DECISION RECORD
Williams Production RMT Company, Cedar Draw Unit 3
ENVIRONMENTAL ASSESSMENT –WY-070-EA11-236
Bureau of Land Management, Buffalo Field Office

DECISION:
BLM approves Williams Production RMT Company (Williams) coalbed natural gas (CBNG) plan of development (POD) Cedar Draw Unit 3 described in Alternative B of the environmental assessment (EA) WY-070-EA-236. This approved POD includes: 41 CBNG applications for permit to drill (APDs) a water management plan (WMP), 1 right-of-way, and supporting infrastructure. This decision considered the finding of no significant impact for this EA.

Compliance
This decision complies with:
- Federal Land Policy and Management Act of 1976 (FLPMA) (43 USC 1701).
- Mineral Leasing Act of 1920 (30 U.S.C. 181) and 43 CFR Part 3160 to include On Shore Order No. 1.
- National Environmental Policy Act of 1969 (NEPA) (42 USC 4321).
- Migratory Bird Treaty Act (MBTA) (16 USC 703).
- Buffalo Final Environmental Impact Statement (FEIS) (1985), and FEIS for the Powder River Basin (PRB) Oil and Gas Project, and Record of Decision (ROD) 2003.
- Buffalo Resource Management Plan (RMP), 1985, Amendments 2001, 2003.
- Update of the Bureau of Land Management (BLM), Wyoming, Sensitive Species List, (WY-IM-2010-027), Apr 2010.
- U.S. Department of Interior Order (USDI) 3310, (2010); BLM Manuals 6301; 6302; and 6303 (2011).

BLM summarizes the details of the approval, below. The project description, including specific changes made at the onsites, and site-specific mitigation measures, is found in the EA.

Well Sites:
BLM approves the following 41 APDs and associated infrastructure:

	Well Name	Well #	QTR	Sec	TWP	RNG	Lease #
1	Cedar Draw Unit 3	24-6G	SESW	6	53N	75W	WYW143982
2	Cedar Draw Unit 3	23-7WG	NWNW	7	53N	75W	WYW143982
3	Cedar Draw Unit 3	34-7WG	SWSE	7	53N	75W	WYW143982
4	Cedar Draw Unit 3	22-7G	SENW	7	53N	75W	WYW143982
5	Cedar Draw Unit 3	24-7WG	SESW	7	53N	75W	WYW143982
6	Cedar Draw Unit 3	31-7G	NWNE	7	53N	75W	WYW143982
7	Cedar Draw Unit 3	43-7G	NESE	7	53N	75W	WYW143982
8	Cedar Draw Unit 3	14-8G	SWSW	8	53N	75W	WYW143982
9	Cedar Draw Unit 3	13-9WG	NWSW	9	53N	75W	WYW0309256A
10	Cedar Draw Unit 3	34-18WG	SWSE	18	53N	75W	WYW143983
11	Cedar Draw Unit 3	12-18WG	SWNW	18	53N	75W	WYW143983
12	Cedar Draw Unit 3	21-18WG	NENW	18	53N	75W	WYW143983
13	Cedar Draw Unit 3	23-18WG	NESW	18	53N	75W	WYW143983
14	Cedar Draw Unit 3	41-18WG	NENE	18	53N	75W	WYW143983
15	Cedar Draw Unit 3	42-18WG	SENE	18	53N	75W	WYW143983

	Well Name	Well #	QTR	Sec	TWP	RNG	Lease #
16	Cedar Draw Unit 3	43-18WG	NESE	18	53N	75W	WYW143983
17	Cedar Draw Unit 3	14-18WG	SWSW	18	53N	75W	WYW143983
18	Cedar Draw Unit 3	21-19WG	NENW	19	53N	75W	WYW135223
19	Cedar Draw Unit 3	23-19WG	NESW	19	53N	75W	WYW135223
20	Cedar Draw Unit 3	44-19WG	SESE	19	53N	75W	WYW146814
21	Cedar Draw Unit 3	11-29WG	NWNW	29	53N	75W	WYW143985
22	Cedar Draw Unit 3	42-29G	SENE	29	53N	75W	WYW143985
23	Cedar Draw Unit 3	14-28G	SWSW	28	53N	75W	WYW143985
24	Cedar Draw Unit 3	21-32G	NENW	32	53N	75W	WYW143986
25	Cedar Draw Unit 3	31-30WG	NWNE	30	53N	75W	WYW143985
26	Cedar Draw Unit 3	43-30WG	NESE	30	53N	75W	WYW143985
27	Cedar Draw Unit 3	24-30WG	SESW	30	53N	75W	WYW143985
28	Cedar Draw Unit 3	22-30G	SENW	30	53N	75W	WYW143985
29	Cedar Draw Unit 3	13-31WG	NWSW	31	53N	75W	WYW143986
30	Cedar Draw Unit 3	22-31WG	SENW	31	53N	75W	WYW143986
31	Cedar Draw Unit 3	31-31WG	NWNE	31	53N	75W	WYW143986
32	Cedar Draw Unit 3	11-31WG	NWNW	31	53N	75W	WYW143986
33	Cedar Draw Unit 3	31-32WG	NWNE	32	53N	75W	WYW143986
34	Cedar Draw Unit 3	42-32WG	SENE	32	53N	75W	WYW143986
35	Cedar Draw Unit 3	44-32G	SESE	32	53N	75W	WYW143986
36	Cedar Draw Unit 3	11-33G	NWNW	33	53N	75W	WYW143986
37	Cedar Draw Unit 3	13-33G	NWSW	33	53N	75W	WYW143986
38	Cedar Draw Unit 3	22-33G	SENW	33	53N	75W	WYW143986
39	Cedar Draw Unit 3	24-33G	SESW	33	53N	75W	WYW143986
40	Cedar Draw Unit 3	33-33G	NWSE	33	53N	75W	WYW143986
41	Cedar Draw Unit 3	44-33G	SESE	33	53N	75W	WYW143986

Water Management:
BLM approves the use of federal water in this POD's water management plan as summarized with 1 existing reservoir approved for use, 1 existing water treatment facility with discharge to Wild Horse Creek, and 1 proposed water treatment facility with discharge to Middle Prong Wild Horse Creek.

Facility Name	Qtr/Qtr	Sec	TWP	RNG	Capacity (acre	Surface Disturbance (acres)	Lease #
Res 32-6	SWNE	6	53N	75W	161	0*	WYW143982
Echeta Road (Existing@)	NWNW	26	53N	76W	NA	0	None
Cedar Draw (Proposed@)	NWNE	6	53N	75W	NA	2	WYW143982

* Approved under Cedar Draw Unit 1 POD @ Using Higgins Loop technology provided by Exterran Water Management Systems, formerly Emission Mitigation Technology

Rights-of-Way:
BLM approves the following road right-of-way WYW-169609 under the Federal Land Policy and Management Act (FLPMA). Construction of the following location may begin after Williams receives right-of-way documents from BLM. This rights-of-way falls within the constraints of the conditions of approval (COAs) of the POD.

	Serial #	Description	Length	Width	Sec	TWP	RNG
1	WYW-169609	Proposed template road	Apprx 1,000’	NTE 45’	3	52N	75W

NTE: not to exceed

Limitations: The limitations are the POD design features and COAs.

Operator Committed Measures:
The operator incorporated several measures to alleviate resource impacts into their Master Surface Use Plan (MSUP) and engineered plan set, submitted on December 30, 2010. Refer to the MSUP, Appendix 7 and the engineered plan set, for details of operator committed measures.

Site-specific Mitigation Measures:
Site-specific Conditions of Approval have been applied to this project, in addition to the programmatic and standard COAs identified in the PRB FEIS, to mitigate the site-specific impacts described in the Environmental Consequences section of the attached EA. For a complete description of all site-specific COA’s associated with this approval, see section 4.2 in the attached EA.

Williams and BLM applied site-specific conditions of approval (COAs) to this project, in addition to the programmatic and standard COAs identified in the PRB FEIS ROD, to mitigate the site-specific impacts described in the EA. For a complete description of all site-specific COAs associated with this approval, see the EA and COAs.

COMPLIANCE WITH LAWS, REGULATIONS, LAND USE PLANS, AND POLICIES:
This approval complies with all federal laws, regulations, and policies. This includes, but is not limited to, the FLPMA, the National Historic Preservation Act, the Threatened and Endangered Species Act, the Migratory Bird Treaty Act, the Bald and Golden Eagle Protection Act, the Clean Water Act, the Clean Air Act, and the National Environmental Policy Act.

Approval of Alternative B conforms to the PRB FEIS, its ROD, and the RMP (1985, 2001, and 2003) for the public lands administered by the BLM, Buffalo Field Office (BFO), and DOI Order 3310. This approval is subject to adherence with all of the operating plans, design features, and mitigation measures contained in the Master Surface Use Plan of Operations, drilling plan, WMP, and information in individual APDs. This approval is also subject to operator compliance with all mitigation and monitoring requirements contained in the PRB FEIS ROD, 2003.

RATIONALE:
My decision to approve Alternative B, as summarized above, is based on the following.

1. Williams and BLM included design features and mitigation measures reduce environmental impacts while still meeting the project’s need. Mitigation is discussed in the environmental effects section of the EA, and see the COAs.

2. The selected alternative will not result in any undue or unnecessary environmental degradation.

3. The selected alternative will help meet the nation's energy and revenue needs, and will help stimulate local economies by maintaining workforce stability.

4. The Operator, in their POD, committed to:
   - Comply with all applicable federal, state, and local laws and regulations (Cedar Draw Unit 3 POD, Self Certification Section).
   - 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 (Cedar Draw Unit 3 POD, Self Certification Section).
   - 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 (MSUP, p.. 7).
   - Provide water analysis from a designated reference well in each coal zone (WMP, Attachment E).

5. The Operator certified that it has a surface use agreement with the landowners or posted bond.

6. Alternative B 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 need for the Cedar Draw Unit 3 POD.

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

Any party who is adversely affected by the State Director's decision may appeal that decision to the Interior Board of Land Appeals, as provided in 43 CFR 3165.4.

Field Manager: _____ Date: 6/17/11

FINDING OF NO SIGNIFICANT IMPACT
Williams Production RMT Company, Cedar Draw Unit 3
ENVIRONMENTAL ASSESSMENT – WY-070-EA11-236
Bureau of Land Management, Buffalo Field Office

FINDING OF NO SIGNIFICANT IMPACT:

On the basis of the information in the EA, and all other information available to me, I find that: (1) the implementation Alternative B will not have significant environmental impacts beyond those already addressed in the Power River Basin Final Environmental Impact Statement (PRB FEIS) to which the EA is tiered; (2) Alternative B conforms to the Buffalo Field Office (BFO) Resource Management Plan (RMP) (1985, 2001, 2003) and DOI Order 3310; and (3) Alternative B does not constitute a major federal action having a significant effect on the human environment. Therefore an EIS is not required. This finding is based on my consideration of the Council on Environmental Quality's (CEQ) criteria for significance (40 CFR 1508.27), with regard to the context and to the intensity of the impacts described in the EA.

CONTEXT:

Mineral development (leasable, locatable, and saleable) is a long-standing and common land use in the PRB. More than 40% of the nation's coal production comes from the PRB. The PRB FEIS reasonably foreseeable development predicted and analyzed the development of 51,000 coalbed natural gas (CBNG) and 3,200 oil wells. The CBNG development described in Alternative B is insignificant in the national, regional, and local context.

INTENSITY:

The implementation of Alternative B will result in beneficial effects in energy and revenue production however; there will also be adverse effects to the environment. Design features and mitigation measures were included in Alternative B to minimize adverse environmental effects.

The preferred alternative does not pose a significant risk to public health and safety. The geographic area of this plan of development (POD) does not contain unique characteristics identified in the RMP, 2003 PRB FEIS, or other legislative or regulatory processes or scientific documents, other highly erosive soils and soils with limited reclamation potential. This POD area is clearly lacking in wilderness characteristics due to extensive CBNG infrastructure.

BFO used relevant scientific literature and professional expertise in preparing the EA. The scientific community is reasonably consistent with their conclusions on environmental effects relative to oil and gas development. Research findings on the nature of the environmental effects are not highly controversial, highly uncertain, or involve unique or unknown risks.

CBNG development of the nature proposed with this POD and similar PODs was predicted and analyzed in the PRB FEIS; the selected alternative does not establish a precedent for future actions with significant effects.

There are no cultural or historical resources present that will be adversely affected by the selected alternative. No species listed under the Endangered Species Act or their designated critical habitat will be adversely affected. The selected alternative will not have any anticipated effects that would threaten a violation of federal, state, or local law or requirements imposed for the protection of the environment.

Field Office Manager: _____ Date: 6/17/11

ENVIRONMENTAL ASSESSMENT – WY-070-EA11-236
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Bureau of Land Management, Buffalo Field Office

1. INTRODUCTION

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

1.1. Background

Williams Production RMT Company (Williams or Operator) initially submitted 43 applications for permit to drill (APDs) and infrastructure for the Cedar Draw Unit 3 plan of development (POD) on October 3, 2008 to the BFO to develop and produce natural gas from coal bearing formations of the PRB. During onsites Williams agreed to withdraw 2 APDs (11-7 & 33-29) due to steep slopes, erosive soils, and limited reclamation potential. Williams submitted a revised Cedar Draw Unit 3 POD on April 4, 2011.

Williams and BFO conducted onsite visits in 2010 on June 29 to July 2, and October 12 to evaluate the proposal and modify it as necessary to alleviate environmental impacts. BLM sent 3 post-onsite deficiency letters on July 16, and October 27, 2010, and February 8, 2011.The BLM received the Operator's response to the post onsite deficiencies on April 4, 2011 but the POD was incomplete due to missing components identified in the February 8, 2011 post onsite deficiency letter. The project proposal and APDs were complete when BLM received the complete operator's response to the post onsite deficiencies on June 10, 2011. BFO shared proposed COAs with the Operator on June 10, 2011.

1.2. Need for the Proposed Action

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

1.3. Decision to be Made

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

1.4. Scoping and Issues

BFO did not conduct external scoping for this EA. BFO conducted extensive external scoping for the PRB FEIS and it is discussed on p. 15 of the PRB FEIS Record of Decision (ROD) and on p. 2-1 of the FEIS. This action is similar in scope to other CBNG PODs that BFO analyzed. BFO verified that external scoping would be unlikely to identify new issues as shown by the few POD EAs that had external scoping: Clabaugh POD (WY-070-EA08-134) and Hollcroft/Stotts Draw POD (WY-070-EA07-021).

The BLM interdisciplinary team (ID team) conducted internal scoping by reviewing the proposed development and project location to identify potentially affected resource and land uses. Appendix B identifies those resources and land uses present and affected by the proposed action; those resources and

land uses that are either not present, not affected, or were adequately covered by the PRB FEIS will not be discussed in this EA. The ID team identified significant issues for the affected resources to further focus the analysis. This EA addresses those site-specific impacts that were unknown at the time of the PRB FEIS analysis that would help in making a reasoned decision or may be related to a potentially significant effect. Issues for this project include:

- **Soils and vegetation**: site stability, reclamation potential, riparian and wetland communities, invasive species
- **Wildlife**: raptor productivity, greater sage-grouse lek occupancy and persistency, mountain plover productivity, bald eagle nesting and roosting habitat
- **Water**: ground water depletion, quality and quantity of produced water

2. ALTERNATIVES INCLUDING THE PROPOSED ACTION

BFO evaluated 2 alternatives, A and B. A brief description of each alternative appears in the following sections. Programmatic mitigation measures, as determined in PRB FEIS Record of Decision (ROD) apply to all alternatives, including the no action alternative (Alternative A), and are included in the standard mitigation measures, Operator-committed mitigation measures, and site-specific conditions of approval (COAs) would apply only to action alternatives (Alternative B).

2.1. Alternative A - No Action

The PRB FEIS considered a No Action Alternative, Volume 1, pp. 2-54 to 2-62. This alternative would deny these APDs and /or POD requiring the operator to resubmit APDs or a POD that complies with statutes and the reasonable measures in the PRB RMP Record of Decision (ROD) in order to lawfully exercise conditional lease rights. This alternative could, through secretarial discretion suspend the senior leasehold, or could administratively cancel or withdraw the lease if improperly awarded, or seek to cancel the lease. It is not possible in the abstract to identify every interest and that is beyond the scope here.

2.2. Alternative B - Operator Proposed Action

Alternative B contains complete APDs and is based on the operator and BLM working to reduce environmental impacts. This alternative summarizes the POD as it was, after site visits, submitted to the BLM by Williams on April 4, 2011.

Proposed Action Title/Type: Proposed Action Title/Type: Williams Production RMT Company‘s Cedar Draw Unit 3 CBNG POD.

Proposed Well Information: There are 41 wells proposed in this POD, the original proposal of 43 well changed after onsites (see Section 1.1, above). The wells are vertical bores proposed on an 80 acre spacing pattern with 1 well per location. Each well will produce from Lower Canyon and Gates coal seams. Proposed well house dimensions are 6ft wide x 6ft length x 6ft height. Proposed central metering station (pod buildings) dimensions are 8.5ft wide x 34ft length x 10ft height. Well house color is Carlsbad Canyon, selected to blend with the surrounding vegetation. A list of proposed wells is found in Table 2.1.

Table 2.1. Proposed Wells – Alternative B

	Well Name	Well #	QTR	Sec	TWP	RNG	Lease #
1	CEDAR DRAW UNIT 3	24-6G	SESW	6	53N	75W	WYW143982
2	CEDAR DRAW UNIT 3	23-7WG	NWNW	7	53N	75W	WYW143982
3	CEDAR DRAW UNIT 3	34-7WG	SWSE	7	53N	75W	WYW143982
4	CEDAR DRAW UNIT 3	22-7G	SENW	7	53N	75W	WYW143982
5	CEDAR DRAW UNIT 3	24-7WG	SESW	7	53N	75W	WYW143982
6	CEDAR DRAW UNIT 3	31-7G	NWNE	7	53N	75W	WYW143982

	Well Name	Well #	QTR	Sec	TWP	RNG	Lease #
7	CEDAR DRAW UNIT 3	43-7G	NESE	7	53N	75W	WYW143982
8	CEDAR DRAW UNIT 3	14-8G	SWSW	8	53N	75W	WYW143982
9	CEDAR DRAW UNIT 3	13-9WG	NWSW	9	53N	75W	WYW0309256A
10	CEDAR DRAW UNIT 3	34-18WG	SWSE	18	53N	75W	WYW143983
11	CEDAR DRAW UNIT 3	12-18WG	SWNW	18	53N	75W	WYW143983
12	CEDAR DRAW UNIT 3	21-18WG	NENW	18	53N	75W	WYW143983
13	CEDAR DRAW UNIT 3	23-18WG	NESW	18	53N	75W	WYW143983
14	CEDAR DRAW UNIT 3	41-18WG	NENE	18	53N	75W	WYW143983
15	CEDAR DRAW UNIT 3	42-18WG	SENE	18	53N	75W	WYW143983
16	CEDAR DRAW UNIT 3	43-18WG	NESE	18	53N	75W	WYW143983
17	CEDAR DRAW UNIT 3	14-18WG	SWSW	18	53N	75W	WYW143983
18	CEDAR DRAW UNIT 3	21-19WG	NENW	19	53N	75W	WYW135223
19	CEDAR DRAW UNIT 3	23-19WG	NESW	19	53N	75W	WYW135223
20	CEDAR DRAW UNIT 3	44-19WG	SESE	19	53N	75W	WYW146814
21	CEDAR DRAW UNIT 3	11-29WG	NWNW	29	53N	75W	WYW143985
22	CEDAR DRAW UNIT 3	42-29G	SENE	29	53N	75W	WYW143985
23	CEDAR DRAW UNIT 3	14-28G	SWSW	28	53N	75W	WYW143985
24	CEDAR DRAW UNIT 3	21-32G	NENW	32	53N	75W	WYW143986
25	CEDAR DRAW UNIT 3	31-30WG	NWNE	30	53N	75W	WYW143985
26	CEDAR DRAW UNIT 3	43-30WG	NESE	30	53N	75W	WYW143985
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28	CEDAR DRAW UNIT 3	22-30G	SENW	30	53N	75W	WYW143985
29	CEDAR DRAW UNIT 3	13-31WG	NWSW	31	53N	75W	WYW143986
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31	CEDAR DRAW UNIT 3	31-31WG	NWNE	31	53N	75W	WYW143986
32	CEDAR DRAW UNIT 3	11-31WG	NWNW	31	53N	75W	WYW143986
33	CEDAR DRAW UNIT 3	31-32WG	NWNE	32	53N	75W	WYW143986
34	CEDAR DRAW UNIT 3	42-32WG	SENE	32	53N	75W	WYW143986
35	CEDAR DRAW UNIT 3	44-32G	SESE	32	53N	75W	WYW143986
36	CEDAR DRAW UNIT 3	11-33G	NWNW	33	53N	75W	WYW143986
37	CEDAR DRAW UNIT 3	13-33G	NWSW	33	53N	75W	WYW143986
38	CEDAR DRAW UNIT 3	22-33G	SENW	33	53N	75W	WYW143986
39	CEDAR DRAW UNIT 3	24-33G	SESW	33	53N	75W	WYW143986
40	CEDAR DRAW UNIT 3	33-33G	NWSE	33	53N	75W	WYW143986
41	CEDAR DRAW UNIT 3	44-33G	SESE	33	53N	75W	WYW143986

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

Table 2.2. Proposed Water Management Facilities – Alternative B

	Facility Name	Qtr/Qtr	Sec	TWP	RNG	Capacity (acre feet)	Surface Disturbance, (acres)	Lease #
1	Res 32-6	SWNE	6	53N	75W	161	0	WYW143982
2	Echeta Road Unit (Existing)	NWNW	26	53N	76W	NA	0	None
3	Cedar Draw Unit (Proposed)	NWNE	6	53N	75W	NA	2	WYW143982

County: Campbell

Applicant: Williams Production RMT Company

Surface Owners: Rick Floyd, Floyd Land and Livestoct Inc., Bobby Jo and Rebecca Spellman, Deer Track Ranch LLC, State of Wyoming, Bureau of Land Managment

Drilling and Construction:

- Wells will be in Lower Canyon and Gates coal zones at depths of approximately 1739 feet.

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

- Well metering shall be accomplished by telemetry and central metering facility (POD Building) visitation. Metering would entail multiple visits per month to each central metering facility. Surface inspections to each well will entail multiple well visits per month to each well.

- A Water management plan (WMP) that involves the following infrastructure and strategy: existing full containment reservoir with existing outfall, 1 existing Echeta Road Unit water treatment facility with discharge to Echeta Road Unit (WYPDES Permit Number WY0049697), and 1 proposed Cedar Draw Unit water treatment facility with discharge to Middle Prong Wild Horse Creek (WYPDES Permit Number WY0094072).

- A road network consisting of 8.48 miles of improved road and 3.28 miles of primitive road.

- An above ground power line network to be constructed by Powder River Energy Corporation. If the proposed route is altered, then the new route will be proposed via sundry application and analyzed in a separate NEPA action. If the power line network is not completed before the wells are in production, then temporary diesel generators shall be placed at the power drops indicated in Cedar Draw Unit 3 Map D.

- A storage tank of 1000 gallon capacity shall be located with each diesel generator. Generators are projected to be in operation until PreCorp installs eletric lines. On average this takes approximately 12 months. Fuel deliveries are anticipated to be 2 times per week. Maximum generator noise level is expected to be 82.3 decibels at 50 feet distance.

- A buried gas, water and power line network, and 3 central gathering/metering facilities.

- 5 staging areas and 1 pump station.

Refer to the master surface use plan (MSUP), drilling plan, WMP, and individual APDs for a detailed description of design features, construction practices and water management strategies associated with the proposed action,. Also see the POD for maps showing the proposed well locations and support facilities. More information on CBNG well drilling, production and standard practices also is available in the PRB FEIS, Volume 1, pp. 2-9 to 2-40 (2003).

Implementation of committed mitigation measures contained in the MSUP, drilling plan and WMP, in addition to the standard COAs contained in the PRB FEIS ROD, Appendix A, are incorporated and analyzed in this alternative.

2.3. Alternatives Considered but Not Analyzed in Detail

Williams submitted the original POD for the Cedar Draw Unit 3 on October 3, 2008 with 43 federal APDs. BFO considered but did not analyze in detail the original POD submittal because onsite visits between April 2010 and May 2011 revealed that adjustments were necessary to minimize environmental impacts inherent in the preliminary submittal.

- 8 well pads (24-6, 14-18, 21-18, 42-32, 44-32, 13-33, 24-33, and 44-33) were adjusted (e.g., from No pad/ no slot to slots) to allow for space for safe operations.
- 2 well slots (31-32 and31-31) were adjusted (e.g., from slots to pads) to allow for space for safe operations.
- 5 well pads (34-7, 24-7, 21-19, 12-18, and 11-33) were adjusted (e.g., from constructed pads to slots or to a reduced pad size) to limit surface disturbance.
- 5 wells (44-18, 44-29 (now the 14-28), 43-30, 22-33, and 33-33) were relocated to:
  - Reduce overall and/or sensitive resource surface disturbance;
  - Improve operational reliability (e.g., maintain a 20-foot vegetation buffer between the proposed well site and drainages).
  - Reduce disturbance, avoid steep slopes, limit soil erosion, and avoid soils with low reclamation potential;
  - Reduce impacts to wildlife.
- 2 pads (11-7 and 33-29) were withdrawn to:
  - Reduce disturbance;
  - Avoid steep slopes;
  - Limit soil erosion; and
  - Avoid soils with low reclamation potential.
- 13 roads were relocated, spot up graded, upgraded, and/or engineered to:
  - Provide surfacing and drainage relief;
  - Limit soil erosion; and
  - Avoid existing infrastructure (e.g., pipelines).
- 6 stock tanks added per request by surface owner and leesees.
- 6 erosion mitigations applied at well sites and/or corridors were added to
  - Provide surfacing and drainage relief; and
  - Limit soil erosion.
- 4 Site specific reclamation plans were submitted to:
  - Provide surfacing and drainage relief;
  - Limit soil erosion;
  - Reduce disturbance;
  - Avoid steep slopes;
  - Limit soil erosion; and
  - Avoid soils with low reclamation potential.

Williams and BFO documented the above design feature changes in a revised project description provided as Williams' response to BLM's deficiency letter, and this resulted in a refined proposed project, which is discussed in this document as Alternative B. The initial POD, the post-onsite deficiency letters, and the Operator's response to the deficiency letter are in the administrative record.

2.4. Summary of Alternatives

A summary of the infrastructure currently existing within the POD area (Alternative A), the infrastructure proposed by the operator (Alternative B) are presented in Table 2.5.

Table 2.3. Approximate Summary of Alternatives

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

Facility	Alternative A (No Action) Existing Number/ Acres/Miles	Alternative B (Operator Proposal) Proposed Number/ Acres/Miles
Total CBNG Wells	1	41
Well Locations Nonconstructed Constructed Slotted	0.5 acres	10.14 acres
Gather/Metering Facilities Number of Facilities Acreage of Facilities	0	3 0.06 acres
Number of Ancillary Facilities (Staging/Storage Areas)	0	5 4.6 acres
Acres (Miles) of Template/ Spot Upgrade Roads No Corridor With Corridor	7.8 acres/3.7 miles	0.48 acres/0.28 miles (No Corridor) 58.1 acres/4.5 miles (With Corridor)
Acres (Miles) of Engineered Roads No Corridor With Corridor	0	13.6 acres/2.9 miles
Acres (Miles) of Primitive Roads No Corridor With Corridor	13.1 acres/2.7 miles	14.9 acres/3.08 miles
Miles of Pipeline No Corridor With Corridor	0	17.5 acres/2.8 miles (With Corridor)
Miles of Overhead Powerlines Proposed Existing	0	3.3 acres / 0.90 miles 0.4 acres / 0.10 miles
Number of Impoundments On-channel Off-channel Lined Unlined	0	1 (Existing-Cedar Draw 1 POD
Water Discharge Points	0	2 Existing (Cedar Draw 1POD) 1 Proposed (0.1 Acres)
TOTAL ACRES DISTURBANCE	**21.4 acres**	**123.18 acres**

Inside the Cedar Draw Unit 3 POD there is 22.4 acres of existing disturbance but surrounding the POD, within the Cedar Draw Unit, there is existing infrastructure and disturbance that Williams will use for the Cedar Draw Unit 3 POD. Some of the calculations in Alternative B include the existing disturbance in the Cedar Draw Unit but not in the Cedar Draw Unit 3 POD boundaries. This includes disturbance corridors and roads. Alternative A calculations are solely based on the Cedar Draw Unit 3 POD boundary.

2.5. Conformance.

The proposed action conforms to the 1985 Buffalo RMP, the 2001, and the 2003 PRB FEIS and RMP Amendment. The proposed project complies with all federal laws, regulations, and policies. This includes, but is not limited to: FLPMA (particularly Sections 201 and 202), the National Historic Preservation Act, the Endangered Species Act (1973), the Migratory Bird Treaty Act (1918), the Clean Water Act (1972), the Clean Air Act (1970), and the National Environmental Policy Act (1969).

3. AFFECTED ENVIRONMENT

This section describes and analyzes the physical and regulatory environment existing in and over the project area, absent consideration of the alternatives. This description and analysis focuses on relevant major issues. Appendix B includes a screening of all resources and uses potentially affected. Resources unaffected or not affected beyond the level analyzed in the PRB FEIS, are not discussed in the EA.

3.1. Project Area Description

Cedar Draw Unit 3 POD is approximately 22 miles west of Gillette, Wyoming on Echeta Road in west central Campbell County. Project elevations range from 4000 to 4470 feet above sea level. The project area topography varies from narrow stream bottomlands to rolling hills, to steep ridges that rise into large flat mesas. Sandstone outcrops and buttes rise above some ridgelines throughout the ridges and steep channel slopes. Ephemeral tributaries of the Middle Prong of Wild Horse Creek, itself an ephemeral tributary of the Powder River, drains the majority of the project area. Cedar Draw, an ephemeral tributary of Wild Horse Creek, drains the southern project area. The climate is semi-arid, averaging 14 inches of precipitation annually, more than 60% of which occurs between May and September (Heath 2006).

Livestock grazing is the primary historic land use in the project area as well as oil development, existing fee CBNG developments, and ranching operations are the current land uses. The majority of the land in the project area is privately owned, with some parcels interspersed that are state owned and under BLM management. Precise parcels are described in Section 2.2. Development will occur on private, BLM, and State of WY surface. Regardless of whether the project goes forward it is reasonably forseeable development (RFD) that eventually CBNG wells may fill in this POD boundary with wells near an 80-acre spacing that is the industry convention, as was identified in the PRB FEIS, and as is general experience in the PODs in Table 3.1, below. This POD area is clearly lacking in wilderness characteristics because it contains CBNG development infrastructure.

Cedar Draw Unit 3 POD project area is adjacent to the boundaries of 5 approved CBNG PODs that include 221 wells, 1 lies within the Cedar Draw Unit 3 POD boundary, see Table 3.1.

Table 3.1. Adjacent or Overlapping CBNG POD Development

POD Name	Environmental Assessment #	Decision Date
Cedar Draw 1	WY-070-05-130	7/28/2005
Cedar Draw Unit 2	WY-070-07-137	6/27/2007
Acacia	WY-070-07-114	5/24/2007
NW Croton	WY-070-10-273	9/27/2010
Morphius	WY-070-06-289	9/29/2006

3.2. Transportation

There are 3.7 miles of existing roads in the POD boundary used for ranching, recreation, and oil and gas development. The existing road types are primitive and crown and ditch roads. The primitive routes were created by direct vehicle use; the average travel width is less than 10 feet without surfacing, and without drainage control. These routes are used primarily by the local rancher. The crown and ditch roads were mechanically constructed and have some level of maintenance associated with them. The crown and ditch roads have a 12-14 feet travel way width with a sub-grade of 14-16 feet; some with and some without surfacing material. The ditches are approximately 6 inches deep and have some visible scouring. There are several spots where rutting greater than four inches occurred due to minimal compaction and minimal drainage control. A majority of the existing culverts are 18 inches, corrugated metal and are generally in good condition. Several culverts on existing oil and gas roads require maintenance to clean them out. The maximum grade on both road types is 16%.

3.3. Soils, Vegetation, and Ecological Sites

3.3.1. Soils

The PRB has relatively young soils which developed in alluvium and residuum derived from the Wasatch Formation. Lithology consists of light to dark yellow and tan siltstone and sandstones with minor coal seams. Soils have surface and subsurface textures of silt loam and fine sandy loam. Soil depths vary from deep on lesser slopes to shallow and very shallow on steeper slopes. Soils are generally productive, though varies with texture, slope and other characteristics. Soils differ with topographic location, slope and elevation. Topsoil depths to be salvaged for reclamation range from 0 to 4 inches on ridges to 8+ inches in bottomland.

The map unit symbols for the soils identified above for the identified soil map unit symbols found in the POD boundary are listed in Table 3.2, below. Ecological site descriptions are soil and vegetation community descriptions compiled by the Natural Resources Conservation Service (NRCS) for the purpose of resource identification, providing management, and reclamation recommendations.

Table 3.2. Dominant Soils Affected by the Proposed Action

Map Unit	Map Unit Name	Approximate Acres	Project Area (%)
278	Fairburn-Samsil-Badland complex, 10 to 45 percent slopes	2030	42%
225	Ucross-Iwait-Fairburn loams, 3 to 30 percent slopes	1108	23%
204	Samday-Samday, very shallow-Shingle clay loams, 6 to 40 percent slopes	501	10%
317	Silhouette-Ulm clay loams, 0 to 6 percent slopes	326	6%
176	Leiter-Cromack clay loams, 3 to 15 percent slopes	183	4%
168	Jaywest-Spottedhorse loams, 0 to 6 percent slopes	130	4%
134	Deekay-Oldwolf loams, 0 to 6 percent slopes	123	3%
184	Moorhead-Leiter clay loams, 6 to 15 percent slopes	90	2%
334	Vonalf-Xema-Mittenbutte fine sandy loams, 3 to 30 percent slopes	85	2%
253	Absted-Arvada-Slickspots complex, 0 to 6 percent slopes	66	1%

Source: NRCS 2010.

BFO identified soils in the project area from the North Campbell County Survey Area, Wyoming (WY705).

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

3.3.1.1. Soils Susceptible to Erosion

Loss in productivity is likely to occur on most soils if erosion continues unchecked. Because soil formation is a very slow process, most soils cannot renew their eroded surface while erosion continues.

The development of a favorable rooting zone by the weathering of parent rock is much slower than development of the surface horizon. One estimate of this renewal rate is 0.5 ton per acre per year for unconsolidated parent materials and much less for consolidated materials. These very slow renewal rates support the philosophy that any soil erosion is too much. Loss of organic matter, resulting from erosion and tillage, is one of the primary causes for reduction in production yields. As organic matter decreases, soil aggregate stability, the soil's ability to hold moisture, and the cation exchange capacity decline. (Soil Quality-Agronomy Technical Note #7, USDA, Aug 1998)

3.3.1.2. Slope Hazard

A soil's stability is greatly affected by the slope on which it occurs. In general the greater the slope, the greater the potential there is for slumping, landslides and water erosion. Approximately 2359 acres (49%) in the project area have slopes of 25% or more. Slopes greater than 25% are shown on Figure 3.2 below.

Soils with slopes of less than 25% may also be prone to high erosion because of the soil type, particle size, texture, or amount of organic matter. Soil types in the POD area with severe erosion potential and slopes 25% or greater, as defined by the Natural Resources Conservation Service (NRCS; USDA NRCS 2007), are listed in Tables 3.2 and 3.3, respectively along with the number of acres and percentage of the project area.

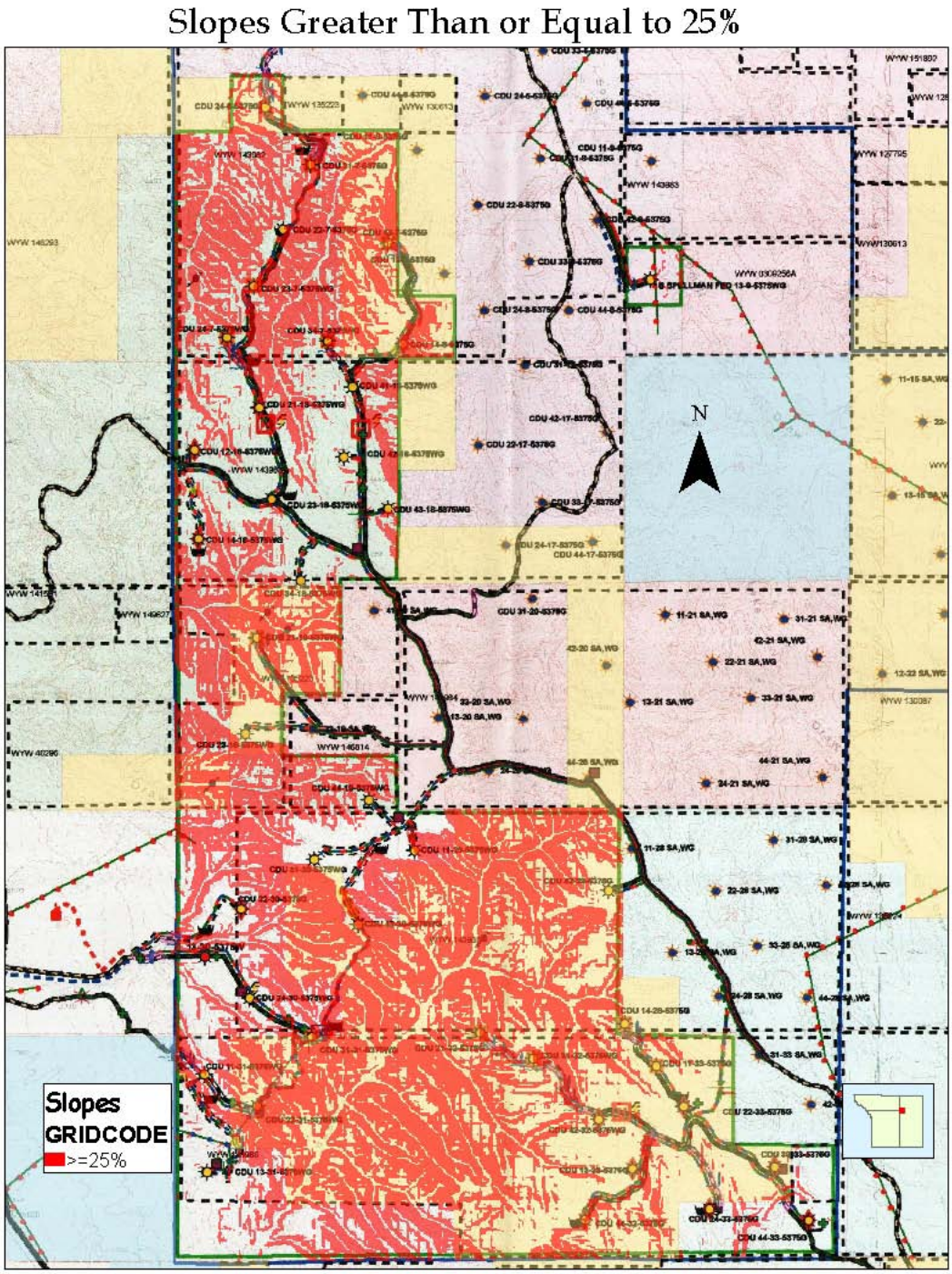
Other contributing factors to slope stability include slope length, slope aspect and colluvium. Slope length has considerable control over runoff and potential accelerated water erosion. Slope aspect is the direction which the surface of the soil faces. Slope aspect may affect soil temperature, evapotranspiration,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

Table 3.3. Percent Slope in the POD Project Area

% Slope	Acres	% of Project Area
0-24%	2468	51%
Greater than or Equal to 25%	2359	49%

Source: NRCS 2010

Figure 3.1. Areas of Slopes Exceeding 25% in the Project Area



Source: NRCS 2010.

3.3.1.3. Reclamation Suitability

Soils with poor reclamation and re-vegetation potential occur throughout the project area as shown in Table 3.. Currently, soil conditions in the project area are being impacted by CBNG development as well as traditional activities, including livestock grazing and wildlife use. Much of the area is covered with soils that are easily damaged by use or disturbance or are difficult to revegetate or otherwise reclaim. Soil impacts (e.g., roads, linear pipeline scars, and artificial wet areas) can be readily observed in the area.

This high erosion potential could result in higher suspended sediment and turbidity levels in the Powder River.

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

Reclamation potential of soils varies throughout the project area. The main soil limitations in the project area include: depth to bedrock, low organic matter content, and high erosion potential especially in areas of steep slopes. Many of the soils and landforms of this area present distinct challenges for development. Approximately 53% of the area within the boundary of the proposed action contains soil mapping units having poor reclamation suitability (Table 3.5) and 49% of the area has slopes greater than 25% (Table 3.4) making stabilization of disturbance and reclamation challenging and possibly unachievable.

Table 3.4. Reclamation Potential within the Cedar Draw Unit 3 Project Area

	Reclamation Potential		
	Well	Moderate	Poor
Total Acres	359	1925	2557
% of Project Area	7%	40%	53%

Source: NRCS 2010

3.3.1.4. Limited Reclamation Potential (LRP)

Scientists identify LRP soils using SSURGO Data and onsite investigation. The onsite investigation found LRP areas in the project boundary have minor component described as miscellaneous areas or soils series in the above Taxa, and see Figure 3.2, below.

3.3.1.5. Miscellaneous Areas

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

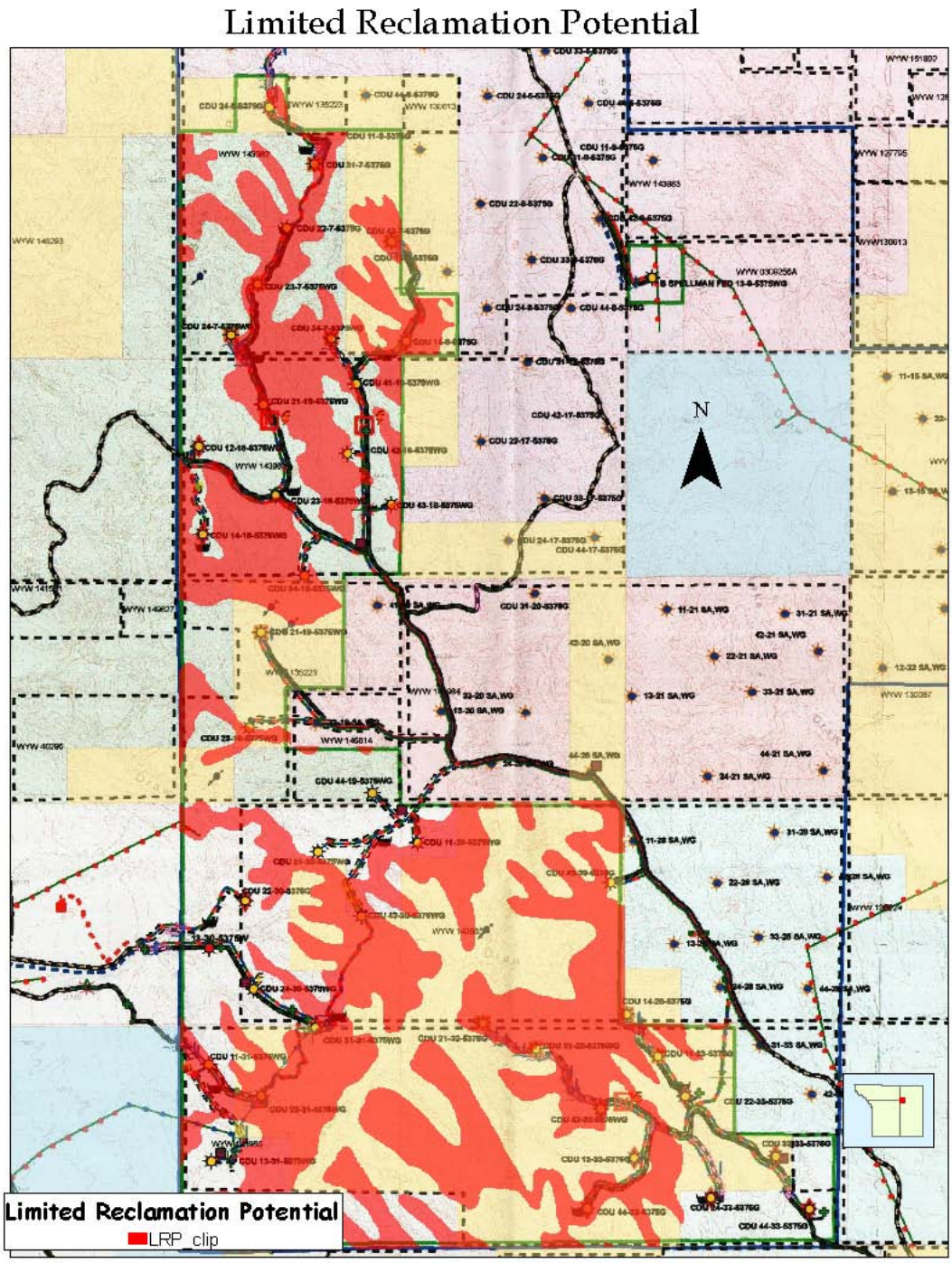
Badlands: A landscape which is intricately dissected and characterized by a very fine drainage network with high drainage densities and short, steep slopes with narrow interfluves. Badlands develop on surfaces with little or no vegetative cover, overlying unconsolidated or poorly cemented materials (clays,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

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

Subgroups and above level of soil taxonomy (Fairburn-Samsil-Badland complex, 10-45 percent slopes): Indicating a wide range in soil properties, making soil interpretations and suitability's difficult to predict. A "gullied" phase is recognized if gullied land occupies less than about 10 percent of the map unit. Gullied phases are used for areas having gullies so deep that intensive measures, including reshaping, are reclaiming the soil. (Soil Survey Manual 1993)

BLM used SSURGO Data to determine that soils in the project area contain 42% LRP areas.

Figure 3.2. Limited Reclamation Potential within the Project Area



Source: NRCS 2010

3.3.2. Vegetation, Ecological Sites, and Invasive Species

3.3.2.1. Vegetation

Vegetation throughout the project area varies depending on soils and topography. Steep ridges and draws in the area are dominated by juniper and big Wyoming sagebrush intermixed with native grasses.

Cottonwood trees are sparsely scattered along ephemeral tributaries and around old ranch buildings. Large areas within the western half of the project area are covered by ponderosa pine, juniper, and cedar with an understory of sagebrush and native grasses. The major vegetation community in the lowland areas was historically sagebrush grassland. Big Wyoming sagebrush was most likely the predominant overstory species; however, much of the vegetation within the lowlands has been removed from the invasion of black-tailed prairie dog colonies and/or agricultural practices that cleared the area (Heath 2006). Grasses primarily dominate the vegetative community within the lowlands currently and common species include: western wheatgrass, needleandthread, and green needlegrass. Plains prickly pear cactus is found in areas heavily disturbed by prairie dogs or grazing.

Present Plant Communities/ Historic Climax Plant Community

The historic climax plant community (HCPC - defined as the plant community that was best adapted to the unique combination of factors associated with this ecological site), for the Cedar Draw Unit 3 POD would be a rhizomatous wheatgrasses/needleandthread/big bluestem plant community. The potential vegetation is about 75% grasses or grass-like plants, 15% forbs, and 10% woody plants. A mix of warm and cool season mid-grasses dominate the state.

There are primarily 2 plant communities found throughout the project area, the mixed sagebrush/grass community and the heavy sagebrush community. Big sagebrush is a significant component of both communities, with sagebrush canopy caver ranging from 20% to 30% in the mixed sagebrush/grass community, and often exceeding 60% in the heavy sage community. A mix of warm and cool-season grasses make up the majority of the understory of the mixed sagebrush/grass community with the balance made up of annual cool-season grasses, and miscellaneous forbs. Compared to the HCPC, sagebrush and blue grama have increased and the production of cool season grasses has decreased. The dominant plants in the heavy sagebrush community tend to be somewhat similar to those found in the HCPC. Weedy species, cool-season grasses, and sedges have increased and blue grama decreased.

Dominant grasses identified throughout the project area include: Sandberg's blue grass, blue bunch wheatgrass, crested wheatgrass, little blue stem, blue grama, prairie junegrass, needleandthread, western wheatgrass, and cheat grass. Other vegetative species identified at onsites: juniper, ponderosa pine, cedar, Wyoming big sagebrush, yucca, yarrow, rabbitbrush, prickly pear cactus, fringed sagewort, ponderosa pine, and juniper.

3.3.3. Ecological Sites

Ecological Site Descriptions (Table 3.5) 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.

Table 3.5. Map Units and Ecological Sites

Map Unit	Ecological Site
278	Shallow Loamy (15-17np)
253, 225, 168, 134, 299	Loamy (15-17np)

Source: NRCS 2010

Dominant ecological sites and plant communities identified in this POD and its infrastructure are shallow loamy and loamy sites. In addition, minor ecological sites and plant communities identified as areas that are difficult to reclaim include sands and sandy sites. Within the project area are small inclusions areas of very shallow parent material (less than 10 inches in depth). Typically, in these locations little bluestem and junipers are found, which are indicators of shallow soils. A summary of all ecological sites in the

project area are in Table 3.7, along with the individual acreage and the percentage of the total area identified within the POD boundary.

Shallow Loamy Sites:
This site occurs on steep slopes and ridge tops, but may occur on all slopes on landforms which include hill sides, ridges and escarpments, in the 15-17 inch precipitation zone.

The soils of this site are shallow (less than 20 inches to bedrock), well drained soils that formed in alluvium and residuum derived from shale and sandstone. These soils have moderate permeability and may occur on all slopes. The main soil limitations include depth to bedrock.

The HCPC for this site would be a rhizomatous wheatgrasses / needleandthread / big bluestem plant community. A description of this plant community is described in Section 3.2.2, Vegetation.

The present plant communities are mixed sagebrush/grass and heavy sagebrush communities as described in Section 3.2.2, Vegetation.

Loamy Sites:
This site occurs on land nearly level up to 50% slopes on landforms which include hill slopes and the associated alluvial fans and stream terraces, in the 15-17 inch precipitation zone.

The soils of this site are moderately deep to deep (greater than 20 inches to bedrock), well drained soils that formed in alluvium and residuum derived from unspecified sandstone. These soils have moderate permeability and may occur on all slopes.

The HCPC for this site would be a rhizomatous wheatgrasses / needleandthread / big bluestem plant community. A description of this plant community is described in Section 3.2.2, Vegetation.

Clayey sites:
These occur on nearly level to steep slopes on landforms which include hill sides, alluvial fans and stream terraces in the 10-14 inch precipitation zone. The soils of this site are moderately deep to very deep (greater than 20 inches to bedrock), well-drained soils that formed in alluvium or alluvium over residuum derived calcareous shale. These soils have slow permeability. The bedrock is clay shale which is virtually impenetrable to plant roots. The present plant community is the similar to the Loamy site listed above.

Shallow Clayey
This ecological site can be found on ridge tops and all slopes, and the soils are shallow, typically less than 20 inches deep, and well drained. The bedrock is clay shale bedrock, which is virtually impenetrable to plant roots. Textures range from clay to silty clay loam. The dominant species are cool season midgrasses, which in addition to the two dominant species include bluebunch wheatgrass, Cusick bluegrass, Sandberg bluegrass, needleleaf sedge (*Carex duriuscula*), blue grama and plains reedgrass. The typical shrubs are Wyoming big sagebrush, and winterfat (*Krascheninnikovia lanata*). Disturbances can lead to increases in blue grama and Wyoming big sagebrush, and can lead to decreases in green needlegrass, bluebunch wheatgrass and rhizomatous wheatgrasses.

Sandy sites:
These occur on nearly level to steep slopes on landforms which include alluvial fans, hillsides, plateaus, ridges and stream terraces in the 10-14 inch precipitation zone. The soils of this site are moderately deep to very deep (greater than 20 inches to bedrock), well drained soils that formed in eolian deposits or residuum derived from unspecified sandstone. These soils have moderate, moderately rapid or rapid permeability. The main soil limitations include low available water holding capacity, and high wind

erosion potential. The present plant community is the similar to the Loamy site listed above with the following exception: Wyoming big sagebrush not as dominant whereas Yucca is more predominate.

The present plant communities are mixed sagebrush/grass and heavy sagebrush communities as described Section 3.2.2, Vegetation.

Table 3.6. Summary of All Ecological Sites

Ecological Site	Acres	Percent
Shallow Loamy (15-17np)	2030	42%
Loamy (15-17np)	1447	30%
Shallow Clayey (10-14np)	501	10%
Clayey (15-17np)	374	8%
Clayey (10-14np)	326	7%
Sandy (15-17np)	125	2%
Loamy (10-14np)	26	1%
Total	4829	100%

Source: NRCS 2010

3.3.3.1. Invasive Species

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

- Leafy spurge
- Canada thistle
- Field bindweed
- Salt cedar
- Cheatgrass

Additionally, the Operator or BLM confirmed the following infestations field investigations:

- Canada thistle
- Cheatgrass

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).

3.3.3.2. Wetlands/Riparian

The National Wetland Inventory (NWI) identifies approximately 7.3 acres of sporadic, isolated wetlands within the POD boundary. These wetlands have for the most part formed in low lying areas where surface water accumulates for extended periods of time. Some of the wetlands are adjacent to streams and others may be the result of leaking livestock water facilities. Identification and management of wetland resources is under the jurisdiction of the U.S. Army Corps of Engineers.

3.4. 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 BFO wildlife biologists, the PRB FEIS, the Wyoming Game and Fish Department (WGFD) big game and sage-grouse maps, and the Wyoming Natural Diversity Database (WYNDD).

A habitat assessment and wildlife inventory surveys were performed by ARCADIS U.S., Inc. (Arcadis). Arcadis performed surveys for mountain plover, sharp-tailed grouse, greater sage-grouse, raptor nests, bald eagles, and prairie dog colonies according to Powder River Basin Interagency Working Group (PRBIWG) accepted protocol in 2008, 2010, and 2011. A habitat assessment was conducted for Ute ladies'-tresses orchid in 2008. PRBIWG accepted protocol is available on the BFO website at: http://www.blm.gov/wy/st/en/field_offices/Buffalo/wildlife.html.

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

In its, Recommendations for Development of Oil and Gas Resources within Important Wildlife Habitats (WGFD 2009), WGFD developed impact thresholds to evaluate impacts to wildlife from oil and gas development. For species or habitats discussed in this EA where impact thresholds have been developed, those thresholds will be disclosed and discussed both in relation to the current conditions (affected environment) and in relation to reasonable foreseeable development, including development associated with the proposed project (impacts analysis). Moderate impacts occur when impairment of habitat function becomes discernable. High impacts occur when impairment of habitat function increases. Extreme impacts occur where habitat function is substantially impaired. Mitigation for each level of impact is discussed in the guidelines. Thresholds for impacts are generally determined by well densities.

3.4.1. Habitat Types

The project area is located in sagebrush steppe habitat. Wyoming big sagebrush (*Artemisia tridentata*) is the dominant shrub, intermixed with native grasses and cheatgrass. The sagebrush grasslands occur along slopes rising to steep ridges from bottomlands.

The area is drained by Cedar Draw and Black Bill Draw, which are ephemeral tributaries to Wild Horse Creek and Middle Prong Wild Horse Creek, respectively. Wild Horse Creek flows perennially due to the receipt of produced water from CBNG activities in the surrounding areas. Draws in the project area are deeply incised, steeply rising to uplands. Mature juniper stands dominate the slopes of the draws, particularly in Sections 7, 18, 19, and 29-33 T53N R75W. Stream channels are vegetated with a diverse mix of shrubs, forbs, and grasses. Some mature cottonwoods also occur along channels.

Twenty-one prairie dog towns occur within 0.25 miles of the CDU3 project area, totaling 807 acres in size. The towns occur in Sections 5-6, 8-9, 30-31, and 30 T53N R75W, and Sections 24-5 and 36 T 53N R76W (Arcadis 2010).

3.4.2. Threatened, Endangered, Proposed, Candidate, and BLM Sensitive Species

3.4.2.1. Threatened and Endangered Species

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

3.4.2.1.1. Black-footed ferret

The black-footed ferret is listed as endangered under the ESA. The affected environment for black-footed ferrets is discussed in the PRB FEIS on pg. 3-175.

This nocturnal predator is closely associated with prairie dogs. The ferret depends almost entirely upon prairie dogs for food and uses old prairie dog burrows for dens. Current science indicates that a black-footed ferret population requires at least 1,000 acres, separated by no more than 1.5 km of black-tailed prairie dog colonies for survival (USFWS 1989).

Active reintroduction efforts reestablished populations in Mexico, Arizona, Colorado, Montana, South Dakota, Utah, and Wyoming. In 2004, the WGFD identified 6 prairie dog complexes (Arvada, Sheridan, Pleasantdale, Four Corners, Linch, Kaycee, and, Thunder Basin National Grasslands) partially or wholly within the BLM Buffalo Field Office administrative area as potential black-footed ferret reintroduction sites (Grenier et al. 2004).

Black-footed ferret habitat is present within 0.25 miles of this project area. A detailed description of prairie dog colonies is in section 3.3.1.1(Habitat Types). The acreage of the colonies, when combined with other colonies in the complex that are not within 0.25 miles of the project, is equal to the 1000 acres necessary for ferret habitat requirements. The project area is partially located in the Arvada prairie dog complex, a potential black-footed ferret reintroduction area identified by WGFD. USFWS determined that black-footed ferrets do not occur in Wyoming outside of the Shirley Basin, and the species has been block-cleared for the rest of the state. Black-footed ferret is not expected to occur in the project area.

3.4.2.1.2. Blowout Penstemon

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

3.4.2.1.3. 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 p. 3-175.

This orchid occurs in moist, sub-irrigated or seasonally flooded soils at elevations between 1,780 and 6,800 feet above sea level. Habitat includes wet meadows, abandoned stream channels, valley bottoms, gravel bars, and near lakes or perennial streams that become inundated during large precipitation events. Wyoming Natural Diversity Database model predicts undocumented populations may be present particularly within southern Campbell and northern Converse Counties.

Prior to 2005, only 4 orchid populations were documented in Wyoming. Five additional sites were found in 2005 and 1 in 2006 (Heidel pers. Comm.). The new locations were in the same drainages as the original populations, with 2 on the same tributary and within a few miles of an original discovery. Drainages with documented orchid populations include Antelope Creek in northern Converse County, Bear Creek in northern Laramie and southern Goshen Counties, Horse Creek in Laramie County, and Niobrara River in Niobrara County. In Wyoming, *Spiranthes diluvialis* blooms from early August to early September,

A discussion of affected environment for ULT is found in the Cedar Draw Unit 1 (EA-WY-070-05-130) and Cedar Draw Unit 2 (EA-WY-070-07-137) EAs and BFO tiers to those EAs for ULT descriptions and analysis. Arcadis conducted a ULT habitat assessment in 2006 for the Cedar Draw Unit (Arcadis 2008). Wild Horse Creek is perennial, while its tributaries are ephemeral. Based on inappropriate hydrology of the streams proposed for crossing or construction activities and disqualifying habitat features in the project area, suitable ULT habitat is not present within the CDU3 project area.

3.4.2.2. Candidate Species

3.4.2.2.1. Greater Sage-grouse

The affected environment for greater sage-grouse (sage-grouse) is discussed in the PRB FEIS (pp. 3-194 to 3-199).

In 2010, USFWS determined that the sage-grouse is warranted for federal listing across its range, but listing is precluded by other higher priority listing actions. In addition to being listed as a Wyoming BLM sensitive species, sage-grouse are listed as a WGFD species of greatest conservation need, because populations are declining and they are experiencing ongoing habitat loss. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also listed by USFWS as a BCC for Region 17.

The State Wildlife Agencies' Ad Hoc Committee for Consideration of Oil and Gas Development Effects to Nesting Habitat (2008) recommends that impacts be considered for leks within 4 miles of oil and gas developments. WGFD records indicate that 3 sage-grouse leks occur within 4miles of the project area. These 3 lek sites are identified in Table 3.7. Data from shown for peak males in 2011 was taken from the BLM WYGISC online lek observation system on 5/6/11 and may not accurately reflect the peak males for the season.

Table 3.7. Sage-grouse leks within 4 miles of the Cedar Draw Unit 3 project area

Lek Name	Legal Location	Distance from Project Area (mi)	Year: Peak Males	Occupied
Playa	NWSW S12 T53N R75W	3.0	2011: 4 2010: 13 2009: 20 2008: 14 2007: 11 2006: 32	Yes
Laramore	SESW S26 T53N R75W	1.6	2011: 2 2010: 4 2009: 10 2008: 6 2007: 18 2006: 10	Yes
Kretschmann	NWNW S1 T53N R75W	3.2	2011: 0 2010: 0 2009: 0 2008: 0 2007: 0 2006: 0	Yes

Sage-grouse are found in prairie, sagebrush shrublands, other shrublands, wet meadows, and agricultural areas. They depend upon substantial sagebrush stands for nesting and winter survival (BLM 2003).

Suitable sage-grouse habitat is present in the project area. Sparse to moderately dense stands of sagebrush with mixed grasses and forbs are present throughout the project area. Riparian areas and draw bottoms along the tributaries of Wild Horse and Middle Prong Wild Horse Creeks contain a diverse mix of vegetation that could support sage-grouse and their broods during summer and early fall. Sage-grouse habitat models indicate that approximately 46 percent of the project area contains high quality sage-

grouse nesting habitat and approximately 13 percent of the project area contains high quality sage-grouse wintering habitat (Walker et al. 2007). Although models indicate the presence of quality sage-grouse habitat, proximity of steep topography and wooded areas may preclude use of some modeled habitat by sage-grouse.

3.4.2.3. Sensitive Species (SS)

Wyoming BLM has prepared a list of SS on which management efforts should be focused towards maintaining habitats under a multiple use mandate. The goals of the policy are to:

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

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

3.4.2.3.1. Baird's Sparrow

The affected environment for Baird's sparrow is discussed in the PRB FEIS on p. 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.

Sagebrush grassland areas in the project area provide suitable nesting habitat for Baird's sparrows, and the species is suspected to occur.

3.4.2.3.2. Bald Eagle

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

Mature cottonwoods along Wild Horse and Middle Prong Wild Horse Creeks provide the best nesting and roosting habitat within 1 mile of the project area. Mature juniper stands and scattered mature cottonwoods occurring aside tributaries to those creeks may also provide marginal roosting and nesting habitat. No documented bald eagle nests occur within 1 mile of the project area. Arcadis observed eagles roosting along Wild Horse and Middle Prong Wild Horse Creeks during winter roost surveys (Arcadis 2008, Arcadis 2010, Arcadis 2011).

3.4.2.3.3. Brewer's Sparrow

The affected environment for Brewer's sparrow is discussed in the PRB FEIS on p. 3-200. In addition to being listed as a BLM Wyoming sensitive species, Brewer's sparrows are a WGFD SGCN, with a rating of NSS4 because populations are declining, habitat is vulnerable with no ongoing loss, and the species is 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.

Sagebrush grassland areas in the project area provide suitable nesting habitat for Brewer's sparrows, and the species is suspected to occur.

3.4.2.3.4. Loggerhead Shrike

The affected environment for loggerhead shrike is discussed in the PRB FEIS on p. 3-187. In addition to being listed as a Wyoming BLM sensitive species, loggerhead shrikes are listed by USFWS as a BCC for Region 17. The Wyoming Bird Conservation Plan rates them as a Level II species, indicating they are in need of monitoring.

Sagebrush grassland and mature juniper stands in the project area provide suitable nesting habitat for loggerhead shrikes, and the species is suspected to occur.

3.4.2.3.5. Long-billed Curlew

The affected environment for long-billed curlew is discussed in the PRB FEIS on pg. 3-184. In addition to being listed as a Wyoming BLM sensitive species, long-billed curlews are a WGFD SGCN, with a rating of NSS3, because populations are restricted in distribution, and habitat is vulnerable but not undergoing loss. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also listed by USFWS as a BCC for Region 17.

Sagebrush grasslands and prairie dog towns occurring in the project area may provide suitable habitat for long-billed curlews, and the species is suspected to occur.

3.4.2.3.6. Mountain Plover

The affected environment for mountain plover is discussed in the PRB FEIS on pp. 3-177 to 3-178. At the time the PRB FEIS was written, the mountain plover was proposed for listing as a threatened species under the ESA. In 2003, USFWS withdrew the proposal, finding that the population was larger than had been thought and was no longer declining. On June 29, 2010 the USFWS reinstated a December 5, 2002 proposed rule (67 FR 72396) to list the mountain plover as a threatened species. On May 12, 2011, the USFWS withdrew the proposal to list the mountain plover as a threatened species. In addition to being listed as a Wyoming BLM sensitive species, mountain plovers are a WGFD SGCN, with a rating of NSS4, because population status and trends are unknown but are suspected to be stable, habitat is vulnerable without ongoing loss, and the species is sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also listed by USFWS as a BCC for Region 17.

Suitable mountain plover habitat is present within 0.25 miles of the project area. See Section 3.3.1, Habitat Types, for a description of prairie dog colonies that would be considered potential habitat. The largest colonies occur along terraces and low-lying areas associated with the Middle Prong Wild Horse and Wild Horse Creeks (Arcadis 2010). No plovers were documented by Arcadis during surveys.

3.4.2.3.7. Sage Sparrow

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

Sagebrush grassland areas in the project area provide suitable nesting habitat for sage sparrows, and the species is suspected to occur.

3.4.2.3.8. Sage Thrasher

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

Sagebrush grassland areas in the project area provide suitable nesting habitat for sage thrashers, and the species is suspected to occur.

3.4.2.3.9. Western Burrowing Owl

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

According to databases maintained by the BLM-BFO, western burrowing owls were documented nesting in NWSW Section 9 T53N R75W in 2005. Arcadis did not locate any burrowing owls in the project areas during subsequent surveys (Arcadis 2008, Arcadis 2010, Arcadis 2011). Suitable nesting habitat is present within 0.25 miles of the project area and the species is known to occur.

3.4.2.3.10. Black-tailed Prairie Dog

The affected environment for black-tailed prairie dogs is discussed in the PRB FEIS (p 3-179). See Section 3.3.1, Habitat Types, for a description of prairie dog colonies occurring within 0.25 miles of proposed wells and infrastructure.

3.4.2.3.11. Fringed Myotis

The affected environment for fringed myotis is discussed in the PRB FEIS on pp. 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 substantial loss of habitat, and they are sensitive to human disturbance.

Mature juniper stands and shrub/grasslands in the project area provide suitable foraging habitat for fringed myotis, and the species is suspected to occur.

3.4.2.3.12. Long-eared Myotis

The affected environment for long-eared myotis is discussed in the PRB FEIS on p. 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 substantial loss of habitat, and they are sensitive to human disturbance.

Mature juniper stands and shrub/grasslands in the project area provide suitable foraging habitat for long-eared myotis, and the species is suspected to occur.

3.4.2.3.13. Swift Fox

The affected environment for swift fox is discussed in the PRB FEIS on p. 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 substantial loss.

Prairie dog colonies occurring within 0.25 miles of the project area provide suitable foraging habitat for swift fox, and the species is suspected to occur.

3.4.2.3.14. Townsend's Big-eared Bat

The affected environment for Townsend's big-eared bat is discussed in the PRB FEIS on p. 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 loss of habitat, and they are sensitive to human disturbance.

Mature juniper stands and shrub/grasslands in the project area provide suitable foraging habitat for Townsend's big-eared bat, and the species is suspected to occur.

3.4.2.4. Big Game

The affected environment for pronghorn, mule deer, white-tailed deer, and elk is discussed in the PRB FEIS on pp. 3-117 to 3-122, pp. 3-127 to 3-132, 3-122 to 3-127, and 3-132 to 3-140, respectively.

The project contains yearlong and winter range for pronghorn antelope, yearlong and winter yearlong range for mule deer, and yearlong range for white-tailed deer. Both antelope and mule deer were observed in the area by the BLM biologist during the onsite.

The project area is adjacent to the Fort Creek elk herd. Approximately 10 percent of the Fort Creek herd is fitted with GPS collars to track seasonal movements of the herd. The WGFD has not classified this project area as seasonal range for elk, however, sagebrush grasslands and juniper woodlands dominating steep slopes in the project area provide adequate forage and cover to sustain the species. According to BFO-BLM databases, 3 collared cow elk (frequencies 332422, 330523, and 330479) consistently used the project area during all seasons over the last year. Because the PRB FEIS did not consider impacts of CBNG development on the isolated Fortification Creek elk herd, alternatives for management are currently being analyzed for in an amendment to the RMP. This project is not included in the amendment due to its location outside of the Fortification Creek Planning Area.

3.4.2.5. Aquatics

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

3.4.2.6. Migratory Birds

The affected environment for migratory birds is discussed in the PRB FEIS (pp. 3-150 to 3-153). A wide variety of migratory birds may be found in the proposed project area at some point throughout the year. Migratory birds are those that migrate for the purpose of breeding and foraging at some point in the calendar year.

Nationally, grassland and shrubland birds declined more consistently in the last 30 years than any other ecological association of birds (WGFD 2009). 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 includes steep ephemeral drainages to rough broken terrain. The primary vegetation throughout the project area is sagebrush grassland and steep draws dominated by

juniper woodlands, with a few dispersed cottonwood trees. Many species that are of high management concern use these areas for their primary breeding habitats (Saab and Rich 1997).

Species that may occur in the vegetation types in the project area, according to the Wyoming Bird Conservation Plan, are listed in Table 3.8 and are grouped by level as identified in the plan.

Table 3.8. Priority Bird Species Likely Occurring in the Cedar Draw Unit 3 Area (Nicholoff 2003).

Level	Species	Wyoming BLM Sensitive
Level I	Baird's sparrow	Yes
	Brewer's sparrow	Yes
	Ferruginous hawk	Yes
	Greater sage-grouse	Yes
	Long-billed curlew	Yes
	McCown's longspur	
	Sage sparrow	Yes
	Short-eared owl	
	Upland sandpiper	
	Western burrowing owl	Yes
Level II	Ash-throated Flycatcher	
	Black-chinned hummingbird	
	Bobolink	
	Bushtit	
	Cassin's Kingbird	
	Chestnut-collared longspur	
	Dickcissel	
	Grasshopper sparrow	
	Gray Flycatcher	
	Juniper Titmouse	
	Lark bunting	
	Lark sparrow	
	Loggerhead shrike	Yes
	Sage thrasher	Yes
	Scott's Oriole	
	Townsend's Solitaire	
	Vesper sparrow	
	Western Bluebird	
	Western Scrub-Jay	
Level III	Bewick's Wren	
	Black-throated Gray Warbler	
	Common poorwill	
	Virginia's Warbler	

3.4.2.7. Raptors

The affected environment for raptors is discussed in the PRB FEIS on pp. 3-141 to 3-148.

Thirty-one 31 raptor nest sites were identified by Arcadis and BLM within 0.5 miles of the project boundary (Arcadis 2011). These are listed in Appendix C.

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

3.4.2.8. Plains Sharp-tailed Grouse

The affected environment for plains sharp-tailed grouse is discussed in the PRB FEIS on pp. 3-148 to 3-150.

Two 2 sharp-tailed grouse leks are within 0.63 miles of infrastructure proposed in this POD. The Fitch lek is in NWNW Section 31 T 53N R75W and the Floyd lek is in SESW Section 25 T53N R76W. WGFD records indicate that both leks are inactive for several years, and are likely extirpated. (Tim Thomas, personal communication, February 3, 2011). Enough survey data is not available to classify these leks as unoccupied according to WGFD protocol. Overhead powerlines occur within 58 feet of the Floyd lek, as well as an existing compressor station within 0.4 miles. Five 5 CBNG well locations occur within 0.6 miles of the Fitch lek, in addition to access roads and overhead powerlines also within this distance.

Arcadis performed surveys for sharp-tailed grouse within 1 mile of the POD from 2006 to 2011 (Arcadis 2011). No active sharp-tailed leks were located during the surveys.

3.4.3. West Nile Virus

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

Since its discovery in 1999 in New York, WNv has become established and spread across the United States. Birds are the natural vector host and serve not only to amplify the virus, but to spread it. Though less than 1% of mosquitoes are infected with WNv, they still are very effective in transmitting the virus to humans, horses, and wildlife. *Culex tarsalis* appears to be the most common mosquito to vector, WNv.

The human health issues related to WNv are well documented and continue to escalate. Historic data collected by the CDC and published by the USGS at www.westnilemaps.usgs.gov are summarized in Table 3.9. Reported data from the Powder River Basin (PRB) includes Campbell, Sheridan and Johnson counties.

Table 3.9. Historical West Nile Virus Information

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

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

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

Although most of the attention focused on human health issues, WNv had an impact on vertebrate wildlife populations. At a 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 4 days. In the PRB, there is generally increased surface water availability associated with CBNG development. This increase in potential mosquito breeding habitat provides opportunities for mosquito populations to increase. Preliminary research conducted in the PRB indicates WNv mosquito vectors were notably more abundant on a developed CBNG site than 2 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 in the Upper Powder River drainage system. The Wyoming Department of Environmental Quality (WDEQ) assumed primacy from United States Environmental Protection Agency (EPA) for maintaining the water quality in the waters of the state of Wyoming. The Wyoming State Engineer's Office (WSEO) has authority for regulating water rights, and permitting reservoirs for

impounding surface water within state. The Wyoming Oil and Gas Conservation Commission (WYOGCC) have authority for permitting and bonding off-channel impoundments that are located over State and fee minerals.

3.5.1. Groundwater

The groundwater in the project area is historically used for stock water or domestic purposes. A search of the WSEO groundwater rights database for this area showed 20 registered stock and domestic water wells within 1 mile of the POD boundary with depths ranging from 124 to 1012 feet. For additional information on groundwater, please refer to the PRB FEIS (January 2003), Chapter 3, Affected Environment, pp. 3-1 through 3-36.

WDEQ Water Quality Rules and Regulations: Chapter 8. Quality Standards for Wyoming Groundwaters define the following general limits for Total Dissolved Solids (TDS): 500 mg/l TDS for Drinking Water (Class I), 2000 mg/l for Agricultural Use (Class II) and 5000 mg/l for Livestock Use (Class III). For additional water quality limits for groundwater, please refer to the WDEQ internet site.

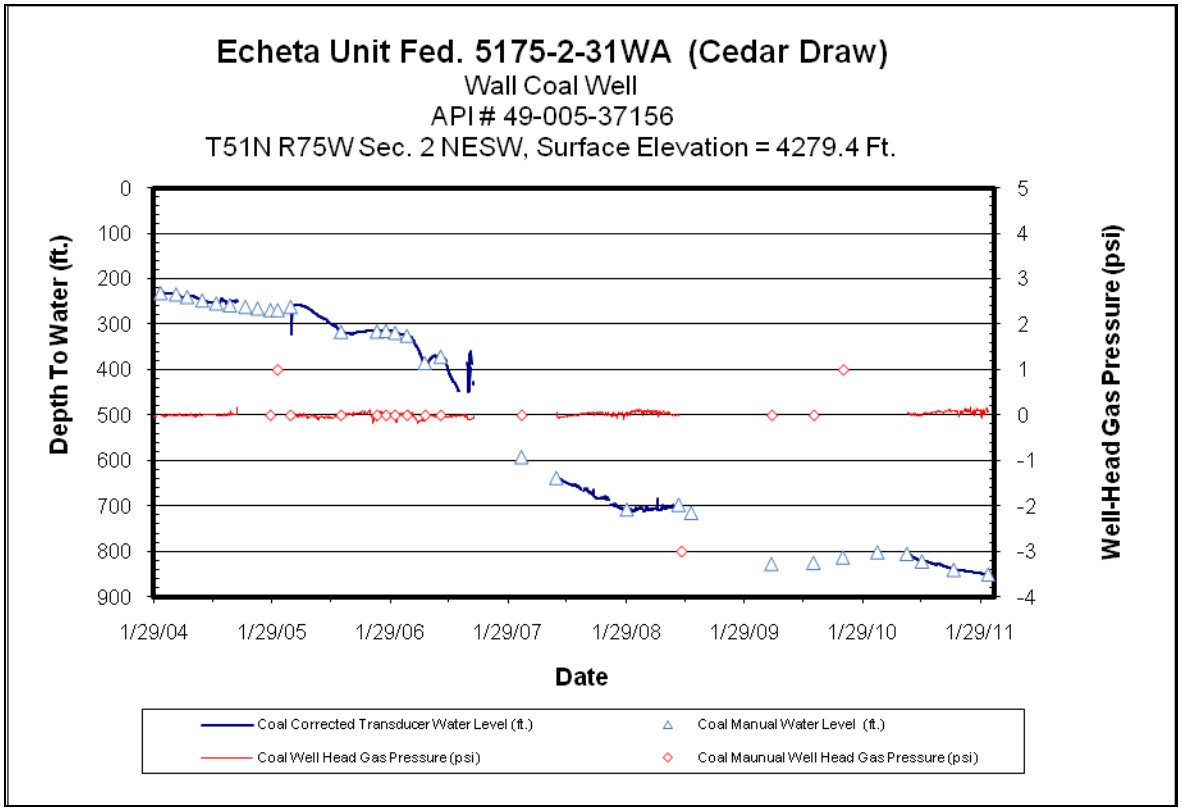
The ROD includes a Monitoring, Mitigation and Reporting Plan (MMRP). The objective of the MMRP is to monitor those elements of the analysis addressed in the ROD where there was limited information available during the preparation of the PRB FEIS. The MMRP called for the use of adaptive management to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

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

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

The production of CBNG requires the temporary reduction of the hydraulic head in the saturated coal zones targeted for CBNG production. The BFO has been monitoring coal zone water levels and gas pressures in the PRB since the early 1990s (Figure 3.3). The Cedar Draw Unit 3 POD is surrounded by numerous approved Federal, fee, and state CBNG projects. As a result, the target coal zone pressure may have been reduced through off set water production associated with those projects. The Cedar Draw Unit 1 Groundwater monitoring well was installed by Williams as a part of the BFO's groundwater monitoring program. The well is located in the NESW of Section 2, Township 51 N, Range 75 W, and is located within the Cedar Draw Unit 3 POD boundary. The initial water level of the Wall coal at this site was recorded at 227 feet below ground level on February 20, 2004. On February 23, 2011, the water level was 752 feet below the ground surface, representing a decline of 525 feet since the well was completed. This level of drawdown is within the range predicted through the regional groundwater modeling conducted for the PRB FEIS. For additional information, please refer to the PRB FEIS. Chapter 4, Groundwater; and the Wyoming State Geological Survey's Open File Report 2009-10 titled "1993-2006 Coalbed Natural Gas (CBNG) Regional Groundwater Monitoring Report: Powder River Basin, Wyoming" which is available at: http://www.wsgs.uwyo.edu.

Figure 3.3. Depth to Water from Surface



3.5.2. Surface Water

The project area is within the Wild Horse Creek and Middle Prong Wild Horse Creek drainages which are tributary to the Upper Powder River watershed. Most of the drainages in the area are ephemeral (flowing only in response to a precipitation event or snow melt) to intermittent (flowing only at certain times of the year when it receives water from alluvial groundwater, springs, or other surface source – PRB FEIS, Chapter 9, Glossary). The channels are primarily well vegetated and stable with mild incision and meandering.

The PRB FEIS presents the historic mean electrical conductivity (EC, in µmhos/cm) and sodium adsorption ratio (SAR) by watershed at selected United States Geological Survey (USGS) Gauging Stations in Table 3-11 (PRB FEIS, p. 3-49). These water quality parameters "illustrate the variability in ambient EC and SAR in streams within the project area. The representative stream water quality is used in the impact analysis presented in Chapter 4 as the baseline for evaluating potential impacts to water quality and existing uses from future discharges of CB[NG] produced water of varying chemical composition to surface drainages within the project area" (PRB FEIS, p. 3-48). For the Upper Powder River Watershed, the EC ranges from 1,797 at maximum monthly flow to 3,400 at low monthly flow; and the SAR ranges from 4.76 at maximum monthly flow to 7.83 at low monthly flow. These values were determined at the USGS station (Station ID 06317000) located on the Upper Powder River at Arvada, WY (PRB FEIS, p. 3-49).

The Operator identified 5 natural springs in the POD area. The spring locations and their basic water quality data are found in Table 3.10.

Table 3.10. Springs in the Cedar Draw 3 POD Area

Spring Name	Qtr	Section	Twn	Rng	Flow Rate (GPD)	TDS	EC (µmhos/cm)
Spring 7-1	NW¼SW¼	7	53N	75W	10	4900	4730
Spring 19-1	NW¼NE¼	19	53N	75W	10	9560	8820
Spring 19-2	NE¼NW¼	19	53N	75W	10	5830	5980
Spring 19-3	SW¼SW¼	19	53N	75W	10	9140	9010
Spring 29-1	NE¼SW¼	29	53N	75W	10	8090	8060

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

3.6. Cultural Resources

A Class III cultural resource inventory was performed for the Cedar Draw 3 POD prior to on-the-ground project work (BFO project no. 70090016). A class III cultural resource inventory following the Archeology and Historic Preservation, Secretary of the Interior's Standards and Guidelines (48CFR190) and the Wyoming State Historic Preservation Office Format, Guidelines, and Standards for Class II and III Reports was provided to BFO by Williams Production RMT Company. Clint Crago, BLM Archaeologist, reviewed the report for technical adequacy and compliance with Bureau of Land Management (BLM) standards, and determined it to be adequate. The following resources are located in or near the project area (Table 3.11).

Table 3.11. Cultural Resources Inventory Results

Site Number	Site Type	Eligibility
48CA746	Historic Homestead	Not Eligible
48CA2528	Historic Dump	Not Eligible
48CA2529	Historic Homestead	Not Eligible
48CA3968	Historic Stockherding Camp	Not Eligible
48CA4452	Historic Homestead	Not Eligible
48CA4453	Historic Stockherding Camp	Not Eligible
48CA4454	Historic Dump	Not Eligible
48CA4455	Historic Artifact Scatter	Not Eligible
48CA4456	Historic Stockherding Camp	Not Eligible
48CA4461	Historic Homestead	Not Eligible
48CA4462	Historic Homestead	Not Eligible
48CA4463	Prehistoric Stone Circle and Historic Artifact Scatter	Eligible
48CA4464	Historic Homestead	Not Eligible
48CA5708	Historic Dump	Not Eligible

Site Number	Site Type	Eligibility
48CA5711	Prehistoric Lithic Scatter and Historic Stockherding Camp	Unevaluated
48CA5712	Prehistoric Lithic Scatter	Unevaluated
48CA5713	Historic Stockherding Camp	Not Eligible
48CA5714	Prehistoric Stone Circle	Eligible
48CA6943	Prehistoric Lithic Scatter	Not Eligible
48CA6944	Prehistoric Lithic Scatter	Not Eligible

3.7. Air Quality

Existing air quality throughout most of the PRB is in attainment with all ambient air quality standards. Specific air quality monitoring in the PRB occurs at 3 Wyoming state sites: Cloud Peak; Thunder Basin (NE of Gillette); and Campbell County (SSW of Gillette). Air quality in rural areas is generally very good (ozone less than 60 parts per billion (ppb), minimal nitrous oxide (NO_x) and volatile organic compounds (VOCs). However in recent years the region had some ozone ratings between 65 and 70 (ppb) and had a few air quality advisories due to dust, of which it is thought that coal mine dust contributed. The area has few and dispersed emission sources (few industrial facilities and residential emissions in the relatively small communities and isolated ranches) and good atmospheric dispersion. This results in relatively low air pollutant concentrations as the area does not have a “bowl-like” topography which may trap low-level ozone layers. Instead the open topography fosters low-level air exchange (high winds). Yet the air quality issue is receiving greater monitoring and regulatory scrutiny in Wyoming since the ozone (smog) in the Upper Green River Basin exceeded the worst in the nation for 13 days in 2011 and had air quality issues since 2005 due, in part, to affects from oil and gas field operations.

Existing air pollutant emission sources in the region include:

- Exhaust emissions (primarily CO and nitrous oxides [NO_X]) from existing natural gas fired compressor engines used in production of natural gas and CBNG; and, gasoline and diesel vehicle tailpipe emissions of combustion pollutants;
- Dust (particulate matter) generated by vehicle travel on unpaved roads, windblown dust from neighboring areas and road sanding during the winter months;
- Transport of air pollutants from emission sources located outside the region;
- Dust (particulate matter) from coal mines;
- NO_X, particulate matter, and other emissions from diesel trains; and
- SO_2 and NO_X from power plants.
- For a description of the 2003-era air quality conditions in the PRB, refer to the PRB Final EIS Volume 1, Chapter 3, pp. 3-291 to 3-299.

4. ENVIRONMENTAL EFFECTS

This section describes and analyzes the known and probable environmental effects of the proposed action, Alternative B (Section 2) on and in the context of the current physical and regulatory environment (Section 3). The effects analysis addresses the direct and indirect effects of implementing the proposed action, the cumulative effects of the proposed action combined with reasonably foreseeable federal and non-federal actions, identifies and analyzes mitigation measures (COAs), and discloses any residual effects remaining following mitigation.

4.1. Alternative A

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

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

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

4.2. Alternative B

4.2.1. Transportation

4.2.1.1. Direct and Indirect Effects

The Cedar Draw Unit 3 plan of development proposes an additional 7.26 miles of proposed primitive, in sloped, out sloped, and crown and ditch roads. The main access to Cedar Draw Unit 3 POD is off of Echeta Road with development to the north-east. There are 17 engineered sections provided by WWC Engineering with an average travel way surface of 14 feet. The lowest design speed for the POD is 10 mph with an average daily traffic (ADT) ranging from 1 to 20 trips per day. The primitive roads have road grades less than 6%, the in-sloped and out-sloped roads have road grades less than 8%, and the crown and ditch roads have grades less than 16%. The maximum road grade proposed is 16%. There are an additional 38 proposed CMP culverts that have a minimum diameter of 18 inches and an additional 3 low water crossings that will follow the typical installation details provided in the engineered diagrams. Additional culverts and wing ditches may be needed through the life of the project and will be addressed via the sundry process. Surfacing to gain traction on all roads (including primitive roads) can be added at the discretion of the operator.

The 2 main surfacing materials used in the PRB are gravel or clinker rock (sometimes referenced as scoria). Gravel is a hard durable material and by definition it is loose rock that has a particle distribution from 1/12 to 2.5 inches in diameter. One cubic yard of gravel typically weighs around 3000 pounds. Clinker rock is a red-brown shale that has been baked and fused by in situ burning of underlying coal. Clinker rock found in the PRB (called porcelanite) has similar properties to ceramic; it readily breaks down into smaller fragments and has sharp edges when broken. Its weight varies depending upon the parent material but it usually is fairly light and has a specific gravity greater than one.

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

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

4.2.1.1. Cumulative Effects

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

4.2.1.2. Mitigation Measures

The typical engineering notes require that an average of 4 inches of surfacing material be used when specified. It is important to use a surfacing material that is hard and durable so that it can be compacted,

minimizes dust, and minimizes maintenance. The BFO has the authority to require site specific use of gravel aggregate on federal surface and recommends it on private and state, specifically gravel that meets the requirements of Gradation W as outlined in the WY Highway Department specifications for road and bridge construction per the BLM Manual Supplement WYSO for 9113.

All engineered road segments will be completed, including any culverts, low water crossings and required surfacing, before the drilling rig or other drilling equipment moves onto the pad.

The BLM requires the following roads on federal surface to be surfaced with an average of 4 inches of Gradation W gravel due to the higher anticipated ADT and steep slopes per the WY Supplement to the BLM Manual 9113: all roads with grades steeper than 8% grade or an anticipated ADT of 10 or greater.

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

4.2.1.3. Residual Effects

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

4.2.1.4. Soils – Alternative B

4.2.1.4.1. Direct and Indirect Effects

The impacts listed below, singly or in combination, would increase the potential for valuable soil loss due to increased water and wind erosion, invasive plant establishment, and increased sedimentation and salt loads to the watershed system but may facilitate grazing program improvement with increased access to and water sources in previously lesser grazed areas.

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

Construction of wells with no pad and no slot would result in less disturbance to the soil resource. No soil would be removed or graded. Where reserve pits are constructed for these wells, soil productivity and soil quality would be negatively altered if subsoil is spread on the surface top soil.

Soils would be compacted as a result of the construction of well and associated facilities, with compaction maintained, at least in part, by continued vehicle and foot traffic as well as operational activities. Factors affecting compaction include soil texture, moisture, organic matter, clay content and type, pressure exerted, and the number of passes by vehicle traffic or machinery. Compaction leads to a loss of soil structure; decreased infiltration, permeability, and soil aeration; as well as increased runoff. When runoff is concentrated and discharged onto native ground, the energy of the runoff can increase erosion of the loose native material. Increased erosion can lead to a decrease in soil fertility and an increase in sedimentation. The duration and intensity of these impacts would vary according to the type of construction activity to be completed and the inherent characteristics of the soils to be impacted.

The potential for erosion would increase through the loss of vegetation cover and soil structure as compared to an undisturbed state. A Wyoming Pollutant Discharge Elimination System (WYPDES) permit is required for construction activities, and would address runoff and erosion leading to sedimentation impacts. Culverts would be installed to control stormwater runoff associated with construction within the Cedar Draw Unit 3 POD. Soil productivity would decrease, primarily as a result of profile mixing and compaction along with the loss in vegetative cover. The primary variables affecting microbial action of top soil include stockpile depth and duration of time top soil is stored. A decrease in soil productivity also would occur in association with soil salvage and stockpiling activities as microbial action is curtailed which may lead to a decline in topsoil viability. These impacts would begin immediately as the soils are subjected to grading and construction activities and impacts would continue for the term of operations. Topsoil viability can be lost completely if microbial activity ceases.

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

Additional effects to soils resulting from well pad, access roads, and utility corridor construction include:

- Loss of soil vegetation cover, biologic crusts, organic matter, and productivity; and
- Increased soil erosion and reduced soil health and productivity. Erosion rates are site-specific and are dependent on soil, climate, topography, and cover.

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

During initial site visits to the well sites, BLM staff observed site conditions for well pads and access roads. As stated in Section 2.3 of this EA, well sites were adjusted or moved to minimize sitting on steep slopes, minimize soil erosion, and minimize facilities on soils with low reclamation potential. Areas that mapped as limited reclamation potential cover 42% of the Cedar Draw Unit 3 POD. During onsites most wells, roads, and pipelines locations were either in or moved to areas that had minimal percent slopes. Engineered roads and road components within the Cedar Draw Unit 3 POD need to be constructed prior to drilling because the soils within the POD have low reclamation potential and are prone to erosion. Constructing the engineered roads and road components prior to drilling would help alleviate erosion and help with successful recliamtion. Due to the lack of slope, water erosion should be minimal.

Williams would take a number of actions to lessen the impacts to soils and maintain soil productivity potential to the degree possible. Applicant-committed measures and BLM COAs would be implemented to mitigate or reduce the impacts associated with construction and operation. In addition, Williams committed to site-specific reclamation plans for areas of concern to reduce site impacts. The topsoil would be salvaged, stockpiled, and returned to graded surfaces as an integral part of the construction of all project elements, thereby reducing the impacts to soil productivity status. Well pads and associated facility disturbances would be re-graded to match existing topography and revegetated following project termination.

One pipeline route (cross-country corridor running north from the 31-31 well to the 43-30 well) was identified during the onsites as having limited room for operations and therefore safety concerns. No alternative location for pipeline placement was found during the onsites. An alternative such as boring the pipeline was discussed during the onsites. The BLM feels this is the safest option. Williams believes that construction without boring of this pipeline can be done safely. Williams submitted a PRB Job Safety Analysis and outlined the pipeline route disturbance widths in relation to the topography and working area in order to address safety concerns. Hazards, equipment, protection actions, and a procedure summary are provided within submitted documentation. The PRB Job Safety Analysis and outlined the pipeline route disturbance widths can be found in the Cedar Draw Unit 3 POD book under the Reclamation tab.

4.2.1.4.1.1. Soils Susceptible to Erosion, Slope Hazard, and Reclamation Suitability

Sandy Ecological Sites: Two of these wells (21-32 and 43-7) have Sandy Ecological Sites, steep slopes ranging from 20% to 25%, and poor reclamation suitability which will increase erosion from water making it difficult achieve the reclamation.

Much of the sandy loams were found on ridge tops with topsoil depths averaging 2- 4 inches. The dominant vegetation included; yucca, big sagebrush, rubber rabbit brush, needle and thread, prairie sandreed, blue gramma, and cheat grasses. Without proper and timely re-vegetation practices the sands readily erode due to wind and water action. The invasion of prickly pear and cheat grass indicates some deterioration from identified transition state.

In addition, portions of the road and utility corridors are located on soils with poor reclamation suitability and have slopes of 20% to 25%. During the onsites the BLM noted large erosion features (i.e. head cuts) with evidence of active erosion. Road construction in these locations will likely increase and concentrate runoff thus increasing and accelerating erosion to these features. Williams addresses these issues in their site specific reclamation plan by applying mitigation measures to minimize concentrated runoff. Continued monitoring of the erosion features to insure they do not encroach on the access roads thereby compromising its structure is recommended.

The plant communities on these areas can be difficult to re-establish, especially in areas of shallow parent material. Reclamation will be difficult without extra mitigation. A site specific seed mix was chosen for these locations to expedite re-vegetation. These seed mixes can be found in the site specific reclamation plan. The locations will require expedient reclamation. COAs will be applied to insure that the surface is stabilized to protect from wind/water erosion within 30 days and that construction activities will maintain a proper vegetative buffer from all headcuts.

The combination of the poor reclamation potential and steep slopes will make these 2 wells and infrastructure very difficult to have successful reclamation. Alternative locations were limited thus pad and road modifications were discussed as ways to increase the likelihood of successful reclamation. Site specific reclamation plans and engineered designs have been submitted by Williams addressing erosion, reclamation, and stabilization. Williams feels with these modifications, site specific reclamation plans, and engineered designs the likely hood for successful reclamation has a fair probability. It is the opinion of the BLM the combination of steep slopes and sandy soils will make it difficult to achieve the requirements set forth in the Wyoming State Reclamation Policy.

4.2.1.4.1.2. Limited Reclamation Potential

4.2.1.4.1.2.1. Miscellaneous Areas

Badlands: Six locations were identified during onsite inspections as having limited reclamation potential, i.e. rated poor as a source of reclamation material due to depth to bedrock (very shallow) and high erosion

potential. These locations are the 43-7, 22-31, and 21-32 well locations and infrastructure and the upgraded road sections for the 22-30 and 11-31 access roads and cross-country pipeline corridor running north from the 22-31 well to the 43-30 well.
Site specific reclamation plan for the 43-7, 22-31, and 21-32 well locations and infrastructure and the upgraded road sections for the 22-30 and 11-31 access roads was provided by Williams. The site specific reclamation plan details the revegetation, site stabilization, and reclamation actions Williams would take to reduce the impacts to the soil resource. These actions would notably reduce intensity of the impacts to soils as well as the estimated time it would take to return the disturbed soils to a stable and productive state. Approximately 3915 feet of new disturbance for road and utility corridor would be on soils with poor reclamation suitability. Approximately 803 feet of this new disturbance is located on a reclaimed conventional well access road. The site specific reclamation plan can be found in the Cedar Draw Unit 3 POD book under the Reclamation tab. The locations will require expedient reclamation. COAs will be applied to insure that the surface is stabilized to protect from wind/water erosion within 30 days.

The cross-country pipeline corridor running north from the 22-31 well to the 43-30 well require expedient reclamation. A COA will be applied to insure that the surface is stabilized to protect from wind/water erosion within 30 days.

4.2.1.4.2. Cumulative Effects

The designation of the duration of disturbance is defined in the PRB FEIS, (pp. 4-1 and 4-151). Most soil disturbances would result in 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. Long-term impacts would result in relation to project roads and well pads necessary for operations and maintenance. Impacts would continue until successful final reclamation has been achieved.

Geomorphic effects of roads and other surface disturbance range from chronic and long-term contributions of sediment into waters of the state to catastrophic effects associated with mass failures of road fill material during large storm events. Roads could affect geomorphic processes primarily by: accelerating erosion from concentrating runoff and limiting infiltration, altering surface flow paths, leading to diversion or extension of channels onto previously un-channelized portions of the landscape, and causing interactions among water, sediment, and debris at road-stream crossings.

These impacts, singly or in combination, could increase the potential for valuable soil loss due to increased water and wind erosion, invasive/noxious/poisonous plant spread, invasion and establishment, and increased sedimentation and salt loads to the watershed system.
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4.2.1.4.3. Mitigation Measures

The site-specific reclamation plan for wells (and associated infrastructure) 43-7, 22-31, and 21-32, as well as site-specific reclamation plan for 22-30 and 11-31 access road in combination with COAs, mitigation measures, and applicant committed measures discussed in the COAs will help to mitigate or reduce the impacts described above. Additionally, the following resource-specific BLM COAs will be implemented:

1. Stabilization of steep slopes greater than 4H:1V will include but is not limited to the following components to minimize soil erosion and loss of seed:
    a. Surface roughening/pocking or scarification perpendicular to the slope;
        i. Install slope breakers such as waddles and water bars at the appropriate spacing.
    b. Seed with appropriate seed mix.
    c. Apply straw mulch or bio/photodegradable erosion control fabric on highly erodible soils.

2. Waddling is most effective as erosion control if applied on slopes less than 3H:1V. In the absence of manufacture's specifications included in the operator's Master Surface Use Plan, the minimum spacing requirements will be as follows:

Slope	6-inch waddle	9-inch waddle	12-inch waddle
<4H:1V	20 feet	40 feet	60 feet
3H:1V	15 feet	30 feet	45 feet

3. All pit spoil must be placed back in the pit once the pit is dry or fluids are removed. Subsoil must then be replaced in the reserve pit before topsoiling. Under no circumstances would any by-products from drilling or subsoil to be spread on top of topsoil. The pit area should usually be mounded slightly or restored to the original contour to allow for settling and positive surface drainage.

4. The reserve pit will be lined with an impermeable liner for the following wells because sandy soils were identified during onsite visits:
   - 22-7, 23-7, 31-7, 44-32, 21-19, 23-19, 11-29, and 31-32.

   The liner will be installed so that it will not leak and will be chemically compatible with all substances that may be put in the pit. Liners made of any man-made synthetic material will be of sufficient strength and thickness to withstand normal installation and pit use. In gravelly or rocky soils, a suitable bedding material such as sand will be used prior to installing the liner.

5. The Cedar Draw Unit 3 Project area is dominated by soils that have been identified to have limited reclamation potential and/or soils susceptible to erosion that will require disturbed areas to be stabilized (stabilization efforts may include mulching, matting, soil amendments, etc.) 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. This applies to the following:
   - The Cedar Draw Unit 3 21-32, 43-7,and 22-31 wells;
   - The upgraded road section for the 22-30 well and 11-3 well access roads; and
   - cross country pipeline corridor running from the 22-31 well to the 43-30 well.

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

7. All engineered road segments must be completed, including any culverts, low water crossings and required surfacing, before the drilling rig or other drilling equipment moves onto the pad.

8. Per the WY Supplement to the BLM Manual 9113 road surfacing material on Federal Surface will meet the gradation requirements for "Grading W" as outlined in the Wyoming Highway Department's Standard Specification for Road and Bridge Construction.

4.2.1.4.4. Residual Effects

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

4.2.1.5. Vegetation, Ecological Sites, and Invasive Species

4.2.1.5.1. General

4.2.1.5.1.1. Direct and Indirect Effects

(Direct and indirect effects to vegetation are discussed in the PRB FEIS, pp. 4-153 to 4-164). Direct effects to vegetation would occur from ground disturbance caused by construction of well pads, ancillary facilities, associated pipelines, and roads. Short-term effects would occur where vegetated areas are disturbed and reclaimed within 2 years of the initial disturbance. Long-term effects would occur where well pads, compressor stations, roads, water-handling facilities, or other semi-permanent facilities would result in loss of vegetation and where reclamation for the life of the project. Indirect effects, as described in the PRB FEIS, would include the spread and/or establishment of noxious weeds, the alteration in surface water flows affecting vegetation communities, alteration in ecosystem biodiversity, and changes in wildlife habitat. These impacts would be mitigated by expediently stabilizing the disturbance through interim reclamation, and the implementation of erosion control measures.

Areas that are difficult to reclaim include sands and sandy sites and areas where the parent material is very shallow (less than 10 inches in depth). Areas that could be difficult to reclaim were identified during initial site visits to the well sites. Well sites were adjusted or moved to avoid these areas or to allow for the best reclamation possible, as described in Section 2.3 of this document. Two access roads and pads (21-32 and 43-7) are located on soils rated poor as a source of reclamation material as described above. These 2 wells are discussed in section 4.2.2.1.1, Soils Direct and Indirect Effects. The plant communities on these areas can be difficult to re-establish, especially in areas of shallow parent material.

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

The 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.

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

4.2.1.5.2. Cumulative Effects

Cumulative effects to vegetation from oil and gas development are discussed in the PRB FEIS, pp. 4-164 and 4-172. Most surface disturbances would result in short-term impacts to grasses and forbs related to construction activities that would be reclaimed through interim reclamation and site stabilization, as committed to by the operator and as required by the BLM in COAs. The proposed project is planned in an area already impacted by mineral development and other associated infrastructure.

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

Impacts to vegetation from surface disturbance will be reduced through the implementation of the mitigation measures in the COAs; the Cedar Draw Unit 3 POD, and its associated plans including the Integrated Weed and Pest Management Plan, the WMP, Site Specific Reclamation Plan, and the MSUP (specifically Section 10, Plans for Reclamation of the Surface and Site Specific Reclamation Plan). These documents are included in the Administrative Record for the Cedar Draw Unit 3 POD at the BFO.

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

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

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

4.2.1.5.3. Mitigation Measures

The site-specific reclamation plans and COAs for the 43-7, 22-31, and 21-32 wells and road and corridors to the 22-30 and 11-31 wells provide additional mitigation for impacts identified in those areas. In addition to those COAs listed in Section 4.2.2.1 of this document for soils, the following resource and site-specific BLM COAs will be implemented: BLM developed seed mixes for each ecological site identified within the project area based on the NRCS ecological site description, the reference plant community and desired species richness with the intent of maximizing revegetation potential.

Impacts to vegetation from surface disturbance would be reduced through the implementation of the mitigation measures in the COAs, the Cedar Draw Unit 3 POD design, and its associated plans including the Integrated Weed and Pest Management Plan, the WMP and the MSUP (specifically Section 10 Plans for Reclamation of the Surface). In addition, the site-specific reclamation plan for wells 43-7, 22-31, 21-32 and the upgraded road sections for the 22-30 and 11-31 would provide additional mitigation for impacts identified in that area.

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

1. Control Methods include physical, biological, and chemical methods:
   Physical methods include mowing during the first season of establishment, prior to seed formation, and hand pulling of weeds (for small or new infestations). Biological methods include the use of domestic animals, or approved biological agents. Chemical methods include the use of herbicides, done in accordance with the existing Surface Use Agreement with the private surface owner.

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

3. Education:

The company will provide periodic weed education and awareness programs for its employees and contractors through the county weed districts and federal agencies. Field employees and contractors will be notified of known noxious weeds or weeds of concern in the project area.

4.2.1.5.3.1. Residual Effects

Residual effects also were identified in the PRB FEIS, p. 4-408, such as the loss of vegetative cover despite expedient reclamation for several years until reclamation is successfully established. In the event the operator fails or reneges on their obligation to successfully reclaim the area as defined by the Wyoming Policy on Reclamation (Instruction Memorandum WY-90-231), the bond will not be released for the site and the BLM will be responsible for site reclamation.

The alteration of biodiversity of ecological sites could result from changes in disturbance regimes, alterations in vegetation in reclaimed areas, and the spread and establishment of weed species.

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

4.2.1.5.4. Wetlands/Riparian

4.2.1.5.4.1. Direct and Indirect Effects

No project infrastructure will directly impact any wetland areas, however, re-surfacing water from the impoundments will potentially allow for wetland-riparian species establishment. Continuous high stream flows into wetlands and riparian areas would change the composition of species and dynamics of the food web. The shallow groundwater table would rise closer to the surface with increased and continuous stream flows augmented by produced water discharges.

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

4.2.1.5.4.2. Cumulative Effects

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

Additional mitigation measures may be required should discharges into the Powder River watershed from the downstream-most reservoirs become necessary.

4.2.1.5.4.3. Mitigation Measures

Mitigation measures are listed in the Standard Conditions of Approval (Appendix A).

4.2.1.5.4.4. Residual Effects

There will be changes to wetland and riparian areas through alterations in volume, velocity, timing and quality of the stream flow due to direct discharge. Turbidity and solids loading in the streams would probably increase due to erosion of project disturbed areas and sediment transport to the associated drainages. These impacts would be mitigated by expediently stabilizing the disturbance and reducing the amount of sediment reaching the streams.

4.2.2. Wildlife

4.2.2.1. Threatened, Endangered, Proposed and Candidate Species

4.2.2.1.1. Threatened and Endangered Species

Table 4.2. Summary of Threatened and Endangered Species Habitat and Project Effects

Common Name (scientific name)	Habitat	Project Effects	Rationale
Endangered			
Black-footed ferret	Black-tailed prairie dog colonies or complexes > 1,000 acres.	NLAA	Northeast Wyoming has been block cleared for presence of black-footed ferret by the USFWS.
Blowout penstemon	Sparsely vegetated, shifting sand dunes	NE	Habitat not present
Threatened			
Ute ladies'-tresses orchid	Riparian areas with permanent water	NE	No suitable habitat present in the project area.
Candidate			
Greater Sage-grouse	Basin-prairie shrub, mountain-foothill shrub	MIIH	Habitat is present and will be affected by construction of wells and infrastructure.

Project Effects
LAA – Likely to adversely affect
NE – No Effect
NLAA – May Affect, not likely to adversely affect individuals or habitat.
NLJ – Not likely to jeopardize the continued existence of the species
MIIH – May impact individuals and habitat
NP – Habitat not present and species unlikely to occur within the project area.

4.2.2.1.1.1. Black-Footed Ferret

4.2.2.1.1.1.1. Direct and Indirect Effects

Direct and indirect effects to black-footed ferret are discussed in the PRB FEIS. Prairie dog colonies will be impacted by proposed activities. Suitable habitat is of sufficient size to support a black-footed ferret population and the project area is in the Arvada prairie-dog complex, identified by WGFD as a potential black-footed ferret reintroduction site. It is extremely unlikely that black-footed ferrets are present in the project area. However, if any become present, the proposed action will most likely make portions of the project area unsuitable for ferret inhabitance. Implementation of the proposed development "***may affect, but is not likely to adversely affect***" the black-footed ferret.

4.2.2.1.1.1.2. Cumulative Effects

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

4.2.2.1.1.1.3. Mitigation Measures

No mitigation is proposed with alternative B.

4.2.2.1.1.1.4. Residual Effects

No residual effects are anticipated.

4.2.2.1.1.2. Blowout penstemon

4.2.2.1.1.2.1. Direct and Indirect Effects

Habitat is not present in the project area and implementation of the proposed project will have "***no effect***" on blowout penstemon.

4.2.2.1.1.2.2. Cumulative Effects

The proposed project will not affect blowout penstemon.

4.2.2.1.1.2.3. Mitigation Measures

No mitigation is proposed with alternative B.

4.2.2.1.1.2.4. Residual Effects

No residual effects are anticipated.

4.2.2.1.1.3. Ute Ladies'-Tresses Orchid

4.2.2.1.1.3.1. Direct and Indirect Effects

Suitable habitat is not present in the project area and implementation of the proposed project will have "***no effect***" on ULT.

4.2.2.1.1.3.2. Cumulative Effects

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

4.2.2.1.1.3.3. Mitigation Measures

No mitigation is proposed with alternative B.

4.2.2.1.1.3.4. Residual Effects

No residual effects are anticipated.

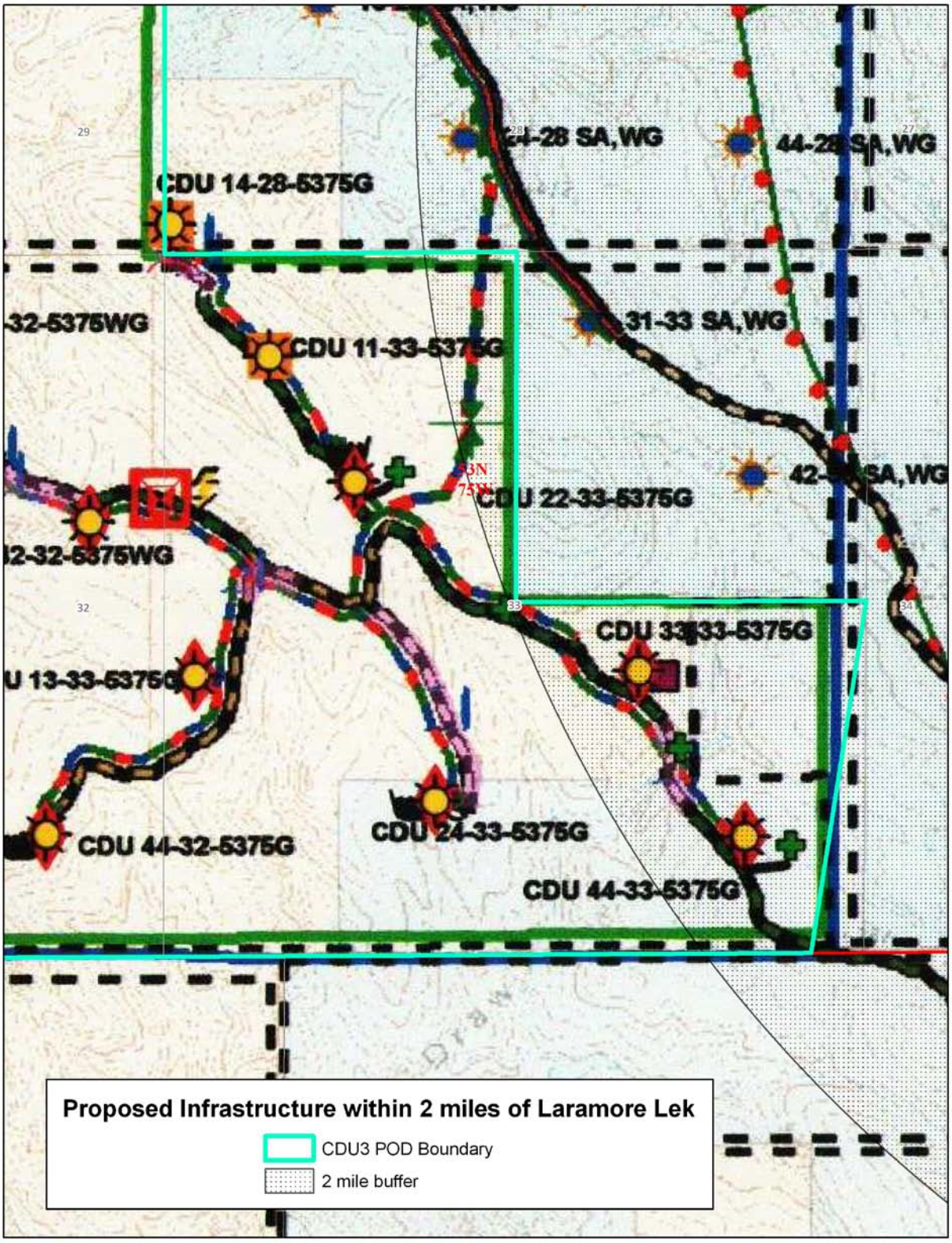
4.2.2.1.2. Candidate Species

4.2.2.1.2.1. Greater Sage-grouse

4.2.2.1.2.1.1. Direct and Indirect Effects

Impacts to sage-grouse associated with energy development are discussed in detail in the *12-Month Findings for Petitions to List the Greater Sage-Grouse (Centrocercus urophasianus) as Threatened or Endangered* (USFWS 2010). Impacts to sage-grouse are generally a result of loss and fragmentation of sagebrush habitats associated with roads and infrastructure. Research indicates that sage-grouse hens also avoid nesting in developed areas.

Figure 4.1. Proposed and existing infrastructure occurring within 2 miles of the Laramore Lek.



Infrastructure occurring within 2 miles of occupied sage grouse leks is shown in Figure 4.1 above. During onsite visits, the BLM biologist made specific recommendations to avoid placement of facilities in sagebrush to reduce direct loss of sage-grouse habitat.

Implementation of the proposed project will cause sagebrush habitat removal and functional loss of habitat from fragmentation and anthropogenic activity. According to habitat models, the following wells (and associated infrastructure) are all located within high quality nesting habitat:

• CDU 11-31	• CDU 24-6
• CDU 11-33	• CDU 31-31
• CDU 13-33	• CDU 31-32
• CDU 14-18	• CDU 31-7
• CDU 14-8	• CDU 33-33
• CDU 21-32	• CDU 41-18
• CDU 22-33	• CDU 42-18
• CDU 22-7	• CDU 42-29
• CDU 23-18	• CDU 43-18
• CDU 23-19	• CDU 43-7
• CDU 24-30	• CDU 44-32
• CDU 24-33	• CDU 44-33

Implementation of the proposed project will impact sage-grouse habitat and individuals.

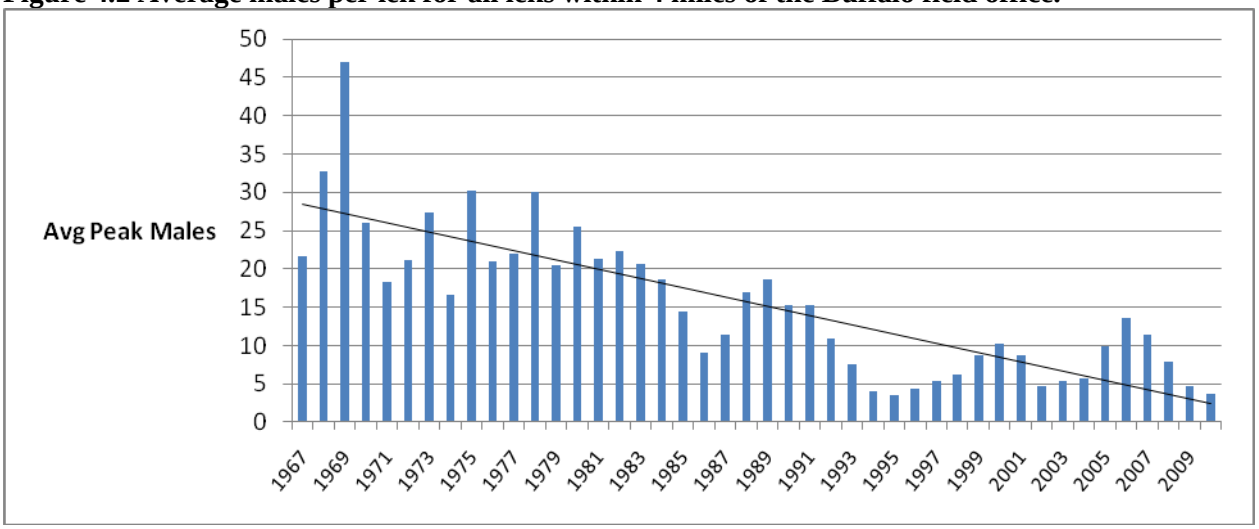
4.2.2.1.2.1.2. Cumulative Effects

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

The sage-grouse population within northeast Wyoming has been exhibiting a steady long term downward trend, as measured by lek attendance (WGFD 2010). Figure 4.2 illustrates a 10-year cycle of periodic highs and lows. Each subsequent population peak is lower than the previous peak. Research suggests that these declines may be a result, in part, of CBNG development, as discussed in detail in USFWS (2010).

Currently, 494 fee, state, and federal wells exist in the analysis area. Excluding the CDU3 project, there are approximately 407 proposed wells (Automated Fluid Minerals Support System [AFMSS] 4/25/11) within the cumulative effects analysis area. Of these, 137 are approved APDs (AAPD), 10 are APDs, and 260 are unapproved APDs (UAPD). With the addition of these wells, well density increases to 10.4 wells per square mile from 5.7 wells per square mile. With approval of Alternative B (41 proposed well locations) well density would increase to 10.8 wells per square mile, well above the one well per square mile recommendation by the State Wildlife Agencies' Ad Hoc Committee for Sage-Grouse and Oil and Gas Development.

Figure 4.2 Average males per lek for all leks within 4 miles of the Buffalo field office.



Based on the summary of research describing the impacts of energy development on sage-grouse, efforts to reduce habitat loss and fragmentation are likely to be the most effective in ensuring long-term lek persistence. Design features specifically included in the proposed action under Alternative B to minimize impacts to sage-grouse include:

- Access to the CDU 13-31well was rerouted to avoid sagebrush habitat.
- Access to the CDU43-18 well was rerouted to avoid sagebrush habitat.

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

4.2.2.1.2.1.3. Mitigation Measures

In order to reduce the likelihood that activities associated with noise, construction, and human disturbance, BLM will implement a timing limitation on all surface-disturbing activities within 2 miles of the Laramore lek. Because nesting grouse have been shown to avoid infrastructure by up to 0.6 miles, the intent of this timing restriction is to decrease the likelihood that grouse will avoid these areas and increase habitat quality by reducing noise and human activities during the breeding season.

4.2.2.1.2.1.4. Residual Effects

A timing limitation does nothing to mitigate loss and fragmentation of habitat or changes in disease mechanisms. Suitability of the project area for sage-grouse will be negatively affected due to habitat loss and fragmentation and proximity of human activities associated with CBNG development.

4.2.2.2. 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."

The PRB FEIS discusses impacts to sensitive species on pp. 4-257 to 4-265. Effects to sensitive species are described in Table 4.3 and sections 4.2.3.5 (migratory birds), 4.2.3.2.1 (bald eagle), 4.2.3.2.1.5 (mountain plover), 4.2.3.2.2 (western burrowing owl), and 4.2.3.2.3 (black-tailed prairie dog) below.

Table 4.3. Summary of Sensitive Species Habitat and Project Effects.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Amphibians				
Northern leopard frog (*Rana pipiens*)	Beaver ponds and cattail marshes from plains to montane zones.	NP	NI	Suitable habitat is not present.
Columbia spotted frog (*R*anus pretiosa)	Ponds, sloughs, small streams, and cattails in foothills and montane zones. Confined to headwaters of the S Tongue R drainage and tributaries.	NP	NI	The project area is outside the species' range, and the species is not expected to occur .
Fish				
Yellowstone cutthroat trout (*Oncoryhynchus clarki bouvieri*)	Cold-water rivers, creeks, beaver ponds, and large lakes in the Upper Tongue sub-watershed	NP	NI	The project area is outside the species' range, and the species is not expected to occur.
Birds				
Baird's sparrow (*Ammodramus bairdii*)	Shortgrass prairie and basin-prairie shrubland habitats; plowed and stubble fields; grazed pastures; dry lakebeds; and other sparse, bare, dry ground.	S	MIIH	Nesting and foraging habitat may be impacted by dust, noise, human activities, and direct loss. Species may avoid area. Impacts will be mitigated by limitation on timing of activities.
Bald eagle (*Haliaeetus leucocephalus*)	Mature forest cover often within one mile of large water body with reliable prey source nearby.	K	MIIH	Surface disturbing and maintenance activities may impact wintering eagles and the species may avoid the area. Impacts will be mitigated by limitation on timing of activities.
Brewer's sparrow (*Spizella breweri*)	Sagebrush shrubland	S	MIIH	Nesting and foraging habitat may be impacted by dust, noise, human activities, and direct loss. Species may avoid area. Impacts will be mitigated by limitation on timing of activities.
Ferruginous hawk (*Buteo regalis*)	Basin-prairie shrub, grasslands, rock outcrops	NS	NI	Nesting and foraging habitat may be impacted and human activities will increase.
Loggerhead shrike (*Lanius ludovicianus*)	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Nesting and foraging habitat may be impacted by dust, noise, human activities, and direct loss. Species may avoid area. Impacts will be mitigated by limitation on timing of activities.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Long-billed curlew (*Numenius americanus*)	Grasslands, plains, foothills, wet meadows	S	MIIH	Nesting and foraging habitat may be impacted by dust, noise, human activities, and direct loss. Species may avoid area. Impacts will be mitigated by limitation on timing of activities.
Mountain Plover	Short-grass prairie with slopes < 5%	K	MIIH	Wells and infrastructure are proposed in prairie dog colonies.See Mountain Plover discussion below.
Northern goshawk (*Accipiter gentilis*)	Conifer and deciduous forests	NS	NI	Suitable habitat is present but no goshawks were located during nesting surveys.
Peregrine falcon (*Falco peregrinus*)	Cliffs	NP	NI	Habitat not present.
Sage sparrow (*Amphispiza billneata*)	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Nesting and foraging habitat may be impacted by dust, noise, human activities, and direct loss. Species may avoid area. Impacts will be mitigated by limitation on timing of activities.
Sage thrasher (*Oreoscoptes montanus*)	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Nesting and foraging habitat may be impacted by dust, noise, human activities, and direct loss. Species may avoid area. Impacts will be mitigated by limitation on timing of activities.
Trumpeter swan (*Cygnus buccinator*)	Lakes, ponds, rivers	NP	NI	Habitat is not present.
Western Burrowing owl (*Athene cunicularia*)	Grasslands, basin-prairie shrub	K	MIIH	Nesting and foraging habitat may be impacted and human activities will increase.
White-faced ibis (*Plegadis chihi*)	Marshes, wet meadows	NP	NI	Habitat not present.
Yellow-billed cuckoo (*Coccyzus americanus*)	Open woodlands, streamside willow and alder groves	NP	NI	Habitat not present.
Mammals				
Black-tailed prairie dog (*Cynomys ludovicianus*)	Prairie habitats with deep, firm soils and slopes less than 10 degrees.	K	MIIH	Surface disturbing and maintenance activities will impact prairie dog colonies.
Fringed myotis (*Myotis thysanodes*)	Conifer forests, woodland chaparral, caves and mines	S	MIIH	Construction may impact foraging areas and alter habitat conditions.
Long-eared myotis (*Myotis evotis*)	Conifer and deciduous forest, caves and mines	S	MIIH	Construction may impact foraging areas and alter habitat conditions.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Swift fox (*Vulpes velox*)	Grasslands	S	MIIH	Dust, noise, and human activities may cause the species to avoid the area.
Townsend's big-eared bat (*Corynorhinus townsendii*)	Caves and mines.	S	MIIH	Construction may impact foraging areas and alter habitat conditions.
Plants				
Porter's sagebrush (*Artemisia porteri*)	Sparsely vegetated badlands of ashy or tufaceous mudstone and clay slopes 5300-6500 ft.	NP	NI	Habitat not present.
William's wafer parsnip (*Cymopterus williamsii*)	Open ridgetops and upper slopes with exposed limestone outcrops or rockslides, 6000-8300 ft.	NP	NI	Project area outside of species' range.

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

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

4.2.2.2.1. Bald Eagle

4.2.2.2.1.1. Direct and Indirect Effects

Impacts to bald eagles are discussed in the PRB FEIS on pp. 4-251 to 4-253. Additional site-specific information is provided here.

Human activities, traffic, and construction associated with implementation of the project may displace eagles from winter roosting and nesting habitats along Wild Horse and Middle Prong Wild Horse Creeks, and foraging eagles in the remainder of this project area.

4.2.2.2.1.2. Cumulative Effects

The cumulative effects for bald eagles are described in the PRB FEIS, pp. 4-251 to 4-253. In addition to the federal development, there is fee development associated with the project that has similar impacts on bald eagles. Livestock grazing also occurs in the area, which may provide some of the prey base for bald eagles that winter in the area. If bald eagles rely on the prairie dog colonies for prey, practices such as poisoning or shooting of prairie dogs or other intentional methods of extermination in order to increase forage for livestock can potentially harm bald eagles through a reduction in their prey base.

4.2.2.2.1.3. Mitigation Measures

To reduce the risk of disruption to the winter roosting activities of bald eagles, BFO will require a timing limitation on surface disturbing activities within 1.0 mile of winter roost habitat(Wild Horse and Middle Prong Wild Horse Creeks)between November 1and April 1 annually, until the habitat has been surveyed and no roosting is documented for that season.

To reduce the risk of disruption to nesting bald eagles, BFO will implement a timing limitation on surface disturbing activities within 1.0 miles of bald eagle nesting habitat (Wild Horse and Middle Prong Wild Horse Creeks) between February 1 and August 15 annually, until the habitat has been surveyed and no nesting is documented for that season.

4.2.2.2.1.4. Residual Effects

Even with timing limitations, habitat may be degraded to a point that the area no longer provides habitat requirements for wintering bald eagles. A 1.0 mile timing restriction on construction activities does nothing to protect valuable habitats from disturbance and also does not mitigate impacts associated with fee development, and habitat may be degraded over time to such an extent that productivity of bald eagles may be reduced, resulting in possible violations of the Bald and Golden Eagle Protection Act.

4.2.2.2.2. Mountain Plover

4.2.2.2.2.1. Direct and Indirect Effects

Suitable mountain plover habitat is present within the project area. Development of this project may impact mountain plovers. Playas, linear pipeline corridors and the black-tailed prairie dog colonies described in Section 3.3.2.3.6 (Black-tailed Prairie Dog) may provide suitable mountain plover habitat in some years, depending on precipitation and grazing pressure. The construction of CDU 13-31 and B Spellman Fed 13-9 wells, and associated infrastructure, will directly impact plover nesting habitat located in prairie dog colonies. It is likely that plover will avoid human disturbance in the area up to 0.25 miles from the well locations, making the area unsuitable for the species. Existing overhead power is located within 100 feet of the 13-9 well, potentially already making the area unsuitable for plover use.

Mineral development has mixed effects on mountain plovers. Disturbed ground, such as buried pipeline corridors and roads, may be attractive to plovers, while human activities within 0.25 mile may be disruptive. Use of roads and pipeline corridors by mountain plovers may increase their vulnerability to vehicle collision. Even if a nesting plover flushes in time, the nest would likely still be destroyed. Overhead power lines provide perch sites for raptors that could result in increased mountain plover

predation. CBNG infrastructure such as well houses and nearby metering facilities may provide shelter and den sites for ground predators such as skunks and foxes. Displaced mountain plovers may choose to nest in poor quality habitat when loss or alteration of their natural breeding habitat (predominantly prairie dog colonies) occurs, such as heavily grazed land, burned fields, fallow agriculture lands, roads, oil and gas well pads, and pipelines. These areas could become reproductive sinks. Adult mountain plovers may breed there, lay eggs and hatch chicks; however, the young may not reach fledging age due to the poor quality of the habitat. An analysis of direct and indirect impacts to mountain plover due to oil and gas development is included in the PRB FEIS, p. 4-254 to 4-255.

4.2.2.2.2.2. Cumulative Effects

The cumulative effects to mountain plover are discussed in the PRB FEIS (pp. 4-245 to 4-255).

4.2.2.2.2.3. Mitigation Measures

To reduce impacts to nesting mountain plovers, BFO will require a 0.25 mile timing limitation on surface-disturbing activities for potential nesting habitat during the nesting season.

4.2.2.2.2.4. Residual Effects

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

4.2.2.2.3. Western Burrowing Owl

4.2.2.2.3.1. Direct and Indirect Effects

The PRB FEIS discusses impacts to sensitive species on pp. 4-257 to 4-273. Nest #6028 is a burrow nest located approximately 300 feet from an access road to an existing CBNG facility, and within 0.25 mile of the B Spellman 13-9 well. The nest has been reported inactive since 2009. Due to the location of the nest it is likely that additional use from 1 CBNG well will not impact the nesting pair if the pair should use the nest in the future. Use of roads and pipeline corridors may increase owl vulnerability to vehicle collision. See the direct and indirect effects section for black-tailed prairie dog (4.2.3.2.3.1) for site specie effects to burrowing owl habitat.

4.2.2.2.3.2. Cumulative Effects

The PRB FEIS discusses impacts to sensitive species on pp. 4-257 to 4-273. In addition to the federal development, there will be fee development associated with the project that will have similar impacts on burrowing owls as those discussed in the PRB FEIS. Practices such as poisoning or shooting of prairie dogs or other intentional methods of extermination in order to increase forage for livestock can potentially affect burrowing owl productivity through a reduction in nest site availability.

4.2.2.2.3.3. Mitigation Measures

The Thunder Basin National Grasslands in Campbell County, WY, who cooperated with the BLM in the creation of the 2003 PRB EIS, recommends a 0.25 mile timing restriction buffer zone on surface disturbing activities for burrowing nest locations during their nesting season (April 15 to August 31). Instruction Memorandum No. 2006-197, directs the field offices to “use the least restrictive stipulations that effectively accomplish the resource objectives or uses.” Alteration of the general raptor nest timing limitation (Feb 1 to July 31) to a more specific burrowing owl nesting season timing limitation will

effectively reduce the vulnerability of owls to collision while shortening the timing restriction period to four and one half months from six and one half months, and from 0.5 mile to 0.25 mile.

4.2.2.2.3.4. Residual Effects

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

4.2.2.2.4. Black-tailed Prairie Dog

4.2.2.2.4.1. Direct and Indirect Effects

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

In Alternative B, 2 wells and their associated infrastructure are proposed within the prairie dog colony in Sections 9 and 31, T53N R75W. In addition, direct loss of prairie dog habitat is proposed from construction of a pump station and water lines through Section 6 T53N R75W, and Section 31 T54N 75W. A proposed gas line through Section 25 T53N R76W will also contribute to direct habitat loss. Degradation of habitat may result from overhead powerlines proposed in Section 31 T53N R75W and Section 36 T53N R76W.

4.2.2.2.4.2. Cumulative Effects

The PRB FEIS discusses impacts to black-tailed prairie dog on pp. 4-255 and pp. 4-256.

4.2.2.2.4.3. Mitigation Measures

No mitigation is proposed with alternative B.

4.2.2.2.4.4. Residual Effects

No residual effects are anticipated.

4.2.2.3. Big Game

4.2.2.3.1. Direct and Indirect Effects

Under the environmentally preferred alternative, yearlong and winter range for pronghorn antelope, yearlong and winter-yearlong range for mule deer, and yearlong range for white-tailed deer would be directly disturbed with the construction of wells, pipelines and roads. Habitat loss resulting from implementation of the project loss will also affect year-round use by elk. Habitat effectiveness for elk is discussed on p. 4-207 of the PRB EIS. Long term disturbance would be direct habitat loss. Short-term disturbances also result in direct habitat loss; however, they should provide some habitat value as these areas are reclaimed and native vegetation becomes established.

In addition to the direct habitat loss, big game would likely be displaced from the project area during drilling and construction. A study in central Wyoming reported that mineral drilling activities displaced mule deer by more than 0.5 miles (Hiatt and Baker 1981). The WGFD indicates a well density of 8 wells per section creates a high level of impact for big game and that avoidance zones around mineral facilities overlap creating contiguous avoidance areas (WGFD 2004). A multi-year study on the Pinedale Anticline suggests not only do mule deer avoid mineral activities, but after 3 years of drilling activity the deer have not become accustomed to the disturbance (Madson 2005).

Big game animals are expected to return to the project area following construction; however, populations will likely be lower than prior to project implementation as the human activities associated with operation and maintenance continue to displace big game. Mule deer are more sensitive to operation and maintenance activities than pronghorn, and, as the Pinedale Anticline study suggests, mule deer do not readily habituate. A study in North Dakota stated, "although the population (mule deer) had over 7 years to habituate to oil and gas activities, avoidance of roads and facilities was determined to be long term and chronic" (Lustig 2003). Deer have even been documented to avoid dirt roads that were used only by 4-wheel drive vehicles, trail bikes, and hikers (Jalkotzy et al. 1997).

Winter big game diets are sub-maintenance, meaning they lose weight and body condition as the winter progresses. Survival below the maintenance level requires behavior that emphasizes energy conservation. Canfield et al. (1999) pointed out that forced activity caused by human disturbance exacts an energetic disadvantage, while inactivity provides an energetic advantage for animals. Geist (1978) further defined effects of human disturbance in terms of increased metabolism, which could result in illness, decreased reproduction, and even death.

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

4.2.2.3.2. Cumulative Effects

The cumulative effects associated with Alternative B are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, refer to the PRB FEIS, pp. 4-181 to 4-215.

4.2.2.3.3. Mitigation Measures

No mitigation is proposed with alternative B.

4.2.2.3.4. Residual Effects

No residual effects are anticipated.

4.2.2.4. Aquatics

4.2.2.4.1. Direct and Indirect Effects

One proposed discharge will flow directly into Middle Prong Wild Horse Creek. Additionally, Williams is proposing to use an existing treatment originally provided by EMIT (Emissions Mitigation Technology, dba Exterran Water Management Services since 2008) (EWMS), from the Echeta Road Unit Treatment Facility on Wild Horse Creek. Minimal effects may occur if discharged water reaches a fish bearing stream.

4.2.2.4.2. Cumulative Effects

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

4.2.2.4.3. Mitigation Measures

No mitigation is proposed with alternative B.

4.2.2.4.4. Residual Effects

No residual effects are anticipated.

4.2.2.5. Migratory Birds

4.2.2.5.1. 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 to other migratory bird species, several species that are classified as sensitive by the BLM are suspected to occur in the project area including: Baird's sparrow, Brewer's sparrow, loggerhead shrike, long-billed curlew, sage sparrow, and sage thrasher.

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

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

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

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

4.2.2.5.2. Cumulative Effects

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

4.2.2.5.3. Mitigation Measures

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

4.2.2.5.4. Residual Effects

Sage-grouse timing limitations will apply only a small portion of this POD. Those migratory bird species

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

4.2.2.6. Raptors

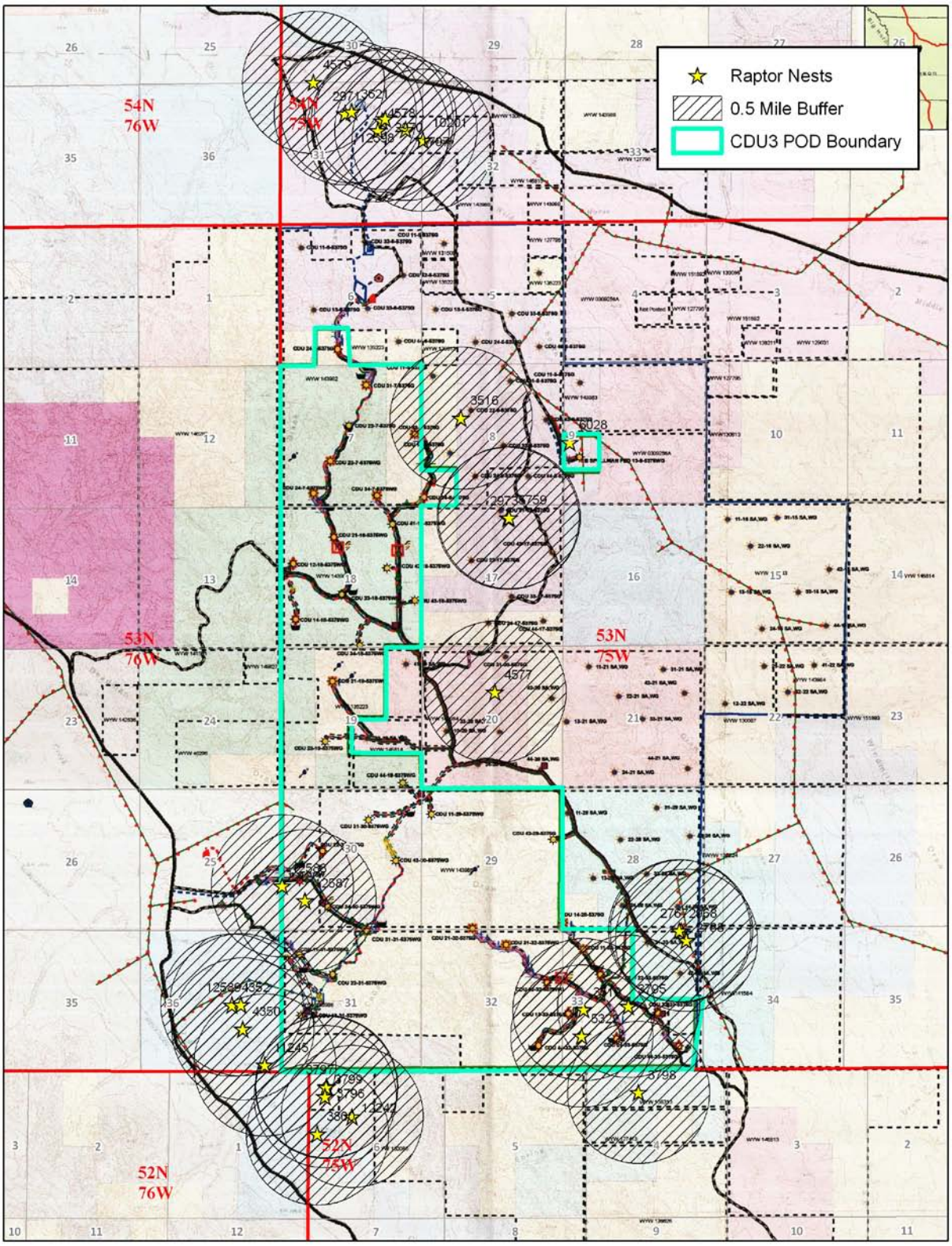
4.2.2.6.1. Direct and Indirect Effects

Direct and indirect effects to raptors are described in the PRB FEIS (pp. 4-216 to 4-220). This project will result in disturbance in proximity of nesting raptors, including direct loss of foraging habitats and indirect losses associated with declines in habitat effectiveness. All raptors using nests in the vicinity of the CDU3 project will likely be impacted to some extent by the human disturbance associated with operation and maintenance. Additional information and site-specific impacts are discussed here.

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

To reduce the risk of decreased productivity or nest failure, the BLM BFO requires a 0.5 mile radius timing limitation during the breeding season around active raptor nests and recommends all infrastructure requiring human visitation be located in such a way as to provide adequate biologic buffer for nesting raptors. A biologic buffer is a combination of distance and visual screening that provides nesting raptors with security such that they will not be flushed by routine activities. All proposed wells and associated infrastructure occurring within 0.5 miles of documented raptor nests are shown in Figure 4.3 below.

Figure 4.3. Proposed and Existing Infrastructure within 0.5 Mile of Documented Raptor Nests within the Cedar Draw Unit 3 Project Area.



At the onsite visits, the BLM biologist and Williams worked to try and reduce impacts to raptors from placement of wells and infrastructure. The following were changes made as a result of the onsite:

- Well 22-33 was moved approximately 400 feet northwest out of the line of nest #3795.
- Well 33-33 and a staging area were relocated east-southeast approximately 600 feet out of the direct line of site of nest #3795.

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

4.2.2.6.2. Cumulative Effects

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

4.2.2.6.3. Mitigation Measures

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

Williams also committed to the following measure (to be applied as a condition of approval) to mitigate potential impacts to nest #3795:

- Williams will not conduct work over operations associated with the 33-33-5375G well during the raptor timing limitation period, prior to an occupancy survey to determine nesting activity.

4.2.2.6.4. Residual Effects

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

4.2.2.7. Plains Sharp-tailed Grouse Effects

4.2.2.7.1. Direct and Indirect Effects

Direct and indirect effects to sharp-tailed grouse are described in the PRB FEIS pp. 4-221 to 4-226.

4.2.2.7.2. Cumulative Effects

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

4.2.2.7.3. Mitigation Measures

No mitigation is proposed with Alternative B.

4.2.2.7.4. Residual Effects

No residual impacts are anticipated.

4.2.2.8. West Nile Virus

4.2.2.8.1. Direct and Indirect Effects

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

4.2.2.8.1. Cumulative Effects

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

4.2.2.8.2. Cumulative Effects

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

4.2.2.8.3. Mitigation Measures

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

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

4.2.3. Water Resources

The operator submitted a comprehensive WMP for this project. It is incorporated-by-reference into this EA pursuant to 40 CFR 1502.21. The WMP incorporates sound water management practices, monitoring of downstream impacts within the Upper Powder River watershed and commitment to comply with Wyoming State water laws/regulations. It also addresses potential impacts to the environment and landowner concerns. Qualified hydrologists, in consultation with the BLM, developed the WMP that proposes to treat and discharge the produced water in Wild Horse Creek or Middle Prong Wild horse Creek. Adherence with the plan, in addition to BLM applied mitigation (in the form of COAs), would reduce project area and downstream impacts from proposed water management strategies.

The maximum water production for the Cedar Draw Unit 3 POD is predicted to be 18 gpm per well, or 738 gpm for the POD as approved under this alternative (1.6 cubic feet per second (cfs) or 1190 acre-feet per year). The PRB FEIS projected the total amount of water that was anticipated to be produced from CBNG development per year (Table 2-8, Projected Amount of Water Produced from CBM Wells. Under Alternatives 1, 2A and 2B, p. 2-26), for the Upper Powder River drainage, the volume projected to be produced within the watershed in 2011 was 44,169 acre-feet (maximum production was estimated to be 171,423 acre-feet in 2006). As such, the volume of water from these wells is 2.6% of the total volume projected for 2011. This volume of produced water is also within the predicted parameters of the PRB FEIS.

4.2.3.1. Groundwater

4.2.3.1.1. Direct and Indirect Effects

The PRB FEIS predicts an infiltration rate of 40% to groundwater aquifers and coal zones in the Upper Powder River drainage area (PRB FEIS, p. 4-5). For this action, it may be assumed that a maximum of 295 gpm will infiltrate at or near the discharge points and impoundments (476 acre feet per year). This water will saturate the near surface alluvium and deeper formations prior to mixing with the groundwater used for stock and domestic purposes. According to the PRB FEIS, “the increased volume of water recharging the underlying aquifers of the Wasatch and Fort Union Formations would be chemically similar to alluvial groundwater.” (PRB FEIS, p. 4-54). Therefore, the chemical nature and the volume of the discharged water may not degrade the groundwater quality.

The PRB FEIS predicts that one of the possible environmental consequences of CBNG production is impacts to the groundwater. “The effects of development of CB[NG] on groundwater resources would be seen as a drop in the water level (drawdown) in nearby wells completed in the developed coal aquifers and underlying or overlying sand aquifers.” (PRB FEIS, p. 4-1). In the process of dewatering the coal zones to increase natural gas recovery rates, this project may have some effect on the static water level of wells in the area. The permitted water wells produce from depths which range from 124 to 1012 feet compared to 650-1800 feet to the Smith, Anderson, Werner, and Gates coals. The Operator committed to offer water well agreements to holders of properly permitted domestic and stock wells within the circle of influence (0.5 mile of a federal CBNG producing well) of the proposed wells.

Recovery of the coal bed aquifer was predicted in the PRB FEIS to “…resaturate and repressurize the areas that were partially depressurized during operations. The amount of groundwater stored within the Wasatch - Tongue River sand and coals, and sands units above and below the coals is almost 750 million acre-feet of recoverable groundwater are (PRB FEIS, Table 3-5). Redistribution is projected to result in a rapid initial recovery of water levels in the coal. The model projects that this initial recovery period would occur over 25 years.” (PRB FEIS, p. 4-38).

4.2.3.1.2. Cumulative Effects

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

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

4.2.3.1.3. Mitigation Measures

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

In order to address the potential impacts from infiltration on shallow ground water, the Wyoming DEQ has developed a guidance document, "Compliance Monitoring and Siting Requirements for Unlined Impoundments Receiving Coalbed Methane Produced Water" (November, 2008). For all new WYPDES permits, the WDEQ requires that the proponent investigate the shallow groundwater at the proposed impoundment locations. Drilling at proposed impoundments began in the spring of 2004. Based on information received from the WDEQ, as of December, 2010, over 2016 impoundment sites have been investigated with more than 2305 borings. Of these impoundments, 257 met the criteria to require “compliance monitoring” if constructed and used for CBNG water containment. Only 132 impoundments requiring monitoring are presently being used. As of the fourth quarter of 2010, only 24 of those monitored impoundments (13.6%) caused a change in the “Class of Use” of any parameter in the underlying aquifer water.

4.2.3.1.4. Residual Effects

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

4.2.3.2. Surface Water

4.2.3.2.1. Direct and Indirect Effects

Produced Water Quality

Table 4.4 shows the average values of EC and SAR as measured at selected USGS gauging stations at high and low monthly flows, as well as the Wyoming groundwater quality standards for TDS and SAR for Class I to Class III water (there is no current standard for EC). Many of the limits established by the project WYPDES permits are variable according to time of year, and are dependent on other parameters. It also shows concentrations found in the POD's representative water sample.

Table 4.4. Comparison of Regulated Water Quality Parameters to Predicted Water Quality

Sample location or Standard	TDS mg/l	SAR	EC µmhos/cm
Primary Watershed at Powder River Gauging station Historic Data Average at Maximum Flow Historic Data Average at Minimum Flow		 4.76 7.83	 1,797 3,400
WDEQ Quality Standards for Wyoming Groundwater (Chapter 8) Drinking Water (Class I) Agricultural Use (Class II) Livestock Use (Class III)	 500 2,000 5,000	 8	
WDEQ Water Quality Standards for WYPDES Permit # WY0094072, WY0049697 (At discharge point)	Variable	Variable	Variable
Predicted Produced Water Quality from the Smith, Anderson, Werner, and Gates Coal Zones	1840	26.3	2830

Based on the analysis performed in the PRB FEIS, the primary beneficial use of the surface water in the PRB is the irrigation of crops (PRB FEIS, p. 4-69). The water quality projected for this POD is 1840 mg/l TDS which is within the WDEQ criteria for agricultural use (2000 mg/l TDS). However direct land application is not included in this proposal. If at any future time the operator entertains the possibility of irrigation or land application with the water produced from these wells, the proposal must be submitted as a sundry notice for separate environmental analysis and approval by the BLM.

The quality for the water produced from the Smith, Anderson, Werner, and Gates target coal zone wells is predicted to be similar to the sample water quality collected from a location near the POD. A maximum of 18 gallons per minute (gpm) is projected is to be produced from these 41 wells, for a total of 738 gpm for the POD.

To ensure that the produced water meets discharge standards established by their WYPDES permits the operator will use the existing Echeta Road Unit Treatment Facility and the proposed 32-6 Cedar Draw Unit Treatment Facility. All water management facilities were evaluated for compliance during the onsite.

The outfall design proposed for use in this project provides passive water treatment by aerating the produced water. Aeration adds dissolved oxygen to the produced water, allowing susceptible ions to oxidize and precipitate out of the water. This action is of particular importance with dissolved iron, as it is a key water quality parameter that is monitored by the state. When iron precipitates from the produced water, it will frequently leave iron oxide at or near the outfall, which can be identified as an orange stain

on materials that have been in contact with the water. The orange stain represents a positive benefit to the downstream waters, as iron left near the outfall means improved water quality downstream.

The operator obtained WYPDES permits from the WDEQ for the discharge of water produced from this project. Permit number WY0049697 will cover discharges within the Wild Horse Creek drainage and WY0094072 will cover discharges within the Middle Prong Wild Horse Creek.

Permit effluent limits were set at (WYPDES, pp. 2 and 3):

pH	6.5 to 9
Specific Conductance	2560 µmhos/cm max
Dissolved iron	1000 µg/l max
Total Barium	1800 µg/l max
Total Arsenic	8.4 µg/l max
Chlorides	150 mg/l

The WYPDES permit also addresses existing downstream concerns, such as irrigation use, in the COAs for the permit. As part of the WYPDES permits, an Irrigation and Tributary Monitoring Points have been established in the SESE of Section 16, Township 54N, Range 77W and NWSW of Section 23, Township 53N, Range 76W.

In order to determine the actual water quality of the producing formations in this POD and to verify the water analysis submitted for the pre-approval evaluation, the operator has committed to designate a reference well to each coal zone within the POD boundary. The reference well will be sampled at the wellhead for analysis within sixty days of initial production. A copy of the water analysis will be submitted to the BLM Authorized Officer. For more information refer to the WMP included in this POD.

Produced Water Control

There are 2 direct discharge points proposed under this alternative that discharge produced water to Wild Horse Creek and Middle Prong of Wild Horse Creek. The discharge point in Wild Horse Creek is existing and attached to Lance Oil and Gas' Echeta Road Unit Treatment Facility. The discharge point in the Middle Prong of Wild Horse Creek is proposed and will be attached to the proposed Cedar Draw Unit Treatment Facility. A third discharge point will also be attached to the 32-6 Cedar Draw Treatment Facility and will discharge to the existing 32-6 Reservoir (161 acre feet of storage). This reservoir and discharge point will act as an overflow and emergency storage for the Cedar Draw Treatment Facility. The reservoir was built to meet the requirements of the WSEO, WDEQ and the needs of the operator and the landowner. All facilities are appropriately sited and use appropriate water energy dissipation measures. Existing and proposed water management facilities were evaluated for compliance with best management practices during the onsite.

Produced Water Quantity

The operator proposes to discharge most of the water produced by the project to Wild Horse Creek of the Middle Prong Wild Horse Creek. Consequently, the volume of water produced from these wells may result in the addition of 1.64 cfs, divided between the 2 outfalls, to the receiving creeks. The operator committed to monitor the condition of channels and address any problems resulting from discharge. Reclamation plans for the impoundment will be submitted and approved when it is no longer needed for disposal of CBNG water, as required by BLM applied COAs.

Alternative (2A), the approved alternative in the ROD for the PRB FEIS, states that the peak production of water discharged to the surface will occur in 2006 with a total contribution to the mainstem of the Upper Powder River of 68 cfs (PRB FEIS, p. 4-87). The predicted maximum discharge rate from these 41 wells is anticipated to be a total of 738 gpm (1.64 cfs), which will be discharged to Wild Horse Creek and

Middle Prong Wild Horse Creek. Using an assumed conveyance loss of 20% (PRB FEIS, p. 4-74), this action may add a maximum 1.3 cfs to the Upper Powder River flows, or 1.9% of the predicted total CBNG produced water contribution. For more information regarding the maximum predicted water impacts resulting from the discharge of produced water, see Table 4-6 (PRB-FEIS p. 4-85).

In the WMP portion of the POD, the operator provided an analysis of the potential development in the watersheds above the project area (WMP, Appendix E). Based on the area of the Middle Prong Wild Horse Creek watershed above the POD (61.2 sq mi) and an assumed density of one well per location, every 80 acres, the potential exists for the development of 490 wells which could produce a maximum flow rate of 8820 gpm (20 cfs) of water. The BLM agrees with the operator that this is not expected to occur because:

1. Some of these wells are drilled and are producing.
2. New wells will be phased in over several years, and
3. A decline in well discharge generally occurs after several months of operation.

The potential maximum flow rate of produced water within the watersheds upstream of the project area, 20 cfs in Middle Prong Wild Horse Creek, is much less than the flow rate of runoff estimated from the 2-year storm event (236 cfs), (WMP Attachment D).

Springs

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

In-channel downstream impacts are addressed in the WMP for the Cedar Draw Unit 3 POD prepared by Western Water Consultants for Williams.

4.2.3.2.2. Cumulative Effects

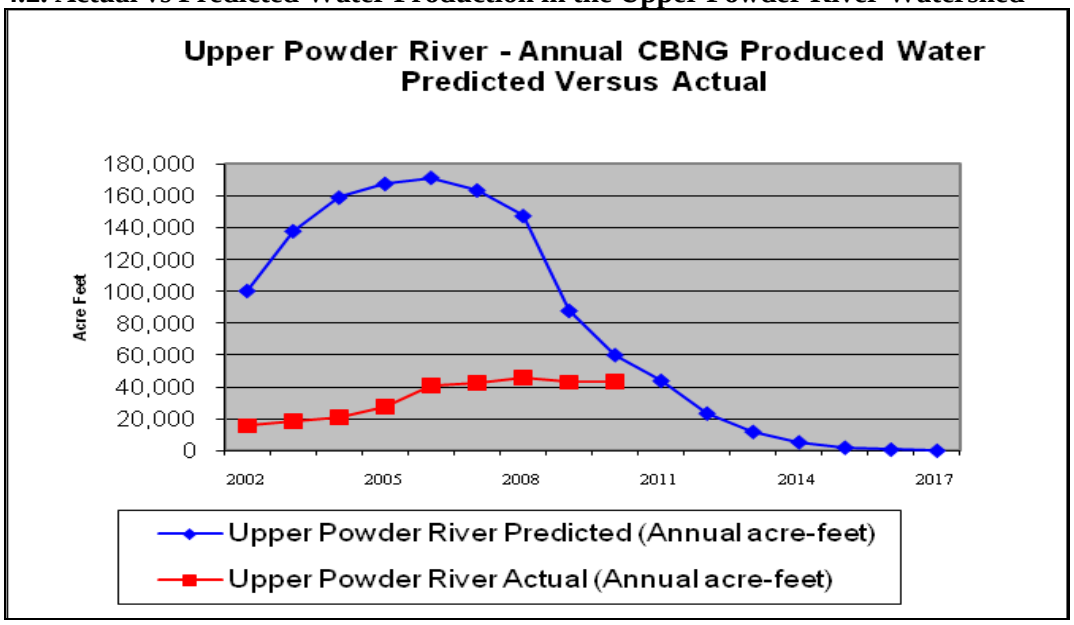
The analysis in this section includes cumulative data from fee, state and federal CBNG development in the Upper Powder River watershed. These data were obtained from the Wyoming Oil and Gas Conservation Commission (WOGCC).

As of December 2010, all producing CBNG wells in the Upper Powder River watershed discharged a cumulative volume of 298,864 acre-ft of water compared to the predicted 1,135,567 acre-ft disclosed in the PRB FEIS (Table 2-8, p. 2-26). These figures are presented graphically in Figure 4.2 and Table 4.5 following. This volume is 25.0 % of the total predicted produced water analyzed in the PRB FEIS for the Upper Powder River watershed.

Table 4.5. Actual vs Predicted Water Production in the Upper Powder River Watershed
2010 Data Update 04-06-11

Year	Upper Powder River Predicted (Annual acre-feet)	Upper Powder River Predicted (Cumulative acre-feet from 2002)	Upper Powder River Actual (Annual acre-feet)		Upper Powder River Actual (Cumulative acre-feet from 2002)	
			A-ft	% of Predicted	A-Ft	% of Predicted
2002	100,512	100,512	15,846	15.8	15,846	15.8
2003	137,942	238,454	18,578	13.5	34,424	14.4
2004	159,034	397,488	20,991	13.2	55,414	13.9
2005	167,608	565,096	27,640	16.5	83,054	14.7
2006	171,423	736,519	40,930	23.9	123,984	16.8
2007	163,521	900,040	42,112	25.8	166,096	18.5
2008	147,481	1,047,521	45,936	31.1	212,522	20.3
2009	88,046	1,135,567	43,079	48.9	255,601	22.5
2010	60,319	1,195,886	43,263	71.7	298,864	25.0
2011	44,169	1,240,055				
2012	23,697	1,263,752				
2013	12,169	1,275,921				
2014	5,672	1,281,593				
2015	2,242	1,283,835				
2016	1,032	1,284,867				
2017	366	1,285,233				
Total	**1,285,233**		**298,864**			

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



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

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

1. They are proportional to the actual amount of cumulatively produced water in the Upper Powder River drainage, which is approximately 25% of the total predicted in the PRB FEIS.
2. The WDEQ enforcement of the terms and conditions of the WYPDES permit that are designed to protect irrigation downstream.

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

4.2.3.2.3. Mitigation Measures

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

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

The operator has also committed to expediently stabilize and revegetate disturbance within channels and floodplains associated with this project.

4.2.3.2.4. 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, p. 4-118).

4.2.4. Cultural Resources

4.2.4.1. Direct and Indirect Effects

Non eligible site(s) 48CA746, 48CA4452, 48CA4453 will be impacted by the proposed project. No historic properties will be impacted by the proposed project. Following the Wyoming State Protocol Section VI(A)(1) the Bureau of Land Management electronically notified the Wyoming State Historic

Preservation Officer (SHPO) on May 13, 2011 that no historic properties exist within the area of potential effects (APE). If any cultural values [sites, artifacts, human remains (Appendix L PRB FEIS)] are observed during operation of this lease/permit/right-of-way, they will be left intact and the Buffalo Field Manager notified. Further discovery procedures are explained in the Standard COA (General)(A)(1).

4.2.4.2. Cumulative Effects

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

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

4.2.4.3. Mitigation Measures

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

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

4.2.4.4. 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.

4.3. Summary of Effects

Table 4.6 provides a comparison of the cumulative effects associated with the alternatives.

Table 4.6. Summary of Environmental Consequences for Cedar Draw Unit 3 POD by Alternative

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

Resource/Species	Alternative A	Alternative B
Sensitive Species		
Greater Sage Grouse	No habitat loss.	Greatest habitat loss.
	Existing overhead power poses predation and collision risk.	Greatest predation and collision risk associated with additional overhead power lines.
West Nile Virus	No Impact	Likely to have effect on the overall spread of Wnv.

5. CONSULTATION & COORDINATION

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

Table 5.1. Consultations

Contact	Title	Organization	
Mary Hopkins	Wyoming SHPO	WY State Historic Preservation Office	No
Meleah Corey	NRS	BLM	Yes
Scott Jawors	Wildlife biologist	BLM	Yes
Stacy Gunderson	Civil Engineer	BLM	Yes
Brent Sobotka	Hydrologist	BLM	Yes
Josh Wagner	Landman	Williams	Yes
Daren Downs	Project Supervisor	Williams	Yes
Jerry R Means		MAGNA	Yes
Ralph Demel	Construction supervisor	Williams	Yes
Brent Bruce	Manager	Superior Field Services	Yes
Justin Clyde	Construction supervisor	Williams	Yes
David Huber	POD/Biologist	Arcadis	Yes
Richard VanCampen	Landman	Williams	Yes
Mike Evens	Hydrologist	WWC	Yes
Peggy Carter	Hydrology	Williams	Yes
Ron Gossard	Hydrology	Williams	Yes
Kendell Cox	Rep.	Floyd Land and Livestock	Yes
Will Myers	Engineer	WWC	Yes
Pauline Schuette	Wildlife Biologist	US Fish and Wildlife Service	No

6. OTHER PERMITS REQUIRED

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

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8. LIST OF INTERDISCIPLINARY TEAM PREPARERS AND REVIEWERS

Meleah Corey, Natural Resource Specialist
Casey Freise, Supervisory Natural Resource Specialist
Brent Sobotka, Hydrologist
Matthew Warren, Petroleum Engineer
Karen Klaahsen, Legal Instruments Examiner
Clint Crago, Archaeologist
Darci Stafford, Wildlife Biologist
Scott Jawors, Wildlife Biologist
Kerry Aggen, Geologist
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Shirley Green, Administrative Record and Technical Editor
Stacy Gunderson, Civil Engineer
Arnie Irwin, Soil Scientist
Jim Verplancke, Assistant Field Manager, Resources
John Kelley, Planning and Environmental Coordination
Chris Durham, Assistant Field Manger, Resources
Duane W. Spencer, Field Manager

Interdisciplinary Team Lead: Meleah Corey

APPENDIX A: CONDITIONS OF APPROVAL FOR THE APPLICATION FOR PERMIT TO DRILL

POD Name: Cedar Draw Unit 3

Operator Name: Williams Production RMT Company

Field Office: Buffalo Field Office
Address: 1425 Fort Street
Buffalo, Wyoming 82834

Office Telephone Number: 307-684-1100

List of Wells:

	Well Name	Well #	QTR	Sec	TWP	RNG	Lease #
1	CEDAR DRAW UNIT 3	24-6G	SESW	6	53N	75W	WYW143982
2	CEDAR DRAW UNIT 3	23-7WG	NWNW	7	53N	75W	WYW143982
3	CEDAR DRAW UNIT 3	34-7WG	SWSE	7	53N	75W	WYW143982
4	CEDAR DRAW UNIT 3	22-7G	SENW	7	53N	75W	WYW143982
5	CEDAR DRAW UNIT 3	24-7WG	SESW	7	53N	75W	WYW143982
6	CEDAR DRAW UNIT 3	31-7G	NWNE	7	53N	75W	WYW143982
7	CEDAR DRAW UNIT 3	43-7G	NESE	7	53N	75W	WYW143982
8	CEDAR DRAW UNIT 3	14-8G	SWSW	8	53N	75W	WYW143982
9	CEDAR DRAW UNIT 3	13-9WG	NWSW	9	53N	75W	WYW0309256A
10	CEDAR DRAW UNIT 3	34-18WG	SWSE	18	53N	75W	WYW143983
11	CEDAR DRAW UNIT 3	12-18WG	SWNW	18	53N	75W	WYW143983
12	CEDAR DRAW UNIT 3	21-18WG	NENW	18	53N	75W	WYW143983
13	CEDAR DRAW UNIT 3	23-18WG	NESW	18	53N	75W	WYW143983
14	CEDAR DRAW UNIT 3	41-18WG	NENE	18	53N	75W	WYW143983
15	CEDAR DRAW UNIT 3	42-18WG	SENE	18	53N	75W	WYW143983
16	CEDAR DRAW UNIT 3	43-18WG	NESE	18	53N	75W	WYW143983
17	CEDAR DRAW UNIT 3	14-18WG	SWSW	18	53N	75W	WYW143983
18	CEDAR DRAW UNIT 3	21-19WG	NENW	19	53N	75W	WYW135223
19	CEDAR DRAW UNIT 3	23-19WG	NESW	19	53N	75W	WYW135223
20	CEDAR DRAW UNIT 3	44-19WG	SESE	19	53N	75W	WYW146814
21	CEDAR DRAW UNIT 3	11-29WG	NWNW	29	53N	75W	WYW143985
22	CEDAR DRAW UNIT 3	42-29G	SENE	29	53N	75W	WYW143985
23	CEDAR DRAW UNIT 3	14-28G	SWSW	28	53N	75W	WYW143985
24	CEDAR DRAW UNIT 3	21-32G	NENW	32	53N	75W	WYW143986
25	CEDAR DRAW UNIT 3	31-30WG	NWNE	30	53N	75W	WYW143985
26	CEDAR DRAW UNIT 3	43-30WG	NESE	30	53N	75W	WYW143985

	Well Name	Well #	QTR	Sec	TWP	RNG	Lease #
27	CEDAR DRAW UNIT 3	24-30WG	SESW	30	53N	75W	WYW143985
28	CEDAR DRAW UNIT 3	22-30G	SENW	30	53N	75W	WYW143985
29	CEDAR DRAW UNIT 3	13-31WG	NWSW	31	53N	75W	WYW143986
30	CEDAR DRAW UNIT 3	22-31WG	SENW	31	53N	75W	WYW143986
31	CEDAR DRAW UNIT 3	31-31WG	NWNE	31	53N	75W	WYW143986
32	CEDAR DRAW UNIT 3	11-31WG	NWNW	31	53N	75W	WYW143986
33	CEDAR DRAW UNIT 3	31-32WG	NWNE	32	53N	75W	WYW143986
34	CEDAR DRAW UNIT 3	42-32WG	SENE	32	53N	75W	WYW143986
35	CEDAR DRAW UNIT 3	44-32G	SESE	32	53N	75W	WYW143986
36	CEDAR DRAW UNIT 3	11-33G	NWNW	33	53N	75W	WYW143986
37	CEDAR DRAW UNIT 3	13-33G	NWSW	33	53N	75W	WYW143986
38	CEDAR DRAW UNIT 3	22-33G	SENW	33	53N	75W	WYW143986
39	CEDAR DRAW UNIT 3	24-33G	SESW	33	53N	75W	WYW143986
40	CEDAR DRAW UNIT 3	33-33G	NWSE	33	53N	75W	WYW143986
41	CEDAR DRAW UNIT 3	44-33G	SESE	33	53N	75W	WYW143986

Water Management:

Facility Name	Qtr/Qtr	Sec	TWP	RNG	Capacity (acre feet)	Surface Disturbance (acres)	Lease #
Res 32-6	SWNE	6	53N	75W	161	0*	WYW143982
Echeta Road Unit Treatment Facility (Existing)	NWNW	26	53N	76W	NA	0	None
Cedar Draw Unit Treatment Facility (Proposed)	NWNE	6	53N	75W	NA	2	WYW143982

* Approved under Cedar Draw Unit 1 POD

List of approved Right-of Ways:

Rights-of-Way:
The following road rights-of-way locations were identified with the Cedar Draw Unit 3 POD. Amended right-of-Way WYW-169609 will be granted under the Federal Land Policy and Management Act of 1976. Construction of the following location is prohibited until authorized rights-of-ways have been issued. These rights-of-ways will fall within the constraints of the appropriate stipulations and conditions of approval of the POD.

	Serial Number	Description	Length	Width	Sec	TWP	RNG
1	WYW-169609	Proposed template road	Apprx. 1,000’	NTE 45’	3	52N	75W

SITE SPECIFIC

Surface Use

1. Stablization of steep slopes greater than 4H:1V will include but is not limited to the following components to minimize erosion and loss of seed:

    a. Surfacing roughening/pocketing or scarification perpendicular to the slope; Install slope breakers such as wattled and water vars at the appropriate spacing.
    b. Seed with appropriate seed mis
    c. Apply straw mulch or bio/photodegradable erosion control facric on highly erodible soils.

2. Waddling is most effective as erosion control if applied on slopes less than 3H:1V. In the absence of manufacture's specifications included in the operator's Master Surface Use Plan, construct per DEQ requirements.

3. All pit spoil must be placed back in the pit once the pit is dry or fluids are removed. Subsoil must then be replaced in the reserve pit before topsoiling. Under no circumstances would any by-products from drilling or subsoil to be spread on top of topsoil. The pit area should usually be mounded slightly or restored to the original contour to allow for settling and positive surface drainage.

4. The reserve pit will be lined with an impermeable liner for the following wells because sandy soils were identified during onsite visits:
    - 22-7, 23-7, 31-7, 44-32, 21-19, 23-19, 11-29, and 31-32.

    The liner will be installed so that it will not leak and will be chemically compatible with all substances that may be put in the pit. Liners made of any man-made synthetic material will be of sufficient strength and thickness to withstand normal installation and pit use. In gravelly or rocky soils, a suitable bedding material such as sand will be used prior to installing the liner.

5. The Cedar Draw Unit 3 Project area is dominated by soils that have been identified to have limited reclamation potential and/or soils susceptible to erosion that will require disturbed areas to be stabilized (stabilization efforts may include mulching, matting, soil amendments, etc.) 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. This applies to the following:

    - The Cedar Draw Unit 3 21-32, 43-7,and 22-31 wells;
    - The upgraded road section for the 22-30 well and 11-3 well access roads; and
    - cross country pipeline corridor running from the 22-31 well to the 43-30 well.

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

7. All engineered road segments must be completed, including any culverts, low water crossings and required surfacing, before the drilling rig or other drilling equipment moves onto the pad.

8. The BLM requires the following roads on federal surface to be surfaced with an average of 4 inches of Gradation W gravel due to the higher anticipated ADT and steep slopes per the WY Supplement to the BLM Manual 9113: all roads with grades steeper than 8% grade or an anticipated ADT of 10 or greater.

9. By November 1 each year, the operator will submit the following information, attached to a Sundry Form 3160-5, where construction and development have taken place in the last year.
   - Georeferenced spatial data depicting as-built locations of all facilities, wells, roads, pipelines, power lines, reservoirs, discharge points, and other related facilities to the BLM for all PODs.
   - Two as-built copies of Map D.

Wildlife

Bald Eagles

The following conditions will alleviate impacts to bald eagles:

1. Surveys for active bald eagle nests and winter roost sites will be conducted within suitable habitat by a BLM approved wildlife biologist. Surface disturbing activities will not be permitted within one mile of suitable habitat prior to survey completion. Suitable habitat in the Cedar Draw Unit 3 POD is defined as portions of Wild Horse Creek and Middle Prong Wild Horse Creek (Attachment 1)..

2. A minimum disturbance-free buffer zone of 0.5 mile (i.e., no surface occupancy) will be established year-round for all Bald eagle nest sites. A seasonal minimum disturbance-free buffer zone of one mile will be established for all Bald eagle nest sites (February 15 – August 15).

3. A seasonal minimum disturbance-free buffer zone of 1 mile will be established for all bald eagle winter roost sites (November 1 – April 1). These buffer zones and timing may be adjusted based on site-specific information through coordination with, and written approval from, the USFWS.

Mountain Plover

The following conditions will alleviate impacts to mountain plovers:

1. No surface-disturbing activities shall occur within 0.25 mile of potential mountain plover nesting habitat, annually, from March 15 through July 31, prior to a nesting survey. This timing limitation will be in effect unless surveys determine the habitat to be unoccupied. Refer to the attached map (Attachment 2) for affected wells and infrastructure for the 2011 year.

   a. Mountain plover nesting surveys shall be conducted by a biologist following the most current USFWS Mountain Plover Survey Guidelines. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities.
   b. If a plover is observed, no surface-disturbing activities shall occur within 0.25 miles of the prairie dog colony from March 15 through July 31.

Raptors

The following conditions will alleviate impacts to raptors:

1. The operator shall not conduct workover operations associated with the 33-33-5375G well during the raptor timing period, prior to an occupancy survey of nest 3795 (operator committed measure). Surveys shall be conducted by a biologist following BLM protocol and results shall be submitted in writing to a Buffalo BLM biologist and approved prior to commencement of operations.

2. No surface-disturbing activities shall occur within 0.5 mile of all identified raptor nests, from February 1 through July 31, annually, prior to a nesting survey. This timing limitation will be in effect unless surveys determine the nest to be inactive. Refer to the attached map (Attachment 3) for affected wells and infrastructure for the 2011 year.
   a. Surveys shall be conducted by a biologist following BLM protocol. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities.
   b. If an undocumented raptor nest is located during project construction or operation, the Buffalo Field Office (307-684-1100) shall be notified within 24 hours.

Sage-Grouse

The following conditions will alleviate impacts to sage-grouse:

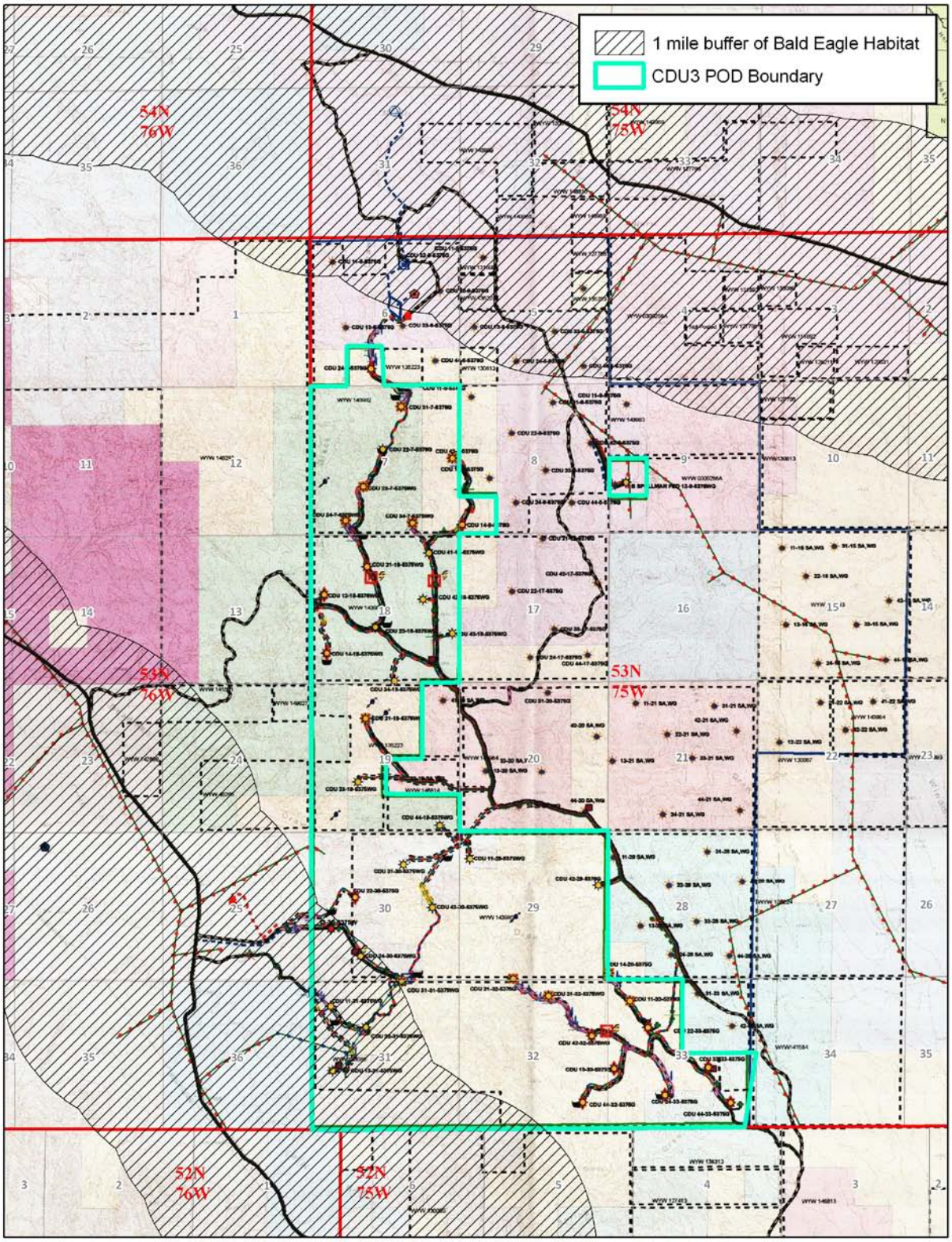
1. No surface-disturbing activities shall occur within 2 miles of the Laramore lek (Section 26, T53N R75W), from March 15 through June 30 (Buffalo RMP Maintenance Action September 17, 2010), annually. Refer to the attached map (Attachment 4) for affected wells and associated infrastructure.

Western Burrowing Owls

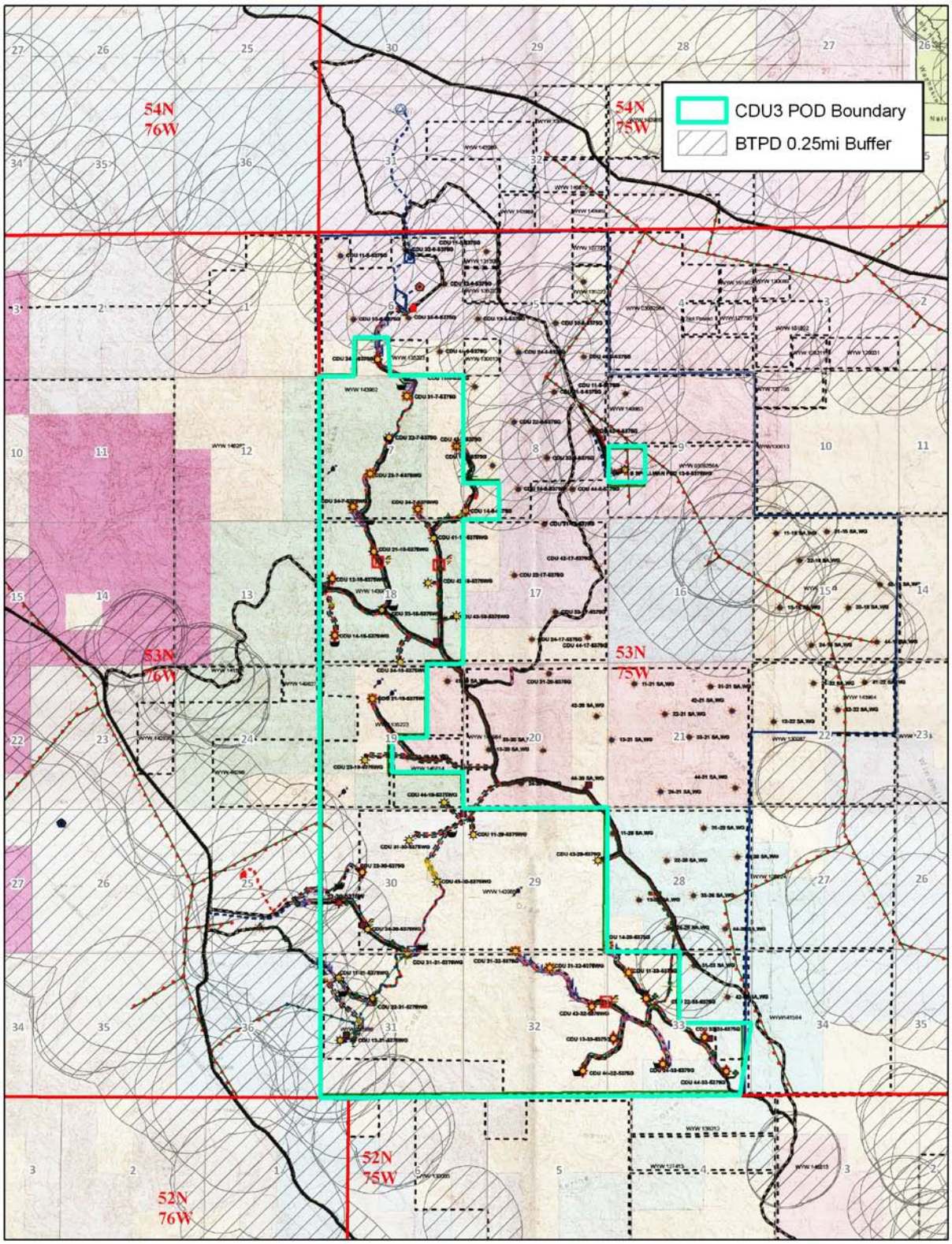
The following conditions will alleviate impacts to burrowing owls:

1. No surface-disturbing activities shall occur within 0.25 mile of all identified prairie dog colonies, from April 15 through August 31, annually, prior to a burrowing owl survey. This timing limitation will be in effect unless surveys determine that no burrowing owls are present. A 0.25 mile buffer will be applied if a burrowing owl nest is identified. Refer to the attached map (Attachment 2) for affected wells and infrastructure.
    a. Surveys shall be conducted by a biologist following BLM protocol. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities.
    b. If a burrowing owl nest is located during project construction or operation, the Buffalo Field Office (307-684-1100) shall be notified within 24 hours.

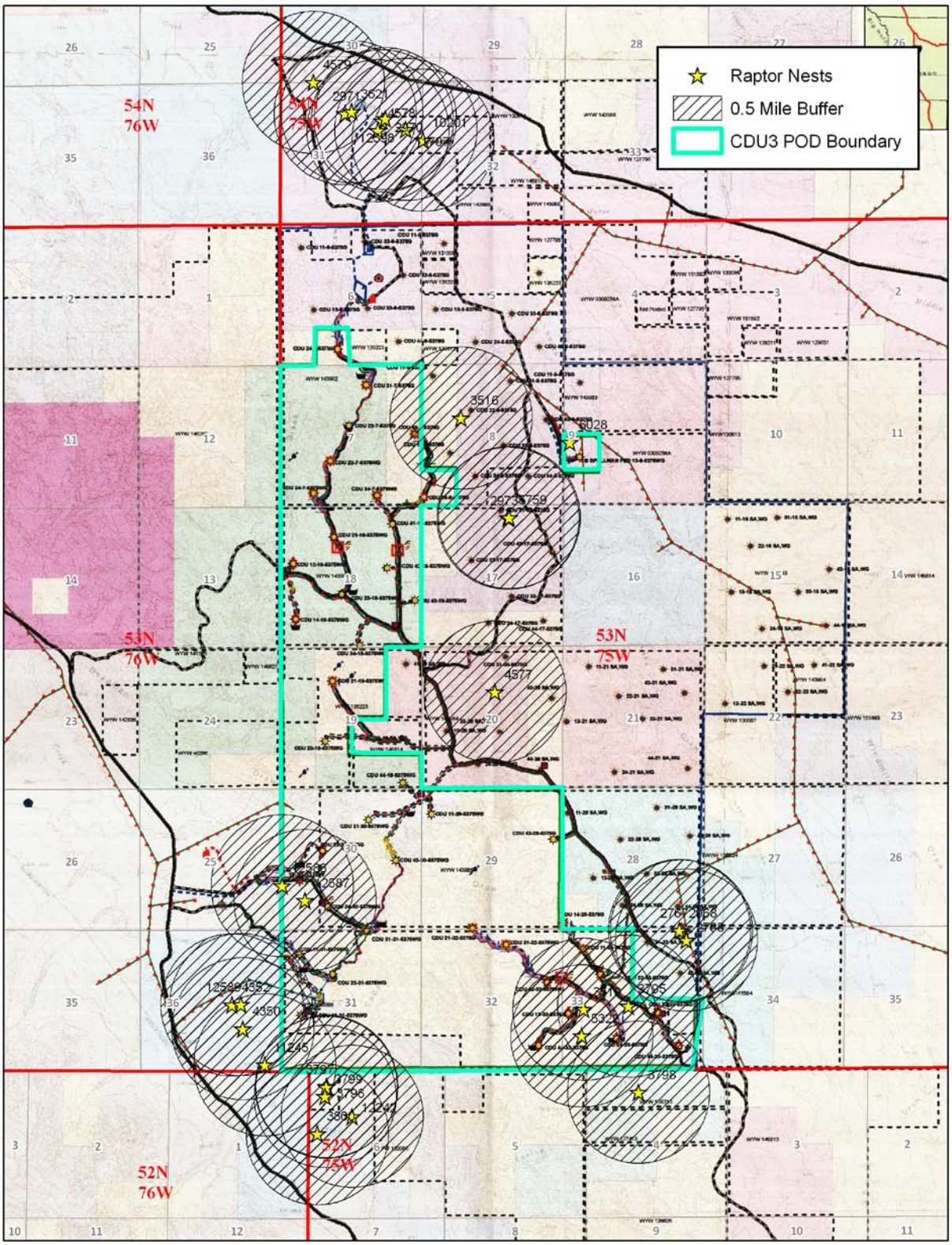
Attachment 1. Bald Eagle Site Specific Condition of Approval Map



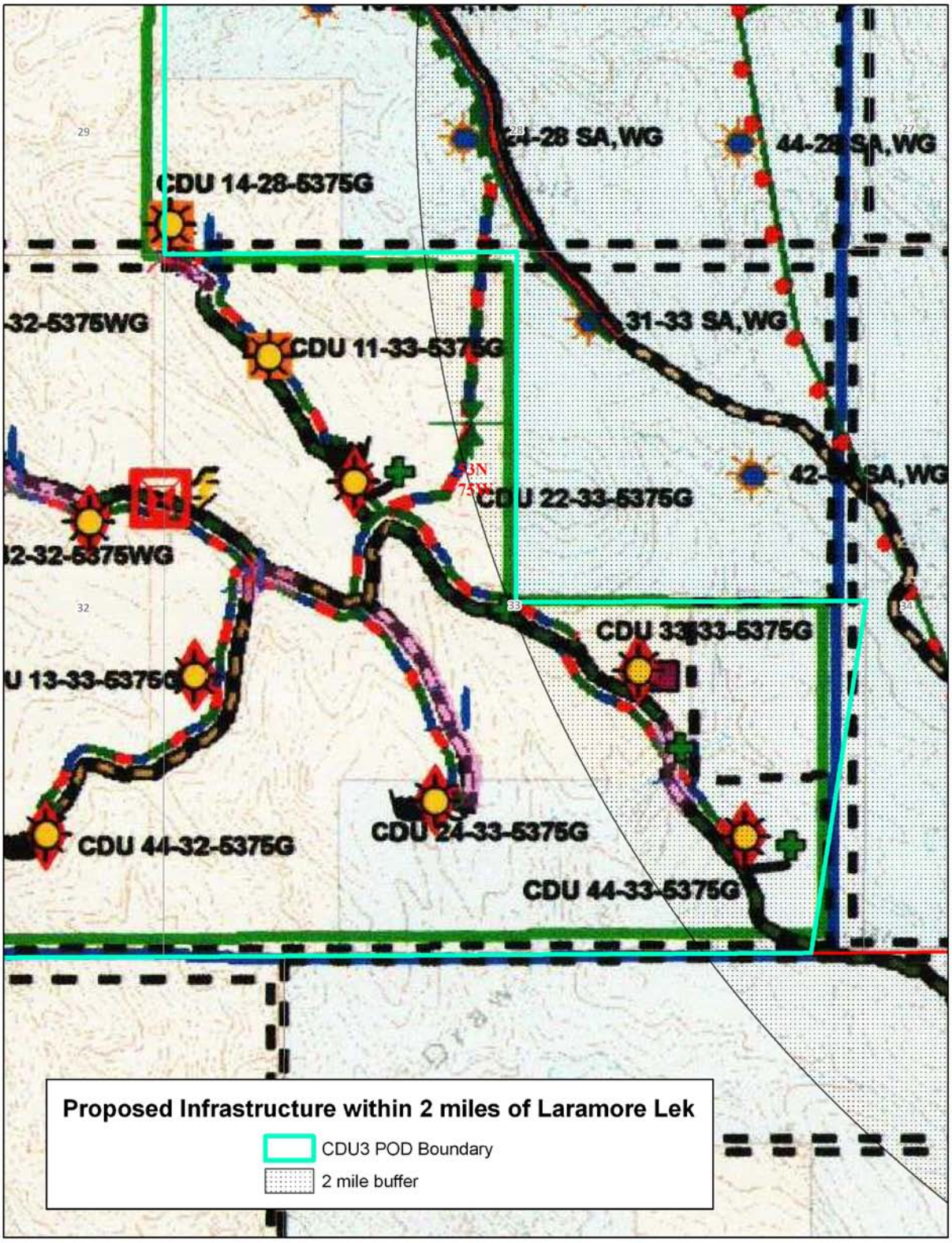
Attachment 2. Mountain Plover and Burrowing Owl Site Specific Condition of Approval Map



Attachment 3. Raptor Site Specific Condition of Approval Map



Attachment 4. Sage-grouse Site Specific Condition of Approval Map



Water

1. The operator will sample the springs as listed below twice each year (spring and fall) for the duration of production to determine any changes in water quality or quantity. Analysis will follow the WYPDES Permit initial quality criteria suite. Flow rate will also be determined. Copies of water quality and quantity data will be reported to the BLM BFO.

Spring Name	Qtr	Section	Twn	Rng
Spring 7-1	NW¼SW¼	7	53N	75W
Spring 19-1	NW¼NE¼	19	53N	75W
Spring 19-2	NE¼NW¼	19	53N	75W
Spring 19-3	SW¼SW¼	19	53N	75W
Spring 29-1	NE¼SW¼	29	53N	75W

Cultural

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 Middle Prong Wild Horse Creek). Some portions of the monitoring areas as described may lie outside alluvial deposits and exact monitoring areas are left to the discretion of the archeological monitor. All monitored areas must be plotted on the map provided with the monitoring report. The submission of two copies of a monitoring report to BFO is required within 30 days of the completion of all monitoring work.

1. All surface disturbing activity associated with the construction of the waterline and outfall in T54N R75W Section 31, as delineated on the cultural resource inventory map.

<u>PROGRAMMATIC</u>

Programmatic mitigation measures identified in the PRB FEIS ROD

Programmatic mitigation measures are those, determined through analysis, which may be appropriate to apply at the time of APD approval if site specific conditions warrant. 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.

Surface Water

1. Channel Crossings:
   a) 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.
   b) Channel crossings by pipelines will be constructed so that the pipe is buried at least four feet below the channel bottom.

2. Low water crossings will be constructed at original streambed elevation in a manner that will prevent any blockage or restriction of the existing channel. Material removed will be stockpiled for use in reclamation of the crossings.

3. The operator will supply a copy of the complete approved Chapter 3 permit to construct associated with treatment facilities to BLM as they are issued by WDEQ.

Wildlife

1. For any surface-disturbing activities proposed in sagebrush shrublands, the Companies will conduct clearance surveys for sage grouse breeding activity during the sage grouse's breeding season before initiating the activities. The surveys must encompass all sagebrush shrublands within 0.5 mile of the proposed activities.

Threatened, Endangered, or Sensitive Species

Bald Eagle

1. In the event that a bald eagle (dead or injured) is located during construction or operation, the USFWS' Wyoming Field Office (307-772-2374) and the USFWS' Law Enforcement Office (307-261-6365) will be notified within 24 hours.

2. Special habitats for raptors, including wintering bald eagles, will be identified and considered during the review of Sundry Notices

Mountain Plover

1. A disturbance-free buffer zone of 0.25 mile will be established around all occupied mountain plover nesting habitat between March 15 and July 31.

2. Work schedules and shift changes will be set to avoid the periods from 30 minutes before to 30 minutes after sunrise and sunset during June and July, when mountain plovers and other wildlife are most active.

STANDARD

General

1. A pre-construction field meeting shall be conducted prior to beginning any dirt work approved under this POD. The operator shall contact Meleah Corey, Natural Resource Specialist, BLM, at 307-684-1070 at least 4-days prior to beginning operations so that the meeting can be scheduled. The operator is responsible for having all contractors present (dirt contractors, drilling contractor, pipeline contractor, project oversight personnel, etc.) including the overall field operations superintendent, and for providing all contractors copies of the approved POD, project map and BLM Conditions of Approval pertinent to the work that each will be doing.

2. If any cultural values [sites, artifacts, human remains (Appendix L FEIS)] are observed during operation of this lease/permit/right-of-way, they will be left intact and the Buffalo Field Manager notified. The authorized officer will conduct an evaluation of the cultural values to establish appropriate mitigation, salvage or treatment. The operator is responsible for informing all persons in the area who are associated with this project that they will be subject to prosecution for knowingly disturbing historic or archaeological sites, or for collecting artifacts. If historic or archaeological materials are uncovered during construction, the operator is to immediately stop work that might further disturb such materials, and contact the authorized BLM officer (AO). Within five working days the AO will inform the operator as to:

   a. whether the materials appear eligible for the National Register of Historic Places;
   b. the mitigation measures the operator will likely have to undertake before the site can be used (assuming in situ preservation is not necessary); and,
   c. a time-frame for the AO to complete an expedited review under 36 CFR 800.11 to confirm, through the State Historic Preservation Officer, that the findings of the AO are correct and that mitigation is appropriate. The AO will provide technical and procedural guidelines for the conduct of mitigation. Upon verification from the AO that the required mitigation has been completed, the operator will then be allowed to resume construction measures.

3. If paleontological resources, either large or conspicuous, and/or a significant scientific value are discovered during construction, the find will be reported to the Authorized Officer immediately. Construction will be suspended within 250 feet of said find. An evaluation of the paleontological discovery will be made by a BLM approved professional paleontologist within five (5) working days, weather permitting, to determine the appropriate action(s) to prevent the potential loss of any significant paleontological values. Operations within 250 feet of such a discovery will not be resumed until written authorization to proceed is issued by the Authorized Officer. The applicant will bear the cost of any required paleontological appraisals, surface collection of fossils, or salvage of any large conspicuous fossils of significant scientific interest discovered during the operation.
4. Please contact Meleah Corey, Natural Resource Specialist, at (307) 684-1100, Bureau of Land Management, Buffalo, if there are any questions concerning the following surface use COAs.

5. The first well drilled to each targeted coal zone will be designated as the POD reference well. Designated reference wells must have the ability to be sampled at the wellhead. Water quality samples will be collected by the operator and submitted for analysis using WDEQ NPDES criteria within 30-60 days of initial water production. Results of the analysis will be submitted to the BFO-BLM Authorized Officer as soon as they become available.

DRILLING AND PRODUCTION OPERATIONS

1. The operator shall complete wells (case, cement and under ream) as soon as possible, but no later than 30 days after drilling operations, unless an extension is given by the BLM Authorized Officer.

2. If in the process of air drilling the wells there is a need to utilize mud, all circulating fluids will be contained either in an approved pit or in an aboveground containment tank. The pit or containment tank will be large enough to safely contain the capacity of all expected fluids without danger of overflow. Fluid and cuttings will not be squeezed out of the pit, and the pit will be reclaimed in an expedient manner.

Well Control Equipment

1. The flow line shall be a minimum of 30 feet from the well bore and securely anchored. The 30-foot length of line is a minimum and operators must make consideration for increasing this length for topography and/or wind direction.

2. The flow line shall be a straight run.

3. The flow line must be constructed from non-flammable material.

4. All cuttings and circulating medium shall be directed to and contained in a reserve pit.

5. The nearest edge of the pits shall be a minimum of 25’ from the rig.

6. A minimum of 2’ of freeboard shall be maintained in the pits at all times.

7. The authorized officer may modify these requirements at any time if it is determined that increased pressure control is deemed necessary.

8. Verbal notification shall be given to the Authorized Officer at least 24 hours before formation tests, BOP tests, running and cementing casing, and drilling over lease expiration dates.

Cement Program

1. If there are indications of inadequate primary cementing of the surface, intermediate, or production casing strings; such as but not limited to no returns to surface, cement channeling, fallback or mechanical failure of equipment, the operator will evaluate the adequacy of the cementing operations. This evaluation will consist of running a cement bond log (CBL) or an alternate method approved by the Authorized Officer (AO) no sooner than 12 hours and no later than 24 hours from the time the cement was first pumped.

2. If the evaluation indicates inadequate cementing, the operator shall contact a BLM Buffalo Field Office Petroleum Engineer for approval of remedial cementing work.

3. The adequacy of the remedial cementing operations shall be verified by a cement bond log (CBL) or an alternate method approved by the Authorized Officer (AO). All remedial work shall be completed and verified prior to drilling out the casing shoe or perforating the casing for purposes other than remedial cementing.

4. The cement mix water used must be of the same water quality used to develop the cement program.

Production Equipment

1. Other actions such as off-lease measurement, commingling, allocation, etc. shall be approved via a Notice of Intent sundry (Form No. 3160-5). Submission of additional information in the POD shall not be construed as permission for these items. If the operator wishes to utilize off-lease gas measurement for wells approved in this POD, they are required to obtain approval via a Notice of Intent sundry (Form No. 3160-5) prior to any gas production.

Well and POD Building Identification

1. From the time a well pad is constructed or a well is spudded (if no well pad needed), until abandonment, all well locations must be properly identified with a legible sign. The sign will include the well name and number, operator name, lease number, and the surveyed location.

2. At each POD building site where federal wells are metered, the operator is required to maintain a legible sign displayed in a conspicuous place. This sign is required to be in place at the time metering goes online. The sign shall include: POD name, Operator, Federal well names and numbers, Federal lease numbers being metered at the POD building, and surveyed location of the building.

Protection of Fresh Water Resources

1. All oil and gas operations shall be conducted in a manner to prevent the pollution of all freshwater resources. All fresh waters and waters of present or probable future value for domestic, municipal, commercial, stock or agricultural purposes will be confined to their respective strata and shall be adequately protected. Special precautions will be taken to guard against any loss of artesian water from the strata in which it occurs and the contamination of fresh water by objectionable water, oil, condensate, gas or other deleterious substance to such fresh water.

Miscellaneous Conditions

1. Any changes to the approved drilling plan and/or these conditions of approval shall be approved by the BLM-Buffalo Field Office Petroleum Engineer prior to being implemented.

After hour's numbers:
Supervisory Petroleum Engineer: Matthew Warren Cell Telephone: 307-620-0103

2. If any cores are collected, a copy of all analysis performed shall be submitted to the BLM-Buffalo Field Office Petroleum Engineer.

SURFACE USE STANDARD

A. Construction

1. Construction and drilling activity will not be conducted using frozen or saturated soil material during periods when watershed damage or excessive rutting is likely to occur.

2. Remove all available topsoil from constructed well locations including areas of cut and fill, and stockpile at the site. Topsoil will also be salvaged for use in reclamation on all other areas of surface disturbance (roads, pipelines, etc.). Clearly segregate topsoil from excess spoil material. Any topsoil stockpiled for one year or longer will be signed and stabilized with annual ryegrass or other suitable cover crop.

3. The operator will not push soil material and overburden over side slopes or into drainages. All soil material disturbed will be placed in an area where it can be retrieved without creating additional undue surface disturbance and where it does not impede watershed and drainage flows.

4. Construct the backslope no steeper than ½:1, and construct the foreslope no steeper than 2:1, unless otherwise directed by the BLM Authorized Officer.

5. Maintain a minimum 20-foot undisturbed vegetative border between toe-of-fill of pad and/or pit areas and the edge of adjacent drainages, unless otherwise directed by the BLM Authorized Officer.

6. To minimize electrocution potential to birds of prey, all overhead electrical power lines will be constructed to standards identified by the Avian Power Line Interaction Committee (2006).

7. The reserve pit will be oriented to prevent collection of surface runoff. After the drilling rig is removed, the operator may need to construct a trench on the uphill side of the reserve pit to divert surface drainage around it. If constructed, the trench will be left intact until the pit is closed.

8. The reserve pit will be lined with an impermeable liner if permeable subsurface material is encountered. An impermeable liner is any liner having a permeability less than 10^{-7} cm/sec. The liner will be installed so that it will not leak and will be chemically compatible with all substances that may be put in the pit. Liners made of any man-made synthetic material will be of sufficient strength and thickness to withstand normal installation and pit use. In gravelly or rocky soils, a suitable bedding material such as sand will be used prior to installing the liner.

9. The reserve pit will be constructed so that at least half of its total volume is in solid cut material (below natural ground level).

10. Reserve pits will be adequately fenced during and after drilling operations until pit is reclaimed so as to effectively keep out wildlife and livestock. Adequate fencing, in lieu of more stringent requirements by the surface owner, is defined as follows:

    - Construction materials will consist of steel or wood posts. Three or four strand wire (smooth or barbed) fence or hog panel (16-foot length by 50-inch height) or plastic snow fence must be used with connectors such as fence staples, quick-connect clips, hog rings, hose clamps, twisted wire, etc. Electric fences will not be allowed.

- Construction standards: Posts shall be firmly set in ground. If wire is used it must be taut and evenly spaced, from ground level to top wire, to effectively keep out animals. Hog panels must be tied securely into posts and one another using fence staples, clamps, etc. Plastic snow fencing must be taut and sturdy. Fence must be at least 2-feet from edge of pit. 3 sides fenced before beginning drilling, the fourth side fenced immediately upon completion of drilling and prior to rig release. Fence must be left up and maintained in adequate condition until pit is closed.

11. Reserve pits will be closed as soon as possible, but no later than 90 days from time of drilling/well completion, unless the BLM Authorized Officer gives an extension. Squeezing of pit fluids and cuttings is prohibited. Pits must be dry of fluids or they must be removed via vac truck or other environmentally acceptable method prior to backfilling, recontouring and replacement of topsoil. Mud and cuttings left in pit must be buried at least 3-feet below recontoured grade. The operator will be responsible for recontouring any subsidence areas that develop from closing a pit before it is sufficiently dry.

12. Culverts will be placed on channel bottoms on firm, uniform beds, which have been shaped to accept them, and aligned parallel to the channel to minimize erosion. Backfill will be thoroughly compacted.

13. The minimum diameter for culverts will be 18 inches. However, all culverts will be appropriately sized in accordance with standards in BLM Manual 9113.

14. Construction and other project-related traffic will be restricted to approved routes. Cross-country vehicle travel will not be allowed.

15. Maximum design speed on all operator constructed and maintained roads will not exceed 25 miles per hour.

16. Pipeline construction shall not block nor change the natural course of any drainage. Pipelines shall cross perpendicular to drainages. Pipelines shall not be run parallel in drainage bottoms. Suspended pipelines shall provide adequate clearance for maximum runoff.

17. Pipeline trenches shall be compacted during backfilling. Pipeline trenches shall be routinely inspected and maintained to ensure proper settling, stabilization and reclamation.

18. During construction, emissions of particulate matter from well pad and road construction would be minimized by application of water or other non-saline dust suppressants with at least 50 percent control efficiency. Dust inhibitors (surfacing materials, non-saline dust suppressants, and water) will be used as necessary on unpaved roads that present a fugitive dust problem. The use of chemical dust suppressants on public surface will require prior approval from the BLM Authorized Officer.

19. Operators are required to obtain a National Pollution Discharge Elimination System (NPDES) Storm Water Permit from the Wyoming DEQ for any projects that disturb five or more acres (changing to one acre in March 2005). This general construction storm water permit must be obtained from WDEQ prior to any surface disturbing activities and can be obtained by following directions on the WDEQ website at http://deq.state.wy.us. Further information can be obtained by contacting Barb Sahl at (307) 777-7570.

20. The operator shall submit a Sundry Notice (Form 3160-5) to BLM for approval prior to construction of any new surface disturbing activities that are not specifically addressed in the approved APD or POD Surface Use Plan.

B. Operations/Maintenance

1. Confine all equipment and vehicles to the access road(s), pad(s), and area(s) specified in the approved APD or POD.

2. All waste, other than human waste and drilling fluids, will be contained in a portable trash cage. This waste will be transported to a State approved waste disposal site immediately upon completion of drilling operations. No trash or empty barrels will be placed in the reserve pit or buried on location. Operators and their contractors will comply with all state and local laws and regulations pertaining to disposal of human and solid waste will be complied with.

3. The operator will be responsible for prevention and control of noxious weeds and weeds of concern on all areas of surface disturbance associated with this project (well locations, roads, water management facilities, etc.) Use of pesticides shall comply with the applicable Federal and State laws. Pesticides shall be used only in accordance with their registered uses and within limitations imposed by the Secretary of Interior. Prior to the use of pesticides on public land, the holder shall obtain from the BLM authorized officer written approval of a plan showing the type and quantity of material to be used, pest(s) to be controlled, method of application, location of storage and disposal of containers, and any other information deemed necessary by the authorized officer to such use.

4. All permanent above-ground structures (e.g. , production equipment, tanks, etc.) not subject to safety requirements will be painted to blend with the natural color of the landscape. The paint used will be a color which simulates "Standard Environmental Colors." The color selected for this (site, project), is (name and Munsell Soil Color Number).

5. Sewage shall be placed in a self-contained, chemically treated porta-potty on location.

6. The operator and their contractors shall ensure that all use, production, storage, transport and disposal of hazardous and extremely hazardous materials associated with the drilling, completion and production of these wells will be in accordance with all applicable existing or hereafter promulgated federal, state and local government rules, regulations and guidelines. All project-related activities involving hazardous materials will be conducted in a manner to minimize potential environmental impacts. In accordance with OSHA requirements, a file will be maintained onsite containing current Material Safety Data Sheets (MSDS) for all chemicals, compounds and/or substances which are used in the course of construction, drilling, completion and production operations.

7. Produced fluids shall be put in test tanks on location during completion work. Produced water will be put in the reserve pit during completion work per Onshore Order #7.

8. The only fluids/waste materials which are authorized to go into the reserve pit are RCRA exempt exploration and production wastes. These include:
   - drilling muds & cuttings
   - rigwash
   - excess cement and certain completion & stimulation fluids defined by EPA as exempt

   It does not include drilling rig waste, such as:
   - spent hydraulic fluids
   - used engine oil
   - used oil filter
   - empty cement, drilling mud, or other product sacks
   - empty paint, pipe dope, chemical or other product containers

– excess chemicals or chemical rinsate

Any evidence of non-exempt wastes being put into the reserve pit may result in the BLM Authorized Officer requiring specific testing and closure requirements.

9. The operator shall restrict travel on unimproved two-track roads during periods of inclement weather or spring thaw when the possibility exists for excessive surface resource damage (e.g., rutting in excess of 4-inches, travel outside two-track roadway, etc.).

C. Producing Well

1. Landscape those areas not required for production to the surrounding topography as soon as possible. The fluids and mud must be dry in the reserve pit before re-contouring pit area. The operator will be responsible for re-contouring and reseeding of any subsidence areas that develop from closing a pit before it is completely dry.

2. Reduce the backslope to 2:1 and the foreslope to 3:1, unless otherwise directed by the BLM Authorized Officer. Reduce slopes by pulling fill material up from foreslope into the toe of cut slopes.

3. Any spilled or leaked oil, produced water or treatment chemicals must be reported in accordance with NTL-3A and immediately cleaned up in accordance with BLM requirements. This includes clean-up and proper disposition of soils contaminated as a result of such spills/leaks.

4. Distribute stockpiled topsoil evenly over those areas not required for production (ie.,cut/fill slopes, road ditches, pipelines, etc.) and reseed with approved seed mix.

5. Upgrade and maintain access roads and drainage control (e.g., culverts, drainage dips, ditching, crowning, surfacing, etc.) as necessary and as directed by the BLM Authorized Officer to prevent soil erosion and accommodate safe, environmentally-sound access.

6. Prior to construction of production facilities not specifically addressed in the APD/POD, the operator shall submit a Sundry Notice to the BLM Authorized Officer for approval.

7. Waterbars shall be installed on all reclaimed pipeline corridors per the guidelines in A.4.2.4 #6.

D. Reclamation/Dry Hole

1. All disturbed lands associated with this project, including the pipelines, access roads, water management facilities, etc will be expediently reclaimed and reseeded in accordance with the surface use plan and any pertinent site-specific COAs.

2. Disturbed lands will be re-contoured back to conform with existing undisturbed topography. No depressions will be left that trap water or form ponds.

3. The fluids and mud must be dry in the reserve pit before re-contouring pit area. The operator will be responsible for re-contouring of any subsidence areas that develop from closing a pit before it is completely dry. The plastic pit liner (if any) will be cut off below grade and properly disposed of at a state authorized landfill before beginning to re-contour the site.

4. Before the location has been reshaped and prior to redistributing the topsoil, the operator will rip or scarify the drilling area and access road on the contour, to a depth of at least 12 inches. The rippers are to be no farther than 24 inches apart.

5. Distribute the topsoil evenly over the entire location and other disturbed areas. Prepare the seedbed by disking following the contour.

6. Waterbars are to be constructed at least one (1) foot deep, on the contour with approximately two (2) feet of drop per 100 feet of waterbar to ensure drainage, and extended into established vegetation. All waterbars are to be constructed with the berm on the downhill side to prevent the soft material from silting in the trench. The initial waterbar should be constructed at the top of the backslope. Subsequent waterbars should follow the following general spacing guidelines:

Slope (percent)	Spacing Interval (feet)
< 2	200
2 - 4	100
4 - 5	75
> 5	50

7. The operator will drill seed on the contour to a depth of no greater than 0.5 inch followed by cultipaction to compact the seedbed, preventing soil and seed losses. To maintain quality and purity, the current years tested, certified seed with a minimum germination rate of 80% and a minimum purity of 90% will be used. On BLM surface or in lieu of a different specific mix desired by the surface owner, use the following:

Site-specific Seed Mixes by Ecological Site

Sandy Ecological Site Seed Mix	
Species	**Lbs PLS***
Thickspike Wheatgrass (*Elymus lanceolatus ssp. lanceolatus*)	3.5
Prairie sandreed (*Calamovilfa longifolia*)	4.6
Indian ricegrass (*Achnatherum hymenoides*)	3.5
Blue grama (*Bouteloua gracilis*) Or ***Needleandthread*** (*Hesperostipa comate*)	1.0
Prairie coneflower (*Ratibida columnifera*)	0.8
White or purple prairie clover (*Dalea candidum, purpureum*)	0.8
Blue flax (*Linum lewisii*)	0.8
Fourwing saltbush (*Atriplex canescens*) Or ***Wyoming big sagebrush*** (*Artemisia tridentate*) Or ***Winterfat*** (*Krascheninnikovia lanata*)	0.5
Rubber rabbitbrush (*Ericameria nauseousus*) Or ***Green rabbitbrush*** (*Chrysothamnus viscidiflorous*)	0.5

Site-specific Seed Mixes by Ecological Site

Sandy Ecological Site Seed Mix	
Species	**Lbs PLS***
Totals	**16 lbs/acre**

Loamy Ecological Site Seed Mix	
Species	**Lbs PLS***
Western Wheatgrass (*Pascopyrum smithii*) Or ***Thickspike Wheatgrass*** (*Elymus lanceolatus ssp. lanceolatus*)	3.9
Bluebunch Wheatgrass (*Pseudoroegneria spicata ssp. Spicata*)	1.5
Green needlegrass (*Nassella viridula*)	3.4
Slender Wheatgrass (*Elymus trachycaulus ssp. trachycaulus*)	2.8
Blue grama (*Bouteloua gracilis*) Or ***Needleandthread*** (*Hesperostipa comate*)	1.0
Prairie coneflower (*Ratibida columnifera*)	0.8
White or purple prairie clover (*Dalea candidum, purpureum*)	0.8
Rocky Mountain beeplant (*Cleome serrulata*)	0.8
Fourwing saltbush (Atriplex canescens) Or ***Wyoming big sagebrush (Artemisia tridentate)*** Or ***Winterfat (Krascheninnikovia lanata)***	***0.5***
Rubber rabbitbrush (Ericameria nauseousus) Or ***Green rabbitbrush (Chrysothamnus viscidiflorous)***	***0.5***
Totals	**16 lbs/acre**

Clayey Ecological Site Seed Mix	
Species	**Lbs PLS***
Western Wheatgrass (*Pascopyrum smithii*)	4.6
Green needlegrass (*Nassella viridula*)	5.2
Slender Wheatgrass (*Elymus trachycaulus ssp. trachycaulus*)	1.8

Clayey Ecological Site Seed Mix	
Species	**Lbs PLS***
Blue grama (*Bouteloua gracilis*) Or ***Needleandthread*** (*Hesperostipa comate*)	1.0
Prairie coneflower (*Ratibida columnifera*)	0.8
White or purple prairie clover (*Dalea candidum, purpureum*)	0.8
Rocky Mountain beeplant (*Cleome serrulata*)	0.8
Fourwing saltbush (*Atriplex canescens*) Or ***Wyoming big sagebrush*** (*Artemisia tridentate*) Or ***Winterfat*** (*Krascheninnikovia lanata*)	0.5
Rubber rabbitbrush (*Ericameria nauseousus*) Or ***Green rabbitbrush*** (*Chrysothamnus viscidiflorous*)	0.5
Totals	**16 lbs/acre**

Shallow Clayey Ecological Site Seed Mix	
Species	**Lbs PLS***
Western Wheatgrass (*Pascopyrum smithii*)	2.4
Green needlegrass (*Nassella viridula*)	2.4
Blue grama (*Bouteloua gracilis*) Or ***Needleandthread*** (*Hesperostipa comate*)	1.0
American vetch (*Vicia Americana*)	1.0
Blue flax (*Linum lewisii*)	0.2
Fourwing saltbush (*Atriplex canescens*) Or ***Wyoming big sagebrush*** (*Artemisia tridentate*) Or ***Winterfat*** (*Krascheninnikovia lanata*)	0.5
Rubber rabbitbrush (*Ericameria nauseousus*) Or ***Green rabbitbrush*** (*Chrysothamnus viscidiflorous)*	0.5
Totals	**8.0 lbs/acre**

Slopes too steep for machinery may be hand broadcast and raked with twice the specified amount of seed.

8. BLM will not release the performance bond until the area has been successfully revegetated (evaluation will be made after the second complete growing season) and has met all other reclamation goals of the surface owner and surface management agency.

9. A Notice of Intent to Abandon and a Subsequent Report of Abandonment must be submitted for abandonment approval.

10. For performance bond release approval, a Final Abandonment Notice (with a surface owner release letter on split-estate) must be submitted prior to a final abandonment evaluation by BLM.

11. Phased reclamation plans will be submitted to BLM for approval prior to individual POD facility abandonment via a Notice of Intent (NOI) Sundry Notice. Individual facilities, such as well locations, pipelines, discharge points, impoundments, etc. need to be addressed in these plans as they are no longer needed. Individual items that will need to be addressed in reclamation plans include:

    - Pit closure (Close ASAP after suitably dry, but no later than 90 days from time of drilling unless an extension is given by BLM Authorized Officer.) BLM may require closure prior to 90 days in some cases due to land use or environmental concerns.
    - Configuration of reshaped topography, drainage systems, and other surface manipulations
    - Waste disposal
    - Revegetation methods, including specific seed mix (pounds pure live seed/acre) and soil treatments (seedbed preparation, fertilization, mulching, etc.). On private surface, the landowner should be consulted for the specific seed mix.
    - Other practices that will be used to reclaim and stabilize all disturbed areas, such as water bars, erosion fabric, hydro-mulching, etc.
    - An estimate of the timetables for beginning and completing various reclamation operations relative to weather and local land uses.
    - Methods and measures that will be used to control noxious weeds, addressing both ingress and egress to the individual well or POD.
    - Decommissioning/removal of all surface facilities
    - Closure and reclamation of areas utilized or impacted by produced CBM water, including discharge points, reservoirs, off-channel pits, land application areas, livestock/wildlife watering facilities, surface discharge stream channels, etc.

12. Soil fertility testing and the addition of soil amendments may be required to stabilize some disturbed lands.

13. Any mulch utilized for reclamation needs to be certified weed free.

Appendix B: Resource and Species Worksheets Affected Resources Worksheet

Resource	Resource Present	Resource Affected	PRB FEIS Sufficient	Notes
Air quality	X	Yes	Yes	See PRB EIS 3-291, 3-298, 4-404-4-406, 4-377, 4-386
Cultural	X	Yes		See PRB EIS 3-206, 3-228, 4-273, 4-287, 4-394; waiting for final cultural report to confirm
Native American religious concerns		No		PBTCP & PRB EIS 3-228, 4-227
Traditional Cultural Properties		No		PBTCP
Mineral Potential				See PRB EIS 3-66, 3-70, 3-230, 4-127 through 4-129
Coal	X	No	Yes	3-66,
Fluid Minerals	X	Yes	Yes	3-68, 3-69
Locatable Minerals	X	No	Yes	Address in EA
Other leasables	X	No	Yes	
Salable minerals	X	Yes	Yes	
Paleontology	No			See PRB EIS 3-65-66, 4-125-127
PFYC 3				
PFYC 5				
Rangeland management	X	Yes	Yes	
Existing range improvements	NA	NA	NA	Boundary Fences between the Fortification Cr.(Hayden) and Upper Fortification Cr. (Belus Brothers) allotments
Proposed range improvements	NA	NA	NA	
Realty	No			
Recreation	X	Yes	Yes	See PRB EIS 3-263, 3-273, 4-319 -4-328
Developed site	No	No	No	3-266, 4-326
Walk-in-Area	No	No	No	
Social & Economic	X	Yes	Yes	Analyze in EA. See PRB EIS 3-275-3-289, 4-336-4-370
Soils & Vegetation	X	Yes	Yes	Analyze in EA. See PRB EIS 3-80-3-107, 4-134-4-152, 4-153-4-164, 4-343-4-391, 4-406
Erosion Hazard	X	Yes	Yes	Analyze in EA. See PRB EIS 3-82, 4-35
Poor Reclamation Potential	X	Yes	Yes	Analyze in EA.
Slope hazard	X	Yes	Yes	Analyze in EA. See PRB EIS 3-81, 4-135
Forest products	X	Yes	Yes	
Invasive Species	X	Yes	Yes	Analyze in EA. See PRB EIS 3-103-3-108, 4-153

Wetlands/Riparian	X	Yes	Yes	Analyze in EA. See PRB EIS 3-108-3-111, 4-172-4-178, 4-406, 4-395-4-396
Special Designations	No			
Proposed ACEC	No			
Wild & Scenic River	No			
Wilderness Characteristics/Citizen Proposed	No	No	No	DOI Order 3310
WSA	No			
Visual Resources	X			See PRB EIS 3-252-3-263, 4-302-4-314, 4-403
Class II	No			
Class III	Yes	Yes	Yes	Class IV bordered by Class III
Water	X			
Floodplains	Yes	Yes	Yes	See PRB EIS 3-1-3-56, 4-1-4-122, 4-135, 4-393, 4-405; ROD (A32), Vol. 1 (3-108 to 113)
Ground water	Yes	Yes	No	Analyze in EA. See PRB EIS 3-1-3-30, 4-1-4-69, 4-392, 4-405; ROD pg 7&8 (App. D), Vol.1 (3-1 to 36)
Surface water	Yes	Yes	No	Analyze in EA. See PRB EIS 3-36-3-56, 4-69-4-122, 4-393, 4-405; ROD pg 7&8 (App. D) (App. A pg 30 to 310, Vol.1 (3-36 to 56)
Drinking water	Yes	Yes	Yes	ROD pg 7&8 (App. D), Vol. 1 (3-1 to 56)
Wildland Urban Interface	No			
Wildlife	X	Yes	No	
ESA listed, proposed, or candidate species	X	Yes	No	PRB FEIS: 3-174-178, 4-251-255
BLM sensitive species	X	Yes	No	PRB FEIS: 3-189-206, 4-255-273
General wildlife	X	Yes	No	
West Nile virus potential	X	Yes	No	

Threatened, Endangered, Proposed, and Candidate Species Worksheet

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

Sensitive Species worksheet

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

Common Name	Habitat	Habitat Present?	Individuals Present?	Direct Impacts Anticipated?	Impacts anticipated beyond the level analyzed within the PRB FEIS?
Mountain plover	Short-grass prairie with slopes < 5%	Yes	NS	NLAA	4-254, 4-255 & BA; EA treatment required
Northern goshawk	Conifer and deciduous forests	Yes	NS	NLAA	
Peregrine falcon	Cliffs				
Sage sparrow	Basin-prairie shrub, mountain-foothill shrub	Yes	NS	NLAA	
Sage thrasher	Basin-prairie shrub, mountain-foothill shrub	Yes	NS	NLAA	EA treatment required
Trumpeter swan	Lakes, ponds, rivers	No			
Western Burrowing owl	Grasslands, basin-prairie shrub	Yes	NS	NLAA	
White-faced ibis	Marshes, wet meadows	No	No	No	
Yellow-billed cuckoo	Open woodlands, streamside willow and alder groves	No			
Mammals					**4-264 &4-265**
Black-tailed prairie dog	Prairie habitats with deep, firm soils and slopes less than 10 degrees.	Yes	Yes	Yes	4-255, 4-256; EA treatment required
Fringed myotis	Conifer forests, woodland chaparral, caves and mines	Yes	S	NLAA	
Long-eared myotis	Conifer and deciduous forest, caves and mines	Yes	S	NLAA	
Spotted bat	Cliffs over perennial water.	No			
Swift fox	Grasslands	No			
Townsend's big-eared bat	Caves and mines.	No			
Plants					**4-258**
Limber pine	Mountains, associated with high elevation conifer species	No			

Common Name	Habitat	Habitat Present?	Individuals Present?	Direct Impacts Anticipated?	Impacts anticipated beyond the level analyzed within the PRB FEIS?
Porter's sagebrush	Sparsely vegetated badlands of ashy or tufaceous mudstone and clay slopes 5300-6500 ft.	No			
William's wafer parsnip	Open ridgetops and upper slopes with exposed limestone outcrops or rockslides, 6000-8300 ft.	No			

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

Effect Determinations
Listed Species
LAA Likely to adversely affect
NE No Effect.
NLAA May Affect, not likely to adversely affect individuals or habitat.
Candidate Species
J Is likely to jeopardize candidate.
NJ Is not likely to jeopardize candidate species.

Appendix C Raptor nests occurring within 0.5 miles of CDU3 proposed activities.

BLM ID	Legal	Substrate	Year	Condition	Status	Species
2767	S33 T53N R75W	Live Cottonwood	2010	Good	Inactive	
			2009	Good	Inactive	
			2006	Good	Active	Red-tailed Hawk
2768	S33 T53N R75W	Live Cottonwood	2011	Unknown	Unknown	
			2010	Fair	Inactive	
			2009	Fair	Inactive	
2968	S33 T53N R75W	Live Cottonwood	2011	Good	Active	Red-tailed Hawk
			2010	Good	Inactive	Red-tailed Hawk
			2009	Good	Inactive	
2970	S31 T54N R75W	Dead Cottonwood	2011	Nest Gone	Inactive	
			2010	Nest Gone	Inactive	
			2009	Unknown	Not Located	
			2008	Excellent	Active	Red-tailed Hawk
2971	S31 T54N R75W	Live Cottonwood	2011	Poor	Inactive	
			2010	Good	Inactive	
			2009	Good	Inactive	
2973	S17 T53N R75W	Juniper	2011	Nest Gone	Inactive	
			2010	Good	Inactive	
			2009	Good	Inactive	
3516	S8 T53N R75W	Live Cottonwood	2011	Poor	Inactive	
			2010	Poor	Inactive	
			2009	Poor	Inactive	
3519	S33 T53N R75W	Live Cottonwood	2011	Poor	Inactive	
			2010	Fair	Inactive	
			2009	Fair	Inactive	
3621	S31 T54N R75W	Dead Cottonwood	2011	Fair	Inactive	
			2010	Fair	Inactive	
			2009	Fair	Inactive	
3795	S33 T53N R75W	Juniper	2011	Fair	Inactive	
			2010	Good	Inactive	
			2009	Good	Inactive	
3796	S6 T52N R75W	Live Cottonwood	2011	Poor	Inactive	
			2010	Fair	Inactive	Unknown Raptor
			2009	Fair	Inactive	
3797	S6 T52N R75W	Live Cottonwood	2011	Poor	Inactive	
			2010	Poor	Inactive	
			2009	Poor	Inactive	

BLM ID	Legal	Substrate	Year	Condition	Status	Species
3798	S4 T52N R75W	Live Cottonwood	2011	Fair	Inactive	
			2010	Good	Active Failed	Red-tailed Hawk
			2009	Good	Active	Red-tailed Hawk
3799	S6 T52N R75W	Live Cottonwood	2011	Good	Active	Red-tailed Hawk
			2010	Poor	Inactive	
			2009	Fair	Inactive	
3800	S6 T52N R75W	Live Cottonwood	2011	Fair	Active	Great Horned Owl
			2010	Good	Active	Red-tailed Hawk
			2009	Good	Inactive	
4350	S36 T53N R76W	Live Cottonwood	2011	Poor	Inactive	
			2010	Fair	Inactive	
			2008	Excellent	Active	Red-tailed Hawk
4352	S36 T53N R76W	Live Cottonwood	2011	Nest Gone	Inactive	
			2010	Nest Gone	Inactive	Great Horned Owl
			2006	Good	Occupied	Great Horned Owl
4577	S20 T53N R75W	Juniper	2010	Fair	Inactive	
			2009	Good	Inactive	
			2008	Good	Active	Red-tailed Hawk
4578	S31 T54N R75W	Live Cottonwood	2011	Nest Gone	Inactive	
			2010	Nest Gone	Inactive	
			2009	Good	Inactive	
4579	S31 T54N R75W	Live Cottonwood	2011	Good	Active	Golden Eagle
			2010	Good	Inactive	
			2009	Fair	Inactive	
			2008	Excellent	Active	Golden Eagle
			2007	Good	Active	Great Horned Owl
5322	S33 T53N R75W	Juniper	2011	Poor	Inactive	
			2010	Fair	Inactive	
			2009	Good	Inactive	
5759	S17 T53N R75W	Juniper	2011	Poor	Inactive	
			2010	Good	Inactive	
			2009	Good	Inactive	
6028	S9 T53N R75W		2011	Unknown	Inactive	
			2010	Unknown	Inactive	
			2009	Unknown	Inactive	
10201	S32 T54N R75W	Live Cottonwood	2009	Good	Active	Red-tailed Hawk
11245	S36 T53N R76W	Live Cottonwood	2011	Good	Active	Red-tailed Hawk
			2010	Good	Active	Red-tailed Hawk
11707	S31 T54N R75W	Live Cottonwood	2011	Good	Inactive	

BLM ID	Legal	Substrate	Year	Condition	Status	Species
12242	S6 T52N R75W	Live Cottonwood	2010	Poor	Inactive	
12587	S30 T53N R75W	Juniper	2011	Remnants	Inactive	
			2010	Remnants	Inactive	
			2008	Remnants	Inactive	
12588	S30 T53N R75W	Juniper	2011	Remnants	Inactive	
			2010	Remnants	Inactive	
			2008	Remnants	Inactive	
12589	S36 T53N R76W	Boxelder	2011	Poor	Inactive	
			2008	Fair	Inactive	
12598	S31 T54N R75W	Live Cottonwood	2011	Fair	Active Failed	