

**FINDING OF NO SIGNIFICANT IMPACT & DECISION RECORD
FOR
Williams Production RMT Company
Kingwood II**

ENVIRONMENTAL ASSESSMENT –WY-070-EA07-143

DECISION: Is to approve Alternative C as described in the attached Environmental Assessment (EA) and authorize Williams Production RMT Company’s Kingwood II Coal Bed Natural Gas (CBNG) POD comprised of the following 67 Applications for Permit to Drill (APDs), as follows:

	Well Name	Well #	QTR	Sec	TWP	RNG	Lease
1	KINGWOOD II BRUBAKER	12-19	SWNW	19	46N	76W	WYW89856
2	KINGWOOD II BRUBAKER	12-19L	SWNW	19	46N	76W	WYW89856
3	KINGWOOD II BRUBAKER	14-19	SWSW	19	46N	76W	WYW89856
4	KINGWOOD II BRUBAKER	14-19L	SWSW	19	46N	76W	WYW89856
5	KINGWOOD II BRUBAKER	21-19	NENW	19	46N	76W	WYW89856
6	KINGWOOD II BRUBAKER	21-19L	NENW	19	46N	76W	WYW89856
7	KINGWOOD II BRUBAKER	23-19	NESW	19	46N	76W	WYW89856
8	KINGWOOD II BRUBAKER	23-19L	NESW	19	46N	76W	WYW89856
9	KINGWOOD II BRUBAKER	34-19	SWSE	19	46N	76W	WYW89856
10	KINGWOOD II BRUBAKER	43-19	NESE	19	46N	76W	WYW89856
11	KINGWOOD II BRUBAKER	43-19L	NESE	19	46N	76W	WYW89856
12	KINGWOOD II BRUBAKER	34-19L	SWSE	19	46N	76W	WYW89856
13	KINGWOOD II BRUBAKER	12-30	SWNW	30	46N	76W	WYW89856
14	KINGWOOD II BRUBAKER	12-30L	SWNW	30	46N	76W	WYW89856
15	KINGWOOD II BRUBAKER	14-30	SWSW	30	46N	76W	WYW21221
16	KINGWOOD II BRUBAKER	21-30	NENW	30	46N	76W	WYW89856
17	KINGWOOD II BRUBAKER	21-30L	NENW	30	46N	76W	WYW89856
18	KINGWOOD II BRUBAKER	23-30	NESW	30	46N	76W	WYW21221
19	KINGWOOD II BRUBAKER	32-30	SWNE	30	46N	76W	WYW89856
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26	KINGWOOD II BRUBAKER	43-30L	NESE	30	46N	76W	WYW89856
27	KINGWOOD II BRUBAKER	12-31	SWNW	31	46N	76W	WYW72471
28	KINGWOOD II BRUBAKER	21-31	NENW	31	46N	76W	WYW72471
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36	KINGWOOD II FEDERAL	43-23	NESE	23	46N	77W	WYW85360
37	KINGWOOD II BRUBAKER	12-24	SWNW	24	46N	77W	WYW0266643
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44	KINGWOOD II BRUBAKER	23-24L	NESW	24	46N	77W	WYW0266643
45	KINGWOOD II BRUBAKER	32-24	SWNE	24	46N	77W	WYW112380
46	KINGWOOD II BRUBAKER	32-24L	SWNE	24	46N	77W	WYW112380
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48	KINGWOOD II BRUBAKER	34-24L	SWSE	24	46N	77W	WYW112380
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55	KINGWOOD II BRUBAKER	14-25	SWSW	25	46N	77W	WYW16066
56	KINGWOOD II BRUBAKER	21-25	NENW	25	46N	77W	WYW85361
57	KINGWOOD II BRUBAKER	21-25L	NENW	25	46N	77W	WYW85361
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67	KINGWOOD II BRUBAKER	43-25L	NESE	25	46N	77W	WYW85361

Rights-of-Way Grants and a staging area are approved as follows:

ROW Grant	Type	Section	TWP/RNG
WYW-169653	Access road, water pipeline and buried power line	23	46N/77W
WYW-169652	6" Gas pipeline	23	46N/77W
WYW-169553-01	Construct, operate, maintain and terminate one staging area.	23	46N/77W

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

	IMPOUNDMENT Name / Number	Qtr/Qtr	Section	TWP	RNG	Primary/ Secondary	Lease Number
1	Brubaker 21-19-4676	NENW	19	46	76	Primary	WYW089856
2	Brubaker 31-24-4677	NWNE	24	46	77	Primary	WYW112380
3	Brubaker 22-24-4677	SENE	24	46	77	Primary	WYW0266643
4	Brubaker 34-24-4677	SWSE	24	46	77	Primary	WYW112380
5	Hood Draw Section 25	NWSE	31	46	76	Secondary	WYW085361
6	Brubaker 12-30-4676	SWNW	30	46	76	Secondary	WYW089856
7	P30-1	SENE	30	46	76	Secondary	WYW089856
8	Brubaker 43-30-4676	NWSE	30	46	76	Secondary	WYW089856
9	Brubaker 43-25-4677	NESE	25	46	77	Secondary	WYW085361
10	P31-1	SWNW	31	46	76	Secondary	WYW040635
11	Wilson Stock	NWSE	31	46	76	Na	WDEQ
12	Brubaker 34-31-4676	SWSE	31	46	76	Na	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 Plan of Development, has committed to:
 - o Comply with all applicable Federal, State and Local laws and regulations.
 - o 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.
 - o Provide water well agreements to the owners of record for permitted water wells within the area of influence of the action.
 - o 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 of the proposed action in the attached environmental assessment, I have determined that NO significant impacts are expected 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
Kingwood II
PLAN OF DEVELOPMENT
WY-070-EA07-143**

INTRODUCTION

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

1. PURPOSE AND NEED

The purpose for the proposal is to define and produce coal bed natural gas (CBNG) on eight (8) valid federal oil and gas mineral leases issued to the applicant by the BLM. Analysis has determined that federal CBNG is being drained from the federal leases by surrounding fee or state mineral well development. The need exists because without approval of the Applications for Permit to Drill (APDs), federal lease royalties will be lost and the lessee will be deprived of the federal gas they have the rights to develop.

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

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

2. ALTERNATIVES INCLUDING THE PROPOSED ACTION

2.1. Alternative A - No Action

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

2.2. Alternative B Proposed Action

Proposed Action Title/Type: Williams Production RMT Company’s Kingwood II Plan of Development (POD) for 67 coal bed natural gas well APDs and associated infrastructure.

Proposed Well Information: There are 67 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 the Big George and Lower Big George coal seams. Well house color is Carlsbad Canyon, selected to blend with the surrounding vegetation. Wells are located as follows:

	Well Name	Well #	QTR	Sec	TWP	RNG	Lease
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Rights-of-Way Grants and a staging area are proposed as follows:

ROW Grant	Type	Section	TWP/RNG
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WYW-169652	6" Gas pipeline	23	46N/77W
WYW-169553-01	Construct, operate, maintain and terminate one staging area.	23	46N/77W

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

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9	Brubaker 43-25-4677	NESE	25	46	77	WYW085361
10	P31-1	SWNW	31	46	76	WYW040635
11	Wilson Stock	NWSE	31	46	76	Non-federal
12	Brubaker 34-31-4676	SWSE	31	46	76	Non-federal

County: Johnson

Applicant: Williams Production RMT Company

Surface Owners: Clifford L. Brubaker and Valerie Brubaker

Project Description:

The proposed action involves the development of the project, which includes the following:

- Drilling of 67 total federal CBM wells in Big George and Lower Big George coal zones to depths of approximately 1,680 feet maximum. Multiple seams will be produced by co-locating wells (multiple wells at a common or shared pad 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.
- An unimproved and improved road network.
- An above ground power line network to be constructed by a contractor. If the proposed route is altered, then the new route will be proposed via sundry application and analyzed in a separate NEPA action.
- A water management plan that involves 12 discharge points and 12 on-channel stock water reservoirs (two existing and 10 proposed) that will provide partial containment of CBNG discharge within the Upper Powder River watershed. Ten of the reservoirs will be periodically drained or pulse released so that water flows in channels between reservoirs where some water will be lost to infiltration and evapotranspiration. CBNG water will not be discharge from the most downstream reservoir in the system. A pump station at the downstream reservoir will allow water to be pumped to reservoirs in the Kingwood I and Wormwood I PODs if needed.

- A buried gas, water and power line network.

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, Drilling Plan and Water Management Plan in the Plan of Development (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 Master Surface Use Plan, Drilling Program and Water Management Plan, in addition to the Standard Conditions of Approval contained in the PRB FEIS Record of Decision Appendix A, are incorporated and analyzed in this alternative.

Additionally, the Operator, in their Plan of Development, 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 Provide water well agreements to the owners of record for permitted water wells within the area of influence of the action.
- 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 reduce potential impacts to natural resources. 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 Kingwood II POD are listed below under 2.3.1:

2.3.1. Changes as a result of the on-sites

Master POD Surface Use Plan:

1. Federal 12-30-4676 & 12-30-4676L: Re-Route utilities / production corridor adjacent to proposed access road.
2. Federal 41-30-4676 & 41-30-4676L: Move wells approximately 500 feet south, due to topography and well access route.
3. Federal 23-24-4677 & 23-24-4677L: Move wells and /or well access two track approximately 200 feet south, due potential of an erosional hazard.

4. Federal 23-25-4677 & 23-24-4677L: Move wells S-SE across C & D road, due to topography.
5. Federal 23-19-4676L: Move well approximately 200 feet east, due to topography.

Wildlife:

1. Federal 23-25-4677 & 23-25-4677L: Move wells approximately 300 feet south-southeast out of line of site of nest.
2. Federal 21-30-4676 BG/LBG: Move wells approximately 200 feet north, to less dense sagebrush.
3. Federal 43-31-4676 BG: Move well approximately 100 feet south out of line of site of nest.

Water Management Plan:

1. The dam for Reservoir 31-24-4677 was moved a short distance upstream.
2. The operator agreed to periodically release or pulse release water from reservoirs so that downstream areas with poorly defined channels do not stay saturated for long periods as a result of constant discharge.

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 *Conditions of Approval* (COAs) and will be in addition to stipulations applied at the time of lease issuance and any standard conditions of approval.

2.3.2.1. Groundwater

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

2.3.2.2. Surface Water

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

3. The operator will supply a copy of the complete approved SW-4, SW-3, or SW-CBNG permits for these impoundments to BLM when they are issued by WSEO.
4. The operator will supply copies of the WYPDES permits to the BLM for this POD as soon as they are issued by WDEQ.

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 CBM discharges at concentrations exceeding detectable limits.

2.3.2.4. Wetland/Riparian

1. No waste material will be in riparian areas, flood plains, or in natural drainage ways.
2. Soil or other material stockpiles will be placed outside floodplains.
3. Disturbed channels will be re-shaped to their approximate original configuration or stable geomorphological configuration and properly stabilized.
4. Reclamation of disturbed wetland/riparian areas will begin immediately after project activities are complete.

2.3.2.5. Wildlife

1. For any surface-disturbing activities proposed in sagebrush shrublands, the Companies will conduct clearance surveys for sage grouse breeding activity during the sage grouse's breeding season before initiating the activities. The surveys must encompass all sagebrush shrublands within 0.5 mile of the proposed activities.
2. The Companies will 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.
3. 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.
4. Containment impoundments will be fenced to exclude wildlife and livestock. If they are not fenced, they will be designed and constructed to prevent entrapment and drowning.
5. 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.
6. All stock tanks shall include a ramp to enable trapped small birds and mammals to escape. See Idaho BLM Technical Bulletin 89-4 entitled Wildlife Watering and Escape Ramps on Livestock Water Developments: Suggestions and Recommendations.

2.3.2.6. Threatened, Endangered, or Sensitive Species

2.3.2.6.1. Bald Eagle

1. Surveys for active bald eagle nests and winter roost sites will be conducted within suitable habitat by a BLM approved biologist. Surface disturbing activities will not be permitted within one mile of suitable habitat prior to survey completion.
2. A disturbance-free buffer zone of 0.5 mile (i.e., no surface occupancy) will be established year-round for all bald eagle nest sites. A seasonal minimum disturbance buffer zone of one mile will be established for all bald eagle nest sites (February 15 – August 15).
3. A disturbance-free buffer zone of 0.5 mile (i.e., no surface occupancy) will be established year-round for all bald eagle roost sites. A seasonal minimum disturbance buffer zone of 1 mile will be established for all bald eagle winter roost sites (November 1 – April 1). These buffer zones and timing may be adjusted based on site-specific information through coordination with, and written approval from, the USFWS.

2.3.2.6.2. Black-footed Ferret

1. Prairie dog colonies will be avoided wherever possible.

2.3.2.6.3. Ute Ladies'-tresses Orchid

1. Suitable habitat will be avoided wherever possible.
2. If suitable habitat for Ute ladies'-tresses cannot be avoided, surveys will be conducted in compliance with USFWS standards (USFWS 1995) by a BLM approved biologist or botanist. Surveys can only be conducted between July 20 and August 31.
3. Moist soils near wetlands, streams, lakes, or springs in the project area will be promptly revegetated if construction activities impact the vegetation in these areas. Revegetation will be designed to avoid the establishment of noxious weeds.
4. Companies operating in areas identified with weed infestations or suitable Ute ladies'-tresses orchid habitat will be required to submit an integrated pest management plan prior to APD approval. The components of the integrated pest management plans are outlined in the CBM APD and POD Preparation Guide. Mitigation will be determined on a site-specific basis and may include such measures as spraying herbicides prior to entering areas and washing vehicles before leaving infested areas. Infestation areas of noxious weeds have been identified through the county Weed and Pest Districts and are available at the Buffalo BLM office.

2.3.2.7. Visual Resources

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

2.3.2.8. Noise

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

locations.

2.3.3. Site specific mitigation measures

1. 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 Kingwood II POD is Carlsbad Canyon (2.5 y 6/2).
2. Ensure any and all damages to existing stock-related waterlines during POD related operations are both reported to the landowner and repaired immediately.
3. 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.
4. The operator will drill seed on the contour to a depth of 0.5 inch, followed by cultipaction to compact the seedbed, preventing soil and seed losses. To maintain quality and purity, the current years tested, certified seed with a minimum germination rate of 80% and a minimum purity of 90% will be used. On BLM surface or in lieu of a different specific mix desired by the surface owner, use the following:

Species - Cultivar	Full Seeding (lbs/ac PLS*)	% in Mix	Lbs PLS*
Western Wheatgrass - <i>Rosana</i>	6	20	2.6
Bluebunch Wheatgrass – <i>Secar or P-7</i>	7	15	2.0
Green Needlegrass	6	15	2.0
Needleandthread grass	6	15	2.0
Indian Ricegrass – <i>Paloma or Rimrock</i>	6	5	0.65
American vetch	7	10	1.5
Lewis - <i>Appar</i> , Blue, or Scarlet flax	4	7	1.0

Species - Cultivar	Full Seeding (lbs/ac PLS*)	% in Mix	Lbs PLS*
White – <i>Antelope</i> or Purple Prairie Clover – <i>Bismark</i>	3	8	1.0
Fourwing Saltbush - <i>Wytana</i>	3	5	0.65
Totals		100 %	13.4 lbs/acre

5. 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. The operator will provide the seed stock labels for any seed applied on Federal surface to the Authorized Officer in the BFO.
7. Provide 4" of aggregate where grades exceed 8%.
8. Where the operator proposes to use existing roads with no improvements, regular inspection of the road condition is needed during operations. Degradation of the road surface, including increased rutting, potholing, corrugation ("wash boarding"), or excessive loss of surface gravel, will require maintenance. Likewise, operator is responsible for repairing damage to drainage structures, and mitigating increased erosion related to proposed operations.
9. Areas that are mulched shall first be recontoured, reseeded, and then mulched using a technique that will prohibit the mulch from blowing or washing away.
10. Extraordinary reclamation measures (mulched straw, blankets, hydro-mulch) shall be applied to cut or fill slopes over 8% and in areas with sandy soils or blow-outs.

Wildlife

1. The following conditions will minimize the impacts to raptors:
 - a. No surface disturbing activity will be allowed within ½ mile of the documented nest sites from February 1 through July 31, annually, prior to a raptor nest occupancy survey for the current breeding season. This timing limitation affects the following wells as well as nearby reservoirs and infrastructure:

Nest	Township/Range	Section	Proposed Wells and Infrastructure Affected (Listed wells include associated infrastructure)
6*	46/76	19	23-19-4677 BG/LBG, 14-19-4677 BG/LBG, 41-25-4677 BG/LBG, 43-24-4677 BG/LBG, 12-19-4676 BG/LBG, 34-19-4677BG/LBG, 21-30-4676 BG/LBG, proposed overhead power,
8*	46/76	19	43-19-4677 BG/LBG, access for 21-19-4676 BG/LBG,
10*	46/76	20	43-19-4677 BG/LBG,
11*	46/76	31	41-31-4676 BG, 43-31-4676 BG/LBG, access for 34-30-4676 BG/LBG, staging area, discharge point, stock tank,

Nest	Township/Range	Section	Proposed Wells and Infrastructure Affected (Listed wells include associated infrastructure)
3063	46/77	23	12-24-4677 BG/LBG, 41-23-4677 BG/LBG, 12-24-4677 BG/LBG, 32-23-4677 BG/LBG, staging area
3590	46/77	23	14-24-4677 BG/LBG, 43-23-4677 BG/LBG, 2 staging areas
15*	46/77	24	41-24-4677 BG/LBG, 32-24-4677 BG/LBG, 43-24-4677 BG/LBG, 21-24-4677 BG/LBG, 23-24-4677 BG/LBG, 12-19-4676 BG/LBG, discharge point, stock tank, and overhead power
3608	46/77	25	14-25-4677 BG, 32-25-4677 BG/LBG, access for 34-25-4677,
16*	46/77	25	32-25-4677 BG/LBG, 14-25-4677 BG, 23-25-4677 BG/LBG, access for 21-25-4677 BG/LBG, staging area, pipeline between 14-25 and 23-25-4677 BG/LBG
17*	46/77	36	12-31-4676 BG, staging area, discharge point
18*	46/76	20	43-19-4677 BG/LBG

- 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 and approved prior to surface disturbing activities. Surveys outside this window may not depict nesting activity. If a survey identifies active raptor nests, a ½ mile timing buffer will be implemented. The timing buffer restricts 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 Kingwood II POD listed in the table below. The productivity checks shall be completed for the first five years following project completion. The occupancy 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.

BLM ID	UTM E	UTM N	Species	Activity	Legals
6*	416128	4865910	Unknown	Inactive 2006 & 2007	T.46N. R.76 W., Sec. 19 SWSW
8*	417268	4866846	Red-tailed Hawk	Inactive 2006 & 2007	T.46N. R.76 W., Sec. 19 NENE
10*	417834	4866153	Red-tailed Hawk	Active 2006 & 2007	T.46N. R.76 W., Sec. 20 NESW
11*	417135	4863184	Red-tailed Hawk	Inactive 2006 & 2007	T.46N. R.76 W., Sec. 31 SENW
3063	413763	4866687	Red-tailed Hawk	Active 2006 & 2007	T.46N. R.77 W., Sec. 23 SWNE
3590	413492	4865650	Unknown	Inactive 2006 & 2007	T.46N. R.77 W., Sec. 23 SWSE
15*	415329	4866660	Great-horned Owl	Inactive 2006 & 2007	T.46N, R.77 W., Sec. 24 SWNE

BLM ID	UTM E	UTM N	Species	Activity	Legals
3608	414386	4864060	Unknown	Inactive 2006 & 2007	T.46N. R.77 W., Sec. 25 SWSW
16*	414520	4864502	Red-tailed Hawk	Active 2006, Inactive 2007	T.46N. R.77 W., Sec. 25 NWSW
17*	415518	4862714	Great-horned Owl	Active 2006, Gone 2007	T.46N. R.77 W., Sec. 36 SESE
18*	417958	4866439	Great-horned Owl	No data 2006, Active 2007	T.46N. R.76 W., Sec. 20 SENW

- d. If an undocumented raptor nest is located during project construction or operation, the Buffalo Field Office (307-684-1100) shall be notified within 24 hours.
 - e. Well metering, maintenance and other site visits within 0.5 miles of raptor nests should be minimized as much as possible during the breeding season (February 1 – July 31), and restricted to between 0900 and 1500 hours.
 - f. Surveys for burrowing owls shall be conducted prior to start of any activities within 0.25 miles of active or inactive prairie dog colonies between February 1 and July 31.
4. No surface disturbing activity shall occur within one mile of bald eagle habitat (Pumpkin Creek) annually from November 1 through April 1, prior to a winter roost survey. Williams RMT will submit a sundry request if blowers are proposed on wells.

Water Management

1. The operator will inform the BLM approximately one week prior to reservoir releases for each reservoir within this POD to allow BLM personnel to observe the effectiveness of “pulsed releases”. Notifications should continue until at least two release events from each reservoir have been observed. Water will be periodically drained or pulse released from reservoirs to somewhat mimic natural storm runoff events to avoid perennialization of the affected stream reaches.
2. Ensure any and all damages to existing stock-related waterlines during POD related operations are both reported to the landowner and repaired immediately.

Cultural

All earth moving activity in the following areas will be monitored by an archeologist who meets or exceeds the qualification standards recommended by the Secretary of the Interior. The Bureau has identified these areas as containing the potential for buried cultural deposits (areas containing alluvial and or aeolian deposits). The Bureau will require the submission of two copies of a monitoring report within 30 days of the completion of all monitoring work.

All earth moving activities associated with construction of electric, gas, and water pipelines in T46N R77W Section 24, SW¼ and T46N R77W Section 25 NE¼ as recommended by ARCADIS. Construction monitoring locations and dates in these sections shall be coordinated with ARCADIS. These segments in Section 24 and Section 25 total approximately 4400’ in length.

All earth moving activities associated with construction of electric, gas, and water pipelines in T46N R76W Section 30, W½ W½ NE¼ as recommended by ARCADIS. Construction

monitoring locations and dates in this section shall be coordinated with ARCADIS. This segment in Section 30 totals approximately 900' in length.

3. DESCRIPTION OF AFFECTED ENVIRONMENT

Applications to drill were received at the NFO on January 9th, 2007. Field inspections of the proposed Kingwood II CBM project were conducted on March 3rd and 8th, and April 13th, 2007 by:

Nate West – BLM	Mark Bollack – BLM
Chris Williams – BLM	James Bashor – BLM
Adam Graves – ARCADIS	Ben Shoup – ARCADIS
David Huber – ARCADIS	Kristin Mackey – Williams RMT Production
Penny Bellah – Williams RMT Production	

This section describes the environment that would be affected by implementation of the Alternatives described in Section 2. Aspects of the affected environment described in this section focus on the relevant major issues. Certain critical environmental components require analysis under BLM policy. These items are presented below in Table 3.1.

Table 3.1 - Critical elements requiring mandatory evaluation are presented below.

Mandatory Item	Potentially Impacted	No Impact	Not Present On Site	BLM Evaluator
Threatened and Endangered Species	X			Nate West
Floodplains		X		Chris Williams
Wilderness Values			X	James Bashor
ACECs			X	James Bashor
Water Resources	X			Chris Williams
Air Quality		X		James Bashor
Cultural or Historical Values		X		Mark Bollack
Prime or Unique Farmlands			X	James Bashor
Wild & Scenic Rivers			X	James Bashor
Wetland/Riparian		X		Chris Williams
Native American Religious Concerns			X	Mark Bollack
Hazardous Wastes or Solids			X	James Bashor
Invasive, Nonnative Species	X			James Bashor
Environmental Justice		X		James Bashor

3.1. Topographic Characteristics of Project Area

The proposed Kingwood II POD is located approximately 30 miles southeast of Buffalo, Wyoming, within Johnson County. Elevations within the project area range from 4,380 to 4,740 feet above sea level. The topography throughout most of the project area consists of ephemeral stream bottomlands rising to sagebrush and grassland habitats with steep sloping ridges and draws. Hood Draw and various unnamed tributaries to Pumpkin Creek drain the project area. The climate in the area is semi-arid, averaging 12-14 inches of precipitation annually, more than 55% of which occurs between May and September. Coal bed natural gas and conventional oil and gas development along with livestock grazing constitute the major land uses within the general area.

3.2. Vegetation & Soils

The project area is dominated by shallow loamy and loamy 10-14" Northern Plains (10-14 NP)

precipitation zone ecological sites. The shallow loamy site occurs on steep slopes and ridge tops, but may occur on all slopes. The soils of this site are shallow (less than 20" to bedrock), well-drained soils formed in alluvium over residuum or residuum. The loamy site occurs on gently undulating rolling land. The soils on this site are deep to moderately deep (more than 20" to bedrock), well drained and moderately permeable. Shallow sandy (10-14 NP) ecological site occurs on nearly level to 50% slopes. The soils of this site are shallow well-drained soils formed in eolian deposits or alluvium over residuum or residuum. Other ecological sites occur within the project area, including sands (10-14 NP), sandy (10-14 NP), clayey (10-14 NP), shallow clayey (10-14 NP), dense clay (10-14 NP) lowland (10-14 NP), and clayey overflow (15-17NP). Off road/trail use may increase the hazard of erosion ranges from slight to moderate within the project area. Reclamation potential varies within the project area.

Vegetation varies among the ecological sites. Commonly occurring species include western wheatgrass, blue grama, prairie junegrass, bluebunch wheatgrass, blue grasses, needle-and-thread, green needlegrass, threadleaf sedge, Wyoming big sagebrush, fringed sagewort, prickly pear, and annual bromes.

3.2.1. Wetlands/Riparian

Wetlands were not observed within the POD area. Enhanced vegetation in riparian areas was not easy to identify at the onsite inspection, probably due to the ephemeral nature of channel flow, the presence of heavy grazing and the early spring season. Mature cottonwood trees were not observed along channels that will be affected by reservoirs or CBNG discharge in the Kingwood II POD area, however they are found further downstream in small groves along Pumpkin Creek.

3.2.2. Invasive Species

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

- **Scotch Thistle**

The CBM Clearinghouse database was created cooperatively by the University of Wyoming, BLM and county Weed and Pest offices. Additionally, the operator or BLM confirmed the following CBM Clearinghouse identified infestations and/or documented additional weed species during subsequent field investigations. The operator conducted a weed and vegetation survey on April 27, 2006 and the following weed species were found:

Scotch Thistle

- Dense isolated infestations were found in section 31 T46N R76W and section 25 T46N R77W.

Downy Brome

- Individual populations were not identified due to the scattered nature of the infestations. For the most part, downy brome infestations were a part of the existing plant community throughout the entire Kingwood II POD.

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

The identified habitats within the proposed Kingwood II project area are of importance to several wildlife species. Prior to project approval several resources were consulted to identify potential species that may occur in the proposed project area. Resources that were consulted include the wildlife database compiled and managed by Buffalo BLM wildlife biologists, the Wyoming Game and Fish Department (WGFD) big game and sage grouse maps, Wyoming Natural Diversity Database (WYNDD), and wildlife reports

submitted by ARCADIS to Williams RMT for the proposed Kingwood II POD. A BLM Newcastle Field Office (NFO) biologist, prior to project approval, conducted a field visit and a Biological Assessment was developed. Species that have been identified in the proposed project area, or that have been noted as being of special importance are described below.

3.3.1. Big Game

The Kingwood II project area is a yearlong use area for mule deer and winter-yearlong use for pronghorn antelope. Yearlong use is defined as when a substantial portion of a population makes general use of the habitat on a year-round basis. Winter-yearlong use is when a substantial portion of a population makes general use of the habitat on a year-round basis; during winter months there is an influx of additional animals into the area from other seasonal ranges. Big game range maps are available in the PRB FEIS and from the WGFD.

3.3.2. Aquatics

The project area does not support any aquatic species habitat.

3.3.3. Migratory Birds

Migratory birds are those that migrate from one locality to another for the purposes of breeding, and or foraging at some point during the calendar year. Please refer to the PRB FEIS for a list of potential migratory bird species that may occur in the project area.

3.3.4. Raptors

Twenty-six raptor nests were identified within one half mile of the Kingwood II project area (ARCADIS 2007); of these, eight were observed to be active in 2006 and seven were active in 2007 (Table 4). Eleven nests have wells proposed within ½ mile of the nest. Several nests were within one quarter mile of well sites and infrastructure, but steps were taken by the BLM biologist to move well locations outside of the ¼ mile buffer or out of the line of sight of the nest. Eleven wells are within ¼ mile of raptor nests of those four wells are within ¼ mile of nests that were active in the last 2 years. Twenty-four wells are within ½ of raptor nests of those thirteen wells are within ½ mile of active nests (Table 3.3.4 Raptor Nest Data). ARCADIS identified a nest in the NWSW section 19, T46N, R76W as an unknown raptor nest (nest 7*). During on-sites it was determined that the nest was not a raptor nest, but that of a magpie or crow.

TABLE 3.3.4 Raptor Nest Data

2006 nest status	I	A	I	I	A	I	I	I	A	A	I	I	I	D	D	A	A	I	I	I	G	I	I	A	A	I
2007 nest status	I	A	I	I	A	I	G	I	A	A	I	I	A	D	D	I	A	I	G	I	G	I	I	I	G	A
BLM Nest # → Well Name↓	1*	2*	3*	4*	5*	6*	7*	8*	9*	10*	11*	12*	13*	3581	3582	3576	3063	3082	3081	3590	14*	15*	3608	16*	17*	18*
41-24-4677 BG/LBG							X															X				
32-24-4677 BG/LBG																						X				
23-19-4677 BG/LBG						X	X																			
43-19-4677 BG/LBG								X		X																X
14-19-4676 BG/LBG						X																				
41-25-4677 BG/LBG						X																				
43-24-4677 BG/LBG						X	X															X				
34-24-4677 BG/LBG							X																			
32-25-4677 BG/LBG																								X		
21-25-4677 BG/LBG																								A		
34-25-4677 BG/LBG																							A			
14-25-4677 BG																							X	X		
23-25-4677 BG/LBG																							X	X		
12-24-4677 BG/LBG																	X									
21-24-4677 BG/LBG																						X				
23-24-4677 BG/LBG																						X				
14-24-4677 BG/LBG																				X						
41-23-4677 BG/LBG																	X									
12-24-4677 BG/LBG																	X									
43-23-4677 BG/LBG																				X						
32-23-4677 BG/LBG																	X									
12-19-4676 BG/LBG						X	X															X				
21-19-4676 BG/LBG								A																		
34-19-4677 BG/LBG						X																				
21-30-4676 BG/LBG						X																				
41-30-4676 BG/LBG																										
43-30-4676 BG/LBG																										
32-30-4676 BG/LBG																										
41-31-4676 BG												X														
34-30-4676 BG/LBG												A														
23-30-4676 BG																										
12-30-4676 BG/LBG																										

TABLE 3.3.4 Raptor Nest Data																										
2006 nest status	I	A	I	I	A	I	I	I	A	A	I	I	I	D	D	A	A	I	I	I	G	I	I	A	A	-
2007 nest status	I	A	I	I	A	I	G	I	A	A	I	I	A	D	D	I	A	I	G	I	G	I	I	I	G	A
BLM Nest # → Well Name↓	1*	2*	3*	4*	5*	6*		8*	9*	10*	11*	12*	13*	3581	3582	3576	3063	3082	3081	3590	14*	15*	3608	16*	17*	18*
43-25-4677 BG/LBG																										
21-31-4676 BG																										
14-30-4676 BG																										
12-31-4676 BG																										X
43-31-4676 BG											X															
Wells within 1/4 mile	0	0	0	0	0	2	2	0	0	0	1	0	0	0	0	0	2	0	0	1	0	2	1	1	0	0

Facilities within 1/4 mile of the nest A= timing for access/utilities	I = inactive, A= active, U = undetermined, — = no data, G= gone, D = Did not locate *= new nest not in BLM database
X = wells within 1/2 mile of a nest	

3.3.5. Threatened and Endangered and Sensitive Species

3.3.5.1. Threatened and Endangered Species

3.3.5.1.1. Black-footed ferret

The Kingwood II project area was surveyed for black-tailed prairie dog colonies by ARCADIS. ARCADIS delineated four active and three inactive prairie dog colonies spanning approximately 338 acres.

3.3.5.1.2. Bald eagle

The Kingwood II POD has few mature trees in the project area. ARCADIS conducted surveys for nesting and winter roosting bald eagles. No nests or roosts were identified as a result of the surveys. Surveys for winter roosting eagles December 1, 2005 through March 1, 2006 did not identify any bald eagle use of the project area. No eagles were observed as a result of winter roost surveys. A historic bald eagle roost was identified using Buffalo Field Office GIS data.

The presence of domestic sheep in the area provides a possible prey base for wintering eagles, however no eagles were observed.

3.3.5.1.3. Ute’s Ladies Tresses Orchid

Produced water will be contained in 10 proposed reservoirs and surface discharged at 12 proposed sites. The reservoirs and outfalls are located within ephemeral drainages. Suitable habitat is not present within the Kingwood II project area.

3.3.5.2. Sensitive Species

3.3.5.2.1. Black-tailed prairie dog

The Kingwood II project area was surveyed for black-tailed prairie dog colonies by ARCADIS. ARCADIS delineated four active and three inactive prairie dog colonies spanning approximately 338 acres.

3.3.5.2.2. Greater sage grouse

One occupied sage-grouse lek is present within two miles of the project area; County Line Lek is located approximately 1.9 miles northeast of the POD. Lek count surveys were conducted by ARCADIS and are detailed in the table 3.3.5.2.2.

Table 3.3.5.2.2			Count Information		
Lek Name	Survey date	Lek status	Males	Females	Unknown
County Line	4/15/2005	Active	28	0	0
	5/2/2005	Active	30	1	0
	4/1/2006	Active	15	1	0
	4/12/2006	Active	5	0	0
	4/21/2006	Inactive	0	0	0
	4/4/2007	Active	16	2	0
	4/14/2007	Active	5	0	0
	4/27/2007	Inactive	0	0	0

Suitable sage grouse nesting and brood rearing habitat is present throughout the POD.

3.3.5.2.3. Mountain plover

Suitable mountain plover habitat is present within the project area but it is limited. Mountain plovers prefer relatively flat terrain, with short vegetation, and high percentages of bare ground. Flat areas with bare ground were observed within the project area and occur on prairie dog colonies. No mountain plovers were observed by ARCADIS during surveys (ARCADIS 2007).

3.4. West Nile Virus

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

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

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

Table 3.4 Historical West Nile Virus Information

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

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

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

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

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

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

3.5. Water Resources

The project area is within the Upper Powder River drainage system. All of the POD area that is affected by water management structures and strategy is within the headwaters of the Hood Draw Watershed. Hood Draw is a larger tributary to Pumpkin Creek, which is a major tributary to the Powder River.

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 Engineers Office Ground Water Rights Database for this area showed six registered stock and domestic water wells within the POD boundary with aquifer depths ranging from 55 feet to 7,200 feet. For additional information on water, please refer to the PRB FEIS FEIS (January 2003), Chapter 3, Affected Environment pages 3-1 through 3-36 (groundwater) and 3-36 through 3-56 (surface water).

3.5.2. Surface Water

All drainages in the within Hood Draw Watershed and the POD area are ephemeral (flow only in response to a precipitation event or snow melt – PRB FEIS Chapter 9 Glossary). All reservoirs proposed for the POD area are in four tributaries to Hood Draw. These tributaries compose the headwaters area of the Hood Draw watershed that drains all but a few small areas of the POD area. Hood Draw is a larger tributary to Pumpkin Creek which is located approximately three miles downstream of the POD boundary. The channels in the area vary from broad, flat-bottomed swales to deeply incised gullies with highly erodible banks.

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 1797 $\mu\text{mhos/cm}$ at Maximum monthly flow to 3400 $\mu\text{mhos/cm}$ 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 on the Powder River at Arvada, Wyoming (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.

No natural springs were identified by the operator within $\frac{1}{2}$ mile of the POD boundary.

3.6. Cultural Resources

Class III cultural resource inventories were conducted for the Kingwood II project prior to on-the-ground project work (BFO project no. 70060282).

ARCADIS conducted a Class III cultural resource inventories following the Archeology and Historic Preservation: Secretary of the Interior's Standards and Guidelines (48FR190) for the proposed project. Mark Bollack, Worland FO archaeologist, reviewed the reports for technical adequacy and compliance with BLM standards, and determined them to be adequate. The following resources are located in or near the APE.

Site No.	Site Type	National Register Eligibility	Anticipated Effects
48JO1445	Prehistoric camp	Not eligible	No effect
48JO1480	Prehistoric camp	Eligible	No effect
48JO1481	Historic	Not eligible	No effect
48JO1516	Homestead site/ lithic scatter	Not eligible	No effect
48JO3571	Historic debris	Not eligible	No effect
48JO3572	Prehistoric lithic scatter	Not eligible	No effect
48JO3573	Prehistoric lithic scatter	Not eligible	No effect
48JO3574	Prehistoric lithic scatter	Not eligible	No effect
48JO3575	Historic debris/ lithic scatter	Not eligible	No effect
48JO3576	Prehistoric lithic scatter	Not eligible	No effect
48JO3577	Prehistoric lithic scatter	Not eligible	No effect
48JO3578	Prehistoric lithic scatter	Not eligible	No effect
48JO3579	Prehistoric lithic scatter	Eligible	No effect
48JO3580	Prehistoric lithic scatter	Not eligible	No effect
48JO3581	Prehistoric lithic scatter	Not eligible	No effect
48JO3582	Prehistoric lithic scatter	Not eligible	No effect
48JO3583	Historic debris/ lithic flake	Not eligible	No effect
48JO3584	Prehistoric lithic scatter	Not eligible	No effect
48JO3585	Prehistoric camp/ Hist. engraving	Eligible	No effect
48JO3586	Historic debris/ lithic scatter	Not eligible	No effect
48JO3587	Prehistoric lithic scatter	Not eligible	No effect
48JO3588	Prehistoric camp	Eligible	No effect
48JO3589	Prehistoric lithic scatter	Not eligible	No effect
48JO3590	Prehistoric lithic scatter	Not eligible	No effect
48JO3591	Prehistoric lithic scatter	Not eligible	No effect
48JO3592	Prehistoric lithic scatter	Not eligible	No effect
48JO3593	Homestead site/ lithic scatter	Not eligible	No effect
48JO3594	Prehistoric lithic scatter	Not eligible	No effect
48JO3595	Prehistoric lithic scatter	Not eligible	No effect
48JO3596	Prehistoric lithic scatter	Not eligible	No effect
48JO3597	Prehistoric lithic scatter	Not eligible	No effect
48JO3598	Prehistoric faunal remains	Not eligible	No effect
48JO3599	Prehistoric flake/ can	Not eligible	No effect
48JO3600	Prehistoric lithic scatter	Not eligible	No effect

Site No.	Site Type	National Register Eligibility	Anticipated Effects
48JO3601	Prehistoric lithic scatter	Not eligible	No effect
48JO3602	Cairn/ Prehistoric lithic scatter	Not eligible	No effect
48JO3603	Prehistoric lithic scatter	Not eligible	No effect
48JO3604	Prehistoric lithic scatter	Not eligible	No effect
48JO3605	Prehistoric lithic scatter	Not eligible	No effect
48JO3606	Historic debris	Not eligible	No effect
48JO3607	Cairn/ Prehistoric lithic scatter	Not eligible	No effect
48JO3608	Historic structure	Not eligible	No effect
48JO3609	Prehistoric lithic scatter	Not eligible	No effect
48JO3610	Prehistoric lithic scatter	Not eligible	No effect
48JO3611	Can scatter	Not eligible	No effect
48JO3612	Prehistoric lithic scatter	Not eligible	No effect
48JO3613	Historic debris	Not eligible	No effect
48JO3614	Historic debris	Not eligible	No effect
48JO3615	Historic debris	Not eligible	No effect
48JO3616	Prehistoric lithic scatter	Not eligible	No effect
48JO3617	Prehistoric camp	Eligible	No effect
48JO3618	Prehistoric lithic scatter	Not eligible	No effect
48JO3619	Prehistoric lithic scatter	Eligible	No effect

3.7. Foot Rot

Foot rot, also called infectious pododermatitis, foul claw, or hoof rot, is an acute or chronic infection of cattle characterized by lameness, swelling, and inflammation of the skin of the coronary band and the skin between the claws. The disease is seen most commonly in feedlot cattle or in the winter and spring months when mud, urine, and manure are the greatest problem. There is no indication that incidence of foot rot has occurred or increased anywhere in the Powder River Basin in association with coal bed methane development. It is extremely unlikely foot rot problems will occur or increase as a result of this project, therefore it will not be discussed further in this analysis.

4. ENVIRONMENTAL CONSEQUENCES

The changes to the proposed action plan of development, which resulted in development of Alternative C as the preferred alternative, have reduced the potential impact to the environment which will result from this action. The environmental consequences of Alternative C are described below.

4.1. Vegetation & Soils Direct and Indirect Effects

Impacts to vegetation and soils from surface disturbance would be reduced by following the operator's plans and BLM applied mitigation. Of the 67 proposed well locations, all 67 can be drilled without a well pad being constructed. Disturbance associated with drilling the wells would involve digging-out of rig wheel wells (for leveling drill rig on minor slopes), reserve pit construction (estimated approximate size of 10 x 30 feet), and compaction (from vehicles driving/parking at the drill site). Estimated disturbance associated with these 67 wells would involve approximately 0.1 acre/well for 6.7 total disturbed acres. This would be a short-term, impact with expedient, successful reclamation and site-stabilization, as committed to by the operator in their POD Surface Use Plan and as required by BLM in Conditions of Approval (COAs).

Approximately 3.42 miles of improved roads would be constructed to provide access to various well locations. Approximately 0.33 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 3.76 miles of water pipeline would be constructed outside of corridors. Expedient reclamation of disturbed land with stockpiled topsoil, proper seedbed preparation techniques, and appropriate seed mixes, along with utilization of erosion control measures (e.g., waterbars, water wings, culverts, rip-rap, gabions etc.) would ensure land productivity/stability is regained and maximized.

Proposed stream crossings, including culverts and fords (low water crossings) are shown on the Master Surface Use Plan and the Water Management Plan 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 only 13 or more cause potentially irreversible changes to soil structure, especially in clayey soil types, that reduce permeability for infiltration of rainfall and surface water flows, restrict root growth, limit permeability of gases and moisture, and make tillage difficult.” (PRB FEIS page 4-144).

Table 4.1 summarizes the proposed surface disturbance.

Table 4.1 - SUMMARY OF DISTURBANCE

Facility	Number or Miles	Factor	Acreage of Disturbance	Duration of Disturbance
Nonconstructed Pad	67	0.1/acre	6.7	Long Term
Gather/Metering Facilities	0.0	Site Specific	0.0	Long Term
Screw Compressors	0.0	Site Specific	0.0	Long Term
Monitor Wells	0.0	0.1/acre	0.0	Long Term
Impoundments	12		37.27	Long Term
On-channel	12	Site Specific	37.03	
Off-channel	0.0	Site Specific	0.0	
Water Discharge Points	12	Site Specific or 0.01 ac/WDP	0.24	
*Wetlands Filled	----	Site Specific	0.0	
Channel Disturbance				
Headcut Mitigation*	0.0	Site Specific	0.0	
Channel Modification		Site Specific	0.0	
Pipeline Crossing*	0.0	Site Spec or 0.01 acres	0.0	
Road Crossing*	0.0	Site Spec or 0.01 acres	0.0	
Improved Roads				Long Term

Facility	Number or Miles	Factor	Acreage of Disturbance	Duration of Disturbance
No Corridor With Corridor	3.42	80' Width	33.16	
2-Track Roads No Corridor With Corridor	0.33 1.3	40' Width	1.59 6.3	Long Term
Pipelines No Corridor With Corridor	1.6	40' Width	7.8	Short Term
Buried Power Cable No Corridor	0.0	12' Width or Site Specific	0.0	Short Term
Overhead Powerlines	1.89	30' Width	6.9	Long Term
Additional Disturbance	0.0	Site Specific	0.0	

*Already included in other categories of disturbance, but separated here for USCOE General Permit 98-08 reporting.

Right of Way grants WYW-169652, and 169653, total 84.25 acres, and are associated with pipelines, roads, reservoirs and staging areas. Anticipated disturbance is reflected in table 4.1.

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

4.1.1. Wetland/Riparian

Existing wetlands will not be impacted by development of this POD. Soil chemistry in riparian areas may be affected by exposure to CBNG discharge which can influence species success. Specifically, salts can become elevated in the riparian soils, thus favoring salt tolerant plant species for growth. The pulsing of discharge from reservoirs is designed to minimize the formation of these soil conditions.

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 following measures in an Integrated Pest Management Plan (IPMP) included in the proposal:

1. Control Methods, including frequency
2. Preventive practices
3. Education

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, Scotch thistle, cheatgrass, 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 relative to this project are anticipated to be minimal 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.

No additional mitigation measures are required.

4.2. Wildlife

4.2.1. Big Game Direct and Indirect Effects

Under the environmentally preferred alternative winter-yearlong and yearlong range 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. No additional mitigation measures are required.

4.2.2. Aquatics Direct and Indirect Effects

The project area does not support any aquatic species habitat.

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

There are no timing restrictions or survey requirements in place specifically to offer protection to nesting migratory passerines. Raptor and sage-grouse timing buffers would likely provide some protection. Migratory birds and their active nests are protected under the Migratory Bird Treaty Act. 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).

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).

Disturbances in sagebrush and grassland habitats (such as mowing) may result in the destruction of individuals and active nests. Prior to any ground disturbing activities during the nesting season searches for active nests should be conducted.

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

Several species of raptors may potentially be found in the habitat types associated with the proposed Kingwood II POD project area. For a list of potential raptor species that may occur in the proposed project area please refer to the PRB FEIS. Twenty-six raptor nest sites were identified by ARCADIS (ARCADIS 2007); of these, 10 nests (2, 5, 9, 10, 13, 3576, 3063, 16, 17, and 18) were active in 2006 or 2007. Species included red-tailed hawk and great-horned owls. Three nests that were active in 2006 were inactive in 2007; one nest that was inactive in 2006 was active in 2007.

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. 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).

To reduce the risk of decreased productivity or nest failure, the BLM BFO commonly 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 level of activity in the area may influence the quality of habitat for nesting raptors and result in decreased habitat effectiveness. Following BLM guidelines may not ensure that impacts from development are fully mitigated. For example four nests within in the POD are within ½ mile of 3 or more wells and all are within ¼ mile of a proposed well (out of line of sight). The impact of the level of development within ½ mile of nesting raptors has not been adequately documented. Impacts of development vary by species and by individual raptors. Development in the project area may result in some areas that were previously used for nesting becoming undesirable. The project area may also experience a shift in species diversity with species more tolerant to disturbance inhabiting nest sites previously used by species more sensitive to disturbance.

A shift in spacing will could lead to a decrease in disturbance to raptors in the project area. For example, with 160 acre well spacing 16 wells would be within ½ mile of a raptor nest, of the sixteen wells six would be within ¼ mile of a nest. Under Alternative C, 80 acre well spacing, twenty-four wells are within ½ mile of a raptor nest and of those wells eleven are within ¼ mile of a 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. No additional mitigation measures are required.

4.2.5. Threatened and Endangered and Sensitive Species

4.2.5.1. Threatened and Endangered Species Direct and Indirect Effects

Table 4.2 (T&E table)

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Endangered Black-footed ferret (<i>Mustela nigripes</i>)	Black-tailed prairie dog colonies or complexes > 80 acres.	NP	NE	Prairie dog colonies insufficient in size.
Threatened Bald eagle (<i>Haliaeetus leucocephalus</i>)	Mature forest cover often within one mile of large water body.	S	LAA	Overhead electrical lines occur in the area.
Ute ladies'-tresses orchid (<i>Spiranthes diluvialis</i>)	Riparian areas with permanent water	NP	NE	No habitat existing in project area.

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

Implementation of the proposed development should have “*no effect*” on the black-footed ferret given that is unlikely that ferrets occur in the area since there is not sufficient habitat to support ferrets and there are no re-introduction sites in the project’s proximity.

4.2.5.1.2. Bald eagle

Winter roosting habitat is available in the project area. Surveys for winter roosting eagles did not identify any winter roosts, however. One historic bald eagle winter roost is in the project area, however it was most likely associated with larger sheep operations that are no longer present.

Williams is proposing to develop overhead power throughout the project area. There are currently 1.89 miles proposed overhead electrical lines within the project area. It is likely that lines will be constructed in compliance with the Avian Power Line Interaction Committee’s (most recent version) suggested practices and with the Service’s standards (USFWS 2002).

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. Twenty-two raptors including 16 golden eagles were electrocuted within Wyoming’s Powder River Basin in 2003; 12 electrocutions were on recently constructed lines which did not fully meet APLIC standards (Rogers pers. Comm.). 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.

Williams is proposing 10 new reservoirs associated with this project. The effect of the reservoir 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.

The proposed project may affect, and is “*likely to adversely effect*” bald eagles. The presence of existing overhead electric lines being utilized for the project may present an electrocution risk. All lines shall be constructed to APLIC Guidelines (2006) to minimize the risk of electrocution.

4.2.5.1.3. Ute’s Ladies Tresses Orchid

Produced water will be contained in 10 proposed reservoirs and surface discharged at 12 proposed sites. The reservoirs and outfalls are located within ephemeral drainages. Suitable habitat is not present within the Kingwood II project area. Reservoir seepage may create suitable habitat if historically ephemeral drainages become perennial.

Implementation of the proposed coal bed natural gas project should have “*no effect*” on the Ute ladies’-tresses orchid. Most activities are proposed to occur in upland sites away from any potential habitat. Areas in the project area that have been surveyed were determined not to be able to support Ute Ladies’-tresses.

4.2.5.2. Sensitive Species Direct and Indirect Effects

Table 4.3 (Sensitive Species table)

Table 4.3 (Sensitive Species table)

Common Name (scientific name)	Habitat	Presence	Project Effects	Rationale
Amphibians				
Northern leopard frog (<i>Rana pipiens</i>)	Beaver ponds, permanent water in plains and foothills	S	MIIH	Additional water will affect existing waterways.
Spotted frog (<i>Ranus pretiosa</i>)	Ponds, sloughs, small streams	NP	NI	Prairie not mountain habitat.
Birds				
Baird's sparrow (<i>Ammodramus bairdii</i>)	Grasslands, weedy fields	S	MIIH	Grassland habitats will be impacted.
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 and shrubland habitats 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	NS	MIIH	Grasslands will be affected.
Mountain plover (<i>Charadrius montanus</i>)	Short-grass prairie with slopes < 5%	NS	MIIH	Suitable habitat available.
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	MIIH	Sagebrush cover will be affected.
Sage thrasher (<i>Oreoscoptes montanus</i>)	Basin-prairie shrub, mountain-foothill shrub	S	MIIH	Sagebrush cover will be affected.
Trumpeter swan (<i>Cygnus buccinator</i>)	Lakes, ponds, rivers	NS	MIIH	Reservoirs will be created.
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				
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, basin-prairie shrub	NP	NI	Cliffs & perennial water not present.
Swift fox (<i>Vulpes velox</i>)	Grasslands	S	MIIH	Grassland habitats will be affected.
Townsend's big-eared bat (<i>Corynorhinus townsendii</i>)	Forests, basin-prairie shrub, 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 ridge tops 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.

Effect Determinations

MIH May Impact Individuals and Habitat

NI No Impact.

WIPV Will Impact Population Viability.

The Wyoming USDI Bureau of Land Management has prepared a list of sensitive species to focus species management efforts toward 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.

4.2.5.2.1. Black-tailed prairie dog

Proposed overhead power avoids prairie dog colonies to the extent that is possible. Wells were placed on the edge of prairie dog colonies to minimize disturbance to prairie dog. One overhead power line is within ¼ mile of a prairie dog colony and may result in increased predation of prairie dog.

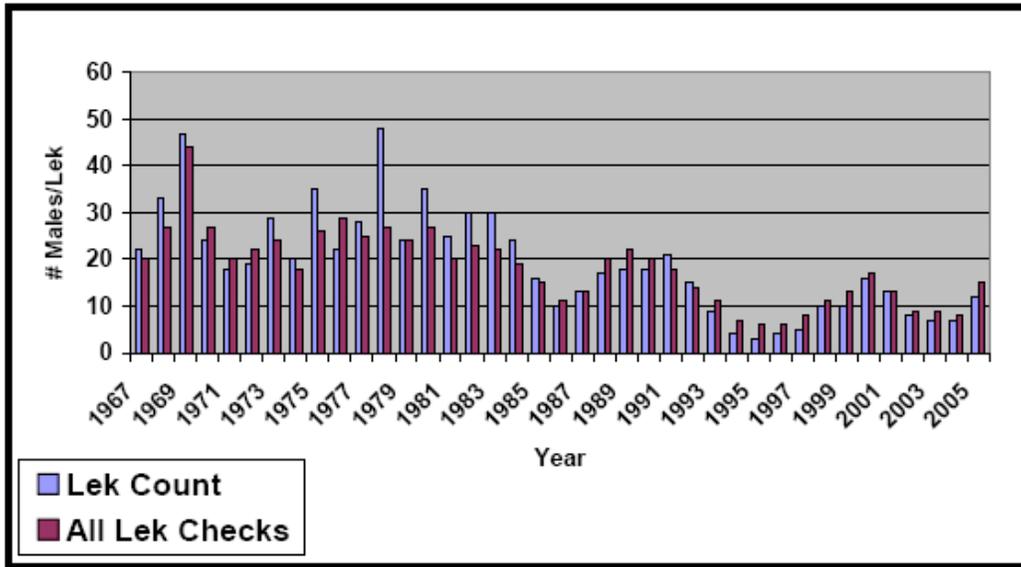
4.2.5.2.2. Greater sage grouse

Suitable sage grouse habitat is present throughout the POD and a grouse feather was observed at a well location by the BLM biologist. The County Line lek is located approximately 1.9 miles northeast of the Kingwood II POD. The County Line lek has experienced a decline in male sage-grouse attendance in the last 3 years. Male attendance peaked at 30 individuals in 2005. In 2006 peak male attendance was 15 and peak male attendance was 16 individuals in 2007. Male sage-grouse attendance appears to be declining in the area independent of the Kingwood II project. Cause of the decline in male attendance is not known, however cumulative impacts from drought, grazing, and adjacent oil and gas activity cannot be ruled out.

Wells and other infrastructure located within sagebrush communities will result in direct habitat loss. Sage-grouse avoidance of these facilities produces even greater indirect habitat loss. The WGFD feels a well density of eight wells per section creates a high level of impact for sage-grouse and that avoidance zones around mineral facilities overlap creating contiguous avoidance areas (WGFD 2004). Well houses and power poles may provide habitats for mammal and avian predators increasing sage grouse predation. Overhead power lines may also present a collision risk for sage-grouse. Sage-grouse may avoid suitable habitat containing overhead power lines to reduce their exposure to predation.

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 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.

During the nesting and brood rearing seasons females and broods feed on sagebrush, forbs and insects. Data suggest that diet of pre-laying hens may influence reproductive success (Connelly 2004). Competition between livestock and sage-grouse has not been adequately researched. Impacts of livestock grazing on vegetative communities have been documented and inferences to impacts on sage-grouse have been drawn. “If the livestock reduce and degrade the under story significantly, hiding cover is reduced, potentially increasing predation on grouse.” (Gunnison 2005) One study of sage grouse in Wyoming identified that hens were leaving a heavily grazed ranch to nest elsewhere but returning to that ranch to rear broods (Gunnison 2005). Grazing during the nesting season has the potential to directly impact nesting sage-grouse through the trampling of nests and nest abandonment. Indirect impacts that may result are competition for forbs, decreased residual cover, increased predation and avoidance of areas. Overgrazing may increase the spread of cheatgrass and negatively impact sage-grouse by decreasing habitat quality.

On-sites in the project area revealed that little or no ground cover was present in the project area. It should be noted that on-sites were conducted in early March 2007 and vegetative conditions in the area may change with spring rains. Grazing in the project area appears to have a substantial impact on residual cover. This may be further compounded by the implementation of coal bed natural gas projects. The proposed project will bring water throughout the project area, enabling broader distribution of livestock in the project area.

4.2.5.2.3. Mountain plover

Mountain plover habitat is available in the project area on prairie dog colonies and conventional oil and gas well pads. The overall topography of the project area is rolling hills and sage brush. Mountain plovers are not expected to occur in the project area due to topography where vegetation is low enough to attract plovers and due to the majority of the area is sagebrush. ARCADIS conducted surveys for mountain plover and no plovers were found in the project area.

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).

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. No additional mitigation measures are required.

4.3. West Nile Virus

The PRB FEIS and ROD included a programmatic mitigation measure that states, “The BLM will consult with appropriate state agencies regarding WNV. If determined to be necessary, a condition of approval will be applied at the time of APD approval to treat mosquitoes for any CBM discharge waters that become stagnant.” 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. Based on current information, we determined that no significant impacts in the spread of WNV would occur from the implementation of this project.

4.4. Water Resources

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

the water management plan. Adherence with the plan, in addition to BLM applied mitigation (in the form of COAs), should minimize project area and downstream potential 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 14.5 gpm per well or 595.0 gpm (1.39 cfs or 959.6 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 22,351 acre-feet in 2006 (estimated maximum year). As such, the volume of water resulting from the production of these wells is 4% of the total volume projected for 2006. This volume of produced water is also within the predicted parameters of the PRB FEIS.

4.4.1. Groundwater

The PRB FEIS predicts an infiltration rate of 40% to groundwater aquifers and coal zones in the Upper Powder River drainage area (PRB FEIS pg 4-5). For this action, it may be assumed that a maximum of 238 gpm will infiltrate at or near the discharge points and impoundments (383.8 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 six permitted water wells produce from depths which range from 55 to 7,200 feet compared to a range of depths of 1390 to 1790 feet for the Big George and Lower Big George coal production zones. 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” which should be approved by June, 2006. 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. Drilling at selected existing impoundments should begin in the spring of 2006. For WYPDES permits received by DEQ after the August 1st 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 Formation, Tongue River Member sands and coals (nearly 750 million acre-feet, from Table 3-5). All of the groundwater projected to be removed during reasonably foreseeable CBNG development and coal mining would represent less than 0.3 percent of the total recoverable groundwater in the Wasatch and Fort Union Formations within the PRB (nearly 1.4 billion acre-feet, from Table 3-5).” (PRB FEIS page 4-65). No additional mitigation is necessary.

4.4.2. Surface Water

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

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

Predicted Values	TDS, mg/l	SAR	EC, µmhos/cm
Most Restrictive Proposed Limit –		2.0	1,000

Predicted Values	TDS, mg/l	SAR	EC, μ mhos/cm
Least Restrictive Proposed Limit		10.0	3,200
Upper Powder River Watershed at Arvada, WY USGS #06317000 Gauging Station			
Historic Data Average at Maximum Flow		4.76	1,797
Historic Data Average at Minimum Flow		7.83	3,400
WDEQ Quality Standards for Wyoming Groundwater (Chapter 8)			
Drinking Water (Class I)	500		
Agricultural Use (Class II)	2,000	8	
Livestock Use (Class III)	5,000		
WDEQ Water Quality Requirements for WYPDES Willow Creek General Watershed Permit			
At discharge point	5,000	na	7,500
At Irrigation Compliance point	na	na	na
Predicted Produced Water Quality			
Big George Coal Zone	3,690	21.8	2,410
Lower Big George Coal Zone	4,030	31.1	2,630

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 2410.0 mg/l TDS which is/is not within the WDEQ criteria for agricultural use (2000 mg/l TDS).

The quality for the water produced from the Big George and Lower 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 volume of 14.5 gallons per minute (gpm) is projected is to be produced from these 37 wells, for a total of 595.0 gpm for the POD. See Table 4.5.

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

There are 12 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, 10 new impoundments (171 acre-feet) would potentially be constructed within the project area, along with 2 existing impoundments that will be upgraded. These impoundments will disturb approximately 37.08 acres including the dam structures. All 12 these water impoundments, will be on-channel reservoirs. Existing impoundments will be upgraded and proposed impoundments will be constructed to meet the requirements of the WSEO, WDEQ and the needs of the operator and the landowner. All water management facilities were evaluated for compliance with best management practices during the onsite.

The PRB FEIS assumes that 15% of the impounded water will re-surface as channel flow (PRB FEIS pg 4-74). Consequently, the volume of water produced from these wells may result in the addition of at least 0.21 cfs below the lowest reservoir (after infiltration and evapotranspiration losses). The operator has committed to monitor the condition of channels and address any problems resulting from discharge. Discharge from the impoundments will potentially allow for streambed enhancement through wetland-riparian species establishment. 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 37 wells is anticipated to be a total of 595.0 gpm or 1.39 cfs to impoundments. Using an assumed conveyance loss of 20% (PRB FEIS pg 4-74), the produced water re-surfacing in Hood Draw from this action (0.21 cfs) may add a maximum 0.17 cfs to the Upper Powder River flows, or 0.02% of the predicted total CBNG produced water contribution. For more information regarding the maximum predicted water impacts to the Powder River resulting from the discharge of produced water, see Table 4-6 (PRB-FEIS pg 4-85).

In the WMP portion of the POD, the operator provided an analysis of the potential development in the watershed above the project area (WMP page 4). Based on the area of the Hood Draw watershed above the POD (5.38 sq mi) and an assumed density of one wells per location every 80 acres, the potential exists for the development of 43 wells which could produce a maximum flow rate of 595 gpm (1.42 cfs) of water. The BLM agrees with the operator that this is not expected to occur because:

1. New wells will be phased in over several years, and
2. A decline in well discharge generally occurs after several months of operation.

The potential maximum flow rate of produced water within the watershed upstream of the northern POD boundary area, 1.42 cfs, is much less than the peak flow rate of runoff estimated from the 2-year storm event for the Hood Draw of the drainage which equals 73 cfs.

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

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

Typical permit effluent limits for this area that are set by the WYPDES permit (not yet approved) are as follows:

Total Petroleum Hydrocarbons	10 mg/l max
pH	6.5 to 8.5
TDS	5000 mg/l max
Specific Conductance	7500 mg/l max
Sulfates	3000 mg/l max
Radium 226	1 pCi/l max
Dissolved iron	1000 µg/l max
Dissolved manganese	630 µg/l max
Total Barium	1800 µg/l max
Total Arsenic	7 µg/l max
Chlorides	46 mg/l

The WYPDES permit also addresses existing downstream concerns, such as irrigation use, in the COA for the permit. The designated point of compliance that will be identified for this permit will be end of

pipe.

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

As stated previously, the operator has committed to offer water well agreements to properly permit domestic and stock water wells within the circle of influence of the proposed CBNG wells.

In-channel downstream impacts are addressed in the Water Management Plan for the Kingwood II POD prepared by Western Land Services for Williams Production RMT Company.

4.4.2.1. Surface Water Cumulative Effects

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

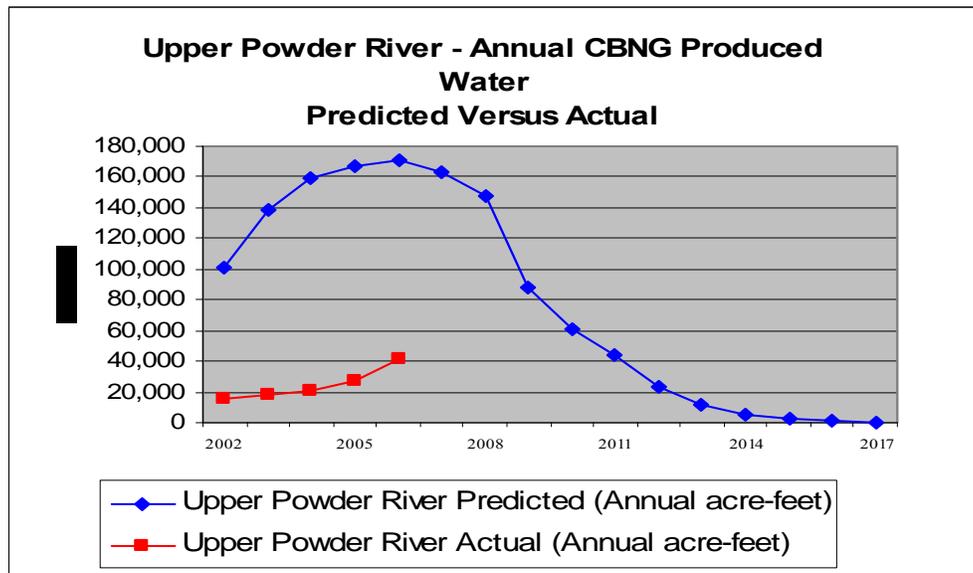
As of December 2006, all producing CBNG wells in the Upper Powder River watershed have discharged a cumulative volume of 123,984 acre-ft of water compared to the predicted 736,519 acre-ft disclosed in the PRB FEIS (Table 2-8 page 2-26). These figures are presented graphically in Table 4.6 and Figure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

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

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

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
2015	2,242	1,283,835				
2016	1,032	1,284,867				
2017	366	1,285,233				
Total	1,285,233		123,984			

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



The PRB FEIS identified downstream irrigation water quality as the primary issue for CBNG produced water. Conductivity (EC) and Sodium Adsorption Ratio (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 BLM requires each POD approved under the PRB FEIS to have a designated reference well to be sampled within 60 days of initial production. There is also a series of monitoring wells that are providing additional data. This new data will be evaluated periodically to assess effects.

The PRB FEIS states, “Cumulative effects to the suitability for irrigation of the Powder River would be minimized through the interim Memorandum of Cooperation (MOC) that the Montana and Wyoming DEQ’s (Departments of Environmental Quality) have signed. This MOC was developed to ensure that designated uses downstream in Montana would be protected while CBM development in both states continued. As the two states develop a better understanding of the effects of CBM discharges through the enhanced monitoring required by the MOC, they can adjust the permitting approaches to allow more or less discharges to the Powder River drainage. Thus, through the implementation of in-stream monitoring and adaptive management, water quality standards and interstate agreements can be met.” (PRB FEIS

page 4-117)

As referenced above, the PRB FEIS did disclose that cumulative impacts may occur to soils and vegetation as a result of discharged produced CBNG water. The cumulative effects relative to this project are anticipated to be minimal 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

No historic properties will be impacted by proposed project activities, nor will any documented cultural resource sites. A monitoring COA has been placed on this project as activities are proposed in areas with potential for buried cultural sites.

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

Contact	Title	Organization	Present at Onsite?
Mary Hopkins	Acting Manager	SHPO	No
Mark Deibert	Hydrologist	Western Land Services	Yes
Ben Shoup	Office Manager	ARCADIS	Yes
David Huber	Biologist	ARCADIS	Yes
Adam Graves	Archaeologist	ARCADIS	Yes
Brad Rogers	Wildlife Biologist	US F & WL Service	Yes

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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