FINDING OF NO SIGNIFICANT IMPACT & DECISION RECORD
FOR
Cedar Ridge, LLC.
Harris POD
ENVIRONMENTAL ASSESSMENT –WY-070-08-172

DECISION: Is to approve Alternative C as described in the attached Environmental Assessment (EA) and authorize Cedar Ridge, LLC.'s Harris PODCoal Bed Natural Gas (CBNG) POD comprised of the following 6 Applications for Permit to Drill (APDs):

	Well Name	Well #	Qtr/Qtr	Section	TWP	RNG	Lease #
1	HARRIS FEDERAL	12-30	SWNW	30	56N	72W	WYW135586
2	HARRIS FEDERAL	14-30	SWSW	30	56N	72W	WYW135586
3	HARRIS FEDERAL	23-30	NESW	30	56N	72W	WYW135586
4	HARRIS FEDERAL	34-30	SWSE	30	56N	72W	WYW135586
5	HARRIS FEDERAL	12-35	SWNW	35	56N	73W	WYW135602
6	HARRIS FEDERAL	34-35	SWSE	35	56N	73W	WYW135602

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

	IMPOUNDMENT Name / Number	Qtr/Qtr	Section	TWP	RNG	Capacity (Acre Feet)	Surface Disturbance (Acres)	Lease #
1	43-26-5673	NESE	26	56	73	14.4	2.88	FEE
2	42-35-5673	SENE	35	56	73	19.07	4.77	WYW025864
3	Parks Playa	NENE	20	55	72	100	19.73	WYW150746

The following rights-of way associated with this POD are authorized:

	Right-of-Way	Qtr/Qtr	Sec	TWP	RNG	Length	Surface Disturbance (Acres)	Use
1	WYW-169953	Lot 3; NENW,NWNE Lots 70G, 70H, 70O;	17 31 25	55 56 56	72 72 73	9,267'	5.012, more or less	Access, water, electric
2	WYW-169954	NENW,NWNE Lots 70G, 70H, 70O;	31 25	56 56	72 73	7,924'	5.012, more or less	Gas gathering pipelines for leases WYW-135602 and WYW-135586

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

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

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

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

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

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

Field Manager:_____ Date: _____

BUREAU OF LAND MANAGEMENT
BUFFALO FIELD OFFICE
ENVIRONMENTAL ASSESSMENT (EA)
FOR
Cedar Ridge, LLC.
Harris POD
PLAN OF DEVELOPMENT
WY-070-08-172

INTRODUCTION

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

1. PURPOSE AND NEED

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

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

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

2. ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1. Alternative A - No Action

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

2.2. Alternative B Proposed Action

Proposed Action Title/Type: Cedar Ridge, LLC.'s Harris Plan of Development (POD) for 6 coal bed natural gas well APD`s and associated infrastructure.

Proposed Well Information: There are 6 wells proposed within this POD; the wells are vertical bores proposed on an 80 acre spacing pattern with one well per location. Each well will produce from four coal seams. Proposed well house dimensions are 6ft wide x 7ft length x 6ft height. Well house color is Covert Green (18-0617 TPX), selected to blend with the surrounding vegetation. Proposed wells are located as follows:

	Well Name	Well #	Qtr/Qtr	Section	TWP	RNG	Lease #
1	HARRIS FEDERAL	12-30	SWNW	30	56N	72W	WYW135586
2	HARRIS FEDERAL	14-30	SWSW	30	56N	72W	WYW135586
3	HARRIS FEDERAL	23-30	NESW	30	56N	72W	WYW135586
4	HARRIS FEDERAL	34-30	SWSE	30	56N	72W	WYW135586
5	HARRIS FEDERAL	12-35	SWNW	35	56N	73W	WYW135602
6	HARRIS FEDERAL	34-35	SWSE	35	56N	73W	WYW135602

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

	IMPOUNDMENT Name / Number	Qtr/Qtr	Section	TWP	RNG	Capacity (Acre Feet)	Surface Disturbance (Acres)	Lease #
1	43-26-5673	NESE	26	56	73	14.4	2.88	FEE
2	42-35-5673	SENE	35	56	73	19.07	4.77	WYW025864
3	Parks Playa	NENE	20	55	72	100	19.73	WYW150746

County: Campbell

Applicant: Cedar Ridge, LLC.

Surface Owners: Mary Jane Harris, State of Wyoming, Paulette Parks Trust

Project Description:
The proposed action involves the following:

- Drilling of 6 total federal CBNG wells in the Canyon, Wall, Pawnee, and Cache coal zones to depths of approximately 769 to 920 feet. Multiple seams will be produced by co-mingling production (a single well per location cable of producing from multiple coal seams).

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

- Well metering shall be accomplished by telemetry and well visitation. Metering would entail 8 to 10 visits per month to each well.

- A Water Management Plan (WMP) that involves the following infrastructure and strategy: 3 discharge points and 3 stock water reservoirs within the Little Powder River watershed; two reservoirs are on-channel impoundments and the third is a proposed off-channel playa. Water will be stored in these facilities at the request of landowners and downstream discharge will be limited, but direct discharge into stream channels is allowed by the WYPDES permit.

- An unimproved and improved road network.

- A buried gas, water and power line network. All electrical lines from existing electric drops will be placed underground. No new overhead powerlines are proposed in the Harris POD.

- Several ROW grants are necessary for road access and utilities between the two leases and for water disposal. A summary of the ROWs is as follows:

	Right-of-Way	Qtr/Qtr	Sec	TWP	RNG	Length	Surface Disturbance (Acres)	Use
1	WYW-169953	Lot 3; NENW,NWNE Lots 70G, 70H, 70O;	17 31 25	55 56 56	72 72 73	9,267'	5.012, more or less	Access, water, electric
2	WYW-169954	NENW,NWNE Lots 70G, 70H, 70O;	31 25	56 56	72 73	7,924'	5.012, more or less	Gas gathering pipelines for leases WYW-135602 and WYW-135586

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

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

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

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

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

2.3. Alternative C – Environmentally Preferred

Alternative C represents a modification of Alternative B based on the operator and BLM working cooperatively to reduce environmental impacts. The description of Alternative C is the same as Alternative B with the addition of the project modifications identified by BLM and the operator following the initial project proposal (Alternative B). At the on-sites, all areas of proposed surface disturbance were inspected to insure that the project would meet BLM multiple use objectives to conserve natural resources while allowing for the extraction of Federal minerals. In some cases, access roads were re-routed, and well locations, pipelines, discharge points and other water management control structures were moved, modified, mitigated or dropped from further consideration to alleviate environmental impacts.

Alternatives to the different aspects of the proposed action are always considered and applied as pre-approval changes, site specific mitigation and/or Conditions of Approval (COAs), if they will alleviate environmental effects of the operator's proposal. The specific changes identified for the Harris POD are listed below under 2.3.1:

2.3.1. Changes as a result of the on-sites

Well Name & Number	Aliquot	Section	T/R	Notes
Harris Federal 12-30-5672	SWNW	30	56N/72W	The well location was moved approx. 1020ft S/SW. The original location was situated at the base of a well-vegetated drainage. Good habitat for sage grouse. Slopes and the potential for soil erosion/degradation were also identified. The new well location is flat and sits at edge of a small bowl feature. A constructed pad will not be required at this new location. The proposed engineered segment of the access road was dropped as a result of the well move. Pit liner will be required.
Harris Federal 14-30-5672	SWSW	30	56N/72W	The well location was moved approx. 291ft S/SW, across the county road. The original well location was moved due to the site's poor reclamation potential, soil fragility; and, overall susceptibility to degradation. Potential impacts to adjacent drainages were also identified. The new location has deeper soils and better reclamation potential. The new location is flat with scattered sagebrush vegetation. No constructed pad or engineered access road is needed.
Harris Federal 23-30-5672	NESW	30	56N/72W	The well location was moved approx. 450ft S/SE. The original location was within line-of-sight and within a ¼ mile buffer of an active raptor nest. Good habitat characteristics for sage grouse were also noted. The new location is still within the ¼ mile buffer but outside of the line-of-sight. The location's topography buffers the nest from potential visual impacts. Dense sagebrush covers much of the area, including the access road and well location. To minimize sagebrush impacts, the access road will be limited to a clearing/disturbance width of 20'.
Harris Federal 34-30-5672	SWSE	30	56N/72W	The well location was moved approx. 180ft E, out of dense sagebrush. A new "Eyebrow" location was sited along the access road.

Well Name & Number	Aliquot	Section	T/R	Notes
Harris Federal 34-35-5673	SWSE	35	56N/73W	Pit liner required due to the location's proximity to an adjacent drainage. Rerouted pipeline corridor and access road to avoid fragmentation of sagebrush. The new route was sited next to the existing Belle Fourche pipeline corridor.
Harris Federal 12-35-5673	SWNW	35	56N/73W	Pit liner required due to the location's proximity to an adjacent drainage.

2.3.2. Programmatic mitigation measures identified in the PRB FEIS ROD

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

2.3.2.1. Groundwater

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

2.3.2.2. Surface Water

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

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

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

2.3.2.3. 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. Containment impoundments will be fenced to exclude wildlife and livestock. If they are not fenced, they will be designed and constructed to prevent entrapment and drowning.

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.*

2.3.2.4. Threatened, Endangered, or Sensitive Species

2.3.2.4.1. Bald Eagle

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

2. Additional mitigation measures may be necessary if the site-specific project is determined by a BLM biologist to have adverse effects to bald eagles or their habitat.

2.3.2.4.2. Black-footed Ferret

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

2.3.2.4.3. Ute Ladies'-tresses Orchid

1. Suitable habitat will be avoided wherever possible.

2. If suitable habitat for Ute ladies'-tresses cannot be avoided, surveys will be conducted in compliance with USFWS standards (USFWS 1995) by a BLM approved biologist or botanist. Surveys can only be conducted between July 20 and August 31.

3. Moist soils near wetlands, streams, lakes, or springs in the project area will be promptly revegetated if construction activities impact the vegetation in these areas. Revegetation will be designed to avoid the establishment of noxious weeds.

2.3.2.4.4. Air Quality

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

2.3.3. Site specific mitigation measures

General

1. All changes made at the pre-approval onsite will be followed. They have all been incorporated into the operator's plan of development (POD). Please refer to Table 2.3.1 "Changes as a result of the

onsite" on pages 6-7 of EA#WY-070-EA08-172, and/or the Post-Onsite Deficiency Letter dated 08/04/2008.

2. Cedar Ridge, LLC. field representatives and contractors will have a copy of the approved POD map and conditions of approval (COAs) at all times while conducting activities within the Harris Federal POD project area.

3. Please contact Julian Serafin – Natural Resource Specialist, @ (307) 684-1043, Bureau of Land Management, Buffalo, if there are any questions concerning surface use COAs.

Surface Use

1. All permanent above-ground structures (e.g., production equipment, well house, 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 Harris Federal POD is Covert Green, 18-0617 TPX.

2. Interim Reclamation of disturbed areas will adhere to the following guidance (as per the Wyoming Policy on Reclamation (IM WY-90-231):
   A. The reclaimed area shall be stable and exhibit none of the following characteristics:
      i. Large rills or gullies.
      ii. Perceptible soil movement or head cutting in drainages.
      iii. Slope instability on, or adjacent to, the reclaimed area in question.
   B. The soil surface must be stable and have adequate surface roughness to reduce runoff and capture rainfall and snow melt. Additional short-term measures, such as the application of mulch, shall be used to reduce surface soil movement.
   C. Vegetation canopy cover (on unforested sites), production and species diversity (including shrubs) shall approximate the surrounding undisturbed area. The vegetation shall stabilize the site and support the planned post disturbance land use, provide for natural plant community succession and development, and be capable of renewing itself.
      This shall be demonstrated by:
      i. Successful onsite establishment of species included in the planting mixture or other desirable species.
      ii. Evidence of vegetation reproduction, either spreading by rhizomatous species or seed production.
   D. The reclaimed landscape shall have characteristics that approximate the visual quality of the adjacent area with regard to location, scale, shape, color and orientation of major landscape features and meet the needs of the planned post disturbance land use.

3. All topsoil removed during construction activities will be respread for interim reclamation success.

4. The operator will drill seed on the contour to a depth of 0.5 inch, followed by cultipaction to compact the seedbed, preventing soil and seed losses. To maintain quality and purity, the current years tested, certified seed with a minimum germination rate of 80% and a minimum purity of 90% will be used. On BLM surface or in lieu of a different specific mix desired by the surface owner, use the following:

Shallow Loamy Ecological Site Seed Mix		
Species	**% in Mix**	**Lbs PLS***
Thickspike Wheatgrass (Elymus lanceolatus ssp. lanceolatus)	50	6.0

Shallow Loamy Ecological Site Seed Mix		
Species	**% in Mix**	**Lbs PLS***
Bluebunch wheatgrass (Pseudoroegneria spicata ssp. Spicata)	35	4.2
Prairie coneflower (Ratibida columnifera)	5	0.6
White or purple prairie clover (Dalea candidum, purpureum)	5	0.6
Rocky Mountain beeplant (Cleome serrulata)	5	0.6
Totals	**100%**	**12 lbs/acre**

*Pure Live Seed
*Northern Plains adapted species
*Slopes too steep for machinery may be hand broadcast and raked with twice the specified amount of seed. Complete fall seeding after September 15 and prior to prolonged ground frost. To be effective, complete spring seeding after the frost has left the ground and prior to May 15.

5. Disturbance for pipelines and utility corridors adjacent to access roads will be contained within the disturbance allowed for road construction.

6. Access roads/pipeline corridors to the following well locations will be allowed a working width of 30 feet with a blading/clearing width not to exceed 20 feet: Harris Federal 23-30-5672.

7. The operator will maintain all existing improved roads in the Harris Federal POD in accordance with guidelines contained in the BLM/FS Gold Book, 4th Edition "Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development," and/or the Road Standards in the BLM Manual 9113.

8. Adequate drainage control must be in place at all stages of construction and culverts installed as soon as feasible.

9. Final grading and surfacing shall occur immediately after utility installation is complete. All rills, gullies, and other surface defects shall be ripped to the full depth of erosion across the entire width of the roadway prior to final grading and surfacing.

10. Reserve pits will be lined at the following locations: Harris Federal 12-30, 12-35, and 34-35.

Wildlife

Raptors

The following conditions will alleviate impacts to raptors:

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

Legal	Infrastructure
S30 T56N R72W	3 wells (12-30, 14-30, 23-30, 34-30), All pipelines and roads.
S25 T56N R73W	Pipeline in NE and NESE
S31 T56N R72W	Pipeline corridors in N

Legal	Infrastructure
S06 T55N R72W	Waterline in NW
S01 T55N R73W	Waterline in NE
S36 T56N R73W	Waterline in SE
S08 T55N R72W	Waterline in SESW
S17 T55N R72W	Waterline in W
S20 T55N R72W	Waterline in NW and NWNE

2. 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.

3. Nest occupancy and productivity checks shall be completed for nests within a 0.5 mile of any surface disturbing activities (e.g., well drilling or pipeline installation) across the entire POD for as long as the POD is under construction. Once construction of the POD has ceased, nest occupancy and productivity checks shall continue for the first five years on all nests that are within a 0.5 mile of locations where any surface-disturbing activities took place. Productivity checks shall be completed only on those nests that were verified to be occupied during the initial occupancy check of that year. The productivity checks shall be conducted no earlier than June 1 or later than June 30, and any evidence of nesting success or production shall be recorded. Survey results will be submitted to a Buffalo BLM biologist in writing no later than July 31 of each survey year. In 2009, this applies to the nest(s) listed and is subject to change each year after that, pending surveys.

4. 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.

5. Well metering, maintenance and other site visits within 0.5 miles of raptor nests should be minimized as much as possible during the breeding season (February 1 – July 31).

Sage-Grouse

The following conditions will alleviate impacts to sage-grouse:

1. No surface disturbing activities are permitted within two miles of the Elk Creek Road lek (S26 T56N R73W) and Elk Creek Road NE lek (S18 T56N R72W) between March 1 and June 15, prior to completion of a sage-grouse lek survey. This condition will be implemented on an annual basis for the duration of surface disturbing activities. This timing limitation will affect the following:

Legal	Wells and Infrastructure
S30 T56N R72W	3 wells (12-30, 14-30, 23-30). Pipeline corridors in SW. Two-track road in SW.
S25 T56N R73W	All infrastructure
S35 T56N R73W	2 wells (12-35, 34-35). All infrastructure.
S36 T56N R73W	Waterline in SE.
S06 T55N R72W	Waterline in NWNW.

2. If an active lek is identified during the survey, the 2 mile timing restriction (March 1-June 15)

will be applied, and surface disturbing activities will not be permitted until after the nesting season. If surveys indicate that the identified lek is inactive during the current breeding season, surface disturbing activities may be permitted within the 2 mile buffer until the following breeding season (March 1). The required sage-grouse survey will be conducted by a biologist following the most current WGFD protocol. All survey results shall be submitted in writing to a Buffalo BLM biologist and approved prior to surface disturbing activities.

3. Well metering, maintenance and other site visits within 2.0 miles of documented sage grouse lek sites should be minimized as much as possible during the breeding season (March 1– June 15).

Sharp-tailed Grouse

The following conditions will alleviate impacts to sharp-tailed grouse:

1. Clearance surveys for sharp-tailed grouse breeding activity will be conducted prior to initiating any surface-disturbing activities during the sharp-tailed grouse's breeding season (April 1 – May 7) for as long as the project is under construction. The surveys must encompass all areas within 0.64 mile of the proposed activities.

2. The required sharp-tailed grouse survey will be conducted by a biologist following the most current WGFD protocol. All survey results shall be submitted in writing to Buffalo BLM and approved prior to surface-disturbing activities.

3. If an active lek is identified during the surveys, a 0.64-mile timing restriction will be applied from April 1 – May 7, and surface-disturbing activities will not be permitted until after the nesting season.

Ute Ladies-tresses

The following conditions will alleviate impacts to Ute ladies'-tresses:

1. A habitat suitability survey will be conducted each year, according to the Powder River Basin Interagency Working Group's (PRBIWG) accepted protocol, to evaluate all areas of potential Ute ladies'-tresses habitat impacted by the project. Results will be submitted to BLM BFO annually. This COA affects the three impoundments, their discharge points, the receiving drainages downstream until surface water and hydrophytic vegetation dissipate, and the water pipeline crossing of White Tail Creek.

Recreation

1. No drilling or construction activities shall take place on BLM managed lands located on S30,31 T56N R72W and S25,26 T56N R73W during the mule deer and pronghorn hunting seasons, October 1 – October 31, to protect this long-standing and popular recreation activity. Metering and maintenance activities shall be minimized during this period. At the discretion of Authorized Officer, this condition of approval may be reviewed for site specific exceptions.

Water Management

1. The operator will contact Chris Williams or other hydrology staff member at the BLM BFO at least one week before discharging water into the Parks Playa.

2. The operator will conduct monthly inspections for seepage on the steep hillslopes or breaks area immediately south of Parks Playa for one year after discharge to the facility begins and quarterly thereafter until production water discharge ceases. If seepage is found, contact Williams or other hydrology staff member at the BLM BFO within one week.

Cultural

1. Use of the proposed water line and outfall (T55N R72W Sections 8, 17, and 20) will not be authorized until the Bureau receives an acceptable Class III cultural inventory of the proposed access and completes the consultation process with the Wyoming SHPO.

2.4. Alternatives considered but not analyzed in detail

Land Application

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

2.5. Summary of Alternatives

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

Table 2.5 Summary of the Alternatives

Existing energy development in the general project area includes Federal, Fee, and State CBNG and conventional oil and gas wells and associated infrastructure. The general project area involves well locations and infrastructure found within one mile of the proposed Harris Federal CBNG wells.

Other federal CBNG PODs in the general vicinity include Collums (EA# WY-070-02-274) & Collums Additions (EA# WY-070-03-207), Deen Draw (EA# WY-070-06-024), and Horse Creek North (EA# WY-070-07-131).

Facility	Alternative A (No Action) Existing Number or Miles	Alternative B (Original Proposal) Proposed Number or Miles	Alternative C (Environmental Alt.) Revised Number or Miles
Total CBNG Wells	68	6	6
Fed	14		
Fee	29		
State	25		
Total Locations		6	6
Nonconstructed Pads		4	6
Slotted Pads		0	0
Constructed Pads		2	0
Conventional Wells	29	0	0
P&A (Plugged & Abandoned)	22	0	0
Gather/Metering Facilities	0	0	0
Compressors	1	0	0

Facility	Alternative A (No Action) Existing Number or Miles	Alternative B (Original Proposal) Proposed Number or Miles	Alternative C (Environmental Alt.) Revised Number or Miles
Monitor Wells	0	0	0
Impoundments	8	1	1
On-channel	8	0	0
Off-channel	0	1	1
Water Discharge Points	2	1	1
Treatment Facilities	0	0	0
Improved Roads	9.18	0.44	0.11
No Corridor		0	0
With Corridor		0.44	0.11
2-Track Roads	7.80	6.63	6.45
No Corridor		2.18	2.0
With Corridor		4.45	4.45
Buried Utilities	13.81	5.05	5.35
No Corridor		5.05	5.35
With Corridor		0.0	0.0
Overhead Powerlines	7.4	0	0
Communication Sites	0	0	0
Staging/Storage Areas	0	0	0
Other Disturbance	0	0	0
Acres of Disturbance	235	54.79	53.91

3. DESCRIPTION OF AFFECTED ENVIRONMENT

Applications to drill were received on 03/28/2008. Field inspections of the proposed Harris CBNG project were conducted on 7/24/2008 and 07/28/2008 by:

NAME	TITLE	AGENCY
Aaron Peterson	Environmental Consultant	ASAP Environmental Resources
Alan Schultz	Environmental Consultant	ASAP Environmental Resources
Jodi Donahey	Land Advisor	Baker Energy
Ron Rougeau	Project Manager	Baker Energy
Ted Hamersma	Civil Engineer Tech	Bureau of Land Management
Chris Williams	Hydrologist	Bureau of Land Management
Andy Perez	Natural Resource Specialist	Bureau of Land Management
Julian Serafin	Natural Resource Specialist (Lead)	Bureau of Land Management
Barb Hamersma	Production Accountability Tech	Bureau of Land Management
Christine Sadler	Realty Specialist	Bureau of Land Management
Courtney Frost	Wildlife Biologist (Lead)	Bureau of Land Management
Jennifer Morton	Wildlife Biologist	Bureau of Land Management
Luke Titus	Geologist	Cedar Ridge, LLC.

NAME	TITLE	AGENCY
Claude Voiles	Landowner	Harris Jayne Revocable Trust

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			Courtney Frost
Floodplains		X		Chris Williams
Wilderness Values			X	Julian Serafin
ACECs			X	Julian Serafin
Water Resources	X			Chris Williams
Air Quality	X			Julian Serafin
Cultural or Historical Values		X		Clint Crago
Prime or Unique Farmlands			X	Julian Serafin
Wild & Scenic Rivers			X	Julian Serafin
Wetland/Riparian	X			Chris Williams
Native American Religious Concerns			X	Clint Crago
Hazardous Wastes or Solids		X		Julian Serafin
Invasive, Nonnative Species	X			Julian Serafin
Environmental Justice		X		Julian Serafin

3.1. Topographic Characteristics of Project Area

The Harris Federal POD is located approximately 40 miles north of Gillette, Wyoming within Sections 25, 26, 35, and 36 T56N R73W; Sections 19, 20, 29, 30, and 31 T56N R72W; Sections 5, 6, 8, 17, and 20 T55N R72W; and, Section 1 T55N R73W. Elevations within the project area range from 4,000 to 4,270 feet above sea level. The topography is characterized by gentle sloped draws rising to mixed sagebrush and grassland uplands. Uplands abruptly develop into juniper breaks, scoria buttes or sandstone outcrops with moderate sloping ridges and draws. Ephemeral tributaries of Elk Creek and White Tail Creek drain the northern and southern project areas, respectively. No perennial streams are located within the project area. The climate in the area is semi-arid, averaging 12 inches of precipitation annually, more than 60% of which occurs between April and September. Conventional oil and gas production, as well as CBNG development exists around and within the proposed Harris Federal project; this, in conjunction with livestock grazing, are the major land uses within the general area.

3.2. Vegetation & Soils

The general vegetation community within the project area consists of a mixed sagebrush/grassland mosaic. Wyoming big sagebrush (*Artemisia tridentata wyomingensis*) intermixed with various native bunch grasses dominates the project area. The greatest concentrations of sagebrush occurred among the gentler upland slopes with patches of silver sagebrush (*Artemisia cana*) intermixed in the uplands and draw bottoms.

Soils have developed in alluvium and residuum derived from the Wasatch Formation. Lithology consists of light to dark yellow and tan siltstone and sandstones with minor coal seams. Soils have surface and subsurface textures of silt loam and fine sandy loam. Soil depths vary from deep on lesser slopes to

shallow and very shallow on steeper slopes. Soils are generally productive, though varies with texture, slope and other characteristics. Soils differ with topographic location, slope and elevation.

Soils within the project area were identified from the *North Campbell County Survey Area, Wyoming (WY705).* The soil survey was performed by the Natural Resource Conservation Service according to National Cooperative Soil Survey standards. Pertinent information for analysis was obtained from the published soil survey and the National Soils Information System (NASIS) database for the area.

The dominant map units identified for the soils within this 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. The map unit symbols within this project area were filtered and map units representing 3.0% or greater in extent within the pod boundary are displayed.

Soil Map Unit Types

Map Unit	Map Unit Name	Acres	Percent
239	IRONBUTTE-FAIRBURN-MITTENBUTTE COMPLEX, 6 TO 40 PERCENT SLOPES	686.0	18%
134	DEEKAY-OLDWOLF LOAMS, 0 TO 6 PERCENT SLOPES	596.0	15%
225	UCROSS-IWAIT-FAIRBURN LOAMS, 3 TO 30 PERCENT SLOPES	455.0	12%
323	UCROSS-FAIRBURN LOAMS, 3 TO 15 PERCENT SLOPES	383.3	10%
168	JAYWEST-SPOTTEDHORSE LOAMS, 0 TO 6 PERCENT SLOPES	239.8	6%
136	DEEKAY-ZIGGY LOAMS, 0 TO 6 PERCENT SLOPES	235.4	6%
278	FAIRBURN-SAMSIL-BADLAND COMPLEX, 10 TO 45 PERCENT SLOPES	207.0	5%
291	IRONBUTTE-FAIRBURN-MITTENBUTTE COMPLEX, WOODED, 3 TO 60 PERCENT SLOPES	164.7	4%
309	PITCHDRAW-ASHOLLOW-MITTENBUTTE FINE SANDY LOAMS, 3 TO 20 PERCENT SLOPES	151.2	4%
299	OLDWOLF-FAIRBURN LOAMS, 3 TO 15 PERCENT SLOPES	142.6	4%
248	ZIGGY-IWAIT LOAMS, 0 TO 6 PERCENT SLOPES	118.5	3%

For more detailed soil information, see the NRCS Soil Survey 705 – North Campbell County. Additional site specific soil information is included in the Ecological Site interpretations below.

Topsoil depths to be salvaged for reclamation range from 0 to 4 inches on ridges to 8+ inches in bottomland. Erosion potential varies from slight to severe depending on the soil type, vegetative cover and slope. Reclamation potential of soils also varies from fair to moderate throughout the project area. The main soil limitations in the project area include: depth to bedrock, low organic matter content, and high erosion potential especially in areas of steep slopes.

3.2.1. Dominant Ecological Sites and Plant Communities by dominant soil series

Ecological Site Descriptions are used to provide site and vegetation information needed for resource identification, management and reclamation recommendations. To determine the appropriate Ecological Sites for the area contained within this proposed action, BLM specialists analyzed data from onsite field reconnaissance and Natural Resources Conservation Service published soil survey soils information.

The map unit symbols for the soils identified above and the associated ecological sites for the identified soil map unit symbols found within the POD boundary are listed in the table below.

Map Unit	Ecological site
239	SHALLOW LOAMY (15-17NP)
134	LOAMY (15-17NP)
225	LOAMY (15-17NP)
323	LOAMY (15-17NP)
168	LOAMY (15-17NP)
136	LOAMY (15-17NP)
278	SHALLOW LOAMY (15-17NP)
291	Ponderosa Pine and Little Bluestem
309	SANDY (15-17NP)
299	LOAMY (15-17NP)
248	LOAMY (15-17NP)

Dominant Ecological Sites and Plant Communities identified in this POD and its infrastructure are Loamy and Shallow Loamy sites.

Loamy Sites occur on land nearly level to steep slopes on landforms which include hill slopes and the associated alluvial fans and stream terraces, in the 15-17 inch precipitation zone. The soils of this site are moderately deep to deep (greater than 20" to bedrock), well drained soils that formed in alluvium and residuum derived from unspecified sandstone. These soils have moderate permeability and may occur on all slopes.

Shallow Loamy Sites occurs on steep slopes and ridge tops, but may occur on all slopes on landforms which include hill sides, ridges and escarpments, in the 15-17 inch precipitation zone. Generally soils of this site are shallow (less than 20" to bedrock), well drained soils that formed in alluvium and residuum derived from shale and sandstone. These soils have moderate permeability and may occur on all slopes. The main soil limitations include depth to bedrock.

The present plant community in both the loamy and shallow loamy sites is *Mixed Sagebrush/Grass*. Wyoming big sagebrush is a significant component of the plant community. Perennial cool-season grasses make up the majority of the understory with the balance made up of short warm-season grasses, annual cool-season grass, and miscellaneous forbs. Dominant grasses include: bluebunch wheatgrass, rhizomatous wheatgrass, blue grama, needleandthread, and little bluestem. Other grasses occurring on the state include Cusick's and Sandberg bluegrass, and prairie junegrass.

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.

Summary of Ecological Sites

Ecological site	Acres	Percent
LOAMY (15-17NP)	2463.2	63%
SHALLOW LOAMY (15-17NP)	893.1	23%
Ponderosa Pine and Little Bluestem	245.7	6%
SANDY (15-17NP)	189.6	5%
CLAYEY (15-17NP)	59.1	2%
LOWLAND (15-17NP)	55.2	1%
SHALLOW CLAYEY (15-17NP)	14.0	0%

3.2.2. Wetlands/Riparian

Wetlands and riparian vegetation are generally restricted to existing reservoirs and stream reaches that

have been influenced by CBNG production water. There are a few riparian areas without CBNG water influence that have enhanced vegetation and could be suitable habitat for Ute ladies'-tresses orchid. There are no stands of cottonwoods in or near the POD area.

3.2.3. Invasive Species

The Wyoming Energy Resource Information Clearinghouse (WERIC) web site (www.weric.info) identifies Russian knapweed (*Rhaponticum repens*) as a known state-listed noxious weed population in T56N R72W, T56N R73W, T55N R72W, and T55N R73W. The WERIC database was created cooperatively by the University of Wyoming, BLM and county Weed and Pest offices.

The following is a list of species that are of specific concern to the Campbell County Weed & Pest for the Harris Federal POD project area:

- Canada thistle (*Cirsium arvense* L.)
- field bindweed (*Convolvulus arvensis*)
- leafy spurge (*Euphorbia esula*)

Additionally, the operator documented additional weed species during subsequent field investigations:

- common mullein (*Verbascum thapsus*)
- buffalobur (*Solanum rostratum* Dunal)

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 wildlife databases compiled and managed by BLM Buffalo Field Office (BFO), 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 SWCA in 2006 and ARCADIS in 2007 and 2008 (ARCADIS 2008a, 2008b). All surveys were conducted according to the Powder River Basin Interagency Working Group's (PRBIWG) accepted protocol (available on the CBM Clearinghouse website at www.cbmclearinghouse.info). ARCADIS performed surveys for bald eagle roosts and nests, other raptor nests, greater sage-grouse, sharp-tailed grouse, black-tailed prairie dog colonies, mountain plovers, and Ute ladies'-tresses orchid.

A BLM biologist conducted field visits on July 24 and 28, 2008. During this time, the biologist reviewed the wildlife survey information for accuracy, evaluated impacts to wildlife resources, and provided project modification recommendations where wildlife issues arose.

3.3.1. Big Game

Big game species expected to be within the Harris project area include pronghorn and mule deer. WGFD has determined that the project area contains yearlong and winter range for pronghorn and yearlong range for mule deer. 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. Winter use is when a population or portion of a population of animals uses the documented suitable habitat sites within this range annually, in substantial numbers only during the winter period. Populations of pronghorn and mule deer within their respective hunt areas are above WGFD objectives. Big game range maps are available in the PRB FEIS (3-119 to 3-143) and from WGFD.

During the onsite, pronghorn individuals and sign were observed throughout the project area, and mule

deer sign was noted across the project area.

3.3.2. Aquatics

The project area is drained by ephemeral tributaries of Elk Creek to the north and White Tail Creek to the south. No perennial streams are located within the project area; although, ARCADIS reported that Elk Creek, directly north of the POD, contained standing water throughout the summer of 2007, as did reservoirs along tributaries of White Tail Creek (ARCADIS 2008b). Fish that have been identified in the Little Powder River sub-watershed are listed in the PRB FEIS (3-156 to 3-159).

Amphibian and reptile species occur throughout the Basin, but baseline information is limited. Confluence Consulting, Inc., (2004) reported occurrence of the following species within the Clear Creek and Powder River watersheds: Woodhouse's toad, Northern leopard frog, gopher snake, and garter snake. Because sampling at the upper two sites on Clear Creek occurred late in the season, when likelihood of observing these species is reduced, the timing of these surveys may have influenced the lack of reptiles and amphibians observed at these sites.

3.3.3. Migratory Birds

Migratory birds are those that migrate for the purpose of breeding and foraging at some point in the calendar year. A wide variety of migratory birds may be found in the proposed project area at some point throughout the 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). Several species of migratory birds were observed by SWCA during surveys in 2006. Two of these included Brewer's sparrow and loggerhead shrike, which are listed by BLM Wyoming as sensitive. Brewer's sparrow is discussed in more detail in Section 3.3.5.2.1 (Sensitive Species – Sagebrush Obligates).

3.3.4. Raptors

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

Fifteen raptor nest sites were identified by SWCA, ARCADIS, and BLM within 0.5 mile of the project area. Three nests were active in 2008. Nest 5624 was active with red-tailed hawks, and nest 5628 was active with great-horned owls. Nest 4213 was active with red-tailed hawks, but the breeding attempt failed. Raptor activity in the project area has declined in the last three years. Nest 4340 was active for two years (2006 and 2007) but inactive in 2008. Nest 4212 was active in 2006 but has not been occupied since. Young were fledged from nest 4213 by red-tailed hawks in 2006 and by great-horned owls in 2007, but another attempt by red-tailed hawks failed in 2008. The area around nests 5416 and 5417 was occupied by great-horned owls in 2007 but the owls did not return in 2008. Nest 4215 was occupied by great-horned owls in 2007 but was inactive in 2008.

Table 1. Documented raptor nests within the Harris POD Project Area in 2008

BLM ID	UTMs	Legal	Sub-strate[1]	Year	Condition	Status[2]	Species[3]
875	454580E 4958841N	T55N R72W S06	CTL	2008	Unknown	DNLO	
				2007	Unknown	DNLO	
867	454003E 4959878W	T56N R73W S36	GHS	2008	Remnants	INAC	
				2007	Poor	INAC	

BLM ID	UTMs	Legal	Sub-strate[1]	Year	Condition	Status[2]	Species[3]
				2007	Gone	DNLO	
				2006	Remnants	INAC	
				1998	Unknown	ACTI	FEHA
4212	455154E 4961762N	T56N R72W S30	BOX*[4]	2008	Fair	INAC	
				2007	Fair	INAC	
				2006	Excellent	ACTI	RETA
4213	455294E 4960372N	T56N R72W S31	PON	2008	Excellent	ACTF	RETA
				2007	Excellent	ACTI	GRHO
				2006	Excellent	ACTI	RETA
4215	454929E 4961903N	T56N R72W S30	CTD	2008	Remnants	INAC	
				2007	Fair	OCCU	GRHO
				2006	Fair	INAC	
4339	456492E 4954731N	T55N R72W S17	PON	2008	Poor	INAC	
				2007	Poor	INAC	
				2006	Fair	INAC	
4340	456196E 4955883N	T55N R72W S17	PON	2008	Good	INAC	
				2007	Excellent	ACTI	RETA
				2006	Excellent	ACTI	RETA
5415	455388E 4960337N	T56N R72W S31	PON	2008	Poor	INAC	
				2007	Poor	INAC	
5416	454277E 4962322N	T56N R73W S24	BOX	2008	Poor	INAC	
				2007	Fair	OCCU	GRHO
5417	454136E 4962374N	T56N R73W S24	CTD	2008	Poor	INAC	
				2007	Poor	OCCU	GRHO
5623	454267E 4959000N	T55N R73W S1	CTL	2008	Fair	INAC	
5624	454464E 4958825N	T55N R73W S1	CTL	2008	Good	ACTI	RETA
5626	455420E 4960535N	T56N R72W S31	PON	2008	Good	INAC	
5627	454295E 4962311N	T56N R73W S24	BOX	2008	Poor	INAC	
5628	454207E 4961782N	T56N R73W S25	JUN	2008	Good	ACTI	GRHO

Notes:

1 BOX = Box Elder; CTD = Cottonwood Dead; CTL = Cottonwood Live; GHS = Ground/hillside; JUN = Juniper; PON = Ponderosa Pine

2 ACTF = Active failed; ACTI = Active; DNLO = Did not locate; INAC = Inactive; OCC = Occupied

3 AMKE = American Kestrel; GOEA = Golden Eagle; GRHO = Great-horned Owl; FEHA = Ferruginous Hawk; RETA = Red-tailed Hawk; UNRA = Unknown Raptor

4 SWCA first located this nest and reported it in a boxwood. ARCADIS reported this nest to be in a dead cottonwood.

3.3.5. Threatened and Endangered and Sensitive Species

3.3.5.1. Threatened and Endangered Species

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

3.3.5.1.1. Black-footed Ferret

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

This nocturnal predator is closely associated with prairie dogs. The ferret depends almost entirely upon prairie dogs for food and uses old prairie dog burrows for dens. Current science indicates that a black-footed ferret population requires at least 1,000 acres, separated by no more than 1.5 km of black-tailed prairie dog colonies for survival (USFWS 1989).

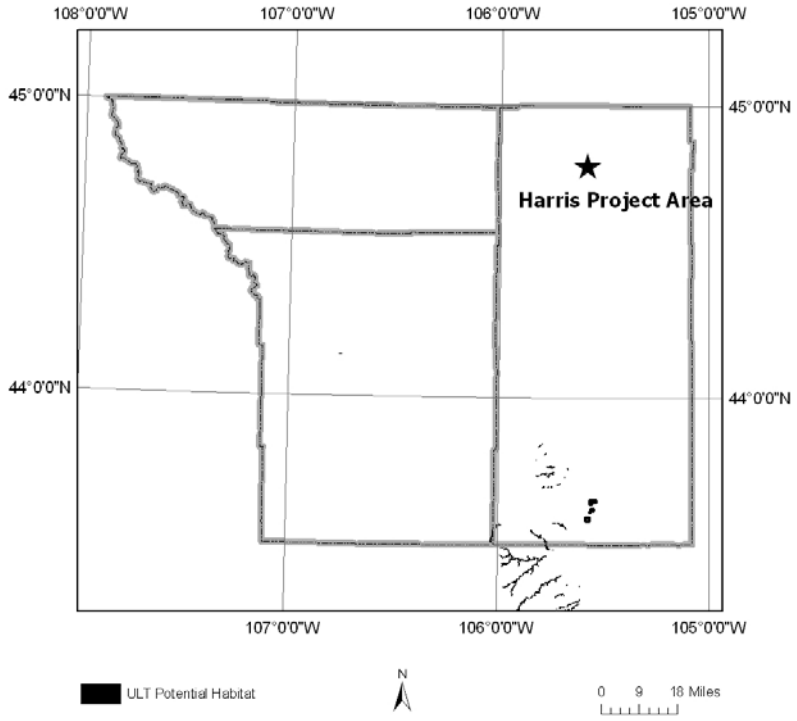
WGFD believes the combined effects of poisoning and Sylvatic plague on black-tailed prairie dogs have greatly reduced the likelihood of a black-footed ferret population persisting east of the Bighorn Mountains (Grenier 2003). USFWS has also concluded that black-tailed prairie dog colonies within Wyoming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

Black-footed ferret habitat is not present within the Harris project area. No black-tailed prairie dog colonies were identified by SWCA, ARCADIS, or BLM.

3.3.5.1.2. Ute Ladies'-Tresses Orchid

Ute ladies'-tresses orchid (ULT) is listed as Threatened under the Endangered Species Act. It is extremely rare and occurs in moist, sub-irrigated or seasonally flooded soils at elevations between 1,780 and 6,800 feet above sea level. Habitat includes wet meadows, abandoned stream channels, valley bottoms, gravel bars, and near lakes or perennial streams that become inundated during large precipitation events. 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 BFO Administrative Area



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 originally known location. Drainages with documented ULT 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. A WYNDD model predicts that undocumented populations may be present in the BFO administrative area, particularly within southern Campbell County.

Suitable ULT habitat is present within the Harris project area along White Tail Creek from S01 T55N R73W to S09 T55N R72W. Thick bands of wetland vegetation dominated by common spikerush and alkali cordgrass line the edges of the creek. ARCADIS performed pedestrian surveys in 2008 but did not observe ULT at this location. The failure to find ULT does not mean that it is not present; the orchid is inconspicuous and does not flower every year.

3.3.5.2. Sensitive Species

BLM Wyoming has prepared a list of Sensitive species to focus species management efforts towards maintaining habitats under a multiple use mandate. The sagebrush ecosystem commonly occurs in the Powder River Basin and dominates the Harris project area. This ecosystem contains components required in the life cycle of several Sensitive species. Species associated with this ecosystem are described below in general terms. Those species within the Powder River Basin that were once listed or candidates for listing under the Endangered Species Act of 1973 and remain BLM Wyoming Sensitive species are described in more detail later in this section. The authority for this policy and guidance comes from the Endangered Species Act of 1973, as amended; Title II of the Sikes Act, as amended; the Federal Land Policy and Management Act (FLPMA) of 1976; and the Department Manual 235.1.1A.

3.3.5.2.1. Sagebrush obligates

Sagebrush obligates are species that require sagebrush for some part of their life cycle. They cannot survive without sagebrush and its associated perennial grasses and forbs. Knick et al. (2003) reported that shrubland and grassland birds are the fastest-declining group of species in North America (Knick et al. 2003).

Sagebrush obligates that were observed in the Harris project area and that are listed as Sensitive species by BLM Wyoming included Brewer's sparrow and greater sage-grouse. Brewer's sparrow is associated closely with sagebrush habitats having abundant scattered shrubs and short grass (Paige and Ritter 1999). They require sagebrush for nesting, with nests typically located within or under the sagebrush canopy. Greater sage-grouse are discussed in more detail in Section 3.3.5.2.4.1 (Greater sage-grouse).

3.3.5.2.2. Bald Eagle

The bald eagle was federally listed as Endangered on February 14, 1978, and was then removed from the Endangered species list on August 8, 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 (WY07F0075) (USFWS 2007) shall continue to be complied with.

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

Mature cottonwood trees are not present within one mile of the project area. Bald eagle roosting habitat is not present in the Harris project area. No bald eagles were observed within one mile of the Harris project area during the winter 2007 and 2008 surveys (ARCADIS 2008a, 2008b).

3.3.5.2.3. Black-tailed Prairie Dog

The black-tailed prairie dog was added to the list of Candidate species for federal listing on February 4, 2000 but was then removed from the list on August 12, 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 diurnal rodent inhabiting prairie and desert grasslands of the Great Plains. Due to human-caused factors, black-tailed prairie dog populations are now highly fragmented and isolated (Miller et al. 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).

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.

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

Black-tailed prairie dogs do not inhabit the Harris project area. No black-tailed prairie-dog colonies were observed.

3.3.5.2.4. Grouse

3.3.5.2.4.1. Greater sage-grouse

The greater sage-grouse (sage-grouse) is listed as a Sensitive species by BLM Wyoming. In recent years, several petitions have been submitted to USFWS to list sage-grouse as Threatened or Endangered. On January 12th, 2005, USFWS issued a decision that the listing of 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).

Sage-grouse are found in prairie, sagebrush shrublands, other shrublands, wet meadows, and agricultural areas. They depend upon substantial sagebrush stands for nesting and winter survival (BLM 2003).

Suitable sage-grouse habitat is present throughout the project area. Moderately dense stands of sagebrush particularly suitable for nesting occur in the north, northwest, and southwest portions of the project area in S30, S31 T56N R72W and S25, S26, S35 T56N R73W. The riparian areas and draw bottoms along White Tail Creek provide suitable late summer brood-rearing habitat. BLM records identified three active sage-grouse leks within four miles of the project area. The four-mile distance was recommended by the State wildlife agencies' ad hoc committee for consideration of oil and gas development effects to nesting habitat (WGFD 2008). The Elk Creek Road lek was discovered by SWCA in 2006 (SWCA 2006) and the Elk Creek Road NE lek was discovered in 2007 by ARCADIS (ARCADIS 2008). The three lek sites are identified below (Table 2) with up to the most recent five years of peak male lek attendance. Where a year is not listed, no data were reported for that year.

Table 2. Sage-grouse leks within 4 miles of the Harris project area

Lek Name	Legal Location	Distance from Project Area (mi)	Year: Peak Males
Elk Creek Road	SWSE S26 T56N R73W	0	2008: 11 2007: 25 2006: 38
Elk Creek Road NE	SWSW S16 T56N R72W	1.3	2008: 7 2007: 12
Lester	NENE S30 T56N R73W	3.0	2008: 0 2007: 0 2006: 7 2005: 7

3.3.5.2.4.2. Sharp-tailed Grouse

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

Suitable sharp-tailed grouse habitat is present in the Harris project area. The grassy ridges and knolls present in the project area along with ungrazed or lightly grazed herbaceous vegetation intermixed with shrubland hillsides and stream bottomlands provide suitable sharp-tailed grouse breeding habitat. No dancing grounds were identified by SWCA or ARCADIS. SWCA reported observations of sharp-tailed grouse throughout the project area in April 2006, and ARCADIS observed sharp-tailed grouse on two occasions in May 2007. On both occasions, the grouse were found in the general area of a grassy plateau in NW S29 T56N R72W.

3.3.5.2.5. Mountain Plover

The mountain plover was proposed for listing as Threatened in 1999, but, in 2003, USFWS withdrew the proposal, stating that the population was larger than had been thought and was no longer declining. Mountain plovers are a BLM Wyoming Sensitive species. Recent analysis of the USWFS Breeding Bird Survey 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).

Mountain plovers are typically associated with high, dry, short grass prairies (BLM 2003). Nesting habitat is often associated with heavily grazed areas such as prairie dog colonies and livestock pastures.

Suitable mountain plover habitat is not present in the project area. Patches of flat ground in the project area are less than 10 acres in size and are characterized by tall vegetation (>4 inches), dense vegetation, and are surrounded by rough terrain. No mountain plovers were seen by SWCA in 2006 or ARCADIS in 2007 and 2008.

3.4. Recreation

The northern portion of the Harris project area has been cooperatively managed, by the BLM, Wyoming Game and Fish Department (WGFD), and Jayne Harris (adjacent landowner), as a walk-in hunting area for more than 7 years. As of 2004, a walk-in area agreement was signed keeping the walk-in area status active for the next 5 years. Under the agreement, the BLM and deeded lands inside the walk-in area restrict motorized use as hunters access the area. Elk Creek Road and Collins Road are the only routes open for motorized travel. Harris POD sections 25, 26, and 36 of Township 56 North Range 73 West and sections 30 and 31 of Township 56 North Range 72 West are contained within the cooperative Walk-In-Area. A map has been included in the project file illustrating the Walk-In-Area boundaries.

3.5. West Nile Virus

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

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

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

Table 3.4 Historical West Nile Virus Information

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

*Wyoming Department of Health Records September 12, 2007.

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

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

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

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

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

3.6. Water Resources

The project area is within the Little Powder River drainage watershed and is mostly within the White Tail Creek sub-watershed.

3.6.1. Groundwater

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

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

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

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

A search of the Wyoming State Engineer Office (WSEO) Ground Water Rights Database for this area showed 14 registered stock and domestic water wells within ½ mile of a federal CBNG producing well in the POD with depths ranging from 160 to 552 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).

3.6.2. Surface Water

The project area is mostly within the White Tail Creek drainage which is tributary to the Little Powder River watershed. The northern most part of the POD area is in the Elk Creek drainage, another tributary of the Little Powder. Most of the drainages in the area are ephemeral (flowing only in response to a precipitation event or snow melt) to 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). The channels range from well vegetated grassy swales without defined bed and bank to well formed channels with well-formed floodplains.

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 CBM produced water of varying chemical composition to surface drainages within the Project Area" (PRB FEIS page 3-48). For the Little Power River, the EC ranges from 1,785 at Maximum monthly flow to 3,300 at Low monthly flow and the SAR ranges from 4.44 at Maximum monthly flow to 6.94 at Low monthly flow. These values were determined at the USGS station located near Weston, Station Number 060324970 (RB FEIS page 3-49).

No natural springs were identified within or near this POD boundary.

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

3.7. Cultural Resources

Class III inventories were conducted for most of the Harris project prior to on-the-ground project work (BFO project #s 70070054, 70080196). SWCA Environmental Consultants and Western Land Services, Inc., conducted the Class III inventories following the Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines (48FR190) for the proposed project. Clint Crago, BFO archaeologist, reviewed the reports for technical adequacy and for compliance with BLM and Wyoming State Historic Preservation Office standards, and determined them to be adequate. However, a portion of the proposed project area has not been inventoried at this time. A Condition of Approval for this project will be that the proposed water line and outfall (T55N R72W Sections 8, 17, and 20) will not be constructed, pending cultural resource inventory. The following resources are located within or near the Area of Potential Effect (APE).

Table 3.6 Cultural Resource Sites Identified within or near the Harris project area

Site Number	Site Type	Eligibility
48CA705	Prehistoric Open Camp	Unevaluated
48CA728	Prehistoric Open Camp	Unevaluated
48CA729	Prehistoric Lithic Scatter	Not Eligible
48CA730	Prehistoric Lithic Scatter	Unevaluated
48CA5964	Elk Creek Road	Not Eligible
48CA6219	Prehistoric Lithic Scatter	Eligible
48CA6220	Prehistoric Lithic Scatter	Eligible
48CA6221	Prehistoric Lithic Scatter	Eligible
48CA6222	Prehistoric Lithic Scatter	Not Eligible
48CA6223	Prehistoric Lithic Scatter	Not Eligible
48CA6346	Historic Homestead	Not Eligible

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 carbon monoxide [CO] and nitrogen oxides [NOx]) from existing natural gas fired compressor engines used in production of natural gas and CBNG; and, gasoline and diesel vehicle tailpipe emissions of combustion pollutants;
- Dust (particulate matter) generated by vehicle travel on unpaved roads, windblown dust from neighboring areas and road sanding during the winter months;
- Transport of air pollutants from emission sources located outside the region;
- Dust (particulate matter) from coal mines;
- NOx, particulate matter, and other emissions from diesel trains and,
- SO2 and NOx from power plants.

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

4. ENVIRONMENTAL CONSEQUENCES

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

4.1. Vegetation & Soils Direct and Indirect Effects

Impacts to vegetation and soils from surface disturbance will be reduced, by following the operator's plans and BLM applied mitigation. Of the 6 proposed well locations, all can be drilled without a well pad being constructed. As such, surface disturbance associated with the drilling of the wells would involve digging-out of rig wheel wells (for leveling drill rig on minor slopes), reserve pit construction (estimated approximate size of 8ft wide x 20ft long x 8ft deep), and compaction (from vehicles driving/parking at the drill site). Estimated disturbance associated with these 6 wells would involve approximately 0.7 acre/well for a total estimated disturbance of 4.2 acres.

Approximately 0.11 miles of improved road would be constructed to provide access to one well location. Approximately 6.45 miles of new and existing two-track primitive roads would be utilized to access project infrastructure. The majority of proposed pipelines (gas and water) have been located in "disturbance corridors." Disturbance corridors involve the combining of 2 or more utility lines (water, gas, power) in a common trench, usually along access routes. This practice results in less surface disturbance and overall environmental impacts. Approximately 5.35 miles of pipeline would be constructed outside of corridors. Expedient reclamation of disturbed land with stockpiled topsoil, proper seedbed preparation techniques, and appropriate seed mixes, along with utilization of erosion control measures (e.g., waterbars, water wings, culverts, rip-rap, gabions etc.) would ensure land productivity/stability is regained and maximized.

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

The PRB FEIS made predictions regarding the potential impact of produced water to the various soil

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

Table 4.1 summarizes the proposed surface disturbance.

Table 4.1 - SUMMARY OF DISTURBANCE

Facility	Number or Miles	Factor	Acreage of Disturbance	Duration of Disturbance
Nonconstructed Pad	6	0.7/acre (150 x 200 feet)	4.2	Long Term
Gather/Metering Facilities	0	Site Specific	0.0	Long Term
Screw Compressors	0	Site Specific	0.0	Long Term
Monitor Wells	0	0.1/acre	0.0	Long Term
Impoundments	1		19.73	Long Term
On-channel	0		0	
Off-channel	1	Site Specific	19.73	
Water Discharge Points	1	0.02 ac/WDP	0.02	
Channel Disturbance				
Headcut Mitigation*	0	Site Specific	0.0	
Channel Modification	0	Site Specific	0.0	
Improved Roads	0.11			Long Term
No Corridor	0.0	Site Specific	0.40	
With Corridor	0.11			
2-Track Roads	6.45		19.82	Long Term
No Corridor	2.0	15' Width	3.64	
With Corridor	4.45	30' Width	16.18	
Pipelines (No Corridor)	5.35	15' Width	9.74	Short Term
Overhead Powerlines	0.0	None proposed	0.0	Long Term

The designation of the duration of disturbance is defined in the PRB FEIS (pg 4-1 and 4-151). "For this EIS, short-term effects are defined as occurring during the construction and drilling/completion phases. Long-term effects are caused by construction and operations that would remain longer".

4.1.1. Soils

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 results 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 revegetation. This drastically disturbed site may change the ecological

integrity of the site and the recommended seed mix.

- 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.
- Loss of soil vegetation cover, 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 productivity would be eliminated along improved roads and severely restricted along two track trails until successful final reclamation is achieved.
- Modification of hill slope hydrology.

These impacts, singly or in combination, would increase the potential for valuable soil loss due to increased water and wind erosion, invasive plant spread and establishment, and increased sedimentation and salt loads to the watershed system.

Soil disturbances other than permanent facilities would be short term with expedient, successful interim reclamation and site stabilization. Expedient reclamation of disturbed land with stockpiled topsoil, proper seedbed preparation techniques, and appropriate seed mixes, along with utilization of erosion control measures (e.g., waterbars, wing ditches, culverts, rip-rap, etc) would ensure land productivity/stability is regained and maximized. In addition, the operator will adhere to COAs which limit the surface disturbance allowable for construction and improvements.

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 or better than that which existed before it was disturbed. 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.

Vegetation

The construction associated with this project will directly disturb a total of 53.91 acres. To insure expedient reclamation that conforms to the Wyoming Reclamation Plan objectives, native seed mixes are recommended for use on the different ecological sites. Seed mixes for the Harris Federal POD were determined based on soil map unit types, the dominant ecological sites found within the project area, and the mixing of soil horizons in disturbed areas. A shallow loamy seed mix was created for the entire POD (see site specific COAs). These native species should adapt readily to each soil and ecological site in the POD area to ensure revegetation, with prompt and appropriate re-contouring and reclamation.

The construction of the access roads, pipelines and well locations will also disturb sagebrush. Wyoming big sagebrush has not been included in these mixes because direct seeding success has been marginal in the past. With expedient reclamation and re-spreading of the topsoil, sagebrush seed should be present in the seed base and should regenerate given proper environmental conditions.

4.1.2. Wetland/Riparian

Discharge from the impoundments, which is allowed under the WYPDES permit, will potentially allow

for streambed enhancement through wetland-riparian species establishment. Because there is potential for water discharge to the playa to resurface in the sandy breaks area to the south, it will be necessary to monitor the area for new seeps and springs that may be caused by CBNG water storage.

4.1.3. Invasive Species

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

1. Control Methods: mowing, tillage, and herbicide applications.
2. Preventive Practices: use of sanitary procedures for field equipment between job locations, identification and delineation of new weed infestations, and use of certified weed-free seed for revegetation projects.
3. Education and awareness programs for field employees and contractors through county weed districts, and state and federal agencies.

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 Little Powder River drainage, which is approximately 32.8% of the total predicted in the PRB FEIS.
- The WDEQ enforcement of the terms and conditions of the WYPDES permit that are designed to protect irrigation downstream.
- The commitment by the operator to land owners to limit impacts to downstream hay fields due to direct discharge of CBNG production water in the Little Powder River Watershed.

No additional mitigation measures are required.

4.2. Wildlife (Alternative C – Environmentally Preferred)

Table 4.1 summarizes the activities proposed with development of the Harris project area.

4.2.1. Big Game Direct and Indirect Effects

Yearlong and winter range for pronghorn and yearlong range for mule deer will be directly disturbed with the construction of wells, reservoirs, pipelines and roads. Items identified as long-term disturbance will cause direct habitat loss. Short-term disturbances will also result in direct habitat loss; however, these areas may provide some habitat value after they are reclaimed and native vegetation has been re-established.

In addition to the direct habitat loss, big game will likely be displaced from the project area during drilling and construction. WGFD indicates that 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 2004a). A study in central Wyoming reported that mineral drilling activities displaced mule deer by more than 0.5 mile (Hiat and Baker 1981). A multi-year study on the Pinedale Anticline suggests that, not only do mule deer avoid mineral activities, but, after three years of drilling activity, they do 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 reduced, as the human activities associated with operation and maintenance will continue to displace them. 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 (Madson 2005). 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 used only by 4-wheel drive vehicles, trail bikes, and hikers (Jalkotzy et al. 1997). Reclamation and other CBNG activities that occur within big game habitats during the spring will likely displace does and fawns due to the human presence in the area. This may cause reduced survival rate of does and fawns that must expend increased energies to avoid such activities.

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

4.2.1.1. Big Game Cumulative Effects

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

4.2.2. Aquatics Direct and Indirect Effects

Produced water will be stored in two existing on-channel impoundments and one off-channel playa. Approximately five miles of pipeline will be constructed to transport water to the playa. If a reservoir were to discharge, it is unlikely that the produced water will reach a fish-bearing stream, and that downstream species would be affected.

4.2.2.1. Aquatics Cumulative Effects

The cumulative effects associated with Alternative C are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, please refer to the referenced PRB FEIS, Volume 2, Chapter 4, page 4-247. No additional mitigation measures are required.

4.2.3. Migratory Birds Direct and Indirect Effects

Disturbance of the habitat types within the project area is likely to impact migratory birds. Native habitats will be lost directly with the construction of wells, roads, and pipelines. Prompt re-vegetation of short-term disturbance areas should reduce habitat loss impacts.

Increased human activities are likely to displace migratory birds farther than simply the areas physical habitat disturbance. 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 within 100 m of dirt roads within a natural gas field, the density of breeding Brewer's sparrows declined by 36%, and breeding sage sparrows declined by 57%. 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 (i.e., displacement) were much greater than the direct physical habitat losses.

Those species that are edge-sensitive will be displaced further away from vegetative edges due to increased human activity, causing otherwise suitable habitat to be abandoned. If the interior habitat is at carrying capacity, then birds displaced from the edges will have no place to relocate. One consequence of habitat fragmentation is a geometric increase in the proportion of the remaining habitat that is near edges (Temple 1986). In severely fragmented habitats, all of the remaining habitat may be so close to edges that no interior habitat remains (Temple and Cary 1988). Over time, this will lead to a loss of interior habitat species in favor of edge habitat species.

Other migratory bird species that utilize the disturbed areas for nesting may be disrupted by the human activity, and nests may be destroyed by equipment. 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).

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. Reclamation and other CBNG activities that occur in the spring may also be detrimental to migratory bird survival, as the timing of these activities may directly impact breeding birds. Additional direct and indirect effects to migratory birds are discussed in the PRB FEIS (4-231-235).

4.2.3.1. Migratory Birds Cumulative Effects

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

4.2.4. Raptors Direct and Indirect Effects

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

To reduce the risk of decreased productivity or nest failure, the BLM BFO requires a 0.5 mile radius timing limitation during the breeding season around active raptor nests and recommends all infrastructure requiring human visitation to be located greater than 0.25 mile from occupied raptor nests.

Table 3 lists the infrastructure within close proximity of the nests in the Harris project area.

Table 3. Proposed and Existing Infrastructure within 0.5 mile of Documented Raptor Nests within the Harris Project Area

BLM ID	Amount and Type of Infrastructure	
	< 0.25 Mile	0.25 - 0.5 Mile
867	• 1 waterline	
875	• 1 waterline	
4212	• 1 well (23-30) • 1 unimproved road • 1 utility corridor	• 2 wells (34-30, 14-30) • 1 unimproved road • 3 utility corridors
4213		• 3 utitility corridors • 1 two-track road
4215	• 1 well (12-30)	• 1 well (23-30) • 1 two-track road • 2 corridors • 1 stock tank
4339	• 1 waterline	• 1 waterline
4340		• 1 waterline
5415	• 1 corridor	• 1 proposed two-track • 3 corridors
5416		• 1 well (12-30) • 1 corridor
5417		• 1 well (12-30) • 1 corridor
5623	• 1 waterline	
5624	• 1 waterline	
5626	• 2 corridors	• 1 well (34-30) • 3 corridors • 1 two-track road
5627		• 1 well (12-30) • 1 corridor
5628	• 1 well (12-30) • 1 corridor	• 2 corridors

Well 23-30 was proposed within 0.25 mile of nest 4212. This well was moved in order to get it out of line-of-sight of the nest. The topography will buffer audio-visual impacts of the well and associated maintenance activities along the road and pipeline corridor. Well 12-30 was proposed within 0.25 mile of nest 4215 and 5628. The well was moved to be out of line-of-sight of the nests and to reduce disturbance to and fragmentation of the surrounding habitat.

A waterline is proposed within 0.25 mile of nests 867, 875, 4339, 5623, and 5624. The waterline is proposed along an existing pipeline corridor and existing roads, with the exception of a segment in SE S36 T56N R73W, where the waterline is proposed to travel adjacent to an existing agricultural field.

Placement of the waterline along existing disturbance minimizes the amount of new disturbance to the surrounding habitat. Pipelines are proposed within 0.25 mile of nests 5415 and 5626. The pipelines are proposed along existing roads, which results in the least disturbance to and fragmentation of the surrounding habitat. The proposed waterlines were retained as proposed with the intent of causing the least habitat disturbance and fragmentation, and because the raptors are likely already acclimated to these linear features on the landscape.

Raptors may continue to use nest 5624, because no new surface-disturbance is proposed to occur within 0.5 mile of this nest. Use of nest 5628 may also continue to occur, because surface-disturbance within 0.5 mile of this nest is limited to pipeline corridors, which will be constructed outside the breeding season timing limitation. It is unlikely that the linear disturbance in the landscape will cause abandonment of the nest by great-horned owls, but increased maintenance along the pipeline could affect their use of this site. Use of nests 4339 and 4340 may not be affected, because the disturbance is limited to an existing corridor that is more than 0.25 mile away.

Of the nests that have been occupied since 2007, nest 4213 may be abandoned as a result of the Harris project, as this year's breeding attempt failed, and proposed development will surround the nest in the future. Nests 4340, 5416, 5417 may be abandoned in the future, as breeding activity did not occur this year, and development will continue to surround them. Nest 4215 may also be abandoned as development around this nest continues.

Nest 867 is not likely to be reoccupied by ferruginous hawks, as they are sensitive to increased human disturbance. Nest 5415 has been in poor condition for two years and is not likely to be reoccupied as development continues to surround it. Nest 5623 may already have been abandoned, because it is already surrounded by existing development. Nest 5626 may be abandoned as a result of the additional disturbance that will surround it.

Additional direct and indirect impacts to raptors, from oil and gas development, are analyzed in the PRB FEIS (4-216-221).

4.2.4.1. Raptors Cumulative Effects

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

4.2.5. Threatened and Endangered and Sensitive Species

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

4.2.5.1. Threatened and Endangered Species

Table 4. 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	Habitat not of sufficient area.
Threatened				
Ute ladies'-tresses orchid (*Spiranthes diluvialis*)	Riparian areas with permanent water	NS	NLAA	Species not found.

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

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

4.2.5.1.1. Black-Footed Ferret Direct and Indirect Effects

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

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

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

Water management for the Harris project will include discharge to two existing on-channel reservoirs, located in ephemeral drainages of White Tail Creek. Reservoir seepage may create suitable habitat if the historically ephemeral drainages become perennial. A pipeline will be constructed to convey water to the Parks playa, located in S20 T55N R72W. With the addition of CBNG discharge, ULT habitat may be created around the playa. The pipeline will cross White Tail Creek in SESW S05 T55N R72W, where currently suitable habitat for ULT will be disturbed and removed for construction. Surveys for the presence of ULT were negative, but detection is difficult, as ULT does not bloom every year, the flowers are inconspicuous, the timing of blooming varies from year to year, and so ULT may be present but not detected in the one year of surveys. Due to the presence of suitable habitat, the lack of identification of any individual plants, and the distance of the proposed project from any known ULT populations, development of the Harris POD "***may affect, but is not likely to adversely affect***" ULT.

4.2.5.2. Sensitive Species Direct and Indirect Effects

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

4.2.5.2.1. Sagebrush Obligates

Construction and maintenance activities associated with development of the Harris project are likely to cause a decline in sagebrush obligate species. 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).

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). 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 sagebrush-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 for many years after reclamation activities are completed.

Table 5. 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	Habitat will be affected.
Spotted frog (*Ranus pretiosa*)	Mountain ponds, sloughs, & small streams	NP	NI	Habitat not present.
Birds				
Baird's sparrow (*Ammodramus bairdii*)	Grasslands, weedy fields	S	MIIH	Sagebrush and grassland cover will be affected.
Bald eagle (*Haliaeetus leucocephalus*)	Mature forest cover often within one mile of large water body.	S	MIIH	Foraging habitat will be affected.
Brewer's sparrow (*Spizella breweri*)	Basin-prairie shrub	K	MIIH	Sagebrush cover will be affected.
Burrowing owl (*Athene cunicularia*)	Grasslands, basin-prairie shrub	NP	NI	Habitat not present
Ferruginous hawk (*Buteo regalis*)	Basin-prairie shrub, grasslands, rock outcrops	S	MIIH	Human activity will increase.
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	MIIH	Grassland cover will be affected.
Mountain plover (*Charadrius montanus*)	Short-grass prairie with slopes < 5%	NP	NI	Habitat not present
Northern goshawk (*Accipiter gentilis*)	Conifer and deciduous forests	NP	NI	No forest habitat present.
Peregrine falcon (*Falco peregrinus*)	Cliffs	NP	NI	No cliffs present.

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

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
William's wafer parsnip (*Cymopterus williamsii*)	Open ridgetops and upper slopes with exposed limestone outcrops or rockslides, 6000-8300 ft.	NP	NI	Habitat not present.

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

Project Effects
NI - No Impact.
MIIH - May Impact Individuals or Habitat, but will not likely contribute to a trend towards Federal listing or a loss of viability to the population or species.
WIPV - Will Impact Individuals or Habitat with a consequence that the action may contribute to a trend towards Federal listing or cause a loss of viability to the population or species.
BI - Beneficial Impact

4.2.5.2.2. Bald Eagle Direct and Indirect Effects

Based on the raptor nesting and bald eagle winter roost surveys and lack of suitable habitat, it is unlikely bald eagles nest or roost within the Harris project area. The proposed project should not affect bald eagle nesting or winter roosting habitat but will likely impact foraging areas.

There are 4.8 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. Cedar Ridge is not proposing any additional overhead power lines.

There are currently 6.6 miles of improved roads within the project area with 2.0 miles proposed, and 5.2 miles of two-track roads with 1.2 miles proposed. Typically, two-tracks and improved project roads pose minimal collision risk. In one year of monitoring road-side carcasses the BLM Buffalo Field Office reported 439 carcasses, 226 along Interstates (51%), 193 along paved highways (44%), 19 along gravel county roads (4%), and 1 along an improved CBNG road (<1%) (Bills 2004). No road-killed eagles were reported. Bald and golden eagles 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, it is unlikely that leads CBNG project roads will affect bald eagles.

Produced water will be stored in two existing reservoirs and a playa, 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 benefit bald eagles by increasing their food supply or adversely affect them, from an increase in potential contaminants or by increasing collisions because of proximity to roads. Eagle use of reservoirs should be reported to determine the need for any future management.

4.2.5.2.3. Black-tailed Prairie Dog Direct and Indirect Effects

Black-tailed prairie dogs do not occur within the project area. The project should not impact black-tailed prairie dogs.

4.2.5.2.4. Grouse

4.2.5.2.4.1. Greater Sage-grouse Direct and Indirect Effects

According to WGFD sage-grouse lek database, three sage-grouse leks are located within four miles of the Harris project area boundary. The proposed action will adversely impact breeding, nesting, brood rearing, late summer, and winter habitat. Proposed project elements that are anticipated to negatively impact grouse include: 6 CBNG wells on 6 locations, 3.2 miles of new roads, 5.8 miles of new pipelines, and increased vehicle traffic on established roads. Using 0.6 miles as an avoidance buffer (Holloran et al. 2007, Aldridge and Boyce 2007), effective sage-grouse habitat loss will be 7.8 square miles from roads and pipelines and7.2 square miles from well locations. These numbers are not additive since the buffered area overlaps between these infrastructure types.

Based on the best available science, which is summarized below, the proposed action will most likely contribute to the extirpation of the local grouse population and reduction of attendance at the three leks within four miles of the project area.

Several changes were made at the onsite to minimize affects on sage-grouse habitat. Wells 23-30, 34-30, and 12-30 were moved to reduce fragmentation of and disturbance to sage-grouse habitat. Well 23-30 was moved towards the main county road towards the edge of a sagebrush stand. Well 34-30 was moved to the edge of a sagebrush stand towards the main access road. Well 12-30 was moved out of a well-vegetated drainage and towards the main access road. The pipeline corridor and access road to well 34-35 was moved along an existing pipeline corridor to reduce fragmentation of high-quality sage-grouse

habitat.

4.2.5.2.4.1.1. Greater Sage-grouse Cumulative Effects

In addition to the direct impacts to sage-grouse habitat that will be created by the federal wells and infrastructure associated with the Harris project, the surrounding area contains existing fee, state, and federal fluid mineral development. The sage-grouse cumulative impact assessment area for this project encompasses a four mile radius from the three sage-grouse leks that intersect the project area. As of September 9, 2008, there were approximately 394 existing wells and associated infrastructure within four miles of the three leks - an area of 99.3 square miles. The existing well density is approximately 4.0 wells per square mile. Due to this level of development there is a strong potential that the populations breeding at these leks may become severely reduced or extirpated without development of the Harris POD.

There are 185 proposed wells (6 from this project) within four miles of the three leks. With the addition of the 179 proposed wells that are not associated with this proposed action, the well density within four miles of the leks increases to 5.8 wells per square mile. With approval of Alternative C (6 proposed well locations) the well density would not change.

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

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

The Powder River Basin Oil and Gas Project Record of Decision (PRB ROD) (BLM 2003) included a Mitigation Monitoring and Reporting Plan (MMRP). The uncertainties as to where and at what level development was to proceed as well as the uncertainties associated with the assumptions that were used to predict impacts suggests that one-time determination of impacts that is included in the EIS may not occur as projected. The MMRP helps to continually assess the effects of the project and the adequacy of the mitigation. Such a plan/process provides a mechanism to continuously modify management practices in order to allow development while continuing to protect the environment (E-1)." In other words, development pace and patterns may not occur as predicted, and so the BLM may use the adaptive management process provided for in the BFO Resource Management Plan (BLM 2001).

Impacts from CBNG development are likely to be significant and additive to the long-term impacts afflicting the sage-grouse population (WGFD 2004). Greater sage-grouse habitat is being directly lost with the addition of well sites, roads, pipelines, powerlines, reservoirs and other infrastructure in the Powder River Basin (WGFD 2005, WGFD 2004). Sage-grouse avoidance of CBNG infrastructure results in even greater indirect habitat loss. In southwestern Wyoming, yearling female greater sage-grouse avoid

nesting in areas within 0.6 miles of producing well pads (Holloran et al. 2007), and in southern Alberta, brood-rearing females avoid areas within 0.6 miles of producing wells (Aldridge and Boyce 2007). Doherty et al. (2008) demonstrated that sage-grouse in the Powder River Basin avoided otherwise suitable wintering habitats once they had been developed for energy production, even after timing and lek buffer stipulations had been applied. WGFD feels a well density of eight wells per section creates a high level of impact for sage-grouse and that sage-grouse avoidance zones around mineral facilities overlap creating contiguous avoidance areas (WGFD 2004). As interpreted by a coordinated effort among state fish and wildlife agencies from Montana, Colorado, Utah, South Dakota, North Dakota and Wyoming, (State wildlife agencies' ad hoc committee for sage-grouse and oil and gas development 2008), research indicates that oil or gas development exceeding approximately 1 well pad per square mile with the associated infrastructure, results in calculable impacts on breeding populations, as measured by the number of male sage-grouse attending leks (Holloran et al. 2005, Walker et al. 2007)

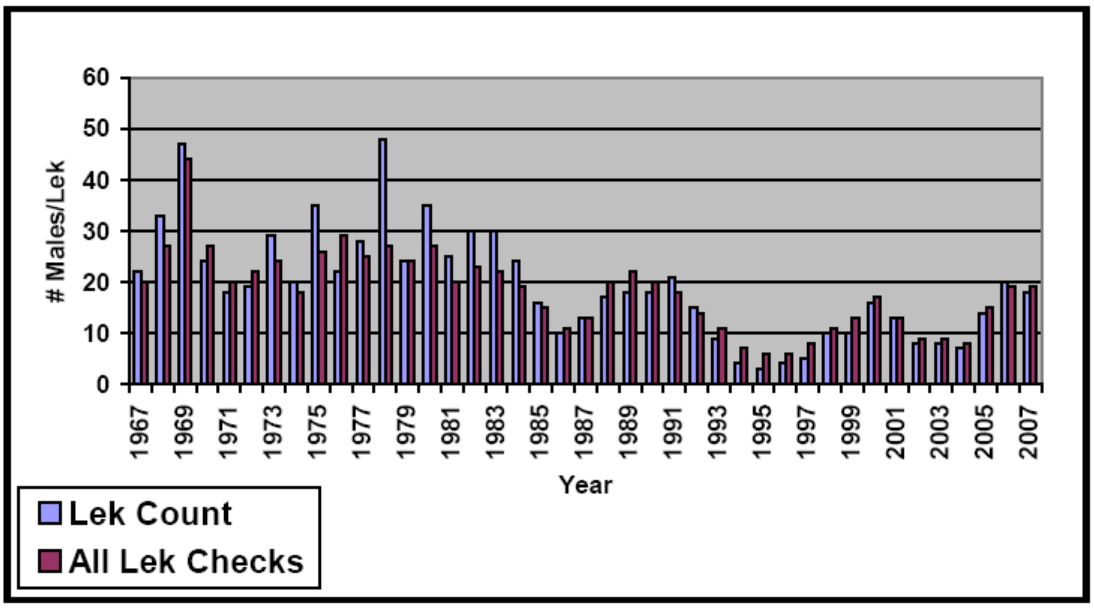
Noise can affect sage-grouse by preventing vocalizations that influence reproduction and other behaviors (WGFD 2003). In a study of greater sage-grouse population response to natural gas field development in western Wyoming, Holloran et al. (2005) concluded that increased noise intensity, associated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

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

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

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

Figure 2. Male sage-grouse lek attendance within northeastern Wyoming, 1967-2007.



The BFO RMP and the PRB ROD include a two-mile timing limitation within sage-grouse nesting habitat. The two-mile measure originated with the Western Association of Fish and Wildlife Agencies (WAFWA) (BLM 2004). BLM Wyoming adopted the two-mile recommendation in 1990 (BLM 1990). The two-mile recommendation was based on early research which indicated between 59% and 87% of sage-grouse nests were located within two miles of a lek (BLM 2004). These studies were conducted within prime, contiguous sage-grouse habitat, such as Idaho's Snake River plain.

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

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

Walker et al. (2007) indicate the size of a no-development buffer sufficient to protect leks would depend

on the amount of suitable habitat around the lek and the population impact deemed acceptable. Also, rather than limiting mitigation to only timing restrictions, research suggests more effective mitigation strategies include, at a minimum, burying power lines (Connelly et al. 2000b); minimizing road and well pad construction, vehicle traffic, and industrial noise (Lyon and Anderson 2003, Holloran et al. 2005); and managing produced water to prevent the spread of mosquitoes with the potential to vector West Nile Virus in sage grouse habitat (Walker et al 2007).

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

4.2.5.2.4.2. Sharp-tailed grouse Direct and Indirect Effects

Effects to sharp-tailed grouse are similar to those expected for sage-grouse.

4.2.5.2.5. Mountain Plover Direct and Indirect Effects

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

4.2.5.3. Sensitive Species Cumulative Effects

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

4.3. Recreation Direct and Indirect Effects

A portion of the Harris project area has been cooperatively managed as a mule deer and pronghorn walk-in hunting area for more than 7 years. The area has been popular with the hunting public because of the motor vehicle restrictions, the semi-primitive experience, and because it is one of the few large land blocks available for unguided hunters in northern Campbell County within the Powder River Basin. CBNG development is changing the rural undeveloped nature of the Basin to a rural industrial setting, decreasing the satisfaction levels of many hunters and other recreationists. One permitted outfitter with the BLM Buffalo Field Office returned his 2005 permit due to client dissatisfaction with hunting in natural gas fields. Other outfitters have also made similar comments and discussed returning their permits.

Drilling and construction activities are the most disruptive to big game and hunters. Construction noise and activity displaces big game and competes with the solitude and primitive experience many hunters seek. The hunting experience is expected to improve following construction, but the solitude and primitive experiences prior to development would not. Ongoing CBNG operations during the hunting season will impact hunting success and satisfaction, loss of the near-wilderness experience, goal interference, and displacing hunting activities. This may result in long term decreased hunting activity in the area.

There are four proposed well locations on BLM surface inside the walk-in area. Conflicts between different recreation users and CBNG activities may increase. With the increased roads and access, illegal off-road vehicle use and trespass are likely to increase. The CBNG activity may also pose a danger to recreation users due to heavy machinery on the roads. CBNG activity, such as metering, maintenance, and other such procedures depending on the use of motorized travel, also conflicts with the management under the walk-in area, compromising the walk-in area program.

In order to protect the integrity of the long-standing popular walk-in area and to reduce the mentioned

conflicts, no CBNG activity will be allowed during the mule deer and pronghorn hunting season from October 1 – October 31 on BLM surface. If any unforeseen CBNG related events happen during this time, consent must be granted from the approving authority before any activity is to take place.

4.4. 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.

4.5. 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 Little 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. Water will be stored within the POD area in two on-channel reservoirs impoundments and in one off-channel playa. Water will be stored in these facilities at the request of landowners, but direct discharge into stream channels is allowed by the WYPDES permit. Discharge below impoundments will likely be limited because the operator has agreed with landowners to prevent flowing production water in downstream hayfields for extended periods of time. More than four miles of pipeline will be constructed to convey water to the Parks playa, and it is expected that this pipeline project will be constructed later in development of the area, if at all.

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

The maximum water production is predicted to be 100 gpm per well or 600 gpm (1.34 cfs or 968 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 Little Powder River drainage, the projected volume produced within the watershed area was 19,121 acre-feet in 2008 (maximum production is estimated in 2005 at 22,427 acre-feet). As such, the volume of water resulting from the production of these wells is 5.1% of the total volume projected for 2008. This volume of produced water is also within

the predicted parameters of the PRB FEIS.

4.5.1. Groundwater

The PRB FEIS predicts an infiltration rate of 34% to groundwater aquifers and coal zones in the Little Powder River drainage area (PRB FEIS pg 4-5). For this action, it may be assumed that a maximum of 204 gpm will infiltrate at or near the discharge points and impoundments (329 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 160 to 552 feet compared to 159 feet from the top of the Canyon Coal to 820 feet at the bottom of the Cache. As mitigation, the operator has committed to offer water well agreements to holders of properly permitted domestic and stock wells within the circle of influence (½ mile of a federal CBNG producing well) of the proposed wells.

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

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

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

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

The BLM has installed shallow groundwater monitoring wells at five impoundment locations in the PRB to assess ground-water quality changes due to infiltration of CBNG produced water. Water quality data has been sampled from these wells on a regular basis. Preliminary data from three sites show increasing

TDS level as water infiltrates while two sites are not.

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

4.5.1.1. Groundwater Cumulative Effects:

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

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

4.5.2. Surface Water

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

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

Predicted Values	**TDS, mg/l**	**SAR**	**EC,** µmhos/cm
Most Restrictive Proposed Limit –		3.0	1,000
Least Restrictive Proposed Limit		10.0	3,000
Little Powder River near Weston Gauging Station # 06324970			
Historic Data Average at Maximum Flow		4.62	1,785
Historic Data Average at Minimum Flow		6.94	3,300
WDEQ Quality Standards for Wyoming Groundwater (Chapter 8)			
Drinking Water (Class I)	500		
Agricultural Use (Class II)	2,000	8	
Livestock Use (Class III)	5,000		
WDEQ Water Quality Requirement for WYPDES Permit # WY0053791			
At discharge point	na	na	7500

Predicted Values	TDS, mg/l	SAR	EC, μmhos/cm
Predicted Produced Water Quality Comingled Canyon, Wall, Pawnee and Cache Coals	1,130	11.8	1,810

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 1130.0 mg/l TDS which is/is not within the WDEQ criteria for agricultural use (2000 mg/l TDS). However direct land application is not included in this proposal. If at any future time the operator entertains the possibility of irrigation or land application with the water produced from these wells, the proposal must be submitted as a sundry notice for separate environmental analysis and approval by the BLM.

The quality for the water produced from the Canyon, Wall, Pawnee and Cache comingled 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 100 gallons per minute (gpm) is projected is to be produced from each these 6 wells, for a total of 600 gpm for the POD. See Table 4.5.

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

There are 3 discharge points proposed for this project. They have been appropriately sited and utilize appropriate water erosion dissipation designs. Existing and proposed water management facilities were evaluated for compliance with best management practices during the onsite.

To manage the produced water, 3 impoundments (133.5 acre-feet) would potentially be constructed within the project area. These impoundments will disturb approximately 19.23 acres including the dam structures. Of these water impoundments, 2 are on-channel reservoirs with no new disturbance, and 1 would be off-channel playa with 19.23 acres of potential inundation. Because there is potential for water discharge to the playa to resurface in the sandy breaks area to the south, it will be necessary to monitor the area for new seeps and springs that may be caused by CBNG water storage. The off-channel playa impoundment would result in evaporation and infiltration of CBNG water. Criteria identified in "Off-Channel, Unlined CBNG Produced Water Pit Siting Guidelines for the Powder River Basin, Wyoming" (WDEQ, 2002) was used to locate these impoundments. Monitoring may be required based upon WYDEQ findings relative to "Compliance Monitoring for Ground Water Protection Beneath Unlined Coalbed Methane Produced Water Impoundments" (June 14, 2004). Two existing impoundments were constructed as part of fee development and were 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.

Discharge from the existing impoundments, which is allowed under the WYPDES permit, 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 2005 at a total contribution to the mainstem of the Little Powder River of 13 cfs (PRB FEIS pg 4-86). The predicted maximum discharge rate from these 6 wells is anticipated to be a total of 600 gpm or 1.3 cfs to impoundments or to direct stream discharge. As such the full discharge ratre can potentially be added to tributaries of White Tail Creek from this action and eventually to Little Powder River flows, or 10% 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 obtained a Wyoming Pollutant Discharge Elimination System (WYPDES) permit for the discharge of water produced from this project from the WDEQ.

Permit effluent limits were set at (WYPDES Permit # WY0053791 page 2):

pH	6.5 to 9.0
Specific Conductance	7500 mg/l max
Sulfates	3000 mg/l max
Dissolved iron	1000 µg/l max
Total Barium	1800 µg/l max
Total Arsenic	3.6 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 Harris POD prepared by ASAP Environmental Resources, LLC for Cedar Ridge, LLC.

4.5.2.1. Surface Water Cumulative Effects

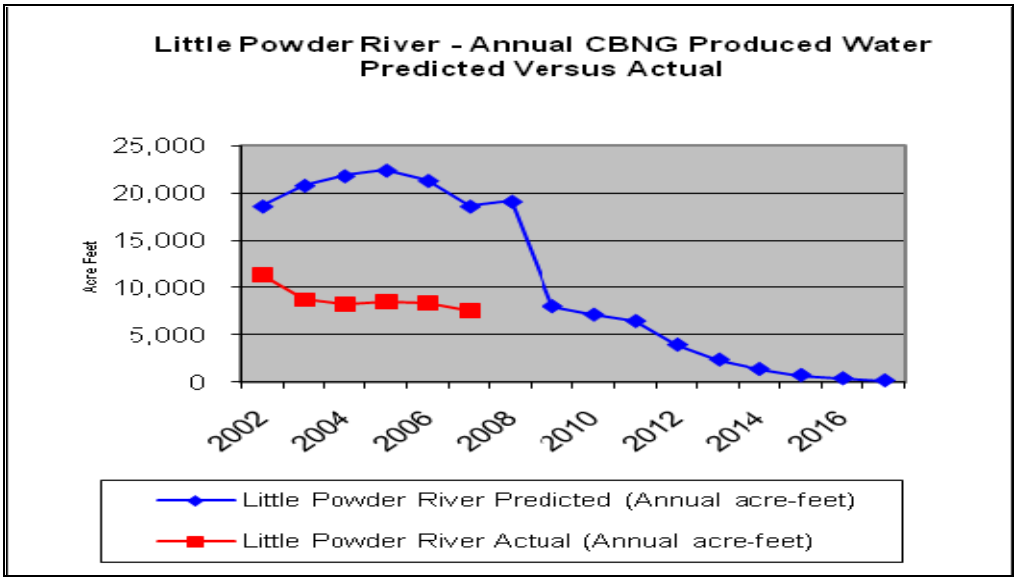
The analysis in this section includes cumulative data from Fee, State and Federal CBNG development in the Little Powder River watershed. These data were obtained from the Wyoming Oil and Gas Conservation Commission (WOGCC).

As of December 2007, all producing CBNG wells in the Little Powder River watershed have discharged a cumulative volume of 52,902 acre-ft of water compared to the predicted 123,631 acre-ft 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 42.8 % of the total predicted produced water analyzed in the PRB FEIS for the Little Powder River watershed.

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

Year	Little Powder River Predicted (Annual acre-feet	Little Powder River Predicted (Cumulative acre-feet from 2002)	Little Powder River Actual (Annual acre-feet)		Little Powder River Actual (Cumulative acre-feet from 2002)	
			Actual Ac-ft	% of Predicted	Cum Ac-ft	% of Predicted
2002	18,613	18,613	11,391	61.2	11,391	61.2
2003	20,822	39,435	8,767	42.1	20,158	51.1
2004	21,832	61,267	8,266	37.9	28,424	46.4
2005	22,427	83,694	8,529	38.0	36,953	44.2
2006	21,330	105,024	8,383	39.3	45,336	43.2
2007	18,607	123,631	7,566	40.7	52,902	42.8
2008	19,121	142,752				
2009	8,016	150,768				
2010	7,124	157,892				
2011	6,439	164,331				
2012	3,930	168,261				
2013	2,340	170,601				
2014	1,335	171,936				
2015	699	172,635				
2016	350	172,985				
2017	133	173,118				
Total	**173,118**		**52,902**			

Figure 4.1 Actual vs predicted water production in the Little 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 CBNG 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 Little Powder River drainage, which is approximately 42.8% of the total predicted in the PRB FEIS.
2. The WDEQ enforcement of the terms and conditions of the WYPDES permit that are designed to protect irrigation downstream.
3. The commitment by the operator to monitor the volume of water discharged.

No additional mitigation measures are required.

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

4.6. Cultural Resources

No known historic properties will be impacted by the project as proposed, within the culturally inventoried areas. The un-inventoried areas will not be authorized for project activities, until a cultural inventory can be conducted. On 9/30/08, the Bureau will electronically notify the Wyoming State Historic Preservation Office (SHPO), following section VI(A)(1) of the Wyoming State Protocol, of a finding of no effect to historic properties for the proposed project.

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).

4.7. Air Quality

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

5. CONSULTATION/COORDINATION

Contact	Title	Organization	Present at Onsite
Mary Hopkins	Interim WY SHPO	WY State Historic Preservation Office	No
Brad Rogers	Wildlife Biologist	US Fish & Wildlife Service	No

6. OTHER PERMITS REQUIRED

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

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8. LIST OF INTERDISCIPLINARY TEAM PREPARERS AND REVIEWERS

Julian Serafin, Natural Resource Specialist
Casey Freise, Supervisory Natural Resource Specialist
Chris Williams, Hydrologist
Rob Coleman, Petroleum Engineer
Kristine Phillips, Legal Instruments Examiner
Clint Crago, Archaeologist
Courtney Frost, Wildlife Biologist
Gerald Queen, Geologist
Christine Sadler, Realty Specialist
Thomas Bills, NEPA Coordinator
Buddy Green, Assistant Field Manager, Resources
Paul Beels, Associate Field Manager, Minerals & Lands
Chris E. Hanson, Field Manager

Interdisciplinary Team Lead: Julian Serafin