

**FINDING OF NO SIGNIFICANT IMPACT & DECISION RECORD  
FOR  
Comet Energy  
Box Draw**

**ENVIRONMENTAL ASSESSMENT –WY-070-EA08-181**

DECISION: Is to approve Alternative C as described in the attached Environmental Assessment (EA) and authorize Comet Energy’s Box Draw Coal Bed Natural Gas (CBNG) POD comprised of the following 30 Applications for Permit to Drill (APDs):

	<b>Well Name</b>	<b>Well #</b>	<b>QTR</b>	<b>Sec</b>	<b>TWP</b>	<b>RNG</b>	<b>Lease</b>
1	BOX DRAW CRUMP	A1-06*	NWNW	6	53N	74W	WYW23216
2	BOX DRAW CRUMP	B3-06	SWNE	6	53N	74W	WYW23216
3	BOX DRAW SORENSON	C1-20	NWSW	20	54N	74W	WYW137635
4	BOX DRAW SORENSON	D2-20	SESW	20	54N	74W	WYW137635
5	BOX DRAW SORENSON	A2-28	NENW	28	54N	74W	WYW130079
6	BOX DRAW SORENSON	B1-28	SWNW	28	54N	74W	WYW130079
7	BOX DRAW SORENSON	C1-28	NWSW	28	54N	74W	WYW130079
8	BOX DRAW SORENSON	A2-29	NENW	29	54N	74W	WYW131219
9	BOX DRAW SORENSON	A4-29	NENE	29	54N	74W	WYW130079
10	BOX DRAW SORENSON	B1-29	SWNW	29	54N	74W	WYW131219
11	BOX DRAW SORENSON	B3-29	SWNE	29	54N	74W	WYW130079
12	BOX DRAW BLM	C1-29	NWSW	29	54N	74W	WYW131219
13	BOX DRAW BLM	C2-29	NESW	29	54N	74W	WYW131219
14	BOX DRAW SORENSON	C4-29	NESE	29	54N	74W	WYW130079
15	BOX DRAW BLM	D3-29	SWSE	29	54N	74W	WYW130079
16	BOX DRAW BLM	A2-30	NENW	30	54N	74W	WYW132917
17	BOX DRAW BLM	B1-30	SWNW	30	54N	74W	WYW132917
18	BOX DRAW BLM	B3-30	SWNE	30	54N	74W	WYW132917
19	BOX DRAW BLM	B4-30	SENE	30	54N	74W	WYW132917
20	BOX DRAW SORENSON	C2-30	NESW	30	54N	74W	WYW132917
21	BOX DRAW SORENSON	C4-30	NESE	30	54N	74W	WYW132917
22	BOX DRAW SORENSON	D1-30	SWSW	30	54N	74W	WYW128753
23	BOX DRAW SORENSON	D3-30	SWSE	30	54N	74W	WYW132917
24	BOX DRAW BLM	A2-31	NENW	31	54N	74W	WYW137080
25	BOX DRAW BLM	B1-31	SWNW	31	54N	74W	WYW136168
26	BOX DRAW CRUMP	C2-31	NESW	31	54N	74W	WYW136168
27	BOX DRAW CRUMP	D1-31	SWSW	31	54N	74W	WYW136168
28	BOX DRAW CRUMP	D3-31	SWSE	31	54N	74W	WYW131728
29	BOX DRAW SORENSON	A4-32	NENE	32	54N	74W	WYW130079
30	BOX DRAW SORENSON	A2-33	NENW	33	54N	74W	WYW130079

The following impoundment locations were inspected and approved for use in association with the water management strategy for the POD.

	<b>IMPOUNDMENT Name / Number</b>	<b>Qtr/Qtr</b>	<b>Sec</b>	<b>TWP</b>	<b>RNG</b>	<b>Capacity (Acre Feet)</b>	<b>Surface Disturbance (Acres)</b>	<b>Bond Status</b>	<b>Lease #</b>
1	B-3-30-5474	SWNE	30	54	75	8.09	2	S	WYW132917
2	A3-30-5474	NWNE	30	54	75	64.82	8.6	P	WYW132917
3	C1-29-5474	NWSW	29	54	75	17.2	3.3	S	WYW132919
4	B4-29-5474	SENE	30	54	75	4.45	1.8	S	WYW132917
5	A4-29-5474	NENE	29	54	75	5.81	1.5	S	WYW130079
6	New Kimberly	NENW	33	54	75	13.2	2	S	WYW130079
7	Washout	NESW	54	75	20	11.75	3.89	S	WYW132929
8	Ford	NESE	29	54	75	5.62	2	S	WYW130079
9	C3-29-5474	NWSE	29	54	75	14.05	3.3	S	WYW130079

Notes: P = Primary Impoundment  
S = Secondary Impoundment

**Rights-Of-Way:**

The following Right-of-Way applications that are associated with this project have been received and are currently being processed.

<b>Grant</b>	<b>ROW Action</b>	<b>Section(s)</b>	<b>TWP</b>	<b>RNG</b>	<b>Length</b>	<b>Width</b>
WYW-169978	Gas Pipeline	19,29,30,31,35	54	74/75	7389	30
WYW-169979	Road, Water, Electric	19,29,30,31,25,35	54	74/75	15019	50

The following right-of-way locations were identified with the Box Draw POD. Construction of the following location is prohibited until authorized right-of-ways have been issued and a right-of-way bond attached to the reservoir.

T. 54 N., R. 75 W., section 30, NWNE for the A3-30-5474 reservoir on BLM land.

The following wells and infrastructure may not be constructed until BLM completes Native American consultation for sites 48CA6686, 48CA1654, 48CA1655 and 48CA1566:

1. All wells and infrastructure in T54N R74W Section 30 SW and WSE
2. All wells and infrastructure in T54N R74W Section 31 NW

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.

**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 has certified that a Surface Use Agreement has been reached with the Landowner(s).
  3. Alternative C will not result in any undue or unnecessary environmental degradation.
  4. It is in the public interest to approve these wells, as the leases are being drained of federal gas, resulting in a loss of revenue for the government.
  5. Mitigation measures applied by the BLM will alleviate or minimize environmental impacts.
  6. Alternative C is the environmentally-preferred Alternative.
  7. 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.

**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  
Comet Energy  
Box Draw  
PLAN OF DEVELOPMENT  
WY-070-EA08-181**

## **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 produce coal bed natural gas (CBNG) on 11 federal oil and gas mineral leases issued to the applicant by the BLM.

#### **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: Comet Energy’s Box Draw Plan of Development (POD) for 35 coal bed natural gas well APD’s and associated infrastructure.

Proposed Well Information: There were 35 wells proposed within this POD; the wells are vertical bores proposed on an 80 acre spacing pattern with 1 well per location. Each well will produce from the Anderson, Canyon and Wall coal seams. No well houses will be used on this POD. The wellheads will be fenced off with panels. The dimensions for the fenced off area is 16’x 16’ x 4’ height. Facilities will be Covert Green, selected to blend with the surrounding vegetation. Proposed wells are located as follows:

	<b>Well Name</b>	<b>Well #</b>	<b>QTR</b>	<b>Sec</b>	<b>TWP</b>	<b>RNG</b>	<b>Lease</b>
1	BOX DRAW CRUMP	A1-06*	NWNW	6	53N	74W	WYW23216
2	BOX DRAW CRUMP	B3-06	SWNE	6	53N	74W	WYW23216
3	BOX DRAW SORENSON	C1-20	NWSW	20	54N	74W	WYW137635
4	BOX DRAW SORENSON	D2-20	SESW	20	54N	74W	WYW137635
5	BOX DRAW SORENSON	A2-28	NENW	28	54N	74W	WYW130079
6	BOX DRAW SORENSON	B1-28	SWNW	28	54N	74W	WYW130079
7	BOX DRAW SORENSON	C1-28	NWSW	28	54N	74W	WYW130079
8	BOX DRAW SORENSON	A2-29	NENW	29	54N	74W	WYW131219
9	BOX DRAW SORENSON	A4-29	NENE	29	54N	74W	WYW130079
10	BOX DRAW SORENSON	B1-29	SWNW	29	54N	74W	WYW131219
11	BOX DRAW SORENSON	B3-29	SWNE	29	54N	74W	WYW130079
12	BOX DRAW BLM	C1-29	NWSW	29	54N	74W	WYW131219
13	BOX DRAW BLM	C2-29	NESW	29	54N	74W	WYW131219
14	BOX DRAW SORENSON	C4-29	NESE	29	54N	74W	WYW130079
15	BOX DRAW BLM	D3-29	SWSE	29	54N	74W	WYW130079
16	BOX DRAW BLM	A2-30	NENW	30	54N	74W	WYW132917
17	BOX DRAW BLM	B1-30	SWNW	30	54N	74W	WYW132917
18	BOX DRAW BLM	B3-30	SWNE	30	54N	74W	WYW132917
19	BOX DRAW BLM	B4-30	SENE	30	54N	74W	WYW132917
20	BOX DRAW SORENSON	C2-30	NESW	30	54N	74W	WYW132917
21	BOX DRAW SORENSON	C4-30	NESE	30	54N	74W	WYW132917
22	BOX DRAW SORENSON	D1-30	SWSW	30	54N	74W	WYW128753
23	BOX DRAW SORENSON	D3-30	SWSE	30	54N	74W	WYW132917
24	BOX DRAW BLM	A2-31	NENW	31	54N	74W	WYW137080
25	BOX DRAW JOSLYN	A4-31	NENE	31	54N	74W	WYW136445
26	BOX DRAW BLM	B1-31	SWNW	31	54N	74W	WYW136168
27	BOX DRAW JOSLYN	B3-31	SWNE	31	54N	74W	WYW136445
28	BOX DRAW CRUMP	C2-31	NESW	31	54N	74W	WYW136168
29	BOX DRAW CRUMP	D1-31	SWSW	31	54N	74W	WYW136168
30	BOX DRAW CRUMP	D3-31	SWSE	31	54N	74W	WYW131728
31	BOX DRAW JOSLYN	A2-32	NENW	32	54N	74W	WYW131219
32	BOX DRAW SORENSON	A4-32	NENE	32	54N	74W	WYW130079
33	BOX DRAW JOSLYN	B1-32	SWNW	32	54N	74W	WYW131219
34	BOX DRAW SORENSON	A2-33	NENW	33	54N	74W	WYW130079
35	BOX DRAW JOSLYN	B1-33	SWNW	33	54N	74W	WYW130079

Water Management Proposal: The following impoundments were proposed for use in association with the water management strategy for the POD

	<b>IMPOUNDMENT Name / Number</b>	<b>Qtr/Qtr</b>	<b>Section</b>	<b>TWP</b>	<b>RNG</b>	<b>Capacity (Acre Feet)</b>	<b>Surface Disturbance (Acres)</b>	<b>Lease #</b>
1	B-3-30-5474	SWNE	30	54	75	8.09	2	WYW132917
2	A3-30-5474	NWNE	30	54	75	64.82	8.6	WYW132917

	<b>IMPOUNDMENT Name / Number</b>	<b>Qtr/Qtr</b>	<b>Section</b>	<b>TWP</b>	<b>RNG</b>	<b>Capacity (Acre Feet)</b>	<b>Surface Disturbance (Acres)</b>	<b>Lease #</b>
3	C1-29-5474	NWSW	29	54	75	17.2	3.3	WYW132919
4	Cole (B4-29-5474)	SENE	30	54	75	4.45	1.8	WYW132917
5	Alissa (A4-29-5474)	NENE	29	54	75	5.81	1.5	WYW130079
6	Washout	NESW	20	54	75	11.75	3.5	WYW132919
7	New Kimberly	NENW	33	54	75	13.2	2	WYW130079
8	Ford	NESE	29	54	75	5.62	2	WYW130079
9	Chance(C3-29-5474)	NWSE	29	54	75	14.05	3.3	WYW130079

**Rights-Of-Way:**

The following Right-of-Way applications that are associated with this project have been received and are currently being processed.

<b>Grant</b>	<b>ROW Action</b>	<b>SEC.</b>	<b>T.</b>	<b>R.</b>	<b>Length</b>	<b>Width</b>
WYW-169978	Gas Pipeline	19,29,30,31,35	54	74/75	7389	30
WYW-169979	Road, Water, Electric	19,29,30,31,25,35	54	74/75	15019	50

County: Campbell

Applicant: Comet Energy

Surface Owners: Sorenson Ranch Co., John Crump, Don Joslyn, BLM.

**Project Description:**

The proposed action involves the following:

- Drilling of 35 total federal CBM wells in the Anderson, Canyon, and Wall coal zones to depths from approximately 617 feet to 1,822 feet. Multiple seams will be produced by co-mingling production (a single well per location cable of producing from multiple coal seams).
- Drilling and construction activities are anticipated to be completed within two years, the term of an APD. Drilling and construction occurs year-round in the PRB. Weather may cause delays lasting several days but rarely do delays last multiple weeks. Timing limitations in the form of COAs and/or agreements with surface owners may impose longer temporal restrictions on portions of this POD, but rarely do these restrictions affect an entire POD.
- Well metering shall be accomplished by telemetry. Each well would most likely be visited once a day for trouble shooting and inspection.
- Water Management Plan (WMP) that involves the following infrastructure and strategy: 9 discharge points and 9 stock water reservoirs that will provide full containment for most of the water produced by this POD within the Upper Powder River watershed. The largest proposed reservoir will hold 64.8 acre-feet and may negate the need to build some of the smaller reservoirs. Water produced from five wells in the southeastern corner of the POD will be manifolded into an existing the Kenai POD infrastructure so that it can be conveyed to two existing Subsurface Drip Irrigation (SDI) system and two existing reservoir.
- An unimproved and improved road network.

- An above ground power line network is existing in and adjacent to the POD. No new overhead power lines are proposed.
- If the underground power line network is not in place at the time of well production, temporary diesel generators shall be placed at the 2 power drops or other appropriate sites.
- A storage tank of 1,000 gallons capacity shall be located with each diesel generator. Generators are projected to be in operation for up to 12 months. Fuel deliveries are anticipated to be 2 times per week. Noise level is expected to be 61.7 to 82.3 decibels at 50 feet distance, depending on type of generator used.
- A buried gas, water and power line network and 1 compression facility.

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.

The Operator has certified that a Surface Use Agreement has been reached with the Landowners.

### **2.3. Alternative C – Environmentally Preferred**

**Note: The five Joslyn wells are not addressed in this EA due to unresolved issues between the landowner and the operator. The wells were not visited during on-sites or analyzed in this EA.**

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 the Box Draw POD are listed below under 2.3.1:

### **2.3.1. Changes as a result of the on-sites**

1. Compressor site, near well C4-29 was moved farther away and out of line of site, to reduce disturbance to a sage-grouse lek.
2. Well C2-30, was moved about 200 feet to avoid a cultural site.
3. Moved a utility corridor to connect infrastructure for wells C4-30 and C2-30.
4. Well D3-30, Comet will surface road sections of 6% or more grade.
5. Well A2-31, moved well to avoid sage-grouse nesting habitat. Stabilize slot during and within 30 days after disturbance and maintain a 20' undisturbed vegetated buffer near slope.
6. Well A4-32, was moved about 300' to reduce surface disturbance and avoid a "dry hole".
7. The 5 Joslyn wells, located on private land, were not able to be analyzed with this POD, due to unresolved issues between the landowner and the operator.
8. An existing unnamed reservoir was proposed at the onsite for inclusion into the POD, and was later dropped due to its proximity of a sage-grouse lek.

### **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. In order to address the potential impacts from infiltration on shallow ground water, the Wyoming DEQ has developed a guidance document, "Compliance Monitoring and Siting Requirements for Unlined Coalbed Methane Produced Water Impoundments" which was approved September, 2006. For WYPDES permits received by DEQ after the August 1st effective date, the BLM requires that operators comply with the current approved DEQ compliance monitoring guidance document prior to discharge of federally-produced water into newly constructed or upgraded impoundments..

#### **2.3.2.2. Surface Water**

1. Channel Crossings:
  - a) Channel crossings by road and pipelines will be constructed perpendicular to flow. Culverts will be installed at appropriate locations for streams and channels crossed by roads as specified in the BLM Manual 9112-Bridges and Major Culverts and Manual 9113-Roads. Streams will be crossed perpendicular to flow, where possible, and all stream crossing structures will be designed to carry the 25-year discharge event or other capacities as directed by the BLM.
  - b) Channel crossings by pipelines will be constructed so that the pipe is buried at least four feet below the channel bottom.
2. Low water crossings will be constructed at original streambed elevation in a manner that will prevent any blockage or restriction of the existing channel. Material removed will be stockpiled for use in reclamation of the crossings.
3. Concerns regarding the quality of the discharged CBNG water on downstream irrigation use may require operators to increase the amount of storage of CBNG water during the irrigation months and allow more surface discharge during the non-irrigation months.
4. The operator will supply two copies of the complete approved SW-4, SW-3, or SW-CBNG permits to BLM as they are issued by WSEO for impoundments.

5. The operator will supply to the BLM two copies of the WYPDES permits for this POD as soon as they are available from WDEQ and before discharging CBNG production water from this POD.

#### **2.3.2.3. Soils**

1. The Companies, on a case by case basis depending upon water and soil characteristics, will test sediments deposited in impoundments before reclaiming the impoundments. Tests will include the standard suite of cations, ions, and nutrients that will be monitored in surface water testing and any trace metals found in the CBNG discharges at concentrations exceeding detectable limits.

#### **2.3.2.4. Wetland/Riparian**

1. Wetland areas will be disturbed only during dry conditions (that is, during late summer or fall), or when the ground is frozen during the winter.
2. No waste material will be deposited in riparian areas, floodplains, or in natural drainage ways.
3. Soil or other material stockpiles will be located outside the active floodplain.
4. Disturbed channels will be re-shaped to their approximate original configuration or stable geomorphological configuration and properly stabilized.
5. Reclamation of disturbed wetland/riparian areas will begin immediately after project activities are complete.

#### **2.3.2.5. 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.
3. All stock tanks shall include a ramp to enable trapped small birds and mammals to escape. See Idaho BLM Technical Bulletin 89-4 entitled Wildlife Watering and Escape Ramps on Livestock Water Developments: Suggestions and Recommendations.

#### **2.3.2.6. Threatened, Endangered, or Sensitive Species**

##### **2.3.2.6.1. Black-footed Ferret**

1. If any black-footed ferrets are located, the USFWS will be consulted. Absolutely no disturbance will be allowed within prairie dog colonies inhabited by black-footed ferrets.
2. Additional mitigation measure may be necessary if the site-specific project is determined by a BLM biologist to have adverse effects to black-footed ferrets or their habitat. In the event that a mountain plover is located during construction or operation, the USFWS' Wyoming Field Office (307-772-2374) and the USFWS' Law Enforcement Office (307-261-6365) will be notified within 24 hours.

### 2.3.2.7. 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.

### 2.3.2.8. Noise

1. Noise mufflers will be installed on the exhaust of compressor engines to reduce the exhaust noise.
2. Where noise impacts to existing sensitive receptors are an issue, noise levels will be required to be no greater than 55 decibels measured at a distance of one-quarter mile from the appropriate booster (field) compressor. When background noise exceeds 55dBA, noise levels will be no greater than 5dBA above background. This may require the installation of electrical compressor motors at these locations.

### 2.3.2.9. 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

All changes made at the onsite will be followed. They have all been incorporated into the operator's POD.

#### General

1. All roads over 6% grade will be surfaced and measures used to stop erosion and establish permanent vegetation.
2. All improved roads, spot upgrades and areas needing gravel surfaces, will be completed before well construction/drilling occurs.

#### Surface Use

1. Well A1-6, will have a modified slot design of 120' x 50' x 4'. Stay within engineered pad design if slot won't work.
2. Well A2-31, maintain an undisturbed, vegetated buffer near the edge of slope.
3. The following well locations, access road/corridors and other noted infrastructure in the project area have been identified to have limited reclamation potential that will require disturbed areas to be stabilized (stabilization efforts may include mulching, matting, soil amendments, etc.) in a manner which eliminates accelerated erosion until a self-perpetuating native plant community has stabilized the site in accordance with the Wyoming Reclamation Policy. Stabilization efforts shall be finished within **30 days** of the initiation of construction activities:  
A1-6, D2-20, C1-28, A4-29, B1-30, D1-30, B3-30, A4-32  
C1-20, B1-28, A2-29, D3-29, C2-30, D3-30, A2-31  
-Larger reservoir in Box Draw, in the NE ¼ of section 30.  
-Access corridor, around the hill, just SW of well A2-31 in the NW ¼ of section 31

4. All permanent above-ground structures (e.g., production equipment, tanks, etc.) not subject to safety requirements, will be painted to blend with the natural color of the landscape. The paint used will be a color which simulates “Standard Environmental Colors.” The color selected for the Box Draw POD is Covert Green, 18-0617TPX.
5. The operator will drill seed on the contour to a depth of 0.5 inch **or less** and/or surface apply, depending on species, 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:

**SEED MIX:**

**10 to 14” Precipitation Zone, Loamy/Clayey Sites (Includes Shallow sites):**

<b>Species - Cultivar</b>	<b>% in Mix</b>	<b>Lbs PLS*/acre</b>
Thickspike Wheatgrass – <i>Critana</i> <b>OR</b> Western Wheatgrass - <i>Rosana</i>	35	4.2
Bluebunch Wheatgrass – <i>Secar</i> or <i>P-7</i>	15	1.8
Green needlegrass - <i>Lodorm</i>	25	3.0
American vetch <b>OR</b> Cicer Milkvetch - <i>Lutana</i>	10	1.2
White – <i>Antelope</i> or Purple Prairie Clover - <i>Bismarck</i>	5	.60
Lewis - <i>Appar</i> , Blue, or Scarlet flax	5	.60
Winterfat – <i>Open Range</i>	5	.60
<b>Totals</b>	<b>100%</b>	<b>12 lbs/acre</b>

\*PLS = pure live seed

\*Northern Plains adapted species

\*Double this rate if broadcast seeding

\*Varieties planted will be “suitable/adaptable” to Powder River Basin

**Wildlife**

*Raptors*

The following conditions will alleviate impacts to raptors:

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

Township/Range	Section	Wells and Infrastructure
54N, 75W	31	A2-30, B1-30, C12-30, D1-30 and all access corridors in W1/2 W1/2 Section 31.

- a. Surveys to document nest occupancy shall be conducted by a biologist following BLM protocol, between April 15 and June 30. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities. Surveys outside this window may not depict nesting activity. If a survey identifies active raptor nests, a 0.5 mile timing buffer will be implemented. The timing buffer restricts surface disturbing activities within 0.5 mile of occupied raptor nests from February 1 to July 31.
- b. Nest productivity checks shall be completed annually and continued 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 the following nest(s): 4177, 4836 and 4857.
2. If an undocumented raptor nest is located during project construction or operation, the Buffalo Field Office (307-684-1100) shall be notified within 24 hours.
3. Well metering, maintenance and other site visits within 0.5 miles of raptor nests should be minimized as much as possible during the breeding season (February 1 – July 31).

#### *Sage Grouse*

The following conditions will alleviate impacts to sage-grouse:

1. No surface disturbing activities are permitted within 2 miles of the Box Draw, Ridgetop, Fitch Prong and Kretchman sage grouse lek(s) 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 timing limitation will affect the entire Box Draw POD.
  - a. 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. If surveys indicate that the identified lek is 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.
  - b. If during the greater-sage grouse lek survey a new sharp-tailed grouse lek is identified, a 0.67 mile timing restriction (April 1 to May 31) will be applied and surface disturbing activities will not be permitted until after the nesting season. If surveys indicate that the identified lek is inactive during the current breeding season, surface disturbing activities may be permitted within the buffer until the following breeding season. The required 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.
  - c. Well metering, maintenance and other site visits within 2.0 miles of documented sage grouse lek sites should be minimized as much as possible during the breeding season (March 1– June 15).
  - d. To prevent exposure to West Nile Virus, Comet has agreed to monitor Reservoir A3-30-5474 for *Culex tarsalis* (mosquito) larva and treat as needed. The Buffalo BLM biologist will be notified should monitoring show the need for treatment.

#### **Rights-of-Ways**

The following right-of-way locations were identified with the Box Draw POD. Construction of the following location is prohibited until authorized right-of-ways have been issued and a right-

of-way bond attached to the reservoir.

T. 54 N., R. 75 W., section 30, NWNE for the A3-30-5474 reservoir on BLM land.

**Water Management**

1. One week prior to beginning construction of Reservoir A3-30-5474, contact BLM hydrologist Chris Williams at 307-684-1100 so that inspections of dam construction activities may be scheduled.
2. A spring was identified in the Ute Ladies Truss Orchid survey in NWNE Section 6 T53 R74. The operator will locate the spring and monitor the location for flow each Spring and Fall while in CBNG production. When flow is observed, sample the spring and submit for analysis. Forward the initial lab analysis results and flow rate to the BLM hydrology staff for insertion into the WMP.
3. The operator will submit a sundry requesting a change of status to primary along with bonding information for reservoirs designated as secondary before construction begins on these water management structures.

**Cultural**

The following wells and infrastructure may not be constructed until BLM completes Native American consultation for sites 48CA6686, 48CA1654, 48CA1655 and 48CA1566:

1. All wells and infrastructure in T54N R74W Section 30 SW and WSE
2. All wells and infrastructure in T54N R74W Section 31 NW

Results of the consultation may require additional mitigation measures or changes to the plan of development.

**2.4. Summary of Alternatives**

A summary of the infrastructure currently existing within the POD area (Alternative A), the infrastructure originally proposed by the operator (Alternative B), and the infrastructure within the BLM/operator modified proposal (Alternative C) are presented in Table 2.5.

**Table 2.5 Summary of the Alternatives**

Facility	Alternative A (No Action) Existing Number or Miles	Alternative B (Original Proposal) Proposed Number or Miles	Alternative C (Environmental Alt.) Revised Number or Miles
Total CBNG Wells	7	35	30
Well Locations		32	
Non-constructed		2	24
Constructed		1	1
Slotted			5
Conventional Wells	7	0	0
Gather/Metering Facilities	0	0	0
Compressors	0	1	1
Ancillary (Staging/Storage Areas)	0	At compressor site	At compressor site
Template/Spot Upgrade Roads No Corridor	0		

<b>Facility</b>	<b>Alternative A (No Action) Existing Number or Miles</b>	<b>Alternative B (Original Proposal) Proposed Number or Miles</b>	<b>Alternative C (Environmental Alt.) Revised Number or Miles</b>
With Corridor		1mi. 1.4 mi.	1.3 mi. 1.4 mi.
Engineered Roads No Corridor With Corridor	0	0.7 mi.	0.7 mi.
Primitive Roads No Corridor With Corridor	7 mi. 0	0.24 mi. 15 mi.	1.4 mi. 7.4 mi.
Buried Utilities No Corridor With Corridor	0	1.2 mi. 0.9 mi.	2.8 mi. 1.4 mi.
Overhead Powerlines	2 mi.	0	0
Communication Sites	0	0	0
Monitor Wells	0	0	0
LAD	0	0	0
SDI	2	0	0
Treatment Facilities	0	0	0
Impoundments On-channel Off-channel Lined Unlined	4 0 0 0	9 0 0 0	9 0 0 0
Water Discharge Points	0	9	9
Channel Disturbance Headcut Mitigation Channel Modification	0	0	0
<b>TOTAL ACRES DISTURBANCE</b>	<b>22 Acres</b>	<b>143.6 Acres</b>	<b>78 Acres</b>

### 3. DESCRIPTION OF AFFECTED ENVIRONMENT

Applications to drill were received on August 10<sup>th</sup>, 2007. Field inspections of the proposed Box Draw CBNG project were conducted on 4/22, 4/30, 8/5, 8/6 and 8/7/2008 by; Kent Fink, Troy Riely, Kevin Anderson, Tony Barrows and Allen Jones-Company Representatives, Steve and Bob Sorenson and Don Joslyn- Landowners, Dan Sellers, Don Brewer, Ted Hamersma, Amber Haverlock, Chris Williams, Buck Damone, Seth Lambert- BLM Representatives and Brad Rodgers- USFWS Representative.

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.**

<b>Mandatory Item</b>	<b>Potentially Impacted</b>	<b>No Impact</b>	<b>Not Present On Site</b>	<b>BLM Evaluator</b>
Threatened and Endangered Species		X		Don Brewer
Floodplains		X		Dan Sellers, Chris Williams
Wilderness Values		X		Dan Sellers
ACECs		X		Dan Sellers
Water Resources	X			Dan Sellers, Chris Williams
Air Quality		X		Dan Sellers
Cultural or Historical Values	X			G.L. "Buck" Damone III
Prime or Unique Farmlands			X	Dan Sellers
Wild & Scenic Rivers			X	Dan Sellers
Wetland/Riparian	X			Dan Sellers, Chris Williams
Native American Religious Concerns	X			G.L. "Buck" Damone III
Hazardous Wastes or Solids		X		Dan Sellers
Invasive, Nonnative Species	X			Dan Sellers
Environmental Justice		X		Dan Sellers

### **3.1. Topographic Characteristics of Project Area**

Primary land uses in the area are ranching/farming, CBNG production, and hunting. There is currently natural gas and oil development within the project area. Comet's, Linn Draw and Kenai PODs are to the west, Williams' Long Draw POD is to the south east, Pennaco's Middle Prong POD is to the northwest, and Lance's West Gas Draw Beta POD is located to the northeast.

Elevations within the project area range from 4,200 to 4,588 feet above sea level. The topography is classic Powder River breaks, from flat to prominent ridgelines cut by numerous, rough draws. The project area is drained by several ephemeral draws such as Horse Creek, Box Draw and Harper Draw.

For more information please see the POD book.

### **3.2. Vegetation & Soils**

Land cover within the project area is a sagebrush grassland habitat type. Common species associated with this vegetation type include Wyoming big sagebrush (*Artemisia tridentata wyomingensis*), silver sagebrush (*Artemisia cana*), western wheat grass (*Pascopyrum smithii*), junegrass (*Koeleria macrantha*), needle and thread grass (*Hesperostipa comata*), Sandberg blue grass (*Poa secunda*), Japanese brome (*Bromus japonicus*), cheatgrass (*Bromus tectorum*), prickly pear cactus (*Opuntia spp.*), scarlet globemallow (*Sphaeralcea coccinea*), and rabbit brush (*Chrysothamnus spp.*) (Martini 2007). The project area is made up of sagebrush and native grasses; sagebrush and native grasses with cheatgrass/Japanese brome invading; and sagebrush with a cheat grass/Japanese brome dominated under story. This vegetation

type includes a combination of sparse (0-5% cover), light (5-10% cover), moderately dense (10-15% cover) and dense (15-25% cover) big sagebrush crown closure. In areas where sagebrush and native grasses exist, grass cover ranges from 10-35% depending on soil type. In areas with sagebrush and native grasses and cheatgrass/Japanese Brome, cheatgrass/Japanese Brome cover ranges from sparse (0-10%) to dense (40 to 80%). Cheatgrass and Japanese brome have taken over areas that have been affected by fire and over grazing. In these areas cheatgrass and Japanese brome cover is between 60 and 80%.

Juniper tree stands occur mainly in the draw bottoms to about mid slope. They are thickest in the draw bottoms. Scattered juniper trees occur within sagebrush communities, on ridge lines and flats throughout the project area (Martini 2007).

Middle Prong of Wild Horse Creek, adjacent to the project area consists of wetland and upland grasses, upland shrubs and scattered cottonwood trees.

The soils vary from sand and clay to primarily sandy clay loam throughout the project area. Soils differ with topographic location, slope and elevation. Topsoil depths to be salvaged for reclamation range from 0 to 2 inches on ridges to 12 inches plus in bottomland. Erosion potential varies from low to high, depending on the soil type, vegetative cover and slope. Reclamation potential of soils also varies throughout the project area from well (3%), to moderate (41%), to poor (56%). Successful reclamation is expected with adequate moisture, time and sound land management.

Using the Natural Resource Conservation Service, (NRCS, USDA), Technical Guides for the Major Land Resource Area 58B Northern Rolling High Plains, in the 15"-17" Northern Plains precipitation zone, the landforms and soils of the project area are deep to moderately deep (greater than 20" to bedrock), well-drained & moderately permeable. Layers of the soil most influential to the plant community vary from 3 to 6 inches thick. These layers consist of the A horizon with very fine sandy loam, loam, or silt loam texture and may also include the upper few inches of the B horizon with sandy clay loam, silty clay loam, or clay loam texture. The predominant ecological sites occurring within the proposed POD are shallow loamy (56%), loamy (25%), clayey (19%), and sandy (2%). Lowland sandy sites make up a small portion of the ecological range sites. These sites occur on land nearly level to up to 50% slopes.

Landform: Hill slopes with associated alluvial fans & stream terraces.

For more detailed soil information, see the NRCS Soil Survey WY705.

### **3.2.1. Wetlands/Riparian**

Small areas of wetland vegetation exist around existing stock reservoirs. Middle Prong of Wild Horse Creek, adjacent to the project area have localized areas of wetland, and areas upland grasses and upland shrubs.

### **3.2.2. Invasive Species**

A Wyoming Energy Resource Information Clearinghouse (WERIC) database was created cooperatively by the University of Wyoming, BLM, and county Weed and Pest offices to identify and log weed species. The operator & BLM confirmed the following WERIC identified infestations during subsequent field investigations:

- Russian knapweed
- leafy spurge
- Canada thistle
- saltcedar

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

Concern are listed in Table 3-22 (p. 3-105.)

### **3.3. Wildlife**

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

A habitat assessment and wildlife inventory surveys were performed by Western Lands Services (2007 2008). Western Lands Services performed surveys for bald eagles, mountain plover, sharp-tailed grouse, greater sage-grouse, raptor nests, and prairie dog colonies according to Powder River Basin Interagency Working Group (PRBIWG) accepted protocol in 2007 and 2008. Surveys were conducted for Ute ladies'-tresses orchid. PRB IWG accepted protocol is available on the CBM Clearinghouse website ([www.cbmclearinghouse.info](http://www.cbmclearinghouse.info)).

A BLM biologist conducted field visits on August 5, 6 and 7, 2008. During this time, the biologist reviewed the wildlife survey information for accuracy, evaluated impacts to wildlife resources, and provided project modification recommendations where wildlife issues arose.

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

#### **3.3.1. Big Game**

Big game species expected to be within the Box Draw project area include white-tailed deer, pronghorn antelope and mule deer. Both mule deer and antelope, and their sign were seen at a number of locations throughout the project area during the on-site field visits. The WGFD has determined that the project area contains Winter range for pronghorn antelope, Winter-Yearlong and Yearlong range for mule deer, and a small amount of white-tailed deer Yearlong range in the southeastern portion of the project area.

**Winter** use is when a population or portion of a population of animals uses the documented suitable habitat sites within this range annually, in substantial numbers only during the winter period. **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.

Populations of pronghorn antelope, mule deer, and white-tailed deer within their respective hunt areas are above WGFD objectives. Big game range maps are available in the PRB FEIS (3-119-143), the project file, and from the WGFD.

#### **3.3.2. Aquatics**

The project area is drained by ephemeral tributaries of Horse Creek. One spring was identified by Western Lands Services in their Ute ladies' tresses survey in NWNE Section 6 T53N, R74W.

Amphibian and reptile species occur throughout the Basin, but there is little recorded baseline information available about them. Confluence Consulting, Inc. identified the following species present within the Clear Creek and Powder River watersheds: Woodhouse's toad, Northern leopard frog, gopher snake, and garter snake (2004). Because sampling at the upper two sites on Clear Creek occurred late in the season, seasonality may have influenced the lack of reptiles and amphibians observed at these sites.

### 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. Many species that are of high management concern use shrub-steppe and shortgrass prairie areas for their primary breeding habitats (Saab and Rich 1997). Migratory bird species of management concern that may occur in the project area are listed in the PRB FEIS (3-151). Species commonly observed during the onsite field visits were western meadowlark and lark bunting.

### 3.3.4. Raptors

Raptors species expected to occur in suitable habitats within the Powder River Basin include northern harrier, golden eagle, red-tailed hawk, Swainson’s hawk, ferruginous hawk, American kestrel, prairie falcon, short-eared owl, great horned owl, bald eagle, rough-legged hawk, merlin, Cooper’s hawk, northern goshawk, long-eared owl, and burrowing owl. Most raptor species nest in a variety of habitats including but not limited to; native and non-native grasslands, agricultural lands, live and dead trees, cliff faces, rocky outcrops, and tree cavities.

Three raptor nest sites were identified by Western Lands Services (2008) and BLM within 0.5 mile of the project area. Of these, two nests were active in 2008.

**Table 3.2.** Documented raptor nests within the Box Draw POD project area.

BLM_ID	UTME	UTMN	Location Section Township Range	Substrate	Year	Condition	Status Code	Species
4177	435136	4942380	S30 T54N R74W	COTTONWOOD LIVE	2008	Good	ACTIVE	LONG-EARED OWL
					2007	Good	ACTIVE	LONG-EARED OWL
					2006	Good	ACTIVE	LONG-EARED OWL
4836	434863	4942619	S25 T54N R75W	JUNIPER	2008	Good	INACTIVE	
					2008	Good	ACTIVE	RED-TAILED HAWK
					2007	Good	ACTIVE	RED-TAILED HAWK
4837	434751	4942976	S25 T54N R75W	JUNIPER	2008	Good	INACTIVE	LONG-EARED OWL
					2007	Good	ACTIVE	

### 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 2004, the WGFD identified six prairie dog complexes (Arvada, Sheridan, Pleasantdale, Four Corners, Linch, Kaycee, and Thunder Basin National Grasslands) partially or wholly within the BLM Buffalo Field Office administrative area as potential black-footed ferret reintroduction sites (Grenier et al. 2004).

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 1,000 acres of black-tailed prairie dog colonies, separated by no more than 1.5km, 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 have also concluded that black-tailed prairie dog colonies within Wyoming are unlikely to be inhabited by black-footed ferrets (Kelly 2004); therefore, no ferret surveys were required or conducted.

No black-tailed prairie dog colonies were identified during site visits by Western Lands Services within the project area; however, the BLM database indicates a colony of approximately 28 acres in the SE NW Section 33 T54N, R74W. This area is now cultivated. Prairie dogs no longer exist in the project area. Black-footed ferret habitat is not present within the Box Draw project area.

#### **3.3.5.1.2. Ute Ladies'-Tresses Orchid**

Ute ladies'-tresses orchid (ULT) 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. Wyoming Natural Diversity Database model predicts undocumented populations may be present particularly within southern Campbell and northern Converse Counties. In Wyoming, ULT blooms from early August to early September, with fruits produced in mid August to September (Fertig 2000).

Prior to 2005, only four orchid populations 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 Wind Creek and Antelope Creek in northern Converse County, Bear Creek in northern Laramie and southern Goshen Counties, Horse Creek in Laramie County, and Niobrara River in Niobrara County.

Box Draw and its tributaries are ephemeral drainages within the Spotted Horse Creek, Middle Prong Wild Horse Creek and Horse Creek watersheds. A survey for Ute Ladies' Tresses Orchid in the Box Draw project area was conducted by Western Lands Services on August 21, 2008. One spring was identified in the NW NE Section 6 T53N, R74W. Soil was saturated at the spring site and wetland vegetation was present but there was no flowing water. The survey found no ULTs and concluded that potential habitat is present. Suitable orchid habitat is present within the Box Draw project area.

#### **3.3.5.2. Sensitive Species**

BLM Wyoming has prepared a list of sensitive species to focus species management efforts towards maintaining habitats under a multiple use mandate. Two habitat types – prairie dog colonies and sagebrush ecosystems – are the most common within the Powder River Basin and contain habitat components required in the life cycle of several sensitive species. The species associated with these ecosystems are described below in general terms. Those species within the Powder River Basin that were once listed or candidates for listing under the Endangered Species Act of 1973 and remain BLM Wyoming sensitive species are also described in more detail in this section. 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.

#### **3.3.5.2.1. Sagebrush obligates**

Sagebrush ecosystems support a variety of species. Sagebrush obligates are animals that cannot survive without sagebrush and its associated perennial grasses and forbs; in other words, species requiring sagebrush for some part of their life cycle. Sagebrush obligates within the Powder River Basin, listed as sensitive species by BLM Wyoming include greater sage-grouse, Brewer's sparrow and sage thrashers all require sagebrush for nesting, with nests typically located within or under the sagebrush canopy. Sage thrashers usually nest in tall dense clumps of sagebrush within areas having some bare ground for foraging. Brewer's sparrows are associated closely with sagebrush habitats having abundant scattered shrubs and short grass (Paige and Ritter 1999). Other sagebrush obligate species include sagebrush vole, pronghorn antelope, and sagebrush lizard.

#### **3.3.5.2.2. 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 the protection of the Bald and Golden Eagle Protection Act and the Migratory Bird Treaty Act. In order to avoid violation of these laws and uphold the BLM's commitment to avoid any future listing of this species, all conservation measures and terms and conditions identified in the Powder River Basin Oil and Gas Project Biological Opinion (ES-6-WY-07-F012) (USFWS 2007) 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 are often more varied. In addition to prairie dogs, ground squirrels, and lagomorphs, carcasses of domestic sheep and big game 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.

Field surveys conducted by Western Lands Services found no suitable habitat for bald eagles. Juniper is the primary tree species. No bald eagles were observed during field surveys. The Box Draw project area is approximately seven miles from the Powder River. Individual eagles may use the area for foraging but it is unlikely the area would be used for nesting or roosting by bald eagles.

#### **3.3.5.2.3. Black-tailed prairie dog**

The black-tailed prairie dog was added to the list of Candidate species for federal listing on February 4, 2000 (USFWS 2000). On August 12, 2004, the U.S. Fish and Wildlife Service removed the black-tailed prairie dog's Candidate status. BLM Wyoming, considers prairie dogs as a sensitive species and continues to afford this species the protections described in the PRB FEIS. The black-tailed prairie dog is a diurnal rodent inhabiting prairie and desert grasslands of the Great Plains.

Due to human-caused factors, black-tailed prairie dog populations are now highly fragmented, and isolated (Miller 1994). Most colonies are small and subject to potential extirpation due to inbreeding, population fluctuations, and other problems, such as landowner poisoning and disease that affect long term population viability (Primack 1993, Meffe and Carroll 1994, Noss and Cooperrider 1994).

The black-tailed prairie dog is considered common in Wyoming, although its abundance fluctuates with activity levels of Sylvatic plague and the extent of control efforts by landowners. Comparisons with 1994 Digital Ortho Quads indicated that black-tailed prairie dog acreage remained stable from 1994 through

2001. However, aerial surveys conducted in 2003 to determine the status of known colonies indicated that a significant portion (approximately 47%) of the prairie dog acreage was impacted by Sylvatic plague and/or control efforts (Grenier 2004).

No black-tailed prairie dog colonies were identified during site visits by Western Lands Services within the project area; however, the BLM database indicates a colony of approximately 28 acres in the SE NW Section 33 T54N, R74W. The site has since been cultivated and no prairie dogs remain.

### 3.3.5.2.4. Grouse

#### 3.3.5.2.4.1. Greater sage-grouse

The greater sage-grouse is listed as a sensitive species by BLM (Wyoming). In recent years, several petitions have been submitted to the USFWS to list greater sage-grouse as Threatened or Endangered. On January 12<sup>th</sup>, 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. In 2007, the U.S. District Court remanded that decision, stating that the USFWS’ decision-making process was flawed and ordered the USFWS to conduct a new Status Review as a result of a lawsuit and questions surrounding the 2005 review (Winmill Decision Case No. CV-06-277-E-BLW, December 2007).

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 in the project area. Moderately dense sagebrush is present in patches throughout the project area. Much of the Box Draw project area is rough, steep terrain with sharp, narrow ridgetops, sharply sloping into deeply dissected drainages. Some of the ridgetops and side slopes are gentle enough to be suitable for sage grouse. The terrain becomes gentler with good stands of sagebrush toward the southern end of the project area. Sage-grouse habitat models indicate that approximately 85% of the project area contains high quality sage-grouse nesting habitat and high quality sage-grouse wintering habitat (Walker et al. 2007). At the onsite, sage-grouse sign and individual birds were seen in the SW NW Section 31 T54N, R75W. BLM records identified nine sage-grouse leks within 4 miles of the project area. The 4-mile distance was recommended by the State wildlife agencies' ad hoc committee for consideration of oil and gas development effects to nesting habitat (WGFD 2008). These nine lek sites are identified below (Table 3.3).

**Table 3.3.** Sage-grouse leks surrounding the Box Draw project area.

<b>Lek Name</b>	<b>Legal Location</b>	<b>Occupancy and activity Status In 2008(Peak Males)</b>	<b>Distance From Project Area (miles)</b>
Box Draw	Section 30 T54N, R74W	Occupied, Active, 13 males	Within Project Area
Case I	Section 8 T54N, R74W	Occupied, Inactive	2.11
Case II	Section 6 T54N, R74W	Occupied, Inactive	2.47
Case III	Section 31 T55N, R74W	Occupied, Inactive	2.80
Fitch Prong Road	Section 5 T53N, R74W	Occupied, Inactive	0.50
Kretchman	Section 1 T53N, R75W	Occupied, Inactive	0.85

Lek Name	Legal Location	Occupancy and activity Status In 2008(Peak Males)	Distance From Project Area (miles)
Playa	Section 12 T53N, R75W	Occupied, Active, 14 males	1.44
Ridgetop	Section 5 T53N, R74W	Occupied, Inactive	0.33
Wildcat	Section 36 T54N, R74W	Occupied, Inactive	2.50

#### 3.3.5.2.4.2. Sharp-tailed grouse

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

The Box Draw project area has the potential to support sharp-tailed grouse during most of the year. The mosaic of grasslands and sagebrush-grasslands could provide habitat from April through October. Cottonwoods and junipers could provide buds and berries, respectively, to sustain grouse through the winter. No sharptail grouse were observed during field surveys. The closest sharptail grouse leks identified in the BLM database are an unnamed lek in the SW 35 T54N, R74W (1.51 miles to the southeast corner of the project area); and the Fitch Lek in the center of Section 2 T53N, R75W (1.52 miles to the southwest corner of the project area).

#### 3.3.5.2.5. Mountain plover

The mountain plover was proposed for listing in 1999 (USFWS). In 2003, the USFWS withdrew a proposal to list the Mountain Plover as a Threatened species, stating that the population was larger than had been thought and was no longer declining. Mountain plovers, which are a BLM sensitive species, are typically associated with high, dry, short grass prairies (BLM 2003). Mountain plover nesting habitat is often associated with heavily grazed areas such as prairie dog colonies and livestock pastures.

The Box Draw project area consists of steep, rough terrain with relatively tall vegetation. Suitable mountain plover habitat is not present within the project area.

### 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](http://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	Veterinary Cases	Bird Cases
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	<b>Human Cases</b>	<b>PRB</b>	<b>PRB</b>	<b>PRB</b>
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 the headwaters of three major drainages, Horse Creek, Spotted Horse Creek, and Middle Prong Wild Horse Creek, all of which are tributary to 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.

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.

The BLM has installed shallow groundwater monitoring wells at five impoundment locations in the PRB to assess ground-water quality changes due to infiltration of CBNG produced water. Water quality data has been sampled from these wells on a regular basis. Preliminary data from three sites show increasing TDS level as water infiltrates while two sites are not.

As of April 2008, approximately 1774 impoundment sites have been investigated. These sites had more than 1988 borings. Of those impoundments, 259 met the criteria to provide compliance monitoring data if constructed and used for CBNG water containment. Only 109 monitored impoundments are currently in use. As of the 1<sup>st</sup> quarter of 2008, only 16 monitored impoundments exceeded groundwater class of use limits (Fischer, 2008). The BLM requires that operators comply with the DEQ compliance monitoring guidance document prior to discharge of federally-produced water into newly constructed or upgraded impoundments.

A search of the Wyoming State Engineer Office (WSEO) Ground Water Rights Database for this area

showed 14 registered stock and domestic water wells within ½ mile of a federal CBNG producing well in the POD with depths ranging from 22 to 510 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 headwaters of three major drainages, Horse Creek, Spotted Horse Creek, and Middle Prong Wild Horse Creek, all of which are tributary to the Upper Powder River watershed. All drainages within the POD area are ephemeral, flowing only in response to a precipitation event or snow melt. The channels range from well vegetated grassy swales without defined bed and bank to flat-bottomed, incised channels with erosive banks.

The PRB FEIS presents the historic mean Electrical Conductivity (EC, in µmhos/cm) and Sodium Adsorption Ratio (SAR) by watershed at selected United States Geological Survey (USGS) Gauging Stations in Table 3-11 (PRB FEIS page 3-49). These water quality parameters “illustrate the variability in ambient EC and SAR in streams within the Project Area. The representative stream water quality is used in the impact analysis presented in Chapter 4 as the baseline for evaluating potential impacts to water quality and existing uses from future discharges of CBNG produced water of varying chemical composition to surface drainages within the Project Area” (PRB FEIS page 3-48). For the Upper Powder River watershed, the EC ranges from 1,797 at Maximum monthly flow to 3,400 at Low monthly flow and the SAR ranges from 4.76 at Maximum monthly flow to 7.83 at Low monthly flow. These values were determined at the USGS station located at Arvada, WY, Station ID 06317000 (PRB FEIS page 3-49).

One identified spring exists near the POD area in NWNE Section 6, T53 R74. The operator has not sampled this spring at the time of POD approval.

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

Class III cultural resource inventories were conducted for the Box Draw project prior to on-the-ground project work (BFO project no. 70080001 and 07008008). Foothills Archaeological Services and Western Lands Services conducted a block and linear Class III cultural resource inventory following the Archeology and Historic Preservation, Secretary of the Interior's Standards and Guidelines (48CFR190) for the project. G.L. “Buck” Damone III, BLM Archaeologist, reviewed the reports for technical adequacy and compliance with Bureau of Land Management (BLM) standards, and determined them to be adequate. The following resources are located within the project area.

**Table 3.5 Cultural Resources Inventory Results**

Site Number	Site Type	National Register Eligibility
48CA1653	Prehistoric Site	Not Eligible
48CA1654	Prehistoric Site	Not Eligible
48CA1655	Prehistoric Site	Not Eligible
48CA1656	Prehistoric Site	Eligible
48CA2594	Historic Site	Not Eligible
48CA6685	Prehistoric Site	Unevaluated

<b>Site Number</b>	<b>Site Type</b>	<b>National Register Eligibility</b>
48CA6686	Prehistoric Site	Not Eligible
48CA6687	Prehistoric Site	Not Eligible
48CA6688	Prehistoric Site	Not Eligible
48CA6689	Prehistoric Site	Unevaluated
48CA6690	Prehistoric Site	Not Eligible
48CA6922	Historic Site	Not Eligible

The project area contains several stone circle sites (48CA1654, 48CA1655, 48CA1656, 48CA6686, 48CA6687, 48CA6688, and 48CA6690) which may have significance to Native American tribes. The Bureau is obligated by law (National Historic Preservation Act, American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, National Environmental Policy Act, Federal Land Policy and Management Act and EO13007) to consult with interested tribes when a federal action may impact a site important to those tribes. Site specific tribal consultation relating to identification and impacts to stone circle sites in the project area has not been completed.

### **3.7. Air Quality**

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

Existing air pollutant emission sources within the region include following:

- Exhaust emissions (primarily CO and nitrogen oxides [NO<sub>x</sub>]) from existing natural gas fired compressor engines used in production of natural gas and CBNG; and, gasoline and diesel vehicle tailpipe emissions of combustion pollutants;
- Dust (particulate matter) generated by vehicle travel on unpaved roads, windblown dust from neighboring areas and road sanding during the winter months;
- Transport of air pollutants from emission sources located outside the region;
- Dust (particulate matter) from coal mines;
- NO<sub>x</sub>, particulate matter, and other emissions from diesel trains and,
- SO<sub>2</sub> and NO<sub>x</sub> from power plants.

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

## **4. ENVIRONMENTAL CONSEQUENCES**

The changes to the proposed action (Alternative B) resulted in development of 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. Vegetation & Soils Direct and Indirect Effects**

Impacts to vegetation and soils from surface disturbance will be reduced, by following the operator's plans and BLM applied mitigation. Of the 30 proposed well locations, 24 can be drilled without a well pad being constructed, 2 will require a constructed (cut & fill) well pad and 4 will require a "slotted pad". Surface disturbance associated with the drilling of the 24 wells 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 12 x 30feet), and compaction (from vehicles driving/parking at the drill site). Estimated disturbance associated with these 24 wells would involve approximately 0.2 acre/well for 4.8 total acres. The other 6 wells requiring cut & fill pad construction, 2 will disturb approximately 0.7 acres/well pad, for a total of 1.4 acres and 4 would disturb approximately 0.2 acres/well pad, for a total of 0.8 acres. The total estimated disturbance for all 30 wells would be 7 acres.

Approximately 3.35 miles of improved roads would be constructed to provide access to various well locations. Approximately 1.36 miles of new and existing two-track 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. This practice results in less surface disturbance and overall environmental impacts. Approximately 4.2 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.

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

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

Table 4.1 summarizes the proposed surface disturbance.

**Table 4.1 - SUMMARY OF DISTURBANCE**

<b>Facility</b>	<b>Number or Miles</b>	<b>Factor</b>	<b>Acreage of Disturbance</b>	<b>Duration of Disturbance</b>
Non-constructed Pad	24	0.2/acre	7.0	Long Term
Constructed Pad	6	4 at 0.2 & 2 at 0.7		
Gather/Metering Facilities	0	Site Specific	0.0	Long Term
Screw Compressors	1	250 x 250	1.4	Long Term
Monitor Wells	0	0.1/acre	0	Long Term
Impoundments			28.0	Long Term
On-channel	9	Site Specific	28.0	
Off-channel	0	Site Specific	0.0	
Water Discharge Points	9	Site Specific	0.18	

Facility	Number or Miles	Factor	Acreage of Disturbance	Duration of Disturbance
Channel Disturbance				
Headcut Mitigation*	0	Site Specific	0.0	
Channel Modification	0	Site Specific	0.0	
Improved Roads	3.35	30' to 50 Width		Long Term
No Corridor			4.8	
With Corridor			6.7	
2-Track Roads	1.36			Long Term
No Corridor		12' Width	2	
With Corridor		40' Width	22.5	
Pipelines	4.19			Short Term
No Corridor				
With Corridor		30' Width	10	
Buried Power Cable	0	12' Width or Site Specific	0	Short Term
No Corridor				
Overhead Powerlines	0.0	15' Width	0	Long Term
Additional Disturbance	0	Site Specific	0	

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”.

#### 4.1.1. Wetland/Riparian

Impacts to wetlands and riparian zones are projected to be minimal if the programmatic COAs are followed.

#### 4.1.2. 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 the following measures in an Integrated Pest Management Plan (IPMP) included in the proposal:

1. Use of approved herbicides by licensed applicators. Treatments done in the Spring, Summer, and Fall.
2. Preventive practices: clean equipment off, maintain weed free travel routes, minimize surface disturbance, use weed free seed, mulch, etc.,
3. Education: The operator will work with landowners, company reps, county weed and pest departments and the BLM to identify and control weeds.

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

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

#### **4.1.3. 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 18.5% of the total predicted in the PRB FEIS.
- The WDEQ enforcement of the terms and conditions of the WYPDES permit that are designed to protect irrigation downstream.
- The WMP for the Box Draw proposes that produced water will not contribute significantly to flows downstream.

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, mule deer and white-tailed deer would be directly disturbed with the construction of wells, reservoirs, pipelines and roads. 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 indicates a well density of eight wells per section creates a high level of impact for big game and that avoidance zones around mineral facilities overlap creating contiguous avoidance areas (WGFD 2004). 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 become accustomed to the disturbance (Madson 2005).

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

by 4-wheel drive vehicles, trail bikes, and hikers (Jalkotzy et al. 1997).

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

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

#### **4.2.1.1. Big Game 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 4-211.

#### **4.2.2. Aquatics Direct and Indirect Effects**

Produced water is to be discharged into two on-channel reservoirs in the bordering Kenai POD. In addition, water will go to two subsurface drip irrigation (SDI) systems, covering 127 acres in Sections 33 and 34 T54N, R75W and Section 3 T53N, R75W. Eight additional on-channel reservoirs are planned for construction to handle the remaining water produced by coal-bed methane wells in the project area. If a reservoir were to discharge, it is unlikely that the produced water will reach a fish-bearing stream, and that downstream species would be affected.

#### **4.2.2.1. Aquatics 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.

#### **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).

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

Reclamation and other CBNG activities that occur in the spring may be detrimental to migratory bird survival. Those species that are edge-sensitive will be displaced further away from vegetative edges due to increased human activity, causing otherwise suitable habitat to be abandoned. If the interior habitat is at carrying capacity, then birds displaced from the edges will have no place to relocate. One consequence of

habitat fragmentation is a geometric increase in the proportion of the remaining habitat that is near edges (Temple 1986). In severely fragmented habitats, all of the remaining habitat may be so close to edges that no interior habitat remains (Temple and Cary 1988). Over time, this will lead to a loss of interior habitat species in favor of edge habitat species. Other migratory bird species that utilize the disturbed areas for nesting may be disrupted by the human activity and nests may be destroyed by equipment.

Migratory bird species within the Powder River Basin nest in the spring and early summer and are vulnerable to the same affects as sage-grouse and raptor species. Though no timing restrictions are typically applied specifically to protect migratory bird breeding or nesting, where sage-grouse or raptor nesting timing limitations are applied, nesting migratory birds are also protected. Where these timing limitations are not applied and migratory bird species are nesting, migratory birds remain vulnerable. Additional direct and indirect effects to migratory birds are discussed in the PRB FEIS (4-231-235).

**4.2.3.1. Migratory Birds 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.

**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 overheating or chilling of eggs or chicks. 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.

The presence of overhead power lines may impact foraging raptors. Raptors forage opportunistically throughout the Powder River Basin. Power poles provide attractive perch sites in areas where mature trees and other natural perches are lacking. From May 2003, through December 28, 2006, Service Law Enforcement salvage records for northeast Wyoming identified that 156 raptors, including 1 bald eagle, 93 golden eagles, 1 unidentified eagle, 27 hawks, 30 owls and 4 unidentified raptors were electrocuted on power poles within the Powder River Basin Oil and Gas Project area (USFWS 2006a). Of the 156 raptors electrocuted 31 were at power poles that are considered new construction (post 1996 construction standards). Additionally, two golden eagles and a Cooper’s hawk were killed in apparent mid span collisions with powerlines (USFWS 2006a). 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.

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.

Three nests, BLM ID#s 4177, 4836, and 4837 are located just outside of the northwest corner project boundary. Nest 4177 is approximately 0.22 miles from the nearest proposed disturbance. All three nests are in the bottom of a draw, well out of sight of the proposed actions associated with the Box Draw project. The topography in the area dictated the location of the well sites and access corridors, leaving very little room for movement. **Table 5.** Infrastructure within close proximity (0.5 mile) to documented raptor nests within the Box Draw project area.

BLM ID#	AMOUNT AND TYPE OF INFRASTRUCTURE
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	<i>Within 0.25 mile</i>	<i>Within 0.25 to 0.5 mile</i>
4177	B1-30 (nest in draw bottom, not visible from well site)	D1-30, C2-30 and all infrastructures in the W1/2W1/2 of Section 30 T54N, R74W.
4836		B1-30 and access corridor to A2-30 in the NW Section 30 T54N, R74W.
4837		B1-30 and access corridor to A2-30 in the NW Section 30 T54N, R74W.

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. Raptors 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.

#### 4.2.5. Threatened and Endangered and Sensitive Species

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 Species

**Table 4.2 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	Project actions will not affect potential habitat.

#### Presence

**K** Known, documented observation within project area.

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

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

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

#### Project Effects

**LAA** Likely to adversely affect

**NE** No Effect.

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

##### 4.2.5.1.1. Black-Footed Ferret Direct and Indirect Effects

No black-tailed prairie dog colonies exist within or adjacent to the Box Draw project area. Implementation of the proposed development will have "no effect" on the black-footed ferret.

#### **4.2.5.1.2. Ute Ladies'-Tresses Orchid Direct and Indirect Effects**

Suitable habitat is present within the Box Draw project area but there are no construction activities proposed in or near potential Ute ladies' tresses orchid habitat. Reservoir seepage may create suitable habitat if historically ephemeral drainages become perennial, however no historic seed source is present within the project area. Implementation of the proposed coal bed natural gas project will have "no effect" on the Ute ladies'- tresses orchid.

#### **4.2.5.2. Sensitive Species Direct and Indirect Effects**

BLM will take necessary actions to meet the policies set forth in sensitive species policy (BLM Manual 6840). BLM Manual 6840.22A states: "The BLM should obtain and use the best available information deemed necessary to evaluate the status of special status species in areas affected by land use plans or other proposed actions and to develop sound conservation practices. Implementation-level planning should consider all site-specific methods and procedures which are needed to bring the species and their habitats to the condition under which the provisions of the ESA are not necessary, current listings under special status species categories are no longer necessary, and future listings under special status species categories would not be necessary."

##### **4.2.5.2.1. Sagebrush obligates**

Shrubland and grassland birds are declining faster than any other group of species in North America (Knick et al. 2003). In Wyoming, existing oil and gas wells are located primarily in landscapes dominated by sagebrush, causing direct loss of this habitat. Associated road networks, pipelines, and powerline transmission corridors also influence vegetation dynamics by fragmenting habitats or by creating soil conditions facilitating the spread of invasive species (Braun 1998, Gelbard and Belnap 2003). Density of sagebrush-obligate birds within 100 m of roads constructed for natural gas development in Wyoming was 50% lower than at greater distances (Ingelfinger 2001). Increased numbers of corvids and raptors associated with powerlines (Steenhof et al. 1993, Knight and Kawashima 1993, Vander Haegen et al. 2002) increases the potential predation impact on sage-grouse and other sagebrush-breeding birds (Knick et al. 2003).

Fragmentation of shrubsteppe habitat is a major disruption that has consequences for sagebrush-obligate species (Braun et al. 1976; Rotenberry & Wiens 1980a). In fragmented habitats, suitable habitat area remains only as a remnants surrounded by unusable environments (Urban and Shugart 1984; Fahrig & Paloheimo 1988). Populations of sagebrush-obligate species decline because areas of suitable habitat decrease (Temple & Cary 1988), because of lower reproduction, and/or because of higher mortality in remaining habitats (Robinson 1992; Porneluzi et al. 1993). Fragmentation of shrubsteppe has the further potential to affect the conservation of shrub-obligate species because of the permanence of disturbance (Knick and Rotenberry 1995). Several decades are required to reestablish ecologically functioning mature sagebrush communities. Due to this, sagebrush obligate species may not return until after habitat reestablishment.

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

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
<b>Amphibians</b>				
Northern leopard frog ( <i>Rana pipiens</i> )	Beaver ponds, permanent water in plains and foothills	S	MIIH	Additional water will affect existing waterways. Prairie not mountain habitat.
Spotted frog ( <i>Ranus pretiosa</i> )	Mountain ponds, sloughs, and small streams	NP	NI	
<b>Birds</b>				
Baird's sparrow ( <i>Ammodramus bairdii</i> )	Grasslands, weedy fields	S	MIIH	Sagebrush cover will be affected.
Bald eagle ( <i>Haliaeetus leucocephalus</i> )	Mature forest cover often within one mile of large water body.	S	MIIH	Overhead power present
Brewer's sparrow ( <i>Spizella breweri</i> )	Basin-prairie shrub	S	MIIH	Sagebrush cover will be affected.
Burrowing owl ( <i>Athene cunicularia</i> )	Grasslands, basin-prairie shrub	NP	MIIH	No prairie dog colony present.
Ferruginous hawk ( <i>Buteo regalis</i> )	Basin-prairie shrub, grasslands, rock outcrops	S	MIIH	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	MIIH	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%	NP	NI	Habitat not present.
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	NS	MIIH	No documented observations within the Powder River Basin.
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	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
<b>Fish</b>				
Yellowstone cutthroat trout ( <i>Oncorhynchus clarki bouvieri</i> )	Mountain streams and rivers in Tongue River drainage	NP	NI	Outside species range.
<b>Mammals</b>				
Black-tailed prairie dog ( <i>Cynomys ludovicianus</i> )	Prairie habitats with deep, firm soils and slopes less than 10 degrees.	NP	NI	Prairie dog towns not present.
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

#### **4.2.5.2.2. Bald eagle Direct and Indirect Effects**

Bald eagle nesting and winter roosting surveys were conducted by Western Lands Services in the Box Draw project area to determine if bald eagles or their habitat is present. Because the only trees present are junipers and a few Box Elder trees, it was determined that no suitable nesting or winter roosting is available in the Box Draw project area for bald eagles.

The proposed project should not affect bald eagle nesting or winter roosting.

There are 2.23 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 (1996) suggested practices and with the Service's standards (USFWS 2002); however other features may not be in compliance. Comet is not proposing any additional overhead power. There are currently no improved roads within the project area. Comet is proposing to construct 2.26 miles of improved roads.

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

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%). The risk of big-game vehicle-related mortality along CBNG project roads is so insignificant or discountable that when combined with the lack of bald eagle mortalities associated with highway foraging leads to the conclusion that CBNG project roads do not affect bald eagles.

Produced water will be stored in reservoirs which may attract eagles if reliable prey is present, most likely in the form of waterfowl. The effect of the reservoirs on eagles is unknown. The reservoirs could prove to be a benefit (e.g. increased food supply) or an adverse effect (e.g. contaminants, proximity of power lines and/or roads to water). Eagle use of reservoirs should be reported to determine the need for any future management.

#### **4.2.5.2.3. Grouse**

##### **4.2.5.2.3.1. Greater sage-grouse Direct and Indirect Effects**

There are nine sage grouse leks within four miles of the Box Draw project area. Of these, only two have been active in recent years. The proposed action will adversely impact breeding, nesting, brood rearing, late summer and winter habitat. Proposed project elements that are anticipated to negatively impact grouse are approximately: 30 CBNG wells on 30 locations, 4.27 miles of new roads, 4.19 miles of new pipelines, 9 potential new reservoirs, increased vehicle traffic on established roads and increased noise from compressor stations.

Using 0.6 miles as a distance for impacts (Holloran et al. 2007, Aldridge and Boyce 2007), effective sage-

grouse habitat loss will be 1640 acres from roads, and 11,520 acres from 30 well locations. These numbers are not additive since each well location has an associated road and power and in many cases wells are closer than 0.6 miles to each other. Therefore, the above numbers over-represent anticipated impacts within the project area if totaled, however since most well locations are within 0.6 miles of each other the entire project area (approximately 3615 acres within the POD boundaries) can be considered affected.

Based on the best available science, which is summarized below, the proposed action will most likely contribute to the extirpation of the local grouse population and subsequent abandonment of the Box Draw lek within the project area.

Several changes were made at the onsite field visits to reduce loss of sage habitat and disturbance to sage grouse. Well A4-32 was moved closer to the main access route to reduce sage-grouse habitat loss. A proposed access route between wells B1-29 and B4-30 was dropped to reduce disturbance to the Box Draw Lek. Well C2-31 was moved out of known sage-grouse nesting cover. The access corridor to well B3-6 was moved from sagebrush cover to an existing road and into cheatgrass. The compressor site was moved 0.3 miles further from the Box Draw Lek to a site where a hill provides a shield between the compressor and the lek.

The BLM biologist recommended moving wells A2-29 and A2-30 to reduce disturbance to the Box Draw Lek. A2-29 could not be moved due to drainage needs and spacing concerns with other wells. A2-30 was moved to a location behind a ridge but was moved back to the original site after the onsite visit to reduce erosion. The BLM biologist recommended dropping the proposed reservoir in the NW Section 31 because of its proximity to the Box Draw Lek, causing disturbance to grouse and potential exposure to West Nile Virus. The water holding capacity of the reservoir is necessary to the water management program for the project. Comet has agreed to monitor the reservoir for mosquito larva and treat with larvicide as needed.

#### **4.2.5.2.3.1.1. Greater sage-grouse Cumulative Effects**

In addition to the direct impacts to sage-grouse habitat that will be created by the federal wells and associated infrastructure the project area does contain existing fee, state, and federal fluid mineral development. The sage-grouse cumulative impact assessment area for this project encompasses a four mile radius from the nine sage-grouse leks. As of September 15, 2008, there are approximately 1,096 existing wells and associated infrastructure within four miles of the 9 leks - an area of 145 square miles. The existing well density is approximately 7.6 wells per square mile. Due to this level of development there is a strong potential that the population(s) breeding at these leks may become extirpated without the federal development.

There are 411 proposed wells (30 are the wells from this project) within four miles of the 9 leks. With the addition of the 381 proposed wells that are not associated with this proposed action, the well density within four miles of the 9 leks increases to 10.2 wells per square mile (higher than the 8 well per section which is typical of a full field development). With approval of alternative C (30 proposed well locations) the well density increases to 10.4 wells per square mile. The additional wells and infrastructure within the Box Draw project area will add additional stress to the local sage grouse population.

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

The Powder River Basin Oil and Gas Project FEIS (BLM 2003) concluded that “Activities associated with the proposed project would affect sage-grouse in several ways. These effects may include: (1) increased direct mortality (including legal hunting, poaching, and collision with power lines and vehicles); (2) the introduction of new perches for raptors and thus the potential change in rate of predation; (3) direct loss or degradation of habitats; (4) indirect disturbance resulting from human activity (including harassment, displacement, and noise); (5) habitat fragmentation (particularly through construction of roads); and (6) changes in population (pg. 4-257).” The FEIS goes on to state that “implementation of several mitigation measures would reduce the extent of each impact addressed by those measures. Despite these measures, the synergistic effect of several impacts would likely result in a downward trend for the sage-grouse population, and may contribute to the array of cumulative effects that may lead to its federal listing. Local populations may be extirpated in areas of concentrated development, but viability across the Project Area (Powder River Basin) or the entire range of the species is not likely to be compromised (pg. 4-270).”

The Powder River Basin Oil and Gas Project Record of Decision (BLM 2003) included a Mitigation Monitoring and Reporting Plan (MMRP). The uncertainties as to where and at what level development was to proceed as well as the uncertainties associated with the assumptions that were used to predict impacts suggests that one-time determination of impacts that is included in the EIS may not occur as projected. The MMRP helps to continually assess the effects of the project and the adequacy of the mitigation. Such a plan/process provides a mechanism to continuously modify management practices in order to allow development while continuing to protect the environment (E-1).” In other words, development pace and patterns may not occur as predicted, and so the BLM may use the adaptive management process provided for in the BFO RMP.

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

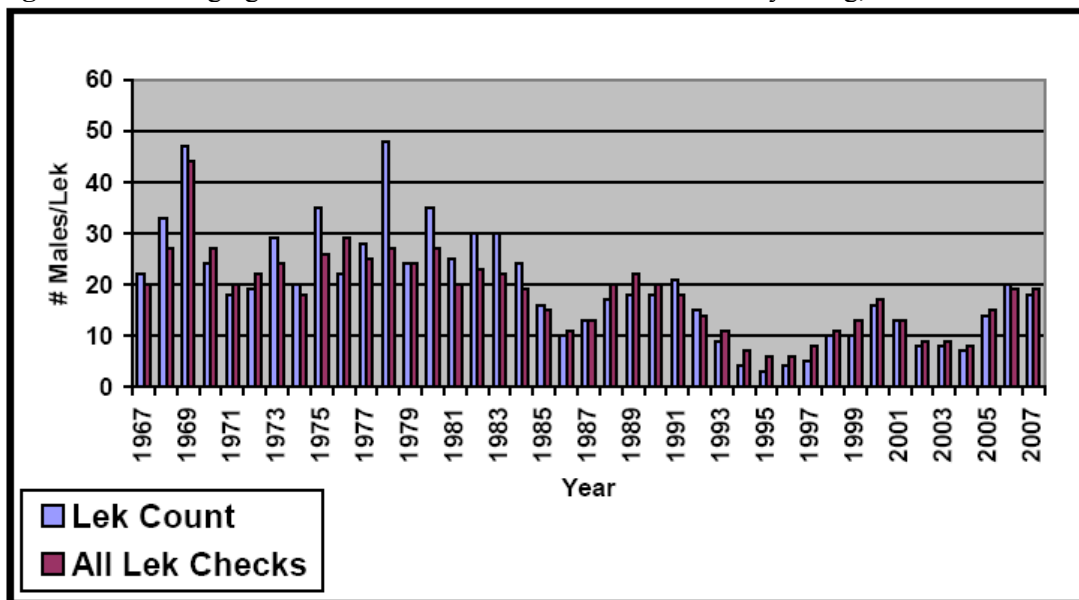
Noise can affect sage-grouse by preventing vocalizations that influence reproduction and other behaviors (WGFD 2003). In a study of greater sage-grouse population response to natural gas field development in western Wyoming, Holloran (2005) concluded that increased noise intensity, associated with active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

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

Another concern with CBNG development is that reservoirs created for water disposal provide habitat for mosquitoes associated with West Nile virus (WGFD 2004). West Nile virus represents a significant new stressor, which in 2003 reduced late summer survival of sage-grouse an average of 25% within four populations including the Powder River Basin (Naugle et al. 2004). In northeastern Wyoming and southeastern Montana, West Nile virus-related mortality during the summer resulted in an average decline in annual female survival of 5% from 2003 to 2006 (Walker et al. 2007). Powder River Basin sage-grouse losses during 2004 and 2005 were not as severe. Summer 2003 was warm and dry, more conducive to West Nile virus replication and transmission than the cooler summers of 2004 and 2005 (Cornish pers. comm.).

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

**Figure 1.** Male sage-grouse lek attendance within northeastern Wyoming, 1967-2007.



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

contiguous sage-grouse habitat such as Idaho's Snake River plain.

Additional studies, across more of the sage-grouse's range, indicate that many populations nest much farther than two miles from the breeding lek (BLM 2004). Holloran and Anderson (2005), in their Upper Green River Basin study area, reported only 45% of their sage-grouse hens nested within 3 km (1.86 mi) of the capture lek. Moynahan and Lindberg (2004) found only 36% of their grouse nesting within 3 km of the capture lek. Moynahan's study area was north-central Montana in an area of mixed-grass prairie and sagebrush steppe, with Wyoming big sagebrush (*Artemisia tridentata wyomingensis*) being the dominant shrub species (Moynahan et al. 2007). Habitat conditions and sage-grouse biology within the Buffalo Field Office are more similar to Moynahan's north-central Montana study area than the Upper Green River area.

A two-mile timing limitation, given the long-term population decline and that less than 50% of sage-grouse are expected to nest within the limitation area, is 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. The BLM and University of Montana are currently researching nest location and other sage-grouse questions and relationships between grouse and coalbed natural gas development. Thus far, this research suggests that impacts to leks from energy development are discernable out to a minimum of four miles, and that some leks within this radius have been extirpated as a direct result of energy development (State wildlife agencies' ad hoc committee for sage-grouse and oil and gas development 2008). Even with a timing limitation on construction activities, sage-grouse may avoid nesting within CBNG fields because of the activities associated with operation and production. In a typical landscape in the Powder River Basin, energy development within two miles of leks is projected to reduce the average probability of lek persistence from 87% to 5% percent (Walker et al. 2007).

Walker et al, 2007 indicates the size of a no-development buffer sufficient to protect leks would depend on the amount of suitable habitat around the lek and the population impact deemed acceptable. Also, rather than limiting mitigation to only timing restrictions, research suggests more effective mitigation strategies include, at a minimum, burying power lines (Connelly et al. 2000 b); minimizing road and well pad construction, vehicle traffic, and industrial noise (Lyon and Anderson 2003, Holloran 2005); and managing produced water to prevent the spread of mosquitoes with the potential to vector West Nile Virus in sage grouse habitat (Walker et al 2007).

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

#### **4.2.5.2.4. Sharp-tailed grouse Direct and Indirect Effects**

Effects similar to sage-grouse.

#### **4.2.5.2.5. Mountain plover Direct and Indirect Effects**

Suitable mountain plover habitat is not present within the project area. The project should not impact mountain plovers.

#### **4.2.5.3. Sensitive Species 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 the secondary watershed and commitment to comply with Wyoming State water laws/regulations. It also addresses potential impacts to the environment and landowner concerns. Water will be managed with 9 stock water reservoirs that will provide full containment for most of the water produced by this POD within the Upper Powder River watershed. The largest proposed reservoir will hold 64.8 acre-feet and may negate the need to build some of the smaller reservoirs. Water produced from five wells in the southeastern corner of the POD will be manifolded into an existing the Kenai POD infrastrucuter so that it can be conveyed to two existing Subsurface Drip Irrigation (SDI) system and two existing reservoirs. Qualified hydrologists, in consultation with the BLM, developed the water management plan. Adherence with the plan, in addition to BLM applied mitigation (in the form of COAs), would reduce project area and downstream impacts from proposed water management strategies.

The 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 5.8 gpm per well or 175 gpm (0.39 cfs or 282 acre-feet per year) for this POD. The PRB FEIS projected the total amount of water that was anticipated to be produced from CBNG development per year (Table 2-8 Projected Amount of Water Produced from CBM Wells Under Alternatives 1, 2A and 2B pg 2-26). For the Upper Powder River drainage, the projected volume produced within the watershed area was 147,481 acre-feet in 2008 (maximum production is estimated in 2006 at 171,423 acre-feet). As such, the volume of water resulting from the production of these wells is 0.5% of the total volume projected for 2008. 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 Upper Powder River drainage area (PRB FEIS pg 4-5). For this action, when water is not being conveyed to the

SDI facility it may be assumed that a maximum of 70 gpm will infiltrate at or near the discharge points and impoundments (113 acre feet per year). This water will saturate the near surface alluvium and deeper formations prior to mixing with the groundwater used for stock and domestic purposes. According to the PRB FEIS, “the increased volume of water recharging the underlying aquifers of the Wasatch and Fort Union Formations would be chemically similar to alluvial groundwater.” (PRB FEIS pg 4-54). Therefore, the chemical nature and the volume of the discharged water may not degrade the groundwater quality.

The PRB FEIS predicts that one of the environmental consequences of coal bed natural gas production is possible impacts to the groundwater. “The effects of development of CBM on groundwater resources would be seen as a drop in the water level (drawdown) in nearby wells completed in the developed coal aquifers and underlying or overlying sand aquifers.” (PRB FEIS page 4-1). In the process of dewatering the coal zone to increase natural gas recovery rates, this project may have some effect on the static water level of wells in the area. The permitted water wells produce from depths which range from 22 to 510 feet compared to a range of 635 to 977 feet for the Anderson coal zone and 1,480 to 1,822 feet for the Canyon coal zone. As mitigation, the operator has committed to offer water well agreements to holders of properly permitted domestic and stock wells within the circle of influence (½ mile of a federal CBNG producing well) of the proposed wells.

Recovery of the coal bed aquifer was predicted in the PRB FEIS to “...resaturate and repressurize the areas that were partially depressurized during operations. The amount of groundwater 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 Formation - Tongue River Member sands 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 and Siting Requirements for Unlined Coalbed Methane Produced Water Impoundments” which was approved September, 2006. For WYPDES permits received by DEQ after the August 1st effective date, the BLM requires that operators comply with 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 Member 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 for the nearby Kenai POD, and the levels found in the POD’s representative water sample.

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

<b>Predicted Values</b>	<b>TDS, mg/l</b>	<b>SAR</b>	<b>EC, µmhos/cm</b>
Most Restrictive Proposed Limit –		2.0	1,000
Least Restrictive Proposed Limit		10.0	3,200
Upper Powder River Watershed at Arvada, WY USGS #06317000 Gauging Station Historic Data Average at Maximum Flow Historic Data Average at Minimum Flow		4.76 7.83	1,797 3,400
WDEQ Quality Standards for Wyoming Groundwater (Chapter 8) Drinking Water (Class I) Agricultural Use (Class II) Livestock Use (Class III)	500 2,000 5,000	8	
WDEQ Water Quality Requirements for WYPDES Permit WY0054330, Kenai POD At discharge point	5,000	na	7,500
Predicted Produced Water Quality Anderson Coal Zone Canyon Coal Zone	1,390 600	14.3 13.1	2,190 1,010

Based on the analysis performed in the PRB FEIS, the primary beneficial use of the surface water in the Powder River Basin is the irrigation of crops (PRB FEIS pg 4-69). The water quality for the Anderson Coal zone is projected for this POD is 1390.0 mg/l TDS which is within the WDEQ criteria for agricultural use (2000 mg/l TDS).

The quality for the water produced from the Anderson and Canyon 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 5.8 gallons per minute (gpm) is projected is to be produced from these 30 wells, for a total of 175 gpm

for the POD. See Table 4.5.

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

There are 9 discharge points proposed for 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.

To manage the produced water, 9 impoundments (145 acre feet) would potentially be constructed within the project area. All of these impoundments will be on-channel reservoirs and they will disturb approximately 28 acres including the dam structures. Only the largest of these reservoirs, A3-30-5474 at 64.82 acre feet, will have primary status, while the rest will be designated as secondary and will only be constructed if additional water storage is needed. Reservoir A3-30 is on BLM surface. Because of the relative large size of the project on federal land and due to the proximity of a grouse lek (within two miles), the BLM will conduct inspections during construction to verify that an adequate level of quality is maintained and that disturbance is minimized. All water management facilities were evaluated for compliance with best management practices during the onsite.

Water produced from five wells on Crump Land and Livestock, LLC property will be piped to existing SDI facilities and two existing reservoirs that were constructed on Crump property (S33 and S34, T54 R75) in association with the Kenai POD. For more information regarding the potential impacts of SDI, please refer to Section 4.4.2 of the environmental analysis for the Kenai POD, EA# WY-070-07-166 as approved on 8/30/2007.

The PRB FEIS assumes that 15% of the impounded water will re-surface as channel flow (PRB FEIS pg 4-74). Consequently, the volume of water produced from these wells may result in the addition of 0.06 cfs below the lowest reservoir (after infiltration and evapotranspiration losses). The operator has committed to monitor the condition of channels and address any problems resulting from discharge. Discharge from the impoundments will potentially allow for streambed enhancement through wetland-riparian species establishment. Phased reclamation plans for the impoundments will be submitted and approved on a site-specific, case-by-case basis as they are no longer needed for disposal of CBNG water, as required by BLM applied COAs.

Alternative (2A), the approved alternative in the Record of Decision for the PRB FEIS, states that the peak production of water discharged to the surface will occur in 2006 at a total contribution to the mainstem of the Upper Powder River of 68 cfs (PRB FEIS pg 4-86). The predicted maximum discharge rate from these 30 wells is anticipated to be a total of 175 gpm or 0.39 cfs to impoundments. Using an assumed conveyance loss of 20% (PRB FEIS pg 4-74) and full containment (excludes consideration of SDI) the produced water re-surfacing in downstream drainages from this action (0.06 cfs) may add a maximum 0.048 cfs to the Upper Powder River flows, or 0.07% of the predicted total CBNG produced water contribution. This incremental volume is statistically below the measurement capabilities for the volume of flow of the Upper Powder River (refer to Statistical Methods in Water Resources U.S. Geological Survey, Techniques of Water-Resources Investigations Book 4, Chapter A3 2002, D.R. Helsel and R.M. Hirsch authors). For more information regarding the maximum predicted water impacts resulting from the discharge of produced water, see Table 4-6 (PRB-FEIS pg 4-85).

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

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

Permit effluent limits set for the nearby Kenai POD are representative of those that will govern this POD and are shown below (WYPDES Permit pending for Linn Draw):

pH	6.5 to 9.0
TDS	5000 mg/l max
Specific Conductance	7500 mg/l max
Sulfates	3000 mg/l max
Dissolved iron	1000 µg/l max
Dissolved manganese	630 µg/l max
Total Barium	1800 µg/l max
Total Arsenic	7 µg/l max
Chlorides	46 mg/l

The WYPDES permit for this POD (pending) will address existing downstream concerns such as irrigation use in the COA for the permit. The designated point of compliance should be identified for this permit as end of pipe.

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

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

The development of coal bed natural gas and the production and discharge of water in the area surrounding the existing natural spring may affect the flow rate or water quality of the spring.

In-channel downstream impacts are addressed in the WMP for the Box Draw POD prepared by Western Land Services for Comet Energy Services, LLC.

#### **4.4.2.1. Surface Water Cumulative Effects**

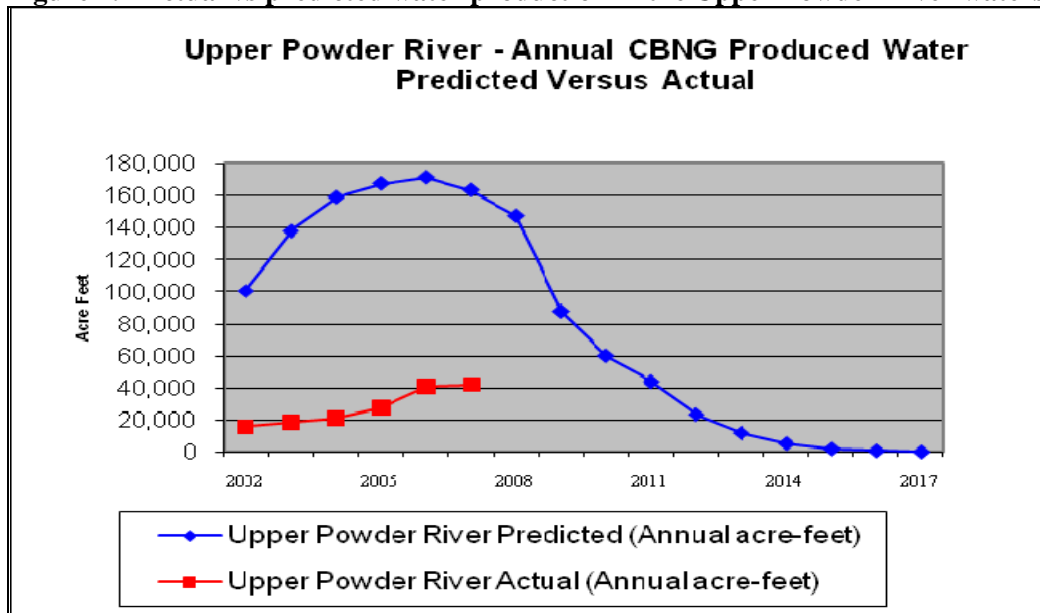
The analysis in this section includes cumulative data from Fee, State and Federal CBNG development in the Upper Powder River watershed. These data were obtained from the Wyoming Oil and Gas Conservation Commission (WOGCC).

As of December 2007, all producing CBNG wells in the Upper Powder River watershed have discharged a cumulative volume of 166,096 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 Table 4.6 and Figure 4.1 below. This volume is 18.5% of the total predicted produced water analyzed in the PRB FEIS for the Upper Powder River watershed.

**Table 4.6 Actual vs predicted water production in the Upper Powder River watershed *2007 Data Update 3-08-08***

Year	Upper Powder River Predicted (Annual acre-feet)	Upper Powder River Predicted (Cumulative acre-feet from 2002)	Upper Powder River Actual (Annual acre-feet)		Upper Powder River Actual (Cumulative acre-feet from 2002)	
			A-ft	% of Predicted	A-Ft	% of Predicted
2002	100,512	100,512	15,846	15.8	15,846	15.8
2003	137,942	238,454	18,578	13.5	34,424	14.4
2004	159,034	397,488	20,991	13.2	55,414	13.9
2005	167,608	565,096	27,640	16.5	83,054	14.7
2006	171,423	736,519	40,930	23.9	123,984	16.8
2007	163,521	900,040	42,112	25.8	166,096	18.5
2008	147,481	1,047,521				
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				
<b>Total</b>	<b>1,285,233</b>		<b>166,096</b>			

**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 Upper Powder River drainage, which is approximately 18.5% of the total predicted in the PRB FEIS.
2. The WDEQ enforcement of the terms and conditions of the WYPDES permit that are designed to protect irrigation downstream.
3. The commitment by the operator to monitor the volume of water discharged.

Additional mitigation measures may be required if unforeseen site conditions create the need additional action.

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

#### **4.5. Cultural Resources**

Stone circle sites 48CA1654 and 48CA1655 would be physically impacted by the project as proposed. Stone circle sites 48CA6686 and 48CA1656 are very near the project area as designed. Native American consultation has not been completed for the project. A condition of approval has been added to this document stating that construction on or near (roughly within ¼ mile) the above mentioned stone circle sites will not be authorized until the Bureau completes consultation with interested Native American tribes relating to identification and effects.

No historic properties will be impacted by the proposed project. Following the Wyoming State Protocol Section VI(A)(1) the Bureau of Land Management electronically notified the Wyoming State Historic Preservation Officer (SHPO) on 9/18/08 that no historic properties exist within the APE. If any cultural values [sites, artifacts, human remains (Appendix L PRB FEIS)] are observed during operation of this lease/permit/right-of-way, they will be left intact and the Buffalo Field Manager notified. Further discovery procedures are explained in the Standard COA (General)(A)(1).

#### **4.6. Air Quality**

In the project area, air quality impacts would occur during construction (due to surface disturbance by earth-moving equipment, vehicle traffic fugitive dust, well testing, as well as drilling rig and vehicle engine exhaust) and production (including non-CBM well production equipment, booster and pipeline

compression engine exhaust). The amount of air pollutant emissions during construction would be controlled by watering disturbed soils, and by air pollutant emission limitations imposed by applicable air quality regulatory agencies. Air quality impacts modeled in the PRB FEIS concluded that projected oil & gas development would not violate any local, state, tribal or federal air quality standards.

## 5. CONSULTATION/COORDINATION

Contact	Title	Organization	Present at Onsite
Mary Hopkins	Interim Wyoming SHPO	Wyoming SHPO	No
Brad Rogers	Biologist	USFWS	Yes

## 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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