

**FINDING OF NO SIGNIFICANT IMPACT & DECISION RECORD
FOR
Williams
Carr Draw III East**

ENVIRONMENTAL ASSESSMENT - WY-070-08-029

DECISION: Is to approve Alternative C as described in the attached Environmental Assessment (EA) and authorize Williams's Carr Draw III East Coal Bed Natural Gas (CBNG) POD comprised of the following 82 Applications for Permit to Drill (APDs):

	Well Name	Well #	Qtr/Qtr	Sec	TWP	RNG	Lease #
1	CARR DRAW III E CARU	11-18BG*	NWNW	18	50N	75W	WYW146811
2	CARR DRAW III E CARU	11-18W	NWNW	18	50N	75W	WYW146811
3	CARR DRAW III E CARU	12-19BG	SWNW	19	50N	75W	WYW154404
4	CARR DRAW III E CARU	12-19W	SWNW	19	50N	75W	WYW154404
5	CARR DRAW III E CARU	14-19BG	SWSW	19	50N	75W	WYW154404
6	CARR DRAW III E CARU	14-19W	SWSW	19	50N	75W	WYW154404
7	CARR DRAW III E CARU	21-19BG	NENW	19	50N	75W	WYW146811
8	CARR DRAW III E CARU	21-19W	NENW	19	50N	75W	WYW146811
9	CARR DRAW III E CARU	23-19BG	NESW	19	50N	75W	WYW146811
10	CARR DRAW III E CARU	23-19W	NESW	19	50N	75W	WYW146811
11	CARR DRAW III E CARU	32-19BG	SWNE	19	50N	75W	WYW146811
12	CARR DRAW III E CARU	32-19W	SWNE	19	50N	75W	WYW146811
13	CARR DRAW III E CARU	34-19BG	SWSE	19	50N	75W	WYW146811
14	CARR DRAW III E CARU	34-19W	SWSE	19	50N	75W	WYW146811
15	CARR DRAW III E CARU	41-19BG	NENE	19	50N	75W	WYW146811
16	CARR DRAW III E CARU	41-19W	NENE	19	50N	75W	WYW146811
17	CARR DRAW III E CARU	43-19BG	NESE	19	50N	75W	WYW146811
18	CARR DRAW III E CARU	43-19W	NESE	19	50N	75W	WYW146811
19	CARR DRAW III E CARU	12-20BG	SWNW	20	50N	75W	WYW146811
20	CARR DRAW III E CARU	12-20W	SWNW	20	50N	75W	WYW146811
21	CARR DRAW III E CARU	14-20BG	SWSW	20	50N	75W	WYW146811
22	CARR DRAW III E CARU	14-20W	SWSW	20	50N	75W	WYW146811
23	CARR DRAW III E CARU	22-20BG	SENW	20	50N	75W	WYW146811
24	CARR DRAW III E CARU	22-20W	SENW	20	50N	75W	WYW146811
25	CARR DRAW III E CARU	34-20BG	SWSE	20	50N	75W	WYW129538
26	CARR DRAW III E CARU	34-20W	SWSE	20	50N	75W	WYW129538
27	CARR DRAW III E CARU	43-20BG	NESE	20	50N	75W	WYW146811
28	CARR DRAW III E CARU	43-20W	NESE	20	50N	75W	WYW146811
29	CARR DRAW III E CARU	21-29BG	NENW	29	50N	75W	WYW129538
30	CARR DRAW III E CARU	21-29W	NENW	29	50N	75W	WYW129538
31	CARR DRAW III E CARU	41-29BG	NENE	29	50N	75W	WYW129538
32	CARR DRAW III E CARU	41-29W	NENE	29	50N	75W	WYW129538
33	CARR DRAW III E CARU	14-30BG	SWSW	30	50N	75W	WYW146812

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36	CARR DRAW III E CARU	21-30W	NENW	30	50N	75W	WYW146812
37	CARR DRAW III E CARU	31-30BG	NWNE	30	50N	75W	WYW146812
38	CARR DRAW III E CARU	31-30W	NWNE	30	50N	75W	WYW146812
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46	CARR DRAW III E CARU	21-31W	NENW	31	50N	75W	WYW146812
47	CARR DRAW III E CARU	14-13BG	SWSW	13	50N	76W	WYW146290
48	CARR DRAW III E CARU	14-13W	SWSW	13	50N	76W	WYW146290
49	CARR DRAW III E CARU	23-13BG	NESW	13	50N	76W	WYW146290
50	CARR DRAW III E CARU	23-13W	NESW	13	50N	76W	WYW146290
51	CARR DRAW III E CARU	32-13BG	SWNE	13	50N	76W	WYW146290
52	CARR DRAW III E CARU	32-13W	SWNE	13	50N	76W	WYW146290
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54	CARR DRAW III E CARU	34-13W	SWSE	13	50N	76W	WYW146290
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56	CARR DRAW III E CARU	43-13W	NESE	13	50N	76W	WYW146290
57	CARR DRAW III E CARU	34-23BG	SWSE	23	50N	76W	WYW146290
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64	CARR DRAW III E CARU	21-24W	NENW	24	50N	76W	WYW146290
65	CARR DRAW III E CARU	23-24BG	NESW	24	50N	76W	WYW146290
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71	CARR DRAW III E CARU	23-25BG	NESW	25	50N	76W	WYW146290
72	CARR DRAW III E CARU	23-25W	NESW	25	50N	76W	WYW146290
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76	CARR DRAW III E CARU	34-25W	SWSE	25	50N	76W	WYW147335
77	CARR DRAW III E CARU	43-25BG	NESE	25	50N	76W	WYW147335
78	CARR DRAW III E CARU	43-25W	NESE	25	50N	76W	WYW147335
79	CARR DRAW III E CARU	21-26BG	NENW	26	50N	76W	WYW33138
80	CARR DRAW III E CARU	21-26W	NENW	26	50N	76W	WYW33138
81	CARR DRAW III E CARU	41-26BG	NENE	26	50N	76W	WYW33138
82	CARR DRAW III E CARU	41-26W	NENE	26	50N	76W	WYW33138

This approval is subject to adherence with all of the operating plans and mitigation measures contained in the Master Surface Use Plan of Operations, Drilling Plan, Water Management Plan, and information in individual APDs. This approval is also subject to operator compliance with all mitigation and monitoring requirements contained within the Powder River Oil and Gas Project Environmental Impact Statement and Resource Management Plan Amendment (PRB FEIS) approved April 30, 2003. The proposed water line that will transport water off location was inspected and approved for use in EA WY-070-08-013.

RATIONALE: The decision to authorize Alternative C, as described in the attached Environmental Assessment (EA), is based on the following:

1. The Operator, in their POD, has committed to:
 - Comply with all applicable Federal, State and Local laws and regulations.
 - Obtain the necessary permits from other agencies for the drilling, completion and production of these wells including water rights appropriations, the installation of water management facilities, water discharge permits, and relevant air quality permits.
 - Offer water well agreements to the owners of record for permitted water wells within ½ mile of a federal CBNG producing well in the POD.
 - Provide water analysis from a designated reference well in each coal zone.
2. The Operator was not able to reach a surface use agreement after a good faith effort and has submitted a good and sufficient bond in accordance with 43 CFR 3418.
3. Alternative C will not result in any undue or unnecessary environmental degradation.
4. Mitigation measures applied by the BLM will alleviate or minimize environmental impacts.
5. Alternative C is the environmentally-preferred Alternative.
6. The proposed action is in conformance with the PRB FEIS and the Approved Resource Management Plan for the Public Lands Administered by the Bureau of Land Management (BLM), Buffalo Field Office, April 2001.
7. Based on current information, we determined that no significant impacts in the spread of WNV would occur from the implementation of this project.

FINDING OF NO SIGNIFICANT IMPACT: Based on the analysis of the potential environmental impacts, I have determined that NO significant impacts are expected from the implementation of Alternative C and, therefore, an environmental impact statement is not required.

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: _____

**BUREAU OF LAND MANAGEMENT
BUFFALO FIELD OFFICE
ENVIRONMENTAL ASSESSMENT (EA)
FOR
Williams
Carr Draw III East
PLAN OF DEVELOPMENT
WY-070-080-029**

INTRODUCTION

This site-specific analysis tiers into and incorporates by reference the information and analysis contained in the Powder River Basin Oil and Gas Project Environmental Impact Statement and Resource Management Plan Amendment (PRB FEIS), #WY-070-02-065 (approved April 30, 2003), pursuant to 40 CFR 1508.28 and 1502.21. This document is available for review at the Buffalo Field Office. This project EA addresses site-specific resources and impacts that were not covered within the PRB FEIS.

1. PURPOSE AND NEED

The purpose for the proposal is to define and produce coal bed natural gas (CBNG) on valid federal oil and gas mineral leases issued to the applicant by the BLM. The need exists because without approval of the Applications for Permit to Drill (APDs), federal lease royalties will be lost and the lessee will be deprived of the federal gas they have the rights to develop.

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

The proposed action is in conformance with the terms and the conditions of the Approved Resource Management Plan for the Public Lands Administered by the Bureau of Land Management, Buffalo Field Office (BFO), April 2001 and the PRB FEIS, as required by 43 CFR 1610.5

2. ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1. Alternative A - No Action

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

2.2. Alternative B Proposed Action

Proposed Action Title/Type: Williams’s Carr Draw III East Plan of Development (POD) for 82 coal bed natural gas well APD’s and associated infrastructure.

Proposed Well Information: There are 82 wells proposed within this POD, the wells are vertical bores proposed on an 80 acre spacing pattern with 2 wells per location. Each well will produce from the Big George or Wall coal seam. Proposed well house dimensions are 6 ft wide x 10 ft length x 6 ft height. Well house color is Carlsbad Canyon, 2.5Y 6/2, selected to blend with the surrounding vegetation. Wells are located as follows:

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County: Campbell

Applicant: Williams, United States

Surface Owners: William Maycock

Project Description:

On March 02, 2006, Williams submitted the Carr Draw III POD with 197 APDs. BLM inspected the area July 10-19 of 2006. Due to potentially significant impacts to the Fortification Creek elk herd the Carr Draw III POD was returned to Williams who divided it into two PODs. The non-elk range POD was then resubmitted as the Carr Draw III East POD with 84 APDs. Two wells (one location; 12-13) were dropped from consideration due to non-reclaimable access, leaving 82 APDs for analysis. This POD borders the Fortification Creek elk herd yearlong range, with the 21-26 well and the western portion of the existing road in section 26 within the yearlong range. The Cumulative Effects to the Fortification Creek Elk Herd Environmental Report (Bills 2007) was completed in September 2007 and is used in this EA analysis. The Buffalo Field Office is currently working on an amendment to the RMP that addresses CBNG development in the Fortification Creek Area. Williams intends to submit the Carr Draw III West POD in the future, probably after completion of the Buffalo Field Office’s RMP amendment. This project is in compliance with all past RMP & PRB EIS decisions and is therefore moving forward.

The proposed action involves the following:

- Drilling of 82 total federal CBM wells (41 to Big George and 41 to Wall coal zones) to depths of approximately 1200 and 2200 feet respectively. Drilling and construction activities are anticipated to be completed within two years, the term of an APD. Drilling and construction occurs year-round in the PRB. Weather may cause delays lasting several days but rarely do delays last multiple weeks. Timing limitations in the form of COAs may impose longer temporal restrictions on portions of this POD.
- Well metering shall be accomplished by telemetry at the well head. Routine well visits would be limited to an average of once a week.
- A Water Management Plan (WMP) was submitted that involves the following infrastructure and strategy: Use of existing discharge points and stock water reservoirs within these previously approved PODs; Schoonover Road Unit #1, 2, 3, & 5; and South Prong Unit 3. A waterline was approved through sundry (EA# WY-070-08-013) on 10/19/2007 which transports the produced water south to the aforementioned PODs. No water, produced in association with a federal action, is approved to be discharged within the Carr Draw III East POD.
- An unimproved and improved road network.
- An above ground power line network to be constructed by a contractor. If the proposed route is altered, then the new route will be proposed via sundry application and analyzed in a separate NEPA action. Power line construction has not been scheduled and will not be completed before the CBNG wells are producing. Temporary diesel generators shall be placed at the power drops.
- A storage tank of 500-1000 gallon capacity shall be located with each diesel generator.

- A buried gas, water and power line network, no central gathering/metering facilities and no compression facilities.

For a detailed description of design features, construction practices, and water management strategies associated with the proposed action, refer to the Master Surface Use Plan (MSUP), Drilling Plan, and WMP in the POD and individual APDs. Also see the subject POD and/or APDs for maps showing the proposed well locations and associated facilities described above. More information on CBNG well drilling, production and standard practices is also available in the PRB FEIS, Volume 1, pages 2-9 through 2-40 (January 2003).

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

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

1. Comply with all applicable Federal, State and Local laws and regulations.
2. Obtain the necessary permits for the drilling, completion and production of these wells including water rights appropriations, the installation of water management facilities, water discharge permits, and relevant air quality permits.
3. Offer water well agreements to the owners of record for permitted water wells within ½ mile of a federal CBNG producing well in the POD
4. Provide water analysis from a designated reference well in each coal zone.

After good faith efforts failed to reach a surface use agreement, the Operator has submitted a good and sufficient bond in accordance with 43 CFR 3814.

2.3. Alternative C – Environmentally Preferred

Alternative C represents a modification of Alternative B based on the operator and BLM working cooperatively to reduce environmental impacts. The description of Alternative C is the same as Alternative B with the addition of the project modifications identified by BLM and the operator following the initial project proposal (Alternative B). At the on-sites, all areas of proposed surface disturbance were inspected to insure that the project would meet BLM multiple use objectives to conserve natural resources while allowing for the extraction of Federal minerals. In some cases, access roads were re-routed, and well locations, pipelines, discharge points and other water management control structures were moved, modified, mitigated or dropped from further consideration to alleviate environmental impacts. Alternatives to the different aspects of the proposed action are always considered and applied as pre-approval changes, site specific mitigation and/or Conditions of Approval (COAs), if they will alleviate environmental effects of the operator's proposal. The specific changes identified for each location in the Carr Draw III East POD are listed below under 2.3.1:

2.3.1. Changes as a result of the on-sites

Well #	location	Access	Changes onsite
12-13	sagebrush slope	unstable soils, large cut and fill, erosion on road. Adjust alignment and grade	Dropped due to inability to reclaim access.
14-13	saddle	a) Use dam for access. b) move road away from knob @ 30 M west of proposed road.	No need for SSRP (site specific reclamation plan) with a commitment to 20 foot maximum width on ridges. Second ridge line after drop stay to west (off crest).
23-13	east facing slope	main road	Main utilities line. pad. pull through design
32-13	blm ridge	Ridge.	Moved well up ridge to flatter spot, out of sage-grouse habitat. Pipeline in road. Drop road off west side of ridge on to slope . Use old cow trail on main ridge road where it turns south after the 32-13 turn-off.
34-13	west sage slope	main road	change to pull through
43-13	side hill	ridge road on BLM. Use existing 2-track.	Put pipeline in road. No need for SSRP with a commitment to 20 foot maximum width on ridges.
12-18	sage slope	new - steep- engineer	Move well to Hayden surface. Avoid raptor nest. Reduce surface disturbance. Avoid site specific reclamation plan.
12-19	sage slope	new	Moved 100 feet closer to fence out of best sage and grass.
14-19	prairie dog town		moved south to edge of prairie dog town
21-19	sage ridge	ridge	Minimize corridor along ridge (20 feet)
23-19	swale		pad moved south / east toward road and fence
32-19	ridge access to old oil location		Moved to north-west for CBNG drainage
41-19	sage and juniper slope	new	Moved east 100 feet
43-19	sage slope		Move closer to road
12-20	sage slope	road template culvert	Moved 100 meters closer to main road
23-20	sage bench	new	Moved to road moved away from nest
34-20	bench	new	Discussed size of needed work area. Needs to be addressed on all locations.
43-20	gentle sage slope	new	Move toward road

Well #	location	Access	Changes onsite
43-23	swale	New. Needs engineering	Very loose soils at location. Very poor reclamation potential. Moved location south to 44-23
12-24	steep canyon	20 foot cut. road cannot be reclaimed to contour	Dropped well due to inability to reclaim.
14-24	barber creek	along bottoms. Pipeline needs to be assured that it will stay in the ground along the creek. Test compaction? Fabric?	Water well close 150 ft. Moved well up off the creek bottom. Water well agreement needed.
12-25	sage hump		Pipeline down ridge to Barber Creek? pull well back to grassy spot
21-25	gentle sage slope	sandy ridge	Move south 500 feet. Need pad. Now the 41-26
23-25	ridge	sandy ridge	Move road off ridge on west side to edge of sage avoid sandy soils
43-25	slope	sandy road	Pad. move 300 feet south. Thin soils. Minimize blading
41-26	south side of Barber Creek	need to design crossing for Barber Creek	Move to the north. land owner wants access from south.
21-29	sage slope	new	Minimal blading
41-29	old oil road and location		No blade work needed on road in. move wells toward old hole
21-30	slope	new	Move south east 100 feet. move road south of sand knob
32-30	slope	new	Moved out of view from ranch house
34-30	ridge	BLM.	Pipeline road where needed. No spillage. 25 feet disturbance on ridge lines. No blade work where it's not needed
41-30	sage slope	new. Proposed new corridor across Barber Cr.	Access from the east. Move well east across draw. Stay east of sagebrush on access
43-30	sage slope can be seen from ranch house	new really long access for single well	Moved across drainage to west to reduce access and hide well.
21-31	slope	pipeline road. No spillage. 25 feet disturbance. Need pad.	Moved gate down fence line to avoid parallel roads. Avoid corner posts. Moved well to top of hill – no pad. Avoid powerlines.

2.3.2. 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.

2.3.2.1. Groundwater

1. For all WYPDES permits the BLM will require that operators comply with the latest DEQ standards and monitoring guidance.

2.3.2.2. Vegetation

1. Temporarily fence reseeded areas, if not already fenced, for at least two complete growing seasons to insure reclamation success on problematic sites (e.g. close to livestock watering source, erosive soils etc.).

2.3.2.3. Wildlife

1. For any surface-disturbing activities proposed in sagebrush shrublands, the Companies will conduct clearance surveys for sage grouse breeding activity during the sage grouse's breeding season before initiating the activities. The surveys must encompass all sagebrush shrublands within 0.5 mile of the proposed activities.
2. The Companies will locate facilities so that noise from the facilities at any nearby sage grouse or sharp-tailed grouse display grounds does not exceed 49 decibels (10 dBA above background noise) at the display ground.

2.3.2.4. Threatened, Endangered, or Sensitive Species

2.3.2.4.1. Bald Eagle

1. Special habitats for raptors, including wintering bald eagles, will be identified and considered during the review of Sundry Notices.
2. Additional mitigation measures may be necessary if the site-specific project is determined by a BLM biologist to have adverse effects to bald eagles or their habitat.

2.3.2.4.2. 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.

2.3.2.5. Visual Resources

1. The Companies will mount lights at compressor stations and other facilities on a pole or building and direct them downward to illuminate key areas within the facility while minimizing the amount of light projected outside the facility.

2.3.2.6. Air Quality

1. During construction, emissions of particulate matter from well pad and resource road construction will be minimized by application of water, or other dust suppressants, with at least 50 percent control efficiency. Roads and well locations constructed on soils susceptible to wind erosion could be

appropriately surfaced or otherwise stabilized to reduce the amount of fugitive dust generated by traffic or other activities, and dust inhibitors (surfacing materials, non-saline dust suppressants, and water) could be used as necessary on unpaved collector, local and resource roads that present a fugitive dust problem. The use of chemical dust suppressants on BLM surface will require prior approval from the BLM authorized officer.

2.3.3. Site specific mitigation measures

Surface

1. All changes made at the onsite have been incorporated into the proposed action.
2. On non-constructed locations the work area (driving, parking, and equipment placement) will be limited to 200 x 200 feet, and delineated in the field.
3. For those proposed disturbance areas identified below, there are lands with limited reclamation potential that shall be stabilized in a manner which eliminates accelerated erosion until a self-perpetuating non-weed, 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:
 - a. Section 13 East half of section 24.
 - b. The 21-19 location and access road.
 - c. The 44-23 location and access road.
 - d. Road from 21-31 south to road junction.
 - e. Bladed disturbance will be limited to twenty (20) feet maximum (where engineering or templates are not in use) on the following roads: 43-13, 14-13, plus a ten (10) foot temporary driving location on either side. In addition, in locations where pipelines 12" or larger are to be laid, the bladed disturbance will be 30' plus a ten (10) foot temporary driving location on either side.
4. The operator will follow the guidance provided in the Wyoming Policy on Reclamation (IM WY-90-231) specifically the following:

Reclamation Standards:

- C. 3 The reclaimed area shall be stable and exhibit none of the following characteristics:
 - a. Large rills or gullies.
 - b. Perceptible soil movement or head cutting in drainages.
 - c. Slope instability on, or adjacent to, the reclaimed area in question.
 - C.4. The soil surface must be stable and have adequate surface roughness to reduce runoff and capture rainfall and snow melt. Additional short-term measures, such as the application of mulch, shall be used to reduce surface soil movement.
 - C.5. Vegetation canopy cover (on unforested sites), production and species diversity (including shrubs) shall approximate the surrounding undisturbed area. The vegetation shall stabilize the site and support the planned post disturbance land use, provide for natural plant community succession and development, and be capable of renewing itself. This shall be demonstrated by:
 - a. Successful onsite establishment of species included in the planting mixture or other desirable species.
 - b. Evidence of vegetation reproduction, either spreading by rhizomatous species or seed production.
 - C.6. The reclaimed landscape shall have characteristics that approximate the visual quality of the adjacent area with regard to location, scale, shape, color and orientation of major landscape features and meet the needs of the planned post disturbance land use.
5. Corridor utilities shall be placed within:
 - a. The "roadway" as delineated in Figure 2, page 19 of the 2006 BLM Gold Book for engineered and template roads or;
 - b. Within 4 feet of a wheel track on primitive roads.

6. As agreed to at the onsite, corridor disturbance width to the 43-20 well shall be limited to 30 feet.
7. There will be no blading on the road in to the 41-29 well. The corridor from the 41-26 well to section 36 shall be limited to 40 feet.
8. Drawings will be submitted and approved prior to the pre-construction onsite showing the change in access to 14-13 well.
9. All staking will be completed for the preconstruction onsite.
10. The culvert locations will be staked prior to construction. The culvert invert grade and finished road grade will be clearly indicated on the stakes. Culverts will be installed on natural ground, or on a designed flow line of a ditch. The minimum cover over culverts will be 12" or one-half the diameter whichever is greater. Culverts shall be placed according to the following spacing:

<u>Grade</u>	<u>Drainage Spacing</u>
2-4%	310 ft
5-8%	260 ft
9-12%	200 ft

11. 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. Provide 4" of aggregate where grades exceed 8%.
12. Williams will work with the landowner to minimize impacts to the Maycock ranching operation, including agreement on language and placement of signs advising Williams' personnel and contractors of ranch operations.
13. Any and all fences or waterlines that are damaged by Williams shall be repaired or replaced by Williams to a condition consistent with the condition of the existing fences or waterlines.
14. In order to prevent pipeline exposure and erosion, the construction practices for the proposed pipeline along Barber Creek Sections 23, 24, 26, (T50R76) and the crossing in section 30 (T50R75) shall be detailed and submitted to the BLM engineer prior to construction.
15. At final abandonment, pipelines and flowlines will be flushed and any fluids present properly disposed of. All surface lines and any lines that are buried close to the surface that may become exposed due to water or wind erosion, soil movement, or anticipated subsequent use, must be removed. Deeply buried lines may remain in place unless otherwise directed by the authorized officer.
16. If during the life of the project pipelines, or segments of pipelines, create erosion or become exposed, then those lines will be removed at final abandonment.
17. If pit-liners are used, then Williams will ensure they do not become exposed. Williams will bury liners below the root zone and no closer than 36" to the reclaimed surface.
18. The following widths of disturbance (from the 12/11/2007 Surface Use Data Summary Form) shall apply during construction and operations for infrastructure not identified in #3 above: Improved roads with or without utilities = 50 feet. Primitive roads with or without utilities, and non-corridor utilities = 40 feet. The following are exceptions:
 - a. The corridor from location 14-19 to the main access in Section 24, main corridor in Section 26, pipeline in Section 30, waterline in SE of POD, gas and waterline between the 41-26 location and the main access in Section 26 will require 60 feet in certain areas where necessary.
19. The operator will drill seed on the contour to a depth of 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:

Species	% in Mix	Lbs PLS*
Thickspike Wheatgrass (Elymus lanceolatus ssp. lanceolatus)	25	2.1
Western Wheatgrass (Pascopyrum smithii)	25	2.1
Bluebunch wheatgrass (Pseudoroegneria spicata ssp. Spicata)	25	6
Prairie coneflower (Ratibida columnifera)	5	0.6
White or purple prairie clover (Dalea candidum, purpureum)	5	0.6
Rocky Mountain beeplant (Cleome serrulata) /or American vetch (Vicia americana)	5	0.6
Totals	100%	12 lbs/acre

Wildlife

1. The following conditions will minimize impacts to raptors;
 - a. No surface disturbing activity shall occur within ½ mile of all identified raptor nests from February 1 through July 31, annually, prior to a raptor nest occupancy survey for the current breeding season. This affects the following infrastructure:

Township/Range	Section	Infrastructure
50/75	18	<ul style="list-style-type: none"> • Wells 11-18-5075BG/W and their associated infrastructure. • The proposed pipeline along the county road within the northern half of this section. • The proposed overhead powerlines within NW ¼ of this section
50/75	19	<ul style="list-style-type: none"> • Wells 12-19-5075BG/W, 21-19-5075BG/W, 23-19-5075BG/W, and 32-19-5075BG/W and their associated infrastructure. • All proposed access routes and/or pipeline corridors within the west half of this section except the proposed pipeline corridor along the existing primitive road in the SWSW of this section.
50/75	20	<ul style="list-style-type: none"> • Wells 14-20-5075BG/W, 22-20-5075BG/W, and 34-20-5075BG/W and their associated infrastructure. • The proposed pipeline corridor along the county road from the 12-20-5075BG/W well eastward. • All proposed access routes and/or pipeline corridors within the south half of this section. • All proposed overhead powerlines within this entire section, if
50/75	29	<ul style="list-style-type: none"> • Wells 21-29-5075BG/W and their associated infrastructure. • All proposed access routes and/or pipeline corridors in the NE of this section.
50/75	30	<ul style="list-style-type: none"> • Wells 14-30-5075BG/W and 34-30-5075BG/W and their associated infrastructure. • All proposed access routes and/or pipeline corridors within the south half of this section.
50/75	31	<ul style="list-style-type: none"> • Wells 21-31-5075BG/W and their associated infrastructure. • All proposed access routes and/or pipeline corridors within this

Township/Range	Section	Infrastructure
		entire section. <ul style="list-style-type: none"> • The proposed overhead powerlines within the NW ¼ of this section.
50/76	12	<ul style="list-style-type: none"> • The proposed overhead powerlines in the SE ¼ of this section.
50/76	13	<ul style="list-style-type: none"> • Wells 14-13-5076BG/W, 32-13-5076BG/W, and 43-13-5076BG/W and their associated infrastructure. • All proposed access routes and/or pipeline corridors within the north half of this section except to the 12-13-5076BG/W wells.
50/76	25	<ul style="list-style-type: none"> • Wells 43-25-5076BG/W and their associated infrastructure. • The proposed access route / pipeline corridor to the 43-25-5076BG/W wells within this section.

- b. Surveys to document nest occupancy shall be conducted by a biologist following BLM protocol, between April 15 and June 30. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities. Surveys outside this window may not depict nesting activity. If a survey identifies active raptor nests, a ½ mile timing buffer will be implemented. The timing buffer restricts surface disturbing activities within ½ mile of occupied raptor nests from February 1 to July 31.
- c. Nest productivity checks shall be completed for the first five years following project completion. The productivity checks shall be conducted no earlier than June 1 or later than June 30 and any evidence of nesting success or production shall be recorded. Survey results will be submitted to a Buffalo BLM biologist in writing no later than July 31 of each survey year. This applies to all the nests listed in Table 3.2 of this EA.
2. The following conditions will minimize impacts to sage-grouse:
- a. No surface disturbing activities are permitted within 2 miles of the Hayden I lek (SWSE Section 17, T50N, R75W), the Hayden Satellite A lek (SWNE Section 22, T50N, R75W), the Hayden Satellite B lek (NENW Section 27, T50N, R75W), the Barber Creek South Prong lek (NWSE Section 1, T49N, R76W) and the Laskie Draw East lek (NENW Section 3, T49N, R76W) between March 1 and June 15, prior to completion of a greater sage-grouse lek survey. This condition will be implemented on an annual basis for the duration of surface disturbing activities. This affects the following infrastructure:

Township/Range	Section	Infrastructure
50/75	16	<ul style="list-style-type: none"> • All proposed overhead powerlines associated with the federal action within this section.
50/75	18	<ul style="list-style-type: none"> • Wells 11-18-5075BG/W and their associated infrastructure. • All proposed access routes and/or pipeline corridors within this entire section. • All proposed overhead powerlines within this entire section.
50/75	19	<ul style="list-style-type: none"> • Wells 12-19-5075BG/W, 14-19-5075BG/W, 21-19-5075BG/W, 23-19-5075BG/W, 32-19-5075BG/W, 34-19-5075BG/W, 41-19-5075BG/W and 43-19-5075BG/W and their associated infrastructure. • All proposed access routes and/or pipeline corridors within this entire section. • All proposed overhead powerlines within this entire section .
50/75	20	<ul style="list-style-type: none"> • Wells 12-20-5075BG/W, 14-20-5075BG/W, 22-20-5075BG/W, 34-20-5075BG/W, and 43-20-5075BG/W and their associated infrastructure. • All proposed access routes and/or pipeline corridors within this

<i>Township/Range</i>	<i>Section</i>	<i>Infrastructure</i>
		entire section. <ul style="list-style-type: none"> • All proposed overhead powerlines within this entire section.
50/75	21	<ul style="list-style-type: none"> • All proposed overhead powerlines associated with the federal action within this section.
50/75	29	<ul style="list-style-type: none"> • Wells 21-29-5075BG/W and 41-29-5075BG/W and their associated infrastructure. • All proposed access routes and/or pipeline corridors within this entire section.
50/75	30	<ul style="list-style-type: none"> • Wells 14-30-5075BG/W, 21-30-5075BG/W, 31-30-5075BG/W, 41-30-5075BG/W, and 42-30-5075BG/W • All proposed access routes and/or pipeline corridors within this entire section.
50/75	31	<ul style="list-style-type: none"> • Wells 21-31-5075BG/W and their associated infrastructure. • All proposed access routes and/or pipeline corridors within this entire section. • All proposed overhead powerlines within this entire section.
50/76	13	<ul style="list-style-type: none"> • Wells 34-13-5076BG/W and 43-13-5076BG/W and their associated infrastructure. • All proposed access routes and/or pipeline corridors within the SE and ENE of this section. • All proposed overhead powerlines within NE of this section.
50/76	25	<ul style="list-style-type: none"> • Wells 34-25-5076BG/W and their associated infrastructure. • All proposed access routes and/or pipeline corridors within the SSE and SSW of this section. • All proposed overhead powerlines within the south half of this section.
50/76	26	<ul style="list-style-type: none"> • The proposed pipeline corridor along the existing road within SW of this section. • All proposed overhead powerlines within the south half of this section.
50/76	35	<ul style="list-style-type: none"> • All proposed access routes and/or pipeline corridors within this entire section.
50/76	36	<ul style="list-style-type: none"> • All proposed access routes and/or pipeline corridors related to the federal action within this entire section.

- b. If an active lek is identified during the survey, the 2 mile timing restriction (March 1-June 15) will be applied and surface disturbing activities will not be permitted until after the nesting season.
 - c. If surveys indicate that the identified leks are inactive during the current breeding season, surface disturbing activities may be permitted within the 2 mile buffer until the following breeding season (March 1). The required sage grouse survey will be conducted by a biologist, following the most current WGFD protocol. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities.
 - d. Creation of raptor hunting perches will be avoided within 0.5-mile of documented sage-grouse lek sites. Perch inhibitors will be installed to deter avian predators from preying on sage grouse.
3. No surface disturbing activity shall occur in the prairie dog colony located in the east half of Section 24, Township 50 North, Range 76 West from April 15 through August 31, annually, prior

to a burrowing owl nest occupancy survey for the current breeding season. This timing limitation will affect the following proposed wells and their associated infrastructure:

<i>Township/Range</i>	<i>Section</i>	<i>Infrastructure</i>
50/76	24	<ul style="list-style-type: none"> All proposed access routes and/or pipeline corridors within the eastern half of this section.

- a. A 0.25 mile buffer will be applied if a burrowing owl nest is identified. This condition will be implemented on an annual basis for the duration of surface disturbing activities within the prairie dog town(s).
4. A mountain plover nesting survey is desired in suitable habitat prior to commencement of surface disturbing activities in the prairie dog colony located in the east half of Section 24, Township 50 North, Range 76 West. If the survey is not conducted prior to commencement of surface disturbing activities, it shall be conducted during the first breeding season following POD approval. No surface disturbing activities are permitted in suitable habitat areas listed above, from March 15-July 31, until a mountain plover nesting survey has been conducted for the current breeding season. This affects the following infrastructure:

<i>Township/Range</i>	<i>Section</i>	<i>Infrastructure</i>
50/76	24	<ul style="list-style-type: none"> All proposed access routes and/or pipeline corridors within the western half of this section.

- a. If a mountain plover is identified, then a seasonal disturbance-free buffer of ¼ mile shall be maintained between March 15 and July 31. If no mountain plovers are identified, then surface disturbing activities may be permitted within suitable habitat until the following breeding season (March 15).
- b. 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.
- c. Reclamation of areas of previously suitable mountain plover habitat will include the seeding of vegetation to produce suitable habitat for mountain plover.

2.3.4. Lease Stipulations

The following stipulations exist:

LEASE #	Stipulation	Rationale
WYW146290	TLS. Feb1-July 31	To protect raptor nesting habitat
WYW146811	TLS. Feb1-July 31	To protect sage-grouse nesting habitat.
WYW129538	TLS. Feb1-July 31	To protect sage-grouse, sharp-tailed grouse and raptor nesting habitat.

Subsequent to leasing, the BFO issued the PRB FEIS and RMP amendment which modified timing limitation dates used for the protection of sharp-tailed grouse and sage-grouse to March 1 to June 15. Grouse timing limitations were modified to better account for grouse biology. Grouse typically initiate breeding during March and have completed nesting by June 15; therefore March 1 to June 15 is the minimum period determined to be sufficient for the protection of nesting grouse.

2.4. Alternatives considered but not analyzed in detail

In the original the Carr Draw III POD 53 impoundments and 57 outfalls were proposed. The WYPDES permit allowing discharge to reservoirs, and channels, within the upper Barber Creek drainage was revoked. The impoundment water management proposal was subsequently withdrawn and therefore was not analyzed.

3. DESCRIPTION OF AFFECTED ENVIRONMENT

Applications to drill were received for the Carr Draw III POD on March 02, 2006. Onsites were held July 10-19 2006, September 11, 2007 and November 28, 2007.

This section describes the environment that would be affected by implementation of the Alternatives described in Section 2. Aspects of the affected environment described in this section focus on the relevant major issues. Certain critical environmental components require analysis under BLM policy. These items are presented below in Table 3.1.

Table 3.1 - Critical elements requiring mandatory evaluation are presented below.

Mandatory Item	Potentially Impacted	No Impact	Not Present On Site	BLM Evaluator
Threatened and Endangered Species		X		Jennifer Morton
Floodplains		X		Bill Ostheimer, Mike McKinley
Wilderness Values		X		Bill Ostheimer
ACECs		X		Bill Ostheimer
Water Resources	X			Mike McKinley
Air Quality	X			Bill Ostheimer
Cultural or Historical Values		X		Clint Crago
Prime or Unique Farmlands		X		Bill Ostheimer
Wild & Scenic Rivers			X	Bill Ostheimer, Mike McKinley
Wetland/Riparian		X		Bill Ostheimer, Mike McKinley
Native American Religious Concerns			X	Clint Crago
Hazardous Wastes or Solids		X		Bill Ostheimer
Invasive, Nonnative Species	X			Bill Ostheimer
Environmental Justice		X		Bill Ostheimer

3.1. Topographic Characteristics of Project Area

The Carr Draw III East Federal POD is located approximately 20 miles west of Gillette, Wyoming in Campbell County. The project area is located in Townships 50 North, Range 75 West Sections 18, 19, 20, 29, 30, 31. Townships 50 North, Range 76 Sections 13, 24, 23, 26, 25. The project area is approximately 90% private surface and 10% federal surface overlaying approximately 85% federal minerals and 15% private minerals. Current land uses within the project area include cattle grazing and one oil well in the southwest corner of the POD.

The topography within the project area consists of rugged uplands with ridges separating deep draws and breaks in the northern half of the POD. In the southern half of the POD, south of Barber Creek, the topography is softer with wider ridges and more gradual slopes. Draws are incised throughout the project area. The elevation within the project area ranges from 4200 feet to 4800 feet above sea level. The entire POD is within the Barber Creek drainage, a tributary to the Upper Powder River.

3.2. Soils & Vegetation

3.2.1. Soils

Soils within the project area were identified from the *South Campbell County Survey Area, Wyoming (WY605)*. The soil survey was performed by the Natural Resource Conservation Service according to

National Cooperative Soil Survey standards. Pertinent information for analysis was obtained from the published soil survey and the National Soils Information System (NASIS) database for the area. The soils and landforms of this area present distinct challenges for reclamation. Approximately 73 percent of the area (3985 acres) within the POD boundary has soil mapping units identified as having a poor reclamation potential utilizing Soil Survey Geographical Data (SSURGO).

The soil map units for this project area are listed in the table below along with the individual acreage and the percentage of the total area identified within the POD boundary.

Soil Map Unit Types

Map Unit	Map Unit Name	Acres	Percent
111	BIDMAN-PARMLEED LOAMS, 0 TO 6 PERCENT SLOPES	18	<1%
117	CAMBRIA-KISHONA-ZIGWEID LOAMS, 6 TO 15 PERCENT SLOPES	28	1%
122	CUSHMAN-CAMBRIA LOAMS, 6 TO 15 PERCENT SLOPES	1	<1%
127	CUSHMAN-THEEDLE LOAMS, 6 TO 15 PERCENT SLOPES	22	<1%
139	EMBRY-ORPHA COMPLEX, 3 TO 15 PERCENT SLOPES	97	2%
144	FORKWOOD LOAM, 0 TO 6 PERCENT SLOPES	16	<1%
146	FORKWOOD-CUSHMAN LOAMS, 0 TO 6 PERCENT SLOPES	16	<1%
147	FORKWOOD-CUSHMAN LOAMS, 6 TO 15 PERCENT SLOPES	303	6%
153	HAVERDAD-KISHONA ASSOCIATION, 0 TO 6 PERCENT SLOPES	211	4%
157	HILAND-BOWBAC FINE SANDY LOAMS, 0 TO 6 PERCENT SLOPES	55	1%
158	HILAND-BOWBAC FINE SANDY LOAMS, 6 TO 15 PERCENT SLOPES	31	1%
204	SAMDAY-SAMDAY, COOL-SHINGLE CLAY LOAMS, 6 TO 40 PERCENT SLOPES	1372	25%
206	SAMDAY-SHINGLE-BADLAND COMPLEX, 10 TO 45 PERCENT SLOPES	25	<1%
209	SAVAGETON-SILHOUETTE CLAY LOAMS, 6 TO 15 PERCENT SLOPES	73	1%
215	THEEDLE-KISHONA LOAMS, 6 TO 20 PERCENT SLOPES	550	10%
216	THEEDLE-KISHONA-SHINGLE LOAMS, 3 TO 30 PERCENT SLOPES	54	1%
217	THEEDLE-SHINGLE LOAMS, 3 TO 30 PERCENT SLOPES	1153	21%
233	USTIC TORRIORTHENTS, GULLIED	1339	24%
236	VONALEE-TERRO FINE SANDY LOAMS, 2 TO 10 PERCENT SLOPES	113	2%

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

Soils differ with topographic location, slope and elevation. Topsoil depths to be salvaged for reclamation range from 2 to 4 inches on ridges to 8 inches in bottomland. Erosion potential varies from moderate to severe depending on the soil type, vegetative cover, and slope. Reclamation potential of soils also varies throughout the project area. Areas with poor reclamation potential were identified by BLM specialists and the operator during the pre-approval onsite inspection. The main soil limitations in the project area include: depth to bedrock, low organic matter content, soil droughtiness, low water holding capacity, and high erosion potential especially in areas of steep slopes.

Ecological Sites

Ecological Site Descriptions are used to provide soils and vegetation information needed for resource identification, management and reclamation recommendations. To determine the appropriate Ecological Sites for the POD area, BLM specialists used data the Natural Resources Conservation Service published soil survey soils information and field observations.

Dominant Ecological Sites and Plant Communities identified in this POD and its infrastructure are: loamy-mixed sagebrush/grass and shallow clayey-mixed sagebrush/grass within the 10-14” precipitation zone Northern Plains. Miscellaneous areas were described as badlands were mainly found on south facing ridges. A summary of the ecological sites within the project area are listed in the table below along

with the individual acreage and the percentage of the total area identified within the POD boundary.

Summary of Ecological Sites

Ecological Site	Acres	Percent
Loamy 10-14" Northern Plains	2162	39%
Shallow Clayey 10-14" Northern Plains	1397	26%
Badlands	1339	24%
Lowland 10-14" Northern Plains	211	4%
Sandy 10-14" Northern Plains	199	4%
Sands 10-14" Northern Plains	97	2%
Clayey 10-14" Northern Plains	73	1%

The *loamy sites* occurred on gently undulating to rolling land on landforms which include hill sides, alluvial fans, ridges and stream terraces. The soils of this site are moderately deep to deep (greater than 20" to bedrock), well drained soils that formed in alluvium and residuum derived from sandstone and shale. These soils have moderate permeability.

The *shallow clayey sites* occur on slopes and ridge tops on landforms which include hill sides, ridges and escarpments in the 10-14" precipitation zone. The soils of this site are shallow (less than 20" to bedrock) well drained soils that formed in alluvium or residuum derived from unspecified shale. These soils have moderate to slow permeability and may occur on all slopes. The bedrock is clay shale which is virtually impenetrable to plant roots. The main soil limitations include depth to bedrock and clay content.

Badlands: occur on steep slopes and ridge tops, but may occur on all slopes which include landforms such as hillsides, ridges and escarpments. The sites are identified as miscellaneous areas and classified as Badland, having essentially no soil and supporting little or no vegetation. Runoff potential is very high, and erosion is active.

3.2.2. Vegetation

General vegetation communities observed within the project area were sagebrush steppe, juniper woodland, isolated pine woodlands, and grassland. Wyoming Big Sagebrush intermixed with various native bunch grasses dominated the vegetative composition of the POD. Dominant grasses observed within the ecological sites listed above include:

Loamy sites - rhizomatous wheatgrasses, cheatgrass, green needlegrass, scurfpea, scarlet globemallow, pricklypear, fringed sagewart, rabbit brush, and occasionally winterfat.

Shallow clayey sites - bluebunch wheatgrass, rhizomatous wheatgrass, blue grama, and little bluestem.

Badlands - bare ground with some abiotic and biotic crusts.

3.2.3. Wetlands/Riparian

One wetland area was noted during the onsite along Barber Creek in Section 30. The majority of drainage bottoms within the project area are well vegetated grassy swales of dry land species, without defined bed and bank and therefore are not indicative of a riparian environment. No produced water is proposed to be discharged to the surface within this POD.

3.2.4. Invasive Species

Spotted knapweed was discovered by a search of the BLM GIS database. This infestation appears to occur along I-90, approximately 4 miles south of the Carr Draw III East project area. There were no individual spotted knapweed or other state-listed noxious weeds discovered during the onsite or listed by the proposed project proponent. Introduced Brome (*Bromus tectorum*, *B. japonicus*) grasses are present in the project area but not prolific. The state-listed noxious weeds are in PRB FEIS Table 3-21 (p. 3-

104) and the Weed Species of Concern are listed in Table 3-22 (p. 3-105).

3.3. Wildlife

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

A habitat assessment and wildlife inventory surveys were performed by Western Land Services (WLS). WLS performed surveys for bald eagles, sharp-tailed grouse, greater sage-grouse, and raptor nests according to protocol in 2005, 2006, and 2007. Surveys were conducted for Ute ladies'-tresses orchid on August 8, 2007. Due to restricted access set forth by the land owner, surveys for prairie dog colonies, burrowing owls and mountain plovers were not conducted in 2006 or 2007.

A BLM biologist conducted field visits on July 10-19, 2006. During this time, the biologist reviewed the wildlife survey information for accuracy, evaluated impacts to wildlife resources, and provided project adjustment recommendations where wildlife issues arose.

Wildlife species common to the habitat types present are identified in the Final Environmental Impact Statement and Proposed Plan Amendment for the Powder River Basin Oil and Gas Project (PRB FEIS 3-114). Species that have been identified in the project area or that have been noted as being of special importance are described below.

3.3.1. Big Game

Big game species expected to be within the Carr Draw III East project area include pronghorn antelope and mule deer. The WGFD has determined that the project area contains Yearlong and Winter-yearlong range for pronghorn antelope and mule deer.

Pronghorn antelope within the project area belong to the Gillette herd unit. The 2006 proposed estimate herd population is 18,600 with a population objective of 11,000. Mule deer within the project area belong to the Powder River herd unit. The 2006 proposed estimate herd population is 55,716 with a population objective of 52,000.

Well site 21-26 and 0.6 mi of existing primitive road within a proposed utility corridor fall within elk yearlong range, otherwise yearlong range for the Fortification elk herd is located directly west of the project area. No elk have been recorded within the project area by the landowner, consultant surveys, or BLM radio collared elk in recent years. Topography and vegetation throughout the project area does not provide suitable hiding cover for elk. Suitable habitat is present adjacent to the project area within Sections 13-15, T50N, R76W and continues north and west into the Fortification Creek area. Radio-collared elk data, from 2005 and 2006, indicate that this area as well as the southern portions of the designated Yearlong range for this herd are not being utilized by this herd. The Fortification Creek elk herd historically (1990s) utilized the entire designated yearlong range area. The 2005, radio collared elk data indicate that the elk are concentrating in the northern portions of their yearlong range, though still using the southern portions of this range sporadically throughout the year. The 2006 data indicate that the elk have concentrated completely into the northern portions of their ranges. Elk within the project area belong to the Fortification herd unit. The 2006 estimated herd population is 226 with a population objective of 150.

Winter-Yearlong use is when a population or a portion of a population of animals makes general use of the documented suitable habitat sites within this range on a year-round basis. During the winter months there is a significant influx of additional animals into the area from other seasonal ranges. Yearlong use

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

3.3.2. Aquatics

The project area is drained by ephemeral tributaries of Barber Creek and the South Prong of Barber Creek, which are ephemeral tributaries of the Powder River. No springs were identified within the Carr Draw III East project area (Western Land Services 2006). Fish that have been identified in the Powder River watershed are listed in the PRB FEIS (3-156-159).

3.3.3. Migratory Birds

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. Migratory bird species of management concern that may occur in the project area are listed in the PRB FEIS (3-151).

3.3.4. Raptors

Eleven raptor nest sites were identified by Western Land Services (Aksamit 2007) and BLM within 0.5 mile of the project area, of these, six nests were active in 2005, four nests were active in 2006 and five nests were active in 2007 (see table 3.2).

Table 3.2. Documented raptor nests within the Carr Draw III East project area in 2005, 2006, and 2007.

BLM ID#	SPECIES	UTM (NAD 83)	LEGAL LOCATION	SUBSTRATE	CONDITION IN 2007	STATUS IN 2005	STATUS IN 2006	STATUS IN 2007
3717	Golden Eagle	423528E 4905605N	NENE Sec. 23 T50N, R76W	Ponderosa pine, live	Excellent	Active	Active	Active
3719	Unknown	425726E 4902432N	NWNW Sec. 31 T50N, R75W	Creek bank	Remnant	Active	Inactive	Inactive
3699	Red-tailed hawk	425596E 4906897N	NWNW Sec. 18 T50N, R75W	Ponderosa pine, live	Excellent	Active	Active	Inactive
1399	Red-tailed hawk	427799E 4904539N	NESW Sec. 20 T50N, R75W	Cottonwood, live	Excellent	Active	Active	Active
3725	Red-tailed hawk	425897E 4905056N	SWNW Sec. 19 T50N, R75W	Ponderosa pine, live	Fair	Inactive	Inactive	Active
3700	Cooper's hawk	424984E 4907159N	NENE Sec. 13 T50N, R76W	Juniper, live	Poor	Active	Inactive	Inactive
3731	Red-tailed hawk	426313E 4901771N	SWNE Sec. 31 T50N, R75W	Cottonwood, live	Good	Unknown	Inactive	Active
None	Great-horned owl	425953E 4902448N	NENW Sec. 31 T50N, R75W	Cottonwood, live	Good	Unknown	Unknown	Unknown
1394	Red-tailed hawk	427221E 4902175N	NWNW Sec. 32 T50N, R75W	Cottonwood, live	Good	Unknown	Unknown	Active – Canada goose
3715	Great-horned owl	421725E 4904359N	SWSE Sec. 22 T50N, R76W	Creek bank	Excellent	Active	Active	Inactive
3716	Great-horned owl	421544E 4904327N	SWSE Sec. 22 T50N, R76W	Cottonwood, live	Good	Inactive	Inactive	Inactive

3.3.5. Threatened and Endangered and Sensitive Species

3.3.5.1. Threatened and Endangered Species

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

3.3.5.1.1. Black-footed ferret

The USFWS listed the black-footed ferret as Endangered on March 11, 1967. Active reintroduction efforts have reestablished populations in Mexico, Arizona, Colorado, Montana, South Dakota, Utah, and Wyoming. In 1988, the WGFD identified four prairie dog complexes (Arvada, Recluse, Thunder Basin National Grasslands, and Midwest) partially or wholly within the BLM Buffalo Field Office administrative area as potential black-footed ferret reintroduction sites (Oakleaf 1988).

This nocturnal predator is closely associated with prairie dogs, depending almost entirely upon them for its food. The ferret also uses old prairie dog burrows for dens. Current science indicates that a black-footed ferret population requires at least 1000 acres of black-tailed prairie dog colonies for survival (USFWS 1989).

The WGFD believes the combined effects of poisoning and Sylvatic plague on black-tailed prairie dogs have greatly reduced the likelihood of a black-footed ferret population persisting east of the Big Horn Mountains (Grenier 2003). The U.S. Fish and Wildlife Service has also concluded that black-tailed prairie dog colonies within Wyoming are unlikely to be inhabited by black-footed ferrets (Kelly 2004).

Twelve black-tailed prairie dog colonies were identified during site visits by WLS within the project area. An additional fourteen colonies are documented within the surrounding area (see Table 3.3). The project area is located approximately 6 miles from the Arvada complex, the nearest potential reintroduction area. Total prairie dog acreage within the project area and extending out 1.5 km is 796.5 acres. Black-footed ferret habitat is not present within the Carr Draw III East project area.

Table 3.3. Black-tailed prairie dog colonies identified during site visits by Western Land Services and the BLM BFO database within the project area or within 1.5km. of those colonies, totaling 796.5 acres.

Location	Approximate size (acres)	Status
<i>Within the project area</i>		
NE Sec. 24, T50N, R76W	126	Active
NESW Sec. 25, T50N, R76W	3	Active
SESW Sec. 25, T50N, R76W	4	Active
SENE Sec. 25, T50N, R76W	1	Active
NESE Sec. 26, T50N, R76W	9	Active
NESW Sec. 26, T50N, R76W	11	Active
NWNW Sec. 29, T50N, R75W	3	Active
NENE Sec. 21, T50N, R76W	2	Active
SWSW Sec. 19, T50N, R75W	8	Active
SENE Sec. 25, T50N, R76W	5	Active
NESW Sec. 24, T50N, R76W	3.2	Active
SWSE Sec. 23, T50N, R76W	2.3	Inactive
<i>Within approximately 1.5km (0.9 mile) of colonies</i>		
NESW Sec. 29, T50N, R75W	1.5	Active
NE Sec. 32, T50N, R75W	29.7	Active
E Sec. 33 and W Sec. 34, T50N, R75W	84.7	Active
SW Sec. 21, T50N, R75W	34.0	Active

Location	Approximate size (acres)	Status
S Sec. 21 and N Sec. 28, T50N, R75W	28.4	Active
SE Sec. 34 and SW Sec. 35, T50N, R75W and NE Sec. 3 and W Sec. 2, T49N, R75W	194.5	Active
SE Sec. 3, T49N, R75W	75.3	Active
SW Sec. 3 and NW Sec. 10, T49N, R75W	25.8	Active
SE Sec. 9, T49N, R75W	8	Active
S Sec. 10 and N Sec. 15, T49N, R75W	13.2	Active
NE Sec. 22, T49N, R75W	17.6	Active
SW Sec. 8, T49N, R75W	20.2	Active
NE Sec. 17, T49N, R75W	68.2	Active
W Sec. 18, T49N, R75W	17.9	Active
TOTAL	796.5	

3.3.5.1.2. Ute's Ladies Tresses Orchid

This orchid is listed as Threatened under the Endangered Species Act. It is extremely rare and occurs in moist, sub-irrigated or seasonally flooded soils at elevations between 1,780 and 6,800 feet above sea level. Habitat includes wet meadows, abandoned stream channels, valley bottoms, gravel bars, and near lakes or perennial streams that become inundated during large precipitation events. Prior to 2005, only four orchid populations had been documented within Wyoming. Five additional sites were located in 2005 and one in 2006 (Heidel pers. Comm.). The new locations were in the same drainages as the original populations, with two on the same tributary and within a few miles of an original location. Drainages with documented orchid populations include 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.

Barber Creek and the South Prong of Barber Creek and its tributaries are ephemeral. No springs were identified within the Carr Draw III East project area (Western Land Services 2006). On August 8, 2007, Western Land Services conducted surveys for Ute ladies'-tresses within portions of the Carr Draw Federal III East POD that posed potential habitat areas. Four areas were examined in detail. A proposed utility crossing of a narrow channel within Barber Creek floodplain in SESE Section 23, T50N, R76W showed no surface hydrology, was dominated by native upland vegetation (>40% cover and less than 50 cm. tall), and classified to have very deep, well drained soils. A second site, a proposed road crossing across a deep channel within the Barber Creek floodplain in NWSE Section 30, T50N, R75W, showed no surface hydrology, was dominated by native upland vegetation (>60% cover and less than 50 cm. tall within the channel bottom), and classified to have very deep, well drained soils. A third site, a proposed utility crossing across a 2-4 foot deep incised channel within the South Prong of Barber Creek floodplain in NWN Section 35, T50N, R75W, showed no surface hydrology, was dominated by native upland vegetation (>60% cover and less than 50 cm. tall within the channel bottom), and classified to have well drained soils that are moderately deep to soft bedrock and soils that are well drained with slow and medium runoff. The fourth site, a proposed waterline crossing across a 2-4 foot deep incised channel within the South Prong of Barber Creek floodplain in NESW Section 35, T50N, R75W, showed no surface hydrology, was dominated by native upland vegetation (>60% and was less than 50 cm. tall within the channel bottom), and classified to have very shallow or shallow, well drained soils. Suitable orchid habitat is not present within the Carr Draw III East project area.

3.3.5.2. Sensitive Species

The USDI Bureau of Land Management (BLM) Wyoming has prepared a list of sensitive species to focus species management efforts towards maintaining habitats under a multiple use mandate. The authority for this 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.

Prairie dogs colonies create a biological niche or habitat for many species of wildlife (King 1955, Reading 1989). Agnew (1986) found that bird species diversity and rodent abundance were higher on prairie dog towns than on mixed grass prairie sites. Several studies (Agnew 1986, Clark 1982, Campbell and Clark 1981 and Reading 1989) suggest that richness of associated species on black-tailed prairie dog colonies increases with colony size and regional colony density. Prairie dog colonies attract many insectivorous and carnivorous birds and mammals because of the concentration of numerous prey species (Clark 1982, Agnew 1986, Agnew 1988).

In South Dakota, forty percent of the wildlife taxa (134 vertebrate species) are associated with prairie dog colonies (Agnew 1983, Apa 1985, Mac Cracken 1985, Agnew 1986, Uresk 1986, Deisch 1989). Of those species regularly associated with prairie dog colonies, six are on the Wyoming BLM sensitive species list. The species of concern are swift fox (*Vulpes velox*), mountain plover (*Charadrius montanus*), ferruginous hawk (*Buteo regalis*), burrowing owl (*Athene cunicularia*), loggerhead shrike (*Lanius ludovicianus*), and long-billed curlew (*Numenius americanus*).

3.3.5.2.1. Bald eagle

On February 14, 1978, the bald eagle was federally listed as Endangered. On August 8, 2007, the bald eagle was removed from the Endangered Species list. The bald eagle remains under protection by the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. In order to avoid violation of these laws and uphold the BLM's commitment to avoid any future listing of this species, all conservation measures and terms and conditions identified in the Powder River Basin Oil and Gas Project Biological Opinion (WY07F0075) shall continue to be complied with.

Bald eagle nesting habitat is generally found in areas that support large mature trees. Eagles typically will build their nests in the crown of mature trees that are close to a reliable prey source. This species feeds primarily on fish, waterfowl, and carrion. In more arid environments, such as the Powder River Basin, prairie dogs, ground squirrels, and lagomorphs (hares and rabbits) can make up the primary prey base. The diets of wintering bald eagles can be more varied. In addition to prairie dogs, ground squirrels, and lagomorphs, domestic sheep and big game carcasses may provide a significant food source in some areas. Historically, sheep carcasses from large domestic sheep ranches provided a reliable winter food source within the Powder River Basin (Patterson and Anderson 1985). Today, few large sheep operations remain in the Powder River Basin. Wintering bald eagles may congregate in roosting areas generally made up of several large trees clumped together in stands of large ponderosa pine, along wooded riparian corridors, or in isolated groups. Bald eagles often share these roost sites with golden eagles as well.

Marginal nesting and roosting habitat is present within the Carr Draw III East project area in the form of large ponderosa pines or cottonwood trees along Barber Creek. Suitable prey sources are available throughout the project area in the form of lagomorphs, prairie dogs, and ranch livestock. No bald eagles have been documented within the immediate project area or extending one mile from proposed activities in 2005, 2006, or 2007.

3.3.5.2.2. Black-tailed prairie dog

On August 12, 2004, the U.S. Fish and Wildlife Service removed the black-tailed prairie dog's Candidate status. The Buffalo Field Office however will consider prairie dogs as a sensitive species and continue to afford this species the protections described in the FEIS. The black-tailed prairie dog is a diurnal rodent inhabiting prairie and desert grasslands of the Great Plains. Their decline is related to multiple factors including, habitat destruction, poisoning, and Sylvatic plague.

Twelve black-tailed prairie dog colonies were identified during site visits by WLS within the project area (see Table 3.3 for colonies within the project area.).

3.3.5.2.3. Burrowing owls

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

The western burrowing owl has declined significantly throughout its range in North America. Current population estimates for the United States are not well known but trend data suggest significant declines across their range. The last official population estimate placed them at less than 10,000 breeding pairs. The majority of the mid-western and western states within the owl's range have recognized that western burrowing owls are in trouble. It is listed as a sensitive species by the Bureau of Land Management throughout the west and by the U.S. Fish and Wildlife Service (Defenders of Wildlife). Primary threats across the North American range of the burrowing owl are habitat loss and fragmentation primarily due to intensive agricultural and urban development, and habitat degradation due to declines in populations of colonial burrowing mammals (Klute 2003).

Burrowing owl nesting habitat consists of open areas with mammal burrows. Individual burrowing owls have moderate to high site fidelity to breeding areas and even to particular nest burrows (Klute et al. 2003). Burrow and nest sites are reused at a higher rate if the bird has reproduced successfully during the previous year. Favored nest burrows are those in relatively sandy sites (possibly for ease of modification and drainage), areas with low vegetation around the burrows (to facilitate the owl's view and hunting success), holes at the bottom of vertical cuts with a slight downward slope from the entrance, and slightly elevated locations. In Wyoming egg laying begins in mid-April. Incubation is assumed to begin at the mid-point of the laying period and lasts for 26 days (Olenick 1990). Young permanently leave the primary nest burrow around 44 days from hatch (Landry 1979) although juveniles will continue to hunt with and associate with parents until migration (early September through early November) (Haug 1985).

One burrowing owl was observed on June 10, 2005 in NESW Section 25, T50N, R76W. Another was observed on June 26, 2005 in SE Section 24, 50N, R76W. No nest locations were found. No surveys were conducted for burrowing owls within the project area in 2006 or 2007.

3.3.5.2.4. Greater sage-grouse

Sage-grouse are listed as a sensitive species by BLM (Wyoming). In recent years, seven petitions have been submitted to the U.S. Fish and Wildlife Service (FWS) to list greater sage-grouse as threatened or endangered. On January 12th, 2005, the USFWS issued a decision that the listing of the greater sage-grouse was "not warranted" following a Status Review. The decision document supporting this outcome noted the need to continue or expand all conservation efforts to conserve sage-grouse. A judge in Idaho recently (December 2007) ordered the USFWS to conduct a new Status Review as a result of a lawsuit and questions surrounding the 2005 review.

Greater 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 throughout the project area. Nesting and brood-rearing habitat occurs in sagebrush communities throughout the project area. Old and fresh sign was observed in the project area primarily in the southern and southeastern portion of the project area in Sections 19, 20 and 30, T50N, R75W as well as in Sections 25, 26, and 36, T50N, R76W. Individual sage-grouse were

observed by WLS in NESE Section 19 (Aksamit 2007). The BLM biologist observed a hen and brood among the sagebrush and greasewood in the floodplain of North Prong of Barber Creek in NENE Section 26, T50N, R76W. BLM records identified eight sage-grouse leks within 3 miles of the Carr Draw III East POD. These lek sites are identified below (Table 3.4).

Table 3.4. Sage-grouse leks surrounding the Carr Draw III East project area.

LEK NAME	LEGAL LOCATION	STATUS IN (YEAR - PEAK MALES)	DISTANCE FROM PROJECT AREA (MILES)
Hayden I	SWSE Sec. 17 T50N, R75W	'79 - 39, '80 - 73, '82 - 24, '85 - 14, '88 - 44, '89 - 10, '92 - 4, '95 - 7, '98 - 0, '01 - 32, '02 - 17, '03 - 21, '04 - 17, '05 - 17, '06 - 27, '07 - 22	0.33
Hayden II	SESW Sec. 31 T51N, R75W	'79 - 39, '80 - 23, '83 - 8, '85 - 0, '88 - 8, '91 - 13, '92 - 7, '95 - 0, '98 - 0, '00 - 0, '01 - 7, '02 - 3 '03 - 2, '04 - 2, '05 - 0, '06 - 2, '07 - 2	2.76
Hayden Satellite A	SWNE Sec. 22 T50N, R75W	'80 - 9, '85 - 18, '88 - 23, '89 - 12, '92 - 5, '95 - 23, '98 - 0, '00 - 40, '01 - 1, '02 - 0, '03 - 0, '04 - 0, '05 - 2, '06 - 4, '07 - 2	1.03
Hayden Satellite B	NENW Sec. 27 T50N, R75W	'80 - 7, '85 - 0, '88 - 0, '91 - 4, '92 - 0, '95 - 0, '98 - 30, '00 - 20, '01 - 0, '02 - 0, '03 - 22, '04 - 12, '05 - 63, '06 - 33, '07 - 30	1.84
Barber Creek South Prong	NWSE Sec. 1 T49N, R76W	'06 - 8, '07 - 0	1.32
Watsabaugh IV	NENE Sec. 17 T49N, R75W	'04 - 7, '05 - 34, '06 - 51, '07 - 45	2.72
Laskie Draw	SESW Sec. 4 T49N, R76W	'04 - 3, '05 - 6, '06 - 4, '07 - 19	2.82
Laskie Draw East	NENW Sec. 3 T49N, R76W	'05 - 20, '06 - 23, '07 - 24	1.61

3.3.5.2.5. Mountain plover

Mountain plovers, which are a Buffalo Field Office sensitive species, are typically associated with high, dry, short grass prairies containing vegetation typically shorter than four inches tall, and slopes less than 5 degrees (BLM 2003). Mountain plovers are closely associated with heavily grazed areas such as prairie dog colonies and livestock pastures.

Most of the terrain in the project area is either too steep or covered with too dense or too tall vegetation to be considered preferred habitat for mountain plovers. The areas of habitat within the project area which can be classified as suitable habitat for mountain plover are located in the identified prairie dog colonies (see Table 3.3) (Aksamit 2007). No mountain plovers were observed during surveys conducted in 2005. Due to landowner restrictions, surveys were not conducted within the project area in 2006 or 2007.

3.4. West Nile Virus

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

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

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

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

Table 3.4 Historical West Nile Virus Information

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

*Wyoming Department of Health Records September 12, 2007.

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

Although most of the attention has been focused on human health issues, WNV has had an impact on vertebrate wildlife populations. At a recent conference at the Smithsonian Environmental Research Center, scientists disclosed WNV had been detected in 157 bird species, horses, 16 other mammals, and alligators (Marra et al 2003). In the eastern US, avian populations have incurred very high mortality, particularly crows, jays and related species. Raptor species also appear to be highly susceptible to WNV. During 2003, 36 raptors were documented to have died from WNV in Wyoming including golden eagle, red-tailed hawk, ferruginous hawk, American kestrel, Cooper's hawk, northern goshawk, great-horned owl, prairie falcon, and Swainson's hawk (Cornish et al. 2003). Actual mortality is likely to be greater. Population impacts of WNV on raptors are unknown at present. The Wyoming State Vet Lab determined 22 sage-grouse in one study project (90% of the study birds), succumbed to WNV in the PRB in 2003. While birds infected with WNV have many of the same symptoms as infected humans, they appear to be more sensitive to the virus (Rinkes 2003).

Mosquitoes can potentially breed in any standing water that lasts more than four days. In the Powder River Basin, there is generally increased surface water availability associated with CBNG development. This increase in potential mosquito breeding habitat provides opportunities for mosquito populations to increase. Preliminary research conducted in the Powder River Basin indicates WNV mosquito vectors were notably more abundant on a developed CBNG site than two similar undeveloped sites (Walker et al. 2003). Reducing the population of mosquitoes, especially species that are apparently involved with bird-to-bird transmission of WNV, such as *Culex tarsalis*, can help to reduce or eliminate the presence of virus

in a given geographical area (APHIS 2002). The most important step any property owner can take to control such mosquito populations is to remove all potential man-made sources of standing water in which mosquitoes might breed (APHIS 2002).

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

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

3.5. Water Resources

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

3.5.1. Groundwater

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

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

Specifically relative to groundwater, the plan identified the following (PRB FEIS ROD page E-4):

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

The BLM has installed shallow groundwater monitoring wells at five impoundment locations throughout the PRB to assess ground-water quality changes due to infiltration of CBNG produced water. The most intensively monitored site has a battery of nineteen wells which have been installed and monitored jointly by the BLM and USGS since August, 2003. Water quality data has been sampled from these wells on a regular basis. That impoundment lies atop approximately 30 feet of unconsolidated deposits (silts and sands) which overlie non-uniform bedrock on a side ephemeral tributary to Beaver Creek and is

approximately one and one-half miles from the Powder River. Baseline investigations showed water in two sand zones, the first was at a depth of 55 feet and the second was at a depth of 110 feet. The two water bearing zones were separated by a fifty-foot thick shale layer. The water quality of the two water bearing zones fell in the WDEQ Class III and Class I classifications respectively. Preliminary results from this sampling indicate increasing levels of TDS and other inorganic constituents over a six month period resulting in changes from the initial WDEQ classifications.

The on-going shallow groundwater impoundment monitoring at four other impoundment locations are less intensive and consist of batteries of between 4 and 6 wells. Preliminary data from two of these other sites also are showing an increasing TDS level as water infiltrates while two other sites are not.

A search of the Wyoming State Engineer Office (WSEO) Ground Water Rights Database for this area showed 21 registered stock and domestic water wells within ½ mile of a federal CBNG producing well in the POD with depths ranging from 84 to 1,200 feet and 4 industrial wells with depths ranging from 400 to 3,905 feet. For additional information on water, please refer to the PRB FEIS (January 2003), Chapter 3, Affected Environment pages 3-1 through 3-36 (groundwater).

3.5.2. Surface Water

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

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

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

3.6. Cultural Resources

A Class III inventory was conducted for the Carr Draw 3 East project prior to on-the-ground project work (BFO project #'s 70080055). Western Land Services conducted the Class III inventory following the Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines (48FR190) for the proposed project. Clint Crago, BFO archaeologist, reviewed the reports for technical adequacy and for compliance with BLM and Wyoming State Historic Preservation Office standards, and determined them to be adequate. The following resources are located within the Area of Potential Effect (APE).

Table 3.4 Cultural Resource Sites Identified within the Carr Draw 3 East project area

Site Number	Site Type	National Register Eligibility
48CA157	Prehistoric Habitation, Possible Stone Circle	Eligible
48CA158	Prehistoric Open Camp	Unevaluated
48CA159	Prehistoric Lithic Scatter	Not Eligible
48CA160	Prehistoric Lithic Scatter	Not Eligible
48CA161	Prehistoric Lithic Scatter	Not Eligible
48CA162	Prehistoric Lithic Scatter	Not Eligible
48CA2100	Prehistoric Lithic Scatter	Eligible
48CA2101	Historic Homestead	Not Eligible
48CA5122	Prehistoric Lithic Scatter	Not Eligible
48CA5814	Prehistoric Charcoal Lense	Not Eligible
48CA5815	Historic Structure	Not Eligible
48CA5816	Prehistoric Lithic Scatter	Not Eligible
48CA5817	Prehistoric Lithic Scatter	Not Eligible
48CA5818	Prehistoric Lithic Scatter	Not Eligible
48CA5819	Prehistoric Lithic Scatter	Not Eligible
48CA5820	Prehistoric Lithic Scatter	Not Eligible
48CA5830	Historic Trash Scatter	Not Eligible
48CA5831	Historic Trash Scatter	Not Eligible
48CA5832	Prehistoric Lithic Scatter	Not Eligible
48CA5842	Prehistoric Lithic Scatter	Not Eligible
48CA6113	Historic Collapsed Structure	Not Eligible
48CA6114	Prehistoric Lithic Scatter	Not Eligible

3.7. Socioeconomics

The POD is located primarily on Billy and Christina Maycock’s Ranch. The Maycocks believe the proposed development will significantly impact their quality of life and the economic viability of the ranching operation. Most landowners involved in federal CBNG development reach a surface use agreement with operators that covers the anticipated impacts to the ranch. In this case, the Maycocks and Williams Production could not reach an agreement. Therefore Williams secured a bond, as required by 43 CFR 3814, for \$37,000.00 to cover damages to tangible improvements and crops that would result from development of the current Carr Draw III East and future Carr Draw III West PODs.

The existing environment for the Maycock ranch can be assessed by reviewing documents submitted to the BLM as part of their protests against the bond mentioned above. In summary, the ranch has existed for 100 years as a traditional cattle operation. The Maycocks still use horses to gather cattle and argue that the areas most important to their operations, the ridges and valley bottoms, are also the areas most impacted by the proposed development. The Maycocks argue that their traditional gathering and sorting areas would be compromised by the development such that their cattle operation would suffer significantly. The Maycocks have also stated the dust generated from the development will render many more acres unpalatable than what is directly impacted, and that cattle will trail vehicles (they are used to being fed from a truck) and lose weight.

In addition to potential monetary impacts from CBNG development on the cattle operation, the Maycocks argue that their quality of life – that of a traditional ranch- will be significantly impacted.

4. ENVIRONMENTAL CONSEQUENCES

The changes to the proposed action (Alternative B) resulted in development of Alternative C as the preferred alternative. The changes have reduced impacts to the environment which will result from this action. The environmental consequences of Alternative C are described below.

4.1. Soils & Vegetation Direct and Indirect Effects

4.1.1. Soil

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

- Mixing of horizons where construction on roads, pipelines or other activities take place. Mixing may result in removal or relocation of organic matter and nutrients to depths where it would be unavailable for vegetative use. Soils which are more susceptible to wind and water erosion may be moved to the surface. Soil structure may be destroyed, which may impact infiltration rates. Less desirable inorganic compounds such as carbonates, salts or weathered materials may be relocated and have a negative impact on revegetation.
- Loss of soil vegetation cover, biologic crusts, organic matter and productivity.
- Soil erosion would also affect soil health and productivity. Erosion rates are site specific and are dependant on soil, climate, topography and cover.
- Soil compaction is the collapse of soil pores resulting in decreased infiltration and increased erosion potential. Factors affecting compaction include soil texture, moisture, organic matter, clay content and type, pressure exerted, and the number of passes by vehicle traffic or machinery. Compaction may be remediated by plowing or ripping.
- Modification of hill slope hydrology.

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

There are many areas which will be reclaimed by traditional methods. However, some areas will be challenging for reclamation due to soil properties and/or site characteristics. Fencing problematic areas to allow vegetation establishment can minimize soil loss and help interim reclamation efforts. The proponent planned their project and the BLM made further recommendations on the onsite to avoid areas having a low reclamation potential (potentially highly erosive soils) where possible. The BLM has an obligation to protect these lands from disturbance which could lead to irretrievable and irreversible impacts. The proposed action was designed or modified to avoid highly erosive soils which have a poor potential for successful reclamation. However the proposed action will affect some areas of soils with a limited potential for successful reclamation. Disturbances within these areas require the programmatic/standard COAs be complimented with a site specific performance based reclamation

related COA. Where unavoidable impacts will occur, the operator has committed to minimizing the disturbance. For example, the roads into 14-13 and 43-13 will be limited to 20 feet total width of disturbance, with the utilities buried in the roadbed. Surface disturbance in sections 13, 18, northwest of 19, northeast of 24, northwest of 31 will be reclaimed within 30 days of disturbance in order to assure reclamation success. Soil disturbance shall be minimized by avoiding blading where it is not needed for creation of a safe road.

Cumulative Effects: Most soil disturbances would be short term impacts with expedient, successful interim reclamation and site stabilization, as committed to by the operator in their POD Surface Use Plan and as required by BLM in COAs.

The operator will follow the guidance provided in the Wyoming Policy on Reclamation (IM WY-90-231), and applied COAs. BLM reclamation goals emphasize eventual ecosystem reconstruction, which means returning the land to a condition approximate to or better than that which existed before it was disturbed. Final reclamation measures are used to achieve this goal. BLM reclamation goals also include the short-term goal of quickly stabilizing disturbed areas to protect both disturbed and adjacent undisturbed areas from unnecessary degradation. Interim reclamation measures are used to achieve this short-term goal.

4.1.2. Vegetation

Impacts to vegetation will be reduced by following the operator's plans and BLM applied mitigation. Of the 41 proposed well locations for the 82 wells, 0 are on existing or reclaimed conventional well pads, 34 can be drilled without a well pad being constructed and seven will require a constructed (cut & fill) well pad. Surface disturbance associated with the drilling of the 68 wells (35 locations) without constructed pads would involve digging-out of rig wheel wells (for leveling drill rig on minor slopes), reserve pit construction (estimated approximate size of 40 x 40 feet), and compaction (from vehicles driving/parking at the drill site). Estimated disturbance associated with these 70 wells would involve approximately 0.1 acre/well for 7 total acres. Vegetation may be crushed within 0.5 acres per location resulting in 20.5 acres disturbance. The other seven wells requiring cut & fill pad construction would disturb approximately .5 acres/well pad for a total of 3.5 acres. The total estimated disturbance for all 82 wells would be 10.5 acres.

Two and three tenths (2.3) miles of improved roads would be constructed to provide access to various well locations. Approximately 16.0 miles of new and existing primitive trails would be utilized to access well sites. The majority of proposed pipelines (gas and water) have been located in "disturbance corridors." Disturbance corridors involve the combining of 2 or more utility lines (water, gas, power) in a common trench, usually along access routes. The landowner requested all utilities be placed under the road bed. Where it is deemed necessary for future reclamation efforts (for example access to 14-13 and 43-13 along ridges) the utilities will be placed directly in the road bed. Other corridor pipelines will be placed within the edges of cuts and fills or within four feet of a wheel track. Approximately 28 miles of pipeline would be constructed outside of corridors. Expedient reclamation of disturbed land with stockpiled topsoil, proper seedbed preparation techniques, and appropriate seed mixes, along with utilization of erosion control measures (e.g., waterbars, water wings, culverts, rip-rap, gabions etc.) would ensure land productivity/stability is regained and maximized. Vegetation impacts at well locations shall be minimized to a working area of 200 by 200 feet. All activities will be contained within this area. Mowing shall be minimized within this area to allow for a safe working environment around the well-head. To ensure reclamation of difficult areas, surface disturbance in Sections 13, 18, 19, 23, 24, 31, shall be stabilized within 30 days of disturbance. For reclamation in all other areas within the POD the Wyoming Policy on Reclamation (IM WY-90-231) shall be applied. If BLM identifies problematic sites (those that are not meeting reclamation standards) they will be fenced from grazing to allow vegetative root establishment.

To minimize long term impacts to vegetation, the landowner requested all pipelines be placed in the roadbed and all infrastructure, including roads, pipelines and pit liners, be removed at final reclamation. The landowner has existing pipelines on the property that over time have been exposed or caused erosion. Installation of pipelines within the roadway (inside edge of ditches) and subsequent removal will result in a short-term disturbance along the shoulder of roads. By keeping the pipelines within the roadway, but not under the running surface where the operator has safety concerns, the landowner is assured that vegetation impacts from removal of the lines will not add to the disturbance from road reclamation. In the few locations where pipelines diverge from roads (for example the Barber Creek crossing in the southwest of section 30), there will be a second short-term impact to vegetation at the time those pipelines are removed. The 28 mile waterline would most likely remain to serve other development. Table 4.1 summarizes the proposed surface disturbance.

Proposed stream crossings, including culverts and fords (low water crossings) are shown on the MSUP (see the POD). These structures would be constructed in accordance with sound, engineering practices and BLM standards.

Table 4.1 - SUMMARY OF DISTURBANCE

Facility	Number or Miles	Factor	Acreage of Disturbance	Duration of Disturbance
Nonconstructed Pad	34	0.1/acre	10.5	Long Term
Constructed Pad	7	or Site Specific		
Gather/Metering Facilities	0	Site Specific		Long Term
Screw Compressors		Site Specific		Long Term
Monitor Wells		0.1/acre		Long Term
Impoundments	0 0		0.0	Long Term
On-channel	0	Site Specific	0.0	
Off-channel		Site Specific	0.0	
Water Discharge Points		Site Specific or 0.01 ac/WDP	0.0	
Channel Disturbance				
Headcut Mitigation*		Site Specific	0.0	
Channel Modification		Site Specific	0.0	
Improved Roads	2.3	50' Width or Site Specific	14	Long Term
No Corridor				
With Corridor				
2-Track Roads	16.0	40' Width or Site Specific	79.5	Long Term
With Corridor				
Waterline	28.0	40' Width	138.21	Short Term
Buried Power Cable	Miles Buried	12' Width or Site Specific		Short Term
No Corridor	Power Not within Corridor			

Facility	Number or Miles	Factor	Acreage of Disturbance	Duration of Disturbance
Overhead Powerlines	4.2	15' Width	0.62	Long Term
Additional Disturbance	Pump Station	Site Specific	5	
TOTAL			237.3	

The designation of the duration of disturbance is defined in the PRB FEIS (pg 4-1 and 4-151). “For this EIS, short-term effects are defined as occurring during the construction and drilling/completion phases. Long-term effects are caused by construction and operations that would remain longer”.

4.1.3. Wetland/Riparian

The only wetland identified at the onsite was in Barber Creek in the vicinity of the ranch house (section 30). A proposed utility crossing is planned upstream of this area and should not impact it. The channels within the project area are primarily well vegetated grassy swales of dry land species, without defined bed and bank and therefore are not indicative of a riparian environment. It is not anticipated that discharge of produced water into a pipeline for transportation off-site will impact wetland or riparian areas. Barber Creek contains mature cottonwood trees. The proposed project will not impact these trees.

4.1.4. Invasive Species

Based on the investigations performed during the POD planning process, the operator has committed to the control of noxious weeds and species of concern using an Integrated Pest Management Plan (IPMP) should noxious weeds become established.

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

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. Construction and production would create a favorable environment and vector for the establishment and spread of noxious weeds/invasive plants such as salt cedar, Canada thistle and perennial pepperweed. However, mitigation as required by BLM applied COAs will reduce potential impacts from noxious weeds and invasive plants.

4.1.5. Soils and Vegetation 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 Project Area. SAR in water in the sub-watersheds could be altered by saline soils because disturbed soils with a conductivity of 16 mmhos/cm could release as much as 0.8 tons/acre/year of sodium (BLM 1999c). Soils in floodplains and streambeds may also be affected by produced water high in SAR and TDS. (PRB FEIS page 4-151).

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

- They are proportional to the actual amount of cumulatively produced water in the Upper Powder River drainage, which is approximately 16.8% of the total predicted in the PRB FEIS.
- The WDEQ enforcement of the terms and conditions of WYPDES permits that are designed to protect irrigation downstream.

- The WMP for the Carr Draw III East proposes that produced water will not contribute to flows downstream as a result of discharging all produced water into a water transmission line.

No additional mitigation measures are required.

4.2. Wildlife

4.2.1. Big Game Direct and Indirect Effects

Under the environmentally preferred alternative, Winter-Yearlong, and Yearlong range for pronghorn antelope and mule deer would be directly disturbed with the construction of wells, reservoirs, pipelines and roads. A proposed pipeline corridor adjacent to an existing primitive road, a short well access route and pipeline corridor, and a twinned well location (21-26) are proposed within designated Yearlong range for the Fortification Creek elk herd.

Human activities associated with mineral activities are having the greatest influence on elk habitat selection within the Fortification Creek Elk Herd area. The elk have adjusted to the current level of development, by favoring the Wilderness Study Area and crucial ranges, but how much more development they can tolerate is unknown. Elk are exhibiting an avoidance of existing wells by at least 1.7 miles. Elk are expected to continue to avoid wells and roads for 20 years, the duration of the CBNG activities (US DOI BLM BFO 2007). Within a 1.7 mile buffer of the project's well locations, the BLM identified one large area (approximately 1,444 acres) of elk security habitat within the Fortification Creek yearlong range. Security habitat is defined as those blocks of contiguous habitat >250 acres in size that presently are unaffected (directly or indirectly) by CBNG activities. A view-shed analysis conducted to identify impacts to elk habitat, based on proposed wells within the project area indicates that approximately 1000 acres of this security habitat will be compromised (Provided as Attachment A for the project record).

Table 4.1 summarized the proposed activities; items identified as 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 feels a well density of eight wells per section creates a high level of impact for big game and that avoidance zones around mineral facilities overlap creating contiguous avoidance areas (WGFD 2004). A multi-year study on the Pinedale Anticline suggests not only do mule deer avoid mineral activities, but after three years of drilling activity the deer have not accepted 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. Elk and mule deer are more sensitive to operation and maintenance activities than pronghorn, and as the Pinedale Anticline study suggests mule deer do not readily habituate. A study in North Dakota stated "Although the population (mule deer) had over seven years to habituate to oil and gas activities, avoidance of roads and facilities was determined to be long term and chronic" (Lustig 2003). Deer have even been documented to avoid dirt roads that were used only by 4-wheel drive vehicles, trail bikes, and hikers (Jalkotzy et al. 1997).

Winter big game diets are sub-maintenance, meaning they lose weight and body condition as the winter progresses. To survive 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.

4.2.1.1. Cumulative effects

During the 1990s study, 44 data points of elk locations were recorded within 1.7 miles of the security habitat within Sections 2, 3, 10, 11, 14, and 15, T50N, R76W. An examination of Wyoming Oil & Gas Conservation Commission well data indicates that no wells existed within 1.7 miles of the security habitat at that time. Road information for the 1990s time period is unavailable. Data points collected in 2005 recorded five elk locations within 1.7 miles of the security habitat. No wells existed at this time. Road information, provided by digital orthophotography, indicates approximately 23 road segments existed within 1.7 miles of the security habitat in September of 2006. Data points collected in 2006 (through September) recorded no elk locations within 1.7 miles of the security habitat. The well data indicates that 55 wells were drilled within 1.7 miles of the security habitat from November 2006 to November 2007. Road information indicates approximately 65 road segments within 1.7 miles of the security habitat by June of 2007. The data suggests that oil and gas activities in the area have displaced the elk between the 1990s and today. However, as elk have already been displaced from within 1.7 miles of the Carr Draw III East project area, development of the Carr Draw III East project should not further impact elk habitat use.

Though elk may return to this area during the production phase of oil and gas projects, their numbers are expected to be less than before the presence of oil and gas activity and usage of the remaining habitat in the area will be altered. The timing of construction for the Carr Draw III East project will likely also prolong the displacement.

4.2.2. Aquatics Direct and Indirect Effects

Produced water is to be discharged into a pipeline that will transport the water to various existing outfall locations. This pipeline and discharge to all of its outfalls was previously analyzed in a sundry notice submitted to the BLM BFO (EA# WY-070-08-013), approved 10/19/2007. No additional effects to aquatic species are anticipated.

4.2.2.1. Cumulative effects

The cumulative effects associated with Alternative C are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, please refer to the referenced PRB FEIS, Volume 2, Chapter 4, page 4-247. No additional mitigation measures are required.

4.2.3. Migratory Birds Direct and Indirect Effects

Disturbance of the habitat types within the project area is likely to impact migratory birds. Native habitats are being lost directly with the construction of wells, roads, and pipelines. Prompt re-vegetation of short-term disturbance areas should reduce habitat loss impacts. Human activities likely displace migratory birds farther than simply the physical habitat 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). 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 (displacement) were much greater than the direct physical habitat losses.

Overhead power lines may affect migratory birds in several ways. Power poles provide raptors with perch sites and may increase predation on migratory birds. Power lines placed in flight corridors may result in collision mortalities. Some species may avoid suitable habitat near power lines in an effort to

avoid predation. Additional direct and indirect effects to migratory birds are discussed in the PRB FEIS (4-231-235).

4.2.3.1. Cumulative effects

The cumulative effects associated with Alternative C are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, please refer to the referenced PRB FEIS, Volume 2, Chapter 4, Page 4-235. No additional mitigation measures are required.

4.2.4. Raptors Direct and Indirect Effects

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

Table 4.2. Infrastructure within close proximity to documented raptor nests within the Carr Draw III East project area (Timing limitations will apply to this infrastructure).

BLM ID#	INFRASTRUCTURE	DISTANCE (MILES)
2083	Proposed overhead powerline	0.46 (SW)
3699	Well 11-18-5075BG/W Well 43-13-5076BG/W Proposed overhead powerlines	0.16 (N) (out of line-of-sight) 0.43(SW) 0.20 (E) and 0.20 (N)
3700	Well 11-18-5075BG/W Well 32-13-5076BG/W Proposed overhead powerlines	0.35 (E) 0.31 (SSW) 0.10 (N)
3717	Well 14-13-5076BG/W	0.32 (NE)
3725	Well 21-19-5075BG/W Well 32-19-5075BG/W Well 23-19-5075BG/W Well 12-19-5075BG/W	0.31 (NE) 0.41 (ENE) 0.33 (SSE) 0.16 (W)
1399	Well 22-20-5075BG/W Well 43-20-5075BG/W Well 34-20-5075BG/W Well 41-29-5075BG/W Well 21-29-5075BG/W Well 14-20-5075BG/W Proposed overhead powerline	0.29 (NNW) 0.44 (NE) 0.23 (SE) 0.49 (SE) 0.35 (S) 0.43 (SW) 0.35 (E) and 0.18 (N)
None (New in 2007)	Well 34-40-5075BG/W Well 14-30-5075BG/W Proposed overhead powerlines	0.17 (NE) (out of line-of-sight) 0.27 (NW) 0.07 (S)
3719	Well 34-40-5075BG/W Well 43-25-5076BG/W Well 14-30-5075BG/W Proposed overhead powerlines	0.31 (ENE) 0.44 (NW) 0.20 (NNW) (out of line-of-sight) 0.06 (S)

To reduce the risk of decreased productivity or nest failure, the BLM BFO requires a one-half mile radius timing limitation during the breeding season around active raptor nests and recommends all infrastructure requiring human visitation to be located greater than one-quarter mile from occupied raptor nests.

The original proposed location for the 23-20-5075BG/W wells was 0.10 mile from a red-tailed hawk nest. This well was relocated approximately 897 feet north to within 200 feet of a county road. The new location is out of line-of-sight of the nest and greater than 0.25 mile from the nest. The original proposed location for the 12-19-5075BG/W wells was 0.15 mile from a red-tailed hawk nest. This well was relocated approximately 200 feet south to an existing fence line. Although this new location does not remove it from line-of-sight of the nest nor is it greater than the recommended 0.25 mile from the nest, it is now located next to existing infrastructure. The original proposed location for the 21-31-5075BG/W wells was 0.10 mile from a newly discovered great-horned owl nest. This well was relocated approximately 480 feet southeast. The new location is out of line-of-sight of the nest and near existing powerlines, though it is not greater than the recommended 0.25 mile from the nest. The original proposed location for the 12-18-5075BG/W wells was within 500 feet of a red-tailed hawk nest. The BLM recommended removing this well from the project. The company representatives expressed concern as this well is a lease border well and they would lose drainage to the operator to the north. The well was relocated approximately 1159 feet north to within 100 feet of a county road. Although this new location does not remove it from line-of-sight of the nest nor is it greater than the recommended 0.25 mile from the nest, it is now located next to existing infrastructure.

Nests 3725 and 1399 (see Table 3.2) will likely be abandoned as the proposed development surrounds them. The raptors occupying nests 3699 and 1399 (see Table 3.2) will likely experience greater electrocution and collision risks due to an increase in powerlines surrounding the nests. In order to mitigate impacts to nesting raptors, a timing limitation will be applied to all surface disturbing activities within 0.5 mile of all raptor nests within the project area. Proposed powerlines are to meet APLIC standards that will reduce electrocution, though not collision, risks. Additional direct and indirect impacts to raptors, from oil and gas development, are analyzed in the PRB FEIS (4-216-221).

4.2.4.1. Cumulative effects

The cumulative effects associated with Alternative C are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, please refer to the referenced PRB FEIS, Volume 2, Chapter 4, page 4-221. No additional mitigation measures are required.

4.2.5. Threatened and Endangered and Sensitive Species

Within the BLM Buffalo Field Office there are two species that are Threatened or Endangered under the Endangered Species Act. Potential project effects on Threatened and Endangered Species were analyzed and a summary is provided in Table 4.2.5.1. Threatened and Endangered Species potentially affected by the proposed project area are further discussed following the table.

4.2.5.1. Threatened and Endangered and Sensitive Species

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

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Endangered				
Black-footed ferret (<i>Mustela nigripes</i>)	Black-tailed prairie dog colonies or complexes > 1,000 acres.	NP	NE	Suitable habitat of insufficient size.
Threatened				
Ute ladies'-tresses orchid (<i>Spiranthes diluvialis</i>)	Riparian areas with permanent water	NP	NE	No suitable habitat present.

Presence

K Known, documented observation within project area.

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

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

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

Effect Determinations

Project Effects

LAA Likely to adversely affect

NE No Effect.

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

4.2.5.1.1. Black-footed ferret

Because the black-tailed prairie dog colonies within and adjacent to the Carr Draw III East project area are of insufficient size for supporting ferrets and are isolated from additional prairie dog complexes, implementation of the proposed development should have “no effect” on the black-footed ferret.

4.2.5.1.2. Ute’s Ladies Tresses Orchid

Suitable Ute ladies’-tresses orchid habitat for is not present within the Carr Draw III East project area. Implementation of the proposed coal bed natural gas project will have “no effect” on the Ute ladies’-tresses orchid as suitable habitat is not present.

4.2.5.2. Sensitive Species Direct and Indirect Effects

Table 4.4 Summary of Sensitive Species Habitat and Project Effects.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Amphibians				
Northern leopard frog (<i>Rana pipiens</i>)	Beaver ponds, permanent water in plains and foothills	NP	NI	Habitat not present
Spotted frog (<i>Ranus pretiosa</i>)	Ponds, sloughs, small streams	NP	NI	Prairie not mountain habitat.
Birds				
Baird's sparrow (<i>Ammodramus bairdii</i>)	Grasslands, weedy fields	S	MIH	Sagebrush cover will be affected.
Bald eagle (<i>Haliaeetus leucocephalus</i>)	Mature forest cover often within one mile of large water body.	S	MIH	Project includes overhead power.
Brewer's sparrow (<i>Spizella breweri</i>)	Basin-prairie shrub	S	MIH	Sagebrush cover will be affected.
Burrowing owl (<i>Athene cunicularia</i>)	Grasslands, basin-prairie shrub	K	MIH	Project facilities proposed in prairie dog colonies.
Ferruginous hawk (<i>Buteo regalis</i>)	Basin-prairie shrub, grasslands, rock outcrops	S	MIH	Sagebrush cover will be affected.
Greater sage-grouse (<i>Centrocercus urophasianus</i>)	Basin-prairie shrub, mountain-foothill shrub	K	WIPV	Sagebrush cover will be affected.
Loggerhead shrike (<i>Lanius ludovicianus</i>)	Basin-prairie shrub, mountain-foothill shrub	S	MIH	Sagebrush cover will be affected.
Long-billed curlew (<i>Numenius americanus</i>)	Grasslands, plains, foothills, wet meadows	NP	NI	Habitat not present.
Mountain plover (<i>Charadrius montanus</i>)	Short-grass prairie with slopes < 5%	S	MIH	Project facilities proposed in prairie dog colonies.
Northern goshawk (<i>Accipiter gentilis</i>)	Conifer and deciduous forests	NP	NI	No forest habitat present.
Peregrine falcon (<i>Falco peregrinus</i>)	cliffs	NP	NI	No nesting habitat present.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Sage sparrow (<i>Amphispiza billneata</i>)	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Sagebrush cover will be affected.
Sage thrasher (<i>Oreoscoptes montanus</i>)	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Sagebrush cover will be affected.
Trumpeter swan (<i>Cygnus buccinator</i>)	Lakes, ponds, rivers	S	MIIH	Existing reservoirs may provide migratory habitat.
White-faced ibis (<i>Plegadis chihi</i>)	Marshes, wet meadows	NP	NI	Permanently wet meadows not present.
Yellow-billed cuckoo (<i>Coccyzus americanus</i>)	Open woodlands, streamside willow and alder groves	NP	NI	Streamside habitats not present
Fish				
Yellowstone cutthroat trout (<i>Oncorhynchus clarki bouvieri</i>)	Mountain streams and rivers in Tongue River drainage	NP	NI	Outside species range.
Mammals				
Black-tailed prairie dog (<i>Cynomys ludovicianus</i>)	Prairie habitats with deep, firm soils and slopes less than 10 degrees.	K	MIIH	Project facilities proposed in prairie dog colonies
Fringed myotis (<i>Myotis thysanodes</i>)	Conifer forests, woodland chaparral, caves and mines	NP	NI	Habitat not present.
Long-eared myotis (<i>Myotis evotis</i>)	Conifer and deciduous forest, caves and mines	NP	NI	Habitat not present.
Spotted bat (<i>Euderma maculatum</i>)	Cliffs over perennial water.	NP	NI	Cliffs & perennial water not present.
Swift fox (<i>Vulpes velox</i>)	Grasslands	NP	NI	Habitat not present.
Townsend's big-eared bat (<i>Corynorhinus townsendii</i>)	Caves and mines.	NP	NI	Habitat not present.

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

Presence

K Known, documented observation within project area.

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

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

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

Project Effects

NI No Impact.

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

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

BI Beneficial Impact

4.2.5.2.1. Bald eagle

Based on the raptor nesting and bald eagle winter roost surveys, it is unlikely bald eagles nest or roost within the Carr Draw III East project area. The proposed project should not impact bald eagle nesting or winter roosting.

There are 6.0 miles of existing overhead three-phase distribution lines within the project area. The wire spacing is likely in compliance with the Avian Power Line Interaction Committee's (2006) suggested practices and with the Service's standards (USFWS 2002); however other features may not be in compliance. Williams Production RMT Company is proposing to have an additional 3.4 miles of overhead three-phase distribution lines installed within the project area. There are currently 3.8 miles of improved roads within the project area, with no additional improved roads miles proposed.

The presence of overhead power lines may adversely affect foraging bald eagles. Bald eagles forage opportunistically throughout the Powder River Basin particularly during the winter when migrant eagles join the small number of resident eagles. Power poles provide attractive perch sites in areas where mature trees and other natural perches are lacking. From May 2003, through August 14, 2007, Service Law Enforcement salvage records for northeast Wyoming identified that 180 raptors, including 1 bald eagle, 106 golden eagles, 1 unidentified eagle, 28 hawks, 44 owls and 8 unidentified raptors and 1 great-blue heron were electrocuted on power poles within the Powder River Basin Oil and Gas Project area (USFWS 2007). Of the 180 raptors electrocuted 58 were at power poles that are considered new construction (post 1996 construction standards). Additionally, two golden eagles and a Cooper's hawk were killed in apparent mid span collisions with powerlines (USFWS 2006a). Power lines not constructed to APLIC suggestions pose an electrocution hazard for eagles and other raptors perching on them; the Service has developed additional specifications improving upon the APLIC suggestions. Constructing power lines to the APLIC suggestions and Service standards minimizes but does not eliminate electrocution risk.

Roads present a collision hazard, primarily from bald eagles scavenging on carcasses resulting from other road related wildlife mortalities. Collision risk increases with automobile travel speed. Typically two-tracks and improved project roads pose minimal collision risk. In one year of monitoring road-side carcasses the BLM Buffalo Field Office reported 439 carcasses, 226 along Interstates (51%), 193 along paved highways (44%), 19 along gravel county roads (4%), and 1 along an improved CBNG road (<1%) (Bills 2004). No road-killed eagles were reported; eagles (bald and golden) were observed feeding on 16 of the reported road-side carcasses (<4%).

4.2.5.2.2. Black-tailed prairie dog

The original proposed location for the 14-19-5075BG/W wells was within a small active prairie dog colony. The well was relocated approximately 300 feet southwest to the edge of this colony. The 23-25-5076BG/W wells are located adjacent to a small prairie dog colony. The original proposed location of the 34-23-5076BG/W wells was within a small prairie dog colony. The wells were relocated to the southern edge of this prairie dog colony. The 23-24-5076BG/W wells are located on the edge of a small prairie dog colony. The large prairie dog colony in the west half of Section 24, T50N, R76W will be impacted by one additional proposed road. This road is located next to an existing fence line. Well houses and power poles may provide habitats for mammal and avian predators increasing prairie dog predation. Mineral related traffic on the adjacent roads may result in prairie dog road mortalities.

4.2.5.2.3. Burrowing owl

An access route and a well are proposed along the prairie dog colony in NESW Section 25, T50N, R76W, where a burrowing owl was observed in 2005. An access route is proposed within the prairie dog colony in W Section 24, where a burrowing owl was observed in 2005. This access route will be used by project traffic on a regular basis. A pipeline corridor is proposed along this route. Overhead powerlines are proposed within or adjacent to both of these colonies.

The dramatic reduction of prairie habitat in the United States has been linked to reduction of burrowing owl populations, (Klute, 2003). Use of roads and pipeline corridors may increase their vulnerability to vehicle collision. Overhead power lines provide perch sites for raptors that could potentially result in increased burrowing owl predation. CBNG infrastructure such as roads, pipe line corridors, and nearby metering facilities may provide shelter and den sites for ground predators such as skunks and foxes.

The United States Department of Agriculture Forest Service on the Thunder Basin National Grasslands in Campbell County, WY with which the BLM coordinated with in the creation of the 2003 PRB EIS, recommends a 0.25 mile timing restriction buffer zone for burrowing nest locations during their nesting season (April 15 to August 31). Instruction Memorandum No. 2006-197, issued on July 6, 2006 directs the BLM BFO and all other BLM field offices to “use the least restrictive stipulations that effectively accomplish the resource objectives or uses.” Alteration of the general raptor nest timing limitation (Feb 1 to July 31) to a more specific burrowing owl nesting season timing limitation will effectively reduce the vulnerability of owls to collision while shortening the timing restriction period to four and one half months (See Chapter 3 for breeding, nesting, and migration chronology) from six and one half months.

4.2.5.2.4. Greater sage-grouse

There are eight sage-grouse leks within 3 miles of the Carr Draw III East project area. During the onsite inspection, ten wells were relocated out of sage-grouse nesting habitat. Braun (1998) reported that the presence of powerlines may limit sage-grouse use within 0.6 mile in otherwise suitable habitat. In this way, the proposed powerlines and other project activities will impact approximately 1295 acres of otherwise suitable sage-grouse habitat within the southern portions of the project area.

Greater sage-grouse habitat is being directly lost with the addition of well sites, roads, pipelines, power lines, reservoirs and other infrastructure (Thiele 2005, Oedekoven 2004). Sage grouse avoidance of CBNG infrastructure results in even greater indirect habitat loss. The Wyoming Game and Fish Department (WGFD) feels a well density of eight wells per section creates a high level of impact for sage grouse and that sage-grouse avoidance zones around mineral facilities overlap creating contiguous avoidance areas (WGFD 2004).

The presence of overhead power lines and roads within the project area may adversely affect sage grouse. Overhead power lines create hunting perches for raptors, thus increasing the potential for predation on sage grouse. Increased predation from overhead power near leks may cause a decrease in lek attendance and possibly lek abandonment. Overhead power lines are also a collision hazard for sage grouse flying through the area. Increased roads and mineral related traffic can affect grouse activity and reduce survival (Braun et al. 2002). Activity along roads may cause nearby leks to become inactive over time (WGFD 2003).

Noise can affect sage grouse by preventing vocalizations that influence reproduction and other behaviors (WGFD 2003). Sage grouse attendance on leks within one mile of compressors is lower than for sites farther from compressors locations (Braun et al. 2002).

The Buffalo Field Office (BFO) Resources Management Plan (BLM 2001) and the Powder River Basin Oil and Gas Project Record of Decision (BLM 2003) include a two-mile timing limitation within sage-grouse nesting habitat. The two-mile measure originated with the Western Association of Fish and Wildlife Agencies (WAFWA), which includes the WGFD, 1977 sage-grouse guidelines (Bennett 2004). Under pressure for standardization BLM Wyoming adopted the two-mile recommendation in 1990, and instructed the field offices to incorporate the measure into their land use plans (Bennett 2004, Murkin 1990).

The two-mile recommendation was based on research which indicated between 59 and 87 percent of sage-grouse nests were located within two-miles of a lek (Bennett 2004). These studies were conducted within prime, contiguous sage-grouse habitat such as Idaho's Snake River plain.

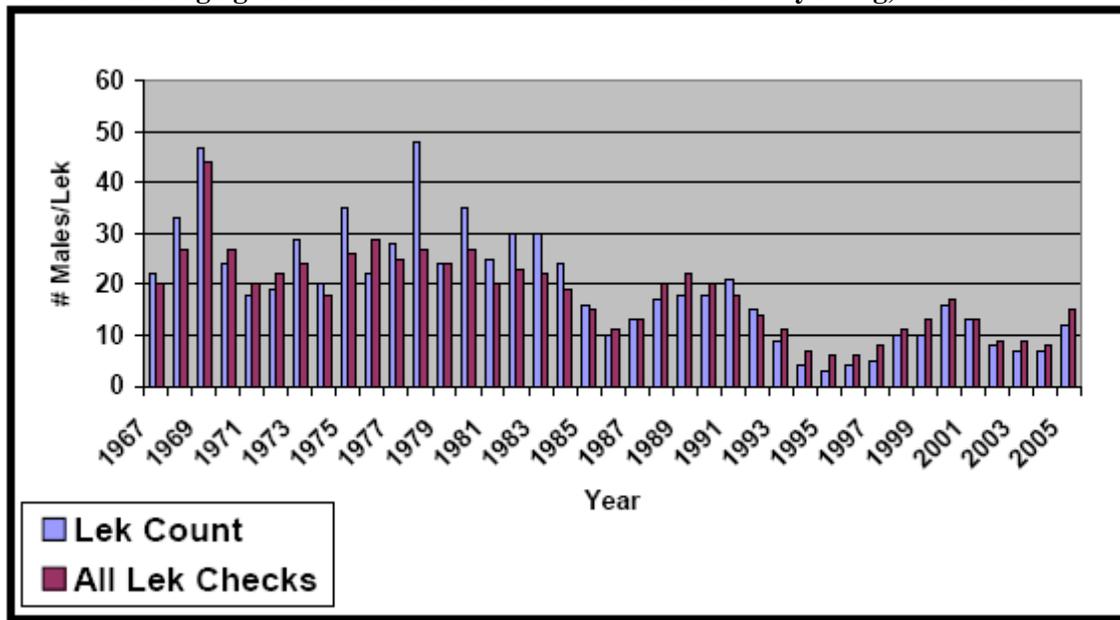
Additional studies, across more of the sage-grouse's range, indicate that many populations nest much farther than two miles from the lek of breeding (Bennett 2004). Holloran and Anderson (2005), in their Upper Green River Basin study area, reported only 45% of their sage grouse hens nested within 3 km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

Percentage of sage-grouse nesting within a certain distance from their breeding lek is unavailable for the Powder River Basin. The Buffalo and Miles City field offices through the University of Montana with assistance from other partners including the U.S. Department of Energy and industry are currently researching nest location and other sage-grouse questions and relationships between grouse and coalbed natural gas development. Habitat conditions and sage grouse biology within the Buffalo Field Office is probably most similar to Moynahan's north-central Montana study area.

Vegetation communities within the Powder River Basin are naturally fragmented as they represent a transition between the intermountain basin sagebrush communities to the west and the prairie communities to the east. The Powder River Basin is also near the eastern edge of greater sage-grouse range. Without contiguous habitat available to nesting grouse it is likely a smaller percentage of grouse nest within two-miles of a lek within the PRB than grouse within those areas studied in the development of the 1977 WAFWA recommendations and even the Holloran and Moynahan study areas. Holloran and Moynahan both studied grouse in areas of contiguous sagebrush habitats without large scale fragmentation and habitat conversion (Moynahan et al In press, Holloran and Anderson 2005). A recent sagebrush cover assessment within Wyoming basins estimated sagebrush coverage within Holloran and Anderson's Upper Green River Basin study area to be 58% with an average patch size greater than 1200 acres; meanwhile Powder River Basin sagebrush coverage was estimated to be 35% with an average patch size less than 300 acres (Rowland et al. 2005). The Powder River Basin patch size decreased by more than 63% in forty years, from 820 acre patches and an overall coverage of 41% in 1964 (Rowland et al. 2005). Recognizing that many populations live within fragmented habitats and nest much farther than two miles from the lek of breeding WAFWA revised their sage grouse management guidelines (Connelly et. al. 2000) and now recommends the protection of suitable habitats within 5 km (3.1 mi) of leks where habitats are not distributed uniformly such as the Powder River Basin.

The sage grouse population within northeast Wyoming is exhibiting a steady long term downward trend (Figure 1) (Thiele 2005). The figure illustrates a ten year cycle of periodic highs and lows. Each subsequent population peak is lower than the previous peak and each periodic low is lower than the previous population low. Long-term harvest trends are similar to that of lek attendance (Thiele 2005).

Figure 4.1. Male sage-grouse lek attendance within northeastern Wyoming, 1967-2005.



Sage-grouse populations within the PRB are declining independent of coalbed natural gas development. CBNG is a recent development, with the first well drilled in 1987 (Braun et al. 2002). In February 1998 there were 420 producing wells primarily restricted to eastern Campbell County (BFO 1999). By May 2003 there were 26,718 CBNG wells permitted within the BFO area (Oedekoven 2004). The Powder River Basin Oil and Gas Project Final Environmental Impact Statement estimated 51,000 additional CBNG wells to be drilled over a ten year period beginning in 2003 (BFO 2003). Impacts from CBNG development are likely to be significant and additive to the long-term impacts afflicting the sage-grouse population (Oedekoven 2004). In other terms, CBNG development is expected to accelerate the downward sage-grouse population trend.

A two-mile timing limitation given the long-term population decline and that less than 50% of grouse are expected to nest within the limitation area is likely insufficient to reverse the population decline. Moynahan and Lindberg (2004) like WAFWA (Connelly et al. 2000) recommend increasing the protective distance around sage grouse leks. Even with a timing limitation on construction activities, sage-grouse may avoid nesting within CBNG fields because of the activities associated with operation and production. As stated earlier, a well density of eight wells per section creates sage-grouse avoidance zones which overlap creating contiguous avoidance areas (WGFD 2004).

An integrated approach including habitat restoration, grazing management, temporal and spatial mineral limitations etc. is necessary to reverse the population decline. The Wyoming Game and Fish Department (WGFD) has initiated such a program within the Buffalo Field Office area (Jellison 2005). The WGFD program is modeled after a successful program on the Deseret Ranch in southwestern Wyoming and northeastern Utah. The Deseret Ranch has demonstrated a six-fold increase in their sage-grouse population while surrounding areas exhibited decreasing populations (Danvir 2002).

4.2.5.2.5. Mountain plover

Suitable mountain plover habitat is present within the project area. The project may impact mountain plovers. Since surveys for mountain plovers have not been completed within the project area since 2005, surveys will be required on an annual basis within suitable habitat within the project area. A timing limitation restriction will be applied to construction within all prairie dog colonies within the project area

during mountain plover nesting seasons until after survey completion. If any mountain plovers are observed, the timing restrictions will remain throughout the remainder of the nesting season during this phase of the project.

Mineral development may have mixed effects on mountain plovers. Disturbed ground such as buried pipe line corridors and roads may be attractive to plovers while human activities within one-quarter mile may be disruptive. Use of roads and pipe line corridors by mountain plovers may increase their vulnerability to vehicle collision. The existing overhead power lines adjacent to the project area provide perch sites for raptors potentially resulting in increased mountain plover predation. CBNG infrastructure such as the well houses, roads, pipe line corridors, and nearby metering facilities may provide shelter and den sites for ground predators such as skunks and foxes. An analysis of direct and indirect impacts to mountain plover due to oil and gas development is included in the PRB FEIS (4-254-255).

4.2.5.3. Cumulative effects

The cumulative effects associated with Alternative C are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, please refer to the referenced PRB FEIS, Volume 2, Chapter 4, page 4-271.

4.3. West Nile Virus Direct and Indirect Effects

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

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

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

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.

4.4. Water Resources

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

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

The maximum water production is predicted to be 20.0 gpm per well or 1,680 gpm (3.75 cfs or 2,672 acre-feet per year) for this POD. The PRB FEIS projected the total amount of water that was anticipated to be produced from CBNG development per year (Table 2-8 Projected Amount of Water Produced from CBM Wells Under Alternatives 1, 2A and 2B pg 2-26). For the drainage, the projected volume produced within the watershed area was 171,423 acre-feet in 2006 (maximum production). As such, the volume of water resulting from the production of these wells is 1.56 % of the total volume projected for 2006. This volume of produced water is also within the predicted parameters of the PRB FEIS.

4.4.1. Groundwater

The PRB FEIS predicts an infiltration rate of 40% to groundwater aquifers and coal zones in the drainage area (PRB FEIS pg 4-5). However, for this action, no water will infiltrate into project area groundwaters due to discharge into a water transmission line for offsite disposal. The offsite discharge points have been previously analyzed and authorized.

The PRB FEIS predicts that one of the environmental consequences of coal bed natural gas production is possible impacts to the groundwater. “The effects of development of CBM on groundwater resources would be seen as a drop in the water level (drawdown) in nearby wells completed in the developed coal aquifers and underlying or overlying sand aquifers.” (PRB FEIS page 4-1). In the process of dewatering the coal zone to increase natural gas recovery rates, this project may have some effect on the static water level of wells in the area. The permitted residential and stock water wells produce from depths which range from 84 to 1,200 feet compared to 1,200 feet to the Big George and 2,200 feet to the Wall. As mitigation, the operator has committed to offer water well agreements to holders of properly permitted domestic and stock wells within the circle of influence ($\frac{1}{2}$ mile of a federal CBNG producing well) of the proposed wells.

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

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

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 within the POD. The reference well will be sampled at the well head for analysis within sixty days of initial production and a copy of the water analysis will be submitted to the BLM Authorizing Officer.

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

In order to address the potential impacts from infiltration on shallow ground water, the Wyoming DEQ has developed a guidance document, “Compliance Monitoring for Ground Water Protection Beneath Unlined Coalbed Methane Produced Water Impoundments” (June 14, 2004) which can be accessed on their website. This guidance document became effective August 1, 2004, and is currently being revised as the “Compliance Monitoring and Siting Requirements for Unlined Coalbed Methane Produced Water Impoundments”. Approximately 800 new impoundments have been investigated to date with 102 impoundments in 52 permits that have gone into compliance monitoring. The Wyoming DEQ has established an Impoundment Task Force which is in the process of drafting an “Impoundment Monitoring Plan” to investigate the potential for existing impoundments to have impacted shallow groundwater. For WYPDES permits received by DEQ after the August 1st effective date, the BLM will require that operators comply with the requirements outlined in the current approved DEQ compliance monitoring guidance document prior to discharge of federally-produced water into newly constructed or upgraded impoundments.

4.4.1.1. Groundwater Cumulative Effects:

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

Development of CBNG through 2018 (and coal mining through 2033) would remove 4 million acre-feet of groundwater from the coal zone aquifer (PRB FEIS page 4-65). This volume of water “...cumulatively represents 0.5 percent of the recoverable groundwater stored in the Wasatch – Tongue River sands and coals (nearly 750 million acre-feet, from Table 3-5). All of the groundwater projected to be removed during reasonably foreseeable CBNG development and coal mining would represent less than 0.3 percent of the total recoverable groundwater in the Wasatch and Fort Union Formations within the PRB (nearly 1.4 billion acre-feet, from Table 3-5).” (PRB FEIS page 4-65). No additional mitigation is necessary.

4.4.2. Surface Water

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

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

Predicted Values	TDS, mg/l	SAR	EC, µmhos/cm
Most Restrictive Proposed Limit –		2	1,000
Least Restrictive Proposed Limit		10	3,200
Primary Watershed at Arvada Gauging station			
Historic Data Average at Maximum Flow		4.76	1,797
Historic Data Average at Minimum Flow		7.83	3,400
WDEQ Quality Standards for Wyoming			
Groundwater (Chapter 8)			
Drinking Water (Class I)	500		
Agricultural Use (Class II)	2,000	8	
Livestock Use (Class III)	5,000		
Predicted Produced Water Quality			
Big George Coal Zone	1,790	27.1	2,840
Wall Coal Zone	969	19.4	1,550

Based on the analysis performed in the PRB FEIS, the primary beneficial use of the surface water in the Powder River Basin is the irrigation of crops (PRB FEIS pg 4-69). The water quality projected for this POD ranges from 969 to 1,790 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 Big George target coal zone from these wells is predicted to be similar to the sample water quality collected from a location near the POD. A maximum of 20.0 gallons per minute (gpm) is projected is to be produced from these 42 wells, for a total of 840 and 1,680 gpm for the POD. See Table 4.5.

The quality for the water produced from the Wall target coal zone from these wells is predicted to be similar to the sample water quality collected from a location near the POD. A maximum of 20.0 gpm is projected is to be produced from these 42 wells, for a total of 840 and 1,680 gpm for the POD. See Table 4.5.

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

Previously approved discharge points will be used by this project. They have been appropriately sited and utilize appropriate water erosion dissipation designs. Existing and proposed water management facilities were evaluated for compliance with best management practices during the onsite.

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

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

4.4.2.1. Surface Water Cumulative Effects

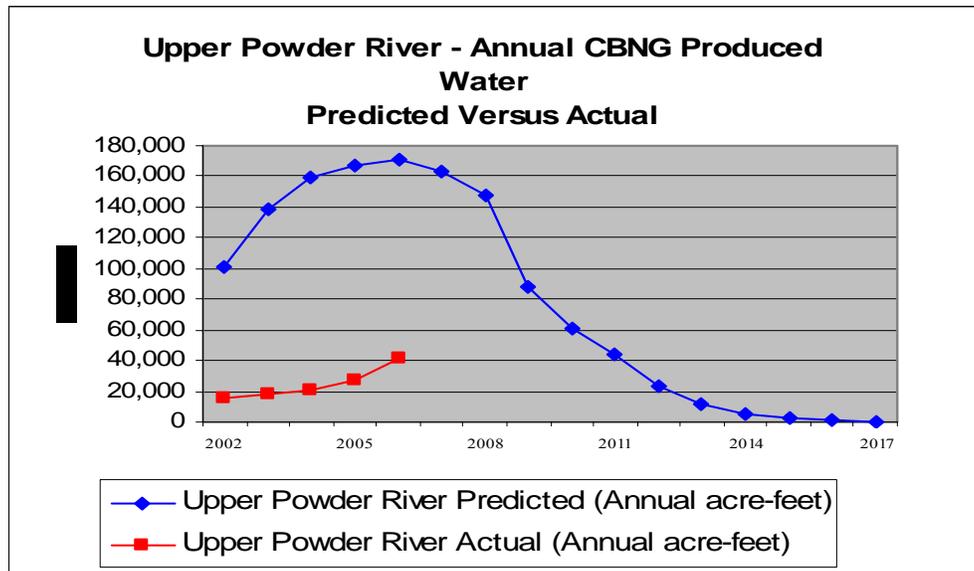
The analysis in this section includes cumulative data from Fee, State and Federal CBNG development in the watershed. These data were obtained from the Wyoming Oil and Gas Conservation Commission (WOGCC).

As of March 2007, all producing CBNG wells in the Upper Powder River watershed have discharged into the same watershed a cumulative volume of 123,984 acre-ft of water compared to the predicted 900,040 acre-ft disclosed in the PRB FEIS (Table 2-8 page 2-26). These figures are presented graphically in Figure 4.1 and Table 4.6 following. This volume is 16.8% of the total predicted produced water analyzed in the PRB FEIS for the watershed.

Table 4.6 Actual vs predicted water production in the Upper Powder River watershed 2006 Data Update 3-16-07

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				
2008	147,481	1,047,521				
2009	88,046	1,135,567				
2010	60,319	1,195,886				
2011	44,169	1,240,055				
2012	23,697	1,263,752				
2013	12,169	1,275,921				
2014	5,672	1,281,593				
2015	2,242	1,283,835				
2016	1,032	1,284,867				
2017	366	1,285,233				
Total	1,285,233		123,984			

Figure 4.1 Actual vs predicted water production in the Upper Powder River watershed



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

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

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

1. They are proportional to the actual amount of cumulatively produced water in the drainage, which is approximately 16.8% of the total predicted in the PRB FEIS.
2. The WDEQ enforcement of the terms and conditions of the WYPDES permit that are designed to protect irrigation downstream.
3. The commitment by the operator to monitor the volume of water discharged.

No additional mitigation measures are required.

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

4.5. Cultural Resources

Sites 48CA159, 48CA5815, 48CA5816, 48CA5817, 48CA5831, and 48CA5832 will be impacted by the project; however all are considered not eligible to the National Register of Historic Places. Eligible historic properties, 48CA157 and 48CA2100 will not be impacted by the project as proposed.

On 12/13/07, the Bureau electronically notified the Wyoming State Historic Preservation Office (SHPO), following section VI(A)(1) of the Wyoming State Protocol, of a finding of no effect to historic properties for the proposed project.

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)*.

4.6. Socioeconomics

The proposed action will impact the Maycock ranching operation. The Maycocks have submitted a report that estimates the cost to the ranch’s cattle operation from the Williams proposal will be \$1,776,400 dollars. Williams has submitted a \$37,000 bond to cover damages to tangible improvements and crops. The total disturbance for the project is 237 acres. The tangible improvement damages will be to fences and waterlines. The operator has committed to replace or repair fences and water lines if they are damaged.

Based on AUMs for BLM lands in the area, it is estimated that 10 acres would satisfy 1 AUM (grazing land value) in the project area. The disturbance of this project is approximately 238 acres, there would be a maximum loss of 23.8 AUM (238/10=23.8). When determining the adequacy of a 3814 Bond, the BLM uses Federal land grazing values based on the trespass fee. In this case, the BLM's fee for trespass grazing is \$13.90 per AUM. Based on this figure, with the life span of the project being approximately 10 years and an annual inflation rate of 5%, the total loss is valued at \$4,161.02.

Year	Cost per AUM	Annual Increase (5%)	# of AUMs	Subtotal
2007	\$ 13.90	\$ -	23.8	\$ 330.82
2008	\$ 14.60	\$ 0.70	23.8	\$ 347.36
2009	\$ 15.32	\$ 0.73	23.8	\$ 364.73
2010	\$ 16.09	\$ 0.77	23.8	\$ 382.97
2011	\$ 16.90	\$ 0.80	23.8	\$ 402.11
2012	\$ 17.74	\$ 0.84	23.8	\$ 422.22
2013	\$ 18.63	\$ 0.89	23.8	\$ 443.33
2014	\$ 19.56	\$ 0.93	23.8	\$ 465.50
2015	\$ 20.54	\$ 0.98	23.8	\$ 488.77
2016	\$ 21.56	\$ 1.03	23.8	\$ 513.21
			Total	\$ 4,161.02

Reclamation of the well pads, access and pipeline corridors are detailed in Williams surface use plan. All costs associated with reclamation are proposed to be paid for by Williams and already are covered by their existing lease bond (43 CFR 3104) filed with the BLM. Williams proposed reclamation plan is consistent with what the BLM has required in the area in the past and it does satisfy the requirements of Onshore Order No. 1 and the BLM's reclamation guidelines. Furthermore, the BLM would retain Williams lease bond until the disturbance is satisfactory re-contoured, vegetated with native grasses and shrubs, and otherwise determined to be adequately reclaimed. Therefore, the \$37,000.00 bond posted by Williams was determined to be good and sufficient to compensate the surface owner for losses of crops and damages to tangible improvements.

The impacts that the Maycocks anticipate go beyond the loss of forage and include to the ability to gather and sort cattle and final reclamation costs. Signs giving ranch operations right of way should help with sorting and gathering. Impacts to forage will occur. The proposed POD may impact high quality forage in Barber Creek in sections 26 and 24 through increased dust dispersed onto grass. Watering roads for dust suppression is a programmatic COA with a requirement for more than 50% effectiveness. Williams can further reduce this impact with strict speed limits on this section of road to reduce fugitive dust. Williams has already cut a channel to handle water in portions of Barber Creek and South Prong Barber Creek. The cut channel in South Prong drastically meanders from one side of the prong bottom to the other, effectively making this area useless for gathering and sorting cattle. The channel may reduce deposition of new soil in what were once broad bottom swales, thereby limiting grass production. This action of scoring a low-flow channel was taken without a federal nexus.

The Maycocks requested all pipelines be placed in the roadbed and that all roads, pipelines, and pit liners be removed when production is complete. Williams contends that placing pipelines within the roadbed (driving on pipelines) is dangerous, creates problems for maintenance and pipeline removal would disturb reclaimed areas. By placing the pipelines in the roadway (within the edge of cuts and fills) and not the roadbed (driving surface), the lines would not be directly under traffic and the disturbance associated with

removal of the lines would be no greater than that required to reclaim the road. In addition, Mr. Maycock showed BLM field personnel locations on the ranch where old oil well pipelines were eroding sections of road. The Maycocks contend that Williams is coming onto the ranch uninvited and the least they can do is take all their “stuff” with them when they leave and if POD pipelines are not removed then eventually (20-100 years) they will cause erosion to occur, or become exposed, and the Maycock family will be left to cover the costs.

Williams’ construction practices and Conditions of Approval applied to this project effectively alleviate future impacts from pipelines. Williams’ construction practices include burying pipelines five feet deep and compacting the trench after laying pipe and backfilling. Those areas that the BLM has identified as potentially problematic (along or across Barber Creek) shall require extraordinary construction practices and may be removed at final abandonment. In addition, if a pipeline shows signs of erosion or exposure during the life of the project, then that line will be identified for removal at final abandonment. At the final abandonment stage, the BLM authorized officer can identify pipelines to be removed if they are likely to become a problem in the future. All lines remaining after final abandonment will be purged and capped deep lines. The removal of all pipelines, whether or not they are likely to become a problem, would result in unnecessary impacts to vegetation.

5. CONSULTATION/COORDINATION

Contact	Title	Organization	Present at Onsite
Mary Hopkins	Interim Wyoming SHPO	Wyoming SHPO	No

6. OTHER PERMITS REQUIRED

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

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