

**FINDING OF NO SIGNIFICANT IMPACT & DECISION RECORD  
FOR  
Williams Production RMT Company  
Kingsbury IV**

**ENVIRONMENTAL ASSESSMENT –WY-070-07-220**

DECISION: Is to approve Alternative C as described in the attached Environmental Assessment (EA) and authorize Williams’s Kingsbury 4 Coal Bed Natural Gas (CBNG) POD comprised of the following 82 Applications for Permit to Drill (APDs):

	<b>Well Name</b>	<b>Well #</b>	<b>QTR</b>	<b>Sec</b>	<b>TWP</b>	<b>RNG</b>	<b>Lease #</b>
1	KINGSBURY IV FEDERAL	12-15	SWNW	15	46N	77W	WYW0266642
2	KINGSBURY IV FEDERAL	12-15L	SWNW	15	46N	77W	WYW0266642
3	KINGSBURY IV FEDERAL	14-15	SWSW	15	46N	77W	WYW0266642
4	KINGSBURY IV FEDERAL	14-15L	SWSW	15	46N	77W	WYW0266642
5	KINGSBURY IV FEDERAL	23-15	NESW	15	46N	77W	WYW89849
6	KINGSBURY IV FEDERAL	23-15L	NESW	15	46N	77W	WYW89849
7	KINGSBURY IV FEDERAL	32-15	SWNE	15	46N	77W	WYW0266642
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11	KINGSBURY IV FEDERAL	41-15	NENE	15	46N	77W	WYW85360
12	KINGSBURY IV FEDERAL	41-15L	NENE	15	46N	77W	WYW85360
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The following impoundments were inspected and approved for use in association with the water management strategy for the POD.

	<b>IMPOUNDMENT Name / Number</b>	<b>Qtr/Qtr</b>	<b>Section</b>	<b>TWP</b>	<b>RNG</b>	<b>Capacity (Acre Feet)</b>	<b>Surface Disturbance (Acres)</b>	<b>Lease #</b>
1	BLM-23-17-4677*	NESW	17	46	77	19.41	5.6	WYW143349
2	BLM-21-20-4677*	NENW	20	46	77	16.64	3.91	WYW134919

\* These proposed on-channel reservoirs are on state surface over federal mineral and the state has elected to bond the reclamation of these reservoirs through the WDEQ.

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  
Williams Production RMT Company  
Kingsbury IV  
PLAN OF DEVELOPMENT  
WY-070-07-220**

## **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 quantify reserves and produce coal bed natural gas (CBNG) on seven valid federal oil and gas mineral leases issued to the applicant by the BLM. The need exists because without approval of the Applications for Permit to Drill (APDs), federal lease royalties will be lost and the lessee will be deprived of the federal gas they have the rights to develop.

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

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

### **2. ALTERNATIVES INCLUDING THE PROPOSED ACTION**

#### **2.1. Alternative A - No Action**

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

#### **2.2. Alternative B Proposed Action**

Proposed Action Title/Type: Williams’s IV Plan of Development (POD) for 84 coal bed natural gas well APD’s and associated infrastructure. A water management plan was developed and submitted as part of this POD to handle the produced water from all the Kingsbury IV wells

Proposed Well Information: There are 82 wells proposed within this POD, the wells are vertical bores proposed on an 80 acre spacing pattern with 2 wells per location. Each well will produce from two coal seams. Proposed well house dimensions are 4 ft wide x 4 ft length x 4 ft height. Well house color is Carlsbad Canyon, selected to blend with the surrounding vegetation. Wells are located as follows:

	<b>Well Name</b>	<b>Well #</b>	<b>QTR</b>	<b>Sec</b>	<b>TWP</b>	<b>RNG</b>	<b>Lease #</b>
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Water Management Proposal: The following impoundments were proposed for use in association with the water management strategy for the POD.

	<b>IMPOUNDMENT Name / Number</b>	<b>Qtr/Qtr</b>	<b>Section</b>	<b>TWP</b>	<b>RNG</b>	<b>Capacity (Acre Feet)</b>	<b>Surface Disturbance (Acres)</b>	<b>Lease #</b>
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County: Johnson

Applicant: Williams Production RMT Company

Surface Owners: John Iberlin, Larry Brubaker, Falxa Land Company, State of Wyoming, Bureau of Land Management

Project Description:

The proposed action involves the following:

- Drilling of 84 total federal CBM wells in Upper Big George, and Lower Big George coal zones to depths of approximately 1415 feet. The two coal seams will be produced by co-locating wells at a single location each targeting a single formation.

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/central metering facility/well visitation. Metering would entail 20 visits per month to each well/central metering facility.
- A Water Management Plan (WMP) that involves the following infrastructure and strategy: 2 discharge points, 2 stock water reservoirs within the Upper Powder River watershed which will accommodate produced water storage from 7 wells and a pump station. The remainder of the produced water will be put in a pipeline and transferred to Kingsbury I, II, or III existing infrastructure.
- An unimproved and improved road network.
- An above ground power line network to be constructed by a contractor. The proposed route has been reviewed by the contractor. If the proposed route is altered, then the new route will be proposed via right-of-way application and analyzed in a separate NEPA action. Power line construction has not been scheduled and will not be completed before the CBNG wells are producing. If the power line network is not completed before the wells are in production, then temporary diesel generators shall be placed at the 14 power drops.

A storage tank of 1000 gallon capacity shall be located with each diesel generator. Generators are projected to be in operation for up to 1 to 1 ½ years. Fuel deliveries are anticipated to be 2 times per week. Decibel ratings on the commonly used generators will be consulted prior to generator installments. Any generator exceeding stated COA decibel levels will have noise dampeners in stalled, enclosed with in a genitor building or sound attenuated models will be used.

- A buried gas, water and power line network, and central gathering/metering facilities.

For a detailed description of design features, construction practices and water management strategies associated with the proposed action, refer to the Master Surface Use Plan (MSUP), Drilling Plan and Water Management Plan (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 Kingsbury IV POD are listed below under 2.3.1:

#### 2.3.1. Changes as a result of the on-sites

Well #	QTR	Sec	TWP	RNG	Onsite Notes
32-15/32-15L	SWNE	15	46N	77W	well moved: proximity to raptor nest, minimize cut/fill in sandy inclusion, new location uses existing conventional pad & access, will require engineered pad but will be an eyebrow location off of existing access rd less cut & disturbance w/ new location
34-15/34/15L	SWSE	15	46N	77W	well moved: location in sagebrush habitat, new location will use existing conventional pad for completion & access
41-15/41-15L	NENE	15	46N	77W	well moved: proximity to raptor nest, new location uses existing conventional pad/ access
23-15/23-15L	NESW	15	46N	77W	well moved: location was in sage-grouse habitat, highly erosive soils
14-23/14-23L	SWSW	23	46N	77W	engineered access/utilities rerouted to minimize disturbance, less cut
21-23/21-23L	NENW	23	46N	77W	engineered access realigned to decrease cut/fill
23-23/23-23L	NESW	23	46N	77W	well moved: required engineered pad/access, new location is eyebrow off of existing main rd, will incorporate turnout into pad

Well #	QTR	Sec	TWP	RNG	Onsite Notes
34-23/34-23L	SWSE	23	46N	77W	well moved: proximity to raptor nest
21-17/21-17L	NENW	17	46N	77W	well moved: raptor nest, engineered pad required and ~300 of access from pad, rest of access/utility will be template
32-17/32-17L	SWNE	17	46N	77W	access/utilities rerouted off of main rd, highly erosive soils, steep slopes, will move ~80'W,
34-17/34-17L	SWSE	17	46N	77W	well moved at preplan field day, access from existing road rerouted, skirt sandy inclusion and steep topography
14-20/14-20L	SWSW	20	46N	77W	dropped proximity to bald eagle nest
21-20/21-20L	NENW	20	46N	77W	well moved, due to Anadarko pipeline, moved N Sec 17, possible may become one well location, constructed pad
23-20/23-20L	NESW	20	46N	77W	well moved away from bald eagle nest, eyebrow off of existing main rd, well name will change to 24
34-20/34-20L	SWSE	20	46N	77W	well moved: minimize disturbance, engineered pad encroached on drainage, new location eyebrow off of existing main rd,
21-21/21-21L	NENW	21	46N	77W	well moved inadequate location, fill in steep slopes, access/utilities rerouted to stay out of erosive soils,
32-21/32-21L	SWNE	21	46N	77W	well moved, highly erosive slopes and proximity to raptor buffer, no engineered pad needed, new location will require constructed pad, access/utilities rerouted to skirt rocky knob, SU: ~ 250 ' in from main rd
12-22/12-22L	SWNW	22	46N	77W	well moved, location was adequate, proposed access/utilities were located on slopes >25%, that required engineered designs requiring 30' of cut in highly erosive soils, new location eyebrow location off existing road
14-22/14-22L	SWSW	22	46N	77W	well moved at preplan field day, constructed pad, access/utilities 1/2 state engineered, 1/2 BLM template
21-22/21-22L	NENW	22	46N	77W	engineered pad will not be used, constructed pad, main rd to well: 2 TK
34-22/34-22L	SWSE	22	46N	77W	well moved, staked pad in drainage, new engineered pad drawing, access rerouted to skirt ridge less disturbance new route drawing will incorporate rd and pad
41-22/41-22L	NENE	22	46N	77W	well moved, sagebrush habitat, eyebrow location ~ off of proposed location, ~300' from existing main rd
43-22/43-22L	NESE	22	46N	77W	engineered access to be change to template: less cut

### 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 and revised a guidance document, "Compliance Monitoring and siting Requirements for Unlined Impoundments Containing Coalbed Methane Produced Water" (September, 2006) which can be accessed on their website. For all WYPDES permits the BLM will require that operators comply with the latest DEQ standards and monitoring guidance.

#### **2.3.2.2. Surface Water**

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

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

#### **2.3.2.4. Vegetation**

1. Temporarily fence reseeded areas, if not already fenced, for at least two complete growing seasons to insure reclamation success on problematic sites (e.g. close to livestock watering source, erosive soils etc.).

#### **2.3.2.5. Wetland/Riparian**

1. Power line corridors will avoid wetlands, to the extent possible, in order to reduce the chance of waterfowl hitting the lines. Where avoidance can't occur, the minimum number of poles necessary to cross the area will be used.
2. Wetland areas will be disturbed only during dry conditions (that is, during late summer or fall), or when the ground is frozen during the winter.
3. No waste material will be deposited below high water lines in riparian areas, flood plains, or in natural drainage ways.
4. The lower edge of soil or other material stockpiles will be located outside the active floodplain.
5. Disturbed channels will be re-shaped to their approximate original configuration or stable geomorphological configuration and properly stabilized.

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

#### **2.3.2.6. Wildlife**

1. For any surface-disturbing activities proposed in sagebrush shrublands, the Companies will conduct clearance surveys for sage grouse breeding activity during the sage grouse's breeding season before initiating the activities. The surveys must encompass all sagebrush shrublands within 0.5 mile of the proposed activities.
2. The Companies will locate facilities so that noise from the facilities at any nearby sage grouse or sharp-tailed grouse display grounds does not exceed 49 decibels (10 dBA above background noise) at the display ground.
3. The Companies will construct power lines to minimize the potential for raptor collisions with the lines. Potential modifications include burying the lines, avoiding areas of high avian use (for example, wetlands, prairie dog towns, and grouse leks), and increasing the visibility of the individual conductors.
4. The Companies will locate aboveground power lines, where practical, at least 0.5 mile from any sage grouse breeding or nesting grounds to prevent raptor predation and sage grouse collision with the conductors. Power poles within 0.5 mile of any sage grouse breeding ground will be raptor-proofed to prevent raptors from perching on the poles.
5. The Companies will locate impoundments to avoid sagebrush shrublands, where practical.
6. 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.
7. The Companies will limit the construction of aboveground power lines near streams, water bodies, and wetlands to minimize the potential for waterfowl colliding with power lines.
8. 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.

#### **2.3.2.7. Threatened, Endangered, or Sensitive Species**

##### **2.3.2.7.1. Bald Eagle**

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

##### **2.3.2.7.2. Black-footed Ferret**

1. Prairie dog colonies will be avoided wherever possible.

##### **2.3.2.7.3. Mountain Plover**

1. Work schedules and shift changes will be set to avoid the periods from 30 minutes before to 30 minutes after sunrise and sunset during June and July, when mountain plovers and other wildlife are most active.
2. Reclamation of areas of previously suitable mountain plover habitat will include the seeding of vegetation to produce suitable habitat for mountain plover.

**2.3.2.7.4. Ute Ladies'-tresses Orchid**

1. 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.

**2.3.2.8. Air Quality**

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

**2.3.3. Site specific mitigation measures**

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

**General**

1. Please contact Eric Holborn – Natural Resource Specialist, @ (307) 684-1044, Bureau of Land Management, Buffalo, if there are any questions concerning surface use COAs.

**Surface Use**

Well #	QTR	Sec	TWP	RNG	Lease	site specific COAs
34-15/15L	SWSE	15	46N	77W	WYW0266642	Existing conventional location to be used for drilling processes, frac tanks, pit spoils to be placed on conventional location
43-15/15L	NESE	15	46N	77W	WYW0266642	Engineered pad to be constructed with SE corner rounded to minimize cut/fill
12-23/23L	SWNW	23	46N	77W	WYW0266642	Location: Template 125'x80', <4cut
22-17/17L	NENW	17	46N	77W	WYW134919	Location: Template 125'x80', <4cut
23-17/17L	NESW	17	46N	77W	WYW143349	Location: Template 125'x80', <4cut
32-17/17L	SWNE	17	46N	77W	WYW146303	Location: Template 125'x80', <4cut
41-17/17L	NENE	17	46N	77W	WYW146303	Location: Template 125'x80', <4cut
43-17/17L	NESE	17	46N	77W	WYW146303	Location: Template 125'x80', <4cut
21-20/20L	NENW	20	46N	77W	WYW134919	Location: Template 125'x80', <4cut
32-20/20L	SWNE	20	46N	77W	WYW134919	Spot Upgrade required: culvert to east and LWC/rock apron to W for access off of main rd
12-21/21L	SWNW	21	46N	77W	WYW146304	Location: Template 125'x80', <4cut
14-21/21L	SWSW	21	46N	77W	WYW146304	Location: Template 125'x80', <4cut
32-21/21L	SWNE	21	46N	77W	WYW134919	Location: Template 125'x80', <4cut
34-21/21L	SWSE	21	46N	77W	WYW146304	Location: Template 125'x80', <4cut, sign to be placed at road intersection to turn into well, "no oil and gas traffic beyond this point"
14-22/22L	SWSW	22	46N	77W	WYW146304	Location: Template 125'x80', <4cut, sign to be placed at the South East end of location, "no oil and gas traffic beyond this point"
21-22/22L	NENW	22	46N	77W	WYW146304	Location: Template 125'x80', <4cut

Well #	QTR	Sec	TWP	RNG	Lease	site specific COAs
32-22/22L	SWNE	22	46N	77W	WYW146304	Location: Template 125'x80', <4cut
42-22/22L	NENE	22	46N	77W	WYW146304	Location: Template 125'x80', <4cut

2. All permanent above-ground structures (e.g., production equipment, tanks, etc.) not subject to safety requirements will be painted to blend with the natural color of the landscape. The paint used will be a color which simulates “Standard Environmental Colors.” The color selected for the Kingsbury IV POD is Carlsbad Canyon, (Munsell Soil Color 2.5Y 6/2).
3. The access road for the reservoir located T. 46 N., R. 77 W., Sec. 17 SESW will require a spot upgrade: the existing access coming from the east side of dam will be cut down to 12-14%(25% now), turnouts to be placed at the top of the hill, turnouts also to be placed along the existing access coming from the west side of dam. Turnouts will be constructed per guidelines provided in the Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development “*The Gold Book*”.
4. The Kingsbury POD project area has been identified to have limited reclamation potential that will require disturbed areas to be stabilized (stabilization efforts may include mulching, matting, soil amendments, etc.) in a manner which eliminates accelerated erosion until a self-perpetuating native plant community has stabilized the site in accordance with the Wyoming Reclamation Policy. Stabilization efforts shall be finished within 30 days of the initiation of construction activities.

The operator will follow the guidance provided in the Wyoming Policy on Reclamation (IM WY-90-231) specifically the following:

Reclamation Standards:

- C. 3 The reclaimed area shall be stable and exhibit none of the following characteristics:
    - a. Large rills or gullies.
    - b. Perceptible soil movement or head cutting in drainages.
    - c. Slope instability on, or adjacent to, the reclaimed area in question.
  - C.4. 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.5. 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:
    - a. Successful onsite establishment of species included in the planting mixture or other desirable species.
    - b. Evidence of vegetation reproduction, either spreading by rhizomatous species or seed production.
  - C.6. 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.
5. 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 different specific mix desired by the surface owner, use the following:

<b>Species</b>	<b>% in Mix</b>	<b>Lbs PLS*</b>
<b>Thickspike Wheatgrass</b> ( <i>Elymus lanceolatus ssp. lanceolatus</i> )	20	2.4
<b>Bluebunch Wheatgrass</b> ( <i>Pseudoroegneria spicata ssp. Spicata</i> )	15	1.8
<b>Prairie sandreed</b> ( <i>Calamovilfa longifolia</i> )	30	3.6
<b>Needleandthread</b> ( <i>Hesperostipa comata ssp. comata</i> )	20	1.0
<b>Prairie coneflower</b> ( <i>Ratibida columnifera</i> )	5	0.6
<b>White or Purple Prairie Clover</b> ( <i>Dalea candidum, purpureum</i> )	5	0.6
<b>Scarlet Globemallow</b> ( <i>Sphaeralcea coccinea</i> ) / or <b>Blue flax</b> ( <i>Linum lewisii</i> )	5	0.6
<b>Total</b>	<b>100%</b>	<b>10.6 lbs/acre</b>

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.

6. Provide 4" of aggregate where grades exceed 8% for stability and erosion prevention.
7. The culvert locations will be staked prior to construction. The culvert invert grade and finished road grade will be clearly indicated on the stakes. Culverts will be installed on natural ground, or on a designed flow line of a ditch. The minimum cover over culverts will be 12" or one-half the diameter whichever is greater. Drainage laterals in the form of culverts or water bars shall be placed according to the following spacing:

<b>Grade</b>	<b>Drainage Spacing</b>
2-4%	310 ft
5-8%	260 ft
9-12%	200 ft

8. The operator is responsible for having the licensed professional engineer certify that the actual construction of the road meets the design criteria and is constructed to Bureau standards.
9. Proposed Template Roads/Spot Upgrade with Utility Corridor will be allowed a maximum working width of 45ft with a blading/clearing width not to exceed 35ft.
10. Proposed Primitive Roads with utility corridor will be allowed a maximum working width of 35 ft with a blading/clearing width not to exceed 20ft.

**Hydrology:**

1. Due to the location of the 2 proposed reservoirs (BLM-23-17-4677 and BLM-21-20-4677) being on state surface, a Temporary Use Permit from the Office of State Lands & Investments will be required prior to discharge of off-lease water, produced in association with recovery of federal CBNG

minerals, into these reservoirs. Please submit the approved Temporary Use Permit to the BLM Authorized Officer (AO) upon receipt.

2. The operator will submit a copy of the Wyoming Pollution Discharge Elimination System (WYPDES) Permit to the BLM when it becomes available.

**Wildlife Protective Measures**

1. A disturbance-free buffer zone of 0.5 mile (i.e., no surface occupancy) will be established year-round for the Brubaker bald eagle nest (BLM ID# 3584). A seasonal minimal disturbance buffer zone of one mile will be established (February 1 – August 15). This affects the following wells and infrastructure:

<i>Township/Range</i>	<i>Section</i>	<i>Affected Wells and Infrastructure</i>
46/77	17	<b>Wells: 24-17 &amp; 24-17L</b> <b>Reservoir 23-17-4677</b> All project related activities within the: SW <sup>1</sup> / <sub>4</sub> SE <sup>1</sup> / <sub>4</sub> , SW <sup>1</sup> / <sub>4</sub> SW <sup>1</sup> / <sub>4</sub> , SE <sup>1</sup> / <sub>4</sub> SW <sup>1</sup> / <sub>4</sub> , S <sup>1</sup> / <sub>2</sub> NE <sup>1</sup> / <sub>4</sub> SW <sup>1</sup> / <sub>4</sub> of this section.
46/78	18	All proposed overhead power within the SE <sup>1</sup> / <sub>4</sub> of this section.
46/77	20	<b>Wells: 24-20 &amp; 24-20L, 32-20 &amp; 32-20L, 34-20 &amp; 34-20L and 43-20 &amp; 43-20L</b> <b>Reservoir 21-20-4677</b> All project related activities within the NW <sup>1</sup> / <sub>4</sub> , SW <sup>1</sup> / <sub>4</sub> , SE <sup>1</sup> / <sub>4</sub> , NW <sup>1</sup> / <sub>4</sub> NE <sup>1</sup> / <sub>4</sub> , SW <sup>1</sup> / <sub>4</sub> NE <sup>1</sup> / <sub>4</sub> and SE <sup>1</sup> / <sub>4</sub> NE <sup>1</sup> / <sub>4</sub> of this section.

2. Following nest productivity surveys (no earlier than April 15 or later than June 15), if the Brubaker bald eagle nest (BLM ID# 3584) is active, Williams Production RMT Company will monitor the activity of the bald eagle nest at the nest for the remainder of the nesting period (until August 15 or the young have fledged) during operations and maintenance visits to the 24-20 well location for the first five years following project completion. Monitoring will occur as follows:

A biologist is required to monitor the nest during well metering, maintenance and other site visits (excluding emergencies) and document the birds' behavior in response to human activity, equipment activity and noise throughout the entire buffer. The biologist must be in position to monitor the nest at least ½ hour before the monitoring or maintenance crews arrive and begin work and ½ hour after the monitoring or maintenance crews leave for the day. The biologist will record all of the bird's activity and document weather conditions and submit a report of the activity to the BLM biologist.

3. The following conditions will reduce impacts within bald eagle nesting and roosting habitat:
  - a. No surface disturbing activity shall occur within one mile of bald eagle habitat (Powder River) or identified nests annually from November 1 through April 1, prior to a winter roost survey or from February 1 through August 15 prior to a nesting survey. This affects the following wells and infrastructure:

<i>Township/Range</i>	<i>Section</i>	<i>Affected Wells and Infrastructure</i>
46/77	17	<b>Wells: 12-17 &amp; 12-17L, 22-17 &amp; 22-17L, 23-17 &amp; 23-17L, 24-17 &amp; 24-17L, 32-17 &amp; 32-17L, 34-17 &amp; 34-17L and 43-17 &amp; 43-17L</b> <b>Reservoir 23-17-4677</b> All project related activities within the: NW <sup>1</sup> / <sub>4</sub> , SW <sup>1</sup> / <sub>4</sub> , SW <sup>1</sup> / <sub>4</sub> NE <sup>1</sup> / <sub>4</sub> , NW <sup>1</sup> / <sub>4</sub> SE <sup>1</sup> / <sub>4</sub> , SW <sup>1</sup> / <sub>4</sub> SE <sup>1</sup> / <sub>4</sub> , SE <sup>1</sup> / <sub>4</sub> SE <sup>1</sup> / <sub>4</sub> , NW <sup>1</sup> / <sub>4</sub> NE <sup>1</sup> / <sub>4</sub> SE <sup>1</sup> / <sub>4</sub> , SW <sup>1</sup> / <sub>4</sub> NE <sup>1</sup> / <sub>4</sub> SE <sup>1</sup> / <sub>4</sub> , SE <sup>1</sup> / <sub>4</sub> NE <sup>1</sup> / <sub>4</sub> SE <sup>1</sup> / <sub>4</sub> of this section.
46/78	18	All proposed overhead power within this section.

<b>Township/Range</b>	<b>Section</b>	<b>Affected Wells and Infrastructure</b>
46/77	20	<b>Wells: 24-20 &amp; 24-20L, 32-20 &amp; 32-20L, 34-20 &amp; 34-20L, 41-20 &amp; 41-20L and 43-20 &amp; 43-20L</b> <b>Reservoir 21-20-4677</b> All project related activities within the <b>ENTIRE</b> section.
46/78	21	<b>Wells: 12-21 &amp; 12-21L and 14-21 &amp; 14-21L</b> All project related activities within the: NW <sup>1</sup> / <sub>4</sub> NW <sup>1</sup> / <sub>4</sub> , SW <sup>1</sup> / <sub>4</sub> NW <sup>1</sup> / <sub>4</sub> , NW <sup>1</sup> / <sub>4</sub> SW <sup>1</sup> / <sub>4</sub> , SW <sup>1</sup> / <sub>4</sub> SW <sup>1</sup> / <sub>4</sub> .

- b. If a roost is identified and construction has not been completed, a year round disturbance-free buffer zone of 0.5 mile will be established for all bald eagle winter roost sites. A seasonal minimum disturbance buffer zone of 1-mile will be established for all bald eagle roost sites (November 1 – April 1). Additional measures such as remote monitoring and restricting maintenance visitation to between 9:00 AM and 3:00 PM may be necessary to prevent disturbance.
  - c. If a nest is identified and construction has not been completed, a disturbance-free buffer zone of 0.5 mile (i.e., no surface occupancy) would be established year round for all bald eagle nests. A seasonal minimum disturbance-free buffer zone of 1-mile will be established for all bald eagle nest sites (February 1 - August 15).
  - d. Additional mitigation measures may be necessary if the site-specific project is determined by a Bureau biologist to have an adverse affect to bald eagles or their habitat.
4. The following conditions will reduce impacts to nesting raptors:
- a. No surface disturbing activity shall occur within ½ mile of all identified raptor nests from February 1 through July 31, annually, prior to a raptor nest occupancy survey for the current breeding season. This affects the following wells and infrastructure:

<b>Township/Range</b>	<b>Section</b>	<b>Affected Wells and Infrastructure</b>
46/77	14	All project related activities within NW <sup>1</sup> / <sub>4</sub> and south half of this section.
46/77	15	<b>Wells: 32-15 &amp; 32-15L and 41-15 &amp; 41-15L</b> All project related activities within the NE <sup>1</sup> / <sub>4</sub> and north half SE <sup>1</sup> / <sub>4</sub> .
46/77	16	All project related activities within the <b>ENTIRE</b> section.
46/77	17	<b>Wells: 12-17 &amp; 12-17L, 22-17 &amp; 22-17L, 23-17 &amp; 23-17L, 24-17 &amp; 24-17L, 32-17 &amp; 32-17L, 34-17 &amp; 34-17L, 41-17 &amp; 41-17L and 43-17 &amp; 43-17L</b> <b>Reservoir 23-17-4677</b> All project related activities within the <b>ENTIRE</b> section.
46/77	20	<b>Wells: 24-20 &amp; 24-20L, 32-20 &amp; 32-20L, 34-20 &amp; 34-20L, 41-20 &amp; 41-20L and 43-20 &amp; 43-20L</b> <b>Reservoir 21-20-4677</b> All project related activities within the <b>ENTIRE</b> section.
46/77	21	<b>Wells: 12-21 &amp; 12-21L, 14-21 &amp; 14-21, 21-21 &amp; 21-21L and 23-21 &amp; 23-21L.</b> All project related activities within the west half of the section.

<b>Township/Range</b>	<b>Section</b>	<b>Affected Wells and Infrastructure</b>
46/77	23	<b>Wells: 14-23 &amp; 14-23L, 21-23 &amp; 21-23L, 23-23 &amp; 23-23L and 34-23 &amp; 34-23L</b>  All project related activities within the NE¼, SE ¼, SW¼, NE¼NW¼ and SE¼NW¼.
46/77	26	All project related activities within the NE¼NE¼.

- b. 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. Surveys outside this window may not depict nesting activity. If a survey identifies active raptor nests, a ½ mile timing restriction will be implemented. The timing buffer restricts surface disturbing activities within ½ mile of occupied raptor nests from February 1 to July 31.
- c. Nest productivity checks shall be completed for all raptor nests within the Kingsbury IV POD listed in the table below. The occupancy checks shall be completed for the first five years following project completion. The productivity checks shall be conducted no earlier than June 1 or later than June 30 and any evidence of nesting success/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.
- d.

<b>BLM ID#</b>	<b>Species</b>	<b>UTMs (NAD83)</b>	<b>Legal Location</b>
3084	Long Eared Owl	412114E 4869137N	SWSE Sec. 10 T46N, R77W
3573	Great Horned Owl	411969E 4868301N	SWNE Sec. 15 T46N, R77W
3598	Red Tail Hawk	412487E 4868750N	NENE Sec. 15 T46N, R77W
3576	Great Horned Owl	413163E 4867244N	SESW Sec. 14 T46N, R77W
3063	Red Tail Hawk	413760E 486660N	SWNE Sec. 23 T46N, R77W
3603	Golden Eagle	405790E 4868630N	NENE Sec. 13 T46N, R77W
3584	Bald Eagle	407760E 4866230N	NWSW Sec. 20 T46N, R77W
3080	Long Eared Owl	410541E 4864907N	SENE Sec. 28 T46N, R77W
3579	Long Eared Owl	409578E 4866793N	NWNW Sec. 21 T46N, R77W
3077	Unknown	409000E 4865980N	SESE Sec. 20 T46N, R77W
3076	Unknown	408830E 4866620N	SWNE Sec. 20 T46N, R77W
3583	Great Horned Owl	407403E 4867308N	SESE Sec. 18 T46N, R77W
4335	Great Horned Owl	408855E 4868718N	NWNE Sec. 17 T46N, R77W
None	Red Tail Hawk	406835E 4869395	NESW Sec. 7 T46N, R77W

<b>BLM ID#</b>	<b>Species</b>	<b>UTMs (NAD83)</b>	<b>Legal Location</b>
4338	Long Eared Owl	410163E 4867812N	NESW Sec. 16 T46N, R77W
3574	Red Tail Hawk	407135E 4867435	SWSE Sec. 18 T46N, R77W
None	Red Tail Hawk	406281E 4866107N	NWSW Sec. 19 T46N, R77W
None	Great Horned Owl	406703E 4869388N	NESW Sec. 7 T46N, R77W
3085	Red Tail Hawk	408238E 4868547N	NWNW Sec. 17 T46N, R77W
3581	Unknown	412327E 4868625N	NENE Sec. 15 T46N, R77W
3067	Red Tail Hawk	412950E 4868940N	SWSW Sec. 11 T46N, R77W
3081	Red Tail Hawk	413845E 4865750N	SESE Sec. 23 T46N, R77W
3591	Unknown	413492E 4865780N	SWSE Sec. 23 T46N, R77W
3592	Unknown	413451E 4865650N	SWSE Sec. 23 T46N, R77W
3590	Unknown	413519E 4865502N	SWSE Sec. 23 T46N, R77W
None	Unknown	406934E 4864870N	SWSE Sec. 30 T46N, R77W
None	Unknown	405697E 4867649	NWSE Sec. 13 T46N, R77W
3073	Unknown	408820E 4865020N	NENE Sec. 29 T46N, R77W
3587	Unknown	413845E 4865750N	NENE Sec. 30 T46N, R77W
3072	Unknown	409423E 4865999N	SWSW Sec. 21 T46N, R77W
3075	Red Tail Hawk	407845E 4867040N	NWNW Sec. 20 T46N, R77W
None	Unknown	405750E 4868580N	NENE Sec. 13 T46N, R78W
3078	Unknown	409573E 4866809N	NWNW Sec. 17 T46N, R77W
4349	Great Horned Owl	409245E 4867808N	NESE Sec. 17 T46N, R77W
None	Unknown	406739E 4868965N	SESW Sec. 7 T46N, R77W

5. A mountain plover nesting survey is desired in suitable habitat prior to commencement of surface disturbing activities in the prairie dog towns located in Section 20 SW $\frac{1}{4}$ , NE $\frac{1}{4}$  NW $\frac{1}{4}$  in Township 46

North, Range 77 West. If the survey is not conducted prior to commencement of surface disturbing activities, it shall be conducted during the first breeding season following POD approval. No surface disturbing activities are permitted in suitable habitat areas listed above, from March 15-July 31, until a mountain plover nesting survey has been conducted for the current breeding season. This affects the following:

<i>Township/Range</i>	<i>Section</i>	<i>Affected Wells and Infrastructure</i>
46/77	20	Wells: 24-20& 24-20L Reservoir 21-20-4677

- a. If a mountain plover is identified, then a seasonal disturbance-free buffer of ¼ mile shall be maintained between March 15 and July 31. If no mountain plovers are identified, then surface disturbing activities may be permitted within suitable habitat until the following breeding season (March 15).
  - b. Work schedules and shift changes will be set to avoid the periods from 30 minutes before to 30 minutes after sunrise and sunset during June and July, when mountain plovers and other wildlife are most active.
  - c. Reclamation of areas of previously suitable mountain plover habitat will include the seeding of vegetation to produce suitable habitat for mountain plover.
6. The following conditions will alleviate impacts to sage grouse:
- a. No surface disturbing activities are permitted within 2 miles of any greater sage-grouse lek between March 1 and June 15, prior to completion of a greater sage-grouse lek survey. **This condition will be implemented on an annual basis for the duration of surface disturbing activities.** This timing limitation will affect the following wells and infrastructure:

<i>Township/Range</i>	<i>Section</i>	<i>Affected Wells and Infrastructure</i>
46/77	14	All project related activities within south half of this section.
46/77	15	Wells: 12-15 & 12-15L, 23-15 & 23-15L, 32-15 & 32-15L, 34-15 & 34-15L and 41-15 & 41-15L  All project related activities within the NE¼, SE¼, NW¼, NE¼SW¼, NW¼SW¼ and SE¼SW¼ within this section.

- b. If an active sage grouse lek is identified during the survey, the 2 mile timing restriction (March 1-June 15) will be applied and surface disturbance 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 disturbance 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.
- c. Creation of raptor hunting perches will be avoided within 0.5 mile of documented sage grouse lek sites. Perch inhibitors will be installed to deter avian predators from preying on sage grouse.

### 3. DESCRIPTION OF AFFECTED ENVIRONMENT

Applications to drill were received on December 20, 2007. Field inspections of the proposed Kingsbury IV CBNG project were conducted on 7/10/2007 July 9-13, 2007 by:

NAME	TITLE	AGENCY
Eric Holborn	NRS	BLM
Jim Verplancke	NRS/Wildlife Biologist	BLM

<b>NAME</b>	<b>TITLE</b>	<b>AGENCY</b>
Jenny Morton	Wildlife Biologist	BLM
Mike McKinley	Hydrologist	BLM
Chris Perry	Civil Engineer	BLM
Clint Crago	Archaeologist	BLM
Mike Evers	Engineer	WWC
Penny Bellah	Regulatory Agent	Williams Production Company
Richard Jarvis	Landman	Williams Production Company
Randy Materi	Construction Supervisor	Williams Production Company
Charlie Bolerjack	Operations Superintendent	Williams Production Company
Rex Lynde	Drilling Supervisor	Williams Production Company
Dan Bock	Pipeline Foreman	Williams Production Company
Brad Rodgers	Wildlife Biologist	US Fish and Wildlife Service
Jason Crower	Principal Lands Management Representative	State of Wyoming
Bill Bellah		Grouse Mountain Consulting
Tom Lohse	Falxa representative	
Martin Falxa	Land Owner	

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.**

<b>Mandatory Item</b>	<b>Potentially Impacted</b>	<b>No Impact</b>	<b>Not Present On Site</b>	<b>BLM Evaluator</b>
Threatened and Endangered Species	X			Jim Verplancke/Jenny Morton
Floodplains		X		Eric Holborn,
Wilderness Values			X	Eric Holborn
ACECs			X	Eric Holborn
Water Resources	X			Eric Holborn,
Air Quality	X			Eric Holborn
Cultural or Historical Values		X		Clint Crago
Prime or Unique Farmlands			X	Eric Holborn
Wild & Scenic Rivers			X	Eric Holborn
Wetland/Riparian		X		Eric Holborn,
Native American Religious Concerns			X	Clint Crago
Hazardous Wastes or Solids			X	Eric Holborn
Invasive, Nonnative Species	X			Eric Holborn
Environmental Justice		X		Eric Holborn

**3.1. Topographic Characteristics of Project Area**

The project area is west and south of Gillette, T. 46 N., R.77 W. Sec.15, 17, 20-23. For detailed directions on how to access the project are see the MSUP in the POD. Elevations within the project area range from 4000 to 4650 feet above sea level. The topography throughout the area is rolling hills with moderately steep ridges and draws. Several ephemeral tributaries drain the majority of the area into the Powder River. The Powder River is located approximately 1/2 mile west. Current land uses in the region include grazing of cattle and sheep, conventional oil production, and coalbed methane gas production.

**3.2. Vegetation & Soils**

General vegetation communities within the project area consist of sagebrush/grassland. Wyoming Big Sagebrush intermixed with various native bunch grasses dominates the vegetative composition of the POD. Grass species consist of needle and thread, western wheatgrass, cheatgrass, threadleaf sedge, little bluestem, and buffalo grass. Broom snakeweed, rubber rabbitbrush, and prickly pear are found interspersed throughout the general area. Juniper trees were observed along incised draws, cottonwood trees and willows were observed in draw bottoms and along the Powder River flood plain. Differences in dominant species within the project area vary with soil type, aspect and topography.

Soils within the project area were identified from the *South Johnson County Survey Area, Wyoming (WY619)*. 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 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.

**Soil Map Unit Types**

<b>Map Unit Symbol</b>	<b>MAP UNIT NAME</b>	<b>ACRES</b>	<b>PERCENT</b>
AL	Alluvial land	70	1%
BA	Badland	111	2%
CV	Cushman-Briggsdale association	59	1%
He	Haverson silt loam	15	<1%
Hm	Haverson silt loam, sandy subsoil variant	1	<1%
KdA	Kim loam, 0 to 3 percent slopes	2	<1%
KZB	Kim-Zigweid association, gently sloping	22	<1%
LO	Limon-Cadoma association	16	<1%
REC	Renohill-Razor association, undulating	63	1%
SNb	Shingle-Cushman association	18	<1%
SNc	Shingle-Kim association	67	1%
SNd	Shingle-Kim association, valleys	4	<1%
SNe	Shingle-Tassel association	3903	81%
STd	Stoneham-Cushman association	31	1%
TE	Terry-Tassel association	172	4%
VC	Valent-Cushman association	286	6%
W	Water	5	<1%

For more detailed soil information, see the NRCS Soil Survey 619 – Southern Johnson County.

Additional site specific soil information is included in the Ecological Site interpretations which follow in Section 3.2.1.

Soils differ with topographic location, slope and elevation. Topsoil depths to be salvaged for reclamation

range from 2 to 4 inches on ridges to 8 inches in bottomland. Erosion potential varies from moderate to severe depending on the soil type, vegetative cover and slope. Reclamation potential of soils also varies throughout the project area. Areas with limited reclamation capability and/or highly erosive soils were identified by BLM specialists and the operator during the pre-approval onsite inspection. Approximately 94 percent of the area within the proposed action boundary has soil mapping units identified as having a low reclamation potential.

The main soil limitations in the project area include: depth to bedrock, low organic matter content, soil droughtiness, low water holding capacity, and high erosion potential especially in areas of steep slopes. Approximately 3903 acres within the POD boundary have been identified by BLM as being susceptible to degradation due to steep slopes and/or highly erosive soil utilizing Soil Survey Geographical Data (SSURGO).

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

Ecological Site Descriptions are used to provide soils 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 identified for the soils and the associated ecological sites found within the POD boundary are listed in the table below.

**Map Units and Ecological Sites**

Map Unit Symbol	ECOLOGICAL SITE
AL	SANDS (10-14NP)
CV	LOAMY (10-14NP)
He	LOWLAND (10-14NP)
Hm	LOWLAND (10-14NP)
KdA	LOAMY (10-14NP)
KZB	LOAMY (10-14NP)
LO	CLAYEY (10-14NP)
REC	CLAYEY (10-14NP)
SNb	SHALLOW LOAMY (10-14NP)
SNc	LOAMY (10-14NP)
SNd	SHALLOW LOAMY (10-14NP)
SNe	SHALLOW LOAMY (10-14NP)
STd	LOAMY (10-14NP)
TE	SANDY (10-14NP)
VC	SANDS (10-14NP)

Dominant Ecological Sites and Plant Communities identified in this POD and its infrastructure, by dominant soil series are:

*Shallow Loamy site:* This site occurs on steep slopes and ridge tops, but may occur on all slopes, on landforms which include hill sides, ridges and escarpments in the 10-14 inch precipitation zone. The soils of this site are shallow (less than 20” to bedrock) well-drained soils formed in alluvium over residuum or residuum derived from sandstone and shale. These soils have moderate permeability and may occur on all slopes. The bedrock may be any kind which is virtually impenetrable to plant roots, except igneous. The main soil limitations include the depth to bedrock.

The present plant community is a Mixed Sagebrush/Grass.

Wyoming big sagebrush is a significant component of this Mixed Sagebrush/Grass plant community. Cool-season mid-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, and little bluestem. Other grasses occurring on the state include Cusick's and Sandberg bluegrass, and prairie junegrass. Cheatgrass has invaded the state. Other vegetative species identified at onsite include: pricklypear and fringed sagewort.

*Sands Site:* This site occurs on nearly level to 50 percent slopes on landforms which include hillsides and ridges in the 10-14" precipitation zone. The soils of this site are moderately deep to very deep (greater than 20" to bedrock), well drained soils that formed in eolian deposits, alluvium or residuum derived from unspecified sandstone. These soils have rapid permeability. The main soil limitations include low available water holding capacity, and high wind erosion potential. The soil will develop into active sand dunes, with the deterioration of cover.

The present plant community is a *Threadleaf sedge/Needleandthread/Yucca* plant community. Dominant vegetation includes needleandthread, threadleaf sedge, sand dropseed and yucca. Other vegetative species identified at onsite include prairie sandreed, Indian ricegrass, cheatgrass and prickly pear.

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**

<b>ECOLOGICAL SITE</b>	<b>ACRES</b>	<b>PERCENT</b>
SHALLOW LOAMY (10-14NP)	3925	81%
SANDS (10-14NP)	357	7%
LOAMY (10-14NP)	181	4%
SANDY (10-14NP)	172	4%
WATER/BADLANDS	115	2%
CLAYEY (10-14NP)	79	2%
LOWLAND (10-14NP)	16	0%
TOTAL	4844	100%

**3.2.2. Wetlands/Riparian**

No wetland/riparian areas were noted during the onsite which might be impacted from the 2 proposed on-channel reservoirs.

**3.2.3. Invasive Species**

The following state-listed noxious weeds and/or weed species of concern infestations were discovered by a search of inventory databases on the Wyoming Energy Resource Information Clearinghouse (WERIC) web site ([www.weric.info](http://www.weric.info)):

- Russian knapweed
- Scotch thistle

The WERIC database was created cooperatively by the University of Wyoming, BLM and county Weed and Pest offices. Additionally, the operator or BLM confirmed the following WRIC identified infestations and/or documented additional weed species during subsequent field investigations:

- salt cedar
- Canada thistle

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

### **3.3. Wildlife**

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

A habitat assessment and wildlife inventory surveys were performed by Duffy Brown of Wildlife Resources, LLC (2007). Wildlife Resources, LLC performed surveys for bald eagles, mountain plover, sharp-tailed grouse, greater sage-grouse, raptor nests and prairie dog colonies according to protocol in 2006 and 2007. Surveys were conducted for Ute ladies'-tresses orchid within the Powder River riparian (sections 18-20, T46N, R77W) on August 23, 2006.

BLM biologists conducted field visits on July 10-13, 2007. During this time, the biologists reviewed the wildlife survey information for accuracy, evaluated impacts to wildlife resources, and provided project adjustment recommendations where wildlife issues arose.

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

#### **3.3.1. Big Game**

Big game species expected to be within the Kingsbury IV project area include pronghorn antelope and mule deer. The WGFD has determined that the project area contains Yearlong pronghorn antelope and mule deer range as well as Winter Yearlong range for mule deer.

**Winter-Yearlong** use is when a population or a portion of a population of animals makes general use of the documented suitable habitat sites within this range on a year-round basis. During the winter months there is a significant influx of additional animals into the area from other seasonal ranges. **Yearlong** use is when a population of animals makes general use of suitable documented habitat sites within the range on a year round basis. Animals may leave the area under severe conditions.

Pronghorn antelope within the project area belong to the Pumpkin Buttes herd unit 309. The 2005 estimated herd population was 32,405 with a population objective of 18,000. The 2005 data indicates that the pronghorn antelope population within the hunt area is above WGFD objectives.

Mule deer within the project area belong to the Pumpkin Buttes herd unit 320. The 2005 estimated herd population was 9,900 with a population objective of 11,000. The 2005 data indicates that the mule deer population within the hunt area is above WGFD objectives.

Big game range maps are available in the PRB FEIS (3-119-143), the project file, and from the WGFD.

#### **3.3.2. Aquatics**

The project area is drained by the ephemeral Hoe Draw, tributary of the Upper Powder River. No natural springs have been documented within the project area (WWC Engineering, 2006). Fish that have been identified in the Upper Powder River watershed are listed in the PRB FEIS (3-156-159).

### 3.3.3. Migratory Birds

A wide variety of migratory birds may be found in the proposed project area at some point throughout the year. Migratory birds are those that migrate for the purpose of breeding and foraging at some point in the calendar year. Migratory bird species of management concern that may occur in the project area are listed in the PRB FEIS (3-151).

### 3.3.4. Raptors

Thirty-six raptor nest sites were identified by Wildlife Resources LLC (Brown) and BLM within 0.5 mile of the project area, of these, 15 nests were active in 2006 and 10 nests were active in 2007.

**Table 3.2** Documented raptor nests within the Kingsbury IV project area in 2006 and 2007.

BLM ID#	Species	UTMs (NAD83)	Legal Location	Substrate /Height	2007 Condition	2006 Status	2007 Status
3084	LOOW	412114E 4869137N	SWSE Sec. 10 T46N, R77W	CTL/35'	FAIR	Active	Inactive
3573	GHOW	411969E 4868301N	SWNE Sec. 15 T46N, R77W	CTL/40'	GOOD	Active	Active
3598	RTHA	412487E 4868750N	NENE Sec. 15 T46N, R77W	CTL/40'	GOOD	Active	Active
3576	GHOW	413163E 4867244N	SESW Sec. 14 T46N, R77W	CTL/45'	GOOD	Active	Inactive
3063	RTHA	413760E 486660N	SWNE Sec. 23 T46N, R77W	CTL/35'	GOOD	Active	Inactive
3603	GOEA	405790E 4868630N	NENE Sec. 13 T46N, R77W	CTL/55'	GOOD	Active	Active
3584	BAEA	407760E 4866230N	NWSW Sec. 20 T46N, R77W	CTL/60'	GOOD	Active	Active
3080	LOOW	410541E 4864907N	SENE Sec. 28 T46N, R77W	CTL/30'	FAIR	Active	Inactive
3579	LOOW	409578E 4866793N	NWNW Sec. 21 T46N, R77W	CTL/35'	FAIR	New in 2007	Inactive
3077	UNK	409000E 4865980N	SESE Sec. 20 T46N, R77W	CTL/35'	GOOD	Active	Inactive
3076	UNK	408830E 4866620N	SWNE Sec. 20 T46N, R77W	CTL/20'	GOOD	Active	Inactive
3583	GHOW	407403E 4867308N	SESE Sec. 18 T46N, R77W	CTL/50'	GOOD	Active	Active
4335	GHOW	408855E 4868718N	NWNE Sec. 17 T46N, R77W	CLIF/35'	GONE	Active	Inactive
None	RTHA	406835E 4869395	NESW Sec. 7 T46N, R77W	CTL/55'	GOOD	Active	Active
4338	LOOW	410163E 4867812N	NESW Sec. 16 T46N, R77W	CTL/35'	POOR	Active	Inactive
3574	RTHA	407135E 4867435	SWSE Sec. 18 T46N, R77W	CTL/55'	GOOD	Active	Active
None	RTHA	406281E 4866107N	NWSW Sec. 19 T46N, R77W	CTL/60'	FAIR	New in 2007	Active
None	GHOW	406703E 4869388N	NESW Sec. 7 T46N, R77W	CTL/50'	GOOD	New in 2007	Active
3085	RTHA	408238E 4868547N	NWNW Sec. 17 T46N, R77W	CTL/30'	POOR	Inactive	Inactive
3581	UNK	412327E 4868625N	NENE Sec. 15 T46N, R77W	CTL/40'	FAIR	Inactive	Inactive

<b>BLM ID#</b>	<b>Species</b>	<b>UTMs (NAD83)</b>	<b>Legal Location</b>	<b>Substrate /Height</b>	<b>2007 Condition</b>	<b>2006 Status</b>	<b>2007 Status</b>
3067	RTHA	412950E 4868940N	SWSW Sec. 11 T46N, R77W	CTL/55'	FAIR	Inactive	Inactive
3081	RTHA	413845E 4865750N	SESE Sec. 23 T46N, R77W	CTL/35'	GONE	New in 2007	Inactive
3591	UNK	413492E 4865780N	SWSE Sec. 23 T46N, R77W	CTL/45'	POOR	Inactive	Inactive
3592	UNK	413451E 4865650N	SWSE Sec. 23 T46N, R77W	CTL/45'	POOR	Inactive	Inactive
3590	UNK	413519E 4865502N	SWSE Sec. 23 T46N, R77W	CTL/40'	POOR	Inactive	Inactive
None	UNK	406934E 4864870N	SWSE Sec. 30 T46N, R77W	CTL/50'	FAIR	Inactive	Inactive
None	UNK	405697E 4867649	NWSE Sec. 13 T46N, R77W	CTD/25'	POOR	Inactive	Inactive
3073	UNK	408820E 4865020N	NENE Sec. 29 T46N, R77W	CTL/25'	POOR	Inactive	Inactive
3587	UNK	413845E 4865750N	NENE Sec. 30 T46N, R77W	CTL/30'	FAIR	New in 2007	Inactive
3072	UNK	409423E 4865999N	SWSW Sec. 21 T46N, R77W	CTL/20'	POOR	Inactive	Inactive
3075	RTHA	407845E 4867040N	NWNW Sec. 20 T46N, R77W	CTL/50'	GOOD	Inactive	Active
None	UNK	405750E 4868580N	NENE Sec. 13 T46N, R78W	CTL/50'	POOR	New in 2007	Inactive
3078	UNK	409573E 4866809N	NWNW Sec. 17 T46N, R77W	CTL/30'	POOR	New in 2007	Inactive
4349	GHOW	409245E 4867808N	NESE Sec. 17 T46N, R77W	CTL/35'	POOR	Inactive	Inactive
None	UNK	406739E 4868965N	SESW Sec. 7 T46N, R77W	CTL/50'	POOR	New in 2007	Inactive

**Species**

**GOEA** = Golden Eagle

**LEOW** = Long-eared Owl

**GRHO** = Great Horned Owl

**RETA** = Red-tailed Hawk

**BAEA** = Bald Eagle

**UNK** = Unknown

**NEST SUBSTRATE/ HEIGHT OF SUBSTRATE (i.e. 50')**

**CTL** = Cottonwood Tree (Live)

**CTD** = Cottonwood Tree (Dead)

**CLF** = Cliff

**3.3.5. Threatened and Endangered and Sensitive Species**

**3.3.5.1. Threatened and Endangered Species**

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

**3.3.5.1.1. Black-footed ferret**

The USFWS listed the black-footed ferret as Endangered on March 11, 1967. Active reintroduction efforts have reestablished populations in Mexico, Arizona, Colorado, Montana, South Dakota, Utah, and Wyoming. In 1988, the WGFD identified four prairie dog complexes (Arvada, Recluse, Thunder Basin

National Grasslands, and Midwest) partially or wholly within the BLM Buffalo Field Office administrative area as potential black-footed ferret reintroduction sites (Oakleaf 1988).

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

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

Two black-tailed prairie dog colonies were identified during site visits by Wildlife Resources LLC (Brown) within the project area. Approximately 145 acres of active black-tailed prairie dog towns were mapped inside and adjacent to the proposed development area. The largest colony is approximately 93 acres (NW Sec. 29, SW Sec. 20, T46N, R77W and the other is 5 acres (NE Sec. 20 T46N, R77W) (Brown 2007). The project area is located approximately 9 miles north northeast of the Midwest complex, the nearest potential reintroduction area. Black-footed ferret habitat is not present within the Kingsbury IV project area.

#### **3.3.5.1.2. Ute Ladies'-Tresses Orchid**

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

There are no records of Ute ladies'-tresses orchid in the project area. The only potential suitable habitat for the Ute ladies'-tresses orchid exists within the Powder River riparian zone. The remainder of the Kingsbury IV POD is located in mainly upland shrub/grassland habitat, with no wetlands or perennial waterways. A Ute ladies'-tresses orchid survey was conducted with the Powder River riparian zone (sections 18-20, T46N, R77W). No Ute ladies'-tresses orchid were observed (Brown 2007).

#### **3.3.5.2. Sensitive Species**

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

Prairie dogs colonies create habitat for many species of wildlife (King 1955, Reading 1989). Agnew (1986) found that bird species diversity and rodent abundance were higher on prairie dog towns than on mixed grass prairie sites. Several studies (Agnew 1986, Clark 1982, Campbell and Clark 1981 and Reading 1989) suggest that richness of associated species on black-tailed prairie dog colonies increases with colony size and regional colony density. Prairie dog colonies attract many insectivorous and

carnivorous birds and mammals because of the concentration of numerous prey species (Clark 1982, Agnew 1986, Agnew 1988).

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

#### **3.3.5.2.1. Bald eagle**

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

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

The area along the Powder River, on the western edge of the project, is dominated by a cottonwood forest, established on terraces adjacent to the river. Cottonwood habitat found in this area serves as roosting/nesting habitat. Bald eagles have been documented frequently using an area in central Section 7, and within 0.5 mile of the Brubaker bald eagle nests in Sections 19 and 20, T46N, R77W. An aquatic food source exists within this habitat and a reliable prey base exists within the project area in the lagomorphs (hares and rabbits), prairie dogs, domestic sheep and big game carcasses. The BLM wildlife database shows a historical bald eagle nest site (BLM ID# 3584) on the Powder River located NWSW Section 20, T46N, R77W. Data collected by the Wyoming Game & Fish Dept. indicates bald eagles actively using the nest since 1996 with young of the year observed in 1997, 1999, 2003 and 2007. The records are not clear during the 2006 nesting season the nest was blown out of the cottonwood tree and landed on the ground intact with offspring surviving the fall as witnessed by Dan Thiele, WYGF biologist. The bald eagles rebuilt the nest in 2006 in a nearby cottonwood tree. It was identified as productive again in its new location during the 2007 nest survey. On May 9, 2007, the Wyoming Game and Fish Department personnel surveyed the "Brubaker" nest observing two adults and two fully feathered juveniles. The WYGF considers the "Brubaker" nest as one of the oldest nests as well as the most product bald eagle nest within the Powder River Basin. During the onsite Kingsbury IV onsite inspection, a bald eagle pair was observed utilizing this active nest. The nest is located 0.45 miles from Larry Brubaker's long time ranch house and sheep ranching operation.

#### **3.3.5.2.2. Black-tailed prairie dog**

On August 12, 2004, the U.S. Fish and Wildlife Service removed the black-tailed prairie dog's Candidate

status. The Buffalo Field Office however will consider prairie dogs as a sensitive species and continue to afford this species the protections described in the FEIS. The black-tailed prairie dog is a diurnal rodent inhabiting prairie and desert grasslands of the Great Plains. Their decline is related to multiple factors including, habitat destruction, poisoning, and Sylvatic plague.

Two black-tailed prairie dog colonies were identified during site visits by Wildlife Resources LLC (Brown) within the project area. Approximately 145 acres of active black-tailed prairie dog towns were mapped inside and adjacent to the proposed POD area. The largest colony is approximately 93 acres (NW Sec. 29, SW Sec. 20, T46N, R77W and the other is 5 acres (NE Sec. 20 T46N, R77W) (Brown 2007).

**3.3.5.2.3. Greater sage-grouse**

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

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

The Kingsbury IV project area is well suited for sage-grouse breeding, nesting, and wintering grounds. During the onsite field inspection BLM observed signs of sage-grouse activity within sagebrush habitat at multiple well locations and along proposed access routes. No sage-grouse were observed during the field visits. Two documented sage grouse leks (Pumpkin Butte I and Pumpkin Butte II) exist within 3 miles of the proposed Kingsbury IV POD. Wildlife Resources LLC conducted ground surveys within the project area on April 3, 11, and 17, 2006 and April 4, 11 and 27 2007. While sage-grouse activity was observed at the Pumpkin Butte II lek in 2006 and 2007, the Pumpkin Butte I lek was not active in 2006. The Pumpkin Butte I lek was first identified in 1976 with 25 males observed, 5 males were observed in 2004, and 20 males were observed in 2007. In 2003, the Pumpkin Butte II lek was first identified with 4 males observed. The peak number of males observed at the Pumpkin Butte II lek in 2007 was 27. No other sage grouse leks were identified during surveys. These lek sites are identified below.

**Table 3.3 Sage-grouse leks surrounding the Kingsbury IV project area.**

<b>Lek Name</b>	<b>Legal Location</b>	<b>Status In 2006 (Peak Males)</b>	<b>Status In 2007 (Peak Males)</b>	<b>Distance From Project Area</b>
Pumpkin Butte I	NWNW, Sec. 11, T46N/R77W	0	20	0.80 miles
Pumpkin Butte II	SESE, Sec. 2, T46N/R77W	26	23	1.16 miles

**3.3.5.2.4. Mountain plover**

Mountain plovers, which are a Buffalo Field Office sensitive species, are typically associated with high, dry, short grass prairies containing vegetation typically shorter than four inches tall, and slopes less than 5 degrees (BLM 2003). Mountain plovers are closely associated with heavily grazed areas such as prairie dog colonies and livestock pastures.

Suitable mountain plover habitat does exist, although limited and fragmented, throughout the project area. Prairie dog towns and flat ridge tops with short herbaceous cover were the most suitable habitat types observed in the project area. The BLM’s habitat suitability model indicates that suitable mountain plover habitat exists throughout the Kingsbury IV POD; however the topography within the area has the habitat highly fragmented by slopes in excess of 12%. Due to a wet spring in 2007, vegetation within the project area was greater than 4 inches in height with the exception of the identified prairie dog towns.

### 3.4. West Nile Virus

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

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

The human health issues related to WNV are well documented and continue to escalate. Historic data collected by the CDC and published by the USGS at [www.westnilemaps.usgs.gov](http://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	Unknown	1

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

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

more sensitive to the virus (Rinkes 2003).

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

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

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

### **3.5. Water Resources**

The project area is within Hoe Creek, tributary to the Upper Powder River drainage system. The upper reaches of Hoe Creek and its tributaries consist of steep, dissected terrain with slopes at times exceeding 15%. The watershed has slope gradients in the range of 4% to 8%. The main stem and tributaries possess a sinuous, well-vegetated channel bottom.

#### **3.5.1. Groundwater**

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

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

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

- The effects of infiltrated waters on the water quality of existing shallow groundwater aquifers are not well documented at this time;
- Potential impacts will be highly variable depending upon local geologic and hydrologic conditions;

- It may be necessary to conduct investigations at representative sites around the basin to quantify these impacts;
- Provide site specific guidance on the placement and design of CBM impoundments, and;
- Shallow groundwater wells would be installed and monitored where necessary.

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

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

A search of the Wyoming State Engineer Office (WSEO) Ground Water Rights Database for this area showed 33 registered stock and domestic water wells within ½ mile of a federal CBNG producing well in the POD with depths ranging from 90 to 950 feet. For additional information on water, please refer to the PRB FEIS (January 2003), Chapter 3, Affected Environment pages 3-1 through 3-36 (groundwater).

### **3.5.2. Surface Water**

The project area is within the Hoe Draw drainage which is tributary to the Upper Powder River watershed. Most of the drainages in the area are ephemeral (flowing only in response to a precipitation event or snow melt) 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 are primarily well vegetated grassy swales, without defined bed and bank.

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

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

### **3.6. Cultural Resources**

A Class III inventory was conducted for the Kingsbury IV project prior to on-the-ground project work (BFO project # 70080021). Arcadis U.S. Inc. conducted the Class III inventory following the Archeology

and Historic Preservation: Secretary of the Interior’s Standards and Guidelines (48FR190) for the proposed project. Clint Crago, BFO archaeologist, reviewed the report for technical adequacy and for compliance with BLM and Wyoming State Historic Preservation Office standards, and determined it to be adequate. The following resources are located within the project area.

**Table 3.5 Cultural Resource Sites Identified within the Nurse Draw project area**

<b>Site Number</b>	<b>Site Type</b>	<b>National Register Eligibility</b>
48JO2524	Prehistoric Open Camp	Not Eligible
48JO3904	Prehistoric Lithic Scatter	Not Eligible
48JO3905	Prehistoric Lithic Scatter	Not Eligible
48JO3906	Prehistoric Lithic Scatter	Not Eligible
48JO3907	Prehistoric Lithic Scatter	Not Eligible
48JO3908	Prehistoric Lithic Scatter	Not Eligible
48JO3909	Prehistoric Lithic Scatter and Historic Debris Scatter	Not Eligible
48JO3910	Prehistoric Lithic Scatter	Not Eligible
48JO3911	Prehistoric Lithic Scatter	Not Eligible

#### **4. ENVIRONMENTAL CONSEQUENCES**

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

##### **4.1. Vegetation & Soils Direct and Indirect Effects**

Impacts to vegetation and soils from surface disturbance will be reduced, by following the operator’s plans and BLM applied mitigation. Of the 41 proposed locations, 2 wells per location, 2 will incorporate existing or reclaimed conventional well pads, 11 can be drilled without a well pad being constructed, 16 will require a constructed well pad (125’x80’, < 4’ of cut), and 12 will require an engineered pad. Surface disturbance associated with the drilling of the (22) wells without constructed pads would involve digging-out of rig wheel wells (for leveling drill rig on minor slopes), reserve pit construction (estimated approximate size of 25 x 40 feet), and compaction (from vehicles driving/parking at the drill site). Estimated disturbance associated with these 11 locations would involve approximately 0.9 acre/location for 9.9 total acres. The 16 wells requiring a constructed pad would disturb approximately 0.22 acres/well pad for a total of 3.7 acres, the 12 wells requiring an engineered pad will disturb approximately 0.7 acres/well pad for a total of 8.4 acres. The total estimated disturbance for all 41 twin well locations would be 12.3 acres.

Approximately 5.7 miles of improved roads would be constructed to provide access to various well locations. Approximately 0.8 miles of new and existing two-track trails would be utilized to access well sites. The majority of proposed pipelines (gas and water) have been located in “disturbance corridors.” Disturbance corridors involve the combining of 2 or more utility lines (water, gas, power) in a common trench, usually along access routes. This practice results in less surface disturbance and overall

environmental impacts. Approximately .30 miles of pipeline would be constructed outside of corridors. 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**

<b>Facility</b>	<b>Number or Miles</b>	<b>Factor</b>	<b>Acreage of Disturbance</b>	<b>Duration of Disturbance</b>
Nonconstructed Pad	11	.9/acre	9.9	Long Term
Constructed Pad	16	.2/acre	3.2	
Engineered Pad	12	.7/acre	8.4	
Using existing or reclaimed conventional well pad	2	0	0	
Gather/Metering Facilities	0	Site Specific		Long Term
Screw Compressors	0	Site Specific		Long Term
Monitor Wells		0.1/acre		Long Term
Impoundments	2		9.51	Long Term
On-channel	2	Site Specific	9.51	
Off-channel	0	Site Specific	0.0	
Water Discharge Points	2	Site Specific or 0.01 ac/WDP	0.02	
Channel Disturbance				
Headcut Mitigation*		Site Specific	0.0	
Channel Modification		Site Specific	0.0	
Engineered Roads				
With Corridor	3.1	80'	29.7	
Improved Roads				Long Term
No Corridor	0.1	35'	0.39	
With Corridor	2.6	35'	10.9	
2-Track Roads				Long Term
With Corridor	0.8	35'	0.1	
Pipelines				Short Term
No Corridor	.33	35'	1.4	
With Corridor	.41	35'	1.7	

<b>Facility</b>	<b>Number or Miles</b>	<b>Factor</b>	<b>Acreage of Disturbance</b>	<b>Duration of Disturbance</b>
Buried Power Cable No Corridor	0.60	35'	2.5	Short Term
Overhead Powerlines	8.4	30' Width	30.6	Long Term
Additional Disturbance				
Pump station	1		4.0	Long Term
staging areas	3	1.0 acre	3.0	Short 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”.

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

The operator will follow the guidance provided in the Wyoming Policy on Reclamation (IM WY-90-231). BLM reclamation goals emphasize 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.

The soils and landforms of this area present distinct challenges for reclamation. There are many areas which will be reclaimed by traditional methods. However, some areas will be challenging for reclamation due to soil properties and other site characteristics. The Bureau of Land Management has an obligation to protect these lands from disturbance which could lead to irretrievable and irreversible impacts. Disturbances within these areas require the programmatic/standard COA's be complimented with a site specific performance based reclamation related COA. In the Kingsbury IV POD, the entire project area has been identified, through onsites and data analysis, to have low/poor reclamation potential. The

operator has agreed to design and implement site specific reclamation strategies to address these areas of concern. 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. Seed mixes for the Kingsbury IV 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). In addition, the operator will adhere to COAs which limit the surface disturbance allowable for construction and improvements.

**Cumulative Effects:** Most soil disturbances would be short term impacts with expedient, successful interim reclamation and site stabilization, as committed to by the operator in their POD Surface Use Plan and as required by BLM in COAs.

#### **4.1.1. Wetland/Riparian**

The 2 proposed on-channel reservoirs are full-containment and should only contribute to surface flow during a storm event. The PRB FEIS assumes that 15% of the impounded water will re-surface as channel flow (PRB FEIS pg 4-74). Re-surfacing water from the impoundments will potentially allow for wetland-riparian species establishment.

#### **4.1.2. Invasive Species**

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

1. Spraying of herbicides on disturbed soils.
2. Incorporate weed prevention and control measures into environmental restoration and infrastructure maintenance activities (for specifics see Integrated Pest Management Plan (IPMP) in the POD.
3. Initiate a weed education policy to assist contractors and field employees in the identification of noxious weeds and to create an awareness of the impacts of noxious weeds and invasive plants.

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.

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

#### **4.1.3. Cumulative Effects**

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

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

- They are proportional to the actual amount of cumulatively produced water in the Upper Powder River drainage, which is approximately 16.8% of the total predicted in the PRB FEIS.
- The WDEQ enforcement of the terms and conditions of the WYPDES permit that are designed to protect irrigation downstream.
- The commitment by the operator to monitor the volume of water flowing into Hoe Draw and to construct additional downstream reservoirs, if necessary, to prevent significant volumes of water from flowing into the Upper Powder River Watershed.
- The WMP for the Kingsbury 4 proposes that produced water will not contribute significantly to flows downstream.

No additional mitigation measures are required.

#### **4.2. Wildlife**

Under the environmentally preferred alternative, Yearlong pronghorn antelope and mule deer range as well as Winter Yearlong range for mule deer would be directly disturbed with the construction of wells, reservoirs, pipelines and roads. Table 4.1 summarized the proposed activities; items identified as long term disturbance would be direct habitat loss. Short-term disturbances also result in direct habitat loss; however, they should provide some habitat value as these areas are reclaimed and native vegetation becomes established.

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

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

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

#### **4.2.1.1. Cumulative effects**

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

#### **4.2.2. Aquatics Direct and Indirect Effects**

The operator proposes to discharge the produced water into two full-containment on-channel impoundments to be constructed within tributaries of Hoe Draw as well as existing structures permitted with prior developments operated by Williams. If a reservoir were to discharge, it is possible that produced water will reach a fish-bearing stream, the Powder River.

##### Change in Water Quality

Fish and amphibian species have evolved and adapted to existing conditions. Changes in water quality may have detrimental impacts on the native aquatic fauna. Major information gaps for these species include feeding habits, reproduction, specific habitat preference (pools, riffles, runs, backwaters, side channels, or a combination), and seasonal habitat use.

Wyoming Game and Fish Department initiated a detailed fish and amphibian survey of the main-stem Powder River in 2004 to determine baseline species composition and distribution in the Basin. In accordance with the PRB FEIS, a monitoring plan was established by the Interagency work group. The plan calls for baseline data collection over a three year period which is intended to provide information relative to the effects upon the aquatic biota of CBNG water.

Changes in the conductivity and sodium absorption ratio may occur as increased flows move sediment from channel bottoms and potentially increase erosion of floodplains. Confluence Consulting reported high salinities and electrical conductivities, possibly due to CBNG water, for the Spotted Horse drainage in their recently released report on the Powder River. This report indicated that CBNG discharges could affect native species in the drainage.

##### Change In Water Quantity

Native fauna in the Powder River drainage have evolved and adapted to a very dynamic hydrograph with high sediment loads. Changes in this flow regime (i.e., perennial flows) may seriously impact native fauna by altering their use of historical habitats for spawning, rearing, and reproduction. Alterations that impact channel morphology is an issue, and will have impacts to the aquatic biota due to changes in sediment loads, loss of habitat, and possible disruption of migration movements due to barriers created by culverts and/or head cuts. This is a monitoring and adaptive management issue for CBNG development.

#### **4.2.2.1. Cumulative effects**

The cumulative effects associated with Alternative C are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, please refer to the referenced PRB FEIS, Volume 2, Chapter 4, page 4-247. 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 are being lost directly with the construction of wells, roads, and pipelines. Prompt re-vegetation of short-term disturbance areas should reduce habitat loss impacts. Human activities likely displace migratory birds farther than simply the physical habitat disturbance. Drilling and construction noise can be troublesome for songbirds by interfering with the males' ability to attract mates and defend territory, and the ability to recognize calls from conspecifics (BLM 2003).

Density of breeding Brewer's sparrows declined by 36% within 100 m of dirt roads within a natural gas

field. Effects occurred along roads with light traffic volume (<12 vehicles per day). Findings suggest that indirect habitat losses from energy development may be substantially larger than direct habitat losses (Ingelfinger 2004).

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

Overhead power lines may affect migratory birds in several ways. Power poles provide raptors with perch sites and may increase predation on migratory birds. Power lines placed in flight corridors may result in collision mortalities. Some species may avoid suitable habitat near power lines in an effort to avoid predation. Additional direct and indirect effects to migratory birds are discussed in the PRB FEIS (4-231-235).

**4.2.3.1. Cumulative effects**

The cumulative effects associated with Alternative C are within the analysis parameters and impacts described in the PRB FEIS. For details on expected cumulative impacts, please refer to the referenced PRB FEIS, Volume 2, Chapter 4, Page 4-235. 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 miles of a nest are prone to cause adverse impacts to nesting raptors. If mineral activities occur during nesting, they could be sufficient to cause adult birds to remain away from the nest and their chicks for the duration of the activities. This absence can lead to over heating or chilling of eggs or chicks. The prolonged disturbance can also lead to the abandonment of the nest by the adults. Both actions can result in egg or chick mortality. In addition, routine human activities near these nests can draw increased predator activity to the area and increase nest predation. Additional direct and indirect impacts to raptors, from oil and gas development, are analyzed in the PRB FEIS (4-216-221).

**Table 4.2** Infrastructure within close proximity to documented raptor nests within the Kingsbury IV project area (Timing limitations will apply to this infrastructure).

BLM ID#	UTM (NAD 83)	SPECIES	INFRASTRUCTURE	DISTANCE
3076	413078E 4869050N	Red-tailed hawk	Proposed overhead powerline	0.46
3603	405790E 4868630N	Golden eagle	Wells: 41-15	0.44
			Proposed overhead powerline	0.37
3084	412114E 4869137N	Long-eared owl	Wells: 41-15	0.48
3581	412237E 4868625N	Unknown	Wells: 41-15	0.17
			32-15	0.44
			Proposed overhead powerline	0.17

BLM ID#	UTM (NAD 83)	SPECIES	INFRASTRUCTURE	DISTANCE
3573	411969E 4868301N	Great-horned owl	Wells: 41-15 32-15 23-15 43-15 Proposed overhead powerline Proposed overhead powerline Proposed stock tank	0.32 0.21 0.49 0.44 0.32 (NE) 0.32 (SW) 0.49
4338	410163E 4867812N	Long-eared owl	Proposed overhead powerline	0.11
4349	409245E 4867808N	Great-horned owl	Wells: 43-17 34-17 32-17 41-17 Proposed overhead powerline	0.09 0.33 0.36 0.47 0.09
4335	408855E 4868718N	Great-horned owl	Wells: 41-17 32-17 22-17	0.19 0.36 0.41
3085	408238E 4868547N	Red-tailed hawk	Wells: 22-17 12-17 32-17 23-17 Proposed stock tank	0.16 0.25 0.42 0.43 0.19
3574	407135E 4867435	Red-tailed hawk	Proposed overhead powerline	0.3
3583	407403E 4867308N	Great-horned owl	Proposed overhead powerline	0.14
3075	407845E 4867040N	Red-tailed hawk	Proposed overhead powerline Wells: 24-17 Impoundments: 23-17 21-20	0.13 0.33 0.42 0.4
3076	408830E 4866620N	Unknown	Proposed overhead powerline Wells: 32-20 41-20 43-20 12-21 24-17 34-17 Impoundment 21-20	0.18 0.13 0.28 0.4 0.44 0.45 0.48 0.19

BLM ID#	UTM (NAD 83)	SPECIES	INFRASTRUCTURE	DISTANCE
3077	409000E 4865980N	Unknown	Proposed overhead powerline Proposed stock tank Proposed stock tank Wells: 43-20 14-21 32-20 34-20 24-20 12-21	0.11 0.14 (N) 0.31 (SW) 0.11 0.28 0.31 0.29 0.43 0.4
3579	409578E 4866793N	Long-eared owl	Proposed overhead powerline Proposed overhead powerline Proposed stock tank Proposed stock tank Wells: 41-20 12-21 21-21 23-21	0.42 (N) 0.40 (S) 0.39 (NE) 0.48 (SE) 0.22 0.26 0.31 0.48
3078	409573E 4866809N	Unknown	Proposed overhead powerline Proposed overhead powerline Proposed stock tank Proposed stock tank Wells: 21-21 41-20 12-21 23-21	0.39 (NE) 0.40 (S) 0.33 (NE) 0.46 (SE) 0.24 0.23 0.29 0.45
3063	413760E 486660N	Red-tailed hawk	Proposed overhead powerline Proposed stock tank Wells: 21-23 23-23	0.34 0.39 0.36 0.46
3592	413451E 4865650N	Unknown	Proposed overhead powerline Wells: 34-23 23-23 14-23	0.43 0.14 0.35 0.4
3590	413519E 4865502N	Unknown	Proposed overhead powerline Wells: 34-23 23-23 14-23	0.36 0.16 0.3 0.41
3081	413845E 4865750N	Red-tailed hawk	Proposed overhead powerline Wells: 34-23 23-23	0.48 0.16 0.45
3598	412487E 4868750N	Red-tailed hawk	Proposed overhead powerline Wells: 41-15	0.18 0.2

BLM ID#	UTM (NAD 83)	SPECIES	INFRASTRUCTURE	DISTANCE
3584	407760E 4866230N	Bald Eagle	Proposed overhead powerline (NW)	0.52
			Proposed overhead powerline (SW)	0.51
			Wells: 24-17	0.7
			24-20	0.53
			32-20	0.64
			34-20	0.68
			43-20	0.87
			Reservoir: 21-20-4677	0.64
			Stock Tank	0.63
			Staging Area	0.51
Staging Area with Stock Tank	0.8			
3080	410541E 4864907N	Long-eared owl	Wells: 34-21	0.47
3067	412950E 4868940N	Red-tailed hawk	Proposed overhead powerline	0.45
3591	413492E 4865780N	Unknown	Proposed overhead powerline	0.37
			Wells: 14-23	0.41
			23-23	0.3
			34-23	0.16
3073	408820E 4865020N	Unknown	Proposed overhead powerline	0.46
			Wells: 24-20	0.46
			34-20	0.4
			Stock Tank	0.43
3072	409423E 4865999N	Unknown	Proposed overhead powerline	0.1
			Wells: 12-21	0.23
			14-21	0.14
			23-21	0.34
			43-20	0.18
			Stock Tank	0.27
			Staging Area	0.05

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

The specific changes identified to alleviate impacts to raptor nests within the Kingsbury IV project are listed below:

1. The KU 21-17 wells were relocated to 0.16 mile from and out of line of sight of a red-tailed hawk nest.
2. The Fed 34-23 wells were relocated approximately 750' south to remove them from line of sight of four raptor nests.
3. The Fed 41-15 wells were relocated 400' south to remove them from line of sight of a raptor nest.
4. The Fed 32-15 wells were relocated approximately 200' south to remove them from line of sight of a great-horned owl nest.
5. The Fed 23-23 wells were relocated approximately 281' north to place them greater than ¼ mile

from a raptor nest.

**4.2.4.1. Cumulative effects**

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

**4.2.5. Threatened and Endangered and Sensitive Species**

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

4.2.5.1. Threatened and Endangered Species Direct and Indirect Effects

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

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
<b>Endangered</b>				
Black-footed ferret ( <i>Mustela nigripes</i> )	Black-tailed prairie dog colonies or complexes > 1,000 acres.	NP	NE	Suitable habitat is of insufficient size.
<b>Threatened</b>				
Ute ladies'-tresses orchid ( <i>Spiranthes diluvialis</i> )	Riparian areas with permanent water	NP	NE	No suitable habitat present.

**Presence**

**K** Known, documented observation within project area.

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

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

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

**Effect Determinations**

**LAA** Likely to adversely affect

**NE** No Effect.

**NLAA** May Affect, not likely to adversely effect individuals or habitat.

#### **4.2.5.1.1. Black-footed ferret**

Because the black-tailed prairie dog colonies within and adjacent to the Kingsbury IV project area are of insufficient size for supporting ferrets and are isolated from any prairie dog complexes, implementation of the proposed development should have “no effect” on the black-footed ferret.

#### **4.2.5.1.2. Ute Ladies'-Tresses Orchid**

The two proposed reservoirs are located within ephemeral drainages of the Powder River. No natural springs have been documented within the project area. Suitable habitat is not present within the Kingsbury IV project area.

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

#### **4.2.5.2. Sensitive Species Direct and Indirect Effects**

Continued loss of prairie dog habitat and active prairie dog towns will result in the decline of numerous sensitive species in the short grass prairie ecosystem.

Of the wildlife species regularly associated with prairie dog colonies, six are on the Wyoming BLM sensitive species list. The species are swift fox (*Vulpes velox*), mountain plover (*Charadrius montanus*), ferruginous hawk (*Buteo regalis*), burrowing owl (*Athene cunicularia*), loggerhead shrike (*Lanius ludovicianus*), long-billed curlew (*Numenius americanus*).

The high water line within the proposed 21-20-4677 reservoir within the NWNE, section 20, T46N, R77W will encompass approximately half of 5 acre prairie dog colony identified by Wildlife Resources LLC where habitat will be lost.

The existing improved road within the SWSW, section 20 T46N, R77W passes through a 93 acre prairie dog colony with no additional disturbance proposed. The 24-20 well location is proposed on the east edge of this prairie dog colony with no constructed pad proposed minimizing additional habitat loss.

**Table 4.4 Summary of Sensitive Species Habitat and Project Effects.**

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

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

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

**Presence**

**K** Known, documented observation within project area.

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

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

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

**Project Effects**

**NI** No Impact.

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

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

**BI** Beneficial Impact

#### 4.2.5.2.1. Bald eagle

During the initial review and subsequent onsite field inspection of the Kingsbury IV POD, it was identified that Williams Production had proposed wells and infrastructure within 0.5 mile from an active bald eagle nest. BLM recommended changes to the project in an effort to minimize effects to the nesting bald eagles. The KU 14-20 wells and associated access and infrastructure were removed from the project proposal as they were within 0.50 mile of a bald eagle nest and an acceptable alternate was not identified by the operator. The KU 23-20 wells and associated access and infrastructure were relocated (to the 24-20 well location) approximately 0.53 mile from the bald eagle nest. Approximately 1,500 feet of proposed overhead powerline and one power drop within 0.5 miles of the bald eagle nest were removed from the POD as well.

There are 5.6 miles of existing overhead three-phase distribution lines within the project area. The wire spacing is likely in compliance with the Avian Power Line Interaction Committee's (1996) suggested practices and with the Service's standards (USFWS 2002); however other features may not be in compliance. Williams is proposing an additional 5.8 miles of overhead three-phase distribution lines. There are currently 12.7 miles of improved roads within the project area, with 3.8 miles proposed.

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

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

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

Use of the primary access road through the Powder River floodplain will impact winter bald eagle use not only during the project's construction phase, but also during the operation phase as the road is traveled to monitor and maintain CBNG facilities. BLM staff observed eagles in flight as they traveled this road in a single pick-up truck, as the road passes underneath the cottonwoods where the eagles perch. The road is currently being used to access several existing non-federal CBNG wells within the Powder River floodplain. Additional winter use of the road will continue to disturb eagles and could lead to

abandonment of this section of Powder River. To minimize eagle disturbance no construction activities shall be authorized during the winter season (November 1 to April 1).

During the onsite inspection, Williams Production RMT Company personnel identified the potential disruption that additional development may cause to nesting bald eagle and volunteered to monitor the Brubaker bald eagle nest (BLM ID# 3584) after initial development within the BLM protocol. A condition of approval has been applied to this effect.

The proposed project may affect “**likely to adversely affect**” bald eagles due to the main access road passing through occupied winter roosting habitat and electrocution potential when perching on overhead power lines.

#### **4.2.5.2.2. Black-tailed prairie dog**

The main access is existing through the prairie dog colony located NW section 29, SW section 20, T46N, R77W (93 acres). This access route will be used by project traffic on a regular basis. Approximately 30% of the prairie dog colony located NE section 20, T46N, R77W is within the high water line of the proposed reservoir 21-20-4677. These prairie dogs will be displaced and will likely occupy the area surrounding the impoundment especially where the soil is disturbed.

When construction begins on reservoirs, roads, pipelines and pads the earth moving equipment can remove several feet of dirt at one time destroying prairie dog burrows and foraging habitat. During construction of these facilities, there is the possibility that prairie dogs within these colonies may be killed as a direct result of the earth moving equipment. Constant noise and movement of equipment and the destruction of burrows puts considerable stress on the animals and will cause an increase in prairie dog mortalities. During the construction of these facilities individuals are exposed more frequently to predators and have less protective cover.

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

Unlike roads and pipelines, the construction and operation of reservoirs will permanently remove habitat. By the time the reservoirs are no longer needed, the reservoirs may become hard pan, soil that has hardened due to mineral deposits and evaporation. Prairie dogs may be unable to burrow in this type of soil compaction.

The presence of a reservoir may limit colony expansion. Well houses and power poles may provide habitats for mammal and avian predators increasing prairie dog predation. Mineral related traffic on the adjacent roads may result in prairie dog road mortalities.

#### 4.2.5.2.3. Greater sage-grouse

Two leks have been documented within 3 miles of the Kingsbury IV project area. Approximately 3,900 and 2,320 acres of the POD falls with the 3 mile buffer of the Pumpkin Butte lek I and Pumpkin Butte II lek respectfully.

Greater sage grouse habitat is being directly lost with the addition of well sites, roads, pipelines, Powerlines, reservoirs and other infrastructure (Theile 2005, Oedekoven 2004). Approximately 48 acres of sage grouse habitat will be lost within the project area. Sage-grouse avoidance of CBNG infrastructure results in even greater indirect habitat loss. The Wyoming Game and Fish Department (WGFD) feels a well density of eight wells per section creates a high level of impact for sage-grouse and that sage-grouse avoidance zones around mineral facilities overlap creating contiguous avoidance areas (WGFD 2004).

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

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

Another concern with CBNG is that reservoirs created for water disposal provide habitat for mosquitoes associated with West Nile virus (Oedekoven 2004). West Nile virus represents a significant new stressor which in 2003 reduced late summer survival of sage-grouse an average of 25% within four populations including the Powder River Basin (Naugle et al. 2004). Powder River Basin grouse losses during 2004 and 2005 were not as severe. Summer 2003 was warm and dry, more conducive to West Nile virus replication and transmission than the cooler summers of 2004 and 2005 (Cornish pers. Comm.).

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

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

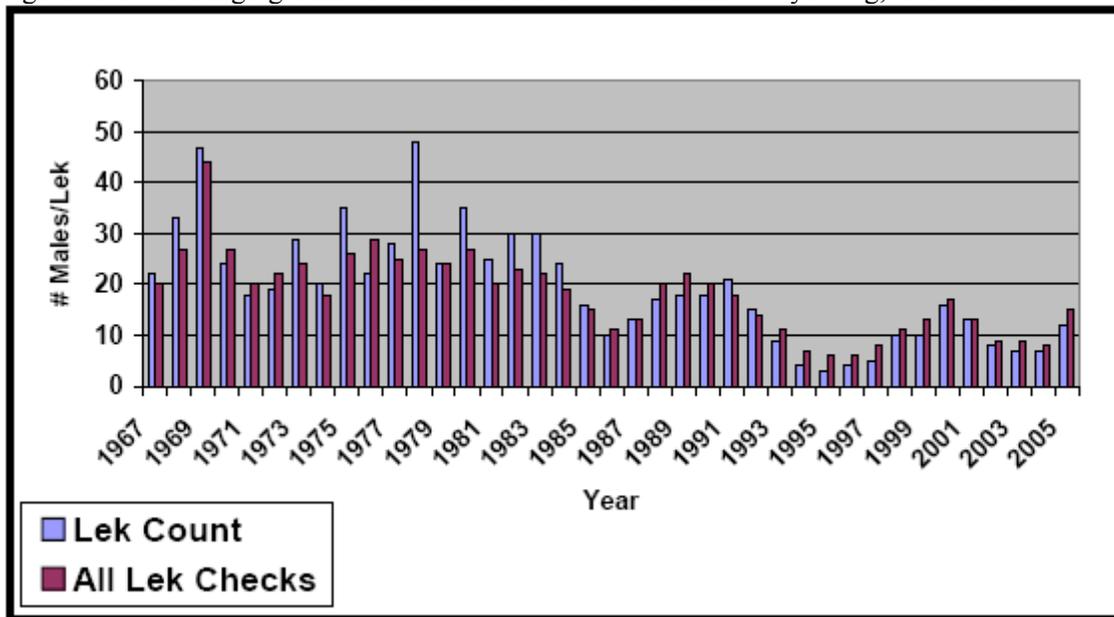
Additional studies, across more of the sage-grouse's range, indicate that many populations nest much farther than two miles from the lek of breeding (Bennett 2004). Holloran and Anderson (2005), in their Upper Green River Basin study area, reported only 45% of their sage grouse hens nested within 3 km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

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

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

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

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



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

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

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

#### 4.2.5.2.4. Mountain plover

Mineral development may have mixed effects on mountain plovers. Disturbed ground such as buried pipe line corridors and roads may be attractive to plovers while human activities within one-quarter mile may be disruptive. Use of roads and pipe line corridors by mountain plovers may increase their vulnerability to vehicle collision. The existing overhead power lines adjacent to the project area provide perch sites for

raptors potentially resulting in increased mountain plover predation. CBNG infrastructure such as the well houses, roads, pipe line corridors, and nearby metering facilities may provide shelter and den sites for ground predators such as skunks and foxes. An analysis of direct and indirect impacts to mountain plover due to oil and gas development is included in the PRB FEIS (4-254-255).

Suitable mountain plover habitat is present within the project area. Mountain plover habitat occurs within the 2 prairie dog towns and a few flatter (<12%) slope ridge tops. Wildlife Resources LLC conducted mountain plover surveys 5/1/07, 5/21/07 and 6/4/07. No mountain plover observations were made within the project area. The project should not impact mountain plovers.

#### **4.2.5.3. Cumulative effects**

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

#### **4.3. West Nile Virus Direct and Indirect Effects**

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

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

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

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

#### **4.4. Water Resources**

The operator has submitted a comprehensive WMP for this project. It is incorporated-by-reference into this EA pursuant to 40 CFR 1502.21. The WMP incorporates sound water management practices, monitoring of downstream impacts within the Upper Powder River watershed and commitment to comply with Wyoming State water laws/regulations. It also addresses potential impacts to the environment and landowner concerns. Qualified hydrologists, in consultation with the BLM, developed the water management plan. Adherence with the plan, in addition to BLM applied mitigation (in the form of COAs), would reduce project area and downstream impacts from proposed water management strategies.

The 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 15.0 gpm per well or 1230.0 gpm (2.74cfs or 1,984 acre-feet per year) for this POD. The PRB FEIS projected the total amount of water that was anticipated to be produced from CBNG development per year (Table 2-8 Projected Amount of Water Produced from

CBM Wells Under Alternatives 1, 2A and 2B pg 2-26). For the Upper Powder River drainage, the projected volume produced within the watershed area was 171,423 acre-feet in 2006. As such, the volume of water resulting from the production of these wells is 1.16% of the total volume projected for 2006. This volume of produced water is within the predicted parameters of the PRB FEIS.

#### **4.4.1. Groundwater**

The PRB FEIS predicts an infiltration rate of 40% to groundwater aquifers and coal zones in the Upper Powder River drainage area (PRB FEIS pg 4-5). For this action, it may be assumed that within the Kingsbury IV POD boundary a maximum of 7 of the 82 wells (42 gpm) will infiltrate at or near the discharge points and 2 proposed state impoundments (67.7 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 90 to 950 feet compared to 1,300-1,520 feet to the Big George. As mitigation, the operator has committed to offer water well agreements to holders of properly permitted domestic and stock wells within the circle of influence (½ mile of a federal CBNG producing well) of the proposed wells.

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

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

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

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

In order to address the potential impacts from infiltration on shallow ground water, the Wyoming DEQ

has developed a guidance document, “Compliance Monitoring for Ground Water Protection Beneath Unlined Coalbed Methane Produced Water Impoundments” (June 14, 2004) which can be accessed on their website. This guidance document became effective August 1, 2004, and is currently being revised as the “Compliance Monitoring and Siting Requirements for Unlined Coalbed Methane Produced Water Impoundments”. Approximately 800 new impoundments have been investigated to date with 102 impoundments in 52 permits that have gone into compliance monitoring. The Wyoming DEQ has established an Impoundment Task Force which is in the process of drafting an “Impoundment Monitoring Plan” to investigate the potential for existing impoundments to have impacted shallow groundwater. For WYPDES permits received by DEQ after the August 1<sup>st</sup> effective date, the BLM will require that operators comply with the requirements outlined in the current approved DEQ compliance monitoring guidance document prior to discharge of federally-produced water into newly constructed or upgraded impoundments.

**4.4.1.1. Groundwater Cumulative Effects:**

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

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

**4.4.2. Surface Water**

The following table shows Wyoming proposed numeric limits for the watershed for SAR, and EC, the average value measured at selected USGS gauging stations at high and low monthly flows, and Wyoming groundwater quality standards for TDS and SAR for Class I to Class III water. It also shows pollutant limits for TDS, SAR, and EC detailed in 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 –		2	1,000
Least Restrictive Proposed Limit		10	3,200
Primary Watershed at Arvada Gauging station			
Historic Data Average at Maximum Flow		4.76	1,797
Historic Data Average at Minimum Flow		7.83	3,400
WDEQ Quality Standards for Wyoming Groundwater (Chapter 8)			
Drinking Water (Class I)	500		
Agricultural Use (Class II)	2,000	8	
Livestock Use (Class III)	5,000		
Predicted Produced Water Quality Big George Coal Zone	1,430	21.3	2,240

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 1420.0 mg/l TDS which is within the WDEQ criteria for agricultural use (2000 mg/l TDS). However direct land application is not included in this proposal. If at any future time the operator entertains the possibility of irrigation or land application with the water produced from these wells, the proposal must be submitted as a sundry notice for separate environmental analysis and approval by the BLM.

The quality for the water produced from the Big George target coal zone from these wells is predicted to be similar to the sample water quality collected from a location near the POD. A maximum of 15.0 gallons per minute (gpm) is projected is to be produced from these 82 wells, for a total of 1230.0 gpm for the POD. See Table 4.5.

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

There are 2 discharge points proposed for this project. They have been appropriately sited and utilize appropriate water erosion dissipation designs. Existing and proposed water management facilities were evaluated for compliance with best management practices during the onsite.

To manage the produced water, 2 impoundments (36.05 acre-ft of storage) would potentially be constructed within the project area. These impoundments will disturb approximately 9.51 acres including the dam structures of which both would be on-channel reservoirs. All water management facilities were evaluated for compliance with best management practices during the onsite.

The PRB FEIS assumes that 15% of the impounded water (7 wells producing 42 gpm discharged into 2 reservoirs) will re-surface as channel flow (PRB FEIS pg 4-74). Consequently, the volume of water produced from these 7 wells may result in the addition of 0.094 cfs below the lowest reservoir (after infiltration and evapotranspiration losses) within the Kingsbury IV POD boundary. The operator has committed to monitor the condition of channels and address any problems resulting from discharge. Discharge from the impoundments will potentially allow for streambed enhancement through wetland-riparian species establishment. Sedimentation will occur in the impoundments, but would be controlled through a concerted monitoring and maintenance program. Phased reclamation plans for the impoundments will be submitted and approved on a site-specific, case-by-case basis as they are no longer needed for disposal of CBNG water, as required by BLM applied COAs.

Alternative (2A), the approved alternative in the Record of Decision for the PRB FEIS, states that the peak production of water discharged to the surface will occur in 2006 at a total contribution to the mainstem of the Upper Powder River of 68 cfs (PRB FEIS pg 4-86). The predicted maximum discharge rate from these 82 wells is anticipated to be a total of 1230.0 gpm or 2.74 cfs to impoundments. Using an assumed conveyance loss of 20% (PRB FEIS pg 4-74) and full containment the produced water re-surfacing in Hoe Draw from this action (0.41 cfs) may add a maximum 0.33 cfs to the Upper Powder River flows, or 0.48% of the predicted total CBNG produced water contribution. This incremental volume is statistically below the measurement capabilities for the volume of flow of the Upper Powder River Watershed (refer to Statistical Methods in Water Resources U.S. Geological Survey, Techniques of Water-Resources Investigations Book 4, Chapter A3 2002, D.R. Helsel and R.M. Hirsch authors). For more information regarding the maximum predicted water impacts resulting from the discharge of produced water, see Table 4-6 (PRB-FEIS pg 4-85).

The proposed method for surface discharge provides passive treatment through the aeration supplied by the energy dissipation configuration at each discharge point outfall. Aeration adds dissolved oxygen to the produced water which can oxidize susceptible ions, which may then precipitate. This is particularly

true for dissolved iron. Because iron is one of the key parameters for monitoring water quality, the precipitation of iron oxide near the discharge point will improve water quality at downstream locations.

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

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 Kingsbury IV POD prepared by Western Water Consultants for Williams Production RMT.

**4.4.2.1. Surface Water Cumulative Effects**

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

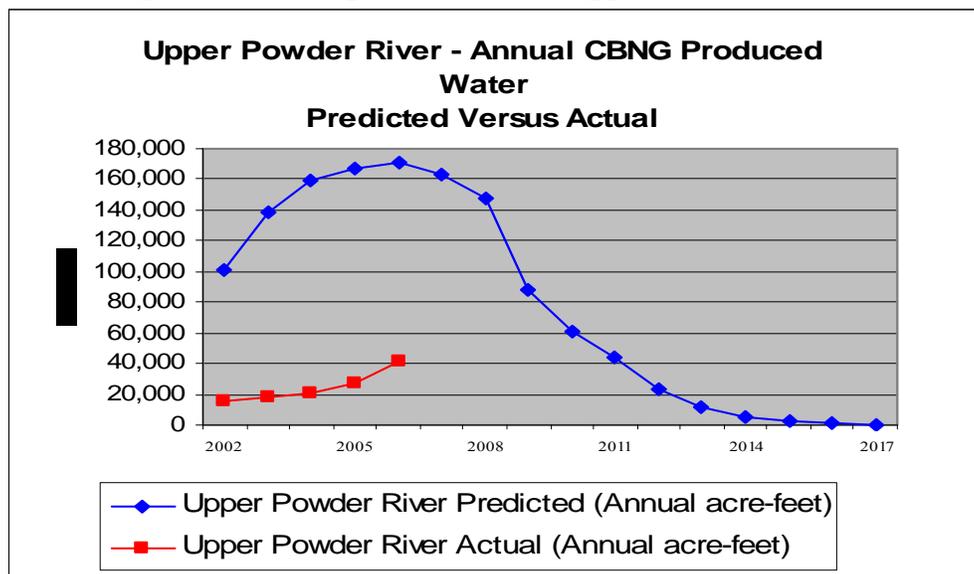
As of March 2007, all producing CBNG wells in the watershed have discharged a cumulative volume of 123,984 acre-ft of water compared to the predicted 736,519 acre-ft disclosed in the PRB FEIS (Table 2-8 page 2-26). These figures are presented graphically in Figure 4.1 and Table 4.6 following. This volume is 16.8 % of the total predicted produced water analyzed in the PRB FEIS for the watershed.

**Table 4.6 Actual vs. predicted water production in the Upper Powder River watershed 2006 Data Update 3-16-07**

Year	Upper Powder River Predicted (Annual acre-feet)	Upper Powder River Predicted (Cumulative acre-feet from 2002)	Upper Powder River Actual (Annual acre-feet)		Upper Powder River Actual (Cumulative acre-feet from 2002)	
			A-ft	% of Predicted	A-Ft	% of Predicted
2002	100,512	100,512	15,846	15.8	15,846	15.8
2003	137,942	238,454	18,578	13.5	34,424	14.4
2004	159,034	397,488	20,991	13.2	55,414	13.9
2005	167,608	565,096	27,640	16.5	83,054	14.7
2006	171,423	736,519	40,930	23.9	123,984	16.8
2007	163,521	900,040				
2008	147,481	1,047,521				
2009	88,046	1,135,567				
2010	60,319	1,195,886				
2011	44,169	1,240,055				
2012	23,697	1,263,752				

Year	Upper Powder River Predicted (Annual acre-feet)	Upper Powder River Predicted (Cumulative acre-feet from 2002)	Upper Powder River Actual (Annual acre-feet)		Upper Powder River Actual (Cumulative acre-feet from 2002)	
			A-ft	% of Predicted	A-Ft	% of Predicted
2013	12,169	1,275,921				
2014	5,672	1,281,593				
2015	2,242	1,283,835				
2016	1,032	1,284,867				
2017	366	1,285,233				
<b>Total</b>	<b>1,285,233</b>		<b>123,984</b>			

Figure 4.2 Actual vs. predicted water production in the Upper Powder River watershed



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

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

agreements can be met.” (PRB FEIS page 4-117)

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

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

No additional mitigation measures are required.

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

#### **4.5. Cultural Resources**

The Bureau of Land Management has determined that no historic properties are within the area of potential effect. On 9/26/07, the Bureau electronically notified 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.

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

### **5. CONSULTATION/COORDINATION**

<b>Contact</b>	<b>Title</b>	<b>Organization</b>	<b>Present at Onsite</b>
Mary Hopkins	Interim WY SHPO	Wyoming SHPO	No
Dan Theile	Wildlife Biologist	Wyoming Game and Fish	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.

### **7. REFERENCES AND AUTHORITIES**

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