FINDING OF NO SIGNIFICANT IMPACT & DECISION RECORD
FOR
Yates Petroleum Corporation
Gauge POD
ENVIRONMENTAL ASSESSMENT –WY-070-EA09-75

DECISION: BLM's decision is to approve a combination of alternatives C and D as summarized below and described in the attached EA and authorize Yates Petroleum Corporation's Gauge POD Coal Bed Natural Gas (CBNG) POD comprised of the following 75Applications for Permit to Drill (APDs):

	Well Name	Well #	QTR	Sec	TWP	RNG	Lease
1.	GAUGE BAROMETER CS	1	SWNE	4	45N	75W	WYW131734
2.	GAUGE WATERMELON CS	11	SWSE	4	45N	75W	WYW128604
3.	GAUGE TOUCHSTONE CS	1	NESE	5	45N	75W	WYW145578
4.	GAUGE TOUCHSTONE CS	2	SWSE	5	45N	75W	WYW145578
5.	GAUGE WATERMELON CS COM	10	SWNE	5	45N	75W	WYW128604
6.	GAUGE CS COM	1	SWNE	9	45N	75W	WYW145579
7.	GAUGE TOUCHSTONE CS	3	NESE	9	45N	75W	WYW145578
8.	GAUGE TOUCHSTONE CS	4	NESW	9	45N	75W	WYW145578
9.	GAUGE TOUCHSTONE CS	5	SWSW	9	45N	75W	WYW145578
10.	GAUGE TOUCHSTONE CS	6	SWSE	9	45N	75W	WYW145578
11.	GAUGE MAGNITUDE CS	1	NENE	22	45N	75W	WYW145580
12.	GAUGE MAGNITUDE CS	2	SWNE	22	45N	75W	WYW145580
13.	GAUGE PRESCRIPTION CS	1	SWSW	1	46N	75W	WYW132916
14.	GAUGE PALOOKAVILLE CS	1	NENE	2	46N	75W	WYW135617
15.	GAUGE PALOOKAVILLE CS	2	NENW	2	46N	75W	WYW135617
16.	GAUGE PALOOKAVILLE CS	3	SWNW	2	46N	75W	WYW135617
17.	GAUGE PALOOKAVILLE CS	4	SWNE	2	46N	75W	WYW135617
18.	GAUGE PALOOKAVILLE CS	5	NESE	2	46N	75W	WYW135617
19.	GAUGE PALOOKAVILLE CS	6	NESW	2	46N	75W	WYW135617
20.	GAUGE PALOOKAVILLE CS	7	SWSW	2	46N	75W	WYW135617
21.	GAUGE PALOOKAVILLE CS	8	SWSE	2	46N	75W	WYW135617
22.	GAUGE ISOSCELES CS COM	1	SWSW	5	46N	75W	WYW130609
23.	GAUGE SIDWELL CS	1	NESE	5	46N	75W	WYW32845
24.	GAUGE SIDWELL CS	2	NESW	5	46N	75W	WYW32845
25.	GAUGE SIDWELL CS	3	SWSE	5	46N	75W	WYW32845
26.	GAUGE ISOSCELES CS COM	4	SWSE	7	46N	75W	WYW130609
27.	GAUGE ISOSCELES CS	7	SWNE	8	46N	75W	WYW130609
28.	GAUGE ISOSCELES CS	8	NESE	8	46N	75W	WYW130609
29.	GAUGE ISOSCELES CS COM	9	SWSW	8	46N	75W	WYW130609
30.	GAUGE ISOSCELES CS COM	10	SWSE	8	46N	75W	WYW130609
31.	GAUGE SIDWELL CS	4	NENE	8	46N	75W	WYW32845

	Well Name	Well #	QTR	Sec	TWP	RNG	Lease
32.	GAUGE MEDICINE CS	1	NENE	11	46N	75W	WYW138440
33.	GAUGE MEDICINE CS	2	NENW	11	46N	75W	WYW138440
34.	GAUGE MEDICINE CS	3	SWNW	11	46N	75W	WYW138440
35.	GAUGE MEDICINE CS	4	SWNE	11	46N	75W	WYW138440
36.	GAUGE MEDICINE CS	5	NESE	11	46N	75W	WYW138440
37.	GAUGE MEDICINE CS	6	NESW	11	46N	75W	WYW138440
38.	GAUGE MEDICINE CS	7	SWSW	11	46N	75W	WYW138440
39.	GAUGE MEDICINE CS	8	SWSE	11	46N	75W	WYW138440
40.	GAUGE ISOSCELES CS COM	11	NESW	14	46N	75W	WYW130609
41.	GAUGE GEOMETRY CS	1	SWSW	15	46N	75W	WYW39561
42.	GAUGE ISOSCELES CS	12	NENE	15	46N	75W	WYW130609
43.	GAUGE ISOSCELES CS	13	SWNE	15	46N	75W	WYW130609
44.	GAUGE ISOSCELES CS	14	NESE	15	46N	75W	WYW130609
45.	GAUGE ISOSCELES CS	15	SWSE	15	46N	75W	WYW130609
46.	GAUGE CIRCUMFERENCE CS	1	SWSE	17	46N	75W	WYW144523
47.	GAUGE ISOSCELES CS	16	NENE	17	46N	75W	WYW130609
48.	GAUGE ISOSCELES CS	17	NENW	17	46N	75W	WYW130609
49.	GAUGE ISOSCELES CS	18	SWNW	17	46N	75W	WYW130609
50.	GAUGE ISOSCELES CS	19	SWNE	17	46N	75W	WYW130609
51.	GAUGE ISOSCELES CS	20	NESE	17	46N	75W	WYW130609
52.	GAUGE ISOSCELES CS	21	NESW	17	46N	75W	WYW130609
53.	GAUGE ISOSCELES CS	22	SWSW	17	46N	75W	WYW130609
54.	GAUGE ISOSCELES CS	24	NENW	18	46N	75W	WYW130609
55.	GAUGE ISOSCELES CS	25	SWNE	18	46N	75W	WYW130609
56.	GAUGE ISOSCELES CS	26	NESE	18	46N	75W	WYW130609
57.	GAUGE ISOSCELES CS	27	NESW	18	46N	75W	WYW130609
58.	GAUGE PARABOLA CS COM	1	NENE	20	46N	75W	WYW144525
59.	GAUGE PYTHAGOREAN CS COM	2	SWNW	20	46N	75W	WYW144524
60.	GAUGE LINE CAMP CS	10	SWNW	21	46N	75W	WYW133611
61.	GAUGE LINE CAMP CS	11	SWSW	21	46N	75W	WYW133611
62.	GAUGE ISOSCELES CS	31	NENE	22	46N	75W	WYW130609
63.	GAUGE ISOSCELES CS	32	SWNE	22	46N	75W	WYW130609
64.	GAUGE MEDICINE CS	10	NESW	29	46N	75W	WYW138440
65.	GAUGE MEDICINE CS	11	SWSW	29	46N	75W	WYW138440
66.	GAUGE MEDICINE CS COM	9	SWNE	29	46N	75W	WYW138440
67.	GAUGE MEDICINE CS	13	NWSW	31	46N	75W	WYW138440
68.	GAUGE LINE CAMP CS COM	12	SESE	32	46N	75W	WYW133611
69.	GAUGE DAVENPORT CS	1	NENE	25	46N	76W	WYW131224
70.	GAUGE DAVENPORT CS	2	NENW	25	46N	76W	WYW131224
71.	GAUGE SETTEE CS	1	SENE	35	46N	76W	WYW153362

	Well Name	Well #	QTR	Sec	TWP	RNG	Lease
72.	GAUGE OUTRIGGER CS	1	NENW	34	47N	75W	WYW126621
73.	GAUGE OUTRIGGER CS	2	SWNW	34	47N	75W	WYW126621
74.	GAUGE OUTRIGGER CS	4	SWSW	34	47N	75W	WYW126621
75.	GAUGE OUTRIGGER CS COM	3	NESW	34	47N	75W	WYW126621

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The following impoundment locations were inspected and approved for use in association with the water management strategy for the Gauge POD. All locations are Primary in designation except for Chantel, which has a Secondary designation due to lack of a bond.

	Impoundment Name / Number	Qtr/Qtr	Sec	TWP	RNG	Capacity (Acre Feet)	Surface Disturbance (Acres)	Lease #
1	5 Calves (exist)	SESE	15	45	75	5.25	2.5	WYW72456
2	Blitz	NESW	29	46	75	19.9	3.0	WYW138440
3	Bootleg	SWNW	20	46	75	19.9	3.2	WYW144524
4	Broom	NESE	2	46	75	88.4	9.0	WYW135617
5	Catch	NESE	17	46	75	18	2.7	WYW130609
6	Chantel[1]	SESE	2	46	75	17.2	2.2	WYW135617
7	Chase	NWNE	22	46	75	40.6	5.7	WYW130609
8	Dustin	NESE	9	45	75	35.10	6.2	WYW145578
9	Innes	SENE	16	46	75	128.89	25.6	State
10	Olive	SWNE	22	45	75	2.7	1.8	WYW154480
11	Punt	NWNW	21	46	75	14.9	2.5	WYW133611
12	Purple Cliff	NENW	34	47	75	87.3	9.0	WYW126621
13	Red Leg	NWNW	2	46	75	19.9	3.3	WYW135617
14	Shutter	NWNW	36	46	76	57.6	6.6	State
15	Throw	SESE	17	46	75	16.8	2.9	WYW144523
16	Tish	SESW	9	45	75	16.3	2.9	WYW145578
17	Toss	SENE	17	46	75	19	3.5	WYW130609
18	Fumble	NENW	20	46	75	12.1	2.1	WYW144525

1 Secondary reservoir, bond not provided.

SUMMARY OF SELECTED ALTERNATIVE

The selected alternative includes appropriate components of alternatives C and D as described in the EA. Timing restrictions on surface-disturbing activities are incorporated from Alternative C, and will mitigate project-specific impacts to sage-grouse habitat.

The following item summarizes actions in the selected alternative:

The following impoundment locations were not approved due multiple wildlife issues:

Impoundment Name Number	Qtr/Qtr	Sec	TWP	RNG	Capacity (Acre Feet)	Surface Disturbance (Acres)	Lease #	Disturbance amount (access road)
Touch Down	NWSE	20	46	75	26.6	4.9	Private	0.45 mi
Carry	SWNE	18	46	75	23.6	3.4	WYW130609	0.2 mi
Halftime	NENW	20	46	75	14.5	2.4	WYW144525	0.23 mi
Shatter	SENE	24	46	76	13.4	2.1	State	0.37 mi
Shock	NENE	24	46	76	15.2	2.4	State	0.7 mi
Kennedy	NENE	18	46	75	19.9	3.8	WYW130609	0.18 mi
Kick	NWNW	17	46	75	19.4	3.6	WYW130609	0.37 mi
Skunk	NWSE	17	46	75	11.2	1.9	WYW144523	0.25 mi
Pass	SENW	17	46	75	19.6	3.1	WYW130609	0.9 mi

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 the selected alternative, as summarized above, 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 Landowners.
3. The selected alternative 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. Furthermore, approval of this development will help meet the nation's future needs for energy reserves, and will help to stimulate local economies by maintaining stability for the workforce.
5. The selected alternative incorporates appropriate local sage-grouse research and the best available science from across the species' range in development of the attached conditions of approval. Mitigation measures from the range of alternatives were selected to best meet the purpose and need, and will be applied by the BLM to alleviate environmental impacts. The selected mitigation measures are as follows(A through E)
    A. All proposed power that will service the Federal action in the Gauge POD will be buried.
    B. Deferment of 9 impoundments(see table below)

Impoundment Name / Number	Qtr/Qtr	Sec	TWP	RNG	Capacity (Acre Feet)	Surface Disturbance (Acres)	Lease #	Disturbance amount (access road)
Touch Down	NWSE	20	46	75	26.6	4.9	Private	0.45 mi
Carry	SWNE	18	46	75	23.6	3.4	WYW130609	0.2 mi
Halftime	NENW	20	46	75	14.5	2.4	WYW144525	0.23 mi
Shatter	SENE	24	46	76	13.4	2.1	State	0.37 mi
Shock	NENE	24	46	76	15.2	2.4	State	0.7 mi
Kennedy	NENE	18	46	75	19.9	3.8	WYW130609	0.18 mi
Kick	NWNW	17	46	75	19.4	3.6	WYW130609	0.37 mi
Skunk	NWSE	17	46	75	11.2	1.9	WYW144523	0.25 mi
Pass	SENW	17	46	75	19.6	3.1	WYW130609	0.9 mi

C. Throughout production, human presence will be limited with the deployment of the most recent technology(For example, cameras and remote sensing)
D. Reclamation activities (other than locations having a 30 day interim reclamation COA), including seeding, will take place in the fall.

Deferment of 13 wells (see table below)

The following well locations, were not approved due multiple wildlife issues that pertained to the following criteria:

- Proposed wells that do not have existing access roads
- Proposed wells that are within quality habitat
- Proposed wells within two miles of an active lek

E. Proposed wells that fragment habitat connectivity

Well Name	Well #	QTR	Sec	TWP	RNG	Lease	Disturbance amount(access road)
GAUGE PYTHAGOREAN CS	1	NENW	19	46N	75W	WYW144524	0.4 mi, 1 low water crossing
GAUGE ISOSCELES CS	28	SWSE	18	46N	75W	WYW130609	0.3 mi, 1 low water crossing
GAUGE ISOSCELES CS	30	SWNE	19	46N	75W	WYW130609	0.38 mi
GAUGE ISOSCELES CS	29	NENE	19	46N	75W	WYW130609	0.4 mi
GAUGE ZUCINNI CS COM	1	SWNE	20	46N	75W	WYW134909	0.15 mi
GAUGE ISOSCELES CS	23	NENE	18	46N	75W	WYW130609	0.6 mi
GAUGE LINE CAMP CS	9	SWSE	6	46N	75W	WYW133611	0.27 mi
GAUGE CONIC CS COM	1	NESE	6	46N	75W	WYW129030	0.16 mi
GAUGE ISOSCELES CS	6	SWNW	8	46N	75W	WYW130609	0.2 mi
GAUGE MEDICINE CS	12	NWNW	31	46N	75W	WYW138440	0.16 mi
GAUGE ISOSCELES CS COM	2	NENE	7	46N	75W	WYW130609	0.05 mi
GAUGE ISOSCELES CS COM	3	NENW	7	46N	75W	WYW130609	0.17 mi
GAUGE ISOSCELES CS	5	NENW	8	46N	75W	WYW130609	0.12 mi

6. The selected alternative incorporates appropriate local sage-grouse research and the best available science from across the species' range in development of the attached conditions of approval. Mitigation measures from the range of alternatives were selected to best meet the purpose and need, and will be applied by the BLM to alleviate environmental impacts (See above number 5) .
7. Approval of this alternative is in conformance with the PRB FEIS, and the Approved Resource Management Plan for the Public Lands Administered by the Bureau of Land Management, Buffalo Field Office, April 2001 (refer to Appendix E of that document relative to adaptive management).
8. The selected alternative incorporates components of the Wyoming Governor's Sage Grouse Implementation Team's "core population area" strategy and executive order and local research to provide appropriate protections for sage-grouse, while meeting the purpose and need for the Gauge Project.

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

In conformance with Appendix E, *Record of Decision, Powder River Oil and Gas Project Environmental Impact Statement and Resource Management Plan Amendment* BLM Buffalo Field Office has initiated actions within the PRB FEIS analysis area in response to additional information regarding impacts to sage-grouse. These measures include:

1. Early initiation of a Resource Management Plan (RMP) revision, based on the evaluation of monitoring data generated under the mitigation monitoring and reporting plan (MMRP) in the PRB FEIS Record of Decision

2. Establishment of sage-grouse "focus" areas, encompassing approximately 1 million acres of sage-grouse habitat. These areas are managed under strict guidelines designed to preserve sage-grouse habitat for development of alternatives during the RMP process (Appendix 1).

3. Initiation of a population viability analysis in the Powder River Basin. This is a 24-month project involving the United States Geological Survey (USGS), BLM Miles City Field Office, BLM Buffalo Field Office, and the University of Montana.

4. Development of alternatives that modify the proposed action to reflect the best available science in sage-grouse management.

5. Development of conditions of approval, specific to sage-grouse management, that incorporate some recommendations from recent research, the NE Local Sage-grouse Working Group, and the Petroleum Association of Wyoming.

The implementation of the selected alternative best meets the stated purpose and need for the proposed action. With the application of mitigating measures selected from alternatives C and D, sage-grouse population viability in the Powder River Basin will not be compromised due to the larger scope of planning actions and research initiated by the BLM, Buffalo Field Office.

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: 9/11/09

BUREAU OF LAND MANAGEMENT
BUFFALO FIELD OFFICE
ENVIRONMENTAL ASSESSMENT (EA)
FOR
Yates Petroleum Corporation
Gauge POD
PLAN OF DEVELOPMENT
WY-070-EA09-75

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 and need of this EA is to determine how and under what conditions to allow Yates Petroleum Corporation to exercise lease rights granted by the United States to develop the oil and gas resources on federal leaseholds as described in their proposed action.

Development of the Gauge POD wells would return royalties to the federal Treasury as well as stimulate local economies.

The BLM recognizes the extraction of natural gas is essential to meeting the nation's future needs for energy. As a result, private exploration and development of federal gas reserves are integral to the agencies' oil and gas leasing programs under the authority of the Mineral Leasing Act of 1920, as amended, and the Federal Land Policy Management Act (FLPMA) of 1976. The oil and gas leasing program managed by BLM encourages the development of domestic oil and gas reserves and reduction of the U.S. dependence on foreign sources of energy.

This action responds to the goals and objectives outlined in the 1985 Buffalo RMP and the PRB FEIS. This action helps move the project area toward desired conditions for mineral development with appropriate mitigation consistent with the goals, objectives and decisions outlined in these two documents.

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

The proposed action conforms to the terms and the conditions of the 1985 Buffalo RMP and the PRB FEIS, as required by 43 CFR 1610.5. The BFO RMP is currently under revision.

For the RMP revision, BFO established focus areas with rigorous interim protections in order to preserve "decision space" during the revision process. Outside the focus areas, BFO continues to apply appropriate, but far less rigorous, site-specific mitigating measures for high-quality sage-grouse habitat with well densities up to 80-acre spacing and may include site-specific mitigating measures suggested by the best available science. Actions within BFO focus areas will be limited to impacts consistent with 640 acre spacing, and must have a plan of development that demonstrates that the proposal can be managed in a manner that effectively conserves sage-grouse habitats (in focus areas) affected by the proposal.

The Gauge POD does not occur within a core or focus area. However, high quality sage-grouse habitat, as indicated by the University of Montana model, occurs throughout the project area.

2. ALTERNATIVES INCLUDING THE PROPOSED ACTION

Four alternatives, A, B, C and D, were evaluated in determining how to best meet the stated purpose and need of the proposed action. A brief description of each alternative follows. For the complete detailed description of each alternative, including the alternatives considered but not analyzed in detail, see Appendix A.

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

Alternative B, the "proposed action" alternative, summarizes the Gauge POD Project as originally submitted to the BLM by Yates Petroleum Corporation, prior to any BLM review or modifications. See Appendix A for full description.

2.3. Alternative C – Modified Proposed Action

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 Gauge POD are described in detail in the Appendix A

Alternative C also incorporates the results of sage-grouse habitat mapping efforts in the project area and on-site verification of habitat suitability. This alternative represents BFO efforts to mitigate project-specific impacts to sage-grouse habitat, while maintaining proposed spacing and infrastructure requirements consistent with the purpose and need of the proposed action.

2.4. Alternative D-Sage-Grouse Emphasis

Alternative D represents a modification of Alternative C based on the application of mitigating measures designed to reduce impacts to sage-grouse and sage-grouse habitat. Alternative D is the same as Alternative C with the addition of the project modifications identified by BLM, guided by seven years of sage-grouse research in the project area. Alternative D represents BFO efforts to mitigate project-specific impacts to sage-grouse habitat, while maintaining proposed spacing and infrastructure requirements consistent with the purpose and need of the proposed action.

This alternative incorporates mitigating measures designed around site-specific habitat characteristics to minimize habitat fragmentation and accelerate return to habitat effectiveness at reclamation. In order to best meet this objective, the changes from Alternative C follow.

For a description of the project-level details of Alternative D, see Appendix A.

3. DESCRIPTION OF AFFECTED ENVIRONMENT

Applications to drill were received on September 4, 2007. Field inspections of the proposed Gauge POD CBNG project were conducted on 12/3, 4,5, 9,10,19/2008 and 1/13, 22/2009 and 3/18/2009 by:

NAME	TITLE	AGENCY
Jeb Tachick	Permitting	Yates Petroleum
Saunda Phillips	Landman	Yates Petroleum
Trent Knez	Drilling Supervisor	Yates Petroleum
Boyd Ableseth	Environmental Regulatory Agent	Yates Petroleum
Scott Jawors	Wildlife Biologist	BLM
Seth Lambert	Archaeologist	BLM
Dan Sellers	Natural Resource Specialist	BLM
Chris Williams	Hydrologist	BLM

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

3.1. Topographic Characteristics of Project Area

The Gauge POD project is located in Campbell County approximately 26 miles SW of Gillette, WY. The POD is scattered in 4 main areas, encompassing approximately 50 square miles. All of the project area is on private land surface, except for a ¼ section of State Land. Elevations in the project area range from

4,520’ to 5,080’. The topography in the project area consists of gentle rolling prairie dissected by 3 intermittent creeks: the North and Middle Forks of Pumpkin Creek and Nut Creek, and by ephemeral swales and occasional steep, erosive ephemeral drainages. Conventional oil development exists in the project area. The area is mostly private surface and major use of the area is livestock production, hunting, oil and CBM production. Approximately 59% or the area is grassland, 32% sagebrush-grasslands, 5% agricultural (introduced pastures and alfalfa hay fields), 3% rock or bareground and 1% water and woodlands.

3.2. Soils & Vegetation

Soils for the POD range from mainly sandy clay loam to much lesser areas of sands and clays. Soil depths vary from deep on bottomland and gentle slopes to shallow and very shallow on steeper slopes. Soils differ with topographic location, slope and elevation. Topsoil depths to be salvaged for reclamation range from 0 to 4 inches on ridges to 8+ inches in bottomland. Erosion potential varies from moderate to severe depending on the soil type, vegetative cover and slope.

Soils within the project area were identified from the South Campbell County Survey Area, Wyoming (WY605). The soil survey was performed by the Natural Resource Conservation Service according to National Cooperative Soil Survey standards. The BLM used county soil survey information and personal experience, to predict soil behavior, limitations, or suitability for a given activity or action. Reclamation potential of soils varied throughout the project area. The main soil limitations include: depth to bedrock, low organic matter content, low moisture content, and high erosion potential especially in areas of steep slopes. Approximately 96 percent of the project area contains soil with fair reclamation potential. 4% of the project area has poor reclamation potential. The project was able to avoid most of the poor reclamation areas and place most of the wells and infrastructure on the areas with better reclamation potential, but due to topography and drainage, there are 4 wells in the project area located where the reclamation potential is poor. Additional and appropriate BMPs (Best Management Practices) will be used as needed in this project area, such as minimizing surface disturbance, using erosion control measures, etc.

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

3.2.1. Vegetation

The dominant Ecological Site identified in this POD is Loamy, Northern Plains 10-14” precipitation zone:

Loamy Sites occur on gently undulating to rolling land on landforms which include hill sides, alluvial fans, ridges, and stream terraces, in the 10-14 inch precipitation zone. These soils are moderately deep to very deep (greater than 20" to bedrock), well drained soils that formed in alluvium and residuum derived from sandstone and shale. These soils have moderate permeability. The present plant community is Western Wheatgrass/Cheatgrass. Rhizomatous wheatgrasses and annuals dominate the site. Cool-season mid-grasses are decreasing and being replaced by cheatgrass. Dominant vegetation includes needle & thread, prairie junegrass, crested wheatgrass, smooth brome, bluegrass sp., threadleaf sedge, Indian ricegrass, green needlegrass, blue grama, cheatgrass & Japanees brome, foxtail barley. Common forbs, shrubs and trees include Wyoming big sagebrush, silver sagebrush, greasewood, Great Plains yucca, prickly pear cactus, skunkbush sumac, currant berry and alfalfa. Also, sparsely scattered cottonwoods, willows, elms and Russian olive trees.

A summary of the ecological sites within the project area are listed in the table below along with the individual acreage and the percentage of the total area identified within the POD boundary. (Note: like ecological sites have been combined.)

Table 3.2 Summary of Ecological Sites

Ecological Site	Acres	Percent
Loamy 10-14" Northern Plains	9100	92%
Clayey 10-14” Northern Plains	214	3%
Lowland 10-14" Northern Plains	370	4%
Sands/Sandy 10-14" Northern Plains	46	0.5%
Saline 10-14" Northern Plains	36	0.5%

3.2.2. Wetlands/Riparian

Small areas of riparian vegetation are restricted to the North and Middle Prongs of Pumpkin Creek where they cross the POD area. One spring in the Middle Prong Pumpkin Creek keeps the main channel saturated in most years and supports a wetland community for several hundred feet. Sporadic stands of cottonwoods are also present in these stream corridors. Similar riparian and wetland vegetation is mostly absent in the small ephemeral tributaries that drain most of the POD area.

3.2.3. Invasive Species

The following state-listed noxious weeds and/or weed species of concern infestations were discovered by a search of inventory databases on the Wyoming Energy Resource Information Clearinghouse (WERIC) web site. The WERIC database was created cooperatively by the University of Wyoming, BLM and county Weed and Pest offices. (www.weric.info):
- Canada thistle, field bindweed, Scotch thistle, black henbane, Russian knapweed.

The onsites were conducted during the late Fall and early Winter, due to this, the operator and BLM did not confirm any WERIC identified infestations, although an additional weed species of concern noted was Russian olive.

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 ICF Jones & Stokes (J&S) (2008). J&S performed surveys for mountain plover, sharp-tailed grouse, greater sage-grouse, raptor nests, and prairie dog colonies according to Powder River Basin Interagency Working Group (PRBIWG) accepted protocol. Surveys were also conducted for Ute ladies’-tresses orchid and bald eagle winter roosts. PRB IWG accepted protocol is available on the CBM Clearinghouse website (www.cbmclearinghouse.info).

A BLM biologist conducted field visits on 12/3, 4, 5, 9 & 19 /2008 - 1/13 & 22/2009 -3/18/2009. During the visits, the biologist verified the wildlife survey information for accuracy, evaluated potential impacts to wildlife resources, and provided project modification recommendations.

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 Gauge POD project area include pronghorn antelope and mule deer. The WGFD has determined that the project area contains Winter-Yearlong range for pronghorn antelope and Yearlong and Winter-Yearlong range for mule deer. At various times and locations throughout each onsite, the BLM biologist observed approximately four individual herds of pronghorn antelope. The average size of each pronghorn antelope herd observed within the Gauge POD was 35 animals.

The affected environment for pronghorn is discussed in pp. 3-117 to 3-122 in the PRB FEIS and for mule deer in pp. 3-127 to 3-132.

Winter-Yearlong use is when a population or a portion of a population of animals makes general use of the documented suitable habitat sites within this range on a year-round basis. During the winter months there is a significant influx of additional animals into the area from other seasonal ranges. Yearlong use is when a population of animals makes general use of suitable documented habitat sites within the range on a year round basis. Animals may leave the area under severe conditions. Populations of pronghorn antelope and mule deer within their respective hunt areas are above WGFD objectives. Big game range maps are available in the PRB FEIS (3-119-143), the project file, and from the WGFD.

3.3.2. Aquatics

The project area is within the Upper Powder River drainage system mostly within the Pumpkin Creek drainage. A small area within the northern portion of the POD is within the headwaters of the Beaver Creek drainage. Major tributaries coursing through the area include North Prong Pumpkin Creek, Middle Prong Pumpkin Creek and Nut Creek. 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).

3.3.4. Raptors

The affected environment for raptors is discussed in the PRB FEIS on pp. 3-141 to 3-148. Four raptor species are known to have used nests within 0.5 miles of the project area: ferruginous hawks, Swainson's hawk, red-tailed hawks, and great-horned owls. Ferruginous hawk, which is a BLM Wyoming sensitive species, will be discussed in more detail later in this document.

The affected environment for red-tailed hawks and great-horned owls are discussed in the PRB FEIS (pp. 3-146 to 3-148).

2009 Observations

Seventy-five raptor nest sites were identified by J&S (2009) and BLM within 0.5 mile of the project area, of these, 5 were active in spring 2009, while 42 were inactive, 15 were gone, and the status of 11 others could not be determined due to restricted access.

Golden eagles were recorded on three separate occasions, including one immature eagle perched along cliff banks of the Middle Prong Pumpkin Creek in Section 19 on June 11, and another hunting over sagebrush in NW NW Section 5 T46N:R75W on June 19. Also on June 11, an adult golden eagle flushed from a nearby lamb carcass on the side of Chimney Hill in NW SE Section 22. BLM wildlife biologist observed three ferruginous hawks soaring above and calling during an onsite on March 8, 2009 in SWNE Sec 5 T45N:R75W (near nest 6441).

Table 3.3 Documented raptor nests within the Gauge POD project area.

BLM ID	UTMs	Legal	Sub-strate	Year	Condition	Status	Species
651	425864E 4866740N	S19 T46N R75W	GHS	2009	Fair	INAC	n/a
				2008	Good	INAC	n/a
652	426296E 4864479N	S30 T46N R75W	CKB	2009	Fair	INAC	n/a
				2008	Good	INAC	n/a
655	426836E 4870801N	S6 T46N R75W	CTL	2009	Remnants	INAC	n/a
				2008	Remnants	INAC	n/a
				2007	Excellent	ACTI	GRHO
				2005	Excellent	ACTI	SWHA
657	426875E 4865020N	S30 T46N R75W	GHS	2009	Gone	INAC	n/a
				2008	Remnants	INAC	n/a
661	427224E 4861459N	S5 T45N R75W	ROK	2009	Fair	INAC	n/a
				2008	Fair	INAC	n/a
665	427498E 4866798N	S20 T46N R75W	GHS	2009	Poor	INAC	n/a
				2008	Poor	INAC	n/a
669	428629E 4863579N	S32 T46N R75W	GHS	2009	Remnants	INAC	n/a
				2008	Remnants	INAC	n/a
				2007	Poor	INAC	n/a
670	428630E 4864035N	S29 T46N R75W	GHS	2009	Gone	INAC	n/a
				2008	Remnants	INAC	n/a
				2007	Gone	INAC	n/a
675	431824E 4871898N	S2 T46N R75W	GHS	2009	Unknown	UNK	n/a
				2008	Unknown	UNK	n/a
676	432447E 4856368N	S23 T45N R75W	CTL	2008	Gone	DNLO	n/a
				2007	Gone	INAC	n/a
1396	427490E 4867624N	S17 T46N R75W	CTL	2008	Gone	DNLO	n/a
				2007	Gone	INAC	n/a
				2003	Unknown	UNK	n/a
1401	428002E 4867493N	S17 T46N R75W	GHS	2009	Good	INAC	n/a
				2008	Good	INAC	n/a

BLM ID	UTMs	Legal	Sub-strate	Year	Condition	Status	Species
				2007	Good	INAC	n/a
				2003	Unknown	ACTI	FEHA
1402	428018E 4866142N	S20 T46N R75W	GHS	2009	Good	INAC	n/a
				2008	Good	INAC	n/a
				2007	Good	INAC	n/a
				2003	Unknown	INAC	n/a
1433	431474E 4866078N	S22 T46N R75W	GHS	2009	Gone	INAC	n/a
				2008	Gone	INAC	n/a
				2007	Gone	INAC	n/a
				2006	Gone	INAC	n/a
				2005	Gone	INAC	n/a
				2003	Good	INAC	n/a
1941	433093E 4863795N	S35 T46N R75W	GHS	2009	Poor	INAC	n/a
				2008	Poor	INAC	n/a
				2007	Good	INAC	n/a
				2006	Poor	INAC	n/a
				2005	Fair	INAC	n/a
1942	433095E 4863754N	S35 T46N R75W	GHS	2009	Poor	INAC	n/a
				2008	Poor	INAC	n/a
				2007	Poor	INAC	n/a
				2006	Poor	INAC	n/a
				2005	Poor	INAC	n/a
2281	428803E 4869064N	S9 T46N R75W	CTL	2009	Good	INAC	n/a
				2008	Good	ACTI	RETA
				2007	Excellent	ACTI	RETA
				2005	Good	ACTI	RETA
				2004	Good	ACTI	RETA
2282	430241E 4869102N	S9 T46N R75W	BOX	2009	Good	INAC	n/a
				2008	Good	ACTI	SWHA
				2007	Good	ACTI	GRHO
				2005	Gone	INAC	n/a
				2005	Good	INAC	n/a
				2004	Good	ACTI	GRHO
2284	431265E 4868404N	S15 T46N R75W	CTL	2009	Gone	INAC	n/a
				2008	Gone	INAC	n/a
				2007	Gone	INAC	n/a
				2006	Unknown	DNLO	n/a
				2005	Good	ACTI	RETA
2285	431445E 4868732N	S15 T46N R75W	BOX	2009	Gone	INAC	n/a
				2008	Gone	INAC	n/a

BLM ID	UTMs	Legal	Sub-strate	Year	Condition	Status	Species
				2007	Gone	INAC	n/a
				2006	Poor	INAC	n/a
				2005	Good	INAC	n/a
2286	431483E 4869174N	S10 T46N R75W	BOX	2009	Gone	INAC	n/a
				2008	Gone	DNLO	n/a
				2008	Gone	INAC	n/a
				2007	Remnants	INAC	n/a
				2006	Poor	INAC	n/a
				2005	Good	ACTF	SWHA
2287	431542E 4873361N	S34 T47N R75W	GHS	2009	Unknown	UNK	n/a
				2008	Fair	INAC	n/a
				2007	Fair	INAC	n/a
				2006	Good	INAC	n/a
				2005	Fair	INAC	n/a
2289	431847E 4871840N	S2 T46N R75W	GHS	2009	Unknown	UNK	n/a
				2008	Good	INAC	n/a
				2007	Excellent	INAC	n/a
				2006	Remnants	INAC	n/a
				2005	Excellent	INAC	n/a
2290	432870E 4870196N	S11 T46N R75W	GHS	2009	Fair	INAC	n/a
				2008	Fair	INAC	n/a
				2007	Fair	INAC	n/a
				2006	Fair	INAC	n/a
				2005	Poor	INAC	n/a
3707	431988E 4856611N	S23 T45N R75W	ELM	2008	Gone	DNLO	n/a
				2007	Gone	INAC	n/a
				2005	Good	INAC	n/a
				2004	Gone	INAC	n/a
3708	431802E 4856525N	S22 T45N R75W	ELM	2009	Good	ACTI	SWHA
				2008	Good	INAC	n/a
				2007	Good	ACTI	SWHA
				2006	Good	ACTI	SWHA
3886	431207E 4873356N	S34 T47N R75W	GHS	2009	Unknown	UNK	n/a
				2007	Good	INAC	n/a
				2006	Excellent	ACTI	FEHA
				2005	Gone	INAC	n/a
				2004	Gone	INAC	n/a
3997	427516E 4860101N	S8 T45N R75W	GHS	2008	Poor	INAC	n/a
				2007	Poor	INAC	n/a
				2006	Poor	OCCU	FEHA

BLM ID	UTMs	Legal	Sub-strate	Year	Condition	Status	Species
3998	424932E 4863457N	S36 T46N R76W	ERR	2009	Remnants	INAC	n/a
				2008	Poor	INAC	n/a
				2007	Fair	INAC	n/a
4015	431772E 4856477N	S22 T45N R75W	BLT	2009	Gone	INAC	n/a
				2008	Gone	INAC	n/a
				2007	Gone	INAC	n/a
				2006	Unknown	ACTI	SWHA
4089	428246E 4864633N	S29 T46N R75W	CKB	2009	Fair	INAC	n/a
				2008	Good	INAC	n/a
				2007	Good	INAC	n/a
4093	431772E 4872100N	S34 T47N R75W	GHS	2009	Unknown	UNK	n/a
				2008	Fair	INAC	n/a
				2007	Fair	INAC	n/a
				2006	Good	INAC	n/a
				2005	Unknown	INAC	n/a
4381	423357E 4862794N	S35 T46N R76W	CTL	2009	Good	ACTI	GRHO
				2008	Good	ACTI	RETA
4384	425496E 4862011N	S6 T45N R75W	CTL	2009	Good	INAC	n/a
				2008	Good	ACTI	RETA
4594	428874E 4869032N	S9 T46N R75W	CTL	2008	Gone	DNLO	n/a
				2007	Excellent	ACTI	RETA
4595	431587E 4868933N	S10 T46N R75W	GHS	2009	Gone	INAC	n/a
				2008	Gone	INAC	n/a
4764	425133E 4868437N	S13 T46N R76W	CTD	2009	Gone	INAC	n/a
				2008	Poor	INAC	n/a
4947	434073E 4863353N	S36 T46N R75W	MMS	2009	Good	INAC	n/a
				2008	Good	ACTI	FEHA
5052	431395E 4873651N	S27 T47N R75W	CTL	2009	Unknown	UNK	n/a
				2008	Good	ACTI	RETA
				2007	Good	ACTI	RETA
5053	431204E 4873478N	S34 T47N R75W	GHS	2009	Unknown	UNK	n/a
				2008	Remnants	INAC	n/a
5054	430888E 4873372N	S34 T47N R75W	GHS	2009	Unknown	UNK	n/a
				2008	Remnants	INAC	n/a
5055	427059E 4869758N	S8 T46N R75W	CTL	2009	Poor	INAC	n/a
				2008	Fair	INAC	n/a
5056	426332E 4869509N	S7 T46N R75W	CTL	2009	Gone	INAC	n/a
				2008	Gone	INAC	n/a
5057	426075E 4867099N	S19 T46N R75W	GHS	2009	Gone	INAC	n/a
				2008	Gone	INAC	n/a

BLM ID	UTMs	Legal	Sub-strate	Year	Condition	Status	Species
5058	425954E 4866766N	S19 T46N R75W	CKB	2009	Poor	INAC	n/a
				2008	Poor	INAC	n/a
5059	425600E 4866759N	S19 T46N R75W	CKB	2009	Fair	INAC	n/a
				2008	Good	INAC	n/a
5060	425884E 4866642N	S19 T46N R75W	CKB	2009	Gone	INAC	n/a
				2008	Gone	INAC	n/a
5061	425496E 4866527N	S19 T46N R75W	GHS	2009	Good	INAC	n/a
				2008	Good	INAC	n/a
5062	428141E 4866116N	S20 T46N R75W	CKB	2009	Poor	INAC	n/a
				2008	Remnants	INAC	n/a
5063	431224E 4866106N	S22 T46N R75W	ROK	2009	Poor	INAC	n/a
				2008	Remnants	INAC	n/a
5064	426954E 4865675N	S19 T46N R75W	CKB	2009	Remnants	INAC	n/a
				2008	Remnants	INAC	n/a
5065	427195E 4865502N	S20 T46N R75W	CKB	2009	Gone	INAC	n/a
				2008	Gone	INAC	n/a
5066	427141E 4865162N	S29 T46N R75W	CKB	2009	Remnants	INAC	n/a
				2008	Remnants	INAC	n/a
5067	426877E 4865023N	S30 T46N R75W	ROK	2009	Good	INAC	n/a
				2008	Good	ACTI	FEHA
5068	426900E 4864943N	S30 T46N R75W	ROK	2009	Poor	INAC	n/a
				2008	Poor	INAC	n/a
5069	428221E 4864911N	S29 T46N R75W	CKB	2009	Fair	INAC	n/a
				2008	Good	INAC	n/a
5070	424602E 4863966N	S25 T46N R76W	CKB	2009	Fair	INAC	n/a
				2008	Fair	INAC	n/a
5072	427668E 4861973N	S5 T45N R75W	MMS	2009	Good	ACTI	FEHA
				2008	Good	INAC	n/a
5073	427332E 4860580N	S8 T45N R75W	GHS	2009	Poor	INAC	n/a
				2008	Poor	INAC	n/a
5074	428682E 4858193N	S16 T45N R75W	GHS	2009	Poor	INAC	n/a
				2008	Unknown	UNK	n/a
5075	428750E 4857960N	S16 T45N R75W	GHS	2009	Poor	INAC	n/a
				2008	Unknown	UNK	n/a
5082	425582E 4866762N	S19 T46N R75W	ROK	2008	Unknown	UNK	n/a
				2007	Fair	INAC	n/a
5795	425201E 4868643N	S13 T46N R76W	CTD	2009	Good	INAC	n/a
				2008	Poor	INAC	n/a
6329	428359E 4864552N	S29 T46N R75W	CKB	2009	Fair	INAC	n/a

BLM ID	UTMs	Legal	Sub-strate	Year	Condition	Status	Species
6356	434583E 4870299N	S12 T46N R75W	CTL	2009	Unknown	UNK	n/a
6358	434542E 4870359N	S12 T46N R75W	CTL	2009	Unknown	UNK	n/a
6433	429339E 4869151N	S9 T46N R75W	CTL	2008	Gone	INAC	n/a
6434	426240E 4864663N	S30 T46N R75W	GHS	2008	Good	INAC	n/a
6435	426290E 4864524N	S30 T46N R75W	GHS	2009	Fair	INAC	n/a
6436	426142E 4864327N	S30 T46N R75W	GHS	2009	Remnants	INAC	n/a
6437	426083E 4864055N	S30 T46N R75W	GHS	2009	Remnants	INAC	n/a
6438	423550E 4863772N	S36 T46N R76W	CTL	2009	Good	ACTI	FEHA
6439	425124E 4863309N	S36 T46N R76W	GHS	2009	Good	INAC	n/a
6440	423391E 4862642N	S35 T46N R76W	CTD	2008	Unknown	ACTI	AMKE
6441	427869E 4861900N	S5 T45N R75W	GHS	2008	Good	INAC	n/a
8379 (10602)	425199E 4866974N	S14 T46N R76W	CTL	2009	Good	INAC	n/a
8380	423990E 4863623N	S36 T46N R76W	CTL	2009	Good	ACTI	n/a
				2009	Fair	INAC	n/a

Notes:
1 ABB = Abandoned burrow; CTD = Cottonwood - dead; CTL = Cottonwood – live; Creek bottom; MMS=Man made structure; ROK-Rock outcrop; JUN=Juniper tree; ACB= Active Burrow; GHS=Ground/Hillside

2 ACTF = Active failed; ACTI = Active; INAC = Inactive
3 BUOW = Burrowing Owl; FEHA=Ferruginous Hawk; GOEA = Golden Eagle; GRHO = Great horned Owl; RETA = Red-tailed Hawk; LOOW=Long-eared owl

3.3.5. Plains Sharp-tailed Grouse

Plains sharp-tailed grouse are discussed in this document because specific concerns for this species were identified during the scoping process for the PRB FEIS. The affected environment for plains sharp-tailed grouse is discussed in the PRB FEIS on pp. 3-148 to 3-150.

The most recent BLM and WGFD records (2003) do not indicate the presence of any known sharp-tailed grouse leks within 0.64 mile of the POD site. The nearest known lek (Iberlin) is located 11 miles northwest of the POD site. No leks, sharp-tailed grouse, or grouse sign were observed within the Gauge project area J&S 2009.

3.3.6. Sagebrush Obligates

Sagebrush communities are the most common habitat type in the project area. These ecosystems support a variety of species, including migratory birds, raptors, big game, reptiles, and small mammals. Sagebrush

obligates are those which require sagebrush for some part of their life cycle and cannot survive without it. Several sensitive species are associated with sagebrush ecosystems. Sagebrush obligate birds within the Powder River Basin that are listed as sensitive species by BLM Wyoming include Brewer's sparrow, sage thrasher, sage sparrow, and greater sage-grouse. All require sagebrush for nesting, with nests typically located within or under the sagebrush canopy.

3.3.7. Threatened and Endangered and Sensitive Species

3.3.7.1. Threatened and Endangered Species

Within the BLM Buffalo Field Office there are three species listed as Threatened or Endangered under the Endangered Species Act: black-footed ferret, Ute ladies'-tresses orchid, and blowout penstemon.

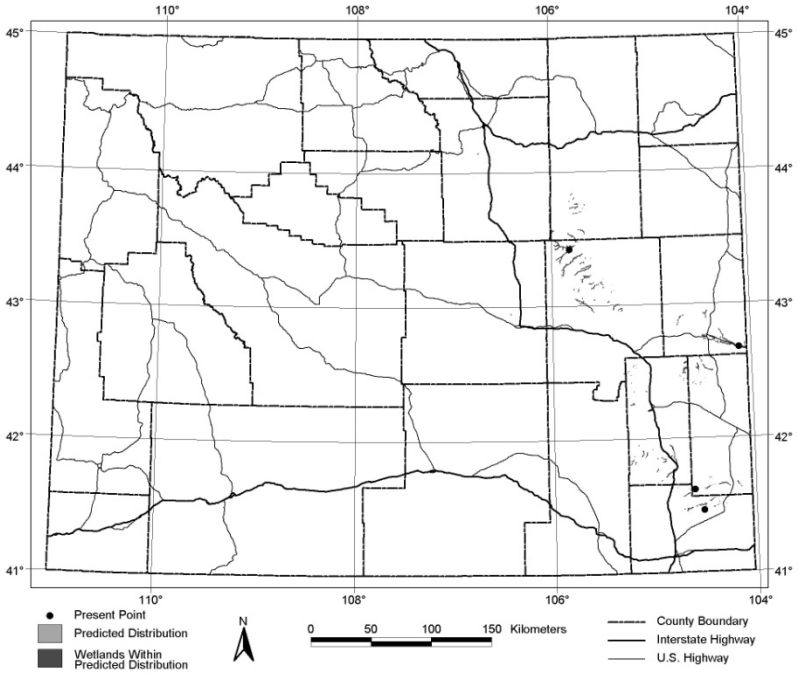
3.3.7.1.1. Black-footed ferret

Direct and indirect effects to black-footed ferret are discussed in the PRB FEIS (pg. 4-251).
Current science indicates that a black-footed ferret population requires at least 1,000 acres of black-tailed prairie dog colonies for survival (USFWS 1989). Implementation of the proposed development will have no effect on the black-footed ferret because 0.83 acres of habitat exist within the Gauge POD. The location of the recorded site by J&S is in the NW SW Section 5 T46N:R75W. The project area is located approximately 25 miles northwest from the Kaycee complex, the nearest potential reintroduction area. For further documentation see prairie dog section (3.3.7.2.3).

3.3.7.1.2 Ute Ladies'-Tresses Orchid

Ute ladies'-tresses orchid (ULT) is listed as Threatened under the Endangered Species Act. It is extremely rare and occurs in moist, sub-irrigated or seasonally flooded soils at elevations between 1,780 and 6,800 feet above sea level. Habitat includes wet meadows, abandoned stream channels, valley bottoms, gravel bars, and near lakes or perennial streams that become inundated during large precipitation events. Wyoming Natural Diversity Database model predicts undocumented populations may be present particularly within southern Campbell and northern Converse Counties. In Wyoming, ULT blooms from early August to early September, with fruits produced in mid August to September (Fertig 2000).

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



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

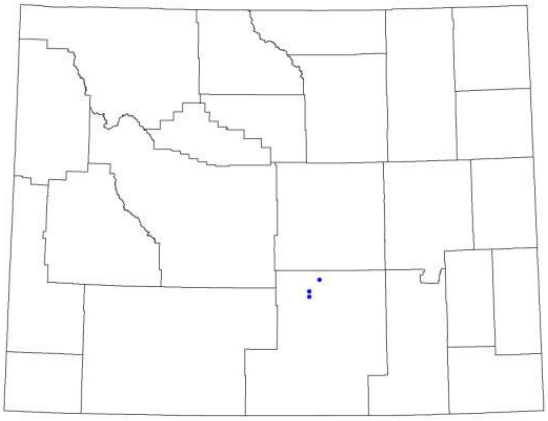
No known populations of Ute ladies'-tresses orchid exist within the vicinity of the Gauge POD; however, Ute ladies'-tresses orchid habitat exist within the project area. J&S surveyed for the orchid on August 22, 2007. Area surveyed for the orchid included all proposed low water crossings, culverts, and pipelines crossing the North Prong Pumpkin Creek, Middle Prong Pumpkin creek and Nut Creek in sections 6-8,14,15,19,21,22,29 and 32 T46N:R75W; Section 24 T46N:R76W; and Section 15 T45N:R75W. Several proposed reservoirs and discharge sites were also assessed and determined to be suitable for the Ute Ladies'-tresses orchid, as the vast majority were located in-channel and near the head of ephemeral minor drainages.

Significant stands of mesic vegetation existed along most areas of North Prong Pumpkin Creek and its tributaries in NW SE Section 6, SW NE Section 7, and SW NE Section 8. Species present in those areas included prairie cordgrass, milkweed, arrowhead, mint, rushes, sedges, cattails, American licorice, smooth scouring rush, foxtail barley, and timothy. Most hosted vegetation that was relatively dense (<20% bare ground or standing water) and tall (>16 inches), but evidence of grazing was present along the edge and, sometimes, within the wetlands habitats. Soils in those locations were primarily composed of Sandy loams and sandy clays, with only a few sites that exhibited significant saline conditions. Nearly all sites surveyed included a mixture of gradual transitions to upland habitats as well as cut banks (ranging from 4 to 20 feet high) that transitioned abruptly to upland vegetation.

3.3.7.1.2. Blowout Penstemon

ICF Jones & Stokes biologists conducted a habitat assessment on the POD site for blowout penstemon based on criteria defined by the Wyoming Natural Diversity Database's state species abstract (Fertig 2001). Prior to the survey, topographic and soils data (Natural Resources Conservation Service) maps were consulted to assess soil features in the area and reference soil types for determination of potential habitat. Photographs of representative habitat types were taken, predominant vegetative species were recorded, and soil types (i.e., textures) were evaluated.

Blowout penstemon is a regional endemic species of the Sand Hills of west-central Nebraska and the northeastern Great Divide Basin in Carbon County, Wyoming. Suitable blowout penstemon habitat consists of sparsely vegetated, early successional, shifting sand dunes and blowout depressions created by wind. In Wyoming, the habitat is typically found on sandy aprons or the lower half of steep sandy slopes deposited at the base of granitic or sedimentary mountains or ridges. Associated vegetation includes blowout grass (Redfieldia flexuosa), thickspike wheatgrass (Elymus lanceolatus), lemon scurfpea (Psoralidium lanceolatum), Indian ricegrass (Achnatherum hymenoides) and western wheatgrass (Pascopyrum smithii). The flowering period for the plant is typically between April and July. For Gauge POD vegetation see vegetation 3.2.1.



Wyoming distribution of *Penstemon haydenii*

3.3.7.2. Sensitive Species

BLM Wyoming has prepared a list of sensitive species to focus species management efforts towards maintaining habitats under a multiple use mandate. The goals of the policy are to:

- Maintain vulnerable species and habitat components in functional BLM ecosystems
- Ensure sensitive species are considered in land management decisions
- Prevent a need for species listing under the ESA

This section lists those species on the BLM Wyoming sensitive species list that, according to the PRB FEIS, may occur in the Powder River Basin Oil and Gas Project Area, which includes the Gauge POD project area. The following discussion for each of those sensitive species includes an analysis of whether the species is likely to occur in or be affected by the proposed Gauge POD. According to the PRB FEIS, spotted bats were not likely to be affected by the Powder River Basin Oil and Gas Project, and are therefore not discussed in this section. The authority for the sensitive species 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.

3.3.7.2.1. Northern Leopard Frog

The affected environment for northern leopard frog is discussed in the PRB FEIS on pg. 3-181. This is a WGFD Species of Greatest Conservation Need (SGCN), with a rating of NSS4, indicating that the species is common (widely distributed throughout its native range and populations are stable) and habitat is stable.

One large CBNG-filled reservoir is present within NW Section 15, T46N R75W and another reservoir in SENW Section 9 T46N R75W. Several smaller CBNG and natural impoundments are located throughout the project.

3.3.7.2.2. Sturgeon Chub

The sturgeon chub was petitioned for listing under the ESA in 2000, but, in 2001, it was determined that the listing was not warranted, due to the population being more abundant and better distributed throughout its range than previously believed. Because this species has been petitioned for listing, according to BLM Wyoming Sensitive Species policy, it remains on the sensitive species list. The affected environment for this species is discussed in the PRB FEIS on pg. 3-165. Sturgeon chub is listed by WGFD as a SGCN with a rating of NSS1, indicating that the species is rare (populations are physically isolated and/or it occurs in extremely low densities throughout its historic range and that extirpation appears possible) and habitat is declining or vulnerable.

3.3.7.2.3. Baird's Sparrow

The affected environment for Baird's sparrow is discussed in the PRB FEIS on pg. 3-188. In addition to being listed as a BLM Wyoming sensitive species, Baird's sparrows are listed by USFWS as a Bird of Conservation Concern (BCC) for Region 17. Suitable habitat is present throughout the project area.

3.3.7.2.4. Bald Eagle

The affected environment for bald eagles is described in the PRB FEIS on pg. 3-175. At the time the PRB FEIS was written, the bald eagle was listed as a threatened species under the ESA. Due to successful recovery efforts, it was removed from the ESA on 8 August 2007. 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 (PRB Oil & Gas Project BO - WY07F0075) (USFWS 2007) shall continue to be complied with.

In addition to being listed as a BLM Wyoming sensitive species, bald eagles are a WGFD SGCN with a NSS2 rating, due to populations being restricted in numbers and distribution, ongoing significant loss of habitat, and sensitivity to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also listed by USFWS as a BCC for Region17.

In the PRB Oil & Gas Project BO, USFWS defined bald eagle winter roosting habitat as any mature conifer or deciduous trees where bald eagles consistently perch. A consistent use roost was defined as a location where bald eagles are observed on more than one occasion (at least one week apart) within a single winter or over multiple winters.

BLM data base indicates multiple eagle observations within the Gauge POD along the North Prong of Pumpkin Creek. The locations and dates are as listed below.

Table 3.4 Documented bald eagle winter observations within one mile of the Gauge POD.

UTM	TN:RW	Section	Date	Observations
428858E 4869269N	46 75	9 SWNW	12/23/2004	Two adults perched in same tree
428900E 4869400N	46 75	9 SWNW	1/18/2005	Two adults and one juvenile perched in separate trees
429205E 4869277N	46 75	9 SWNW	2/13/2006	One adult
429325E 4869154N	46 75	9 SWSW	2/13/2008	One adult perched along side of creek
427513E 4869111N	46 75	8 SWSW	12/17/2008	One adult, Perched Creek bank
431266E 4868392N	46 75	15 NWNE	12/17/2008	2 adults, perched Cottonwood, live
431266E 4868392N	46 75	15 NWNE	2/6/2009	1 adult, perched Cottonwood, live
430501E 4868488N	46 75	15 NWNW	1/6/2006	One adult
431306E 4868335N	46 75	15 NENE	1/24/2006	Two adults perched in same tree
431322E 4868216N	46 75	15 NENE	1/27/2006	One adult
431405E 4868385N	46 75	15 NENE	1/30/2007	One adult
430584E 4868650N	46 75	15 NWNW	2/20/2007	One adult

Eagle habitat exists within one mile of the proposed project. A substantial prey base (domestic sheep ranching, rabbits, prairie dogs, sage grouse, and carrion) for eagles exist within the area. Groves of mature cottonwood trees along side of North Prong Pumpkin Creek SW Section 9 T46N:R75W and another in SE Section 35 T46N:R76W provide roosting and nesting habitat for eagles. Additionally, a large grove and several windbreaks surrounding the Inns Ranch in NENE Section 33T46N:R75W contain numerous cottonwoods, willow, Russian olives, Siberian elms, ponderosa pines, and Caragana.

3.3.7.2.5. Brewer's Sparrow

The affected environment for Brewer's sparrow is discussed in the PRB FEIS on pg. 3-200. In addition to being listed as a BLM Wyoming sensitive species, Brewer's sparrows are a WGFD SGCN, with a rating of NSS4 because populations are declining, habitat is vulnerable with no ongoing loss, and the species is not sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also listed by USFWS as a BCC for Region 17. Brewer's sparrow habitat is present throughout the project area, and this species is suspected to occur.

Brewer's sparrow was observed on multiple occasions singing in sagebrush habitats throughout the project area (J&S 2007).

3.3.7.2.6. Ferruginous Hawk

The affected environment for ferruginous hawk is discussed in the PRB FEIS on pg. 3-183. In addition to being listed as a BLM Wyoming sensitive species, ferruginous hawks are a WGFD SGCN, with a rating of NSS3 because the species is widely distributed, population status and trends are unknown but are suspected to be stable, they are experiencing ongoing loss of habitat, and they are sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also listed by USFWS as a BCC for Region 17. Ferruginous hawk nests are located throughout the Powder River Basin. Foraging habitat and prey is available throughout the project area, and ferruginous hawks do occur.

Ferruginous hawk populations within the Powder River Basin have declined in recent years, according to the BLM data base. Ferruginous hawks are sensitive to human disturbance; pairs may abandon nests even

when mildly disturbed during nest building or incubation (Smith and Murphy 1978, White and Thurow 1985, Olendorff 1993, Washington Department of Fish and Wildlife 1996). Furthermore, disturbed nests fledge fewer young, and they often are not reoccupied the year following disturbances (White and Thurow 1985). Rather than becoming acclimated to repeated disturbance, ferruginous hawks become sensitized and flush at greater distances (White and Thurow 1985), which may result in increased clutch or brood mortality due to exposure, predation, starvation, or nest desertion. Recommended biological buffer distance from other federal agencies are no surface disturbance 0.5 mi year-round and a one mile timing restriction from April 1 to July 31(Fisher 1978). See Raptor Direct and Indirect Effects section for observations within 0.5 miles of the Gauge POD.

3.3.7.2.7. Greater Sage-Grouse

The affected environment for greater sage-grouse (herein referred to as sage-grouse) is discussed in the PRB FEIS (pg. 3-194 to 3-199). In addition to being listed as a Wyoming BLM sensitive species, sage-grouse are listed as a WGFD SGCN, with a rating of NSS2, because populations are declining, and they are experiencing ongoing significant loss of habitat. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also listed by USFWS as a BCC for Region 17.

In recent years, several petitions have been submitted to USFWS to list sage-grouse as threatened or endangered under the ESA. On 12 January 2005, 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 USFWS's decision-making process was flawed and ordered USFWS to conduct a new Status Review (Winmill Decision Case No. CV-06-277-E-BLW, December 2007).

The BFO has taken several steps to consider the evolving information on impacts to sage-grouse which could result from development activities on federal lands. These steps include:

- February 2008: BFO consolidated research and data to identify high-quality sage-grouse habitat in the Powder River Basin. University of Montana developed models indicating quality of habitat using topographic and vegetative criteria and habitat selection by radio-collared birds to identify areas with high potential for use by nesting/wintering birds. The models are divided into habitat categories of 1 through 5. Categories 1 & 2 are not considered suitable habitat. Category 3 may have the vegetative components necessary for suitable habitat. Categories 4 & 5 have the vegetative components for suitable habitat, and meet criteria for topography, slope and other landscape level characteristics that were indicated through analysis of radio-collared sage-grouse. The 4 and 5 categories of habitats are considered "high-quality".
- March 2008: BFO, Wyoming State Office (WYSO) and Washington Office (WO) established the need for a Resource Management Plan (RMP) approach to evaluate impacts to sage-grouse and habitat. A RMP amendment or revision was discussed. The decision to begin a RMP revision was approved two years ahead of the originally scheduled date.
- May 28, 2008: BFO conducted a public meeting to present habitat information developed through research in the Powder River Basin. BFO solicited additional information from the public and energy development companies to refine sage-grouse habitat maps. The objective was to establish areas of interim management for sage-grouse to preserve decision space during the RMP process.
- August 13, 2008: BFO released its *Guidance for general management actions during BFO Resource Management Plan Revision* and a map identifying the Focus Areas. The guidance contained criteria for any proposed development in Focus Areas (Appendix A). For fluid mineral development inside Focus Areas, this guidance includes the following requirement; "The proponent will be asked to demonstrate that the proposal can be managed in a manner that

effectively conserves sage-grouse habitats affected by the proposal." The guidance also states that "Efforts will be made to assure that the impacts of surface disturbing projects will be consistent with a well pad density of 640 acres."

- Efforts to minimize impacts to high-quality sage-grouse habitats outside the Focus Areas will be far less restrictive, with well densities up to 80-acre spacing, but may include site-specific mitigating measures suggested by the best available science.
- August 1, 2008: Concurrent with BFO efforts, the Governor of the State of Wyoming issued an Executive Order (EO 2008-2) mandating special management for all lands within sage-grouse Core Population Areas. Lands for special management were identified by the Wyoming Governor's Sage-Grouse Implementation Team, and generally followed the boundaries of the majority of the Focus Areas identified by the BFO. This team also recommended stipulations to be placed on development activities on state lands to ensure existing habitat function is maintained within those areas. EO 2008-2 also identifies objectives outside of Core Areas, including that "…development scenarios should be designed and managed to maintain populations, habitats and essential migration routes outside core population areas."
- August 13, 2008 to the Present: BFO crafted an updated impacts assessment to be included in all project analyses affecting sage-grouse habitat. This analysis included research conducted in the Powder River Basin and other sage-grouse research published since the 2003 PRB FEIS and ROD. The analysis explicitly tied impacts to the impacts accepted under the 2003 ROD.
- October 1, 2008: BFO officially began the RMP revision. This process was accelerated by two years to more rapidly assess impacts to sage-grouse.
- April 14, 2009: BFO/WYSO entered into an agreement with the University of Montana and the Miles City Field Office to conduct a population viability analysis in the Powder River Basin. The emphasis will be on the adequacy of BFO Focus Areas for maintenance of a persistent sage-grouse population. Information gathered will be used in developing alternatives for the RMP revision.
- May, 2009: The WGFD released an updated version of its *Recommendations for Development of Oil and Gas Resources within Important Wildlife Habitats*, which further described management objectives for sage-grouse outside Core Areas: "Non-core areas should not be construed as "sacrifice areas" since this conservation strategy requires habitat connectivity and movement between populations in core areas. The goal in non-core areas is to maintain habitat conditions that will sustain at least a 50% probability of lek persistence over the long term."
- In conformance with Appendix E of the PRB FEIS ROD, BLM BFO has initiated actions within the PRB FEIS analysis area in response to additional information regarding impacts to sage-grouse. These measures include:
- Early initiation of a RMP revision, based on the evaluation of monitoring data generated under the mitigation monitoring and reporting plan (MMRP) in the PRB FEIS Record of Decision.
- Establishment of sage-grouse Focus Areas, encompassing approximately 1 million acres of sage-grouse habitat. These areas are managed under strict guidelines designed to preserve sage-grouse habitat for development of alternatives during the RMP process (Appendix B).
- Initiation of a population viability analysis in the Powder River Basin. This is a 24-month project involving the USGS, BLM Miles City Field Office, BLM BFO, and the University of Montana.
- Development of alternatives that modify the proposed action to reflect the best available science in sage-grouse management.
- Development of conditions of approval, specific to sage-grouse management, that incorporate some recommendations from recent research, the NE Local Sage-grouse Working Group, and the Petroleum Association of Wyoming.

The State Wildlife Agencies' Ad Hoc Committee for Consideration of Oil and Gas Development Effects to Nesting Habitat (WGFD 2008) recommends that impacts be considered for leks within four

miles of oil and gas developments. WGFD records indicate that nine sage-grouse leks occur within four miles of the project area. These nine lek sites are identified in Table 3.5 (*The shaded rows are leks within two miles of the Gauge POD area).*

Table 3.5 Leks within four miles of the Gauge POD

LEK ID	QQ	Q	Sec	Twn	Rng	peak male 2009	peak male 2008	peak male 2007	WY Game and Fish Category of impact and well #'s per square mile
38-Black Butte	SW	SW	16	46	74	*	0	0	Extreme 16.5
38-Cottonwood	SW	NE	16	47	75	*	25	46	Extreme 8.2
38-County Line	NW	SE	16	46	76	*	9	18	Extreme 6.8
38-Gilkie Ranch	SE	SW	1	46	76	2	8	12	Extreme 4.9
38-Innes	NW	NE	30	46	75	22	34	39	High 2.1
38-Kaufman Draw	SE	NW	18	47	75	*	49	69	Extreme 3
38-North Beaver Creek	NW	SW	31	47	74	0	0	0	Extreme 5.9
38-Upper Kaufman Draw	SE	SE	24	47	76	*	1	7	Extreme 7
38-Willow Creek	NE	SW	33	45	76	*	8	7	Extreme 7.6

M= moderate = 1-2 wells/square mile; H= high = 2-3 wells/square mile; E= extreme = 4 or more wells/square mile,*2009 data is unknown as of 8/20/2009.

Habitats within the Gauge project area support sage-grouse throughout the year. The Gauge POD has approximately ½ of the west portion mapped for high quality nesting and wintering habitat for sage grouse. Of the mapped portion, 100 percent of the west half of the Gauge Pod (east of sections 3,10,15,22,27,and 34 T46N,R75W sections 2,11,14, and 23 T45N,R75W, and section 14 T47N,R75W) is in high quality nesting and wintering habitat. One sage grouse was recorded by J&S biologist during ground surveys within the Gauge project area in 2007 and sage-grouse sign was recorded in several broad areas throughout the vicinity.

- On 4/22/2009 three males were observed displaying at a new location in SW NW Section 36 T47N:R76W(424509E, 4873000N) approximately 1.5 miles north of the Gilkie Ranch lek.
- A lone male was flushed from the sparse sagebrush grassland immediately north of the 13 Isosceles well in SW NE Section 15 T46N:R75W on 22 August, 2007.
- Numerous, old roost piles were documented throughout Sections 21 and 22 T46N:R75W, including larger concentrations (up to 25 piles) in NE NW Section 21 and NE NW Section 22 and roost piles and cecal deposits in SE NE Section 21.
- Additional sign was also noted in SESW Section 8 T46N:R75W, NWNE Section 36 T46N:R76W, and NESW Section 2T45N:R76W.

A No Surface Occupancy (NSO-hereafter) stipulation is attached to lease # WYW-130609, located NE ¼ of section 19 T46N R75W. According to the BLM wildlife biologist field notes, sage grouse nesting habitat is marginal and historically no sage grouse leks were recorded within the area of the NSO.

3.3.7.2.8. Loggerhead Shrike

The affected environment for loggerhead shrike is discussed in the PRB FEIS on pg. 3-187. In addition to being listed as a BLM Wyoming sensitive species, they are listed by USFWS as a BCC for Region 17.

The Wyoming Bird Conservation Plan rates them as a Level II species, indicating they are in need of monitoring. Loggerhead shrike habitat is present throughout the project area, and the species is suspected to occur.

Two loggerhead shrikes were observed, including one on top of a dead cottonwood in NE SE Section 22 on June 19, 2007 and another perched in a Russian olive tree along Middle Prong Pumpkin Creek in SW NW Section 28 on May 10, 2007(J&S 2009).

3.3.7.2.9. Long-billed Curlew

The affected environment for long-billed curlew is discussed in the PRB FEIS on pg. 3-184. In addition to being listed as a BLM Wyoming sensitive species, they are a WGFD SGCN, with a rating of NSS3, because populations are restricted in distribution, and habitat is vulnerable but not undergoing significant loss. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also listed by USFWS as a BCC for Region 17.

Long-billed curlew habitat is present throughout the project area. One large CBNG-filled reservoir is present within NW Section 15, T46N R75W and another reservoir in SENW Section 9 T46N R75W. Several smaller CBNG and natural impoundments are located throughout the project area.

3.3.7.2.10. Mountain Plover

The affected environment for mountain plover is discussed in the PRB FEIS on pg. 3-177 to 3-178. At the time the PRB FEIS was written, the mountain plover was proposed for listing as a threatened species under the ESA. In 2003, USFWS withdrew the proposal, finding that the population was larger than had been thought and was no longer declining. In addition to being listed as a BLM Wyoming sensitive species, mountain plovers are a WGFD SGCN, with a rating of NSS4, because population status and trends are unknown but are suspected to be stable, habitat is vulnerable without ongoing significant loss, and the species is sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also listed by USFWS as a BCC for Region 17.

Suitable mountain plover habitat is present within 0.25 miles of the project area. One documented prairie dog colony of 0.8 acres is located in NW SW Section 5 T46N:R75W.

3.3.7.2.11. Sage Sparrow

The affected environment for sage sparrow is discussed in the PRB FEIS on pg. 3-200 to 3-201. Sage sparrows are a WGFD SGCN, with a rating of NSS3, because populations are restricted in distribution, habitat is restricted but not undergoing significant loss, and they are sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action. They are also listed by USFWS as a BCC for Region 17.
Although sage sparrows prefer to nest in areas characterized by dense, tall shrub cover, the areas of moderately dense shrub cover and smaller stature shrubs that occur throughout the project area may be selected for nesting habitat.

3.3.7.2.12. Sage Thrasher

The affected environment for sage thrasher is discussed in the PRB FEIS on pg. 3-199 to 3-200. In addition to being listed as a BLM Wyoming sensitive species, sage thrashers are a WGFD SGCN, with a rating of NSS4, because populations are declining, habitat is vulnerable but not undergoing loss, and the species is not sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a

Level II species, indicating the action and focus should be on monitoring and because Wyoming has a high percentage of and responsibility for the breeding population. They are also listed by USFWS as a BCC for Region 17.

The project area contains marginal habitat for sage thrashers, due to the presence of only moderately dense sagebrush stands. Although they prefer dense stands of shrubs for nesting, sage thrashers may occur throughout the project area.

On June 19, 2007 J&S observed one sage thrasher running among the moderately dense stands of sagebrush in NW NW Section 20.

3.3.7.2.13. Western Burrowing Owl

The affected environment for western burrowing owl (burrowing owl) is discussed in the PRB FEIS on pg. 3-186. In addition to being listed as a BLM Wyoming sensitive species, burrowing owls are a WGFD SGCN, with a rating of NSS4 because the species is widely distributed, population status and trends are unknown but are suspected to be stable, habitat is restricted or vulnerable without recent or on-going significant loss, and it may be sensitive to human disturbance. The Wyoming Bird Conservation Plan rates them as a Level I species, indicating they are clearly in need of conservation action, and they are also a USFWS BCC in Region 17.

Current population estimates for the United States are not well known but trend data suggest declines throughout the burrowing owl's North American range (McDonald et al. 2004). Primary threats are habitat loss and fragmentation, mostly due to intensive agricultural and urban development and habitat degradation, due to declines in populations of colonial burrowing mammals (Klute et al. 2003).

The Gauge POD has one active prairie dog colony of 0.83acres within a pasture of mixed grasses located in NW SW Section 5 T46N:R75W. No known burrowing owl nest occurs within the Gauge POD according to the BLM BFO databases and the survey information provided by J&S (2008).

3.3.7.2.14. Yellow-billed Cuckoo

The affected environment for yellow-billed cuckoo is discussed in the PRB FEIS on pg. 3-185. In addition to being listed as a BLM Wyoming sensitive species, the yellow-billed cuckoo is a WGFD SGCN, with a rating of NSS2, because populations are restricted in numbers and distribution and they are experiencing ongoing significant loss of habitat.

The project does contain groves of mature cottonwood trees along side of North Prong Pumpkin Creek SW Section 9 T46N:R75W as well as another in SE Section 35 T46N:R76W and the species may occur.

3.3.7.2.15. Black-tailed Prairie Dog

The affected environment for black-tailed prairie dogs is discussed in the PRB FEIS (pg 3-179). At the time the PRB FEIS was written, the black-tailed prairie dog was added to the list of candidate species for federal listing in 2000 (USFWS 2000). It was removed from the list in 2004. BLM Wyoming considers black-tailed prairie dogs a sensitive species and continues to afford this species the protections described in the PRB FEIS. The black-tailed prairie dog is a WGFD SGCN, with a rating of NSS3, because populations are declining, and habitat is vulnerable but not undergoing significant loss.

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 aerial imagery indicated that black-tailed prairie dog acreage remained stable from 1994 through 2001, but aerial surveys conducted in 2003 indicated that approximately 47% of the prairie dog acreage was impacted by Sylvatic plague and/or control efforts (Grenier et al. 2004). 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 that affect long term population viability, such as landowner poisoning and disease (Primack 1993, Meffe and Carroll 1994, Noss and Cooperrider 1994).

One documented prairie dog colony of 0.8 acres is located in NW SW Section 5 T46N:R75W.

3.3.7.2.16. Fringed Myotis

The affected environment for fringed myotis is discussed in the PRB FEIS on pg. 3-188 to 3-189. In addition to being listed as a BLM WY sensitive species, the fringed myotis is a WGFD SGCN, with a rating of NSS2, because populations are restricted in distribution, they are experiencing ongoing significant loss of habitat, and they are sensitive to human disturbance. The fringed myotis occupies a variety of habitats, including grasslands and basin-prairie shrublands, usually in proximity of drinking water (Hester and Grenier 2005). After feeding, it uses night roosts, which may include buildings, rock crevices, and bridges (Hester and Grenier 2005), all of which occur in the vicinity of the project area. Fringed myotis may occur in the project area, due to availability of roost sites and its proximity to the Powder River.

3.3.7.2.17. Long-eared Myotis

The affected environment for long-eared myotis is discussed in the PRB FEIS on pg. 3-201. In addition to being listed as a BLM WY sensitive species, the long-eared myotis is a WGFD SGCN, with a rating of NSS2, because populations are restricted in distribution, they are experiencing ongoing significant loss of habitat, and they are sensitive to human disturbance. Although long-eared myotis primarily inhabit coniferous forest and woodland, they are occasionally found in cottonwood riparian areas and sagebrush grasslands where roost sites are available (Hester and Grenier 2005). Roosts include cavities in snags, under loose bark, stumps, buildings, and rock crevices (Hester and Grenier 2005), all of which may occur in the vicinity of the project area. Because of its proximity to the Powder River and the potential for available roost sites, long-eared myotis may occur in the Gauge project area.

3.3.7.2.18. Townsend's Big-eared Bat

The affected environment for Townsend's big-eared bat is discussed in the PRB FEIS on pg. 3-189. In addition to being listed as a BLM WY sensitive species, Townsend's big-eared bat is listed as a WGFD SGCN, with a rating of NSS2, because populations are restricted in distribution, they are experiencing ongoing significant loss of habitat, and they are sensitive to human disturbance. Townsend's big-eared bats occur in sagebrush and other shrublands, and roosts include rock outcrops and buildings, which occur in the vicinity of the project area. It may be limited to areas with reliable, accessible sources of drinking water (Hester and Grenier 2005), such as the Powder River. Foraging areas include riparian corridors (Hester and Grenier 2005). Townsend's big-eared bat may occur in the project area because of its proximity to potential roost sites and a foraging area along the Powder River.

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 3.6 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
2008*	10	0	0	0

*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 Wyoming Department of Environmental Quality (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 mostly within the Pumpkin Creek drainage. A small area within the northern portion of the POD is within the headwaters of the Beaver Creek drainage. Major tributaries coursing through the area include North Prong Pumpkin Creek, Middle Prong Pumpkin Creek and Nut Creek.

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 CBNG 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 72 registered stock and domestic water wells within ½ mile of a federal CBNG producing well in the POD with depths ranging from 16 to 2199 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 mostly within the Pumpkin Creek drainage, except for the northernmost portion of the POD area which is located within the Beaver Creek drainage. Both are tributaries to the Upper Powder River watershed. The tributaries in 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 deeper channels with well-formed floodplains. Some channels are incised into the landscape with steep, erosive banks. The main channels of Pumpkin Creek and Beaver Creek were historically intermittent (flowing only at certain times of the year when it receives water from alluvial groundwater, springs, or other surface source – PRB FEIS Chapter 9 Glossary). Reaches of both Pumpkin Creek and Beaver Creek downstream of the POD boundary have become perrenialized by CBNG discharge water. This condition will persist for some years while gas production is active.

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 identified no natural springs within this POD boundary in the WMP, but one spring was identified in Section 29 T46N R75W on Middle Prong Pumpkin Creek just south of the Medicine CS Federal Com 9 well during onsite visits.

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

3.6. Economics and Recovery of CBNG Resources

Development of this project would have effects on the local, state, and national economies. Based on the estimates in the PRBEIS, the drilling of the 88 proposed wells in the Gauge POD will generate approximately 0.35 billion cubic feet of gas (BCFG) per well, over the life of the well. Actual revenue from this amount of gas is difficult to calculate, as there are several variables contributing to the price of gas at any given time. Regardless of the actual dollar amount, the royalties from the gas produced in the Gauge POD would have wide-ranging benefit. The federal government collects 12.5% of the royalties from all federal wells, which helps offset the costs of maintaining the federal agencies that oversee permitting. In addition to generating federal income, approximately 49% of the royalties from the Gauge POD wells would return to the State of Wyoming. This revenue from mineral development has contributed to Wyoming's strong economy for the past several years, allowing for improvements in state funded programs such as infrastructure and education. The development of the Gauge project would also provide revenue locally by employing an array of workers, both directly and indirectly. People would be employed to build the roads and project infrastructure, drill the wells, and maintain and monitor the project area. The large pool of individuals employed to work on the Gauge project would also have the secondary effect of increased demand for goods and services from nearby communities, primarily those of Gillette and Wright.

3.7. Cultural

Class III cultural resource inventory was performed for the Gauge POD prior to on-the-ground project work (BFO project no. 70080020). Quality 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) and the *Wyoming State Historic Preservation Office Format, Guidelines, and Standards for Class II and III Reports*. Seth Lambert, 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 in or near the project area.

Site Number	Site Type	Eligibility
48CA2217	Historic	NE
48CA3541	Prehistoric	NE
48CA6214	Historic	NE
48CA6676	Prehistoric	NE
48CA6698	Prehistoric	NE
48CA6699	Prehistoric/ Historic	NE
48CA6700	Historic	NE
48CA6701	Historic	NE
48CA6717	Historic	NE
48CA6718	Prehistoric/ Historic	NE
48CA6719	Historic	NE

3.8. 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 – ALTERNATIVE C

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

4.1. Alternative C

4.1.1. Vegetation & Soils Direct and Indirect Effects

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

- Mixing of horizons – occurs where construction on roads, pipelines or other activities take place. Mixing may result in removal or relocation of organic matter and nutrients to depths where it would be unavailable for vegetative use. Soils which are more susceptible to wind and water erosion may be moved to the surface. Soil structure may be destroyed, which may impact infiltration rates. Less desirable inorganic compounds such as carbonates, salts or weathered materials may be relocated and have a negative impact on re-vegetation. This drastically disturbed site may change the ecological integrity of the site and the recommended seed mix.
- Loss of soil vegetation cover, biologic crusts, organic matter and productivity. With expedient reclamation, productivity and stability should be regained in the shortest time frame.
- Soil erosion would also affect soil health and productivity. Erosion rates are site specific and are dependent on soil, climate, topography and cover.
- Soil compaction – the collapse of soil pores results in decreased infiltration and increased erosion potential. Factors affecting compaction include soil texture, moisture, organic matter, clay content and type, pressure exerted, and the number of passes by vehicle traffic or machinery. Compaction may be remediated by plowing or ripping.
- Modification of hill slope hydrology.
- An important component of soils in Wyoming's semiarid rangelands, especially in the Wyoming big sagebrush cover type, are biological soil crusts, or cryptogamic soils that occupy ground area not covered with vascular plants. Biological soil crusts are important in maintaining soil stability, controlling erosion, fixing nitrogen, providing nutrients to vascular plants, increasing precipitation infiltration rates, and providing suitable seed beds (BLM 2003). They are adapted to growing in severe climates; however, they take many years to develop (20 to 100) and can be easily disturbed or destroyed by surface disturbances associated with construction activities.

These impacts, singly or in combination, would increase the potential for valuable soil loss due to increased water and wind erosion, invasive/noxious/poisonous plant spread, invasion and establishment, and increased sedimentation and salt loads to the watershed system.
The operator will follow the guidance provided in the Wyoming Policy on Reclamation (IM WY-90-231). The Wyoming Reclamation Policy applies to all surface disturbing activities. Authorizations for surface disturbing actions are based upon the assumptions that an area can and ultimately will be successfully reclaimed. BLM reclamation goals emphasize eventual ecosystem reconstruction, which means returning the land to a condition approximate to an approved "Reference Site" or NRCS Ecological Site Transition State. Final reclamation measures are used to achieve this goal. BLM reclamation goals also include the short-term goal of quickly stabilizing disturbed areas to protect both disturbed and adjacent undisturbed areas from unnecessary degradation. Interim reclamation measures are used to achieve this short-term goal.

Cumulative Effects: Most soil disturbances would be short term impacts with expedient, successful interim reclamation and site stabilization, as committed to by the operator in their POD Surface Use Plan and as required by BLM in COAs. Successful reclamation of disturbed lands is expected in this project area with adequate moisture, use of BMPs and time. For a detailed record of surface disturbance associated with the Gauge POD, see Table 5 in Appendix A.

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 only 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).

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".

4.1.2. Wetland/Riparian

The PRB FEIS assumes that 15% of the impounded water will re-surface as channel flow (PRB FEIS pg 4-74). Re-surfacing water from the impoundments will potentially allow for wetland-riparian species establishment immediately downstream of these structures. Affects to riparian areas along Pumpkin Creek are not anticipated from this project because this stream has been perennialized downstream of the POD area by discharge from other CBNG projects.

4.1.3. Invasive Species

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. Control Methods include physical, biological, and chemical methods:
   Physical methods include mowing during the first season of establishment, prior to seed formation, and hand pulling of weeds (for small or new infestations). Biological methods include the use of domestic animals, or approved biological agents. Chemical methods include the use of herbicides, done in accordance with the existing Surface Use Agreement with the private surface owner.

2. Preventive practices:
   Certified weed-free seed mixtures will be used for re-seeding, and vehicles and equipment will be washed before leaving areas of known noxious weed infestations.

3. Education:
   The company will provide periodic weed education and awareness programs for its employees and contractors through the county weed districts and federal agencies. Field employees and contractors will be notified of known noxious weeds or weeds of concern in the project area.

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.

4.1.4. Cumulative Effects

The PRB FEIS stated that cumulative impacts to soils could occur due to sedimentation from water erosion that could change water quality and fluvial characteristics of streams and rivers in the sub-

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

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

- They are proportional to the actual amount of cumulatively produced water in the drainage, which is approximately 20.3% 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 Gauge POD proposes that produced water will be fully contained and therefore will not contribute significantly to flows downstream.

No additional mitigation measures are required.

4.1.5. Wildlife

4.1.5.1. Big Game Direct and Indirect Effects

Under the environmentally preferred alternative,Winter-Yearlong range for pronghorn antelope and Yearlong and Winter-Yearlong range for mule deer will be impacted. This habitat would be directly disturbed with the construction of wells, reservoirs, pipelines and roads. Table 5 of Appendix A summarizes the proposed activities; items identified as long term disturbance would be direct habitat loss. Short-term disturbances also result in direct habitat loss; however, they should provide some habitat value as these areas are reclaimed and native vegetation becomes established.

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

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

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

Reclamation and other 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.

4.1.5.1.1. 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.

4.1.5.2. Aquatics Direct and Indirect Effects

Water produced from the project wells will be contained in a series of on channel reservoirs. Yates will manage this project so that infiltration and evaporation losses from the reservoirs will consume the produced water. Reservoirs shall only discharge coincident with the occurrence of overtopping during a storm event, according to the Gauge POD water management plan December 21, 2007 (page 3 of 11). The primary drainage within the project area is drained by tributaries (North Prong Pumpkin creek, Middle Prong Pumpkin creek, and Nut Creek) of Beaver Creek. If a reservoir were to discharge, it is likely that the produced water will reach a fish-bearing stream and that downstream species would be affected.

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

4.1.5.2.1. 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. No additional mitigation measures are required.

4.1.5.3. Migratory Birds Direct and Indirect Effects

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

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

Reclamation activities that occur in the spring may be detrimental to migratory bird survival. Those species that are edge-sensitive will be displaced further away from vegetative edges due to increased human activity, causing otherwise suitable habitat to be abandoned. If the interior habitat is at carrying capacity, then birds displaced from the edges will have no place to relocate. One consequence~~s~~ of habitat fragmentation is a geometric increase in the proportion of the remaining habitat that is near edges (Temple 1986). In severely fragmented habitats, all of the remaining habitat may be so close to edges that

no interior habitat remains (Temple and Cary 1988). Over time, this will lead to a loss of interior habitat species in favor of edge habitat species. Other migratory bird species that utilize the disturbed areas for nesting may be disrupted by the human activity and nests may be destroyed by equipment.

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

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

4.1.5.3.1. 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. No additional mitigation measures are required.

4.1.5.4. Raptors Direct and Indirect Effects

Scientific studies have shown that human activities in close proximity to active raptor nests may interfere with nest productivity. Romin and Muck (1999) found that activities within 0.5 miles of a nest are prone to cause adverse impacts to nesting raptors. If project activities occur during nesting, they could be sufficient to cause adult birds to abandon the nest and their chicks for the duration of the activities. This absence can lead to overheating or chilling of eggs or chicks. Prolonged disturbance can also lead to the

abandonment of the nest by the adults. Both actions can result in egg or chick mortality. In addition, routine human activities near these nests can draw increased predator activity to the area and increase nest predation.

The presence of overhead power lines may impact foraging raptors. Raptors forage opportunistically throughout the Powder River Basin. Power poles provide attractive perch sites in areas where mature trees and other natural perches are lacking. From May 2003, through December 28, 2006, US Fish and Wildlife 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 Avian Power Line Interaction Committee (APLIC) suggestions pose an electrocution hazard for eagles and other raptors perching on them; the Service has developed additional specifications improving upon the APLIC suggestions. Constructing power lines to the APLIC suggestions and Service standards minimizes but does not eliminate electrocution risk.

To reduce the risk of decreased productivity or nest failure, the BLM BFO requires a one-half mile radius timing limitation during the breeding season around active raptor nests and recommends all infrastructure requiring human visitation to be located in such a way as to provide an adequate biologic buffer for nesting raptors. During the onsite, staked well locations were moved and agreed upon (Yates and BLM).

From the staked well location, the well stakes were moved out of line of sight from raptor nest and to a distance not likely to result in a nest failure. The following adjustments were decided upon during the onsite:

1. Watermelon CS Fed Com. # 10, moved well out of line of sight of a hawk nest.
2. Circumference CS Fed # 1, moved well out of line of sight of hawk nest.
3. Isosceles CS Fed # 21, moved well out of line of sight of hawk nest.
4. Pythagorean CS Fed # 1, moved well out of line of sight of hawk nest.
5. Medicine CS Fed # 9, moved well out of line of sight of hawk nest.
6. Settee CS Fed # 1, moved well out of line of sight of hawk nest.

Table 4.1 Proposed and existing infrastructure within 0.5 mile of documented raptor nests within the Gauge POD project area.

BLM ID	AMOUNT AND TYPE OF INFRASTRUCTURE PROPOSED AND EXISTING WITHIN 0.5 MILES OF RAPTOR NEST
651	Well: 28, 29, and 30 Isosceles, 1Pythagorean Overhead Power: 1 mile Access road: 1.6 miles Impoundments: Shatter and Shock
655	Well: 1&2 Isosceles, 9 Line, 1 Conic, and 3 Sidwell Overhead Power: Proposed 1.1 mile and 2 meter drop Access road: Proposed 0.8 miles, Existing 1.4 miles
657	Well: 2 existing Access road: 0.8 mile
661	Well: 10 Watermelon
665	Well: 1Pythagorean, 29 Isosceles, 22 Isosceles, 1 Circumference Impoundment: Bootleg, Halftime, Fumble Overhead Power: existing 0.5mile, proposed:0.7 mile Access road : 2 miles
669	Access road & Utility corridor: 0.5 miles
670	Access road & Utility corridor: 0.25 miles
675	Well: 2&3 Palookaville Impoundment: Red Leg Access road: Proposed 0.3 miles, Existing 0.4 mile
1396	Well: 18,19,26 & 22 Isosceles, and 1 Circumference Overhead Power: Existing 0.3 mile, Proposed 1.5 mile and 3 meter drops Impoundment: Halftime, Skunk, Fumble, Throw, and Pass Access road: 1.8 miles
1401	Well: 19,21 & 22 Isosceles, 1 Circumference, and 1 Parabola Overhead Power: Existing 0.7 mile, Proposed0.6 mile and 1 meter drops Impoundment: Halftime, Skunk, Fumble, Throw, Catch, Pass, and Toss Access road: 2.5 miles
1402	Well: 1 Parabola, 1 line, 10 & 11 Line, 1 Zuccini, Impoundment: Touchdown Overhead Power: existing 0.4mile Access road: 1.5 miles
1433	Well: 33 Isosceles Impoundment: Chase Access Road: Existing road: 1.5 mile
1942	Utility Corridor: 0.1 mile
2281	Well: 8, 10&16 Isosceles

BLM ID	AMOUNT AND TYPE OF INFRASTRUCTURE PROPOSED AND EXISTING WITHIN 0.5 MILES OF RAPTOR NEST
	Overhead Power: Proposed 0.3 mile and 1 meter drop Access road: Proposed 0.8 miles, Existing 1.5 miles
2284	Well: 12,13, & Isosceles Access road: Proposed 0.3 miles, Existing 0.6 mile Overhead Power: 0.5 mile and 1meter drop Impoundment: Innes Utility Corridor:0.3 mile
2285	Well: 12&13 Isosceles, and 7 Medicine Access road: Proposed 0.3 miles, Existing 0.6 mile Overhead Power: 0.3 mile and 1meter drop
2286	Well: 12 Isosceles, and 7 Medicine Access road: Proposed 0.2 miles, Existing 0.6 mile
2287	Well: 1 Outrigger Impoundment: Purple Cliff Access road: Proposed 0.1 miles
2289	Well: 2&3 Palookaville Impoundment: Red Leg Access road: Proposed 0.3 miles, Existing 0.4 mile
2290	Well: 8 Palookaville, 2&4Medicene, 1Prescription Impoundment: Channel Access road: Proposed 0.3 miles, Existing County Road:1 mile Overhead Power: Proposed 1.2 mile and 2 meter drops
3707	Wells: 1 Magnitude, 2 Magnitude Impoundment: Olive Access roads: 0.4 miles
3708	Wells: 1 Magnitude, 2 Magnitude Impoundment: Olive Access roads: 0.3 miles
3886	Well: 1 Outrigger Impoundment: Purple Cliff Access road: Proposed 0.4 miles
3998	Well: 12&13 Medicine, 5 existing wells Overhead Power: 0.7 mile and 2 meter drops Access Road: Existing road: 2.5 mile, Proposed 0.14 mile
4015	Wells: 1 Magnitude, 2 Magnitude Impoundment: Olive Access roads: 0.4 miles
4089	Wells: 9&10 Medicene Access road: 1.1 mile
4093	Well: 2&3 Palookaville Impoundment: Red Leg Access road: Proposed 0.2 miles, Existing 0.3 mile
4764	Well: 24 Isosceles Access road: Existing 0.1 miles
4947	Utility Corridor: 0.1 mile
5052	Well: 1 Outrigger Impoundment: Purple Cliff Access road: Proposed 0.1 miles

BLM ID	AMOUNT AND TYPE OF INFRASTRUCTURE PROPOSED AND EXISTING WITHIN 0.5 MILES OF RAPTOR NEST
5053	Well: 1 Outrigger Impoundment: Purple Cliff Access road: Proposed 0.4 miles
5054	Well: 1&2 Outrigger Impoundment: Purple Cliff Access road: Proposed 0.5 miles, Existing 0.4 mile
5055	Well: 1,2,5,6,&9 Isosceles Overhead Power: Proposed 0.3 mile and 1 meter drop Access road: Proposed 0.2 miles, Existing 1.3 miles
5056	Well: 2,3,&4 Isosceles Access road: Proposed 0.1 miles, Existing 0.9 miles
5057	Well: 27,28, 29, and 30 Isosceles, 1Pythagorean Overhead Power: 0.7 mile Access road: 1.8 miles
5058	Well: 28, 29, and 30 Isosceles, Impoundments: Shatter and Shock Overhead Power: 1 mile Access road: 1.6 miles Impoundments: Shatter and Shock
5059	Well: 1Pythagorean, and 2 existing Overhead Power: 0.5 mile Impoundments: Shatter and Shock Access road: 1.8 miles
5060	Well: 28, 29, and 30 Isosceles, 1Pythagorean Overhead Power: 1 mile Access road: 1.6 miles Impoundments: Shatter and Shock
5061	Well: 1Pythagorean, and 2 existing Overhead Power: 0.5 mile Impoundments: Shatter and Shock Access road: 2 miles
5062	Well: 1 Parabola, 1 line, 10 & 11 Line, 1 Zuccini, Impoundment: Touchdown Overhead Power: existing 0.4Mile Access road: 1.5 miles
5063	Well: 33 Isosceles Impoundment: Chase Access Road: Existing road: 1.5 mile
5064	Well: 3 existing Cross country Utility corridor: 0.8 mile Access road:1.8
5065	Cross country Utility corridor: 0.5 mile Well:2 exisitng Access road: 1.5 miles
5066	Well: 2 existing Access road and Utility corridor: 1.5 mile
5067	Well: 2 existing Access road: 0.8 mile
5068	Well: 2 existing

BLM ID	AMOUNT AND TYPE OF INFRASTRUCTURE PROPOSED AND EXISTING WITHIN 0.5 MILES OF RAPTOR NEST
	Access road: 0.8 mile
5069	Wells: 9&10 Medicene, and 1 existing well Access road: 1.1 mile
5070	Well: 6 Existing wells Overhead Power: 0.7 mile and 2 meter drops Access Road: Existing road: 1.9 miles
5072	Wells: 10 Watermelon, 12 Line Access roads: 0.7 mile
5073	Well: 2 Touchstone
5074	Utility Corridor: 0.7 miles
5075	Utility Corridor: 0.5 miles
5082	Well: 1Pythagorean, and 2 existing Overhead Power: 0.5 mile Impoundments: Shatter and Shock Access road: 1.8 miles
5795	Well: 24 Isosceles Access road: Existing 0.1 miles
6329	Wells: 9&10 Medicene Access road: 1 mile
6433	Overhead Power: Proposed 0.15 mile Access road: Proposed 0.2 miles, Existing 1.1 miles
6438	Well:1 Settee well, 3 Existing wells Overhead Power: 0.2 mile and 1 meter drop Access Road: Existing road: 0.5 miles Impoundment: Shutter
6439	Well: 12&13 Medicine, 5 existing wells Overhead Power: 0.4 mile and 1 meter drop Access Road: Existing road: 1.5 mile, Proposed 0.14 mile
6441	Wells: 10 Watermelon, 1Touchstone, 12 Line Access roads: 1 mile Overhead Power: 1 meter drop
10602 (8379)	Wells: 7 Exiting wells, 1 Settee Overhead Power: 0.5 mile and 1 meter drop Access Road: Existing road: 1.4 miles Impoundment: Shutter

Nests that have been inactive in the past several years and/or nests that are rated in either poor condition or gone, as well as species observed as unknown are as follows:
655,657,665,669,670,675,676,1396,1401,1402,1433,1941,1942,2284,2285,2286,2287,2289,2290,3707,3886,3997,3998,4015,4089,4093,4594,4595,4764,5053,5054,5055,5056,5057,5058,5059,5060,5061,5062,5063,5064,5065,5066,5068,5069,5070,5073,5074,5075,5082,5795,6329,6356,6358,6433,6434,6435,6436,6437,6439,6441, and 8379.

- Swainson's hawk nest 3708 is reported active in 2006-2007, and active incubating in 2009. The nest is located approximately 150 ft from an existing two track. The two-track will not service activity associated from the Gauge POD. The Olive impoundment is 0.2 miles west of the nest. The outfall associated with the impoundment is on the west side of the impoundment. It is likely the nest will not be impacted from the Gauge POD.

- Ferrruginous hawk nest 4947 is reported active in 2008 with 2 young. The nest is located 0.2 miles from an existing two-track that will not service activities associated with the Gauge POD. A proposed buried utility corridor is proposed along side of the existing two-track road. It is unlikely the proposed buried utility will impact the nest.

- Red-tailed nest 5052 is reported active in 2007 -2008. The nest is approximately 300 north of an existing two-track road. Proposed well #1 Outrigger and impoundment Purple Cliff is located 0.2 miles west, out of line of sight from the nest. It is unlikely the proposed infrastructure will impact the nest.

- Ferruginous hawk nest 5067 is reported active last year with 2 chicks. The nest is located approximately 0.45 miles from two existing wells and 0.3 miles from and exiting mineral production road. The nest is out of line sight from all existing infrastructure. The proposed buried utility/pipeline will be corridor with the existing road and it is unlikely that the nest will be impacted from the Gauge POD.

- Ferruginous hawk nest 6438 is reported active in 2009 and failed. The nest located approximately 245ft west of the well #1 Settee and approximately 800ft from the Shutter impoundment. The proposed well was moved approximately 1,300ft south to avoid impacts to the nest. The shutter impoundment will receive state water regardless of the approval of the Gauge POD. Five existing wells to the east of the nest and an access road 0.3 miles north of the nest may have compromised the success of the nest in 2009, therefore it is likely the nest has already been impacted.

Likely to be impacted

- Ferruginous hawk nest 5072 is reported active/incubating during 2009. The proposed well #10 Watermelon is approximately 0.26 miles from the nest. The well was relocated out of line of sight approximately 450ft southwest and within a biological buffer. Well spacing limited a move beyond a biological buffer, therefore it is likely the nest will be used in the future.

- Ferruginous hawk nest 1407 was reported inactive since 2007. The nest is in good condition. Five wells and seven impoundments are proposed within 0.5 miles of the nest. The increase in traffic, human presence at well and impoundments, maintenance at each well location and each impoundment will more than likely impact the nest and territory.

- Red-tailed hawk nest 2281 is reported active from 2004-2008, nest is in good condition in 2009. The nest is located 0.25 miles from the #8 Isosceles well and 0.4 miles from the #16 Isosceles well. Both wells are in line of sight of the nest. Proposed OHP 0.15 miles south from the nest will more than likely increase electrocution and collision potential. The increase in traffic, human presence at each well and maintenance at each well location will more than likely impact the nest.

Off site Mitigation

- Ferruginous hawk nest 10602 was known during spring of 2008 and reported in 2009 as inactive. A state well was drilled within 100 yards of the nest during 2008. The nest is located within the Shutter impoundment boundary. It is likely that the nest has been compromised with existing development. The shutter impoundment will receive state water regardless of the approval of the Gauge POD. To reduce impacts to the species, Yates has committed to offsite mitigation. Yates will have J&S place an artificial nesting structure on private land (South ½ Section 30

T46N:R75W and/or West ½ Section 24 T46N:R76W) outside of a biological buffer distance from human activity. (See project file for detail information provided in correspondence letter dated April,1 2009).

4.1.5.4.1. Raptor Cumulative Effects

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

4.1.5.5. 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. Threatened and Endangered Species potentially affected by the proposed project area are further discussed following the table.

4.1.5.6. Threatened and Endangered Species

Table 4.2 Summary of Threatened and Endangered Species Habitat and Project Effects.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Endangered				
Black-footed ferret (*Mustela nigripes*)	Black-tailed prairie dog colonies or complexes > 1,000 acres.	NP	NE	Suitable habitat of insufficient size.
Threatened				
Ute ladies'-tresses orchid *(Spiranthes diluvialis)*	Riparian areas with permanent water	NP	NE	Suitable habitat is not present.
Blowout Penstemon(*Penstemon haydenii)*	Active sand dunes	NP	NE	Suitable habitat is 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
LAA Likely to adversely affect
NE No Effect.
NLAA May Affect, not likely to adversely affect individuals or habitat.

4.1.5.6.1. Black-Footed Ferret Direct and Indirect Effects

Because the black-tailed prairie dog colonies within and adjacent to the Gauge POD project area are of insufficient size for supporting ferrets and are isolated from any prairie dog complexes, implementation of the proposed development will have "***no effect***" on the black-footed ferret.

4.1.5.6.2. 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.

Reservoir seepage may create suitable habitat if historically ephemeral drainages become perennial, however no historic seed source is known to occur within the project area. Implementation of the proposed coal bed natural gas project will have "***no effect***" on the Ute ladies'- tresses orchid.

4.1.5.6.3. Blowout Penstemon

No known Blowout penstemon habitat occurs within the Gauge POD. Implementation of the proposed coal bed natural gas project will have "***no effect***" on the Ute ladies'- tresses orchid.

4.1.5.7. 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 Endangered Species Act 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."

4.1.5.7.1. Prairie dog colony obligates Direct and Indirect Effects

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. Displacement 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.

4.1.5.7.2. Sagebrush obligates Direct and Indirect Effects

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 remnants surrounded by unusable environments (Urban and Shugart 1984; Fahrig & Paloheimo 1988). Populations of sagebrush-obligate species decline because areas of suitable habitat decrease (Temple & Cary 1988), because of lower reproduction, and/or because of higher mortality in remaining habitats (Robinson 1992; Porneluzi et al. 1993). Fragmentation of shrubsteppe has the further

potential to affect the conservation of shrub-obligate species because of the permanence of disturbance (Knick and Rotenberry 1995). Several decades are required to reestablish ecologically functioning mature sagebrush communities. Due to this, sagebrush obligate species may not return even after habitat reestablishment.

Table 4.3 Summary of Sensitive Species Habitat and Project Effects.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Amphibians				
Northern leopard frog (Rana pipiens)	Beaver ponds, permanent water in plains and foothills	S	MIIH	Additional water will affect existing waterways.
Spotted frog (Ranus pretiosa)	Mountain 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 occupied habitat & overhead power.
Brewer's sparrow (Spizella breweri)	Basin-prairie shrub	K	MIIH	Sagebrush cover will be affected.
Burrowing owl (Athene cunicularia)	Grasslands, basin-prairie shrub	S	MIIH	Occupied habitat will be impacted.
Ferruginous hawk (Buteo regalis)	Basin-prairie shrub, grasslands, rock outcrops	K	WIPV	Active nests present. Species is more sensitive to human disturbance than other hawk species. Species is declining in the basin according to BLM data base(2009), therefore current mitigation measures (½ mi buffer and out of line of sight from infrastructure) are not effective.
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	K	MIIH	Sagebrush cover will be affected.
Long-billed curlew (Numenius americanus)	Grasslands, plains, foothills, wet meadows	S	NI	Habitat not present.
Mountain plover (Charadrius montanus)	Short-grass prairie with slopes < 5%	S	NI	Habitat not present.

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
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.
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	K	MIIH	Sagebrush cover will be affected.
Trumpeter swan (Cygnus buccinator)	Lakes, ponds, rivers	NP	NI	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	S	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	S	NI	Habitat not present.
Long-eared myotis (Myotis evotis)	Conifer and deciduous forest, caves and mines	S	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	MIIH	Habitat not present.
Townsend's big-eared bat (*Corynorhinus townsendii*)	Caves and mines.	S	NI	Habitat not present.
Sage sparrow (Amphispiza billneata)	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Sagebrush cover will be affected.
Sage thrasher	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Sagebrush cover will be

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
(Oreoscoptes montanus)				affected.
Trumpeter swan (Cygnus buccinator)	Lakes, ponds, rivers	NP	NI	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
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

4.1.5.7.3. Bald eagle Direct and Indirect Effects

Based on the raptor nesting and bald eagle winter roost surveys and suitable habitat, it is unlikely bald eagles nest within the Gauge POD project area, although there is habitat and prey base present. Bald eagles have been observed within the four three years in sections 9 and15 along North Prong Creek, however no more than two birds have been observed in the same tree more than once. CBNG activities in close proximity to a nest or roost may lead to nest or roost abandonment; to reduce the potential for nest or roost site abandonment, the BLM provides a permanent ½ mile buffer and a 1 mile temporal buffer around bald eagle nests and roosts. This and other steps have been taken to minimize loss of bald eagles such as buried power lines, and roads designed for minimal speeds. The proposed project should not impact bald eagle nesting or winter roosting provided Yates complies with all mitigation.

There are 4 miles of existing overhead three-phase distribution lines within the project area. The wire spacing is likely in compliance with the Avian Power Line Interaction Committee's (1996) suggested practices and with the Service's standards (USFWS 2002); however other features may not be in compliance. Yates is proposing an additional 9 miles of overhead three-phase distribution lines.

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 one 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 twenty-seven 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. Bald eagles are sensitive to human activities and tend to seek nesting and roosting areas away from human disturbance.

4.1.5.7.4. Black-tailed prairie dog Direct and Indirect Effects

The disturbance to black-tailed prairie dog colonies within the Gauge POD is minimal a small portion of disturbance is from existing access (ranch two-track) roads. A proposed buried utility corridor next to an existing road will impact 0.4 acres of the existing 1.0 acre prairie dog colony. The prairie dog colonies are located on private property within an existing access road and the landowner did not want to avoid prairie

dog colonies within the Gauge POD. Therefore, BLM did not propose relocating the utility corridor to reduce impacts to prairie dogs and other species dependent upon prairie dog colonies.

4.1.5.7.5. Burrowing owl Direct and Indirect Effects

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

The USDAFS Thunder Basin National Grasslands in Campbell County, WY, whom cooperated with the BLM in the creation of the 2003 PRB EIS, recommends a 0.25 mile timing restriction buffer zone for burrowing nest locations during their nesting season (April 15 to August 31). Instruction Memorandum No. 2006-197, directs the field offices to "use the least restrictive stipulations that effectively accomplish the resource objectives or uses." Alteration of the general raptor nest timing limitation (Feb 1 to July 31) to a more specific burrowing owl nesting season timing limitation will effectively reduce the vulnerability of owls to collision, while shortening the timing restriction period from six months to four and one half months, and the distance from 0.5 mile to 0.25 mile. (See Chapter 3 for breeding, nesting, and migration chronology).

4.1.5.7.6. Greater sage-grouse Direct and Indirect Effects

Nine active leks are within four miles of the Gauge POD boundary. The proposed action will adversely impact breeding, nesting and brood rearing, as well as winter habitat. According to the Surface Use Plan submitted by Yates for the Gauge POD, proposed project elements that are anticipated to negatively impact grouse are approximately: CBNG wells on 88 locations, 12.9 miles of new improved roads, 2.2 miles of new pipelines not within a corridor, 9.2 miles of new 3-phase overhead power, 27 new reservoirs, increased vehicle traffic on established roads and increased noise from compressor stations.

Throughout the onsite process, Yates' representative made adjustments to the well locations and access routes to mitigate impacts to sage grouse. The changes from the onsite follow:

1. Palookaville CS Fed #4, moved pit to avoid sagebrush.
2. Isosceles CS Fed # 17, moved well to reduce surface disturbance and avoid sage-grouse habitat.
3. Outrigger CS Fed # 2, changed access road to follow existing oil road.
4. Barometer CS Fed #1, moved the utility corridor to follow an existing road.

The Innes lek is the most productive lek within four miles of project elements. A condition of approval limiting travel on this road between 9AM and 3 PM, March 1 to June 15 each year would increase the potential for grouse breeding on and nesting near the lek. To further minimize impacts to sage-grouse,
BLM will also implement a timing limitation on all activities within identified nesting habitat across the project area. Because nesting grouse have been shown to avoid infrastructure by up to 0.6 miles, the intent of this timing restriction is to decrease the likelihood that grouse will avoid these areas and increase habitat quality by reducing noise and human activities during the breeding season.
Using habitat affected by the proposed action, surface-disturbing activities will be restricted during sage-grouse breeding and nesting periods (March 1 to June 15) for project components located in sage-grouse habitat for the life of the project. These restrictions would affect T46NR75W, Sections: 1,2,4,5,6,7,8,9,16,17,18,19,20,21,22, 29, 30, 31 and 32. T46N R76W, Sections: 24, 27, 35 and 36. T45N R75W, Sections: 4, 5, 9. This restriction provides a more accurate application of protection than the original 2-mile timing restriction from the BFO RMP and the 2003 PRB Oil & Gas Project EIS.

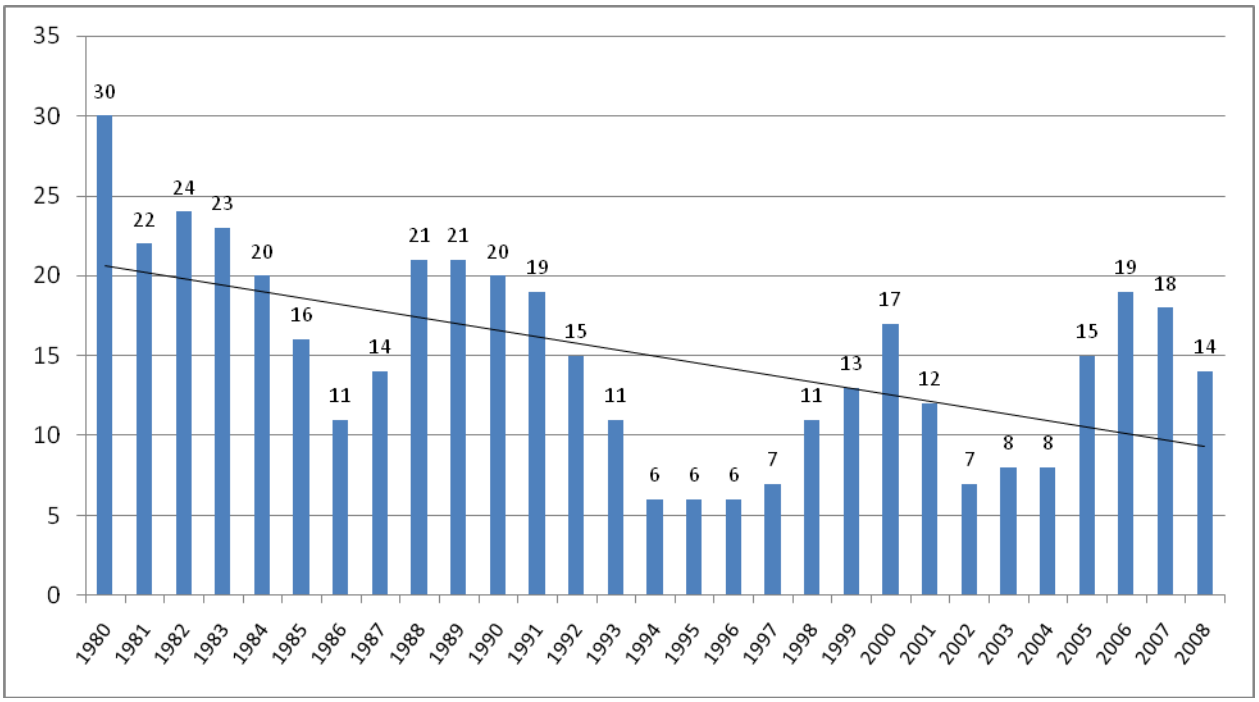
Direct and indirect impacts to sage-grouse are discussed in more detail in the PRB FEIS on pg. 4-257 to 4-273.

4.1.5.7.6.1. Greater sage-grouse Cumulative Effects

Recent research suggests that the cumulative and synergistic effects of current and foreseeable CBNG development within the vicinity of the project area are likely to impact the local sage-grouse population, cause declines in lek attendance, and may result in local extirpation. The cumulative impact assessment area for this project encompasses a four mile radius from the seven sage-grouse leks that occur within four miles of the project boundary. Analysis of impacts up to four miles was recommended by the State Wildlife Agencies' Ad Hoc Committee for Consideration of Oil and Gas Development Effects to Nesting Habitat (2008).

The sage-grouse population within northeast Wyoming has been exhibiting a steady long term downward trend, as measured by lek attendance (WGFD 2008b). Figure 3 illustrates a ten-year cycle of periodic highs and lows. Each subsequent population peak is lower than the previous peak. The research described below suggests that these declines may be a result, in part, of CBNG development in this region of Wyoming and that the leks within the cumulative impact assessment area are experiencing similar declines.

Figure 1 Average number of male sage-grouse per active lek within the WGFD Sheridan region, 1980-2007



Research has shown that declines in lek attendance are correlated with oil and gas development. 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). Several studies have shown that well density can be used as a metric for evaluating impacts to sage-grouse, as measured by declines in lek attendance (Braun et al. 2002, Holloran et al. 2005, and Walker et al. 2007). These studies indicated that oil or gas development exceeding approximately one well pad per square mile, resulted in calculable impacts on breeding populations, as measured by the number of male sage-grouse attending leks (State Wildlife Agencies' Ad Hoc Committee for Sage-Grouse and Oil and Gas Development 2008).

There are currently 1,852 wells (Wyoming Oil and Gas Conservation Commission [WOGCC] 08/2009) within the cumulative impact assessment area, an area of 166 square miles, which amounts to a density of approximately 7.15 wells per square mile. Currently, there are approximately 890 proposed wells (Automated Fluid Minerals Support System [AFMSS] 08/2009) (including the 88 from this project) within four miles of the seven leks. With the addition of the 890 proposed wells that are not associated with this proposed action, the well density within four miles of the leks increases to 10.2 wells per square mile. With approval of alternative C (88 proposed well locations) the well density could increase to 10.6 wells per square mile, well above the one well per square mile recommendation by the State Wildlife Agencies' Ad Hoc Committee for Sage-Grouse and Oil and Gas Development.

In its *Recommendations for Development of Oil and Gas Resources within Important Wildlife Habitats* (2009), WGFD categorized levels of oil and gas development into thresholds that correspond to moderate, high, and extreme impacts to habitat effectiveness for various species of wildlife, based on well pad densities and acreages of disturbance. All three levels of impact result in a loss of habitat function by directly eliminating habitat; disrupting wildlife access to, or use of habitat; or causing avoidance and stress to wildlife. Impacts to sage-grouse are categorized by number of well pad locations per square mile within two miles of a lek and within identified nesting/brood-rearing habitats greater than two miles from a lek. Moderate impacts occur when well density is between one and two well pad locations per square mile or where there is less than 20 acres of disturbance per square mile. High impacts occur when well density is between two and three well pad locations per square mile or when there are between 20 and 60 acres of disturbance per square mile. Extreme impacts occur when well density exceeds three well pad locations per square mile or when there are greater than 60 acres of disturbance per square mile. Extreme impacts mean those where the function of an important wildlife habitat is substantially impaired or lost.

Well # 1 Isosceles in Sec 7 T46N R76W is located less than one mile from the Gilkie Ranch lek. There are currently 62 wells within two miles of this lek, an area of 12.6 square miles, for a total well density of 4.9 wells per square mile, indicating that impacts to this lek as a result of existing oil and gas development are considered by WGFD to be extreme. Forty-six additional wells are proposed within two miles of the Gilkie Ranch lek,13 from this project. If only 7of the 13 proposed Gauge POD wells were to be drilled, well density would increase to 5.4 wells per square mile within two miles of the Gilkie Ranch lek. With the addition of the 29 wells not associated with the Gauge POD project, well density within two miles of this lek would increase to 7.5 wells per square mile, well above the threshold of 3 wells per square mile for extreme impacts. Gauge POD proposed wells will impact the remaining continuous habitat connectivity to the west portion of the lek. See figure 2 below.

Four wells: 1 Dave (Sec 27 T46N R76W), 10 Medicine, 11 Medicine (Sec 29 T46N R75W), and 12 Medicine (Sec 31 T46N R75W) are located less than one mile from the Innes lek. There are currently 27 wells within two miles of this lek, an area of 12.6 square miles, for a total well density of 2.1 wells per square mile, indicating that impacts to this lek as a result of existing oil and gas development are considered by WGFD to be high. Forty-seven additional wells are proposed within two miles of the Innes lek, 19 are from this project. If only 13 of the 19 proposed Gauge POD wells were to be drilled, well density would increase to 3.2 wells per square mile within two miles of the Gilkie Ranch lek. With the addition of the wells not associated with the Gauge POD project, well density within two miles of this lek would increase to 4.4 wells per square mile, well above the threshold of 3 wells per square mile for extreme impacts. The Innes lek has a continuous downward trend of peak male attendance since 1987 when male peak attendance was 70 males compared to 2008 at 22 males. The approval of the wells in Gauge POD will impact habitat with new disturbance to the west, east, south, and north of the lek. See Fig 3 below.

Walker et al. (2007) estimated the extent of CBNG development around leks by buffering wells by 350 m. At well densities of 1 well per 80-160 acres, a 350 m buffer around wells estimated the extent of CBNG development more accurately than larger or smaller buffer sizes. This metric was less sensitive to variation in spacing of wells such as well density and therefore more accurately estimated the total area affected by CBNG development. Figure 2 depicts the extent of CBNG development within two miles of the Gilkie Ranch lek by creating a 350 m buffer around existing wells, approved APDs, and the Triangle Unit Additions 1 wells.

Figure 2 Alternative C - Impacted area within 2 miles of the Gilkie Ranch Lek based on a 350 m buffer around wells

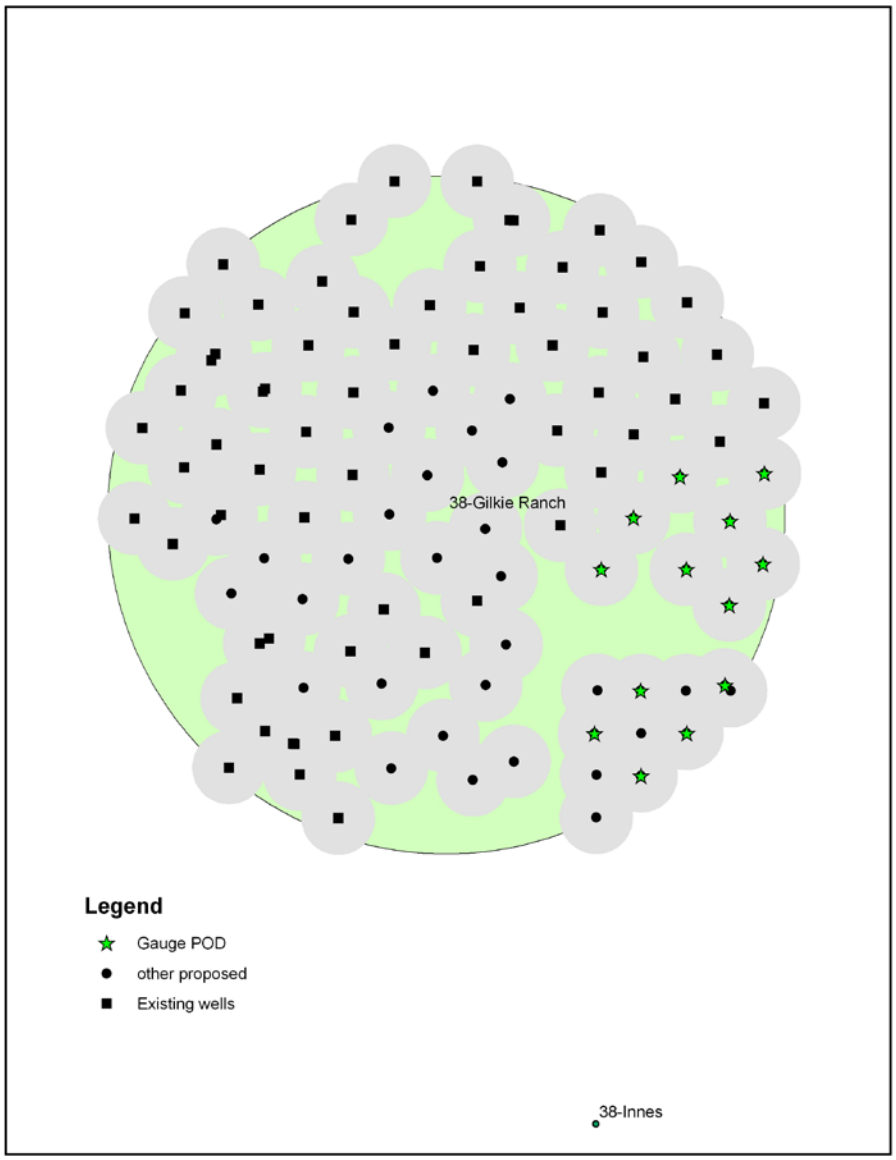
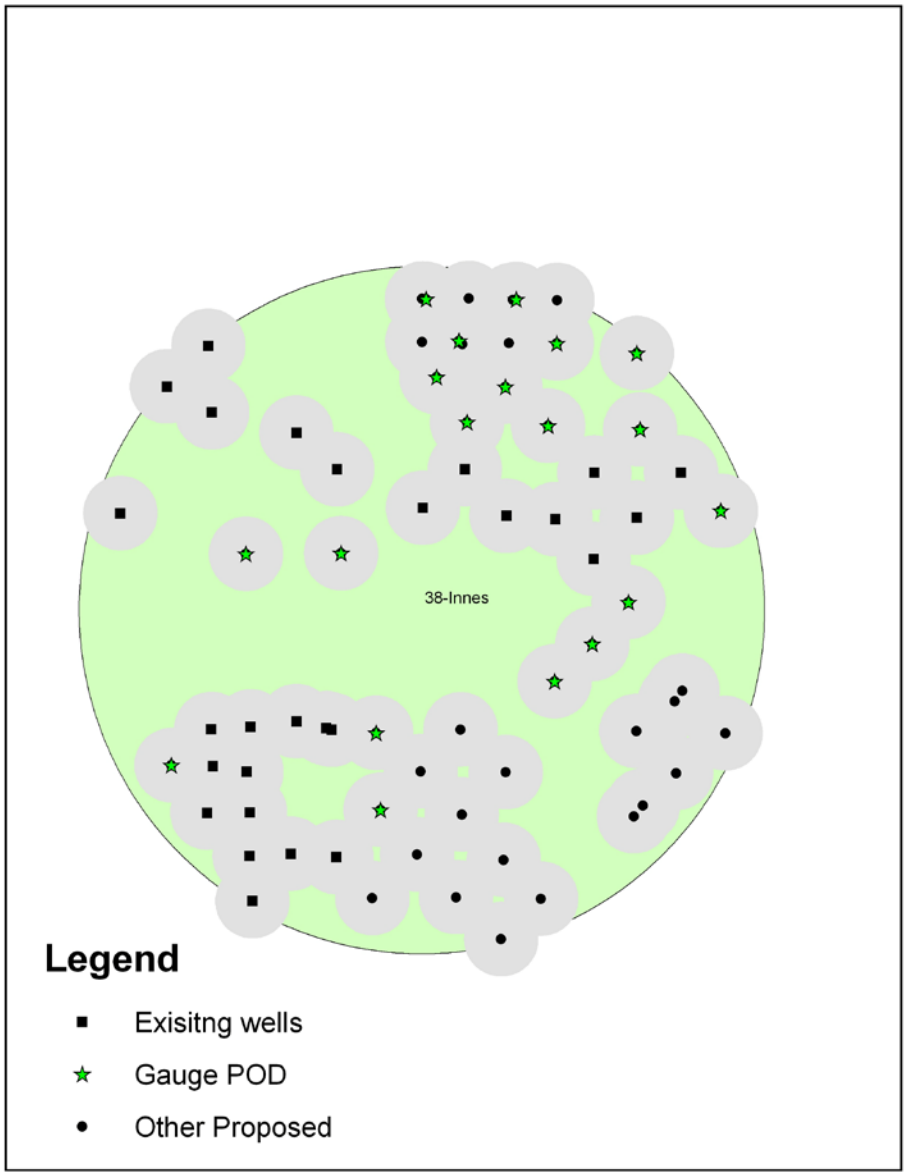


Figure 3 Alternative C - Impacted area within 2 miles of the Innes Lek based on a 350 m buffer around wells



Declines in lek attendance associated with oil and gas development may be a result of a suite of factors including avoidance (Holloran et al. 2005, Holloran et al. 2007, Aldridge and Boyce 2007, Walker et al. 2007, Doherty et al. 2008, WGFD 2009), loss and fragmentation of habitat (Connelly et al. 2000, Braun et al. 2002, Connelly et al. 2004, WGFD 2004a, Rowland et al. 2005, WGFD 2005, Naugle et al. in press), reductions in habitat quality (Braun et al. 2002, WGFD 2003, Connelly et al. 2004, Holloran et al. 2005) and changes in disease mechanisms (Naugle et al. 2004, WGFD 2004b, Walker et al. 2007, Cornish pers. comm.).

The leks within the cumulative impact assessment area have experienced an overall downward trend since 2003, with the exception of the Kaufman Draw lek, which increased from 20 males in 2004 to 76 males in 2007 and then decreased. The lek counts from 2009 were submitted by consultants to BLM and have not been reviewed by WGFD at the time this EA was written. WOGCC data shows that the number of wells

drilled within two miles of the Kaufman Draw lek increased each year between 2006 and 2008. The peak number of males observed at the lek increased from 2004 to 2007 but then declined from 2007 to 2009. This is consistent with patterns described in Walker et al. (2007) where lek attendance initially increased as development encroached, to account for displaced birds, but then declined rapidly as development continued to move through an area.

The BFO Resource Management Plan (BLM 2001) and the PRB FEIS Record of Decision (BLM 2003) included a two-mile timing limitation on surface-disturbing activities around sage-grouse leks. The two-mile measure originated with the Western Association of Fish and Wildlife Agencies (WAFWA) (BLM 2004). Wyoming BLM adopted the two-mile recommendation in 1990 (BLM 1990).

The two-mile recommendation was based on early research which indicated between 59% and 87% of sage-grouse nests were located within two miles of a lek (BLM 2004). These studies were conducted within vast contiguous stands of sagebrush, such as those that occur in Idaho's Snake River plain.

Additional research across more of the sage-grouse's range have since indicated that nesting may occur much farther than two miles from the breeding lek (BLM 2004). Holloran and Anderson (2005), in their Upper Green River Basin study area, reported that only 45% of their sage-grouse hens nested within 1.9 miles of the capture lek. Moynahan and Lindberg (2004) found that only 36% of their sage-grouse hens nested within 1.9 miles of the capture lek. Habitat conditions, and, thus, sage-grouse biology, within the BFO are more similar to Moynahan's north-central Montana study area than the Upper Green River area. Moynahan's study area occurred in mixed-grass prairie and sagebrush steppe, dominated by Wyoming big sagebrush (Moynahan et al. 2007). Recent research in the Powder River Basin 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 (Walker et al. 2007, Walker 2008, Naugle et al. *In press*). Based on these studies, the BLM has determined that a two-mile timing limitation is insufficient to reverse the population decline.

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. A timing limitation does nothing to mitigate loss and fragmentation of habitat and changes in disease mechanisms. Rather than limiting mitigation to only timing restrictions, more effective mitigation strategies may include, at a minimum, burying power lines (Connelly et al. 2000b); 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). Walker et al. (2007) recommend maintaining extensive stands of sagebrush habitat over large areas (at least one mile in size) around leks to ensure sage-grouse persistence. The size of such a no-development buffer would depend on the amount of suitable habitat around the lek and the population impact deemed acceptable. Connelly et al. (2000) recommended locating all energy-related facilities at least two miles from active leks. Other researchers have recommended avoiding areas within four miles of a lek and within areas of mapped nesting and brood-rearing habitat outside the four-mile perimeter (Walker et al. 2007, Walker 2008, Naugle et al. *In press*).

Several guidance documents are available that recommend practices that would reduce impacts of development on greater sage-grouse. These include *Northeast Wyoming Sage-Grouse Conservation Plan* (Northeast Wyoming Sage-grouse Working Group 2006), *Sage-Grouse Habitat Management Guidelines for Wyoming* (Bohne et al. 2007), *Recommendations for Development of Oil and Gas Resources within Important Wildlife Habitats* (WGFD 2009), *Bureau of Land Management National Sage-Grouse Habitat Conservation Strategy* (USDI 2004), and *Greater Sage-Grouse Comprehensive Conservation Strategy* (Stiver et al. 2006).

The PRB FEIS (BLM 2003) states that "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)." Based on the impacts described in the Powder River Basin Oil and Gas Project FEIS and the findings of more recent research, the proposed action is likely to accelerate the decline to male attendance at the eight leks within four miles of the project area, and, potentially, extirpation of the local grouse population within this radius.

4.1.5.7.7. Mountain plover Direct and Indirect Effects

Suitable mountain plover habitat is present, but limited within the project area. The presence of mountain plovers has not been documented within the Gauge project during three surveys. Additional surveys will be conducted annually. See Black-tailed prairie dog Direct and Indirect Effects of this EA for affects to mountain plover 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 pipeline 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).

4.1.5.7.8. 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.

4.2. West Nile Virus Direct and Indirect Effects

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

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

Cumulatively, there are many sources of standing water, beyond CBM discharge, throughout the PRB that would add to the potential for mosquito habitat. Sources include; natural flows, livestock watering facilities, coal mining operations, and outdoor water use and features in and around communities.
BLM will keep monitoring this issue by continuing to consult with the State agencies and the researchers working in the area in order to stay abreast of the most current developments and any need to apply mitigation.

4.3. Water Resources

The operator has submitted a comprehensive WMP for this project. It is incorporated-by-reference into this EA pursuant to 40 CFR 1502.21. The WMP incorporates sound water management practices, monitoring of downstream impacts within the Upper Powder River watershed and commitment to comply with Wyoming State water laws/regulations. It also addresses potential impacts to the environment and landowner concerns. Qualified hydrologists, in consultation with the BLM, developed the water management plan. Adherence with the plan, in addition to BLM applied mitigation (in the form of COAs), would reduce project area and downstream impacts from proposed water management strategies. The operator plans on containing all water produced from this project in on-channel impoundments within the POD area. One discharge point is associated with each structure and all are proposed to be near the high water level of each impoundment. The flow calculations below are based on the 87wells that were analyzed in the WMP and assumes that most deferred wells may eventually be drilled. (Note: an additional proposed well was added later on, making the total number of proposed wells to 88. This additional well will not significantly change the calculation in the water management analysis).

The WDEQ has assumed primacy from United States Environmental Protection Agency for maintaining the water quality in the waters of the state. The Wyoming State Engineer's Office (WSEO) has authority for regulating water rights issues and permitting impoundments for the containment of surface waters of the state.

The maximum water production is predicted to be 22 gpm per well or 1,914 gpm (4.27 cfs or 3,083.5 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. As such, the volume of water resulting from the production of these wells is 2.1% of the total volume projected for 2008. This volume of produced water is also within the predicted parameters of the PRB FEIS.

4.3.1. 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 766 gpm will infiltrate at or near the discharge points and impoundments (1,233 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 16 to 2,199 feet compared to an average top depth of 1,275 feet to the Big George coal zone and 1,600 to the top of the Wyodak coal zone. As mitigation, the operator has committed to offer water well agreements to holders of properly permitted domestic and stock wells within the circle of influence (½ mile of a federal CBNG producing well) of the proposed wells.

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

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

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

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

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. As of April of 2009, approximately 1,999 impoundment sites had been investigated through over 2,272 borings. Of these impoundments, 277 met the criteria to require "compliance monitoring" if constructed and used for CBNG water containment. Only 155 impoundments requiring monitoring are presently being used. As of the first quarter of 2009, only 18 of those monitored impoundments caused a change in the "Class of Use" of the underlying aquifer water.

4.3.1.1. Groundwater Cumulative Effects:

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

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

4.3.2. 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 4.4 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 Historic Data Average at Minimum Flow		 4.76 7.83	 1,797 3,400
WDEQ Quality Standards for Wyoming Groundwater (Chapter 8) Drinking Water (Class I) Agricultural Use (Class II) Livestock Use (Class III)	 500 2,000 5,000	 8	
WDEQ Water Quality Requirements (typical) At discharge point	 5,000	 na	 7,500
Predicted Produced Water Quality Comingled Big George and Wyodak Coal Zones	 1,060	 12.4	 1,690

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 within the WDEQ criteria for agricultural use (2000 mg/l TDS). The quality for the water produced from the Big George target coal zone from these wells is predicted to be similar to the sample water quality collected from a location near the POD. A maximum of 22 gallons per minute (gpm) is projected is to be produced from these 87 wells, for a total of 1,914 gpm for the POD. See Table 4.5.

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

There are 27 discharge points proposed for this project. Only those associated with reservoirs that are eventually built will likely be constructed. 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, 27 impoundments (783 acre-feet) would potentially be constructed within the project area as originally proposed in the WMP and as locations were approved in Alternative C. These impoundments will disturb approximately 122.3 acres including the dam structures. All of these water impoundments would be on-channel reservoirs. Existing impoundments will be upgraded and proposed impoundments will be constructed to meet the requirements of the WSEO, WDEQ and the needs of the operator and the landowner. All water management facilities were evaluated for compliance with best management practices during the onsite.

The PRB FEIS assumes that 15% of the impounded water will re-surface as channel flow (PRB FEIS pg 4-74). Consequently, the volume of water produced from these wells may result in the addition of 287.1 gpm (0.64 cfs) below the lowest reservoir (after infiltration and evapotranspiration losses). The operator has committed to monitor the condition of channels and address any problems resulting from discharge. Discharge from the impoundments will potentially allow for streambed enhancement through wetland-riparian species establishment. Phased reclamation plans for the impoundments will be submitted and approved on a site-specific, case-by-case basis as they are no longer needed for disposal of CBNG water, as required by BLM applied COAs.

Alternative (2A), the approved alternative in the Record of Decision for the PRB FEIS, states that the peak production of water discharged to the surface will occur in 2006 at a total contribution to the mainstem of the Upper Powder River of 68 cfs (PRB FEIS pg 4-86). The predicted maximum discharge rate from these 88 wells is anticipated to be a total of 1,914 gpm or 4.27 cfs to impoundments. Using an assumed conveyance loss of 20% (PRB FEIS pg 4-74) and full containment, the produced water re-surfacing downstream from this action (0.64 cfs) may add a maximum 0.51 cfs to the Upper Powder River watershed flows, or 0.7% of the predicted total CBNG produced water contribution. For more information regarding the maximum predicted water impacts resulting from the discharge of produced water, see Table 4-6 (PRB-FEIS pg 4-85).

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

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

Effluent limits that are representative for WYPDES permits in this area such as those associated with the Pumpkin Creek I POD (WY0055590) listed below:

Total Petroleum Hydrocarbons	10 mg/l max
pH	6.5 to 8.5
TDS	5000 mg/l max
Specific Conductance	7500 mg/l max
Sulfates	3000 mg/l max
Radium 226	1 pCi/l max
Dissolved iron	299.7 µg/l max
Dissolved manganese	629 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 Gauge POD prepared by CBM Associates for Yates Petroleum Company.

4.3.2.1. 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. This data were obtained from the Wyoming Oil and Gas Conservation Commission (WOGCC).

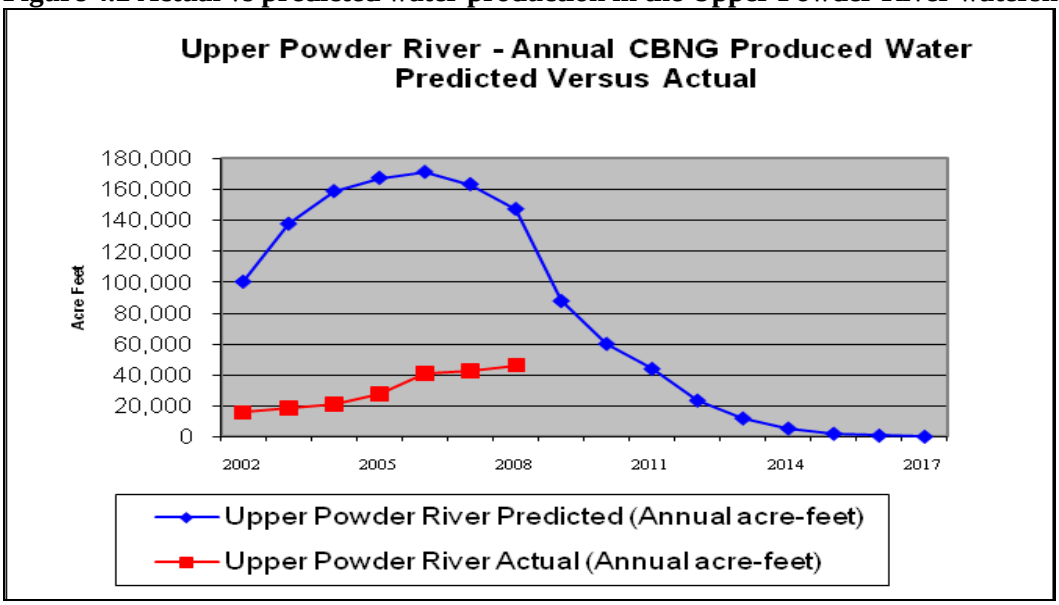
As of December 2008, all producing CBNG wells in the Upper Powder River watershed have discharged a cumulative volume of 212,522 acre-feet of water compared to the predicted 1,047,521 acre-feet disclosed in the PRB FEIS (Table 2-8 page 2-26). These figures are presented graphically in Figure 4.1 and Table 4.6 following. This volume is 20.3 % of the total predicted produced water analyzed in the PRB FEIS for the Upper Powder River watershed.

Table 4.5 Actual vs predicted water production in the Upper Powder River watershed *2008 DataUpdate 06-08-09*

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

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
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	45,936	31.1	212,522	20.3
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**		**212,522**			

Figure 4.2 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 20.3% 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.

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.

4.4. Cultural Resources

Non-eligible sites 48CA2217, 48CA3541, 48CA6214, 48CA6676, 48CA6699, 48CA6718 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 05/21/09 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).
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).

4.5. 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. Alternative D

Only specific differences from alternative C will be discussed. Alternative D was not explored during the onsite, however, following the onsite inspection, the BLM Interdisciplinary Team (IDT) reviewed the

surface use and wildlife data with the changes agreed to in the field. The BLM-IDT identified that further mitigation to reduce the loss of sage-grouse habitat within the project area was warranted. BLM determined that the greatest impact to the habitat from the proposed action is the fragmentation of sage-grouse habitat on a landscape scale, specifically the proposed road segments to various well locations, vertical intrusion from over head power, an increase risk of West Nile virus, and an increase of predators due to travel corridors, increase in habitat edge and introduction of new nesting substrate proposed in Alternative C.

After further analysis, the BLM Wildlife Biologist refined the above recommendations with a paradigm that acknowledges a hierarchy of parameters that meets the following criteria: Defer wells and impoundments that are proposed with new access roads, which are located in quality habitat within 2 miles of an active lek. The deferment of the wells and impoundments as listed in Appendix A will maintain habitat connectivity as well as reduce fragmentation of habitat on a landscape scale.

5.1. Vegetation & Soils Direct and Indirect Effects

Trenching construction will remove vegetation while burying proposed and existing overhead power. Table 4.4 summarizes the proposed surface disturbance associated with Alternative D.

5.2. Wildlife

5.2.1. Big Game Direct and Indirect Effects

Short-term disturbances with burying existing and proposed will result in direct habitat loss; however, effective reclamation should provide some habitat value as these areas are reclaimed and native vegetation becomes established. Consolidating all linear infrastructure with access roads will reduce habitat fragmentation.

5.2.1.1. Cumulative effects

The cumulative effects associated with Alternative D 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. No additional mitigation measures are required.

5.2.2. Migratory Birds Direct and Indirect Effects

Disturbance of the habitat types within the project area is unlikely to impact migratory birds; Alternative D contains the least habitat impact once the existing and proposed overhead power is buried.

5.2.2.1. Cumulative effects

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

5.2.3. Raptors Direct and Indirect Effects

Alternative D contains the least habitat impact once the existing and proposed overhead power is buried. Additional direct and indirect impacts to raptors, from oil and gas development, are analyzed in the PRB FEIS (4-216-221).

5.2.3.1. Cumulative effects

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

5.2.4. Threatened and Endangered and Sensitive Species

5.2.4.1. Threatened and Endangered Species Direct and Indirect Effects

5.2.4.1.1. Bald eagle

With additional disturbance associated with burying overhead power, the overall vertical intrusion within the project, would be reduced with implementation of Alternative D. With a decreased amount of overhead power, there would be a decreased likelihood of power line mortalities.

5.2.4.2. Sensitive Species Direct and Indirect Effects

5.2.4.2.1. Greater sage grouse

Alternative D would create the least amount of disturbance to and fragmentation of sage-grouse habitat while meeting the purpose and need of the proposed action.

Trenching construction will temporarily remove habitat while burying proposed and existing overhead power outside of existing corridors. This will cause a short-term disturbance and direct habitat loss; however, effective reclamation should provide some habitat value, as these areas are reclaimed and native

vegetation becomes established. Alternative D will reduce the negative impact to nesting and wintering habitat as well as habitat fragmentation to sage grouse. This alternative will improve sage grouse habitat by removing vertical intrusions and consolidating all linear infrastructure with access roads. Eliminating surface disturbing or disruptive activities from March to July 15 will enhance nesting success.

5.2.4.2.2. Sharp-tailed grouse

Impacts to sharp-tailed grouse are similar to that of sage-grouse although of a lesser magnitude as sharp-tailed grouse tend to be more tolerant of disturbance and activity.

5.2.4.3. Cumulative effects

Cumulative effectsThe cumulative effects associated with Alternative D 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. No additional mitigation measures are required.

5.3. Economics and Recovery of CBNG Resources

The cumulative effects associated with Alternative D 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.

5.4. Fluid Minerals

The cumulative effects associated with Alternative D 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. In addition, the table below indicates potential for lost resources and revenue under Alternative D.

Estimated Lost Gas from Undrilled Federal Locations							
Assuming these wells are not drilled but all surrounding 80s are							
Twp	**Rng**	**Sec**	**Qtr/Qtr**	**Lease**	**Well Name**	**Unrecovered CBM**	
						High	**Low**
45N	75W	9	SWNE	WYW145579	CS Com 1	39	5
46N	75W	6	NESE	WYW129030	Conic CS Com 1	73	13
46N	75W	6	SWSE	WYW133611	Line Camp CS 9	73	13
46N	75W	7	NENE	WYW130609	Isosceles CS Com 2	73	13
46N	75W	7	NENW	WYW130609	Isosceles CS Com 3	73	13
46N	75W	8	NENW	WYW130609	Isosceles CS 5	73	13
46N	75W	8	SWNW	WYW130609	Isosceles CS 6	73	13
46N	75W	8	SWNE	WYW130609	Isosceles CS 7	73	13
46N	75W	8	NESE	WYW130609	Isosceles CS 8	73	13
46N	75W	17	SWNE	WYW130609	Isosceles CS 19	26	10
46N	75W	18	NENE	WYW130609	Isosceles CS 23	73	10
46N	75W	18	NENW	WYW130609	Isosceles CS 24	73	10
46N	75W	18	SWSE	WYW130609	Isosceles CS 28	73	10
46N	75W	19	NENE	WYW130609	Isosceles CS 29	73	10
46N	75W	19	SWNE	WYW130609	Isosceles CS 30	73	10
46N	75W	19	NENW	WYW144524	Pythagorean CS 1	73	10
46N	75W	20	SWNW	WYW144524	Pythagorean CS Com 2	26	10
46N	75W	20	SWNE	WYW134909	Zucinni CS Com 1	26	10
46N	75W	29	NESW	WYW138440	Medicine CS 10	26	10
46N	75W	31	NWNW	WYW138440	Medicine CS 12	26	10
All numbers are in thousands of MCF							

Estimated Lost Gas from Undrilled Federal Locations							
Assuming these wells are not drilled and there are no offsetting wells							
Twp	**Rng**	**Sec**	**Qtr/Qtr**	**Lease**	**Well Name**	**Unrecovered CBM**	
						High	**Low**
45N	75W	9	SWNE	WYW145579	CS Com 1	359	41
46N	75W	6	NESE	WYW129030	Conic CS Com 1	664	114
46N	75W	6	SWSE	WYW133611	Line Camp CS 9	664	114
46N	75W	7	NENE	WYW130609	Isosceles CS Com 2	664	114
46N	75W	7	NENW	WYW130609	Isosceles CS Com 3	664	114
46N	75W	8	NENW	WYW130609	Isosceles CS 5	664	114
46N	75W	8	SWNW	WYW130609	Isosceles CS 6	664	114
46N	75W	8	SWNE	WYW130609	Isosceles CS 7	664	114
46N	75W	8	NESE	WYW130609	Isosceles CS 8	664	114
46N	75W	17	SWNE	WYW130609	Isosceles CS 19	232	93
46N	75W	18	NENE	WYW130609	Isosceles CS 23	664	93
46N	75W	18	NENW	WYW130609	Isosceles CS 24	664	93
46N	75W	18	SWSE	WYW130609	Isosceles CS 28	664	93
46N	75W	19	NENE	WYW130609	Isosceles CS 29	664	93
46N	75W	19	SWNE	WYW130609	Isosceles CS 30	664	93
46N	75W	19	NENW	WYW144524	Pythagorean CS 1	664	93
46N	75W	20	SWNW	WYW144524	Pythagorean CS Com 2	232	93
46N	75W	20	SWNE	WYW134909	Zucinni CS Com 1	232	93
46N	75W	29	NESW	WYW138440	Medicine CS 10	232	93
46N	75W	31	NWNW	WYW138440	Medicine CS 12	232	93
All numbers are in thousands of MCF							

5.5. Comparison Summary of Effects By Cumulative effects

The cumulative effects associated with Alternative D are within the analysis parameters and impacts described I the PRB FEIS. For details on expected cumulative impacts, please refer to the referenced PRB FEIS, Volume 2, Chapter 4, page4-271. No additional mitigation measures are required.

Table 5.1 Cumulative Effects

Resource	Alternative A	Alternative B	Alternative C	Alternative D
Surface Resources	No change	Gauge POD	Surface disturbance is reduced by eliminating or rerouting roads, pipelines and overhead power lines.	Surface disturbance is reduced considerably by eliminating or rerouting roads. The number of new roads constructed is minimized to the greatest extent.
Wetlands/Riparian Areas	No existing wetlands/ riparian areas would be disturbed.			
Wildlife				
Big Game	No habitat loss or fragmentation. Would likely see increased traffic passing through due to surrounding mineral development	Greatest habitat loss.	Reduced habitat loss.	Least habitat loss.
		Greatest habitat fragmentation.	Reduced habitat fragmentation.	Least habitat fragmentation.
Raptors	No habitat loss.	Greatest foraging habitat fragmentation.	Reduced foraging habitat fragmentation.	Least habitat loss.
	No wells authorized near nests.		.	Least foraging habitat fragmentation.
Migratory Birds	No habitat loss.	Greatest habitat loss.	Reduced habitat loss.	Least habitat loss.
	No habitat fragmentation.	Greatest habitat fragmentation.	Reduced habitat fragmentation.	Least habitat fragmentation.

		Overhead electric poses predation & collision risk.	Effects from overhead electricity reduced.	Overhead electric poses predation & collision risk.
Threatened and Endangered Species				
Bald eagle	No habitat loss	Overhead electricity increasing mortality risk from electrocution.	Less overhead electricity proposed than Alt C, smaller increased electrocution risk	Overhead electricity increasing mortality risk from electrocution
Sensitive Species				
Greater Sage Grouse	No habitat loss. No decision on overhead electricity. Overhead power could be routed through project area on private surface without BLM discretion increasing predation and collision risk. Grouse may avoid overhead power lines.	Greatest habitat loss. Greatest habitat fragmentation.	Reduced habitat loss. Reduced habitat fragmentation.	Least habitat loss. Least habitat fragmentation.
		Greatest predation and collision risk associated with overhead power lines.	Reduced predation and collision risk associated with overhead power lines.	Greatest predation and collision risk associated with overhead power lines.
West Nile Virus	No Impact	likely to have effect on the overall spread of WNV.	Unlikely to have any effect on the overall spread of WNV.	likely to have effect on the overall spread of WNV.

The cumulative effects associated with 4 Comparison Summary of Effects By Alternative D 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, page4-271. No additional mitigation measures are required.

6. CONSULTATION/COORDINATION

Contact	Title	Organization	Present at Onsite
Jeb Tachick	Permitting Agent	Yates Petroleum	yes

7. 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.

8. REFERENCES AND AUTHORITIES

Agnew, W. D. 1983. Flora and Fauna Associated with Prairie Dog Ecosystems. Unpublished thesis. Colorado State University, Fort Collins. 47pp.

Agnew, W. D. 1988. Arthropod Consumption by Small Mammals on Prairie Dog Colonies and Adjacent Ungrazed Mixed-grass Prairie in Western South Dakota. Eighth Great Plains Wildlife Damage Control Workshop Proceedings. USDA Forest Service General Technical Report RM 154. pgs. 81-87.

Agnew, W., D. W. Uresk. and R. M. Mansen. 1986. Flora and Fauna Associated with Prairie Dog Colonies and Adjacent Ungrazed Mixed-grass Prairie in Western South Dakota. Journal of Range Management 39, pgs 135-139.

AHPIS, Animal and Plant Health Inspection Service. 2002. General information available online at http://www.aphis.usda.gov/lpa/issues/wnv/wnv.html.

Aldridge, C. L., and M. S. Boyce. 2007. Linking occurrence and fitness to persistence: a habitat-based approach for endangered greater sage-grouse. Ecological Applications 17:508-526.

Apa, A. D. 1985. Efficiency of Two Black-tailed Prairie Dog Rodenticides and Their Impacts on Non-target Bird Species. Unpublished thesis, South Dakota State University Brookings. 71pp.

Avian Power Line Interaction Committee (APLIC) 2006. R. Harness, contributing author to: Suggested Practices for Avian Protection on Power Lines: State of the Art in 2006. 207pp.

Bills, Thomas E. 2004. Powder River Basin Oil & Gas Project Semi-Annual Report: May 1, 2003 – October 31, 2003. BLM Buffalo Field Office. Buffalo, WY. 8pp.

Big Horn Environmental Consultants. 2008. Powder Valley Unit – Delta POD Wildlife Survey and Habitat Report. Sheridan, WY. 11pp.

Braun C. E. 1998. Sage-grouse declines in western North America: what are the problems? Proceedings of the Western Association of State Fish and Wildlife Agencies. 67:134–144.

Braun C. E., M. F. Baker, R. L. Eng, J. S. Gashwiler, and M. H. Schroeder. 1976. Conservation committee report on effects of alteration of sagebrush communities on the associated avifauna. Wilson Bulletin. 88:165–171.

Braun, C.E., O.O. Oedekoven, and C.L. Aldridge. 2002. Oil and Gas Development in Western north America: Effects on Sagebrush Steppe Avifauna with Particular Emphasis on Sage Grouse. In: Transactions of the 67th North American Wildlife and Natural Resources Conference. pp337-349.

Bureau of Land Management. 2004. Instruction Memorandum No. WY-2005-057: Statement of Policy Regarding Sage-Grouse Management Definitions, and Use of Protective Stipulations, and Conditions of Approval. Bureau of Land Management, Wyoming State Office. Cheyenne, WY.

Bureau of Land Management. 2008. Fact Sheet Greater Sage-Grouse Buffalo Field Office RMP Amendment. May 28, 2008

Bureau of Land Management. 1990. Instruction Memorandum No. WY-90-564: Resource Management Plan Action and Wyoming BLM Standard Mitigation Guidelines for Surface Disturbing Activities. Bureau of Land Management, Wyoming State Office. Cheyenne, WY.

Campbell, Thomas and Tim Clark. 1981. Colony Characteristics and Vertebrate Associates of White-tailed and Black-tailed Prairie Dogs. American Midland Naturalist, Vol. 105, No. 2 (April 1981). pgs 269-276.

Canfield, J. E., L. J. Lyon, J. M. Hillis, and M. J. Thompson. 1999. Ungulates. Chapter 6 in Effects of Recreation on Rocky Mountain Wildlife: A Review for Montana, coordinated by G. Joslin and H. Youmans. Committee on Effects of Recreation on Wildlife, Montana Chapter of The Wildlife Society.

Clark, T. W., T. M. Campbell, D. G. Socha, and D. E. Casey. 1982. Prairie Dog Colony attributes and Associated Vertebrate Species. Great Basin Naturalist 42: 572-582.

Code of Federal Regulations (CFR)

- 40 CFR All Parts and Sections inclusive Protection of Environment. Revised as of July 1, 2004.
- 43 CFR All Parts and Sections inclusive - Public Lands: Interior. Revised as of October 1, 2006.

Confluence Consulting, Inc. 2004. Powder River Biological Survey and Implications for Coalbed Methane Development. Bozeman, MT. 179pp.

Connelly, J. W., M. A. Schroeder, A. R. Sands, and C. E. Braun. 2000. Guidelines for management of sage grouse populations and habitats. Wildlife Society Bulletin 28:967-985.

Connelly, J. W., S. T. Knick, M. A. Schroeder, and S. J. Stiver. 2004. Conservation Assessment of Greater Sage-grouse and Sagebrush Habitats. Western Association of Fish and Wildlife Agencies. Unpublished Report. Cheyenne, Wyoming.

Cornish, Todd; Terry Creekmore; Walter Cook; and Elizabeth Williams. 2003. "West Nile Virus - Wildlife Mortality in Wyoming 2002-2003". In: The Wildlife Society Wyoming Chapter Program and Abstracts for the Annual Meeting at the Inn in Lander, WY November 18-21, 2003. Wildlife Society Wyoming Chapter. 17pp.

Cornish, Todd. Personal Communication. Wyoming State Veterinary Laboratory, University of Wyoming. Laramie, WY. (307) 742-6638. tcornish@uwyo.edu.

Dantzker, M. S., Deane, G. B. & Bradbury, J. W. 1999. Directional acoustic radiation in the strut display of male sage grouse Centrocercus urophasianus. Journal of Experimental Biology, 202, 2893–2909.

Danvir, Rick E. 2002. Sage Grouse Ecology and Management in Northern Utah Sagebrush-Steppe: A Deseret Land and Livestock Wildlife Research Report. Deseret Land and Livestock Ranch and the Utah Foundation for Quality Resource Management. Woodruff, UT.

Deisch, M. S., D. W. Uresk, and R. L. Lindor. 1989. Effects of Two Prairie Dog Rodenticides on Ground Dwelling Invertebrates in Western South Dakota. Ninth Great Plains Wildlife Damage Control Workshop Proceedings. USDA Forest Service General Technical Report RM. Pgs 171-181.

Dobkin D. S. 1994. *Conservation and management of Neotropical migrant landbirds in the northern Rockies and Great Plains*. University of Idaho Press, Moscow, ID.

Doherty, K.E., D.E. Naugle, B.L. Walker, J.M. Graham. 2008. Greater sage-grouse winter habitat selection and energy development. Journal of Wildlife Management. In press.

Fahrig, L., and J. Paloheimo. 1988. Determinations of local population size in patchy habitats. Theorectical Population Biology 34:194-213.

Fertig, W. 2000. *Status Review of the Ute Ladies Tresses (Spiranthes diluvialis) in Wyoming*. Wyoming Natural Diversity Database, Laramie, Wyoming.

Fertig, W. 2001. 2000 survey for Blowout penstemon (*Penstemon haydenii*) in Wyoming. Prepared for the Bureau of Land Management Wyoming State Office by the Wyoming Natural Diversity Database, University of Wyoming, Laramie, WY.

Fischer, Don, P.G. 2009. Wyoming Department of Environmental Quality, Groundwater Pollution Control Division, Personal Communication, January, 2009.

Fisher, R.J. 1978. Biological values in the Raft Valley, geothermal resource area. Appendix A in Department of Energy Environmental Assessment. Raft River geothermal Project, Thermal Test Loop, Cassia County, Idaho. DOE-EA-0008. U.S. Department of Energy, Washington, D.C. 121 pp.

Geist, V. 1978. Behavior. Big Game of North America; ecology and management. Stackpole Books, Harrisburg, Pennsylvania.

Gelbard J. L., and J. Belnap. 2003. Roads as conduits for exotic plant invasions in a semiarid landscape. Conservation Biology. 17:420–432.

Gibson, R. M. 1989. Field playback of male display attracts females in lek breeding Sage Grouse. Behavioral Ecology and Sociobiology 24: 439-443.

Gibson, R. M. and J. W. Bradbury. 1986. *Male and female mating strategies on sage grouse leks*. Pp. 379-398 in Ecological aspects of social evolution: birds and mammals (D. I. Rubenstein and R. W. Wrangham, eds.). Princeton Univ. Press, Princeton, New Jersey.

Grenier, M., B. Oakleaf, K. Taylor, and M. Hymas. 2004. *Inventory and Mapping of Black tailed Prairie Dogs in Wyoming – An Estimate of Acreage Completion Report*.

Grenier, M. 2003. An Evaluation of Black-footed Ferret Block Clearances in Wyoming: Completion Report. Wyoming Game and Fish Department. Lander, WY. 16pp

Haug, E. A. and L. W. Oliphant. 1985. Movements, Activity Patterns, and Habitat Use of Burrowing Owls in Saskatchewan. Journal of Wildlife Management. 54(1):27-35.

Hazlett, D.L. 1996. *The discovery of Spiranthes diluvialis along the Niobrara River in Wyoming and Nebraska*. Report prepared for the Bureau of Land Management Wyoming State Office.

Hazlett, D.L. 1997. *A 1997 search for Spiranthes diluvialis in southeastern Wyoming and western Nebraska*. Report prepared for the Bureau of Land Management Wyoming State Office.

Heidel, Bonnie. Botanist. Wyoming Natural Diversity Database. University of Wyoming. Laramie, WY

Hiat, G.S. and D. Baker. 1981. Effects of oil/gas drilling on elk and mule deer winter distributions on Crooks Mountain, Wyoming. Wyoming Game and Fish Department.

Holloran, M. J, and S. H. Anderson. 2005. Spatial distribution of Greater Sage-Grouse nests in relatively contiguous sagebrush habitats. Condor 107:742-752.

Holloran, M J.; B. J. Heath; A. G. Lyon; S. J. Slater; J. L. Kuppiers; and S. H. Anderson. 2005. Greater sage-grouse nesting habitat selection and success in Wyoming. J. Wildl. Manage. 69(2):638-649.

Holloran, M. J., R. C. Kaiser, and W. A. Hubert. 2007. Population Response of yearling greater sage-grouse to the infrastructure of natural gas fields in southwestern Wyoming. Completion report. Wyoming Cooperative Fish and Wildlife Research Unit, Laramie, WY, USA. 34pp.

Hoogland, J. 1995. *The black-tailed prairie dog: Social life of a burrowing mammal*. Chicago: Chicago University Press.

Hubert, W. A. 1993. *The Powder River: a relatively pristine stream on the Great Plains*. Pages 387-395 in L. W. Hesse, C. B. Stalnaker, N. G. Benson, and J. R. Zuboy, editors. Restoration planning for the rivers of the Mississippi River ecosystem. Biological Report 19, National Biological Survey, Washington, D.C.

Ingelfinger, F., and S. Anderson. 2004. Passerine response to roads associated with natural gas extraction in a sagebrush steppe habitat. Western North American Naturalist 64:385-395

Ingelfinger F. 2001. *The effects of natural gas development on sagebrush steppe passerines in Sublette County, Wyoming*. M.Sc. thesis, University of Wyoming, Laramie, WY.

Jalkotzy, M.G., P.I. Ross, and M.D. Nasserden. 1997. The Effects of Linear Developments on Wildlife: A Review of Selected Scientific Literature. Arc Wildlife Services Ltd., Calgary, Alberta, Canada.

Jellison, Bert. 2005. Sage-Grouse Restoration Project: Lake DeSmet Conservation District. Wyoming Game and Fish Department. Sheridan, WY.

Kelly Brian T. 2004. Letter to interested parties: Black-footed ferret clearance surveys. U.S. Fish and Wildlife Service (February 2, 2004). Cheyenne, WY. 4pp.

King, J. A. 1955. Social Behavior, Social Organization and Population Dynamics in a Black-tailed Prairie Dog Town in the Black Hills of South Dakota. Contr. Lab. Vert. Biol., University of Michigan. 67pp.

Klute, D. S., L.W. Ayers, M.T. Green, W.H. Howe, S.L. Jones, J.A. Shaffer, S.R. Sheffield, and T.S. Zimmerman. 2003. *Status Assessment and Conservation Plan for the Western Burrowing Owl in the United States*. U.S. Department of the Interior; Fish and Wildlife Service, Biological Technical Publication FWS/BTP-R6001-2003, Washington, D.C.

Knick, S. T., and J. T. Rotenberry. 1995. Landscape characteristics of fragmented shrubsteppe habitats and breeding passerine birds. Conservation Biology 9:1059-1071.

Knick S. T., D. S. Dobkin, J. T. Rotenberry, M. A. Schroeder, W. M. Vander Haegen, and C. van Riper III. 2003. Teetering on the edge or too late? Conservation and research issues for avifauna of sagebrush habitats. Condor. 105:611–634.

Knight R. L., and J. Y. Kawashima. 1993. Responses of raven and Red-tailed Hawk populations to linear right-of-ways. Journal of Wildlife Management. 57:266–271.

Knopf F.L. and J.R Rupert. 1995. Habits and habitats of Mountain Plovers in California. Condor 97:743-751.

Landry, R.E. 1979. *Growth and development of the Burrowing Owl*. M.S. thesis, California State University, Long Beach, CA.

Litzel, R. 2004. Personal communication [January 6 phone conversation with Jim Sparks]. Johnson County Weed and Pest District.

Lowham, H.W. Streamflows in Wyoming WRIR 88-4045 U.S. Geological Survey 1988

Lustig, Thomas D., March. 2003. Where Would You Like the Holes Drilled into Your Crucial Winter Range? Transactions of the 67th North American Wildlife and Natural Resources Conference.

Marra PP, Griffing SM, McLean RG. West Nile virus and wildlife health. Emerg Infect Dis [serial online] 2003 Jul. Available from: URL: http://www.cdc.gov/ncidod/vol9no7/03-0277.htm.

McCraken, J. G., D. W. Uresk and R. M. Mansen. 1985. Burrowing Owl Foods in Conata Basin, South Dakota. Great Basin Naturalist 45: 287-290.

McDonald, D., N.M. Korfanta, and S.J. Lantz. 2004. *The Burrowing Owl (Athene cunicularia): a technical conservation assessment*. USDA Forest Service, Rocky Mountain Region.

Meffe, G.K. and C.R. Carroll. 1994. *Principles of Conservation Biology*. Sinauer Associates, Inc. Sunderland, MA.

Miller, K.A Peak-Flow Characteristics of Wyoming Streams WRIR 03-4107 U.S. Geological Survey 2003

Mooney, A. 2004. Personal Communication [January 6 phone conversation with Jim Sparks]. Campbell County Weed and Pest District.

Moynahan, B. J. and M. S. Lindberg. 2004. *Nest Locations of Greater Sage-Grouse in Relation to Leks in North-Central Montana*. *Presented at* Montana Sage-Grouse Workshop, Montana Chapter of The Wildlife Society, Billings.

Moynahan, B. J.; M. S. Lindberg; J. J. Rotella; and J. W. Thomas. 2005. Factors Affecting Nest Survival of Greater Sage-Grouse in Northcentral Montana. J. Wildl. Manage.

Moynahan, B. J., M. S. Lindberg, J. J. Rotella, and J. W. Thomas. 2007. Factors affecting nest survival of greater sage-grouse in north-central Montana. Journal of Wildlife Management 71:1773-1783.

Naugle, D. E.; C. L. Aldridge; B. L. Walker; T. E. Cornish; B. J. Moynahan; M. J. Holloran; K. Brown; G. D. Johnson; E. T. Schmidtmann; R. T. Mayer; C. Y. Kato; M. R. Matchett; T. J. Christiansen; W. E. Cook; T. Creekmore; R. D. Falise; E. T. Rinkes; and M. S. Boyce. 2004. West Nile virus: Pending Crisis of Greater Sage-grouse. Ecology Letters. 7:704-713.

Naugle, David E.; Brett L. Walker; and Kevin E. Doherty. 2006. Sage Grouse Population Response to Coal-bed Natural Gas Development in the Powder River Basin: Interim Progress Report on Region-wide Lek Analyses. May 26, 2006. University of Montana. Missoula, MT. 10pp.

Noss, R. F. and A. Cooperrider. 1994. *Saving Nature's Legacy: Protecting and Restoring Biodiversity.* Defenders of Wildlife and Island Press, Washington, D. C.

Oakleaf, Bob. January 13, 1988. Letter to BFAT: Preliminary BFF Reintroduction Site Analysis, Meeteetse Management Plan Assignments. Wyoming Game and Fish Department. Lander, WY. 10pp.

Olendorff, R. R. 1993. Biology and management of ferruginous hawk (*Buteo regalis*): a review. Occasional Papers Number 1. Raptor Research and Technical Assistance Center, U.S. Bureau of Land Management, Boise, Idaho, USA

Olenick, B. E. 1990. *Breeding biology of burrowing owls using artificial nest burrows in southeastern Idaho*. Thesis, Idaho State University, Pocatello, Idaho, USA.

Paige, C., and S. A. Ritter. 1999. *Birds in a sagebrush sea: managing sagebrush habitats for bird communities*. Partners in Western Flight working group, Boise, ID.

Patterson, C. T. and S. H. Anderson. 1985. Distributions of Eagles and a Survey for Habitat Characteristics of Communal Roosts of Bald Eagles (Haliaeetus leucocephalus) Wintering in Northeastern Wyoming. Wyoming Cooperative Fishery and Wildlife Research Unit. University of Wyoming. Laramie, WY.

Porneluzi, P, J. C. Bednarz, L. J. Goodrich, N. Zawada, and J. Hoover. 1993. Reproductive performance of territorial Ovenbirds occupying forest fragments and a contiguous forest in Pennsylvania. Conservation Biology 7:618-622.

Primack, R.B. 1993. Essentials of conservation biology. Sinauer Associates, Sunderland, Massachusetts, USA.

Reading, R. P., S. R. Beissinger, J. J. Grensten, and T. W. Clark. 1989. Attributes of Black-tailed Prairie Dog Colonies in North Central Montana with Management Recommendations for the Conservation of Biodiversity. Attributes of Black-tailed Prairie Dog Colonies in North Central Montana with Management Recommendations for the Conservation of Biodiversity. pgs 13-28.

Reading, R., and Randy Matchet. 1997. Attributes of Black-tailed Prairie Dog Colonies in Northcentral Montana. Journal of Wildlife Management 61(3): 664-673.

Rinkes, T. 2003. Personal communication [Draft notes from Annual Sage-Grouse and Sagebrush Species of Concern Meeting]. Bureau of land Management Wildlife Biologist/Sage Grouse Coordinator.

Robinson, S. K. 1992. *Population dynamics of breeding birds in a fragmented Illinois landscape*. Pages 408-418 in J. Hagan and D. W. Johnston, editors. Ecology and conservation of neotropical migrant land birds. Smithsonian Institution press, Washington, D. C.

Rogers, Brad. Personal Communication. Fish and Wildlife Biologist. U.S. Fish and Wildlife Service, Cheyenne Field Office. Cheyenne, WY.

Romin, Laura A., and Muck, James A. May 1999. Utah Field Office Guidelines For Raptor Protection From Human And Land Use Disturbances. U.S. Fish and Wildlife Service, Salt Lake City, Utah

Rotenberry J. T., and J. A. Wiens. 1980a. Habitat structure, patchiness, and avian communities in North American steppe vegetation: a multivariate analysis. Ecology. 61:1228–1250.

Rowland, M. M., M. Leu, , S. P. Finn, S. Hanser, L. H. Suring, J. M. Boyd, C. W. Meinke, S. T. Knick, and M. J. Wisdom. 2005. Assessment of threats to sagebrush habitats and associated species of concern in the Wyoming Basins. Version 1.1, June 2005, unpublished report on file at USGS Biological Resources Discipline, Snake River Field Station, 970 Lusk St., Boise, ID 83706.

Rowland, M. M., M. Leu, , S. P. Finn, S. Hanser, L. H. Suring, J. M. Boyd, C. W. Meinke, S. T. Knick, and M. J. Wisdom. 2005. Assessment of threats to sagebrush habitats and associated species of concern in the Wyoming Basins. Version 1.1, June 2005, unpublished report on file at USGS Biological Resources Discipline, Snake River Field Station, 970 Lusk St., Boise, ID 83706.

Ruggiero, L.F., K.B. Aubry, S.W. Buskirk, G.M. Koehler, C.J. Krebs, K.S. McKelvey, and J.R. Squires. 1999. The Scientific Basis for Lynx Conservation: Qualified Insights. Ch16. USDA Forest Service Technical Report RMRS-GTR-30.

Saab, V., and T. Rich. 1997. *Large-scale conservation assessment for neotropical migratory landbirds in the Interior Columbia River Basin*. USDA Forest Service General Technical Report PNW-GTR-399, Portland, Oregon, USA.

Smith, D. G., and J. R. Murphy. 1978. Biology of the ferruginous hawk in central Utah. Sociobiology 3:79-95.

State wildlife agencies' ad hoc committee for sage-grouse and oil and gas development. 2008. Using the best available science to coordinate conservation actions that benefit greater sage-grouse across states affected by oil and gas development in Management Zones I-II (Colorado, Montana, North Dakota, South Dakota, Utah and Wyoming). Unpublished report. Colorado Division of Wildlife, Denver; Montana Fish, Wildlife and Parks, Helena; North Dakota Game and Fish Department, Bismarck; Utah Division of Wildlife Resources, Salt Lake City; Wyoming Game and Fish Department, Cheyenne.

Steenhof K., M. N. Kochert, and J. A. Roppe. 1993. Nesting by raptors and Common Ravens on electrical transmission line towers. Journal of Wildlife Management. 57:272–281.

Stinson, D. W., D. W. Hays, and M. A. Schroeder. 2004. Washington State Recovery Plan for the Sage-grouse. Washington Department of Fish and Wildlife, Olympia, Washington. 109 pages.

Temple S. A. 1986. Predicting impacts of habitat fragmentation on forest birds: A comparison of two models. Pages 301-304 in Wildlife 2000 (J. Verner, C. J. Ralph, and M. L. Morrison, Eds.). Univ. Wisconsin Press, Madison.

Temple S.A., and J. R. Cary. 1988. Modeling dynamics of habitat-interior bird populations in fragmented landscapes Conserv. Biol.2 :340-347.

Temple, S.A., and B.A. Wilcox. 1986. Introduction: Predicting effects of habitat patchiness and fragmentation. In *Wildlife 2000: Modeling Habitat Relationships of Terrestrial Vertebrates*, ed. J. Verner, M.L. Morrison, and C.J. Ralph, 261-62. Madison: University of Wisconsin Press.

The National Environmental Policy Act of 1969 (NEPA), as amended (Pub. L. 91-90, 42 U.S.C. 4321 et seq.).

Urban, D. L., and H. H. Shugart, Jr. 1984. Avian demography in mosaic landscapes: modeling paradigm and preliminary results. Pages 273-280 in J. Verner, M. L. Morrison, and C. J. Ralph editors. Wildlife 2000: Modeling habitat relationships of terrestrial vertebrates. University of Wisconsin Press, Madison.

U.S. Department of the Interior, Bureau of Land Management and Office of the Solicitor (editors). 2001. The Federal Land Policy and Management Act, as amended. Public Law 94-579.

U.S. Department of the Interior 2001, Bureau of Land Management, Buffalo Field Office. Approved Resource Management Plan for Public Lands Administered by the Bureau of Land Management Buffalo Field Office April 2001.

U.S. Department of the Interior 2003, Bureau of Land Management. Powder River Oil and Gas Project Environmental Impact Statement and Resource Management Plan Amendment. April 30, 2003.

U.S. Department of the Interior 2007, US Fish and Wildlife Service. Reinitiation of Formal Consultation for Powder River Oil and Gas Project. March 23, 2007

U.S. Department of the Interior, Fish and Wildlife Service. 2002. Final Biological and Conference Opinion for the Powder River Oil and Gas Project, Campbell, Converse, Johnson, and Sheridan Counties (WY6633). U.S. Fish and Wildlife Service. December 17, 2002. Cheyenne, WY. 58pp.

U.S. Department of the Interior, Fish and Wildlife Service (USFWS). 1989. Black-footed ferret Survey Guidelines for Compliance with the Endangered Species Act. Denver, CO and Albuquerque, NM.

Vander Haegen, W. M., F. C. Dobler, and D. J. Pierce. 2000. Shrubsteppe bird response to habitat and landscape variables in eastern Washington, USA. Conservation Biology 14:1145-1160.

Walker B, Naugle D, Rinkes T. 2003. The Response of Sage Grouse to Coal-bed Methane Development and West Nile virus in the Powder River Basin: Is There a Link ? Page 6 in: Program and Abstracts for the Annual Wildlife Society Meeting, Wyoming Chapter.

Walker, B.L., D. E. Naugle, and K.E. Doherty. 2007. Greater sage-grouse population response to energy development and habitat loss. Journal of Wildlife Management 71:2644-2654.

Washington Department of Fish and Wildlife. 1996. Washington state recovery plan for the ferruginous hawk. Washington Department of Fish and Wildlife, Olympia, Washington, USA

WDEQ, June 14, 2004. Compliance Monitoring for Ground Water Protection Beneath Unlined Coalbed Methane Produced Water Impoundments

White, C. M., and T. L. Thurow. 1985. Reproduction of ferruginous hawks exposed to controlled disturbance. Condor 87:14-22.

Windingstad, R. M., F. X. Kartch, R. K. Stroud, and M. R. Smith. 1987. Salt toxicosis in waterfowl in North Dakota. Jour. Wildlife Diseases 23(3):443-446.

Wyoming Game and Fish Department (WGFD). 2004. Minimum Recommendations for Development of Oil and Gas Resources within Crucial and Important Wildlife Habitats on BLM Lands. WGFD. Cheyenne, WY.

WGFD. 2003. Wyoming Greater Sage-Grouse Conservation Plan. WGFD. Cheyenne, WY

WGFD. 2004. Sheridan Region Wyoming Game and Fish Department: Annual Sage-Grouse Completion Report for 2004. Wyoming Game and Fish Department. Gillette, WY.

WGFD. 2005. Northeast Wyoming Local Working Group Area: Annual Sage-Grouse Completion Report for 2005. Wyoming Game and Fish Department. Buffalo, WY. 42pp.

WGFD. 2008. Hunting and Sage-Grouse: A Technical Review of Harvest Management On a Species of Concern in Wyoming. Wyoming Game and Fish Department. Green River, WY. 21pp.

9. LIST OF INTERDISCIPLINARY TEAM PREPARERS AND REVIEWERS

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Appendix A
Detailed Description of Alternatives B, C, D and Alternatives Considered but not Analyzed in Detail
Yates Petroleum Corporation
Gauge POD
ENVIRONMENTAL ASSESSMENT –WY-070-EA09-75

1. Alternative B - Proposed Action

Proposed Action Title/Type: Yates Petroleum Corporation‘s Gauge POD Plan of Development (POD) for 88 coal bed natural gas well APD`s and associated infrastructure.

Proposed Well Information: There were 88 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 one coal seam. Proposed well house dimensions are approximately 4 ft. wide x 4 ft. length x 6 ft. height. Well house color is Covert Green, selected to blend with the surrounding vegetation. Proposed wells are located as follows:

	Well Name	Well #	QTR	Sec	TWP	RNG	Lease
1	GAUGE BAROMETER CS	1	SWNE	4	45N	75W	WYW131734
2	GAUGE WATERMELON CS	11	SWSE	4	45N	75W	WYW128604
3	GAUGE TOUCHSTONE CS	1	NESE	5	45N	75W	WYW145578
4	GAUGE TOUCHSTONE CS	2	SWSE	5	45N	75W	WYW145578
5	GAUGE WATERMELON CS COM	10	SWNE	5	45N	75W	WYW128604
6	GAUGE CS COM	1	SWNE	9	45N	75W	WYW145579
7	GAUGE TOUCHSTONE CS	3	NESE	9	45N	75W	WYW145578
8	GAUGE TOUCHSTONE CS	4	NESW	9	45N	75W	WYW145578
9	GAUGE TOUCHSTONE CS	5	SWSW	9	45N	75W	WYW145578
10	GAUGE TOUCHSTONE CS	6	SWSE	9	45N	75W	WYW145578
11	GAUGE MAGNITUDE CS	1	NENE	22	45N	75W	WYW145580
12	GAUGE MAGNITUDE CS	2	SWNE	22	45N	75W	WYW145580
13	GAUGE PRESCRIPTION CS	1	SWSW	1	46N	75W	WYW132916
14	GAUGE PALOOKAVILLE CS	1	NENE	2	46N	75W	WYW135617
15	GAUGE PALOOKAVILLE CS	2	NENW	2	46N	75W	WYW135617
16	GAUGE PALOOKAVILLE CS	3	SWNW	2	46N	75W	WYW135617
17	GAUGE PALOOKAVILLE CS	4	SWNE	2	46N	75W	WYW135617
18	GAUGE PALOOKAVILLE CS	5	NESE	2	46N	75W	WYW135617
19	GAUGE PALOOKAVILLE CS	6	NESW	2	46N	75W	WYW135617
20	GAUGE PALOOKAVILLE CS	7	SWSW	2	46N	75W	WYW135617
21	GAUGE PALOOKAVILLE CS	8	SWSE	2	46N	75W	WYW135617
22	GAUGE ISOSCELES CS COM	1	SWSW	5	46N	75W	WYW130609
23	GAUGE SIDWELL CS	1	NESE	5	46N	75W	WYW32845
24	GAUGE SIDWELL CS	2	NESW	5	46N	75W	WYW32845
25	GAUGE SIDWELL CS	3	SWSE	5	46N	75W	WYW32845
26	GAUGE CONIC CS COM	1	NESE	6	46N	75W	WYW129030

	Well Name	Well #	QTR	Sec	TWP	RNG	Lease
27	GAUGE LINE CAMP CS	9	SWSE	6	46N	75W	WYW133611
28	GAUGE ISOSCELES CS COM	2	NENE	7	46N	75W	WYW130609
29	GAUGE ISOSCELES CS COM	3	NENW	7	46N	75W	WYW130609
30	GAUGE ISOSCELES CS COM	4	SWSE	7	46N	75W	WYW130609
31	GAUGE ISOSCELES CS	5	NENW	8	46N	75W	WYW130609
32	GAUGE ISOSCELES CS	6	SWNW	8	46N	75W	WYW130609
33	GAUGE ISOSCELES CS	7	SWNE	8	46N	75W	WYW130609
34	GAUGE ISOSCELES CS	8	NESE	8	46N	75W	WYW130609
35	GAUGE ISOSCELES CS COM	9	SWSW	8	46N	75W	WYW130609
36	GAUGE ISOSCELES CS COM	10	SWSE	8	46N	75W	WYW130609
37	GAUGE SIDWELL CS	4	NENE	8	46N	75W	WYW32845
38	GAUGE MEDICINE CS	1	NENE	11	46N	75W	WYW138440
39	GAUGE MEDICINE CS	2	NENW	11	46N	75W	WYW138440
40	GAUGE MEDICINE CS	3	SWNW	11	46N	75W	WYW138440
41	GAUGE MEDICINE CS	4	SWNE	11	46N	75W	WYW138440
42	GAUGE MEDICINE CS	5	NESE	11	46N	75W	WYW138440
43	GAUGE MEDICINE CS	6	NESW	11	46N	75W	WYW138440
44	GAUGE MEDICINE CS	7	SWSW	11	46N	75W	WYW138440
45	GAUGE MEDICINE CS	8	SWSE	11	46N	75W	WYW138440
46	GAUGE ISOSCELES CS COM	11	NESW	14	46N	75W	WYW130609
47	GAUGE GEOMETRY CS	1	SWSW	15	46N	75W	WYW39561
48	GAUGE ISOSCELES CS	12	NENE	15	46N	75W	WYW130609
49	GAUGE ISOSCELES CS	13	SWNE	15	46N	75W	WYW130609
50	GAUGE ISOSCELES CS	14	NESE	15	46N	75W	WYW130609
51	GAUGE ISOSCELES CS	15	SWSE	15	46N	75W	WYW130609
52	GAUGE CIRCUMFERENCE CS	1	SWSE	17	46N	75W	WYW144523
53	GAUGE ISOSCELES CS	16	NENE	17	46N	75W	WYW130609
54	GAUGE ISOSCELES CS	17	NENW	17	46N	75W	WYW130609
55	GAUGE ISOSCELES CS	18	SWNW	17	46N	75W	WYW130609
56	GAUGE ISOSCELES CS	19	SWNE	17	46N	75W	WYW130609
57	GAUGE ISOSCELES CS	20	NESE	17	46N	75W	WYW130609
58	GAUGE ISOSCELES CS	21	NESW	17	46N	75W	WYW130609
59	GAUGE ISOSCELES CS	22	SWSW	17	46N	75W	WYW130609
60	GAUGE ISOSCELES CS	23	NENE	18	46N	75W	WYW130609
61	GAUGE ISOSCELES CS	24	NENW	18	46N	75W	WYW130609
62	GAUGE ISOSCELES CS	25	SWNE	18	46N	75W	WYW130609
63	GAUGE ISOSCELES CS	26	NESE	18	46N	75W	WYW130609
64	GAUGE ISOSCELES CS	27	NESW	18	46N	75W	WYW130609
65	GAUGE ISOSCELES CS	28	SWSE	18	46N	75W	WYW130609
66	GAUGE ISOSCELES CS	29 Deferred	NENE	19	46N	75W	WYW130609

	Well Name	Well #	QTR	Sec	TWP	RNG	Lease
67	GAUGE ISOSCELES CS	30 Deferred	SWNE	19	46N	75W	WYW130609
68	GAUGE PYTHAGOREAN CS	1	NENW	19	46N	75W	WYW144524
69	GAUGE PARABOLA CS COM	1	NENE	20	46N	75W	WYW144525
70	GAUGE PYTHAGOREAN CS COM	2	SWNW	20	46N	75W	WYW144524
71	GAUGE ZUCINNI CS COM	1	SWNE	20	46N	75W	WYW134909
72	GAUGE LINE CAMP CS	10	SWNW	21	46N	75W	WYW133611
73	GAUGE LINE CAMP CS	11	SWSW	21	46N	75W	WYW133611
74	GAUGE ISOSCELES CS	31	NENE	22	46N	75W	WYW130609
75	GAUGE ISOSCELES CS	32	SWNE	22	46N	75W	WYW130609
76	GAUGE MEDICINE CS	10	NESW	29	46N	75W	WYW138440
77	GAUGE MEDICINE CS	11	SWSW	29	46N	75W	WYW138440
78	GAUGE MEDICINE CS COM	9	SWNE	29	46N	75W	WYW138440
79	GAUGE MEDICINE CS	12	NWNW	31	46N	75W	WYW138440
80	GAUGE MEDICINE CS	13	NWSW	31	46N	75W	WYW138440
81	GAUGE LINE CAMP CS COM	12	SESE	32	46N	75W	WYW133611
82	GAUGE DAVENPORT CS	1	NENE	25	46N	76W	WYW131224
83	GAUGE DAVENPORT CS	2	NENW	25	46N	76W	WYW131224
84	GAUGE SETTEE CS	1	SENE	35	46N	76W	WYW153362
85	GAUGE OUTRIGGER CS	1	NENW	34	47N	75W	WYW126621
86	GAUGE OUTRIGGER CS	2	SWNW	34	47N	75W	WYW126621
87	GAUGE OUTRIGGER CS	4	SWSW	34	47N	75W	WYW126621
88	GAUGE OUTRIGGER CS COM	3	NESW	34	47N	75W	WYW126621

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

	Impoundment Name / Number	Qtr/Qtr	Sec	TWP	RNG	Capacity (Acre Feet)	Surface Disturbance (Acres)	Lease #
1	5 Calves	SESE	15	45	75	5.25	2.5	WYW72456
2	Blitz	NESW	29	46	75	19.9	3.0	WYW138440
3	Bootleg	SWNW	20	46	75	19.9	3.2	WYW144524
4	Broom	NESE	2	46	75	88.4	9.0	WYW135617
5	Carry	SWNE	18	46	75	23.6	3.4	WYW130609
6	Catch	NESE	17	46	75	18	2.7	WYW130609
7	Chantel	SESE	2	46	75	17.2	2.2	WYW135617
8	Chase	NWNE	22	46	75	40.6	5.7	WYW130609
9	Dustin	NESE	9	45	75	35.10	6.2	WYW145578
10	Fumble	NENW	20	46	75	12.10	2.1	WYW144525
11	Halftime	NENW	20	46	75	14.5	2.4	WYW144525
12	Innes	SENE	16	46	75	128.89	25.6	State

	Impoundment Name / Number	Qtr/Qtr	Sec	TWP	RNG	Capacity (Acre Feet)	Surface Disturbance (Acres)	Lease #
13	Kennedy	NENE	18	46	75	19.9	3.8	WYW130609
14	Kick	NWNW	17	46	75	19.4	3.6	WYW130609
15	Olive	SWNE	22	45	75	2.7	1.8	WYW154480
16	Pass	SENW	17	46	75	19.60	3.1	WYW130609
17	Punt	NWNW	21	46	75	14.9	2.5	WYW133611
18	Purple Cliff	NENW	34	47	75	87.3	9.0	WYW126621
19	Red Leg	NWNW	2	46	75	19.9	3.3	WYW135617
20	Shatter	SENE	24	46	76	13.4	2.1	State
21	Shock	NENE	24	46	76	15.2	2.4	State
22	Shutter	NWNW	36	46	76	57.6	6.6	State
23	Skunk	NWSE	17	46	75	11.2	1.9	WYW144523
24	Throw	SESE	17	46	75	16.8	2.9	WYW144523
25	Tish	SESW	9	45	75	16.3	2.9	WYW145578
26	Toss	SENE	17	46	75	19	3.5	WYW130609
27	Touch Down	NWSE	20	46	75	26.6	4.9	Private

County: Campbell
Applicant: Yates Petroleum Corporation

Surface Owners: Richard L. & Dorothy Davis Trust, Lee A. & Margaret Jo Saunders Trusts, InnesRanch LLC., Robert F. & Janet K. Christensen, Donald Rosebro C/O John Groves, Katie O. Schlautmann Trust & Groves Ranch LLC.

Project Description:
The proposed action involves the following:

- Drilling of 88 total federal CBM wells in the Big George and Wyodak coal zones, to depths of approximately 1,100 feet to 1,700 feet. Multiple seams will be produced by co-mingling production (a single well per location, capable of producing from multiple coal seams). The entire POD is private surface except for a ¼ section of State land.

- 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/well visitation. Metering would entail approximately 4 visits per month to each well.

- A Water Management Plan (WMP) that involves the following infrastructure and strategy: 27 discharge points and 27 stock water reservoirs that will provide full containment of water discharged by this project within the Upper Powder River watershed.

- An unimproved and improved road network.

- An above ground power line network to be constructed by a contractor. The proposed routes have been reviewed by the contractor. If the proposed route is altered, then the new route will be proposed via sundry application and analyzed in a separate NEPA action. Power line construction has not been scheduled and will not be completed before the CBNG wells are producing. If the power line network is not completed before the wells are in production, then approximately 10 temporary diesel generators shall be placed at the approximately 10 power drops or other appropriate areas such as well sites or corridors.

- A storage tank of 1000 gallon capacity shall be located with each diesel generator. Generators are projected to be in operation for approximately 6 months. Fuel deliveries are anticipated to be once per week. Noise level is expected to be, for newer models, 85 decibels at 10 feet distance and for older models, 95 decibels at 10 feet.

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

For a detailed description of design features, construction practices and water management strategies associated with the proposed action, refer to the Master Surface Use Plan (MSUP), Drilling Plan and WMP in the POD and individual APDs. Also, see the subject POD 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 COAs 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 too:

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.
5. Yates has committed to the installation of an off-site artificial nesting structure as mitigation to the impact associated with the Shutter reservoir.

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

2. Alternative C – Environmentally Preferred

2.1. Changes as a result of the on-sites

1. Watermelon CS Fed Com. # 10, moved well out of line of sight of a hawk nest.
2. Palookaville CS Fed #4, moved pit to avoid sagebrush.
3. Circumference CS Fed # 1, moved well out of line of sight of hawk nest.
4. Isosceles CS Fed # 17, moved well to reduce surface disturbance and avoid sage-grouse habitat.
5. Isosceles CS Fed # 21, moved well out of line of sight of hawk nest.
6. Isosceles CS Fed # 28, moved well to reduce surface disturbance.

7. Pythagorean CS Fed # 1, moved well out of line of sight of hawk nest.
8. Medicine CS Fed # 9, moved well out of line of sight of hawk nest.
9. Settee CS Fed # 1, moved well out of line of sight of hawk nest.
10. Outrigger CS Fed # 2, changed access road to follow existing oil road.
11. Barometer CS Fed #1, moved the utility corridor to follow an existing road.

2.2. Description of Mitigation Measures (applied as Conditions of Approval):

The operator is responsible for the COAs attached to this EA and will be issued an Incident of Non-Compliance if found to be in violation of any COA.

3. Programmatic and Site specific mitigation measures, Alt. C

3.1. 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.

3.1.1. Water Management

3.1.1.1. 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.

3.1.1.2. Surface Water

2. 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.

3. 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 immediate use in reclamation of the crossings.

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

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

3.1.2. Soils

1. The Companies, on a case by case basis depending upon water and soil characteristics, will test sediments deposited in impoundments before reclaiming the impoundments. Tests will include the

standard suite of parameters that will be monitored in surface water testing and any trace metals found in the CBNG discharges at concentrations exceeding detectable limits.

3.1.3. Wetland/Riparian

1. Power line corridors will avoid wetlands, to the extent possible, in order to reduce the chance of waterfowl hitting the lines. Where avoidance cannot occur, the minimum number of poles necessary to cross the area will be used.
2. Wetland areas will be disturbed only during dry conditions (that is, during late summer or fall), or when the ground is frozen during the winter.
3. No waste material will be deposited in riparian areas, flood plains, or in natural drainage ways.
4. Soil or other material stockpiles will be located outside the active floodplain.
5. Disturbed channels will be re-shaped to their approximate, original configuration or stable geomorphological configuration and properly stabilized.
6. Reclamation of disturbed wetland/riparian areas will begin immediately after project activities are complete.

3.1.4. Wildlife

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

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

3. The Companies will construct power lines to minimize the potential for raptor collisions with the lines. Potential modifications include burying the lines, avoiding areas of high avian use (for example, wetlands, prairie dog towns, and grouse leks), and increasing the visibility of the individual conductors.

4. 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.

3.1.4.1. Threatened, Endangered, or Sensitive Species

3.1.4.1.1. Bald Eagle

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

3.1.5. 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.

3.2. Site Specific Conditions of Approval, Alternative C

3.2.1. General

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

3.2.2. Surface Use:

1. Barometer CS Fed #1, maintain a 20 foot, undisturbed vegetated buffer near slope and line pit.

2. Isosceles CS Fed # 7, maintain a 20 foot, undisturbed vegetated buffer north of well near slope.

3. Medicine CS Fed # 1, maintain a 20 foot, undisturbed vegetated buffer near slope and line pit.

4. Medicine CS Fed # 8, stay off road when wet. Stabilize disturbance during and within 30 days of construction and line pit if subsurface moisture is encountered.

5. Isosceles CS Fed #13, maintain a 20 foot undisturbed vegetated buffer near slope and line pit.

6. Pythagorean CS Fed # 1, remove fluids from pit as soon as drilling is done and close pit. Put diversion structures, to control runoff, up draw as needed. Stabilize during and within 30 days of construction.

7. Davenport CS Fed # 2, maintain 20 foot, undisturbed vegetated buffer near slope.

8. Outrigger CS Fed # 2, maintain 20 foot, undisturbed vegetated buffer near slope.

9. Approval of this project does not grant authority to use off lease Federal lands. No surface disturbing activity, or use of off-lease federal lands, is allowed on affected leases until right-of-way grants become effective, which is the date signed by the authorized officer.

10. 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 Gauge POD is Covert Green.

11. Due to "poor reclamation potential and/or steep slopes", the following locations will need to be stabilized during and within 30 days of the start of construction.
    - 0.2 miles of utility corridor in the SE corner of Sec. 32 and the SW corner of Sec.33,
    - 0.7 miles of 2 track road and utility corridor in Sec. 7, starting at the crossing on Pumpkin Ck. and ending at the 6 ISOS well.
    - 0.1 mile of 2 track road and utility corridor in the South half of Sec. 16, where the corridor meets the crowned and ditched road.
    - 0.1 mile of road and utility corridor in the SW ¼ of Sec. 14, from the spot upgrade, South to the intersection.
    - 0.4 miles of utility corridor in Sec. 24, from the section line, West of 1LB State well to the Shatter Reservoir.
    - 0.9 miles of road and utility corridor in the South ½ of Sec. 19, from the East section line through the spot upgrade, West to the existing culvert.
    - 0.65 miles of road and utility corridor in Sec. 29, from the proposed culvert, south, through the spot upgrade, just past well 9Med.

- In Section 32, the road and corridor where the proposed culvert crosses the West Fork of Nut Ck.
- 0.7 miles of road and utility corridor in Sec. 5, from the intersection, just South of the existing storage yard, North to the 12 Line well.
- 0.25 miles of utility corridor in Sec.36, from the 2H2 State well to the 2SF State well.

12. The operator will drill or broadcast seed, then rake, on the contour to a depth of less than 0.5 inch, followed by cultipaction to compact the seedbed and minimize 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 seed mix desired by the surface owner, use the following:

Loamy Ecological Site Seed Mix		
Species	**% in Mix**	**Lbs PLS***
Western Wheatgrass (Pascopyrum smithii)/or ***Thickspike Wheatgrass*** (Elymus lanceolatus ssp. lanceolatus)	27	3.5
Bluebunch Wheatgrass (Pseudoroegneria spicata ssp. Spicata)	8	1
Green needlegrass (Nassella viridula)	23	3.0
Slender Wheatgrass (Elymus trachycaulus ssp. trachycaulus)	20	2.5
Sand bluestem/Champ variety Andropogon hallii	12	1.5
Prairie coneflower (Ratibida columnifera)	4	0.5
White or purple prairie clover (Dalea candidum, purpureum)	4	0.5
Rocky Mountain beeplant (Cleome serrulata)	4	0.5
Totals	**100%**	**13 lbs/acre**

*PLS = pure live seed (this seeding rate has not been doubled).
This is a recommended seed mix based on the native plant species listed in the NRCS Ecological Site descriptions, U.W. College of Ag. and seed market availability.

- Slopes too steep for machinery may be hand broadcast and raked with twice the specified amount of seed.

13. Please contact Dan Sellers, Natural Resource Specialist, at (307) 684-1132, Bureau of Land Management, Buffalo, if there are any questions concerning these surface use COAs.

3.2.3. Wildlife

Bald Eagles

The following conditions will alleviate impacts to bald eagles:

- No project related actions shall occur within one mile of North Prong Creek from November 1 through April 1, prior to a winter roost survey or from February 1 through August 15 prior to a nesting survey. All survey results must be submitted in writing to the BFO and approved prior to

initiation of surface disturbing activities. This timing limitation will be in effect unless surveys determine the nest/roost to be inactive. This affects the following wells and infrastructure:

Township/Range	Section	Wells and Infrastructure
T46N R75W	8	4 Sidwell, 7 Isosceles, 8 Isosceles, 10 Isosceles, and16 Isosceles,
	15	11 Isosceles , 12 Isosceles, 13 Isosceles, 14 Isosceles, 15 Isosceles, 31 Isosceles, 6 Medicine, 7 Medicine, and 8 Medicine.

a. If a roost is identified and construction has not been completed, a year-round disturbance-free buffer zone of 0.5 mile will be established for all bald eagle winter roost sites. A seasonal minimum disturbance buffer zone of 1 mile will be established for all bald eagle roost sites (November 1 - April 1). Additional measures such as remote monitoring and restricting maintenance visitation to between 9:00 AM and 3:00 PM may be necessary to prevent disturbance.
b. If a nest is identified and construction has not been completed, a disturbance-free buffer zone of 0.5 mile (i.e., no surface occupancy) would be established year round for all bald eagle nests. A seasonal minimum disturbance buffer zone of 1 mile will be established for all bald eagle nest sites (February 1 - August 15).

- Additional mitigation measures may be necessary if, at any point in the future, this site-specific project is determined by a BLM biologist to have an adverse affect to bald eagles or their habitat.

Burrowing Owls

The following conditions will alleviate impacts to burrowing owls:

1. No surface disturbing activity shall occur within 0.25 miles of the identified prairie dog colony located in section NW SW Section 5, T46N, R75W, from April 15 to August 31, annually, prior to a burrowing owl nest occupancy survey for the current breeding season. A 0.25 mile buffer will be applied if a burrowing owl nest is identified. This condition will be implemented on an annual basis for the duration of surface disturbing activities within the prairie dog town(s). This timing limitation will be in effect unless surveys determine the nest(s) to be inactive. This timing limitation will affect well #2 Sidwell and access road between well #1 Isosles and well # 1 Conic.

Raptors

The following conditions will alleviate impacts to raptors:

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

BLM ID (Raptor nest #)	Wells and associated infrastructure within 0.5 miles of the nest
651	Well: 28, 29, and 30 Isosceles, 1Pythagorean Overhead Power: 1 mile Access road: 1.6 miles Impoundments: Shatter and Shock
655	Well: 1&2 Isosceles, 9 Line, 1 Conic, and 3 Sidwell Overhead Power: Proposed 1.1 mile and 2 meter drop Access road: 2.2 miles
657	Well: 2 existing Access road: 0.8 mile
661	Well: 10 Watermelon

BLM ID (Raptor nest #)	Wells and associated infrastructure within 0.5 miles of the nest
665	Well: 1Pythagorean, 29 Isosceles, 22 Isosceles, 1 Circumference Impoundment: Bootleg, Halftime, Fumble Overhead Power:0.7 mile Access road : 2 miles
669	Access road & Utility corridor: 0.5 miles
670	Access road & Utility corridor: 0.25 miles
675	Well: 2&3 Palookaville Impoundment: Red Leg Access road:0.7 mile
1396	Well: 18,19,26 & 22 Isosceles, and 1 Circumference Overhead Power: 1.8 mile and 3 meter drops Impoundment: Halftime, Skunk, Fumble, Throw, and Pass Access road: 1.8 miles
1401	Well: 19,21 & 22 Isosceles, 1 Circumference, and 1 Parabola Overhead Power: 1.3 mile and 1 meter drops Impoundment: Halftime, Skunk, Fumble, Throw, Catch, Pass, and Toss Access road: 2.5 miles
1402	Well: 1 Parabola, 1 line, 10 & 11 Line, 1 Zuccini, Impoundment: Touchdown Overhead Power: 0.4mile Access road: 1.5 miles
1433	Well: 33 Isosceles Impoundment: Chase Access Road: 1.5 mile
1942	Utility Corridor: 0.1 mile
2281	Well: 8, 10&16 Isosceles Overhead Power: Proposed 0.3 mile and 1 meter drops Access road: 2.3 miles
2284	Well: 12,13, & Isosceles Access road: 0.9 mile Overhead Power: 0.5 mile and 1meter drop Impoundment: Innes Utility Corridor:0.3 mile
2285	Well: 12&13 Isosceles, and 7 Medicine Access road: Proposed 0.9 miles Overhead Power: 0.3 mile and 1meter drop
2286	Well: 12 Isosceles, and 7 Medicine Access road: 0.8 miles
2287	Well: 1 Outrigger Impoundment: Purple Cliff Access road: Proposed 0.1 miles
2289	Well: 2&3 Palookaville Impoundment: Red Leg Access road: 0.7 mile
2290	Well: 8 Palookaville, 2&4Medicene, 1Prescription Impoundment: Channel Access road: 1.3 mile Overhead Power: 1.2 mile and 2 meter drops

BLM ID (Raptor nest #)	Wells and associated infrastructure within 0.5 miles of the nest
3707	Wells: 1 Magnitude, 2 Magnitude Impoundment: Olive Access roads: 0.4 miles
3708	Wells: 1 Magnitude, 2 Magnitude Impoundment: Olive Access roads: 0.3 miles
3886	Well: 1 Outrigger Impoundment: Purple Cliff Access road: 0.4 miles
3998	Well: 12&13 Medicine Overhead Power: 0.7 mile and 2 meter drops Access Road: 2.35 miles
4015	Wells: 1 Magnitude, 2 Magnitude Impoundment: Olive Access roads: 0.4 miles
4089	Wells: 9&10 Medicene Access road: 1.1 mile
4093	Well: 2&3 Palookaville Impoundment: Red Leg Access road: 0.5 miles
4764	Well: 24 Isosceles Access road: Existing 0.1 miles
4947	Utility Corridor: 0.1 mile
5052	Well: 1 Outrigger Impoundment: Purple Cliff Access road: Proposed 0.1 miles
5053	Well: 1 Outrigger Impoundment: Purple Cliff Access road: Proposed 0.4 miles
5054	Well: 1&2 Outrigger Impoundment: Purple Cliff Access road: 0.9 miles
5055	Well: 1,2,5,6,&9 Isosceles Overhead Power: Proposed 0.3 mile and 1 meter drop Access road: 1.23 miles
5056	Well: 2,3,&4 Isosceles Access road: 1 mile
5057	Well: 27,28, 29, and 30 Isosceles, 1Pythagorean Overhead Power: 0.7 mile Access road: 1.8 miles
5058	Well: 28, 29, and 30 Isosceles Overhead Power: 1 mile Access road: 1.6 miles Impoundments: Shatter and Shock
5059	Well: 1Pythagorean Overhead Power: 0.5 mile Impoundments: Shatter and Shock Access road: 1.8 miles

BLM ID (Raptor nest #)	Wells and associated infrastructure within 0.5 miles of the nest
5060	Well: 28, 29, and 30 Isosceles, 1Pythagorean Overhead Power: 1 mile Access road: 1.6 miles Impoundments: Shatter and Shock
5061	Well: 1Pythagorean Overhead Power: 0.5 mile Impoundments: Shatter and Shock Access road: 2 miles
5062	Well: 1 Parabola, 1 line, 10 & 11 Line, 1 Zuccini, Impoundment: Touchdown Access road: 1.5 miles
5063	Well: 33 Isosceles Impoundment: Chase Access Road: 1.5 mile
5064	Cross country Utility corridor: 0.8 mile Access road:1.8
5065	Cross country Utility corridor: 0.5 mile Access road: 1.5 miles
5066	Access road and Utility corridor: 1.5 mile
5067	Access road: 0.8 mile
5068	Access road: 0.8 mile
5069	Wells: 9&10 Medicine Access road: 1.1 mile
5070	Overhead Power: 0.7 mile and 2 meter drops Access Road: Existing road: 1.9 miles
5072	Wells: 10 Watermelon, 12 Line Access roads: 0.7 mile
5073	Well: 2 Touchstone
5074	Utility Corridor: 0.7 miles
5075	Utility Corridor: 0.5 miles
5082	Well: 1Pythagorean Overhead Power: 0.5 mile Impoundments: Shatter and Shock Access road: 1.8 miles
5795	Well: 24 Isosceles Access road: Existing 0.1 miles
6329	Wells: 9&10 Medicene Access road: 1 mile
6433	Overhead Power: Proposed 0.15 mile Access road: 1.21 miles
6438	Well:1 Settee well Overhead Power: 0.2 mile and 1 meter drop Access Road: 0.5 miles Impoundment: Shutter
6439	Well: 12&13 Medicine Overhead Power: 0.4 mile and 1 meter drop Access Road: 1.64 miles
6441	Wells: 10 Watermelon, 1Touchstone, 12 Line

BLM ID (Raptor nest #)	Wells and associated infrastructure within 0.5 miles of the nest
	Access roads: 1 mile Overhead Power: 1 meter drop
10602 (8379)	Wells:1 Settee Overhead Power: 0.5 mile and 1 meter drop Access Road: 1.4 miles Impoundment: Shutter

- 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.

  Nest productivity checks shall be completed annually during POD construction and 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 the BLM biologist in writing no later than July 31 of each survey year. This applies to the following nests: BLM ID#s 655,657,665,669,670,675,676,1396,1401,1402,1433,1941,1942,2284,2285,2286,2287,2289,2290,3707,3886,3997,3998,4015,4089,4093,4594,4595,4764,5053,5054,5055,5056,5057,5058,5059,5060,5061,5062,5063,5064,5065,5066,5068,5069,5070,5073,5074,5075,5082,5795,6329,6356,6358,6433,6434,6435,6436,6437,6439,6441, and 8379. 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.

2. 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. No surface disturbing activities are permitted for the locations, access roads, and impoundments listed below between March 1-June 15. This condition will be implemented on an annual basis for the duration of surface disturbing activities. This timing limitation will affect the following:

T46N R75W	Sections:1,2,4,5,6,7,8,9,16,17,18,19,20,21, 22,29,30,31 and 32.
T46N R76W	Sections:24,27,35 and 36.
T45N R75W	Sections:4,5, and 9.

   a) If a previously unknown lek is identified during surveys, additional areas may be included in the above referenced timing restriction (March 1-June 15). If surveys indicate a lek is inactive during the current breeding season, surface disturbing activities may be permitted with BLM approval. 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.

2. A sage-grouse survey will be conducted for all known leks within 2 miles of the POD by a biologist following the most current WGFD protocol. All survey results shall be submitted in writing to a Buffalo BLM biologist no later than July 31of the current year. Currently, this applies to the Gilkie Ranch lek, Innes lek, and North Beaver Creek leks.

3. If an active lek is identified and construction has not been completed, surface disturbance and occupancy within 0.25 miles of the center of the lek will be prohibited.

4. Roads within 1/2 mile of sage grouse leks will be posted (with signs shorter than four feet) by the operator at 10 mph during daylight hours between March1-June 15.

Mountain Plover
The following conditions will alleviate impacts to mountain plovers:

1. No surface disturbing activities are permitted, from March 15-July 31, unless a mountain plover nesting survey has been conducted during the current breeding season by a biologist following the most current USFWS Mountain Plover Survey Guidelines (the survey period is May 1-June 15). All survey results must be submitted in writing to the BFO and approved prior to initiation of surface disturbing activities. This timing limitation will be in effect unless surveys determine no plovers are present. This timing limitation will affect the following: NW SW Section 5 T46N:R75W.

Water Management
1. The operator will conduct a spring survey for the POD area and will submit a sundry prior to POD development that provides results of the spring survey. Provide appropriate updates to the WMP including Map C showing the spring located on Middle Prong Pumpkin Creek near the Medicine CS Federal Com 9 well as well as other springs found in the survey. Also provide a page for the WMP that describes the survey and the identified springs, spring flow rates and their results of water quality analyses for each spring. Collect spring and fall water quality samples and flow rates from all springs identified, and analyze each sample for the standard WYPDES suite of parameters. Forward two copies of the lab analyses and flow rates to the BLM after each sampling event.

4. Alternative D-Sage-Grouse Emphasis

Alternative D represents a modification of Alternative C based on the application of mitigation measures designed to reduce impacts to sage-grouse and sage-grouse habitat. The description of Alternative D is the same as Alternative C with the addition of the project modifications identified by BLM, guided by seven years of sage-grouse research in the Powder River Basin and additional research on sage-grouse in other areas. Alternative D represents BFO efforts to mitigate project-specific impacts to sage-grouse habitat, while maintaining proposed spacing and infrastructure requirements consistent with the purpose and need of the proposed action.

This Alternative incorporates mitigation measures designed around site-specific habitat characteristics to minimize habitat fragmentation and accelerate return to habitat effectiveness at reclamation. In order to best meet this objective, the following general changes from Alternative C, are listed below:

1. All proposed power that will service the Federal action will be buried.
2. Remove all proposed impoundments
3. All linear infrastructure and access roads will be consolidated.
4. Throughout production, human presence will be limited with the deployment of the most recent technology(For example, cameras and remote sensing)
5. Reclamation activities (other than locations having a 30 day interim reclamation COA), including seeding, will take place in the fall.
6. If project construction continues for more than 1 year, the project will be phased to leave undisturbed habitat available to nesting sage-grouse during the season following the first year of construction.

7. After the wells are complete, well metering, maintenance and other site visits will be limited to an average of 3 visits to each well location per week (up to 12 visits per well/month for the first six months). The company will be required to report frequency of site visits, after the wells are complete, along with repairs made and problems identified resulting from the visits. The company will submit these reports to BLM at the end of every month. The BLM will use site visit data in order to determine the necessary frequency of site visits.

In addition to the general measures above, the following site specific mitigating measures applied for the following proposed wells and infrastructure would maintain open corridors for sage-grouse, provide contiguous habitat patches, and reduce disturbance in and adjacent to sage-grouse habitat:.

Thirteen recommended wells to be deferred in order of priority:

Well Name	Well #	QTR	Sec	TWP	RNG	Lease	Disturbance amount(access road)
GAUGE PYTHAGOREAN CS	1	NENW	19	46N	75W	WYW144524	0.4 mi, 1 low water crossing
GAUGE ISOSCELES CS	28	SWSE	18	46N	75W	WYW130609	0.3 mi, 1 low water crossing
GAUGE ISOSCELES CS	30	SWNE	19	46N	75W	WYW130609	0.38 mi
GAUGE ISOSCELES CS	29	NENE	19	46N	75W	WYW130609	0.4 mi
GAUGE ZUCINNI CS COM	1	SWNE	20	46N	75W	WYW134909	0.15 mi
GAUGE ISOSCELES CS	23	NENE	18	46N	75W	WYW130609	0.6 mi
GAUGE LINE CAMP CS	9	SWSE	6	46N	75W	WYW133611	0.27 mi
GAUGE CONIC CS COM	1	NESE	6	46N	75W	WYW129030	0.16 mi
GAUGE ISOSCELES CS	6	SWNW	8	46N	75W	WYW130609	0.2 mi
GAUGE MEDICINE CS	12	NWNW	31	46N	75W	WYW138440	0.16 mi
GAUGE ISOSCELES CS COM	2	NENE	7	46N	75W	WYW130609	0.05 mi
GAUGE ISOSCELES CS COM	3	NENW	7	46N	75W	WYW130609	0.17 mi
GAUGE ISOSCELES CS	5	NENW	8	46N	75W	WYW130609	0.12 mi

Nine impoundments locations are not approved:

Impoundment Name / Number	Qtr/Qtr	Sec	TWP	RNG	Capacity (Acre Feet)	Surface Disturbance (Acres)	Lease #	Disturbance amount (access road)
Touch Down	NWSE	20	46	75	26.6	4.9	Private	0.45 mi
Carry	SWNE	18	46	75	23.6	3.4	WYW130609	0.2 mi
Halftime	NENW	20	46	75	14.5	2.4	WYW144525	0.23 mi
Shatter	SENE	24	46	76	13.4	2.1	State	0.37 mi
Shock	NENE	24	46	76	15.2	2.4	State	0.7 mi
Kennedy	NENE	18	46	75	19.9	3.8	WYW130609	0.18 mi
Kick	NWNW	17	46	75	19.4	3.6	WYW130609	0.37 mi
Skunk	NWSE	17	46	75	11.2	1.9	WYW144523	0.25 mi
Pass	SENW	17	46	75	19.6	3.1	WYW130609	0.9 mi

Within the analysis in Section 4.3.2 of the EA, the analysis assumes that all 27 reservoirs would potentially be constructed, therefore a conservatively high estimate of impacts was considered.

5. Alternatives considered but not analyzed in detail

The following water management strategies were considered for use in this POD.

5.1. Land Application

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. Land application of water produced from the Gauge POD was considered, but due to the high construction and operating costs, land application was ruled out.

5.1.1. Treatment of Produced Water

Treatment of produced water from the Gauge POD was researched to examine the full range of possibilities. Ion exchange was the principle technology considered, but costs were considered to be cost prohibitive for this project. In particular, the waste stream produced would require disposal through commercial injection or evaporation on site, thus adding substantial costs and detracted from the viability of this project. As well, the discharge of treated water into stream channels was not desirable.

5.1.1.1. Artificial Wetlands

Artificial wetlands do not effectively reduce the level of dissolved solids in the discharge water or meet the volume requirements of this project, and the landowners and lessees did not desire the creation of large wetland areas.

5.2. 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 5.

Table 5 Summary of Alternatives

Summary of the Alternatives	Alternative A (No Action) Existing Number or Miles	Alternative B (Original Proposal) Proposed Number or Miles	Alternative C (Environmental Alt.1) Revised Number or Miles	Alternative D (Environmental Alt.2) Revised Number or Miles
Total CBNG Wells	0	88	88	75
Well Locations Nonconstructed	0	87 (0.5 acre ea.)	87 (0.5 acre ea.)	(0.5 acre ea)
Constructed	0	0	0	0 (0.5acre ea)
Slotted	0	1 (0.5 acre ea.)	1 (0.5 acre ea.)	
Conventional Wells	258 1 acre ea.	0	0	0

Summary of the Alternatives	Alternative A (No Action) Existing Number or Miles	Alternative B (Original Proposal) Proposed Number or Miles	Alternative C (Environmental Alt.1) Revised Number or Miles	Alternative D (Environmental Alt.2) Revised Number or Miles
Gather/Metering Facilities	0	0	0	0
Compressors	0	0	0	0
Ancillary (Staging/Storage Areas)	2 (1.5 ac. ea.) 3 acres	2 (1.5 acre ea)	2 (1.5 acres ea) 3 acres	2 (1.5 acres ea) 3 acres
Template/Spot Upgrade Roads No Corridor With Corridor	23.3 mi. x 40' wide 23.3 mi. 0	2.5 mi. x 75'wide 0 2.5 mi.	2.5 mi. x 75' wide 0 2.5	2.5 mi. x 75' wide 0 2.5
Engineered Roads No Corridor With Corridor	0 0 0	0 0 0	0' 0 0	0 0 0
Primitive Roads No Corridor With Corridor	9.6 mi x 12' wide 9.3 mi. 0.25	17.2 mi. 0.5 mi x12' 16.7 mi. x 40'	17.2 mi. 0.5 mi. x 12' 16.7 mi x 40'	10.2 mi.
Buried Utilities No Corridor With Corridor	0 0 0	0.88 mi. x 40' 1.73 mi. x 40'	0.88 mi. x 40' 1.73 mi. x 40'	0.88 mi. x 40' 1.73 mi. x 40'
Overhead Powerlines	4 mi. x 30' wide	9.2 mi.	9.2 mi.	0
Communication Sites	0	0	0	0
Monitor Wells	0	0	0	0
LAD	0	0	0	0
SDI	0	0	0	0
Treatment Facilities	0	0	0	0
Impoundments On-channel	3	27 (122.3 ac)	27 (122.3 ac)	18 (94.7 ac)
Water Discharge Points	1	27 (0.54 ac.)	27 (0.54 ac)	18 (.32 ac)
Channel Disturbance Headcut Mitigation				

Summary of the Alternatives	Alternative A (No Action) Existing Number or Miles	Alternative B (Original Proposal) Proposed Number or Miles	Alternative C (Environmental Alt.1) Revised Number or Miles	Alternative D (Environmental Alt.2) Revised Number or Miles
Channel Modification	0 0	0 0	0 0	0 0
TOTAL ACRES DISTURBANCE	**Approx. 172**	**Approx. 293.7**	**Approx. 293.7**	**Approx. 255.7**

APPENDIX B
Bureau of Land Management Wyoming Buffalo Field Office
Guidance for general management actions during BFO
Resource Management Plan Revision
as of August 13, 2008

Lands shown on the attached map in white will be subject to the existing decisions from the 1985 RMP (as amended) and the 2003 Environmental Impact Statement/Plan Amendment Record of Decision for the Powder River Basin. Areas that are shown in blue will be managed according to these same planning documents as well as the management actions listed below.

The additional management actions were designed in accordance with the 2003 Record of Decision which states, in part, "Land use plan monitoring will be conducted by BLM…Information gathered from this monitoring will guide mid-course corrections in adapting to the inevitable changes that will occur because of new information."

Fluid Minerals

- Processing of new proposals will be considered on a case-by-case basis.
- Efforts will be made to assure that the impacts of surface disturbing projects will be consistent with a well pad density of 640 acres.
- Lease suspension requests will be processed in accordance with current regulations and policy.

Solid Minerals

- Processing of new proposals will be considered on a case-by-case basis.

Vegetation Management

- Current and proposed pesticide use proposals for weed control will be reviewed on a case-by-case basis.
- Consideration of new proposals for vegetation treatments other than weed control may be considered on a case-by-case basis.

Fire Suppression

- The national strategy for fire suppression in sage-grouse habitat will be applied.
- Renewed emphasis on integration of resource advisors in fire suppression efforts.

Recreation

- Renewals for existing permitted actions will be allowed.
- New proposals for permitted activities will be considered on a case-by-case basis.
- New proposals for recreational facilities will be considered on a case-by-case basis.

Wildlife

- Approved habitat improvements and maintenance of existing improvements will be allowed.
- New proposals for habitat improvement projects will be considered on a case by case basis.

Rangeland Management

- Grazing use will continue in accordance with the grazing regulations.
- New proposals for range improvements or treatments will be considered on a case-by-case basis.

Realty

- Processing of new applications will be considered on a case-by-case basis.
- Changes to existing Terms & Conditions will be considered on a case-by-case basis.

When considering these general management actions on a case-by-case basis consideration will be given to maintaining a viable population of sage-grouse and associated habitat needs. The proponent will be asked to demonstrate that the proposal can be managed in a manner that effectively conserves sage-grouse habitats affected by the proposal.

BLM will work with industry to include measurable conservation objectives for use in project planning. Resources such as, but not limited to, the Local Sage-Grouse Working Group Plan may be used to develop these objectives. Each proposal will be evaluated by BLM in coordination with the Wyoming Game & Fish Department to ensure that BLM maintains habitat connectivity by addressing habitat loss, degradation and fragmentation.

Criteria that will be used when reviewing proposed activities include, but are not limited to the following:

- Consolidation of infrastructure to lessen habitat fragmentation, degradation and loss.
- Effective conservation of sage-grouse seasonal habitats and habitat connectivity.
- Measurable conservation objectives.
- Consideration of measures contained in the Local Working Group Conservation Plan.