FINDING OF NO SIGNIFICANT IMPACT & DECISION RECORD
FOR
Comet Energy
Linn Draw
ENVIRONMENTAL ASSESSMENT –WY-070-EA08-178

DECISION: Is to approve Alternative C as described in the attached Environmental Assessment (EA) and authorize Comet Energy's Linn Draw, Coal Bed Natural Gas (CBNG) POD comprised of the following 43 Applications for Permit to Drill (APDs):

**Note: This APD (well D4-32) will be approved, pending a 30 day public posting period ending October 15th, 2008.

	Well Name	Well #	QTR	Section	TWP	RNG	Lease
1	LINN DRAW BLM SMITH	A2-4*	NENW	4	54N	75W	WYW143987
2	LINN DRAW BLM SMITH	B1-4	SWNW	4	54N	75W	WYW143987
3	LINN DRAW BLM SMITH	B3-4	SWNE	4	54N	75W	WYW143987
4	LINN DRAW BLM SMITH	C2-4	NESW	4	54N	75W	WYW143987
5	LINN DRAW BLM SMITH	C4-4	NESE	4	54N	75W	WYW143987
6	LINN DRAW BLM SMITH	D3-4	SWSE	4	54N	75W	WYW143987
7	LINN DRAW BLM	A2-9	NENW	9	54N	75W	WYW143987
8	LINN DRAW BLM SMITH	A4-9	NENE	9	54N	75W	WYW143987
9	LINN DRAW BLM	B1-9	SWNW	9	54N	75W	WYW143987
10	LINN DRAW BLM	B3-9	SWNE	9	54N	75W	WYW143987
11	LINN DRAW BLM	C2-9	NESW	9	54N	75W	WYW143987
12	LINN DRAW BLM SMITH	C4-9	NESE	9	54N	75W	WYW143987
13	LINN DRAW BLM	D1-9	SWSW	9	54N	75W	WYW141583
14	LINN DRAW BLM	D3-9	SWSE	9	54N	75W	WYW141583
15	LINN DRAW BLM SMITH	C2-10	NESW	10	54N	75W	WYW143987
16	LINN DRAW BLM	C4-10	NESE	10	54N	75W	WYW143987
17	LINN DRAW BLM SMITH	D1-10	SWSW	10	54N	75W	WYW143987
18	LINN DRAW BLM	D3-10	SWSE	10	54N	75W	WYW143987
19	LINN DRAW BLM	A2-15	NENW	15	54N	75W	WYW143988
20	LINN DRAW BLM SPELLMAN	A4-15	NENE	15	54N	75W	WYW143987
21	LINN DRAW BLM	B1-15	SWNW	15	54N	75W	WYW143988
22	LINN DRAW BLM	B3-15	SWNE	15	54N	75W	WYW143987
23	LINN DRAW BLM	C2-15	NESW	15	54N	75W	WYW143988
24	LINN DRAW BLM SPELLMAN	C4-15	NESE	15	54N	75W	WYW143987
25	LINN DRAW BLM SPELLMAN	D1-15	SWSW	15	54N	75W	WYW143988
26	LINN DRAW BLM SPELLMAN	D3-15	SWSE	15	54N	75W	WYW143987
27	LINN DRAW BLM	A2-25	NENW	25	54N	75W	WYW143989
28	LINN DRAW BLM	B1-25	SWNW	25	54N	75W	WYW143989
29	LINN DRAW BLM	B3-25	SWNE	25	54N	75W	WYW143989

	Well Name	Well #	QTR	Section	TWP	RNG	Lease
30	LINN DRAW BLM	C2-25	NESW	25	54N	75W	WYW143987
31	LINN DRAW BLM	C4-25	NESE	25	54N	75W	WYW143989
32	LINN DRAW BLM	D1-25	SWSW	25	54N	75W	WYW143989
33	LINN DRAW BLM SMITH	D3-29	SWSE	29	55N	75W	WYW143992
34	LINN DRAW BLM DRAKE	A2-31	NENW	31	55N	75W	WYW143992
35	LINN DRAW BLM	A4-31	NENE	31	55N	75W	WYW143992
36	LINN DRAW BLM DRAKE	B1-31	SWNW	31	55N	75W	WYW143992
37	LINN DRAW BLM SMITH	B3-31	SWNE	31	55N	75W	WYW143992
38	LINN DRAW BLM ODEGARD	A2-32	NENW	32	55N	75W	WYW143992
39	LINN DRAW BLM SMITH	B1-32	SWNW	32	55N	75W	WYW143992
40	LINN DRAW BLM SMITH	B3-32	SWNE	32	55N	75W	WYW143992
41	LINN DRAW BLM SMITH	C2-32	NESW	32	55N	75W	WYW143992
42	LINN DRAW BLM SMITH	D1-32	SWSW	32	55N	75W	WYW143992
43	**LINN DRAW BLM SMITH	D4-32	SESE	32	55N	75W	WYW143992

The following impoundment locations were inspected and approved for use in association with the water management strategy for the POD. All of these reservoirs are Secondary and a sundry requesting a change of status to Primary along with bonding information will need to be submitted to the BLM before construction or improvements begin.

	IMPOUNDMENT Name / Number	Qtr/Qtr	Section	TWP	RNG	Capacity (Acre Feet)	Surface Disturbance (Acres)	Lease #
1	P9-1-5474	SWSW	9	54	75	8.5	2.7	WYW 141583
2	EX25-1-5576	NWSE	25	55	76	10.2	3.2	State
3	EX25-2-5576	SESE	25	55	76	11.3	3.6	State
4	P25-1-5576	NWSE	25	55	76	12.5	4	State

Rights-Of-Ways
The following right-of-way locations were identified with the Linn Draw POD. Use and maintenance of these locations are prohibited until authorized right-of-ways have been issued.
T. 54 N., R. 75 W., section 9, lot 13 for the P9-1-5475 reservoir.
T. 54 N., R. 75 W., sections 5, 6, 7,8,9,15,17, 25, and 26 for Road, Water, Gas and Buried electric.

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
Linn Draw
PLAN OF DEVELOPMENT
WY-070-EA08-178

INTRODUCTION

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

1. PURPOSE AND NEED

The purpose for the proposal is to produce coal bed natural gas (CBNG) on 5 federal oil and gas mineral leases issued to the applicant by the BLM.

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

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

2. ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1. Alternative A - No Action

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

2.2. Alternative B Proposed Action

Proposed Action Title/Type: Comet Energy's, Linn Draw Plan of Development (POD) for 48 coal bed natural gas well APD`s and associated infrastructure.

Proposed Well Information: There were 48 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 Anderson, Canyon & Wall coal seams. No well houses will be used on this POD. The wellheads will be fenced off with panels. The dimensions for the fenced off area is 16'x 16' x 4' height. Facilities will be Covert Green, selected to blend with the surrounding vegetation. Proposed wells are located as follows:

Well Name	Well #	Qtr/Qtr	Sec	TWP	RNG	Lease #
1. LINN DRAW BLM	A2-9	NENW	9	54N	75W	WYW143987
2. LINN DRAW BLM	B1-9	SWNW	9	54N	75W	WYW143987
3. LINN DRAW BLM	B3-9	SWNE	9	54N	75W	WYW143987
4. LINN DRAW BLM	C2-9	NESW	9	54N	75W	WYW143987
5. LINN DRAW BLM	D1-9	SWSW	9	54N	75W	WYW141583
6. LINN DRAW BLM	D3-9	SWSE	9	54N	75W	WYW141583
7. LINN DRAW BLM	C4-10	NESE	10	54N	75W	WYW143987
8. LINN DRAW BLM	D3-10	SWSE	10	54N	75W	WYW143987
9. LINN DRAW BLM	A2-15	NENW	15	54N	75W	WYW143988
10. LINN DRAW BLM	B1-15	SWNW	15	54N	75W	WYW143988
11. LINN DRAW BLM	B3-15	SWNE	15	54N	75W	WYW143987
12. LINN DRAW BLM	C2-15	NESW	15	54N	75W	WYW143988
13. LINN DRAW BLM	B1-25	SWNW	25	54N	75W	WYW143989
14. LINN DRAW BLM	B3-25	SWNE	25	54N	75W	WYW143989
15. LINN DRAW BLM	C4-25	NESE	25	54N	75W	WYW143989
16. LINN DRAW BLM	C2-25	NESW	25	54N	75W	WYW143987
17. LINN DRAW BLM	D3-25	SWSE	25	54N	75W	WYW143989
18. LINN DRAW BLM	A2-25	NENW	25	54N	75W	WYW143989
19. LINN DRAW BLM	D1-25	SWSW	25	54N	75W	WYW143989
20. LINN DRAW BLM	A4-31	NENE	31	55N	75W	WYW143992
21. LINN DRAW BLM DRAKE	A2-31	NENW	31	55N	75W	WYW143992
22. LINN DRAW BLM DRAKE	B1-31	SWNW	31	55N	75W	WYW143992
23. LINN DRAW BLM ODEGARD	A2-32	NENW	32	55N	75W	WYW143992
24. LINN DRAW BLM SMITH	A2-4*	NENW	4	54N	75W	WYW143987
25. LINN DRAW BLM SMITH	B1-4	SWNW	4	54N	75W	WYW143987
26. LINN DRAW BLM SMITH	B3-4	SWNE	4	54N	75W	WYW143987
27. LINN DRAW BLM SMITH	C4-4	NESE	4	54N	75W	WYW143987
28. LINN DRAW BLM SMITH	C2-4	NESW	4	54N	75W	WYW143987
29. LINN DRAW BLM SMITH	D1-4	SWSW	4	54N	75W	WYW143987
30. LINN DRAW BLM SMITH	D3-4	SWSE	4	54N	75W	WYW143987
31. LINN DRAW BLM SMITH	C4-9	NESE	9	54N	75W	WYW143987
32. LINN DRAW BLM SMITH	A4-9	NENE	9	54N	75W	WYW143987
33. LINN DRAW BLM SMITH	C2-10	NESW	10	54N	75W	WYW143987
34. LINN DRAW BLM SMITH	D1-10	SWSW	10	54N	75W	WYW143987
35. LINN DRAW BLM SMITH	D3-29	SWSE	29	55N	75W	WYW143992
36. LINN DRAW BLM SMITH	B3-31	SWNE	31	55N	75W	WYW143992
37. LINN DRAW BLM SMITH	B1-32	SWNW	32	55N	75W	WYW143992
38. LINN DRAW BLM SMITH	B3-32	SWNE	32	55N	75W	WYW143992
39. LINN DRAW BLM SMITH	C2-32	NESW	32	55N	75W	WYW143992
40. LINN DRAW BLM SMITH	D1-32	SWSW	32	55N	75W	WYW143992
41. LINN DRAW BLM SMITH	D3-32	SWSE	32	55N	75W	WYW143992
42. LINN DRAW BLM SMITH	C4-32	NESE	32	55N	75W	WYW143992
43. LINN DRAW BLM SPELLMAN	C4-15	NESE	15	54N	75W	WYW143987
44. LINN DRAW BLM SPELLMAN	D1-15	SWSW	15	54N	75W	WYW143988
45. LINN DRAW BLM SPELLMAN	D3-15	SWSE	15	54N	75W	WYW143987
46. LINN DRAW BLM SPELLMAN	A4-15	NENE	15	54N	75W	WYW143987
47. LINN DRAW BLM SPELLMAN	A4-23	NENE	23	54N	75W	WYW145587

Well Name	Well #	Qtr/Qtr	Sec	TWP	RNG	Lease #
48. LINN DRAW BLM SPELLMAN	B3-23	SWNE	23	54N	75W	WYW145587

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

	IMPOUNDMENT Name / Number	Qtr/Qtr	Section	TWP	RNG	Capacity (Acre Feet)	Surface Disturbance (Acres)	Lease #
1	P9-1-5474	SWSW	9	54	75	8.5	2.7	WYW 141583
2	EX25-1-5576	NWSE	25	55	76	10.2	3.2	State
3	EX25-2-5576	SESE	25	55	76	11.3	3.6	State
4	P25-1-5576	NWSE	25	55	76	12.5	4	State

County: Campbell

Applicant: Comet Energy

Surface Owners: Clifford Smith, Darrel Drake, Bobby Joe Spellman Trust, Mutual Life Insurance Co. of New York, Michael & Brenda Odegard, State of Wyoming, BLM, Duane Odegard, Duane & Mary Odegard Trust, Dale Smith, Sandra Speck, Orville Carson, Bobby Joe Rebbeca Spellman, Crump Land & Livestock, LLC.

Project Description:
The proposed action involves the following:

- Drilling of 48 total federal CBM wells in the Anderson,Canyon & Wall coal zones to depths of approximately 2400 to 2800 feet. Multiple seams will be produced by wells that will co-mingle production (a single well per location cable of producing from multiple coal seams). Construction and drilling is scheduled to start in the Fall of 2008.

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

- Well metering shall be accomplished by telemetry. Each well/central metering facility would most likely be visited once a day for trouble shooting/inspection.

- A Water Management Plan (WMP) that involves the following infrastructure and strategy: 4 discharge points and 4 stock water reservoirs will provide partial storage for produced water, and the balance of water will be piped to two new subsurface drip irrigation (SDI) tracts in the northern portion of this POD or to existing SDI facilities constructed as part of the Kenai Federal POD. All facilities are located within the Upper Powder River watershed.

- An unimproved and improved road network.

- An above ground power line network is existing in or adjacent to the POD. No new overhead power lines are proposed.

- If the underground power line network is not in place at the time of well production, temporary

diesel generators shall be placed at the power drops or other appropriate sites.

- A buried gas, water and power line network, 2 compression facilities and 3 equipment, staging areas.

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

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

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

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

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

2.3. Alternative C – Environmentally Preferred

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

2.3.1. Changes as a result of the on-sites

1. Well B1-4 was moved closer to a 2 track road to reduce disturbance.
2. Well C2-4 had the pipeline moved out of the bottom of the draw and put along the access road.
3. Well D1-4, A4-23, B3-23, D3-25, D3-32 were dropped, due to rough country with poor reclamation potential.
4. Well B1-9 was moved to reduce potential disturbance to a hawk nest.
5. Well C2-9 was moved out of the ¼ mile buffer zone of a hawk nest.
6. Well C4-9 will have the washout, just south of the well, fenced off to reduce disturbance and increase

safety of the crews.
7. Well D1-9 was moved to eliminate the need for an engineered pad.
8. Well C2-10, C4-10, D3-10, D3-29, A2-31 & B1-31 were moved to reduce surface disturbance.
9. Well B1-15 and access corridor was moved to reduce surface disturbance.
10. Moved well C4-32 (now called D4-32) for better drainage spacing.

2.3.2. Programmatic mitigation measures identified in the PRB FEIS ROD

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

2.3.2.1. Groundwater

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

2.3.2.2. Surface Water

1. Channel Crossings:
   a) Channel crossings by road and pipelines will be constructed perpendicular to flow. Culverts will be installed at appropriate locations for streams and channels crossed by roads as specified in the BLM Manual 9112-Bridges and Major Culverts and Manual 9113-Roads. Streams will be crossed perpendicular to flow, where possible, and all stream crossing structures will be designed to carry the 25-year discharge event or other capacities as directed by the BLM.
   b) Channel crossings by pipelines will be constructed so that the pipe is buried at least four feet below the channel bottom.
2. Low water crossings will be constructed at original streambed elevation in a manner that will prevent any blockage or restriction of the existing channel. Material removed will be stockpiled for use in reclamation of the crossings.

3. Concerns regarding the quality of the discharged CBNG water on downstream irrigation use may require operators to increase the amount of storage of CBNG water during the irrigation months and allow more surface discharge during the non-irrigation months.

4. The operator will supply two copies of the complete approved SW-4, SW-3, or SW-CBNG permits to BLM as they are issued by WSEO for impoundments.

5. The operator will supply two copies of the WYPDES permit for this POD to the BLM as soon as it is available from WDEQ.

6. The operator will provide a copy of the UIC application and design report for the SDI facility planned for Section 24 R76W T55N when it is available.

2.3.2.3. Soils

1. The Companies, on a case by case basis depending upon water and soil characteristics, will test sediments deposited in impoundments before reclaiming the impoundments. Tests will include the standard suite of cations, ions, and nutrients that will be monitored in surface water testing and any

trace metals found in the CBNG discharges at concentrations exceeding detectable limits.

2.3.2.4. Wetland/Riparian

1. Wetland areas will be disturbed only during dry conditions (that is, during late summer or fall) or when the ground is frozen during the winter.

2. No waste material will be deposited below high water lines in riparian areas, flood plains, or in natural drainage ways.

3. The lower edge of soil or other material stockpiles will be located outside the active floodplain.

4. Disturbed channels will be re-shaped to their approximate original configuration or stable geomorphological configuration and properly stabilized.

5. Reclamation of disturbed wetland/riparian areas will begin immediately after project activities are complete.

2.3.2.5. Wildlife

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

2. The Companies will locate facilities so that noise from the facilities at any nearby sage grouse or sharp-tailed grouse display grounds does not exceed 49 decibels (10 dBA above background noise) at the display ground.

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

2.3.2.6. Threatened, Endangered, or Sensitive Species

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

2.3.2.6.1. Black-footed Ferret

1. If any black-footed ferrets are located, the USFWS will be consulted. Absolutely no disturbance will be allowed within prairie dog colonies inhabited by black-footed ferrets.

2. Additional mitigation measure may be necessary if the site-specific project is determined by a BLM biologist to have adverse effects to black-footed ferrets or their habitat. In the event that a mountain plover is located during construction or operation, the USFWS' Wyoming Field Office (307-772-2374) and the USFWS' Law Enforcement Office (307-261-6365) will be notified within 24 hours.

2.3.2.6.2. Mountain Plover

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

   Outside of occupied black-tailed prairie dog colonies, a mountain plover nesting survey following U.S. Fish and Wildlife Service protocol is encouraged prior to construction initiation, as project modifications can be made if necessary to protect nesting plovers and natural gas production. If

requested in writing, then authorization may be granted for construction activities to occur between August 1 and March 15, outside the mountain plover breeding season. A mountain plover nesting survey following U.S. Fish and Wildlife Service protocol shall be conducted during the first available survey period (May 1 – June 15). Additional measures such as monitoring and activity restrictions may be applied if mountain plovers are documented.

2.3.2.7. Visual Resources

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

2.3.2.8. Noise

1. Noise mufflers will be installed on the exhaust of compressor engines to reduce the exhaust noise.

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

2.3.2.9. Air Quality

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

2.3.3. Site specific mitigation measures

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

General

1. Field supervisors/construction foreman and anyone else doing construction, dirt work, drilling, etc. should have or have readily available, a copy of the Plan of Development (POD), Conditions of approval (COAs), Surface Use Data Summary (SUDS) Form and understand them. If there are questions or information is not clear, stop and get answers or clarification before doing the surface disturbance.

Surface Use

1. Do not disturb/turn over sod, brush hog or mow vegetation any more than what was approved. Use appropriate sized equipment for the job.
2. Well A2-9, maintain a 20', undisturbed, vegetative buffer near edge of slope.
3. Well C4-9, fence/avoid the "washout" area just south of the well.
4. Well D1-10, extra attention needed to stabilize this location/access.
5. Well B1-15, stay out of draw, access corridor disturbance width is 25' or less and disturbance must be stabilized during and within 30 days of start of construction.
6. Well D3-15, access corridor disturbance width is 25' or less and disturbance must be stabilized during and within 30 days of start of construction.

7. Well B1-25, do not disturb hillside.
8. Well C2-25, maintain an undisturbed, vegetated buffer near top of draw/drainage.
9. Well D3-29, access disturbance will be 25' or less.
10. Well A2-31, 40'curcumfrance maximum sagebrush mowing.
11. Well B1-31 and B3-32 maintain undisturbed, vegetative buffer near draw.
12. Well B3-31, modified from standard slot design, slot size is 40' wide x 80' long x 4'or less deep. B1-31, slot size is 30' x 100'. D1-32, slot size is 20' x 30'.
13. Well B1-32, access corridor disturbance width is 25' or less and disturbance must be stabilized during and within 30 days of start of construction.
14. Well D1-32, access corridor disturbance width is 25' or less and disturbance must be stabilized during and within 30 days of start of construction. Maintain undisturbed, vegetative buffer.
15. Access corridors to wells C4-9 and D3-10, disturbance must be stabilized during and within 30 days of the start of construction. Pay special attention to disturbance in and around the middle tributary of Linn Draw.
16. 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 Linn Draw POD is Covert Green, 18-0617TPX.
17. 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): For all wells except the C2-9 well and infrastructure.

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

10" to 14" Precipitation Zone, Sandy Ecological Sites: For well C2-9 and the infrastructure going, for approximately 800' north, to well B1-9.

Species	**% in Mix**	Lbs PLS*/acre
Thickspike Wheatgrass (Elymus lanceolatus ssp. lanceolatus)	30	3.6
Prairie sandreed (Calamovilfa longifolia)	30	3.6
Indian ricegrass (Achnatherum hymenoides)	25	3.0
Prairie coneflower (Ratibida columnifera)	5	0.6
White or purple prairie clover (Dalea candidum, purpureum)	5	0.6
Scarlet Globemallow (Sphaeralcea coccinea) / or ***Blue flax***(Linum lewisii)	5	0.6
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

Raptors

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

Township/Range	**Section**	**Wells and Infrastructure**
T54N, R75W	9	A2-9
T54N, R75W	9	B1-9
T54N, R75W	9	B3-9
T54N, R75W	9	C2-9
T54N, R75W	9	D1-9
T54N, R75W	9	All access corridors in Sec. 9 except the portion in the NE NE of the section.
T54N, R75W	15	D3-15 and the access corridor in the S SW of Sec. 15.
T54N, R75W	25	A2-25
T54N, R75W	25	B3-25
T54N, R75W	25	C4-25
T54N, R75W	25	All access corridors in the E and NE NE of Sec. 25
T54N, R75W	32	A2-32
T54N, R75W	32	B3-32
T54N, R75W	32	C1-32

Township/Range	Section	Wells and Infrastructure
T54N, R75W	32	C3-32
T54N, R75W	32	C9-32
T54N, R75W	32	D3-32
T54N, R75W	32	D4-32
T54N, R75W	32	All access corridors in Section 32

1) Surveys to document nest occupancy shall be conducted by a biologist following BLM protocol, between April 15 and June 30. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities. Surveys outside this window may not depict nesting activity. If a survey identifies active raptor nests, a 0.5 mile timing buffer will be implemented. The timing buffer restricts surface disturbing activities within 0.5 mile of occupied raptor nests from February 1 to July 31.
2) Nest productivity checks shall be completed annually and continue for the first five years following project completion. The productivity checks shall be conducted no earlier than June 1 or later than June 30 and any evidence of nesting success or production shall be recorded. Survey results will be submitted to a Buffalo BLM biologist in writing no later than July 31 of each survey year. This applies to the nests listed in Table 4 of this EA.

b. If an undocumented raptor nest is located during project construction or operation, the Buffalo Field Office (307-684-1100) shall be notified within 24 hours.
c. Well metering, maintenance and other site visits within 0.5 miles of raptor nests should be minimized as much as possible during the breeding season (February 1 – July 31).

Sage Grouse

1. The following conditions will alleviate impacts to sage-grouse:
   a. No surface disturbing activities are permitted within 2 miles of the Ruckel Draw, Howell, Spotted Horse, and Box Draw sage grouse lek(s) between March 1 and June 15, prior to completion of a greater sage grouse lek survey**. This condition will be implemented on an annual basis for the duration of surface disturbing activities.** This timing limitation will affect the following:

Township/Range	Section	Wells and Infrastructure
T54N, R75W	25	All wells and access corridors in Section 25
T54N, R75W	4	All wells and access corridors in Section 4
T55N, R75W	31,32,33	All wells and infrastructure in Sections 31,32 & 33

   1) If an active lek is identified during the survey, the 2 mile timing restriction (March 1-June 15) will be applied and surface disturbing activities will not be permitted until after the nesting season. If surveys indicate that the identified lek is inactive during the current breeding season, surface disturbing activities may be permitted within the 2 mile buffer until the following breeding season (March 1). The required sage grouse survey will be conducted by a biologist following the most current WGFD protocol. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities.
   b. Well metering, maintenance and other site visits within 2.0 miles of documented sage grouse lek sites should be minimized as much as possible during the breeding season (March 1– June 15).
2. The compressor in Section 33 T55N, R75W will be designed using "best technology" to reduce noise to below 49 decibels (10 dBA above background noise) at the display ground.

Rights-Of-Ways:
The following right-of-way locations were identified with the Linn Draw POD. Use and maintenance of these locations are prohibited until authorized right-of-ways have been issued.
T. 54 N., R. 75 W., section 9, lot 13 for the P9-1-5475 reservoir.
T. 54 N., R. 75 W., sections 5, 6, 7,8,9,15,17, 25, and 26 for Road, Water, Gas and Buried electric.

2.4. Alternatives considered but not analyzed in detail

Direct Discharge
Direct discharge to tributaries is not feasible as the sole water management strategy because there is not a sufficient stream length to attenuate and lose the proposed water production volume prior to reaching the Powder River as required by the WDEQ.

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

Land Application
Land application of produced water within the Linn Draw POD was considered. Land application would involve applying the water to cropland at agronomic rates through an irrigation system. Land application is at best a seasonal approach and would require the construction of several reservoirs to store produced water during the non-irrigation season. Due to the high construction and operating costs and lack of landowner interest, land application was ruled out.

Total Containment
Total containment within existing and proposed reservoirs was assessed and discounted due to the number of reservoirs necessary to contain the volume of CBNG production water associated with this POD. Landowner concerns coupled with the large number of new reservoirs required under this alternative resulted in poor economics and high surface disturbance, prompting the selection of other alternatives. Containment is used in combination with SDI for this POD.

Treatment of Produced Water
Treatment of produced water from the POD with subsequent discharge into North Prong Wild Horse Creek was extensively researched to examine the full range of possibilities. The following potential treatment technologies were considered: Sulfur burners, constructed wetlands, rapid spray distillation, electrodialysis reversal, electronic water purification, reverse osmosis, ion exchange with resins, ion exchange with zeolites and cation exchange and cation removal. Sulfur burner technologies were rejected since they will not address sodium concentrations in the produced water. Use of constructed wetlands was determined to not be a reasonable alternative since they have limited utility in removing total dissolved solids and salts. Given the short growing season in the area, substantial reservoir storage would still be needed. Rapid spray distillation and electronic water purification are emerging technologies that are unproven and have not been demonstrated to effectively treat CBNG water. Electrodialysis reversal has not been cost effectively applied the treatment of CBNG water. Both electrodialysis reversal and reverse osmosis would generate a brine reject stream of up to 20 percent of the design flow of the treatment system. With ion exchange technologies, it is possible to substantially reduce the volume of brine reject water however the resulting reject stream would be more concentrated. The concentrated brine from these treatment systems would need to be appropriately managed to address potential

environmental concerns. The brine waters could potentially be trucked off-site for disposal, which given the volumes associated with electrodialysis reversal and reverse osmosis, would render those options uneconomic. Other options for managing the brine reject streams include evaporation in a lined pit; or dilution to stock water standards and discharge to total containment reservoirs.

2.5. Summary of Alternatives

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

Table 2.5 Summary of the Alternatives

Facility	Alternative A (No Action) Existing Number or Miles	Alternative B (Original Proposal) Proposed Number or Miles	Alternative C (Environmental Alt.) Revised Number or Miles
Total CBNG/Gas Wells	76	48	43
Total Locations			43
Non-constructed Pads	84	48	11
Slotted Pads		48	32
Constructed Pads			0
Conventional Wells	8	0	0
Gather/Metering Facilities	0	2	0
Compressors	1	0	2
Monitor Wells	0	0	0
Impoundments			
On-channel	2	4	4
Off-channel	0	0	0
Water Discharge Points	0	4	4
Treatment Facilities	0	0	0
Improved Roads			
No Corridor	17.75mi.	2 mi.	1.1 mi.
With Corridor	5.4 mi.	5.8 mi.	5.7 mi.
2-Track Roads			
No Corridor	13.6 mi.	0.4 mi.	5.3 mi.
With Corridor	0.9 mi.	12.3 mi.	13.5 mi.
Buried Utilities			
No Corridor	0 mi.	1.2 mi.	1.5 mi.
With Corridor	0 mi.	3.2 mi.	3.8 mi.

Facility	Alternative A (No Action) Existing Number or Miles	Alternative B (Original Proposal) Proposed Number or Miles	Alternative C (Environmental Alt.) Revised Number or Miles
Overhead Powerlines	9.7 mi.	0	0
Communication Sites		0	0
Staging/Storage Areas	0	3	3 (on compressor sites)
Subsurface Drip Irrigation Fields (SDI)	0	2	2
Acres of Disturbance	263 ac	201 ac	157 ac

3. DESCRIPTION OF AFFECTED ENVIRONMENT

Applications to drill were received on November 9th, 2007. Field inspections of the proposed Linn Draw CBNG project were conducted on 4/22nd & 30th and 7/15,16,17,18/2008 by Darrell Drake, Bobby Spellman-Landowners, Kent Fink, Troy Reile, Greg Hoechst, Zack Byran, Allen Jones, Jason Sutton-Company Representatives, Dan Sellers, Don Brewer, Chris Williams, Jim Verplanke, Amber Haverlock, Ted Hamersma, Jenny Morton-BLM, Brad Rodgers- US Fish & Wildlife Service.

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			Don Brewer
Floodplains		X		Chris Williams-Dan Sellers
Wilderness Values			X	Dan Sellers
ACECs			X	Dan Sellers
Water Resources	X			Chris Williams
Air Quality	X			Dan Sellers
Cultural or Historical Values	X			G.L. “Buck” Damone III
Prime or Unique Farmlands			X	Dan Sellers
Wild & Scenic Rivers			X	Dan Sellers
Wetland/Riparian		X		Chris Williams-Dan Sellers
Native American Religious Concerns			X	G.L. “Buck” Damone III
Hazardous Wastes or Solids		X		Dan Sellers
Invasive, Nonnative Species	X			Dan Sellers

Mandatory Item	Potentially Impacted	No Impact	Not Present On Site	BLM Evaluator
Environmental Justice		X		Dan Sellers

3.1. Topographic Characteristics of Project Area

Primary land uses in the area are ranching/farming, CBNG production, and hunting. There is currently natural gas and oil development within the project area. William's Carr Draw I is to the southwest, Yates' Nemiss 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 4,800 to 5,000 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 Wild Horse Creek, and Spotted Horse Creek. Middle Prong of Wild Horse Creek and Spotted Horse Creek are ephemeral. The topography consists from flat to rugged terrain with ridges, deep draws and rough breaks.

For more information please see the POD book.

3.2. Vegetation & Soils

Species typical of short grass prairie comprise the project area flora.
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 (Pascopryum 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 (*Opunita spp*.), scarlet globemallow (*Sphaeralcea coccinea*), and rabbit brush (Chrysothamnus spp.) (Martini 2007). The project area is made up of sagebrush and native grasses; sagebrush and native grasses with cheatgrass/Japanese brome invading; and sagebrush with a cheat grass/Japanese brome dominated under story. This vegetation type includes a combination of sparse (0-5% cover), light (5-10% cover), moderately dense (10-15% cover) and dense (15-25% cover) big sagebrush crown closure. In areas where sagebrush and native grasses exist, grass cover ranges from 10-35% depending on soil type. In areas with sagebrush and native grasses and cheatgrass/Japanese Brome, cheatgrass/Japanese Brome cover ranges from sparse (0-10%) to dense (40 to 80%). Cheatgrass and Japanese brome have taken over areas that have been affected by fire and over grazing. In these areas cheatgrass and Japanese brome cover is between 60 and 80%.

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

Cottonwood trees are found, much less frequently, scattered throughout the project area in deep narrow draws. Middle Prong of Wild Horse Creek, adjacent to the project area consists of wetland and upland grasses and upland shrubs.

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

Using the Natural Resource Conservation Service, (NRCS, USDA), Technical Guides for the Major Land

Resource Area 58B Northern Rolling High Plains, in the 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 are shallow loamy (44%), loamy (22%), clayey (32%), and sandy (2%). Lowland sandy sites make up a small portion of the ecological range sites. These sites occur on land nearly level to up to 50% slopes.

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

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

3.2.1. Wetlands/Riparian

Small areas of wetland vegetation exist around existing stock reservoirs and short reaches of riparian vegetation may be found in the larger tributaries in the POD area.

3.2.2. Invasive Species

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

- Russian knapweed
- leafy spurge
- Canada thistle
- saltcedar

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

3.3. Wildlife

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

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

A BLM biologist conducted field visits on July 15, 16, 17 and 18, 2008. During this time, the biologist reviewed the wildlife survey information for accuracy, evaluated impacts to wildlife resources, and provided project modification recommendations where wildlife issues arose.

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

3.3.1. Big Game

Big game species expected to be within the Linn Draw project area include pronghorn antelope and mule deer. Both mule deer and pronghorns were commonly seen throughout the area during field visits by the BLM biologist. The WGFD has determined that the project area contains Winter and Yearlong range for pronghorn antelope and Winter-Yearlong range for mule deer. The project area is approximately seven miles to the northeast of the Fortification Creek Herd Area. Radio telemetry data shows elk from the Fortification Creek area occurring south and north of the Linn Draw project area. Although no elk or elk sign was seen during field visits, the project area may be within a travel corridor between the Fortification Creek area and Montana.

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.

3.3.2. Aquatics

The project area is drained by ephemeral tributaries of Spotted Creek and Middle Prong Wild Horse Creek, tributaries to the Powder River. No springs are known to exist in the project area. Fish that have been identified in the Powder River watershed are listed in the PRB FEIS (3-156-159).

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

3.3.3. Migratory Birds

A wide variety of migratory birds may be found in the proposed project area at some point throughout the year. Migratory birds are those that migrate for the purpose of breeding and foraging at some point in the calendar year. Many species that are of high management concern use shrub-steppe and shortgrass prairie areas for their primary breeding habitats (Saab and Rich 1997). Migratory bird species of management concern that may occur in the project area are listed in the PRB FEIS (3-151). Species observed by the BLM Biologist during the field visits include; western meadowlark, Brewer's blackbird and bobolink.

3.3.4. Raptors

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

Twelve raptor nest sites were identified by Arcadis (2008) and BLM within 0.5 mile of the project area, of these, one nest was active in 2008.

Table 4. Documented raptor nests within the Linn Draw project area.

BLM_ID	UTME	UTMN	Legal	* Substrate	Year	Condition	Status Code	* Species
658	427093	4950653	T55N R75W S32	GHS	2008	Unknown	DID NOT LOCATE	UNRA
2772	428837	4943764	T54N R75W S21	CTL	2008	Fair	INACTIVE	
					2008	Good	INACIVE	RETA
					2007	Poor	INACIVE	
					2006	Good	INACIVE	
					2005	Good	INACIVE	
4177	435136	4942380	T54N R74W S30	CTL	2008	Fair	INACIVE	
					2007	Good	ACTIVE	LOOW
					2006	Good	ACTIVE	LOOW
4836	434863	4942619	T54N R75W S25	JUN	2008	Good	INACIVE	
					2007	Good	ACTIVE	RETA
4837	434751	4942976	T54N R75W S25	JUN	2008	Poor	INACIVE	
					2007	Good	ACTIVE	LOOW
5636	433568	4945337	T54N R75W S13	ROK	2007	Remnant	INACTIVE	FEHA
6274	429074	4946995	T54N R75W S9	BOX	2008	Fair	INACIVE	
6275	429057	4947012	T54N R75W S9	BOX	2008	Good	OCCUPIED	SHHA
6276	4288813	4943793	TN54 R75W 21S	CTL	2008	Poor	INACIVE	
6277	431652	4944533	T54N R75W S22	BOX	2008	Fair	INACIVE	UNRA
6278	428254	4950568	T55N R75W S32	PON	2008	Good	ACTIVE	RETA
6279	427899	4950539	T55N R75W S32	PON	2008	Fair	INACTIVE	UNRA

* BOX - Box Elder Tree
CTL - Cottonwood Live
GHS - Ground/Hillside
JUN - Juniper Tree
PON - Ponderosa Pine Tree
ROK - Rocky Outcrop

FEHA - Ferruginous hawk
LOOW - Long-eared Owl
RETA - Red-tailed hawk
SHHA - Sharp-shinned hawk
UNRA - Unknown Raptor

3.3.5. Threatened and Endangered and Sensitive Species

3.3.5.1. Threatened and Endangered Species

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

3.3.5.1.1. Black-footed ferret

The USFWS listed the black-footed ferret as Endangered on March 11, 1967. Active reintroduction efforts have reestablished populations in Mexico, Arizona, Colorado, Montana, South Dakota, Utah, and Wyoming. In 2004, the WGFD identified six prairie dog complexes (Arvada, Sheridan, Pleasantdale, Four Corners, Linch, Kaycee, and, Thunder Basin National Grasslands) partially or wholly within the BLM Buffalo Field Office administrative area as potential black-footed ferret reintroduction sites (Grenier et al. 2004).

This nocturnal predator is closely associated with prairie dogs, depending almost entirely upon them for its food. The ferret also uses old prairie dog burrows for dens. Current science indicates that a black-footed ferret population requires at least 1000 acres, separated by no more than 1.5 km, 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).

Ten black-tailed prairie dog colonies were identified during site visits by Arcadis within the project area covering a total of 176.3 acres (Table 4.2). The colonies are distributed into two cluster areas. Five of the colonies are within 1.1 miles of each other in the northern part of the project area (Sections 28, 29, 32 and 33 T55N, R76W). The other cluster is in Sections 11 and 14 T54N, R74W. The four colonies in this cluster are within 1.45 miles of each other. One small two acre colony is located 1.41 miles due south of the second cluster in Section 26.

Table 4.2 Prairie Dog Colonies in or near the Linn Draw POD.

Location	Acres	Status
NW 11 T54N, R75W	74	Occupied
SW SE 14 T54N, R75W	13	Occupied
NE NW 14 T54N, R75W	27	Occupied
SE 14 T54N, R75W	29	Occupied
NW 26 T54N, R75W	15	Occupied
SE SW 28 T55N, R75W	5	Occupied
SW SE 29 T55N, R75W	6	Occupied
NE SW 32 T55N, R75W	2.3	Occupied
NE SW 33 T55N, R75W	3	Occupied
NW NW 33 T55N, R75W	2	Occupied

A portion of the Arvada complex, a potential black-footed ferret reintroduction area extends into the project area. Black-footed ferret habitat is present within the Linn Draw project area.

3.3.5.1.2. Ute Ladies'-Tresses Orchid

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

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

Spotted Creek, Middle Prong Wild Horse Creek and their tributaries are ephemeral. No springs are known to exist in the project area. Arcadis reported in their survey report (2007) that the entire project area was surveyed. They concluded that all streams were ephemeral and did not possess the hydrology

necessary to support the orchid. Suitable orchid habitat is not present within the Linn Draw project area.

3.3.5.2. Sensitive Species

The USDI Bureau of Land Management (BLM) Wyoming has prepared a list of sensitive species to focus species management efforts towards maintaining habitats under a multiple use mandate. Two habitat types, prairie dog colonies and sagebrush ecosystems, specifically, are the most common among habitat types within the Powder River Basin and contain habitat components required in the life cycle of several sensitive species. These are described below in general terms. Those species within the Powder River Basin that were once listed or candidates for listing under the Endangered Species Act of 1973 and remain BLM Wyoming sensitive species are described in more detail. The authority for this policy and guidance comes from the Endangered Species Act of 1973, as amended; Title II of the Sikes Act, as amended; the Federal Land Policy and Management Act (FLPMA) of 1976; and the Department Manual 235.1.1A.

3.3.5.2.1. Prairie dog colony obligates

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

In South Dakota, forty percent of the wildlife taxa (134 vertebrate species) are associated with prairie dog colonies (Agnew 1983, Apa 1985, McCracken et al. 1985, Agnew 1986, Uresk and Sharps 1986, Deisch et al. 1989). Of those species regularly associated with prairie dog colonies, six are on the Wyoming BLM sensitive species list: swift fox (*Vulpes velox*), mountain plover (*Charadrius montanus*), ferruginous hawk (*Buteo regalis*), burrowing owl (*Athene cunicularia*), loggerhead shrike (*Lanius ludovicianus*), and long-billed curlew (*Numenius americanus*). None of the above species were observed by the biologist during field surveys.

3.3.5.2.2. Sagebrush obligates

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

3.3.5.2.3. Bald eagle

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

Bald eagle nesting habitat is generally found in areas that support large mature trees. Eagles typically will

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

No bald eagle nests were found during surveys by Arcadis in 2007 and 2008. Nest structures observed within the trees appeared to be of insufficient size to be suitable for bald eagle nesting (Arcadis 2008). Their survey reports concluded that suitable winter roost habitat does not occur in the project area as there are no coniferous or deciduous trees capable of providing roosts. Ten prairie dog colonies are present in the project area which could provide a prey source for wintering bald eagles. Arcadis has documented inconsistent bald eagle use in Middle Prong Wild Horse Creek, two miles away from the project area and the Powder River, six miles to the west. The area is likely only used by bald eagles for daytime foraging.

3.3.5.2.4. Black-tailed prairie dog

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

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

The black-tailed prairie dog is considered common in Wyoming, although its abundance fluctuates with activity levels of Sylvatic plague and the extent of control efforts by landowners. Comparisons with 1994 Digital Ortho Quads indicated that black-tailed prairie dog acreage remained stable from 1994 through 2001. However, aerial surveys conducted in 2003 to determine the status of known colonies indicated that a significant portion (approximately 47%) of the prairie dog acreage was impacted by Sylvatic plague and/or control efforts (Grenier 2004).

Ten black-tailed prairie dog colonies, totaling approximately 176.3 acres were identified during site visits by Arcadis within the project area (Table 4.2). The colonies are distributed into two cluster areas. Five of the colonies are within 1.1 miles of each other in the northern part of the project area (Sections 28, 29, 32 and 33 T55N, R76W). The other cluster is in Sections 11 and 14 T54N, R74W. The four colonies in this cluster are within 1.45 miles of each other. One small two acre colony is located 1.41 due south of the second cluster in Section 26. These colonies are linked to the Arvada complex.

3.3.5.2.5. Grouse

3.3.5.2.5.1. Greater sage-grouse

The greater sage-grouse is listed as a sensitive species by BLM (Wyoming). In recent years, several petitions have been submitted to the USFWS to list greater sage-grouse as Threatened or Endangered. On January 12th, 2005, the USFWS issued a decision that the listing of the greater sage-grouse was "not warranted" following a Status Review. The decision document supporting this outcome noted the need to

continue or expand all conservation efforts to conserve sage-grouse. In 2007, the U.S. District Court remanded that decision, stating that the USFWS' decision-making process was flawed and ordered the USFWS to conduct a new Status Review as a result of a lawsuit and questions surrounding the 2005 review (Winmill Decision Case No. CV-06-277-E-BLW, December 2007).

Greater sage-grouse are found in prairie, sagebrush shrublands, other shrublands, wet meadows, and agricultural areas; they depend upon substantial sagebrush stands for nesting and winter survival (BLM 2003). Suitable sage-grouse habitat is present throughout the project area. Arcadis describes sagebrush canopy coverage as being 10 -15-% throughout much of the foothill slopes and ephemeral draws of the project area. Potential nesting habitats occur in Rucker Draw and Linn Draw areas where sagebrush canopy densities are relatively high such as in Sections 32 and 33 T54N, R75W and Sections 3, 4, 5, 9, 14, 15, 22, 23 and 24 T55N, R75W. Sage-grouse habitat models indicate that approximately 25% of the project area contains high quality sage-grouse nesting habitat and approximately 35-40% of the area contains high quality sage-grouse wintering habitat (Walker et al. 2007). At the onsite, BLM biologists found sage-grouse sign in NE SE Section 25 T54N, R75W. BLM records identified 13 sage-grouse leks within 4 miles of the project area. The 4-mile distance was recommended by the State wildlife agencies' ad hoc committee for consideration of oil and gas development effects to nesting habitat (WGFD 2008). These 13 lek sites are identified below (Table 6).

Table 6. **Sage-grouse leks surrounding the Linn Draw project area.**

LEK NAME	LEGAL LOCATION	OCCUPANCY STATUS IN 2008	DISTANCE FROM PROJECT AREA (IN MILES)
Barton North	Sec. 34 T55N,R76W	Active, 5 males	2.3
Larey Draw	Sec. 2 T54N,R76W	Active, 38 males	1.7
Howell Draw	Sec. 28 T55N,R75W	Inactive	In Project Area
Ruckel Draw	Sec. 29 T55N,R75W	Inactive	In Project Area
Spotted Horse	Sec. 35 T55N,R75W	Inactive	1.5
Case I	Sec. 8 T.54N,R74.	Inactive	2.9
Case II	Sec. 6 T.54N,R74W	Inactive	2.3
Case III	Sec. 31 T55N,R74W	Inactive	2.8
Box Draw	Sec. 30 T54N,R74W	Active, 13 males	0.9
Kretschmann	Sec. 1 T53N,R75W	Inactive	1.2
Ridgetop	Sec. 5 T53N,R74W	Inactive	1.9
Fitch Prong	Sec. 5 T53N,R74W	Inactive	2.0
Playa	Sec. 12 T53N,R75W	Active, 14 males	2.7

3.3.5.2.5.2. Sharp-tailed grouse

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

The Linn Draw project area has the potential to support sharp-tailed grouse during most of the year. The mosaic of grasslands and sagebrush-grasslands could provide habitat from April through October. Cottonwoods and junipers could provide buds and berries, respectively, to sustain grouse through the winter. Two sharp-tailed grouse leks exit within two miles Linn Draw southern boundary. The Fitch Lek is 1.6 mile south of the project area in NE SW Section 2 T53N, R75W. The Greasewood Lek is 1.9 miles south of the project boundary in NE NE Section 4 T53N, R75W. No Sharp-tailed grouse were observed during field surveys by Arcadis or BLM biologists.

3.3.5.2.6. Mountain plover

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

Suitable mountain plover habitat is present within the project area but marginal. Terrain throughout the Linn Draw project area is generally rough. Although the terrain found throughout most of the project area is unsuitable for mountain plover. Portions of the few prairie dog colonies present are flat enough to be used by plovers for nesting.

3.4. West Nile Virus

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

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

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

Table 3.4 Historical West Nile Virus Information

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

*Wyoming Department of Health Records September 12, 2007.

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

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

Mosquitoes can potentially breed in any standing water that lasts more than four days. In the Powder River Basin, there is generally increased surface water availability associated with CBNG development. This increase in potential mosquito breeding habitat provides opportunities for mosquito populations to increase. Preliminary research conducted in the Powder River Basin indicates WNV mosquito vectors were notably more abundant on a developed CBNG site than two similar undeveloped sites (Walker et al. 2003). Reducing the population of mosquitoes, especially species that are apparently involved with bird-to-bird transmission of WNV, such as *Culex tarsalis*, can help to reduce or eliminate the presence of virus in a given geographical area (APHIS 2002). The most important step any property owner can take to control such mosquito populations is to remove all potential man-made sources of standing water in which mosquitoes might breed (APHIS 2002).

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

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

3.5. Water Resources

The project area is within the Upper Powder River drainage system. Most of the POD area is within the Spotted Horse Creek watershed, and the remainder is within the North Prong 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.

A search of the Wyoming State Engineer Office (WSEO) Ground Water Rights Database for this area showed 18 registered stock and domestic water wells within ½ mile of a federal CBNG producing well in the POD with depths ranging from 65 to 590 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 Spotted Horse Creek and Middle Prong Wild Horse Creek drainages which are tributaries to the Upper Powder River watershed. All drainages within the POD area are ephemeral, flowing only in response to a precipitation event or snow melt. The channels range from well vegetated grassy swales without defined bed and bank to flat-bottomed, incised channels with erosive banks.

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

composition to surface drainages within the Project Area" (PRB FEIS page 3-48). For the Upper Powder River watershed, the EC ranges from 1,797 at Maximum monthly flow to 3,400 at Low monthly flow and the SAR ranges from 4.76 at Maximum monthly flow to 7.83 at Low monthly flow. These values were determined at the USGS station located at Arvada, WY, Station ID 06317000 (PRB FEIS page 3-49).

The operator has identified no natural springs within or near this POD.

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 Linn Draw project prior to on-the-ground project work (BFO project no. 70080061). North Platte Archaeological Services conducted a block and linear Class III cultural resource inventory following the Archeology and Historic Preservation, Secretary of the Interior's Standards and Guidelines (48CFR190) for the project. G.L. "Buck" Damone III, BLM Archaeologist, reviewed the report for technical adequacy and compliance with Bureau of Land Management (BLM) standards, and determined it to be adequate. The following resources are located within the project area.

Table 3.5 Cultural Resources Inventory Results

Site Number	Site Type	National Register Eligibility
48CA995	Prehistoric Site	Not Eligible
48CA6617	Historic Site	Not Eligible
48CA6618	Prehistoric Site	Not Eligible
48CA6619	Prehistoric Site	Not Eligible
48CA6620	Prehistoric Site	Not Eligible
48CA6621	Historic Site	Not Eligible
48CA6794	Historic Site	Not Eligible
48CA6795	Historic Site	Not Eligible
48CA6796	Historic Site	Unevaluated

3.7. Air Quality

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

Existing air pollutant emission sources within the region include following:

- Exhaust emissions (primarily CO and nitrogen oxides [NOx]) from existing natural gas fired compressor engines used in production of natural gas and CBNG; and, gasoline and diesel vehicle tailpipe emissions of combustion pollutants;

- Dust (particulate matter) generated by vehicle travel on unpaved roads, windblown dust from neighboring areas and road sanding during the winter months;
- Transport of air pollutants from emission sources located outside the region;
- Dust (particulate matter) from coal mines;
- NOx, particulate matter, and other emissions from diesel trains and,
- SO2 and NOx from power plants.

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

4. ENVIRONMENTAL CONSEQUENCES

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

4.1. Vegetation & Soils Direct and Indirect Effects

Impacts to vegetation and soils from surface disturbance will be reduced, by following the operator's plans and BLM applied mitigation. Of the 43 proposed well locations, 11 can be drilled without a well pad being constructed and 32 will require a constructed "slotted" well pad. Surface disturbance associated with the drilling of the 11 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 25 x 40 feet), and compaction (from vehicles driving/parking at the drill site). Estimated disturbance associated with these 11 wells would involve approximately 0.2 acre/well for 2.2 total acres. The other 32 wells requiring slotted pad construction would disturb approximately 0.2 acres/well pad for a total of 6.4 acres. The total estimated disturbance for all 43 wells would be 8.6 acres.

Approximately 6.8 miles of improved roads would be constructed to provide access to various well locations. Approximately 14 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 5.3 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 adequate moisture and utilization of erosion control measures (e.g., waterbars, water wings, culverts, rip-rap, 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	11	0.2/acre		Long Term
Slotted Pad	32		8.6	
Gather/Metering Facilities	0	Site Specific	0.0	Long Term
Screw Compressors	2	Site Specific	1.4	Long Term
Monitor Wells	0	0.1/acre	0	Long Term
Impoundments	4		13.5	Long Term
On-channel	4	Site Specific	13.5	
Off-channel	0	Site Specific	0.00.08	
Water Discharge Points	4	Site Specific or 0.01 ac/WDP		
Channel Disturbance				
Headcut Mitigation*	0	Site Specific	0.0	
Channel Modification	0	Site Specific	0.0	
Improved Roads	6.8	40’ Width		Long Term
No Corridor			1.1	
With Corridor			5.7	
2-Track Roads				Long Term
No Corridor	5.3	12’ Width	11	
With Corridor	13.5	25’ Width	41	
With Corridor	0.88	40’ Width	4.3	
Pipelines	5.3		3.5	Short Term
With Corridor		20’ Width		
Overhead Powerlines	0.0	15’ Width	0	Long Term
Subsurface Drip Irrigation Fields (in disturbed, cultivated fields)	2		97.5	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. Wetland/Riparian

No impacts to wetlands and riparian zones are projected with the development of this POD. The SDI systems are not anticipated to create wetland habitat because the system uses low application rates that allow for downward percolation of water without saturating surface areas.

4.1.2. Invasive Species

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

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

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

The use of existing facilities along with the surface disturbance associated with construction of proposed access roads, pipelines, water management infrastructure, produced water discharge points and related facilities would present opportunities for weed invasion and spread. Produced CBNG water would likely continue to modify existing soil moisture and soil chemistry regimes in the areas of water release and storage. The activities related to the performance of the proposed project would create a favorable environment for the establishment and spread of noxious weeds/invasive plants such as salt cedar, Canada thistle, and perennial pepperweed. However, mitigation as required by BLM applied COAs will reduce potential impacts from noxious weeds and invasive plants.

4.1.3. Cumulative Effects

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

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

- They are proportional to the actual amount of cumulatively produced water in the Upper Powder River drainage, which is approximately 18.5% of the total predicted in the PRB FEIS.
- The WDEQ enforcement of the terms and conditions of the WYPDES permit that are designed to protect irrigation downstream.
- The WMP for the Linn Draw proposes that produced water will not contribute significantly to flows downstream.

4.2. Wildlife (Alternative C – Environmentally Preferred)

EFFECTS ANALYSIS

4.2.1. Big Game Direct and Indirect Effects

Under the environmentally preferred alternative, Winter and Yearlong range for pronghorn antelope and Winter/Yearlong range for mule deer would be directly disturbed with the construction of wells, reservoirs, pipelines and roads. The occasional elk use in the area would also be disturbed by construction

activities; however the project is not in an area the WGFD manages for elk. Table 4.1 summarized the proposed activities; items identified as long term disturbance would be direct habitat loss. Short-term disturbances also result in direct habitat loss; however, they should provide some habitat value as these areas are reclaimed and native vegetation becomes established.

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

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

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

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

4.2.1.1. Big Game Cumulative effects

The cumulative effects associated with Alternative C are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, please refer to the referenced PRB FEIS, Volume 2, Chapter 4, page 4-211.

4.2.2. Aquatics Direct and Indirect Effects

Produced water is to be discharged into two existing and two proposed reservoirs in ephemeral tributaries of the Spotted Creek Watershed. If a reservoir were to discharge, it is unlikely that the produced water will reach a fish-bearing stream, and that downstream species would be affected. In addition, Comet proposes to construct two subsurface drip irrigation (SDI) systems. One is located in Section 24 T55N, R76 and in Sections 33 and 34 T54N, R75W. SDI water managed properly will be consumed onsite, through plant uptake and infiltration, and not enter any drainages.

4.2.2.1. Aquatics Cumulative effects

The cumulative effects associated with Alternative C are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, please refer to the referenced PRB FEIS, Volume 2, Chapter 4, page 4-247.

4.2.3. Migratory Birds Direct and Indirect Effects

Disturbance of the habitat types within the project area is likely to impact migratory birds. Native habitats are being lost directly with the construction of wells, roads, and pipelines. Prompt re-vegetation of short-term disturbance areas should reduce habitat loss impacts. Human activities likely displace migratory birds farther than simply the physical habitat disturbance. Drilling and construction noise can be troublesome for songbirds by interfering with the males' ability to attract mates and defend territory, and the ability to recognize calls from conspecifics (BLM 2003).

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

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

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

4.2.3.1. Migratory Birds Cumulative effects

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

4.2.4. Raptors Direct and Indirect Effects

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

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.

Six wells proposed in the Linn Draw project are within one-quarter mile of raptor nests identified during the wildlife survey. Nest 658 is located just north of well number A2-32. After extensive searching, during the onsite inspection, it was determined that the nest is gone.

Wells B1-9 and C2-9, were moved out of sight of nests 6274 and 6275. The access road associated with the nest is still within sight of the nest in a few locations. Use of the road during regular maintenance visits to the wells will be a disturbance and may cause birds to flush from the nests leading to reduced productivity, nest failure, and nest abandonment.

Wells B3-25 and C4-25 are located along a ridge with nests 4177, 4836, and 4837 in a deep ravine to the east. The nests are out of line of sight of the wells and are well screened by the topography. Because of the visual screening from the topography, it is not likely the operation and maintenance activity will result in nest abandonment. Nest 6279 was discovered by Arcadis this spring. It is unoccupied, showing no sign of recent use.

Table 4.2. Infrastructure within close proximity (0.5 mile) to documented raptor nests within the Linn Draw project area.

BLM ID#	**AMOUNT AND TYPE OF INFRASTRUCTURE**	
	Within 0.25 mile	*Within 0.25 to 0.5 mile*
658	A2-32	A4-31,B8-31,B3-32,C1-32,C9-32 & D3-32
4177	C4-25	B3-25
4836	B3-25	A2-25 & C4-35
4837		B3-25
6274	B1-9 & C2-9	D1-9,A2-9 & B3-9
6275	B1-9 & C2-9	D1-9,A2-9 & B3-9
6277		D3-15
6278		B3-32, D3-29 & corridors to C3-32 & D4-32
6279	B3-32	A2-32,C2-32 & corridor to D4-32

Impacts to the remaining nests within one-half mile of wells and infrastructure will be reduced with the application of timing limitations. Additional direct and indirect impacts to raptors, from oil and gas development, are analyzed in the PRB FEIS (4-216-221).

4.2.4.1. Raptors Cumulative effects

The cumulative effects associated with Alternative C are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, please refer to the referenced PRB FEIS, Volume 2, Chapter 4, page 4-221.

4.2.5. Threatened and Endangered and Sensitive Species

Potential project effects on Threatened and Endangered Species were analyzed and a summary is provided in Table 4.2.5.1. Threatened and Endangered Species potentially affected by the proposed project area are further discussed following the table.

4.2.5.1. Threatened and Endangered Species

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

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Endangered				
Black-footed ferret (*Mustela nigripes*)	Black-tailed prairie dog colonies or complexes > 1,000 acres.	NS	NLAA	Within Arvada potential reintroduction area.
Threatened				
Ute ladies'-tresses orchid (*Spiranthes diluvialis*)	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.

Project Effects
LAA Likely to adversely affect
NE No Effect.
NLAA May Affect, not likely to adversely affect individuals or habitat.

4.2.5.1.1. Black-Footed Ferret Direct and Indirect Effects

Although the prairie dog colonies (176.3 total acres) within the Linn Draw project area are not of sufficient size to support a black-footed ferret population at present, the Arvada complex extends into the project area. There is a potential at some time in the future for prairie dogs colonies to expand enough to provide habitat for ferrets should they become established in the Arvada black-footed ferret reintroduction area.

No surveys for ferrets were required or conducted. It is extremely unlikely that any black-footed ferret is present in the project area. However, if any become present, the proposed action will likely make portions of the project area unsuitable for ferret inhabitance. Implementation of the proposed development ***"may affect, but is not likely to adversely affect"*** the black-footed ferret.

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

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

Reservoir seepage may create suitable habitat if historically ephemeral drainages become perennial, however no historic seed source is present within the project area. Implementation of the proposed coal bed natural gas project will have "***no effect***" on the Ute ladies'- tresses orchid as suitable habitat is not present.

4.2.5.2. Sensitive Species Direct and Indirect Effects

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

4.2.5.2.1. Prairie dog colony obligates

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

4.2.5.2.2. Sagebrush obligates

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

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

Table 4.4 Summary of Sensitive Species Habitat and Project Effects.

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

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

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Plants				
Porter's sagebrush (*Artemisia porteri*)	Sparsely vegetated badlands of ashy or tufaceous mudstone and clay slopes 5300-6500 ft.	NP	NI	Habitat not present.
William's wafer parsnip (*Cymopterus williamsii*)	Open ridgetops and upper slopes with exposed limestone outcrops or rockslides, 6000-8300 ft.	NP	NI	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.
MIIH May Impact Individuals or Habitat, but will not likely contribute to a trend towards Federal listing or a loss of viability to the population or species.
WIPV Will Impact Individuals or Habitat with a consequence that the action may contribute to a trend towards Federal listing or cause a loss of viability to the population or species.
BI Beneficial Impact

4.2.5.2.3. Bald eagle Direct and Indirect Effects

Based on the raptor nesting and bald eagle winter roost surveys and lack of suitable habitat, it is unlikely bald eagles nest or roost within the Linn Draw project area. The proposed project should not affect bald eagle nesting or winter roosting.

There are 9.7 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. No additional overhead powerlines are proposed by Comet. There are currently 26.3 miles of improved roads within the project area, with 11.3 miles proposed.

The presence of overhead power lines may impact foraging bald eagles. Bald eagles forage opportunistically throughout the Powder River Basin particularly during the winter when migrant eagles join the small number of resident eagles. Power poles provide attractive perch sites in areas where mature trees and other natural perches are lacking. From May 2003, through December 28, 2006, Service Law Enforcement salvage records for northeast Wyoming identified that 156 raptors, including 1 bald eagle, 93 golden eagles, 1 unidentified eagle, 27 hawks, 30 owls and 4 unidentified raptors were electrocuted on power poles within the Powder River Basin Oil and Gas Project area (USFWS 2006a). Of the 156 raptors electrocuted 31 were at power poles that are considered new construction (post 1996 construction standards). Additionally, two golden eagles and a Cooper's hawk were killed in apparent mid span collisions with powerlines (USFWS 2006a). Power lines not constructed to APLIC suggestions pose an electrocution hazard for eagles and other raptors perching on them; the Service has developed additional specifications improving upon the APLIC suggestions. Constructing power lines to the APLIC suggestions and Service standards minimizes but does not eliminate electrocution risk.

Typically two-tracks and improved project roads pose minimal collision risk. In one year of monitoring road-side carcasses the BLM Buffalo Field Office reported 439 carcasses, 226 along Interstates (51%), 193 along paved highways (44%), 19 along gravel county roads (4%), and 1 along an improved CBNG road (<1%) (Bills 2004). No road-killed eagles were reported; eagles (bald and golden) were observed feeding on 16 of the reported road-side carcasses (<4%). The risk of big-game vehicle-related mortality along CBNG project roads is so insignificant or discountable that when combined with the lack of bald eagle mortalities associated with highway foraging leads to the conclusion that CBNG project roads do not affect bald eagles.

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

4.2.5.2.4. Black-tailed prairie dog Direct and Indirect Effects

Well D3-29 was proposed in the middle of a prairie dog colony in the south half of Section 29 T55N, R75W. The well and its access were moved to western edge of the colony. Approximately 1.6 acres of prairie dog habitat will be disturbed. A proposed corridor goes through a small colony in center of Section 33 T54N, R75W. The corridor follows an existing road. Altering the route would increase the amount of surface disturbance.

Individuals that survive the excavation process but whose burrows were destroyed will be displaced. As the prairie dog town grows in size, prairie dogs move from an area of high population density to an area of low population density. Male prairie dogs resort to either long-distance dispersal to new colonies (mostly as yearlings, rarely as adults) or short distance within the home colony. Female prairie dogs

disperse over long distances to other colonies (as either yearlings or adults). Short-distance dispersal of females within the home colony almost never occurs (Hoogland 1995). Dispersal of prairie dogs occurs as single individuals. Both male and female prairie dogs prefer to move into an existing colony or one that has been abandoned rather than start a completely new colony. Coterie (small family group within the colony) members resist attempted invasions by conspecifics including immigrants. Dispersing prairie dogs have increased stress levels, higher exposure to predators, and are unlikely to be accepted by other colonies if they even encounter one.

4.2.5.2.5. Grouse

4.2.5.2.5.1. Greater sage-grouse Direct and Indirect Effects

Thirteen sage grouse leks are located within four miles of the Linn Draw project area. The proposed action will adversely impact breeding, nesting, brood rearing, late summer, winter habitat. Proposed project elements that are anticipated to negatively impact grouse are approximately: 43 CBNG wells on 43 locations, 11.3 miles of new roads, 47.8 miles of new pipelines and 2 new reservoirs, increased vehicle traffic on established roads and increased noise from compressor stations. Using 0.6 miles as a distance for impacts (Holloran et al. 2007, Aldridge and Boyce 2007), effective sage-grouse habitat loss will be 4339 acres from roads and 16,512 acres from 43 well locations. These numbers are not additive since each well location has an associated road and power and in many cases wells are closer than 0.6 miles to each other. Therefore, the above numbers over-represent anticipated impacts within the project area if totaled, however since most well locations are within 0.6 miles of each other the entire project area (approximately 9,100 acres within the POD boundaries) can be considered affected.

Based on the best available science, which is summarized below, the proposed action will most likely contribute to the extirpation of the local grouse population. The two leks within the project area have not been active in recent years. The project will not likely affect these lek sites. Eight other leks are within four miles of the project area. Of these, only two have shown activity in the past two years. All of the lek sites are classified as Occupied and will be afforded the prescribed protections. Grouse that use these leks may use habitat within the project area for nesting, brood rearing and winter cover and would be adversely impacted by the proposed activities in the Linn Draw project area.

A proposed compressor site in the south half of Section 28 T55N, R75W was moved further south into Section 33 to reduce disturbance to the Howell Draw lek. Comet is required by the conditions of approval to insure that compressor noise does not exceed 49 decibels (10 dBA above background noise) at the lek. Well D3-29 and its access were moved to the west to remove it from the quarter mile CSU buffer of the Ruckel Draw lek.

4.2.5.2.5.1.1. Greater sage-grouse Cumulative Effects

In addition to the direct impacts to sage-grouse habitat that will be created by the federal wells and associated infrastructure the project area does contain existing fee, state, and federal fluid mineral development. The sage-grouse cumulative impact assessment area for this project encompasses a four mile radius from the ten sage-grouse leks (Table 6). As of September 2, 2008, there are approximately 1512 existing wells and associated infrastructure within four miles of the ten leks - an area of 194 square miles. The existing well density is approximately, nine wells/section. Due to this level of development there is a strong potential that the populations breeding at these leks may become extirpated without the federal development.

There are 645 proposed wells (43 are the wells from this project) within four miles of the ten leks. With the addition of the 597 proposed wells that are not associated with this proposed action, the well density within four miles of the ten leks increases to 12 wells/section. With approval of alternative C (43 proposed well locations) the well density increases to 12.3 wells/section.

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

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

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

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

Noise can affect sage-grouse by preventing vocalizations that influence reproduction and other behaviors (WGFD 2003). In a study of greater sage-grouse population response to natural gas field development in western Wyoming, Holloran (2005) concluded that increased noise intensity, associated with active

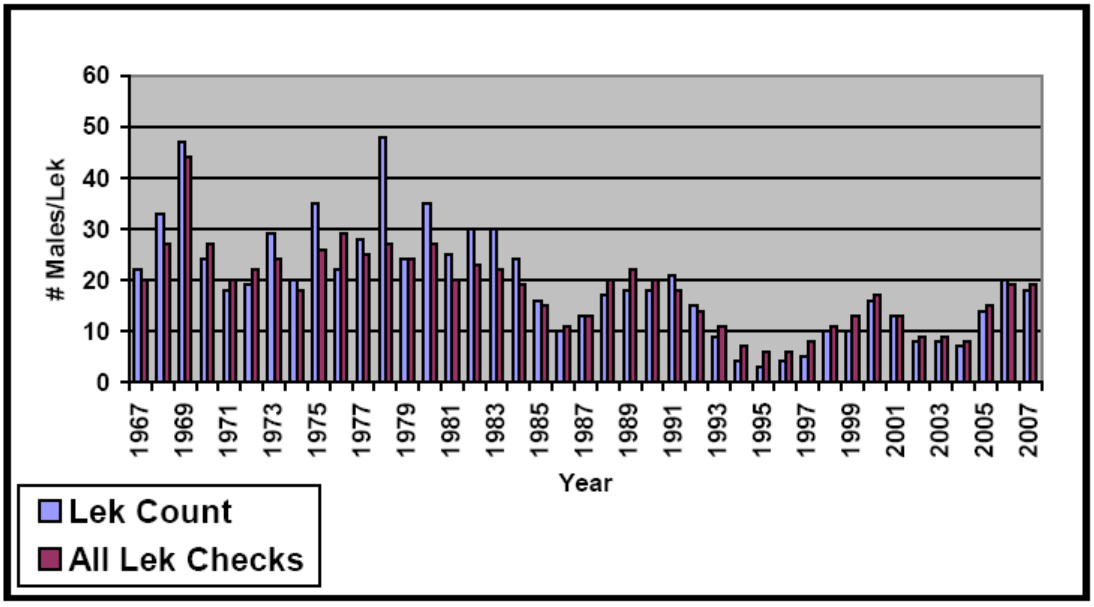
drilling rigs within 5 km (3.1 miles) of leks, negatively influenced male lek attendance. In 2002, Braun et al. documented approximately 200 CBNG facilities within one mile of sage-grouse leks. Sage-grouse numbers were found to be consistently lower for these leks than for leks without this disturbance. Direct habitat losses from the facilities themselves, roads and traffic, and the associated noise were found to be the likely reason for this finding.

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

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

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

Figure 4.1. Male sage-grouse lek attendance within northeastern Wyoming, 1967-2007.



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

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

A two-mile timing limitation, given the long-term population decline and that less than 50% of sage-grouse are expected to nest within the limitation area, is insufficient to reverse the population decline. Moynahan and Lindberg (2004) like WAFWA (Connelly et al. 2000), recommend increasing the protective distance around sage-grouse leks. The BLM and University of Montana are currently researching nest location and other sage-grouse questions and relationships between grouse and coalbed natural gas development. Thus far, this research suggests that impacts to leks from energy development are discernable out to a minimum of four miles, and that some leks within this radius have been extirpated as a direct result of energy development (State wildlife agencies' ad hoc committee for sage-grouse and oil and gas development 2008). Even with a timing limitation on construction activities, sage-grouse may avoid nesting within CBNG fields because of the activities associated with operation and production. In a typical landscape in the Powder River Basin, energy development within two miles of leks is projected to reduce the average probability of lek persistence from 87% to 5% percent (Walker et al. 2007).

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

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

4.2.5.2.5.2. Sharp-tailed grouse Direct and Indirect Effects

The effects of the proposed project to sharp-tailed grouse will be similar as the effects to sage-grouse.

4.2.5.2.6. Mountain plover Direct and Indirect Effects

Suitable mountain plover habitat is present within the project area but is marginal. Refer to the Black-tailed prairie dog section for impacts to habitat.

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

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

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

4.2.5.3. Sensitive Species Cumulative effects

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

4.3. West Nile Virus Direct and Indirect Effects

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

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

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

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

4.4. Water Resources

The operator has submitted a comprehensive WMP for this project. It is incorporated-by-reference into this EA pursuant to 40 CFR 1502.21. The WMP incorporates sound water management practices, monitoring of downstream impacts within the Upper Powder River watershed and commitment to comply with Wyoming State water laws/regulations. The operator proposes to store water in 4 on-channel reservoirs, 2 existing and 2 proposed, and will send the balance of produced water to new and existing SDI facilities. Two new SDI tracts are proposed for the northern part of this POD, and pipelines will allow water to be pumped to existing SDI facilities in the Kenai POD area. 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 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.

Calculations in the WMP were based on 44 wells and these are the numbers that are presented below. After the WMP document was prepared one well was dropped from the POD. The maximum water production is predicted to be 12.0 gpm per well or 528 gpm (1.1 cfs or 852 acre-feet per year) for this POD. The PRB FEIS projected the total amount of water that was anticipated to be produced from CBNG development per year (Table 2-8 Projected Amount of Water Produced from CBM Wells Under Alternatives 1, 2A and 2B pg 2-26). For the Upper Powder River drainage, the projected volume produced within the watershed area was 147,481 acre-feet in 2008 (maximum production is estimated in 2006 at 171,423 acre-feet). As such, the volume of water resulting from the production of these wells is 0.5% of the total volume projected for 2008. This volume of produced water is also within the predicted parameters of the PRB FEIS.

4.4.1. Groundwater

The PRB FEIS predicts an infiltration rate of 40% to groundwater aquifers and coal zones in the Upper Powder River drainage area (PRB FEIS pg 4-5). For this action, it may be assumed that a maximum of 211 gpm will infiltrate at or near the discharge points and impoundments (342 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 65 to 590 feet compared to 700 feet to 1500 feet for the Anderson, Canyon, Cook, and Wall coals. As mitigation, the operator has committed to offer water well agreements to holders of properly permitted domestic and stock wells within the circle of influence (½ mile of a federal CBNG producing well) of the proposed wells.

Recovery of the coal bed aquifer was predicted in the PRB FEIS to "…resaturate and repressurize the areas that were partially depressurized during operations. The amount of groundwater storage within the

coals and sands units above and below the coals is enormous. Almost 750 million acre-feet of recoverable groundwater are stored within the Wasatch Formation - Tongue River Member sands and coals (PRB FEIS Table 3-5). Redistribution is projected to result in a rapid initial recovery of water levels in the coal. The model projects that this initial recovery period would occur over 25 years." (PRB FEIS page 4-38).

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

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

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

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

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
WDEQ Quality Standards for Wyoming Groundwater (Chapter 8)			
Drinking Water (Class I)	500		
Agricultural Use (Class II)	2,000	8	
Livestock Use (Class III)	5,000		
WDEQ Water Quality Requirements for WYPDES Permit WY0054330			
At discharge point	5,000	na	7,500
At Irrigation Compliance point	na	na	na
Predicted Produced Water Quality			
Anderson Coal Zone	1,390	14.3	2,190
Canyon Coal Zone	600	13.1	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 comingled water produced from the Anderson and Canyon target coal zone from these wells is predicted to be similar to the sample water quality collected from a location near the POD. A maximum of 12.0 gallons per minute (gpm) is projected is to be produced from each these 44 wells, for a total of 528 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 approximately 6 gpm is projected is to be produced from each of the two coal zones from these 44 wells, for a total of 12 gpm from each well and totaling 528 gpm for the POD when the other two coal zones are developed. This assumes that water production from the first coal zones to be developed will have dropped to near zero. See Table 4.5.

The Linn Draw POD proposes SDI on private land as part of the Water Management Plan. According to Wyoming State Water Law (W.S. 41-3-101) the water extracted in the production of CBNG belongs to the state; BLM policy 1982 directs the BLM's cooperation and full compliance with State water laws. Subsurface Drip Irrigation (SDI) is permitted and regulated by the Wyoming Department of Environmental Quality (WDEQ) through the Underground Injection Control (UIC) program, requiring a WDEQ 5C5 UIC permit. The BLM is responsible for analyzing the proposed action with available data provided in the WMP for the POD and disclose potential impacts of the proposed action. Responsibility, liability, monitoring, mitigation measures and reclamation should be addressed in the surface use

agreement (SUA).

SDI systems are designed to utilize cations present in the soils to mitigate the impact of the quality of CBNG water on soils. The irrigation quality of the CBNG "produced water" and the variability of soils and the range in characteristics (RIC) of their physical and chemical properties within the project area, have the potential to cause long term soil impacts.

Literature review of soils and soil primary soil characterization lab data collected by the NRCS indicates wide variability within the Powder River Basin. Variability or RIC of soil features and properties of the identified soils include:

- soil depth
- available water holding capacity
- saturated hydraulic conductivity
- amount, depth to base and the mineralogy of clays present
- highly variable chemical properties found in alluvial and colluvial soils within the Powder River Basin.

CBNG "produced water" has a moderate to high salinity hazard and often has a very high sodium hazard based on standards used for irrigation suitability. The sodium hazard of CBNG "produced water" may affect the soil resource. Sodic irrigation water causes dispersion of clays and clogging of soil pores thereby impairing soil hydraulic conductivity, affecting water availability and reducing soil aeration, all of which are important to long term soil health and productivity. Elevated sodium concentrations can harm some plants due to direct toxicity as it is taken up by the root cells. Sodium can also indirectly affect crop growth by causing calcium, potassium, and magnesium deficiencies.

With time, salts from CBNG water can accumulate in the root zone in concentrations that will affect plant growth and water utilization. Semi arid and arid climates create the potential for upward movement of salts into the root zone. Proper plant selection for deep roots and salt tolerance is important. Germination of these plant species may require special management practices to prevent negative impacts to soils.

With yearlong water disposal all injected water may not used by surface plants, and there is the potential for injected water to affect shallow aquifers. The characteristics of the water impacting shallow ground water may be difficult to predict and model.

Sites should be closely monitored to assure long term soil health and productivity is maintained. Specific soil chemical and physical property action levels should be established to ensure that the soil is not measurably impacted and that remedial actions can be implemented before irreversible soil damage occurs. These thresholds should be based on soil type, vegetation, water quality, soil and/or water amendments used, potential land use, beneficial use goals and landowner requests. Monitoring of the SDI site should include an evaluation of soil chemical and physical properties, runoff and erosion, water quantity and quality, and vegetative performance.

The long term impacts and mitigation success are unknown at this time. Impacts are subjective and not well defined and long term effects will depend on the success of applied soil amendments and intense monitoring, management and immediate site mitigation. Reclamation or mitigation practices may be difficult to achieve, are expensive and are the responsibility of the operator, contractor 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.

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

There are discharge points proposed for this project. They have been appropriately sited and utilize appropriate water erosion dissipation designs. Existing and proposed water management facilities were evaluated for compliance with best management practices during the onsite.

To manage the produced water, 2 new impoundments (22.0 acre feet) would potentially be constructed within the project area. These impoundments will disturb approximately 6.7 acres including the dam structures. Two existing reservoirs (21.5 acre-feet) will also be upgraded as part of this project. All of these water impoundments would be on-channel reservoirs disturbing 42.5 acres. Existing impoundments will be upgraded and proposed impoundments will be constructed to meet the requirements of the WSEO, WDEQ and the needs of the operator and the landowner. All water management facilities were evaluated for compliance with best management practices during the onsite.

Seepage from the impoundments will potentially allow for streambed enhancement through wetland-riparian species establishment. Phased reclamation plans for the impoundments will be submitted and approved on a site-specific, case-by-case basis as they are no longer needed for disposal of CBNG water, as required by BLM applied COAs.

Alternative (2A), the approved alternative in the Record of Decision for the PRB FEIS, states that the peak production of water discharged to the surface will occur in 2006 at a total contribution to the mainstem of the Upper Powder River of 68 cfs (PRB FEIS pg 4-86). The predicted maximum discharge rate from these 44 wells is anticipated to be a total of 528 gpm or 1.1 cfs. It is projected that most of this discharge will be injected into SDI facilities where it is intended to be lost to evapotranspiration in surface crops and to infiltration into the groundwater system. A small percentage of the water stored in the 4 reservoirs may resurface downstream.

In the WMP portion of the POD, the operator provided an analysis of the potential development in the watershed above the project area (WMP page 3). Based on the area of the Spotted Horse Creek watershed above the POD (96.9 sq mi) and an assumed density of 1 wells per location every 80 acres, the potential exists for the development of 775 wells which could produce a maximum flow rate of 9,300 gpm (20.7 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, 20.7 cfs, is much less than the volume of runoff estimated from the 2-year storm event, 229 cfs, for Spotted Horse Creek

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

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

Permit effluent limits were set for the nearby Kenai POD at (WYPDES Permit pending for Linn Draw):

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

The WYPDES permit 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 Linn Draw POD prepared by 609 Consulting, Inc for Comet Energy Services.

4.4.2.1. Surface Water Cumulative Effects

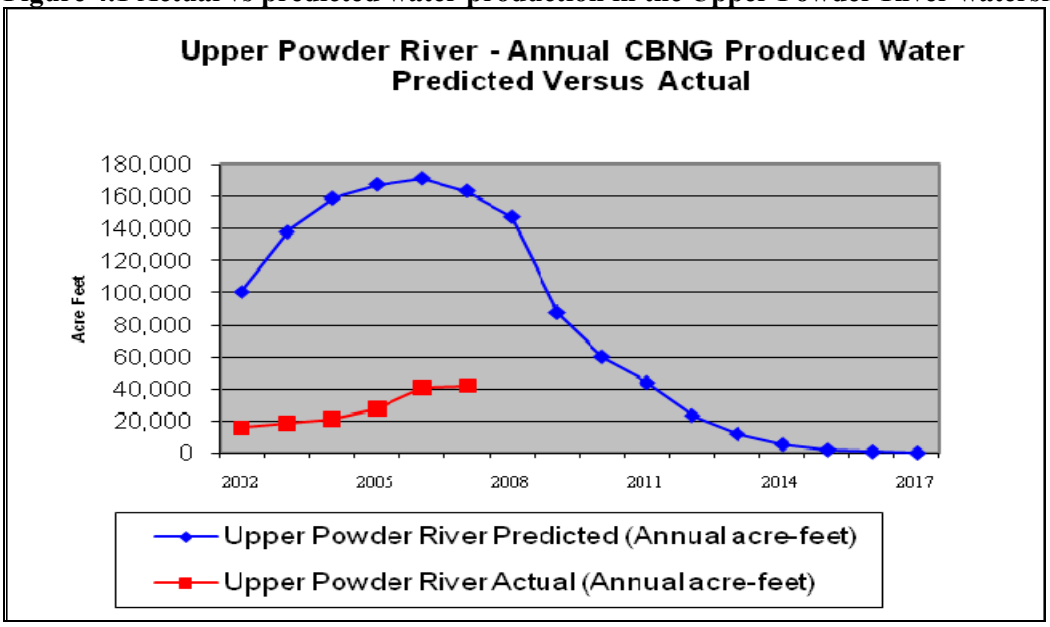
The analysis in this section includes cumulative data from Fee, State and Federal CBNG development in the Upper Powder River watershed. These data were obtained from the Wyoming Oil and Gas Conservation Commission (WOGCC).

As of December 2007, all producing CBNG wells in the Upper Powder River watershed have discharged a cumulative volume of 166,096 acre-ft of water compared to the predicted 900,040 acre-ft disclosed in the PRB FEIS (Table 2-8 page 2-26). These figures are presented graphically in Table 4.6 and Figure 4.1 below. This volume is 18.5% of the total predicted produced water analyzed in the PRB FEIS for the Upper Powder River watershed.

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

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

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



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

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

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

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

No additional mitigation measures are required.

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

4.5. Cultural Resources

Non eligible sites 48CA6621, 48CA6794 and 48CA6795 will be impacted by the proposed project. No historic properties will be impacted by the proposed project. Following the Wyoming State Protocol Section VI(A)(1) the Bureau of Land Management electronically notified the Wyoming State Historic Preservation Officer (SHPO) on 9/11/08 that no historic properties exist within the APE. If any cultural values [sites, artifacts, human remains (Appendix L PRB FEIS)] are observed during operation of this lease/permit/right-of-way, they will be left intact and the Buffalo Field Manager notified. Further discovery procedures are explained in the ***Standard COA*** (General)(A)(1).

4.6. Air Quality

In the project area, air quality impacts would occur during construction (due to surface disturbance by earth-moving equipment, vehicle traffic fugitive dust, well testing, as well as drilling rig and vehicle engine exhaust) and production (including non-CBM well production equipment, booster and pipeline compression engine exhaust). The amount of air pollutant emissions during construction would be controlled by watering disturbed soils, and by air pollutant emission limitations imposed by applicable air quality regulatory agencies. Air quality impacts modeled in the PRB FEIS concluded that projected oil & gas development would not violate any local, state, tribal or federal air quality standards.

5. CONSULTATION/COORDINATION

Contact	Title	Organization	Present at Onsite
Brad Rodgers	Biologist	US Fish & Wildlife Service	Yes
Mary Hopkins	Interim Wyoming SHPO	Wyoming SHPO	No

6. OTHER PERMITS REQUIRED

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

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