n/a
				2007	Poor	INAC	n/a
				2006	Good	ACTI	LOOW
3990	415313E 4856096N	S24 T45N R77W	CTL	2009	Poor	INAC	n/a
				2009	Unknown	INAC	n/a
				2008	Poor	INAC	n/a
				2007	Poor	INAC	n/a
				2006	Remnants	INAC	n/a
3993	420675E 4854855N	S27 T45N R76W	CTL	2009	Fair	INAC	n/a
				2009	Excellent	INAC	n/a
				2008	Remnants	INAC	n/a
				2007	Unknown	INAC	n/a
				2006	Good	ACTI	GOEA
3999	421031E 4860472N	S10 T45N R76W	CTD	2008	Remnants	INAC	n/a
				2006	Good	ACTI	RETA
4000	421005E 4860527N	S10 T45N R76W	CTD	2008	Fair	INAC	n/a
				2006	Fair	ACTI	GRHO
4144	418514E 4857743N	S17 T45N R76W	CTL	2009	Fair	INAC	n/a
				2009	Good	INAC	n/a
				2008	Unknown	ACTI	BBMA
4311	417764E 4861855N	S5 T45N R76W	CTL	2009	Good	INAC	n/a
				2008	Good	ACTI	BBMA
				2006	Good	INAC	n/a
4313	416975E 4860502N	S7 T45N R76W	CTL	2009	Fair	INAC	n/a
				2009	Poor	INAC	n/a
				2008	Nest Gone	INAC	n/a
				2006	Remnants	INAC	n/a
4319	418006E 4862573N	S32 T46N R76W	CTL	2009	Good	ACTI	BBMA
				2009	Poor	INAC	n/a
				2008	Good	ACTI	BBMA
				2008	Remnants	INAC	n/a
				2006	Poor	INAC	n/a

BLM ID	UTMs	Legal (Section/Township/Range)	Substrate	Year	Condition	Status	Species
4382	419489E 4861466N	S4 T45N R76W	CTL	2009	Fair	INAC	n/a
				2009	Poor	INAC	n/a
				2008	Good	INAC	n/a
				2006	Poor	INAC	n/a
5671	417539E 4860532N	S8 T45N R76W	CTL	2009	Good	INAC	n/a
				2008	Fair	INAC	n/a
				2007	Good	ACTI	GRHO
5673	418178E 4856078N	S20 T45N R76W	CTL	2009	Fair	INAC	n/a
				2009	Good	INAC	n/a
				2008	Fair	INAC	n/a
				2007	Good	INAC	n/a
5674	416957E 4860479N	S7 T45N R76W	CTL	2009	Nest Gone	INAC	n/a
				2008	Good	ACTI	BBMA
				2007	Poor	INAC	n/a
5746	419561E 4863782N	S33 T46N R76W	CTL	2009	Fair	INAC	n/a
				2009	Good	ACTI	RETA
				2009	Good	INAC	n/a
				2008	Fair	ACTI	GRHO
5877	418028E 4859757N	S8 T45N R76W	CTL	2009	Fair	INAC	n/a
				2009	Good	INAC	n/a
				2008	Fair	INAC	n/a
5879	419440E 4859951N	S9 T45N R76W	CTL	2009	Good	INAC	n/a
				2009	Excellent	INAC	n/a
				2008	Good	ACTI	GRHO
5880	419254E 4856829N	S21 T45N R76W	CTL	2009	Fair	INAC	n/a
				2009	Excellent	ACTI	RETA
				2008	Excellent	ACTI	RETA
5881	418031E 4857311N	S20 T45N R76W	CTL	2009	Fair	INAC	n/a
				2008	Remnants	INAC	n/a
6482	415504E 4859938N	S12 T45N R77W	CTL	2009	Nest Gone	INAC	n/a
				2008	Fair	INAC	n/a
6483	414950E 4859599N	S12 T45N R77W	CTL	2009	Poor	INAC	n/a
				2008	Good	INAC	n/a
6614	417924E 4859602N	S8 T45N R76W	CTL	2009	Fair	INAC	n/a

BLM ID	UTMs	Legal (Section/Township/Range)	Substrate	Year	Condition	Status	Species
8379	419544E 4864048N	S28 T46N R76W	CTL	2009	Fair	INAC	n/a
8380	419508E 4863585N	S33 T46N R76W	CTL	2009	Excellent	INAC	n/a
8381	421664E 4858480N	S15 T45N R76W	CTL	2009	Good	INAC	n/a
8382	422312E 4859470N	S11 T45N R76W	CTL	2009	Good	ACTI	GRHO
8385	421591E 4860958N	S3 T45N R76W	CTL	2009	Excellent	ACTI	RETA
8387	420469E 4854842N	S27 T45N R76W	CTL	2009	Excellent	INAC	n/a
8388	418854E 4857410N	S20 T45N R76W	CTL	2009	Fair	INAC	n/a
8389	419437E 4855571N	S28 T45N R76W	CTL	2009	Good	INAC	n/a
8390	419692E 4859413N	S9 T45N R76W	CTL	2009	Good	INAC	n/a
8391	419857E 4858116N	S16 T45N R76W	CTL	2009	Good	INAC	n/a
8392	418615E 4858620N	S17 T45N R76W	CTL	2009	Good	INAC	n/a
8393	419009E 4853652N	S33 T45N R76W	CTL	2009	Good	INAC	n/a
8394	418942E 4853728N	S33 T45N R76W	CTL				
10346	417994E 4857290N	S20 T45N R76W	CTL	2009	Fair	ACTF	RETA
10347	418530E 4857090N	S20 T45N R76W	ROP	2009	Remnants	INAC	n/a
10348	418595E 4857031N	S20 T45N R76W	ROK	2009	Poor	INAC	n/a
10349	419240E 4856928N	S21 T45N R76W	CTL	2009	Fair	INAC	n/a
10350	418886E 4856484N	S21 T45N R76W	CKB	2009	Poor	INAC	n/a
10351	416309E 4855912N	S19 T45N R76W	GHS	2009	Poor	INAC	n/a
10352	418601E 4855884N	S20 T45N R76W	ROK	2009	Poor	INAC	n/a
10356	419434E 4855567N	S28 T45N R76W	CTL	2009	Poor	INAC	n/a
10357	418934E 4854918N	S28 T45N R76W	JUN	2009	Fair	INAC	n/a
10358	420401E 4854851N	S28 T45N R76W	CTL	2009	Fair	INAC	n/a
10359	420174E 4854680N	S28 T45N R76W	CTL	2009	Fair	INAC	n/a
10360	422145E 4853958N	S35 T45N R76W	CTL	2009	Fair	INAC	n/a
10363	418751E 4853821N	S32 T45N R76W	BOX	2009	Poor	ACTI	GRHO

BLM ID	UTMs	Legal (Section/Township/Range)	Substrate	Year	Condition	Status	Species
10364	418944E 4853724N	S33 T45N R76W	CTD	2009	Fair	INAC	n/a
10365	418996E 4853646N	S33 T45N R76W	CTL	2009	Fair	INAC	n/a
10609	421055E 4860542N	S10 T45N R76W		2009	Good	ACTI	RETA
10610	421547E 4860973N	S3 T45N R76W		2009	Good	ACTI	SWHA
10611	422262E 4859544N	S11 T45N R76W		2009	Good	ACTI	RETA
10612	422270E 4859582N	S11 T45N R76W		2009	Poor	INAC	n/a
10613	423825E 4857426N	S24 T45N R76W		2009	Good	INAC	n/a
10626	419650E 4864477N	S28 T46N R76W	CTL	2009	Poor	INAC	n/a
10628	418996E 4862725N	S33 T46N R76W	CTL	2009	Poor	INAC	n/a

Notes

1. Where nests were surveyed by more than one consultant, results may have varied. All results are reported her
2. BOX = Boxelder; CKB = Creek bank; CLF = Cliff; CTL = Cottonwood (live); CTD = Cottonwood (dead); GHS = Ground/Hillside; ROK = Rock outcrop; ROP = Rock pillar/pinnacle; UNK = Unknown
3. ACTI = Active; DNLO = Did not locate; INAC = Inactive; OCCU = Occupied; UNK = Unknown.
4. BBMA = Black-billed magpie; GOEA = Golden eagle; GRHO = Great-horned owl; LOOW = Long-eared Red-tailed hawk; SWHA = Swainson's hawk

3.3.6. Plains Sharp-tailed Grouse

Sharp-tailed grouse inhabit short and mixed-grass prairie, sagebrush shrublands, woodland edges, and river canyons. In Wyoming, this species is found where grasslands are intermixed with shrublands, especially wooded draws, shrubby riparian area, and wet meadows.

Habitats within the Culp/Hartzog Draw project area have limited potential to support sharp-tailed grouse. The mosaic of grasslands and sagebrush-grasslands that occurs in the area may provide nesting and brood-rearing habitat, but the lack of wooded draws, shrubby riparian areas, and wet meadows limit the likelihood of plains sharp-tailed grouse occurrence. The nearest known plains sharp-tailed grouse lek is approximately sixteen miles north of the project area. No plains sharp-tailed grouse were noted in the project area.

3.3.7. Sagebrush Obligates

Sagebrush communities are the primary vegetation type in the project area (Western Lands Services 2009). Occurrence of Wyoming big sagebrush within these communities facilitates development of environmental conditions that support hundreds of plant and animal species (Welch 2005, Wisdom et al. 2005). Species most dependent on sagebrush ecosystems for survival are considered obligate (e.g., sage-grouse, sage thrasher, Brewer's sparrow, sage sparrow, sagebrush lizard) or near-obligate (e.g., pronghorn, vesper sparrow) (Rowland et al. 2006). Many of these species are socially and/or ecologically important including several Wyoming BLM sensitive species.

3.4. West Nile Virus

West Nile virus (WNv) is a mosquito-borne disease that can cause encephalitis or brain infection. Mosquitoes spread this virus after they feed on infected birds and then bite people, other birds, and

animals. WNv is not spread by person-to-person contact, and there is no evidence that people can get the virus by handling infected animals.

Since its discovery in 1999 in New York, WNv has become firmly established and spread across the United States. Birds are the natural vector host and serve not only to amplify the virus, but to spread it.

Though less than 1% of mosquitoes are infected with WNv, they still are very effective in transmitting the virus to humans, horses, and wildlife. *Culex tarsalis* appears to be the most common mosquito to vector, WNv.

The human health issues related to WNv are well documented and continue to escalate. Historic data collected by the CDC and published by the USGS at www.westnilemaps.usgs.gov are summarized below. Reported data from the Powder River Basin (PRB) includes Campbell, Sheridan and Johnson counties.

Table 3.8 Historical West Nile Virus Information

Year	Total WY Human Cases	Human Cases PRB	Veterinary Cases PRB	Bird Cases PRB
2001	0	0	0	0
2002	2	0	15	3
2003	392	85	46	25
2004	10	3	3	5
2005	12	4	6	3
2006	65	0	2	2
2007*	155	22	Unk	1
2008*	10	0	0	0

*Wyoming Department of Health Records.

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

Although most of the attention 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.

The WDEQ and the Wyoming Department of Health sent a letter to CBNG operators on June 30, 2004. The letter encouraged people employed in occupations that require extended periods of outdoor labor, be provided educational material by their employers about WNv to reduce the risk of WNv transmission. The letter encouraged companies to contact either local Weed and Pest Districts or the Wyoming Department of Health for surface water treatment options.

3.5. Water Resources

The project area is within the Upper Powder River drainage system. Proposed development associated with the Culp Draw project will occur within the Willow Creek watershed, which is tributary to the Powder River. Willow Creek Watershed is 109.20 square miles. Effluent from the Culp Draw POD will, however, be transported and discharged into the Pumpkin Creek watershed. Proposed development associated with the Hartzog Draw project will occur within the Pumpkin Creek watershed and its tributaries. Pumpkin Creek watershed is 167 square miles and is also tributary to the Powder River.

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, submitted for the Culp Draw POD area showed 20 registered stock water wells within 1 mile of a federal CBNG producing well in the POD with depths ranging from 4 to 464 feet. The Hartzog Draw POD area showed 34 registered stock and domestic water wells within 1 mile of a federal CBNG producing well in the POD with depths ranging from 4 to 630 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 Pumpkin and Willow Creek drainages which are tributary to the Upper Powder River watershed. Under natural conditions, Pumpkin Creek is an ephemeral drainage system (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 main stem of Pumpkin Creek splits into three upper sub-watersheds (North, Middle and South Prong) that consist of moderately steep, dissected terrain with average basin slops ranging from 5.3 to 6.2%. Smaller tributaries of Pumpkin Creek form a dendritic system that can be described as ephemeral and have average watershed slopes of 5 to 10% with average channel slopes of 0.5 to 2%. The channels are primarily well vegetated grassy swales, without defined bed and bank.

The PRB FEIS presents the historic mean Electrical Conductivity (EC, in µmhos/cm) and Sodium Adsorption Ratio (SAR) by watershed at selected 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).

The operator has identified three natural springs within the Culp Draw POD boundary shown in the following table:

NAME	MAP ID	TWN	RNG	SEC	QQ	FLOW	EC (µmhos/cm)	TDS (mg/l)	SAR
Craney Spring	Spring #1	45	76	8	NWNE	1gpm	1,211	940	1.5
Sping	Spring #2	45	76	17	SENW	No flow	No flow	No flow	No flow
Middle Water Spring	Spring #3	45	76	21	SENW	1.2 gpm	2,500	2,340	2.6

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 BLM's 2009 Reasonably Foreseeable Development Scenario, the drilling of the 61 proposed wells in the Culp Draw Federal POD/Hartzog Draw Federal POD 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 Culp Draw Federal POD/Hartzog Draw Federal POD 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 Culp Draw Federal POD/Hartzog Draw Federal POD 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 Culp Draw Federal POD/Hartzog Draw Federal POD 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 Culp Draw Federal POD/Hartzog Draw Federal POD 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 conducted for the Culp Draw and Hartzog Draw Federal POD projects prior to on-the-ground project work (BFO Inventory No. 70100017,70100011). SWCA Inc. Environmental Consultants and Arcadis U.S., Inc., conducted block class III cultural resource inventories 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 reports for technical adequacy and compliance with Bureau of Land Management (BLM) standards, and determined them to be adequate. The following resources are located in or near the project area.

Table 3.9 Cultural Resources Inventory Results for Culp Draw POD

Site Number	Site Type	National Register Eligibility
48CA268	Pumpkin Buttes Traditional Cultural Property	Eligible
48CA3165	Prehistoric Stone Circle and Lithic Scatter	Not Eligible
48CA3171	Prehistoric Lithic Scatter	Not Eligible
48CA3172	Historic Cairn	Not Eligible
48CA6757	Prehistoric Lithic Scatter	Not Eligible
48CA6766	Prehistoric Lithic Scatter	Unevaluated
48CA6965	Prehistoric Lithic Scatter	Not Eligible
48CA6966	Prehistoric Lithic Scatter	Eligible
48JO1431	Prehistoric Lithic and Ceramic Scatter	Eligible
48JO1475	Prehistoric Campsite	Not Eligible
48JO1480	Prehistoric Campsite and Historic Trash Scatter	Eligible

Table 3.9 Cultural Resources Inventory Results for Hartzog Draw POD

Site Number	Site Type	National Register Eligibility
48CA268	Pumpkin Buttes Traditional Cultural Property	Eligible
48CA2147	Historic Homestead	Unevaluated
48CA2192	Prehistoric Lithic Scatter	Eligible
48CA2193	Prehistoric Lithic Scatter and Historic Stockherding Camp	Unevaluated
48CA2274	Historic Rock Cairn	Not Eligible
48CA2280	Prehistoric Lithic Scatter and Historic Stockherding Camp	Not Eligible
48CA3165	Prehistoric Stone Arc	Not Eligible
48CA5413	Prehistoric Lithic Scatter	Not Eligible
48CA5414	Prehistoric Lithic Scatter	Not Eligible
48CA5415	Historic Artifact Scatter	Not Eligible
48CA5416	Prehistoric Lithic Scatter	Eligible
48CA5417	Prehistoric Lithic Scatter	Not Eligible
48CA5418	Prehistoric Campsite and Historic Artifact Scatter	Not Eligible
48CA5419	Prehistoric Lithic Scatter	Not Eligible
48CA5420	Prehistoric Lithic Scatter	Not Eligible
48CA5421	Historic Artifact Scatter	Not Eligible
48CA5422	Prehistoric Lithic Scatter	Not Eligible
48CA5423	Historic Artifact Scatter	Not Eligible
48CA5424	Prehistoric Lithic Scatter	Not Eligible
48CA5542	Historic Stockherding Camp	Not Eligible
48CA6758	Historic Foundation and Artifact Scatter	Not Eligible
48CA6759	Historic Cairn	Not Eligible
48CA6760	Prehistoric Lithic and Historic Artifact Scatter	Eligible
48CA6761	Prehistoric Lithic Scatter	Not Eligible
48CA6762	Prehistoric Lithic Scatter	Unevaluated
48CA6763	Prehistoric Lithic Scatter	Unevaluated
48CA6764	Prehistoric Lithic Scatter	Not Eligible

Site Number	Site Type	National Register Eligibility
48CA6765	Prehistoric Lithic Scatter	Not Eligible
48CA6766	Prehistoric Lithic Scatter	Unevaluated
48CA6966	Prehistoric Lithic Scatter and Hearth	Eligible
48CA6994	Prehistoric Lithic Scatter	Eligible
48CA6995	Prehistoric Lithic Scatter	Not Eligible
48CA6996	Historic Artifact Scatter	Not Eligible
48CA6997	Prehistoric Lithic Scatter	Unevaluated
48CA6998	Prehistoric Lithic and Historic Artifact Scatter	Not Eligible
48CA6999	Historic Homestead and Artifact Scatter	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 [NOx]) from existing natural gas fired compressor engines used in production of natural gas and CBNG; and, gasoline and diesel vehicle tailpipe emissions of combustion pollutants;
- 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 FEIS.

Mitigation measures are applied by resource only where necessary to reduce impacts and Residual Effects by resource are only disclosed when anticipated.

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 Culp Draw Federal Pod/Hartzog Draw Federal POD 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.

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 Upper Powder River drainage, which is approximately 22.5% 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.

- The WMP for the Culp Draw Federal POD/Hartzog Draw Federal POD proposes that produced water will not contribute significantly to flows downstream.

- The commitment by the operator to monitor the volume of water flowing into Pumpkin Creek and prevent significant volumes of water from flowing into the Upper Powder River Watershed.

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 Culp Draw Federal POD/Hartzog Draw Federal POD. Please refer to the supplemental information submitted by the operator as an attachment I labeled Culp Draw Location Information/Hartzog Draw Location Information for further detail. The attachment I provides information about general POD planning/location history, post on-site information, dirt work, and soil/vegetation data.

- Please refer to the Culp Draw Federal POD/Hartzog Draw Federal POD Reclamation Management Plan and site specific conditions of approval for the Culp Draw Federal POD/Hartzog Draw Federal POD 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) for the Culp Draw Federal POD/Hartzog Draw Federal POD:

- 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. Threatened, Endangered, and Sensitive Species

4.1.3.1.1. Threatened and Endangered Species

Potential project effects on Threatened and Endangered Species were analyzed and a summary is provided in Table 4.1.

Table 4.1 Summary of Threatened and Endangered Species Habitat and Project Effects.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Endangered				
Black-footed ferret (*Mustela nigripes*)	Black-tailed prairie dog colonies or complexes > 1,000 acres.	NP	NE	No suitable habitat present.
Blowout penstemon (*Penstemon haydenii*)	Sparsely vegetated, shifting sand dunes	NP	NE	No suitable habitat present.
Threatened				
Ute ladies'-tresses orchid (*Spiranthes diluvialis*)	Riparian areas with permanent water	NP	NE	No suitable habitat present.

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

Project Effects
LAA - Likely to adversely affect
NE - No Effect
NLAA - May Affect, not likely to adversely affect individuals or habitat.

4.1.3.1.1.1. Black-Footed Ferret

4.1.3.1.1.1.1. Direct, Indirect, and Cumulative Effects

Implementation of the proposed development will have **no effect** on the black-footed ferret because habitat is not present in the project area, and the species is not likely to occur.

4.1.3.1.1.2. Blowout Penstemon

4.1.3.1.1.2.1. Direct, Indirect, and Cumulative Effects

Suitable habitat is not present within the proposed Hartzog/Culp Draw project area. Implementation of the proposed coal bed natural gas project will have **no effect** on the blowout penstemon.

4.1.3.1.1.3. Ute Ladies'-Tresses Orchid

4.1.3.1.1.3.1. Direct, Indirect, and Cumulative Effects

Suitable habitat is not present within the proposed Hartzog/Culp Draw POD project area. Reservoir seepage may create suitable habitat if historically ephemeral drainages become perennial. Implementation of the proposed coal bed natural gas project will have **no effect** on the Ute ladies'- tresses orchid.

4.1.3.1.2. 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."

4.1.3.1.2.1. Bald Eagle

4.1.3.1.2.1.1. Direct and Indirect Effects

The project will not impact any identified bald eagle nests or winter roost concentration areas. Activities associated with the Hartzog/Culp Draw project may impact bald eagles by disturbing birds foraging in the area (as 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.

4.1.3.1.2.2. Black-tailed Prairie Dog

4.1.3.1.2.2.1. Direct and Indirect Effects

Within the project area, an existing two-track road proposed for improvement passes through the prairie dog colonies in T46N, R76W Section 10. Because it is an existing road on private surface, and re-routing would cause greater resource impacts, no attempt was made to re-route the road. There will be direct habitat loss associated with the improvement of the road, and vehicle traffic will increase prairie dog mortality along approximately 0.65 miles of road. Further impacts to black-tailed prairie dogs are discussed in the PRB FEIS on pg. 4-255 to 4-256.

4.1.3.1.2.3. Mountain Plover

4.1.3.1.2.3.1. Direct and Indirect Effects

Direct impacts to suitable mountain plover habitat will occur as described in the black-tailed prairie dog direct and indirect effects section above (4.1.3.1.2.2.1). Further impacts to mountain plover due to oil and gas development are discussed in the PRB FEIS (pp. 4-254 to 4-255).

4.1.3.1.2.4. Western Burrowing Owl

4.1.3.1.2.4.1. Direct and Indirect Effects

Direct impacts to suitable western burrowing owl habitat will occur as described in the black-tailed prairie dog direct and indirect effects section above (4.1.3.1.2.2.1). Further impacts to western burrowing owl due to oil and gas development are discussed in the PRB FEIS (pp. 4-260 to 4-264).

4.1.3.1.2.5. Greater Sage-grouse

4.1.3.1.2.5.1. Direct and Indirect Effects

The proposed action will adversely impact nesting, brood rearing, late summer, and winter habitat, both through loss of habitat and avoidance of habitat in proximity to the development. Wells 11-23, and 21-23 in particular, along with the access corridor to the wells will fragment high quality sage-grouse nesting habitat to the north of the Willow Creek lek in T45N, R76W, Sections 14, 15, and 23. The lek is approximately 0.37 miles south of the two wells. To decrease disturbance and fragmentation Williams agreed to drop the 13-23 well which was located 0.25 miles west of the Willow Creek lek. Proposed project elements that are anticipated to negatively impact grouse include 61 CBNG wells, approximately 21 miles of new roads, approximately 4 miles of new pipelines outside of roads, 2.8 miles of overhead

power with 11 power drops, 6 staging areas and increased vehicle traffic on established roads. Using 0.6 mile as a distance at which sage-grouse will avoid otherwise suitable habitat (Holloran et al. 2007, Aldridge and Boyce 2007), effective sage-grouse habitat loss will be 4.49 square miles from overhead power, 25.2 square miles from roads, 4.8 square miles from pipelines, and 68.9 square miles from 61 well locations. These numbers are not additive because each well location has an associated road and power, and in many cases, wells are closer than 0.6 mile to each other. Therefore, the above numbers over-represent anticipated impacts within the project area. However, if totaled, since most well locations are within 0.6 mile of each other, the entire project area (approximately 18.2 square miles within the POD boundaries) can be considered affected. During project planning and onsite visits, Williams and BLM sited wells and infrastructure out of high quality sage-grouse habitat into sparse/ moderate sage cover of lesser value as sage-grouse habitat.

Indirect effects include habitat fragmentation (i.e., habitat partitioning trending toward isolation) and degradation associated with: 1) human-caused displacement; 2) auditory disturbance; 3) infrastructure avoidance; 4) changes in predator species composition, abundance, and efficacy; 5) facilitated infestation and spread of noxious weeds; and 6) spread of west Nile virus. These effects are difficult to quantify but are related to disturbance arrangement, intensity, and extent. Indirect effects may extend for some distance; reducing habitat effectiveness in zones surrounding CBNG developments (WGFD 2009). Walker et al. (2007) used 350 meters (1,148 feet) from wells to approximate the area affected by CBNG development because this metric was less sensitive to variation in spacing of wells and therefore more accurately estimated the total area affected by CBNG development. The amount of disturbance will be decreased by the construction of four Pod buildings that will monitor the wells through telemetry, thereby reducing the number of wells needed in sage-grouse habitat.

Further information regarding direct and indirect impacts to sage-grouse is provided in the PRB FEIS on pg. 4-257 to 4-273.

4.1.3.1.2.5.2. Cumulative Effects

In addition to the direct impacts to sage-grouse habitat that will be created by the federal wells and associated infrastructure, the project area also contains existing fee, state, and federal fluid mineral development. The sage-grouse cumulative impact assessment area for this project encompasses a four mile radius from the nine sage-grouse leks within 4 miles of the project area. As of March 1, 2010, there are approximately 2,750 existing wells and associated infrastructure within four miles of the nine leks, an area of 443 square miles.

The existing well density is approximately 6.2 wells/section. Due to this level of development, there is potential that the population(s) breeding at these leks may become extirpated without the federal development. There are 780 proposed wells (including the 61 wells from this project) within four miles of the nine leks. With the addition of 719 proposed wells that are not associated with this proposed action, the well density within four miles of the nine leks increases to 7.8 wells/section. With approval of alternative C (61 proposed well locations) the well density increases to 8 wells/section.

CBNG is a recent development, with the first well drilled in 1987 (Braun et al. 2002). In February 1998 there were 420 producing wells primarily restricted to eastern Campbell County (BFO 1999). By May 2003 there were 26,718 CBNG wells permitted within the BFO area (WGFD 2004). The PRB FEIS estimated 51,000 additional CBNG wells to be drilled over a ten year period beginning in 2003 (BFO 2003).

The Powder River Basin Oil and Gas Project FEIS (BLM 2003) concluded that “Activities associated with the proposed project would affect sage-grouse in several ways. These effects may include: (1) increased direct mortality (including legal hunting, poaching, and collision with power lines and

vehicles); (2) the introduction of new perches for raptors and thus the potential change in rate of predation; (3) direct loss or degradation of habitats; (4) indirect disturbance resulting from human activity (including harassment, displacement, and noise); (5) habitat fragmentation (particularly through construction of roads); and (6) changes in population (pg. 4-257)." The FEIS goes on to state that "implementation of several mitigation measures would reduce the extent of each impact addressed by those measures. Despite these measures, 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)."

Impacts from CBNG development are likely to be significant and additive to the long-term impacts afflicting the sage-grouse population (WGFD 2004). Greater sage-grouse habitat is being directly lost with the addition of well sites, roads, pipelines, powerlines, reservoirs and other infrastructure in the Powder River Basin (WGFD 2005, WGFD 2004). Sage-grouse avoidance of CBNG infrastructure results in even greater indirect habitat loss. In southwestern Wyoming, yearling female greater sage-grouse avoid nesting in areas within 0.6 miles of producing well pads (Holloran et al. 2007), and in southern Alberta, brood-rearing females avoid areas within 0.6 miles of producing wells (Aldridge and Boyce 2007). Doherty et al. (2008) demonstrated that sage-grouse in the Powder River Basin avoided otherwise suitable wintering habitats once they have been developed for energy production, even after timing and lek buffer stipulations had been applied. The WGFD feels a well density of eight wells per section creates a high level of impact for sage-grouse and that sage-grouse avoidance zones around mineral facilities overlap creating contiguous avoidance areas (WGFD 2004). As interpreted by a coordinated effort with state fish and wildlife agencies from Montana, Colorado, Utah, South Dakota, North Dakota and Wyoming, (State wildlife agencies' ad hoc committee for sage-grouse and oil and gas development 2008), research indicates that oil or gas development exceeding approximately 1 well pad per square mile with the associated infrastructure, results in calculable impacts on breeding populations, as measured by the number of male sage-grouse attending leks (Holloran 2005, Walker et al. 2007)

Noise can affect sage-grouse by preventing vocalizations that influence reproduction and other behaviors (WGFD 2003). In a study of greater sage-grouse population response to natural gas field development in western Wyoming, Holloran (2005) concluded that increased noise intensity, associated with active drilling rigs within 5 km (3.1 miles) of leks, negatively influenced male lek attendance. In 2002, Braun et al. documented approximately 200 CBNG facilities within one mile of sage-grouse leks. Sage-grouse numbers were found to be consistently lower for these leks than for leks without this disturbance. Direct habitat losses from the facilities themselves, roads and traffic, and the associated noise were found to be the likely reason for this finding.

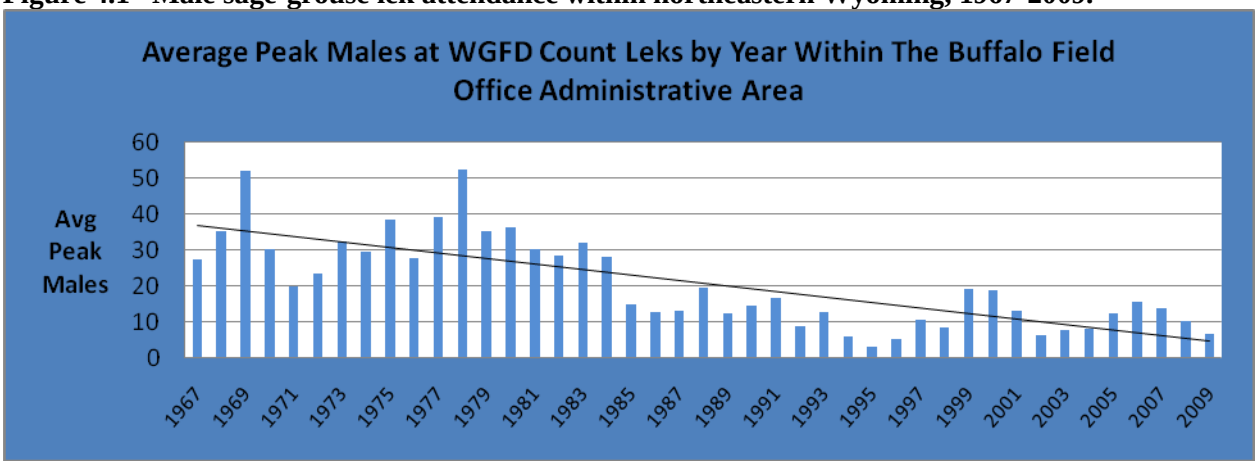
Vegetation communities within the Powder River Basin are naturally fragmented, as they represent a transition between the intermountain basin sagebrush communities to the west and the prairie communities to the east. The Powder River Basin is also near the eastern edge of greater sage-grouse range. A sagebrush cover assessment within Wyoming basins estimated sagebrush coverage within the Powder River Basin to be 35% with an average patch size less than 300 acres (Rowland et al. 2005). The Powder River Basin patch size has decreased by more than 63% in the past forty years, from 820 acre patches and an overall coverage of 41% in 1964 (Rowland et al. 2005). The existing development within the cumulative impacts assessment area has further fragmented the sage-grouse habitat. Disturbance created by this project will contribute to additional fragmentation.

Another concern with CBNG development is that reservoirs created for water disposal provide habitat for mosquitoes associated with West Nile virus (WGFD 2004). West Nile virus represents a significant new stressor, which in 2003 reduced late summer survival of sage-grouse an average of 25% within four

populations including the Powder River Basin (Naugle et al. 2004). In northeastern Wyoming and southeastern Montana, West Nile virus-related mortality during the summer resulted in an average decline in annual female survival of 5% from 2003 to 2006 (Walker et al. 2007). Powder River Basin sage-grouse losses during 2004 and 2005 were not as severe. Summer 2003 was warm and dry, more conducive to West Nile virus replication and transmission than the cooler summers of 2004 and 2005 (Cornish pers. comm.).

The sage-grouse population within northeast Wyoming also exhibited a steady long term downward trend from 1967 to 2009 (WGFD 2008b Figure 4.1). The figure illustrates a twelve-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 2008b.)

Figure 4.1 Male sage-grouse lek attendance within northeastern Wyoming, 1967-2009.



4.1.3.1.2.5.3. Mitigation Measures

To reduce impacts to breeding sage-grouse(as described in the PRB EIS (pp. 4-223 and 4-224), surface disturbing activities will be restricted during the nesting and early brood rearing season near leks and in high quality habitat. Once construction is completed, disruptive activities that require people or activities will be restricted near leks. In addition, traffic speed will be restricted to reduce potential vehicle collisions with sage-grouse in the vicinity of leks in the project area.

4.1.3.1.2.5.4. Residual Effects

The BFO Resource Management Plan (BLM 2001) and the Powder River Basin Oil and Gas Project Record of Decision (BLM 2003) include a two-mile timing limitation within sage-grouse nesting habitat. The two-mile measure originated with the Western Association of Fish and Wildlife Agencies (WAFWA) (BLM 2004). BLM Wyoming adopted the two-mile recommendation in 1990 (BLM 1990). The two-mile recommendation was based on early research which indicated between 59 and 87 percent of sage-grouse nests were located within two miles of a lek (BLM 2004). These studies were conducted within prime, contiguous sage-grouse habitat such as Idaho's Snake River plain.

Additional studies, across more of the sage-grouse's range, indicate that many populations nest much farther than two miles from the breeding lek (BLM 2004). Holloran and Anderson (2005), in their Upper Green River Basin study area, reported only 45% of their sage-grouse hens nested within 3 km (1.86 mi) of the capture lek. Moynahan and Lindberg (2004) found only 36% of their grouse nesting within 3 km of the capture lek. Moynahan's study area was north-central Montana in an area of mixed-grass prairie and sagebrush steppe, with Wyoming big sagebrush (*Artemisia tridentata wyomingensis*) being the

dominant shrub species (Moynahan et al. 2007). Habitat conditions and sage-grouse biology within the Buffalo Field Office are more similar to Moynahan's north-central Montana study area than the Upper Green River area.

A two-mile timing limitation is insufficient to reverse the population decline, given the long-term population decline and that less than 50% of sage-grouse are expected to nest within the limitation area.

Moynahan and Lindberg (2004) like WAFWA (Connelly et al. 2000), recommend increasing the protective distance around sage-grouse leks. The BLM and University of Montana are currently researching nest location and other sage-grouse questions and relationships between grouse and coalbed natural gas development. Thus far, this research 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 (State wildlife agencies' ad hoc committee for sage-grouse and oil and gas development 2008). 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. 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).

Walker et al, 2007 indicates the size of a no-development buffer sufficient to protect leks would depend on the amount of suitable habitat around the lek and the population impact deemed acceptable. Also, rather than limiting mitigation to only timing restrictions, research suggests more effective mitigation strategies include, at a minimum, burying power lines (Connelly et al. 2000 b); 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).

The multi-state recommendations presented to the WGFD for identification of core sage grouse areas acknowledges there may be times when development in important sage grouse breeding, summer, and winter habitats cannot be avoided. In those instances they recommend, "…infrastructure should be minimized and the area should be managed in a manner that effectively conserves sagebrush habitats (State wildlife agencies' ad hoc committee for sage-grouse and oil and gas development 2008).

4.1.3.1.3. Big Game

4.1.3.1.3.1. Direct and Indirect Effects

Direct and indirect effects to big game are discussed in the PRB FEIS (pp. 4-181 to 4-215).

4.1.3.1.4. Aquatics

4.1.3.1.4.1. Direct and Indirect Effects

Williams will manage produced water by sending it to 41 reservoirs previously approved with other PODs in the area. Also, produced water will be sent to four previously approved direct outfalls on Pumpkin Creek. Water contained in reservoirs will not impact aquatic communities. Impacts to aquatics are discussed further in the PRB FEIS on pp. 4-235 to 4-247.

4.1.3.1.5. Migratory Birds

4.1.3.1.5.1. Direct and Indirect Effects

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

In addition, 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). There have also been observations in the BLM BFO area of migratory birds that drowned in stock tanks. It is likely that these occurrences would increase with the introduction of more reservoirs and stock tanks.

4.1.3.1.5.2. Mitigation Measures

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

4.1.3.1.5.3. Residual Effects

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.

4.1.3.1.6. Raptors

4.1.3.1.6.1. Direct and Indirect Effects

Direct and indirect effects to raptors are discussed in the PRB FEIS (pp. 4-216 to 4-221). To reduce the risk of decreased productivity or nest failure (impacts described in the PRB FEIS), the BLM BFO recommends all infrastructure requiring human visitation be located in such a way as to provide an adequate biologic buffer for nesting raptors. A biologic buffer is a combination of distance and visual screening that provides nesting raptors with security such that they will not be flushed by routine activities. Where adequate biologic buffers are not incorporated into the project design, disruptive activities during well operation may discourage raptors from using the nest location.

Forty of the 72 identified raptors nests in the Hartzog/Culp Draw project area are within 0.5 mile of proposed wells and infrastructure (Table 4.2). All raptors using these nests listed will be impacted by the human disturbance associated Hartzog/Culp Draw CBNG project. The distance from wells and topography providing cover along with timing restrictions will reduce the impact project activities will have on nesting raptors on nine of the nests within the project area. Several nests are in close proximity to wells and infrastructure but are out of line of site in canyon bottoms or protected in ponderosa stands. In the Hartzog/Culp Draw CBNG Project, well siting options are limited because of the topography. Although alternative options were considered, in many cases well locations could not be moved to increase the distance between the well and the nest.

Nests 3993, 3932, 8387, and 10356 are located in a ravine within 0.25 miles of wells 43-28 and 12-27. A producing conventional oil well is located directly above the nest locations. Nest 3993 was last actively used by golden eagles in 2006. Nest 3933 was used by golden eagles in 2007. BLM raptor database list the nest tree as being gone. The other two nests are listed as unknown raptors that were discovered recently. The existing disturbance from the oil well and the fact that the wells are located out of sight of the nests will reduce the disturbance factor wells 43-28 and 12-27 will have on these nests. Well metering will reduce the amount of visitation to the area.

Nest 8380 is a ground stick nest on a hillside overlooking the original 23-7 well location approximately 359 feet distance away. There are two existing wells in close proximity providing disturbance to the nest site and territory. The well location was moved at the onsite to a location further away and out of site of the nest site. This will reduce the amount of direct disturbance to the nest. The presence of the well and other existing CBM disturbances may preclude the likelihood that raptors will use the nest site in the future.

Other well moves at the onsite to provide topographic and distance relief to nests include 24-9 and 34-9 to be out of site of 8390, and 21-28 to out of site of 8389.

Well 32-9 could not be moved due to spacing restriction, but distance and the fact that nest 5879 has been used by more tolerant great-horned owls. It can be assumed that the nest has a good chance of persisting despite project implementation.

Well 23- 4 is approximately 435 feet from nest 4382. The well could not be moved because of the boundary restrictions. The well is out of line of site of the nest and Williams agreed to implement an adaptive management plan to reduce well visitation during nesting season throughout the life of the project. Well number 21-10 will have adaptive management restricting disturbance during nesting season to protect nests 3999 and 4000. Adaptive management measures will include measures to reduce well visitation during nesting season while the nests are occupied through the use of a telemetry metering system.

Well 43-33 is near existing overhead power and is not to APLIC standards. PRECorp has submitted an Avian Protection Plan to the USFWS to update the powerline system within this geographic area. This change will reduce the likelihood of electrocution of a raptor on the existing overhead powerlines.

Table 4.2 Proposed and existing infrastructure within 0.5 mile of documented raptor nests in the Hartzog/Culp Draw Hartzog/Culp Draw project area

BLM ID	Infrastructure
684	Wells 34-22, 21-27, 43-22, utility corridors and staging area in the SE Section 22
3571	Pump station and infrastructure in Section 8
3572	Pump station and infrastructure in Section 8
3709	Wells 34-22, 21-27, 43-22, utility corridors and staging area in the SE Section 22
3932	Wells 12-27 and 43-28
3972	Pump station in Section 8
3973	Pump station in Section 8
3985	Wells 34-12 and 43-12 and proposed utility crossing in Section 7
3986	Wells 34-12 and 43-12 and proposed utility crossing in Section 7
3989	Wells 12-19, 41-19, 43-19 and Staging area in Section 19
3993	Wells 12-27 and 43-28
3999	Wells 41-9, 12-10, 32-10, 21-10 and the utility crossing in Section 10
4000	Wells 41-9, 12-10, 32-10, 21-10 and the utility crossing in Section 10
4382	Wells 23-4 and 34-4
5673	Wells 14-20 and 23-20 and staging area and Section 20
5877	Pump station and infrastructure in Section 8
5879	Wells 12-9, 13-9, 21-9, 24-9, and 32-9
6614	Pump station and infrastructure in Section 8
6482	Wells 34-12 and 43-12 and proposed utility crossing in Section 7
6483	Wells 34-12 and 43-12 and proposed utility crossing in Section 7
8360	Wells 23-7 and 43-12
8381	Wells 12-14, 21-15, 23-15, 32-15, 34-15, 41-15 and utility crossing and staging areas in Section 15
8382	Well 41-15 and POD building in Section 10
8385	Wells 41-10 and 21-10
8387	Wells 12-27 and 43-28
8389	Pump station in Section 8

BLM ID	Infrastructure
8390	Wells 13-9, 24-9, 32-9, and 34-9
8392	Pump station in Section 8
10346	Well 23-20 and staging area in Section 20
10350	Staging area in Section 20 and road construction in Section 21
10351	Wells 14-19, 34-19 and POD building in Section 19
10352	Wells 12-28, 21-28 and Staging in Section 20
10356	Wells 12-28, 21-28, and 34-21
10357	Well 12-28
10358	Wells 12-27 and 43-28
10359	Wells 12-27 and 43-28
10609	Wells 41-9, 12-10, 32-10, 21-10 and the utility crossing in Section 10
10610	Wells 41-10 and 21-10
10611	Well 41-15 and Pod building in Section 10
10612	Well 41-15 and Pod building in Section 10

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

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

4.1.3.1.6.2. Mitigation Measures

To reduce the risk of decreased productivity or nest failure (PRB FEIS, p. 4-218), the BLM BFO requires a 0.5 mile radius timing limitation during the breeding season around active raptor nests. In addition, well metering, maintenance, and other site visits within 0.5 mile of raptor nests should also be minimized during the breeding season around active nests.

In order to further understand the degree of potential population effects to raptor species (PRB FEIS, p. 4-219 to 4-220), annual surveys for new raptor nests and nest occupancy checks shall be completed.

4.1.3.1.7. Plains Sharp-tailed Grouse

4.1.3.1.7.1. Direct and Indirect Effects

Sharp-tailed grouse are not expected to be impacted by the proposed project because the project area has limited potential to support them.

4.1.3.2. Sagebrush Obligates

4.1.3.2.1. Direct and Indirect Effects

Construction and maintenance activities associated with development of the Hartzog/Culp Draw 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).

4.1.3.2.2. 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.

4.1.4. 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 Upper Powder River watershed and the Pumpkin Creek watershed and commitment to comply with Wyoming State water laws/regulations. It also addresses potential impacts to the environment and landowner concerns. Qualified hydrologists, in consultation with the BLM, developed the 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 61 wells within the Culp Draw/Hartzog Draw project will be transported by common waterline systems to off-project facilities located to approved PODs (*Wormwood 2 POD will be utilized only when approved) adjacent of the project area. The existing off-project infrastructure that will be utilized to manage Culp Draw/Hartzog Draw effluents is listed in a table below. These existing plans incorporate water management strategies that vary from discharge to

impoundments, direct discharge to Pumpkin Creek, land application and injection to the Salt Creek Madison/Tensleep Formation area (UIC Permit 08-144) located near Midwest, WY. Information pertaining to the specific water management infrastructure for these projects can be reviewed in the respective POD water management plans.

Previously Approved Water Management Strategies

Approval Date	POD/Sundry Name	EA Number
9/29/2006	Kingwood 1 POD	WY-070-06-210
7/27/2007	Kingwood 2 POD	WY-070-07-143
9/29/2009	Kingwood 3 POD	WY-070-09-148
7/28/2006	Wormwood 1 POD	WY-070-06-104
8/03/2009	Wormwood 3 POD	WY-070-09-068
PENDING	*Wormwood 2 POD	PENDING

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 14.5 gpm per well or 884.5 gpm (1.97 cfs or 1,427 acre-feet per year) for the combined Culp Draw/Hartzog Draw 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 60,319 acre-feet in 2010(maximum production was estimated in 2006 at 171,423 acre-feet). As such, the volume of water resulting from the production of these wells is 2.4% of the total volume projected for 2010. 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 Upper Powder River drainage area (PRB FEIS pg 4-5). For this action, it may be assumed that a maximum of 353.8 gpm will infiltrate at or near the discharge points and impoundments (570.8 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 4 to 464 feet in Culp Draw POD and 4 to 630 feet in Hartzog Draw POD, compared to 1,130 to 1,770 feet to the Big George coal zone. 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 stored within the Wasatch - Tongue River sand and coals, and sands units above and below the coals is almost 750 million acre-feet of recoverable groundwater are (PRB FEIS Table 3-5). Redistribution is projected to result in a rapid initial recovery of water levels in the coal. The model projects that this initial recovery period would occur over 25 years." (PRB FEIS 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). No additional mitigation is necessary.

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 WDEQ has developed a guidance document, "Compliance Monitoring for Ground Water Protection Beneath Unlined Coalbed Methane Produce Water Impoundments" (June 14, 2004) which can be accessed on their web site. For all new WYPDES permits, the WDEQ requires that the proponent investigate the shallow groundwater at the proposed impoundment locations. As of December of 2009, approximately 2,013 impoundment sites had been investigated through over 2,296 borings. Of these impoundments, 132 met the criteria to require "compliance monitoring" if constructed and used for CBNG water containment.

Only 146 impoundments requiring monitoring are presently being used. As of the last quarter of 2009, only 21 of those monitored impoundments caused a change in the "Class of Use" for any parameter of the underlying aquifer water.

4.1.5.1.4. Residual Effects

The production of CBNG necessitates the removal of some degree of the water saturation in the coal zones to temporarily reduce the hydraulic head in the coal. The Buffalo Field Office has been monitoring coal zone pressures as expressed in depth to water from surface since the early 1990's in the PRB.

The level of depressurization is within the potential predicted in the PRB FEIS which was determined through the Regional Groundwater Model for that document. For additional information, please refer to the PRB FEIS Chapter 4 Groundwater and the Wyoming State Geological Survey's Open File Report 2009-10 titled "1993-2006 Coalbed Natural Gas (CBNG) Regional Groundwater Monitoring Report: Powder River Basin, Wyoming" which is available on their website at http://www.wsgs.uwyo.edu**.**

4.1.5.2. Surface Water/Wetland/Riparian

4.1.5.2.1. Direct and Indirect Effects

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 4.3 Comparison of Regulated Water Quality Parameters to Predicted Water Quality

Predicted Values	**TDS, mg/l**	**SAR**	**EC,** µmhos/cm
Most Restrictive Proposed Limit –		2	1,000
Least Restrictive Proposed Limit		10	3,200
Upper Powder River 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		
WDEQ Water Quality Requirement for WYPDES Permit # WY0054593			7,500
At discharge point	5,000	Not Specified	
Predicted Produced Water Quality			
Big George Coal	2,120	24	3,330
Existing Surface Water Quality			
Craney Spring NWNE Sec 8 T45N R76W	1,211	1.5	940
Spring #2 (No flow) SENW Sec 17 T45N R76W	N/A	N/A	N/A
Middle Water Spring SENW Sec 21 T45N R76W	2,500	2.6	2,340

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 2120 mg/l TDS which is not within the WDEQ criteria for agricultural use (2000 mg/l TDS).

Currently, Williams has no plans to utilize a managed irrigation system for effluent management purposes within the Culp Draw/Hartzog Draw project boundaries. Williams may however send up to 190 acre-feet per year of produced effluent to a pivot irrigation system located in the approved Wormwood 1 and Kingwood 1 project areas and up to 200 acre-feet per year to the pivot irrigation system associated with the approved Kingsbury 3 Federal POD. Information on the water management strategy for the approved PODs mentioned can be obtained in their respective WMP's.

The quality for the water produced from the Big George target coal zone from these wells is predicted to

be similar to the sample water quality collected from a location near the POD. A maximum of 14.5 gallons per minute (gpm) is projected is to be produced from these 61 wells, for a total of 884.5 gpm for the POD. See Table 4.5.

For more information, please refer to the WMP included in this POD, and the WMP's in the listed approved PODs.

There are no new discharge points proposed within the boundary of the Culp Draw/Hartzog Draw project. There are outfalls within the approved PODs mentioned that will be utilized as part of the water management strategy for this proposal. They have been appropriately sited and utilize appropriate water erosion dissipation designs. Existing and proposed water management facilities were evaluated for compliance with best management practices during the onsite.

To manage the produced water, effluent will be transported, via common waterlines and proposed pump stations, to approved water management infrastructure within approved POD's located adjacent to the Culp Draw Federal/Hartzog Draw Federal POD's. The approved PODs that will be receiving CBNG effluent from this proposed action are the Kingwood 1, Kingwood 2, Kingwood 3, Wormwood 1 and Wormwood 3 POD's. When approved, the proposed Wormwood 2 POD will also be part of the water management strategy. The approved POD's have a combined 41 outfalls and associated impoundments, 4 direct discharges on Pumpkin Creek, pivot irrigation and injection as alternatives for approved water management strategy options. There will be no additional disturbance for the water management strategy listed from within the Culp Draw/Hartzog Draw project boundary. There will be additional disturbance from proposed infrastructure and pump stations that will be needed to transfer the water to those approved PODs mentioned. There is one pump station proposed within Culp Draw, disturbing 1.95 acres and there are two pump stations proposed in Hartzog Draw disturbing a combined 4.8 acres. Each pump station will include an emergency pit, as listed in the table below. These pits will only be used when the transfer pumps systems are not functioning. The pits, which are located on private surface over Federal mineral, will be bonded for the cost of reclamation, as listed below. All water management facilities were evaluated for compliance with best management practices during the onsite.

Pump Station	POD	Location	Size, acres	Capacity, acre-feet	Lease Number	Reclamation Bond Amount
PS-4-4576	Hartzog Draw	NESW Sec 4 T45N R76W	1.0	6.97	WYW89855	$18,161
PS-8-4576	Culp Draw	SWSE Sec 8 T45N R76W	0.5	2.05	WYW72455	$9,108
PS-27-4576	Hartzog Draw	SWSE Sec 27 T45N R76W	0.9	6.07	WYW41473	$14,410

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 0.3 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

mainstem of the Upper Powder River of 68 cfs (PRB FEIS pg 4-86). The predicted maximum discharge rate from these 61 wells is anticipated to be a total of 884.5 gpm or 1.97 cfs to impoundments. Using an assumed conveyance loss of 20% (PRB FEIS pg 4-74) and full containment the produced water re-surfacing in Pumpkin Creek from this action (0.3 cfs) may add a maximum 0.2 cfs to the Upper Powder River flows, or 0.29% 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 Watershed (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).

In the WMP portion of the POD, the operator provided an analysis of the potential development in the watershed above the project area (WMP page 7). Additional reference can be obtained from the aforementioned approved PODs that will be part of the Culp Draw/Hartzog Draw water management strategy. Based on past production rates, the estimated pumping rates for Culp Draw/Hartzog Draw and all effluent produced from the project areas can be adequately managed within the existing water management system without adversely impacting Pumpkin Creek and its associated vegetative communities. The current pumping rate from all the wells within the approved PODs is 3,009 gpm. This rate is based on current production from the Big George and Lower Big George coals. Based on historic rates for the coal seams, it is anticipated that the initial production from the Culp Draw/Hartzog Draw wells proposed in this plan will be 14.5 gpm per well or 884.5 gpm for all 61 wells. Water management facilities described throughout this report will be utilized in handling the additional water production. There will be no new additional impacts to the Willow Creek watershed in Culp Draw. All effluent will be transferred to water management facilities within Pumpkin Creek that are mentioned in the approved PODs. Portions of effluent may also be transported to existing permitted off-project injection facility located near Midwest, WY.

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

The operator has obtained a Wyoming Pollutant Discharge Elimination System (WYPDES) permit for the discharge of water produced from this project from the WDEQ.

Permit effluent limits were set at (WY0054593 page 2):

pH	6.5 to 9.0
TDS	5000 mg/l max
Specific Conductance	7500 mg/l max
Dissolved iron	1000 µg/l max
Total Barium	1800 µg/l max
Total Arsenic	7 µg/l max
Chlorides	150 mg/l

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.

The development of coal bed natural gas and the production in the area surrounding the three existing natural springs may affect the flow rate or water quality of the spring. Initial samples were taken of the springs that had more than 1.0 gpm of flow and their water quality analysis have been submitted with the WMP as Attachment E. There is no planned discharge within the channels of Culp Draw/Hartzog Draw project areas. The operator will monitor the springs for adverse impacts.

In-channel downstream impacts are addressed in the WMP for the Culp Draw/Hartzog Draw POD prepared by Western Land Services for Williams Production RMT Company.

The PRB FEIS assumes that 15% of the impounded water will re-surface as channel flow (PRB FEIS pg 4-74). Re-surfacing water from the impoundments will potentially allow for wetland-riparian species establishment. Continuous high stream flows into wetlands and riparian areas would change the composition of species and dynamics of the food web. The shallow groundwater table would rise closer to the surface with increased and continuous stream flows augmented by produced water discharges.

Vegetation in riparian areas, such as cottonwood trees, that cannot tolerate year-round inundated root zones would die and would not be replaced. Other plant species in riparian areas and wetland edges that favor inundated root zones would flourish, thus changing the plant community composition and the associated animal species. A rise in the shallow ground groundwater table would also influence the hydrology of wetlands by reducing or eliminating the seasonal drying periods that affect recruitment of plant species and species composition of benthic and water column invertebrates. These changes to the aquatic food web base would affect the higher trophic levels of fish and waterfowl abundance and species richness for wetlands and riparian areas." (PRB FEIS Page 4-175).

4.1.5.2.2. Cumulative Effects

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

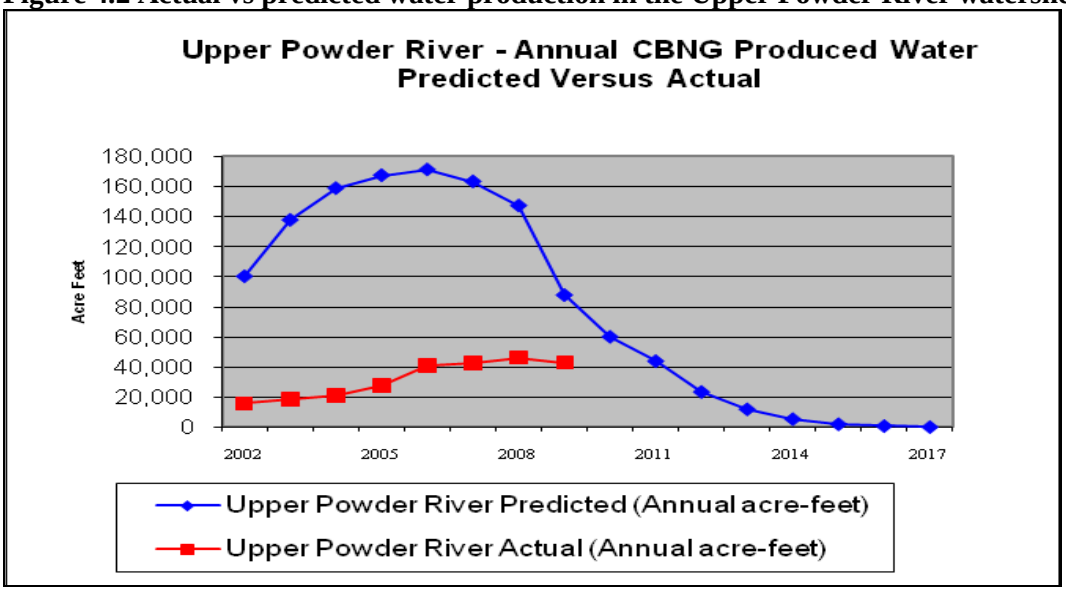
As of December 2009, all producing CBNG wells in the Upper Powder River watershed have discharged a cumulative volume of 255,531 acre-ft of water compared to the predicted 1,135,567 acre-ft disclosed in the PRB FEIS (Table 2-8 page 2-26). These figures are presented graphically in Figure 4.2 and Table 4.4 following. This volume is 22.5 % of the total predicted produced water analyzed in the PRB FEIS for the Upper Powder River watershed.

Table 4.4 Actual vs predicted water production in the Upper Powder River watershed *2009 Data Update 04-06-10*

Year	Upper Powder River Predicted (Annual acre-feet)	Upper Powder River Predicted (Cumulative acre-feet from 2002)	Upper Powder River Actual (Annual acre-feet)		Upper Powder River Actual (Cumulative acre-feet from 2002)	
			A-ft	% of Predicted	A-Ft	% of Predicted
2002	100,512	100,512	15,846	15.8	15,846	15.8

2003	137,942	238,454	18,578	13.5	34,424	14.4
2004	159,034	397,488	20,991	13.2	55,414	13.9
2005	167,608	565,096	27,640	16.5	83,054	14.7
2006	171,423	736,519	40,930	23.9	123,984	16.8
2007	163,521	900,040	42,112	25.8	166,096	18.5
2008	147,481	1,047,521	45,936	31.1	212,522	20.3
2009	88,046	1,135,567	43,009	48.8	255,531	22.5
2010	60,319	1,195,886				
2011	44,169	1,240,055				
2012	23,697	1,263,752				
2013	12,169	1,275,921				
2014	5,672	1,281,593				
2015	2,242	1,283,835				
2016	1,032	1,284,867				
2017	366	1,285,233				
Total	**1,285,233**		**255,531**			

Figure 4.2 Actual vs predicted water production in the Upper Powder River watershed



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

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

1. They are proportional to the actual amount of cumulatively produced water in the Upper Powder River drainage, which is approximately 22.5% of the total predicted in the PRB FEIS.

2. The WDEQ enforcement of the terms and conditions of the WYPDES permit that are designed to protect irrigation downstream.
3. The commitment by the operator to monitor the volume of water discharged.

The increase in surface water flow resulting from continuous discharge from treatment facilities could affect existing wetlands and riparian areas. "The major effects to be expected may include (1) increased erosion of channels and floodplains; (2) loss of riparian streambank vegetation; (3) changes to the composition and physical structure of the vegetation community in the wetlands and riparian areas; and (4) raising of shallow groundwater in floodplains. Erosion of channels an floodplains would increase turbidity in the water column, thus adversely affecting plankton and macroinvertebrate production and growth rates that are the basis of aquatic food chains in the prairie streams of the Project Area." (PRB FEIS pg 4-174).

4.1.5.2.3. Mitigation Measures

The operator has committed to monitor the water discharge points and the channels downstream for stability. If erosion is noted, the operator will be required to repair and stabilize the area using selected mitigation techniques.

Channel crossings by road and pipelines will be constructed perpendicular to flow. Culverts will be installed at appropriate locations for streams and channels crossed by roads as specified in the BLM Manual 9112-Bridges and Major Culverts and Manual 9113-Roads. Streams will be crossed perpendicular to flow, where possible, and all stream crossing structures will be designed to carry the 25-year discharge event or other capacities as directed by the BLM. Channel crossings by pipelines will be constructed so that the pipe is buried at least four feet below the channel bottom.

Residual Effects"Streams enhanced by large volumes of CBM produced water may begin to establish meander patterns on longer wavelengths in response to increased flows. Stream drainages would readjust to their existing natural flows at the end of the project's life. Downcutting (stream erosion) and sediment deposition (aggradation) are natural processes that occur as stream drainages age through time. Downcutting occurs within the upper reaches of a drainage system as the stream channel becomes incised through erosion, until the slope of the stream and its velocity are reduced and further erosion is limited. Sediment is deposited within the lower, slower reaches of a stream.

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

Refer to the PRB FEIS, Volume 2, page 4-115 – 117 and table 4-13 for cumulative effects relative to the Upper Powder River watershed and page 117 for cumulative effects common to all sub-watersheds.

4.1.6. Fluid Minerals

Assuming this well is not drilled and there are no offsetting wells							
Twp	**Rng**	**Sec**	**Qtr/Qtr**	**Lease**	**Well Name**	**Unrecovered CBM**	
						High	**Low**
45N	76W	23	NWSW	WYW147322	R Christensen Fed 13-23	609	
All numbers are in thousands of MCF, low numbers were not figured since there is not enough surrounding production to make an estimate.							

Assuming this well is not drilled but all surrounding 80's are							
Twp	**Rng**	**Sec**	**Qtr/Qtr**	**Lease**	**Well Name**	**Unrecovered CBM**	
						High	**Low**
45N	76W	23	NWSW	WYW147322	R Christensen Fed 13-23	67	
All numbers are in thousands of MCF, low numbers were not figured since there is not enough surrounding production to make an estimate.							

4.1.7. Cultural Resources

4.1.7.1. Direct and Indirect Effects

The proposed project will cause a weak contrast to the setting of the Pumpkin Buttes TCP – 48CA268. 48CA5417, 48CA5418, 48CA5419, 48CA6764, 48JO1475 will be impacted by the project as proposed, but all have been determined *not eligible* to the NRHP. Following the Wyoming State Protocol Section VI(B)(5) the Bureau of Land Management determined that the project will result in "No Adverse Effect". The Wyoming State Historic Preservation Officer (SHPO) concurred with the Bureau's determination on 4/23/10 and 5/12/10

4.1.7.2. Cumulative Effects

The cumulative effects associated with Alternatives C are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, refer to the PRB FEIS, pg. 4-298.

4.1.7.3. Mitigation Measures

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

4.1.7.4. Residual Effects

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

4.1.8. Air Quality

4.1.8.1. 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

Only specific differences from alternative C will be discussed. Alternative 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 further mitigation to reduce the loss of sage-grouse habitat within the project area. 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 increased 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. The following proposal will be recommended to the operator as mitigation to reduce the impacts of habitat loss, habitat fragmentation, and West Nile virus within the Culp Draw Federal POD/Hartzog Draw Federal POD

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4.2.1. Vegetation & Soils

4.2.1.1. 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 all 11 impoundments will retain native soil and vegetation. (see table 4.9.1 for quantification) The following table summarizes the proposed surface disturbance associated with Alternative D.

4.2.1.2. Cumulative effects for Vegetation and Soils

No additional mitigation measures are required.

4.2.2. Wildlife

4.2.2.1. Threatened and Endangered and Sensitive Species

4.2.2.1.1. Bald eagle

Impacts to bald eagles under Alternative D would be similar to those indicated above for Alternative C.

4.2.2.1.2. Cumulative Effects

The cumulative effects associated with Alternative D are within the analysis parameters and impacts described in the PRB FEIS. No additional mitigation measures are required

4.2.2.1.3. Direct and Indirect Effects

4.2.2.1.3.1. Greater sage-grouse

While wildlife effects already described for Alternative C generally apply, Alternative D was designed to minimize impacts to the Willow Creek sage-grouse lek by leaving undisturbed nesting habitat to the north. Two CBNG wells were dropped from Alternative C to reduce impacts to high quality sage-grouse habitat. The dropped well numbers are: 11-23-4576 and 21-23-4576.

Removal of the two wells and their associated infrastructure would result in reduced effects to high-quality sage-grouse winter and nesting habitat near the Hartzog/Culp Draw POD periphery. Alternative D would result in reduced impact area and extent while maintaining greater habitat connectivity at the POD periphery.

4.2.2.1.4. Cumulative Effects

The cumulative effects associated with Alternative D are within the analysis parameters and impacts described in the PRB FEIS. No additional mitigation measures are required

4.2.2.2. Big Game

4.2.2.2.1. Direct and Indirect Effects

This alternative will reduce disturbance to big game habitat by two wells and associated infrastructure. However, effects would be largely similar to those indicated for Alternative C.

4.2.2.2.2. Cumulative Effects

The cumulative effects associated with Alternative D are within the analysis parameters and impacts described in the PRB FEIS. No additional mitigation measures are required.

4.2.2.3. Migratory Birds

4.2.2.3.1. Direct and Indirect Effects

Alternative D contains the least habitat impact to migratory birds.

4.2.2.3.2. Cumulative Effects

The cumulative effects associated with Alternative D are within the analysis parameters and impacts described in the PRB FEIS. No additional mitigation measures are required.

4.2.2.4. Raptors

4.2.2.4.1. Direct and Indirect Effects

Impacts to raptors under Alternative D would be similar to those indicated above for Alternative C.

4.2.2.4.2. Cumulative effects for Raptors

The cumulative effects associated with Alternative D are within the analysis parameters and impacts described in the PRB FEIS. No additional mitigation measures are required.

4.2.2.4.2.1. Sharp-tailed grouse

4.2.2.4.2.1.1. Impacts to sharp-tailed grouse are similar to those indicated above for Alternative C.

4.2.2.4.1. Cumulative Effects

The cumulative effects associated with Alternative D are within the analysis parameters and impacts described in the PRB FEIS. No additional mitigation measures are required

4.2.3. Fluid Minerals

4.2.3.1. Direct and Indirect Effects

The table below indicates potential for lost resources and revenue under Alternative D.

Assuming these wells are not drilled and there are no offsetting wells							
Twp	**Rng**	**Sec**	**Qtr/Qtr**	**Lease**	**Well name**	**Unrecovered CBM**	
						High	**Low**
45N	76W	23	NWNW	WYW147322	R Christensen Fed 11-23	609	
45N	76W	23	NENW	WYW147322	R Christensen Fed 21-23	609	
All numbers are in thousands of MCF, low numbers were not figured since there is not enough surrounding production to make an estimate.							

Assuming these wells are not drilled but all surrounding 80's are							
Twp	**Rng**	**Sec**	**Qtr/Qtr**	**Lease**	**Well name**	**Unrecovered CBM**	
						High	**Low**
45N	76W	23	NWNW	WYW147322	R Christensen Fed 11-23	67	
45N	76W	23	NENW	WYW147322	R Christensen Fed 21-23	67	
All numbers are in thousands of MCF, low numbers were not figured since there is not enough surrounding production to make an estimate.							

Note: All figures are in thousands of MCFG or thousands of dollars.

4.2.4. Comparison Summary of Effects By Cumulative effects

The cumulative effects associated with Alternative D are within the analysis parameters and impacts described I the PRB FEIS. No additional mitigation measures are required.

Table 4.5 Cumulative Effects

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

Resource/Species	Alternative A	Alternative B & C	Alternative D Sage Grouse emphasis
Sensitive Species			
Greater Sage Grouse	No habitat loss.	Greatest 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.	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 have effect on the overall spread of WNV.	Unlikely to have any effect on the overall spread of WNV.

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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