

**FINDING OF NO SIGNIFICANT IMPACT & DECISION RECORD
FOR
Yates Petroleum Corporation
Blade POD**

ENVIRONMENTAL ASSESSMENT –WY-070-08-076

DECISION: Is to approve Alternative C as described in the attached Environmental Assessment (EA) and authorize Yates Petroleum Corporation’s Blade POD Coal Bed Natural Gas (CBNG) POD comprised of the following 27 Applications for Permit to Drill (APDs):

	Well Name	Well #	Qtr/Qtr	Sec	TWP	RNG	Lease #
1	BLADE CS	1	SWNE	1	43N	77W	WYW129552
2	BLADE CS	2	NENE	1	43N	77W	WYW129552
3	BLADE CS	3	NENE	1	43N	77W	WYW144541
4	BLADE CS	4	SWNE	1	43N	77W	WYW144541
5	BLADE CS	7	NENW	10	43N	77W	WYW144541
6	BLADE CS	10	NESE	10	43N	77W	WYW144541
7	BLADE CS	5	NESE	10	43N	77W	WYW144541
8	BLADE CS	6	SWSE	10	43N	77W	WYW144541
9	BLADE CS	9	SWNE	10	43N	77W	WYW144541
10	BLADE CS	8	SWNW	10	43N	77W	WYW144541
11	BLADE CS	11	NESW	10	43N	77W	WYW144541
12	BLADE CS	13	SWSW	11	43N	77W	WYW144541
13	BLADE CS	14	SWSE	11	43N	77W	WYW144541
14	BLADE CS COM	17	NENW	13	43N	77W	WYW144541
15	BLADE CS	16	NENE	13	43N	77W	WYW144541
16	BLADE CS	18	NESE	13	43N	77W	WYW144541
17	BLADE MIXER CS COM	2	SWNW	19	43N	76W	WYW144541
18	BLADE MIXER CS	1*	SWNW	19	43N	76W	WYW144541
19	BLADE CUISINE CS	1	SWSE	20	43N	76W	WYW130097
20	BLADE CUISINE CS	2	NENW	20	43N	76W	WYW144541
21	BLADE CUISINE CS COM	3	SWSE	20	43N	76W	WYW144541
22	BLADE EBERHART CS	1	NENW	20	43N	77W	WYW130632
23	BLADE EBERHART CS	2	SWNW	20	43N	77W	WYW130632
24	BLADE CS	19	NESE	24	44N	77W	WYW130097
25	BLADE CS	20	SWNE	24	44N	77W	WYW130097
26	BLADE AILERON CS	1	SWSW	33	44N	77W	WYW130622
27	BLADE AILERON CS	2	NESW	33	44N	77W	WYW130622

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

	IMPOUNDMENT Name / Number	Qtr/Qtr	Sec	TWP	RNG	Capacity (Acre Feet)	Surface Disturbance (Acres)	Lease #
1	Backwards	NESE	19	43	77	15.9	2.60	Private
2	Beach Baby	SWSE	10	43	77	14.4	2.40	WYW144541
3	Best Pick	SWSE	10	43	77	12.2	1.90	WYW144541
4	Border	SWNW	34	44	77	7.1	1.20	WYW51886
5	Bull Pasture #1	SWSW	21	43	77	7.6	1.30	WYW142081
6	Bull Pasture #2	SWNE	20	43	77	8.8	1.50	WYW130097
7	Cans	NWSW	10	43	77	14.1	2.50	WYW144541
8	Colors	SENE	10	43	77	4.3	1.00	WYW144541
9	Cow Bones Draw	SWSW	11	43	77	14	2.10	WYW144541
10	Crowd	SESE	9	43	77	18.5	2.90	WYW146837
11	Double Line	SENE	9	43	77	16.8	2.90	WYW146837
12	False Start	SESE	35	44	77	16.7	2.50	Private
13	Fez	SWSE	2	43	77	7.1	1.50	WYW126409
14	Grey Sky	SESE	15	43	77	11.8	1.80	WYW135921
15	Just Fine	SENE	12	43	77	14.4	2.30	WYW52284
16	Other Hand	NESE	2	43	77	16	2.30	WYW126409
17	Potholes	NENW	2	43	77	14.7	2.50	Private
18	Recycle	NWNE	23	43	77	17.4	2.70	WYW152971
19	Resting Place	SESW	34	44	77	13.5	3.70	WYW140150
20	Stepanek	SENE	13	43	76	11	1.90	WYW144541
21	Surrounded	NESE	32	44	76	7.4	1.40	Private
22	Trailhead	NWSE	2	43	76	19.9	3.30	WYW126409
23	William	NESE	13	43	76	12	1.90	WYW144541
24	Ill Prepared	NWSW	19	43	77	19.5	3.00	Private

In addition to the listed APDs and impoundments, it is my decision to approve the following right-of-way grants:

ROW Grant	Type	Sections	TWP/RNG
WYW169694	Gas pipeline total length in right-of-way is 4,257' by 30' wide, acres 2.932	24 SWNW 28 lot 15 33 lots 1, 2,7	T43N, R77W T44N, R77W

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
Yates Petroleum Corporation
Blade POD
PLAN OF DEVELOPMENT
WY-070-08-076**

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 five 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: Yates Petroleum Corporation’s Blade Plan of Development (POD) for 27 coal bed natural gas well APD’s and associated infrastructure.

Proposed Well Information: There are 27 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 Big George coal seam. Proposed well house dimensions are 6 ft wide x 10 ft length x 6 ft height. Well house color is Covert Green (18-0617 TPX), selected to blend with the surrounding vegetation. Wells are located as follows:

	Well Name	Well #	Qtr/Qtr	Sec	TWP	RNG	Lease #
1	BLADE CS	1	SWNE	1	43N	77W	WYW129552
2	BLADE CS	2	NENE	1	43N	77W	WYW129552
3	BLADE CS	3	NENE	1	43N	77W	WYW144541
4	BLADE CS	4	SWNE	1	43N	77W	WYW144541
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21	BLADE CUISINE CS COM	3	SWSE	20	43N	76W	WYW144541
22	BLADE EBERHART CS	1	NENW	20	43N	77W	WYW130632
23	BLADE EBERHART CS	2	SWNW	20	43N	77W	WYW130632
24	BLADE CS	19	NESE	24	44N	77W	WYW130097
25	BLADE CS	20	SWNE	24	44N	77W	WYW130097
26	BLADE AILERON CS	1	SWSW	33	44N	77W	WYW130622
27	BLADE AILERON CS	2	NESW	33	44N	77W	WYW130622

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

	IMPOUNDMENT Name / Number	Qtr/Qtr	Sec	TWP	RNG	Capacity (Acre Feet)	Surface Disturbance (Acres)	Lease #
1	Backwards	NESE	19	43	77	15.9	2.60	Private
2	Beach Baby	SWSE	10	43	77	14.4	2.40	WYW144541
3	Best Pick	SWSE	10	43	77	12.2	1.90	WYW144541
4	Border	SWNW	34	44	77	7.1	1.20	WYW51886
5	Bull Pasture #1	SWSW	21	43	77	7.6	1.30	WYW142081
6	Bull Pasture #2	SWNE	20	43	77	8.8	1.50	WYW130097
7	Cans	NWSW	10	43	77	14.1	2.50	WYW144541

	IMPOUNDMENT Name / Number	Qtr/Qtr	Sec	TWP	RNG	Capacity (Acre Feet)	Surface Disturbance (Acres)	Lease #
8	Colors	SENE	10	43	77	4.3	1.00	WYW144541
9	Cow Bones Draw	SWSW	11	43	77	14	2.10	WYW144541
10	Crowd	SESE	9	43	77	18.5	2.90	WYW146837
11	Double Line	SENE	9	43	77	16.8	2.90	WYW146837
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13	Fez	SWSE	2	43	77	7.1	1.50	WYW126409
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15	Just Fine	SENE	12	43	77	14.4	2.30	WYW52284
16	Other Hand	NESE	2	43	77	16	2.30	WYW126409
17	Potholes	NENW	2	43	77	14.7	2.50	Private
18	Radio Flyer	NWNW	23	43	77	14.2	2.40	WYW135921
19	Recycle	NWNE	23	43	77	17.4	2.70	WYW152971
20	Resting Place	SESW	34	44	77	13.5	3.70	WYW140150
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24	William	NESE	13	43	76	12	1.90	WYW144541
25	Ill Prepared	NWSW	19	43	77	19.5	3.00	Private

Right-of-way amendment proposed:

ROW Grant	Type	Sections	TWP/RNG
WYW169694	Gas pipeline total length in right-of-way is 4,257' by 30' wide, acres 2.932	24 SWNW 28 lot 15 33 lots 1, 2,7	T43N, R77W T44N,R77W

County: Johnson and Campbell

Applicant: Yates Petroleum Corporation

Surface Owners: Dry Fork Land and Livestock,, T-Chair Land Co., William Stepanek, Charles Murry, and Edwin and Dixie Lea Streeter

Project Description: The proposed action involves the following:

- Drilling of 27 total federal CBM wells in Big George, and coal zones to depths of approximately 1450-1750 feet
- Drilling and construction activities are anticipated to be completed within two years, the term of an APD. Drilling occurs 24 hours per day; completion is expected within 30 days of drilling. 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. Metering would entail 4 visits per month to each well and facility.
- A Water Management Plan (WMP) that involves the following infrastructure and strategy: 25 discharge points and 25 off channel pits that would provide total containment for CBNG-produced water for this POD within the Upper Powder River watershed.
- An unimproved and improved road network that is shared with Williams Production and other operators who have wells in the same area.
- A buried gas, water and power line network, gas will be metered at the wellhead.
- An above ground power line network to be constructed by Powder River Energy Corporation. Most of the power line has been completed for the Williams Bullwhacker POD. If the remainder of the power line network is not complete before the wells are in production, Yates Petroleum Corporation will place temporary diesel generators, mounted on a skid plates, placed over constructed berms, at the 6 proposed power drops. If the generators are needed in places other than proposed power drops Yates Petroleum Corporation will submit a sundry for this action.

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

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 Blade POD are listed below under 2.3.1:

2.3.1. Changes as a result of the on-sites

Well Name	Well #	Qtr/Q tr	Sec	TWN	RNG	Comments
BLADE AILERON CS	2	NESW	33	44N	77W	Moved the Aileron 2 location 200' north, due to proximity to raptor nest. This move also reduced disturbance through some rough topography.
BLADE CS	4	SWNE	1	43N	77W	Relocated the Blade 4 well 150' to the east to minimize disturbance that would have occurred in sagebrush.
BLADE CS	8	SWNW	10	43N	77W	Moved the access road out of sagebrush to the ridge on the Blade 8 well. Creating an access for all weather conditions.
BLADE CS	11	NESW	10	43N	77W	Moved the Blade 11 approximately 50' north to achieve a stable vegetated buffer between the well and the drainage.
BLADE CS	14	SWSE	11	43N	77W	Relocated the access road going to the Blade 14 to reduce the disturbance through sagebrush.
BLADE MIXER CS COM	2	SWNW	19	43N	76W	Due issues with drainage, we rerouted the access to the Mixer 2 well and a spot upgrade was added to rock surface the low water crossing to this well.
BLADE MIXER CS	1*	SWNW	19	43N	76W	Relocated the Mixer 1 well approximately 50 ft into an existing area of surface disturbance created by Williams Production for a nearby reservoir.

The Radio Flyer reservoir location was not approved for produced water from Federal wells because it is located within ¼ mile 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. 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.
1. 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.
 2. The operator will supply a copy of the complete approved SW-4, SW-3, or SW-CBNG permits to BLM as they are issued by WSEO for impoundments.

2.3.2.2. 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.

2.3.2.3. 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, flood plains 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.

2.3.2.4. 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. The Companies will locate aboveground power lines, where practical, at least 0.5 mile from any sage grouse breeding or nesting grounds to prevent raptor predation and sage grouse collision with the conductors. Power poles within 0.5 mile of any sage grouse breeding ground will be raptor-proofed to prevent raptors from perching on the poles.
4. Containment impoundments will be fenced to exclude wildlife and livestock. If they are not fenced, they will be designed and constructed to prevent entrapment and drowning.
5. 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.

2.3.2.5. Threatened, Endangered, or Sensitive Species

2.3.2.5.1. Bald Eagle

1. Special habitats for raptors, including wintering bald eagles, will be identified and considered during the review of the APD/POD or Sundry Notices.

2. Surveys for active bald eagle nests and winter roost sites will be conducted within suitable habitat by a BLM approved biologist. Surface disturbing activities will not be permitted within one mile of suitable habitat prior to survey completion.
3. A disturbance-free buffer zone of 0.5 mile (i.e., no surface occupancy) will be established year-round for all bald eagle nest sites. A seasonal minimal disturbance buffer zone of one mile will be established for all bald eagle nest sites (February 15 – August 15).
4. A disturbance-free buffer zone of 0.5 mile (i.e., no surface occupancy) will be established year-round for all bald eagle winter roost sites. A seasonal minimal disturbance buffer zone of 1 mile will be established for all bald eagle winter roost sites (November 1 – April 1). These buffer zones and timing may be adjusted based on site-specific information through coordination with, and written approval from, the USFWS.
5. Within ½ mile of bald eagle winter roost sites additional measures such as remote monitoring and restricting maintenance visitation to between 9:00 and 3:00 may be necessary to prevent disturbance (November 1 – April 1).
6. Additional mitigation measures may be necessary if the site-specific project is determined by a BLM biologist to have adverse effects to bald eagles or their habitat.

2.3.2.5.2. Black-footed Ferret

1. Prairie dog colonies will be avoided wherever possible.
2. 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.
3. 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.

2.3.2.5.3. Mountain Plover

1. A mountain plover nesting survey shall be conducted following U.S. Fish and Wildlife Service protocol within occupied black-tailed prairie dog colonies prior to permit authorization.

Outside of occupied black-tailed prairie dog colonies, a mountain plover nesting survey following U.S. Fish and Wildlife Service protocol is encouraged prior to construction initiation, as project modifications can be made if necessary to protect nesting plovers and natural gas production. If requested in writing, then authorization may be granted for construction activities to occur between August 1 and March 15, outside the mountain plover breeding season. A mountain plover nesting survey following U.S. Fish and Wildlife Service protocol shall be conducted during the first available survey period (May 1 – June 15). Additional measures such as monitoring and activity restrictions may be applied if mountain plovers are documented.

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

3. Project-related features that encourage or enhance the hunting efficiency of predators of mountain plover will not be constructed within ¼ mile of occupied mountain plover nesting habitat.
4. Construction of ancillary facilities (for example, compressor stations, and processing plants) will not be located within ½ mile of known nesting areas. The threats of vehicle collision to adult plovers and their broods will be minimized, especially within breeding aggregation areas.
5. Work schedules and shift changes will be set to avoid the periods from 30 minutes before to 30 minutes after sunrise and sunset during June and July, when mountain plovers and other wildlife are most active.
6. Creation of hunting perches or nest sites for avian predators within 0.5 mile of identified nesting areas will be avoided by burying power lines, using the lowest possible structures for fences and other structures and by incorporating perch-inhibiting devices into their design.
7. When above ground markers are used on capped and abandoned wells they will be identified with markers no taller than four feet with perch inhibiting devices on the top to avoid creation of raptor hunting perches within 0.5 mile of nesting areas.
8. Reclamation of areas of previously suitable mountain plover habitat will include the seeding of vegetation to produce suitable habitat for mountain plover.

2.3.2.5.4. Ute Ladies'-tresses Orchid

1. If suitable habitat for Ute ladies'-tresses cannot be avoided, surveys will be conducted in compliance with USFWS standards (USFWS 1995) by a BLM approved biologist or botanist. Surveys can only be conducted between July 20 and August 31.
2. Moist soils near wetlands, streams, lakes, or springs in the project area will be promptly revegetated if construction activities impact the vegetation in these areas. Revegetation will be designed to avoid the establishment of noxious weeds.
3. Companies operating in areas identified with weed infestations or suitable Ute ladies'-tresses orchid habitat will be required to submit an integrated pest management plan prior to APD approval. Mitigation will be determined on a site-specific basis and may include such measures as spraying herbicides prior to entering areas and washing vehicles before leaving infested areas. Infestation areas of noxious weeds have been identified through the county Weed and Pest Districts and are available at the Buffalo BLM office.

2.3.2.6. 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.

2.3.2.7. 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.

2.3.2.8. 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.

Surface Use

1. Due to proximity to nearby drainage on the Aileron 1 well site, Yates Petroleum Corporation will keep a 20' vegetated border between well disturbance and the drainage.
2. The Eberhart 1 well is within sage grouse habitat. Keep disturbance of sagebrush to a minimum on the west side of the well and on the access road.
3. To prevent further erosion of soils on the west side of the Blade 7 site, keep traffic to the east side of this well location.
4. Due to proximity to nearby drainage on the Blade 11, Yates Petroleum Corporation will keep a 20' vegetated border between well disturbance and the drainage.
5. Due to slope and blind curve on the access road to the Blade 13 well, Yates Petroleum Corporation will work with Williams Production to post a warning sign on the access and add water mitigation to the approach to the well from the shared access road.
6. All pits near drainages will be lined.
7. If storage becomes necessary beyond typical construction timeframes, a sundry will be submitted to designate this area for long term storage.
8. If there are no site specific conflicts with production and/or development, then interim reclamation will include seeding up to the well housing.
9. The operator will drill seed on the contour to a depth of 0.5 inch, followed by cultipaction to compact the seedbed, preventing soil and seed losses. To maintain quality and purity, the current years tested, certified seed with a minimum germination rate of 80% and a minimum purity of 90% will be used. On BLM surface or in lieu of a different specific mix desired by the surface owner, use the following:

Species	% in Mix	Lbs PLS*
<i>Thickspike Wheatgrass</i> (<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>)	50	6.0
<i>Bluebunch wheatgrass</i> (<i>Pseudoroegneria spicata</i> ssp. <i>Spicata</i>)	35	4.2
<i>Prairie coneflower</i> (<i>Ratibida columnifera</i>)	5	0.6

<i>White or purple prairie clover</i> (<i>Dalea candidum</i> , <i>purpureum</i>)	5	0.6
<i>Rocky Mountain beeplant</i> (<i>Cleome serrulata</i>) /or <i>American vetch</i> (<i>Vicia americana</i>)	5	0.6
Totals	100%	12 lbs/acre

10. Please contact Jennifer Spagon Natural Resource Specialist, @ (307) 684-1059, Bureau of Land Management, Buffalo, if there are any questions concerning these surface use COAs.

Wildlife

- The Record of Decision for the Powder River Basin EIS includes a programmatic mitigation measure that states, “The companies will conduct clearance surveys for threatened and endangered or other special-concern species at the optimum time” (M32). The measure requires companies to coordinate with the BLM before November 1 annually to review the potential for disturbance and to agree on inventory parameters. Should this project not be completed by November 1, Yates Petroleum Corporation will coordinate with the BLM to determine if additional resurveys will be required.
- The contract biologist shall contact the BLM prior to initiating any wildlife surveys.
- No surface disturbing activities are permitted in suitable mountain plover habitat i.e. prairie dog colonies from March 15-July 31 annually; unless a mountain plover survey has been conducted during the current breeding season. **This timing limitation will affect the “Entire project area”**. This condition will be implemented on an annual basis for the duration of surface disturbing activities. The surveys will be conducted throughout the entire project area.
 - Mountain plover surveys shall be conducted by a biologist following the most current U.S. Fish and Wildlife Service Mountain Plover Survey Guidelines (the survey period is May 1-June 15). All survey results must be submitted in writing to the BFO and approved prior to initiation of surface disturbing activities.
 - If occupied mountain plover habitat is identified, then a seasonal disturbance-free buffer of ¼ mile shall be maintained between March 15 and July 31. If no mountain plovers are identified, then surface disturbing activities may be permitted within suitable habitat until the following breeding season (March 15).
- No surface disturbing activity shall occur within ½ mile of all identified raptor nests from February 1 through July 31, annually, prior to a raptor nest occupancy survey for the current breeding season. This condition will be implemented on an annual basis for the duration of surface disturbing activities. This timing limitation will affect the following proposed wells and their associated infrastructure:

<i>Township/Range</i>	<i>Section</i>	<i>Affected Wells and Infrastructure</i>
<i>T43N, R76W</i>	17	Gas and water lines
<i>T43N, R76W</i>	18	Gas and water lines
<i>T43N R76W</i>	19	Mixer 1 & 2 wells and infrastructure; Backwards & Well Prepared reservoirs; access gas & water lines.
<i>T43N R76W</i>	20	Cuisine wells 1, 2 & 3 and infrastructure; Bull Pasture 2 reservoir and infrastructure
<i>T43N R76W</i>	21	Bull Pasture 1 reservoir and infrastructure
<i>T43N R76W</i>	29	Roads, water and gas lines

T43N R77W	23	Recycle reservoir
T43N R77W	24	Blade 19 and infrastructure;
T43N R77W	13	Access Blade 17 well; Blade 18 well and infrastructure; William reservoir; Gas and water lines.
T43N R77W	14	Cow Bones Draw reservoir;
T43N R77W	9	Double Line reservoir and monitor well; Crowd Reservoir and monitor well
T43N R77W	10	Blade 7 & 8 wells and infrastructure; Colors reservoir
T43N R77W	11	Blade 13 & 14 wells and infrastructure; Fez reservoir
T43N R77W	12	Just Fine reservoir; Pump station; Water and gas lines
T44N R77W	34	Resting Place reservoir
T44N R77W	33	Aileron 2 and infrastructure
T44N R77W	32	Surrounded Reservoir
T44N R77W	20	Gas and Water lines

- 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 ½ mile timing buffer will be implemented. The timing buffer restricts surface disturbing activities within ½ mile of occupied raptor nests from February 1 to July 31.
- b. Nest occupancy and productivity checks shall be completed for nests within a ½ mile of any surface disturbing activities (e.g., well drilling, pipeline installation, or road improvements) across the entire POD for as long as the POD is under construction. Once construction of the POD has ceased, nest occupancy and productivity checks shall continue for the first five years on all nests that are within a ½ mile of locations where any surface-disturbing activities took place.
- c. Productivity checks shall be completed only on those nests that were verified to be occupied during the initial occupancy check. 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 shall be submitted to a Buffalo BLM biologist in writing no later than July 31 or each survey year.

BLM ID#	UTM	LEGAL
1974	413180E 4837240N	NWSE 23 43:77
2834	409752E 4843890N	SENE 33, 44:77
2835	409999E 4841005N	SWNE 9, 43:77
2836	410090E 4840782N	NWSE 9, 43:77
2839	415425E 4837753N	SENE 24, 43:77
2840	415274E 4837238N	NESE 24, 43:77
2841	409772E 4843884N	SENE 33, 44:77
2853	413948E 4838790N	NWSW13, 43:77
2855	414626E	NESW 13,

	4838790N	43:77
2856	414678E 4838698N	NESW 13, 43:77
4496	409823E 4843525N	NESW 33, 44:77
4497	418438E 4838503N	SESE 17, 43:76
4500	418591E 4837803N	NENE 20, 43:76
4501	415301E 4837508N	SENE 24, 43:77
4502	416604E 4837147N	NWSE 19, 43:76
4503	418480E 4836380N	NENE 29, 43:76
4504	415295E 4836320N	NENE 25, 43:77
5035	413653E 4839933N	NENE 14, 43:77
5037	412553E 4840857N	SWNW 11, 43:77
5038	412616E 4840710N	NWSW 11, 43:77
5039	413313E 4841050N	SWNE 11, 43:77
5040	413253E 4840486N	NWSE 11, 43:77
New	413467E 4840184N	SWSE 11, 43:77
New	414778E 4840184N	NWSE 13, 43:77

- d. 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 and timing limitations will be applied.
 - e. Well metering, maintenance and other site visits within 0.5 miles of raptor nests shall be minimized as much as possible during the breeding season (February 1 – July 31), and restricted to between 0900 and 1500 hours.
5. No surface disturbing activities are permitted within 2 miles of the following sage-grouse leks: Beecher Draw, Beecher Draw North, Bushwhacker Creek 1, Cottonwood Creek 1, Cottonwood Creek 2, and Mengel, between March 1 and June 15, prior to completion of a greater sage-grouse lek survey. This timing limitation will affect the following wells and infrastructure:

<i>Township/Range</i>	<i>Section</i>	<i>Affected Wells and Infrastructure</i>
<i>T43N, R76W</i>	21	Bull Pasture reservoir #1
<i>T43N, R76W</i>	20	Cuisine 2 & 3 wells and infrastructure
<i>T43N, R76W</i>	29	Gas, electrical and water lines
<i>T43N, R77W</i>	24	All of Section 24
<i>T43N, R77W</i>	23	All of Section 23

T43N, R77W	22	All of Section 22
T43N, R77W	15	All of Section 15
T43N, R77W	14	All of Section 14
T43N, R77W	13	Blade 17 & 18 wells and infrastructure; Williams reservoir; Gas, water and electric lines
T43N, R77W	12	Just Fine reservoir; Gas and water lines
T43N, R77W	11	All of Section 11
T43N, R77W	10	All of Section 10
T43N, R77W	09	All of Section 09
T43N, R77W	03	All of Section 03
T43N, R77W	02	All of Section 02
T43N, R77W	01	All of Section 01
T44N, R77W	36	All of Section 36
T44N, R77W	35	All of Section 35
T44N, R77W	34	All of Section 34
T44N, R77W	33	All of Section 33
T44N, R77W	28	All of Section 28
T44N, R77W	20	All of Section 20
T44N, R77W	21	All of Section 21

- a. If an active sage grouse 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 WGF D protocol. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities.
- b. Creation of raptor hunting perches will be avoided within 0.5 mile of documented sage grouse and sharp-tailed grouse lek sites. Perch inhibitors will be installed to deter avian predators from preying on sage grouse.
6. If a new sharp-tailed grouse lek is identified during the survey, the 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 WGF D protocol. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities.
7. No surface disturbing activity shall occur within 1 mile of bald eagle roosting habitat from November 1 through April 1, annually, prior to a bald eagle roost survey (CM9). No surface disturbing activity shall occur within 1 mile of bald eagle nesting habitat from February 1 through August 15 (CM8) prior to a bald eagle nest survey. This condition will be implemented on annual basis for the duration of the surface disturbing activities.

This timing limitation will affect the following wells and infrastructure:

- a. If bald eagles are observed using the area on a consistent basis, all activity will stop and the 1 mile timing limitation will apply. "Consistent use" is defined as one or more bald eagles (adult or immature) using the same general area multiple times in the same year or in consecutive years. According to the BLM and Wyoming Game and Fish Department databases, bald eagles use area around the Blade project area on a regular basis for winter roosting and foraging.
- b. If a roost is identified and construction has not been completed, a year round disturbance-free buffer zone of 0.5 mile and a seasonal (November 1 - April 1) minimal disturbance

- buffer zone of 1 mile will be established for all bald eagle winter roost sites. Additional measures such as remote monitoring and restricting maintenance visitation to between 9:00 AM and 3:00 PM may be necessary to prevent disturbance.
- c. If a nest is identified and construction has not been completed, a disturbance-free buffer zone of 0.5 mile (i.e., no surface occupancy) would be established year round for all bald eagle nests. A seasonal minimum disturbance buffer zone of 1-mile will be established for all bald eagle nest sites (February 1 - August 15).
 - d. Additional mitigation measures may be necessary if the site-specific project is determined by a Bureau biologist to have an adverse affect to bald eagles or their habitat.
8. No surface disturbing activities are permitted in suitable burrowing owl habitat (i.e. prairie dog colonies) from April 15 to August 31, annually, unless a burrowing owl survey has been conducted during the current breeding season. Survey period is April 15 to June 15. This condition will be implemented on an annual basis for the duration of surface disturbing activities. **This timing limitation will affect all prairie dog colonies within project area.** The surveys will be conducted in active and inactive prairie dog colonies throughout the entire project area.
- a. If a burrowing owl is identified, then a seasonal disturbance-free buffer of ¼ mile shall be maintained between April 15 and August 31. If no burrowing owls are identified, then surface disturbing activities may be permitted within suitable habitat until the following breeding season.
9. No surface disturbing activities are permitted in suitable swift fox habitat from March 1 to August 31, annually, unless a survey for swift foxes has been conducted during the current breeding season. Survey period is April 15 to June 15. This condition will be implemented on an annual basis for the duration of surface disturbing activities. **This timing limitation will affect all prairie dog colonies within the project area.** The surveys will be conducted in active and inactive prairie dog colonies throughout the entire project area.
- a. If a swift fox den is identified, then a seasonal disturbance-free buffer of ¼ mile shall be maintained between March 1 to August 31. If no swift fox dens are identified, then surface disturbing activities may be permitted within suitable habitat until the following breeding season (March 1).

2.4. Alternatives considered but not analyzed in detail

The following water management strategies were analyzed by the operator for this POD.

Direct Discharge

Direct discharge to tributaries of Powder River is not an alternative due to water quality and limits imposed by the WDEQ discharge permit for this POD. The water produced in this area does not meet WDEQ standards for discharge.

Re-injection

Re-injection of produced water within the Blade POD was not a reasonable solution. A review of the well logs on file with the Wyoming Oil and Gas Conservation Commission and available geologic information suggests that there are no aquifers within the immediate area that have sufficient storage capacity to accept the volume of CBNG water that would be produced from the Blade POD. Re-injection into deep saltwater aquifers would also render the relatively high quality produced water unsuitable for future use.

Land Application

Land application of produced water within the Blade POD has also been considered. Land application would involve applying the water to cropland at agronomic rates through an irrigation system. Land application is at best a seasonal approach and would require the construction of several

reservoirs to store produced water during the non-irrigation season. Due to the high construction and operating costs and lack of landowner interest, land application is not a viable strategy, but several sites are available and the landowner may consider using water from reservoirs for this purpose in the future.

Treatment of Produced Water

Treatment of produced water from the Blade POD with subsequent discharge into the Dry Fork of the Powder River has been extensively researched to examine the full range of possibilities. The following potential treatment technologies were considered: Sulfur burners, constructed wetlands, rapid spray distillation, electrodialysis reversal, electronic water purification, reverse osmosis, ion exchange with resins, ion exchange with zeolites and cation exchange and cation removal. Sulfur burner technologies were rejected since they will not address sodium concentrations in the produced water. Use of constructed wetlands was determined to not be a reasonable alternative since they have limited utility in removing total dissolved solids and salts. Given the short growing season in the Powder River, substantial reservoir storage would still be needed. Rapid spray distillation and electronic water purification are emerging technologies that are unproven and have not been demonstrated to effectively treat CBNG water. Electrodialysis reversal has not been cost effectively applied the treatment of CBNG water. Both electrodialysis reversal and reverse osmosis would generate a brine reject stream of up to 20 percent of the design flow of the treatment system. With ion exchange technologies, it is possible to substantially reduce the volume of brine reject water however the resulting reject stream would be more concentrated. The concentrated brine from these treatment systems would need to be appropriately managed to address potential environmental concerns. The brine waters could potentially be trucked off-site for disposal, which given the volumes associated with electrodialysis reversal and reverse osmosis, would render those options uneconomic. Other options for managing the brine reject streams include evaporation in a lined pit; or dilution to stock water standards and discharge to total containment reservoirs.

2.5. 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	The WOGCC data shows 119 existing oil and gas wells within the Blade project area boundary: 103 wells are in producing and/or drilling status 8 wells are plugged & abandoned wells	27	27
Total Locations		27	27
Nonconstructed Pads		27	27
Slotted Pads		0	0
Constructed Pads		0	0

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
	8 wells have APDs submitted but not approved by operators other than Yates Petroleum Corporation		
Gather/Metering Facilities	There are an existing number of facilities for fee development. This number is not accounted for.	0	0
Compressors	0	0	0
Monitor Wells	0	0	0
Impoundments			
On-channel	2	25	24
Off-channel	0	0	0
Water Discharge Points	0	25	25
Treatment Facilities	0	0	0
Improved Roads			
No Corridor		.35	.55
With Corridor	22.7	4.39	1.27
2-Track Roads			
No Corridor	1.24	.67	.49
With Corridor	5.89	10.45	5.69
Buried Utilities			
No Corridor		.74	.74
With Corridor	2.75	11.76	23.35
Overhead Powerlines	4.6	9.86	9.86
Communication Sites	0	27	27
Staging/Storage Areas	0	0	0
Other Disturbance	0	0	0
Acres of Disturbance	0	0	0

3. DESCRIPTION OF AFFECTED ENVIRONMENT

Applications to drill were received on June 26, 2007. Field inspections of the proposed Blade POD CBNG project were conducted on February 20 and 21, March 3, 13, and 18, 2008 by:

NAME	TITLE	AGENCY
Jennifer Spegon	Natural Resource Specialist	BLM
Clint Crago	Archeologist	BLM
Chris Williams	Hydrologist	BLM
Chris Durham	Biologist	BLM
Jenny Morton	Biologist	BLM
Jeb Tachick	Federal Regulatory Agent	Yates Petroleum Corporation
Vickie Kissack	Yates Rep	Yates Petroleum Corporation
Heather Adams	Yates Rep	Yates Petroleum Corporation
Dee Johnson	Landowner	Landowner
Patricia Clark	Landowner	T-Chair Ranch

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

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

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

3.1. Topographic Characteristics of Project Area

The Blade POD is located within townships 43 and 44 north, ranges 76 and 77 west, approximately 7.6 miles from Linch, Wyoming. This project is completely surrounded by newly constructed CBNG PODs. Williams Production leases are intermingled with Yates leases in most sections of this project area, a portion of these leases are under communitization agreements. The area is interspersed with conventional oil wells. The majority of the land is split estate. It is used heavily for grazing sheep, cattle, and horses.

Elevations within the project area range from approximately 4,450 to 4,950 feet above sea level. The area is primarily flat along the southwest portion of the POD and along the Dry Fork Powder River, Bullwhacker Creek, and Cottonwood Creek flood plains. A few areas of exposed soil and sandstone rock ledges are located on the eastern side of the project. Areas of rough broken terrain exist along the

northern border of the project.

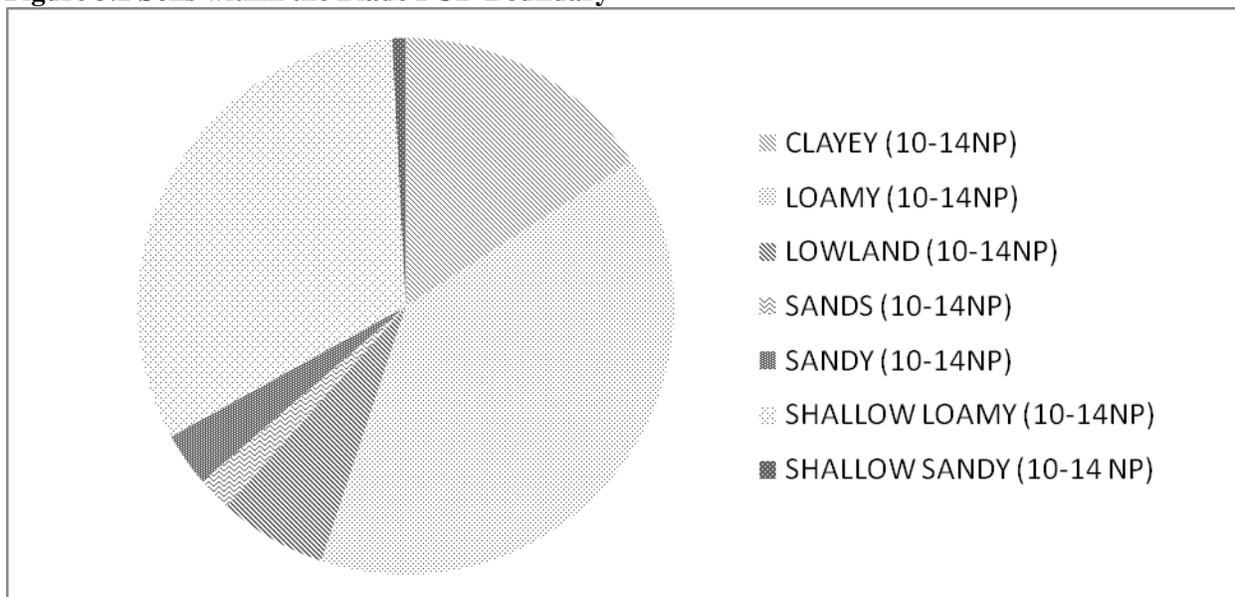
3.2. Vegetation & Soils

The project area is comprised of short grass prairie vegetation with approximately 65% grasslands, 26% sagebrush grasslands, 6% bare soil and rock, 2% woodland (juniper, cottonwood and ponderosa) and 1% water (Thunderbird Jones & Stokes). Specific species observed throughout the project area include blue gramma (*Bouteloua gracilis*), needle and thread (*Hesperostipa comate*), junegrass (*Koeleria marantha*), and native wheat grasses (*Apropyron* and *Pascopyron*) along with cheatgrass, prickly pear cactus, and sagebrush. Wyoming big sagebrush is the predominant sagebrush species. Sagebrush was grazed heavily and was sparse with sagebrush ranging from 6 to 14 inches in height with an average bush approximately 8 inches tall. There were several prairie dog colonies with 2 to 6 inch grass heights and bare ground. There was some dense, taller sagebrush (approx 25 inches) in the steep draws and along the southern portion of the POD. Creek bottoms hosted silver sagebrush (*Artemisia cana*) and greasewood (*Sacobatus vermiculatus*). In upland areas there was green rabbitbrush (*Chysothamnus viscidiflorus*) and yucca (*Yucca glauca*). Cottonwoods occurred in riparian areas along the Dry Fork Powder River, Cottonwood Creek, Bullwhacker Creek, Little Bullwhacker Creek, and other minor drainages throughout the area.

To determine the appropriate Ecological Sites for this proposed action, BLM specialists analyzed and field verified data from the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) published soil survey Technical Guides. Technical Guides are the primary scientific references for the NRCS; they contain technical information about the conservation of soil, water, air, and related plant and animal resources.

The NRCS Technical Guides for the Major Land Resource Area 58B Northern Rolling High Plains in the 10-14” Northern Plains precipitation zone, was used for determining soils information for each Ecological site and to further determine resource identification and management recommendations. The ecological sites occurring within the proposed POD are found to be predominantly Loamy and Clayey Soils with Mixed Sagebrush/Grass Plant Communities.

Figure 3.1 Soils within the Blade POD Boundary



According to table 3.1 above, approximately 75% of the soils in are loamy and shallow loamy, 16% Clayey, 7% lowland and 2% of the project in sand and sandy soils.

Loamy Soils with a Mixed Sagebrush/Grass Plant Community appeared in 75% of the project area. The soils of the loamy ecological site are deep to moderately deep (greater than 20" to bedrock), well drained & moderately permeable. Layers of the loamy soil most influential to the plant community vary from 3 to 6 inches thick. The main loamy soil limitations include low organic matter content and soil droughtiness. The low annual precipitation should be considered when planning a seeding. The loamy sites occur on gently undulating rolling land.

Loamy soil sites in the Blade project area are made up of a Mixed Sagebrush Plant Community. Historically, this plant community evolved under grazing by bison and a low fire frequency. Currently, it is found under moderate, season-long grazing by livestock in the absence of fire or brush management. Wyoming big sagebrush is a significant component of this plant community. Cool-season grasses make up the majority of the understory with the balance made up of short warm-season grasses, annual cool-season grasses, and miscellaneous forbs. Historically, dominant grasses include needleandthread, western wheatgrass, and green needlegrass. Grasses of secondary importance include blue grama, prairie junegrass, and Sandberg bluegrass. Forbs commonly found in this plant community include plains wallflower, hairy goldaster, slimflower scurfpea, and scarlet globemallow. Sagebrush canopy ranges from 20% to 30%. Fringed sagewort is commonly found. Plains pricklypear can also occur.

Clayey Soils with Mixed Sagebrush/Grass Plant Community occurs in 16% of the area: The landforms and the soils of the clayey ecological sites are moderately deep (greater than 20" to bedrock) to very deep, well-drained soils that formed in alluvium or alluvium over residuum. These soils have slow permeability and may develop severe cracks. The layers of a clayey soil having the most influence on plants vary from 4 to 8 inches thick. The main clayey soil limitations include low organic matter content and soil droughtiness. The low annual precipitation should be considered when planning a seeding. The clayey site occurs on nearly level to 30% slopes.

Both clayey sites and loamy sites in the Blade project area are made up of a Mixed Sagebrush Plant Community. When compared to the Historic Climax Plant Community, field visits in the Blade POD found the entire area had been heavily grazed, the sagebrush canopy was browsed off, and there was a considerable amount of bare soil. The area has been in a decade long drought. The lack of precipitation along with continuous grazing has created optimal conditions for numerous prairie dog towns.

This state is not stable. During field visits it was also apparent the soil was not protected from wind erosion. The biotic integrity of this plant community is at risk. Due to the conditions such as drought, grazing and surface disturbance from surrounding CBNG development a shift has occurred in plant composition toward weeds and bare ground. The watershed can become at risk when bare ground increases.

For more detailed soil information, see the NRCS Soil Survey WY619.

3.2.1. Wetlands/Riparian

Larger areas of enhanced riparian vegetation are generally restricted to the larger stream corridors of Dry Fork of the Powder River and Bullwhacker Creek, for example in the NE corner of Section 10, T44:R77. Stands of cottonwoods are present in the channel bottoms of these two drainages where they course through the POD area.

3.2.2. Invasive Species

State-listed noxious weeds and/or weed species of concern, Scotch thistle and henbane, were discovered by a search of inventory databases on the Wyoming Energy Resource Information Clearinghouse (WERIC) web site (www.weric.info). The WERIC database was created cooperatively by the University

of Wyoming, BLM and county Weed and Pest offices. Additionally, the operator listed the following WRIC identified infestations in the Integrated Pest Management Plan for the Blade POD; leafy spurge, buffalobur, perennial pepperweed, salt cedar, Canada thistle, common cocklebur, jointed goatgrass, black henbane, and burdock.

Cheatgrass or downy brome (*Bromus tectorum*) and Japanese brome (*B. japonicus*) have invaded this area, as well as much of the state of Wyoming. 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 Thunderbird – Jones & Stokes (Thunderbird – Jones & Stokes, *Wildlife and Ute Ladies'-Tresses Orchid Surveys and Habitat Assessment*, March 5, 2007). Thunderbird – Jones & Stokes performed surveys for bald eagle, greater sage-grouse, mountain plover, prairie dog colonies, and raptor nests according to Powder River Basin Interagency Working Group (PRBIWG) accepted protocol in 2006 and 2007. Formal Surveys were conducted for Ute ladies'-tresses orchid in late summer of 2006. PRB IWG accepted protocol is available on the CBM Clearinghouse website (www.cbmclearinghouse.info).

BLM biologists conducted field visits on February 20 & 21, 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 Blade POD project area include mule-deer and pronghorn antelope. Both species were observed throughout the Blade POD project area during on-site visits.

Pronghorn antelope within the project area belong to the Pumpkin Butte herd unit. The 2006 proposed estimate of herd population is 36,500 with a population objective of 18,000. Mule deer within the project area belong to the Pumpkin Butte herd unit. The 2006 proposed estimate herd population is 12,350 with a population objective of 11,000. Populations of pronghorn antelope and mule 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 intermittent tributaries of the Powder River. Fish that have been identified in the Powder River watershed are listed in the PRB FEIS (3-156-159).

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 observed by Thunderbird – Jones & Stokes include sage thrasher on June 9, 2006 and loggerhead shrike on May 14, 2006.

3.3.4. Raptors

Raptor species expected to occur in suitable habitats within the project area 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. Raptor species nest in a variety of habitats including but not limited to; native and non-native grasslands, agricultural lands, live and dead trees, cliff faces, rock outcrops, and tree cavities.

Twenty-eight raptor nest sites were identified by Thunderbird – Jones & Stokes and BLM within 0.5 mile of the project area; of these, 8 nests were active in 2007.

Table 4. Documented raptor nests within the Blade POD project area in 2007.

BLM ID#	SPECIES	UTM (NAD 83)	LEGAL LOCATION	SUBSTRATE	CONDITION	STATUS
1974	UNK	413180E 4837240N	NWSE 23, 43:77	Cottonwood, dead	Poor	Inactive
2834	GOEA	409752E 4843890N	SENE 33, 44:77	Cottonwood, live	Remnants	Inactive
2835	RTHA GHOW*	409999E 4841005N	SWNE 9, 43:77	Cottonwood, live	Good	Active, 3 chicks
2836	RTHA	410090E 4840782N	NWSE 9, 43:77	Cottonwood Live	Good	Active, Failed
2839	RTHA	415425E 4837753N	SENE 24, 43:77	Cottonwood, Live	Poor	Inactive
2840	RTHA	415274E 4837238N	NESE 24, 43:77	Cottonwood, Live	Good	Active 1 chick
2841	UNK	409772 4843884	SENE 33, 44:77	Cottonwood, Live	Remnants	Inactive
2852	GHOW	413250 4840225	NWSE 9, 43:77	Cavity w/in cottonwood	N/A	Inactive
2853	UNK	413948 4838790	NWSW13, 43:77	Cottonwood, Live	Poor	Inactive
2855	GHOW	414626 4838790	NESE 13, 43:77	Cottonwood, Live	Good	Inactive
2856	GHOW	414678 4838698	NESE 13, 43:77	Cottonwood, Live	Poor	Inactive
4496	UNK	409823 4843525	NESE 33, 44:77	Cottonwood, Live	Fair	Inactive
4497	UNK	418438	SESE 17,	Cottonwood,	Unknown	Unknown

BLM ID#	SPECIES	UTM (NAD 83)	LEGAL LOCATION	SUBSTRATE	CONDITION	STATUS
		4838503	43:76	Live		
4498	UNK	419268 4838365	SWSW 16, 43:76	Cottonwood, Live	Unknown	Unknown
4499	UNK	416802 4838238	NENE 19, 43:76	Cottonwood, Live	Unknown	Unknown
4500	GOEA	418591 4837803	NENE 20, 43:76	Cottonwood, Live	Unknown	Unknown
4501	RTHA/ GHOW*	415301 4837508	SENE 24, 43:77	Cottonwood, Live	Good	Active, 1 chick
4502	UNK	416604 4837147	NWSE 19, 43:76	Cottonwood, Live	Poor	Inactive
4503	UNK	418480 4836380	NENE 29, 43:76	Cottonwood, Live	Unknown	Unknown
4504/4721	RTHA	415295 4836320	NENE 25, 43:77	Cottonwood, Live	Good	Active, 2 chicks
5035	GOEA	413653 4839933	NENE 14, 43:77	Cottonwood, Live	Unknown	Unknown
5037	RTHA	412553 4840857	SWNW 11, 43:77	Cottonwood, Live	Good	Active
5038	UNK	412616 4840710	NWSW 11, 43:77	Cottonwood, Live	Remnants	Inactive
5039	UNK	413313 4841050	SWNE 11, 43:77	Cottonwood, Live	Poor	Inactive
5040	UNK	413253 4840486	NWSE 11, 43:77	Cottonwood, Live	Poor	Inactive
5041	UNK	414776 4840505	NWSE 12, 43:77	Cottonwood, Live	Fair	Inactive
New	GOEA	413467 4840184	SWSE 11, 43:77	Cottonwood, Live	Good	Active, 2 chicks
New	RTHA	414778 4840184	NWSE 13, 43:77	Cottonwood, Live	Good	Active, Failed

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 1000 acres of black-tailed prairie dog colonies for survival (USFWS 1989).

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

Fourteen black-tailed prairie dog colonies were identified during site visits by Thunderbird-Jones & Stokes within the project area.

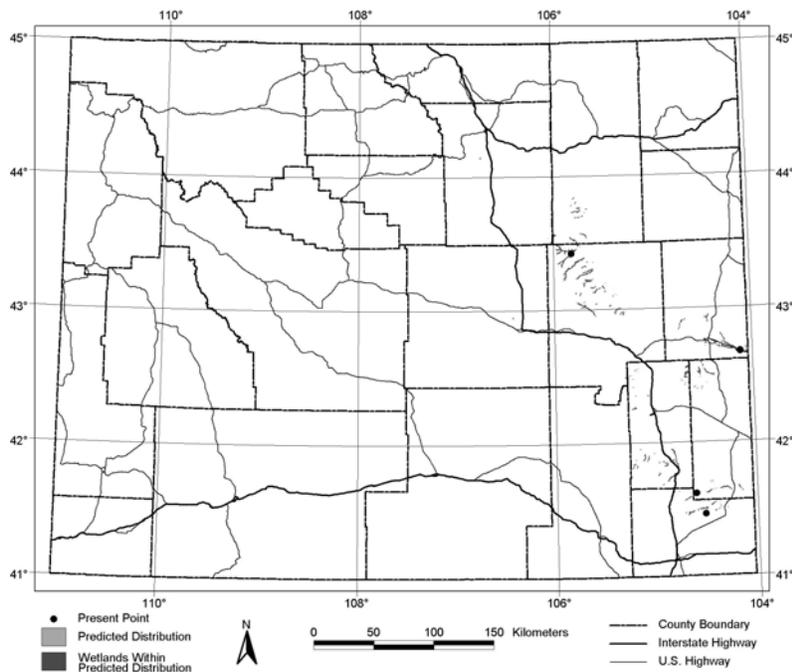
Species	Legal Location Section, Township: Range	Size (acres)	Location to Project Area
Prairie dog town	SW 19, 44:77	102.5	Occurs within the project area.
Prairie dog town	SW 20, 44:77	116.3	Occurs within the project area.
Prairie dog town	NE 33, 44:77	87	Occurs within the project area
Prairie dog town	NW 34, 44:77	38.7	Occurs within the project area
Prairie dog town	NE 32, 44:77	67.8	Occurs within the project area
Prairie dog town	ALL 2-3, 43:77	2315.3	Occurs within the project area
Prairie dog town	NE 11, 43:77	41	Occurs within the project area
Prairie dog town	SW 11, 43:77	338	Occurs within the project area
Prairie dog town	E 15, 43:77	168.6	Occurs within the project area
Prairie dog town	SW 13, 43:77	116.9	Occurs within the project area
Prairie dog town	SWNE 20, 43:76	13.4	Occurs within the project area
Prairie dog town	SW 19, 43:76	186.4	Occurs within the project area
Prairie dog town	SE 23, 43:77	123.8	Occurs within the project area
Prairie dog town	SENE 25, 43:77	19.9	Occurs within the project area

The project area is located approximately 7 miles from the Midwest complex, the nearest potential reintroduction area. Black-footed ferret habitat is present within the Blade project area.

3.3.5.1.2. Ute Ladies'-Tresses Orchid

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

Figure 1. Predicted Distribution of Ute ladies'-tresses in Wyoming



Prior to 2005, only four orchid populations had been documented within Wyoming. Five additional sites were located in 2005 and one in 2006 (Heidel pers. Comm.). The new locations were in the same drainages as the original populations, with two on the same tributary and within a few miles of an original location. Drainages with documented orchid populations include Antelope Creek in northern Converse County, Bear Creek in northern Laramie and southern Goshen Counties, Horse Creek in Laramie County, and Niobrara River in Niobrara County. In Wyoming, *Spiranthes diluvialis* blooms from early August to early September, with fruits produced in mid August to September (Fertig 2000).

Dry Fork Powder River and its tributaries are intermittent. Suitable orchid habitat is present along the Dry Fork Powder River in a “significant area of wetland vegetation” in the NE corner of Section 10, T44:R77. No orchids were observed during the August 24, 2006 survey by Thunderbird – Jones & Stokes and no populations are documented within the vicinity of the Blade POD project area.

3.3.5.2. Sensitive Species

The USDI Bureau of Land Management (BLM) Wyoming has prepared a list of sensitive species to focus species management efforts towards maintaining habitats under a multiple use mandate. Two habitat types, prairie dog colonies and sagebrush ecosystems, specifically, are the most common among habitat types within the Powder River Basin and contain habitat components required in the life cycle of several sensitive species. These 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 described in more detail. 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. Prairie dog colony obligates

Prairie dog colonies create habitat for many species of wildlife (King 1955, Reading et al. 1989). Agnew (1986) found that bird species diversity and rodent abundance were higher on prairie dog towns than on

mixed grass prairie sites. Several studies (Agnew 1986, Clark 1982, Campbell and Clark 1981 and Reading et al. 1989) suggest that species richness increases with colony size and regional colony density. Prairie dog colonies attract many insectivorous and carnivorous birds and mammals because of the concentration of prey species (Clark 1982, Agnew 1986, Agnew 1988).

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

3.3.5.2.2. 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, sage thrasher, and sage sparrow. Sage sparrows, Brewer's sparrows, 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. Sage sparrows prefer large continuous stands of sagebrush, and 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 and pronghorn antelope.

3.3.5.2.3. 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 (WY07F0075) (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.

Suitable nesting and roosting habitat exists throughout the project area, primarily in dense stands of cottonwood along Dry Fork Powder River and Cottonwood Creek. Foraging habitat is also present in the form of numerous, active prairie dog towns. While one bald eagle was observed in December within 0.5 miles of the project boundary, no bald eagle nests or roosting areas were documented during 2006-2007 surveys within the immediate project area or extending one mile from proposed activities.

3.3.5.2.4. 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).

Fourteen black-tailed prairie dog colonies, totaling approximately 3735.6 acres were identified during site visits by Thunderbird – Jones & Stokes within the project area (see table for black-footed ferret).

3.3.5.2.5. Burrowing owl

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

The western burrowing owl has declined significantly throughout its North American range. Current population estimates for the United States are not well known but trend data suggest significant declines (McDonald et al. 2004). The last official population estimate placed them at less than 10,000 breeding pairs. The majority of the states within the owl's range have recognized that western burrowing owl populations are declining. It is listed as a sensitive species by the BLM throughout the west and by the USDAFS. Primary threats across the North American range of the burrowing owl are habitat loss and fragmentation primarily due to intensive agricultural and urban development, and habitat degradation due to declines in populations of colonial burrowing mammals (Klute et al. 2003).

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

The BLM BFO databases and the survey information provided by Thunderbird – Jones & Stokes did not document burrowing owl nests within the project area or within 0.25 mile of the Blade POD project area in 2007; however one burrowing owl was observed in SWSE 28, 44:77 during surveys in May, 2007

(Thunderbird – Jones & Stokes, *Wildlife and Ute Ladies'-Tresses Orchid Surveys and Habitat Assessment, Addendum A*, November 29, 2007).

3.3.5.2.6. Grouse

3.3.5.2.6.1. 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 12th, 2005, the USFWS issued a decision that the listing of the greater sage-grouse was “not warranted” following a Status Review. The decision document supporting this outcome noted the need to continue or expand all conservation efforts to conserve sage-grouse. A judge in Idaho 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 throughout the project area. Within the project area there are small pockets of sagebrush 2 to 10 acres which are of moderate density (10-15 % cover); these pockets provide cover for nesting sage grouse. In areas outside of the prairie dog colony, the sagebrush canopy cover ranges from sparse (0-5% cover) to moderate (10-15% cover). Sparse sagebrush grassland landscape is dominated by grasses. Moderate sagebrush grassland has a canopy cover of 10-15%, and the sagebrush height ranges from 6-35 inches tall. Adjacent to the project area there exists large stands of moderate (10-15% cover) to dense (15-25% cover) stands of sagebrush, thus providing nesting habitat. During on-site visit, sage-grouse sign was noted at the Blade 8 location and along its access road. BLM records identified 6 sage grouse leks within 3 miles of the Blade POD. These lek sites are identified below (Table 6).

Table 6. Sage-grouse leks surrounding the Blade POD project area.

LEK NAME	LEGAL LOCATION	OCCUPANCY AND ACTIVITY STATUS IN 2007 (PEAK MALES)	DISTANCE FROM PROJECT AREA
Beecher Draw	NWSW 2, 43:77	Occupied (3)	Within POD Boundary
Beecher Draw N	NWNE 34, 44:77	Occupied (7)	Within POD Boundary
Bushwhacker Creek 1	SENE 22, 43:77	Occupied (14)	Within POD Boundary
Cottonwood Crk. 1	SENE 33 43:76	Occupied (21)	1.1 mi.
Cottonwood Crk. 2	SESE 15, 43:76	Occupied (11)	1.3 mi.
Mengel	SWNE 19, 44:77	Occupied (24)	.44 mi.

3.3.5.2.6.1 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.

Sharp-tailed grouse habitat is marginal within the project area. No berry producing plants were observed within the project area.

3.3.5.2.7. 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.

Suitable mountain plover habitat is present within the project area. Three mountain plover sightings within .25 miles of the Blade POD project area were documented by Thunderbird-Jones & Stokes in 2007, as summarized in the following table:

Mountain plover observations within and adjacent to the Blade POD project area (2007).

LEGAL LOCATION	UTMS	NUMBER OF ADULT MOUNTAIN PLOVERS	DISTANCE FROM PROJECT AREA
NWSW 20, 44:77	407920E, 4846632N	2	Within project area
NWSW 20, 44:77	408066E, 4846878N	1	Within project area
NWSW 20, 44:77	407850E, 4846839N	4	Within project area

3.3.5.2.8. Swift Fox

The swift fox is native to the grassland prairies of North America. The original range of the species was influenced primarily by the extent of the shortgrass prairie and midgrass prairie ecosystems. The swift fox range primarily follows the distribution of the black-tailed prairie dog. Swift fox populations have been reduced to about 40 percent of their former range. The swift fox was removed from the Federal list of candidate species in January 2001 due to the implementation of the Swift Fox Conservation Plan. It remains a BLM sensitive species and as such, recommendations for mitigation contained within the Swift Fox Conservation Plan will be applied to the project in order to uphold the direction set forth in the BLM Manual 6840.

Swift foxes tend to have their dens on or within 0.8 kilometers of prairie dog colonies (Hillman and Sharps 1978). Breeding occurs from December to February depending on latitude (Kilgore 1969, Hines 1980, Covell 1992). Gestation is approximately 51 days (Kahn et al. 1997). Pups are reared in dens with den sites possibly being changed several times during the pup-rearing period (Kahn et al. 1997). Under certain circumstances, litters from different fox pairs might share the same natal dens. At four or five months, the young foxes are almost fully grown and difficult to distinguish from adults (Kahn et al. 1997). Though little is known about pup-dispersal, it begins during September and October (Kahn et al. 1997).

The major portions of the swift fox diet are prairie dogs (49%) and insects (27%) (Uresk and Sharps 1986). Suitable swift fox habitat exists throughout the project area with the prairie grasslands and prairie dog colonies. For prairie dog colony locations, refer to the prairie dog section of this document.

3.4. West Nile Virus

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

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

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

Table 3.4 Historical West Nile Virus Information

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

*Wyoming Department of Health Records September 12, 2007.

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

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

Mosquitoes can potentially breed in any standing water that lasts more than four days. In the Powder River Basin, there is generally increased surface water availability associated with CBNG development. This increase in potential mosquito breeding habitat provides opportunities for mosquito populations to increase. Preliminary research conducted in the Powder River Basin indicates WNV mosquito vectors

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

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

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

3.5. Water Resources

The project area is within the Upper Powder River drainage system. Dry Fork of the Powder River, Bullwhacker Creek are the main two drainages coursing through the POD area.

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.

A search of the Wyoming State Engineer Office (WSEO) Ground Water Rights Database for this area showed 38 registered stock and domestic water wells within ½ mile of a federal CBNG producing well in

the POD with depths ranging from 22 to 960 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 Dry Fork of the Powder River drainage which is tributary to the Upper Powder River watershed. Most of the drainages in the area are ephemeral (flowing only in response to a precipitation event or snow melt) or intermittent (flowing only at certain times of the year when it receives water from alluvial groundwater, springs, or other surface source – PRB FEIS Chapter 9 Glossary). Channel conditions range from well vegetated grassy swales to deeply incised channels with highly erodible banks with well vegetated, wide channel beds.

The PRB FEIS presents the historic mean Electrical Conductivity (EC, in $\mu\text{mhos/cm}$) and Sodium Adsorption Ratio (SAR) by watershed at selected United States Geological Survey (USGS) Gauging Stations in Table 3-11 (PRB FEIS page 3-49). These water quality parameters “illustrate the variability in ambient EC and SAR in streams within the Project Area. The representative stream water quality is used in the impact analysis presented in Chapter 4 as the baseline for evaluating potential impacts to water quality and existing uses from future discharges of 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).

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

3.6. Cultural Resources

A Class III inventory was conducted for the Blade project prior to on-the-ground project work (BFO project # 70070151). ACR Consultants, Inc., conducted the Class III inventory following the Archeology and Historic Preservation: Secretary of the Interior’s Standards and Guidelines (48FR190) for the proposed project. Clint Crago, BFO archaeologist, reviewed the reports for technical adequacy and for compliance with BLM and Wyoming State Historic Preservation Office standards, and determined them to be adequate. The following resources are located within the Area of Potential Effect (APE).

Table 3.6 Cultural Resources Inventory Results

Site Number	Site Type	National Register Eligibility
48CA5393	Prehistoric Lithic Scatter	Not Eligible
48JO134	The Bozeman Trail	Eligible
48JO2271	Historic Debris Scatter	Not Eligible
48JO2353	Prehistoric Lithic Scatter and Historic Trash Scatter	Not Eligible
48JO2484	Prehistoric Lithic Scatter	Not Eligible
48JO2915	Prehistoric Lithic Scatter	Not Eligible
48JO2916	Prehistoric Lithic Scatter and Historic Trash Scatter	Not Eligible
48JO2921	Prehistoric Lithic Scatter and Historic Artifact	Not Eligible

Site Number	Site Type	National Register Eligibility
48JO3059	Ft. Fetterman to Ft. McKinney Telegraph Line	Not Eligible
48JO3665	Black & Yellow Trail Sussex Variant	Not Eligible
48JO3892	Historic Structure and Artifact Scatter	Not Eligible
48JO3894	Prehistoric Lithic Scatter	Not Eligible

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 27 proposed well locations, 27 can be drilled without a well pad being constructed. Surface disturbance associated with the drilling of the 27 wells would involve digging-out of rig wheel wells (for leveling drill rig on minor slopes), reserve pit construction (estimated approximate size of 15 x 55 feet), and compaction of approximately 150 x 150 feet (from vehicles driving/parking at the drill site). After drilling is complete and interim reclamation is established, the estimated long term disturbance associated with these 27 wells would involve a driving area around the well house approximately 65 feet in diameter, or 0.1 acre/well for 2.7 total acres.

Approximately 1.82 miles of improved roads would be constructed to provide access to various well locations. Approximately 6.18 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 0.74 mile of pipeline and 0.08 miles of buried power 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, wattles, etc.) would ensure land productivity/stability is regained and maximized.

Proposed stream crossings, including culverts and 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

Facility	Number or Miles	Factor	Acreage of Disturbance	Duration of Disturbance
Nonconstructed Pad	27	0.1/acre	2.7	Long Term
Constructed Pad	0		0	
Gather/Metering Facilities	0	Site Specific	0	Long Term
Screw Compressors	0	Site Specific	0	Long Term
Monitor Wells	0	0.1/acre	0	Long Term
Impoundments				Long Term
On-channel	25	Site Specific	55.6	
Off-channel	0	Site Specific	0	
Water Discharge Points	25	Site Specific or 0.01 ac/WDP	0.5	
Channel Disturbance				
Headcut Mitigation*	0	Site Specific	0.0	
Channel Modification	0	Site Specific	0.0	
Improved Roads	1.82			Long Term
No Corridor	0.55	45' Width	3.0	
With Corridor	1.27	75' Width	11.6	
2-Track Roads	6.18			Long Term
No Corridor	0.49	12' Width	0.7	
With Corridor	5.69	40' Width	27.6	
Pipelines				Short Term
No Corridor	0.74	25' Width	2.2	
With Corridor	23.35	35' Width	99.1	
Buried Utilities				Short Term
No Corridor	.08	12' Width	0.2	
Overhead Powerlines	9.86	15' Width	17.9	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

The impoundments for this POD are full containment and are all located in headwater areas, therefore their use will should not affect existing riparian plant communities, which will generally be well downstream of the dam.

The PRB FEIS assumes that 15% of the impounded water will re-surface as channel flow (PRB FEIS pg 4-74). Re-surfacing water downstream of impoundments will potentially promote wetland-riparian species establishment there. Continuous low stream flows into wetlands and riparian areas would change the composition of species and could affect the dynamics of the food web.

4.1.2. Invasive Species

Based on the investigations performed during the project 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. Weed inspection and pre-treatment to control the weed, prior to disrupting area
2. Mowing prior to seed formation
3. Hand pulling small infestations
2. Cleaning equipment after site visits to prevent the spreading between locations
3. Weed education and awareness includes construction supervisors, foreman and landowners

The operator has submitted a Pesticide Use Proposal to treat noxious weeds with a suitable herbicide on BLM surface in the Blade project area. Cheatgrass or downy brome and Japanese brome 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 Blade POD proposes that produced water will not contribute significantly to flows downstream.

No additional mitigation measures are required.

4.2. Wildlife

During the environmental analysis process, the BLM identified project modifications resulting in an environmentally preferred alternative (Alternative C). At the on-sites, all areas of proposed surface disturbance were inspected to ensure that potential impacts to natural resources would be reduced. 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 or minimize environmental impacts.

4.2.1. Big Game Direct and Indirect Effects

Under the environmentally preferred alternative, Winter-Yearlong range for pronghorn antelope and mule 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.

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 at 25 discharge points into 25 stock water reservoirs that would provide total containment for CBNG-produced water for this POD within the Upper Powder River watershed. 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.

The Wyoming Department of Environmental Quality (DEQ) regulates effluent discharge through the National Pollution Discharge Elimination System in compliance with the Federal Water Pollution Control Act and the Wyoming Environmental Quality Act. The Wyoming DEQ has established effluent limits for the protection of game and non-game, aquatic life other than fish, wildlife, and other water uses.

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 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.

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

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.

Table 5. Infrastructure within close proximity (0.5 mile) to documented raptor nests within the (Blade POD) project area (Timing limitations will apply to this infrastructure).

BLM ID#	INFRASTRUCTURE	DISTANCE
1974	Recycle Reservoir	.42
2834	Aileron 2 Well	.27
2834	Surrounded Res.	.48
2835	Double Line Res.	.27
2836	Double Line Res.	.19
2839	Corridor Sec. 24,	.23
2839	Well Prepared Res.	.48
2840	Corridor Sec. 24	.12
2840	Well Prepared Res.	.48
2840	Mixer 2 Well	.48
2841	Aileron 2 Well	.27
2841	Surrounded Res.	.48
2853	Corridor, Sec. 13	.22
2855	Corridor, Sec. 13	.18
2855	Blade 18	.4
2855	William Res.	.41
2856	Corridor, Sec. 13	.22
2856	Blade 18	.39
2856	William Res.	.39
4496	Surrounded Res.	.46
4496	Aileron 2 Well	.34
4497	Bull Pasture Res. #2	.48
4500	Bull Pasture Res. #2	.27

4500	Cuisine 1 Well	.31
4501	Corridor, Sec. 24	.1
4501	Well Prepared Res.	.47
4501	Mixer 2 Well	.43
4502	Mixer 1 Well	.31
4502	Well Prepared Res.	.35
4502	Backwards Res.	.24
4502	Corridor Sec. 19	.1
4503	Cuisine 3 Well	.35
4503	Bull Pasture Res.	.31
4504	Mixer 2 Well	.41
5035	Blade 15 Well	.30
5037	Corridor Sec. 11	.22
5037	Blade 8 Well	.34
5037	Blade 13 Well	.31
5037	Blade 14 Well	.46
5038	Blade 8 Well	.32
5038	Blade 13 Well	.26
5038	Blade 14 Well	.37
5039	Blade 13 Well	.40
5040	Blade 13 Well	.24

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.	NS	NLAA	Suitable Habitat present
Threatened				
Ute ladies'-tresses orchid (<i>Spiranthes diluvialis</i>)	Riparian areas with permanent water	NS	NLAA	Limited suitable habitat present; no populations recorded w/in or

				adjacent to the project area.
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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

Suitable habitat is of sufficient size to support a black-footed ferret population. No surveys for ferrets were required or conducted. It is extremely unlikely that any black-footed ferret is present in the project area. However, if any become present, the proposed action will most likely make portions of the project area unsuitable for ferret inhabitation. Implementation of the proposed development “may affect, but is not likely to adversely affect” the black-footed ferret.

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

The Ute ladies’-tresses orchid is threatened by energy developments, noxious weeds, and water developments. Prolonged idle conditions in the absence of disturbance (flooding, grazing, mowing) may be a threat just as repeated mowing and grazing during flowering may lead to decline (Hazlett 1996, 1997, Heidel 2007). Heavy equipment used in energy development construction could dig up plants. Invasive weeds transplanted by vehicle and foot traffic in habitat could outcompete this fragile species. Restricting work from areas of Ute ladies’-tresses orchid habitat reduces these impacts.

Many of the reservoirs are located within ephemeral drainages of Dry Fork Powder River. Remaining proposed reservoirs are located in upland habitats. Suitable habitat is present in the NE of Section 10, T43N, R77W, within the Blade POD project area.

Reservoir seepage may create suitable habitat if historically ephemeral drainages become perennial, however no historic seed source is present within the project area. Implementation of the proposed coal bed natural gas project “may affect, but is not likely to adversely affect” the Ute ladies’- tresses orchid as limited suitable habitat is present.

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. Prairie dog colony obligates

Wells, roads, pipelines and other infrastructure associated with energy development constructed within prairie dog colonies will directly remove habitat for prairie dog colony obligate species. Activities that disturb these species could lead to temporary or even long-term or permanent abandonment. Direct loss of species may also occur from vehicle traffic. Continued loss of prairie dog habitat and active prairie dog towns will result in the decline of numerous sensitive species in the short grass prairie ecosystem.

4.2.5.2.2. 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 even after habitat reestablishment.

Table 4.3 Summary of Sensitive Species Habitat and Project Effects.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Amphibians				
Northern leopard frog (<i>Rana pipiens</i>)	Beaver ponds, permanent water in plains and foothills	S	MIIH	Additional water will affect existing waterways.
Spotted frog (<i>Rana pretiosa</i>)	Ponds, sloughs, small streams	NP	NI	Prairie not mountain habitat.
Birds				
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	Project includes overhead power.
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	S	MIIH	Prairie dog colony present.
Ferruginous hawk (<i>Buteo regalis</i>)	Basin-prairie shrub, grasslands, rock outcrops	K	MIIH	Active nest present.
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	K	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%	S	MIIH	Prairie dog colony will be affected
Northern goshawk (<i>Accipiter gentilis</i>)	Conifer and deciduous forests	NP	NI	No forest habitat present.
Peregrine falcon (<i>Falco peregrinus</i>)	cliffs	NP	NI	No nesting habitat present.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Sage sparrow (<i>Amphispiza billneata</i>)	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Sagebrush cover will be affected.
Sage thrasher (<i>Oreoscoptes montanus</i>)	Basin-prairie shrub, mountain-foothill shrub	K	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
Fish				
Yellowstone cutthroat trout (<i>Oncorhynchus clarki bouvieri</i>)	Mountain streams and rivers in Tongue River drainage	NP	NI	Outside species range.
Mammals				
Black-tailed prairie dog (<i>Cynomys ludovicianus</i>)	Prairie habitats with deep, firm soils and slopes less than 10 degrees.	K	MIIH	Prairie dog colony will be affected.
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	S	MIIH	Grasslands, prairie-dog towns will be affected.
Townsend's big-eared bat (<i>Corynorhinus townsendii</i>)	Caves and mines.	NP	NI	Habitat not present.

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

Presence

K Known, documented observation within project area.

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

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

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

Project Effects

NI No Impact.

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

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

BI Beneficial Impact

4.2.5.2.1. Bald eagle Direct and Indirect Effects

Though suitable habitat exists within the Blade POD project area, no nests or roosting sites were recorded in 2006-2007 surveys conducted by Thunderbird – Jones & Stokes. To reduce the risk of decreased productivity or nest failure, BLM BFO requires a 0.5 mile no surface occupancy radius and a one mile radius timing limitation of all activity during the breeding season around active bald eagle nests. To reduce the risk of disruption to the winter roosting activities of bald eagles, the BLM BFO requires a 0.5 mile no surface occupancy radius and a one mile radius timing limitation of all winter roosts (either communal or consistent use).

There are currently 4.6 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. Yates is proposing an additional 9.6 miles of overhead three-phase distribution lines. There are currently 22.7 miles of improved roads within the project area, with 1.82 miles proposed.

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 25 proposed 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.

4.2.5.2.2. Black-tailed prairie dog Direct and Indirect Effects

There are 6 proposed gas wells or associated infrastructure within active prairie dog colonies. The wells and infrastructure are listed below:

Township/Range	Section	Affected Wells and Infrastructure
4377	2	Potholes Res., Trailhead Res., Corridor
4377	10, 11	Corridor and Pump Sta.
4477	34	Resting Place Res.
4477	33	Access, Infrastructure for Aileron 1&2, Corridor

Individuals that survive the excavation process but whose burrows were destroyed will be displaced. As the prairie dog town grows in size, prairie dogs move from an area of high population density to an area of low population density. Male prairie dogs resort to either long-distance dispersal to new colonies (mostly as yearlings, rarely as adults) or short distance within the home colony. Female prairie dogs disperse over long distances to other colonies (as either yearlings or adults). Short-distance dispersal of females within the home colony almost never occurs (Hoogland 1995). Dispersal of prairie dogs occurs as single individuals. Both male and female prairie dogs prefer to move into an existing colony or one that has been abandoned rather than start a completely new colony. Coterie (small family group within the colony) members resist attempted invasions by conspecifics including immigrants. Dispersing prairie dogs have increased stress levels, higher exposure to predators, and are unlikely to be accepted by other colonies if they even encounter one. Both males and females actively protect their coterie territories from invading males and females (Hoogland 1995).

Unlike roads and pipelines, the construction and operation of reservoirs will permanently remove habitat. By the time the reservoirs are no longer needed, the reservoirs may become hard-pan, soil that has hardened due to mineral deposits and evaporation. Prairie dogs may be unable to burrow in this type of soil compaction. The presence of a reservoir will limit colony expansion. Well houses and power poles may provide habitats for mammal and avian predators increasing prairie dog predation. Mineral related traffic on the adjacent roads may result in prairie dog road mortalities. During construction of these facilities, there is the possibility that prairie dogs within these colonies may be killed as a direct result of the earth moving equipment. Constant noise and movement of equipment and the destruction of burrows puts considerable stress on the animals and will cause an increase in prairie dog mortalities. During the construction of these facilities individuals are exposed more frequently to predators and have less protective cover.

4.2.5.2.3. Burrowing owl Direct and Indirect Effects

There are 6 proposed wells, associated infrastructure, and three reservoirs within active prairie dog colonies that will directly impact approximately 15 acres of potential burrowing owl nesting habitat.

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

The USDAFS Thunder Basin National Grasslands in Campbell County, WY, whom cooperated with the BLM in the creation of the 2003 PRB EIS, recommends a 0.25 mile timing restriction buffer zone for burrowing nest locations during their nesting season (April 15 to August 31). Instruction Memorandum No. 2006-197, directs the field offices to “use the least restrictive stipulations that effectively accomplish the resource objectives or uses.” Alteration of the general raptor nest timing limitation (Feb 1 to July 31) to a more specific burrowing owl nesting season timing limitation will effectively reduce the vulnerability of owls to collision while shortening the timing restriction period to four and one half months (See

Chapter 3 for breeding, nesting, and migration chronology) from six and one half months and from 0.5 mile to 0.25 mile.

4.2.5.2.4. Grouse

4.2.5.2.4.1. Greater sage-grouse Direct and Indirect Effects

The project area contains sage-grouse breeding, nesting, and wintering habitat. There are 6 leks within or adjacent to the Blade POD project area. The project area is occupied by sage-grouse during all seasons.

The Radio Flyer reservoir was proposed within 400 feet of the Bushwhacker Creek 1 lek. Attempts to relocate the reservoir more than ¼ mile from the lek were unsuccessful.

Greater sage-grouse habitat is being directly lost with the addition of well sites, roads, pipelines, powerlines, reservoirs and other infrastructure (Theiele 2005, Oedekoven 2004). Sage-grouse avoidance of CBNG infrastructure results in even greater indirect habitat loss. 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).

The presence of overhead power lines and roads within the project area may adversely affect sage-grouse. Overhead power lines create hunting perches for raptors, thus increasing the potential for predation on sage-grouse. Increased predation from overhead power near leks may cause a decrease in lek attendance and possibly lek abandonment. Overhead power lines are also a collision hazard for sage-grouse flying through the area. Increased roads and mineral related traffic can affect grouse activity and reduce survival (Braun et al. 2002). Activity along roads may cause nearby leks to become inactive over time (WGFD 2003). Limiting travel speed to 25mph provides sage-grouse sufficient time to escape from approaching vehicles. The BLM BFO documented motor vehicles kills of several sage-grouse males displaying on a road in Campbell County in 2007. Sage-grouse displaying near roads may be too pre-occupied to notice approaching vehicles, therefore travel speed within 0.5 miles of lek sites will be limited to 10 mph. CBNG disturbance and infrastructure may also attract small predators that prey on eggs in the nest.

The presence of powerlines results in changes in sage-grouse dispersal patterns and fragmentation of the habitat. Leks within 0.25 mile of new powerlines constructed for coalbed natural gas development in the Powder River Basin of Wyoming had significantly lower growth rates, as measured by recruitment of new males onto the lek, compared to leks further from these lines (Braun et al. 2002). Braun (1998) reported that the presence of powerlines may limit sage-grouse use within 0.6 mile in otherwise suitable habitat. In this way, the proposed powerlines within the project area will impact approximately 2,570 acres of otherwise suitable habitat.

Noise can affect sage-grouse by preventing vocalizations that influence reproduction and other behaviors (WGFD 2003). Gibson and Bradbury (1986) reported that male sage-grouse mating success was more closely related to individual differences in strut display effort and sound characteristics (i.e., lek attendance, strut display rate, and the temporal and frequency characteristics of the whistle emitted towards the end of the strut display) than to territorial or morphological characteristics. Gibson (1989) further indicated that the acoustic component of the strut display alone (produced by hidden audio speakers situated on a lek) was attractive to females. Although it is unknown if unnatural noises associated with anthropogenic activity (i.e., gas and oil development operations, traffic) disrupt females' ability to evaluate males' displays, it seems reasonable that noises within the range of those emitted by sage-grouse males (within the frequency bands 300-1200 Hz; Dantzker et al. 1999) could mask courtship acoustics and influence breeding behavior and lek attendance (Holloran et al. 2005). Sage-grouse attendance on leks within one mile of compressors is lower than for sites farther from compressor

locations (Braun et al. 2002).

Another concern with CBNG is that reservoirs created for water disposal provide habitat for mosquitoes associated with West Nile virus (Oedekoven 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). Powder River Basin 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 BFO Resources Management Plan (BLM 2001) and the Powder River Basin Oil and Gas Project Record of Decision (BLM 2003) include a two-mile timing limitation within sage-grouse nesting habitat. The two-mile measure originated with the Western Association of Fish and Wildlife Agencies (WAFWA), which includes the WGF 1977 sage-grouse guidelines (Bennett 2004). Under pressure for standardization, BLM Wyoming adopted the two-mile recommendation in 1990, and instructed the field offices to incorporate the measure into their land use plans (Bennett 2004, Murkin 1990).

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

Additional studies, across more of the sage-grouse's range, indicate that many populations nest much farther than two miles from the breeding lek (Bennett 2004). Holloran and Anderson (2005), in their Upper Green River Basin study area, reported only 45% of their sage-grouse hens nested within 3 km (1.86 mi) of the capture lek. Moynahan and Lindberg (2004) found 36% of their grouse nesting within 3 km of the capture leks. Moynahan's study area was north-central Montana in an area of mixed-grass prairie and sagebrush steppe, with Wyoming big sagebrush (*Artemisia tridentata wyomingensis*) being the dominant shrub species (Moynahan et al. 2006). Habitat conditions and sage-grouse biology within the Buffalo Field Office is probably most similar to Moynahan's north-central Montana study area.

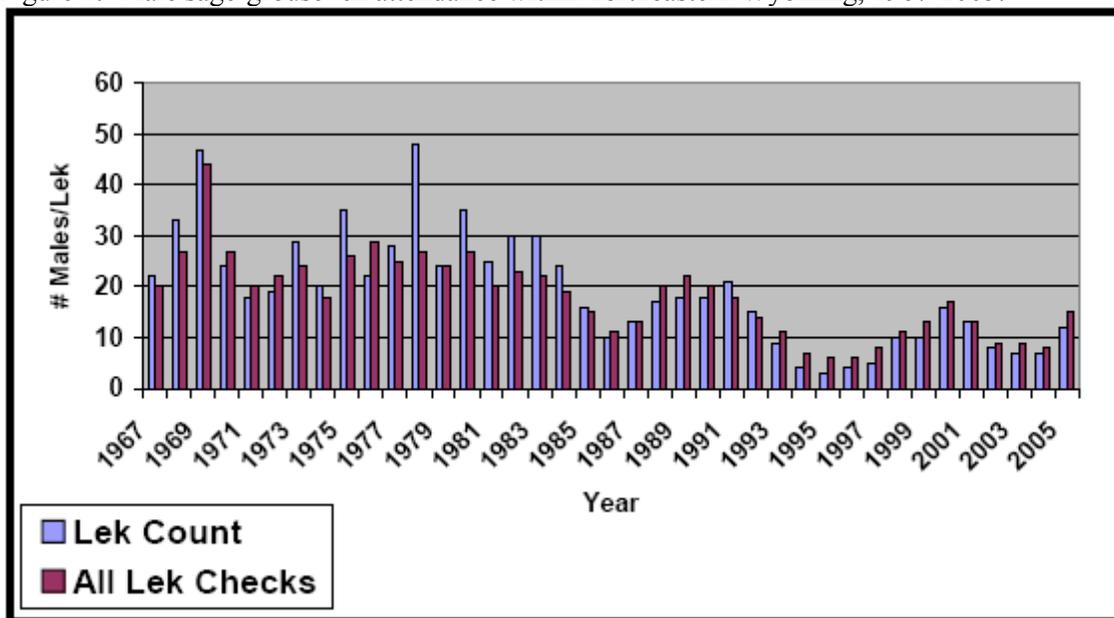
Percentage of sage-grouse nesting within a certain distance from their breeding lek is unavailable for the Powder River Basin. The Buffalo and Miles City field offices through the University of Montana with assistance from other partners including the U.S. Department of Energy and industry are currently researching nest location and other sage-grouse questions and relationships between grouse and coalbed natural gas development.

Vegetation communities within the Powder River Basin are naturally fragmented, as they represent a transition between the intermountain basin sagebrush communities to the west and the prairie communities to the east. The Powder River Basin is also near the eastern edge of greater sage-grouse range. Without contiguous habitat available to nesting grouse, it is likely that a smaller percentage of grouse nest within two-miles of a lek within the PRB than grouse within those areas studied in the development of the 1977 WAFWA recommendations, and even the Holloran and Moynahan study areas. Holloran and Moynahan both studied grouse in areas of contiguous sagebrush habitats without large scale fragmentation and habitat conversion (Moynahan et al. 2006, Holloran and Anderson 2005). A sagebrush cover assessment within Wyoming basins estimated sagebrush coverage within Holloran and Anderson's Upper Green River Basin study area to be 58% with an average patch size greater than 1200 acres. Powder River Basin sagebrush coverage was estimated to be 35% with an average patch size less than 300 acres (Rowland et al. 2005). The Powder River Basin patch size decreased by more than 63% in forty years, from 820 acre patches and an overall coverage of 41% in 1964 (Rowland et al. 2005). Recognizing that many populations live within fragmented habitats and nest much farther than two miles from the lek of breeding, WAFWA revised their sage grouse management guidelines (Connelly et al. 2000) and now recommends the protection of suitable habitats within 5 km (3.1 mi) of leks where habitats

are not distributed uniformly, such as the Powder River Basin. Proposed overhead power lines, access roads and the addition of 27 new well locations will further fragment existing habitat within the Blade POD project area.

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

Figure 1. Male sage-grouse lek attendance within northeastern Wyoming, 1967-2005.



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

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

An integrated approach including habitat restoration, grazing management, temporal and spatial mineral limitations etc. is necessary to reverse the population decline. The WGFD has initiated such a program within the Buffalo Field Office area (Jellison 2005). The WGFD program is modeled after a successful program on the Deseret Ranch in southwestern Wyoming and northeastern Utah. The Deseret Ranch has

demonstrated a six-fold increase in their sage-grouse population while surrounding areas exhibited decreasing populations (Danvir 2002).

4.2.5.2.5. Mountain plover Direct and Indirect Effects

Occupied mountain plover habitat is present within the project area. The project will impact mountain plovers.

Mineral development has mixed effects on mountain plovers. Disturbed ground, such as buried pipeline corridors and roads, may be attractive to plovers, while human activities within one-quarter mile may be disruptive. To reduce impacts to nesting mountain plovers, the BLM BFO requires a 0.25 mile timing limitation for potential nesting habitat prior to nest survey completion and a 0.25 mile timing limitation for all occupied nesting habitat for the entire nesting season.

Use of roads and pipe line corridors by mountain plovers may increase their vulnerability to vehicle collision. Limiting travel speed to 25 mph provides drivers an opportunity to notice and avoid mountain plovers and allows mountain plovers time to escape from approaching vehicles. Even if a nesting plover flushes in time, the nest likely would still be destroyed. Overhead power lines provide perch sites for raptors that could result in increased mountain plover predation. CBNG infrastructure such as well houses, roads, pipeline corridors, and nearby metering facilities may provide shelter and den sites for ground predators such as skunks and foxes.

Mountain plovers have been forced to seek habitat with similar qualities that may be poor quality habitat when loss or alteration of their natural breeding habitat (predominately prairie dog colonies) occurs, such as heavily grazed land, burned fields, fallow agriculture lands, roads, oil and gas well pads and pipelines. These areas could become reproductive sinks. Adult mountain plovers may breed there, lay eggs and hatch chicks; however, the young may not reach fledging age due to the poor quality of the habitat. Recent analysis of the USWFS Breeding Bird Survey (BBS) data suggests that mountain plover populations have declined at an annual rate of 3.7 % over the last 30 years which represents a cumulative decline of 63% during the last 25 years (Knopf and Rupert 1995). An analysis of direct and indirect impacts to mountain plover due to oil and gas development is included in the PRB FEIS (4-254-255).

4.2.5.2.6. Swift Fox Direct and Indirect Effects

The construction of well pads, roads, pipelines and reservoirs causes direct habitat loss (i.e. loss of prairie dogs and prairie dog burrows). During construction of these facilities, there is the possibility that swift foxes may be killed as a direct result of the earth moving equipment. Constant noise and movement of equipment and the destruction of burrows puts considerable stress on the animals and is likely to cause an increase in swift fox mortalities. During the construction of these facilities individuals are exposed more frequently to predators and have less protective cover. Mineral related traffic on the adjacent roads may result in swift fox road mortalities.

The BLM BFO has very little data on swift fox occurrence within the PRB associated with oil and gas PODs. The TBNG in Campbell County, WY whom cooperated with the BLM in the creation of the 2003 PRB EIS, has applied a standard condition to oil and gas activities in association with swift fox dens. Therefore, in order to adequately protect the species, the BLM BFO incorporated the following condition from the TBNG Land Resource Management Plan into this project: "To reduce disturbances to swift fox during the breeding and whelping seasons, prohibit the following activities within 0.25 miles of their dens from March 1 to August 31: Construction (e.g. roads, water impoundments, oil and gas facilities), reclamation, gravel mining operations, drilling of water wells, and oil and gas drilling." This timing restriction, based on the best available science, will reduce direct impacts to swift foxes within the project area.

4.2.5.2.7. 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 commitment to comply with Wyoming State water laws/regulations. It also addresses potential impacts to the environment and landowner concerns. Qualified hydrologists, in consultation with the BLM, developed the water management plan. The WMP will use on-channel reservoirs to fully contain all water produced from development activities in this POD. 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 WMP for the Blade POD was originally based on production from 27 wells and the numbers in this document are based on that assumption. The maximum water production is predicted to be 29 gpm per well or 725 gpm (1.62 cfs or 1,170 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 171,423 acre-feet in 2006 (maximum production year). As such, the volume of water resulting from the production of these wells is 0.7% of the total volume projected for 2006. This volume of produced water is also within the predicted parameters of the PRB FEIS.

4.4.1. Groundwater

The PRB FEIS predicts an infiltration rate of 40% to groundwater aquifers and coal zones in the Upper Powder River drainage area (PRB FEIS pg 4-5). For this action, it may be assumed that a maximum of 290 gpm will infiltrate at or near the discharge points and impoundments (468 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 ranging from 22 to 960 feet compared to the Big George with a top depth ranging from 1400 to 1500. As mitigation, the operator has committed to offer water well agreements to holders of properly permitted domestic and stock wells within the circle of influence (½ mile of a federal CBNG producing well) of the proposed wells.

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

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.

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.

Approximately 1650 new impoundment sites have been investigated with over 1850 borings as of December, 2007. Of those impoundments, 240 met the criteria to provide compliance monitoring data if

constructed and used for CBNG water containment. Only 108 monitored impoundments are currently in use. As of the 4th quarter 2007, only 9 monitored impoundments exceed 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.

4.4.1.1. Groundwater Cumulative Effects:

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

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

4.4.2. Surface Water

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

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

Predicted Values	TDS, mg/l	SAR	EC, µmhos/cm
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 Requirement for WYPDES Permit # WY0054411 At discharge point At Irrigation Compliance point	5,000 Na	na na	7,500 Na
Predicted Produced Water Quality Big George Coal	1,470	10.6	2,370

Based on the analysis performed in the PRB FEIS, the primary beneficial use of the surface water in the Powder River Basin is the irrigation of crops (PRB FEIS pg 4-69). The water quality projected for this POD is 1470.0 mg/l TDS which is/is not within the WDEQ criteria for agricultural use (2000 mg/l TDS).

However direct land application is not included in this proposal. If at any future time the operator entertains the possibility of irrigation or land application with the water produced from these wells, the proposal must be submitted as a sundry notice for separate environmental analysis and approval by the BLM.

The quality for the water produced from the Big George target coal zone from these wells is predicted to be similar to the sample water quality collected from a location near the POD. A maximum of 25.0 gallons per minute (gpm) is projected to be produced from these 29 wells, for a total of 1.62 cfs and 725 gpm for the POD. See Table 4.5.

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

There are 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, 25 impoundments (329.3 acre feet) would potentially be constructed within the project area. These impoundments will disturb approximately 55.6 acres including the dam structures. All 25 water impoundments would be on-channel reservoirs. Existing impoundments will be upgraded and proposed impoundments will be constructed to meet the requirements of the WSEO, WDEQ and the needs of the operator and the landowner. All water management facilities were evaluated for compliance with best management practices during the onsite.

The PRB FEIS assumes that 15% of the impounded water will re-surface as channel flow (PRB FEIS pg 4-74). Consequently, the volume of water produced from these wells may result in the addition of 0.24 cfs below the lowest reservoir (after infiltration and evapotranspiration losses). 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 29 wells is anticipated to be a total of 725 gpm or 1.62 cfs to impoundments. Using an assumed conveyance loss of 20% (PRB FEIS pg 4-74) and full containment the produced water re-surfacing in Bullwhacker Dry Fork of the Powder River from this action (0.24 cfs) may add a maximum 0.19 cfs to the Upper Powder River flows, or 0.3% of the predicted total CBNG produced water contribution. This incremental volume is statistically below the measurement capabilities for the volume of flow of the Upper Powder River Watershed (refer to Statistical Methods in Water Resources U.S. Geological Survey, Techniques of Water-Resources Investigations Book 4, Chapter A3 2002, D.R. Helsel and R.M. Hirsch authors). For more information regarding the maximum predicted water impacts resulting from the discharge of produced water, see Table 4-6 (PRB-FEIS pg 4-85).

In the WMP portion of the POD, the operator provided an analysis of the potential development in the watershed above the project area (WMP page 3). Based on the area of the Dry Fork of the Powder River watershed above the POD (202.7 sq mi) and an assumed density of one well per location every 80 acres, the potential exists for the development of 1,621 wells which could produce a maximum flow rate of 40,532 gpm (90 cfs) of water. The BLM agrees with the operator that this is not expected to occur because:

1. Some of these wells have already been drilled and are producing.

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

The potential maximum flow rate of produced water within the watershed upstream of the project area, 1.62 cfs, is much less than the volume of runoff estimated from the 2-year storm event of 585 cfs for the Dry Fork of the Powder drainage.

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

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

Permit effluent limits were set at (WYPDES #WY0055824 page 2):

pH	6.5 to 9.0
Specific Conductance	2800 mg/l max
Dissolved iron	1000 µg/l max
Total Barium	1800 µg/l max
Total Arsenic	8.4 µg/l max
Chlorides	150 mg/l
Sodium Adsorption Ration	17

The WYPDES permit also addresses existing downstream concerns, such as irrigation use, in the COA for the permit. The designated point of compliance identified for this permit is 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.

Potential in-channel downstream impacts by this project are expected to be minor if any, and they are addressed in the WMP for the Blade POD prepared by WWC Engineering for Yates Petroleum Corporation.

4.4.2.1. Surface Water Cumulative Effects

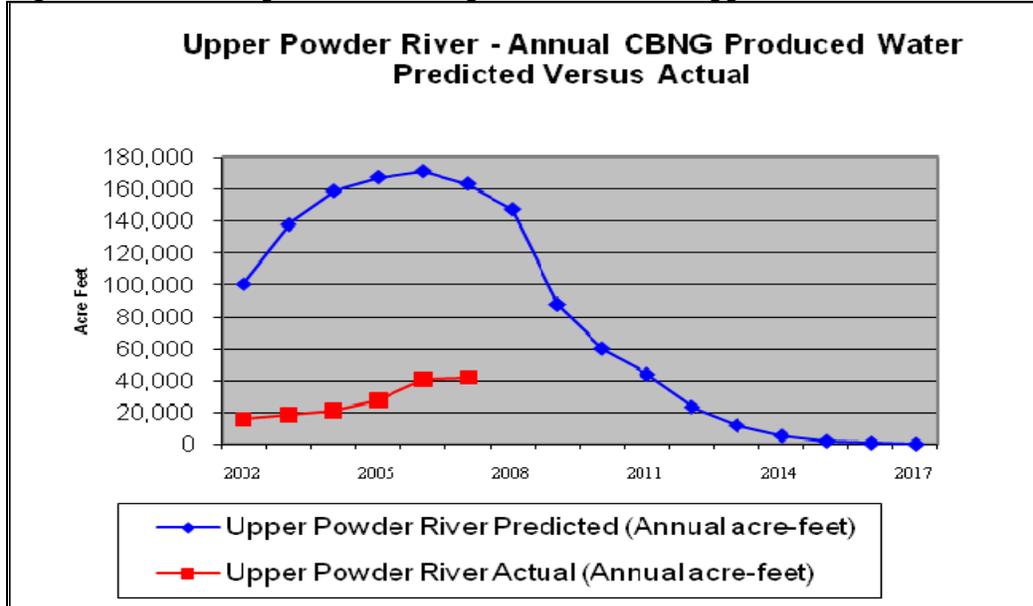
The analysis in this section includes cumulative data from Fee, State and Federal CBNG development in the Upper Powder River watershed. These data were obtained from the Wyoming Oil and Gas Conservation Commission (WOGCC).

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				
Total	1,285,233		166,096			

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.

No additional mitigation measures are required.

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

4.5. Cultural Resources

Sites 48CA5393, 48JO2271, 48JO2484, 48JO2915, 48JO2916, and 48JO2921 will be impacted by the project, however all are considered not eligible to the NRHP. Contributing portions of Eligible historic property, 48JO134 – Bozeman Trail, are within the area of potential effect for this project. No physical impacts of the trail will occur and the setting is no longer intact for any contributing segment. However, one new pipeline will be visible from a contributing segment, which will add to the already impacted viewshed.

On 4/11/08, the Bureau electronically notified the Wyoming State Historic Preservation Office (SHPO), following section V(B)(2) of the Wyoming State Protocol, of a finding of No Adverse Effect to historic properties.

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).

5. CONSULTATION/COORDINATION

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

6. OTHER PERMITS REQUIRED

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

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