

**FINDING OF NO SIGNIFICANT IMPACT & DECISION RECORD
FOR
Comet Energy Services, LLC
Kenai POD**

ENVIRONMENTAL ASSESSMENT –WY-070-07-166

DECISION: Is to approve Alternative C as described in the attached Environmental Assessment (EA) and authorize Comet Energy Services, LLC’s, Kenai POD Coal Bed Natural Gas (CBNG) POD, comprised of the following 37 Applications for Permit to Drill (APDs) and Right-of-Ways WYW169793 and WYW169794:

	Well Name	Well #	QTR	Sec	TWP	RNG	Lease
1	KENAI	A2-2A*	NENW	2	53N	75W	WYW128211
2	KENAI	A4-2A	NENE	2	53N	75W	WYW128211
3	KENAI	B3-2A	SWNE	2	53N	75W	WYW128211
4	KENAI	C2-3	NESW	3	53N	75W	WYW151892
5	KENAI	D1-3	SWSW	3	53N	75W	WYW151892
6	KENAI	A2-4	NENW	4	53N	75W	WYW0309256A
7	KENAI	B1-4	SWNW	4	53N	75W	WYW0309256A
8	KENAI	C2-4ACAW	NESW	4	53N	75W	WYW0309256A
9	KENAI	C4-4	NESE	4	53N	75W	WYW127795
10	KENAI	D1-4	SWSW	4	53N	75W	WYW0309256A
11	KENAI FED	A2-10ACAW	NENW	10	53N	75W	WYW127795
12	KENAI BLM FED	A2-21ACAW	NESW	21	54N	75W	WYW127796
13	KENAI BLM FED	A3-21ACAW	NWNE	21	54N	75W	WYW127796
14	KENAI BLM FED	B1-21ACAW	SWNW	21	54N	75W	WYW127796
15	KENAI BLM FED	B4-21ACAW	SENE	21	54N	75W	WYW127796
16	KENAI SPELLMAN	A2-22ACAW	NENW	22	54N	75W	WYW127796
17	KENAI SPELLMAN	B1-22ACAW	SWNW	22	54N	75W	WYW127796
18	KENAI BLM FED	C2-22ACAW	NESW	22	54N	75W	WYW127796
19	KENAI BLM FED	C3-22ACAW	NWSE	22	54N	75W	WYW127796
20	KENAI SPELLMAN	D1-22ACAW	SWSW	22	54N	75W	WYW127796
21	KENAI SPELLMAN	D4-22ACAW	SESE	22	54N	75W	WYW127796
22	KENAI SPELLMAN	A2-23ACAW	NENW	23	54N	75W	WYW127796
23	KENAI BLM FED	A2-26A/CA/W	NENW	26	54N	75W	WYW159214
24	KENAI BLM FED	A4-26	NENE	26	54N	75W	WYW159214
25	KENAI BLM FED	B1-26	SWNW	26	54N	75W	WYW159214
26	KENAI BLM FED	B3-26	SWNE	26	54N	75W	WYW159214
27	KENAI BLM FED	C2-26ACAW	NESW	26	54N	75W	WYW159214
28	KENAI BLM FED	C4-26	NESE	26	54N	75W	WYW159214
29	KENAI CRUMP	D1-26	SWSW	26	54N	75W	WYW159214
30	KENAI CRUMP	D3-26	SWSE	26	54N	75W	WYW159214
31	KENAI SPELLMAN	C2-27ACAW	NESW	27	54N	75W	WYW127796
33	KENAI SPELLMAN	C3-27ACAW	NWSE	27	54N	75W	WYW127796
33	KENAI SPELLMAN	C4-27ACAW	NESE	27	54N	75W	WYW127796
34	KENAI CRUMP	D1-27ACAW	SWSW	27	54N	75W	WYW127796
35	KENAI	C4-33ANCAW	NESE	33	54N	75W	WYW127796
36	KENAI BLM FED	A1-35ACAW	NWNW	35	54N	75W	WYW127796
37	KENAI BLM FED	B2-35ACAW	SENE	35	54N	75W	WYW127796

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

IMPOUNDMENT Name / Number	Qtr/Qtr	Sec	TWP	RNG	Capacity (Acre Feet)	Surface Dist (Acres)	Primary/Secondary	Lease Number
Crump 22-3-5375	SENW	3	53	75	17.17	5.14	Primary/Exist	Fee
Crump 42-4-5375	SENE	5	53	75	17.09	5.08	Primary/Exist	WYW151892
Crump 31-4-5375	NWNE	5	53	75	14.63	4.96	Secondary	Fee
Crump 11-4-5375	NWNW	5	53	75	19.89	6.82	Secondary	WYW0309256A
Windmill #1	NWNW	28	54	75	22.99	3.77	Primary	WYW130615
B1-27-5475	SWNW	27	54	75	33.15	5.8	Primary	WYW143989
B3-27-5475	SWNE	27	54	75	29.68	5.22	Secondary	WYW143989

This approval is subject to adherence with all of the operating plans and mitigation measures contained in the Master Surface Use Plan of Operations, Drilling Plan, Water Management Plan, and information in individual APDs. This approval is also subject to operator compliance with all mitigation and monitoring requirements contained within the Powder River Oil and Gas Project Environmental Impact Statement and Resource Management Plan Amendment (PRB FEIS) approved April 30, 2003.

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

1. The Operator, in their POD, has committed to:
 - Comply with all applicable Federal, State and Local laws and regulations.
 - Obtain the necessary permits from other agencies for the drilling, completion and production of these wells including water rights appropriations, the installation of water management facilities, water discharge permits, and relevant air quality permits.
 - Offer water well agreements to the owners of record for permitted water wells within ½ mile of a federal CBNG producing well in the POD.
 - Provide water analysis from a designated reference well in each coal zone.
2. The Operator has certified that a Surface Use Agreement has been reached with the Landowner(s).
3. Alternative C will not result in any undue or unnecessary environmental degradation.
4. It is in the public interest to approve these wells, as the leases are being drained of federal gas, resulting in a loss of revenue for the government.
5. Mitigation measures applied by the BLM will alleviate or minimize environmental impacts.
6. Alternative C is the environmentally-preferred Alternative.
7. The proposed action is in conformance with the PRB FEIS and the Approved Resource Management Plan for the Public Lands Administered by the Bureau of Land Management (BLM), Buffalo Field Office, April 2001.

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

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

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

Field Manager: _____ Date: _____

**BUREAU OF LAND MANAGEMENT
BUFFALO FIELD OFFICE
ENVIRONMENTAL ASSESSMENT (EA)
FOR
Comet Energy Services, LLC
Kenai POD
PLAN OF DEVELOPMENT
WY-070-07-166**

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/or impacts that are not covered within the PRB FEIS.

1. PURPOSE AND NEED

The purpose for the proposal is to define and produce coal bed natural gas (CBNG) on 6 valid federal oil and gas mineral leases issued to the applicant by the BLM. Analysis has determined that federal CBNG is being drained from the federal leases by surrounding fee or state mineral well development. The need exists because without approval of the Applications for Permit to Drill (APDs), federal lease royalties will be lost and the lessee will be deprived of the federal gas they have the rights to develop.

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

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

2. ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1. Alternative A - No Action

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

2.2. Alternative B Proposed Action

Proposed Action Title/Type: Comet Energy Services, LLC’s Kenai Plan of Development (POD) for 38 coal bed natural gas well APDs and associated infrastructure.

Proposed Well Information: There are 38 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 2 coal seams initially (Anderson and Canyon), but may eventually produce from another 2 coal zones (Wall and Smith). Proposed well house dimensions are 4 ft wide x 4 ft length x 4 ft height. Well house color is Covert Green, selected to blend with the surrounding vegetation. Wells are located as follows:

	Well Name	Well #	QTR	Sec	TWP	RNG	Lease #
1	KENAI	A2-2A*	NENW	2	53N	75W	WYW128211
2	KENAI	A4-2A	NENE	2	53N	75W	WYW128211
3	KENAI	B1-2A	SWNW	2	53N	75W	WYW128211
4	KENAI	B3-2A	SWNE	2	53N	75W	WYW128211
5	KENAI	C2-3	NESW	3	53N	75W	WYW151892
6	KENAI	D1-3	SWSW	3	53N	75W	WYW151892
7	KENAI	A2-4	NENW	4	53N	75W	WYW0309256A
8	KENAI	B1-4	SWNW	4	53N	75W	WYW0309256A
9	KENAI	C2-4ACAW	NESW	4	53N	75W	WYW0309256A
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24	KENAI BLM FED	A2-26ACAW	NENW	26	54N	75W	WYW159214
25	KENAI BLM FED	A4-26	NENE	26	54N	75W	WYW159214
26	KENAI BLM FED	B1-26	SWNW	26	54N	75W	WYW159214
27	KENAI BLM FED	B3-26	SWNE	26	54N	75W	WYW159214
28	KENAI BLM FED	C2-26ACAW	NESW	26	54N	75W	WYW159214
29	KENAI BLM FED	C4-26	NESE	26	54N	75W	WYW159214
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36	KENAI	C4-33ANCAW	NESE	33	54N	75W	WYW127796
37	KENAI BLM FED	A1-35ACAW	NWNW	35	54N	75W	WYW127796
38	KENAI BLM FED	B2-35ACAW	SENE	35	54N	75W	WYW127796

Proposed Water Management Plan: 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 Dist (Acres)	Primary/Secondary	Lease Number
Crump 22-3-5375	SEnw	3	53	75	17.17	5.14	Primary/Exist	Fee
Crump 42-4-5375	SENE	5	53	75	17.09	5.08	Primary/Exist	WYW151892
Crump 31-4-5375	NWNE	5	53	75	14.63	4.96	Secondary	Fee
Crump 11-4-5375	NWNW	5	53	75	19.89	6.82	Secondary	WYW0309256A
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B1-27-5475	SWNW	27	54	75	33.15	5.8	Primary	WYW143989
B3-27-5475	SWNE	27	54	75	29.68	5.22	Secondary	WYW143989
Crump 22-3-5375	SEnw	3	53	75	17.17	5.14	na	WYW132929

County: Campbell

Applicant: Comet Energy Services, LLC

Surface Owners: John Crump, Mr. Bobby Joe Spellman, Pete Dube, BLM.

Project Description:

The proposed action involves the following:

- Drilling of 38 total federal CBM wells in Anderson and Canyon initially, and later into the Wall and Smith coal zones, to depths of approximately 2000 feet. Multiple seams will be produced by co-mingling production (a single well per location cable of producing from multiple coal seams).

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

- Well metering shall be accomplished by telemetry and well visitation. Metering would entail at least 4 visits per month to each well and once a day to the compressor facility.
- A Water Management Plan (WMP) that originally included 8 discharge points (two existing) and 8 stock water reservoirs (two existing) within the Upper Powder River watershed that will fully contain approximately 50% of the produced water (1 reservoir and 1 discharge point were dropped). The remaining water will be piped to three subsurface drip irrigation systems (SDI) totaling 143 acres of private land, where various cover crops will be irrigated during the growing season, and during the remainder of the year SDI water will flush the root zone of salts and be allowed to percolate deeper to the groundwater table.
- An unimproved and improved road network.
- A buried gas, water and power line network, and 1 compression facility.
- Right-of-Ways (ROW) WYW169793 (gas pipeline) and WYW169794 (road, water pipeline and power line) for CBNG wells in State section 16 and to move product from wells within the Kenai POD across various federal leases.

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(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 Kenai POD are listed below under 2.3.1:

2.3.1. Changes as a result of the on-sites

1. Well B1-2, was dropped, the well was within a quarter mile of a golden eagle nest.
2. Well C2-4, moved well off of steep hill, reducing the need for a full pad to a slotted pad.
3. Well A2-10, dropped the pad. Might need a short spot upgrade on road just before the well.
4. Well B4-21 was moved approximately 100' out of sagebrush (moderate density -10% cover) to a grassy area, thus minimizing the loss of sage-grouse nesting habitat.
5. Access to well A2-22 had two spot upgrades added.

6. Well D1-22, moved well and rerouted access road/utility corridor. The move eliminated approximately 0.38 miles of engineered road. Surface disturbance was greatly reduced.
7. Well D4-22 was moved to the compressor site to reduce surface disturbance.
8. Well A2-23, the access road/utility corridor was rerouted, thus eliminating the need for an engineered road. Surface disturbance was greatly reduced.
9. Well A2-26 was added to achieve better CBNG drainage.
10. Well C2-26 was moved approximately 600 feet to the east out of sagebrush (moderately dense 10-15 % cover), thus reducing direct sage-grouse habitat loss and providing better gas drainage within the section.
11. Well C4-27 was moved to avoid the need for an engineered pad.
12. Well A1-35 was moved approximately 300 feet to the east, thus eliminating the need for an engineered road and reducing the amount of surface disturbance.
13. Spellman A4-27 reservoir was dropped due to landowner's concerns, thus eliminating approximately 2.6 acres of disturbance.
14. Well B1-23, was dropped due to steep and rough topography. This eliminated the need for an engineered road and pad. Approximately 2.8 acres of surface disturbance was eliminated.
15. Well C2-27, the access road/utility corridor was rerouted to follow an existing pipeline scar.
16. The water line that leaves the C2-27 well and heads northwest to the reservoir will not exceed 25 feet maximum disturbance width. This will reduce sagebrush disturbance.
17. The Spellman A4-27 reservoir pipeline and discharge point were rerouted approximately 400 feet to the east out of dense (15-25% cover) sagebrush to a grassy clearing.
18. The Spellman B1-27 reservoir pipeline was rerouted approximately 200 feet north out of dense (15-25% cover) sagebrush onto a ridge with low density (3-8 % cover) sagebrush.

2.3.2. Programmatic mitigation measures identified in the PRB FEIS ROD

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

2.3.2.1. Groundwater

1. In order to address the potential impacts from infiltration on shallow ground water, the Wyoming DEQ has developed a guidance document, "Compliance Monitoring for Ground Water Protection Beneath Unlined Coalbed Methane Produced Water Impoundments" (June 14, 2004) which can be accessed on their website. This guidance document became effective August 1, 2004. For WYPDES permits received by DEQ after the August 1st effective date, the BLM will require that operators comply with the latest DEQ standards and monitoring guidance.

2.3.2.2. Surface Water

1. Channel Crossings:
 - a) Minimize channel disturbance as much as possible by limiting pipeline and road crossings.
 - b) Avoid running pipelines and access roads within floodplains or parallel to a stream channel.
 - c) 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.
 - d) Channel crossings by pipelines will be constructed so that the pipe is buried at least four feet below the channel bottom.
2. Low water crossings will be constructed at original streambed elevation in a manner that will prevent any blockage or restriction of the existing channel. Material removed will be stockpiled for use in reclamation of the crossings.
3. The operator will supply a copy of the complete approved SW-4, SW-3, or SW-CBNG permits to BLM as they are issued by WSEO for impoundments.
4. The operator will supply copies of letters of approval issued by WDEQ for all SDI facilities. Also provide figures that show the layout of facilities at each SDI site, including the location of tanks, ponds, buildings, roads and irrigation zones, labels showing chemicals contained in each tank, and details of spill containment for chemical tanks.
5. Before putting federal water in the Crump 22-3-5375 Reservoir the operator will cancel the bond for this reservoir currently in place with the WDEQ system and re-post this bond with BLM in the amount of \$19,733 (\$2.5 x cubic yards of fill).

2.3.2.3. Soils

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

2.3.2.4. Wetland/Riparian

1. Power line corridors will avoid wetlands, to the extent possible, in order to reduce the chance of waterfowl hitting the lines. Where avoidance can't occur, the minimum number of poles necessary to cross the area will be used.
2. 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.
3. No waste material will be deposited below in riparian areas, flood plains, or in natural drainage ways.
4. Soil or other material stockpiles will be located outside the active floodplain.
5. Disturbed channels will be re-shaped to their approximate original configuration or stable geomorphological configuration and properly stabilized.
6. Reclamation of disturbed wetland/riparian areas will begin immediately after project activities are complete.

2.3.2.5. Wildlife

1. For any surface-disturbing activities proposed in sagebrush shrublands, the Companies will conduct clearance surveys for sage grouse breeding activity during the sage grouse's breeding season before initiating the activities. The surveys must encompass all sagebrush shrublands within 0.5 mile of the proposed activities.
2. All overhead powerlines shall be built to protect raptors, including bald eagles from accidental electrocution using the most recent "suggested practices for raptor protection" by the Avian Power Line Interaction Committee (current version 2006) and any additional practices provided by the US Fish and Wildlife Service. It should be noted that raptor protection can be achieved through insulation and or wire spacing and that there are multiple configurations capable of protecting raptors (CM5 Biological Opinion 2007).
3. 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.

2.3.2.6. Threatened, Endangered, or Sensitive Species

2.3.2.6.1. Bald Eagle

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

2.3.2.6.2. 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.

2.3.2.6.3. Mountain Plover

1. 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 ½ mile of occupied mountain plover nesting habitat.
4. Construction of ancillary facilities (for example, compressor stations, 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. Where possible, roads will be located outside of plover nesting areas.
6. 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.
7. 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.
8. 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.
9. Reclamation of areas of previously suitable mountain plover habitat will include the seeding of vegetation to produce suitable habitat for mountain plover.

2.3.2.6.4. Ute Ladies'-tresses Orchid

1. Suitable habitat will be avoided wherever possible.

2. 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.
3. 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.
4. 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.

2.3.2.7. Visual Resources

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

2.3.2.8. Noise

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

2.3.2.9. Air Quality

1. During construction, emissions of particulate matter from well pad and resource road construction will be minimized by application of water, or other dust suppressants, with at least 50 percent control efficiency. Roads and well locations constructed on soils susceptible to wind erosion could be appropriately surfaced or otherwise stabilized to reduce the amount of fugitive dust generated by traffic or other activities, and dust inhibitors (surfacing materials, non-saline dust suppressants, and water) could be used as necessary on unpaved collector, local and resource roads that present a fugitive dust problem. The use of chemical dust suppressants on BLM surface will require prior approval from the BLM authorized officer.

2.3.3. Site specific mitigation measures

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

1. Minimize sagebrush disturbance at all development areas, by disturbing only areas that are needed for construction/production.
2. The approval of this project does not grant authority to use off lease federal lands. No access or surface activity is allowed on or off the affected leases on Federal lands until right-of-way grants become authorized.
3. Onshore Order #1 revisions effective May 7, 2007 require operators to supply a copy of the Surface

Use Plan to each private surface owner affected by the project prior to APD approval; compliance with this measure will be certified by the operator in writing to the Buffalo Field Office (BFO). The self-certification must be received by the BFO before construction on the project begins.

4. Wells B3-2, A3-21, D1-22 and C3-27, maintain 20' vegetated buffer near slopes/drainages.
5. Well C4-26, block off vehicles to the petrified tree area. No vehicles in the area.
6. All permanent above-ground structures (e.g., production equipment, tanks, etc.) not subject to safety requirements, will be painted to blend with the natural color of the landscape. The paint used will be a color which simulates "Standard Environmental Colors." The color selected for the Kenai POD is Covert Green, 18-0617TPX.
7. The operator will drill seed on the contour to a depth of 0.5 inch or less and/or surface apply, depending on species, followed by cultipaction to compact the seedbed, preventing soil and seed losses. To maintain quality and purity, the current years tested, certified seed with a minimum germination rate of 80% and a minimum purity of 90% will be used. On BLM surface or in lieu of a different specific mix desired by the surface owner, use the following:

SEED MIX:

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

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

*PLS = pure live seed

*Northern Plains adapted species

*Double this rate if broadcast seeding

*Varieties planted will be "suitable/adaptable" to Powder River Basin

Wildlife

1. 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, Comet Energy will coordinate with the BLM to determine if additional resurveys will be required.
2. No surface disturbing activities are permitted in suitable mountain plover habitat from March 15-July 31 annually, unless a mountain plover survey has been conducted during 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>
T54N, R75W	26	C2-26-5475 well and associated infrastructure.
T53N, R75W	2	A4-2-5375 well and associated infrastructure.
T54N, R75W	35	Main access road/utility corridor in the southeast quarter of Section 35.
T53N, R75W	4	D1-4-5375 well and associated infrastructure.
T53N, R75W	10	Access road/utility corridor to the A2-10-5375 well.

The surveys will be conducted in suitable habitat (i.e. prairie dog colonies, roads, pipelines, reservoirs under construction and any short grass prairie area) throughout the entire project area.

- a. Mountain plover nesting 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.
 - b. If a mountain plover is identified, then a seasonal disturbance-free buffer of ¼ mile shall be maintained between March 15 and July 31. If no mountain plovers are identified, then surface disturbing activities may be permitted within suitable habitat until the following breeding season (March 15).
3. 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>
T54N, R75W	21	B1-21-5475 and associated infrastructure; the water line that bisects the southwestern quarter of Section 21.
T54N, R75W	27	Wells D1-27-5475; access road/utility corridor in the southwest quarter of Section 27.
T54N, R75W	33	Access roads/utilities corridor in the southeast quarter of Section 33; access roads/utility corridor in the northeast quarter in Section 33.

<i>Township/Range</i>	<i>Section</i>	<i>Affected Wells and Infrastructure</i>
T53N,R75W	2	B1-2-5375, A2-2-5375, B3-2-5375 and associated infrastructure; proposed water line in the central part of Section 2.
T53N,R75W	3	C2-3-5375 and associated infrastructure; all proposed infrastructure the northwestern ½ of Section 3.
T53N, R75W	4	A2-4-5375, B1-4-5375,C4-4-5375, all proposed infrastructure in the eastern ½ of Section 4 and all proposed infrastructure in the northwestern 1/3 of Section 4.

- 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 disturbance 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 disturbance activities within ½ mile of occupied raptor nests from February 1 to July 31.
- b. Nest productivity checks shall be completed for the first five years following project completion. The productivity checks shall be conducted no earlier than June 1 or later than June 30 and any evidence of nesting success or production shall be recorded. Survey results will be submitted to a Buffalo BLM biologist in writing no later than July 31 of each survey year. Nests to be checked are within a ½ mile or less of the proposed development. The nests are listed below:

BLM ID #	UTM N	UTM E	Legal
4035	428241E	4939462N	SENE Sec 5, T53N,R75W
New	430331E	4939562N	NWNW Sec 3, T53N, R75W
2769	432164E	4939123N	SENE Sec 2 ,T53N, R75W
2773	430079E	4941605N	SENE Sec 28, T53N, R75W
2772	428837E	4943764N	NWSW Sec 21, T53N, R75W
3620	428498E	4939467N	Sec 3, T53N, R75W
3625	430327E	4939495N	Sec 3, T53N, R75W

- c. 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.
4. The following conditions will reduce impacts to sage grouse: No surface disturbing activities are permitted within 2 miles of the following leks: Kretschma and Playa between March 1 and June 15, prior to completion of a greater sage-grouse lek survey. **This condition will be implemented on an annual basis for the duration of surface disturbing activities.** This timing limitation will affect the following wells and infrastructure:

<i>Township/Range</i>	<i>Section</i>	<i>Affected Wells and Infrastructure</i>
T54N, R75W	26	A4-26, C4-26, B3-26, C2-26, D3-26, D1-26 and all associated infrastructure to these wells.
T54N, R75W	35	A1-35 and B2-35 and all proposed infrastructure within Section 35.
T53N, R75W	3	C2-3 well and associated infrastructure; all proposed infrastructure east of the C2-3-5375 access road in Section 3.
T53N, R75W	2	A2-2, B1-2, B3-2, A4-2 and all proposed infrastructure in Section 2.

<i>Township/Range</i>	<i>Section</i>	<i>Affected Wells and Infrastructure</i>
T53N, R75W	10	A2-10-5375 well.

- 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 WGFD 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 lek sites. Perch inhibitors will be installed to deter avian predators from preying on sage grouse.
 - c. Access road to well C2-27-5475 will not exceed 25 feet maximum disturbance width. This condition was agreed to by Kent Fink of Coment Energy during the onsite on June 11, 2007.
5. If a new sharp-tailed grouse lek is identified during the survey, the 0.67 mile timing restriction (March 1 to 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 buffer until the following breeding season. The required survey will be conducted by a biologist following the most current WGFD protocol. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities.
 6. All other conservation measures and terms and conditions identified in the Powder River Basin Oil and Gas Project Biological Opinion (WY07F0075) shall be complied with.
 7. Please contact Dan Sellers, Natural Resource Specialist, @ (307)684-1100, Bureau of Land Management, Buffalo, if there are any questions concerning these surface use COAs.

3. DESCRIPTION OF AFFECTED ENVIRONMENT

Applications to drill were received on 7/28/2006. Field inspections of the proposed Kenai POD CBNG project were conducted on 6/11, 12, 13/2007 by Kent Fink, Todd Tuminallo, Jay Martini, Kevin Anderson, Kelly Long, Allen Aksmitt-Company Representatives, Dan Sellers, BJ Earle, Guymen Easdale, Linda Reed, Chris Perry, and Chris Williams-BLM Representatives.

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			Guymen Easdale
Floodplains		X		Dan Sellers, Chris Williams
Wilderness Values			X	Dan Sellers
ACECs			X	Dan Sellers
Water Resources	X			Dan Sellers, Chris Williams
Air Quality		X		Dan Sellers
Cultural or Historical Values		X		BJ Earle
Prime or Unique Farmlands			X	Dan Sellers
Wild & Scenic Rivers			X	Dan Sellers
Wetland/Riparian		X		Dan Sellers, Chris Williams
Native American Religious Concerns		X		BJ Earle
Hazardous Wastes or Solids			X	Dan Sellers
Invasive, Nonnative Species	X			Dan Sellers
Environmental Justice		X		Dan Sellers

3.1. Topographic Characteristics of Project Area

Primary land uses in the area are ranching/farming, CBNG production and hunting. There is currently natural gas development within the project area. William's Carr Draw I is to the southwest, Yates' Neo is to the south east, Pennaco's Middle Prong is to the northwest and Lance's West Gas Draw Beta is located to the northeast.

Elevations within the project area range from 3900 to 4545 feet above sea level. The topography is classic Powder River breaks, prominent ridgelines cut by numerous draws. The project area is drained by ephemeral tributaries of Middle Prong of Wildhorse Creek, and South Windmill Draw Creek. Middle Prong of Wildhorse Creek and South Windmill Draw are ephemeral (Western Land Services 2007). The topography consists of moderately rugged terrain with ridges, deep draws and rough breaks.

The project area also contains flat areas along the flood plain of Middle Prong of Wildhorse Creek and South Windmill Draw (Martini 2007). The flood plain has been converted to upland grasses and agricultural fields.

For more information please see the POD book.

3.2. Vegetation & Soils

With over 100 years of cow and sheep grazing in northeastern Wyoming, vegetation communities have deviated from historic climax plant communities. Listed below are the vegetation communities that exist within the project area as of 2007.

Native sagebrush grassland along the Middle Prong of Wildhorse Creek has been converted to tilled farmland. Tilled farmland is located on the north and south sides of Middle Prong Road (Martini 2007). Middle Prong Road bisects the southern quarter of the project area.

Land cover within the project area is a sagebrush grassland habitat type. Common species associated with this vegetation type include Wyoming big sagebrush (*Artemisia tridentata wyomingensis*), silver sagebrush (*Artemisia cana*), western wheat grass (*Pascopyrum smithii*), junegrass (*Koeleria macrantha*),

needle and thread grass (*Hesperostipa comata*), Sandberg blue grass (*Poa secunda*), Japanese brome (*Bromus japonicus*), cheatgrass (*Bromus tectorum*), prickly pear cactus (*Opuntia spp.*), scarlet globemallow (*Sphaeralcea coccinea*), and rabbit brush (*Chrysothamnus spp.*) (Martini 2007). The project area is made up of sagebrush and native grasses; sagebrush and native grasses with cheatgrass/Japanese brome invading; and sagebrush with a cheat grass/Japanese brome dominated under story. This vegetation type includes a combination of sparse (0-5% cover), light (5-10% cover), moderately dense (10-15% cover) and dense (15-25% cover) big sagebrush crown closure. In areas where sagebrush and native grasses exist, grass cover ranges from 10-35% depending on soil type. In areas with sagebrush and native grasses and cheatgrass/Japanese Brome, cheatgrass/Japanese Brome cover ranges from sparse (0-10%) to dense (40 to 80%). Cheatgrass and Japanese brome have taken over areas that have been affected by fire and over grazing. In these areas cheatgrass and Japanese brome cover is between 60 and 80%. Stands of juniper trees occur in the northern sections (21, 22, 23, 27, and 28) of Township 54 North, Range 75 West. Juniper tree stands occur mainly in the draw bottoms to about mid slope. Juniper trees are thickest in the draw bottoms. Scattered juniper trees occur within sagebrush communities, on ridge lines and flats throughout the project area (Martini 2007).

Within the project area, cottonwood trees are found at four locations: (1) NENE Section 3, (2) SENE Sec 3, (3) NWNW Section 3, and (4) SWNW Section 2, Township 53 North, Range 75 West. The first location has 8 to 10 cottonwood trees grouped together and is located at a ranch house, the second and third locations both contain 5 trees, and the fourth location contains 20 trees. Single cottonwood trees are found scattered throughout the project area in deep narrow draws. Middle Prong of Wildhorse Creek within and adjacent to the project area consists of wetland and upland grasses and upland shrubs. Historic land uses within the project area include livestock grazing, oil and gas development and wildlife habitat.

The soils vary from sand and clay to primarily sandy clay loam throughout the project area. Soils differ with topographic location, slope and elevation. Topsoil depths to be salvaged for reclamation range from 0 to 2 inches on ridges to 12 inches plus in bottomland. Erosion potential varies from low to high, depending on the soil type, vegetative cover and slope. Reclamation potential of soils also varies throughout the project area.

Successful reclamation is expected with sound management, adequate moisture and time.

Using the Natural Resource Conservation Service, (NRCS, USDA), Technical Guides for the Major Land Resource Area 58B Northern Rolling High Plains, in the 10-14" Northern Plains precipitation zone, the landforms and soils of the project area are deep to moderately deep (greater than 20" to bedrock), well-drained & moderately permeable. Layers of the soil most influential to the plant community vary from 3 to 6 inches thick. These layers consist of the A horizon with very fine sandy loam, loam, or silt loam texture and may also include the upper few inches of the B horizon with sandy clay loam, silty clay loam or clay loam texture. The predominant ecological sites occurring within the proposed POD is found to be Loamy (25%), shallow loamy/clayey (25%) and clayey (45%). Lowland and sandy sites make up a small portion (5%) of the ecological range sites. These sites occur on land nearly level to up to 50% slopes. Landform: Hill slopes with associated alluvial fans & stream terraces.

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

Mixed Sagebrush/Grass Plant Community

This site 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. A mix of warm and cool-season grasses make up the majority of the understory with the balance made up of annual cool-season grasses, and miscellaneous forbs.

Dominant grasses include needleandthread, western wheatgrass, little bluestem 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 0 to 25%. Fringed sagewort and plains prickly pear are common

When compared to the Historic Climax Plant Community (HCPC), sagebrush and blue grama have increased. Production of cool-season grasses, particularly green needlegrass, has been reduced. The cool-season mid-grasses are protected by the sagebrush canopy, but this protection makes them unavailable for grazing. Cheatgrass (downy brome) has invaded the site. The overstory of sagebrush and understory of grass and forbs provide a diverse plant community that will support domestic livestock and wildlife such as mule deer and antelope.

This plant community is resistant to change. A significant reduction of big sagebrush can only be accomplished through fire or brush management. Species composition can be altered through long-term overgrazing. If the herbaceous component is intact, it tends to be resilient if the disturbance is not long-term.

Heavy Sagebrush Plant Community

This plant community is the result of long-term protection from grazing and fire. Sagebrush eventually dominates this plant community. At first, excessive litter builds up, shading out some of the grasses and forbs. Other plants become decadent with low vigor. Bunch grasses often develop dead centers. Eventually, the interspaces between plants increase in size leaving more soil surface exposed. Organic matter oxidizes in the air rather than being incorporated into the soil.

The dominant plants tend to be somewhat similar to those found in the Historic Climax Plant Community. Weedy species, cool-season grasses, and sedges have increased. Blue grama has decreased. Rodent activity has resulted in an increase in soil disturbance. Cactus and sageworts often increase. Noxious weeds such as Dalmatian toadflax, leafy spurge, or Canada thistle may invade the site if a seed source is present. Plant diversity is moderate to high.

This plant community is not resistant to change and is more vulnerable to severe disturbance than the HCPC. The introduction of grazing or fire quickly changes the plant community.

Soil erosion is accelerated because of increased bare ground. Infiltration is reduced and runoff is increased.

Western Wheatgrass/Cheatgrass Plant Community

This plant community is created when the Mixed Sagebrush/Grass Plant Community or the Heavy Sagebrush Plant Community is subjected to fire or brush management not followed by prescribed grazing. Rhizomatous wheatgrasses and annuals will dominate the site.

Compared to the HCPC, cheatgrass has increased with western wheatgrass and thickspike wheatgrass maintaining at a similar or slightly higher level. Virtually all other cool-season mid-grasses are severely decreased. Blue grama is the same or slightly less than found in the HCPC. Plant diversity is low.

3.2.1. Wetlands/Riparian

Wetlands are minimal in the POD area and wetland vegetation is restricted to the margins of one existing reservoir. Well defined riparian areas are found on margins of the Middle Prong Wild Horse Creek channel and along some of the larger tributary channels. Cottonwood trees although present are not common in the area.

3.2.2. Invasive Species

The following state-listed noxious weeds and/or weed species of concern infestations were discovered by a search of inventory maps or databases on the CBM Clearinghouse website (<http://www.cbmclearinghouse.info/>) or from field visits:

- Leafy Spurge
- Canada thistle

The state-listed noxious weeds are listed in PRB FEIS Table 3-21 (p. 3-104) and the Weed Species of Concern are listed in Table 3-22 (p. 3-105).

3.3. Wildlife

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

A habitat assessment and wildlife inventory surveys were performed by Western Land Services (2007). No bald eagle surveys were conducted. Western Land Services conducted surveys for sage and sharp-tailed grouse on April 7, 14, 20, and May 3, 2006. A habitat assessment was conducted on September 14, and 19, 2006. During this time Western Land Services verified the location of known raptor nests. A mountain plover survey was conducted on May 25, 2006. The landowner would only allow Western Land Service one day to conduct a mountain plover survey. Western Land Services conducted a ground survey for sage and sharp-tailed grouse on April 4, 2007, and aerial surveys for sage and sharp-tailed grouse were conducted on April 14 and 21, 2007. Raptors surveys were conducted April 21, May 16, June 12 and 13, 2007. Mountain plover, burrowing owl and prairie dog surveys were conducted on May 16, June 12 and 13, 2007.

Western land Services conducted a habitat assessment for Ute Ladies'-Tresses orchid on September 8, 2006.

A BLM biologist conducted field visits on June 11 and 13, 2007. During this time, the biologist reviewed the wildlife survey information for accuracy, evaluated impacts to wildlife resources, and provided project adjustment recommendations where wildlife issues arose. The biological assessment for the Kenai project is being incorporated into this environmental assessment document.

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

3.3.1. Big Game

Big game species expected to be within the project area include pronghorn, mule deer and possibly elk. The WGFD has determined that the project area contains Winter/Yearlong range and Yearlong for mule deer and Winter range and Yearlong range for pronghorn antelope. Yearlong range for white-tailed deer is located approximately 1.9 miles west of the project area.

The Kenai project area is located 5 miles northeast of the Fortification Creek elk Yearlong range. According to the BLM Buffalo Field Office data base (information that has been gathered from 26 radio collared elk since February 2005) there were 24 locations of collared elk within 3 miles southwest of the project area. The locations were during the spring and fall; most of the locations were from two of the

collared elk within the same sub-herd group. Occasional elk use of the project area may be expected especially during the spring and fall.

Winter use is when a population or portion of a population of animals uses the documented suitable habitat sites within this range annually, in substantial numbers only during the winter period. **Winter-Yearlong** use is when a population or a portion of a population of animals makes general use of the documented suitable habitat sites within this range on a year-round basis. During the winter months there is a significant influx of additional animals into the area from other seasonal ranges. **Yearlong** use is when a population of animals makes general use of suitable documented habitat sites within the range on a year round basis. Animals may leave the area under severe conditions. Big game range maps are available in the PRB FEIS (3-119-143), the project file, and from the WGFD.

3.3.2. Aquatics

The project area is drained by ephemeral tributaries of Middle Prong of Wildhorse Creek which is a tributary Powder River. Middle Prong of Wildhorse Creek is ephemeral and flows primarily in response to snow melt and rain fall. 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 for them.

3.3.3. Migratory Birds

A wide variety of migratory birds may be found in the proposed project area at some point throughout the year. Migratory birds are those that migrate for the purpose of breeding and foraging at some point in the calendar year. Migratory bird species of management concern that may occur in the project area are listed in the PRB FEIS (3-151). Species observed by BLM biologist, Guymen Easdale, include sage sparrow, sage thrasher, and Brewer’s sparrow.

3.3.4. Raptors

Seven raptor nests were identified within the Kenai project area. In 2007, there were 2 active nests. Four nests were inactive in 2007 and one was occupied by a Canada goose. All seven nests are located within the project area.

Table 3.2. Documented raptor nests within the Kenai project area in 2007 (UTM Zone 13, NAD83).

BLM ID#	SPECIES	UTM	LEGAL LOCATION	SUBSTRATE	CONDITION	STATUS
New	RTHA/ GOEA	430331E 4939562N	NWNW Sec 3 T53N, R75W	Cottonwood Tree, live	Excellent	Occupied by Canada goose in 2007
4035	RTHA	428241E 4939462N	SENE Sec 5 T53N, R75W	Cottonwood Tree, dead	Excellent	Active
2769	GOEA	432164E 4939123N	SENE Sec 2 T53N, R75W	Cottonwood Tree, live	Excellent	Active
2773	RTHA	430079E 4941605N	SENE Sec 28 T53N, R75W	Cottonwood Tree, live	Good	Inactive
2772	RTHA	428837E 4943764N	NWSW Sec 21 T53N, R75W	Cottonwood Tree, live	Good	Inactive
3620	RTHA	428498E	Sec 3	Cottonwood	Good	Inactive

BLM ID#	SPECIES	UTM	LEGAL LOCATION	SUBSTRATE	CONDITION	STATUS
		4939467N	T53N, R75W	Tree, live		
3625	GOEA/RTHA	430327E 4939495N	Sec 3 T53N, R75W	Cottonwood Tree, live	Good	Inactive

3.3.5. Threatened and Endangered and Sensitive Species

3.3.5.1. Threatened and Endangered Species

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

3.3.5.1.1. Black-footed ferret

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

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

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

Six active prairie dog colonies were identified by Western Land Services (2007) within the Kenai project area, total acreage is 220.45 acres. According to the BLM Buffalo Field Office data base (2006), there were 18 prairie dog colonies within 4 miles of the project area. The colonies ranged in size from 1 to 3,887 acres. Historically, part of the largest prairie dog colony extended into the Kenai project area. The colony occupied the flat flood plain area along the Middle Prong of Wildhorse Creek. During the onsite (June 11 and 13, 2007), BLM biologist observed that most of the 3, 887 acres was converted to agricultural fields, at present very little prairie dog colony remains. The Kenai project area falls within the Arvada potential black-footed ferret reintroduction area.

3.3.5.1.2. Ute's Ladies Tresses Orchid

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

Middle Prong of Wildhorse Creek and its tributaries are ephemeral (Western Land Services 2007). There

are no springs within the project area. The project area consists of upland vegetation. Suitable orchid habitat is not present within the Kenai project area.

3.3.5.2. Sensitive Species

The USDI Bureau of Land Management (BLM) Wyoming has prepared a list of sensitive species to focus species management efforts towards maintaining habitats under a multiple use mandate. The authority for this policy and guidance comes from the Endangered Species Act of 1973, as amended; Title II of the Sikes Act, as amended; the Federal Land Policy and Management Act (FLPMA) of 1976; and the Department Manual 235.1.1A.

3.3.5.2.1. Bald eagle

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

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

Within the project area, cottonwood trees, capable of supporting roosting and nesting bald eagles, are found at four locations: (1) NENE Section 3, (2) SENE Sec 3, (3) NWNW Section 3, and (4) SWNW Section 2, Township 53 North, Range 75 West.

The project area has a reliable year round prey base in the form of prairie dogs, and lagomorphs. Within the project area there are 220.45 acres of active and densely populated prairie dog colonies. As the reservoirs are developed and begin taking water, waterfowl will likely be attracted to the project area and provide an additional prey source for bald eagles.

According to the BLM Buffalo Field Office data base, bald eagles have been identified at three locations within 1.3 miles of the project area. A single adult bald eagle was observed 0.20 miles from the project area on February 8, 2005; a single adult was observed 1.1 miles from the project area on January 31, 2006, and two adult bald eagles were observed 1.3 miles from the project area on February 23, 2006.

3.3.5.2.2. Black-tailed prairie dog

On August 12, 2004, the U.S. Fish and Wildlife Service removed the black-tailed prairie dog's Candidate status. The Buffalo Field Office however will consider prairie dogs as a sensitive species and continue to afford this species the protections described in the FEIS.

Prairie dogs colonies create a biological niche or habitat for many species of wildlife (King 1955, Reading 1989). Agnew (1986) found that bird species diversity and rodent abundance were higher on

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

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

Six active and densely populated black-tailed prairie dog colonies were identified during site visits by Western Land Services within the Kenai project area. According to the BLM Buffalo Field Office data base (2006), there were 18 prairie dog colonies within 4 miles of the project area. The colonies ranged in size from 1 to 3,887 acres. Historically, part of the largest prairie dog colony extended into the Kenai project area. The colony occupied the flat flood plain area along the Middle Prong of Wildhorse Creek. During the onsite (June 11 and 13, 2007), BLM biologist observed that most of the 3, 887 acres was converted to agricultural fields, at present very little prairie dog colony remains.

Prairie Dog Colonies Located Within the Kenai Project Area and Near the Boundaries.

Legal Location Township, Range and Section	Size Acres	Location to Project Area
SW Sec 26, T54N, R75W	33.2	Within project area.
SW Sec34 and SE Sec 33 T54N, R75 W	32.3	Within project area.
SESE Sec 34, SWSW Sec35, T54N, R75W; NENE Sec 3, NWNW Sec 2, T53N, R75W	31.4	Within project area.
SE Sec 35, T54N, R75W; NE Sec 2, T53N, R75W	39.7	Within project area.
E ¼ Sec 5, W ¼ Sec 4, NW Sec 9, T53N, R75W	78.1	Within project area.
SWSW Sec 3, T53N, R75W	5.75	Within project area.

3.3.5.2.3. Greater sage-grouse

Sage-grouse listed as a sensitive species by BLM (Wyoming). In recent years, seven petitions have been submitted to the U.S. Fish and Wildlife Service (FWS) to list greater sage-grouse as threatened or endangered. On January 12th, 2005, the USFWS issued a decision that the listing of the greater sage-grouse was “not warranted” following a Status Review. The decision document supporting this outcome noted the need to continue or expand all conservation efforts to conserve sage-grouse.

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).

Wyoming big sagebrush (*Artemisia tridentata wyomingensis*), the primary shrub, occurs throughout the project area in a patchy mosaic of sparse (0-5% cover), low (5-10% cover), moderate (10-15% cover), and dense (15-25% cover) stands. On average the sagebrush ranged in size from 15 to 20 inches tall.

Suitable sage-grouse habitat is present throughout the project area. BLM records identified six sage grouse leks within 3.0 miles of the Kenai project area. These lek sites are identified below (Table 6).

Table 3.3. Documented sage-grouse leks within 3 miles of the Kenai project area in 2007.

Lek ID	UTM NAD83	Legal Location	Status (Peak Males)	Distance From Project Area (Miles)
Playa	433858E 4937162N	SWSW Sec 12 T53N, R75W	2007 18 males 2006 32 males 2005 20 males	1.8 miles from project area.
Box Draw	436621E 4943053N	NENE Sec 30 T54N, R74W	2007 11 males 2006 9 males 2005 7 males	2.9 miles from project area
Kretschma	433654E 4939813N	NWNW Sec 1, T53N, R75W	2007 0 birds 2006 0 birds 2005 3 males	0.15 miles from project area.
Fitch Pro	437352E 4939103N	W2SSw Sec 1, T53N, R75W	2002- 2007 inactive	2.4 miles from the project area.
Case II	435715E 4948284N	N2SE Sec 6, T54N, R74W	2004-2007 inactive	2.7 miles from the project area.
Ridgetop	437300E 4939400N	SENW Sec 5, T53N, R74W	2004-2007 inactive	2.3 miles from the project area.

Sharp-tailed grouse

Originally ten sharp-tailed grouse were observed in southeast quarter of Section 33, Township 33 North, Range 75West (UTMs 429751E, 4940056N). Multiple surveys were conducted and found no sharp-tailed grouse using the area. The site did not meet the definition of a lek as per established Wyoming Game and Fish Department/BLM Buffalo Field Office protocol. The sharp-tailed grouse lek, labeled as Greasewood, has been removed from the data base by Wyoming Game and Fish Department.

3.3.5.2.4. Mountain plover

In September 2003, the U.S. Fish and Wildlife Service withdrew their proposal to list the mountain plover. However, the mountain plover remains an agency-designated Sensitive Species within both the Bureau of Land Management and the Forest Service. According to the U.S. Geological Survey, prairie dogs currently exist on less than one percent of their former range, and their numbers have declined by 98 percent (Turbak 2004). Mountain plover numbers have declined-possibly from millions-to only about 10,000 birds today (Turbak 2004).

Due to six active black-tailed prairie dog colonies within the project area and oil and gas development occurring within and adjacent to the project area, good mountain plover habitat exists throughout the area.

3.4. West Nile Virus

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

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

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

The human health issues related to WNV are well documented and continue to escalate. Historic data collected by the CDC and published by the USGS at www.westnilemaps.usgs.gov 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	37	2	None reported	1

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. All proposed reservoirs and SDI facilities are within the Middle Fork Wild Horse Creek watershed.

3.5.1. Groundwater

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

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

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

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

The BLM has installed shallow groundwater monitoring wells at five impoundment locations throughout the PRB to assess ground-water quality changes due to infiltration of CBNG produced water. The most intensively monitored site has a battery of nineteen wells which have been installed and monitored jointly by the BLM and USGS since August, 2003. Water quality data has been sampled from these wells on a regular basis. That impoundment lies atop approximately 30 feet of unconsolidated deposits (silts and sands) which overlie non-uniform bedrock on a side ephemeral tributary to Beaver Creek and is approximately one and one-half miles from the Powder River. Baseline investigations showed water in two sand zones, the first was at a depth of 55 feet and the second was at a depth of 110 feet. The two water bearing zones were separated by a fifty-foot thick shale layer. The water quality of the two water bearing zones fell in the WDEQ Class III and Class I classifications respectively. Preliminary results from this sampling indicate increasing levels of TDS and other inorganic constituents over a six month period resulting in changes from the initial WDEQ classifications.

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

A search of the Wyoming State Engineer Office (WSEO) Ground Water Rights Database for this area showed 14 registered stock and domestic water wells within ½ mile of a federal CBNG producing well in the POD with depths ranging from 75 to 250 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 Middle Fork Wild Horse Creek drainage which is tributary to the Upper Powder River watershed. All drainages in the area are ephemeral, flowing only in response to a precipitation event or snow melt (PRB FEIS Chapter 9 Glossary). The channels range from well-vegetated grassy swales, without defined bed and bank to larger well defined that may be incised into the landscape and have eroding banks or valleys sides with sparse vegetation.

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

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

3.6. Cultural Resources

Class III cultural resource inventories were conducted for the Kenai POD project prior to on-the-ground project work (BFO Inventory Numbers 70040013, 70060261,70060261.A, 70070093. and 70070093.A). A total of 2657.32 acres of block inventory and 82.58 acres of linear inventory were surveyed for this POD. Nine cultural sites and seven isolated resources were located in the course of the survey. Since no eligible historic properties will be affected by this undertaking, cultural clearance is recommended.

Table 3.5 Cultural Resources Inventory Results

Site Number	Site Type	Eligibility
48CA5938	Historic Site	Not Eligible
48CA6441	Historic Site	Not Eligible
48CA6442	Historic Site	Eligible D
48CA6443	Historic Site	Not Eligible
48CA6444	Historic Site	Not Eligible

Site Number	Site Type	Eligibility
48CA6445	Historic Site	Not Eligible
48CA6521	Historic and Prehistoric Site	Not Eligible
48CA6522	Historic Site	Not Eligible
48CA6523	Historic Site	Not Eligible
7 Isolates	Historic and Prehistoric IFs	Not Eligible

3.7. Realty

On 5/3/07 ROW applications were received for road, buried gas, water and power line that lie within the Kenai POD area. The ROWs would service state wells in Section 16 north of the project and to move product across varying federal leases within the Kenai POD. The portion of the ROW that is servicing the state wells in Section 16 lies in Section 17 and 21 of T54N R75W. The gas from the state wells would be transported to an existing compressor station in section 22. The pipelines that would service the state wells would be constructed in the existing ROW corridor that was granted to Pennaco Energy Inc. in 2005. This action was analyzed under an EA (WY-070-05-240) and a FONSI and Decision Record was issued on 5/25/05.

4. ENVIRONMENTAL CONSEQUENCES

The changes to the proposed action POD, which resulted in development of Alternative C as the preferred alternative, have reduced the potential impact 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 37 approved, proposed well locations, 34 can be drilled without a well pad being constructed and 3 will require a constructed (cut & fill) slotted well pad. Surface disturbance associated with the drilling of the 34 wells, without constructed pads, would involve digging-out of rig wheel wells (for leveling drill rig on minor slopes), reserve pit construction (estimated approximate size of 12 x 30 feet), and compaction (from vehicles driving/parking at the drill site). Estimated disturbance associated with these 34 wells would involve approximately 0.2 acre/well for 6.8 total acres. The other 3 wells requiring cut & fill pad construction would disturb approximately 0.2 acres/well pad for a total of 0.6 acres. The total estimated disturbance for all 37 wells would be 7.4 acres.

Approximately 3.81 miles of improved roads would be constructed to provide access to various well locations. Approximately 16.96 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 6.24 miles of pipeline would be constructed outside of corridors. Expedient reclamation of disturbed land with stockpiled topsoil, proper seedbed preparation techniques, and appropriate seed mixes, along with utilization of erosion control measures (e.g., waterbars, water wings, culverts, rip-rap, gabions etc.) would ensure land productivity/stability is regained and maximized.

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

engineering practices and BLM standards.

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

Table 4.1 summarizes the proposed surface disturbance.

Table 4.1 - SUMMARY OF DISTURBANCE

Facility	Number or Miles	Factor	Acreage of Disturbance	Duration of Disturbance
Nonconstructed Pad	34	0.2/acre	7.4	Long Term
Constructed Slotted Pad	3	0.2/acre		
Gather/Metering Facilities	0	Site Specific	0.0	Long Term
Screw Compressors	1	200' x 200'	1.0	Long Term
Monitor Wells	0	0.1/acre	0	Long Term
Impoundments	5		26.67	Long Term
On-channel	5	Site Specific	26.57	
Off-channel	0	Site Specific	0.0	
Water Discharge Points	5	Site Specific or 0.01 ac/WDP	0.10	
Channel Disturbance				
Headcut Mitigation*	0	Site Specific	0.0	
Channel Modification	0	Site Specific	0.0	
Improved Roads	3.81	40' Width	18.54	Long Term
No Corridor	3.34			
With Corridor	0.47			
2-Track Roads	16.96	40' Width	68.65	Long Term
With Corridor				
Pipelines	6.24	40' Width	30.33	Short Term
No Corridor	2.47		12.04	
With Corridor	3.77		18.29	
Buried Power Cable	0	15' Width or Site Specific	0	Short Term
No Corridor				
Overhead Powerlines	0.0	30' Width	0	Long Term
Stockwater Tanks	2	0.005 ac.	0.01	Long Term

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. Subsurface Drip Irrigation (SDI)

The Kenai POD proposes SDI on private land as part of the Water Management Plan. CBNG production water used for irrigation has the potential to cause long term impacts to soils irrigated with this water. Irrigation sites need to be closely monitored to assure that long term soil health and productivity is maintained. Site specific soil chemistry and physical property thresholds should be established to ensure that the soil is not measurably impacted and that remedial actions can be implemented before soil damage takes place. These thresholds should be based on soil type, soil chemistry, vegetation cover, water quality, soil and/or water amendments used, land use, beneficial use goals and landowner needs.

CBNG product water in the PRB generally has a moderate to high salinity hazard and often has a very high sodium hazard based on standards used for irrigation suitability. Irrigation with CBNG product water on range or crop lands should be done with great care and should be managed closely. With time salts from the product water can accumulate in the root zone to concentrations that may adversely affect plant growth.

Sodic irrigation water causes soil crusting and reduces soil hydraulic conductivity thereby lowering water availability and aeration that are important to plant growth and crop yield. Elevated sodium and chloride concentrations can be toxic to some woody plants as it is taken up the root cells. Sodium can also indirectly affect crop growth by causing calcium, potassium, and magnesium deficiencies.

Reclamation of these sites may be difficult to implement and mitigation practices can be expensive. Monitoring of LAD/SDI sites must insure that the applied soil amendments are mitigating any potential impacts caused by the application of CBNG waters. Monitoring should include an evaluation of soil chemical and physical properties, runoff and erosion, water quantity and quality and vegetative performance.

Projected long-term impacts to soils are not well defined at this time, and the mitigation of such impacts have not been proven. Long-term effects will depend on the success of applied soil amendments, comprehensive monitoring, and the complete management and mitigation of impacts at the site. Reclamation of the site and the mitigation practices used are the responsibility of the operator and landowner, and should be addressed in the Surface Use Agreement (SUA). The landowners on whose property the SDI facilities will be located were not present at the onsite, but the operator expressed that the landowners were in agreement with the locations.

BLM authority for this POD ends at the compliance point for the NPDES permitted outfall and/or the reservoir associated with it. According to Wyoming State Water Law (W.S. 41-3-101) all water extracted during CBNG production is waters of the state: BLM 1982 policy directs the BLM to cooperate with state water law. The Wyoming State Engineers Office may appropriate this water for use by a private individual (W.S. 41-3-301). This water right is considered a private property of the surface owner and may provide an additional beneficial use of CBNG water. The use of this water must abide by all State and Federal laws and regulations.

4.1.2. Wetland/Riparian

The PRB FEIS assumes that 15% of the impounded water will re-surface as channel flow (PRB FEIS pg 4-74). Re-surfacing water from the impoundments will potentially allow for wetland-riparian species establishment.

4.1.3. Invasive Species

Based on the investigations performed during the POD planning process, the operator has committed to the control of noxious weeds and species of concern using the following measures in an Integrated Pest Management Plan (IPMP) included in the proposal:

1. Weed control:
 - Methods may include mowing, pulling, use of biological agents and use of approved chemicals.
2. Preventive practices:
 - Reseed areas with weed free mulch and seed.
 - Wash vehicles when leaving noxious weed areas.
3. Education:
 - Company will provide periodic weed education to its employees and contractors through government
 - Agencies information and educational institutions.
 - Employees will be informed of known infestation areas and required to avoid areas when possible.

For more information on the IPMP, see POD book.

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

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.

4.1.4. Cumulative Effects

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

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

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

- The WMP for the Kenai POD proposes that produced water will not contribute significantly to flows downstream.

No additional mitigation measures are required.

4.2. Wildlife

4.2.1. Big Game Direct and Indirect Effects

Under the environmentally preferred alternative, winter yearlong and yearlong ranges for mule deer and winter and yearlong ranges for antelope 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 feels a well density of eight wells per section creates a high level of impact for big game and that avoidance zones around mineral facilities overlap creating contiguous avoidance areas (WGFD 2004). A multi-year study on the Pinedale Anticline suggests not only do mule deer avoid mineral activities, but after three years of drilling activity the deer have not accepted the disturbance (Madson 2005).

Big game animals are expected to return to the project area following construction; however, populations will likely be lower than prior to project implementation as the human activities associated with operation and maintenance continue to displace big game. 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. In order to survive below the maintenance level, requires behavior that emphasizes energy conservation. Canfield et al. (1999) pointed out that forced activity caused by human disturbance exacts an energetic disadvantage, while inactivity provides an energetic advantage for animals. Geist (1978) further defined effects of human disturbance in terms of increased metabolism, which could result in illness, decreased reproduction, and even death.

4.2.1.1. Cumulative effects

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 contained in 7 on-channel reservoirs (2 existing and 5 proposed). If a reservoir were to discharge, it is unlikely produced water will reach a fish-bearing stream. It is unlikely downstream species would be affected.

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, pipelines and reservoirs. 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).

Density of breeding Brewer's sparrows declined by 36% within 100 m of dirt roads within a natural gas field. Effects occurred along roads with light traffic volume (<12 vehicles per day). Findings suggest that indirect habitat losses from energy development may be substantially larger than direct habitat losses (Ingelfinger 2004).

Density of breeding sage sparrows was reduced by 57% within a 100-m buffer of dirt roads regardless of traffic volume. The density of roads constructed in natural gas fields exacerbated the problem and the area of impact was substantial (Ingelfinger 2004).

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.

Existing and newly constructed reservoirs may have either a positive or negative affect on waterfowl. The reservoirs may provide winter forage and nesting habitat for migrating waterfowl and shore birds. Concentrations of salts and metals, particularly barium and selenium, may increase in the containment reservoirs receiving coalbed natural gas produced water discharges, as water evaporates overtime. Direct effects (toxicity) to waterfowl could occur, depending on the quality of the produced water.

With numerous existing reservoirs surrounding the project area and five proposed reservoirs within the project area, the potential for mosquito breeding areas will increase. With the creation of more reservoirs within the sage brush community more species are being exposed to the West Nile virus. Mortality rates are likely to increase and reproductive success is likely to decrease in most bird species using the region. Additional direct and indirect effects to migratory birds are discussed in the PRB FEIS (4-231-235).

4.2.3.1. Cumulative effects

The cumulative effects associated with Alternative C are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, please refer to the referenced PRB FEIS, Volume 2, Chapter 4, Page 4-235.

4.2.4. Raptors Direct and Indirect Effects

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

Table 4.2. Wells within close proximity to documented raptor nests within the Kenai project area (Timing limitations will apply to these wells).

BLM ID#	SPECIES	UTM (NAD 83)	STATUS	WELL / PIT NUMBER	DISTANCE
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BLM ID#	SPECIES	UTM (NAD 83)	STATUS	WELL / PIT NUMBER	DISTANCE
2310	RTHA	428837E 4943767N	Inactive	B1-21-5475 Proposed water line	0.17 miles 0.06 miles
2373	Unknown	430069E 4941604N	Inactive	D1-27-5475 Existing 2-track road and proposed utility corridor	0.25 miles 0.03 miles
2769	GOEA	432164E 4939123N	Active	B1-2-5375 Existing improved county road Proposed water line	0.16 miles 0.11 miles 0.05 miles
3625	GOEA/RTHA	430327E 4939495N	Inactive	Existing 2-track road/proposed Utility corridor C2-3-5375 C4-4-5375	0.09 miles 0.41 miles 0.45 miles
New	GOEA/RTHA	430331E 4939562N	Occupied by Canada goose	Existing 2-track road/proposed Utility corridor C2-3-5375 C4-4-5375	0.09 miles 0.41 miles 0.45 miles
4035	RTHA	428241E 4939462N	Active	Existing 2-track road B1-4-5375	0.02 miles 0.36 miles
3620	Unknown	428498E 4939467N	Inactive	B1-4-5375 Proposed 2-track road/utility corridor	0.20 miles 0.16 miles

Active golden eagle nest (BLM ID # 2769) located in the SWNW Section 2, Township 54 North, Range 75 West (UTM 432164E, 4939123N) is 0.17 miles from well B1-2-5375. Comet Energy decided to drop the well.

Inactive raptor nest (BLM ID # 3625) located in the NWNW Section 3, Township 53 North, Range 75 West (UTM 428498E, 4939467N), is 0.1 miles from an existing primitive road with a proposed pipeline. There is an existing and producing fee gas well directly at the nest location. No facilities were moved.

Inactive raptor nest (BLM ID # 3620) located in SENE Section 5, Township 53 North, Range 75 West (UTM 428498E, 4939467N), is 0.21 miles from well B1-4-5375. Moving the well would cause considerable more surface disturbance, the well is out of sight of the nest.

Active red-tailed hawk nest (BLM ID # 4035) located SWNE Section 5, Township 53 North, Range 75 West (UTM 428241E, 4939462N) is 0.35 miles from well B1-4-5375. The nest is located in a cottonwood tree down in a deep drainage and is out of sight of the well.

Inactive raptor nest (BLM ID # 2773) located SESE Section 28, Township 54 North, Range 75 West (UTM 430079E, 4941605N), is 0.25 miles from well D-1-27-5475. The nest is located in a deep drainage and is out of sight of the well.

Inactive raptor nest (BLM ID # 2772) located in the NWSW Section 21, Township 54 North, Range 75 West (UTM 428837E, 4943764N), is 0.17 miles from well B-1-21-5375. The nest is located in a live cottonwood tree in a deep narrow drainage. The nest is out of view of the well. Moving the well would cause considerable surface disturbance and the loss of good sage grouse nesting habitat. The well was not

moved.

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

The project area is primarily sagebrush grassland habitat type; therefore nesting substrates (i.e. cliffs and trees) for many raptor species are sparse. A few scattered cottonwood trees are found in the draws throughout the project area. Although five of the seven nests were inactive in 2007, some or all of them may become active in the future. Despite commitments such as telemetry metering to limit well visits, well visits during the nesting season would likely be necessary which could lead to nest failure through nest abandonment or predation.

4.2.4.1. Cumulative effects

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

4.2.5. Threatened and Endangered and Sensitive Species

Within the BLM Buffalo Field Office there are two species that are Threatened or Endangered under the Endangered Species Act. Potential project effects on Threatened and Endangered Species were analyzed in a Biological Assessment and a summary is provided in Table 4.3. Threatened and Endangered Species potentially affected by the proposed project area are further discussed following the table.

4.2.5.1. Threatened and Endangered and Sensitive Species

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

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Endangered				
Black-footed ferret (<i>Mustela nigripes</i>)	Black-tailed prairie dog colonies or complexes > 1,000 acres.	NS	NLAA	18 prairie dog colonies within 4 miles, six colonies (220.45 acres) are within the project area.
Threatened				
Ute ladies'-tresses orchid (<i>Spiranthes diluvialis</i>)	Riparian areas with permanent water	NP	NE	No suitable habitat present.

Presence

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

Effect Determinations

- 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

Suitable habitat of sufficient size capable of supporting a black-footed ferret population is present in the project area vicinity, and the project area is in a potential reintroduction area. However, it is highly unlikely ferrets are present, therefore implementation of the proposed development ***“may affect, but is not likely to adversely affect”*** the black-footed ferret. However, if any ferrets become present, the proposed action will most likely make portions of the project area unsuitable for inhabitation.

4.2.5.1.2. Ute’s Ladies Tresses Orchid

Produced water will be stored in 7 reservoirs (2 existing and 5 proposed). The reservoirs are on-channel and are located within dry upland drainages. Reservoir seepage may create suitable habitat if historically ephemeral drainages become perennial, however no historic seed source is present within or upstream of the project area.

Implementation of the proposed coal bed natural gas project should have ***“no effect”*** on the Ute ladies’- tresses orchid as neither suitable habitat nor a seed source are currently present.

4.2.5.2. Sensitive Species Direct and Indirect Effects

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.

Table 4.4 Summary of Sensitive Species Habitat and Project Effects.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Amphibians				
Northern leopard frog (<i>Rana pipiens</i>)	Beaver ponds, permanent water in plains and foothills	NP	NI	Habitat not present
Spotted frog (<i>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	MIH	Sagebrush cover will be affected.
Brewer's sparrow (<i>Spizella breweri</i>)	Basin-prairie shrub	K	MIH	Sagebrush cover will be affected.
Burrowing owl (<i>Athene cunicularia</i>)	Grasslands, basin-prairie shrub	S	MIH	Prairie dog colony present, burrows will be lost.
Ferruginous hawk (<i>Buteo regalis</i>)	Basin-prairie shrub, grasslands, rock outcrops	S	MIH	Sagebrush grassland habitat will be lost.
Greater sage-grouse (<i>Centrocercus urophasianus</i>)	Basin-prairie shrub, mountain-foothill shrub	K	WIPV	Sagebrush cover will be affected.
Loggerhead shrike (<i>Lanius ludovicianus</i>)	Basin-prairie shrub, mountain-foothill shrub	S	MIH	Sagebrush cover will be affected.
Long-billed curlew (<i>Numenius americanus</i>)	Grasslands, plains, foothills, wet meadows	S	MIH	Sagebrush grassland habitat will be lost.
Mountain plover (<i>Charadrius montanus</i>)	Short-grass prairie with slopes < 5%	S	MIH	Prairie dog colonies and short grass prairie habitat will be lost.
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	K	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 towns 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	Sagebrush grassland habitat and prairie dog colonies will be lost.
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

According to the BLM Buffalo Field Office data base bald eagles have been observed at three locations within 0.2 to 1.3 miles from the project area. Bald eagles were observed near the project area during the 2005 and 2006 winters. Within the project area cottonwood trees capable of supporting roosting and nesting bald eagles are found at four locations. Also, single cottonwood trees are found scattered throughout the project area in deep narrow draws. With six active and densely populated black-tailed prairie dog colonies within and adjacent to the project area bald eagles are likely to be found foraging in the area on a regular basis.

The Kenai project area is surround by extensive natural gas development, existing 3-phase overhead powerlines can be found surrounding the project area. There are 5.92 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. Coment Energy will be using existing 3 phase overhead power lines within the project area; at this time there are no plans to construct new overhead powerlines within the Kenai project area.

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

An improved county road bisects the southern portion of the project area and is in close proximity to groups of cottonwood trees and active prairie dog colonies. With the increase in gas development in the area, vehicle size and traffic volume will also increase. The posted speed limit for the county road is 45 mph. The county road presents a collision hazard as bald eagles forage in the area, bald eagle mortalities may occur.

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

Produced water will be stored in seven reservoirs (2 existing and 5 proposed) 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

There are four proposed gas wells (2 Fee and 2 Fed) and their associated infrastructure within active prairie dog colonies. The wells are listed below:

Township/Range	Section	Affected Wells and Infrastructure
T53N, R75W	9	D1-4-5375 and associated infrastructure.
T53N, R75W	10	A2-10-5375 and associated infrastructure.
T54N, R75W	35	Access road and proposed pipeline.
T54N, R75W	26	C2-26-5475 and associated infrastructure.

Approximately 6.25 acres of active and densely populated prairie dog colonies and foraging habitat will be lost due to well pad and road/pipeline construction. The construction of well pads, roads, pipelines and reservoirs will cause direct prairie dog mortalities and an immediate loss of prairie dog burrows. When construction begins on reservoirs, roads, pipelines and pads the earth moving equipment can remove anywhere from an inch to over several feet of dirt at one time destroying prairie dog burrows and foraging habitat.

Due to steepness of topography surrounding the prairie dog colonies, moving wells and access roads would cause more surface disturbance and more loss of sage grouse nesting habitat. Prairie dogs are likely to re-colonize roads/pipelines and well pads.

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.

Individuals that survive the excavation process will likely 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. The expansion of the colony/town is from the center out to the edges. 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).

The well house and nearby power poles may provide habitats for mammal and avian predators increasing prairie dog predation. Mineral related traffic on the adjacent road may result in prairie dog road mortalities.

4.2.5.2.3. Greater sage-grouse

Suitable sage-grouse habitat is present through out the Kenai project area.

Well B4-21 was moved approximately 100 feet out of sagebrush (moderate density 10-15% cover), thus minimizing the loss of sage grouse nesting habitat.

Well C2-26 was moved approximately 600 feet to the east out of sagebrush (moderately dense 10-15 % cover) into a grassy area, thus reducing direct sage grouse habitat loss and providing better gas drainage within the section.

The C2-27 well access road/utility corridor was rerouted to follow an existing pipeline scar. The water line that leaves the C2-27 well and heads northwest to the reservoir will not exceed 25 feet maximum disturbance width. The Spellman A4-27 reservoir pipeline and discharge point were rerouted approximately 400 feet to the east out of dense (15-25% cover) sagebrush to a grassy clearing. The Spellman B1-27 reservoir pipeline was rerouted approximately 200 feet north out of dense (15-25% cover) sagebrush onto a ridge with low density (3-8 % cover) sagebrush. These moves resulted in less sage grouse nesting and early brood rearing habitat loss than the original proposal.

Seven wells and their associated infrastructure go through moderately dense (10-15% cover) sagebrush, resulting in the loss of approximately 12 acres of sage grouse nesting and early brood rearing habitat. Three wells and their associated infrastructure go through low density (5-10% cover), resulting in the loss of 5 acres early brood rearing habitat and protective cover. No other alternatives were available.

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

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

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

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

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

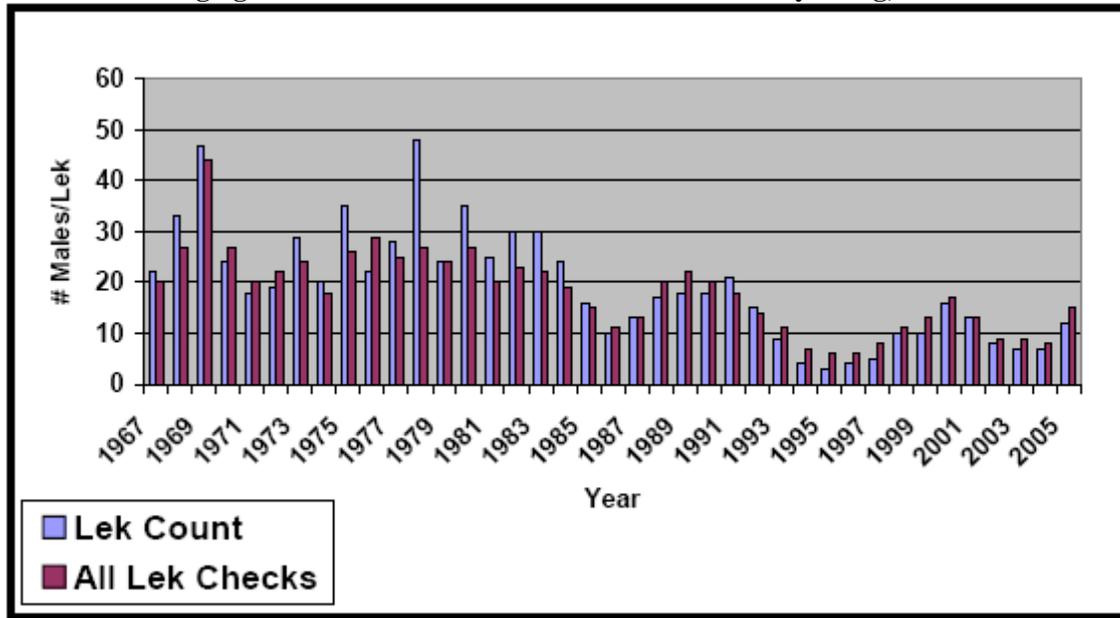
Additional studies, across more of the sage-grouse's range, indicate that many populations nest much farther than two miles from the lek of breeding (Bennett 2004). Holloran and Anderson (2005), in their Upper Green River Basin study area, reported only 45% of their sage grouse hens nested within 3 km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

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

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

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

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



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

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

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

4.2.5.2.4. Mountain plover

The majority of the Kenai project area is unsuitable mountain plover habitat. However, small pockets of suitable mountain plover habitat can be found throughout the project area. There are six active and densely populated prairie dog colonies within the project area.

Mineral development may have 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. Use of roads and pipe line corridors by mountain plovers may increase their vulnerability to vehicle collision. Overhead power lines provide perch sites for raptors that could potentially result in increased mountain plover predation. CBNG infrastructure such as well houses, roads, pipe line corridors, and nearby metering facilities may provide shelter and den sites for ground predators such as skunks and foxes.

With the loss or alteration of their natural breeding habitat (predominately prairie dog colonies), mountain plovers have been forced to seek habitat with similar qualities that may be poor quality habitat. 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 and 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 US Fish and Wildlife Service (USFWS) 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 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).

4.2.5.3. Cumulative effects

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

4.3. West Nile Virus Direct and Indirect Effects

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

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

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

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

4.4. Water Resources

The operator has submitted a comprehensive WMP for this project. It is incorporated-by-reference into this EA pursuant to 40 CFR 1502.21. The WMP incorporates sound water management practices, monitoring of downstream impacts within the Upper Powder River watershed and a commitment to comply with Wyoming State water laws/regulations. It also addresses potential impacts to the

environment and landowner concerns. Qualified hydrologists, in consultation with the BLM, developed the water management plan. Adherence with the plan, in addition to BLM applied mitigation (in the form of COAs), would reduce project area and downstream impacts from proposed water management strategies. The water management plan for the Kenai POD addressed water produced by all 53 wells (7 fee, 8 state, 38 proposed federal), and all values related to water resources in the following sections are in reference to this total number of wells that will contribute water to the system.

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

The maximum water production is predicted to be 12.0 gpm per well or 636.0 gpm (1.42 cfs or 1025.9 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 is estimated in 2006). As such, the volume of water resulting from the production of these wells is 23.9% 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 254.4 gpm (0.6 cfs) infiltrate at or near the discharge points and impoundments (410.3 acre feet per year). This water will saturate the near surface alluvium and deeper formations prior to mixing with the groundwater used for stock and domestic purposes. According to the PRB FEIS, “the increased volume of water recharging the underlying aquifers of the Wasatch and Fort Union Formations would be chemically similar to alluvial groundwater.” (PRB FEIS pg 4-54). Therefore, the chemical nature and the volume of the discharged water may not degrade the groundwater quality.

The PRB FEIS predicts that one of the environmental consequences of coal bed natural gas production is possible impacts to the groundwater. “The effects of development of CBM on groundwater resources would be seen as a drop in the water level (drawdown) in nearby wells completed in the developed coal aquifers and underlying or overlying sand aquifers.” (PRB FEIS page 4-1). In the process of dewatering the coal zone to increase natural gas recovery rates, this project may have some effect on the static water level of wells in the area. The permitted water wells produce from depths which range from 75 to 250 feet compared to projected depth of 805 feet to the Anderson coal seam. 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.

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

4.4.1.1. Groundwater Cumulative Effects:

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

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

4.4.2. Surface Water

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

Table 4.5 Comparison of Regulated Water Quality Parameters to Predicted Water

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		4.76	1,797
Historic Data Average at Minimum Flow		7.83	3,400

Predicted Values	TDS, mg/l	SAR	EC, μ mhos/cm
WDEQ Quality Standards for Wyoming Groundwater (Chapter 8) Drinking Water (Class I) Agricultural Use (Class II) Livestock Use (Class III)	500 2,000 5,000	8	
WDEQ Water Quality Requirements for WYPDES Permit WY0054330 At discharge point At Irrigation Compliance point	5,000 na	na na	7,500 na
Predicted Produced Water Quality Anderson Coal Zone Canyon Coal Zone	1,390 600	14.3 13.1	2,190 1,010

Based on the analysis performed in the PRB FEIS, the primary beneficial use of the surface water in the Powder River Basin is the irrigation of crops (PRB FEIS pg 4-69). The water quality projected for this POD is 1390.0 mg/l TDS which is within the WDEQ criteria for agricultural use (2000 mg/l TDS). However direct land application is not included in this proposal. If at any future time the operator entertains the possibility of irrigation or land application with the water produced from these wells, the proposal must be submitted as a sundry notice for separate environmental analysis and approval by the BLM.

The quality for the water produced from the Anderson 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 6.0 gallons per minute (gpm) is projected is to be produced from these 53 wells, for a total of 318 gpm for the POD. See Table 4.5.

The quality for the water produced from the Canyon target coal zone from these wells is predicted to be similar to the sample water quality collected from a location near the POD. A maximum of 6.0 gpm is projected is to be produced from these 53 wells, for a total of 318 gpm for the POD. See Table 4.5.

At a later time, Comet may produce water from the Wall and finally from the Smith coal zones. The quality for the water produced from these zones from these wells is predicted to be similar to the sample water quality collected from a location near the POD. A maximum of 6.0 gpm is projected is to be produced from each of the two zones from these 53 wells, for a total of 318 gpm from each zone for the POD. See Table 4.5.

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

There are 5 new and 2 existing 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, 7 impoundments (5 new, 2 existing totaling 154.6 ac-ft) would potentially be constructed within the project area. The new impoundments will disturb approximately 26.6 acres including the dam structures, and all would be on-channel reservoirs. The off-channel impoundments would result in evaporation and infiltration of CBNG water. Criteria identified in "Off-Channel, Unlined CBNG Produced Water Pit Siting Guidelines for the Powder River Basin, Wyoming" (WDEQ, 2002) was used to locate these impoundments. Monitoring may be required based upon WYDEQ findings relative

to “Compliance Monitoring for Ground Water Protection Beneath Unlined Coalbed Methane Produced Water Impoundments” (June 14, 2004). Existing impoundments will meet 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 maximum volume of water produced from these wells may result in the addition of 0.1 cfs below the lowest reservoir after infiltration and evapotranspiration losses. This assumes that about half of the produced water will be impounded and the other half will be used in SDI. The operator has committed to monitor the condition of channels and address any problems resulting from discharge. Discharge from the impoundments will potentially allow for streambed enhancement through wetland-riparian species establishment. Sedimentation will occur in the impoundments, but would be controlled through a concerted monitoring and maintenance program. Phased reclamation plans for the impoundments will be submitted and approved on a site-specific, case-by-case basis as they are no longer needed for disposal of CBNG water, as required by BLM applied COAs.

Alternative (2A), the approved alternative in the Record of Decision for the PRB FEIS, states that the peak production of water discharged to the surface will occur in 2006 at a total contribution to the mainstem of the Upper Powder River of 68 cfs (PRB FEIS pg 4-86). The predicted maximum discharge rate from the original proposed 53 wells (7 fee, 8 state, 38 federal) is anticipated to be a total of 636 gpm or 1.42 cfs to impoundments and SDI systems. Using an assumed conveyance loss of 20% (PRB FEIS pg 4-74) and full containment of about half of this water the produced water re-surfacing in Middle Prong Wild Horse Creek from this action (0.14 cfs) may add a maximum 0.11 cfs to the Upper Powder River flows, or less than 0.01% of the predicted total CBNG produced water contribution. This incremental volume is statistically below the measurement capabilities for the volume of flow of the Powder River (refer to Statistical Methods in Water Resources U.S. Geological Survey, Techniques of Water-Resources Investigations Book 4, Chapter A3 2002, D.R. Helsel and R.M. Hirsch authors). For more information regarding the maximum predicted water impacts resulting from the discharge of produced water, see Table 4-6 (PRB-FEIS pg 4-85).

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 8). Based on the area of the 71.8 square miles watershed above the POD and an assumed density of 1 well per location every 80 acres, the potential exists for the development of 574 wells which could produce a maximum flow rate of 6,893 gpm (15 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, 15 cfs, is much less than the peak runoff estimated from the 2-year storm event of 1,047 cfs Middle Prong Wild Horse Creek 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 page 2):

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

The WYPDES permit 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.

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

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).

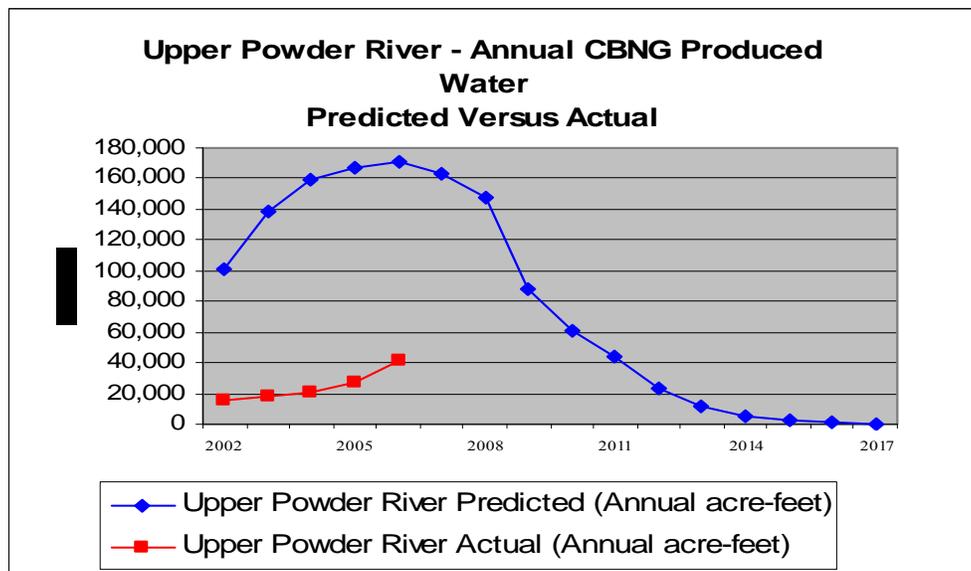
As of December 2006, all producing CBNG wells in the Upper Powder River watershed have discharged a cumulative volume of 123,984 acre-ft of water compared to the predicted 736,519 acre-ft disclosed in the PRB FEIS (Table 2-8 page 2-26). These figures are presented graphically in Table 4.6 and Figure 4.1 following. This volume is 16.8 % 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 2006 Data Update 3-16-07

Year	Upper Powder River Predicted (Annual acre-feet)	Upper Powder River Predicted (Cumulative acre-feet from 2002)	Upper Powder River Actual (Annual acre-feet)		Upper Powder River Actual (Cumulative acre-feet from 2002)	
			A-ft	% of Predicted	A-Ft	% of Predicted
2002	100,512	100,512	15,846	15.8	15,846	15.8
2003	137,942	238,454	18,578	13.5	34,424	14.4

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
2004	159,034	397,488	20,991	13.2	55,414	13.9
2005	167,608	565,096	27,640	16.5	83,054	14.7
2006	171,423	736,519	40,930	23.9	123,984	16.8
2007	163,521	900,040				
2008	147,481	1,047,521				
2009	88,046	1,135,567				
2010	60,319	1,195,886				
2011	44,169	1,240,055				
2012	23,697	1,263,752				
2013	12,169	1,275,921				
2014	5,672	1,281,593				
2015	2,242	1,283,835				
2016	1,032	1,284,867				
2017	366	1,285,233				
Total	1,285,233		123,984			

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



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

The PRB FEIS states, “Cumulative effects to the suitability for irrigation of the Powder River would be minimized through the interim Memorandum of Cooperation (MOC) that the Montana and Wyoming DEQ’s (Departments of Environmental Quality) have signed. This MOC was developed to ensure that designated uses downstream in Montana would be protected while CBM development in both states continued. As the two states develop a better understanding of the effects of CBM discharges through the enhanced monitoring required by the MOC, they can adjust the permitting approaches to allow more or less discharges to the Powder River drainage. 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 16.8% of the total predicted in the PRB FEIS.
2. The WDEQ enforcement of the terms and conditions of the WYPDES permit that are designed to protect irrigation downstream.
3. The commitment by the operator to contain or inject all produced water.

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

Site 48 CA 6442, a historic homestead recommended Eligible to the National Register, will be avoided by proposed development for this undertaking. Three sites recommended not eligible to the Register will be affected: 48 CA 6441, 6444, and 6521. Cultural clearance has been recommended for this undertaking.

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

4.6. Realty

Under ROW WYW169793, the operator applied for 21392 feet of gas pipeline in sections 17, 21, 22, 26, 28, and 35 of T54N R75W. The width of disturbance applied for was 30 feet. This would result in 14.733 acres of surface disturbance. The pipeline would be constructed in the same corridor as the road, water and electric lines. Section 17 is the only section that falls outside the Kenai POD area; the remaining sections are within the Kenai Plan of Development and were analyzed for 40 feet in width vs the 30 feet applied for in the ROW. The portion of the ROW in section 17 would authorize an additional 20 feet of surface disturbance as the original ROW authorization (WY-070-05-240) for Pennaco Energy only allowed 20 feet width of disturbance. The maximum width of disturbance that would be allowed in Section 17 would be 40 feet. The additional disturbance for section 17 is summarized below:

ROW Number	Operator	Length in feet	Width in feet	Acres of Disturbance
WYW163074	Pennaco Energy	4275	20	1.96
WYW169794	Comet Energy	3080	40	2.83
Additional Surface disturbance for Comet Energy				0.87

5. CONSULTATION/COORDINATION

No additional consultations were conducted.

See Section 3 for a list of people consulted with concerning this POD.

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.

7. REFERENCES AND AUTHORITIES

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